WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

DRAFT
Environmental Assessment

Specification of 2018 Bigeye Tuna Catch and Allocation Limits for Pelagic Longline Fisheries of the U.S. Pacific Island Territories

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Abstract

The Western Pacific Regional Fishery Management Council (Council) has recommended the specification of 2018 bigeye tuna catch limits for each of the pelagic longline fisheries of the U.S. Participating Territories (American Samoa, Guam and the Northern Mariana Islands) to the Western and Central Pacific Fisheries Commission (WCPFC) including limits on the amount each the U.S. Participating Territories can allocate to eligible U.S. fishing vessels under specified fishing agreements. The Council prepared this environmental assessment (EA) to evaluate the potential environmental impacts of the proposed 2018 longline bigeye tuna catch limit specifications. The draft EA analyzes the following alternatives for catch and allocation limit specifications in detail:

1. Alternative 1: No specification of catch or allocation limits (No Management Action);
2. Alternative 2 (Status quo): Specify for each U.S. participating territory, a 2,000-mt longline bigeye catch limit and 1,000-mt bigeye allocation limit (Council recommended);
3. Alternative 3: Specify for each U.S. participating territory, a 2,000-mt longline bigeye catch limit and that each territory can allocate up to 2,000-mt of the bigeye catch limit;
4. Alternative 4: No total longline bigeye catch limit per U.S. participating territory, but a limit on the amount of bigeye each territory can allocate under annual specified fishing agreements:
    a. 1,000 mt allocation limit per territory
    b. 1,500 mt allocation limit per territory
    c. 2,000 mt allocation limit per territory

Based on the most recent stock assessment and status determination criteria set forth in the Fishery Ecosystem Plan for Pelagic Fisheries (Pelagic FEP), bigeye tuna in the Western and Central Pacific Ocean (WCPO) is not subject to overfishing or in an overfished condition. The analysis in this EA indicates that the proposed action is not expected to result in adverse effects on the long-term sustainability of bigeye tuna, non-target species, bycatch species protected species, or adversely affect marine habitats.

Draft Environmental Assessment

Specification of Bigeye Tuna Catch and Allocation Limits for Pelagic Longline Fisheries of the U.S. Pacific Island Territories in 2018

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Acronyms and Abbreviations

APA	Administrative Procedure Act
BET	Bigeye tuna
BiOp	Biological Opinion
CCM	Cooperating members, non-members, and participating territories of the WCPFC
CFCAA	Consolidated and Further Continuing Appropriation Act of 2012
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 Treaty Act
MCP	Marine Conservation Plan
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Act 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
Pelagic 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
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
WPSFF	Western Pacific Sustainable Fisheries Fund
WPFMC	Western Pacific Fishery Management Council

1 Background Information

1.1 Overview of Bigeye Tuna Management in the Western and Central Pacific Ocean

The Western Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) manage fishing for bigeye tuna (*Thunnus obesus*) and other pelagic management unit species (PMUS) in federal waters of the Exclusive Economic Zone (EEZ or federal waters; generally 3-200 nautical miles or nm from shore) around American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (CNMI) and Hawaii, and on the high seas through the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) as authorized by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; 16 U.S.C. § 1801 *et seq.*).

Bigeye tuna is an important component of tuna fisheries throughout the Pacific Ocean and is harvested predominantly by purse seine and longline fleets of several nations. In the western and central Pacific Ocean or WCPO (generally west of 150° W. long.) bigeye tuna was previously assessed as experiencing overfishing (69 FR 78397, December 30, 2004), but currently is not experiencing overfishing based on the latest stock assessment (WCPFC 2017). Bigeye has not been in an overfished condition according to stock status determination criteria described in the Pelagic FEP (WPFMC 2009).

Since 2006, the Western and Central Pacific Fisheries Commission (WCPFC) has been adopting conservation and management measures (CMMs) aimed at reduce fishing mortality of bigeye tuna in the WCPO, including catch and effort limits that are applicable to longline and purse seine fisheries of WCPFC member countries. For the purpose of WCPFC membership, the United States is a full WCPFC member, while the U.S. Territories of American Samoa and Guam and the CNMI are each a Participating Territory (PT) to the WCPFC (hereafter, U.S. participating territory). The U.S. Participating Territories have limited participation rights at WCPFC, as described by Article 43 of the *Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean* (WCPF Convention) and the WCPFC's Rules of Procedure.

The most recent WCPFC CMM that applies to WCPO bigeye tuna is CMM 2017-01, which is developed to be a bridging measure towards the Commission's adoption of the a harvest strategy for bigeye, skipjack, and yellowfin tuna stocks and/or fisheries. Taking into account the bridging role of the measure and the uncertainty framework for evaluating the impact of management measures on the bigeye stock, the Commission committed to working towards achieving and sustaining the aims with respect towards bigeye, skipjack, and yellowfin management objectives.

In accordance with CMM 2017-01, and as an interim measure, the U.S. longline bigeye limit for 2018 is 3,554 metric tons (mt), which was the same limit in place for 2015 and 2016 (Table 1). The longline bigeye limits for other CCMs were restored to 2016 levels, with the exception of China and Japan. China received an additional 500 mt increase that came out of Japan's quota. The catch limits for Japan and Indonesia were restored to their 2016 limits, although their 2016 bigeye catches were reported to be 12,610 mt and 8 mt, respectively, which for each country is approximately 5,000 mt less than their catch 2016 catch limit (SPC 2017).

The 3,554 mt limit for the United States is only applicable to U.S. longline fisheries in Hawaii and the West Coast of the United States. The limit does not apply to longline fisheries of the U.S. participating territories, as they are each treated as separate from the U.S. for the purpose of WCPFC catch or effort limits. Furthermore, Commission agreed that for purposes of the provisions on catch and effort limits, catches and efforts of U.S.-flagged vessels operating under agreements with its Participating Territories shall be attributed to the Participating Territories, and not to the U.S. *See* Paragraph 9 of CMM 2017-01. The Commission places no limits on the amount of bigeye that may be transferred by U.S Participating Territories and other SIDS under agreements.

Table 1: Longline bigeye catch limits for WCPFC CCMs

CCM	Catch Limit (mt)		
	2016	2017	2018
Japan	18,265	16,680	17,765
Korea	13,942	12,869	13,942
Chinese Taipei	10,481	9,675	10,481
China	8,224	7,049	8,724
Indonesia	5,889	5,889	5,889
USA	3,554	3,345	3,544
NZ, AU, EU, PI,	2,000	2,000	2,000
SIDS/PTs	No limit	No limit	No limit

Source: WCPFC CMM 2017-01.

CMM 2017-01 also provides that each WCPFC member country that is not a Small Island Developing State (SIDS)[1] that caught less than 2,000 mt of year in 2004 to ensure that its catch does not exceed 2,000 mt in 2018. Paragraph 5 of CMM 2017-01 makes clear, however, that nothing shall prejudice the rights and obligations of SIDS and PTs seeking to develop their domestic fisheries. This provision of CMM 2017-01 addresses Article 30 of the WCPF Convention. Specifically, Article 30 of the WCPF Convention recognizes the special needs of SIDs and PTs, and provides that 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 giving effect to paragraph 7 and Article 30, the 2,000 mt bigeye limit is not applied to SIDS and PTs, which includes the U.S. participating territories. Thus, there are no current WCPFC-agreed upon catch limits or fishing effort for bigeye tuna in longline fisheries of SIDS and PTs, including American Samoa, Guam and the CNMI. This is consistent with previous WCPFC measures.

[1] CMM 2017-01 defines "SIDS"s as inclusive of Participating Territories. *See* Paragraph 6.

1.2 Overview of Catch and Allocation Limit Specification process of the Pelagic FEP

Consistent with Section 113 of the Consolidated and Further Continuing Appropriations Act of 2012 or CFCAA (Pub. Law 112-55, 125 Stat. 552 *et seq*.), the Council in 2014, developed and NMFS approved Amendment 7 to the Pelagic FEP (WPFMC and NMFS 2014). Amendment 7 established a process under the authority of the Magnuson-Stevens Act to specify catch and/or effort limits for pelagic fisheries in American Samoa, Guam and the CNMI (hereinafter the U.S. participating territories), as recommended by the Council. The process also allows NMFS to authorize the government of each U.S. participating territory to allocate a portion of its catch or fishing effort limit of pelagic management unit species to a U.S. fishing vessel permitted under the Pelagic FEP through specified fishing agreements to support fisheries development in the U.S. participating territories. Regulations implementing Amendment 7 became effective on October 24, 2014.

Amendment 7 also established criteria that a specified fishing agreement must satisfy, which include among other requirements, that agreements identify those vessels subject to the agreement, and that such vessels land fish in the territory, or deposit funds into the Western Pacific Sustainable Fisheries Fund (WP SFF). Pursuant to Section 204(e)(4) of the Magnuson-Stevens Act, funds deposited into the WP SFF may be used for the implementation of a marine conservation plan (MCP)[2]. See 50 CFR 665.819 for regulations implementing Amendment 7 to the Pelagic FEP.

When operating under a valid specified fishing agreement, federal regulations (50 CFR 665.819) require NMFS to attribute bigeye tuna catches made by vessels identified in the agreement to the territory to which the agreement applies seven days before NMFS projects the U.S. longline bigeye limit is projected to be reached, or upon the effective date of the agreement, whichever is later. Catches of bigeye tuna made by Hawaii longline vessels identified in a specified fishing agreement are attributed to the territory to which the agreement applies and reported to the WCPFC.

By entering into a specified fishing agreement with Hawaii longline vessels, funds are deposited into the WP SFF and made available to support fisheries development projects identified in the, the Guam MCP (82 FR 38876, August 16, 2017), the CNMI MCP (82 FR 37198, August 8, 2017), the Pacific Remote Island Areas MCP (82 FR 37575, August 11, 2017) and the American Samoa MCP (80 FR 18820, April 8, 2015). For more information on the territorial catch and allocation limit process, see Amendment 7 to the Pelagic FEP (WPFMC and NMFS 2014), and implementing federal regulations at 50 CFR 665.819.

From 2014 to 2017, the Council has recommended annual catch longline bigeye catch limit specifications of 2,000 mt for each US Participating Territory and recommended that each territory could allocate up to 1,000 mt of that limit. The Council made these recommendations taking into account WCPFC measures, MSA requirements, other applicable law, and bigeye stock status, which prior to 2017 was assessed to be experiencing overfishing. As previously

[2] MCPs are developed by the Governors of each U.S. participating territory and describe planned marine conservation projects that may include, but are not limited to, development and implementation of sustainable marine resource development projects, fisheries monitoring and enforcement activities, and scientific research.

mentioned, the best scientific information available indicates that bigeye is no longer experiencing overfishing.

The existing regulations at 50 CFR 665.819(a) implementing Amendment 7 require that the Council first establish a catch or effort longline limit for the US participating territories before specifying an allocation limit.[3] However, in recognition of the special requirements under Article 30 of the Convention, the Commission's tropical tuna measure, CMM 2017-01 (see ¶ 5, ¶¶ 39-44, and Table 3) does not require a SID or Participating Territory to have a longline catch limit, even in cases where it enters into a longline charter or other mechanism. Accordingly, Commission decisions do not provide that Participating Territories should be assigned longline catch limits merely to establish an allocation limit.

Given that CMM 2017-01 does not provide longline catch limits for the US Participating Territories and that bigeye is no longer subject to overfishing, the Council may wish to consider recommending allocation limits only and not total catch limits. If recommending allocation limits only, the Council should also consider necessary changes to the regulations found in 50 CFR§665.819.

1.3 Proposed Action

Under CMM 2017-01, longline catches and effort of vessels operating under agreements with SIDS, including U.S. Participating Territories, are attributed to the applicable SID or Territory. However, in recognition of the development needs of SIDS and Territories, the Commission neither restricts the total amount of catch or effort available to them, or the amount that may be allocated under agreements. To help ensure the sustainability of bigeye tuna, this action would specify a total longline catch for each U.S. Territory, and a portion of which may be allocated to eligible vessels operating under agreements with the U.S. Participating Territory.

Specifically, under the proposed action, NMFS would specify a catch limit of 2,000 mt of longline-caught bigeye tuna for each U.S. participating territory in 2018, as recommended by the Council. NMFS would also authorize each U.S. territory to allocate and transfer up to 1,000 mt of its 2,000 mt bigeye tuna limit to a U.S. longline fishing vessel(s) permitted under the Pelagic FEP and identified in a specified fishing agreement applicable to the territory. The criteria a specified fishing agreement must meet, and the process for attributing longline caught bigeye tuna made by vessels of the U.S. participating territories and U.S. vessels identified in an approved specified fishing agreement shall follow the procedures codified in 50 CFR 665.819.

NMFS will monitor catches of longline-caught bigeye tuna by the longline fisheries of each U.S. territory, including catches made by U.S. longline vessels operating under specified fishing agreements. When NMFS projects a territorial catch or allocation limit would be reached, NMFS

[3] Specifically, 50 CFR 665.819(a)(2) states that "If the WCPFC does not agree to a catch or fishing effort limit for a stock of western Pacific pelagic MUS applicable to a U.S. participating territory, the Council may recommend that the Regional Administrator specify such a limit…. The Council may also recommend that the Regional Administrator authorize a U.S. participating territory to allocate a portion of a specified catch or fishing effort limit to a fishing vessel or vessels holding valid permits issued under § 665.801 through a specified fishing agreement."

would, as an accountability measure (AM), prohibit the retention of longline-caught bigeye tuna by vessels in the applicable U.S. territory (if the territorial catch limit is projected to be reached), and/or by vessels operating under specified fishing agreements (if the allocation limit is projected to be reached). Pursuant to federal regulations at 50 CFR 664.819, if NMFS determines catch made by vessel(s) identified in a specified fishing agreement exceeds the allocated limit, NMFS will attribute any overage of the limit back to the U.S. or U.S. participating territory to which the vessel(s) is registered and permitted.

1.4 Purpose and Need for Action

The purpose and need of this action is to establish a bigeye tuna catch and an allocation limit for longline fisheries of each U.S. territory (American Samoa, Guam and the Northern Mariana Islands) that: a) is consistent with the international conservation objectives of the stock, b) prevents bigeye overfishing, 3) supports fisheries development in US territories, and 4) promotes the availability of sustainably caught bigeye from US vessels supplying the Hawaii seafood market during the culturally important end of year season of peak demand. This action is needed to ensure that allocations of longline caught bigeye tuna under specified fishing agreements are managed consistent with the conservation of needs of the stock.

1.5 Decision to be Made

At its 172nd meeting (March 14-16, 2018), the Council recommended the specification of catch and allocation limits for pelagic longline fisheries of American Samoa, Guam and the CNMI for the fishing year 2018. The Council's recommendation has been transmitted to the Regional Administrator (RA) of the NMFS Pacific Islands Regional Office (PIRO) which will also use the information in this EA to make a determination as to whether to approve or disapprove the Council's recommendation. The RA will also utilize this EA to determine whether or not the recommended catch and allocation limits of the proposed action would constitute a major federal action significantly affecting the quality of the environment to warrant the preparation of an environmental impact statement.

1.6 Public Involvement

At its 172nd meeting held March 14-16, 2018, the Council considered and discussed issues relevant to bigeye tuna catch and allocation limits for the U.S. participating territories, including the most recent (2017) bigeye stock assessment, the recommendations of the Council's Scientific and Statistical Committee (SSC) made at the 128th SSC meeting to held March 6-8, 2018, recommendations made by its Advisory Panels, and other relevant information. Council-affiliated meetings are open to the public and publicized in the local media, the *Federal Register* (83 Federal Register 7162), and on the Council's website. See: www.wpcouncil.org for more information.

NMFS is seeking comments on the proposed rule and this draft EA for the proposed action. Readers may find instructions on how to comment on the proposed rule and draft EA by searching on RIN at www.regulations.gov, or by contacting the responsible official or Council at the above addresses. NMFS must receive comments by the deadline specified in the proposed rule to be considered.

2 Description of the Alternatives Considered

This section describes alternatives for longline bigeye tuna catch and allocation limits for American Samoa, Guam and the CNMI for 2018 and the expected fishery outcomes that would occur under each alternative. Table 2 provides a comparison of the features of the Alternatives considered and possible fishery outcomes.

Features Common to all Alternatives

As a result of CMM 2017-01, the US longline bigeye limit for the WCPO is 3,554 mt NMFS will be undertaking a rulemaking process to implement this limit. If the proposed action described herein is approved, bigeye tuna caught by the eligible U.S. longline vessels fishing under a specified fishing agreement with a U.S. territory would not be counted towards the U.S. bigeye tuna limit. Rather, consistent with CMM 2017-01, and in accordance with 50 CFR Part 300, Subpart O, catches of bigeye tuna by these vessels are attributed to the applicable U.S. participating territory under the specified fishing agreement to which the vessel is associated.

Once the prohibition on bigeye tuna retention is in effect, Hawaii longline vessels that target bigeye tuna in the WCPO and who are not operating under a valid specified fishing agreement with a U.S. territory, may begin targeting swordfish or another pelagic species, or shift fishing effort for bigeye tuna into the eastern Pacific Ocean or EPO (generally east of 150° W. long.).

