DRAFT

Environmental Assessment

Specification of Annual Bigeye Tuna Catch Limits for the U.S. Pacific Island Territories

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Draft Environmental Assessment

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Abstract

The Western and Central Pacific Fisheries Commission (WCPFC), of which the United States is a member, develops and agrees on management measures for highly migratory species caught by WCPFC members and Participating Territories in the Western and Central Pacific Ocean. The U.S. Participating Territories include American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. The WCPFC may agree on conservation and management measures, such as catch and effort limits, that are applicable to U.S. pelagic fisheries operating in the western and central Pacific Ocean. In 2014, Amendment 7 to the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagics FEP) was approved and implemented. Specifically, Amendment 7 established:

1) A management framework to establish catch or effort limits applicable to the U.S. Participating Territories that includes the authorization for the U.S. Participating Territories to use, assign, allocate, and manage the pelagic management species catch and effort limits agreed to by the WCPFC through Specified Fishing Arrangements with U.S. vessels permitted under the Pelagics FEP for the purposes of responsible fisheries development. The Western Pacific Fishery Management Council (Council) could also recommend and the National Marine Fisheries Service (NMFS) could specify catch or effort limits in the absence of such limits or additional or more restrictive limits than the WCPFC for conservation and management purposes. The framework would also provide for consistency review of Territory arrangements with the Pelagics FEP and other applicable laws by the Council and NMFS, as well as annual review and specification recommendations by the Council.

Also in 2014, NMFS approved the Council's recommended specification of annual bigeye tuna longline limits of 2,000 metric tons (mt) per year for each of the U.S. Participating Territories, of which 1,000 mt may be transferred annually under agreements consistent with the Pelagics FEP and other applicable laws to eligible U.S. vessels permitted under the Pelagics FEP.

This draft environmental assessment (EA) considers 2015 and 2016 longline bigeye catch limit specifications for the US Territories, including limits on the amount of catch that could be transferred under Specified Fishing Arrangements.

List of Acronyms/Abbreviations

ASG	American Samoa Government
BiOp	Biological Opinion
CCM	Cooperating members, non-members, and participating territories of the WCPFC
CFCAA	Consolidated and Further Continuing Appropriation Act
CMM	Conservation and management measure
CPUE	Catch per unit of effort
Convention	Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean
Council	Western Pacific Regional Fishery Management Council
DPS	Distinct Population Segment
EA	Environmental assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPO	Eastern Pacific Ocean
ESA	Endangered Species Act
FAD	Fish aggregation device
FEP	Fishery ecosystem plan
FMP	Fishery management plan
FR	Federal Register
HAPC	Habitat Areas of Particular Concern
HLA	Hawaii Longline Association
HMS	Highly migratory species
ITS	Incidental Take Statement
IATTC	Inter-American Tropical Tuna Commission
lb	Pound(s)
MBTA	Migratory Bird Treat Act
MCP	Marine Conservation Plan
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	Maximum sustainable yield
mt	Metric ton(s)
MUS	Management unit species
nm	Nautical mile(s)
NMFS	National Marine Fisheries Service
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
Pelagics FEP	Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
PMUS	Pelagic management unit species
PRIA	Pacific Remote Island Areas
PT	Participating Territory
RFMO	Regional fisheries management organization
Section 113	Section 113 of the Consolidated and Further Continuing Appropriation Act of 2012
SIDS	Small Island Developing States

SPC-OFP	Secretariat of the Pacific Community – Oceanic Fisheries Program
UNCLOS	United Nations Law of the Sea Convention, 1982
USFWS	U.S. Fish and Wildlife Service
VMS	Vessel monitoring system
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean
WPRFMC	Western Pacific Regional Fishery Management Council

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Summary

The United States is a signatory to the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Convention). The United States and 42 other members, cooperating non-members, and participating territories comprise the Western and Central Pacific Fisheries Commission (WCPFC), which governs international management of highly migratory fish stocks (e.g., tuna, marlin) in the western and central Pacific Ocean (WCPO) based on the provisions of the Convention. Conservation and management measures (CMMs) are developed by the WCPFC and, when applicable, implemented for fisheries of the U.S. and its Participating Territories by NMFS under the Western and Central Pacific Fisheries Convention Implementation Act (16 U.S.C. § 6901, *et seq*.)("WCPFCIA") and under procedures established under the Magnuson-Stevens Act (16 U.S.C. § 1801 *et seq.*). The U.S. Participating Territories to the WCPFC are American Samoa, Guam, and CNMI. The US Participating Territories receive separate catch or effort limits than the United States within the WCPFC.

In March 2014, NMFS approved Amendment 7 to the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagics FEP). In October 2014, NMFS issued the final rule implementing Amendment 7. Specifically, Amendment 7 established:

1) A management framework to establish catch or effort limits applicable to the U.S. Participating Territories that includes the authorization for the U.S. Participating Territories to use, assign, allocate, and manage the pelagic management species catch and effort limits agreed to by the WCPFC through arrangements with U.S. vessels permitted under the Pelagics FEP for the purposes of responsible fisheries development. The Western Pacific Fishery Management Council (Council) could also recommend and the National Marine Fisheries Service (NMFS) could specify catch or effort limits in the absence of such limits or additional or more restrictive limits than the WCPFC for conservation and management purposes. The framework would also provide for consistency review of Territory arrangements with the Pelagics FEP and other applicable laws by the Council and NMFS, as well as annual review and specification recommendations by the Council.

The management framework established in Amendment 7 was replicated from legislation established by Congress in 2011 (Pub. Law 112-55, 125 Stat. 552 *et seq,* hereafter Section 113*).* Specifically, Congress authorized that WCPFC catch limits provided to the U.S Participating Territories should be made available for transfer to qualifying U.S. longline vessels, such that it provides a mechanism to support the development of fishery infrastructure in the Territories. Congress directed the Council to recommend an amendment to the Pelagics FEP and associated regulations to implement Section 113 (i.e., to authorize the use, assignment, allocation, and management of catch limits of the pelagic species, or fishing effort limits, agreed to by the WCPFC and applicable to the Territories).

In 2014, NMFS approved the Council's recommended specification of annual bigeye tuna longline limits of 2,000 metric tons (mt) per year for each of the U.S. Participating Territories, of

which 1,000 mt may be transferred annually under agreements consistent with the Pelagics FEP and other applicable laws to eligible U.S. vessels permitted under the Pelagics FEP.

In 2014, the government of the Commonwealth of Northern Mariana Islands had a Specified Fishing Agreement with nearly all active Hawaii longline vessels. All of the potential 1,000 mt of bigeye was transferred to Hawaii longline vessels that operated under the agreement. Prior to 2014, and under the authority provided in Section 113, the CNMI government and Hawaii longline vessels had catch transfer agreement which resulted in approximately 500 mt transferred in 2013. American Samoa government and Hawaii longline vessels had a catch transfer agreement in 2011 and 2012, with 628 mt of bigeye tuna and 771 mt of bigeye tuna attributed by NMFS to American Samoa. The US WCPO longline bigeye catch, which is caught in its entirety by longline vessels operating out of Hawaii, was reduced to 3,763 mt since 2009. For 2015 and 2016, the US WCPO longline limit will be 3,554 mt, and further reduced to 3,345 mt in 2017. reduced from its 2009 limit of 4,164 mt.

Bigeye tuna is considered a Pacific-wide stock that is managed and assessed separately by the WCPFC and Inter-American Tropical Tuna Commission (IATTC). In the western and central Pacific Ocean (WCPO; generally west of 150° W), bigeye tuna is subject to overfishing, but in the eastern Pacific Ocean (EPO; generally east of 150° W), bigeye tuna is not in an overfishing condition. Bigeye tuna in both the WCPO and EPO is not overfished according to the status determination reference points of the Pelagics FEP. However, bigeye is considered overfished when using the non-MSY associated WCPFC limit reference point of $SB/SB_{F=0.}$ In the WCPO, bigeye tuna is harvested using a range of fishing gears, with primary impacts from longline and purse seine fisheries. Bigeye tuna has been experiencing overfishing since the 1990s in the WCPO. The United States cannot end overfishing on bigeye tuna through unilateral actions. International cooperation within the WCPFC is required to end and prevent overfishing on bigeye tuna

This draft Environmental Assessment (EA) analyzes alternatives for the 2015 and 2016 specification of Territory bigeye longline limits, including limits on the amount that may be transferred to US longline vessels permitted under the Pelagics FEP.

This document describes and assesses the potential environmental, social, and economic impacts of three Alternatives:

1) Alternative 1: No-action - no 2015 Territory specifications;
2) Alternative 2: Specify 2,000-mt total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory for 2015 and 2016; and
3) Alternative 3: Specify 2,000-mt total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory for 2015 and 2016.

The potential impacts of the Alternatives to the affected human environment are summarized in Table 1.

Table 1: Summary of impacts from the Alternatives considered in detail.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	**Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory**	**Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory**
Summary of Potential Fishery Outcomes		
U.S. Territories could not make fishing arrangements with U.S. vessels permitted under the Pelagics FEP starting in 2014. U.S. and Territory fisheries are expected to continue to be sustainable whether or not international limits apply. No U.S. or Territory fishery is expected to expand substantially in the near future. No funds would be deposited into the WP SFF from arrangements; so there could be less financial support for projects NMFS approves in Territory MCPs. Fisheries would remain sustainably managed, but Territory fisheries may continue to be underdeveloped. U.S. longline fisheries managed under the Pelagics FEP would continue to fish sustainably for all HMS; but once limits are reached, could face restrictions. For bigeye tuna, once the U.S. longline limit for bigeye tuna in the western and central Pacific Ocean (WCPO) is reached, Hawaii longline	U.S. Territories could make fishing arrangements with U.S. vessels permitted under the Pelagics FEP for 2015 and 2016. Arrangements would be subject to review by the Council and NMFS. Arrangements require funds to be deposited into the WP SFF or that vessels under an arrangement make landings into the applicable Territory. U.S. and Territory fisheries are expected to continue to be sustainable whether or not international limits apply. No U.S. or Territory fishery is expected to expand substantially in the near future. Over time, it is expected that MCP projects funded from arrangements would enhance Territory fisheries, but fisheries would remain sustainably managed. Fishing arrangements are expected to allow the FEP-permitted longline fishery to fish throughout the fishing year, while allowing bigeye catch to be attributed to Territories under approved	Fishery outcomes mostly same as Alternative 2. US permitted vessels operating out of Hawaii may need to enter in two sequential Specified Fishing Agreements in one calendar year.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	**Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory**	**Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory**
fishermen would have to stop fishing in the WCPO or fish in the eastern Pacific Ocean (EPO), which is managed by the Inter-American Tropical Tuna Commission (IATTC) under different fishery management conditions. **Impacts to Target and Non-target Stocks.** With regard to bigeye tuna, this would reduce U.S. WCPO longline catches by approximately 1000 mt, because the prohibition on the harvest and landing of bigeye tuna in the WCPO by the U.S. longline fishery would occur at 3,554 mt in 2015. The difference between 1000 mt of bigeye tuna caught or not caught by U.S. longline vessels in the WCPO is negligible (less than 1 percent) to stock status of bigeye tuna. Similar to the impacts to bigeye tuna described above, catches of non-target stocks by FEP-permitted longline vessels fishing in the WCPO would be reduced by a couple hundred mt to tens of mt per year. When the U.S. longline WCPO bigeye tuna catch limit is reached, Hawaii	arrangements for purposes of responsible fisheries development and conservation and management of HMS stocks. **Impacts to Target and Non-target Stocks** Expected level of total US longline catches (combined with Territory catches) will have less than 1 percent impact on the F/FMSY and B/BMSY ratios. Anticipated catches by Hawaii and Territory longline fisheries (including amounts transferred under Specified Fishing Agreements), when combined with U.S. longline limit for WCPO bigeye tuna (3,554 mt) would have negligible impacts on bigeye tuna stocks in terms of overfishing and overfished reference points, and thus not expected to impede the effectiveness of international measures to eliminate WCPO bigeye overfishing. Since 2011, approximately 80 percent of fishing by Hawaii longline vessels in October through December (when fishing under Territory agreements)	**Impacts to Target and Non-target Stocks** Same as alternative 2.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory	Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory
longline fishing effort would likely move to the EPO, where a similar amount of fish that could have been caught under a Territory arrangement would likely be caught in the EPO, albeit under more variable conditions. IATTC manages many of these HMS stocks, including bigeye tuna, separately in the EPO. **Impacts to Protected Species** All Pelagics FEP managed fisheries would continue to operate within existing ESA and MMPA authorizations. Fisheries development opportunities curtailed, resulting in Guam and CNMI longline fisheries unlikely to develop and American Samoa longline fishery with reduced potential to diversify. Impacts to protected species from Pelagics FEP managed fisheries expected to be unchanged from baseline levels. Since Hawaii is a significant seafood market, potential indirect impacts to protected species may occur if foreign	occurs above 20 degrees N, which is Region 2 of the WCPO bigeye assessment, and an area with little impact on bigeye from fishing. Catches of non-target species would be expected to be tens of metric tons to a couple hundred metric tons greater per year than compared to Alternative 1. **Impacts to Protected Species** All Pelagics FEP managed fisheries would continue to operate within existing ESA and MMPA authorizations. Fisheries development in Territories will continue. In American Samoa, for example, development may lead to diversification of longline fishery, but fishing operations (required deep-set) and protected species mitigation requirements would be maintained under existing regulations. Protected species mitigation measures for Hawaii longline fishery unchanged, and baseline levels of protected species interactions maintained.	**Impacts to Protected Species** All Pelagics FEP managed fisheries would continue to operate within existing ESA and MMPA authorizations.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	**Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory**	**Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory**
fisheries with higher protected species interaction levels or that lack similar protected species mitigation measures fill market gaps left by a constrained Hawaii longline fishery.		
Impacts to Essential Fish Habitats or Habitat Areas of Particular Concern		
Longline fishing does not materially affect benthic marine habitat under typical operations. Derelict longline gear may impact marine benthic habitats, especially substrate such as corals if carried by currents to shallow depths. Loss of longline gear during normal fishing operations is not believed to be at levels that result in significant or adverse impacts to EFH, HAPC, or the marine habitat. Adverse impacts from other FEP-permitted fisheries are not expected.	Same as Alternative 1.	Same as Alternative 1.
Impacts to Fishing Communities and Fishery Participants		
No 2015 Territory bigeye specifications would result in no potential Territory arrangements in 2015. This would mean the loss of a mechanism for Territories to obtain additional fisheries development funding.	Specifying 2015 and 2016 Territory bigeye specifications would allow for Territory arrangements that could provide funding for MCP projects, including fisheries development opportunities like infrastructure development, vessel capacity	Outcomes anticipated to be same as Alternative 2.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory	Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory
Hawaii deep-set longline fishery would likely be subject to restrictions for WCPO bigeye tuna during the year. This could result in potential negative impacts to fishery participants (longer trips to EPO) and Hawaii seafood community (poorer quality fish during winter holiday season), and potential safety at sea considerations when available fishing grounds in EPO are greater distances and during winter months when weather in North Pacific Ocean is frequently poor. FEP-permitted fisheries would likely operate similar to 2009 and 2010.	improvements, and fisheries training. Territory arrangements could help build catch history for the U.S. Participating Territories in the WCPFC, supporting future recognition of the Territories in potential allocation decisions. Hawaii longline fishery participants expected to benefit from entering into Territory arrangements, allowing them greater flexibility in fishing operations and locations, versus a closed fishery once the U.S. WCPO bigeye tuna longline limit is reached or fishing farther from the homeport in the EPO.	
Impacts to Administration and Enforcement		
Administrative costs would be reduced if Territory arrangements were not authorized.	Specifying 2015 and 2016 Territory bigeye specifications involves administrative costs associated with review of arrangements, in-season monitoring and attribution of the U.S. WCPO longline catch limit for bigeye tuna by NMFS, and potential costs associated with notifying when the WCPO bigeye tuna limit is reached. Enforcement of any catch prohibition or	Same as Alternative 2, with added administrative costs associated with potentially reviewing and approving two Specified Fishing Agreements in one calendar year.

Alternative 1. No Action- No 2015 Territory Bigeye Specifications	**Alternative 2: Specify 2,000-mt Total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory**	**Alternative 3. Alternative 3: Specify 2,000-mt Total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory**
	Territory arrangement has not typically been substantial and changes to monitoring or increased costs is not expected.	

Chapter 1: Introduction

1.1 Responsible Council and Agency

The Western Pacific Fishery Management Council (Council) was established by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act or MSA). Among its other fishery management responsibilities, the Council is to develop fishery management plans (FMPs)[1] for U.S. fisheries operating in offshore waters in the Exclusive Economic Zones (EEZs) of American Samoa, Guam, Hawaii, Commonwealth of the Northern Mariana Islands (CNMI), and the U.S. Pacific Remote Island Areas (PRIA).[2] Once a plan is approved by the Secretary of Commerce (Secretary), the National Marine Fisheries Service (NMFS), which acts on behalf of the Secretary, implements the plan through federal regulations, which are enforced by the NOAA Office of Law Enforcement and the U.S. Coast Guard, in cooperation with State, Territorial, and Commonwealth agencies. For further information about the proposed management action, contact:

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1.2 Public Review Process

1.3 Document Overview and Preparers

This Draft EA complies with the requirements with National Environmental Policy Act (NEPA) requirements. This document describes several alternatives and their potential environmental effects. It will serve as the basis for a determination by NMFS on whether or not to prepare an Environmental Impact Statement. It will inform NMFS in its authorization of Council-recommended annual catch specifications associated with Amendment 7.

The draft EA was prepared and reviewed by Western Pacific Fishery Management Council staff and staff of the Sustainable Fisheries Division in NMFS' Pacific Islands Regional Office (PIRO). An interdisciplinary approach was used in the preparation of this document.

[1] In 2009, the Council developed and NMFS implemented five new archipelagic-based fishery ecosystem plans (FEPs). The FEPs incorporated and reorganized elements of the Councils' species-based FMPs into spatially-oriented ecosystem plans (75 FR 2198; January 14, 2010). All applicable regulations were retained through the development and implementation of the five FEPs, and no substantive changes to the fisheries occurred, including around Hawaii.

[2] The PRIA include Howland, Baker, Jarvis, and Wake Islands, Palmyra, Midway, and Johnston Atolls, and Kingman Reef.

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1.4 Background Information

Management of Highly Migratory Species in the Pacific Ocean

The United States is a signatory to the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Convention). The Unite States and 42 other members, cooperating non-members, and participating territories comprise the Western and Central Pacific Fisheries Commission (WCPFC), which governs international management of highly migratory fish stocks (e.g., tuna, marlin) in the western and central Pacific Ocean (WCPO) based on the provisions of the Convention. Conservation and management measures (CMMs) are developed by the WCPFC and, when applicable, implemented for fisheries of the U.S. and its Participating Territories by NMFS under the Western and Central Pacific Fisheries Convention Implementation Act (16 U.S.C. § 6901, *et seq*; "WCPFCIA") and under procedures established under the Magnuson-Stevens Act (16 U.S.C. § 1801 *et seq.*). The U.S. Participating Territories are American Samoa, Guam, and CNMI. The Convention Area comprises the majority of the WCPO (Figure 1).

The Inter-American Tropical Tuna Commission (IATTC), another international regional fishery management organization (RFMO), manages highly migratory species (HMS) in the eastern Pacific Ocean (EPO). The U.S. is a member of the IATTC (Figure 1). There are no U.S. Participating Territories within the IATTC. See Figure 1 for the areas of competency for the WCPFC and IATTC in the Pacific Ocean.

The current action affects only western Pacific pelagic fisheries in the WCPO areas managed in accordance with the WCPFC. The Convention provides the framework for the international management of HMS in the WCPO. Article 1 defines terms used in the Convention, including HMS. HMS are all fish stocks listed in Annex I of the 1982 United Nations Law of the Sea Convention (UNCLOS) as well as other such species the WCPFC may determine. Article 3 of the Convention states that the Convention applies to all HMS within the WCPFC Convention Area, and further, that CMMs shall be applied throughout the range of the stocks; in other words, applied to both the high seas and the exclusive economic zones (EEZs) of cooperating members and cooperating non-members.

Article 30 of the Convention recognizes the special needs of Small Island Developing States (SIDS) and Participating Territories (PTs). Among other provisions, Article 30 provides that WCPFC CMMs should take into account that SIDS and PTs are economically vulnerable and heavily dependent on their fisheries and should not be placed at a disadvantage in developing

their fisheries as a result of measures intended to reduce the impact on tuna and other fish stocks by more developed nations. In recognition of these circumstances, CMMs adopted by the WCPFC recognize that SIDS and PTs have unique challenges in participating in some fisheries, and are often provided exceptions or special consideration with regards to allocations of fishing privileges. In addition, the WCPFC recently agreed to CMM 2013-07 which identifies several issues associated with the special requirements of SIDS and PTs including supporting domestic fisheries, tuna related businesses, and market access. Under the Convention, American Samoa, Guam, and CNMI (collectively, the Territories) are recognized as Participating Territories.[3]

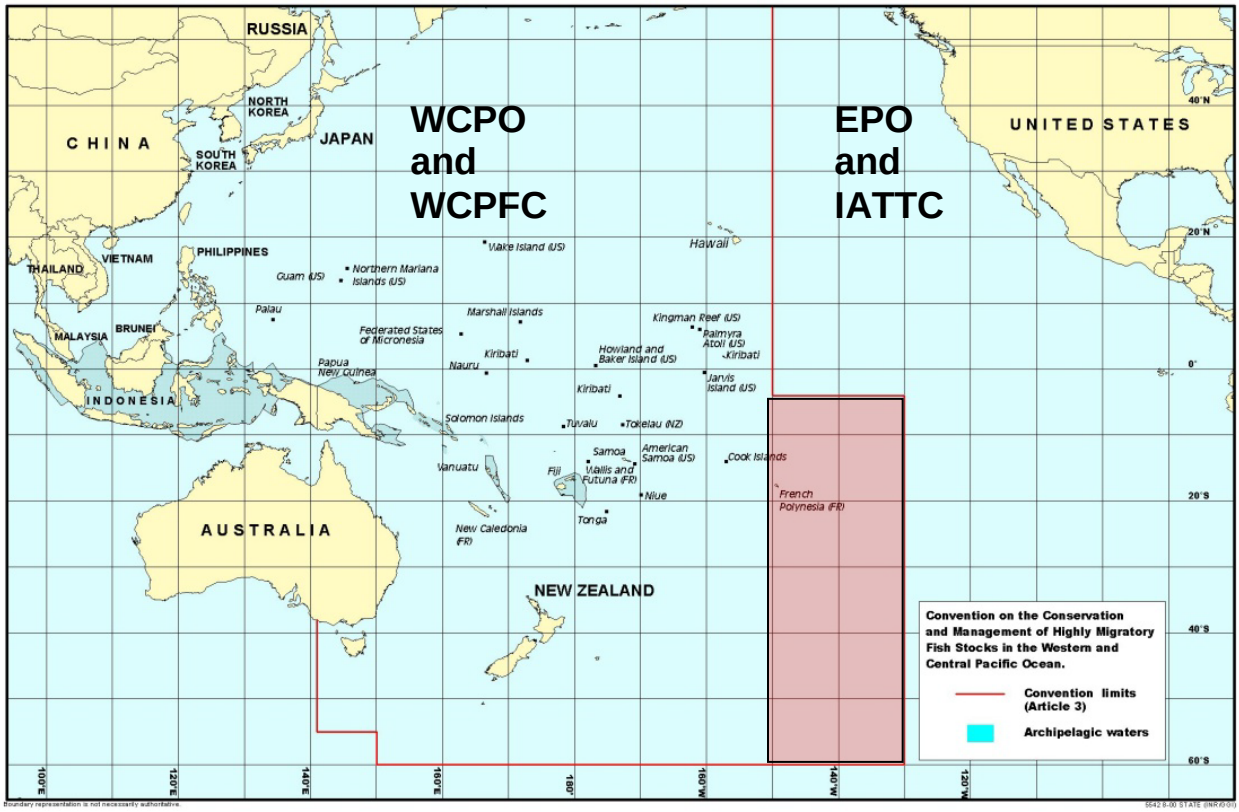

Figure 1: WCPFC and IATTC areas of competency in the Pacific Ocean.
Note: Shaded area represents an area of overlap of the Convention Areas of the WCPFC and IATTC.

The WCPFC has agreed on several CMMs for WCPO HMS stocks since its First Regular Meeting in 2004 (see Table 2). These CMMs include a mix of catch and effort limits applicable to WCPFC members, cooperating non-members, and PTs. To date, the WCPFC has only agreed on catch limits for bigeye and yellowfin tunas and striped marlin.[4] Generally, when WCPFC members endorse a fishery management measure, the individual members are responsible for implementing the requirements under domestic regulations for their fisheries and vessels flying their flag.

[3] The Territories are allowed to participate in all WCPFC meetings and subsidiary bodies; however, they are unable to vote on procedural and substantive matters before the WCPFC.
[4] The WCPFC agreed to catch limits for yellowfin tuna in CMMs 2008-01 and 2011-01, but CMM 2012-01 does not contain catch limits for the species in the Convention Area.

Table 2: Recent WCPFC conservation and management measures (CMM) for HMS stocks.

Fish stock and WCPFC CMM number	Measure	Exemption for SIDS/PTs
S. Pac. Albacore (2010-05)	Limit vessels fishing for S. Pac. albacore S. of 20° S at 2005 levels	Yes
S. Pac. Swordfish (2009-03)	Limit vessels fishing for swordfish S. of 20° S between 2000-2005 and limit catch any amount between 2000-2006	Yes
SW Pac. Striped Marlin (2006-04)	Limit vessels fishing for SW Pacific striped marlin S. of 15° S to 2000-2004 levels.	Yes
N. Pac. Striped Marlin (2010-01)	Limit catch for NP striped marlin from highest years between 2000-2003 and reductions of 10% in 2011, 15% in 2012, and 20% in 2013	Yes
N. Pac. Albacore (2005-03)	Limit fishing effort for N. Pac. albacore to 2005 levels	Yes
Pacific Bluefin Tuna (2010-04)	Limit fishing effort for Pac. bluefin tuna N. of 20° N to 2002-2004 levels for 2011 and 2012	Yes
Bigeye Tuna (2008-01) (2011-01) (2012-01) (2013-01) (2014-01)	Limits on purse seine fishing effort in EEZ and high seas ; Purse seasonal FAD closures; Longline bigeye catch limits.	Yes (exempt for longline limits)

Note: In addition to the CMMs listed in Table 2, WCPFC has agreed to measures that include requirements for vessel monitoring systems, observer coverage, high seas boarding and inspection, and at-sea transshipment. For more information on these measures, see www.wcpfc.int. For U.S. implementation of WCPFC measures see: http://www.fpir.noaa.gov/IFD/ifd_index.html.
Source: Review of the Performance of the WCPFC. WCPFC8-2011/12

WCPFC Management of Bigeye Tuna

Bigeye tuna is considered a Pacific-wide stock, but is separately managed and assessed in the WCPO and EPO. In the WCPO, bigeye tuna is experiencing overfishing, but not considered overfished according to Pelagic FEP stock status reference points. The area in the WCPO with the highest fishing mortality is along the tropical zone between 20 degrees North and 10 degrees South latitudes. Bigeye tuna are generally caught as adults in the WCPO longline fisheries and as juveniles in the WCPO purse seine fisheries. The WCPO purse seine fisheries and surface fisheries of Indonesia and the Philippines have an equal to or greater impact on the stock status of bigeye tuna in the WCPO as the longline fisheries in the same region. The 2011 stock

assessment for bigeye tuna in the WCPO concludes that the level of maximum sustainable yield (MSY) for bigeye tuna would rise if the mortality of small fish were reduced, allowing for greater overall yields to be sustainably attained (Davies et al. 2011).

In 2008, in order to address overfishing of bigeye tuna in the WCPO, the WCPFC adopted CMM 2008-01, with the objective of reducing bigeye tuna fishing mortality by 30 percent from 2001-2004 levels. CMM 2008-01 required WCPFC members to implement the following measures for their purse seine fisheries: fishing effort limits for the high seas and EEZ at 2001-2004 levels, seasonal FAD closure period (2 months in 2009, 3 months in 2010 and 2011), closure of Western Pacific high seas pockets in 2010 and 2011, full catch retention in 2010 and 2011, and 100 percent observer coverage if fishing during the FAD closure period in 2009, as well as 100 percent observer coverage for the entire years in 2010 and 2011. CMM 2008-01 also established annual longline catch limits that would reduce bigeye tuna catches over a three-year period by 30 percent of the 2001-2004 baseline. Fresh fish longline fisheries that caught less than 5,000 mt per year were required to reduce longline landings of bigeye tuna by 10 percent in 2009. This provision effectively only applied to the USA (Hawaii longline fishery). The SIDS and PTs were provided 2,000-mt annual longline limits; however, if conducting responsible fisheries development, then the 2,000-mt limits did not apply.[5] The WCPFC rolled-over several provisions of CMM 2008-01 in March 2012 as an interim measure for 2012.

Accordingly, in both 2009 and 2012, NMFS implemented annual longline bigeye tuna catch limits of 3,763 metric tons (mt) for calendar years 2009-2012 applicable to the Hawaii longline fishery.[6] Under the NMFS regulations, if the limit is reached, the retention on board, transshipment or landing of bigeye tuna by federally permitted vessels of the Hawaii longline fishery in the WCPO is prohibited through the remainder of the year, with certain exceptions.

The WCPO longline fishery reduced landings of bigeye tuna by approximately 20 percent from baseline levels (2001-2004 average or 2004 catch levels), the WCPO purse seine fishery's catch of bigeye tuna increased to record levels in 2011 (Williams and Terawasi 2013). At its 9th Regular Session, in December 2012, the WCPFC agreed on CMM 2012-01, which establishes a goal of reducing bigeye tuna mortality to a level $F/F_{MSY} \leq 1$[7], through a step-by-step approach through 2017. CMM 2012-01 maintained bigeye tuna limits for distant water fleets, including the U.S. limit of 3,763 mt, but did not provide annual longline bigeye tuna catch limits for any of the PTs or SIDS (Table 5). CMM 2012-01, among other things, also increased the FAD closure by a month, requiring a four-month purse seine FAD closure or equivalent reduction in purse seine FAD sets. CMM 2012-01 does not include an overall limit on bigeye tuna mortality.

[5] WCPFC CMM 2008-01, paragraph 34. The term "responsible fisheries development" is undefined in CMM 2008-01.

[6] See 74 FR 63999, published on December 7, 2009; and 77 FR 51709, published on August 27, 2012. The current limit is codified in Federal fishing regulations at Title 50 Code of Federal Regulations Part 300, Section 224 (50 CFR § 300.224).

[7] F/F_{MSY} is defined as the ratio of the fishing mortality rate (F; catch relative to the size of the stock) to the fishing mortality when the stock is being fished at maximum sustainable yield (F_{MSY}; the largest catch that can be taken from a specific fish stock over an indefinite period under constant environmental conditions). If the ratio is less than 1, fishing mortality (F) on the stock is sustainable.

In December 2013, the WCPFC agreed on a conservation and management measure (CMM 2013-01) that builds off CMM 2012-01. The measure applies to purse seine, longline, and other fisheries taking skipjack, yellowfin, and bigeye. To address impacts to bigeye, the purse seine fishery, in 2014, is subject to a 4 month FAD closure or 3 month FAD closure plus a flag based FAD set limits shown in Attachment A of the measure. For years 2015 and 2016, CCMs with purse seine fisheries can either choose to restrict their vessels to a 5 month FAD closure plus limiting their vessels to their 2010-2012 FAD set average or restrict their vessels to a 3 month FAD closure plus restrict their vessels to FAD set limits shown in Attachment A of the measure. For 2017, CCMs shall follow the purse seine options available for 2015 and 2016 in addition to prohibiting their vessels from FAD sets on the high seas for the entire calendar year.

For the longline fishery, CMM 2013-01 provides flag-based bigeye catch limits through 2017 representing a 15% reduction from the limits established in 2012-01 (the limits represent an approximately 40% reduction from limits established under CMM 2008-01).Under CMM 2013-01, the US WCPO longline bigeye limit for 2014 is maintained at 3,763 mt, but will be reduced 5.5 percent in 2015 to 3,554 mt. For 2016, the US limit is maintained at 3,554 mt, but for 2017, the US longline limit will be 3,345, which represents a 11% reduction from the 3,763 mt level. If the reductions to the US limit are taken collectively, the US longline bigeye limit of 3345 mt represents a 20 percent reduction from the 2004 baseline level used in CMM 2008-01. The measure also limits members that harvested less than 2,000 mt of bigeye in 2004 with longline gear to no more than 2,000 mt for each of the years 2014 through 2017. However, paragraph 7 of CMM 2013-01 does not establish an individual limit on the amount of bigeye tuna that may be harvested annually in the Convention Area by SIDS and PTs, including American Samoa, Guam, and the CNMI (see Table 6 and WCPFC CMM 2013-01).

Consistent with CMM 2013-01 and those CMM's it replaced, the U.S. bigeye tuna catch limit does not apply to any permit holders of American Samoa longline limited access or western Pacific general longline permits and land in American Samoa, Guam, or the CNMI. In addition, the U.S. bigeye tuna catch limit does not apply to American Samoa limited access permit holders that possess a Hawaii limited access permit and land in Hawaii (dual permits or dual-permitted), provided the fish are caught outside the U.S. EEZ around Hawaii.

In 2012, the WCPFC also agreed to a charter notification measure that applies to Commission Members and Participating Territories that charter, lease or enter into other mechanisms with eligible vessels[8] flagged to a another State or Fishing Entity for the purpose of conducting fishing operations in the Convention Area as an integral part of the domestic fleet of that chartering Member or Participating Territory (CMM 2012-05).[9] This measure directs WCPFC members and cooperating non-members to cooperate further on issues of attribution of catch and effort by chartered vessels.

[8] Only vessels listed on the WCPFC Record of Fishing Vessels or the WCPFC Interim Register of Non-CCM Carriers and Bunkers, and not on the WCPFC IUU vessel list, or IUU List of another RFMO, are eligible for charter (CMM 2012-05 para. 4).

[9] Vessel chartering arrangements are a common tool for fisheries development in the WCPO whereby one party has vessels to offer and the other party has available resources or an allocation of such resources that it needs assistance in harvesting. Vessel chartering often involves foreign vessels being chartered by a chartering entity (government or business) whereby the vessel can fish on behalf of the chartering entity without having to reflag.

U.S. implementation of WCPFC Bigeye Tuna Conservation and Management Measures
The U.S. pelagic longline fisheries target highly migratory species (hereafter, western Pacific pelagic management unit species, or "pelagic MUS") in the U.S. EEZ (from 3-200 nm offshore) around American Samoa, Guam, and Hawaii, from 0-200 nm around the CNMI and PRIA, and on the high seas. These fisheries are federally managed by regulations under the authority of the MSA through the Council's Pelagics FEP, which was approved by the Secretary in 2009. The Council develops and recommends management measures for longline fisheries in American Samoa, CNMI, Guam, and Hawaii, which, upon approval by the Secretary, NMFS implements through regulations.

As with measures for longline fishing, NMFS implements WCPFC measures for the U.S. purse seine fishery operating in WCPO through the WCPFCIA.

As documented in recent years, the Hawaii longline fleet has the capacity to harvest the entire U.S. bigeye tuna catch limit agreed to by the WCPFC before the end of the year. In 2009 and 2010, the limit was reached and harvest was prohibited until December 31 (see 74 FR 68190, December 23, 2009; and 75 FR 68725, November 9, 2010). Once the catch limit was reached, only bigeye tuna caught in the EPO or by vessels fishing under dual permits could land bigeye tuna in Hawaii. Due to the proximity of the EPO to the main Hawaiian Islands (approximately 120 east of Hilo, Hawaii), Hawaii longline vessels do fish in the EPO on a regular basis throughout the year, but the majority of their EPO effort is in the summer months.

Harvest of bigeye tuna by vessels under an American Samoa longline limited access permit or Western Pacific general longline permits is also reported to the WCPFC. Under 50 CFR § 300.224, harvest of bigeye tuna by vessels with an American Samoa longline limited access permit are attributed to American Samoa so long as the bigeye tuna were not caught in the U.S. EEZ around Hawaii and landed by a U.S. fishing vessel operated in compliance with a permit issued under the western Pacific fishing regulations at 50 CFR §§ 660.707 or 665.801. This provision recognized that vessels operating under American Samoa longline permits have established a sufficiently close connection with American Samoa such that catch on the high seas may be attributed to the Territory, regardless of where they are landed. Therefore, for example, fish caught outside of the EEZ around Hawaii may be landed in Hawaii and attributed to American Samoa so long as they have a Hawaii limited access permit and an American Samoa limited access permit. Combined annual bigeye tuna catches made by these dual-permitted vessels has been less than 400 mt since 2004. Catches of bigeye tuna made by longline vessels with only an American Samoa permit to fish and land in American Samoa or Western Pacific general longline permit that is used to fish and land in Guam and the CNMI are attributed to the respective Territory or Commonwealth.

Through a separate action, NMFS established a catch limit of 3,763 mt of bigeye tuna for U.S. vessels with only Hawaii longline permits and/or Western Pacific general longline permits not landing in the Territories operating in the WCPO for calendar years 2013 and 2014 (78 FR 58240, September 23, 2013). NMFS is currently developing the proposed rule to establish the 2015 US longline bigeye catch limit.

Territory Interest in Responsibly Developing Their Fisheries

The Territories are interested in responsibly developing their fisheries (see the respective MCPs).[10] Pelagic fishing fleets of American Samoa, CNMI, and Guam currently do not target bigeye tuna and do not locally harvest more than 1,000 mt of bigeye tuna collectively on an annual basis. For example, the longline fleet based in American Samoa, which targets albacore, catches approximately 250-400 mt of bigeye tuna each year and its small-vessel troll fleet catches very few bigeye tuna (WPFMC 2012). From 2009 to 2012 up to four longline vessels fished around Guam and CNMI; however, fishing effort was low and sporadic and, therefore, catches of bigeye tuna were less than 100 mt per year. These vessels are no longer operating in Guam and CNMI (WPFMC 2012). High operating costs associated with vessel-docking in Saipan along with poor market access are believed to be contributing factors to the recent halt of longline fishing in the Marianas. For example, the company that was conducting the Marianas longline operations was unsuccessful in securing contracts to provide fish to the U.S. military on Guam, which was an objective in their business model.

While the U.S. Participating Territories do not currently have significant longline fisheries for bigeye tuna, responsibly developing their fisheries, as aspired to by other SIDS and PTs, would promote economic growth and food security. The ex-vessel value of all longline caught bigeye tuna from the WCPO in 2012 was over $800 million, yet bigeye tuna catches from all of the SIDS and PTs represent less than 10 percent total WCPO bigeye tuna longline catches (Williams and Terawasi 2013). This suggests that the revenues derived by longline fishing for bigeye tuna in the WCPO are skewed towards distant water fishing nations. Longline catches of bigeye tuna in the WCPO are dominated by Japan, Korea, China, and Chinese Taipei (see Tables 5, 6, and 7). For example, under CMM 2013-01 the 2014 U.S. longline limit for WCPO bigeye tuna was 3,763 mt per year, whereas Japan's 2014 longline limit for bigeye tuna is 19,670 mt, even though Japan harvested approximately 12,000 mt of bigeye in 2012.

In regards to fisheries development in the Territories, the Council acknowledges that one of the Findings of the MSA is that:

"Pacific Insular Areas contain unique historical, cultural, legal, political, and geographical circumstances which make fisheries resources important in sustaining their economic growth (MSA section 2 "Findings" para. 10)."

The Council further acknowledges that one of the policies of the MSA is:

" to ensure that the fishery resources adjacent to a Pacific Insular Area, including resident or migratory stocks within the exclusive economic zone adjacent to such areas, be explored, developed, conserved, and managed for the benefit of the people of such area and of the United States (MSA section 2 "Policy" para. 7)."

Legislative Background: Consolidated and Further Continuing Appropriation Act (CFCAA) of 2012

In November 2011, the U.S. Congress passed the CFCAA (Pub. Law 112-55, 125 Stat. 552 *et seq*.; see Appendix A), which was effective through 2012. In 2013, Section 113 was extended through the end of 2013 in the Commerce, Justice, Science and Related Agencies Appropriations Act, 2013 (Pub. Law 113-6, 125 Stat. 603, Section 110, the Department of Commerce

[10] See www.wpcouncil.org

Appropriations Act, 2013). Section 113 reflects Congress' intent that the WCPFC catch limits provided to the U.S Participating Territories should be made available for transfer to qualifying U.S. longline vessels, and it provides a mechanism for such transfers provided that contractual arrangements include support for the development of fishery infrastructure in the Territories. Specifically, under Section 113(a) of the CFCAA, U.S. Participating Territories to the Commission are allowed to use, assign, allocate, and manage catch limits of pelagic MUS, or fishing effort limits, agreed to by the WCPFC through arrangements with U.S. vessels permitted under the Pelagics FEP. Additionally, Section 113(a) requires the Secretary (through NMFS) to attribute catches made by vessels operating under arrangements to the U.S. Participating Territories for the purposes of annual reporting to the WCPFC.

The arrangements must meet specific criteria in Section 113 for NMFS to attribute the catch to a Territory. Section 113(a) also provides that vessels under such arrangements are integral to the domestic fisheries of the U.S. Participating Territories, provided that arrangements do not impose requirements regarding where the vessels must fish or land their catch, and provided further that arrangements are funded by deposits to the Western Pacific Sustainable Fisheries Fund in support of fisheries development projects identified in a Territory's Marine Conservation Plan (MCP).[11]

Section 113(b) also directed the Council to recommend an amendment to the Pelagics FEP and associated regulations to implement Section 113 (i.e., to authorize the use, assignment, allocation, and management of catch limits of the pelagic species, or fishing effort limits, agreed to by the WCPFC and applicable to the Territories). Following the directive provided in Section 113, the Council recommended, and NMFS approved in 2014, Amendment 7 to the Pelagics FEP and 2014 Territory bigeye specifications.

Territory Arrangements in 2011, 2012, 2013, 2014

Under the authority of Section 113(a), and for the purposes of responsible fisheries development, the American Samoa Government entered into a two-year (2011 and 2012) fishing arrangement with the Hawaii Longline Association (HLA) that included payments to the Western Pacific Sustainable Fisheries Fund. Per Section 113, the Secretary (NMFS) attributed catches made by vessels operating under the arrangement to the U.S. Territory that made the arrangement. In 2011, NMFS forecasted that the U.S. bigeye tuna catch limit of 3,763 mt would be reached on November 17, 2011. In accordance with Section 113, between November 18 and December 31, 2011, NMFS attributed 628 mt of bigeye tuna caught by Hawaii longline vessels under the arrangement to American Samoa. Hawaii longline vessels that were not part of the arrangement were able to continue catching bigeye tuna in the WCPO under the remaining amount of the U.S. bigeye tuna catch limit.

In 2012, NMFS forecasted that the U.S. bigeye tuna catch limit of 3,763 mt would likely be reached on November 27, 2012. On November 20, 2012, NMFS began to attribute bigeye tuna catch by the vessels under the arrangement to American Samoa for the remainder of 2012. Between November 20 and December 31, 2011, NMFS attributed 771 mt of bigeye tuna to American Samoa. Four active Hawaii longline vessels were not part of the American

[11] Pursuant to Section 204(e)(4) of the MSA, Marine Conservation Plans are developed by the Territories and approved by the Council and Secretary of Commerce.

Samoa/HLA arrangement. In both 2011 and 2012, the amount of bigeye tuna catch transferred under the American Samoa/HLA arrangement was below the 2,000-mt WCPFC limit provided for American Samoa under WCFPC CMM 2008-01 and CMM 2011-01.

It is anticipated that American Samoa will use the funds derived from the arrangement on projects identified in its MCP, such as supporting infrastructure improvements in Pago Pago Harbor relating to upgrading vessel docking space and on other associated fisheries development projects. HLA completed payments into the Sustainable Fisheries Fund in late 2012; however, NMFS has yet to make the total amount available due to fiscal cycles. Total funding from the American Samoa/HLA arrangement will become available in early 2014. Specific projects that are implemented under any Territory's MCP are not part of this proposed action. Environmental reviews and coordination with other agencies for MCP projects would be done separately once a detailed proposal is available.

In 2013, the CNMI government entered into an arrangement with Hawaii longline vessels permitted under the Pelagics FEP. In accordance with 50 CFR 300.224(g)(2), the start date for attribution of catches to CNMI was December 5, 2013. Approximately 500 mt of bigeye was transferred under the 2013 arrangement.

In 2014, the CNMI arrangement with Hawaii longline vessels continued, with 1,000 mt transferred to Hawaii longline vessels.

1.5 Initial Council Actions

At its 161st meeting, the Council reviewed the 2014 bigeye stock assessment and other relevant information, and directed staff to prepare a draft EA for 2015 Territory bigeye catch limit specifications.

The Council has been considering annual Territorial catch limits and the potential for assigning catches against those limits since 2009. See Amendment 7 for a detailed description on the Council's initial actions on these issues.

Amendment 7 established the following:

1. Provided the Territories the authority to use, assign, allocate, and manage catch limits of pelagic MUS, or fishing effort limits that are established by the WCPFC, through arrangements with U.S. vessels permitted under the Pelagics FEP.
2. Establish annual longline bigeye tuna catch limits for each of the Territories based on the SIDS/PTs provisions in the WCPFC CMMs for tropical tunas, and further that the Council review this limit on an annual basis.
3. Establish that the Territories may assign all or a portion of their annual catch or effort limits through arrangements with U.S. vessels permitted under the FEP, and further that the Council may make recommendations to NMFS for this limit and will review this limit on an annual basis.
4. Establish that vessels fishing under such an arrangement be considered integral to the domestic fishery of the U.S. Territory with which an arrangement has been made, provided that such arrangement satisfy either of the following:

i) It contain no requirements regarding where such vessels must fish or land their catch, and shall be funded by deposits to the Western Pacific Sustainable Fisheries Fund in material support of fisheries development projects identified in a territory's MCP, and further that the funding of such arrangements authorized under this Pelagics FEP amendment shall be of a sufficient amount to substantially contribute to MCP fisheries development objectives; or

ii) It provide a landing requirement to offload catch in the ports of the Territory for which the arrangement exists.

5. Establish that arrangements authorized under this Pelagics FEP amendment shall become effective 30 days after submission to the Council and NMFS, unless the Regional Administrator, with the advice and recommendation of the Council's Executive Director, determines that the arrangement does not comply with the Pelagics FEP or applicable law. Further, establish that catch or effort under qualifying arrangements shall be subject to attribution to the applicable Territory for purposes of annual reporting to WCPFC.

Using the framework described above, the Council also recommends the following specifications:

6. An annual bigeye tuna longline catch limit of 2,000 mt per year for each Territory.
7. An annual transferable limit of 1,000 mt of bigeye tuna for each Territory that may be transferred under arrangements with eligible U.S. longline vessels permitted under the Pelagics FEP.

Opportunities for public comment on these issues were offered at Council meetings identified above as well as at public meetings of Council's advisory groups.

1.6 Purpose and Need

The purpose of the proposed action is to specify the 2015 and 2016 catch and allocation limits for longline caught bigeye tuna for each U.S. territory consistent with the framework established in Amendment 7.