In the EPO, the Inter-American Tropical Tuna Commission (IATTC) has adopted a 2018 bigeye tuna limit applicable to US longline vessels of 750 mt for vessels greater than 24 m (78.7 ft) in length. The limit does not apply to vessels less than 24 m in length. Currently, 32 out of 145 vessels in the Hawaii longline fishery are greater than 24 m. When NMFS projects vessels greater than 24 m will reach the limit, NMFS would prohibit the retention of longline-caught bigeye tuna by vessels greater than 24 m in the EPO for the remainder of the calendar year. However, the remaining 110 vessels less than 24 m would continue to be able to retain longline-caught bigeye tuna in the EPO.

2.1 Alternative 1: No Specification of Territorial Catch or Allocation limits (No Action)

Under Alternative 1, NMFS would not specify a bigeye tuna catch or allocation limit for any U.S. participating territory in 2018.

Expected Fishery Outcome

Under Alternative 1, longline fisheries of American Samoa, Guam, and the CNMI would not be subject to a bigeye tuna catch limit in 2018; they would also not be able to allocate any catch under a specified fishing agreement.

Based on recent fishery performance from 2014-2017, it is anticipated that vessels operating in the longline fisheries of American Samoa would catch approximately 529 mt of bigeye tuna in 2018. This amount represents the combined average annual bigeye tuna caught in 2011-2016 by American Samoa longline permitted vessels fishing within the EEZ around American Samoa

(120 mt) and outside the EEZ in the WCPO (409) (See Table 10). It is not expected that longline vessels in CNMI or Guam to catch bigeye tuna in 2018 because as of today there are currently no active longline vessels based in those islands. High operating costs associated with vessel-docking along with poor market access may be contributing factors to the lack of longline fishing in the Marianas (WPFMC and NMFS 2014). Based on recent historical fishery performance, it is anticipated that vessels operating in the Hawaii longline fishery would catch the entire 2018 U.S. bigeye tuna limit of 3,554 mt prior to the end of the calendar year.

Under Alternative 1, the expected total bigeye tuna catch in the WCPO for longline fisheries managed under the Pelagics FEP for 2018 would be 4,083mt. This represents the combined anticipated catch of bigeye tuna by the U.S. longline fisheries from Hawaii (3,554 mt), American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt) (3,554 + 529 + 0 + 0 = 4,083 mt).

Without any Council-recommended specifications for catch and allocation limits for the U.S. participating territories, specified fishing agreements would not be authorized. The U.S. participating territories could not allocate bigeye tuna catch to eligible U.S. longline vessels permitted under the FEP and no funds would be available for deposit into the Western Pacific Sustainable Fisheries Fund in 2018. As a consequence, there would be less monetary resources available to fund fishery development projects identified in an approved territorial MCP, and fewer opportunities for fisheries development by the U.S. participating territories, including improvements to existing fishery infrastructure. The Hawaii longline fishery would likely catch the 3,554 mt bigeye limit prior to the end of the year and would be forced to fish the remainder of the year in the EPO. Historically, fishing in the EPO in the winter months by Hawaii longline vessels is less efficient and can result in longer trips lengths, higher trip costs, and lower quality fish.

2.2 Alternative 2: Specify for each U.S. participating territory a 2,000-mt bigeye catch limit and 1,000-mt bigeye allocation limit in 2018 (Council recommended)

Under Alternative 2, NMFS would implement the Council's recommendation by specifying a catch limit of 2,000 mt of bigeye tuna for each U.S. participating territory in 2018. NMFS would also authorize the three U.S. territories to each allocate up to 1,000 mt of their 2,000 mt bigeye limit to FEP-permitted longline vessels identified in a specified fishing agreement with a U.S. territory. The alternative is identical to the bigeye tuna catch and allocation limit specifications NMFS implemented in 2014 (79 FR 64097, October 28, 2014), 2015 (80 FR 61767, October 14, 2015; 80 FR 68778, November 6, 2015), 2016 (81 FR 63145, September 14, 2016), and 2017 (82 FR 47644, October 13, 2017).

Expected Fishery Outcome

Under Alternative 2, longline fisheries in the U.S. participating territories would each be subject to a 2,000-mt catch limits for bigeye tuna. This catch limit is currently more restrictive than those agreed to by the WCPFC for SIDS and PTs in CMM 2017-01, which places no limits on SIDS and PTs (see Section 1.1). Under Alternative 2, each U.S. participating territory would also be authorized to allocate up to 1,000 mt of its 2,000 mt bigeye tuna catch limit to FEP-permitted longline vessels under specified fishing agreements. Specified fishing agreements under this

Alternative would support responsible fisheries development in the U.S. participating territories by providing funds for territorial MCPs.

Like Alternative 1, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018 because there are currently no active longline fisheries based in those islands. For American Samoa, bigeye tuna catches by longline vessels possessing an American Samoa limited access permit are expected to be similar to the average annual catch in 2011-2016, which is approximately 529 mt annually. Therefore, limiting the amount of bigeye tuna a U.S. participating territory could allocate to 1,000-mt ensures that a sufficient amount of quota (2,000 mt total) would remain available for American Samoa longline fishery participants.

Based on recent levels of bigeye tuna catch by longline vessels to which the U.S bigeye tuna limit applies, the U.S. longline fleet could reach the 2018 U.S. bigeye tuna limit of 3,554 mt sometime between July and September. Once the prohibition occurs, it is anticipated that territorial governments and/or vessels in the Hawaii longline fishery will seek to negotiate a specified fishing agreement to allocate a portion of a territory's 1,000 mt limit. Because federal regulations prohibit a vessel from being identified in more than one specified fishing agreement at a time, it is anticipated U.S. longline permitted vessels from Hawaii would enter into specified fishing agreements sequentially, with one or more U.S. territories.

When operating under a valid specified fishing agreement, federal regulations at 50 CFR § 665.819 require NMFS to attribute bigeye tuna catches made by vessels identified in the agreement to the territory to which the agreement applies seven days before the U.S. limit is projected to be reached, or upon effective date of the agreement, whichever is later. Catches of bigeye tuna made by longline vessels identified in a specified fishing agreement are not counted toward the U.S. bigeye tuna limit because the vessels are fishing under the territory's established limit.

This EA evaluates the range of impacts to the WCPO bigeye tuna stock and other fishery resources based on the Council's recommendation that one, two or three specified fishing agreements could potentially be authorized. Thus, under Alternative 2, there are four distinct possible fishery outcomes.

Potential Outcome A: One Specified Fishing Agreement

Under Outcome A, it is anticipated that a single specified fishing agreement. Like Alternative 1, vessels operating in the longline fisheries of American Samoa are expected to catch around 529 mt of bigeye tuna in 2018. This is the average level of catch for the period 2011-2016. As previously discussed, no bigeye tuna is expected to be caught by longline vessels in CNMI or Guam in 2018. Vessels operating in the Hawaii longline fishery are expected to catch 3,554 mt of bigeye tuna in 2018. With one specified fishing agreement, the expected bigeye tuna catch for 2018 under Outcome A would be 5,083 mt. This amount represents the combined anticipated catch of bigeye tuna by the longline fisheries of the U.S. territories of American Samoa (529 mt), Guam (0 mt), CMMI (0 mt) and by the U.S. longline fisheries from Hawaii (3,554), plus an allocation of 1,000 mt under one specified fishing agreement.

Potential Outcome B: Two Specified Fishing Agreements

Under Outcome B, it is anticipated that two specified fishing agreements. Like Alternative 1, vessels operating in the longline fisheries of American Samoa are expected to catch 529 mt of bigeye tuna in 2018. This is the average level of catch for the period 2011-2016. As previously discussed, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018. Vessels operating in the Hawaii longline fishery are also expected to catch 3,554 mt of bigeye tuna in 2018. With two specific agreements in effect, a total of 6,083 mt would be anticipated to be caught. This amount represents the combined anticipated catch of bigeye tuna by the longline fisheries of the U.S. territories of American Samoa (529 mt), Guam (0 mt), CMMI (0 mt) and by the U.S. longline fisheries from Hawaii (3,554), plus an allocation of 2,000 mt under two specified fishing agreements.

Potential Outcome C: Three Specified Fishing Agreements and Partial Utilization of Territorial Limits

Under Outcome C, it is anticipated that three specified fishing agreements would be in effect. Like Alternative 1, vessels operating in the longline fisheries of American Samoa are expected to catch an average of 529 mt of bigeye tuna in 2018. As previously discussed, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018. Vessels operating in the Hawaii longline fishery are also expected to catch 3,554 mt of bigeye tuna in 2018. Under Outcome C, a total of 7,083 mt of bigeye would be anticipated to be caught. This amount represents the combined anticipated catch of bigeye tuna by the longline fisheries of the U.S. territories of American Samoa (529 mt), Guam (0 mt), CMMI (0 mt) and by the U.S. longline fisheries from Hawaii (3,554), plus an allocation of 3,000 mt under three specified fishing agreements.

Potential Outcome D: Three Specified Fishing Agreements and Full Utilization of Territorial Limits

Under Outcome D, anticipates three specified fishing agreements and full utilization of all three territory's bigeye tuna catch limit is anticipated. That is, Outcome D assumes that all three U.S. territories - American Samoa, Guam and CNMI - would each catch 1,000 mt of bigeye tuna (3,000 mt) in 2018, and each territory would also allocate their 1,000 mt of bigeye tuna under three specified fishing agreements (3,000 mt), for a total of 6,000 mt. Outcome D also assumes the Hawaii longline fishery would catch 3,554 mt in 2018, for a total of 9,554 mt under this scenario. This scenario is not anticipated to occur in the foreseeable future due to lack of longline vessels operating out of Guam and CNMI in recent years.

Under Outcomes A through D, it is not expected that the longline fisheries based in Hawaii and the U.S. participating territories would change the manner in which they fish, including gear types used, species targeted, area fished, seasons fished, or intensity of fishing. Additionally, the effort of these fisheries is not expected to be higher than historical levels due to existing regulatory constraints, including catch limits and limited entry programs.

2.3 Alternative 3: Specify for each U.S. participating territory, a 2,000-mt catch limit and that each territory can allocate up to 2,000-mt of the catch limit; and

Under Alternative 2, NMFS would implement the Council's recommendation by specifying a catch limit of 2,000 mt of bigeye tuna for each U.S. participating territory in 2018. NMFS would also authorize the three U.S. territories to each allocate up to 2,000 mt of their 2,000 mt bigeye limit to FEP-permitted longline vessels identified in a specified fishing agreement with a U.S. territory.

Expected Fishery Outcome

Under Alternative 3, the U.S. participating territories would subject to a total longline bigeye limit (2,000 mt), and would be limited in the amount of catch that could be allocated under specified fishing agreements (up to 2,000 mt per territory). Like Alternative 1, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018 because there are currently no active longline fisheries based in those islands. For American Samoa, bigeye tuna catches by longline vessels possessing an American Samoa limited access permit are expected to be similar to the average annual catch in 2011-2016, which is approximately 529 mt annually. For American Samoa only, there would be a concern on how much bigeye tuna American Samoa could allocate so as to ensure that a sufficient amount of quota would remain available for American Samoa longline fishery participants; however, this could be alleviated through monitoring and forecasting of fleet catches and the process by which the Council reviews specified fishing agreements prior to authorization.

Based on recent levels of bigeye tuna catch by longline vessels to which the U.S bigeye tuna limit applies, the U.S. longline fleet could reach the 2018 U.S. bigeye tuna limit of 3,554 mt sometime between July and September. Once the prohibition occurs, it is expected that territorial governments and/or vessels in the Hawaii longline fishery will seek to negotiate a specified fishing agreement to allocate a portion of a territory's allocation limit. Because federal regulations prohibit a vessel from being identified in more than one specified fishing agreement at a time, it is anticipated that U.S. longline permitted vessels from Hawaii would enter into specified fishing agreements sequentially, with one or more U.S. territories.

When operating under a valid specified fishing agreement, federal regulations at 50 CFR § 665.819 require NMFS to attribute bigeye tuna catches made by vessels identified in the agreement to the territory to which the agreement applies seven days before the U.S. limit is projected to be reached, or upon effective date of the agreement, whichever is later. Catches of bigeye tuna made by longline vessels identified in a specified fishing agreement are not counted toward the U.S. bigeye tuna limit because the vessels are fishing under the territory's established limit.

There are close similarities regarding potential impacts from this Alternative and Alternative 4 below, and for brevity, they are not repeated here. Refer to the description below for Alternative 4 and in Chapter 4 for a analysis on the potential amount of bigeye that could be caught and allocated of up to 2,000 mt per Territory under this Alternative.

2.4 Alternative 4: No total longline catch bigeye limit per U.S. participating territory, but a limit on the amount of bigeye each territory can allocate under annual specified fishing agreements

Under this alternative, total longline bigeye catch limits per U.S. participating territory would not be established, but limits on the amount of bigeye each territory can allocate under annual specified fishing agreements would be specified. The following three sub-alternatives are proposed:

a. 1,000 mt allocation limit per territory
b. 1,500 mt allocation limit per territory
c. 2,000 mt allocation limit per territory

Regulations implementing Amendment 7 (50 CFR 665.819) provide that if the Council recommends an allocation limit, it must also recommend a Territory catch limit. Accordingly, Alternative 4 cannot be selected under current regulations. However, CMM 2017-01 does not place limits on the amount of bigeye each Participating Territory or SID may catch (see Section 1.1), just as it does not place limits on the amount of bigeye each SID or PT may allocate to vessels flagged to another State under charter agreements or other mechanisms. Alternative 4 also represents a more realistic picture of what the Territory fisheries can actually achieve in a fishing year, since none has demonstrated the capacity to fish the longline catch limit assigned. Therefore, Alternative 4 is more consistent with how the Commission treats PTs and SIDs, while maintaining allocation limits to ensure sustainability of affected stocks.

Expected Fishery Outcome

Under Alternative 4, the U.S. participating territories would not be subject to a total longline bigeye limit, but would limited in the amount of catch that could be allocated under specified fishing agreements. Like Alternative 1, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018 because there are currently no active longline fisheries based in those islands. For American Samoa, bigeye tuna catches by longline vessels possessing an American Samoa limited access permit are expected to be similar to the average annual catch in 2011-2016, which is approximately 529 mt annually. Therefore, without a total longline bigeye catch limit, there would not be a concern on how much bigeye tuna American Samoa could allocate would so as to ensure that a sufficient amount of quota would remain available for American Samoa longline fishery participants.

Based on recent levels of bigeye tuna catch by longline vessels to which the U.S bigeye tuna limit applies, the U.S. longline fleet could reach the 2018 U.S. bigeye tuna limit of 3,554 mt sometime between July and September. Once the prohibition occurs, it is expected that territorial governments and/or vessels in the Hawaii longline fishery will seek to negotiate a specified fishing agreement to allocate a portion of a territory's allocation limit. Because federal regulations prohibit a vessel from being identified in more than one specified fishing agreement at a time, it is anticipated that U.S. longline permitted vessels from Hawaii would enter into specified fishing agreements sequentially, with one or more U.S. territories.

When operating under a valid specified fishing agreement, federal regulations at 50 CFR § 665.819 require NMFS to attribute bigeye tuna catches made by vessels identified in the agreement to the territory to which the agreement applies seven days before the U.S. limit is projected to be reached, or upon effective date of the agreement, whichever is later. Catches of bigeye tuna made by longline vessels identified in a specified fishing agreement are not counted toward the U.S. bigeye tuna limit because the vessels are fishing under the territory's established limit.

This EA evaluates the range of impacts to the WCPO bigeye tuna stock and other fishery resources based on the Council's recommendation that one, two or three specified fishing agreements could potentially be authorized. Thus, under Alternative 4, there are 9 possible fishery outcomes.

Potential Outcomes E, F, and G

If each U.S. participating territory is provided an annual 1,000 mt allocation limit, there could be 1 to 3 specified fishing agreements authorized in 2018. The anticipated amount of catch would be the US limit of 3,554 mt, plus the American Samoa average catch of 529 mt, plus the 1,000 mt to 3,000 mt of bigeye subject to 1 to 3 specified fishing agreements. The anticipated amount of bigeye catch would be: Potential Outcome E (5,083 mt), Outcome F (6,083 mt) and Outcome G (7,083 mt). These amounts are the same amounts anticipated for Outcomes A-C of Alternative 1.

Potential Outcomes H, I, and J

If each U.S. participating territory is provided an annual 1,500 mt allocation limit, there could be 1 to 3 specified fishing agreements authorized in 2018. The anticipated amount of catch would be the US limit of 3,554 mt, plus the American Samoa average catch of 529 mt, plus the 1,500 mt to 4,500 mt of bigeye subject to 1 to 3 specified fishing agreements. The anticipated amount of bigeye catch would be: Potential Outcome H (5,174 mt), Outcome I (6,674 mt) and Outcome J (8,583 mt).

Potential Outcomes K, L, and M

If each U.S. participating territory is provided an annual 2,000 mt allocation limit, there could be 1 to 3 specified fishing agreements authorized in 2018. The anticipated amount of catch would be the US limit of 3,554 mt, plus the American Samoa average catch of 529 mt, plus the 2,000 mt to 6,500 mt of bigeye subject to 1 to 3 specified fishing agreements. The anticipated amount of bigeye catch would be: Potential Outcome K (6,083 mt), Outcome L (8,083 mt) and Outcome M (10,083 mt).

Table 2: Comparison of the features of the alternatives.