1.7 Proposed Action

Using the framework established under Amendment 7, the proposed action would specify a catch limit of __X_ mt of longline-caught bigeye tuna for each U.S. territory in 2015 and again in 2016, and allow each territory to allocate annually up to __X_mt of that limit to eligible U.S. longline fishing vessels identified in a specified fishing agreement applicable to the territory. The process for attributing longline caught bigeye tuna made by vessels identified in an approved specified fishing agreement shall follow the procedures set forth in 50 CFR 665.819.

If NMFS determines catches made by vessels identified in a specified fishing agreement exceeds the specified allocation limit for a territory, NMFS will attribute any overage of the limit back to the U.S. or Territory fishery to which the vessel is registered or permitted in accordance with regulations set forth in 50 CFR part 300, subpart O, and other applicable laws.

Under the proposed action, the Council would review each territorial catch limit specification and portion available for allocation in 2016 to ensure consistency with the Pelagics FEP, Magnuson-Stevens Act, WCPFC decisions, and other applicable laws.

2.1 Alternative 1 – No Action: Do not specify 2015 Territory catch limits

Pursuant to regulations implementing Amendment 7, NMFS may specify catch or effort limits for pelagic MUS applicable to a U.S. territory on annual or multi-year basis. However, under this alternative, no Territorial catch or allocation limit would be specified in 2015 or 2016 for pelagic MUS, including bigeye tuna. Therefore, bigeye catch would be unlimited in the Territories. In addition, no Specified Fishing Arrangements between a U.S. territory and eligible vessels permitted under the FEP would be authorized for 2015.

Under this alternatives the US longline fisheries not based in the U.S. territories would be subject to existing regulations at 50 C.F.R. § 300.224 limiting the amount of bigeye tuna that may be captured in the Convention Area by longline gear and retained on board . In 2015 and 2016, CMM 2014-01 provides for a U.S bigeye tuna limit of 3,554 mt.

The expected fishery outcome of this alternative is that the Territory longline fisheries would not be subject to Council-recommended catch limits nor WCPFC established limits for bigeye in 2015. Without any Council-recommended Territorial catch limit specifications, there could be no transfer of catch or effort limits from a Territory to FEP-permitted fishing vessels. It is expected that fewer funds would be available for approved MCPs in the Territories and, therefore, there could be fewer opportunities for fisheries development including improvements to Territory fishery infrastructure. The Hawaii longline fishery would be expected to reach the U.S. WCPO catch limit for bigeye tuna before the year ends. Local markets and consumers may be limited in the fresh pelagic fish from the Hawaii longline fishery. It is expected that fish caught by foreign fleets would fill market gaps that otherwise would have been supplied by US vessels.

Regardless of this Alternative, or the continuity of the U.S. longline fisheries in the WCPO for that matter, unless the WCPFC agrees on more effective conservation and management measures for bigeye tuna, the overfishing status of bigeye tuna in the WCPO is expected to continue. In other words, under this Alternative the potential conservation benefit of not harvesting bigeye tuna under agreements between the Territories and FEP-permitted vessels, will not have a significantly beneficial effect on the overfishing status of bigeye tuna in the WCPO without additional international measures. It is unknown how long overfishing on bigeye tuna can continue before catch rates are economically unviable for U.S. longline fisheries or before the spawning stock is reduced below the minimum stock size threshold (overfished) defined in the Pelagic FEP.

2.3 Alternative 2 - Specify 2,000-mt total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory

Under this alternative, the first (2014) specifications established under the Amendment 7 framework would be maintained for 2015 and again in 2016. An annual longline catch limit for bigeye tuna of 2,000 mt for each Territory would be specified for 2015 and 2016. This

Alternative would also limit the annual amount of bigeye tuna that may be transferred in 2015 and 2016 under a Territory arrangement to 1,000 mt per Territory, which would be part of, and not in addition to, each Territory's 2,000-mt annual limit. No other catch or effort limit specifications for any other species are proposed under this alternative.

The expected fishery outcome of this alternative is that the Territory longline fisheries would be subject to 2,000-mt catch limits for bigeye tuna for each Territory. The catch limit is currently more restrictive than those agreed to by the WCPFC for PTs and SIDS.

Under this alternative, the Territories would also be subject to limits on the amount of bigeye tuna they may transfer to FEP-permitted longline vessels under Specified Fishing Agreements. The limit would be 1,000 mt for each Territory.

The 1,000-mt transfer limit for bigeye tuna would provide a buffer between catches by Territory longline fisheries and catch that may be transferred under Territory arrangements with FEP-permitted longline vessels, to ensure the availability of quota for Territory fishery participants.

An additional expected fishery outcome for Alternative 2 is that Territory arrangements would allow NMFS to attribute longline catch of pelagic MUS or effort limits to a Territory to which the agreement applies shortly before the Hawaii longline fishery achieves the U.S BET catch limit. Arrangements under this Alternative would support responsible fisheries development in the Territories by providing funds for approved MCPs.

In 2014, NMFS projected the 2014 U.S WCPO bigeye limit of 3,763 mt would be reached on November 15, 2014 and began attributing catches of BET made by longline vessels identified in the approved specified fishing agreement with CNMI seven days prior (November 8, 2014) in accordance with the attribution procedures set forth in 50 CFR 665.819. Between November 8, 2014 and December 31, 2014, NMFS attributed 1,000 mt of bigeye to the CNMI.

NMFS If 2014 fishing conditions are repeated in 2015 and 2016, Hawaii longline vessels may reach the reduced 2015 US WCPO BET limit of 3,493 mt and the 2016 US WCPO BET limit of 3,554 mt in October of each year. A 1,000 mt limit on the amount one Territory can transfer could result in Hawaii longline vessels entering into more than one specified fishing agreements with U.S. territories within the same calendar year. If the Hawaii longline fleet could access each territories 1,000 mt allocation limit sequentially, the fleet could potentially catch up to 6,493 mt in 2015 and 6,554 mt in 2016. However, given the limited time between October and the end of the fishing year, it is expected that the fleet could reasonably access less than 1,500 mt of the allocation limit each year bringing the expected the US longline bigeye catch in 2015 and 2016 to 4,887 mt and 5,423 mt, respectively.

Under the proposed action, the Council would review the territorial catch limit specification and portion available for allocation at least annually to ensure consistency with the Pelagics FEP, Magnuson-Stevens Act, WCPFC decisions, and other applicable laws.

2.3 Alternative 3: Specify 2,000-mt total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory

Under this alternative, an annual longline catch limit for bigeye tuna of 2,000 mt for each Territory would be specified for 2015 and 2016. This Alternative would also limit the annual amount of bigeye tuna that may be transferred in 2015 and 2016 under a Territory arrangement to 750 mt per Territory, which would be part of, and not in addition to, each Territory's 2,000-mt annual limit. No other catch or effort limit specifications are proposed under this alternative.

The expected fishery outcome of this alternative is that the Territory longline fisheries would be subject to 2,000-mt catch limits for bigeye tuna for each Territory. The catch limit is currently more restrictive than those agreed to by the WCPFC for PTs and SIDS.

Under this alternative, the Territories would also be subject to lower limits on the amount of bigeye tuna they may transfer to FEP-permitted longline vessels under Specified Fishing Agreements than what was authorized in 2014. The limit would be 750 mt for each Territory.

The 750-mt transfer limit for bigeye tuna would provide a buffer between catches by Territory longline fisheries and catch that may be transferred under Territory arrangements with FEP-permitted longline vessels, to ensure the availability of quota for Territory fishery participants.

An additional expected fishery outcome for Alternative 3 is that Territory arrangements would allow NMFS to attribute longline catch of pelagic MUS or effort limits to a Territory to which the agreement applies shortly before the Hawaii longline fishery achieves the U.S BET catch limit. Arrangements under this Alternative would support responsible fisheries development in the Territories by providing funds for approved MCPs.

If 2014 fishing conditions are repeated in 2015 and 2016, Hawaii longline vessels may reach the reduced 2015 US WCPO BET of 3,493 mt and the 2016 US WCPO BET limit of 3,554 mt in October each year. A 750 mt limit on the amount one Territory can transfer could result in Hawaii longline vessels entering into a specified fishing agreement with up to three U.S. territories within the same calendar year. If the Hawaii longline fleet could access each territories 750 mt allocation limit sequentially, the fleet could potentially catch up to 5,743 mt in 2015 and 5,804 mt in 2016. However, given the limited time between October and the end of the fishing year, it is expected that the fleet could reasonably access less than 1,500 mt of the allocation limit each year bringing the expected BET catch in 2015 and 2016 to 4,887 mt and 5,423 mt, respectively.

2.5 Alternatives Initially Considered but Rejected from Further Consideration

None identified.

Chapter 3: Description of the Affected Environment

For further detail about the physical, biological, and social environment in which the pelagic fisheries managed under the Pelagics FEP operate, please refer to Chapter 3 of the Pelagics FEP and Amendment 7.[12]

3.1 Status of Pelagic Management Unit Species

For a comprehensive discussion of the biology and life history of pelagic MUS, see the Pelagics FEP. Table 4 provides a summary of the stock status of pelagic MUS under the Pelagics FEP.

Table 3: Stock status of pelagic management unit species under the Pelagics FEP.

Species	Stock	Overfishing?	Overfished?
Albacore (*Thunnus alalunga)*	North Pacific	Unknown	Unknown
	South Pacific	No	No
Bigeye tuna (*Thunnus obesus)*	Pacific	Yes in WCPO	No in WCPO
		No in EPO*	No in EPO
Pacific bluefin tuna (*Thunnus orientalis*)	Pacific	Yes	Yes
Yellowfin tuna (*Thunnus albacares)*	Central Western Pacific	No	No
	Eastern Tropical Pacific	No	No
Skipjack tuna (*Katsuwonus pelamis*)	Central Western Pacific	No	No
Striped marlin (*Kajikia audax*)	Western Central North Pacific	Yes	Yes
Blue marlin (*Makaira nigricans*)	Pacific	No	No
Swordfish *(Xiphias gladius)*	Central Western North Pacific	No	No
	Eastern Tropical Pacific	No	No
Oceanic whitetip shark (*Carcharhinus longimanus*)	Pacific	Unknown	Unknown
Blue shark (*Prionace glauca*)	Pacific	No	No
Shorfin mako shark (*Isurus oxyrinchus*)	North Pacific	Unknown	Unknown
Longfin mako shark (*Isurus paucus*)	North Pacific	Unknown	Unknown
Mahimahi (*Coryphaena* spp.)	Pacific	Unknown	Unknown
Wahoo (*Acanthocybium solandri*)	Pacific	Unknown	Unknown
Opah (*Lampris* spp.)	Pacific	Unknown	Unknown
Pomfret (family Bramidae)	Western Pacific	Unknown	Unknown

Note: This table omits some non-target and incidentally caught pelagic MUS in 50 CFR § 665.800, which have unknown status determinations. Statuses are based on NMFS' determinations through August 2013, or other best scientific information available.
* 2013 IATTC stock assessment for bigeye tuna in the EPO concludes overfishing is not occurring; however, at the time of writing, NMFS has not revised its status determination of subject to overfishing.
Source: http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm; NMFS unpublished.

[12] To view the Pelagics FEP online, visit http://www.wpcouncil.org/fishery-plans-policies-reports/pelagics_fe/

3.1.1 Status of Tuna Stocks

3.1.1.1 Bigeye Tuna

Bigeye tuna is considered a Pacific-wide stock, but recently has been assessed separately in the WCPO and EPO. The IATTC and Secretariat of the Pacific Community, Oceanic Fisheries Program (SPC-OFP) are planning to conduct a Pacific-wide bigeye stock assessment in 2015.

WCPO Stock Status

In July 2014, the Secretariat of the Pacific Community (SPC) prepared a new stock assessment for bigeye tuna in the WCPO using data through 2012 (Harley et al. 2014), which updates the previous stock assessment prepared by the SPC in 2011 (Davis et al. 2011) and includes catch data from 2011 and 2012. The 2014 stock assessment applies a two tiered model analysis, with one model providing reference points based on the averages for the period 2008-2011 (latest), while the second model provides reference points for 2012 (current). Additionally, the 2014 stock assessment includes several additional sensitivity model runs.

With respect to recent fishing mortality levels (F) compared to levels associated with MSY (F_{MSY}), under both model tiers, the reference case model (i.e., most plausible model) estimates $F/F_{MSY} = 1.57$. This is an increase from the F/F_{MSY} of 1.46 estimated in the 2011 stock assessment by Davis et al. (2011). For the "latest" model tier, additional sensitivity models provide F/F_{MSY} estimates ranging from 1.27 to 1.95, while for the "current" model tier, F/F_{MSY} estimates range from 1.22 to 2.14. Both model tiers and additional sensitivity runs indicate that the stock is still subject to overfishing, as defined by the Council and NMFS under the Pelagic FEP. In addition, the 2014 stock assessment also estimates a new MSY of 108,520 mt compared to 74,993 mt estimated in the 2011 stock assessment (Davis et al. 2011). The increase in MSY is attributed to (1) higher average recruitment in recent years (2) refinements in the 2014 stock assessment to reduce bias in the spawner-recruitment relationship; and (3) increased catches in recent years.

Based on this information, the Science Committee of the WCPFC at its July 2014 meeting, recommended that fishing mortality on WCPO bigeye tuna be reduced by 36% from the average levels for 2008–2011. This reduction in fishing mortality would be expected to return the fishing mortality rate to F_{MSY} (i.e. $F/F_{MSY} = 1.0$).

With respect to B_{MSY}, under both model tiers, the reference case model indicates $SB/SB_{MSY} = 0.77$. This is a decrease from the SB/SB_{MSY} ratio of 1.08 in the 2011 stock assessment. Additional sensitivity models provide SB/SB_{MSY} estimates ranging from 0.62 to 1.01. Based on a revised estimated natural mortality rate of 0.5 for bigeye tuna, the minimum stock size threshold (MSST) for bigeye tuna in the WCPO is $0.5*B_{MSY}$. Therefore, the 2014 stock assessment indicates WCPO bigeye tuna is not overfished as defined by the Council, and NMFS under the Pelagic FEP. Therefore, stock status remains the same as described in Amendment 7(WPFMC 2014), that is, subject to overfishing, but not overfished.

The Science Committee of the WCPFC noted at its July 2014 meeting a reduction in fishing mortality of at least 36% from the average levels for 2008–2011 should allow spawning biomass to rebuild above the WCPFC's established limit reference point of $SB/SB_{F=0} = 0.20$ over a period

of time.[13] However, Williams and Terawasi (2014) reports that preliminary total WCPO bigeye catch catches for 2013 was 158,622 mt or 6% lower than in 2012. This suggests WCPFC conservation and management measures are beginning to reduce fishing mortality on WCPO bigeye tuna.

EPO Stock Status

Aires-da-Silva and Maunder (2013) conducted the most recent stock assessment for bigeye tuna in the EPO. The results indicate a recent recovery trend for bigeye tuna (2005-2010), subsequent to IATTC tuna conservation resolutions initiated in 2004. Recruitment estimates have been variable since 1975. There were very high peaks in recruitment indices corresponding with the major El Niño events in 1983 and 1998. Recent recruitment indices are predominantly below average. Aires-da-Silva and Maunder (2013) conclude that bigeye tuna in the EPO is not overfished ($B/B_{MSY} = 1.02$), and overfishing is not occurring ($F/F_{MSY} = 0.97$). The 2013 IATTC stock assessment for bigeye tuna in the EPO concludes overfishing is not occurring; however, at the time of writing, NMFS has not changed its status determination, based on the previous stock assessment, of subject to overfishing. The current status in the EPO is considerably more pessimistic if a stock recruitment relationship is assumed, if a higher value is assumed for the average size of the older fish, and if lower rates of natural mortality are assumed for adults (WCPFC 2013a). The most recent estimate of MSY for bigeye tuna in the EPO is 106,706 mt (Aires-da-Silva and Maunder 2013).

3.1.1.2 Yellowfin Tuna

The most recent stock assessment of yellowfin in the WCPO by Davies et al. (2014) using data up to 2012 concluded that for the most plausible range of models, the fishing mortality based reference point **(**$F_{current}/F_{MSY}$) is estimated to be 0.72, and on that basis, it is concluded that overfishing is not occurring. The corresponding biomass based reference points, current spawning biomass to spawning biomass at MSY ($SB_{current}/SB_{MSY}$) were estimated to be above 1.0 at 1.37 and, therefore, the stock is not in an overfished state. Davies et al. (2014) estimate WCPO yellowfin MSY at 586,400 mt.

3.1.1.3 Skipjack Tuna

The most recent assessment of skipjack tuna in the WCPO was conducted in 2014 (Rice et al. 2011) using data up to 2012. The estimates of current fishing mortality to fishing mortality at MSY ($F_{current}/F_{MSY)}$ =0.62 indicate that overfishing of skipjack is not occurring in the WCPO. Nor is the stock in an overfished state with spawning biomass to spawning biomass at MSY ($SB_{current}/SB_{MSY}$) = 1.94. Fishing pressure and recruitment variability (which is influenced by environmental conditions) will continue to be the primary influences on stock size and fishery performance. Rice et al. (2014) estimate MSY at 1,532,000 mt.

[13]

3.1.1.4 North Pacific Albacore

The most recent (2011) stock assessment of North Pacific albacore concluded that overfishing is not occurring and that the stock likely is not in an overfished condition, although biomass-based reference points have not been established for this stock (ISC 2011). The stock is considered to be healthy at average historical recruitment levels and fishing mortality ($F_{2006\text{-}2008}$). Sustainability is not threatened and the stock is expected to fluctuate around the long-term median spawning stock biomass of 400,000 mt in the short- and long-term future (WCPFC 2011a). The 2011 stock assessment estimated MSY at 119,094 mt.

3.1.1.5 South Pacific Albacore

The most recent stock assessment of South Pacific albacore was conducted by Hoyle et al. (2012) using data up through 2010. Catches used in the assessment were the average of July 2007- June 2010 and were estimated to be 79,000 mt. The catch estimate for July 2010 to June-2011 was 90,000 mt, with the 2013 catch at around 82,000 mt. Most of the longline albacore catch is taken in a latitudinal band between 10 and 40° S. The South Pacific albacore stock is currently not overfished and overfishing is not occurring. Current biomass is sufficient to support current levels of catch. However, any increases in catch or effort are likely to lead to declines in catch rates in some regions, especially for longline catches of adult albacore, with associated impacts on vessel profitability. The WCPFC Science Committee recommended that albacore longline fishing mortality be reduced to maintain economically viable catch rates (WCPFC 2012a). The 2011 stock assessment estimated MSY at 99,085 mt.

3.1.1.6 Pacific Bluefin Tuna

Pacific bluefin tuna is considered a single North Pacific-wide stock. In December 2012, the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) completed their assessment of the status of Pacific bluefin tuna using data through 2011, and concluded that the stock is still experiencing overfishing and is now overfished. In April 2013, NMFS determined the same status due to the very low biomass and very high fishing mortality determined by the ISC stock assessment. The ISC assessment estimated the current SB of 22,606 mt to be about 3.6 percent of the unfished SB of 633,468 mt. Current SB is far below that associated with MSY (124,498 mt) and is near historic low levels. NMFS has worked with the Western Pacific and Pacific Councils to develop domestic regulations to address relative domestic fishery impacts. NMFS has also worked with both Councils and the State Department to ensure that effective management measures should be adopted by the WCPFC and IATTC for 2015 and beyond.

3.1.2 Status of Billfish Stocks

3.1.2.1 North Pacific Swordfish

The 9th meeting of the WCPFC Science Committee reviewed the stock status of swordfish in the WCPO using updated catch information through 2012 and found that the stock is not overfished or experiencing overfishing in 2012 relative to MSY-based reference points (WCPFC 2013a).

Revised estimates of biological reference points were virtually identical to those from the 2009 stock assessment. The latest estimate of MSY is 14,400 mt.

3.1.2.2 North Pacific Striped Marlin

A 2012 stock assessment for Western Central North Pacific striped marlin indicates that it is likely overfished and experiencing overfishing (ISC 2012). In August 2013, NMFS determined the stock is subject to overfishing and overfished relative to Pelagics FEP reference points. NMFS will inform and work with the Western Pacific and Pacific Councils under their obligations for international and domestic management under MSA sections 304(i) and 304(i)(2). From 2013 and beyond, the current WCPFC striped marlin measure applies to CCMs with vessels fishing in the Convention Area north of the equator. Each CCM is subject to a 20 percent reduction of the highest catch of north Pacific striped marlin between 2000 and 2003. U.S. catch is below levels agreed to by the WCPFC. NMFS will work with the Councils and the State Department to determine if more effective management measures should be proposed to the WCPFC for 2014 and beyond. The 2012 stock assessment estimated MSY at 5,378 mt.

3.1.2.3 Blue Marlin

A 2013 stock assessment by the ISC Billfish Working Group concluded Pacific blue marlin is not experiencing overfishing and is not overfished relative to MSY-based reference points. However, the stock is nearly fully exploited. Stock biomass has declined since the 1970s and has been stable since the mid-2000s with a slight recent increase. Female spawning biomass was estimated to be 24,990 mt in 2011 (WCPFC 2013a).

3.1.3 Status of Shark Stocks

Clarke (2011) provided a snapshot of shark stocks in the western and central Pacific, which is summarized below.

3.1.3.1 North Pacific Blue Shark

The blue shark is probably the most common, but not the most vulnerable, of pelagic sharks. NMFS has concluded north Pacific blue sharks are not subject to overfishing and are not overfished, based on a 2009 stock assessment. The conclusion of Kleiber et al. (2009), using data through 2002, assumes that the population is at least close to MSY level and fishing mortality may be approaching the MSY level in the future. However, in recent WCPO analyses, substantial recent catch rate declines found in four different datasets for the North Pacific, in combination with demonstrated targeting of blue shark by a large commercial fleet operating in this area, are scientific grounds for concern and suggest further declines in abundance since 2002.

3.1.3.2 Shortfin Mako Shark

Recent abundance indices and median size analyses for shortfin mako in the WCPO have shown no clear trends; therefore, there is no apparent evidence of the impact of fishing on this species in

the WCPO. Most previously published stock status studies are also inconclusive. Ongoing issues of concern for the WCPO are: 1) a previously published study suggesting stock reduction in the northwest Pacific using virtual population analysis; 2) the high vulnerability of shortfin mako to longline fishing; and 3) the potential for collateral targeting in directed fishing for blue sharks in the North Pacific.

3.1.3.3 Oceanic Whitetip Shark

A recent stock assessment for oceanic whitetip shark indicates that it is likely overfished and experiencing overfishing (Rice and Harley 2012a). Recent analysis of four different datasets for the WCPO oceanic whitetip sharks show clear, steep and declining trends in abundance indices for this species. Analysis of two of these datasets for median lengths confirmed that oceanic whitetip sizes decreased significantly until samples became too scarce for meaningful analysis. Given the strong evidence for the depleted state of the oceanic whitetip population in the WCPO, stock assessment studies may clarify but will not alter the case for further conservation and management action. The assessment by Rice and Harley (2012a) conclude that current catches are lower than the MSY (2,001 mt versus 2,700 mt), but this is not surprising given the estimated stock status and fishing mortality. The greatest impact on the stock is attributed to bycatch from the WCPO longline fishery, with lesser impacts from the target longline activities and purse seining in the WCPO. Given the bycatch nature of fishery impacts, mitigation measures provide the best opportunity to improve the status of the oceanic whitetip population.

Despite the data limitations, model runs indicate that the WCPO oceanic whitetip shark stock is currently overfished and overfishing is occurring relative to commonly used MSY-based reference points and depletion-based reference points. Management measures to reduce fishing mortality and to rebuild spawning biomass through non-retention have been agreed to under CMM 2011-04, but mitigation to avoid capture was not recommended.

3.1.3.4 Silky sharks

Silky sharks have a restricted habitat range compared to the other WCPFC key species but within this range, they dominate both longline and purse seine catches. The assessment by Rice and Harley (2012b) conclude that current catches are higher than the MSY (5,950 mt versus 1,885 mt), further catch at current levels of fishing mortality would continue to deplete the stock below MSY. The greatest impact on the stock is attributed to bycatch from the longline fishery, but there are also significant impacts from the associated purse seine fishery, which catches predominantly juvenile individuals, the fishing mortality from the associated purse seine fishery is above F_{MSY}. Given the bycatch nature of fishery impacts, mitigation measures provides the best opportunity to improve the status of the silky shark population. The stock assessment of silky shark in the WCPO (Rice et al 2012b) was presented to the 8th WCPFC Science Committee. Due to concerns over the data conflict and potential biases in the silky shark assessment, it was not possible to provide management advice based on the assessment. However, noting that some basic fishery indicators (e.g., mean lengths and some CPUE series) are showing declines in recent years, the Science Committee recommended no increase in fishing mortality on silky sharks.

3.2 International Management of HMS Stocks in the Pacific

As described in section 1.4, HMS stocks are internationally managed in the Pacific by the WCPFC and IATTC. The United States is a member of both RFMOs. The following provides an overview of species-specific conservation and management measures established by the WCPFC and IATTC.

3.2.1 Western and Central Pacific Fisheries Commission

The following description of conservation management measures is freely adapted from the 2011 Performance Review of the WCPFC (WCPFC 2011b).

3.2.1.1 Measures for Bigeye, Yellowfin, and Skipjack Tunas

The WCPFC adopted CMMs for bigeye and yellowfin tunas in 2005, 2006, 2008, 2011, 2012, 2013, and 2014. The 2008 measure (CMM 2008-01) set the foundation for further WCPFC tropical tuna management by establishing effort levels for the WCPO purse seine fisheries and catch limits for the longline fisheries to reduce catches of bigeye and yellowfin tunas. CMM 2008-01 was implemented over the period from 2009-2011, and its principle objective was to reduce bigeye tuna fishing mortality by at least 30 percent from the annual average during 2001-2004. In order to achieve this, the CMM provided different measures for purse seine and longline fisheries.

For purse seine fisheries in the area bounded by 20˚ N and 20˚ S, in 2009, there was a two-month closure of fishing on FADs in the EEZs and on the high seas, and in 2010-2011 there was a three-month FAD closure. The two western high seas pockets were also closed to purse seine fishing in 2010 and 2011. Other measures for purse seine fisheries included a requirement for all CCMs fishing on the high seas to submit FAD management plans to WCPFC by July 2009, 100 percent observer coverage from January 2010, catch retention rules to create a disincentive to capture small bigeye and yellowfin tunas, and undertakings for the WCPFC and CCMs to explore methods to reduce juvenile catches.

For longline fisheries, members and cooperating non-members were to reduce their catch of bigeye tuna by 10 percent in 2009, 20 percent in 2010, and 30 percent in 2011, relative to average 2001-2004 levels. Exceptions and variations were provided to several CMMs as follows:

- SIDS and PTs were provided 2,000 mt limits, but no limits if conducting responsible fisheries development;
- Non-SIDS CCMs with a base catch of less than 2,000 mt of bigeye tuna are limited to 2,000 mt;
- China, Indonesia and USA use 2004 as the base level to reduce their bigeye tuna catch, rather than 2001-2004;
- The limits for China will remain at 2004 levels pending agreement regarding the attribution of Chinese catch taken as part of domestic fisheries in the EEZs of coastal states; and
- The reductions specified for 2010 and 2011 shall not apply to fleets with a total longline catch of less than 5,000 mt and landing exclusively fresh fish. This exemption effectively

applied to the United States' Hawaii-based longline fleet only. Accordingly, the Hawaii-based longline fishery was subject to one 10% reduction resulting in the annual limit of 3,763 mt.

CMM 2008-01 included the requirement that CMMs not increase the yellowfin catch in their longline fisheries from 2001-2004 levels.

CMM 2008-01 was extended for a year by CMM 2011-01. The WCPFC evaluated the effectiveness of CMM 2008-01 in 2011 and 2012 based on analysis using the WCPO catch of bigeye tuna in recent years and has projected the status of bigeye tuna through 2020. For example, maintenance of observed 2009 bigeye tuna catch and fishery effort levels results in F/F_{MSY} remaining high, with a projected level of $F/F_{MSY} = 1.40$ in 2021 (Pilling et al. 2013; Figure 3). Under a scenario best approximating reported fishery catch and effort in 2010, F/F_{MSY} declines and is at a projected level of 0.96 by 2021. This is driven by several factors: the lower than usual FAD use in 2010, the lower longline catches, and a large (30%) reduction in reported catches from the domestic fisheries of Indonesia and the Philippines. For a scenario approximating 2011 fishery conditions, F/F_{MSY} stabilizes at a projected level of 1.29. The difference between 2010 and 2011 fishery outcomes is mainly due to the return to higher levels of FAD-based purse seine effort in 2011 (Pilling et al. 2013).

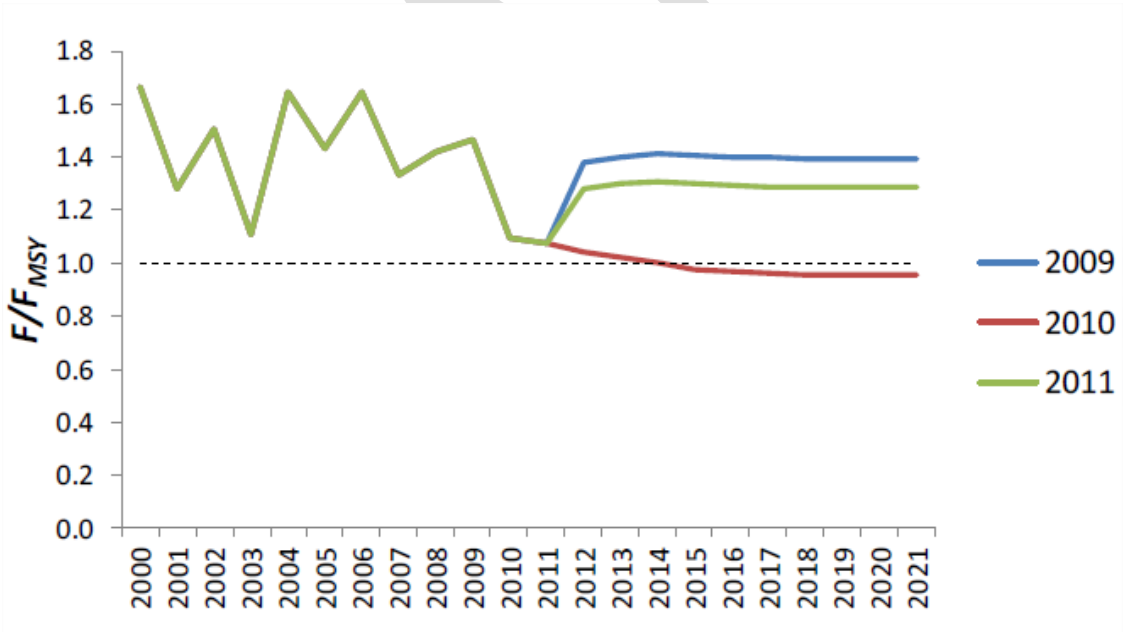

Figure 2: Recent historical and projected F/F_{MSY}, for bigeye tuna under 2009, 2010, and 2011 fishing patterns, assuming that future recruitment is constant at its average 2000-2009 level.
Source: Pilling et al. 2013.

Based on available catch data, Pilling et al. (2013) describe that if catch and effort levels for the WCPO purse seine and longline fisheries were held at 2010 levels, bigeye tuna overfishing would be eliminated in the WCPO by 2021 (Pilling et al. 2013). The expected reduction was based on several factors: the lower than usual purse seine FAD use in 2010, lower longline

catches, and a large (30%) reduction in reported catches from the domestic fisheries of Indonesia and the Philippines. Reductions in purse seine FAD effort in 2010 had the greatest effect in terms of removing overfishing (67.4% of overfishing removed) followed by the reduction in longline catch in 2010 (34.7% of the overfishing removed; Pilling et al. 2013).

However, the low FAD usage in 2010 was followed in 2011 by the highest recorded number of FAD sets in the purse seine fishery, resulting in the highest catch of bigeye tuna by the purse seine fishery on record (Williams and Terawasi 2012). Total effort in the purse seine fishery has also increased from 2004 levels to 21 percent higher levels in 2012, and related to an increasing number of purse seine vessels operating in the WCPO (Pilling et al. 2013). The catch of bigeye tuna by the WCPO longline fishery is reported to have increased slightly from 66,441 mt in 2010 through 67,557 mt in 2011 to 71,148 mt in 2012 (79%, 81%, and 85% of the average catch for 2001-2004; Pilling et al. 2013). For yellowfin tuna, the longline catch in 2001-2004 averaged 75,712 mt. In 2010 and 2011, the catches of yellowfin were 75,582 mt and 75,393 mt respectively, and fell below the 2001-2004 average level in 2012 to 65,582 (Pilling et al. 2013).

Recognizing that the CMM 2008-01 was not effective in eliminating bigeye tuna overfishing, the WCPFC agreed at its 9th Regular Session on CMM 2012-01, which among other provisions, establishes a goal of reducing bigeye tuna mortality to a level no greater than $F/F_{MSY} \leq 1$, through a step-by-step approach through 2017. CMM 2012-01 maintained bigeye tuna limits for distant water fleets, including the U.S. longline catch limit of 3,763 mt, but did not provide annual longline bigeye tuna catches for any of the PTs or SIDS (Table 5). CMM 2012-01, among other things, also increased the FAD closure by a month, requiring a four-month purse seine FAD closure or equivalent reduction in purse seine FAD sets (see WCPFC 2012). CMM 2012-01 did not include longline catch limits for yellowfin tuna.

Table 4: Bigeye tuna longline limits in metric tons under CMM 2012-01.

CCMs	CMM 2012-01 limits (mt)	CCMs	CMM 2012-01 limits (mt)
American Samoa	unrestricted	Niue	unrestricted
Australia	2,000	Northern Mariana Is.	unrestricted
Belize	805	Palau	unrestricted
China	10,673	Papua New Guinea	unrestricted
European Union	2,000	Philippines	2,000
Fiji	unrestricted	Republic of Korea	15,014
French Polynesia	unrestricted	Samoa	unrestricted
New Caledonia	unrestricted	Solomon Islands	unrestricted
Fed. States of Micronesia	unrestricted	Chinese Taipei	15,014
Guam	unrestricted	Tokelau	unrestricted
Indonesia	5,889	Tonga	unrestricted
Japan	19,670	Tuvalu	unrestricted
Kiribati	unrestricted	USA	3,763
Marshall Islands	unrestricted	Vanuatu	unrestricted
Nauru	unrestricted	Wallis and Fortuna	unrestricted
New Zealand	2,000		

Source: WCPFC CMM 2012-01.

In December 2013, the WCPFC agreed on a conservation and management measure (CMM 2013-01) that builds off CMM 2012-01. The measure applies to purse seine, longline, and other fisheries taking skipjack, yellowfin, and bigeye. To address impacts to bigeye, the purse seine fishery, in 2014, is subject to a 4 month FAD closure or 3-month FAD closure plus a flag based FAD set limits shown in Attachment A of the measure. For years 2015 and 2016, CCMs with purse seine fisheries can either choose to restrict their vessels to a 5 month FAD closure plus limiting their vessels to their 2010-2012 FAD set average or restrict their vessels to a 3 month FAD closure plus restrict their vessels to FAD set limits shown in Attachment A of the measure. For 2017, CCMs shall follow the purse seine options available for 2015 and 2016 in addition to prohibiting their vessels from FAD sets on the high seas for the entire calendar year. As stated in CMM 2013-01, implementing the fifth month of FAD closure was conditional upon the WCPFC determining that the extra month FAD closure did not place a disproportionate conservation burden on SIDS. No such agreement occurred at the 11th Regular Session of the WCPFC held in December 2014, and as such, a five-month FAD closure is not required and 2014 measures are maintained for 2015 (see CMM 2014-01).

For the longline fishery, CMM 2013-01 provides flag-based bigeye catch limits through 2017 representing a 15% reduction from the limits established in 2012-01. Overall, the WCPO longline bigeye catch limits established under CMM 2013-01 represent a 41% reduction from the limits established under CMM 2008-01 (see Table 6; see also Table 7).

Under CMM 2013-01, the US WCPO longline bigeye limit for 2014 is maintained at the 3,763 mt, but is reduced by 5.5 percent in 2015 to 3,554 mt. For 2016, the US limit is maintained at 3,554 mt, but for 2017, the US longline limit will be 3,345, which represents an 11% reduction from the 3,763 mt level. If the reductions to the US limit are taken collectively, the US longline bigeye limit of 3,345 mt represents a 20 percent reduction from the 2004 baseline level used in CMM 2008-01. The measure (CMM 2013-01) also limits members that harvested less than 2,000 mt of bigeye in 2004 to no more than 2,000 mt for each of the years 2014 through 2017. However, paragraph 7 of CMM 2013-01 does not establish an individual limit on the amount of bigeye tuna that may be harvested annually in the Convention Area by the SIDS and PTs, including American Samoa, Guam, and the CNMI.

The total 2013 catch of bigeye by longline vessels operating in the WCPO was approximately 60,000 mt, the lowest on record since the mid-1990s (Williams and Terawasi 2014). For the non-SIDS countries that have WCPFC-established longline limits, their cumulative catches represent a 38 percent reduction from baseline (CMM 2008-01) levels (NMFS unpublished).

Table 5: Bigeye tuna longline limits in metric tons under CMM 2013-01.

CCMs	Longline Catch Limits			
	2014 (2012 catches)	**2015**	**2016**	**2017**
American Samoa	unrestricted (1,505)	unrestricted	unrestricted	unrestricted
Australia	2,000 (482)	2,000	2,000	2,000
Belize	2,000 (132)	2,000	2,000	2,000
China	9,938 (11,324)	8,224	8,224	7,049
European Union	2,000 (23)	2,000	2,000	2,000
Fiji	unrestricted (1,558)	unrestricted	unrestricted	unrestricted
French Polynesia	unrestricted (654)	unrestricted	unrestricted	unrestricted
New Caledonia	unrestricted (49)	unrestricted	unrestricted	unrestricted
Fed. States of Micronesia	unrestricted (948)	unrestricted	unrestricted	unrestricted
Guam	unrestricted (0)	unrestricted	unrestricted	unrestricted
Indonesia	5,889 (3,681)	5,889	5,889	5,889
Japan	19,670 (12,259)	18,265	18,265	16,860
Kiribati	unrestricted (451)	unrestricted	unrestricted	unrestricted
Marshall Islands	unrestricted (335)	unrestricted	unrestricted	unrestricted
Nauru	unrestricted (0)	unrestricted	unrestricted	unrestricted
New Zealand	2,000 (154)	2,000	2,000	2,000
Niue	unrestricted (0)	unrestricted	unrestricted	unrestricted
Northern Mariana Is.	unrestricted (0)	unrestricted	unrestricted	unrestricted
Palau	unrestricted (0)	unrestricted	unrestricted	unrestricted
Papua New Guinea	unrestricted (119)	unrestricted	unrestricted	unrestricted

Philippines	2,000 (0)	2,000	2,000	2,000
Republic of Korea	15,014 (18,823)	13,942	13,942	12,869
Samoa	unrestricted (54)	unrestricted	unrestricted	unrestricted
Solomon Islands	unrestricted (0)	unrestricted	unrestricted	unrestricted
Chinese Taipei	11,288 (10,994)	10,481	10,481	9,675
Tokelau	unrestricted (0)	unrestricted	unrestricted	unrestricted
Tonga	unrestricted (10)	unrestricted	unrestricted	unrestricted
Tuvalu	unrestricted (1,408)	unrestricted	unrestricted	unrestricted
USA	3,763 (3,654)	3,554	3,554	3,345
Vanuatu	unrestricted (2,151)	unrestricted	unrestricted	unrestricted
Wallis and Fortuna	unrestricted (0)	unrestricted	unrestricted	unrestricted

Source: WCPFC CMM 2013-01.
Note: The values in parenthesis provide 2012 reported longline bigeye catches for comparison to future year limits.

3.2.1.2 Impacts to the Bigeye Tuna in the WCPO

The greatest fishery impact to the WCPO bigeye tuna stock is in the equatorial region where approximately 90 percent of fishing mortality occurs, while the temperate regions are estimated to be moderately exploited (WCPFC 2011a). The distribution of cumulative bigeye tuna catch from the period of 1990 to 2010 is provided in Figure 4. The 2014 stock assessment for WCPO bigeye tuna indicates that longline fishing is almost entirely responsible for the fisheries impacts in Regions 2, 5, and 6 (see Figure 4). In Region 1, the current impact is shared between foreign longline and Japanese coastal surface fisheries. In Region 3, the purse seine fishery has the greatest impact followed by longline and the domestic fisheries of Indonesia and the Philippines. In Region 4, the purse seine and longline fisheries have similar impacts. Region 2 only experiences longline effort. The Hawaii deep-set longline fishery fishes in Region 2 and 4, with majority of bigeye catches in Region 2 (NMFS unpublished data).

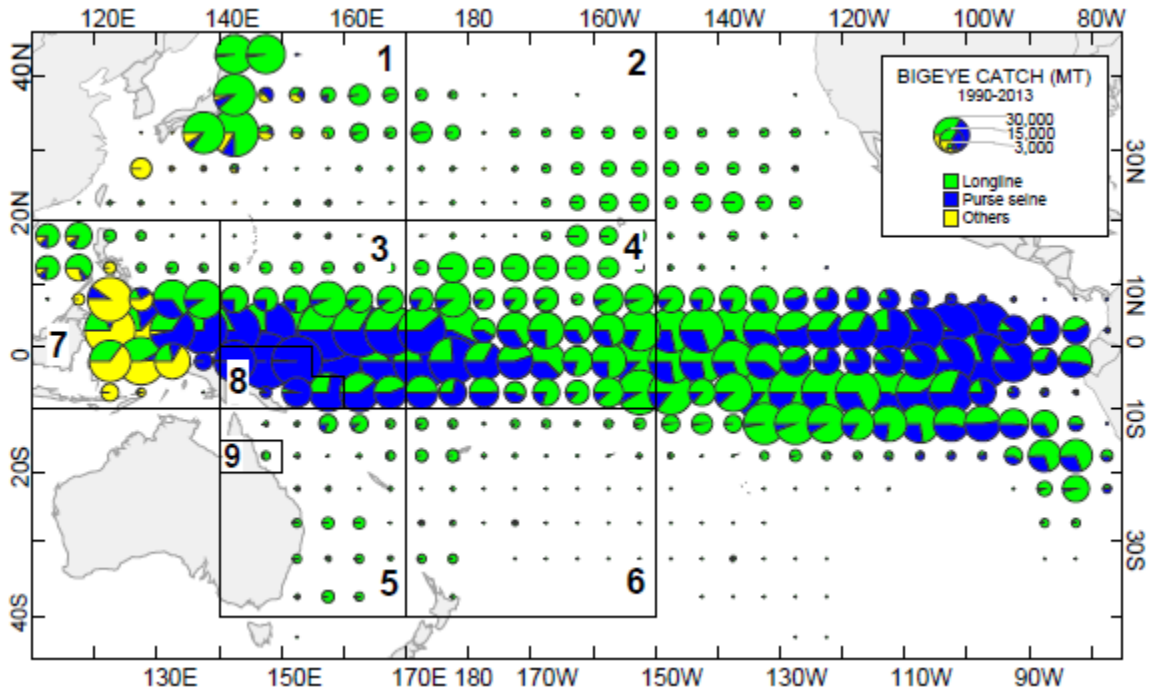

Figure 3: Distribution of cumulative bigeye tuna catch from 1990-2013 by 5-degree squares of latitude and longitude and by fishing gear.
Note: The six-region spatial stratification used in stock assessment for the Western and Central Pacific Convention Area (WCP–CA) is shown. Longline catches of bigeye tuna in the eastern Pacific may not be fully covered. The Hawaii deep-set longline fishery fishes in Regions 2 and 4.
Source: Williams and Terawasi 2014.

As the catches of bigeye tuna by the purse seine fishery are comprised of primarily of juveniles, the fishery has been reducing the MSY of the stock since the 1980s, when the purse seine fishery began fishing on FADs (Figure 5; Davies et al. 2011). As described in the 2011 stock assessment, prior to 1970, the fishery for bigeye tuna in the WCPO was almost exclusively conducted using longlines, with a low exploitation of small bigeye tuna (Davies et al. 2011). The associated age-specific selectivity (i.e., primarily adult fish harvested) resulted in a substantially higher level of MSY (~150,000 mt per annum) compared to that estimated for the fishery based on the recent age-specific fishing mortality pattern (about 77,000 mt). The decline in the MSY over time follows the increased development of those fisheries that catch younger bigeye tuna, principally purse seine fisheries. Harley et al. (2010) demonstrated using a yield-per recruit analysis, that almost 75 percent of the potential MSY from the WCPO bigeye tuna stock is not accessed by the current fishery composition due to the selectivity patterns for smaller and younger fish. Said differently, MSY levels would rise if mortality of small fish were reduced which would allow greater overall yields to be sustainably obtained (Davies et al. 2011).

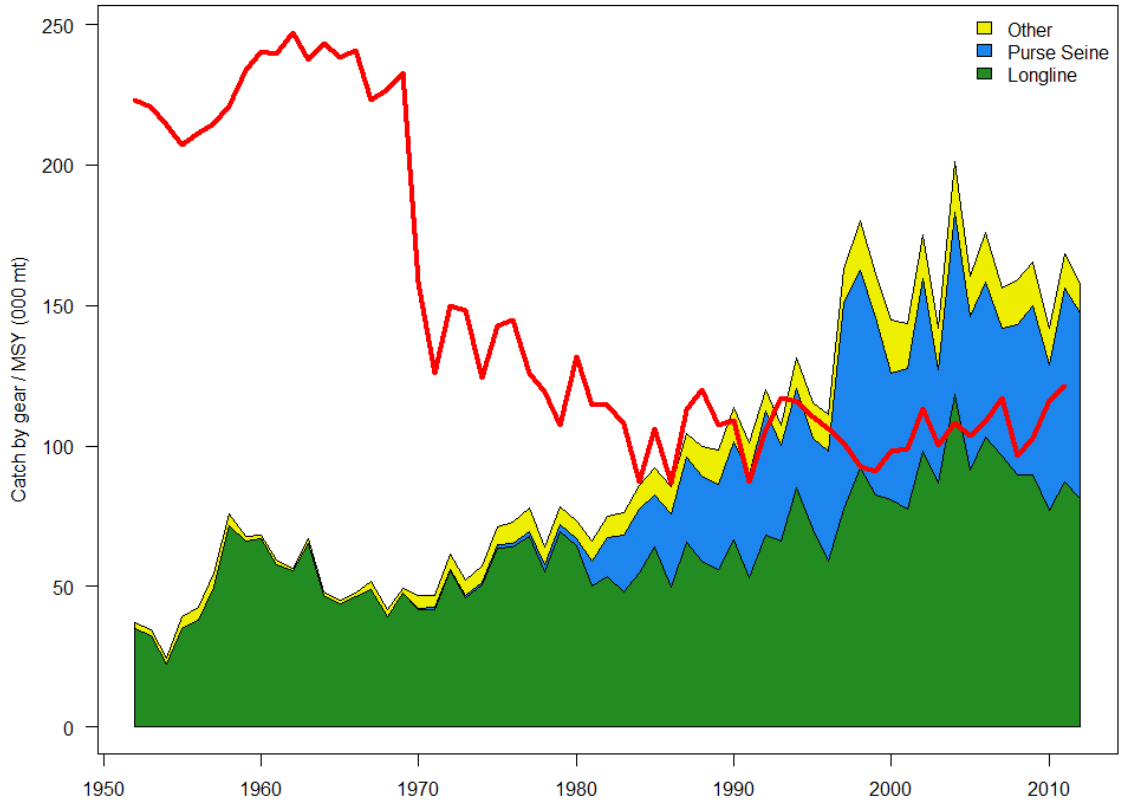

Figure 4: History of the annual estimates of bigeye tuna MSY level compared with annual catch split into three sectors.
Note: Single, solid red line indicates estimated MSY level.
Source: Harley et al. 2014

3.2.1.3 WCPO Purse Seine Fisheries

The world's largest tuna fishery is the purse seine fishery in the WCPO. The WCPO purse seine fishery, which targets skipjack and yellowfin, dominates landings, representing approximately 72 percent of the total Western and Central Pacific-Convention Area (WCP-CA) catch in 2014 and 56 percent of the value (Williams and Terawasi 2014). The WCPO purse-seine fishery is primarily a skipjack fishery, unlike purse seine fisheries in other ocean areas. Skipjack tuna generally accounts for 70-85 percent of the WCPO purse seine catch, with yellowfin tuna accounting for 15-30 percent and bigeye tuna accounting for only a small proportion of the catch (Williams and Terawasi 2014; Figure 6).