Topic	Alternative 1: No Action *No catch and allocation limits for U.S. territories, and no fishing agreements*	Alternative 2: 2,000 mt Catch Limit and 1,000 mt Allocation Limit for each U.S. Territory			
		Outcome A *1 fishing agreement and 1,000 mt allocation*	***Outcome B*** *2 fishing agreements and 2,000 mt allocation*	***Outcome C*** *3 fishing agreements and 3,000 mt allocation and partial utilization of BET limit in U.S. territories*	***Outcome D*** *3 fishing agreements and 3,000 mt allocation and full utilization of BET limit in U.S. territories*
Proposed longline-caught bigeye tuna (BET) catch limit for each U.S. participating territory in 2018:	2018: None	2018: 2,000 mt	2018: 2,000 mt	2018: 2,000 mt	2018: 2,000 mt
Proposed BET limit each U.S. participating territory may allocate to Pelagic FEP permitted longline vessels in and 2018:	2018: None	2018: 1,000 mt	2018: 1,000 mt	2018: 1,000 mt	2018: 1,000 mt
Proposed AMs to ensure the proposed longline BET catch and allocation limits are not exceeded in 2018:	2018: None	2018: If the territorial longline BET catch limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels in the applicable U.S. territory; if the longline BET allocation limit is	Same as in Outcome A	Same as in Outcome A	Same as in Outcome A

Topic	Alternative 1: No Action *No catch and allocation limits for U.S. territories, and no fishing agreements*	Alternative 2: 2,000 mt Catch Limit and 1,000 mt Allocation Limit for each U.S. Territory			
		Outcome A *1 fishing agreement and 1,000 mt allocation*	***Outcome B*** *2 fishing agreements and 2,000 mt allocation*	***Outcome C*** *3 fishing agreements and 3,000 mt allocation and partial utilization of BET limit in U.S. territories*	***Outcome D*** *3 fishing agreements and 3,000 mt allocation and full utilization of BET limit in U.S. territories*
		projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels operating under specified fishing agreements.			
Expected Fishery Outcomes					
Expected amount of BET caught by U.S. (Hawaii) longline vessels in 2018:	2018: 3,554mt	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt
Expected number of specified fishing agreements	2018: None	2018: 1	2018: 2	2018: 3	2018: 3
Expected amount of longline-caught BET that would be allocated to the Hawaii longline fishery under specified fishing agreements	2018: None	2018: 1,000 mt	2018: 2,000 mt	2018: 3,000 mt	2018: 3,000 mt

Topic	Alternative 1: No Action *No catch and allocation limits for U.S. territories, and no fishing agreements*	Alternative 2: 2,000 mt Catch Limit and 1,000 mt Allocation Limit for each U.S. Territory			
		Outcome A *1 fishing agreement and 1,000 mt allocation*	***Outcome B*** *2 fishing agreements and 2,000 mt allocation*	***Outcome C*** *3 fishing agreements and 3,000 mt allocation and partial utilization of BET limit in U.S. territories*	***Outcome D*** *3 fishing agreements and 3,000 mt allocation and full utilization of BET limit in U.S. territories*
Expected amount of BET caught by longline vessels in the three U.S. participating territories in 2018	2018: 529 mt	2018: 529 mt	2018: 529 mt	2018: 529 mt	2018: 3,000
Expected amount of BET caught by Hawaii and U.S. territory longline vessels combined in 2018	2018: 3,963 mt	2018: 4,963 mt	2018: 5,963 mt	2018: 6,963 mt	2018: 9,554 mt
		Alternative 3: 2,000 mt Catch Limit and up to 2,000 mt Allocation Limit for each U.S. Territory			
Expected amount of BET caught by Hawaii and U.S. territory longline vessels combined in 2018		See potential outcomes E-M below for information on the amount of catch that could be assigned under this alternative for each Territory. If each Territory caught and/or assigned up to its 2,000 mt limit, the expected amount of bigeye catch in 2018 would 9,554 mt.			

Topic	Alternative 1: No Action *No catch and allocation limits for U.S. territories, and no fishing agreements*	Alternative 4(a): No Total Catch Limit, but allocation limit of 1,000 mt per U.S. PT		
		Outcome E ***1 fishing agreement and 1,000 mt allocation***	***Outcome F*** ***2 fishing agreements and 2,000 mt allocation***	***Outcome G*** ***2 fishing agreements and 3,000 mt allocation***
Proposed longline-caught bigeye tuna (BET) catch limit for each U.S. PT in 2017 and 2018:	2018: None	2018: No total catch limit	2018: No total catch limit	2018: No total catch limit
Proposed BET limit each U.S. PT may allocate to Pelagic FEP permitted longline vessels in 2017 and 2018:	2018: None	2018: 1,000 mt	2018: 1,000 mt	2018: 1,000 mt
Proposed AMs to ensure the proposed longline BET catch and allocation limits are not exceeded in 2018:	2018: None	2018: If the territorial longline BET catch limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels in the applicable U.S. territory; if the longline BET allocation limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels operating under specified fishing agreements.		
Expected Fishery Outcomes				
Expected amount of BET caught by U.S. (Hawaii) longline	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt

vessels in 2018:				
Expected number of specified fishing agreements	2018: None	2018: 1	2018: 2	2018: 3
Expected amount of longline-caught BET that would be allocated to the Hawaii longline fishery under specified fishing agreements	2018: None	2018: 1,000	2018: 2,000	2018: 3,000
Expected amount of BET caught by longline vessels in the three U.S. participating territories in 2018	2018: 529 mt	2018: 529 mt	2018: 529 mt	2018: 529 mt
Expected amount of BET caught by Hawaii and U.S. territory longline vessels combined in 2018	2018: 3,963 mt	2018: 5,083	2018: 6,083	2018: 7,083
Topic	**Alternative 1:** **No Action** ***No catch and allocation limits for U.S. territories, and no fishing agreements***	**Alternative 4(b): No Total Catch Limit, but allocation limit of 1,500 mt per U.S. PT**		
		Outcome H ***1 fishing agreement and 1,500 mt allocation***	***Outcome I*** ***2 fishing agreement and 3,000 mt allocation***	***Outcome J*** ***3 fishing agreement and 4,500 mt allocation***
Proposed longline-			2018: No total catch limit	2018: No total catch limit

caught bigeye tuna (BET) catch limit for each U.S. PT in 2017 and 2018:	2018: None	2018: No total catch limit		
Proposed BET limit each U.S. PT may allocate to Pelagic FEP permitted longline vessels 2018:	2018: None	2018: 1,500 mt	2018: 1,500 mt	2018: 1,500 mt
Proposed AMs to ensure the proposed longline BET catch and allocation limits are not exceeded in 2018:	2018: None	2018: If the territorial longline BET catch limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels in the applicable U.S. territory; if the longline BET allocation limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels operating under specified fishing agreements.		
Expected Fishery Outcomes				
Expected amount of BET caught by U.S. (Hawaii) longline vessels in 2018:	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt
Expected number of specified fishing agreements	2018: None	2018: 1	2018: 2	2018: 3
Expected amount of longline-caught BET that would be allocated to the Hawaii longline fishery under specified fishing agreements	2018: None	2018: 1,500 mt	2018: 3,000 mt	2018: 4,500 mt
Expected amount of BET caught by longline vessels in the three U.S.	2018: 529 mt	2018: 529 mt	2018: 529 mt	2018: 529 mt

participating territories in 2018				
Expected amount of BET caught by Hawaii and U.S. territory longline vessels combined in 2018	2018: 3,963 mt	2018: 5,174 mt	2018: 6,674 mt	2018: 8,583 mt
Topic	**Alternative 1:** **No Action** ***No catch and allocation limits for U.S. territories, and no fishing agreements***	**Alternative 4(c): No Total Catch Limit, but allocation limit of 2,000 mt per U.S. PT**		
		Outcome K ***1 fishing agreement and 2,000 mt allocation***	***Outcome L*** ***2 fishing agreements and 2,000 mt allocation***	***Outcome M*** ***3 fishing agreements and 6,000 mt allocation***
Proposed longline-caught bigeye tuna (BET) catch limit for each U.S. PT in 2017 and 2018:	2018: None	2018: No total catch limit	2018: No total catch limit	2018: No total catch limit
Proposed BET limit each U.S. PT may allocate to Pelagic FEP permitted longline vessels in 2017 and 2018:	2018: None	2018: 2,000 mt	2018: 2,000 mt	2018: 2,000 mt
Proposed AMs to ensure the proposed longline BET catch and allocation limits are not exceeded in 2018:	2018: None	2018: If the territorial longline BET catch limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels in the applicable U.S. territory; if the longline BET allocation limit is projected to be reached, NMFS would prohibit the retention of longline-caught BET by vessels operating under specified fishing agreements.		
Expected Fishery Outcomes				

Expected amount of BET caught by U.S. (Hawaii) longline vessels in 2018:	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt	2018: 3,554 mt
Expected number of specified fishing agreements	2018: None	2018: 1	2018: 2	2018: 3
Expected amount of longline-caught BET that would be allocated to the Hawaii longline fishery under specified fishing agreements	2018: None	2018: 2,000 mt	2018: 4,000 mt	2018: 6,000 mt
Expected amount of BET caught by longline vessels in the three U.S. participating territories in 2018	2018: 529 mt	2018: 529 mt	2018: 529 mt	2018: 529 mt
Expected amount of BET caught by Hawaii and U.S. territory longline vessels combined in 2018	2018: 3,963 mt	2018: 6,083 mt	2018: 8,083 mt	2018: 10,083 mt

3 Description of the Affected Environment

3.1 Target and Non-Target Stocks

This section identifies the pelagic management unit species (PMUS) managed under the Pelagic FEP that are harvested in longline fisheries of American Samoa, Guam, the CNMI and Hawaii. They include several species of tuna, billfish and sharks shown in Table 3. This section also briefly summarizes the overfishing and overfished status of PMUS where known. For a comprehensive discussion of the biology and life history of PMUS, see the Pelagic FEP (WPFMC 2009).

The Pelagic FEP (WPFMC 2009) includes criteria for overfishing and overfished status determinations. Overfishing occurs when the fishing mortality rate (F) for one or more years is greater than the maximum fishing mortality threshold (MFMT), which is the fishing mortality rate that produces MSY (F_{MSY}). Thus, if the F/F_{MSY} ratio is greater than 1.0, overfishing is occurring.

A stock is considered overfished when its biomass (B) has declined below the minimum stock size threshold (MSST), the level, which jeopardizes the capacity of the stock to produce MSY on a continuing basis (B_{MSY}). Specifically, the $B_{MSST} = (1\text{-}M)B_{MSY}$, where M is the natural mortality rate of the stock, or one half of B_{MSY}, whichever is greater. For example, if the natural mortality rate of a stock is 0.35, $B_{MSST} = 0.65*B_{MSY}$. Thus, if the B/B_{MSY} ratio falls below 0.65, the stock is overfished. If a stock has a natural mortality rate of 0.6, MSST is set at the default of $0.5*B_{MSY}$ (because 1- 0.6 = 0.4, and 0.5 is greater than 0.4). For such a stock, the stock is overfished when the B/B_{MSY} ratio falls below 0.5.

Table 3. Stock status of PMUS under the Pelagic FEP.

Species	Stock	Overfishing?	Overfished?
Bigeye tuna (*Thunnus obesus)*	Western Central Pacific	No	No
	Eastern Pacific	No	No
Yellowfin tuna (*Thunnus albacares)*	Western Central Pacific	No	No
	Eastern Pacific	No	No
Skipjack tuna (*Katsuwonus pelamis*)	Western Central Pacific	No	No
Albacore (*Thunnus alalunga)*	North Pacific	No	No
	South Pacific	No	No
Pacific bluefin tuna (*Thunnus orientalis*)	Pacific	Yes	Yes
Swordfish *(Xiphias gladius)*	Western Central North Pacific	No	No
	Eastern Pacific	Yes	No
Striped marlin (*Kajikia audax*)	Western Central North Pacific	Yes	Yes
Blue marlin (*Makaira nigricans*)	Pacific	No	No
Blue shark (*Prionace glauca*)	North Pacific	No	No
Oceanic whitetip shark	Western and Central	Yes	Yes

Species	Stock	Overfishing?	Overfished?
(*Carcharhinus longimanus*)	Pacific		
Shortfin mako shark (*Isurus oxyrinchus*)	North Pacific	Unknown	Unknown
Longfin mako shark (*Isurus paucus*)	North Pacific	Unknown	Unknown
Silky shark (*Carcharhinus falciformis*)	Western and Central Pacific	Yes	Yes
Common thresher shark (*Alopias vulpinus*)	North Pacific	Unknown	Unknown
Bigeye thresher shark (*Alopias superciliosus*)	North Pacific	Unknown	Unknown
Pelagic thresher shark (*Alopias pelagicus*)	North Pacific	Unknown	Unknown
Salmon shark *(Lamna ditropsis*)	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
Black Marlin (*Istiopax indica*)	Pacific	Unknown	Unknown
Shortbill spearfish (*Tetrapturus anustirostris*)	Pacific	Unknown	Unknown
Sailfish (*Istiophorus platypterus*)	Pacific	Unknown	Unknown
Kawakawa (*Euthynnus affinis*)	Pacific	Unknown	Unknown
Oilfish (family Gympylidae)	Pacific	Unknown	Unknown
Squid	Pacific	Unknown	Unknown

Source: http://www.nmfs.noaa.gov/sfa/fisheries_eco/status_of_fisheries/status_updates.html; accessed 5/09/2017.

3.1.1 Bigeye Tuna

Bigeye tuna is considered a Pacific-wide stock, but is assessed separately in the WCPO and EPO. Bigeye tuna in the EPO was assessed in 2017 and was found to not be experiencing overfishing or in an overfished condition (Aires-de-Silva et al. 2017).

The most recent stock assessment for WCPO bigeye tuna was completed in July 2017 and covers bigeye tuna from Indonesia in the far western Pacific, to the 150° W in the central Pacific Ocean (McKechnie, et al., 2017). The 2017 assessment updates the previous stock assessment prepared by the SPC in 2014 by incorporating additional bigeye catch data from 2013-2015, and investigating alternative regional bigeye tuna stock structure in combination with new bigeye tuna growth curve, which suggests bigeye tuna is more productive than previously assumed. Unlike the 2014 stock assessment, which identified four models that most plausibly reflected the condition of the stock, the 2017 stock assessment identifies 72 plausible models called "structural uncertainty grids."

The 2017 bigeye stock assessment was reviewed at the Thirteenth Regular Session of the WCPFC Scientific Committee (SC). The SC endorsed the 2017 WCPO bigeye tuna stock assessment as the most advanced and comprehensive assessment yet conducted for this species.

The SC also endorsed the use of the assessment model uncertainty grid to characterize stock status and management advice and implications but noted the large variance in the assessment results, mainly due to the inclusion of the old and new regional structures and growth curves, for which some CCMs considered further investigation is necessary. The SC agreed to a weighting scheme for the assessment models in the uncertainty grid, which were increased to 144 model units. The consensus weighting considered all options within the four axes of uncertainty for steepness, tagging dispersion, size frequency and regional structure to be equally likely. For the growth axis of uncertainty, the new growth curve models (n=36 models, weight=3, 108 model weight units) were weighted three times more than the old growth curve models (n=36 models, weight=1, 36 model weight units). In total there were 144 model weight units. The resulting uncertainty grid was used to characterize stock status, to summarize reference points as provided in the assessment document SC13-SA-WP-05, and to calculate the probability of breaching the adopted spawning biomass limit reference point ($0.2*SB_{F=0}$) and the probability of F_{recent} being greater than F_{MSY}. The SC noted that the results would vary depending on the choice and/or weighting of grids, in particular the growth curve model, thus those characterizations of central tendency of stock status need to be interpreted with caution.

Based on the uncertainty grid adopted by SC13, the WCPO bigeye tuna spawning biomass is likely above the biomass LRP and recent F is likely below F_{MSY}, and therefore noting the level of uncertainties in the current assessment it appears that the stock is not experiencing overfishing (77% probability) and it appears that the stock is not in an overfished condition (84% probability). The central tendency of relative recent spawning biomass under the selected new and old growth curve model weightings was median ($SB_{recent}/SB_{F=0}$) = 0.32 with a range of 0.08 to 0.44 (Table 4). There was a roughly 16% probability (23 out of 144 model weight units) that the recent spawning biomass had breached the adopted LRP.

The central tendency of relative recent fishing mortality under the selected new and old growth curve model weightings was median(F_{recent}/F_{MSY}) = 0.83 with a range of 0.54 to 1.76 (Table 4). There was a roughly 23% probability (33 out of 144 model weight units) that the recent fishing mortality was above FMSY.

Table 4: Summary of reference points using WCPFC SC structural uncertainty grid

	Mean	Median	Min	10%	90%	Max
C_{latest}	149,178	153,137	130,903	131,597	156,113	157,725
MSY	156,765	158,040	124,120	137,644	180,656	204,040
$Y_{Frecent}$	150,382	148,920	118,000	133,400	168,656	187,240
F_{mult}	1.21	1.20	0.57	0.76	1.63	1.85
F_{MSY}	0.05	0.05	0.04	0.04	0.05	0.06
F_{recent}/F_{MSY}	0.89	0.83	0.54	0.61	1.32	1.76
SB_{MSY}	457,162	454,100	219,500	285,530	598,210	710,000
SB_0	1,730,410	1,763,000	1,009,000	1,279,300	2,148,200	2,509,000
SB_{MSY}/SB_0	0.26	0.26	0.22	0.24	0.29	0.29
$SB_{F=0}$	1,915,184	1,953,841	1,317,336	1,584,593	2,170,899	2,460,411
$SB_{MSY}/SB_{F=0}$	0.24	0.24	0.17	0.18	0.27	0.29
SB_{latest}/SB_0	0.37	0.40	0.11	0.19	0.49	0.53
$SB_{latest}/SB_{F=0}$	0.34	0.37	0.08	0.15	0.46	0.49
SB_{latest}/SB_{MSY}	1.42	1.45	0.42	0.86	1.97	2.12
$SB_{recent}/SB_{F=0}$	0.30	0.32	0.08	0.15	0.41	0.44
SB_{recent}/SB_{MSY}	1.21	1.23	0.32	0.63	1.66	1.86

The SC determined that although the new assessment is a significant improvement in relation to the previous one, the SC advised that the amount of uncertainty in the stock status results for the 2017 assessment is higher than for the previous assessment due to the inclusion of new information on bigeye tuna growth and regional structures. The SC also noted continued higher levels of depletion in the equatorial and western Pacific (specifically Regions 3, 4, 7 and 8 of the stock assessment) and the associated higher levels of impact, especially on juvenile bigeye tuna, in these regions due to the associated purse-seine fisheries and the 'other' fisheries within the western Pacific. 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).