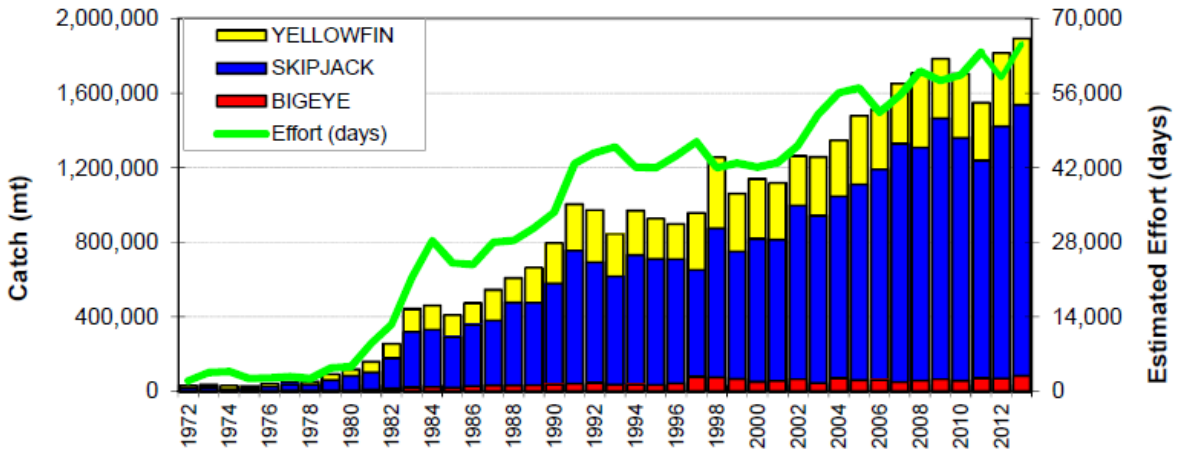

Figure 5: Purse seine catch in the WCP-CA for skipjack, yellowfin, and bigeye tunas, and estimated fishing effort (days fishing and searching).
Source: Williams and Terawasi 2014.

According to Williams and Terawasi (2014), the majority of the historic WCP-CA purse seine catch has come from the four main Distant Water Fishing Nation (DWFN) fleets –Japan, Korea, Chinese-Taipei and USA, which numbered 163 vessels in 1992, declined to a low of 111 vessels in 2006 before increasing again to 142 vessels in 2013.[14] The Pacific Islands fleets have gradually increased in numbers over the past two decades to a level of 95 vessels in 2013 (see Figure 7). The remainder of the purse seine fishery includes several fleets, which entered the WCPFC tropical fishery in the 2000s (e.g., China, Ecuador, El Salvador, New Zealand, and Spain). The total number of purse seine vessels was relatively stable over the period 1990-2006 (in the range of around 180–220 vessels), but over the last five years, the number of vessels has increased, attaining a record level of 297 vessels in 2013 (Williams and Terawasi 2013).

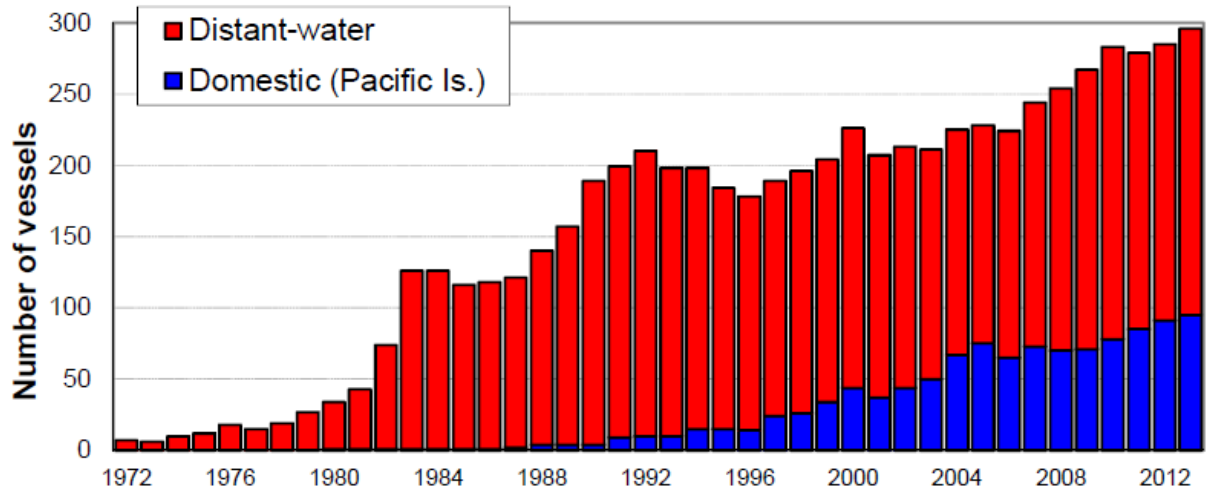

Figure 6: Number of purse seine vessels operating in WCP-CA, 1972-2013.
Source: Williams and Terawasi 2014.

[14] There are a large number of ringnet and small purse seine vessels in Indonesia, Japanese Coastal and Philippines doemestic fisheries not included in the vessel numbers presented above (Williams and Terawasi, 2014).

The purse seine fishery incidentally catches juvenile bigeye and yellowfin tunas while fishing on FADs, although some juvenile bigeye tuna are caught in free-swimming schools of yellowfin. While the percentage of bigeye tuna in the total catch of the purse seine fishery is believed to be relatively low (approximately 5 percent in WCPO, but varies between fleets), the massive volume (~1.8 million mt) of the purse seine fishery results in substantial amount of juvenile bigeye tuna mortality. The juvenile bigeye tuna fishing mortality coupled with the longline fishery targeting adult bigeye tuna has resulted an overfishing condition in the WCPO. The impact of the purse seine fishery on the MSY of the bigeye tuna stock is substantial because of the number of juvenile fish killed by purse seine vessels as compared to the primarily adult bigeye tuna taken by longline vessels. The total weight of fish taken by both fisheries is similar as seen in Figure 8; however, Figure 9 shows the number of fish taken by the purse seine fishery is far greater than the longline fishery.

Large-scale purse seine fishing in the WCPO commenced after the mid 1970s, when purse seine bigeye tuna catches were minor and ranged from 1,000-2,000 mt a year. Total purse seine catches averaged about 400,000 mt in the 1980s, about 1 million mt in the 1990s and 1.5 million mt in the 2000s. The combined 2013 purse seine catch (all species) was the highest on record at over 1.8 million metric tons with a delivered value of approximately $4 billion (Williams and Terawasi 2014). During the last 30 years, purse seine bigeye tuna catches rose steadily from less than 2,000 mt in the 1970s to an average of 50,000 mt per year by the beginning of the 2000s and over 60,000 mt by the end that decade. The 2011 and 2012 purse seine fishery catch of bigeye tuna was estimated at 77,000 mt and 69,000 mt respectively (Williams and Terawasi 2013). The 2013 (provisional) purse seine fishery catch of bigeye is estimated at 82,000 mt, which is the highest on record. Catches of bigeye tuna in the purse seine fishery may be higher than reported as it is difficult to estimate the bigeye tuna catches in the purse seine fishery due to the color and other physical similarities between juvenile bigeye and yellowfin tunas, in addition to comprehensive sampling being logistically difficult during purse seining operations.

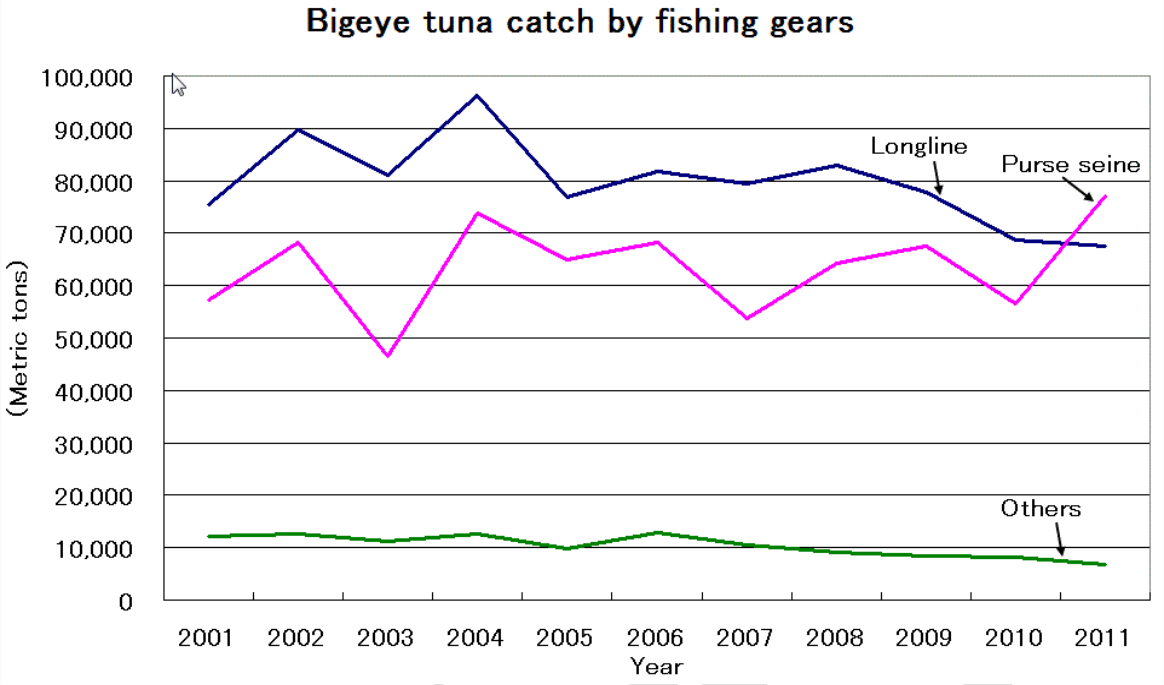

Figure 7: Volume of bigeye tuna catch by weight in the WCPO.
Source: http://oprt.or.jp/eng//wp-content/uploads/2013/02/bigeye%20catch%20by%20fishing%20gears_2.gif
Based on data from WCPFC SC8-2012/ST IP-1.

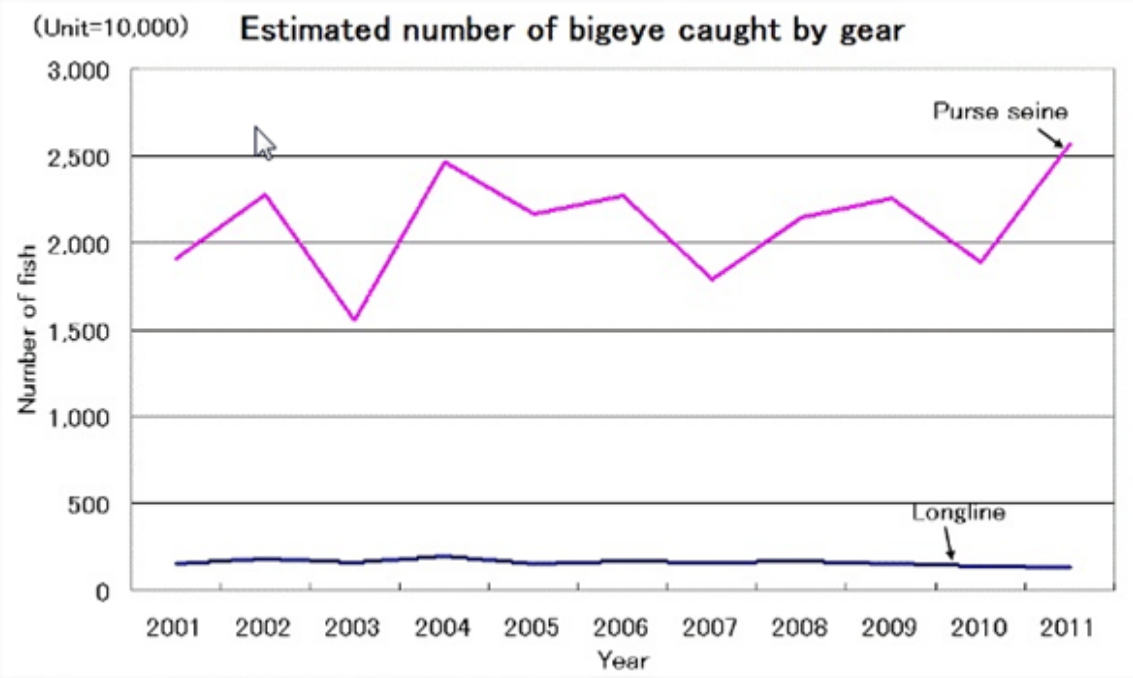

Figure 8: Estimated number of bigeye tuna caught by purse seine and longline gear in the WCPO.
Source: http://oprt.or.jp/eng//wp-content/uploads/2013/02/bigeye%20catch%20by%20fishing%20gears_2.gif

Based on data from WCPFC SC8-2012/ST IP-1.

3.2.1.4 WCPO Longline Fisheries

The following description of the longline fisheries occurring in the WCP-CA presents highlights of a report on the WCPCA fisheries by Williams and Terawasi (2014).

Longline fishing accounts for around 10-13 percent of the total WCP-CA catch, and used to rival the much larger purse seine catch in landed value. The longline fishery provides the longest time series of catch estimates for the WCP-CA, with estimates available since the early 1950s. The total number of vessels involved in the fishery has generally fluctuated between 3,500 and 6,000 for the last 30 years (see Figure 10), although for some distant-water fleets, vessels operating in areas beyond the WCP-CA could not be separated out and more representative vessel numbers for WCP-CA have only become available in recent years.

The fishery involves two main types of operation, namely:

- Large (typically >250 gross ton (GRT)) distant-water freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore tuna) species.
- Smaller (typically <100 GRT) offshore vessels, which are usually domestically-based, undertaking trips of less than one month, with ice or chill capacity, and serving fresh or air-freight sashimi markets, or albacore canneries. There are several foreign offshore fleets based in Pacific Island countries. The Hawaii and American Samoa longline fleets belong in this type of operational category

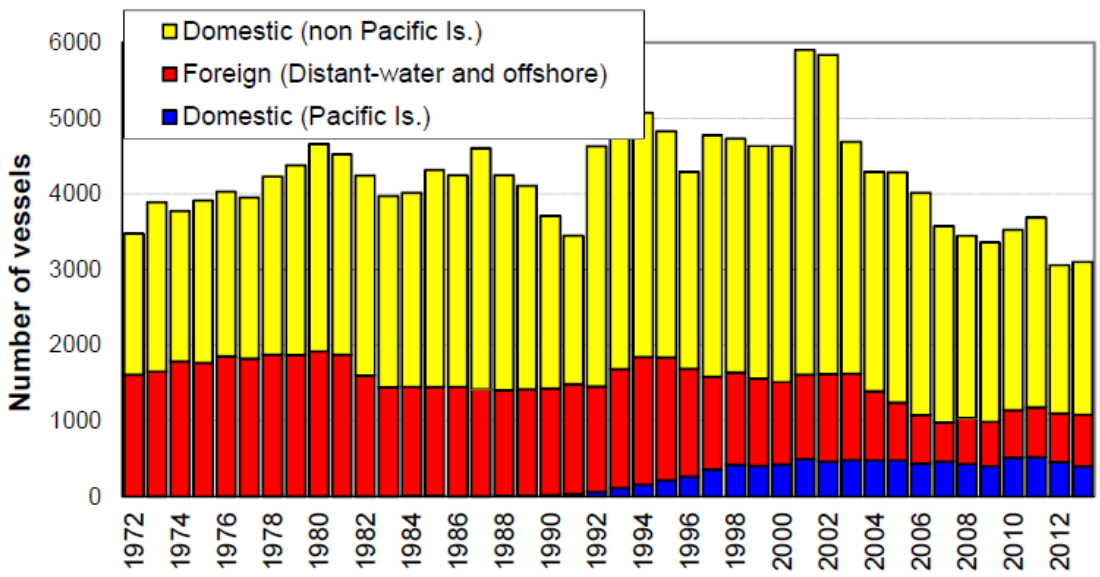

Figure 9: Longline vessels operating in the Western and Central Pacific–Convention Area. Source: Williams and Terawasi 2014.

The provisional WCP-CA longline catch (230,073 mt) for 2013 was the lowest catch since 1999. (Williams and Terawasi 2014). The WCP–CA albacore longline catch (100,666 mt – 47%) for 2013 was the second highest on record. The provisional bigeye tuna catch (62,641 mt – 29%) for 2013 was is the lowest since 1996. The yellowfin catch for 2013 (65,499 mt – 30%) was the lowest since 1991(see Figure 11; Williams and Terawasi 2014).

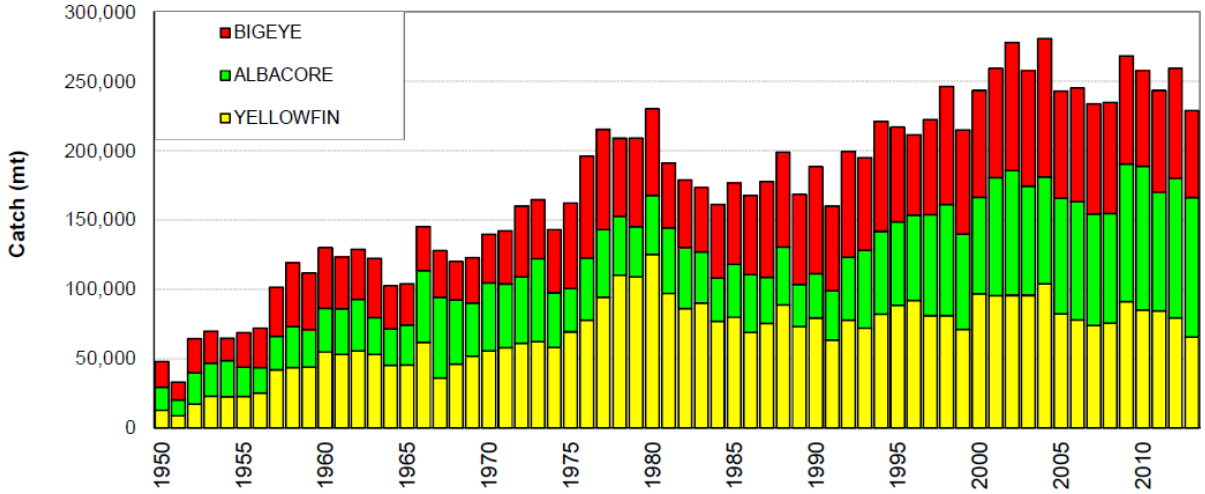

Figure 10: Longline catch (mt) of target tunas in the Western and Central Pacific–Convention Area.
Source: Williams and Terawasi 2013.

The reported longline catch of bigeye tuna by CCM from years 2001-2012 is provided in Table 7. Significant increases in bigeye tuna catch by China and Chinese Taipei in the early 2000s are observed, while Japan's longline bigeye tuna catch is showing a declining trend since the 2008. Catches by the U.S. longline fleet have been stable.

Table 6: Reported longline catches (metric tons) of bigeye tuna in the WCPFC-CA, by flag, 2001-2012.

CCM	2001	2002	2003	2004	Avg. 2001-2004	CMM 2008-01 Attch. F	CMM 2008-01 (Current)	2005	2006	2007	2008	2009	2010	2011	2012	2013	CMM 2012-01 limits for 2013	See notes
AMERICAN SAMOA	75	196	242	227	185	185		134	181	218	132	249	487	1,176	1,505	359		(4)
AUSTRALIA	1,307	1,002	1,024	892	1,056	1,056	2,000	791	499	1,008	1,027	726	458	379	482	482	2,000	(7)
BELIZE	1,322	812	782	297	803	803	803	425	254	158	89	43	89	102	132	217	803	(8)
CHINA	2,227	2,312	8,965	11,748	6,313	9,314	11,748	7,520	13,378	10,535	10,798	15,289	13,924	11,139	11,324	10,671	10,673	(10) (11)
CHINESE TAIPEI	12,435	16,645	14,429	20,992	16,125	15,854	16,125	15,498	14,295	14,760	15,229	13,319	11,552	11,275	10,994	10,600	11,288	(11) (13)
COOK ISLANDS	1	56	204	394	164	164		220	166	238	292	217	192	394	333	205		(4)
CNMI	0	0	0	0	0	0		0	0	0	0	0	0	0	0	501		(4)
EU-Spain	0	0	0	42	11	11	2,000	17	62	62	77	46	15	10	23	23	2,000	(10)
FSM (FED. STATES MICRONESIA)	651	759	656	542	652	652		182	172	1,395	970	1,395	899	1,269	948	1270		(4)
FIJI	662	853	889	1,254	915	915		423	771	556	671	689	532	604	1,588	1018		(4)
FRANCE (FRENCH POLYNESIA)	745	649	439	502	584	584		606	498	478	490	587	436	607	654	787		(4)
FRANCE (NEW CALEDONIA)	128	189	142	90	137	137		76	35	53	63	51	44	41	49	51		(4)
FRANCE (WALLIS AND TUTUNA)	0	0	0	0	0	137		0	0	0	0	0	0	6	0	0		(4)
GUAM	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0		(4)
INDONESIA	942	1,470	2,168	2,192	1,693	8,413	2,192	2,202	3,011	1,993	3,579	4,000	1,221	1,699	3,681	2,860	2,000	(12)
JAPAN	27,466	29,574	26,110	29,248	28,100	28,100	28,100	23,021	25,685	26,076	19,593	16,880	15,927	16,616	15,418	11,723	19,670	
KIRIBATI	0	0	1	0	0	0		0	0	0	44	0	3	70	451	582		(4)
MARSHALL ISLANDS	0	0	0	1	0	0		0	0	3	375	381	257	259	335	80		(4)
NAURU	6	3	10	0	5	5		0	0	0	0	0	0	0	0	0		(4)
NEW ZEALAND	481	201	204	177	266	266	2,000	175	177	213	133	253	132	174	154	109	2,000	(7)

CCM	2001	2002	2003	2004	Avg. 2001-2004	CMM 2008-01 Attch. F	CMM 2008-01 (Current)	2005	2006	2007	2008	2009	2010	2011	2012	2013	CMM 2012-01 limits for 2013	See notes
NIUE	0	0	0	0	0	0		10	22	18	1	10	4	0	0	0		(4)
PALAU	21	1	1	7	8	8		0	0	0	0	0	0	0	0	0		(4)
PAPUA NEW GUINEA	240	318	390	399	337	335		237	216	111	201	128	39	59	119	32		(4)
PHILIPPINES	59	59	59	59	59	343	2,000	59	59	59	59	59	59	0	0	167	2,000	(6,7)
PORTUGAL	0	0	0	0	0	0	2,000	0	0	0	0	0	0	0	0	106	2,000	
REPUBLIC OF KOREA	22,172	28,533	17,151	17,941	21,449	21,499	21,449	15,622	12,489	10,054	17,001	15,231	13,914	15,282	18,823	12,818	15,014	(11) (13)
SAMOA	185	137	110	104	134	134		64	128	101	106	117	108	71	54	36		(4)
SENEGAL	0	0	0	0	0	0		0	3	2	0	0	0	0	0	0		
SOLOMON ISLANDS	187	401	385	294	317	476		3	0	0	0	0	481	481	0	0		(4, 11)
TONGA	191	215	94	40	135	135		125	117	129	81	38	24	18	10	7		(4)
TUVALU	0	0	0	0	0	135		0	0	0	0	0	0	105	1,408	76		(4)
USA	2,418	4,396	3,618	4,181	3,653	4,181	4,181	4,462	4,381	5,381	4,649	3,741	3,577	3,565	3,654	3,612	3,763	
VANUATU	17	396	841	1,862	779	779		1,558	1,651	2,122	860	1,300	2,060	2,060	2,141	1989		(4)
Total	73,938	89,177	78,914	93,485	83,879	94,621	92,598	73,430	78,250	75,723	76,520	74,749	66,250	65,219	71,148	60,487	75,100	
VIETNAM	1,450	614	2,129	2,781				3,527	3,538	3,648	3,358	2,992	2,441	3,424	3761	2,260		(9)

Source: WCFPC Working Group on Tropical Tunas. CMM tropical tunas data summary (v21-08-2013). WCPFC-2013-WGTT/-08 (WCPFC 2013c). This table is adapted from the original in the report to include CNMI and Guam.

Notes:

1. 2013 data for all CCMs are provisional.
2. Catch estimates in red have been carried over from previous years.
3. Indonesia and Philippines have recently revised their estimates in recent years. (see the respective Annual Catch Estimate Workshop reports at (http://www.wcpfc.int/west-pacific-east-asia-oceanic-fisheries-management-project)
4. The limits in the column labeled “CMM 2012-01 for 2013” do not apply to small island developing State members and participating Territories according to paragraph 7 of CMM 2012-01 and CMM 2013-01.
5. Catches and effort of vessels operating under charters and similar arrangements have been attributed to host island states or territories in accordance with paragraph 5 of CMM 2012-01 using the best information available to SPC-OFP. However, in several cases, catches have not yet been attributed to the CCM responsible for the "charter or similar arrangements" since the flag state CCM has yet to advise that it has excluded

these catches from their data (and thereby avoid double-counting).

6. Estimates include archipelagic water catches which for some countries cannot be separated at this stage (e.g. Philippines).
7. The catch limits established at 2,000t prior to 2010, remain at the level of 2,000t. (according to CMM 2008-01 Para. 32)
8. Subject to CNM on participatory rights, in accordance with paragraph 6 of CMM 2013-01 for years from 2014 onwards.
9. The Vietnam longline fleet are understood to fish outside the WCFPC Convention Area (South China Sea).
10. Catches by the Chinese longline fleet in the Kiribati EEZ are included in the estimates.
11. Catches by chartered Chinese, Korean and Chinese-Taipei longline vessels licensed to fish in Solomon Islands waters have been attributed to the Solomon Islands for 2010 and 2011.
12. Indonesia bigeye tuna catch excludes catches in Archipelagic waters.
13. Korea and Chinese Taipei will voluntarily restrict its catch level at 2% less than the catch limits specified here in 2013.
14. "CMM 2012-01 limits for 2013" is according ATTACHMENT F in CMM 2012-01 and refer to catch limits for 2013 only.

3.2.1.5 Other Species-based WCPFC Conservation and Management Measures

See Amendment 7 for a description of other WCPFC CMMs applicable to commercial pelagic fisheries targeting HMS stocks in the WCP-CA.

3.2.2 Inter-American Tropical Tuna Commission

3.2.2.1 Bigeye Tuna Conservation Resolution

A tuna conservation resolution primarily for the purposes of bigeye tuna conservation was adopted by the IATTC in June 2013, for the three-year period (2014-2016), extending the previous resolution which expired at the end of 2013. This includes an EPO wide closure for purse seine (>182 mt) fishing of 62 days in each of those years, along with a 30 day closure of a core offshore FAD fishing area. There is a special provision for class 4 vessels (182-272 mt) which permits 30 days of fishing during the EPO closure provided an observer is aboard. For longline vessels (>24 m) the resolution includes fixed bigeye tuna catch limits for China (2,507 mt), Japan (32,372 mt), Korea (11,947 mt), and Chinese Taipei (7,555 mt), and other members to not to exceed 500 mt or their respective catches in 2001, whichever is greater.

3.2.2.2 Purse Seine Fishing in the EPO

Until about 1960, fishing for tunas in the EPO was conducted by pole-and-line vessels operating in coastal regions and near offshore islands and banks. During the late 1950s and early 1960s, most of the larger pole-and-line vessels were converted to purse seiners, which since 1961, have d the EPO fishery was dominated by these vessels. The number of purse seine vessels operating in the EPO peaked in the early 1990s at 288 vessels. Currently, there are 239 purse seine vessels registered on the IATTC's active vessel registry.[15]

Total catches of the EPO purse seine fishery are 500,000 mt, and comprised mostly of yellowfin and skipjack. Prior to 1994, the annual retained catch of bigeye tuna taken by purse-seine vessels in the EPO was about 8,000 mt. Following the development of FADs in the EPO, the annual retained catches of bigeye tuna increased from 35,000 mt in 1994 to between 44,000 mt and 95,000 mt during 1995-2011. The preliminary estimate of the retained catch in the EPO in 2012 is 69,000 mt (IATTC 2013).

3.2.2.3 Longline Fishing in the EPO

There are 1,227 large-scale longline vessels (greater than 24 m) authorized to operate in the eastern Pacific Ocean, in the waters under the jurisdiction of the IATTC. The major longline fleets are Japan (290 vessels), Korea (197), China (237) Chinese Taipei (149), and European Union, Spain, and Portugal (154). The balance is formed by fleets from the U.S. (42), and countries of Central and South America.[16]

[15] http://www.iattc.org/VesselRegister/VesselList.aspx?List=AcPS&Lang=ENG
[16] http://www.iattc.org/VesselRegister/VesselList.aspx?List=Longline&Lang=ENG

Within the last decade, there has been a significant decline in longline catches for bigeye tuna in the EPO, most notably for Japan and Korea. For example, the 2011 bigeye tuna longline catch (25,216 mt) in the EPO was 25 percent of 1991's record high of 104,195 mt. Prior to 1994, longliners caught an average of 94 percent of the bigeye tuna in the EPO (average 80,000 mt; range 46,000 mt to 104,000 mt). During 1997-2011, this percentage dropped to an average of 40 percent, with a low of 25 percent in 2008. The preliminary estimate of the longline bigeye tuna catch in the EPO in 2012 is 19,000 mt (IATTC 2013).

3.3 Pelagic Fisheries of the Territories and State of Hawaii

The following is an overview of the pelagic fisheries of the Territories and State of Hawaii. For a more detailed description of these fisheries, including catch and effort statistics, see Amendment 7, Appendix C.

3.3.1 American Samoa

American Samoa commercial fisheries have changed from trolling with smaller boats targeting skipjack and yellowfin tuna, to larger boats for longline fishing primarily targeting albacore tuna for canning in Pago Pago. The rapid expansion of longline fishing effort within the EEZ waters around American Samoa in 2000 prompted the Council to develop a limited entry system for the American Samoa pelagic longline fishery (Amendment 11 to the Pelagic FMP). The objectives of the limited entry were to: avoid a boom-and-bust cycle that could disrupt community participation in the small scale pelagic fishery; adjust regulations to more rigorously monitor and manage the fishery; limit the number of vessels engaged in longline fishing and separate large and small vessels to reduce the potential for fishing gear conflicts; maintain local catch rates of albacore at economically viable levels; and provide opportunity for substantial participation by indigenous islanders in the large vessel sector. This limited program was implemented by NMFS in 2005, and limited the total number of permits at 60 (see 50 CFR § 660.816).

The limited entry permit program appears to have been successful at preventing unwanted expansion. However, most of the smaller vessels have left the fishery and the Council has recently recommended changes to the permit program that are intended to improve opportunities for local fishermen to participate in the longline fishery and to enhance the viability of medium sized vessels already in the fishery by reducing potential program impediments to encourage more participation. The proposed changes to the limited entry permit program are not yet finalized and would be the subject of additional review in a separate Pelagics FEP amendment document.

The peak catch of pelagic fish by the American Samoa longline fishery was in 2002 at approximately 16 million lb (7,600 mt). Since then catches have been variable, with a second peak in 2007 at approximately 14 million lb (6,350 mt), but declined thereafter to about half this total or about 6 million lb (2,717) of pelagic MUS in 2013. Albacore tuna forms almost 80 percent of landings, followed by yellowfin tuna (10%), bigeye tuna (3.6%), wahoo (3.5%), and skipjack tuna (3.2%).

Based on logbooks, 23 vessels reported that they made 3393 sets and deployed 10.1 million hooks in 2013. Albacore catch per unit effort (CPUE) has declined from around 25 fish per 1,000 hooks in 2002, to around 11.7 fish per 1,000 hooks in 2013. Skipjack tuna CPUE show a declining trend from a 2002 high of five fish per 1,000 hooks, to about two fish per 1,000 hooks in recent years. Yellowfin tuna CPUE has been variable, with a peak in 2004 of about three fish per 1,000 hooks and a low of about one fish per 1,000 hooks in 2008. The bigeye tuna CPUE trend is similar to that of yellowfin, with a peak in 2004 of about one fish per 1,000 hooks, and a low of 0.5 fish per 1,000 hooks in 2008.

NMFS-trained observers independently observe the American Samoa longline fishery at an annual coverage rate of approximately 20 percent. Bycatch in the fishery is comprised mostly of sharks and other pelagic species (e.g., lancetfish) and are generally not retained due to a combination of limited local markets, logistical constraints for exporting fish, and unmarketable species.

The decline in troll fishing around American Samoa preceded the advent of the longline fishery, but the expansion of longlining in the mid-1990s was marked by a major decline in vessels using trolling gear to a record low of seven vessels in 2010. Troll catches were much higher prior to 2000, which is the year the longline fishery expansion began. The peak year for the troll fishery was 1995, when catches exceeded 278,000 lb. Catches of pelagic species since 2000 have been on a declining trend, reaching their lowest ever in 2010, with just under 5,000 lb landed. In 2013, 13 troll vessels landed 33,086 lb of pelagic fish. Catches are predominantly skipjack and yellowfin tunas, which comprise on average 53 percent and 23 percent of pelagic landings, respectively.

The Council is developing several new Pelagics FEP amendments for the management of the longline fishery, but these are in preliminary stages and not ready to transmit for Secretarial review pursuant to the MSA. These include the following subjects:

- Modifications to the American Samoa longline limited entry program to support greater fishery participation by small vessels (< 50ft) in the fishery and simplify the program.
- Establishing regulations for an American Samoa shallow-set longline fishery.
- Temporary exemption for American Samoa limited entry permitted vessels to fish within the Large Vessel Prohibited Area around American Samoa

The American Samoa longline principally targets albacore tuna for processing at local canneries in Pago Pago. Currently, Starkist Samoa operates a long-standing cannery in Pago Pago, employing over 1,500 people in the Territory. Chicken of Sea once operated a cannery in Pago Pago Harbor, but closed its operations in September 2009, a day before the devastating tsunami that hit American Samoa and neighboring South Pacific countries. In 2011, Tri Marine took control of the old Chicken of the Sea facility and is developing a new cannery and fresh/frozen fish processing center under the name of Samoa Tuna Processors. After extensive rebuilding of the existing property, canning operations are expected to commence in 2015. Small amounts fresh and frozen fish are being accepted at Samoa Tuna Process for export to US and foreign markets.

The American Samoa-based U.S. longline fleet has relied on the canneries as its only market, and there is a need to responsibly diversify this fishery and facilitate revival of the once active small vessel fleet. The development of a sustainable and multifaceted fishery sector is an economic priority identified by the current American Samoa Administration and could help reduce the negative economic impacts facing American Samoa.

3.3.2 Commonwealth of the Northern Mariana Islands

CNMI does not have substantial infrastructure dedicated to commercial fishing. The pelagic fishing fleet consists primarily of trolling vessels less than 24 ft in length that generally take one-day trips within 30 nm to primarily target skipjack tuna. The harvest of pelagic species by CNMI-based vessels has always been small, historically averaging approximately 240,000 lb annually, and caught with trolling gear (WPFMC 2014).

Interest in longline fishing in CNMI has been variable with the issuance of eight, four, and five Western Pacific General Longline permits from 2007 through 2009, respectively. There were three or fewer longline vessels fishing in 2010 and 2011, and due to data confidentiality rules, their catch statistics are not described. In 2012, these longline vessels abandoned their CNMI operations base and returned to Hawaii. High operating costs and poor market access were attributed to the vessels not being profitable while based in the CNMI.

Longline fisheries in Guam and CNMI are permitted with a Western Pacific General Longline permit under the FEP and regulated with a suite of measures similar to the American Samoa and Hawaii longline fisheries. For example, the Pelagics FEP includes longline prohibited areas in the Marianas, extending from shoreline to 50 nm around Guam and 30 nm around the CNMI. An area in northern CNMI around the three northernmost islands (the Islands Unit of the Marianas Trench Marine National Monument) is closed to commercial fishing out to approximately 50 nm.

In 2013, skipjack tuna continued to dominate CNMI's pelagic troll fishery landings, comprising about 80 percent of commercial pelagic landings and revenues totaling about $134,000. Schools of skipjack tuna have historically been common in nearshore waters, providing an opportunity for trollers to catch numerous fish with a minimum of travel time and fuel costs. Yellowfin tuna and mahimahi are also easily marketable species, but are seasonal. Peak mahimahi catches are usually from February through April while the yellowfin season usually runs from April through September. The troll fishery very rarely catches bigeye tuna.

In the 1980s, CNMI used to be the base of several U.S. purse seine vessels, but those operations ceased in that decade. CNMI's local tourism market coupled with its close proximity to Guam and large Asian markets make responsible fisheries development a key area for economic growth. CNMI fisheries development needs include longline vessel capacity, large vessel docking space, fish processing and cold storage facilities, fish handling and HACCP training, and marketing development.

In 2013, CNMI had an arrangement with Hawaii longline vessels pursuant to Section 113. In 2014, CNMI had a Specified Fishing Arrangement with Hawaii longline vessels pursuant Amendment 7.

3.3.3 Guam

Guam's principal pelagic fisheries comprise small, primarily recreational, trolling boats that are either towed to boat launch sites or marina-berthed charter boats. They fish only within local waters, either within Guam's EEZ or on some occasions in the adjacent EEZ around CNMI. Most fishermen sell a portion of their catch to recoup fishing expenses and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. Licenses are not required to sell fish in Guam, nor are there any reporting requirements for those selling fish. Data are collected through a creel survey administered by Guam's Department of Aquatic Resources.

The Western Pacific General Longline permit allows longline fishing in Guam and CNMI under the FEP and regulated with a suite of measures similar to the American Samoa and Hawaii longline fisheries. For example, the FEP established longline prohibited areas in the Marianas, extending 50 nm around Guam and 30 nm around the CNMI. The Council is drafting a Pelagics FEP amendment to prohibit large vessels (≥120 ft) from fishing within 100 nm around Guam and CNMI. The draft amendment would not affect the Council's ability to make the proposed changes in this document nor result in a cumulative environmental impact that would negatively affect the outcome of the proposed changes here.

Like CNMI, skipjack and to a lesser degree yellowfin and blue marlin make up the bulk of the commercial trolling catch around Guam. Bigeye tuna are not caught in substantial numbers in the troll fishery.

Guam currently has hundreds of small-scale fishing vessels that troll for pelagic and bottomfish species using handline methods. Guam has no active longline vessel and no domestic purse seine vessels in operation. In the mid-2000s, one longline vessel with a Western Pacific General Longline permit operated out of Guam as part of a Western Pacific Community Demonstration Project Program, but has since been inactive. Guam also used to homeport several U.S. purse seine vessels, but that ceased in the late 1980s.

Due to its strategic location and regional air service hub, Guam also used to be a principal transshipment port for many foreign longline vessels, but the number of foreign vessels port calls to Guam has significantly decreased over recent years. The decline in foreign port calls is believed to be linked to the U.S. Shark Finning Prohibition Act of 2000 and landing agreements between foreign vessels and neighboring Pacific Island Countries that restrict foreign vessels landing in Guam. Because of its history of a transshipment port, Guam does have cold storage facilities, but is lacking fish-processing facilities. A fisheries development need in Guam is local capital for purchasing or leasing larger vessels that could allow local Guam fishermen to participate in larger scale, offshore tuna fisheries. Guam is close to large Asian markets, serviced by daily from flights to and from Honolulu, and has an expanding local population and markets related to tourism and growing U.S. military presence. There is significant potential for U.S. longline vessels to be based in Guam.

To date, no arrangements have been made by the Guam Government; however, interest in a quota utilization program is identified in the Guam MCP.

3.3.4 Hawaii

Hawaii's pelagic fisheries, which include the longline, Main Hawaiian Islands (MHI) troll and handline, offshore handline, and the aku boat (pole-and-line) fisheries, are the state's largest and most valuable fishery sector. Tuna, billfish, and other tropical pelagic species (such as mahimahi, ono, and opah) supply most of the fresh pelagic fish consumed by Hawaii residents and support popular recreational fisheries. Hawaii longline vessels are capable of traveling long distances to high-seas fishing grounds, while the smaller handline, troll, charter and pole-and-line fisheries, which may be commercial, recreational or subsistence, generally occur within 25 miles of land, with trips lasting only one day.

The catch trend for pelagic species across all fisheries over time has been increasing from 16 million pounds (7,260 mt) in 2004 to a maximum of about 27 million pounds (12,250 mt) in 2007, with a mean of 22 million pounds (9,980 mt). Over this period, the swordfish fishery reopened in 2004, which contributed to higher total landing volumes (WPFMC 2012).

Longline

Longline fishing has almost a century of operations in Hawaii, commencing in 1917 with wooden sampan vessels operating basket-style tarred rope longlines, and using floats with marker flags, which gave rise to this fishery as the 'flag-line' fishery. Fishing was conducted close to shore and targeted bigeye and yellowfin tunas. The limited entry program caps the number of permits for the Hawaii longline fisheries at 164, and maximum vessel length is limited to 101 ft.

In the early 2000s when the Hawaii-based longline fishery experienced area and other closures to protect sea turtles, U.S. longline vessels from the west coast fished in the high seas of the WCPFC Convention Area north of Hawaii and landed their catch on the U.S. West Coast. No rules currently prevent a tuna longliner based on the west coast from fishing in the WCPFC area. If there should again be an expansion of such fishing, in combination with the Hawaii longline fishery it would be subject to the 2015 WCPFC limit of 3,554 mt of bigeye tuna.

There are two distinct Hawaii longline fisheries: one which sets lines deep to maximize the catch of bigeye tuna (deep-set fishery), and the other that sets gear shallow (shallow-set fishery) to target swordfish. Some swordfish vessels may switch to deep-set tuna fishing as the swordfish season ends. In 2013, 135 vessels actively deep-set, and 15 of these vessels switch seasonally to actively shallow-set. Unless distinctly discussed, the Hawaii deep-set and shallow-set fisheries will be referred to as the Hawaii longline fishery.

About one-third of the catch (numbers of fish) in the deep-set fishery is bigeye tuna, with the balance of the catch primarily mahimahi, blue shark, oilfish, pomfret, albacore, yellowfin, and skipjack tunas, moonfish (opah), striped marlin, spearfish and wahoo. Most of these fish are retained, apart from the blue shark, which is mostly discarded alive. About 40 percent of the

shallow-set catch (numbers of fish) comprises swordfish, with blue shark, mahimahi, albacore and oilfish forming most of the balance of the catch. Although the shallow-set fishery targets swordfish, it also catches bigeye tuna incidentally. Like the deep-set fishery, most of the blue shark catch is discarded alive.

From 2004-2012, the annual number of vessels that participated in the deep-set fishery has remained relatively stable, ranging from 124 to 129, with a slight increase in 2013 to 135 vessels. NMFS does not expect the number to increase much beyond this range in the near future (Table 8). Although there is potential for the number of active vessels to increase in under the limited entry program, which is capped at 164 permits, it is difficult to speculate on new vessels entering fishery due to new vessel costs, fishing participant turnover, and the existing regulatory environment.

The average number of deep-set trips per year (1,474) slightly decreased from 2004-2013, while the average number of sets per trip and hooks per set slightly increased from 10 to 12 and 2,007 to 2,249, respectively. Therefore, analyses show vessels are making fewer trips yet deploying more hooks per set. It is likely that fishermen are making more sets per trip and deploying more hooks per set to increase efficiency and spend less money on fuel, which has increased significantly over the last several years.

Catch statistics and economic data from the Hawaii's commercial fisheries are provided in Tables 8 and 9. The Hawaii longline fishery is the largest fishery in Hawaii in terms of volume and value, representing over $85 million in ex-vessel revenue in 2012. Bigeye tuna comprises around two thirds of landings by the Hawaii longline fishery, but nearly 75 percent of the value (See Table 9).

Table 7: Number of active longline vessels and fishing effort in the Hawaii deep-set fishery, 2004-2013 (includes WCPO and EPO).

Year	Vessels making deep-sets	Deep-set fishing effort (hooks)	Deep-set fishing effort (trips)	Deep-set fishing effort (sets)
2004	125	31,913,246	1,522	15,902
2005	124	33,663,248	1,590	16,550
2006	127	34,597,343	1,541	16,452
2007	129	38,839,377	1,588	17,815
2008	127	40,083,935	1,532	17,885
2009	127	37,770,913	1,402	16,810
2010	122	37,244,432	1,360	16,085
2011	129	40,766,334	1,462	17,173
2012	128	43,965,781	1,356	18,069

2013	135	46,900,000	1383	
Mean	**126**	**37,800,000**	**1,344**	**16,971**

Source: NMFS PIFSC, unpublished.

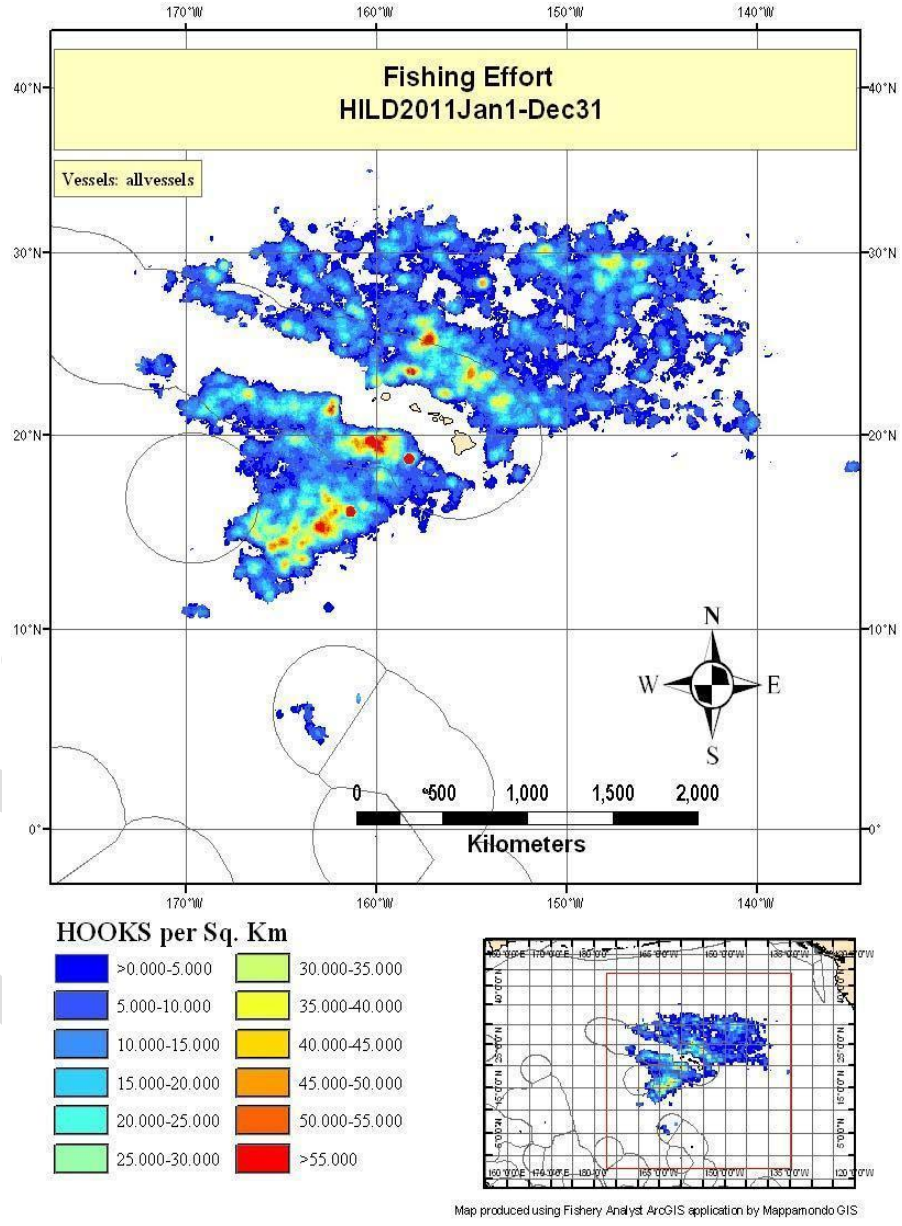

Figure 11: Spatial distribution of fishing effort by the Hawaii longline deep-set fishery, 2011.

Source: NMFS PIFSC, unpublished.

Table 8: Hawaii commercial pelagic landings, revenue, and average price by species for the Hawaii-based deep-set and shallow-set longline fisheries, 2012 and 2013.

	Deep-set longline						Shallow-set longline					
	2012			2013			2012			2013		
	Pounds Kept (1000 lbs)	Revenue ($1000)	Avg. Value ($/lb)	Pounds Kept (1000 lbs)	Revenue ($1000)	Avg. Value ($/lb)	Pounds Kept (1000 lbs)	Revenue ($1000)	Avg. Value ($/lb)	Pounds Kept (1000 lbs)	Revenue ($1000)	Avg. Value ($/lb)
Tuna PMUS												
Albacore	1,421	$ 3,339	$ 2.35	699	$ 1,545	$ 2.26	26	$ 23	$ 0.90	15	$7	$ 2.10
Bigeye tuna	12,741	$ 62,285	$ 4.89	14,067	$ 62,718	$ 4.41	75	$ 365	$ 4.87	44	$194	$ 5.32
Bluefin tuna	1	$ 3	$ 3.05	1	$ 3	$ 5.71	0	$ -	$ -	0	$0	$ -
Skipjack tuna	541	$ 432	$ 0.80	497	$ 403	$ 0.85	1	$ -	$ -	0	$0	$ -
Yellowfin tuna	1,886	$ 7,670	$ 4.07	1,525	$ 6,832	$ 4.19	29	$ 155	$ 5.33	22	$123	$ 5.34
Tuna PMUS Subtotal	16,590	$ 73,730	$ 4.44	16,789	$ 71,501	$ 4.26	130	$ 543	$ 4.18	82	$324	$ 3.95
Billfish PMUS												
Swordfish	566	$ 1,614	$ 2.85	666	$ 1,750	$ 2.54	2,508	$ 5,143	$ 2.05	2,164	$2,680	$ 2.79
Blue marlin	630	$ 1,074	$ 1.70	831	$ 997	$ 1.50	26	$ 23	$ 0.90	17	$20	$ 1.15
Striped marlin	596	$ 1,344	$ 2.26	829	$ 1,248	$ 1.34	25	$ 59	$ 2.36	34	$46	$ 1.24
Spearfish	354	$ 649	$ 1.83	465	$ 585	$ 1.27	5	$ 5	$ 1.02	4	$4	$ 1.94
Other Marlins	21	$ 34	$ 1.60	27	$ 17	$ 2.60	0	$ -	$ -	0	$0	$ -
Billfish PMUS Subtotal	2,168	$ 4,716	$ 2.18	2,818	$ 4,596	$ 1.63	2,564	$ 5,230	$ 2.04	2,219	$2,750	$ 1.24
Other PMUS												
Mahimahi	889	$ 2,256	$ 2.54	847	$ 1,943	$ 2.16	46	$ 91	$ 1.97	42	$104	$ 2.39
Ono (wahoo)	366	$ 1,116	$ 3.05	459	$ 1,243	$ 2.75	1	$ 3	$ 3.05	1	$2	$ 2.16
Opah (moonfish)	1,574	$ 3,210	$ 2.04	2,075	$ 3,186	$ 1.55	17	$ 5	$ 0.30	11	$1	$ 2.98
Oilfish	537	$ 832	$ 1.55	548	$ 405	$ 0.71	24	$ 32	$ 1.31	12	$2	$ 0.46
Pomfrets (monchong)	682	$ 2,034	$ 2.98	1,015	$ 2,367	$ 2.20	5	$ 2	$ 0.41	1	$1	$ 3.18
PMUS Sharks (whole wei	150	$ 116	$ 0.77	106	$ 97	$ 1.38	26	$ 10	$ 0.39	14	$5	$ 0.85
Other PMUS Subtotal	4,198	$ 9,565	$ 2.28	5,050	$ 9,242	$ 1.83	120	$ 142	$ 1.19	82	$115	$ 1.41
Other pelagics	20	$ 37	$ 1.83	14	$ 24	$ 1.79	0	$ -	$ -	0	$ -	$ -
Total pelagics	22,976	$ 88,046	$ 3.83	24,670	$ 85,363	$ 3.46	2,815	$ 5,917	$ 2.10	2,383	$ 3,189	$ 1.34

Source: WPFMC 2013 Pelagics Annual Report (unpublished).

Troll

The number of commercial troll fishers is typically between 1,500 and 1,600 per year, while the troll catch has varied between 2.5 and 3.5 million lb, with an average of 2.8 million lb. The predominant species in the troll catch include yellowfin and skipjack tunas, mahimahi, blue marlin, and wahoo. The troll fishery primarily occurs within the U.S. EEZ around Hawaii, from 3-50 nm offshore. Average catch of bigeye tuna is 97 mt from 2001 to 2013 (WPFMC unpublished)..

Handline

The "offshore handline fishery" has evolved steadily and undergone a number of changes. This fishery originally centered on handline and troll fishing on tuna found in aggregations around the Cross Seamount and four offshore moored NOAA weather buoys. Although the FADs moored offshore of Hawaii by the State government have not been used extensively by the offshore handline fishery, the fishery has, in recent years, expanded to include fishing operations on privately-set FADs, some of which are relatively close to shore, thus blurring the distinction between "offshore handline" and "MHI handline" fisheries, as distinguished by the State of Hawaii Division of Aquatic Resources.

The offshore handline fishery targets juvenile and sub-adult bigeye tuna (53% of the catch) with a considerable catch of juvenile, sub-adult and adult size yellowfin (45% of the catch). Catch of bigeye tuna in the handline fishery is small and averages 392 mt from 2001 to 2013. After developing the short-line to target large bigeye tuna, it became apparent that large quantities of pomfret were also available when fishing above seamounts found within the EEZ around Hawaii. By modifying the gear slightly, it was found that the gear could effectively target this species of monchong (pomfrets) while also catching medium and large bigeye tuna. Short-lines, which are defined as less than one nm in length, are not regulated as longline gear under current federal regulations. Unlike the troll and MHI handline fisheries, the offshore handline fishery does not include recreational fishermen.

Like the troll fishery, the MHI handline fishery includes full time and part time commercial fishermen and recreational fishers that possess a commercial license. Yellowfin tuna comprises about two-thirds of the catch with albacore accounting for nearly 20 percent and bigeye tuna 8 percent.

Table 9: Hawaii commercial pelagic landings, revenue, and average price per pound by fishery, 2012-2013.

	2012			2013		
shery	**Pounds landed (x1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**	**Pounds landed (x1000)**	**Ex-vessel revenue ($1000)**	**Average price ($/lb)**
Deep-set longline	22,959	$88,046	$3.83	24,657	$85,363	$3.46
Shallow-set longline	2,814	$5,916	$2.10	2,381	$3,189	$1.34
MHI trolling	3,710	$8,220	$3.35	3,099	$7,292	$3.01
MHI handline	1,606	$3,255	$2.61	1,323	$3,348	$2.88
Offshore handline	585	$1,041	$2.90	815	$1,636	$2.52
Other gear	418	$854	$2.78	514	$1,141	$2.30
tal	**32,092**	**$107,333**	**$3.56**	**32,789**	**$101,969**	**$3.21**

Sources: WPMFC 2012 and WPFMC unpublished.

Non-Target Species and Bycatch in the Hawaii Longline Fishery

The 2011 NOAA Fisheries U.S. National Bycatch Report provides an estimate of the total discards in terms of pounds caught and discarded is given, with data through 2005 (see Table 11). In 2005, the total percent of catch released for all species combined in the Hawaii longline fisheries was 26.77 percent. Generally, most marketable species such as tuna and billfish have low discard rates. Although striped marlin and other miscellaneous pelagic catch such as mahimahi, blue fin tuna, and wahoo are not directly targeted, these species are highly marketable and also have low rates of discards of less than 5 percent. In general, sharks caught are discarded. Blue shark and other sharks are not marketable, and therefore a high percentage of those species are discarded alive. However, a relatively higher proportion of mako and some thresher sharks are kept since there is a market for their meat (see Table 11).

Table 10: Total weight of discards, landings, and total catch in the Hawaii deep-set and shallow-set longline fisheries in 2005.

Species	Discards (pounds)			Percent of bycatch total for both deep- and shallow-set	Landings pounds	Total Catch pounds	Total in metric tons	Discards as percent of Total Catch
	Deep set	Shallow set	Total					
Albacore	8,027	15,928	23,955	0.28%	662,000	685,955	311.1	3.49%
Bigeye tuna	128,091	5,986	134,076	1.57%	10,977,000	11,111,076	5,039.9	1.21%
Bignose shark	66	66	132	0.00%		132	0.1	100.00%
Billfishes*	24,738	4,720	29,458	0.35%	473,000	502,458	227.9	5.86%
Black mackerel	55		55	0.00%		55	0.0	100.00%
Black marlin	611	152	763	0.01%		763	0.3	100.00%
Blue shark	4,816,698	822,524	5,639,222	66.22%	66,000	5,705,222	2,587.8	98.84%
Bony fishes	119	2	121	0.00%		121	0.1	100.00%
Bony fishes	258	95	353	0.00%		353	0.2	100.00%
Pomfret	1,168	4	1,173	0.01%	632,000	633,173	287.2	0.19%
Brilliant pomfret	723		723	0.01%		723	0.3	100.00%
Cartilaginous		6,969	6,969	0.08%		6,969	3.2	100.00%
Cookie shark	0	2	2	0.00%		2	0.0	100.00%
Cottonmouth Jacks	49		49	0.00%		49	0.0	100.00%
Crestfish	2,998		2,998	0.04%		2,998	1.4	100.00%
Crocodile shark	6,418	51	6,468	0.08%		6,468	2.9	100.00%
Dolphinfish	37,406	19,418	56,824	0.67%	972,000	1,028,824	466.7	5.52%
Driftfishes	42		42	0.00%		42	0.0	100.00%
Escolar	11,378	12,912	24,291	0.29%		24,291	11.0	100.00%
Galapagos shark	1,325	818	2,143	0.03%		2,143	1.0	100.00%
Great	8,490	22	8,512	0.10%		8,512	3.9	100.00%

Species	Discards (pounds)			Percent of bycatch total for both deep- and shallow-set	Landings pounds	Total Catch pounds	Total in metric tons	Discards as percent of Total Catch
	Deep set	Shallow set	Total					
barracuda								
Hammerhead sharks	2,414		2,414	0.03%		2,414	1.1	100.00%
Indo-Pacific blue marlin	27,353	11,398	38,751	0.46%	731,000	769,751	349.2	5.03%
Knifetail pomfret	12,932	88	13,020	0.15%		13,020	5.9	100.00%
Longfin mako shark	2,504	278	2,782	0.03%		2,782	1.3	100.00%
Longnose lancetfish	922,036	5,677	927,713	10.89%		927,713	420.8	100.00%
Louvar	0	15	15	0.00%		15	0.0	100.00%
Makos*	2,476	3,331	5,807	0.07%	233,000	238,807	108.3	2.43%
Manta ray	2006	132	2138	0.01%		2138	1.0	100.00%
Ocean sunfish	37,968	5,767	43,735	0.51%		43,735	19.8	100.00%
Oceanic whitetip shark	58,403	38,640	97,043	1.14%		97,043	44.0	100.00%
Oilfish	5,159	2,778	7,937	0.09%	380,000	387,937	176.0	2.05%
Omosudid	269		269	0.00%		269	0.1	100.00%
Opah	0	2,780	2,780	0.03%	1,093,000	1,095,780	497.0	0.25%
Pacific bluefin tuna	0		0	0.00%	1,000	1,000	0.5	0.00%
Pelagic puffer	2,022	146	2,167	0.03%		2,167	1.0	100.00%
Pelagic stingray	38,043	487	38,530	0.45%		38,530	17.5	100.00%
Pelagic thresher shark	2,005	150	2,155	0.03%		2,155	1.0	100.00%
Pompano dolphin	401		401	0.00%		401	0.2	100.00%

Species	Discards (pounds)			Percent of bycatch total for both deep- and shallow-set	Landings pounds	Total Catch pounds	Total in metric tons	Discards as percent of Total Catch
	Deep set	Shallow set	Total					
Rainbow runner	154		154	0.00%		154	0.1	100.00%
Razorback scabbardfish	2,692		2,692	0.03%		2,692	1.2	100.00%
Roudi escolar	2,388		2,388	0.03%		2,388	1.1	100.00%
Rough pomfret	1,671		1,671	0.02%		1,671	0.8	100.00%
Rough triggerfish	4		4	0.00%		4	0.0	100.00%
Sailfish	346		346	0.00%		346	0.2	100.00%
Salmon shark	600	628	1,228	0.01%		1,228	0.6	100.00%
Sandbar shark	3,225	1,082	4,308	0.05%		4,308	2.0	100.00%
Scalloped hammerhead	774		774	0.01%		774	0.4	100.00%
Scalloped ribbonfish	35		35	0.00%		35	0.0	100.00%
Shark	130		130	0.00%		130	0.1	100.00%
Sharks	51,085		51,085	0.60%	15,000	66,085	30.0	77.30%
Sharptail mola	6,217		6,217	0.07%		6,217	2.8	100.00%
Shortbill spearfish	36,218	3,168	39,386	0.46%		39,386	17.9	100.00%
Shortfin mako	156,618	31,522	188,140	2.21%		188,140	85.3	100.00%
Sickle pomfret	4,996	168	5,163	0.06%		5,163	2.3	100.00%
Silky shark	36,035	2,500	38,535	0.45%		38,535	17.5	100.00%
Skipjack tuna	81,196	172	81,368	0.96%	197,000	278,368	126.3	29.23%
Slender mola	34,557	11	34,568	0.41%		34,568	15.7	100.00%
Smooth hammerhead	2,454	930	3,384	0.04%		3,384	1.5	100.00%
Snake	156,338	686	157,024	1.84%		157,024	71.2	100.00%

Species	Discards (pounds)			Percent of bycatch total for both deep- and shallow-set	Landings pounds	Total Catch pounds	Total in metric tons	Discards as percent of Total Catch
	Deep set	Shallow set	Total					
mackerel								
Striped marlin	27,278	17,699	44,976	0.53%	1,177,000	1,221,976	554.3	3.68%
Swordfish	23,735	76,785	100,520	1.18%	3,527,000	3,627,520	1,645.4	2.77%
Tapertail ribbonfish	2,546		2,546	0.03%		2,546	1.2	100.00%
Thresher shark	483,539	7,568	491,108	5.77%	73,000	564,108	255.9	87.06%
Tiger sharks	4,310	5,578	9,888	0.12%		9,888	4.5	100.00%
Tunas*	20,719	776	21,495	0.25%		21,495	9.7	100.00%
Velvet dogfish	844		844	0.01%		844	0.4	100.00%
Wahoo	13,287	73	13,360	0.16%	458,000	471,360	213.8	2.83%
White shark	93		93	0.00%		93	0.0	100.00%
Yellowfin	86,273	628	86,902	1.02%	1,624,000	1,710,902	776.1	5.08%
Total	7,405,009	1,111,311	8,516,320	100.00%	23,291,000	31,807,320	14,427.6	26.77%

Note: An asterisk following the names of stock groups indicates fisheries for which bycatch estimates were available only for the generalized stock group.
Source: NMFS 2011.

3.3.5 Bigeye Tuna Catches by U.S. Longline Vessels in the Pacific

U.S. longline catches of bigeye tuna in the Pacific are principally made by the Hawaii longline fishery and secondarily by the American Samoa longline fishery. As described earlier, CNMI and Guam's longline fisheries are not currently active (see Table 12).

Table 13 shows the total catches of bigeye tuna in the Pacific, separated by major fishery categories, Pacific-wide, WCPO, and EPO. Table 13 also shows the total U.S. longline catches of bigeye tuna as a percentage of: the WCPO longline bigeye tuna catch (6%), the total EPO longline bigeye tuna catch (3%), the total WCPO bigeye tuna catch (3%), total EPO bigeye tuna catch (1%), and the total Pacific-wide bigeye tuna catch (2%), respectively.

Table 11: Longline landings (mt) by species and species group for U.S. longline vessels operating in the WCPFC statistical area, 2009-2013.

	U.S. in North Pacific Ocean					CNMI in North Pacific Ocean					American Samoa in North Pacific Ocean					American Samoa in South Pacific Ocean					Total				
	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009
Vessels	133	127	128	123	127	113					15	115	114	11	10	22	25	24	26	26	155	153	152	146	151
Species																									
Albacore, North Pacific	272	480	497	324	177	23					13	115	113	48	4						307	595	610	371	181
Albacore, South Pacific	0	0														2,100	3,147	2,291	3,943	3,903	2,100	3,147	2,291	3,943	3,903
Bigeye tuna	3,612	3,660	3,565	3,577	3,741	501					276	1,338	1,086	507	156	84	164	178	178	161	4,472	5,162	4,829	4,261	4,059
Pacific bluefin tuna	0	0	0	0	1											2	7	2	3	1	3	7	2	3	2
Skipjack tuna	181	115	158	114	116	25					9	123	34	18	5	65	251	108	110	152	280	490	300	242	272
Yellowfin tuna	546	576	738	462	429	92					29	272	144	53	15	383	348	555	445	386	1,051	1,196	1,437	960	829
Other tuna	0	0	0	0	0	0					0			0		0					0	0	0	0	0
TOTAL TUNA	4,612	4,831	4,958	4,477	4,464	640					327	1,849	1,376	625	179	2,634	3,916	3,135	4,679	4,603	8,213	10,596	9,469	9,781	9,246
Black marlin	1	1	1	0	0	0					0	0	0	0		0	2	1	0	0	1	3	2	1	0
Blue marlin	283	226	290	238	333	20					18	50	45	23	7	30	36	40	45	42	352	313	375	306	382
Sailfish	7	5	10	9	10	3					1	3	2	1	0	2	1	4	2	2	12	9	15	11	12
Spearfish	132	111	169	79	97	34					9	35	35	9	2	1	1	5	2	3	176	147	209	89	102
Striped marlin, North Paci	256	209	263	124	234	45					20	54	68	13	5						321	263	331	137	239
Striped marlin, South Pac	0	0				0										3	7	3	2	4	3	7	3	2	4
Other marlins	1	1	1	1	0	0					0	0									1	1	1	1	0
Swordfish, North Pacific	545	862	837	1,013	1,243	8					17	38	22	20	5						569	900	859	1,033	1,248
Swordfish, South Pacific	0	0				0										10	14	12	11	13	10	14	12	11	13
TOTAL BILLFISH	1,224	1,414	1,570	1,464	1,917	109					65	180	171	66	19	47	62	64	62	63	1,445	1,656	1,805	1,592	1,999
Blue shark	1	12	9	6	9	0					0	2	2	0		1	3	2	1	1	2	18	14	7	9
Mako shark	30	42	43	63	102	3					5	8	8	5	1	0	0	0	0	0	38	50	51	68	103
Thresher	4	9	15	16	28	0					0	3	3	0	0	0	0	0		0	5	13	18	16	29
Other sharks	0	0	2	3	6	0					0	0	0	0		0	0	1	1	0	0	1	3	3	6
Oceanic whitetip shark	0	1														0	0				0	1			
Silky shark	0	0														0	0				0	0			
Hammerhead shark	0	0																			0	0			
Tiger shark																									
Porbeagle																									
TOTAL SHARKS	35	64	69	87	144	3					5	14	14	6	1	1	4	4	2	1	44	82	87	95	147
Mahimahi	240	288	291	230	265	9					27	52	52	23	7	19	11	11	9	17	295	351	353	262	289
Moonfish	373	356	309	356	485	37					36	86	84	42	22	2	3	3	2	3	448	445	396	400	510
Oilfish	166	169	178	164	194	26					17	59	55	20	7	1	0	1	0	3	210	228	233	185	203
Pomfret	309	215	115	169	202	26					19	56	33	19	10						353	270	148	188	213
Wahoo	153	117	124	101	116	17					14	39	23	11	4	87	85	123	133	140	270	241	270	246	260
Other fish	9	8	20	10	8	0					0	1	0	0	0	0	0	1	1	0	10	9	21	11	8
TOTAL OTHER	1,250	1,154	1,036	1,031	1,269	116					113	292	248	115	51	108	99	137	145	163	1,587	1,545	1,421	1,291	1,484
GEAR TOTAL	**7,121**	**7,463**	**7,632**	**7,058**	**7,794**	**869**					**509**	**2,335**	**1,809**	**812**	**251**	**2,790**	**4,081**	**3,341**	**4,888**	**4,830**	**11,289**	**13,879**	**12,782**	**12,758**	**12,875**

Source: NMFS PIFSC; U.S. Part 1 annual report to the WCPFC.

Table 12: Bigeye tuna catch (mt) in the WCPO, EPO and total combined, including contribution by U.S. longline vessels.

Year	WCPO Longline	WCPO Purse seine	Other Fisheries	Total	U.S. LL WCP-CA	% WCPO LL	% WCPO Total
2007	83,931	49,012	12,536	145,479	5,599	6.67	3.85
2008	84,473	57,795	13,746	156,014	4,781	5.66	3.0
2009	82,108	64,151	13,208	159,467	3,990	4.86	2.5
2010	73,882	55,750	11,211	140,843	4,064	5.50	2.8
2011	77,964	70,737	11,109	159,810	4,829	6.19	3.0
2012	76,599	69,164	15,916	161,679	5,160	6.74	3.1
2013	62,641	82,151	13,870	158,662	4,472	7.14	2.8
mean	80,472	59,489	12,954	152,323	4,737	5.89	3.0

Year	EPO Longline	EPO Purse seine	Other fisheries	Total	U.S. LL EPO	% EPO LL	% EPO Total
2007	29,847	63,451	44	93,342	417	1.40	0.45
2008	26,136	75,028	28	101,192	1,310	5.01	1.29
2009	31,282	76,800	15	108,097	730	2.33	0.68
2010	35,227	57,753	1358	94,338	1,356	3.85	1.44
2011	29,938	57,188	1051	87,177	1,050	3.51	1.20
2012	28,938	68,597	1051	98,586	861	2.98	0.87
2013	30,861	49,104	869	80,834	2056	6.66	2.54
mean	30,228	66,470	592	97,122	954	3.16	0.99

Year	WCPO	EPO	Total	U.S. LL Total	% Total
2007	145,479	93,342	238,821	6,016	2.52%
2008	156,014	101,192	257,206	6,091	2.37%
2009	159,467	108,097	267,564	4,720	1.76%
2010	140,843	94,338	235,181	5,420	2.30%
2011	159,810	87,177	246,987	5,879	2.38%
2012	161,679	98,586	260,265	6,021	2.31%
2013	158,662	80,834	239,496	6,528	2.72%
mean	153,882	97,122	251,004	5,691	2.33%

Source: SPC 2014; PIFSC unpublished data; Calculations: WPFMC unpublished data.
Note: 2013 catch estimates are provisional.

3.3.6 Bigeye Tuna Catches by U.S. Purse Seine Vessels in the WCPO

The U.S.-flagged purse seine fleet has been fishing in the WCPO since the early 1980s. The South Pacific Tuna Treaty (SPTT) largely governs the fishing activities of U.S. purse seine vessels in the WCPO. The SPTT manages access of U.S. purse seine vessels to the EEZs of Pacific Islands Parties to the SPTT and provides for technical assistance in the area of Pacific Island Country fisheries development. The SPTT is implemented domestically by regulations (50 CFR 300 Subpart D) issued under authority of the South Pacific Tuna Act of 1988 (SPTA; 16 U.S.C. 973-973r).

From 1997-2010, the U.S. purse seine fleet in the WCPO conducted 6 percent of its effort in the U.S. EEZ, 22 percent on the high seas, and the remainder in the EEZs of Pacific Island Parties to the SPTT (unpublished NMFS data). Participation in the U.S. WCPO purse seine fishery increased from the late 1980s to the mid-1990s, and then gradually decreased until a low of 13 vessels was reached in 2006. The fleet has since increased to about the levels of the mid 1990s, and has been relatively stable for the past five years. The U.S. WCPO purse seine fleet now numbers at 39 vessels.

Skipjack tuna generally account for around 80 percent of the U.S. purse seine catch, yellowfin tuna for about 16 percent, and bigeye tuna for the remaining portion (about 4 percent) (See Table 14; SPC 2012).

Table 13: Number of vessels and tuna catch (mt) by the U.S. purse seine fleet, 2006-2011.

Year	Vessels	Skipjack		Yellowfin		Bigeye		Other catch	Total catch
		Catch	%	Catch	%	Catch	%		
2006	13	52,277	76	12,238	18	3,930	6	25	68,470
2007	22	69,875	79	15,393	17	3,468	4	25	88,761
2008	36	158,227	76	44,281	21	6,816	3	35	209,359
2009	39	235,621	84	35,979	13	9,888	4	144	281,732
2010	37	199,619	81	38,623	16	7,282	3	180	245,704
2011	37	167,776	82	25,422	12	10,041	5	142	203,381
2012	39	223,575	86	30,721	12	5464	2	n/a	259,760
2013	40	233,175	91	16,717	6.5	4456	1.75	n/a	254,348

Source: SPC 2012. Data for 2012 and 2013 from US Annual Part 1 report to WCPFC.
Note: The SPC has estimated US purse seine catches to be approximately 30% higher than what is reported in the US Annual Part 1 report to the WCPFC.

The trend in the volume of bigeye tuna caught by the U.S. purse seine fleet in the WCPO is provided in Figure 13.

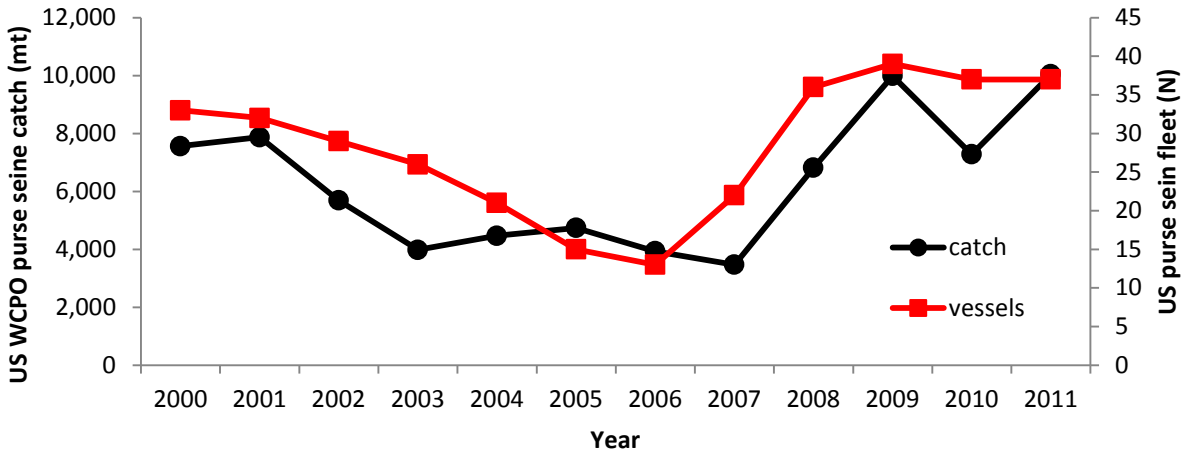

Figure 12: U.S. purse seine fleet size and catch trend of bigeye tuna, 2000-2011.
Source: SPC 2012.

3.4 Protected Species

Applicable Laws

Endangered Species Act
The ESA provides for the conservation of species that are endangered or threatened, and the conservation of the ecosystems on which they depend. Section 7(a)(2) of the ESA requires each federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. To "jeopardize" means to reduce appreciably the likelihood of survival and recovery of a species in the wild by reducing its numbers, reproduction, or distribution. When a federal agency's action "may affect" an ESA-listed species, that agency is required to consult formally with NMFS (for marine species, some anadromous species, and their designated critical habitats) or the U.S. Fish and Wildlife Service (USFWS; for terrestrial and freshwater species or their designated critical habitat). The product of formal consultation is the agency's biological opinion (BiOp). Federal agencies are exempt from this formal consultation requirement if they have concluded that an action "may affect, but is not likely to adversely affect" ESA-listed species or their designated critical habitat, and NMFS or USFWS concur with that conclusion (see ESA section 7 Formal Consultation; 50 CFR § 402.14(b)).

The ESA also prohibits the taking[17] of listed species except under limited circumstances. Western Pacific regional fisheries are operated in accordance with terms of ESA consultations that consider the potential interactions of fisheries with listed species, the impacts of interactions on the survival and recovery of listed species, and the protection of designated critical habitat.

As provided in 50 CFR § 402.16, NMFS is required to reinitiate formal consultation if:

[17] The definition of "take" includes to harass, harm, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.

(1) the amount or extent of the incidental take is exceeded;

(2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in an opinion;

(3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in the opinion; or

(4) a new species is listed or critical habitat designated that may be affected by the action.

Longline and other pelagic fishing vessels operating in the western Pacific region and targeting pelagic species have the potential to interact with a range of protected species (such as marine mammals, sea turtles, and seabirds). Table 15 presents species listed as endangered or threatened under the ESA that have the potential to interact with longline and other fisheries under the Pelagics FEP. This section also provides the number of interactions expected between protected species and the American Samoa and Hawaii longline fisheries with regards to recent fishing effort.

Table 14: ESA-listed species with the potential to interact with vessels permitted under the Pelagics FEP.

Species	**ESA status**
Sea Turtles	
Green turtle (*Chelonia mydas*)	Threatened, except for Mexico's Pacific coast nesting population which is Endangered
Hawksbill turtle (*Eretmochelys imbricata*)	Endangered
Leatherback turtle (*Dermochelys coriacea*)	Endangered
North Pacific loggerhead turtle distinct population segment (DPS) (*Caretta caretta*)	Endangered
South Pacific loggerhead turtle DPS	Endangered
Olive ridley turtle *(Lepidochelys olivacea*)	Threatened, except for Mexico's nesting population which is Endangered
Marine Mammals	
Blue whale (*Balaenoptera musculus*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Hawaiian monk seal (*Neomonachus schauinslandi*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Main Hawaiian Islands insular false killer whale DPS (*Pseudorca crassidens*)	Endangered
North Pacific right whale (*Eubalaena japonica*)	Endangered
Sei whale (*Balaenoptera borealis*)	Endangered
Sperm whale (*Physeter macrocephalus*)	Endangered
Seabirds	
Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*)	Endangered

Newell's shearwater (*Puffinus auricularis newelli*)	Threatened
Short-tailed albatross (*Phoebastria albatrus*)	Endangered
Sharks	
Scalloped hammerhead Indo-West Pacific DPS	Threatened
Scalloped hammerhead Eastern Pacific DPS	Endangered
Corals	
Acropora globiceps	Threatened
Acropora jacquelineae	Threatened
Acropora retusa	Threatened
Acropora rudis	Threatened
Acropora speciosa	Threatened
Euphyllia paradivisa	Threatened
Isopora crateriformis	Threatened
Seriatopora aculeata	Threatened

The following refers to existing BiOps and summarizes the information contained in these documents (identified below) in describing baseline conditions. For further information, refer to the following documents on NMFS' website below, or by contacting NMFS using the contact information at the beginning of the document.
http://www.fpir.noaa.gov/DIR/dir_public_documents.html

NMFS 2001, Biological Opinion on Authorization of Pelagic Fisheries under the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region.

NMFS 2005, Continued authorization of the Hawaii-based Pelagic, Deep-Set, Tuna Longline Fishery based on the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region.

NMFS 2010, Endangered Species Act Section 7 Consultation Biological Opinion on Measures to Reduce Interactions Between Green Sea Turtles and the American Samoa-based Longline Fishery-Implementation of an Amendment to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region.

NMFS 2012, as amended, Continued operation of the Hawaii-based Shallow-set Longline Swordfish Fishery - under Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region.

USFWS 2012, Biological Opinion of the U.S. Fish and Wildlife Service for the Operation of Hawaii-based Pelagic Longline Fisheries, Shallow-Set and Deep-Set, Hawaii.

NMFS, 2014, Biological Opinion on Continued Operation of the Hawaii-based Deep-set Pelagic Longline Fishery.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the take of marine mammals in the U.S. EEZ 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 the protection and conservation of all cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions, except walruses). The MMPA requires NMFS to prepare and periodically review marine mammal stock assessments. *See* 16 U.S.C. § 1361, *et seq*.

Pursuant to the MMPA, NMFS has promulgated specific regulations that govern the incidental take of marine mammals during fishing operations (50 CFR 229). Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that classifies U.S. commercial fisheries into three categories, based on relative frequency of incidental mortality and serious injury to marine mammals in each fishery:

- Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing. Annual mortality and serious injury of a stock in a given fishery is by itself responsible for the annual removal of greater than or equal to 50 percent or more of any stock's potential biological removal (PBR) level (i.e., frequent incidental mortality and serious injuries of marine mammals).

- Category II designates fisheries with occasional serious injuries and mortalities incidental to commercial fishing. Annual mortality and serious injury of a stock in a given fishery is, collectively with other fisheries, responsible for the annual removal of greater than 10 percent of any stock's PBR level, and is by itself responsible for the annual removal of between 1 and less than 50 percent, exclusive, of any stock's PBR level (i.e., occasional incidental mortality and serious injuries of marine mammals).

  Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities. A Category III fishery is, collectively with other fisheries, responsible for the annual removal of 10 percent or less of any stock's PBR level; or collectively with other fisheries, more than 10 percent of any stock's PBR level, but is by itself responsible for the annual removal of 1 percent or less of PBR level (i.e., a remote likelihood or no known incidental mortality and serious injuries of marine mammals).

The Hawaii deep-set longline fishery is a Category I fishery and the Hawaii shallow-set and American Samoa longline fisheries are Category II fisheries in the 2015 List of Fisheries (79 FR 77919, December 29, 2014). Among other requirements, owners of vessels or gear engaging in a Category I or II fishery are required under 50 CFR 229.4 to obtain a marine mammal authorization to lawfully incidentally take non-ESA listed marine mammals by registering with NMFS' marine mammal authorization program. The CNMI and Guam longline fisheries are inactive and not designated at this time.

Section 101 (a)(5)(E) of the MMPA requires the Secretary of Commerce to allow the incidental, but not intentional, taking of individuals from marine mammal stocks that are designated as

depleted because of listing as threatened or endangered under the ESA in the course of commercial fishing operations if it is determined that three criteria are met:

1. Incidental mortality and serious injury will have a negligible impact on the affected species or stock;
2. A recovery plan has been developed or is being developed; and
3. Where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with section 118 of the MMPA, and a take reduction plan (TRP) has been developed or is being developed for such species or stock.

On September 19, 2014, NMFS completed ESA section 7 consultation for the Hawaii deep-set longline fishery by issuing a no-jeopardy biological opinion (2014 BiOp, NMFS 2014d), and provided an incidental take statement for sperm whales, humpback whales, and MHI insular false killer whales, which became effective upon issuance of the MMPA section 101(a)(5)(E) permit.

On October 10, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing the fishery's interactions with depleted stocks of marine mammals. The permit authorizes the incidental, but not intentional, taking of ESA-listed humpback whales (CNP stock), sperm whales (Hawaii stock), and MHI insular false killer whales. In issuing this permit, NMFS determined that incidental taking by the Hawaii deep-set and shallow-set longline fisheries will have a negligible impact on the affected stocks of marine mammals.

3.4.1 Sea Turtles

All Pacific sea turtles are listed under the ESA as either threatened or endangered except for the flatback turtle (*Natator depressus*), which is native to Australia and does not occur in the action area and thus will not be covered in this document. In addition to the BiOps listed in the previous section, more detailed information, including the range, abundance, status, and threats of the listed sea turtles, can be found in the recovery plans for each species at the following NMFS websites:

Green turtle: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_pacific.pdf
Green turtle: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_eastpacific.pdf
Hawksbill: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_hawksbill_pacific.pdf
Olive ridley: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_oliveridley.pdf
Leatherback: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_leatherback_pacific.pdf
Loggerhead: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_loggerhead_pacific.pdf

Sea Turtle Interactions

All sea turtles, being air-breathers, are typically found closer to the surface, e.g., in the upper 100 m of the ocean's surface; however, some turtles are also susceptible to deep-set longlining because of deeper foraging behavior. Therefore, sea turtles are vulnerable to longline fishing gear in the Hawaii deep- and shallow-set longline fisheries, American Samoa deep-set longline fishery, Guam and the CNMI longline fisheries. Other pelagic fisheries impacts are primarily limited to the potential for collisions with sea turtles. After considering a range of potential impacts on sea turtles, NMFS has determined that the pelagic fisheries of the western Pacific, operating in accordance with the Pelagics FEP and implementing regulations, would not jeopardize the survival or recovery of any listed species including sea turtles. NMFS has authorized a certain level of interactions (incidental take) through incidental take statements (ITS)) for these fisheries.

Hawaii deep-set longline fishery

A 2014 BiOp issued by NMFS for the deep-set longline fishery authorizes incidental take for green, leatherback, loggerhead, and olive ridley sea turtles (NMFS 2014). Table 16 specifies two thresholds for incidental take in the fishery. Fishery interactions are monitored by NMFS and at least 20 percent of all deep-set trips are observed. NMFS statistically expands the observed totals (Table 17), based on observer coverage levels, to develop a fleet-wide estimate (Table 19). Each year the fleet-wide estimates are compared to the incidental take statement (Table 18).

Table 15: Observed interactions and conditions of sea turtles caught in the Hawaii deep-set fishery, 2009-2014.

Sea turtles species	Observed Number of Interactions					
	2009	2010	2011	2012	2013	2014
Green	0	1 dead	1 dead	0	1 dead	2 dead
Leatherback	1 injured	1 dead	3 injured	1 dead	3 injured	5 injured, 2 dead
Loggerhead	0	1 dead	0	0	2 dead	0
Olive Ridley	4 dead	1 injured, 3 dead	1 injured, 6 dead	6 dead	9 dead	1 injured, 7 dead

Note: These observations represent approximately 20 percent of the total number of trips.
Source: NMFS observer program annual status reports
http://www.fpir.noaa.gov/OBS/obs_hi_ll_ds_rprts.html

Table 16: Comparison of recent, extrapolated estimates of sea turtle interactions in the Hawaii deep-set fishery with authorized take in the 2014 biological opinion.

Sea turtles species	Sum of Estimated Incidental Take 2011-2013		3-year Incidental Take Statement in 2014 BiOp	
	Interactions	Mortalities	Interactions	Mortalities
Green	10	10	9	9
Leatherback	35	9.45	72	27
Loggerhead	11	11	9	9

Olive Ridley	34	31.6	99	96

Note: The estimated incidental take includes an expansion of the observed sets and applied over the entire fishery for each year.
Sources: McCracken 2012, 2013, 2014; NMFS 2014.

Table 17: Annual sea turtles interactions expanded from observed data to fleet-wide estimates for the Hawaii deep-set longline fishery, 2005-2013.

Year	Sea Turtles			
	Green	Leatherback	Loggerhead	Olive Ridley
2005	0	4	0	17
2006	6	9	0	55
2007	0	4	6	26
2008	0	11	0	17
2009	0	4	0	18
2010	1	6	6	10
2011	5	14	0	36
2012	0	6	0	34
2013	5	15	11	42
Mean	2	8	3	28

Source: NMFS 2014

Critical habitat has not been designated in the action area, so no critical habitat would be affected by the Hawaii deep-set longline fishery.

Hawaii shallow-set longline fishery
The Hawaii shallow-set fishery is conducted in accordance with a NMFS 2012 BiOp. The fishery interacts with sea turtles; however, because of ongoing mitigation measures employed by the fishery, which includes training and handling requirements for reducing the severity of interactions, requirements for the fishery to use large circle hooks and mackerel-type fish bait, and the fact that he fishery closes once the interaction limit for sea turtles has been reached, the BiOp concludes that the fishery is not likely to jeopardize the continued existence of any ESA-listed sea turtle. The 2012 BiOp authorizes incidental take for the north Pacific loggerhead DPS, leatherback sea turtles, olive ridley sea turtles, and green sea turtles (Table 20). The NMFS Observer Program monitors incidental interactions in the fishery. Currently, all shallow-set trips are observed. Table 21 shows shallow-set fishing effort (sets), number of interactions between 2004 and 2014, and interaction rates of sea turtles per set.

Critical habitat has not been designated in the action area, so no critical habitat would be affected by the Hawaii shallow-set longline fishery.

Table 18: The numbers of sea turtles estimated to be captured and/or killed in the Hawaii shallow-set fishery over two consecutive calendar years in NMFS' 2012 biological opinion.

Species	1-year		2-year	
	Interactions	Mortalities	Interactions	Mortalities
N. Pacific	34	7	68	14

loggerhead				
Leatherback	26	6	52	12
Olive ridley	2	1	4	2
Green	3	1	6	2

Source: NMFS 2012b.

Table 19: Fishing effort (sets), and observed interactions and interaction rates in the Hawaii shallow-set longline fishery for the five species considered in NMFS' 2012 biological opinion, 2004-2014.

Year	Sets [a]	Interactions			
		N. Pacific loggerhead	Leatherback	Olive ridley	Green
2004	135	1	1	0	0
2005	1,645	12	8	0	0
2006	850	17	2	0	0
2007	1,570	15	5	1	0
2008	1,605	0	2	2	1
2009	1,761	3	9	0	1
2010	1,875	7	8	0	0
2011	1,463	12	16	0	4
2012	1307	5	7	0	0
2013	912	5	7	0	0
2014	N/A	15	16	1	1
Total		92	81	4	7
Interaction Rate [b]		0.00614	0.00468	0.00028	0.00055

[a] PIRO Observer Program, unpublished data. Number of sets is based on begin set date.
[b] Interaction rates are calculated by dividing total interactions by total sets. The interaction rates then provide the basis for estimating the annual interactions.
Source: NMFS 2012b.

American Samoa longline fishery

The American Samoa longline fishery is conducted in accordance with the provisions of the NMFS 2010 BiOp (NMFS 2010b) on the expected impacts of the fishery on ESA-listed species. NMFS concluded that the longline fishery is not likely to adversely affect loggerhead turtles, sperm whales, or humpback whales and will have no effect on blue, fin, or sei whales. The 2010 BiOp concluded that the American Samoa longline fishery is not likely to jeopardize the continued existence or recovery of green turtles, hawksbill turtles, leatherback turtles, and olive ridley turtles and issued an ITS for these turtles. NMFS has not designated critical habitat in the action area, so the American Samoa longline fishery would not affect critical habitat.

The NMFS Observer Program monitors interactions with approximately 20 percent of all trips observed, although past coverage was less due to lower federal funding. The fishery is required to conduct operations in accordance with a suite of management measures designed to reduce the number and severity of interactions with sea turtles. These include requirements for safe handling and mitigation training of protected species, specific requirements for gear

configuration to set gear at a minimum depth of 100 m, and accommodation of observers upon request. The annual numbers of interactions and mortalities expected to result from the American Samoa longline fishery are shown for a 3-year period in Table 22 (i.e., a 3-year ITS). Recent fleet-wide estimates of sea turtle interactions for the American Samoa longline fishery are not available at time of writing; however, leatherback and olive ridley turtle interactions have exceeded the ITS of no more than one sea turtle of these species every three years (Table 23), and NMFS is in the process of reinitiating formal consultation under Section 7 of ESA.

Table 20: The numbers of sea turtles estimated to be captured and/or killed in the American Samoa longline fishery over three consecutive years (3-year ITS) in the 2010 biological opinion.

Species	**Authorized Incidental Take**		
	Interactions	**Mortalities**	**Adult female equivalents**
Green turtles	45	41	10
Hawksbill turtles	1	1	1
Leatherback turtles	1	1	1
Olive ridley turtles	1	1	1

Source: NMFS 2010.

Table 21: Number of Sea Turtle Interactions by Species Observed in the American Samoa Longline Fishery from 2006-2014.

	Turtle Species and Release Disposition									
Year	Green		Olive		Loggerhead		Leatherback		Hawksbill	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
2006	-	3	-	-	-	-	-	-	-	-
2007	-	1	-	-	-	-	-	-	-	-
2008	-	1	-	-	-	-	-	-	-	-
2009	-	3	-	-	-	-	-	-	-	-
2010	1	5	1	-	-	-	-	-	-	-
2011	1	10	1	-	-	-	1	1	-	-
2012	-	-	1	-	-	-	1	-	-	-
2013	-	2	1	-	-	-	1	1	-	-
2014	-	2	2	-	-	-	-	-	-	-

Source: http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html

Guam and CNMI longline fisheries

NMFS concluded a formal consultation and issued a BiOp for the pelagic fisheries in the western Pacific on March 29, 2001. In this Opinion, NMFS examined the impact of Guam and CNMI longline fisheries on endangered species. At the time, there were three permitted longline vessels in Guam and one in the CNMI, but none were active. Although neither of these longline fisheries were active at the time, NMFS utilized fishery information from American Samoa longline fishery to estimate incidental take and mortality of ESA-listed species. The BiOp analyzed the annual effort of longline fishing in the 1998 American Samoa fishery (26 vessels and 2,359 trips). The BiOp established ITS for sea turtles for the Guam and CNMI longline fisheries and

determined that this level of anticipated take is not likely to result in jeopardy to the green turtle, leatherback turtle, loggerhead turtle, or olive ridley turtle under the proposed regulations for the Guam and CNMI longline fisheries. Although this BiOp did not discuss hawksbill sea turtles, they are considered hard shell turtles and are included in the ITS. The BiOp also concludes that the fisheries are not likely to adversely affect ESA-listed marine mammals or critical habitat that has been designated. See Table 24 for the number of sea turtle authorized to be taken in the Guam and CNMI longline fisheries.

Table 22: The number of turtles estimated to be annually taken (captured and/or killed) in the Guam and CNMI longline fisheries in the 2001 biological opinion.

Fishery	Annual Estimated Incidental Take (All Species Combined)	Annual Estimated Incidental Mortality (All Species Combined)
Guam Longline	3 hardshell turtles, 1 leatherback	1 hardshell turtle
CNMI Longline	3 hardshell turtles, 1 leatherback	3 hardshell turtles, 1 leatherback

Source: NMFS 2001.