The majority of fishing effort by the U.S. longline fishery operating out of Hawaii occurs north of 20° N in Region 2 (Figure 1). Moreover, 98% of bigeye tuna caught by this fishery occurs north of 10° N, which area is above the core equatorial zone of the heaviest purse seine and longline fishing (NMFS unpublished data).

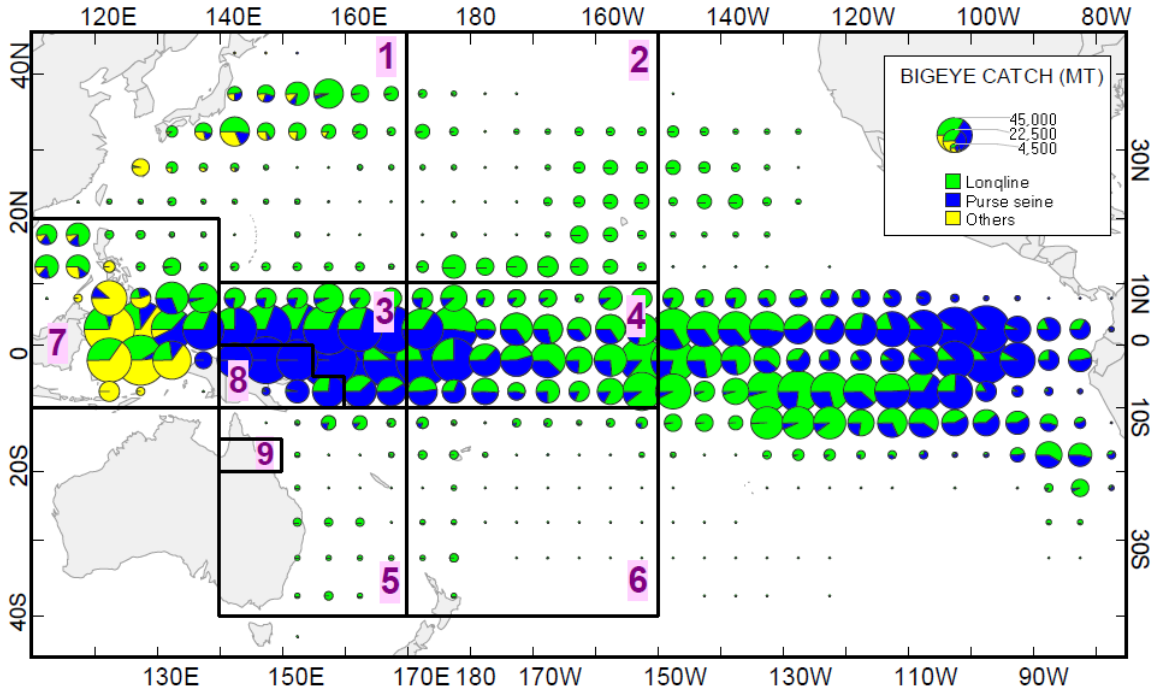

Figure 1. Distribution of cumulative bigeye tuna catch from 1990-2016 by 5-degree squares of latitude and longitude and by fishing gear in the nine sub-regions.
Figure 1 shows the sub-regional spatial stratification used in stock assessment for the Western and Central Pacific Convention Area (WCP–CA). The Hawaii deep-set longline fishery fishes predominately in Region 2.
Source: Williams et al. 2017.

3.1.2 Yellowfin Tuna

The most recent stock assessment for yellow tuna in the WCPO was conducted by Tremblay-Boyer et al. (2017). Yellowfin is not believed to be subject to overfishing or overfished. Similar to what was done for bigeye, the SC endorsed a weighted assessment model uncertainty grid to characterize stock status. SC13 noted that the central tendency of relative recent spawning biomass was median (SBrecent/SBF=0) = 0.33 with a probable range of 0.20 to 0.41 (80% probable range), and that there was a roughly 8% probability (4 out of 48 models) that the recent spawning biomass had breached the WCPFC LRP. The central tendency of relative recent fishing mortality was median (Frecent/FMSY) = 0.74 with an 80% probability interval of 0.62 to 0.97, and there was a roughly 4% probability (2 out of 48 models) that the recent fishing mortality was above F_{MSY}. In 2016, total yellowfin tuna landings by the longline fisheries in Hawaii, American Samoa, Guam and the CNMI was 1,522 mt (Table 10) or less than 1 percent of the estimated MSY. Of the 1,522 mt, the longline fleet based in Hawaii accounted for 1,098 mt with the remainder landed by the American Samoa longline fishery.

3.1.3 Skipjack Tuna

The most recent assessment of skipjack tuna in the WCPO was conducted in 2016 (McKechnie et al. 2016) using data up to 2015. The median estimates of current fishing mortality to fishing mortality at MSY ($F_{2011}/F_{MSY)}$ =0.48 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_{2011}/SB_{MSY}) = 2.15. Fishing pressure and recruitment variability (which is influenced by environmental conditions) will continue to be the primary influences on stock size and fishery performance. McKenchnie et al. (2016) estimate MSY at 1,875,600 mt. In 2016, total skipjack tuna landings by the longline fisheries in Hawaii, American Samoa, Guam and the CNMI was 259 mt (Table 10), or less than 1 percent of the estimated MSY. Of the 259 mt, the Hawaii longline fishery accounted for 176 mt with the remainder landed by the American Samoa longline fishery.

3.1.4 North Pacific Albacore

The ISC in 2017 completed most recent stock assessment of North Pacific albacore, which uses data through 2015 (ISC 2017). The assessment indicates that: a) the stock is likely not overfished relative to the limit reference point adopted by the WCPFC (20%SSBcurrent, F=0), and b) no F-based reference points have been adopted to evaluate overfishing, but stock status was evaluated against seven potential reference points and current fishing intensity (F2012-2014) is below six of the seven reference points except for F50%. In 2016, total albacore tuna landings in the North Pacific by the longline fisheries in Hawaii, American Samoa, Guam and the CNMI was 244 mt (Table 10), or less than 1 percent of the estimated MSY. Nearly all of the landings were made by the Hawaii longline fishery.

3.1.5 South Pacific Albacore

The most recent stock assessment of South Pacific albacore was conducted by Harley et al. (2015) using data up through 2014. Results indicate the stock is not subject to overfishing as $F/F_{MSY} = 0.39$ and the stock is not overfished. The stock assessment suggests that increases in fishing mortality will likely to lead to small increases in catch, but reduce size classes available to longline fisheries with associated impacts on vessel profitability. The 2015 stock assessment estimated MSY at 77,046 mt. In 2016, total South Pacific albacore tuna landings by the longline fisheries in Hawaii, American Samoa, Guam and the CNMI was 1,558 mt (Table 10), or less than 1 percent of the estimated MSY. All of the landings were made by the American Samoa longline fishery.

3.1.6 North Pacific Bluefin Tuna

Pacific bluefin tuna is considered a single North Pacific-wide stock. In 2016, the ISC completed their assessment of the status of Pacific bluefin tuna using data through 2014, and concluded that the stock is still experiencing overfishing and is overfished (ISC 2016). The ISC assessment estimated the current SB is around 2.4 percent of the unfished SB. Current SB is far below that associated with MSY and is near historic low levels.

The U.S. longline fleet rarely catches Pacific bluefin tuna (NMFS PIFSC 2016 U.S. Part 1 annual report to the WCPFC). In 2016, total North Pacific bluefin tuna landings by all U.S. longline fisheries was 1 mt (Table 10). Thus, overfishing of the stock is due to excessive international fishing pressure and the IATTC and WCPFC have inadequate measures in place to address the issue. Nonetheless, NMFS continues to work with the Pacific and Western Pacific Councils and the State Department to ensure that effective management measures be adopted by the WCPFC and IATTC to end overfishing and rebuild the stock.

3.1.7 North Pacific Swordfish

In 2014, the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) completed a stock assessment for North Pacific swordfish using data through 2012 (ISC 2014c). Based on the best scientific information available, the swordfish population in the North Pacific is comprised of two stocks, separated by a roughly diagonal boundary extending from Baja California, Mexico, to the Equator. These are the Western Central North Pacific Ocean (WCNPO) stock, distributed in the western and central Pacific Ocean, and the EPO stock, distributed in the eastern Pacific Ocean.

WCNPO stock

The results of the 2014 assessment support the conclusion that the WCNPO stock is not subject to overfishing because $F_{2012}/F_{MSY} = 0.58$, and is not overfished because $B_{2012}/B_{MSY} = 1.20$. The 2014 stock assessment estimated MSY for the WCNPO stock at 14,920 mt. In 2016, total landings of WCNPO swordfish by all U.S. longline fisheries was 638 mt (Table 10), or

approximately 4 percent of the estimated MSY. Nearly all of the landings were made by the Hawaii longline fishery.

EPO stock

The results of the 2014 assessment support a conclusion that the EPO stock is now subject to overfishing because F_{2012}/F_{MSY} = 1.11, but is not overfished because B_{2012}/B_{MSY} =1.87. The 2014 stock assessment estimated MSY for the EPO stock at 5,490 mt. Based on federal logbook records, catch of swordfish by the U.S. longline vessels operating within the boundary of the EPO stock is less than 5 mt annually, or less than 1 percent of the estimated MSY (PIFSC unpublished data). Thus, overfishing of the EPO stock is due to excessive international fishing pressure and the IATTC and WCPFC have inadequate measures in place to address the issue. Nonetheless, NMFS continues to work with the Pacific and Western Pacific Councils and the State Department to ensure that effective management measures be adopted by the WCPFC and IATTC to end overfishing.

3.1.8 Western and Central North Pacific Striped Marlin

The results of a 2015 stock assessment (ISC 2015) indicates the western and Central North Pacific stock of striped marlin continues to be subject to overfishing (F/F_{MSY} is =1.49) and overfished (SB/SB_{MSY} = 0.39). The 2015 stock assessment estimated MSY at 5,657 mt. CMM 2010-01 for North Pacific striped marlin adopted by the WCPFC requires members and cooperating non-members to limit striped marlin landings 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 measure. The highest striped marlin catch by U.S. fisheries between 2000 and 2003 is 571 mt. Thus, a 20 percent reduction from 571 mt is 457 mt. The Hawaii longline fishery accounts for more than 90 percent of the total U.S. of this stock, with the remainder made by Hawaii small-scale troll fisheries. Since 2012, total landings of WCNPO striped marlin by all U.S. fisheries combined has never exceeded 457 mt (NMFS PIFSC 2016 U.S. Part 1 annual report to the WCPFC).

In 2016, total WCNPO striped marlin landings by all U.S. fisheries was 341 mt, with the Hawaii longline fishery accounting for 329 mt (Table 10) and the Hawaii troll fisheries accounting for 12 mt. Thus, overfishing of the stock is due to excessive international fishing pressure and the IATTC and WCPFC have inadequate measures in place to address the issue. Nonetheless, NMFS continues to work with the Pacific and Western Pacific Councils and the State Department to ensure that effective management measures be adopted by the WCPFC and IATTC to end overfishing.

3.1.9 Pacific Blue Marlin

The 2016 stock assessment by the ISC Billfish Working Group (ISC 2016), which uses data through 2014 indicates Pacific blue marlin is not experiencing overfishing (F_{2014}/F_{MSY} = 0.88). Applying the 2014 spawning biomass (SB) estimates of 24,809 mt, and the SB at MSY of 19,858 mt, the ratio of SB/SB_{MSY} is 1.25 indicating the stock is not overfished. In 2016, total blue marline tuna landings by all longline fisheries in Hawaii, American Samoa, Guam and the CNMI

was 517 mt (Table 10), or approximately 3 percent of the estimated MSY. Of the 517 mt, the Hawaii longline fishery accounted for 429 mt with the remainder caught by American Samoa longline fishery.

3.1.10 North Pacific Blue Shark

The results of the 2017 assessment (ISC 2017b) indicate the North Pacific blue shark is not subject to overfishing ($F_{2012\text{-}2014}/F_{MSY} = 0.37$), and is not overfished ($SB_{2012\text{-}2014}/SB_{MSY} = 1.71$). The 2017 stock assessment estimated SB_{MSY} at 179,539 mt. In 2016, total blue shark landings by all U.S. longline fisheries was 0 mt (Table 10). Nearly all blue sharks caught in US longline fisheries are returned to the sea alive, with some discarded dead as well.

3.1.11 Oceanic Whitetip Shark

A 2012 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) estimate current biomass of oceanic whitetip sharks in the WCPO to be 7,295 mt and current catches at 2,001 mt, which is lower than the MSY of 2,700 mt. The biomass equivalence to individuals is estimated to be approximately 200,000 individuals (FAO 2012). 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. Under CMM 2011-04, the WCPFC has agreed to a non-retention measure to reduce fishing mortality and to rebuild spawning biomass of oceanic white tip shark. In 2016, total oceanic white tip shark landings by all U.S. longline fisheries was 0 mt (Table 10).

On January 30, 2018, NMFS issued a final rule (FR 83 4153) to list the oceanic white-tip shark as threatened under the ESA.

3.1.12 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. In 2016, total mako shark landings by all U.S. longline fisheries was 46 mt (Table 10).

3.1.13 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 (2013) 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 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. In 2016, total silky shark landings by all U.S. longline fisheries was 46 mt (Table 10).

3.2 U.S. Longline Fisheries in the WCPO, including Fisheries of the U.S. Territories

3.2.1 Mariana Archipelago Longline Fisheries

The area where longline fishing vessels based in CNMI and Guam historically have operated is the U.S. EEZ around the Northern Mariana Islands and Guam. Historically, fewer than three longline companies have actively fished in EEZ waters around Guam and the CNMI. For this reason catch and effort information is confidential. Since 2011, there has been no longline fishing activities around CNMI or Guam and no longline fishing activities are expected to occur in 2018.

3.2.2 American Samoa Longline Fishery

The longline fishery based in American Samoa is a limited access fishery with a maximum of 60 vessels under the federal permit program. Vessels range in size from under 40 to over 70 ft long. The fishery primarily targets albacore for canning in the local Pago Pago cannery, although the fishery also catches and retains other tunas (e.g., bigeye, yellowfin, and skipjack), and other

pelagic management unit species (PMUS) (e.g., billfish, mahimahi, wahoo, oilfish, moonfish (opah), and sharks) for sale and home consumption. The target depth for albacore tuna is approximately 100–300 m (WPFMC 2009).

3.2.2.1 Longline Fishing Area

American Samoa longline fishing vessels operate in EEZ around American Samoa, on the high seas in international waters, and occasionally in the EEZs of countries adjacent to American Samoa. Additionally, around 20 American Samoa longline limited access permit holders also hold Hawaii longline limited access permits, the latter of which allows them to fish in the EEZ around Hawaii and land fish in Hawaii. As previously noted, these vessels have possess both an American Samoa and a Hawaii longline limited access permit have an exception to fishery restrictions on the retention on bigeye tuna in the WCPO and may continue to land fish in Hawaii, if NMFS restricts fishing in the WCPO due to the US WCPO bigeye tuna limit being reached.

3.2.2.2 Fishery Statistics

Table 5 provides statistics associated with the American Samoa-based longline fishery.

Table 5: American Samoa-based Longline Fishery Landings, 2006-2016.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Active Vessels	29	28	26	26	24	22	23	21	20	16
Total Pelagics Landings (mt)	6,586	4,347	4,787	4,673	3,250	4,022	2,717	2,192	2,405	2,007
Albacore (mt)	5,329	3,456	3,910	3,938	2,292	3,092	2,051	1,430	1,855	1,588
Yellowfin Tuna (mt)	620	336	155	445	536	385	414	424	255	195
Bigeye Tuna (mt)	199	124	146	178	170	167	85	82	116	98
Skipjack Tuna (mt)	165	163	156	111	109	250	64	116	67	56
Wahoo (mt)	198	136	139	131	125	83	88	78	58	52
Total Ex-vessel Value (adjusted) ($ millions)	$13.7	$9.4	$10.4	$ 10.4	$7.2	$7.2	$6.5	N/A	N/A	N/A

Source: WPFMC 2017

*The first number represents trips by alia and the second by the monohull vessels. From 2006, three or fewer alia longline vessels were active and those data are confidential.

Note: all other species (e.g., mahimahi, swordfish, etc.) landed are less than one percent of total landings.

3.2.2.3 Non-Target Species and Bycatch in the American Samoa Longline Fishery

Table 6 shows the number of fish kept and released in the American Samoa longline fishery during 2016. Fish are released for various reasons including quality, size, handling and storage difficulties, and as well as marketing issues. Fishermen released nearly all sharks and oilfish and a high percentage of certain billfish, which are important to the non-commercial fishery. Overall, 10 percent of the total number of fish caught were released.