There were no observed or reported interactions with sea turtles in the CNMI longline fishery (from the two to four vessels that were active from 2008 to 2012). Currently there are no active longline vessels in Guam; therefore, there have been no observed or reported interaction with a sea turtle.

3.4.2 Marine Mammals

3.4.2 Marine Mammals

ESA-listed Marine Mammals

Table 14 and below list marine mammal species that are listed as endangered or threatened under the ESA that have been observed or may occur in the area where Pelagics FEP fisheries operate.

- Blue whale (*Balaenoptera musculus*)
- Fin whale (*Balaenoptera physalus*)
- Hawaiian monk seal (*Monachus schauinslandi*)
- Humpback whale (*Megaptera novaeangliae*)
- Main Hawaiian Islands insular false killer whale (*Pseudorca crassidens*)
- North Pacific right whale (*Eubalaena japonica*)
- Sei whale (*Balaenoptera borealis*)
- Sperm whale (*Physeter macrocephalus*)

Detailed information on these species' geographic range, abundance, bycatch estimates, and status can be found in the most recent stock assessment reports (SARs), available online at: http://www.nmfs.noaa.gov/pr/sars/. Additional, recent information may be found in NMFS 2012b and NMFS 2014.

Although blue whales, fin whales, north Pacific right whales, and sei whales are found within the action area and could potentially interact with the Pelagics FEP fisheries, there have been no

reported or observed incidental hookings or entanglements of these species in these fisheries. There are records of fishery interactions with humpback whales and one sperm whale in the Hawaii longline fishery. In addition, NMFS has assigned prorated interactions to the population of MHI insular false killer whales based on interactions with pelagic false killer whales, and on interactions with false killer whales from unknown populations and unidentified blackfish. Interactions with listed marine mammals are described below.

Non-listed Marine Mammals

Based on research, observer, and logbook data, the following marine mammals, not listed under the ESA, may occur in the region and may be affected by the fisheries managed under the Pelagics FEP:

- Blainville's beaked whale (*Mesoplodon densirostris*)
- Bryde's whale (*Balaenoptera edeni*)
- Bottlenose dolphin (*Tursiops truncatus*)
- Common dolphin (*Delphinus delphis*)
- Cuvier's beaked whale (*Ziphius cavirostris*)
- Dwarf sperm whale (*Kogia sima*)
- False killer whale (*Pseudorca crassidens*) other than the MHI Insular DPS
- Fraser's dolphin (*Lagenodelphis hosei*)
- Killer whale (*Orcinus orca*)
- Longman's beaked whale (*Indopacetus pacificus*)
- Melon-headed whale (*Peponocephala electra*)
- Minke whale (*Balaenoptera acutorostrata*)
- Northern fur seal (*Callorhinus ursinus*)
- Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)
- Pantropical spotted dolphin (*Stenella attenuata*)
- Pilot whale, short-finned (*Globicephala macrorhynchus*)
- Pygmy killer whale (*Feresa attenuata*)
- Pygmy sperm whale (*Kogia breviceps*)
- Risso's dolphin (*Grampus griseus*)
- Rough-toothed dolphin (*Steno bredanensis*)
- Spinner dolphin (*Stenella longirostris*)
- Striped dolphin (*Stenella coeruleoalba*)

Detailed information on these species' geographic range, abundance, bycatch estimates, and status can be found in the most recent stock assessment reports (SARs), available online at: http://www.nmfs.noaa.gov/pr/sars/. Interactions with marine mammals are described in the next section.

Marine Mammal Interactions

The Hawaii deep-set longline fishery operates in accordance with NMFS' 2014 BiOp, which requires a minimum of 20 percent observer coverage for the fishery to monitor protected species interactions, including marine mammals. Based on observer data from 2008 to 2012, the fishery interacted with several species of marine mammals (Table 25). Most of the animals were released injured. Many of these injuries were determined to be "serious injuries," or injuries

likely leading to death. False killer whales have interacted with deep-set longline gear more than other marine mammal species and NMFS has implemented changes to the operations of the fishery based on the recommendations of the False Killer Whale Take Reduction Team to reduce incidental interactions. The mitigation requirements include: the use circle hooks, a permanently closed area, and an interaction limit, which, when reached, triggers a southern longline fishing exclusion zone (see 50 CFR § 229.37).

There are records of fishery interactions with humpback whales and one sperm whale. In addition, NMFS has assigned prorated interactions to the population of MHI insular false killer whales based on interactions with pelagic false killer whales, and on interactions with false killer whales from unknown populations and unidentified blackfish.

Table 23: Observed marine mammal interactions in the Hawaii deep-set fishery, 2008-2012.

Species	Number caught	Released injured	Released dead
Bottlenose dolphin	2	2	0
False killer whale	19	18	1
Pantropical spotted dolphin	1	0	1
Risso's dolphin	2	2	0
Short-finned pilot whale	3	3	0
Sperm whale	1	1	0
Striped dolphin	4	3	1
Unidentified cetacean	6	6	0
Unidentified whale	2	2	0

Note: Protected species interactions for Observer Program Quarterly and Annual Reports are based on vessel arrivals. The tally of an interaction may fall in a year other than the year when the interaction actually occurred.
Source: NMFS Observer Program Annual Status Reports
http://www.fpir.noaa.gov/OBS/obs_qrtrly_annual_rprts.html

Since observer coverage is approximately 20 percent of all deep-set trips per year, NMFS' PIFSC expands the observed interactions statistically to get an annual estimate for the total number of incidental interactions for all deep-set fishing trips that landed in that calendar year. Table 26 provides the extrapolated number of marine mammal interactions estimated to occur with the Hawaii deep-set longline fishery, from 2008 to 2012. These are estimates of all interactions, including those that result in mortality, serious injury, and non-serious injury. Extrapolated estimates for 2013 and 2014 are not yet available.

Table 24: Estimated annual marine mammal interactions (including mortalities, and serious and non-serious injuries) with the Hawaii deep-set longline fishery from 2008-2012.

Species	2008	2009	2010	2011	2012	Mean*
Blackfish	9	0	3	10	5	5.5
Risso's dolphin	2	0	3	0	0	0.9
Short-finned pilot whale	5	0	0	0	0	1.0
False killer whale	11	55	19	10	15	22.1

Pantropical spotted dolphin	3	0	0	0	0	0.6
Striped dolphin	0	0	0	4	0	0.8
Bottlenose dolphin	0	5	4	0	0	1.9
Unidentified cetacean	3	17	12	0	6	7.6
Sperm whale	0	0	0	6	0	1.3

Note: "Blackfish" include unidentified whales considered to be either false killer whales or short-finned pilot whales.
*Annual estimates are rounded to whole numbers. Five-year means are based on unrounded annual estimates, so they may differ from a five-year average of the rounded figures.
Source: McCracken 2014.

Because of inter-annual variability in marine mammal interaction rates, NMFS typically evaluates multi-year averages when determining whether those rates exceed sustainable thresholds (e.g., Potential Biological Removal level, or PBR).

The Hawaii deep-set longline fishery incidentally interacts with a number of ESA-listed marine mammals during fishing operations. The 2014 BiOp (sections 5, 6, 7, 8, and 9) includes a detailed analysis of recent levels of interactions between the fishery and ESA-listed humpback whales, sperm whales, and MHI Insular false killer whales (NMFS 2014). This information is incorporated by reference and is briefly summarized here.

On October 10, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing the fishery's interactions with depleted stocks of marine mammals. The permit authorizes the incidental, but not intentional, taking of ESA-listed humpback whales (CNP stock), sperm whales (Hawaii stock), and MHI insular false killer whales. In issuing this permit, NMFS determined that incidental taking by the Hawaii deep-set and shallow-set longline fisheries will have a negligible impact on the affected stocks of marine mammals.

NMFS issued a no-jeopardy BiOp in 2014 for the deep-set longline fishery, authorizing incidental take for humpback whales, sperm whales, and MHI Insular false killer whales (NMFS 2014). **Table X** specifies the thresholds for incidental take in the fishery, which became effective issuance of the MMPA section 101(a)(5)(E) permit. **Table XX** summarizes recent interactions between the deep-set longline fishery and ESA-listed marine mammals, based on observed trips in 2011-2013 when the fishery was open year-round.

Table 25: The numbers of ESA-listed marine mammals estimated to be captured and/or killed in the Hawaii deep-set fishery over three consecutive years (3-year ITS) in the 2014 biological opinion.

Species	**Estimated Incidental Take**	
	Interactions	**Total Mortalities**
Humpback whales	6	3
Sperm whales	9	6
MHI Insular FKW	1	0.74

Source: NMFS 2014.

Table 26: Recent interactions between the Hawaii deep-set longline fishery and listed marine mammals (with the fishery operating under Specified Fishing Agreements).

Year	Humpback Whale, Central North Pacific (CNP) Stock	Sperm Whale, Hawaii Stock	False Killer Whale, Main Hawaiian Islands Insular Stock (End. DPS)*
2014 (through June 2014)	0	0	0
2013	0	0	0
2012	0	0	0
2011	0	1 observed; 6.3870 estimated	1 observed; 0.8920 estimated based on pro-ration of observed false killer whales and unidentified blackfish in the insular/pelagic overlap area as defined in section 5.2.3 of the 2014 BiOp

Source: NMFS 2014. (BiOp); *End. DPS = endangered distinct population segment.

Table 27 provides total marine mammal interactions observed in the shallow-set fishery from 2008 through 2012. All trips are observed in the shallow-set fishery; therefore, expansion of the data is not necessary.

Table 27: Total annual marine mammal interactions (including dead, serious injuries, and non-serious injuries) for the Hawaii shallow-set longline fishery, 2008-2012.

Species	2008	2009	2010	2011	2012	Mean**
Blackfish*	1	0	0	1	0	0.4
Common dolphin	0	0	0	1	0	0.2
Risso's dolphin	4	3	7	4	0	3.6
Blainville's beaked whale	0	0	0	1	0	0.2
Humpback whale	1	0	0	1	0	0.4
False killer whale	1	1	0	1	1	0.8
Striped dolphin	1	0	2	0	1	0.8
Bottlenose dolphin	0	0	2	2	1	0.8
Unidentified cetacean	0	1	1	0	1	0.6
Pygmy or dwarf sperm whale	1	0	0	0	0	0.2
Beaked whale, Mesoplodont	0	0	0	1	0	0.2
Unidentified beaked whale	0	0	0	1	0	0.2

Note: * "Blackfish" includes unidentified whales considered to be either false killer whales or short-finned pilot whales. ** Annual estimates are rounded to whole numbers. Five-year means are based on unrounded annual estimates, so they may differ from a five-year average of the rounded figures.
Source: McCracken 2014.

To date, no humpback, sperm, blue, fin, or sei whale interactions have been observed or reported in the American Samoa longline fishery. Observed marine mammal interactions in the American

Samoa longline fishery are shown in Table 28. The target rate for observer coverage is 20 percent of all trips. This is subject to funding limitations and may fluctuate. The average rate of coverage is 23 percent since 2010.

Table 28: Number of marine mammal interactions observed in the American Samoa longline fishery, 2006-2011.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
Number of sets observed	287	410	379	306	798	1,257	284	585	565
Rough-toothed dolphin	0	0	1	0	0	5	0	1	0
Cuvier's beaked whale	0	0	0	0	0	1	0	0	0
False killer whale	0	0	2	0	0	3	0	1	0
Short-finned pilot whale	0	0	0	0	0	0	0	0	1
Unidentified cetacean	0	0	0	0	0	2	0	0	0

Source: NMFS PIRO American Samoa Observer Program 2006-2011 Status Reports.
Note: Protected species interactions for Observer Program Quarterly and Annual Reports are based on vessel arrivals rather than when the interaction occurred. The tally of an interaction may fall in a year other than the year when the interaction actually occurred.

Recent estimates of the total (extrapolated) number of marine mammal interactions in the American Samoa longline fishery are not available. However, based on 2006-2008 data, the total estimated number of serious injuries and mortalities for marine mammals per year in the American Samoa longline fishery is 3.6 rough-toothed dolphins (CV=0.6) and 7.8 false killer whales (CV=1.7) (Carretta et al. 2012).

With no active longline fishery in Guam or the CNMI, there are no interactions with marine mammals reported for the past several years.

3.4.3 Seabirds

ESA-listed Seabirds

The endangered short-tailed albatross, threatened Newell's shearwater, and endangered Hawaiian dark-rumped petrel have ranges that overlap the fishing grounds of the Hawaii longline fisheries. The short-tailed albatross has a range that overlaps the pelagic fisheries operating around the CNMI and Guam. In addition, three other seabirds in the South Pacific were determined to be endangered under the ESA in 2009: the Chatham petrel (*Pterodroma axillaris*), Fiji petrel (*Pseudobulweria macgillivrayi*), and the magenta petrel (*Pterodroma magentae*). However, apart from Newell's shearwater, which was sighted on Tutuila only once in 1993 and considered an accidental visitor, the ranges of the other three species are assumed not to overlap with that of the American Samoa longline fishery or other pelagic fisheries north of the Equator (see sources cited in WPRFMC 2011). A comprehensive description of the species' distribution, population status, threats, and recovery strategy can be found in the species' recovery plans.[18]

[18] Available online at: http://ecos.fws.gov/tess_public/TESSWebpageRecovery?sort=1.

Since NMFS initiated the observer programs in Hawaii in 1994 and American Samoa in 2006, there have been no observed interactions between ESA-listed seabird species and the fisheries under the Pelagics FEP.

In 2012, an ESA section 7 consultation with the U.S. Fish and Wildlife Service covering the potential impacts of the Hawaii deep-set and shallow-set fishery on listed seabirds concluded that the Newell's shearwater and the Hawaiian petrel are not affected by the Hawaii deep-set fishery. In addition, USFWS concluded in the USFWS 2012 BiOp that the continued operation of the Hawaii deep- and shallow-set longline fisheries will adversely affect the short-tailed albatross but will not jeopardize its survival and recovery in the wild. No critical habitat has been designated for this species; therefore, none will be affected. The BiOp covering the short-tailed albatross anticipates that two (2) short-tailed albatross in the deep-set fishery and (1) short-tailed albatross in the shallow-set fishery may be taken every five years in the form of injury or death as a result of interactions with fishing activity operating under existing regulations (USFWS 2012a). This is an authorized observed level of take and if this level is exceeded, NMFS will be required to reinitiate consultation with the USFWS. Since NMFS initiated the mandatory Hawaii longline observer program in 1994, there have been no observed interactions between ESA-listed seabird species and Hawaii deep-set or shallow-set longline fisheries under the Pelagics FEP.

In an informal consultation, dated May 19, 2011, USFWS concurred with NMFS' determination that the American Samoa longline fishery is not likely to adversely affect the Newell's shearwater. In a separate communication on July 29, 2011, and recorded in a memorandum for the record on the same date, USFWS advised that, because of the lack of overlap between the range of the American Samoa longline fishery and the ranges of Chatham, Fiji, and magenta petrels, the fishery would likely not adversely affect those petrels.

Seabird interactions have not been reported or observed in the Guam or CNMI longline fisheries, therefore; a 2011 ESA section 7 consultation with USFWS determined these fisheries are not likely to adversely affect the Newell's shearwater or the short-tailed albatross. Since 2012, there have been no active longline vessels in Guam or CNMI, so there are no reports of interactions with seabirds.

Non-listed Seabirds

Seabird regulations for the Hawaii longline fisheries were published in the *Federal Register* on December 19, 2005 (70 FR 75075). Deep-set fishing operations north of 23º N latitude are required to comply with seabird mitigation regulations that are intended to reduce interactions between seabirds and Hawaii longline fishing vessels (50 CFR parts 600 and 665). The regulations require that longline fishermen employ a suite of mitigation measures that are specific to side-setting or stern-setting, and may include blue-dyed bait, weighted branch lines, strategic offal discards, setting from the side of the vessel, using a "bird curtain", or a hydraulic line-setting machine, among others. These measures help deter birds from becoming hooked or entangled while attempting to feed on bait or catch. For a complete description of the requirements, see 50 CFR § 665.815. These requirements would remain in effect under all Alternatives.

In addition to the ESA-listed seabirds described above, the Hawaii deep-set and shallow-set longline fisheries occasionally interact with other seabirds such as albatrosses, Northern fulmar, and sooty shearwater.

Albatrosses
Albatrosses that forage by diving are some of the most vulnerable species to bycatch in fisheries (Brothers et al. 1999). These species are long-lived, have delayed sexual maturity, small clutches and long generation times, resulting in populations that are highly sensitive to changes in adult mortality. Nineteen of the world's 21 albatross species are now globally threatened with extinction according to the IUCN (IUCN 2004, BirdLife 2004), and incidental catch in fisheries, especially longline fisheries, is considered one of the principal threats to many of these species (Veran et al. 2007).

Hawaii longline fisheries interact at low levels with black-footed and Laysan albatross, but due to strict mitigation measures enacted under the Pelagics FEP, interactions have been drastically reduced since 2000. The Hawaii longline fishery has reduced seabird interactions by 67 percent in the deep-set fishery (Gilman et al. 2008), and a 96 percent in the shallow-set fishery. Increased observer coverage (20-26 percent for the deep-set fishery and 100 percent for the shallow-set fishery) has also resulted in better monitoring and reporting of interactions.

On October 7, 2011, in response to a petition to list the black-footed albatross under the ESA, the USFWS found that the Hawaiian Islands breeding population and the Japanese Islands breeding population of the black-footed albatross are separate distinct population segments, as defined by the DPS policy (76 FR 62503). However, the USFWS also found that neither DPS of the black-footed albatross currently warrants listing under the ESA. The USFWS observed that black-footed albatross bycatch should continue to be minimized by the implementation of effective bycatch minimization measures, and concluded that Hawaii-based longline fishing is not a significant threat to the black-footed albatross.

Non-listed Seabird Interactions
Table 29 contains the estimated numbers of albatross that have interacted with the Hawaii deep- and shallow-set longline fisheries from 2006 through 2013 based on observed interactions by the NMFS Observer Program. From 2004, observer coverage rates were approximately 20 percent in the deep-set fishery and 100 percent in the shallow-set fishery. The major reduction in the number of interactions was due in most part to requirement that the shallow-set longline fishery begin setting one hour after local sunset and to complete setting one hour before local sunrise. Seabirds likely drown if the interaction occurs during gear deployment (setting), but during gear retrieval (hauling), seabirds may be released alive when fishermen promptly apply seabird handling and release techniques. Based on observer data nearly all seabirds hooked or entangled in the Hawaii deep-set longline fishery are dead, since interactions presumably occur during the setting.

In addition, from 2004 to 2013, based on observed sets, the deep-set fishery interacted with one red-footed booby, one brown booby and 42 sooty shearwaters. In the same period, the shallow-set fishery interacted with one northern fulmar and three sooty shearwaters (http://www.fpir.noaa.gov/SFD/SFD_seabirds.html).

Table 29: Estimated total number of interactions with albatrosses in the Hawaii deep- and shallow-set longline fisheries, 2006-2013.

Year	Laysan	Black-footed	Total
2006	73	15	88
2007	85	83	168
2008	124	88	212
2009	139	141	280
2010	105	197	302
2011	92	236	328
2012	195	182	377
2013	297	294	591

Source: NMFS PIFSC and McCracken 2012, 2013, 2014.

Most of the seabird interactions now occur in the deep-set longline fishery (Table 30). Although fewer are caught, a greater percentage of Laysan albatrosses are caught in the shallow-set fishery see Table 31).

Table 30: Estimated interactions with albatrosses in the Hawaii deep-set longline fishery, 2005-2013.

Year	Laysan	Black-footed	Total
2005	43	82	125
2006	7	70	77
2007	44	77	121
2008	55	118	173
2009	60	110	170
2010	157	66	223
2011	187	73	260
2012	167	136	303
2013	257	236	493
Average	108.5	107.5	216

Source: NMFS PIFSC and McCracken 2012, 2013, 2014.

Table 31: Observed albatross interactions in the Hawaii shallow-set longline fishery

Year	Laysan	Black-footed	Total
2004	1	0	1
2005	62	7	69
2006*	8	3	11
2007	40	8	48
2008	33	6	39
2009	81	30	112
2010	40	38	79
2011*	49	19	68
2012	61	37	98

2013	46	28	74
Average	39	14	53

Note: * NMFS closed the fishery before the end of the year because an annual turtle interaction limit was reached.
Source: NMFS PIRO observer data: http://www.fpir.noaa.gov/OBS/obs_hi_ll_ss_rprts.html

The USFWS issued a special permit in 2012 under the Migratory Bird Treaty Act (MBTA) to the Hawaii shallow-set fishery. The permit authorizes incidental take of certain seabirds for a period of three years (Table 32; USFWS 2012b).

Table 32: Total incidental take authorized under the three-year MBTA Special Purpose Permit for the Hawaii shallow-set longline fishery.

Year	**Authorized incidental take (N)**			
	Laysan albatross	Black-footed albatross	Northern fulmar	Sooty shearwater
2012	129	57	10	10
2013	143	64	10	10
2014	159	71	10	10
Total	430	191	30	30

Source: USFWS 2012b.

Many seabird species may occur in the area of operation of the American Samoa longline fishery, similar to Hawaii, Guam, and CNMI. Observers have recorded two interactions with unidentified shearwaters and one unidentified frigatebird in the American Samoa longline fishery from 2006-2014.

3.4.4 Sharks

ESA-listed Sharks

On July 3, 2014, NMFS issued a final rule to list under the ESA, the Indo-West Pacific scalloped hammerhead shark distinct population segment (DPS), and the Eastern Pacific scalloped hammerhead shark DPS as threatened and endangered, respectively (79 FR 38213). The Indo-West Pacific DPS includes areas around most of the U.S. Pacific territories and possessions. The Eastern Pacific DPS generally includes the eastern Pacific, east of 140° W. NMFS has not yet designated critical habitat for these DPSs.

Detailed information on the scalloped hammerhead sharks including the range, abundance, status, and threats to the species can be found in the 2014 BiOp for the deep-set longline fishery (NMFS 2014), the 2014 Status Review Report and the 2014 Final Rule (79 FR 38213).

Shark Interactions

Since 2004, NMFS observers placed on Hawaii deep-set longline fishing vessels recorded three incidentally-caught scalloped hammerhead sharks in the area of the threatened Indo-West Pacific

DPS south of 10° N., all of which were caught from 2004-2007 (PIRO Observer Program, unpublished data). Based on the three observed and the observer coverage levels in those years, NMFS estimates that the total catch of scalloped hammerheads from the Indo-Pacific DPS was approximately 14, which is about 2 annually (rounded from 1.4) during the 2004-2014 time period (NMFS 2014d). NMFS has no records of any interactions with scalloped hammerhead sharks from the Eastern Pacific DPS. As described in the final rule listing (79 FR 38213, July 3, 2014), the Indo-West Pacific scalloped hammerhead shark DPS is not subject to the take prohibitions in section 9 of the ESA because NMFS has determined that protective regulations under section 4(d) are not deemed necessary and appropriate for the conservation of that species.[19]

The 2014 BiOp analyzed the effects of the proposed action on the Indo-West Pacific scalloped hammerhead shark DPS and the Eastern Pacific scalloped hammerhead shark DPS (sections 5, 6.8, 7.8, 8.0 and 9.8), incorporated herein by reference. Based on historical interactions described above, the 2014 BiOp found that the likelihood of interactions with the Eastern Pacific scalloped hammerhead shark DPS is discountable and unlikely to occur as the fishery does not generally operate in the area where this stock is found. Based on this finding, NMFS concluded that the Eastern Pacific DPS of scalloped hammerhead sharks is not likely to be adversely affected by the proposed action.

With respect to the Indo-West Pacific scalloped hammerhead shark DPS, the 2014 BiOp anticipates and authorizes the Hawaii longline fishery to interact with six Indo-Western Pacific scalloped hammerhead sharks, which is expected to result in three mortalities over a three-year period. Although abundance estimates for the entire DPS are unavailable, the effective population size is estimated to be at least 11,280 adults. One mortality represents 0.009% (1/11,280*100=0.00886) of the population. Based on this information, NMFS in its 2014 BiOp concluded that the Hawaii deep-set longline fishery as managed under the Pelagic FEP, is not likely to jeopardize the continued existence or recovery of the Indo-West Pacific scalloped hammerhead DPS.

3.4.4 Corals

ESA-listed Corals

On September 10, 2014, NMFS issued a final rule to list 20 species of corals as threatened under the ESA (79 FR 53851). Fifteen of the newly listed species occur in the Indo-Pacific, and five in the Caribbean. Of those that occur in the Indo-Pacific, only eight are believed to occur in waters under U.S. jurisdiction.

Coral reefs are formed on solid substrate but only within the narrow range of suitable environmental conditions that allows the deposition rates of corals and other reef calcifiers to exceed the rates of physical, chemical, and biological erosion. In the U.S. Pacific Islands, coral

[19] Section 9 of the ESA prohibits any person subject to the jurisdiction of the United States to take, harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct within the United States, or territorial seas of the United States, or the high seas.

reef habitat is generally found immediately within waters from 0-3 nm of shore, although some coral reef habitat can be found further offshore.

In contrast, pelagic fisheries generally operate dozens to a thousand of miles offshore, far away from the islands and coral reef habitat areas, to target pelagic fish species in the water column. With respect to the longline fisheries, federal regulations prohibit longline fishing within 50-75 nm from shoreline of Hawaii and 30 nm from the shoreline of the Northern Mariana Islands. In American Samoa and Guam, federal regulations prohibit all fishing vessels greater than 50 ft in length, including longline vessels from fishing within 50 nm of the shoreline. In the Pacific Remote Islands federal regulations prohibit all commercial fishing within 50 nm of all islands, including longline fishing.

To access fishing grounds, pelagic fishing vessel have to transit areas where ESA-listed corals may occur. While pelagic troll vessels may deploy surface lures during transit, the activity does not occur in coral reef habitat. Pelagic longline and handline vessels do not deploy gear in transit. Additionally, pelagic fishing activities do not involve anchoring and therefore, the potential for anchor damage during fishing activities not an issue.

Chapter 4: Environmental Consequences

This chapter describes the environmental consequences that could result from the implementation of each Alternative. Table 1 provides comparative outcomes summarizing impacts of the Alternatives. The analysis uses the information described in Chapter 3 as the baseline to evaluate the action Alternatives compared to the impacts of Alternative 1 - No-action. The environmental resources that are potentially affected include the following: target and non-target species (including bycatch), protected resources, and marine habitat. This chapter also considers the impacts on fishery participants, fishing communities, and enforcement and administration. Climate change impacts and Environmental Justice are discussed in Chapter 5.

4.1.1 Potential Impacts to Target and Non-target Stocks

The analysis of the Alternatives under this topic includes impacts to target and non-target stocks, with a focus on bigeye tuna, which is experiencing overfishing in the WCPO.

The targeting of bigeye tuna by U.S. longline vessels drives incidental catches of other pelagic MUS such as yellowfin tuna and striped marlin. Incidental catches of non-target pelagic species correspond to longline fishing effort, but also involve variations in population dynamics such as recruitment influenced by oceanographic conditions.

The following analysis (also see Appendix D) uses TUMAS (Tuna Management Simulator) to evaluate impacts to bigeye tuna form the alternatives when combined with international fisheries occurring within the WCPFC Convention Area. TUMAS is an online web tool designed to allow users to control fisheries data under various scenarios and project the status of a particular stock in the future.[20] This application was developed by the SPC-OFP and relies on stock assessments of tropical tunas in the WCPO.

With respect to bigeye tuna, the most recent version of TUMAS incorporates the 2014 stock assessment of bigeye tuna in the WCPO (see Harley et al. 2014). This stock assessment is a spatially disaggregated MULTIFAN-CL model that separates the WCPO into 9 regions. As designed, TUMAS incorporates bigeye tuna catch information from the early 1950s up to 2012 and allows users to scale catch data by fisheries overall or in one or more of the six stock assessment regions to make predictions about likely stock responses to catch or effort changes. New stock assessments are incorporated into TUMAS as they become available. The TUMAS model available at the time of writing incorporates 2012 catch information of bigeye tuna and does not include 2013 or 2014 catches.[21]

TUMAS also offers the ability to conduct projections under two stock-recruitment scenarios for bigeye tuna:

[20] http://www.tumas-project.org/about-tumas

[21] The 2013 WCPO bigeye catch was less than in 2012. The 2014 WCPO bigeye catch is unavailable at the time of writing.

1) Long-term recruitment average (1952-2011), which is termed "spawner recruitment relationship" in the model; and

2) Recent average recruitment (1989-2011).

The two recruitment scenarios offer different stock status trajectories, with long-term average recruitment being more pessimistic and recent average recruitment being more optimistic. The long-term recruitment average includes several decades (1950s-1970s) of older recruitment estimates that were derived from periods when fishing mortality on bigeye tuna was much lower and confined primarily to longline fishing. Higher levels of bigeye tuna recruitment occurred after the 1980s with the expansion of FAD-based purse seine fishing in the WCPO, and thus the recent average recruitment scenario (1989-2009) better reflects current conditions and conditions that are likely to prevail into the near future, where bigeye tuna catches will be from a mixture of purse seine and longline fisheries.

With regards to deterministic projections, such as those produced using TUMAS, the WCPFC Science Committee has recommended that the WCPFC science provider (SPC-OFP) conduct projections using recent average recruitment and the long-term recruitment average; however, since the higher level of recent bigeye tuna recruitment is considered to be a better indicator of future recruitment levels, greater emphasis is provided to recent average recruitment when presenting catch projections (WCPFC 2010; WCPFC 2011(d); J. Hampton, SPC-OFP, pers. comm., 2013).[22] The SPC-OFP will likely incorporate data after 2012 in the TUMAS tool after the next WCPO bigeye stock assessment.

For comparative purposes, the analysis below provides projection results using both recruitment scenarios and scaled 2012 US longline catches combined with catch and effort of other fisheries in 2012. When comparing projection results between years under the same catch levels, there is a noticeable trend in stock status, with the stock improving under the recent average recruitment scenario and declining under the long-term average recruitment scenario. See Appendix A for projected results compiled in tabular form.

Although using both recruitment scenarios in the TUMAS projections results in overfishing under all Alternatives, less emphasis is placed on these results derived using the long-term recruitment average because recruitment levels associated with the long-term recruitment average are not believed to be representative future levels of recruitment. Beginning in the late 1980s, higher levels of recruitment have been observed and incorporated in the bigeye tuna stock assessment. The long-term recruitment average includes several decades (1950s-1970s) of recruitment estimates that were derived from periods when fishing mortality on bigeye tuna was much lower and confined primarily to longline fishing. Moreover, the older recruitment estimates, especially in the 1950s were based on longline data from the Japanese longline fishery when it was more spatially constrained and had not spread out across the WCPO.

[22] In 2011, the SPC-OFP ran projections using both recent average recruitment and long-term average recruitment; however, the SPC-OFP only presented projections using recent average recruitment at the Eighth Regular Session of the WCPFC in March 2012. This exemplifies the greater emphasis being placed on recent average recruitment versus long-term average recruitment when conducting projections on the stock status of bigeye tuna. See WCPFC 2011(d).

Higher levels of bigeye tuna stock recruitment occurred after the 1980s with the expansion of FAD-based purse seine fishing in the WCPO. This high level of juvenile catch is explained in the stock assessment as elevated levels of bigeye recruitment. Moreover, the dynamics of the ecosystem may also have responded to the increasing levels of fishing mortality, which have reduced the upper trophic level predator biomass including adult bigeye tuna, likely resulting in more favorable survival rates for juvenile bigeye tunas (Myers and Worm 2003; Sibert et al. 2006; Polovina et al. 2009; Woodworth-Jefcoats et al. 2012). Furthermore, the 2011 stock assessment for WCPO bigeye tuna indicates that most of the high levels of recruitment observed in the model occur at low estimated spawning biomass (Davies et. al 2011). As such, recent average recruitment of bigeye tuna is likely to be a better reflection of future levels of recruitment, given that favorable conditions will likely persist including the mix of longline and purse seine fishing gears harvesting bigeye in the WCPO.

Because recent average recruitment is believed to be a better representation of current and future recruitment trends, greater emphasis is placed on recent average recruitment associated projections to evaluate impacts from the Alternatives to future bigeye stock status. This is consistent with the advice provided by WCPFC Science Committee (WCPFC 2010; 2011(d)) and subsequent projections conducted by the SPC-OFP (WCPFC 2011(d)). See Appendix D for further information.

TUMAS was used to evaluate the impact of US longline bigeye catches to the current and projected stock status of bigeye. Using information obtained from various reports provided by the SPC and the TUMAS tool, current bigeye stock status reference points and those associated with projected 2012 bigeye catches out to 2022 and 2032 are provided in Table 33.

Table 33: Bigeye stock status based on projecting the 2012 WCPO bigeye catch to 2022 and 2032

year	F/F_{MSY}		SB/SB_{MSY}		B/B_{MSY}	
	Recent Recruitment	Long-term recruitment	Recent Recruitment	Long-term recruitment	Recent Recruitment	Long-term recruitment
2012	1.57 [(a)]	1.39 [(b)]	0.77 [(a)]	0.79 [(b)]	0.89 [(b)]	0.87
2022	1.69 [(b)]	1.99 [(b)]	0.74 [(b)]	0.38 [(b)]	0.83 [(b)]	0.46
2032	1.17 [(c)]	2.10 [(c)]	1.26 [(c)]	0.32 [(c)]	n/a	n/a

Sources: (a) 2014 stock assessment
(b) TUMAS
(c) Graham - pers. comm.
(d) WCPFC-SC10-2014/SA-WP-06
n/a = not available. The SPC does not generate B/B_{MSY} values in their assessments.

The SPC recently evaluated the impact of CMM 2013-01 if implemented with a 5 month FAD closure and associated longline bigeye catch limits as prescribed in the measure. Using 2012 WCPO bigeye catches that were scaled down to meet parameters described above, the SPC

projected the effect of CMM 2013-01 on various stock status reference points out to 2032. A twenty-year projection was conducted, rather than a 10-year projection, due to the stock not reaching equilibrium with the constant effort or catch within the projection under the recruitment assumptions (G. Piling. SPC, pers. comm. February 2015). As shown in Table 34, the effects of a 5-month FAD closure and associated longline catch limits, in combination with other bigeye catches held at 2012 levels, overfishing of bigeye is eliminated by 2032 using the recent recruitment scenario. Using the long term recruitment scenario, overfishing is maintained.

Table 34: Projected Effects of CMM 2013-01 on Bigeye Stock Status (5-month FAD closure and member-based longline bigeye catch limits).

year	F/F_{MSY}		SB/SB_{MSY}		B/B_{MSY}	
	Recent Recruitment	Long-term recruitment	Recent Recruitment	Long-term recruitment	Recent Recruitment	Long-term recruitment
2032	0.99 (a)	1.44 (a)	1.26	0.32	n/a	n/a

Source: (a) SPC. 2014. WCPFC 11-2014-015
Notes: N/A = not available. The SPC does not generate B/B_{MSY} in their assessments.

4.1.2 Alternative 1: No Action- no 2015 Territory Bigeye Specifications

This Alternative would not establish 2015 Territory bigeye specifications, and subsequently would not allow Specified Fishing Agreements in 2015. Without Territory agreements, total bigeye catches by U.S. longline vessels in the WCPO would be similar to 2009 and 2010 levels (see Table 12). The amount of bigeye expected to be caught under this alternative by US longline fisheries operating in the WCPO is 3923 (excluding 100-200 mt that is harvested from EEZ around American Samoa and which is not able to be scaled in TUMAS). This amount represents approximately a 24 percent reduction from 2012 US longline bigeye catch levels.

A TUMAS analysis using the recent recruitment average indicates that a 24% reduction in US longline bigeye catch, while maintaining other 2012 fishing conditions would have a 1 percent decrease in the F/F_{MSY} ratio when projected to 2022 (from 1.69 to 1.68. however, bigeye would still be experiencing overfishing. The effect of approximately 4,000 mt of bigeye harvested by US longline fisheries in the WCPO on bigeye stock status, in combination with a 5-month purse seine FAD closure, member-based longline catch limits longline, and other provisions in CMM 2013-01, would be a similar 1 percent decrease in the F/F_{MSY} ratio. When these conditions are projected to 2032, bigeye overfishing would be eliminated with F/F_{MSY} levels projected at 0.99% (SPC 2014).

Without the authorization of Territory arrangements with FEP-permitted vessels in 2015 and 2016, the catches of non-target stocks by the U.S. longline fisheries would likely be reduced in the WCPO, likely similar to levels that occurred in 2009 and 2010; ranging from 10-200 mt depending on the species of non-target stocks (see Table 12).

It is expected that if the WCPO U.S. longline limit for bigeye tuna was reached, and fishing for or retaining bigeye tuna in the WCPO was prohibited, the Hawaii longline fleet would shift its effort to the EPO (east of 150° W longitude). Under this scenario, it is anticipated that effort in

the EPO would not be as high due to the distance to fish in that area, likely impacting smaller vessels in the fleet more, and would reduce the amount of total annual catches of target and non-target species. In addition, catches of bigeye tuna could be reduced, as catch per unit effort in the EPO is seasonally variable and unlikely to be as high in the WCPO at the end of the calendar year. Hawaii longline vessels typically fish in the WCPO and closer to the MHI during the winter months, taking advantage of what is believed to be a seasonal run of bigeye tuna. As previously mentioned, the longline effort for bigeye tuna influences catches of non-target species, so any reduction in fishing effort in the EPO that would have been expended in the WCPO if arrangements are not authorized, it would also result in a reduction in catches of non-target species during that period.

As observed in the longline shallow-set fishery, a potential indirect effect of this Alternative on bigeye tuna is related to foreign fishing filling market gaps left by constrained U.S. vessels. For example, if the U.S. longline limit for bigeye tuna is reached in the WCPO during the calendar year, and the Hawaii longline fleet is prohibited from fishing for and retaining bigeye tuna in the WCPO, the Hawaii seafood market may be negatively affected due to reduced catches and poorer quality fish landed by the Hawaii longline feet because longer trips would be taken to the EPO. This impact to the market occurred in 2010 (Richmond et al. 2012). Similarly, based on the closure of the longline shallow-set fishery in 2004, it is also expected that foreign caught bigeye tuna would be imported into Honolulu to fill any potential market gaps. Bigeye tuna imports into Hawaii show a significant increase in 2012, which suggest there are fleets that are targeting the Hawaii seafood market (See Figure 15). For example, the spike in 2012 bigeye tuna imports into Hawaii is primarily from a 350-percent increase in imports from the Republic of the Marshall Islands (see Figure 15), which has access agreements to foreign longline vessels consisting mostly of Chinese longline vessels.[23] The operational area of the WCPO Chinese longline fleet targeting bigeye is believed to mostly be in Region 4, which shows significant impacts from fishing on bigeye tuna biomass, which biomass would otherwise be much higher in that area in the absence of such fishing (see Figure 14). Therefore, a potential consequence of this Alternative is that less monitored and less environmentally friendly foreign fisheries targeting the same stocks (e.g., bigeye tuna) would fill market gaps left by U.S. fisheries that are constrained from fishing to optimum yield.

[23] See the 2013 Annual Part 1 Report of Marshal Islands to the WCPFC: http://www.wcpfc.int/system/files/AR-CCM-12-Republic-Marshall-Islands-Part-1.pdf

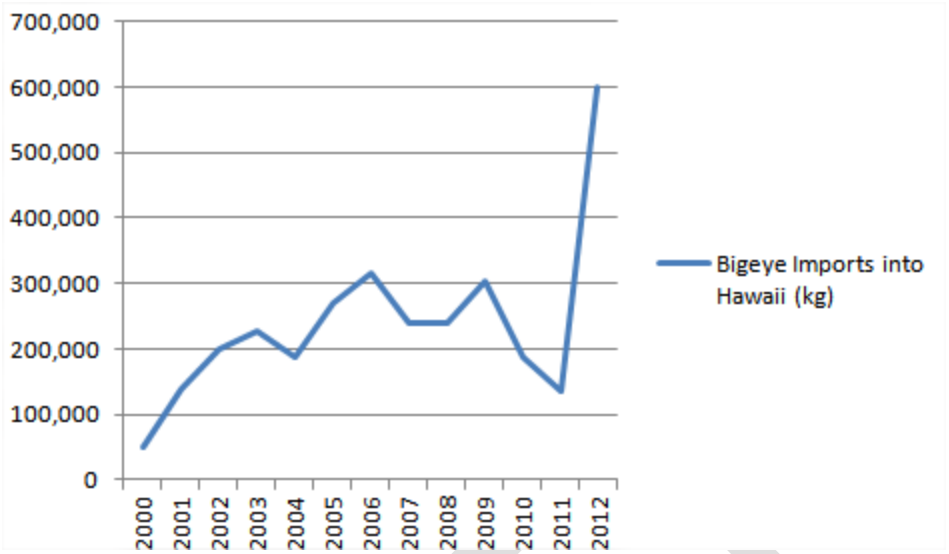

Figure 13: Trend of fresh bigeye tuna imported to Hawaii, 2000-2012.
Source: WPFMC unpublished; data from:
http://www.st.nmfs.noaa.gov/pls/webpls/trade_district_allproducts.results?qtype=IMP&qyearfrom=2001&qyearto=2013&qproduct=TUNA+BIGEYE&qdistrict=32&qsort=PRODUCT&qoutput=TABLE

CNMI and Guam pelagic fisheries

As described in sections 3.3.2 and 3.3.3, the commercial and non-commercial pelagic fisheries of CNMI and Guam are currently conducted with primarily troll and handline gears to target tuna (other than bigeye), billfish, mahimahi, and wahoo. The CNMI and Guam troll fisheries mostly target skipjack tuna and seasonally catches yellowfin tuna and mahimahi. These fisheries do not catch much bigeye tuna due to the location of fishing activity and because bigeye tuna are not readily caught at the surface with troll gear. The annual landings of targeted tuna species in Guam and CNMI are an insignificant fraction of the total catches of these species in the WCPO by all fleets. For example, in 2013, the amount of yellowfin tuna landed in Guam was estimated at approximately 52,000 pounds (267 mt). In 2013, approximately 1,180,255,224 lb (535,506 mt) of yellowfin was caught in the WCPO, thus catches of yellowfin by Guam's pelagic fisheries represent approximately 0.004 percent of the WCPO yellowfin catch. Similarly, CNMI's pelagic fisheries have contributed very minimally to fishing mortality of pelagic species when compared to total WCPO catches. There is very little bycatch in these fisheries and most catch is retained for local sale or for personal consumption. The Council, NMFS, and local fishery managers review the catches of these fisheries annually and believe the catches are sustainable. Therefore, in the near term, this Alternative would likely maintain baseline catch and effort levels for existing pelagic troll fisheries in both locations, and there would be no additional impacts to target or non-target stocks.

American Samoa pelagic fisheries

As described in Chapter 3, the largest pelagic fishery in American Samoa is the commercial longline fishery targeting albacore tuna, which is sold to the local Pago Pago canneries. The

amount of albacore landed by the American Samoa longline fishery in 2013 was 4,679,946 pounds (2,123 mt). The 2013 WCPO catch of south Pacific albacore was estimated at 81,198 mt, thus the American Samoa longline fishery represents approximately 2.6 percent of the total annual south Pacific albacore catch. The stock of south Pacific albacore is healthy; it is not overfished and overfishing is not occurring.

Troll and handline fishing also occurs on a commercial and non-commercial basis in American Samoa, representing relatively small annual catches of yellowfin and skipjack tunas, and other pelagic MUS. Troll and handline fisheries in American Samoa are reported to catch zero bigeye tuna. Catches by the pelagic fisheries are believed to be sustainable and are reviewed annually by the Council, NMFS, and local fishery managers.

There are 60 permits authorized under the American Samoa longline limited entry permit program, split among 4 vessel size categories (Class A (≤ 40.1 ft in length); Class B (40.1-50 ft); Class C (50.1-70 ft); Class D (> 70 ft). Class B, C, and D permit categories are registered with vessels fishing in the EEZ around American Samoa or are dual-permitted and also fishing in the EEZ around Hawaii and adjacent high seas. There are several inactive Class A and B permits. If fisheries development lead to some longline vessels being able to diversify their landings (i.e., in addition to frozen albacore), then catches of yellowfin and bigeye tunas, and other pelagic species may increase under this Alternative in the future. The number of vessels that would diversify their catches and the amount of fish and species composition of catches by these vessels are not predictable at this time. However, given that participation is capped under the American Samoa longline limited entry program at 60 permits, overcapitalization of the fleet is not likely, and the catch of target and non-target stocks by the fishery is not expected to substantially increase over baseline levels, and there would be no additional large impacts to target or non-target stocks.

NMFS targets observer coverage in the American Samoa longline fishery at 20 percent annually. Bycatch of non-target species in the fishery is comprised mostly of sharks and other pelagic species, which are not retained due to little or no market value. Bycatch levels are shown in Chapter 3. The majority of sharks caught in the fishery are returned alive to the sea. The current level of bycatch is not expected to increase under this Alternative. , even if the fishery diversified. For example, under a diversified longline fishery that benefited from funds derived from Territory arrangement in terms of vessel upgrades and fresh fish training, bycatch might decrease from baseline levels due to an ability to properly store and land species that otherwise might have been returned to the sea. Due to a historical lack of fresh fish markets in American Samoa, large yellowfin and bigeye tunas are sometimes discarded if caught in the beginning of the fishing trip because fish of such size are not optimal for cannery operations. Now that Tri Marine is established in Pago Pago, and offering to buy fresh/frozen tuna for export markets from local American Samoa longline vessels, there is potential that tunas and other MUS that otherwise may have been bycatch may be retained and sold. This may likely reduce bycatch levels from historical levels; however, this is also conditional on fleet upgrades (e.g., ice machines) and training (e.g., fresh fish handling).

Hawaii pelagic fisheries

As described in section 3.2.4, the combined Hawaii longline fishery is the largest fishery in terms of volume and value in Hawaii. The primary target species of the Hawaii longline deep-set fishery is bigeye tuna, but the fishery also lands other secondary non-target and incidentally-caught species of commercial value including yellowfin tuna, swordfish, striped marlin, blue marlin, mahimahi, wahoo, monchong (pomfret), opah, escolar, and mako shark. Hawaii's other commercial pelagic fisheries include troll and handline for yellowfin and bigeye tunas, mahimahi, and other pelagic MUS.

The Hawaii longline fishery, as the primary U.S. longline fishery in the WCPO, and for 2015, subject to an annual longline bigeye tuna limit of 3,554 mt in the WCPO and a 500-mt limit (including any fishing by the territories) in the EPO for vessels over 24 meters.[24] The U.S. catch limit for bigeye tuna in the WCPO applicable to the Hawaii longline fisheries (includes both deep- and shallow-set) represents 2.3 percent of the total 2013 WCPO bigeye tuna caught by all gears, and 5.7 percent of the total 2013 WCPO bigeye tuna longline catch (see Table 13).