Table 6: Number of fish kept, released and percent released for all American Samoa longline vessels during 2016

Species	Number Kept	Number Released	Total Caught	Percent Released
Skipjack tuna	14,145	277	14,422	1.9
Albacore tuna	83,759	518	84,277	0.6
Yellowfin tuna	18,610	171	18,781	0.9
Kawakawa	0	0	0	N/A
Bigeye tuna	3,284	31	3,315	0.9
Tunas (unknown)	2	0	2	N/A
Tuna PMUS Total	**119,800**	**997**	**120,797**	**0.8**
Mahimahi	419	22	441	5.0
Black marlin	0	0	0	N/A
Blue marlin	527	59	586	10.1
Striped marlin	58	11	69	15.9
Wahoo	4,881	108	4,989	2.2
Sharks (unknown coastal)	26	5,345	5,371	99.5
Swordfish	118	18	136	13.2
Sailfish	72	88	160	55.0
Spearfish	85	176	261	67.4
Moonfish	92	56	148	37.8
Oilfish	194	4,615	4,809	96.0
Pomfret	92	370	462	80.1
Non-Tuna PMUS Total	**6,564**	**10,868**	**17,432**	**62.3**
Barracudas	113	16	129	12.4
Rainbow runner	3	0	3	N/A
Dogtooth tuna	0	0	0	N/A
Pelagic fishes (unknown)	11	2,501	2,512	99.6
Non-PMUS Pelagics Total	**127**	**2,517**	**2,644**	**95.2**
Total Pelagics	**126,491**	**14,382**	**140,873**	**10.2**

Source: WPFMC 2017

3.2.3 Hawaii Longline Fisheries

Domestic longline fishing around Hawaii consists of two separately managed fisheries. The deep-set fishery targets primarily bigeye tuna (*Thunnus obesus*) and occasionally yellowfin tuna

(*Thunnus albacares*) in the U.S. EEZ surrounding the Hawaiian Islands and on the high seas. The shallow-set fishery targets swordfish (*Xiphias gladius*) to the north of the Hawaiian Islands. NMFS and the Council manage the fisheries under a single limited access program. The program allows a maximum of 164 transferable permits.

3.2.3.1 Longline Fishing Area

Deep-set Fishery

Fishing locations may vary seasonally based on oceanographic conditions, catch rates of target species, and management measures, among others. The deep-set fishery operates in the deep, pelagic waters around the Hawaiian archipelago throughout the year, mostly within 300-400 nm (556-741 km) of the MHI. However, federal regulations and other applicable laws prohibit longline fishing inside the 200 nm U.S. EEZ around the Northwestern Hawaiian Islands and within 50 to 75 nm from the shoreline to minimize the potential for gear conflicts with small boat fisheries and interactions with protected species. Some fishing also occurs in the U.S. EEZ around Pacific Remote Island Areas of Kingman Reef and Palmyra Atoll (5° N. lat.).

In general, deep-set longline vessels operate out of Hawaii ports, with the vast majority based in Honolulu and a few in Hilo. Infrequently, deep-set trips originate from other ports such as Long Beach or San Francisco, California, or Pago Pago, American Samoa, and then fishermen land their catches in Hawaii. Fishermen departing from California begin fishing on the high seas, outside of the U.S. EEZ. Fishermen departing from American Samoa usually begin fishing near the Equator or farther north in the North Pacific where they expect higher catch rates of bigeye tuna.

Shallow-set Fishery

The area of operation of the Hawaii shallow-set fishery includes EEZ waters and areas of the high seas between 180° - 125° W and 17° - 45° N. For both the deep and shallow set fisheries, federal regulations also prohibit the longline vessels from operating within any marine national monument, including monument areas encompassing the U.S. EEZ around Johnston Atoll, and Jarvis and Wake Islands, and specific areas in the EEZ around Hawaii to minimize potential for gear conflicts and interactions with protected marine species.

3.2.3.2 Fishing Participation

As previously mentioned, NMFS manages Hawaii's deep-set and shallow-set longline fishery under a single limited access fishery with a maximum of 164 vessel permits. NMFS has issued all 164 permits; however, not all 164 permits are being actively used. Based on 2016 logbook data, 142 permitted vessels conducted longline fishing activities. Of these vessels, 32 are greater than 24 m in length, some of which also participate in the Hawaii-based swordfish fishery. In the event NMFS restricts fishing in the WCPO and the EPO due to the U.S. bigeye tuna catch limit being reached, some of these vessels would not be able to fish for bigeye tuna in either zone. However, the 110 Hawaii-based longline vessels less than 24 m would still be able to fish in the EPO for the remainder of the year, as the restriction in the EPO would not apply to vessels less

than 24 m. Based on 2016 logbook data, of the 142 permitted vessels, 13 vessels also actively participated in the shallow-set swordfish fishery.

3.2.3.3 Fishing Effort

From 2004-2012, the annual number of vessels that participated in the deep-set fishery remained relatively stable, ranging from 124 to 129. Increases have been observed since, with 135 vessels operating in 2013, 139 vessels in 2014, 143 in 2015. Based on final 2016 logbook data, 142 deep-set longline vessels made 1,354 trips with 17,988 sets and deployed 47.4 million hooks (Table 7). In 2016, the 13 shallow-set longline vessels made 40 trips with 670 sets and deployed 719,385 hooks (WPRFM 2017). All but one swordfish vessel also made at least one deep-set trip in 2016.

Table 7. Number of active longline vessels and fishing effort in the Hawaii deep-set fishery, 2004-2016 (includes effort in both 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	46,919,110	1,383	18,772
2014	139	45,464,747	1,350	17,777
2015	143	47.600,000	1,452	18,519
2016	142	47,400,181	1,354	17,988

Source: WPFMC 2017.

3.2.3.4 Deep-set fishery catch information

Table 8 shows the released catch, retained catch, and total catch of PMUS caught in Hawaii deep-set longline fishery, 2016.

Table 8: Released catch, retained catch, and total catch of PMUS (number of fish) caught in Hawaii deep-set longline fishery, 2016.

	Deep-set longline fishery			
	Released catch	**Percent released**	**Retained catch**	**Total Catch**
Tuna				
Albacore	18	0.2	9,835	9,853
Bigeye tuna	3,810	1.7	217,129	220,939
Bluefin tuna	1	20.0	4	5
Skipjack tuna	545	1.8	30,316	30,861
Yellowfin tuna	819	1.8	45,646	46,465
Other tuna	0	0.0	6	6
Total tunas	**5,193**	**1.7%**	**302,936**	**308,129**
Billfish				
Blue marlin	73	1.2	6,187	6,260
Spearfish	311	1.3	23,712	24,023
Striped marlin	156	1.3	11,416	11,572
Other marlin	11	1.3	856	867
Swordfish	315	6.2	4,796	5,111
Total billfish	**866**	**1.8%**	**46,967**	**47,833**
Other PMUS				
Mahimahi	281	0.6	48,197	48,478
Moonfish	67	0.3	24,276	24,343
Oilfish	2,584	9.3	25,234	27,818
Pomfret	377	0.5	81,285	81,662
Wahoo	104	0.3	30,090	30,194
Total other PMUS	**3,413**	**1.6%**	**209,082**	**212,495**
Non-PMUS fish	**5,774**	**84.7**	**1,046**	**6,820**
Total non-shark	**15,246**	**2.7%**	**560,031**	**575,277**
PMUS Sharks				
Blue shark	72,608	100.0	6	72,614
Mako shark	3,759	83.8	728	4,487
Thresher shark	10,482	99.6	46	10,528
Oceanic Whitetip shark	1,111	100.0	0	1,111
Silky shark	351	100.0	0	351
Total PMUS sharks	**88,311**	**99.1%**	**780**	**89,091**
Non-PMUS sharks	**904**	**99.7**	**3**	**907**
Grand Total	**104,461**	**15.7%**	**560,814**	**665,275**

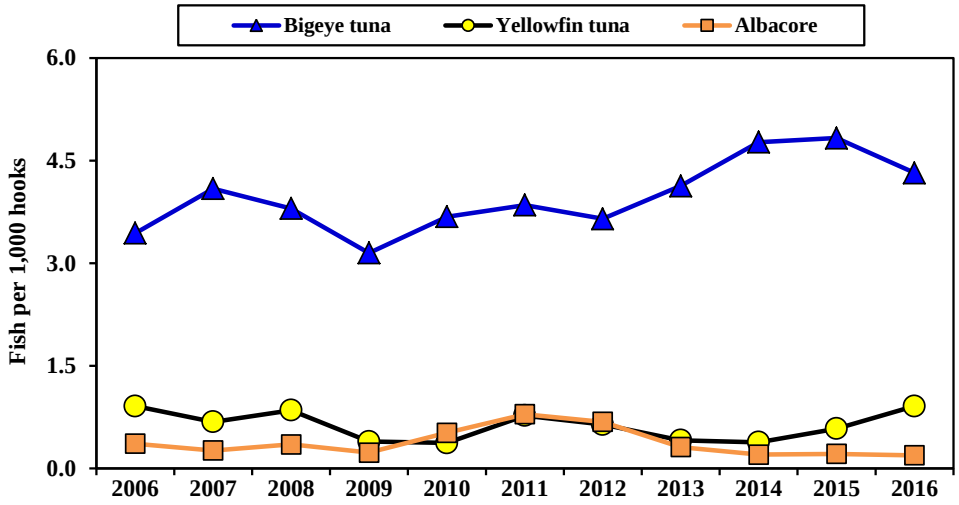

Figure 2: Tuna CPUE for the Hawai`i-permitted deep-set longline fishery, 2006-2016

3.2.3.5 Revenue

In 2014, the Hawaii deep-set longline fishery landed approximately 26.6 million pounds of pelagic MUS valued at approximately $79.4 million dollars. In 2015, the fishery landings increased to 32 million pounds, while value increased to $91.4 million. Revenue generated by the deep-set fishery was around $99.1 million in 2016 (Figure 3)

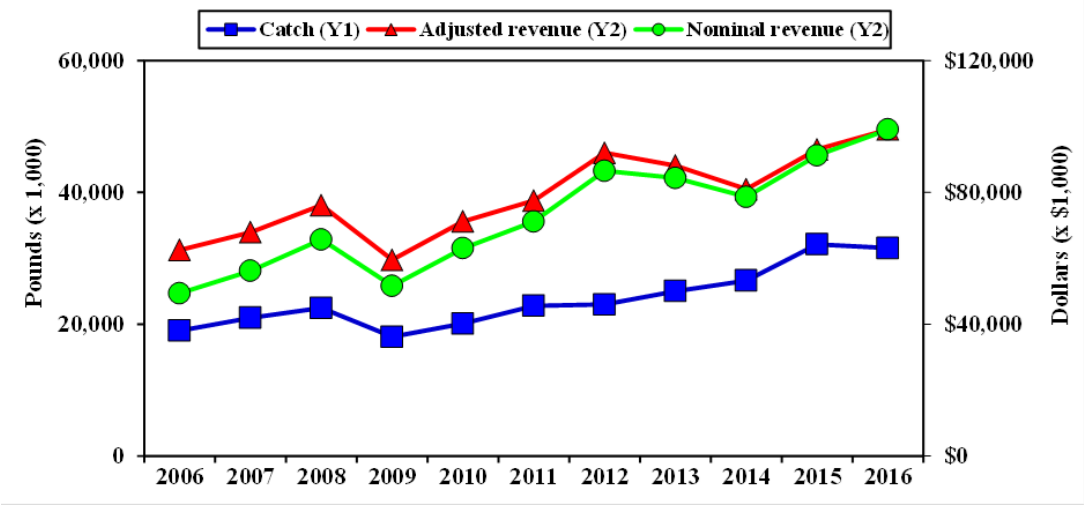

Figure 3: Catch and revenue for the Hawai`i-permitted deep-set longline fishery, 2006-2016

Source: WPRFMC 2017

Source: WPFMC, 2017.

3.2.3.6 Non-Target Species and Bycatch in the Hawaii Longline Fishery

In 2011, NMFS published the 2011 U.S. National Bycatch Report, which provided estimates of bycatch for major U.S. fisheries in terms of pounds discarded, with data through 2005 (NMFS 2011). The next comprehensive update of the National Bycatch Report using data through 2015 will be in 2018. Table 9 provides an estimate of bycatch species in both the Hawaii deep-set and shallow-set longline fisheries. 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 discard, 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.

Table 9. 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 barracuda	8,490	22	8,512	0.10%		8,512	3.9	100.00%
Hammer head sharks	2,414		2,414	0.03%		2,414	1.1	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					
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%
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%

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					
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 mackerel	156,338	686	157,024	1.84%		157,024	71.2	100.00%
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%

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					
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%

Source: NMFS 2011

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

U.S. longline catches of pelagic MUS 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.

Table 10 shows the total catches of pelagic MUS in the WCPO by U.S. Hawaii and U.S. territorial longline fisheries from 2014-2016. Table 11 provides a detailed breakdown of U.S. longline catches of bigeye tuna in the WCPO by U.S. longline fisheries based on data in Table 11.

Table 10. Longline landings (mt) by species and species group for U.S. longline vessels operating in the WCPFC statistical area, 2014-2016.

	U.S. in North Pacific Ocean			CNMI in North Pacific Ocean			Guam in North Pacific Ocean			American Samoa in North Pacific Ocean			American Samoa in South Pacific Ocean			Total		
	2016	**2015**	**2014**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**	**2016**	**2015**	**2014**
Vessels	133	135	140	117	117	109	118	112		23	22	17	20	21	23	151	156	162
Species																		
Albacore, North Pacific	209	197	178							35	19	8				244	217	186
Albacore, South Pacific		0											1,558	1,855	1,430	1,558	1,855	1,430
Bigeye tuna	3,761	3,427	3,823	884	999	1,000	939	856		588	441	236	98	116	82	6,270	5,840	5,141
Pacific bluefin tuna	0	0											0	6	3	1	6	3
Skipjack tuna	183	176	167							25	11	9	50	67	116	259	254	291
Yellowfin tuna	1,098	681	567							175	105	30	195	255	424	1,469	1,041	1,021
Other tuna	0	0								0					0	0	0	
TOTAL TUNA	**5,252**	**4,482**	**4,734**	**884**	**999**	**1,000**	**939**	**856**		**823**	**577**	**283**	**1,902**	**2,299**	**2,055**	**9,801**	**9,213**	**8,072**
Black marlin	1	0	1								0	0				1	0	1
Blue marlin	429	445	428							58	55	31	31	25	28	517	526	486
Sailfish	15	11	15							2	2	0	2	2	2	20	15	17
Spearfish	251	188	163							28	15	11	2	1	1	281	204	175
Striped marlin, North Pacific	281	378	343							48	36	14			0	329	414	357
Striped marlin, South Pacific		0											2	3	7	2	3	7
Other marlins	1	1									0					1	1	
Swordfish, North Pacific	595	665	865							43	24	15				638	690	880
Swordfish, South Pacific		0											7	8	10	7	8	10
TOTAL BILLFISH	**1,573**	**1,688**	**1,813**							**180**	**133**	**72**	**43**	**40**	**47**	**1,796**	**1,862**	**1,932**
Blue shark										0		0	1	1	1	1	1	1
Mako shark	37	35	35							9	4	2				46	39	37
Thresher	3	5	5							0	1	1				4	6	6
Other sharks	0															0		
Oceanic whitetip shark																		
Silky shark																		
Hammerhead shark	0															0		
Tiger shark																		
Porbeagle																		
TOTAL SHARKS	**40**	**40**	**40**							**10**	**5**	**2**	**1**	**1**	**1**	**51**	**45**	**43**
Mahimahi	202	199	236							28	21	15	4	6	12	234	226	263
Moonfish	304	279	385							74	55	22	2	2	1	380	336	408
Oilfish	160	165	169							29	20	13	2	0	0	190	185	182
Pomfret	339	380	373							46	39	18	0	0	0	386	419	392
Wahoo	309	256	243							47	27	18	52	58	75	407	340	336
Other fish	7	7	6							1	1	0	1	1	0	9	9	6
TOTAL OTHER	**1,322**	**1,285**	**1,411**							**224**	**164**	**87**	**60**	**66**	**89**	**1,606**	**1,515**	**1,587**
GEAR TOTAL	**8,187**	**7,495**	**7,999**	**884**	**999**	**1,000**	**939**	**856**		**1,237**	**878**	**445**	**2,007**	**2,405**	**2,192**	**13,254**	**12,635**	**11,635**

Source: NMFS PIFSC unpublished data - Preliminary 2016 U.S. Part 1 annual report to the WCPFC

Table 11. Bigeye tuna catch (mt) by U.S. Hawaii and U.S. Territorial longline fisheries in the WCPO (2014-2016).

Longline Fishery		2016	2015	2014	Ave. 2013-2016
U.S. Hawaii longline permitted vessels	Catch Hawaii longline-permitted vessels applicable to the U.S. bigeye tuna catch limit	3,761	3,427	3,823	3,670
	Catch allocated to Hawaii longline-permitted vessels from a U.S. territory	1,823 (884 from CNMI and 939 from GU)	1,855 (999 from CNMI and 856 from Guam)	1,000 (CNMI)	1,559
American Samoa longline permitted vessels	Catch by dual permitted U.S. Hawaii/American Samoa longline vessels on the high seas	588	441	236	422
	Catch by American Samoa longline permitted vessel in the EEZ around American Samoa	98	116	82	99
Total Catch in WCPO		**6,270**	**5,839**	**5,141**	**5,750**

Source: Table 9 above.

Table 12 shows the total catches of bigeye tuna by gear type including contributions by the U.S. longline fishery 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 12: Bigeye tuna catch (mt) in the WCPO, EPO, and total combined contribution by U.S. longline vessels (Hawaii and US Territory including fishing agreements).

Year	WCPO Longline	WCPO Purse seine	Other Fisheries	Total	U.S. LL WCPO*	% 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	5,162	6.74	3.2

Year	WCPO Longline	WCPO Purse seine	Other Fisheries	Total	U.S. LL WCPO*	% WCPO LL	% WCPO Total
2013	62,641	82,151	13,870	158,662	4,535	7.2	2.9
2014	73,187	65,247	20,037	158,471	5,142	7.1	3.2
2015	63,682	49,333	20,667	134,682	5,839	9.2	4.3
2016	64,131	63.304	29,371	156,806	6,270	9.8	4.0

*Includes US and US Participating Territory catch

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	1.4	0.4
2008	26,136	75,028	28	101,192	1,310	5.0	1.3
2009	31,282	76,800	15	108,097	730	2.3	0.7
2010	35,227	57,753	1358	94,338	1,356	3.8	1.4
2011	29,938	57,188	1051	87,177	1,050	3.5	1.2
2012	28,938	68,597	1051	98,586	861	3.0	0.9
2013	30,861	49,104	869	80,834	2056	6.7	2.5
2014	35,087	54,346	17	89,450	2,073	5.9	2.3
2015	35,087	67,432	17	102,536	3,053	8.7	3.0
2016	34,943	56,629	n/a	91,572	2,087	6.0	2.8

Year	WCPO	EPO	Total	U.S. LL Total*	% Total
2007	145,479	93,342	238,821	6,016	2.5%
2008	156,014	101,192	257,206	6,091	2.4%
2009	159,467	108,097	267,564	4,720	1.8%
2010	140,843	94,338	235,181	5,420	2.3%
2011	159,810	87,177	246,987	5,879	2.4%
2012	161,679	98,586	260,265	6,021	2.3%
2013	158,662	80,834	239,496	6,528	2.7%
2014	152,186	89,450	241,636	7,131	2.9%
2015	128,180	102,536	230,716	8,753	3.8%
2016	156,806	91,572	248,378	8,358	3.4%

Source: SPC 2014c; US Part 1 Annual Report to the WCPFC, IATTC 2017; Williams et al. 2017;
Calculations: WPFMC
Note: There is no catch of bigeye tuna in the EPO by U.S. territory longline vessels.

3.2.5 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 13; SPC 2014c).

Table 13. Number of vessels and tuna catch (mt) by the U.S. purse seine fleet, 2006-2016.

Year	Vessels	Skipjack		Yellowfin		Bigeye		Total tuna Catch (mt)
		US reported Catch	SPC estimated catch	US reported Catch	SPC estimated catch	US reported Catch	SPC estimated catch	
2011	37	169,154	157,463	24,442	34,244	7,838	11,553	201,504* (203,311)+
2012	38	215,702	209,249	31,679	41,958	5,503	8,5533	252,925* (259,910)+
2013	38	226,609	207,284	23,277	34,285	8,157	12,779	258,044* (254,491)+
2014	40	254,560	262,676	25,554	40,188	2,513	10,140	313,004* (313,146)+
2015	39	228,916	208,243	19,354	24,461	2,326	5,460	228,164* (238,299)+
2016	37	201,152	170, 255		24,301		6,866	201,152* (201,216)+

Source: SPC 2016 and 2015 US Annual Part 1 report to WCPFC.
Note: The SPC has estimated US purse seine bigeye catches to be approximately 30% higher than what is reported in the US Annual Part 1 report to the WCPFC.
*US reported purse seine catch
+ SPC estimated total US purse seine tuna catch

3.2.6 Fishing Communities

The Magnuson-Stevens Act defines a fishing community as "...a community that is substantially dependent upon or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and fish processors that are based in such communities" (16 U.S.C. § 1802(16)). NMFS further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)". National Standard 8 of the Magnuson-Stevens Act requires that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and the rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities to (a) provide for the sustained participation of such communities and (b) to the extent practicable, minimize adverse economic impacts on such communities.

In 1999, the Council identified American Samoa, Guam and the Northern Mariana Islands each as a fishing community. The Secretary of Commerce approved this definition on April 19, 2009 (64 FR 19067). In 2002, the Council identified each of the islands of Kauai, Niihau, Oahu, Maui, Molokai, Lanai and Hawaii as a fishing community. The Secretary of Commerce subsequently approved these definitions on August 5, 2003 (68 FR 46112).

3.3 Protected Resources

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 14 lists the species listed as endangered or threatened under the ESA that have the potential to interact with longline fisheries managed under the Pelagic FEP. This section also provides the number of interactions observed and estimated between protected species and the American Samoa and Hawaii longline fisheries with regard to recent fishing effort.

Species Protected under the Endangered Species Act (ESA)

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[4] of listed species except under limited circumstances. Western Pacific fisheries authorized under the Pelagic FEP operate in accordance with terms and conditions set by ESA consultations, including applicable incidental take statements. The consultations 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:

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.

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

Species	ESA status
Sea Turtles	
Central North Pacific green turtle distinct population segment (DPS) (*Chelonia mydas*)	Threatened
East Pacific green turtle DPS (*Chelonia mydas*)	Threatened
Central South Pacific green turtle DPS (*Chelonia mydas*)	Endangered
Central West Pacific green turtle DPS (*Chelonia mydas*)	Endangered
East Indian-West Pacific green turtle DPS (*Chelonia mydas*)	Threatened
Southwest Pacific green turtle DPS (*Chelonia mydas*)	Threatened
Hawksbill turtle (*Eretmochelys imbricata*)	Endangered
Leatherback turtle (*Dermochelys coriacea*)	Endangered
North Pacific loggerhead turtle DPS (*Caretta caretta*)	Endangered
South Pacific loggerhead turtle DPS (*Caretta caretta*)	Endangered
Olive ridley turtle *(Lepidochelys olivacea*)	Threatened, except for Mexico's nesting population which is Endangered

[4] The definition of "take" includes to harass, harm, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. 50 CFR 402.02.

Species	ESA status
Marine Mammals	
Blue whale (*Balaenoptera musculus*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Hawaiian monk seal (*Neomonachus schauinslandi*)	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
Guadalupe fur seal (*Arctocephalus townsendi*)	
Seabirds	
Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*)	Endangered
Newell's shearwater (*Puffinus auricularis newelli*)	Threatened
Short-tailed albatross (*Phoebastria albatrus*)	Endangered
Sharks and Rays	
Scalloped hammerhead Indo-West Pacific DPS	Threatened
Scalloped hammerhead Eastern Pacific DPS	Endangered
Oceanic white tip (*Carcharhinus longimanus*)	Threatened
Giant manta ray (*Manta birostris*)	Threatened
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

Source: http://www.nmfs.noaa.gov/pr/species/esa/listed.htm, accessed May 15, 2017.

The following identifies the valid BiOps under which western Pacific longline fisheries currently operate. This section summarizes much of the information contained in these documents for the purpose of 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. This BiOp covers longline fisheries in Guam and the CNMI.

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.

NMFS 2015, Biological Opinion and Conference Opinion on Continued Operation of the American Samoa Longline Fishery.

NMFS. 2017, Supplement to the 2014 Biological Opinion on Continued Operation of the Hawaii-based Deep-set Pelagic Longline Fishery.

Species Protected under the Marine Mammal Protection Act (MMPA)

The 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 authorizes the Secretary to protect and conserve 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).

According to the 2017 List of Fisheries (82 FR 3655, January 12, 2017), the Hawaii deep-set longline fishery is a Category I fishery due to its interactions with bottlenose dolphins, risso's dolphins, striped dolphin, false killer whales, short-finned pilot whales, sperm whales, pygmy killer whale, and Northwest Hawaiian Island humpback whale. The Hawaii shallow-set longline fishery is a Category II fishery due to its interactions with Blainville's beaked whales, bottlenose dolphins, false killer whales, Central North Pacific humpback whales, risso's dolphins, rough-toothed dolphins, striped dolphins, and short-finned pilot whales. The American Samoa longline fishery is a Category II fishery due to its interactions with false killer whales, rough-toothed dolphins, and short-finned pilot whales. 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 take incidentally, 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 a 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.

3.3.1 Sea Turtles

All Pacific sea turtles are listed under the ESA as either threatened or endangered except for the flatback turtle (*Natator depressus*). This species is native to Australia and does not occur in the action area, and thus will not be addressed 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 status reviews, 5-year reviews, and recovery plans for each species at the following NMFS websites:

Green turtles status review:
http://www.nmfs.noaa.gov/pr/species/Status%20Reviews/green_turtle_sr_2015.pdf
Pacific green turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_pacific.pdf
East Pacific green turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_eastpacific.pdf

Hawksbill turtle 5-year review:
http://www.nmfs.noaa.gov/pr/pdfs/species/hawksbillseaturtle2013_5yearreview.pdf
Hawksbill turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_hawksbill_pacific.pdf
Olive ridley turtle 5-year review:
http://www.nmfs.noaa.gov/pr/pdfs/species/oliveridleyturtle_5yearreview2014.pdf
Olive ridley turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_oliveridley.pdf

Leatherback turtle 5-year review:
http://www.nmfs.noaa.gov/pr/listing/5yearreview_leatherbackturtle.pdf
Leatherback turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_leatherback_pacific.pdf

Loggerhead turtle status review:
http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/loggerheadturtle2009.pdf
Loggerhead turtle recovery plan:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_loggerhead_pacific.pdf

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, through the 2001, 2010, 2012, 2014, 2015 and 2017 BiOps listed above, has determined that the pelagic fisheries of the western Pacific operating in accordance with the Pelagic FEP and implementing regulations, would not jeopardize the survival or recovery of any listed sea turtles.

Within each BiOp, NMFS has authorized a certain level of interactions (incidental take) through incidental take statements (ITS)) for these fisheries. A summary of the BiOp findings and ITS for sea turtles are described for each longline fishery below.

3.3.1.1 Sea Turtle Interaction in the Hawaii Deep-set Longline Fishery

On September 19, 2014, NMFS issued a no-jeopardy biological opinion (2014 BiOp) for the deep-set longline fishery, which authorizes over a three-year period, the incidental take of green, leatherback, North Pacific loggerhead, and olive ridley sea turtles (NMFS 2014). ITSs for green,

loggerhead and olive ridley turtles were subsequently exceeded, and NMFS issued a no-jeopardy supplemental biological opinion on March 24, 2017, authorizing the incidental take of these species over a three-year period. The ITSs from the 2014 and 2017 BiOps are shown in Table 15. There are two thresholds for incidental take in the fishery, the estimated number of interactions and the number of interactions that result in mortality over a three year period. The ITS calculated in the 2014 BiOp were based on observed interaction data from 2008 through June 30, 2014 (end of 2nd quarter 2014). The ITS calculated in the 2017 BiOp were based on observed interaction data from 2008 through June 30, 2016 (end of 2nd quarter 2016).

Based on this information, NMFS in its 2014 BiOp and 2017 Supplemental 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 any sea turtle species.

Table 15. The numbers of sea turtles estimated to be captured and/or killed in the Hawaii deep-set longline fishery over three consecutive years (3-year ITS) in the 2014 and Supplemental 2017 NMFS biological opinions.

Sea turtle species	3-year ITS in 2014 BiOp		3-year ITS in 2017 BiOp	
	Interactions	Mortalities	Interactions	Mortalities
Green	9	9	NA	NA
East Pacific DPS	NA	NA	12	12
Central North Pacific DPS	NA	NA	6	6
East Indian-West Pacific DPS	NA	NA	6	6
Southwest Pacific DPS	NA	NA	6	6
Central West Pacific DPS	NA	NA	3	3
Central South Pacific DPS	NA	NA	3	3
Leatherback	72	27	NA	NA
Loggerhead, North Pacific DPS	9	9	18	18
Olive Ridley	99	96	NA	NA
Mexico and eastern Pacific populations	NA	NA	141	134
Western Pacific population	NA	NA	42	40

Sources: NMFS 2014 and NMFS 2017.

Fishery interactions with protected species are monitored by NMFS, and at least 20 percent of all Hawaii deep-set longline trips are observed by NMFS at-sea observers. NMFS statistically expands the observed take totals, based on observer coverage levels to develop a fleet-wide takes estimate (NMFS 2014). For example, because the fishery is observed at a 20 coverage rate, NMFS multiplies each observed interaction by 5 to estimate interactions at 100% coverage rate.

Table 16 summarizes the fleet-wide sea turtle interaction estimates for the Hawaii deep-set longline fishery from 2005 through 2016. Based on NMFS observer data for the Hawaii deep-set longline fishery for the most recent quarters since the 2014 BiOp data cutoff of June 30, 2014, the fishery has not exceeded the ITS for leatherback turtles. The new ITSs for green turtle DPSs, olive ridley turtle populations and North Pacific DPS of loggerhead turtles in the 2017 BiOp has

a monitoring period starting in July 1, 2016. Based on this monitoring start date, NMFS observer data indicate the fishery has not exceeded the three-year ITS for any sea turtle species.

Table 16. Annual sea turtles interactions expanded from observed data to fleet-wide estimates for the Hawaii deep-set longline fishery, 2005-2017.

Year	Sea Turtle Species				
	Green	Leatherback	N. Pacific Loggerhead	Olive Ridley	Unidentified hardshell
2005	0	4	0	17	0
2006	6	9	0	55	0
2007	0	4	7	26	0
2008	0	11	0	17	0
2009	0	4	0	18	0
2010	1	6	6	10	0
2011	5	14	0	36	0
2012	0	6	0	34	0
2013	5	15	11	42	0
2014	15	38	0	39	0
2015	5	19	10	63	0
2016	5	15	10	154	5
2017	15	0	15	128	0

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017),; 2016 Pelagic FEP SAFE Report ; NMFS PIRO 2017 Observer Annual Report.
Note: 2017 estimates expanded by multiplying observed interactions by 4.9 as there was 20.4% observer coverage levels in 2017. Fractional estimates rounded up to nearest whole number.

3.3.1.2 Sea Turtle Interaction in the Hawaii Shallow-set Longline Fishery

The Hawaii shallow-set longline fishery interacts with several species of sea turtles. The fishery is also managed through several measures to mitigate the potential for interactions and injury if interactions occur. These include training and handling requirements for reducing the severity of interactions, requirements for the fishery to use large circle hooks and mackerel-type fish bait. Additionally, federal regulations require a fishery closure once the fishery reaches the ITS for leatherback and loggerhead sea turtles. On March 31, 2012, NMFS issued a no-jeopardy biological opinion (2012 BiOp; NMFS 2012) for the shallow-set longline fishery, which authorizes incidental take of loggerhead, leatherback, olive ridley and green sea turtles (NMFS 2014) shown in Table 17. Based on this information, NMFS in its 2012 BiOp concluded that the Hawaii shallow-set longline fishery as managed under the Pelagic FEP is not likely to jeopardize the continued existence or recovery of any sea turtle species.

Table 17. 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.

Sea turtle species	1-year		2-year	
	Interactions	Mortalities	Interactions	Mortalities
N. Pacific loggerhead	34	7	68	14
Leatherback	26	6	52	12
Olive ridley	2	1	4	2
Green	3	1	6	2

Source: NMFS 2012b.

On December 27, 2017, a Ninth Circuit panel issued a split 2-1 decision vacating in part the 2012 BiOp and invalidating NMFS's no-jeopardy determination with respect to the N. Pacific loggerhead turtles. *Turtle Island Restoration Network, et al. v. U.S. Dep't of Commerce, et al.*, 878 F.3d 725, 740 (9th Cir. 2017) NMFS is evaluating whether to seek *en banc* rehearing of this decision.

The NMFS Observer Program monitors incidental interactions on all (100 percent) shallow-set fishing trips. Table 18 summarizes the fleet-wide estimates for the Hawaii shallow-set longline fishery from 2005-2016. Based on observed interactions for the most recent two year period from April 1, 2013 (Start of 2rd quarter 2013) through December 31, 2016 (end of 4th quarter 2016), the fishery has not exceeded any ITS for any sea turtle species.

Table 18. Annual sea turtles interactions from observed data for the Hawaii shallow-set longline fishery, 2005-2016. Interactions are based on vessel arrival dates.

Year	Sea Turtle Species				
	N. Pacific loggerhead	Leatherback	Olive ridley	Green	Unidentified hardshell
2005	10	8	0	0	0
2006	17	2	0	0	2
2007	15	5	1	0	0
2008	0	2	2	1	0
2009	3	9	0	1	0
2010	5	7	0	0	0
2011	14	17	0	4	0
2012	5	7	0	0	0
2013	5	7	0	0	1
2014	13	19	1	1	1
2015	15	6	1	0	0
2016	16	5	0	0	0
2017	16	4	4	2	0

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017), 2016 Pelagic FEP SAFE Report ; NMFS PIRO 2017 Observer Program Annual Report

Note: Hawaii longline shallow-set is subject to 100% observer coverage levels so there is no expansion factor associated with these figures.