As described in section 3.1, bigeye tuna is a pan-Pacific stock that has recently been assessed separately in the WCPO and EPO for management purposes. The WCPO stock assessment is expansive, covering bigeye tuna from Indonesia in the far western Pacific, to the 150° W in the central Pacific Ocean.[25] The WCPO stock assessment further separates fishing areas into six regions, and evaluates biomass and fishing mortality information and trends within the regions. The regions with the highest impact to bigeye tuna in the WCPO are Regions 3 and 4 – representing 88 percent of bigeye tuna fishing mortality (WCPFC 2011a). Regions 3 and 4 comprise the tropical equatorial zone between 20° N and 10° S, and whereby the area between 10° N and 10° S is distinguished as the core zone for the tropical tuna longline and purse seine fisheries (see Figure 4). The majority of fishing effort by the Hawaii longline fishery occurs north of above 20° N in Region 2, and further 98% of bigeye tuna caught by the Hawaii longline fishery comes from north of 10° N and outside of the which is outside of the core equatorial zone of heavy purse seine and longline fishing (NMFS unpublished data; NMFS PIFSC 2013).

As shown in Figure 14, the estimated impact of bigeye tuna catches in Region 2 on the stock is much lower than Region 4 where the fishery and stock also occur. According to the 2014 stock assessment for bigeye tuna in the WCPO, the trends in biomass in Region 2 are estimated to be more due to recruitment trends rather than fishing (Harley et al. 2014). The WCPFC Scientific Committee has recognized the disparity in impacts to the stock between evaluated regions in the stock assessment and has recommend that the WCPFC consider adopting spatial management measures to address overfishing of bigeye tuna (WCPFC 2011a).

[24] These limits have been agreed to by the U.S. as a member of the WCPFC and IATTC, respectively. These limits are promulgated in federal regulations (50 CFR § 300.224).

[25] The most recent stock assessment for bigeye tuna in the WCPO was conducted in 2011. It can be accessed from the web at: http://www.wcpfc.int/doc/sa-wp-02/stock-assessment-bigeye-tuna-western-and-central-pacific-ocean. According a 2013 stock assessment in the EPO, bigeye tuna is in a better condition; no longer subject to overfishing, compared to bigeye tuna in the WCPO, due to significant reductions in longline catches in the EPO within the last decade primarily by Asian distant water fishing nations.

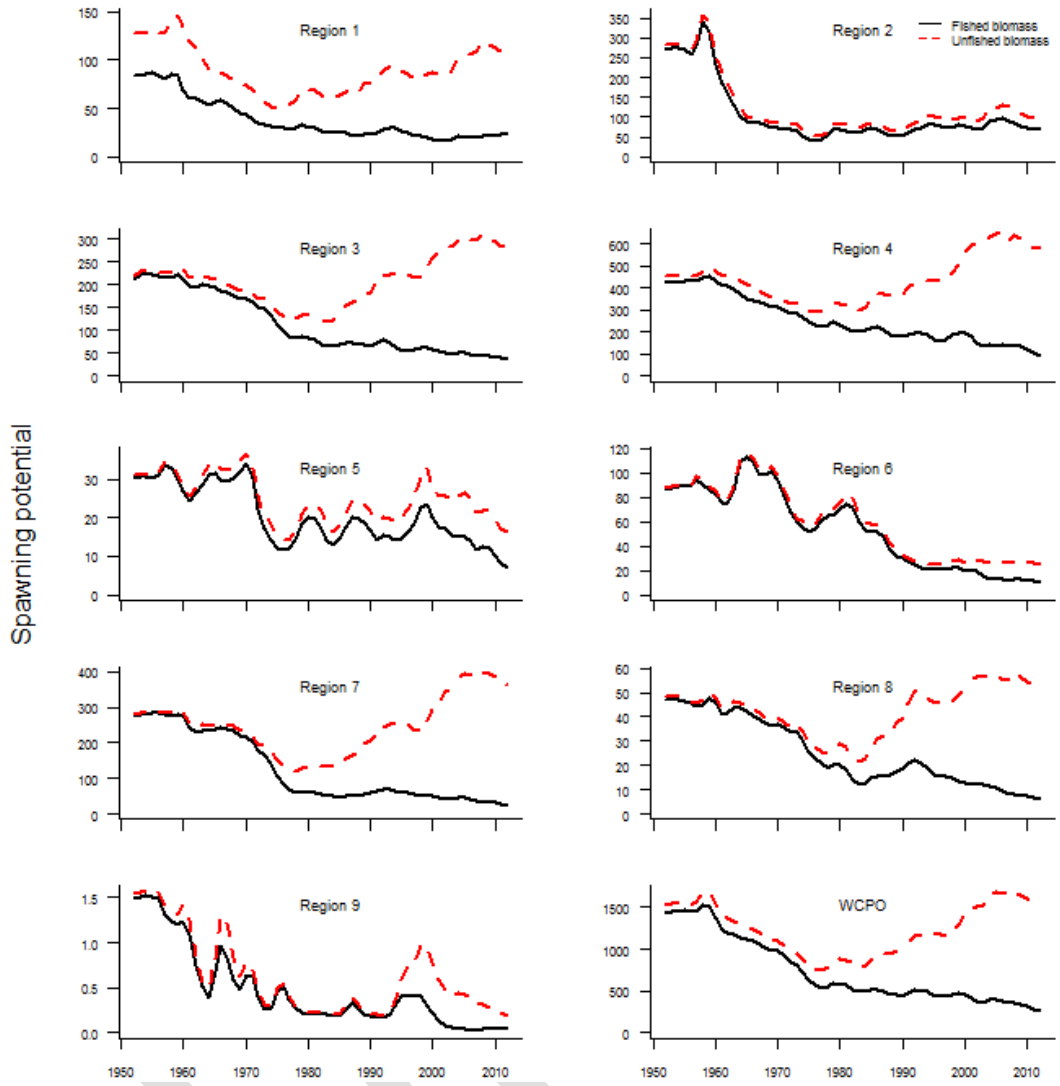

Figure 14: Estimated total biomass trajectories of bigeye tuna in the WCPO with biomass trajectories that would have occurred in the absence of fishing.
Source: Harley et al. 2014.

An analysis using TUMAS of the potential impact to the WCPO bigeye stock under the No Action Alternative indicates the amount of bigeye caught by US longline fisheries would have less than 1 percent potential decrease on F/F_{MSY} level under both recruitment scenarios when 2022, respectively. If CMM 2013-01 is fully implemented, and under the assumption of recent average recruitment, the expected amount of bigeye catch by US longline fisheries under this alternative when combined with other WCPO catch, bigeye overfishing is projected to be eliminated by year 2032 (SPC 2014).

TUMAS was also used to evaluate the impact to bigeye tuna biomass to that of biomass to produce MSY (B/B_{MSY}), which relates to an overfished stock status under the Pelagics FEP. Under the established control rules of the Pelagics FEP, the B/B_{MSY} ratio of 0.6 is the threshold for designating bigeye tuna as overfished. The TUMAS results indicate that the level of catches anticipated under the no-action Alternative, when combined with 2012 catches and projected into the future under the recent recruitment average, would produce an B/B_{MSY} ratio of 0.846 in 2022, which is a less than 1 percent increase from 0.839 when 2012 catches (which includes Hawaii longline vessels operating under a Territory agreement) are projected to 2022. If using long-term average recruitment, the no-action Alternative, when combined with 2012 catches and projected into the future, is likely to produce an B/B_{MSY} ratio of 0.467 in 2022, whereby the WCPO bigeye stock would be considered overfishing under the Pelagic FEP. If US longline bigeye catch at 2012 levels, which included Territory agreement with Hawaii longline vessels, is projected to 2022 under the long term recruitment average, the B/B_{MSY} ratio is 0.457, a 2 percent change when compared to potential US longline bigeye catch under the No-Action Alternative.

With regard to other target and non-target stocks, the WCPFC has established several conservation and management measures for HMS fish stocks (see Table 2). Catch limits have been agreed to by the WCPFC for bigeye tuna and striped marlin for longline fisheries; while other WCPFC measures restrict fishing effort for certain pelagic species (see Table 2). In the Hawaii longline fishery, trends in striped marlin catches, as well as catches of non-target stocks, follow that of longline effort for bigeye tuna with interannual variability (see Table 12). If fishing effort for bigeye tuna were to increase or decrease over the baseline, the catch of other target and non-target stocks would be expected to proportionately increase or decrease with the associate level of fishing effort. Because the Council and NMFS closely monitor catches based on landings data, any such increases are expected to be detected and subject to additional management measures to ensure fishing remains within required limits.

A recent stock assessment for western and central north Pacific striped marlin indicates that it is overfished and experiencing overfishing (ISC 2012). The WCPFC Science Committee has indicated that reducing fishing mortality would likely increase spawning stock biomass and may improve the chances of higher recruitment (WCPFC 2012a). WCPFC CMM 2010-01 for North Pacific striped marlin requires members and cooperating non-members to limit striped marlin catches by all gears from their highest catches from 2000-2003, and then further reduce catches by 10 percent in 2011, 15 percent in 2012, and 20 percent in 2013. The SIDS and PTs are exempt from catch limits under the North Pacific striped marlin measure. The striped marlin limit applicable to the U.S. (i.e., Hawaii's fisheries) is 571 mt, from which reductions are required in years 2015 by all fisheries that catch striped marlin. The Hawaii longline fishery catches approximately 90 percent of the total North Pacific striped marlin caught by Hawaii fisheries. The Council has recently recommended a Pelagics FEP amendment to establish a catch limit for striped marlin applicable to the Hawaii longline fishery.

The scalloped hammerhead shark is caught rarely in U.S. longline fisheries in the Western Pacific Region. In 2013, NMFS identified the species is comprised of six distinct population segments, which are considered species under the ESA, and recently proposed several of them to be listed under the ESA (78 FR 20718, with corrections; April 5, 2013). From 2004-2011, observers in the deep-set fishery recorded three scalloped hammerhead sharks caught

incidentally in the area of the proposed threatened Indo-West Pacific distinct population segment south of 10° N. (Additional records of catch at similarly low levels exist prior to 2004.) No records exist for the deep-set fishery of any scalloped hammerhead caught in the area of the proposed endangered Eastern Pacific DPS (NMFS Observer Program, unpublished data). Incidental catch is likely to continue at very low levels as historically observed.

Taking into account the limited likelihood of the Hawaii longline fishery to expand (both deep-set and shallow-set), as well as the fact that all harvests under the No-Action alternative continues to remain sustainable, substantial increases in catches of target or non-target species are not anticipated under the No-action Alternative. Should NMFS determine that any other target and non-target stocks are overfished or subject to overfishing, and WCPFC management measures appear ineffective, the Council is likely to consider recommending future management measures to the Secretary to rebuild the stock or reduce fishing mortality.

4.1.3 Alternative 2: Specify 2,000-mt total Annual Longline Catch Limits and 1,000-mt Transferable Catch Limits for Bigeye Tuna per Territory

Under this alternative, 2,000-mt longline limit for bigeye tuna would be established for each Territory and a 1,000-mt annual transferable limit for bigeye tuna would be set per Territory.

Fishing activity by Hawaii longline vessels conducted under Specified Fishing Agreements pursuant to Amendment 7 would likely remain centered around Hawaii, both within the EEZ and on the adjacent high seas in the North Pacific subtropical zone and outside of 10° N and 10° S equatorial belt. The equatorial belt is where approximately 90 percent of bigeye fishing mortality occurs.

The Hawaii longline fishery has been operating with into Territorial agreements since 2011. Therefore, the anticipated amount of bigeye caught by US longline fisheries in the WCPO under this alternative would be the average amount from years 2011-2014, which is 4897 mt. Using TUMAS, the expected annual bigeye caught under Alternative 2 combined with 2012 catches from other fisheries, has a less than 1 percent potential decrease on F/F_{MSY} level under both recruitment scenarios. If CMM 2013-01 is fully implemented, and under the assumption of recent average recruitment, the amount of bigeye catch by US longline fisheries under this alternative when combined with other WCPO catch, bigeye overfishing is projected to be eliminated by year 2032 (SPC 2014).

TUMAS was used to evaluate the impacts of the US longline bigeye limit (3554 mt) plus a potential 1,500 mt of bigeye allocated under Territory agreements. This level of catch was added to the 2012 bigeye catch of other WCPO bigeye fisheries and projected to 2022. The analysis resulted in a less than 1 percent increase on the F/FMSY ratio under both recruitment scenarios. With respect to biomass reference points, this level of US longline bigeye catch when combined with other 2012 catches would result in less than 1 percent decrease in the ratio of B/B_{MSY} under both recruitment scenarios (See Appendix A). Under the recent recruitment scenario, WCPO bigeye stocks are projected to be above the Pelagics FEP overfished reference point of $B/B_{MSY} < 0.6$.

Although not expected to occur under this alternative, TUMAS was used to evaluate the impact of the potential for 3,000 mt of bigeye to be transferred under Territory agreements with Hawaii longline vessels under this alternative. The analysis found that this amount of catch when combined with other 2012 WCPO bigeye catches and projected to 2022 would result in 1.1 percent increase in the F/F_{MSY} ratio using recent recruitment and 1.9 percent increase using the long-term recruitment scenario (from 1.695 and 1.988 to 1.715 to 2.026, respectively). With respect to biomass reference points, this level of US longline bigeye catch when combined with other 2012 catches would result in less than 1 percent decrease in the ratio of B/B_{MSY} under the recent recruitment scenario, and 3 percent decrease using the long-term recruitment scenario. Under the recent recruitment scenario, the WCPO bigeye stock is projected to be above the Pelagics FEP overfished reference point of $B/B_{MSY} < 0.6$ when this level of US longline catch is added to 2012 catches and projected to 2022.

Although highly unlikely in the foreseeable future, the potential total US longline bigeye catch including the utilization of 2,000 mt per Territory (total of 9554 mt) was also evaluated with regards to fishing mortality and biomass related reference points. The analysis found that this amount of catch when combined with other 2012 WCPO bigeye catches and projected to 2022 would result in a 3 percent increase in the F/F_{MSY} ratio using recent recruitment and 5 percent increase using the long-term recruitment scenario (from 1.695 and 1.988 to 1.743 to 2.087, respectively). With respect to biomass reference points, this level of US longline bigeye catch when combined with other 2012 catches would result in a 3 percent decrease in the ratio of B/B_{MSY} under the recent recruitment scenario, and 8 percent decrease using the long-term recruitment scenario. Under the recent recruitment scenario, the WCPO bigeye stock is projected to be above the Pelagics FEP overfished reference point of $B/B_{MSY} < 0.6$ when this level of US longline catch is added to 2012 catches and projected to 2022.

Based on current levels of fishing effort and participation in the Hawaii longline fishery, as well as the existing U.S. WCPO longline limit of 3, 554 mt for bigeye tuna, and based on the 2014 scenario where the amount of bigeye tuna assigned under the CNMI/HLA agreement was 1,000 mt, a likely scenario is that more than 1,000 mt, but less than 1,500 mt of bigeye tuna would be transferred annually under Territory agreements.

Contributing to this is that under the proposed regulations to implement this amendment, FEP-permitted vessels would only be allowed to operate under one Territory agreement at any point in time, which at the current level of effort and participation in the Hawaii longline fleet, effectively limits the potential amount of bigeye tuna and non-target stocks that would be caught annually. As recent history has shown, the U.S. WCPO bigeye limit is typically predicted to be reached in November or December, with Hawaii longline vessels operating Territory agreements for the remaining period of the calendar.

The majority of fishing effort by the Hawaii longline fishery occurs north of above 20° N in Region 2, and further 98% of bigeye tuna caught by the Hawaii longline fishery comes from north of 10° N and outside of the which is outside of the core equatorial zone of heavy purse seine and longline fishing (NMFS unpublished data; NMFS PIFSC 2013).

As shown in Figure 14, the estimated impact of bigeye tuna catches in Region 2 on the stock is much lower than Region 4 where the fishery and stock also occur. According to the 2014 stock assessment for bigeye tuna in the WCPO, the trends in biomass in Region 2 are estimated to be more due to recruitment trends rather than fishing (Harley et al. 2014). Fishing by Hawaii longline fishing vessels under Specified Fishing Agreements for bigeye typically occurs in the last quarter of the calendar year (i.e. October-December). Since 2011, approximately 80 percent of fishing by Hawaii longline vessels occurs above 20 degrees N, which is Region 2 of the WCPO bigeye assessment, and an area with little impact on bigeye from fishing.

As mentioned above, catches of non-target species in the Hawaii longline fishery are driven by the fishing effort for bigeye tuna. If fishing effort for bigeye tuna increases, the catches of other target and non-target stocks would be expected to increase commensurate with the increases in fishing effort. The likely scenario under this alternative is expected to result in Hawaii longline fishing effort and catch levels within average years between 2011 and 2014 (see Table 12). While bigeye tuna catch limits under the WCPFC CMM 2013-01 do not apply to American Samoa, the total catch reported for American Samoa is below the 2,000 mt threshold used in WCPFC conservation and management measures (e.g., CMM 2008-01, CMM 2012-01, CMM 2013-01). However, if the American Samoa longline fishery diversified and began targeting bigeye tuna, bigeye tuna landings combined with a transferred amount of bigeye tuna under an arrangement would likely exceed 2,000 mt annually. The proposed action would ensure that catch would not exceed 2,000 mt annually for American Samoa, given existing international management measures, while also recognizing that WCPFC limits do not apply to SIDS and PTs including the US Territories.

While there is not a WCPFC catch limit in place for yellowfin tuna applicable to American Samoa (or for any CCM currently), the amount of yellowfin reported to the WCPFC in 2011 and 2012 for American Samoa, which included yellowfin catch under the ASG/HLA arrangement and dual-permitted vessels, was approximately 600 mt in both years. The American Samoa longline fishery caught nearly 900 mt of yellowfin in 2004, which is a baseline year included in the previous WCPFC measure (CMM 2008-01, paragraph 31). As a result of fisheries development, a diversified longline fishery may lead to catches of yellowfin that exceed levels that were once identified as a baseline for non-SIDS/PTs in previous WCPFC measures. However, as previously described, there are no yellowfin catch limits in CMM 2012-01 and CMM 2013-01 that apply to the Territories, and the WCPO yellowfin stock is not considered to be experiencing overfishing, nor is it in an overfished condition. The Council and NMFS do not expect large adverse effects to yellowfin tuna.

NMFS targets observer coverage in the American Samoa longline fishery at 20 percent annually. Bycatch of non-target species in the fishery is comprised mostly of sharks and other pelagic species, which are not retained due to little or no market value. Bycatch levels are shown in Chapter 3. The majority of sharks caught in the fishery are returned alive to the sea. The current level of bycatch is not expected to increase under this Alternative, even if the fishery diversified. For example, under a diversified longline fishery that benefited from funds derived from Territory arrangement in terms of vessel upgrades and fresh fish training, bycatch might decrease from baseline levels due to an ability to properly store and land species that otherwise might have been returned to the sea. Due to a historical lack of fresh fish markets in American Samoa,

large yellowfin and bigeye tunas are sometimes discarded if caught in the beginning of the fishing trip because fish of such size are not optimal for cannery operations. Now that Tri Marine is established in Pago Pago, and offering to buy fresh/frozen tuna for export markets from local American Samoa longline vessels, there is potential that tunas and other MUS that otherwise may have been bycatch may be retained and sold. This may likely reduce bycatch levels from historical levels; however, this is also conditional on fleet upgrades (e.g., ice machines) and training (e.g., fresh fish handling).

4.1.3 Alternative 3: Specify 2,000-mt total Annual Longline Catch Limits and 750-mt Transferable Catch Limits for Bigeye Tuna per Territory

Similar to what is described under Alternative 2, current levels of fishing effort and participation in the Hawaii longline fishery, as well as the existing U.S. WCPO longline limit of 3, 554 mt for bigeye tuna, the a likely scenario under this alternative is that more than 1,000 mt, but less than 1,500 mt of bigeye tuna, would be transferred annually under Territory agreements.

In order to accomplish this, Hawaii longline vessels would likely have to operate under at least two sequential Territory agreements within one calendar year. For several reasons, it is plausible that only one Territory agreement of up to 750 mt could executed in a calendar year under this alternative. The scenario of combining the 2015 WCPO US limit (3,554 mt) plus 750 mt under Territory agreement is not sufficiently different with respect to the percent change to fishing mortality and biomass reference point when compared to the average US longline bigeye catch between 2011 and 2014. This level of catch was added to the 2012 bigeye catch of other WCPO bigeye fisheries and projected to 2022. The analysis resulted in a less than 1 percent increase on the F/FMSY ratio under both recruitment scenarios. With respect to biomass reference points, this level of US longline bigeye catch when combined with other 2012 catches would result in less than 1 percent decrease in the ratio of B/B_{MSY} under both recruitment scenarios. Under the recent recruitment scenario, WCPO bigeye stocks are projected to be above the Pelagics FEP overfished reference point of $B/B_{MSY} < 0.6$.

4.1.2 Potential Impacts to Protected Species

Of the fisheries managed under the Pelagics FEP, longline fisheries have the most potential for protected species interactions, as this gear type involves baited hooks suspended in depths near the surface to about 300 m. The current levels of interactions for the American Samoa and Hawaii longline fisheries are described in section 3.5. These fisheries operate under separate NMFS Biological Opinions and corresponding Incidental Take Statements, are subject to observer coverage and reporting, and must be conducted using a suite of mitigation measures to reduce the number and severity of protected species interactions (see 50 CFR 665 Subpart F and 50 CFR § 229.37).

4.1.2.1 Alternative 1: No Action –

This Alternative would not provide Territory bigeye specifications include no specifications for amounts that could be transferred under a Specified Fishing Agreement. US Territory and Hawaii pelagic fisheries would continue to be managed under applicable Pelagics FEP regulations and protected species statutes (ESA, MMPA, and MBTA). As Territory agreements would not be not authorized for 2015, and the U.S. WCPO longline limit for bigeye tuna is reached this year, Hawaii longline effort is expected to shift to the EPO, where interactions with protected species may also occur. Due the distance involved in transiting to the EPO and potential for poorer quality fish upon landing, the ability to fish in the EPO is not predicted to result in the same amount of fishing effort that would have been expended if the WCPO remained open to fishing for bigeye tuna.

As described in section 4.1.1.1, there are no active longline vessels currently in CNMI and Guam. Therefore, in the near term, this Alternative would likely maintain baseline effort levels for existing pelagic troll fisheries in both locations. Troll fisheries in CNMI and Guam are not known to interact with protected species.

Existing regulations for longline fishing in American Samoa include requirements for the fishery to conduct operations in accordance with a suite of management measures designed to reduce the number and severity of interactions with sea turtles. These include requirements for safe handling and mitigation training and gear for protected species, specific requirements for gear configuration to set gear at a minimum depth of 100 m, and accommodation of observers upon request (see 50 CFR 665). The expected levels of sea turtle interactions in the American Samoa longline fishery are shown in Table 22. All existing regulations relating to protected species mitigation for the American Samoa longline fishery would be maintained under this Alternative.

The current and maximum likely levels of fishing effort by longline fisheries managed under the FEP would continue to be partially dependent on take authorized under the ESA and regulations under other applicable laws. For example, under MMPA false killer whale take reduction plan regulations, if the annual trigger is met (currently 2) for serious interactions with false killer whales from the pelagic stock within the U.S. EEZ around Hawaii, a “Southern Exclusion Zone” near the MHI is closed to longline fishing (see 50 CFR 229). Although there are other ITS specified in biological opinions for FEP-managed fisheries, NMFS would be required to re-initiate consultation under ESA section 7 if any ITS is exceeded or another criterion for reinitiation is triggered.

The Council believes that longline fisheries managed under the FEP are among the most responsible fisheries in the world as they are highly monitored, strictly enforced, and subject to a suite of effective protected species mitigation requirements. Although a specific study on interaction rates with protected species by the longline deep-set fishery versus foreign fisheries has not been conducted, catch restrictions that reduce the ability of U.S. longline fisheries managed under the Pelagics FEP to obtain optimum yield and supply fresh fish to U.S. seafood consumers, may, as was the case in the shallow-set fishery, result in foreign fisheries targeting the same HMS stocks to fill potential market gaps left open by the U.S. fishery. As was observed in the shallow-set fishery, foreign fishing operations appear to have higher protected species interaction levels than n longline fisheries managed under the MSA and Pelagics FEP.

For example, in the 2012 imports of bigeye tuna into Hawaii, there was a 350 percent increase from the Marshall Islands over 2011 (see Figure 15). An analysis evaluating sea turtle interactions from the 55 foreign-flagged longline vessels fishing out of the Marshall Islands that target bigeye tuna estimated the annual level of sea turtle interactions to be 149 leatherbacks, 53 greens, 32 olive ridleys, and 11 hawksbills, totaling 244 turtles per year, of which only 20 were estimated to be alive upon capture (Gilman et al. 2013). By comparison, the Hawaii deep-set longline fishery with approximately 126 active vessels averaged seven leatherback interactions per year (see Table 19 and section 3.4.1). Although foreign imports of bigeye into the Hawaii due a constrained Hawaii longline fishery are not believed to be a one to one replacement, the difference in monitoring and level of interactions between U.S. fleets and foreign fishing fleets are believed to substantial.

4.1.2.2 Alternatives 2 and 3

Hawaii longline vessels operating under a Territory arrangement would likely continue to operate in a manner consistent with historical fishing patterns and in locations within the EEZ around Hawaii and adjacent high seas throughout the calendar year. The impacts to protected species under this Alternative from Hawaii longline vessels operating under a Territory agreement are expected to be within authorized baseline levels identified section 3.5.

Under these alternatives, annual limits of 2,000 mt of bigeye tuna caught by longline would be specified for each of the Territories. For Guam and CNMI, which currently do not have active longline vessels, it is not possible to estimate foreseeable levels of effort that may be used to predict impacts to protected species. Fisheries development in Guam and CNMI is not expected to be rapid, but rather an iterative process; therefore, it is expected that any fisheries development resulting in increased participation in the near term will not result in levels of interactions currently authorized.

For American Samoa, fisheries development as a result of the proposed action may lead to a diversification of the American Samoa longline fishery to be able to target albacore and other pelagic MUS such as bigeye and yellowfin tunas. However, such potential diversification is not expected to result in higher amounts of fishing effort by American Samoa longline vessels, but rather support the targeting and retention of various pelagic MUS, including bigeye tuna. Therefore, fishing effort levels are expected to be within baseline levels and the interactions currently authorized by NMFS are not predicted to be exceeded under these Alternatives. In addition, the requirements for American Samoa longline vessels to deploy their gear to fish below 100 m to mitigate interactions with sea turtles would be maintained in a diversified longline fishery that targets albacore and other pelagic MUS.

4.1.3 Impacts on Marine Habitat and Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrate necessary for federally managed species to spawn, breed, feed, and/or grow to maturity. It is the legal tool that NMFS uses to manage marine habitat to ensure that the federally managed species identified by the

fishery management councils have a healthy future. Habitat Areas of Particular Concern (HAPC) are subsets of EFH that merit special attention because they meet at least one of the following four criteria:

1) provide important ecological function;
2) are sensitive to environmental degradation;
3) include a habitat type that is/will be stressed by development;
4) include a habitat type that is rare.

HAPC are afforded the same regulatory protection as EFH and do not exclude activities from occurring in the area, such as fishing, diving, swimming or surfing.

An "adverse effect" to EFH is anything that reduces the quantity and/or quality of EFH. It may include a wide variety of impacts such as:

1) direct impacts (e.g., contamination or physical disruption);
2) indirect impacts (e.g., loss of prey, reduction in species' fecundity); or site-specific/habitat wide impacts, including individual, cumulative or synergistic consequences of actions.

None of the Alternatives considered would adversely impact the marine habitat, particularly critical habitat, EFH, HAPC, marine protected areas (MPAs), marine sanctuaries, or marine monuments. None of the western Pacific pelagic fisheries are known to have large adverse impacts to habitats and none of the Alternatives are likely to lead to substantial physical, chemical, or biological alterations to the habitat. Fishing activity would not occur in identified critical habitat, so no critical habitat would be impacted by the proposed regulatory changes. Longline fishing does not occur in MPAs, marine sanctuaries or marine monuments so no marine protected areas would be impacted.

Longline fishing involves suspending baited hooks in the upper surface layers of the water column, which does not materially impact benthic marine habitat under typical operations. Derelict longline gear may impact marine benthic habitats, especially substrate such as corals if carried by currents to shallow depths; however, the loss of longline gear during normal fishing operations is not believed to be at levels that result in significant or adverse impacts to EFH, HAPC, or the marine habitat (See Table 35).

When fishing, all longliners occasionally lose hooks, mainline, floats, float line, and branch lines, which include hooks, lead weights, and usually wire leaders in the deep-set fishery. Fishermen do try to recover gear, and are normally successful – as the floats used in the fishery are marked to be visible from distance, even at night. Lost hooks are unlikely to have a major impact to the physical marine environment. First, hooks are not expected to continue ghost fishing indefinitely since baits would decompose. Second, hooks are made of steel and decompose over time. Most J-shaped and circle hooks are composed of steel and, depending on quality, the hooks will corrode. Hooks lost on the deep-sea bed in water just above freezing, will corrode more slowly, and stainless steel hooks will corrode at a slower rate than non-stainless steel hooks.

In addition, participants in the Hawaii longline fishery have been participating in the Honolulu Harbor Derelict Fishing Gear Port Reception Program since 2006, where fishermen voluntarily dispose of spent longline gear and derelict fishing gear they encounter. The derelict fishing gear is then incinerated on Oahu's H-Power facility to generate electricity. This model private/public partnership is expected to continue under all of the Alternatives.

EFH and HAPC have been identified for species managed under the Pacific Pelagic, Pacific Remote Islands, American Samoa, and Mariana Islands Fishery Ecosystem Plans, which cover fishery management of Pelagic, Precious Corals, Bottomfish and Seamount Groundfish, Crustaceans, and the Coral Reef Ecosystem Fisheries. The definitions of EFH and HAPC for these species groups were included in the Western Pacific Fishery Ecosystem Plans and are presented in Table 35.

Table 35: Essential Fish Habitat and Habitat Areas of Particular Concern for Management Unit Species Groups Under the Pelagics, Pacific Remote Island Areas, Mariana Archipelago, and American Samoa Fishery Ecosystem Plans.

SPECIES GROUP (FEP)	EFH (juveniles and adults)	EFH (eggs and larvae)	HAPC
Pelagic	Water column down to 1,000 meters (m) depth from shoreline out to EEZ boundary	Water column down to 200 meters depth from shoreline out to EEZ boundary	Water column down to 1,000 m that lies above seamounts and banks.
Bottomfish and	Water column and all bottom from shoreline down to 400 m deep	Water column down to 400m depth from shoreline out to 200-nm EEZ boundary	All escarpments and slopes between 40-280 m, and three known areas of juvenile opakapaka habitat
Seamount Groundfish	(adults only): Water column and bottom from 200-600 m deep, bounded by 29°-35° N and 171° E-179° W	(including juveniles): Water column down to 200 m depth of all EEZ waters bounded by 29°-35° N and 171° E -179° W	Not identified
Precious Corals	Known precious coral beds in the Hawaiian Islands located at: Keahole, Makapuu, Kaena, Wespac, Brooks, and 180 Fathom gold/red coral beds, and Milolii, S. Kauai, and Auau Channel black coral beds		Makapuu, Wespac, and Brooks Bank beds, and the Auau Channel

SPECIES GROUP (FEP)	EFH (juveniles and adults)	EFH (eggs and larvae)	HAPC
Crustaceans	Lobsters/crab: Bottom from shoreline down to 100 m deep Deepwater shrimp: Outer reef slopes between 550-700 m deep	Lobsters/crab: Water column down to 150 m deep from shoreline out to EEZ boundary Deepwater shrimp: outer reef slopes between 300-700 m deep	All banks within the Northwestern Hawaiian Islands with summits less than 30 m
Coral Reef Ecosystems	Water column and benthic substrate to a depth of 100 m from shoreline out to EEZ boundary		All MPAs identified in FEP, all PRIAs, many specific areas of coral reef habitat (see FEP)

Note: All areas are bounded by the shoreline, and the outward boundary of the EEZ, unless otherwise indicated.

No adverse impacts on EFH or HAPC have been identified for any management unit species or species groups in Table 35 as a result of the Alternatives considered. There are no known studies that show impacts to species fecundity or negative impacts on predator/prey relationships that result in significant changes to food web dynamics. The removal of top predator pelagic species such as bigeye tuna, yellowfin tuna, and billfish above natural mortality rates for these species would likely not cause major imbalances or wide-ranging changes to ecosystem functions and habitats. None of the action Alternatives would change the fisheries in a way that would adversely affect EFH or HAPC.

4.1.4 Impacts on Fishery Participants and Fishing Communities

American Samoa and Hawaii have home-based pelagic longline fleets, but CNMI and Guam have currently little to no such domestic longline capacity. Guam was once a major transshipment port for Japanese and Taiwanese longline vessels, but this activity has been significantly curtailed in the last 10 years, due to what is believed to be changes in foreign fishing vessel operations and restrictions from the Shark Finning Prohibition Act of 2000.

Pelagic longline fishing contributes greatly to American Samoa's social and economic fabric, despite the Territory's relatively short history practicing modern longlining.

Under Alternative 1, no Territory bigeye specifications would be established, and as such Territory agreement with FEP-permitted vessels would not be authorized in 2015. This alternative would have minor to moderately negative consequences for Territory fisheries, the Hawaii longline fishery, and Hawaii seafood consumers depending upon when the Hawaii longline fishery reaches its bigeye limit. This alternative would eliminate a potential mechanism to facilitate the infusion of capital into fisheries development projects identified in the MCPs of the Territories for 2015.

Based on past experience, there would be a change in the Hawaii longline fishery's profit margins without agreements that allow harvesting during the year-end holiday season. In addition to potential negative economic impacts described above, potential safety-at-sea issues arise under this Alternative. If the U.S. annual WCPO longline limit for bigeye tuna is reached and NMFS prohibits the retention and landing of bigeye tuna in the WCPO, Hawaii longline vessels either must tie up for the remainder of the season, switch to shallow-set longline fishing for swordfish, or fish for bigeye tuna in the EPO. Hawaii longline vessels are restricted from being longer than 101 ft and many active vessels are shorter, ranging from 60-75 ft long. When permitted, vessels in the Hawaii longline fishery fish throughout the year and in many different weather conditions. However, fishing for swordfish and fishing in the EPO for bigeye tuna generally involve longer trips and greater distances from shore. Fishing during the winter months, when strong storms are common in the North Pacific, may pose minor to moderate safety-at-sea concerns. Therefore, potentially minor to moderate safety-at-sea issues arise if vessels have to travel greater distances if prohibited from targeting bigeye tuna in the WCPO.

Prior to Section 113, NMFS prohibited the landing and retention of bigeye tuna (or "closure") caught in the WCPO in 2009 and 2010. Since the closure during 2009 and 2010 occurred toward the end of the year, and hence during the holiday season when fresh, high-quality tuna are in high demand in Hawaii, members of the Oahu fishing community were concerned about price spikes or the unavailability of preferred holiday fare. A PIFSC study of the 2010 closure found minor to moderately negative consequences, though neither the longline industry, nor seafood consumers experienced strictly negative impacts (Richmond et al. 2012). Many small sized vessels were not able to fish because they could not reach the EPO or could not fish because they did not meet the regulatory exceptions to the closure. Also, sub-premium quality tuna (though still good quality fish) was sold at a lower than average price.

However, some Hawaii non-longline boats did very well during the closure because higher quality fish fetched better prices. As a direct result of the closure, which occurred on November 22, 2010, Hawaii small boat non-longline fishermen increased their catch and sales of bigeye tuna. In fact, December 2010 landings of, and revenue from, bigeye tuna by small boat vessels was $166,430, up 533 percent from $26,291 in December 2009 when the fishery closure occurred on December 29, 2009. However, these small vessel fleets would not be able to replace the Hawaii longline fleet in terms of volume and value of fresh fish, as typically bigeye tuna caught by longline receives a higher price at market than troll- or handline-caught bigeye tuna.

Under Alternatives 2, the Territories would each have an annual 2,000-mt longline limit for bigeye tuna and a limit of 1,000 mt for bigeye tuna that could assignable each year under Territory agreements. Longline fisheries in Guam and CNMI have yet to develop much fishing capacity to harvest that quantity of bigeye tuna on an annual basis, so the limit would not affect current FEP-permitted vessels located in the Marinas, which are currently inactive. The American Samoa longline fishery has around 20 active vessels, but capped at 60 permits under the limited entry program. The fishery currently targets albacore when fishing in the South Pacific, and vessels with dual Hawaii and American Samoa permits target bigeye tuna when fishing out of Hawaii. The American Samoa longline fishery would need to diversify and likely add vessel capacity in order to reach a 2,000-mt limit in the near term. However, if American

Samoa entered into a Territory agreement, which assigned up to 1,000 mt of bigeye tuna, catches by American Samoa longline vessels fishing in the South Pacific and North Pacific, combined with the 1,000 mt of bigeye tuna assigned under an agreement, could get close to a 2,000-mt limit for bigeye tuna (see Table 12; 1,505 mt of bigeye tuna was reported for American Samoa in 2012). If this occurred, and the fishery was prohibited from retaining or landing bigeye tuna after reaching its 2,000-mt limit, minor to moderately adverse impacts to fishery participants could result. However, any government that makes agreements with FEP-permitted vessels could control the amount of catch transferred up to 1,000 mt, thereby reducing any impacts to local fishery participants. In addition, the Council would be reviewing and recommending annual limits as well as reviewing arrangements and could make adjustments with respect to avoiding unwanted impacts to fishery participants.

Amendment 7 requires that Specified Fishing Agreements direct funds to the Western Pacific Sustainable Fisheries Fund to support fisheries development projects identified in a Territory's MCP, or that vessels operating under such agreements much land in the Territory. Pursuant to MSA section 204(e), the Council, in close coordination with a particular Territory, uses the Sustainable Fisheries Fund to implement projects identified in a Territory's MCP. Under Alternatives 2 and 3, fishing communities in Territories would benefit indirectly through fishery improvement projects funded from Territory arrangements. Benefits are expected to vary per fisheries development project from minor to moderate in magnitude of impact, depending on the fishery improvement projects implemented. These projects are likely to involve improvements to or construction of infrastructure and facilities, upgrades to existing vessels, and vessel capacity, and the development of fishermen training programs.

Also under Alternatives 2 and 3, the Territories stand to realize minor to moderately positive benefits from developing catch history within WCPFC managed fisheries. As mentioned, the WCPO supports the world's largest tuna fishery; however, Guam and CNMI, do not currently have the domestic fishing capacity to participate in the WCPO tuna fishery. American Samoa has domestic longline capacity with only a history of albacore fishing. The authorization of Territory arrangements allow catch to be attributed to the Territories and demonstrate the aspirations of the U.S. Territories to participate in the larger, internationally managed WCPO fisheries.

For Alternatives 2 and 3, the Hawaii longline fishery participants also stand realize minor to moderately positive benefits from the ability to enter into agreements with Territories. Hawaii longline fishery participants are subject to the annual U.S. longline limit for bigeye tuna in the WCPO, which has been reached previously in the latter part of the year and resulted in NMFS prohibiting the landing and retention of bigeye tuna in the WCPO. As bigeye tuna is principal target species of the Hawaii longline fishery, fishery participants have an incentive to keep fishing throughout the year. In general, benefits from arrangements include a reduction in the need to fish for seasonally-variable bigeye tuna in the EPO (which saves fuel costs), the continued availability of fresh, high quality tuna, lower consumer prices due to more product being available, and more stable income for fishery participants. If some Hawaii longline vessels begin to fish under an arrangement and catch is attributed to a Territory, it is expected that some of the U.S. WCPO catch limit would still be available for vessels that are not party to the arrangement or that do not have an American Samoa longline permit. These vessels may continue fishing and landing in Hawaii under the U.S. WCPO catch limit. That has been the case

in recent years. In addition, the EPO may be available for U.S. longline vessels all year, since the EPO bigeye tuna catch limit applies to U.S. vessels over 24 m long and many longline vessels based in Hawaii are shorter. However, as mentioned, the availability of bigeye tuna in the EPO can be seasonally variable.

Since the Hawaii longline fleet fishes predominately in the WCPO, fishermen are able to optimize their fishing schedule by choosing when to fish in certain areas, since they can have a better sense of transit times and costs. As a less desirable option, fishing in the EPO usually means longer transit times, which results in higher fuel costs, fewer numbers of sets, and potentially poorer quality fish at auction. Further, profits could be lower for fishermen who must fish in the EPO because the availability of bigeye tuna in the EPO can vary seasonally and inter-annually. For all of these reasons, Alternatives 2 and 3 are likely to have minor to moderately positive benefits for Territory and Hawaii longline fisheries. Alternative 3 may require Hawaii longline fishery participants to operate under two sequential Specified Fishing Arrangement within one calendar year, which would likely result higher costs associated with MCP funding.

4.1.5 Impacts on Administration and Enforcement

4.1.5.1 Alternative 1: No-Action –

Using historical data and data collected during the fishing year, PIFSC projects the Hawaii longline fleet's bigeye tuna catches against the U.S. WCPO limit estimates, thereby reducing the potential for exceeding the limit.

This Alternative would have minor positive impacts associated with administration and enforcement, because Territory bigeye specifications would not be established for 2015. Subsequently, Specified Fishing Arrangements would not be authorized under this Alternative. Therefore, the administrative costs associated with tracking and assigning catches made under Territory arrangements with FEP-permitted vessels would not be required under this Alternative. NMFS would continue to monitor catch by U.S. vessels operating in the WCPO against the U.S. catch limit through submission of logbooks as described above. If the U.S. longline industry reached the annual limit of bigeye tuna in the WCPO, NMFS would prohibit the retention and landing as occurred in 2009 and 2010 through fishery notices

4.1.5.2 Alternatives 2 and 3

Alternatives 2 and 3 involves administrative costs similar to Alternative 1, including in-season monitoring of the U.S. WCPO longline catch limits for bigeye tuna by NMFS' PIFSC, and regulatory and management costs associated with announcing a catch prohibition and notifying fishermen. Added costs would result from attributing catches to the correct category and Territory in accordance with Specified Fishing Agreements. The current administrative burden for the government involves NMFS' fishery scientists monitoring catches by the Hawaii-based longline fishery, forecasting when the U.S. limit may be reached, collecting and correcting catch

data, and attributing catch to either the U.S. bigeye tuna catch limit, Territory attributed catch, or American Samoa catch by dual permitted vessels. PIFSC estimates the current administrative burden of this component of the Hawaii longline monitoring program as about half of a full-time employee salary per year and $75,000 in administrative costs.

Regarding enforcement, all Alternatives involve PIFSC tracking the fishery and projecting the date the U.S. bigeye tuna and Territory catch limits will be reached, and then the NOAA Office of Law Enforcement and U.S. Coast Guard monitoring vessel compliance with applicable regulations and laws through vessel monitoring systems and vessel boardings at sea. Changes to the level of monitoring or an increase in costs are not expected since this is the status quo.

4.2 Cumulative Impacts

The MSA and NEPA require appropriate analysis of the potential cumulative effects of a proposed action, as well as the cumulative effects of the Alternatives to the proposed action. Under NEPA, 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 of what federal or non-federal agency or person undertakes such other actions (40 CFR § 1508.7). The following cumulative effects analysis is organized by the following issues: target and non-target species, protected species, and fishery participants and communities.

4.2.1 Cumulative Effects to Target and Non-Target Species

4.2.1.1 Past, Present, and Reasonably Foreseeable Management Actions

Pelagics FEP

The Pelagic FMP was approved and implemented by the Secretary of Commerce in 1987. In 2009, the Secretary of Commerce approved the Pelagics FEP that replaced the FMP and included all previous requirements. Management actions under the FMP that have helped to ensure western Pacific fisheries are sustainable include establishment of the Hawaii longline limited entry program, capped at 164 permits, and the American Samoa longline limited entry program, which is capped at 60 permits. Also included in the Hawaii limited entry program is a restriction on vessel size of no greater than 101 ft, which limits the fishing capacity of individual vessels. Longline fisheries in Guam and CNMI are permitted with a Western Pacific general longline permit under the FEP and regulated with a suite of measures similar to the American Samoa and Hawaii longline fisheries. For example, the FEP established longline prohibited areas in the Marianas, extending 50 nm around Guam and 30 nm around the CNMI. All longline fisheries under the FEP are comprehensively managed through catch reporting, observers coverage, VMS, gear restrictions, vessel marking, and other management measures. See 50 CFR 665 for Pelagics FEP regulations.

Several recommended FEP amendments/regulatory amendments have been recommended by the Council, but are in drafting stage and yet to be transmitted for Secretarial review under the MSA. These include the following issues:

- American Samoa longline limited access permit program modifications to support fishery participation by small vessels (< 50ft) in the fishery and reduce program complexity;
- Temporary exemption to the American Samoa Large Vessel Prohibited Area;
- Establishment of regulations for an American Samoa-based shallow-set longline fishery;
- Large vessel (> 120 ft) prohibited fishing area around CNMI and Guam; and
- Prohibition on FAD sets by U.S. purse seine fishery in U.S. EEZ waters.

The proposed action Alternatives would not have interactive effects with the proposed actions listed as they vary in management scope and impact.

RFMO Management of HMS stocks

In the Pacific Ocean, the international management of HMS stocks is divided between two RFMOs, the WCPFC and IATTC (see Figure 1). The WCPFC and IATTC are a result of negotiated conventions between coastal states and states with vessels fishing on high seas and within waters of national jurisdiction of coastal states under access agreements. The conventions applicable to the WCPFC and IATTC are based upon existing international law such as the United Nations Law of the Sea Convention (UNCLOS), and the United Nations Fish Stocks Agreement on Straddling and Highly Migratory Species (UNFSA).

The U.S. is a member of both the WCPFC and IATTC and is obligated as a member to implement decisions of these RMFOs that are applicable to the U.S.

The management of HMS stocks in the Pacific is complicated by multiple factors including the need to balance rights of coastal states and small developing nations to gain and maintain access to fishery resources and interests of distant water fishing nations in maintaining economically viable harvests, the economic importance of fisheries for developing coastal states, and the overlapping multispecies characteristics of two the largest international fisheries, the purse seine fishery and the longline fishery. For example, the purse seine fishery targets skipjack and yellowfin tunas and dominates landings, representing approximately 75 percent of the total WCPO catch in 2011 and 56 percent of the value (Williams and Terawasi 2012). Longline fisheries for yellowfin, bigeye, and albacore tunas equate to approximately 10 percent of the WCPO catch, but 33 percent of value, with pole and line fisheries and artisanal coastal fisheries responsible for the remainder of the tuna harvests in the WCPO (Ibid.). The purse seine fishery also catches juvenile bigeye tuna incidentally while fishing on FADs. Although the percentage of bigeye tuna in the total catch of the purse seine fishery is believed to be relatively low (approximately 5% in WCPO), the massive catch volume of the purse seine fishery results in significant amount of juvenile bigeye tuna mortality (Williams and Terawasi 2013).

According to the 2011 stock assessment, the juvenile bigeye tuna fishing mortality coupled with the longline fishery targeting adult bigeye tuna has resulted in an overfishing condition and approaching an overfished condition in the WCPO (Davies et al. 2011). NMFS has determined that overfishing of bigeye tuna in the WCPO is occurring but not approaching an overfished condition, because the Magnuson-Stevens Act defines approaching an overfished condition as when the stock will become overfished within two years and NMFS has not made a positive determination under this criterion. The 2011 stock assessment concluded that the MSY level for bigeye tuna would increase if mortality of small fish were reduced which would allow greater

overall yields to be sustainably obtained (Davies et al. 2011). The 2014 WCPO bigeye assessment concludes that overfishing is occurring and the stock is overfished using the WCPFC adopted limit reference point of $SB/SB_{F=0} < 0.2$. The stock is not considered overfished under the Pelagics FEP.