3.3.1.3 Sea Turtle Interaction in the American Samoa Longline Fishery

On October 30, 2015, NMFS issued a no-jeopardy biological opinion (2015 BiOp) for the American Samoa longline fishery, which authorizes over a three-year period, the incidental take of green, hawksbill, leatherback, loggerhead and olive ridley sea turtles (NMFS 2015d). The 2015 Biological Opinion also included a Conference Opinion for the green turtle DPSs and an ITS, which became effective at the time of the final listing in 2016 (81 FR 20058, April 5, 2016). These ITSs are shown in Table 19. Based on this information, NMFS in its 2015 BiOp concluded that the American Samoa longline fishery as managed under the Pelagic FEP is not likely to jeopardize the continued existence or recovery of any sea turtle species.

Table 19. 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 NMFS 2015 biological opinion.

	3-year Incidental Take Statement in 2015 BiOp	
Sea turtle species	**Interactions**	**Mortalities**
Loggerhead turtle (South Pacific DPS)	6	3
Leatherback turtle	69	49
Olive Ridley turtle	33	10
Green turtle[a]	60	54
Green turtle (Central South Pacific DPS)[a]	30	27
Green turtle (Southwest Pacific DPS)[a]	20	17.82
Green turtle (East Pacific DPS)[a]	7	6.48
Green turtle (Central West Pacific DPS)[a]	2	1.62
Green turtle (East Indian-West Pacific DPS)[a]	1	1.08
Hawksbill turtle	6	3

[a] The green turtle DPS-specific ITSs became effective in May 2016 when the DPS listings were finalized.
Source: NMFS 2015d.

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 green 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. Table 20 summarizes the fleet-wide sea turtle interaction estimates for the American Samoa longline fishery from 2006 through 2016. Based on NMFS observer data since the 2015 BiOp data cutoff of June 30, 2015, the fishery has not exceeded the ITS for sea turtles.

Table 20. Annual sea turtle interactions expanded from observer data to fleet-wide estimates for the American Samoa Longline Fishery, from 2006-2016.

	Sea Turtle Species			
Year	Green	Leatherback	Olive Ridley	Hawksbill
2006	37	0	0	0
2007	14	0	0	0
2008	16	0	0	0
2009	39	0	0	0
2010	50	0	0	0
2011	32	4	4	0
2012	0	6	6	0
2013	19	13	4	0
2014	10	0	10	0
2015	0	14	5	0
2016	21	5	15	5
2017	20	5	10	0

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017); 2016 Pelagic FEP SAFE Report ; NMFS PIRO 2017 Observer Annual Report.
Note: 2017 estimates expanded by multiplying observed interactions by 5 as there was 20% observer coverage levels in 2017. Fractional estimates rounded up to nearest whole number.

3.3.1.4 Sea Turtle and Other Protected Species Interactions in the Guam and CNMI Longline Fisheries

NMFS concluded a formal consultation and issued a BiOp (2001 BiOp) for the pelagic fisheries in the western Pacific on March 29, 2001 (NMFS 2001). In the 2001 BiOp, 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 2001 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 21 for the number of sea turtle authorized to be taken in the Guam and CNMI longline fisheries.

Table 21: The number of sea turtles estimated to be annually 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. High operating costs associated with vessel-docking along with poor market access may be contributing factors to the lack of longline fishing in the Marianas (WPFMC and NMFS 2014).

3.3.2 Marine Mammals

ESA-listed Marine Mammals

ESA-listed marine mammal species that are that have been observed or may occur in the area where Pelagic FEP fisheries operate include the following species:

- Blue whale (*Balaenoptera musculus*)
- Fin whale (*Balaenoptera physalus*)
- Hawaiian monk seal (*Monachus schauinslandi*)
- Humpback whale (*Megaptera novaeangliae*)
    - Mexico DPS (threatened)
    - Central America DPS (endangered)
    - Western North Pacific DPS (endangered)
- Main Hawaiian Islands insular false killer whale (*Pseudorca crassidens*)
- North Pacific right whale (*Eubalaena japonica*)
- Sei whale (*Balaenoptera borealis*)
- Sperm whale (*Physeter macrocephalus*)
- Guadalupe fur seal (*Arctocephalus townsendi*)

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, north Pacific right whales, and sei whales are found within the action area and could potentially interact with the Pelagic 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.

On February 27, 2015, gear from a Hawaii shallow-set longline vessel entangled a fin whale slightly more than 200 miles from the coast of California. The crew released the animal with no gear attached. NMFS preliminarily determined that this interaction did not result in a serious injury because the crew and NMFS observer were able to disentangle the whale after they cut the mainline. The observer recorded only superficial wounds on the whale, the crew released the whale with no gear attached, and the observer saw the whale diving after release. NMFS previously determined that the shallow-set fishery was not likely to adversely affect fin whales based on the discountable likelihood that a fin whale would be hooked or entangled by the shallow-set fishery or hit by a vessel, and because of the low densities of these whales. However, in response to this event, NMFS reinitiated ESA section 7 consultation to evaluate the potential impacts of Hawaii shallow-set longline fishery on fin whales. Given the long history of 100% observer coverage in the shallow-set fishery and the lack of observed or reported interaction with a fin whales, NMFS considers the recent interaction an isolated event. Additionally, given the low densities of fin whales in the action area of the shallow-set fishery (Caretta et al 2014), NMFS considers it extremely unlikely that another interaction in the fishery would occur. For these reasons, NMFS determined that the Hawaii shallow-set longline fishery is not likely to adversely affect fin whales and documented its determination in a memorandum of concurrence dated September 16, 2015.

On September 8, 2016 (81 FR 62259), NMFS published a final rule in the Federal Register to reclassify the humpback whale into 14 distinct population segments under the Endangered Species Act (ESA), of which four DPSs were listed as threatened or endangered. The remaining ten DPSs were not listed under the ESA, including the Hawaii DPS and the Oceania DPS, which occur in areas where the Hawaii and American Samoa longline fisheries operate, respectively.

Non ESA-listed Marine Mammals

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

- 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.

3.3.2.1 Marine Mammal Interaction in the Hawaii Deep-set Longline Fishery

The Hawaii deep-set longline fishery operates in accordance with NMFS' 2014 BiOp and the 2017 BiOp, which requires observer coverage to be maintained at rates determined to be statistically reliable for estimating protected species interactions, including marine mammals. The annual level of observer coverage is approximately 20% in this fishery. Based on expanded estimates based on observer data from 2008 through the 2016, the fishery interacted with several species of marine mammals (Table 22). Most of the animals were released injured. Many of these injuries were determined to be "serious injuries," or injuries likely result in mortality. 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).

On October 10, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing the deep-set and shallow-set fisheries' interactions with depleted stocks of marine mammals. (NMFS 2014.) 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 fishery will have a negligible impact on the affected stocks of marine mammals. See Negligible Impact Determination (2014).

As more fully discussed in the MMPA section 101(a)(5)(E) Negligible Impact Determination, there are records of deep-set longline 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 22. Estimated annual marine mammal interactions (including mortalities, and serious and non-serious injuries) with the Hawaii deep-set longline fishery from 2008-2016.

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blackfish	9	0	3	10	5	0	0	0	0	0
Risso's dolphin	2	0	3	0	0	0	0	10	0	5
Short-finned pilot whale	5	0	0	0	0	4	0	4	0	0
False killer whale	11	55	19	10	15	22	55	21	35	40
Pantropical spotted dolphin	3	0	0	0	0	0	0	0	0	0
Striped dolphin	0	0	0	4	0	0	0	4	0	0
Bottlenose dolphin	0	5	4	0	0	11	0	0	5	5
Pigmy killer whale	0	0	0	0	0	5	0	0	0	0
Kogia species	0	0	0	0	0	0	10	0	0	0
Unidentified cetacean	3	17	12	0	6	3	13	5	10	20
Humpback whale	0	0	0	0	0	0	5	0	0	0
Sperm whale	0	0	0	6	0	0	0	0	0	0

Note: "Blackfish" include unidentified whales considered to be either false killer whales or short-finned pilot whales.
Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017), 2016 Pelagic FEP SAFE Report . NMFS PIRO 2017 Observer Annual Report.
Note: 2017 estimates expanded by multiplying observed interactions by 4.9 as there was 20.4% observer coverage levels in 2017. Fractional estimates rounded up to nearest whole number.

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), as supplemented, and the 2014 Negligible Impact Determination include 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.

As previously mentioned, 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 23 specifies the thresholds for incidental take in the fishery, which became effective on issuance of the MMPA section 101(a)(5)(E) permit. 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

these ESA-listed marine mammals. Observer data since the 2014 BiOp data cutoff date (June 30, 2014) indicate that the fishery has not exceeded these ITSs.

Table 23. The number 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 NMFS 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.

3.3.2.2 Marine Mammal Interaction in the Hawaii Shallow-set Longline Fishery

Table 24 provides total marine mammal interactions observed in the shallow-set fishery from 2008 through 2016. All trips are observed in the shallow-set fishery; therefore, expansion of the data is not necessary.

On October 10, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing the shallow-set and deep-set fisheries' interactions with depleted stocks of marine mammals. (NMFS 2014.) 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 shallow-set fishery will have a negligible impact on the affected stocks of marine mammals.

There have been three interactions with CNP humpback whales in the shallow-set longline fishery, which has 100% observer coverage (NMFS 2014). One interaction with a humpback whale was observed in the shallow-set longline fishery in 2006 outside the U.S. EEZ. According to NMFS observer data, the whale was entangled several times in the mainline and branchline, around the body and flukes. The mainline was cut on either side of the whale to release it. This interaction was later determined to be a serious injury (Forney 2010). One interaction was observed in the shallow-set longline fishery in 2007 outside the U.S. EEZ. Further analysis of this interaction using the NMFS policy on the Process for distinguishing Serious from NonSerious Injury of Marine Mammals (NMFS 2012a) determined that this event was a non-serious injury. In 2011 there was an interaction with a humpback whale in the shallow-set longline fishery (100% observer coverage) outside of the U.S. EEZ, which was prorated to be 0.75 serious injury (Bradford & Forney 2013). The observer reported that there was an undetermined amount of gear that remained attached to the whale around its tail stock, which was wrapped once or twice around. There were no branchlines attached to the whale.

There has not been an interaction with a Hawaii sperm whale in the shallow-set longline fishery since the deep-set and shallow-set longline fisheries were split in 2004 for management purposes. (NMFS 2014) Prior to the separation of the fisheries, there was an interaction in 1999 with a vessel that was targeting swordfish, and one in 2002 with an experimental fishery that was

testing sea turtle mitigation gear similar to what is used in the shallow-set longline fishery now. The interaction occurred on a control set and the sperm whale was entangled in the mainline; the mainline was cut and the animal escaped with no line attached (Boggs 2002).

There have been no interactions between the MHI IFKW stock and the shallow-set longline fishery.

The Hawaii shallow-set longline fishery had an observed interaction with an ESA-listed Guadalupe fur seal in 2016. This species was previously not known to interact with the shallow-set fishery and was not included in the 2012 BiOp. Reinitiated consultation for this fishery is underway. The Guadalupe fur seal interaction occurred outside of the U.S. EEZ off the coast of California, and the animal was released alive after the crew removed all gear. The abundance of Guadalupe fur seals is estimated at approximately 20,000 animals, and NMFS estimates the PBR to be 542 animals per year (Carretta et al. 2016). The observed interaction of the Guadalupe fur seal in the Hawaii shallow-set longline fishery is less than 1% of the PBR and likely to have a negligible effect on the population.

Table 24. Estimated annual marine mammal interactions (including mortalities, serious injuries, and non-serious injuries) with the Hawaii shallow-set longline fishery from 2008-2016.

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Blackfish*	1	0	0	1	0	0	0	0	0	0
Short-beaked Common dolphin	0	0	0	1	0	0	1	0	0	0
Risso's dolphin	4	3	7	4	0	3	6	3	2	2
Blainville's beaked whale	0	0	0	1	0	0	0	0	0	0
Humpback whale	1	0	0	1	0	0	0	1	0	0
False killer whale	1	1	0	1	1	0	1	0	0	0
Striped dolphin	1	0	2	0	1	0	2	0	1	3
Bottlenose dolphin	0	0	2	2	1	2	4	2	1	0
Rough-toothed dolphin	0	0	0	0	0	1	0	0	0	0
Fin whale	0	0	0	0	0	0	0	1	0	0
Unidentified cetacean	0	1	1	0	1	0	0	1	0	0
Pygmy or dwarf sperm whale	1	0	0	0	0	0	0	0	0	0
Beaked whale, Mesoplodont	0	0	0	1	0	0	0	0	0	0
Ginkgo-toothed beaked whale	0	0	0	0	0	0	0	1	0	0
Unidentified beaked whale	0	0	0	1	0	2	0	1	0	0
Northern elephant	0	0	0	0	0	1	1	0	0	0

Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
seal										
Guadalupe fur seal	0	0	0	0	0	0	0	0	1	3
Unidentified pinniped	0	0	0	0	0	0	0	3	0	0
Unidentified sea lion	0	0	0	0	0	0	1	2	0	0

Note: "Blackfish" include unidentified whales considered to be either false killer whales or short-finned pilot whales.
Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017);, 2016 Pelagic FEP SAFE Report ; NMFS PIRO 2017 Annual Report.

3.3.2.3 Marine Mammal Interactions in the American Samoa, Guam, and CNMI Longline Fisheries

To date, no humpback, sperm, blue, fin, or sei whale interactions have been observed or reported in the American Samoa longline fishery. The target rate for observer coverage has been above 20 percent of all trips since 2010. This is subject to funding limitations and may fluctuate. Table 25 summarizes the fleet-wide marine mammal interactions in the American Samoa longline fishery from 2006-2016.

Table 25. Number of marine mammal interactions (including mortalities, and serious and non-serious injuries) observed in the American Samoa longline fishery, 2006-2016.

Species	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Rough-toothed dolphin	0	0	16	0	0	15	0	5	0	0	10	5
Cuvier's beaked whale	0	0	0	0	0	3	0	0	0	0	0	0
False killer whale	0	0	31	0	0	9	0	5	0	9	10	5
Short-finned pilot whale	0	0	0	0	0	0	0	0	5	0	0	0
Unidentified cetacean	0	0	0	0	0	6	0	0	0	0	0	0

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017), Draft 2016 Pelagic FEP SAFE Report (in prep).
Note: 2017 estimates expanded by multiplying observed interactions by 5 as there was 20% observer coverage levels in 2017. Fractional estimates rounded up to nearest whole number.

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.

3.3.3 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 WPFMC 2011). A comprehensive description of the species' distribution, population status, threats, and recovery strategy can be found in the species' recovery plans.[5] 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 Pelagic 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 2012). 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

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

range of the American Samoa longline fishery and the ranges of Chatham, Fiji, and magenta petrels, the fishery would not affect those petrels.

Seabird interactions have not been reported or observed in the Guam or CNMI longline fisheries. 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. Thus, there are no reports of interactions with seabirds.

Non ESA-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 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).

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 DPS, 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.

3.3.3.1 Seabird Interactions in the Hawaii Deep and Shallow-set Longline Fisheries

Tables 26 and 27 contain the numbers of albatross that have interacted with the Hawaii deep- and shallow-set longline fisheries from 2005 through 2016 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.

Recent increases in albatross interactions observed in the Hawaii deep-set longline fishery have been linked with reduced ocean productivity. Results from an analysis of seabird interaction rates in the Hawai`i deep-set longline fishery (Gilman et al. 2016) indicate that seabird interaction rates significantly increased as annual mean multivariate ENSO index values increased, meaning that decreasing ocean productivity may have contributed to the increasing trend in seabird catch rates. The analysis also showed a significant increasing trend in the number of albatrosses attending vessels, which may also be contributing to the increasing seabird catch rates.

In addition, from 2004 through 2016, based on observed sets, the deep-set fishery interacted with two red-footed boobies, one brown booby and 42 sooty shearwaters. In the same period, the shallow-set fishery interacted with one northern fulmar and four sooty shearwaters (http://www.fpir.noaa.gov/SFD/SFD_seabirds.html).

Table 26. Estimated total interactions with albatrosses in the Hawaii deep-set longline fishery, 2005- 2016.

Year	Laysan	Black-footed
2005	43	82
2006	7	70
2007	44	77
2008	55	118
2009	60	110
2010	155	65
2011	187	73
2012	136	167
2013	236	257
2014	73	177
2015	119	541
2016	169	517
2017	187	476

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017); 2016 Pelagic FEP SAFE Report ;
NMFS PIRO 2017 Annual Report.
Note: 2017 estimates expanded by multiplying observed interactions by 4.9 as there was 20.4% observer coverage levels in 2017. Fractional estimates rounded up to nearest whole number.

Table 27. Number of albatross interactions observed in the Hawaii shallow-set longline fishery, 2005- 2016.

Year	Laysan	Black-footed
2005	62	7
2006	8	3
2007	39	8
2008	33	6
2009	81	29
2010	40	39
2011	49	19
2012	61	37
2013	46	28
2014	36	29
2015	45	41
2016	26	40
2017	6	51

Source: 2015 Pelagic FEP SAFE Report (WPFMC 2017), 2016 Pelagic FEP SAFE Report; NMFS PIRO 2017 Annual Report.
Note: 1 interaction with an unidentified gull was reported in 2017.

3.3.3.2 Seabird Interactions in the American Samoa Longline Fishery

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 frigate bird in the American Samoa longline fishery from 2006-2017.

3.3.4 Sharks

ESA Listed Sharks and Rays

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 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).