In 2005, the WCPFC agreed to its first measure addressing overfishing of bigeye tuna. The WCPFC followed up the 2005 measure with CMM 2008-01 with the objective of achieving, over a three-year period, from 2009 to 2011, a 30 percent reduction in bigeye tuna fishing mortality, and no increase in yellowfin tuna fishing mortality (relative to a specified historical baselines for each member). CMM 2008-01 required WCPFC members to implement the following measures for their purse seine fisheries: fishing effort limits for the high seas and EEZ at 2001-2004 levels, seasonal FAD closure period (2 months in 2009, 3 months in 2010, 2011), closure of Western Pacific high seas pockets in 2010 and 2011, full catch retention in 2010 and 2011, and 100 percent observer coverage if fishing during the FAD closure period in 2009 as well as 100 percent for entire year in 2010 and 2011. CMM 2008-01 also established annual longline catch limits that would reduce bigeye tuna catches over a three-year period by 30 percent of the 2001-2004 baseline. Fresh fish longline fisheries that caught less than 5,000 mt per year were required to reduce longline landings of bigeye tuna by 10 percent in 2009. This provision effectively only applied to the U.S.A., i.e., the Hawaii longline fishery, which was subject to a 10 percent reduction from 2004 catch, resulting in a catch limit for bigeye tuna of 3,763 mt.

Longline fisheries in the WCPO targeting bigeye tuna have reduced their catches by approximately 15-20 percent since the WCPFC agreed on conservation management measure 2008-01 (Pilling et al. 2013; WCPFC 2013b); however, the established catch limits in CMM 2013-01 represent a 41 percent reduction from the baseline limits established under CMM 2008-01. This is because several nations are not harvesting bigeye up to their maximum quota (e.g. Japan). In the same period, catches of bigeye tuna by the purse seine fishery have increased by around 20 percent (WCPFC 2013b).

The WCPFC rolled-over several provisions of CMM 2008-01 in March 2012 as an interim measure for 2012. In December 2012, the WCPFC adopted a measure for 2013 that generally maintained longline limits for the several countries and removed the 2,000-mt limits for the SIDS and PTs (CMM 2012-01). In December 2013, the WCPFC adopted a multi-year measure (CMM 2013-01) that is more restrictive than CMM 2012-01, containing purse seine FAD closures and FAD set limits and longline bigeye catch limits. In 2014, the WCPFC maintained CMM 2013-01, but did not require the 5th-month FAD closure pending resolution on whether the provision is transferring a disproportionate burden on to SIDS and PTs.

In the EPO, the IATTC amended Resolution C-12-01 on Tuna Conservation in 2013 as follows: Purse seine vessels with capacity class sizes 4-6 (more than 182-mt carrying capacity) are required to stop fishing in the EPO for a period of 62 days in 2011, 62 days in 2012, and 62 days in 2013. These closures shall be in one of two periods in each year as follows:

- 2011 – 29 July to 28 September, or from 18 November to 18 January 2015.
- 2012 – 29 July to 28 September, or from 18 November to 18 January 2016.
- 2013 – 29 July to 28 September, or from 18 November to 18 January 2017.

Notwithstanding the measures above, purse seine vessels capacity class 4 (182-272 mt carrying capacity) will be able to make one fishing trip of up to 30 days duration during the closure periods specified above, provided that any such vessel carries an observer. The IATTC also maintained a temporal closed area, termed "El Corralito", which is the area of 96° W and 110° W and between 4° N and 3° S, near the Galapagos Islands, and is closed for one month, from September 29 to October 29.

The longline fleets of the distant water Asian fishing nations were provided the quotas listed in Table 36. Within the last decade, there has been a significant decline in longline catches for bigeye tuna in the EPO, most notably for Japan and Korea. For example, the 2011 bigeye tuna longline catch (25,216 mt) in the EPO has decreased by 75 percent since 1991's record high EPO longline catch of 104,195 mt (WCPFC-SC8-2012/ST IP-1).

Table 36: IATTC catch limits for longline-caught bigeye tuna for Asian longline fleets fishing in EPO, 2011-2017.

Country	2011-2015 annual EPO longline bigeye tuna limit (mt)	2013 total combined EPO longline bigeye tuna catch (mt)
China	2,507	29,175
Japan	32,372	
Korea	11,947	
Chinese Taipei	7,555	

Source: IATTC Fishery Status Report No. 12.

Other IATTC member nations are required to take actions to ensure that in years 2011-2015 that their longline bigeye tuna catch not exceed the greater of 500 mt or their respective catches of bigeye tuna in 2001. The U.S. longline catch limit for bigeye tuna in the EPO for vessels 24 m and longer for is 500 mt per year.

Collectively, it is intended that the measures by the WCPFC and IATTC will result in sufficient decrease in bigeye tuna fishing mortality on a Pacific-wide scale However, it is uncertain if this will occur, in part because of uncertainty about the structure (e.g., stock mixing between WCPO and EPO) and productivity (e.g., recruitment levels) of the stock(s).

Bigeye tuna is being exploited as juveniles (primarily purse seine fisheries) and as adults (primarily longline fisheries), and further reductions in fishing mortality of bigeye tuna at all life stages is likely until the stock status improves. The 2011 stock assessment for bigeye tuna in the WCPO states that:

> "The current levels of fishing mortality and historical patterns in the mix of fishing gears indicates that bigeye MSY has been reduced to less than half its levels prior to 1970 through harvest of small juveniles. Because of that and overfishing, considerable potential yield from the bigeye tuna stock is being lost. Based on these results, we conclude that MSY levels would rise if mortality of small fish were reduced which would allow greater overall yields to be sustainably obtained (Davies et al. 2011)."

Currently, there are suite of measures in the WCPFC that are applicable to north and south Pacific albacore tuna, north Pacific striped marlin, and to south Pacific swordfish (Table 2). Each of these measures includes exemptions for SIDS and PTs with respect to the development of their fisheries.

Future Actions
As was the case in 2014, the WCPFC will consider the multiyear tropical tuna (skipjack, yellowfin, bigeye) conservation and management measure at its Regular Session to be held in December 2015. Balancing the interests between purse seine and longline fisheries in terms of fishing reductions and preventing the transfer of disproportionate conservation burden on the SIDS and PT will continue to be key issues within the WCPFC.

Purse seine fisheries catch juvenile bigeye tuna incidentally while fishing on FADs, so there is potential for juvenile bigeye tuna mitigation through a technical fix and/or operational practice; however, to date, an effective solution has yet to be identified. The Council is holding an international workshop in April 2015 to identify new measures to reduce the incidental catch of bigeye by purse seine vessels.

The IATTC is also expected to consider a new tuna conservation resolution at its mid-2015 meeting and applicable to purse seine and longline fisheries in 2016 and beyond.

4.2.1.2 External Factors

Five major exogenous factors were identified as having the potential to contribute to cumulative effects on pelagic target and non-target stocks:

- Fluctuations in the pelagic ocean environment focusing on regime shifts
- Pacific-wide fishing effort
- Ocean noise
- Marine debris
- Ocean productivity related to global climate change

Fluctuations in the Pelagic Ocean Environment
Catch rates of pelagic fish species fluctuate in a time and space in relation to environmental factors (e.g., temperature) that influence the horizontal and vertical distribution and movement patterns of fish. Cyclical fluctuations in the pelagic environment affect pelagic habitats and prey availability at high frequency (e.g., seasonal latitudinal extension of warm ocean waters) and low-frequency (e.g., El Niño Southern Oscillation-related longitudinal extension of warm ocean waters). Low or high levels of recruitment of pelagic fish species are also strongly related to fluctuations in the ocean environment.

The effects of such fluctuations on the catch rates of PMUS obscure the effects of the combined fishing effort from Pacific pelagic fisheries. During an El Niño, for example, the purse seine fishery for skipjack tuna shifts over 1,000 km from the western to central equatorial Pacific in response to physical and biological impacts on the pelagic ecosystem (Lehodey et al. 1997). Future ocean shifts are likely to cause changes in the abundance and distribution of pelagic fish resources, which could contribute to cumulative effects. For this reason, accurate and timely

fisheries information is needed to produce stock assessments that allow fishery managers the ability to regulate harvests based on observed stock conditions.

Pacific-wide Catches of Bigeye Tuna
See section 3.2 for Pacific-wide catches of bigeye tuna.

Oceanic Noise Pollution
In the last 50 years, there have been significant increases in sound producing ocean activities such as commercial shipping, hydrocarbon exploration and research, military sonar and other defense related-actions (Hildebrand 2005). Ambient noise from shipping in the Pacific Ocean has doubled every decade for the last 40 years (McDonald et al. 2006). Commercially important fish stocks and marine mammals can be affected by noise pollution by making it more difficult to find food and mates, avoid predators, navigate, and communicate (Popper 2003). Studies of bluefin tuna in the Mediterranean suggest that noise pollution from shipping results in changes to schooling behavior, which could impact migration (Sara et al. 2007). The effects of noise pollution on bigeye tuna and other target and non-targets stocks are unknown, but given the above information and depending on exposure duration and at what life stage, increases in oceanic noise levels could potentially have adverse impacts on target and non-target stocks.

Marine Debris
Derelict fishing gear such as drift-nets have the ability to ghost fish, i.e. continue to catch and kill fish and other animals long after they have been lost or discarded. The amount of derelict fishing gear in the Pacific has not been quantified nor has the amount fish species killed by ghost nets. Longline gear is not readily lost during normal fishing operations because the gear is equipped with radio transponder devices. In addition, Hawaii longline fishermen make efforts to prevent gear loss as well as participate in a voluntary derelict fishing net retrieval program based in Honolulu. Retrieved derelict nets are brought back to Honolulu Harbor and placed in a receptacle which is transported to Schnitzer Steel Corp. where the nets are cut up for incineration at Honolulu City and County's H-Power plant. Purse seine fisheries often used FADs to aggregate fish. While many of these FADs are equipped with radio transponders or GPS beacons to locate them, the FAD themselves are made of netting other loosely connect materials that have the potential to contribute to marine debris.

Ocean productivity related to global climate change
Using remotely-sensed chlorophyll concentrations from satellite observations, Polovina et al. (2008) have found that over the past decade primary productivity in the subtropical and transition zone has declined an average of 1.5 percent per year with about a 3 percent per year decline occurring at the southern limit of the North Pacific Transition Zone. The expansion of the low chlorophyll waters is consistent with global warming scenarios based on increased vertical stratification in the mid-latitudes.

Expanding oligotrophic[26] portions of the subtropical gyres in the world's oceans in time will lead to a reduction in chlorophyll density and carrying capacity in the larger subtropical gyres, thus impacting the abundance of target and non-target species. In general, it has been shown that large scale climate cycles can impact winds, currents, ocean mixing, temperature regimes, nutrient

[26] Meaning waters where relatively little plant life or nutrients occur, but which are rich in dissolved oxygen.

recharge, and affect the productivity of all trophic levels in the north Pacific Ocean (Polovina et al. 1994).

For example, a scientific study using an enhanced version of the spatial ecosystem and population dynamics model (SEAPODYM[27]) suggests that by the end of this century, ocean temperatures in the WCPO will increase to levels that may not support bigeye tuna populations in the WCPO[28] In order to support the long-term sustainability target and non-target fish stocks, and taking in to account potential impacts from climate change, continued research, improved fishery data collection, and coordination with international organizations, will be important to facilitate adaptive fishery management.

4.2.1.3 Cumulative Effects

As described in section 4.1.1, the direct and indirect impact of the Alternatives are expected outcomes are to have minor positive and negative impacts on the status of target and non-target stocks, including bigeye tuna, with none expected to be substantial. U.S. fisheries including those of the Territories are sustainably managed and are operating consistent with internationally agreed upon conservation and management measures. Bigeye tuna is experiencing overfishing in the WCPO, but is not overfished according to the Pelagics FEP. Alternatives 2 and 3 would provide for NMFS-oversight of limited transfers of bigeye tuna catch limits through fishing arrangements, while ensuring that the amount transferred does not exceed catch limits available to the U.S. and Territory longline fisheries. This management approach is also consistent with the Magnuson-Stevens Act in managing the bigeye tuna throughout the range of the species, taking into account stock status, and U.S. and Territory longline catches of bigeye tuna which do not affect the stock status (i.e., whether it is in an overfishing condition or not) and comprise a small fraction of the total WCPO bigeye tuna catch.

Under Alternatives 2 and 3, FEP-permitted vessels would only be allowed to operate under one Territory arrangement at a time. Given this controlling measure, combined with the U.S. WCPO catch limit of 3,554 mt for bigeye tuna, and the current and expected levels of vessel participation, it is likely that the level of effort and associated catches will be within historical baseline levels.

Furthermore, the location of where most U.S. longline fishing effort for bigeye tuna is expected to occur under all Alternatives is an area in the central North Pacific with lower fishing mortality, as compared to the equatorial Pacific, which represents approximately 88 percent of fishing mortality on bigeye tuna in the WCPO (See Figure 12; WCPFC 2011). It is been shown that approximately 98% of Hawaii longline bigeye catch comes from north of 10 ° N, and outside the core equatorial zone where approximately 90% of fishing mortality on bigeye tuna occurs.

[27] The model based on advection-diffusion-reaction equations explicitly predicts spatial dynamics of large pelagic predators, while taking into account data on several mid-trophic level components, oceanic primary productivity and physical environment.

[28] SEAPODYM working progress and applications to Pacific skipjack tuna population and fisheries WCPFC-SC7-2011/EB-WP 06 rev. 1

Bigeye tuna is considered a Pacific-wide stock that is managed and assessed separately by the WCPFC and IATTC. Bigeye tuna is subject to overfishing in the WCPO, but in the EPO bigeye is not in an overfishing condition. In both the WCPO and EPO, bigeye tuna is not overfished. In the WCPO, bigeye tuna is harvested across a range of fishing gears, with primary impacts from longline and purse seine fisheries. Bigeye tuna in the WCPO has been experiencing overfishing since the 1990s. As an internationally managed species, the U.S. cannot end overfishing on bigeye tuna through unilateral actions. International cooperation within the WCPFC is ultimately required to end and prevent overfishing of bigeye tuna in the WCPO. However, the proposed action represents a unilateral action to impose limits on otherwise unrestricted catches applicable to the Territories.

Although the WCPFC and IATTC both manage bigeye tuna, it is a single pan-Pacific stock with no evidence of stocks separation between eastern and western segments of the population. Reduction of fishing mortality in the EPO has been achieved largely through the wholesale reduction of longline fishing mortality, where catches have consistently been lower than IATTC recommended maxima. Given that this is a single stock with exchange between the EPO and WCPO, the reduction of fishing mortality in the EPO may have some benefits to the population as a whole through survival of recruits to reproductive age and spillover of recruits from the EPO to the WCPO. This is especially relevant to bigeye tuna fishing mortality in Regions 2 and 4, whereby the eastern boundaries of these regions adjoin the EPO. The impact of the improved stock condition of bigeye tuna in the EPO and its potentially positive impact to the WCPO stock, especially in the eastern portions of Regions 2 and 4 cannot be discounted and may be quantified in future Pacific-wide bigeye tuna stock assessments. This issue is relevant when evaluating the impact of the Hawaii longline fishery, which fishes predominately in Region 2, as well as in Region 4 and the EPO. Combined catches by the Hawaii longline fishery when fishing under the U.S.WCPO limit and a Territory agreement may be buffered by the improved status of bigeye tuna in the adjacent EPO. Approximately 80 percent of bigeye catch by the Hawaii longline fishery when operating under Territory agreements occurs north of 20 degrees N.

Catches of non-target species in the Hawaii longline fishery are driven by the fishing effort for bigeye tuna. If fishing effort for bigeye tuna increases, the catches of other target and non-target stocks would be expected to increase commensurate with the increases in fishing effort. The predicted level of fishing effort by the Territories and the Hawaii longline fishery under Alternatives 2 and 3 is expected to result in catches of non-target species within historical baseline levels.

As described above, there are several exogenous factors that may be affecting target and non-target species, with the industrial scale purse seine and longline fisheries responsible for the largest impact on the sustainability of the stocks. The impacts analysis of the Alternatives on bigeye tuna stocks was developed in consideration of all other sources of fishing mortality on the stock and the U.S. fisheries would continue to comply with applicable conservation and management measures that are developed by international fishery management organizations. Concerning bigeye tuna, the U.S. cannot end overfishing unilaterally and international cooperation within the WCPFC is needed to eliminate overfishing. None of the Alternatives would result in large adverse impacts to bigeye tuna or prevent management measures from succeeding in improving the status of bigeye tuna in the Pacific.

As the provisions CMM 2013-01 and CMM 2014-01 provide the SIDS and Participating Territories essentially unlimited annual catches of bigeye tuna, there is potential for increased bigeye tuna catches by these countries either through vessel chartering or similar mechanisms including catch attribution programs. Vessel chartering is a common practice among WCPFC membership, principally between SIDS and DWFNs as mechanism for the SIDS to gain fishing capacity. There are no existing WCPFC conservation and management measures to restrict vessel chartering or catch assignment, which is believed to be occurring on various levels within the WCPO. The WCPFC conservation and management measure applicable to vessel chartering (CMM 2012-05) requires notifications of chartering to the WCPFC Secretariat; however, the list of vessels notified to be under charter is available to the public (see WCPFC 2013 (e)).

Alternatives 2 and 3 may further exemplify how unused harvest limits for the SIDS and PTs can be realized as harvests by the other members. Such actions, if widely emulated, could cumulatively erode conservation efforts even while the individual contributions to increased mortality separately may not be substantial. Transfer of purse seine fishing effort is occurring within the WCPO among members of the PNA and longline catch transfers have occurred in the WCPFC, and other RFMO areas of competence such as IATTC in the eastern Pacific and ICCAT in the Atlantic, thus, there is international precedence for quota sharing.

With respect to U.S. negotiating positions and the need for further reductions in bigeye fishing mortality, the Alternatives does not negatively impact future U.S. negotiating positions. Specifically, Alternatives 2 and 3 would establishes more restrictive measures than what is currently in place for the SIDS and PTs (e.g., 2,000-mt catch limits for bigeye tuna in each Territory and 1,000-mt limits on the transfer of bigeye tuna catch under arrangements), which could support U.S. negotiating positions for more restrictive measures.

With regards to market effects and impacts to bigeye tuna and other pelagic MUS, the Hawaii market for fresh and frozen tuna is substantial and cannot be totally supplied with the current amount of domestic landings. The strict regulation of the annual catch limits for the Hawaii longline fishery has left the Hawaii market accessible for foreign imports. If the Hawaii based longline fishery reaches its annual catch limit any one year and is prohibited in fishing in the WCPO, as could occur under Alternative 1, it is believed that foreign imports will fill the market demand in Hawaii. The effect of strictly regulating the Hawaii based longline fleet is expected to represent the same or more amount of fishing for bigeye tuna by foreign interest to satisfy the Hawaii market. Because foreign longline fisheries are believed to be less monitored in terms of target and non-target catches and landings and protected species interactions as compared to U.S. longline fisheries, the proposed action would maintain the U.S. production of bigeye tuna at optimal levels through the highly monitored, environmentally responsible Hawaii longline fishery.

Said differently, a pound of bigeye tuna caught by the Hawaii longline fishery is believed to be more environmentally friendly than a pound of bigeye tuna caught by a foreign longline fleet in regards to protected species interactions and non-target catches (e.g., retained shark bycatch). In addition, supporting the domestic supply of fresh tuna for the Hawaii seafood market is believed to make it less reliant on foreign tuna imports that are likely caught in equatorial regions with

higher fishing mortality levels and in areas known for tuna spawning (e.g., Regions 3 and 4 of the 2011 stock assessment for bigeye tuna in the WCPO). As described earlier, 98% of the Hawaii longline bigeye catch comes from north of 10° N, and outside the core equatorial zone where approximately 90% of fishing mortality on bigeye tuna occurs.

4.2.2 Cumulative Effects to Protected Species

4.2.2.1 Sea Turtles

4.2.2.1.1 Past, Present, and Reasonably Foreseeable Future Management Actions

NMFS Listings Under the ESA

In the late 1970s, NMFS and the USFWS listed all five sea turtles species that occur in the U.S. EEZ as either threatened or endangered pursuant to the ESA (43 FR 32800). The ESA offers Federal protection to species that are displaying population trends that make them vulnerable to extinction.

Pelagics FEP Amendment Model Fishery and Sea Turtle Mitigation Measures

From 2001-2004, the Hawaii based shallow-set fishery was closed due to concerns related impacts on sea turtle populations. In 2004, the Council developed a suite of measures in an FEP amendment to reopen the Hawaii shallow-set swordfish longline fishery. Among the measures in the FEP amendment was a requirement by shallow setting longline vessels to use 18/0 or larger circle hooks and fish bait. This measure has reduced sea turtle interaction rates by 89 percent in comparison to historical interaction rates (Gilman et al. 2007). Deep hooking (thought to result in higher levels of sea turtle mortality) rates have also declined (Gilman et al. 2007). Prior to requiring the use of circle hooks and fish bait in the Hawaii longline shallow-set fishery, 51 percent of the sea turtles were believed to have been deeply hooked. Furthermore, the 2004 regulations instituted annual interaction limits on loggerhead (17) and leatherback (16) sea turtles, which if reached, close the fishery for the remainder of the calendar year. The interaction limit for loggerheads was raised to 46 in 2009 (leatherbacks remained at 16), then reduced back down to 17 and 16, respectively in 2011 as a result of litigation. In January 2012, NMFS completed a new biological opinion on the Hawaii shallow-set longline fishery and concluded that 34 annual interactions with North Pacific loggerheads and 26 annual interactions with leatherbacks will not jeopardize these populations (see 77 FR 60637). Figure 16 shows the significant reduction in sea turtle interactions in the Hawaii longline fisheries as a result of the 2001-2004 closure as well as reopening of the shallow-set fishery under strict sea turtle mitigation measures.

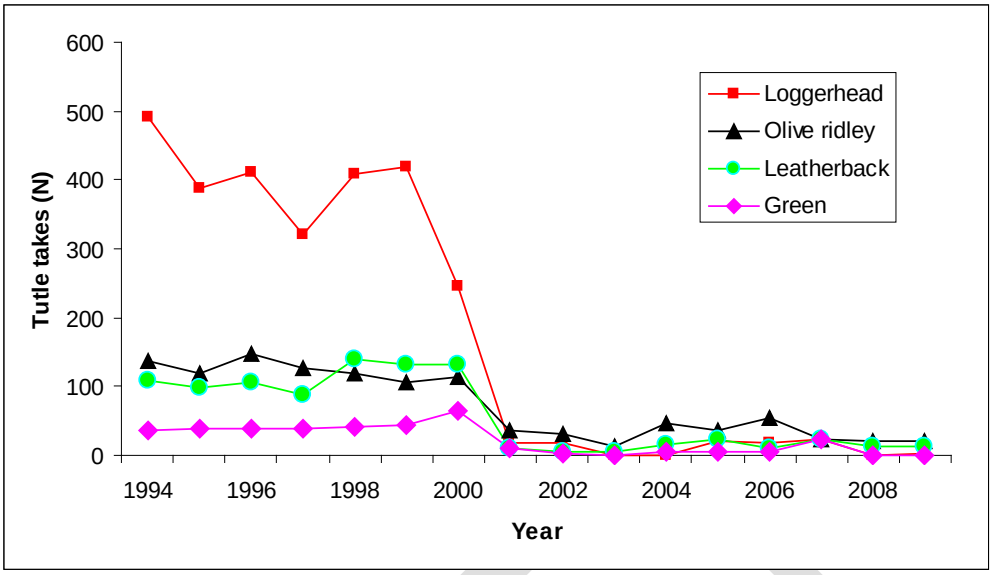

Figure 15: Estimated Annual Sea Turtle Interactions in the Hawaii Longline Fisheries (deep-set and shallow-set combined), 1994-2009.
Source: NMFS unpublished data

In 2009, the Council also recommended requiring American Samoa longline fishing vessels when fishing in the EEZ around American Samoa follow gear modifications to ensure that longline gear is fished at depth below 100 m. This measure is intended to reduce sea turtle interactions (primarily green sea turtles) with the longline fishery. Following the completion of a no-jeopardy biological opinion on September 16, 2010, NMFS implemented the Council's recommended regulations on this issue in 2011 (76 FR 52888). Since implementation, the fishery has had lower interaction rates with sea turtles.

For a detailed description on cumulative impacts to protected species see Amendment 7 and the 2014 Biological Opinion on the Hawaii longline deep-set fishery.

4.2.2.2 Marine Mammals

4.2.2.2.1 Past, Present, and Reasonably Foreseeable Future Management Actions

The Marine Mammal Protection Act (MMPA) requires FEP-regulated fisheries be evaluated by NMFS for impacts on marine mammals and be designated as 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 (50 CFR 229.4-5), to lawfully incidentally take a marine mammal, all fishers participating in Category I or II fisheries must register under the Marine Mammal Authorization Program (MMAP), obtain an Authorization Certificate, carry an observer if requested by NMFS, and comply with any applicable take reduction plans. All commercial fishers, regardless of their fishery category, must report to NMFS any interactions with marine mammals.

The Hawaii longline fishery (deep-set and shallow-set) was previously listed as a single Category I fishery, primarily due to interactions between the deep-set (tuna) fishery and false killer whales (*Pseudorca crassidens*) within EEZ waters around the Hawaiian Islands. Dolphins and false killer whales are also known to take bait and catches from longline and bottomfish fishing lines, most often without becoming hooked or entangled. The Hawaii longline fishery is in compliance with the MMPA in that it is subject to observer coverage, participants must obtain an Authorization Certificate and report any interactions, and the fishery operates under a Take Reduction Plan for false killer whales.

NMFS determined in its List of Fisheries for 2009 (73 FR 73032, December 1, 2008) that the Hawaii deep-set and shallow–set longline fisheries are considered as separate fisheries, with each to be categorized independently based on its characteristics and interactions with marine mammals. The deep-set fishery (which has a history of interacting with false killer whales and exceeding the stock's potential biological removal (PBR) level) is a Category I fishery. The shallow-set fishery is a Category II fishery. Both fisheries are included in the scope of the False Killer Whale Take Reduction Plan; however, the measures implemented mainly address take reduction in the Hawaii deep-set fishery. A final rule for the Take Reduction Plan was published in November, 2012. The measures affect the operation of the fishery and include gear requirements (weak circle hooks and strong leaders), longline prohibited areas, training and certification in marine mammal handling and release, captains' supervision of marine mammal handling and release, and posting of NMFS-approved placards on longline vessels. The rule also recommends research and data collection programs and revises the boundaries of the longline prohibited area around the MHI to be consistent with the prohibited area established under the FKWTRP regulations. This action will not affect the Council's ability to manage Territory catch limits and arrangements nor change the outcome of the proposed action.

The American Samoa longline fishery has been Category II since the 2010 LOF (74 FR 58859, November 16, 2009) by analogy to the Hawaii longline fisheries and its interactions with rough-toothed dolphins and false killer whales. The Hawaii shortline fishery is also listed as Category II by analogy to the Hawaii longline fisheries and anecdotal reports of interactions with "blackfish." Several high seas fisheries in the western Pacific region are classified as Category II, and all other fisheries in the region are classified as Category III fisheries (see the 2012 LOF, 76 FR 73912, November 29, 2011, for further information).

Some marine mammals (e.g., Hawaiian monk seals, humpback whales, other large whales) 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 and recovery of any threatened or endangered species or result in adverse impacts on the critical habitat of such species. The current NMFS BiOps have concluded that no fisheries managed by the Council are likely to jeopardize the continued existence and recovery of any ESA-listed marine mammal species or result in the destruction or adverse modification of designated critical habitat. NMFS issued a 3-year permit for incidental take of endangered Central North Pacific humpback whales in the Hawaii longline fisheries on May 28, 2010, based, in part, on a determination that mortality and serious injury of humpback whales incidental to the fishing operations would have a negligible impact on the stock (75 FR 29984). On June 3, 2013, NMFS reinitiated consultation on the Hawaii deep-set longline fishery in response to the listing of the

MHI insular false killer whale DPS as endangered, and based on a single interaction with a sperm whale.

Future Actions

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. As noted above, NMFS published a False Killer Whale Take Reduction Plan in late 2012 to address incidental serious injuries and mortalities of false killer whales in the Hawaii longline fisheries. NMFS will monitor the effectiveness of the Plan and, if necessary, amend the Plan to ensure its take reduction goals are achieved.

4.2.2.3 Seabirds

4.2.2.3.1 Past, Present, and Reasonably Foreseeable Future Management Actions

Prior to 1999, the shallow-set fishery was estimated to interact with around 2,000 albatross (black-footed and Laysan) per year. The short-tailed albatross, which is listed as endangered under the ESA, is thought to forage in areas where the shallow-set fishery operates; however, no interactions between the short-tailed albatross and the Hawaii longline fleet have ever been reported or observed. In 2002, the Council amended the Pelagics FEP to require Hawaii longline vessels to use known seabird mitigation measures that were expected to significantly reduce seabird interaction rates. These measures include blue-dyed bait, night-setting, line shooters, and weighted branch lines. In 2005, the Council amended the Pelagics FEP to allow longline vessels to side-set in lieu of most required Alternative measures (Figure 17).

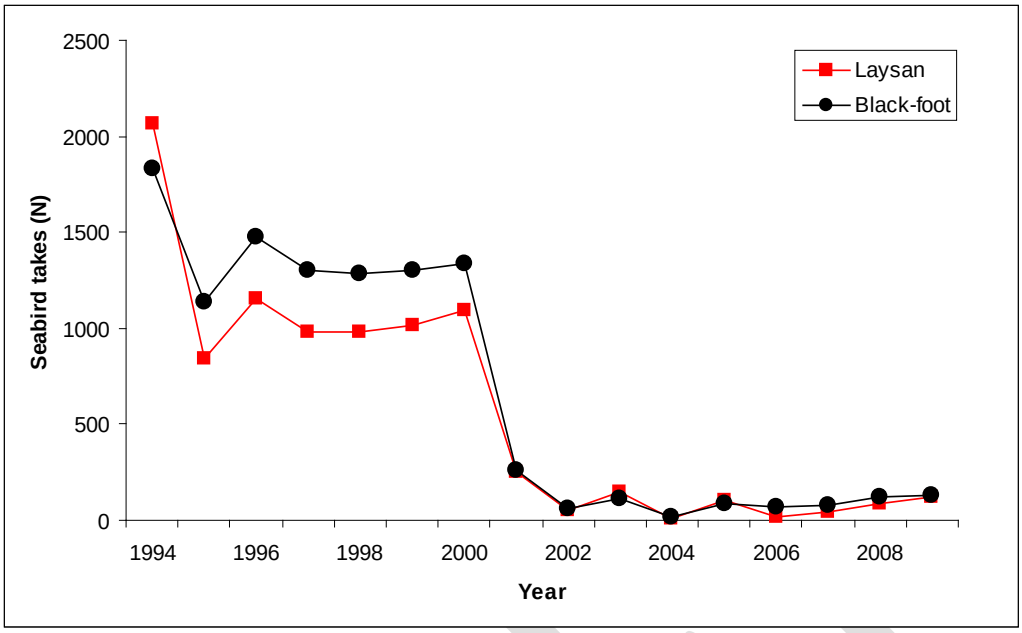

Figure 16: Annual estimated number of interactions between the Hawaii longline fisheries (deep-set and shallow-set) and Laysan and Black-footed albatrosses.
Source: NMFS unpublished data

The introduction of the above regulations in the Hawaii longline fishery reduced the seabird interaction rate by 67 percent on deep-sets (Gilman et al. 2008). The shallow-set fishery typically sets at night and hauls during the day; therefore, most of the interactions occur when fishermen retrieve the gear and birds are actively feeding. The 2011 shallow-set fishery interacted with 49 Laysan albatrosses and 19 black-footed albatrosses and 78 percent of these seabirds were released injured and alive. In the 2011 deep-set fishery observers documented interactions with 32 Laysan albatrosses, 13 black-footed albatrosses, and three sooty shearwaters; four percent of seabirds were released injured and alive.

In August 2012, the USFWS issued a special purpose permit to NMFS under the authority of the Migratory Bird Treaty Act and 50 CFR § 21.27. The 3-year permit authorizes the Hawaii-based shallow set longline fishery to incidentally interact with migratory seabirds, primarily Laysan and black-footed albatrosses. The permit continues the current management regime of the fishery, including the seabird deterrence regulations currently required by NMFS regulations and the 2012 USFWS BiOp (USFWS 2012) referenced above, with no changes to the operation of the fishery during the permit period (see 77 FR 50153). Compliance with the terms of the permit would be considered in the decision to renew any future permit.

The Council and NMFS will continue to monitor seabird interactions with managed fisheries, and if a management need arises, will recommend/implement appropriate measures

4.2.2.4 Cumulative Effects

As previously described, the Council and NMFS have taken significant steps to reduce sea turtle and seabird interactions within several FEP managed fisheries, and ongoing work is being conducted to further reduce interactions. FEP managed fisheries are being held as the benchmark (WCPFC Science Committee 2009 Report) for successful sea turtle, and seabird interaction reductions, and the successes of the Council and NMFS' work are being transferred to other fleets in the region. In addition, NMFS published a final rule for the False Killer Whale Take Reduction Plan, as required under the MMPA, to reduce false killer whale interactions in the Hawaii deep-set and shallow-set longline fisheries (77 FR 71260, November 29, 2012). Exogenous factors continue to be the biggest threat to protected species but implementing the preferred Alternatives is not expected to increase interactions with protected species beyond authorized levels. Even though U.S. and Territory longline fisheries interact with protected species on a rare basis, it is believed that U.S. vessels have a significantly lower negative impact on protected species when compared with less regulated foreign vessels due to the use of proven measures to avoid and reduce fisheries interactions with protected species.

Regardless of the Alternatives selected, including the no-action Alternatives, all U.S. longline vessels will continue to be subject to strict measures to avoid and reduce protected species interactions and to reduce the severity of interactions when they do occur. Impacts to protected species under all of the action Alternatives will be similar. The levels of interactions that are authorized in each fishery do consider the estimated impacts on the same species by all fisheries where the domestic fishery operates, as well as cumulative effects. Cumulative impacts of the U.S. fleets have been considered and authorized in the BiOps, and determinations of impacts to MMPA-protected species to a lesser extent, that apply to the domestic longline and other pelagic fisheries in the western Pacific region.

4.2.3 Cumulative Effects to Fishery Participants and Communities

4.2.3.1 Past, Present, and Reasonably Foreseeable Future Actions

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, CNMI, Guam, and each of the inhabited Hawaiian Islands as fishing communities affected by the proposed action.

In accordance with the MSA, 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.

4.2.3.2 External Factors

There are a number of wide-ranging factors (that change over time) that have the potential to affect fishing participants as well as fishing communities. Current factors may include, but are not limited to, high fuel costs, high costs of other equipment and supplies, increased seafood imports, and restricted access to traditional fishing grounds. High fuel and materials/supply costs affect fishing participants by increasing the costs to go fishing. The effect is that fishery participants reduce the number of fishing trips, switch to less fuel-intensive fisheries, or simply do not go fishing at all. Some longline fishing in the western Pacific has shown contraction in recent years, with an example being longline fishing on small vessels in the American Samoa longline fishery.

The amount of imported seafood is also increasing, and where the U.S. now imports nearly 85 percent of consumed seafood.[29] Increased seafood imports are significant as the level of imports relates to market competition, where a glut of foreign fish products can flood the market and lower ex-vessel prices for U.S. fishermen. Once market channels are lost to imported seafood products it may also be hard for fishery participants to regain those channels. As described previously, the Territories face significant barriers to developing responsible longline fisheries and include lack of infrastructure, transportation, and access to markets.

In addition, a reliance on foreign imports by the U.S. Territories is believed to impact local food security. At a broader level, a recent study by the Great Britain's Royal Institute of International Affairs (Ambler-Edwards et al. 2009) has identified seven fundamental issues, which affect food production and food security. These are as follows:

1. Rapidly rising world population (population growth rates in the western Pacific region range from 1-7%)
2. Nutrition transition, i.e., a shift from traditional staples to processed foods high in sugars, oils, and fats
3. The rising costs of energy (oil, gas, electricity)
4. Limited availability of agricultural land (especially critical on small islands)
5. Increasing demands for water for agricultural and food production
6. Climate change
7. Labor and urban drift

All of these seven fundamentals are especially critical to the small island archipelagos that comprise the Western Pacific Region. The development of domestic sustainable fisheries production in the Western Pacific region would help to mitigate the impacts of most of these fundamental issues by providing increased revenues for communities and developing fisheries that meet domestic consumption needs. Alternatives 1 would not allow the Territories to enter into Specified Fishing Arrangements for 2015, whereas Alternatives 2 and 3 would promote potential opportunities to develop fisheries in the Territories that could help offset other factors that are affecting Territory fishing communities.

[29] http://www.fishwatch.gov/farmed_seafood/index.htm

With regards to the Hawaii fishing communities, which also face the issues described for Territory fisheries such as rising operational costs and increasing seafood imports. Alternative 1 which would not allow Territory arrangements with Hawaii longline participants for 2015, may lead to more foreign imports of bigeye tuna and other pelagic species to fill any market gaps in the Hawaii and U.S. seafood market that would result from a more restricted Hawaii longline fishery. Alternatives 2 and 3, would provide the Hawaii longline fishery the opportunity to fish year around in the WCPO through arrangements with Territories. The Hawaii longline fishery is the largest producer of fresh fish in the State of Hawaii and is an important supplier of quality seafood that supports Hawaii's tourism economy and local seafood market.

4.2.3.3 Cumulative Effects

Regardless of which Alternative is selected, Western Pacific pelagic fisheries will continue to be managed sustainably. None of the Alternatives is expected to result in a large change to the fisheries in terms of area fished, effort, harvests, or protected species interactions.

Alternative 1 would not allow Territories to make fishing agreements with FEP-permitted vessels, as 2015 Territory transfer limits would not be specified. Alternative 1 does not provide long-term stability for fishery participants. Alternatives 2 and 3, while allowing fishing arrangements to occur in 2015, would provide minor to moderate benefits to fishery participants and provide some payments to the Sustainable Fisheries Fund. These alternatives expected to result in the greatest short and long-term benefit to fishery participants by providing the most intensive management oversight of fishing arrangements, managing Territorial catches of bigeye tuna, and in terms of providing long-term stability in the commercial pelagic fisheries. Such stability is expected to result in the lowest amount of cumulative impacts of external stressors on fishing participants and communities, as compared to the No-Action Alternative.

4.3 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."[30]

In addition to Hawaii's indigenous and minority population, the American Samoa, CNMI, and Guam-based pelagic fisheries have participants representing a variety of ethnicities that would fall under the minority provisions of the Executive Order. None of the Alternatives are expected to have large impacts to the environment that would result in a disproportionately large and adverse effect on minority or low-income populations. Alternatives 2 and 3 could provide a mechanism to allow Territory arrangements to support fisheries development in the Territories, which would positively benefit fishing communities in the Territories, which are comprised of members of minority or low-income populations. None of the alternatives are anticipated to affect subsistence fishing in the Territories.

[30] Memorandum from the President to the Heads of Departments and Agencies. Comprehensive Presidential Documents No. 279 (February 11, 1994).

Chapter 5: Consistency with the Magnuson-Stevens Act and Other Laws

5.1 Consistency with National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any FEP or FEP amendment be consistent with the 10 national standards (NS) listed below.

National Standard 1 *states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.*

The proposed action also includes (for 2015 and 2016) specifications of annual 2,000-mt longline catch limits for bigeye tuna and, as part of that limit, X-mt transferable catch limits for bigeye tuna applicable to each Territory. Although WCPFC does not impose an annual longline limit for bigeye tuna for the US Participating Territories, the proposed action would place on each a maximum limit on bigeye mortality of 2000 mt. Both limits are subject to annual review and specification by the Council and NMFS, which facilitates adaptive management and appropriate consideration of the impact of the limits on bigeye tuna stock status.

The United States cannot end bigeye overfishing unilaterally. The MSA exempts stocks including bigeye that are managed under international agreements from the ACL requirement. In the final rule amending National Standard 1 guidelines, NMFS concluded that the intent of MSRA is to "not unfairly penalize U.S. fishermen for overfishing which is occurring predominantly at the international level", and that "applying ACL requirements to U.S. fishermen on just the U.S. portion of the catch or quota, while other nations fished without such additional measures, would not lead to ending overfishing and could disadvantage U.S. fishermen…" 74 Fed. Reg. 3178, 3199 (January 16, 2009). Accordingly, the appropriate inquiry is whether the proposed action to allow the limited transfer of quota among U.S. fisheries and U.S Participating Territories is consistent with the objectives of international decisions to prevent and end overfishing.

WCPFC CMM 2013-01 establishes the objective of eliminating bigeye overfishing and that this objective shall be achieved through a step by step approach through 2017. The proposed action is consistent with this objective. Based on historical operation, it is anticipated that up to 1,500 mt of bigeye tuna would be assigned under Territory agreement(s) in any one year and catches by Hawaii and Territory longline fisheries, when combined with U.S. WCPO longline limit for bigeye tuna of 3,554 mt per year (which will be reduced to 3,345 mt in 2017) and international measures would result in F/Fmsy of 0.99 by 2032, which is consistent with the objectives of CMM 2013-01.

Accordingly, the proposed action had negligible impacts on bigeye tuna in terms of overfishing and overfished reference points projected into the future, and in combination with international measures adopted by the WCPFC to eliminate bigeye overfishing within the WCPO. Therefore, the proposed action is not expected to interfere with the elimination of overfishing under the objectives identified in CMM 2013-01(see section 4.1.1 and Appendix A for more information).

As a result of stricter measures adopted by the WCPFC in CMM 2013-01 and CMM 2014-01 under a phased approach through 2017, bigeye tuna overfishing is anticipated to be eliminated by 2032. As shown in the TUMAS projections used in this analysis, the amount of bigeye catch expected under the proposed action (4,887 mt), in combination with the fishing conditions that will be resultant from WCPFC conservation and management measures through 2017, will prevent bigeye overfishing under the recent average recruitment scenario. Although the long-term average recruitment scenario identifies continued overfishing under all Alternatives, section 4.1.1 explains that recent average recruitment is believed to be a better representation of current and future recruitment trends, and accordingly greater emphasis is placed on recent average recruitment associated projections to evaluate impacts from the Alternatives to future bigeye stock status. Moreover, should future stock assessments and fishing effort data indicate a deterioration of the stock's status, this information will be evaluated in the Council's annual recommendation and NMFS' final action, including the NEPA documentation supporting that action. If the best available information indicates that approval of Territory limits or transferrable limits will interfere with the accomplishment of international conservation and management objectives for the stock, or otherwise violates the National Standards, then NMFS may disapprove those limits and no fishing agreements will be accepted for that fishing year.

The current WCPFC Conservation and Management Measure for tropical tuna stocks(CMM 2014-01), adopted in December 2014, limits members that harvested less than 2,000 mt of bigeye in 2004 to no more than 2,000 mt for each of the years 2014 through 2017. However, paragraph 7 of CMM 2013-01 does not establish an individual limit on the amount of bigeye tuna that may be harvested annually in the Convention Area by Small Island Developing States and Participating Territories, including American Samoa, Guam, and the CNMI. NMFS and the Council, however, believe it is important that the paragraph 7 exemption not apply to U.S. Participating Territories, since bigeye tuna is currently subject to overfishing. Therefore, NMFS proposes to establish 2,000-mt limits for the U.S. Participating Territories, which are more conservative than what is agreed to for the U.S. Participating Territories by the WCPFC under CMM 2014-01, and thus helps constrain overall bigeye mortality.

Consistent with the Findings and Policies of the MSA (section 2 "Findings" para. 10; section 2 "Policy" para. 7) and CMM 2013-07 (Special Requirements of SIDS and PTs) the Council acknowledges that the Territories should be afforded the opportunity to develop their fisheries like other PTs and SIDS within the WCPFC. However, the status of bigeye tuna requires the establishment of appropriate limits, which under the status quo do not exist. The proposed action establishes a stricter management regime than currently exists for SIDS and PTs under WCPFC's CMMs, therefore the proposed action offers a model that other SIDS and PTs may emulate domestically to help prevent overfishing of bigeye tuna, while also providing some ability for development of their fisheries.

WCPFC members that have longline bigye limits have reduced their catches by approximately 38 percent since the WCPFC agreed on conservation and management measure 2008-01 (NMFS unpublished). In the same period, catches of bigeye tuna by the purse seine fishery have increased by around 20 percent (WCPFC 2013b). As articulated in the 2011 WCPO bigeye tuna stock assessment, analysis of current levels of fishing mortality and historical patterns in the mix of fishing gears indicates that MSY has been reduced to less than half its levels prior to 1970

through harvest of small juveniles. Because of that and overfishing, considerable potential yield from the bigeye tuna stock is being lost (approx. 75%), and further, MSY levels would rise if mortality of small fish were reduced which would allow greater overall yields to be sustainably obtained (Davies et al. 2011). The 2014 stock assessment and Scientific Committee reports note that addressing bigeye tuna overfishing requires a significant reduction in the use of FADs in the purse seine fishery which would reduce the incidental juvenile bigeye tuna catch in the WCPO purse seine fishery. If this occurs, MSY values for bigeye tuna would increase, and the ability to achieve optimal yield on a continuing basis under current levels of longline and purse seine fishing effort would be enhanced. In CMM 2013-01 and 14-01, the WCPFC has adopted stricter measures to reduce purse seine fishing effort on FADs as well as reduce longline bigeye limits, than what is provided under CMM 2012-01. Following a phased approach through 2017 identified in CMM 2013-01, the WCPFC is expected to take additional measure to eliminate bigeye overfishing should they become necessary.

The Council and NMFS will continue to monitor the stock condition of the other target and non-target species on an annual basis and will take appropriate conservation action as required and necessary. For example, with regard to striped marlin, the western and central North Pacific stock is experiencing overfishing and is overfished, the annual catch of striped marlin is not expected to increase or exceed the established WCPFC agreed limit applicable to U.S. longline fisheries, nor increase beyond current harvest levels under the proposed action. In the future, if catch of striped marlin is anticipated to exceed any WCPFC management measures, the Council may consider fishery management measures that reduce or maintain catch of this species at levels recommended by the WCPFC. In addition, it is likely the Council will consider recommending future management measures to the Secretary to reduce overfishing and rebuild the stock.

The proposed action does not establish an annual catch limit (ACL) under section 303(a)(15) of the Magnuson-Stevens Act. Section 303(a)(15) applies unless "otherwise provided for under an international agreement in which the United States participates. Pub. Law 109-479 § 104(b). Pelagic highly migratory species fall under the international exception to ACLs.

National Standard 2 *states that conservation and management measures shall be based upon the best scientific information available.*

The proposed action would be consistent with NS2 because the FEP amendment utilizes the best scientific information available from NMFS, WCPFC, and other scientific groups (See Chapters 3 and 4, Appendix C, and Appendix D) to describe the affected human environment and potential impacts of the Alternatives. The WCPFC 2014 stock assessment for bigeye tuna has been subject to extensive peer review. In addition, the FEP amendment has undergone review with, and included input from subject matter experts by the Council's staff and advisory groups, and NMFS' PIRO and PIFSC. Finally, the Council acknowledges that the proposed action is based on projections of future stock status and future fishing effort that involve some degree of uncertainty. Where different information inputs produce different results, such as the impacts of the proposed action under the TUMAS model, the analysis identifies and explains the weaknesses and any gaps in the information. Moreover, the proposed action employs precautionary management measures to take into account uncertainty in future outcomes.

Specifically, annual limits and transferrable limits will require annual review and recommendations by the Council, with action by NMFS supported by the appropriate level of NEPA. Any recommendation that is determined to be inconsistent with international conservation and management measures addressing overfishing will be subject to disapproval.

National Standard 3 *states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.*

The proposed action would be consistent with NS3 because it would allow the Council, NMFS, and, to a limited extent, the Territories to manage pelagic MUS in the WCPO and throughout their range. This includes bigeye tuna and any other pelagic MUS to which catch or effort limits may apply as agreed to by the WCPFC or as recommended by the Council and specified by NMFS in the absence of adequate conservation and management measures for pelagic MUS.

National Standard 4 *states that conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.*

The proposed action would be consistent with NS4 as it does not discriminate between residents of different States. Although it is possible that only Hawaii longline permit holders would enter into an arrangement with a Territory, all fishermen that have a Pelagics FEP permit are eligible to enter into Territorial arrangements including fishermen from American Samoa, Guam, and the CNMI. In addition, Pelagics FEP permits are available to all U.S. citizens and nationals, with the exception of the American Samoa longline permit, which is subject to additional eligibility criteria relating to historical participation in the fishery

National Standard 5 *states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.*

The proposed action would be consistent with NS5 as it considers an efficient, near-term way for the Territories to conduct responsible fisheries development and to access available pelagic stocks for the net benefit of the Nation, consistent with the conservation needs of affected fishery stocks.. The proposed action would also allow the U.S. to more efficiently make use of fishery resources, which, without the opportunity to enter into arrangements with FEP-permitted vessels for purposes of responsible fisheries development, the Territories may continue to be underdeveloped and suffer from a lack of capacity to participate in the WCPO tuna fishery, which by all accounts, is the largest tuna fishery globally.

National Standard 6 *states that conservation and management action shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources and catches.*

The proposed action would be consistent with NS6 as it considers variation in status of stocks and contingencies in regional fisheries and impacts of such fisheries on the spatial distribution of bigeye tuna and other pelagic stocks. The highly migratory species (HMS) that are targeted by and available to Pelagics FEP fisheries are internationally managed by regional fishery management organizations (RFMOs) that consider fishery resources, sources of mortality, and total regional catch in order to make recommendations for domestic fishery management. These organizations consider the necessary changes to sustainably manage region-wide stocks, consider changes in fishery dynamics, and potential responses to fishery management actions. The proposed action includes a process to allow for annual adjustment of Territory catch or effort and Territory transfer limits in response to RFMO conservation and management agreements for HMS that are applicable to the U.S. Participating Territories. In addition, the process allows the Council to recommend and NMFS to specify limits in the absence of specific RFMO conservation and management agreements.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs, and avoid unnecessary duplication.

The proposed action would be consistent with NS7 because it does not create duplicative measures on the regulated fishing community. The proposed action would allow vessels under Territory agreements the option to fish a limited amount of transferrable quota in preferred areas and markets, without having to fish in less accessible areas, for example, in the EPO if NMFS prohibits fishing for bigeye tuna in the WCPO. In addition, Territories are not required to enter into agreements with U.S. vessels, so mandatory administrative costs would not occur over taking no-action.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The proposed action would provide positive benefits to the fishing communities of the Territories and Hawaii as discussed in Chapter 4. The proposed action would not result in adverse economic impacts on the fishing communities of the Territories, but on the contrary, would promote responsible fisheries development with the objective of stimulating long-term economic growth and stability as well as supporting local food security, consistent with the conservation needs of the stock. The action is also consistent with the Findings and Policies of the MSA (section 2 “Findings” para. 10; section 2 “Policy” para. 7), which recognizes the importance of fisheries to the Territories in terms of economic growth and the need to ensure that Territory fisheries are properly developed, conserved, and managed. Furthermore, Hawaii and other U.S. markets would benefit from maintained or increased supply of sustainably caught bigeye tuna and other pelagic species from U.S. vessels.

National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided minimize the mortality of such bycatch.

The proposed action would not authorize any new fisheries with unknown bycatch levels. The proposed measures are similar to the current fishery and so increased bycatch rates are not expected. Pelagics FEP fisheries would continue to be monitored and information would include bycatch, discards, and interactions. Monitoring the fishery would allow NMFS and the Council to develop management measures as necessary to respond to potential needs to reduce bycatch and mortality of bycatch. Vessels authorized to fish under Territory arrangements would still be required to submit logbooks, carry observers when requested by NMFS, as well as VMS. In addition, FEP-permitted vessels are required to follow strict protected species mitigation measures that reduce interactions with these species.

The proposed action supports fisheries development in the Territories that may reduce bycatch. For example, in the American Samoa longline fishery that targets albacore for local canneries, large yellowfin and bigeye tunas have been documented as bycatch due to a historical lack of local markets for export of these species. Recently, a new market has emerged in American Samoa that has the ability to export large fresh/frozen bigeye and yellowfin tunas, and other pelagic species; however, in order to take advantage of this opportunity, the existing fleet requires upgrades (e.g., ice machines) and fresh fish handling training. As the proposed action would help facilitate fisheries development such as vessel upgrades and training, the proposed action may lead to a decrease in bycatch in the American Samoa longline fishery.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The proposed action would be consistent with NS10 because it supports fisheries development in the Territories that potentially involves upgrading vessels that would likely be safer than existing vessels. In addition, the proposed action supports safety-at-sea for the Hawaii longline fishery by allowing fishery participants to enter into Territory arrangements to fish in the WCPO, which otherwise could be restricted if limits for pelagic MUS are reached. This is especially important for small vessels in the Hawaii longline fishery that, if the U.S. WCPO limit is reached, their only option to fish for bigeye tuna would be in the EPO, which is of a greater distance from Hawaii. Furthermore, November and December, which were the months affected by the closure of the bigeye tuna, typically experience strong storm activity in the North Pacific.

References

Allen, S.D., and J.R. Amesbury. 2012. Commonwealth of the Northern Mariana Islands as a fishing community. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-36, 90 p.

Allen S. and P. Bartram. 2008. Guam as a fishing community. Pacific Islands Fisheries Science Center Administrative Report H-08-01, 61 p.

Almengor, M., C. Somarriba, and J.C. Castro. 1994. Eretmochelys imbricata (Hawksbill). Reproduction. Herpetological Review 25(1): 24.

Ambler-Edwards, S., K. Bailey, A. Kiff, T. Lang, R. Lee, T. Marsden, D. Simmons, and H. Tibbs. 2009. Food futures: Rethinking UK strategy. Royal Institute of International Affairs. Chatham House: London.

Aires-da-Silva, A., and M.N. Maunder. 2012. Status of bigeye tuna in the Eastern Pacific Ocean in 2011 and outlook for the future. Inter-American Tropical Tuna Commission Scientific Advisory Committee 3rd Meeting, La Jolla, California (USA), 15-18 May 2012 Document SAC-03-06, 12 pp.

Aires-da-Silva, A., and M.N. Maunder. 2013. Status of Bigeye Tuna in the Eastern Pacific Ocean in 2012 and Outlook for the Future. Fourth Meeting, Scientific Advisory Committee, Inter-American Tropical Tuna Commission, La Jolla, California, USA. April 29 – May 3, 2013. Document SAC-04-05a, 126 p.

Baker, J.D., C.L. Littnan, and D.W. Johnston. 2006. Potential effects of sea level rise on the terrestrial habitats of endangered and endemic megafauna in the Northwestern Hawaiian Islands. Endangered Species Research, 2: 21-30.

Balazs, G.H. 1985. Sea turtles and debris: Ingestion and entanglement. Marine Turtle Newsletter, 32:3-4

Balazs, G.H. 1995. Innovative techniques to facilitate field studies of the green turtle, Chelonia mydas. In: J.I. Richardson and T.H. Richardson (Compilers). Proceedings of the Twelfth Annual Workshop on Sea Turtle Biology and Conservation, p. 158-161. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-SEFSC-361, 274

Balazs, G.H. 1994. Homeward bound: satellite tracking of Hawaiian green turtles from nesting beaches to foraging pastures. Proceedings of the Thirteenth Annual Symposium on Sea Turtle Biology and Conservation. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS-SEFSC-341, p. 205-208.

Bartram, P.K., and J.J. Kaneko. 2004. Catch to bycatch ratios: Comparing Hawaii's longline fishery with others. SOEST Publication 04-05, JIMAR Contribution 04-352, 40 pp.

Bartram, P., and J.J. Kaneko, PacMar, Inc. 2009. Preliminary responsible development plan for the American Samoa longline fishery. Prepared for the Western Pacific Regional Fishery Management Council. Honolulu, HI.

BirdLife International. 2004. Threatened Birds of the World 2004. CD-ROM. Cambridge, UK: BirdLife International.

Bjorndal, K.A., A.B. Bolten, and C.J. Lagueux. 1994. Ingestion of marine debris by juvenile sea turtles in coastal Florida habitats. Marine Pollution Bulletin. 28:154-158.

Boggs C., and R. Ito. 1993. Hawaii's pelagic fisheries. NOAA-NMFS Marine Fisheries Review, 55(2):69-82.

Brothers, N., R. Gales, and T. Reid. 1999. The influence of environmental variables and mitigation measures on seabird catch rates in the Japanese tuna longline fishery within the Australian Fishing Zone, 1991-1995. Biol. Conserv. 88(1): 85-101.

Campbell, L.M. 2003. Contemporary Culture, Use and Conservation of Sea Turtles. In: The Biology of Sea Turtles, Volume II. Lutz, P.L., Musick, J.A., and J. Wyneken (eds.). CRC Press. pp: 307-338.

Carr, A. 1987. Impact of nondegradable marine debris on the ecology and survival outlook of sea turtles. Marine Pollution Bulletin. 18(6):352-356.

Carr, A.F. 1967 (rev. ed. 1984). So Excellent a Fish: A Natural History of Sea Turtles. Scribner, New York, N.Y.

Carretta, J.V. ,K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L. Brownell Jr. J. Robbins, D.K. Mattila, K. Ralls, and M. C. Hill. U.S. Pacific marine mammal stock assessments: 2011. U. S. Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service Southwest Fisheries Science Center, NOAA-TM-NMFS-SWFSC-488, 360 pp

Carretta, J.V., K.A. Forney, E.O. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L. Brownell Jr., J. Robbins, D.K. Matilla, K. Ralls, and M.C. Hill. 2012. U.S. Pacific Marine Mammal Stock Assessments: 2011. U.S. Dept. Commerce, NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-488. 356 p.

Ceron, J.A.J., Rocha, A.R.B., and H.G. Ruiz. 2000. Contamination by phthalate ester plasticizers in two marine turtle species. In: Abreu-Grobois, F. A., Briseno-Duenas, R., Marquez, R.,

Sarti, L. (eds.). Proceedings of the 18th International Sea Turtle Symposium. NOAA Tech. Memo. NMFS-SEFSC-436. p.118-119.

Chan, H.L., and M. Pan. 2012. Spillover effects of environmental regulation for sea turtle protection: the case of the Hawaii shallow-set longline fishery. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-30, 38 p. + Appendices.

Chapman, L. 1998. The rapidly expanding and changing tuna longline fishery in Samoa. SPC Fisheries Newsletter #84 (January – March 1998). Secretariat of the Pacific Community, Noumea, New Caledonia. 10 pp.

Chatto, R., M. Guinea, and S. Conway.1995. Sea turtles killed by flotsam in northern Australia. Marine Turtle Newsletter. 69:17-18.

Cousins, K.L., P. Dalzell, and E. Gilman. 2000. Managing pelagic longline-albatross interactions in the North Pacific Ocean. Appendix 1, p. 159-174 In: J. Cooper (ed.), Albatross and Petrel Mortality from Longline Fishing, International Workshop, Honolulu, Hawaii, USA, 11-12 May 2000.

Clarke, S. 2011. A status snapshot of key shark species in the Western and Central Pacific and potential management options. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011//EB-WP-04.

Crouse, D.T., L.B. Crowder, and H. Caswell. 1987. A stage-based population model for loggerhead sea turtles and implications for conservation. Ecology, 68(5):1412-1423.

Crowder. L.B., D.T. Crouse, S.S. Heppell, and T.H. Martin. 1994. Predicting the impact of turtle excluder devices on loggerhead sea turtle populations. Ecological Applications 4(3): 437-445.

Davies, N., S. Hoyle, S. Harley, A. Langley, P. Kleiber, and J. Hampton. 2011. Stock assessment of bigeye tuna in the Western and Central Pacific Ocean. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011/SA- WP-02, 133 pp.

Day, R.H. and D.G. Shaw. 1987. Patterns in the abundance of pelagic plastic and tar in the North Pacific Ocean, 1976-1985. Marine Pollution Bulletin, 18: 311-316.

Department of Business, Economic Development and Tourism (DBEDT), State of Hawaii. 2011. Year 2011 State of Hawaii Data Book. http://hawaii.gov/dbedt/info/economic/databook/db2011/

Finkelstein, M.E., R.H. Gwiazda, and D.R. Smith. 2003. Lead poisoning of seabirds: environmental risks from leaded paint at a decommissioned military base. Environ. Sci. Technol. 37(15):3256–3260.

Finkelstein, M., S.K. Bradford, D.A. Croll, B. Tershy, W.M. Jarman, S. Rodriguez-Pastor, D.J. Anderson, P.R. Sievert, and D.R. Smith. 2006. Albatross species demonstrate regional differences in North Pacific marine contamination. Ecological Applications, 16(2):678–686.

Frazier, J.P. 2003. Prehistoric and Ancient Historic Interactions between Humans and Marine Turtles. pp: 1-38. In: P.L. Lutz, J.A. Musick, and J. Wyneken (Eds.), The Biology of Sea Turtles. Vol. II. CRC Press, Boca Raton, FL.

Gilman, E., D.R. Kobayashi, T. Swenarton, N. Brothers, P. Dalzell, and I. Kinan-Kelly. 2007. Reducing sea turtle interactions in the Hawaii-based longline swordfish fishery. Biological Conservation, 139(1-2): 19-28.

Gilman, E., D. Kobayashi, and M. Chaloupka. 2008. Reducing seabird bycatch in the Hawaii longline tuna fishery. Endangered Species Research, 5(2-3):309-323.

Gilman, E., Owens, M., and T. Kraft. In Press (Aug. 2013) Ecological risk assessment of the Marshall Islands longline tuna fishery. *Marine Policy*. oi: 10.1016/j.marpol.2013.08.029. To download the report see: https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx3Y3BvYmV0ZmlwfGd4OjQzODk2ZTg1ZGZjZjhkYzk

Gjertsen, H. 2008. The Economics of Sea Turtle Conservation in the Pacific. Report submitted to the Southwest Fisheries Science Center, La Jolla, CA, 252 p.

Harley, S., N. Davies, J. Hampton, S. McKechnie. 2014. Stock assessment of bigeye tuna in the Western and Central Pacific Ocean. WCPFC-SC10-2014/SA-WP-01.

Harrison, C., T. Hida, and M. Seki. 1983. Hawaiian seabird feeding ecology. Wildl. Monogr., 85:1-71.

Heppell, S.S., L.B. Crowder, and D.T. Crouse. 1996. Models to evaluate head-starting as a management tool for long-lived turtles. Ecol. Appl. 6: 556-565.

Hildebrand, J.A. 2005. Impacts of Anthropogenic Sound. In: J.E. Reynolds et al. (eds.), Marine Mammal Research: Conservation beyond Crisis. The Johns Hopkins University Press, Baltimore, MD.

Higuchi, W. 2007. Pre-war Japanese fisheries in Micronesia-focusing on bonito and tuna fishing in the Northern Mariana Islands. Immigration Studies, 3: 49-68

Hoyle, S., P. Kleiber, N. Davies, A. Langley, and J. Hampton. 2011. Stock assessment of skipjack tuna in the Western and Central Pacific Ocean. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011/SA- WP-04, 103 pp.

Hoyle, S. 2011. Stock assessment of albacore tuna in the South Pacific Ocean. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011/SA- WP-06, 90 pp.

IATTC (Inter-American Tropical Tuna Commission). 2012. The fishery for tunas and billfishes in the Eastern Pacific Ocean in 2008. 80th meeting. Inter-American Tropical Tuna Commission Scientific Advisory Committee 3rd Meeting, La Jolla, California (USA) May 15-18, 2012 Document SAC-03-03. June 8-12, 2009. 49 pp.

IUCN (International Union for the Conservation of Nature and Natural Resources). 2004. IUCN Red List of Threatened Species: A Global Species Assessment. Gland, Switzerland.

Ito, R.Y., and W.A. Machado. 2001. Annual report of the Hawaii-based longline fishery for 2000. Administrative Report H-01-07. Southwest Fisheries Science Center, NMFS/NOAA: http://www.pifsc.noaa.gov/library/pubs/admin/SWFC_Admin_Report_01-07.pdf

Kiyota, M., H. Nakano, H. Matsunaga, and H. Minami 2003. Research activities and fishery management for the solution of incidental catch of sharks, seabirds and sea turtles in Japanese tuna longline fishing [BBRG-10]. Noumea, New Caledonia: SPC, Secretariat of the Pacific Community. Standing Committee on Tuna and Billfish, Mooloolaba, Queensland, Australia, 9-16 July 2003, 16th. 7 p.

Kleiber, P., S. Clarke, K. Bigelow, H. Nakano, M. McAllister, and Y. Takeuchi. 2009. North Pacific blue shark stock assessment. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-17, 74 p.

Langley, A., S. Hoyle, and J. Hampton. 2011. Stock assessment of yellowfin tuna in the Western and Central Pacific Ocean. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011/SA-WP-03, 133 pp.

Lehodey, P., M. Bertignac, J. Hampton, A. Lewis, and J. Picaut. 1997. El Niño Southern Oscillation and tuna in the western Pacific. Nature, 389: 715-718.

Levine, A., and S. Allen. 2009. American Samoa as a fishing community. U.S. Dept. of Commerce, NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-19, 74 pp.

Lutcavage, M.E., P. Plotkin, B. Witherington, and P.L. Lutz. 1997. Human Impacts on Sea Turtle Survival. In: P.L. Lutz, and J.A. Musick (eds.), The Biology of Sea Turtles, Vol. 1. (pp. 387–409). CRC Press, Boca Raton, FL.

McCoy, M.A. 1997. The traditional and ceremonial use of the green sea turtle (Chelonia mydas) in the Northern Mariana Islands with recommendations for its use in cultural events and

education. A report prepared for the Western Pacific Regional Fishery Management Council & University of Hawaii, Sea Grant College Program. 82pp.

McCracken, M.L. 2006. Estimation of Incidental Interactions with Sea Turtles, Seabirds, and Marine Mammals in the 2005 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-06-006, Issued 19 April 2006.

McCracken, M.L. 2007. Estimation of Incidental Interactions with Sea Turtles, Seabirds, and Marine Mammals in the 2006 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-07-006, Issued 10 April 2007.

McCracken, M.L. 2008. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2007 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-08-007, Issued 24 April 2008.

McCracken, M.L. 2009. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2008 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-09-011, Issued 24 April 2009.

McCracken, M.L. 2010. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2009 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-09-011, Issued 16 April 2010.

McCracken, M. 2011. Assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow set fisheries from 2006 through 2010. National Marine Fisheries Service Pacific Islands Fisheries Science Center, Working Paper Wp-11-012, 30 pp.

McCracken, M.L. 2011b. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2010 Hawaii Longline Deep Set Fishery. Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-11-005, Issued 19 April 2011.

McCracken, M.L. 2012. Estimation of Incidental Interactions with Sea Turtles and Seabirds in the 2011 Hawaii Longline Deep Set Fishery, Pacific Islands Fisheries Science Center, PIFSC Internal Report IR-12-012, Issued 13 April 2012.

McDonald, M.A., J.A. Hildebrand, and S.M. Wiggins. 2006. Increases in deep ocean ambient noise west of San Nicolas Island, California. J. Acoust. Soc. Am., 120(2):711-717.

Mitchell, J.C. and M.W. Klemens. 2000. Chapter 1: Primary and secondary effects of habitat alteration. In: M.W. Klemens (ed.). Turtle Conservation. Smithsonian Institution Press.

Mosier, A.E. and B.E. Witherington. 2002. Documented effects of coastal armoring structures on sea turtle nesting behavior. In: A. Mosier, A. Foley, and B. Brost (eds.), Proceedings of the 20th Annual Symposium on Sea Turtle Biology and Conservation. NOAA Tech. Memo. NMFS-SEFSC-477. pp. 304-306.

Mrosovsky, N. 1981. Plastic Jellyfish. Marine Turtle Newsletter, 17:5-7.

Musick, J.A., M.J. Rybitski, and R.C. Hale. 1995. Distribution of organochlorine pollutants in Atlantic sea turtles. Copeia, 2:379-390.

Myers, R. A. and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. *Nature.* 423:280-283.

Naughton, M.B, M.D. Romano, and T.S. Zimmerman. 2007. A Conservation Action Plan for Black-footed Albatross (*Phoebastria nigripes*) and Laysan Albatross (*P. immutabilis*), Ver. 1.0. 40 pp. Available at: http://www.fws.gov/pacific/migratorybirds/PDF/Albatross%20Action%20Plan%20ver.1.0.pdf

Naughton, M., K. Morgan, and K. Rivera. 2008. Species Information – Short-tailed Albatross (*Phoebastria albatrus*). Unpublished report.

Nietschmann, B. 1973. Between Land and Water: The Subsistence Ecology of the Miskito Indians, Eastern Nicaragua. Seminar Press, New York. 279pp.

Nietschmann, B. 1979. Caribbean Edge: The Coming of Modern Times to Isolated People and Wildlife. Bobbs-Merrill, Indianapolis, IN. 280pp.

NMFS (National Marine Fisheries Service). 2001. Biological Opinion on Authorization of Pelagic Fisheries under the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region. Office of Protected Resources, NMFS, Washington, D.C.

NMFS. 2004. Biological Opinion on the Authorization of Pelagic Fisheries under the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region. Office of Protected Resources, NMFS, Washington, D.C.

NMFS. 2005. Continued authorization of the Hawaii-based Pelagic, Deep-Set, Tuna Longline Fishery based on the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. Endangered Species Act- Section 7 Consultation, Biological Opinion and Incidental Take Statement. NMFS, Pacific Islands Region, Sustainable Fisheries Division, Hawaii, 187 pp.

NMFS. 2010a. Fisheries Economics of the United States, 2009. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-118, 172p.

NMFS. 2010b. Endangered Species Act Section 7 Consultation Biological Opinion on Measures to Reduce Interactions Between green sea turtles and the American Samoa-based Longline Fishery-Implementation of an Amendment to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region. September 16, 2010. 91 pp.

NMFS. 2011a. U.S. National Bycatch Report (W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117C, 508 p.

NMFS. 2011b. Final Environmental Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis For the False Killer Whale Take Reduction Plan. Pacific Islands Regional Office, Protected Resources Division, Honolulu, Hawaii. November 2012. 375 pp.

NMFS. 2012a. Seabird Mitigation Efforts in the Hawaii longline Fisheries, 2011. NMFS, Pacific Islands Regional Office, Honolulu, HI. 22 pp.

NMFS. 2012b. Biological Evaluation of the Hawaii Deep-set Longline Fishery. NMFS Pacific Islands Regional Office, Sustainable Fisheries Division, Honolulu, HI. 80 p.

NMFS. 2013. Submission of 2011-2012 U.S. Fishery Statistics for the Western and Central Pacific Ocean and Other Areas to the Western and Central Pacific Fisheries Commission. US Metadata Report DR-13-10. National Oceanic and Atmospheric Administration, National Marine Fisheries, Service Pacific Islands Fisheries Science Center.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998a. Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle (*Dermochelys coriacea*), Prepared by the Pacific Sea Turtle Recovery Team.

NMFS and USFWS. 1998b. Recovery Plan for U.S. Pacific Populations of the Loggerhead Turtle (*Caretta caretta*). Prepared by the Pacific Sea Turtle Recovery Team.

NMFS and USFWS. 1998c. Recovery Plan for U.S. Pacific Populations of the Green Turtle (Chelonia mydas). National Marine Fisheries Service: Silver Spring, MD. 50p.

NMFS and USFWS.1998d. Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle (*Eretmochelys imbricata*) National Marine Fisheries Service: Silver Spring, MD. 50p.

NMFS and USFWS.1998e. Recovery plan for U.S. Pacific populations of the olive ridley turtle (*Lepidochelys olivacea*). National Marine Fisheries Service: Silver Spring, MD.

OFP (Oceanic Fisheries Program). 2012. Estimates of annual catches in the WCPFC statistical area. Western and Central Pacific Fisheries Commission, Scientific Committee, Busan August 7-15, 2012, WCPFC-SC8-2012/ST IP-1, 34 pp.

Pacific Islands Fishery Science Center (PIFSC). 2012a. American Samoa 2009 Fishery Statistics. http://www.pifsc.noaa.gov/wpacfin/pdf_file/a_vol26.pdf

Pacific Islands Fishery Science Center (PIFSC). 2012b. Hawaii 2009 Fishery Statistics. http://www.pifsc.noaa.gov/wpacfin/pdf_file/a_vol26.pdf

Pickering, E. and J.B. Gist. 2011. Fisheries of the Pacific Islands Region: A contemporary social perspective and annotated bibliography. NMFS, Pacific Islands Regional Office, Honolulu, HI, 137 pp.

Pilling, G., P. Williams, J. Hampton, S. Harley. 2013. Analysis of the implementation and effectiveness of key management measures for tropical tunas. Western and Central Pacific Fisheries Commission, Scientific Committee, Ninth Regular Session. Pohnpei, Federated States of Micronesia. August 27-30, 2013. WCPFC-SC9-2013/MI-WP-01 REV2.

Pitman, R.L., W.A. Walker, W.T. Everett, and J.P. Gallo–Reynoso. 2004. Population status, foods and foraging of Laysan Albatross *Phoebastria immutabilis* nesting on Guadalupe Island, Mexico. Marine Ornithology, 32: 159-165.

Polovina J., G. Mitchum, N. Graham, M. Craig, E. DeMartini, and E. Flint. 1994. Physical and biological consequences of a climate event in the central North Pacific. Fisheries Oceanogrgraphy, 3:15–21.

Polovina, J.J., E.A. Howell, and M. Abecassis. 2008. Ocean's least productive waters are expanding. Geophysical Research Letters, 35. L03618, doi:10.1029/2007GL031745.

Polovina J.J., M. Abecassis, E.A. Howell, and P. Woodworth. 2009. Increases in the relative abundance of mid-trophic level fishes concurrent with declines in apex predators in the subtropical North Pacific, 1996-2006. Fishery Bulletin. 107(4): 523-531.

Popper, A.N. 2003. Effects of anthropogenic sound on fishes. Fisheries, 28(10):24-31.

Robards, M. D., P. Gould, and J. Platt. 1997. The highest global concentrations and increased abundance of oceanic plastic debris in the North Pacific: evidence from seabirds. Pages 71-80 In: Marine debris: sources, impact and solutions. Springer, NY.

Rausser, G.C., S.F. Hamilton, M. Kovach, and R. Stifter. 2009. Unintended consequences: the spillover effects of common property regulations. Marine Policy, 33:24-39.

Rice, J., and S. Harley. 2012a. Stock assessment of oceanic white tip sharks in the Western and Central Pacific Ocean. Western and Central Pacific Commission Science Committee, Busan August 7-15, 2012, WCPFC-SC8-2012/ SA-WP-06, 53 pp.

Rice, J., and S. Harley. 2012b. Stock assessment of silky sharks in the Western and Central Pacific Ocean. Western and Central Pacific Commission Science Committee, Busan August 7-15, 2012, WCPFC-SC8-2012/ SA-WP-07, 53 pp.

Richmond, L., D. Kotowicz, J. Hospital, and S. Allen. 2012. In review. Adaptations in a fishing community: monitoring socioeconomic impacts of Hawaii's 2010 bigeye tuna closure. Ocean and Coastal Management.

Sakai, H., H. Ichihashi, H. Suganuma, and R. Tatsudawa. 1995. Heavy metal monitoring in sea turtles using eggs. Marine Pollution Bulletin. 30(5): 347-353.

Sakai, H., K. Saeki, K., Ichihashi, H., Suganuma, H., Tanabe, S., and R. Tatsukawa. 2000. Species-specific distribution of heavy metals in tissues and organs of loggerhead turtle and green turtle from Japanese coastal waters. Marine Pollution Bulletin; 40(8): 701-709.

Sarà, G., J.M. Dean, D. D'Amato, G. Buscaino, A. Oliveri, S. Genovese, S. Ferro, G. Buffa, M. Lo Martire, and S. Mazzola. 2007. Effect of boat noise on the behaviour of bluefin tuna *Thunnus thynnus* in the Mediterranean Sea. Marine Ecology Progress Series, 331: 243-253.

Sarmiento, C. 2006. Transfer function estimation of trade leakages generated by court rulings in the Hawaii longline fishery. Applied Economics, 38:183-190.

Sibert, J., J. Hampton, P. Kleiber, and M. Maunder. 2006. Biomass, size, and trophic status of top predators in the Pacific Ocean. Science. 313. p.1773-1776.

Schreiber E.A. and J. Burger. 2002. Biology of Marine Birds. CRC Press, Boca Raton, FL. 722 pp.

Schroeder, B.A. and A.E. Mosier. 2000. Between a rock and a hard place: coastal armoring and marine turtle nesting habitat in Florida. In: F.A. Abreu-Grobois, R. Briseno-Duenas, R.Marquez, and L. Sarti-Martinez. (eds.). Proceedings of the 18th International Sea Turtle Symposium. NOAA Tech. Memo. NMFS-SEFSC-436. p. 290-292.

Seminof, J.A., S.M. Presti, A.R.S. Hidalgo, and A.E. Sollod. 1999. Mercury concentration in the scutes of black sea turtles in the Gulf of California. Chelonian Research Foundation, 3(3): 531-533.

Spear, L. B., D.G. Ainley, and C.A. Ribic. 1995. Incidence of plastic in seabirds from the tropical Pacific, 1984-91: relation with distribution of species, sex, age, season, year, and body weight. Marine Environmental Research, 40: 123-146.

SPC (Secretariat of the Pacific Community). 1998. Report of the eleventh meeting of the Standing Committee on Tuna and Billfish: 28 May - 6 June 1998, Honolulu, Hawaii, United States of America. SPC Oceanic Fisheries Program, Noumea, New Caledonia, 108 pp.

SPC (Secretariat of the Pacific Community). 2013. Western and Central Pacific Fisheries Commission. Tuna Fishery Yearbook. Oceanic Fisheries Programme. Secretariat of the Pacific Community. Noumea, New Caledonia.

Spotila J., A. Dunham, A. Leslie, A.Steyermark, P. Plotkin, and F. Paladino. 1996. Worldwide population decline of Dermochelys coriacea: are leatherback turtles going extinct? Chel. Cons. Biol., 2(2): 209-222.

Tanabe, S., M. Watanabe, T.B. Minh ,T. Kunisue, S. Nakanishi, H. Ono, and H. Tanaka. 2004. PCDDs, PCDFs, and Coplanar PCBs in albatross from the North Pacific and Southern Oceans: levels, patterns, and toxicological implications. Environ. Sci. Technol., 2004, 38(2): 403–413

USFWS (U.S. Fish and Wildlife Service). 2012a. Biological Opinion of the U.S. Fish and Wildlife Service for the Operation of the Hawaii-based Pelagic Longline Fisheries, Shallow Set and Deep Set, Hawaii. January 6, 2012. 2011-F-0436. P. 49.

USFWS. 2012b. Final Environmental Assessment – Issuance of an MBTA Permit to the National Marine Fisheries Service Authoring Take of Seabirds in the Hawaii-based Shallow-set Longline Fishery. U.S Fish and Wildlife Service. Pacific Region Portland, OR. July 27, 2012. p. 57.

Veran, S., O. Gimenez, E. Flint, W.L. Kendall, P.F. Doherty Jr., and J. Lebreton. 2007. Quantifying the impact of longline fisheries on adult survival in the black-footed albatross. J. Applied Ecology, 44(5):942–952.

Wallace, N. 1985. Debris entanglement in the marine environment: a review. In: R.S. Shomura, and H.O. Yoshida (eds.), Proceedings of the Workshop on the Fate and Impact of Marine Debris. 26- 29 November 1984, Honolulu, HI. NOAA Tech. Memo. NMFS, NOAA-TM-NMFS-SWFC-54; p. 259-277.

Wang, S.H., S.B. Wang, and C.L. Kuo. 2002. National report: update on tuna fisheries of Taiwan in the Pacific regions. SCTB 15 Working Paper NRF-22. 15th meeting of the Standing Committee on Tuna and Billfish. July 22-27, 2002. Honolulu, HI.

Wang, S.P., C. Sun, A.E. Punt, and S. Yeh. 2007. Application of the sex-specific age-structured assessment method for swordfish, Xiphias gladius, in the North Pacific Ocean. Fisheries Research, 84:282-300.

WCPFC (Western and Central Pacific Fisheries Commission). 2008. Report of the Fourth Regular Session of the Technical Compliance Committee of the WCPFC. October 2008. Pohnpei, FSM.

WCPFC. 2010. Summary Report. Sixth Regular Session of the WCPFC Scientific Committee. August 10-19, 2010. 186 pp.

WCPFC. 2011(a). Stock Assessment of Albacore Tuna in the North Pacific Ocean in 2011. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, ISC Albacore Working Group Report. Western and Central Pacific Commission Science Committee, Pohnpei, Federated States of Micronesia, August 9-17, 2011, WCPFC-SC7-2011/SA- WP-10, 143 pp.

WCPFC. 2011(b). Summary Report. Seventh Regular Session of the WCPFC Scientific Committee. August 9-17, 2011. Pohnpei. 166 pp.

WCPFC. 2011 (c). Review of the performance of the WCPFC. Western and Central Pacific Ocean Eighth Regular Session, Tumon, Guam, 26-30 March 2012, WCPFC8- 2011/12, 299 pp.

WCPFC. 2011 (d). Review of the implementation and effectiveness of CMM 2008-01. Eighth Regular Session of the WCPFC. March 25-29, 2012. WCPFC8-2011-43 Rev.1. 31 pp.

WCPFC. 2012a. Summary Report. Eighth Regular Session of the WCPFC Scientific Committee. August 7-15, 2012. Busan. 163 pp.

WCPFC. 2012b. Summary Report, Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean Eighth Regular Session, Tumon, Guam, 26-30 March 2012, 52 pp.

WCPFC. 2013a. Summary Report. Ninth Regular Session of the WCPFC Scientific Committee. August 6-14, 2013. Pohnpei. 212 pp.

WCPFC. 2013b. Estimates of annual catches in the WCPFC statistical area. Ninth Regular Session of the WCPFC Scientific Committee. August 6-14, 2013. WCPFC-SC9-2013/ST IP-1 (rev. 1). 34 pp.

WCPFC. 2013c. CMM tropical tunas data summary (v21-08-2013). WCPFC Working Group on Tropical Tunas. Tokyo. August 27-30, 2013. 35 pp.

WCPFC. 2013d. Summary Report. Ninth Regular Session of the WCPFC Technical and Compliance Committee. September 26-October 1, 2013. 86 pp.

WCPFC. 2013e. Available information on implementation of and compliance with conservation and management measures. WCPFC-TCC9-IP03. 10 pp.

Williams, P., and P. Terawasi. 2012. Overview of tuna fisheries in the western and central Pacific Ocean, including economic conditions – 2011. Western and Central Pacific Commission Science Committee, Busan, August 7-15, 2012, WCPFC-SC8-2012/GN WP-1, 49 pp.

Williams, P., and P. Terawasi. 2012. Overview of tuna fisheries in the western and central Pacific Ocean, including economic conditions – 2012. Western and Central Pacific Commission Science Committee, Busan, August 6-14, 2013. WCPFC-SC9-2013/GN WP-1, 56 pp.

WGSE (Working Group on Seabird Ecology. 2008. Report of the Working Group on Seabird Ecology. International Council for the Exploration of the Sea. ICES CM 2008/LRC:05. 10–14 March 2008, Lisbon, Portugal, 99 pp.

Woodworth-Jefcoats PA, Polovina JJ, Dunne JP, Blanchard JL. 2012. Ecosystem size structure response to 21st century climate projection: large fish abundance decreases in the central North Pacific and increases in the California Current. *Global Change Biology* 19(3): 724-733.

Woodrom-Luna, R. 2003. The merging of archaeological evidence and marine turtle ecology: A case study approach to the importance of including archaeological data in marine science. SPC Traditional Marine Resource Management and Knowledge Information Bulletin. No. 15. July 2003, pp: 26-30.

Woodrom-Luna, R. 2003. Traditional food prohibitions (tapu) on marine turtles among Pacific Islanders. SPC Traditional Marine Resource Management and Knowledge Information Bulletin. No. 15. July 2003, pp: 31-33.

Work, T.M. and G.H. Balazs. 1998. Causes of green turtle morbidity and mortality in Hawaii. In: S.P. Epperly, and J. Braun (eds.), Proceedings of the 17th Annual Sea Turtle Symposium. NOAA Tech Memo. NMFS-SEFSC-415, pp: 291-292.

WPRFMC (Western Pacific Regional Fishery Management Council). 2003. Measure to limit pelagic longline fishing effort in the Exclusive Economic Zone around American Samoa Amendment 11 to the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Region. Western Pacific Regional Fishery Management Council Honolulu, HI, 280 pp.

WPRFMC. 2009. Pelagic fisheries of the Western Pacific Region 2007 Annual Report. Honolulu, HI, 283pp.

WPRFMC. 2010. Pelagic fisheries of the Western Pacific Region, 2008 annual report. Administrative Report.

WPRFMC. 2011. Amendment 5 to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region. Measures to Reduce Interactions between the American Samoa Longline Fishery and Green Sea Turtles. Western Pacific Regional Fishery Management Council Honolulu, HI, 140 pp.

WPRFMC. 2012. Pelagic fisheries of the Western Pacific Region 2010 Annual Report. Honolulu, HI, 337 pp.

Appendix A- TUMAS Analysis on Impacts to Stock Status of Bigeye Tuna in the WCPO

TUMAS Analysis[31]

I. Introduction

The following analysis uses TUMAS (Tuna Management Simulator) to evaluate impacts to bigeye tuna from international fisheries occurring within the WCPFC Convention Area. TUMAS is an online web tool designed to allow users to control fisheries data under various scenarios and project the status of a particular stock in the future.[32] This application was developed by the SPC-OFP and relies on stock assessments of tropical tunas in the WCPO.

With respect to bigeye tuna, the most recent version of TUMAS incorporates the 2014 stock assessment of bigeye tuna in the WCPO (see Harley et al. 2014). This stock assessment is a spatially disaggregated MULTIFAN-CL model that separates the WCPO into 9 regions. As designed, TUMAS incorporates bigeye tuna catch information from the early 1950s up to 2012 and allows users to scale catch data by fisheries overall or in one or more of the six stock assessment regions to make predictions about likely stock responses to catch or effort changes. New stock assessments are incorporated into TUMAS as they become available. The TUMAS model available at the time of writing incorporates 2012 catch information of bigeye tuna and does not include 2013 or 2014 catches.[33]

TUMAS also offers the ability to conduct projections under two stock-recruitment scenarios for bigeye tuna:

1) Long-term recruitment average (1952-2011), which is termed "spawner recruitment relationship" in the model; and

2) Recent average recruitment (1989-2011).

The two recruitment scenarios offer different stock status trajectories, with long-term average recruitment being more pessimistic and recent average recruitment being more optimistic. The long-term recruitment average includes several decades (1950s-1970s) of older recruitment estimates that were derived from periods when fishing mortality on bigeye tuna was much lower and confined primarily to longline fishing. Higher levels of bigeye tuna recruitment occurred after the 1980s with the expansion of FAD-based purse seine fishing in the WCPO, and thus the recent average recruitment scenario (1989-2011) better reflects current conditions and conditions

[31] Prepared by Eric Kingma, Western Pacific Regional Fishery Management Council, in collaboration with Keith Bigelow, NMFS Pacific Islands Fisheries Science Center. September 2013.
[32] http://www.tumas-project.org/about-tumas
[33] The 2013 WCPO bigeye catch was less than in 2012. The 2014 WCPO bigeye catch is unavailable at the time of writing.

that are likely to prevail into the near future, where bigeye tuna catches will be from a mixture of purse seine and longline fisheries.

With regards to deterministic projections, such as those produced using TUMAS, the WCPFC Science Committee has recommended that the WCPFC science provider (SPC-OFP) conduct projections using recent average recruitment and the long-term recruitment average; however, since the higher level of recent bigeye tuna recruitment is considered to be a better indicator of future recruitment levels, greater emphasis is provided to recent average recruitment when presenting catch projections (WCPFC 2010; WCPFC 2011(d); J. Hampton, SPC-OFP, pers. comm., 2013).[34] The SPC-OFP will likely incorporate data after 2012 in the TUMAS tool after the next WCPO bigeye stock assessment.

For comparative purposes, the analysis below provides projection results using both recruitment scenarios and scaled 2012 US longline catches combined with catch and effort of other fisheries in 2012. When comparing projection results between years under the same catch levels, there is a noticeable trend in stock status, with the stock improving under the recent average recruitment scenario and declining under the long-term average recruitment scenario

Although using both recruitment scenarios in the TUMAS projections results in overfishing under all Alternatives, less emphasis is placed on these results derived using the long-term recruitment average because recruitment levels associated with the long-term recruitment average are not believed to be representative future levels of recruitment. Beginning in the late 1980s, higher levels of recruitment have been observed and incorporated in the bigeye tuna stock assessment. The long-term recruitment average includes several decades (1950s-1970s) of recruitment estimates that were derived from periods when fishing mortality on bigeye tuna was much lower and confined primarily to longline fishing. Moreover, the older recruitment estimates, especially in the 1950s were based on longline data from the Japanese longline fishery when it was more spatially constrained and had not spread out across the WCPO.

Higher levels of bigeye tuna stock recruitment occurred after the 1980s with the expansion of FAD-based purse seine fishing in the WCPO. This high level of juvenile catch is explained in the stock assessment as elevated levels of bigeye recruitment. Moreover, the dynamics of the ecosystem may also have responded to the increasing levels of fishing mortality, which have reduced the upper trophic level predator biomass including adult bigeye tuna, likely resulting in more favorable survival rates for juvenile bigeye tunas (Myers and Worm 2003; Sibert et al. 2006; Polovina et al. 2009; Woodworth-Jefcoats et al. 2012). Furthermore, the 2011 stock assessment for WCPO bigeye tuna indicates that most of the high levels of recruitment observed in the model occur at low estimated spawning biomass (Davies et. al 2011). As such, recent average recruitment of bigeye tuna is likely to be a better reflection of future levels of recruitment, given that favorable conditions will likely persist including the mix of longline and purse seine fishing gears harvesting bigeye in the WCPO.

[34] In 2011, the SPC-OFP ran projections using both recent average recruitment and long-term average recruitment; however, the SPC-OFP only presented projections using recent average recruitment at the Eighth Regular Session of the WCPFC in March 2012. This exemplifies the greater emphasis being placed on recent average recruitment versus long-term average recruitment when conducting projections on the stock status of bigeye tuna. See WCPFC 2011(d).

Because recent average recruitment is believed to be a better representation of current and future recruitment trends, greater emphasis is placed on recent average recruitment associated projections to evaluate impacts from the Alternatives to future bigeye stock status. This is consistent with the advice provided by WCPFC Science Committee (WCPFC 2010; 2011(d)) and subsequent projections conducted by the SPC-OFP (WCPFC 2011(d)). See Appendix D for further information.

Under the Pelagics FEP, $F/F_{MSY}>1$ indicates overfishing is occurring, and $B/B_{MSY}<0.6$ indicates the stock is in an overfished condition. The tables below also include the SB/SB_{MSY} ratio which represents adult fish biomass levels.

II. Methods

The following provides the methods used in the TUMAS analysis. TUMAS allows users to apply various scalars on the reported US WCPO (e.g. Hawaii) longline catches while not modifying other catches reported for various fisheries included in the model. Hawaii longline data catch data in the model are separated in to Region 2 and Region 4, respectively, of the WCPO MULTIFAN-CL bigeye stock assessment.

III. Results

Table 1: Projections Related to Alternatives 1 through 3 and Percent Increase in F/F_{MSY}, SB/SB_{MSY} and B/B_{MSY}, at various scalars, and using recent bigeye tuna recruitment (1989-2011).

TUMAS runs	Baseline[1]	AS/HI LL dual permit catch[2]	Transfer or Terr. Catch	catch totals (mt)	% difference in TUMAS[3]	Catch in TUMAS value (mt)	TUMAS 2012 US LL bigeye catch (mt)	scalar on 2012 US LL catch in Reg. 2 and 4
No action	3554	369	0	3923	add 8%	4237	5587	0.76
Anticipated outcome	(2011-2014 ave) = 4897 mt	n/a (included)	n/a (included)	4897	add 8%	5289	5587	0.95
US limit + dual+ 1500 transfer	3554	369	1500	5423	add 8%	5857	5587	1.05
US limit + dual+ 3ooo transfer	3554	369	3,000	6923	add 8%	7512	5587	1.34
US limit + dual+ 6,000 Terr. Catch	3554	n/a (included)	6000	9554	add 8%	10,318	5587	1.85

Notes:
1) Baseline (3,554 mt) = 2015 and 2016 US WCPO longline bigeye limit
2) AS/HI LL dual permit catch (369 mt) = average catch from dual permitted vessels from 2011-2014.
3) The catch in metric tons in TUMAS is 8 % greater than what is reported by US in its Annual Part 1 report to WCPFC. This likely due to different length-weight conversion factors.

Table 2: Projections Related to Alternatives 1 through 3 and Percent Increase in F/F_{MSY}, SB/SB_{MSY} and B/B_{MSY} levels, at various scalars, and using recent recruitment.

Recent Recruitment	Baseline (5162 mt)	No transfer (3923 mt)		2011-2014 ave (4897mt)		US limit + dual+ 1500 (5423 mt)		US limit+ dual+ 3,000 (6923 mt)		US limit+dual+6000 (9554 mt)	
			percent change		percent change		percent change		percent change		percent change
2022 F/Fmsy	1.695	1.682	-0.77%	1.692	-0.16%	1.698	0.16%	1.715	1.15%	1.743	2.83%
2022 SB/SBmsy	0.743	0.753	1.3%	0.746	0.40%	0.742	-0.13%	0.73	-1.75%	0.71	-4.44%
2022 B/Bmsy	0.839	0.846	0.8%	0.84	0.12%	0.837	-0.24%	0.829	-1.19%	0.813	-3.10%

Table 3: Projections Related to Alternatives 1 through 3 and Percent Increase in F/F_{MSY}, SB/SB_{MSY} and B/B_{MSY} levels, at various scalars, using long-term average recruitment.

Long-term recruitment	Baseline (5162 mt)	No transfer (3923 mt)		2011-2014 ave (4897mt)		US limit + dual+ 1500 (5423 mt)		US limit+ dual+ 3,000 (6923 mt)		US limit+dual+6000 (9554 mt)	
			percent change		percent change		percent change		percent change		percent change
2022 F/Fmsy	1.988	1.96	-1.41%	1.981	-0.35%	1.99	0.10%	2.026	1.91%	2.087	4.98%
2022 SB/SBmsy	0.382	0.393	2.88%	0.384	0.52%	0.379	-0.79%	0.366	-4.19%	0.343	-10.21%
2022 B/Bmsy	0.457	0.467	2.19%	0.459	0.44%	0.455	-0.44%	0.443	-3.06%	0.422	-7.66%