On January 30, 2018, NMFS issued a final rule to list the oceanic whitetip shark as a threatened species under the ESA (83 FR 4153). The oceanic whitetip shark is distributed worldwide in epipelagic tropical and subtropical waters between 30° North latitude and 35° South latitude. The species is a highly migratory species that is usually found offshore and in deep waters. NMFS has not proposed critical habitat or protective regulations under ESA section 4(d) at this time. Detailed information on the oceanic whitetip sharks including the range, abundance, status and threats to the species can be found in the 2016 Status Review Report (Young et al. 2016) and the 2016 Proposed Rule (81 FR 96304).

Additionally, January 22, 2018, NMFS issued a final rule to list the giant manta ray as a threatened species under the ESA (83 FR 2916). The giant manta ray is found worldwide in tropical, subtropical, and temperate bodies of water. The species is considered to be a migratory species, with estimated distances travelled of up to 1,500 km. NMFS has not proposed critical habitat or protective regulations under ESA section 4(d) at this time. Detailed information on the giant manta ray including the range, abundance, status and threats to the species can be found in the 2017 Status Review Report (Miller & Kilmovich 2016) and the 2016 Proposed Rule (82 FR 3694).

Section 7 of the ESA requires federal agencies to confer on any agency action, which is likely to jeopardize the continued existence of any proposed species to be listed. Available data indicate that the Hawaii and America Samoa longline fisheries interact with oceanic white tip sharks and giant manta rays on low levels.

3.3.4.1 Scalloped Hammerhead Shark Interactions in the Hawaii Deep and Shallow-set Longline Fisheries

Scalloped hammerhead shark interactions in the Hawaii deep-set fishery are rare, unpredictable events. Since 2004, there have been three observed interactions with scalloped hammerhead sharks in the Hawaii deep-set fishery in the area of the threatened Indo-West Pacific DPS (NMFS 2014). In the 2014 no-jeopardy BiOp for the Hawaii deep-set longline fishery, NMFS estimates that there could be up to two interactions with scalloped hammerhead sharks annually in the fishery and authorizes the Hawaii longline fishery to interact with six Indo-Western Pacific scalloped hammerhead sharks, with up to three mortalities over a three year period (NMFS 2014d). NMFS estimates the effective population size of the Indo-West Pacific scalloped hammerhead shark DPS is 33,600 adults based on a 5.7 year generation time and 11,280 adults based on a 16.7 year generation time (NMFS 2015).

In the 2014 BiOp, NMFS applied the lower conservative effective population size of 11,280 adults in its effects analysis. NMFS estimates one annual mortality represents 0.009 percent (1/11,280*100=0.00886) of the population. Due to the small level of take NMFS considers the risk to the scalloped hammerhead shark DPS from the Hawaii deep-set longline fishing operations to be negligible (NMFS 2014). 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.

NMFS has no records of any interactions with scalloped hammerhead sharks from the Eastern Pacific DPS. 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.

The Hawaii shallow-set longline fishery generally occurs within the range of the Central Pacific DPS of scalloped hammerhead shark; this DPS was not listed under the ESA. The shallow-set fishery does not occur within the range of the Indo-West Pacific DPS; however a portion of the shallow-set fishery does fall within the range of the Eastern Pacific DPS. There have been no recorded or observed takes of hammerhead sharks in either the shallow-set or the deep-set longline fishery in the area of the Eastern Pacific DPS (NMFS Observer Program, unpublished data). On the March 2, 2015 Letter of Concurrence, NMFS concurred with the determination that the continued authorization of the Hawaii shallow-set longline fishery under the Pelagic FEP is not likely to adversely affect the Eastern Pacific scalloped hammerhead shark DPS due to the low risk of interaction between the DPS and the fishery.

3.3.4.2 Scalloped Hammerhead Shark Interactions in the American Samoa Longline Fishery

Scalloped hammerhead shark interactions in the American Samoa longline fishery are rare, unpredictable events. Since 2006, there have been ten observed interactions with Indo-West Pacific scalloped hammerhead sharks in the American Samoa longline fishery (NMFS 2015). In the 2015 no-jeopardy BiOp for the American Samoa longline fishery, NMFS estimates that there could be up to twelve interactions with scalloped hammerhead sharks annually in the American Samoa longline fishery and authorizes the fishery to interact with up to 36 Indo-Western Pacific scalloped hammerhead sharks, with up to 12 mortalities over a three year period (NMFS 2015). Applying a conservative population size of 11,280 adults, NMFS estimates four annual mortalities represent 0.04 percent (4/11,280*100=0.03546) of the population. Due to the small level of take NMFS considers the risk to the scalloped hammerhead shark DPS from the American Samoa longline fishery to be negligible (NMFS 2015). NMFS in its 2015 BiOp concluded that the American Samoa 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.

3.3.4.3 Oceanic Whitetip Shark Interactions in the in the Hawaii Deep and Shallow-set Longline Fisheries and American Samoa Longline Fishery

Oceanic whitetip sharks are caught incidentally in the Hawaii longline fisheries. However, in accordance with WCPFC CMM 2011-01, Hawaii longline vessels are required to release all oceanic white tip sharks incidentally caught in the WCPO. Additionally, because this species has no market value, and federal regulations have prohibited shark finning since 2002, they are also release if caught in the EPO.

Based on NMFS observer data from 2011-2013, NMFS estimate the Hawaii deep-set longline fishery caught an average of 1,022 individual oceanic whitetip sharks annually from 2011-2013. This level of catch is equivalent to an annual catch of 10,946 lb or 16.07 mt (Table 28).

This level of catch represents to 0.22% of the current biomass of 2,001 mt and 0.80% of current total catch of 7,295 mt in the WCPO as estimated in the 2012 stock assessment (Rice and Harley 2012a).

Based on observer data for 2011-2013, the Hawaii shallow-set longline fishery caught an average catch of 42 oceanic whitetip sharks annually, which is equivalent to 3.33 mt (Table 28). This level of catch amounts to 0.05% of the current biomass and 0.17% of current total catch in the WCPO.

Table 28. Average annual catch of oceanic whitetip shark in the Hawaii and American Samoa longline fisheries (2011-2013) compared to total catch and biomass estimates.

	Average annual catch, 2011-2013[a]			% of WCPO	% WCPO
Fishery	**Numbers**	**Pounds**	**Metric Tons**	**Total Catch**	**Est. Biomass**
HI DSLL	1,022	35,408	16.07	0.80%	0.22%
HI SSLL	42	7,336	3.33	0.17%	0.05%
ASLL	390	10,946	4.97	0.25%	0.07%
Total	1,454	53,690	24.36	1.22%	0.33%

[a] US National Bycatch Report First Edition Update 2

[b] $C_{current}$(Reference) = 2,001 metric tons (Rice and Harley 2012)

[c] $B_{current}$(Reference) = 7,295 metric tons (Rice and Harley 2012)

A preliminary analysis of annual standardized CPUE for oceanic whitetip shark for 1995-2014 conducted as part of the 2016 Status Review Report (Young et al. 2016) indicated that the population in the area of the Hawaii longline fishery operation may have stabilized in recent years. Observer data from 2015 and 2016 indicate that the nominal CPUE was approximately same or slightly higher than 2014 (NMFS PIROP Observer data, unpublished), but these data are not standardized and should be interpreted with caution.

Of the oceanic whitetip sharks incidentally caught in the Hawaii longline fishery, an average of 77.4% and 87.1% of the catches are released alive in the deep-set and shallow-set longline fisheries, respectively (Table 29). NMFS PIFSC is currently conducting a study to assess the post-release survivorship of sharks released alive in the Hawaii and American Samoa longline fishery.

Table 29. Proportions of oceanic whitetip sharks released alive in the Hawaii and American Samoa longline fisheries, 2007-2016.

	% released alive		
Year	**DSLL**	**SSLL**	**ASLL**
2007	72.5%	92.9%	71.0%
2008	75.0%	83.0%	64.6%

2009	77.4%	74.5%	71.1%
2010	82.6%	81.1%	71.5%
2011	80.9%	88.5%	62.1%
2012	77.9%	91.7%	63.4%
2013	81.6%	92.6%	83.0%
2014	81.8%	85.7%	64.4%
2015	73.8%	90.9%	64.9%
2016	70.9%	90.6%	64.5%
10-year Average	**77.4%**	**87.1%**	**68.0%**

Source: NMFS Pacific Islands Regional Observer Program, unpublished data.

Oceanic whitetip sharks are caught incidentally in the American Samoa longline fisheries. In accordance with WCPFC CMM 2011-01, American Samoa longline vessels are required to release all oceanic white tip sharks incidentally caught in the WCPO. The 2016 update of the National Bycatch Report (NMFS 2016) provides total estimated catch data by weight for 2011-2013 based on NMFS observer data, which allow comparison of the catch in this fishery with the reference points estimated in the oceanic whitetip shark stock assessment. The American Samoa longline fishery had an average catch of 390 oceanic whitetip sharks annually during 2011-2013, which is equivalent to an annual catch of 10,956 lbs or approximately 5.0 mt. This level of catch represents 0.25% of the recent WCPO catch of 2,001 mt and 0.07% of current total biomass of 7,295 mt in the WCPO as estimated in the 2012 stock assessment (Rice and Harley 2012).

The impact of the Hawaii and American Samoa longline fisheries on the oceanic whitetip shark population is likely to be minimal, considering the small contribution to the total WCPO catch (<1%) and in relation to the current biomass (<0.3%) as well as the high proportion of the sharks released alive. As described in the final rule listing (CITE), the oceanic whitetip shark 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.

3.3.4.4 Giant Manta Ray Interactions in the in the Hawaii Deep and Shallow-set Longline Fisheries and American Samoa Longline Fishery

Giant manta rays are caught incidentally in the Hawaii and American Samoa longline fisheries. The average annual incidental catch of giant manta rays for 2011-2013 was estimated at 616 lbs in the Hawaii deep-set longline fishery, 88 lbs in the Hawaii shallow-set longline fishery, and 1,308 lbs in the American Samoa longline fishery (NMFS 2016). Most of the giant manta rays incidentally caught in the Hawaii and American Samoa longline fisheries are released alive (Table 30).

There is no historical or current global abundance estimates for giant manta rays. Most estimates of subpopulations are based on anecdotal observations, and range from around 100-1,500

individuals (Miller and Klimovich 2016). The 2016 NMFS Status Review Report for the giant manta ray concluded that the incidental catch of this species in U.S. longline fisheries are likely to have minimal impacts on the population (Miller and Klimovich 2016).

Table 30: Observed interactions and proportions of giant manta rays released alive in the Hawaii deep-set (DSLL), Hawaii shallow-set (SSLL) and American Samoa longline fisheries (ASLL), 2007-2016.

	DSLL		SSLL		ASLL	
Year	Observed interactions	% released alive	Observed interactions	% released alive	Observed interactions	% released alive
2007	2	100%	5	60%	0	—
2008	2	100%	0	—	0	—
2009	4	100%	0	—	1	100%
2010	17	94%	6	100%	3	100%
2011	1	100%	3	33%	3	100%
2012	2	100%	0	—	3	100%
2013	1	100%	0	—	2	100%
2014	3	100%	1	100%	1	100%
2015	2	100%	0	—	0	—
2016	4	100%	0	—	0	—

Source: NMFS Pacific Islands Regional Observer Program, unpublished data.

3.3.5 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 suitable environmental conditions that allow 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 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.

3.3.6 Critical Habitat

3.3.6.1 Leatherback Sea turtle Critical Habitat

On January 26, 2012, NMFS designated critical habitat for leatherback sea turtles off the west coast of the U.S., including areas off WA, OR, and CA (77 FR 4170). Because Hawaii longline vessels in both the deep-set and shallow-set fishery may occasionally transit through the U.S. EEZ to and from west coast ports, NMFS evaluated the fishery for potential effects to leatherback sea turtle critical habitat in both the 2012 BiOp for the shallow-set fishery (NMFS 2012) and the 2014 BiOp for the deep-set fishery (NMFS 2014). Because longline fishing is prohibited by federal law within the EEZ off the west coast, NMFS determined that the deep-set and shallow-set longline fisheries may affect, but are not likely to adversely modify designated critical habitat for leatherback sea turtles.

3.3.6.2 Monk Seal Critical Habitat

On August 21, 2015, NMFS published a final rule (80 FR 50926) designating critical habitat for the Hawaiian monk seal (*Neomonachus schauinslandi*) in the main Hawaiian Islands (MHI) and expanding monk seal critical habitat in the Northwestern Hawaiian Islands (NWHI). NMFS identified features that are essential for the conservation of monk seals, including areas preferred for pupping and nursing, areas that support adequate prey quality and quantity for foraging, and areas for hauling out, resting, or molting. Accordingly, NMFS identified critical habitat in certain areas in the MHI, and around designated islands in the NWHI, to include, generally, from the beach to the 200-m depth contour and the seafloor and the waters and habitat within 10 m of the seafloor. Please consult the final rule for specific critical habitat boundaries.

In response to the critical habitat designation, NMFS reinitiated ESA section 7 consultation to evaluate the potential impacts of Hawaii deep-set and shallow-set longline fisheries on monk seal critical habitat. Because monk seals do not prey on species targeted by the Hawaii's deep-set and shallow-set longline fisheries and due to the fact that longline vessels are prohibited from fishing within 50 to 75 nm around all Hawaiian Islands, NMFS determined that the Hawaii shallow-set and deep-set longline fisheries may affect, but are not likely to adversely modify monk seal critical habitat. NMFS documented its determinations in a memorandum of concurrence dated September 16, 2015.

4 Potential Impacts of the Alternatives

This chapter describes the potential environmental consequences that could result from the Alternatives considered. The analysis relies on the information described in Chapter 3 as the

baseline to evaluate the impacts of the management alternatives considered herein. 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 are discussed in the cumulative effects section.

Changes to fisheries in the U.S. participating territories may occur in the future if the proposed action is approved, and funding provided through specified fishing agreements under this action becomes available to support NMFS-approved fisheries development projects identified in a U.S. participating territory's MCP. However, it would be speculative at this time to attempt to evaluate environmental effects of potential projects without specific information on the type or scope of the project that would be funded. For this reason, potential impacts of future fishery development projects that could be funded are briefly discussed, but not analyzed in detail in this EA. Such projects may be subject to separate environmental review when project details are known.

Due to the similarities in potential impacts under Alternatives 2, 3 and 4, where appropriate, the following analysis often groups the action alternatives in consideration to impacts to resource categories.

4.1 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. As described in Section 3.1, pelagic MUS, including bigeye tuna, is not currently considered to be subject to overfishing or in an overfished condition. To evaluate the potential impacts of the alternatives on bigeye tuna, Council staff with the assistance from NMFS Pacific Islands Fisheries Science Center (PIFSC) and SPC,[6] conducted an analysis to evaluate the impact on bigeye stock status of the various catch limit specifications under consideration (Kingma and Bigelow 2018). See Tables 31-34 for the results of the analysis and Appendix 1.

At the WCPFC's 14th Regular Session held December 3–7, 2017, in Manila, Philippines, the SPC presented an evaluation of the outcomes of CMM 2016-01 on bigeye tuna stock status in year 2045 with defined management options for the tropical tuna fishery (purse seine and longline) from the August 2018 Intersessional Meeting to progress the draft Bridging CMM on Tropical Tuna (SPC 2017). This evaluation was based on the 2017 bigeye tuna stock assessment (McKechnie et al. 2017) and utilized deterministic projections across a range of weighted models as agreed to by the SC at its 13th meeting held August in 2017 (WCPFC 2017). The SPC conducted a thirty-year projection from 2016, rather than a 20-year projection due to the stock not reaching equilibrium in the 20 year horizon with the assumed purse seine effort and longline catch, and under the recruitment assumptions used. (G. Piling. SPC, pers. comm. January 2018).

The analysis presented in Kingma and Bigelow (2018) utilizes the same bigeye stock assessment parameters as utilized by the SPC in the evaluation for the WCPFC14. Due to the computational complexity of the 144 weighted models within the structural uncertainty grid, only deterministic

[6] The SPC is the scientific services provider of the WCPFC.

projections were able to be conducted based on scalars to the Hawaii-permitted longline catch. The analysis assumes full implementation of CMM 2017-01, including the 3-month purse seine FAD closure within EEZs and the high seas and an additional two sequential months on the high seas by member countries. For longline catches, the analysis assumes that countries with specified annual longline bigeye limits in excess of 2,000 mt would each catch their full annual limit, even if actual catches have been less (e.g. Japan and Indonesia). Japan, for example, caught in 2016 nearly 6,000 mt less than its limit in 2016, and Indonesia reported catches of 8 mt in 2016, whereas its limit under CMM 2017-01 is maintained at 5,889 mt. Therefore the analysis indicates greater impacts to bigeye under full implementation of CMM 2017-01 versus recent total longline bigeye catches. For member countries that have bigeye longline catches less than 2,000 mt, and for SIDS and PTs without limits specified in CMM 2017-01, it was assumed that the catches of these fleets would be continued at their average 2013-2015 levels. Under all these assumptions, the SPC estimates that the total WCPO longline bigeye catch would be increased by 9.6% of the 2013-2015 average catch under CMM 2017-01.

Stock projections indicate the F_{2045}/F_{MSY} increases from 0.927 to 0.983 assuming full implementation of CMM 2017-01. In other words, if CMM 2017-01 is fully implemented, bigeye tuna would not be subject to overfishing in 2045. With respect to spawning biomass and total biomass in 2045 versus biomass at MSY, SPC (2017) did not calculate these values, focusing instead on the spawning biomass ratio to that in the absence of fishing ($SB_{2045}/SB_{F=0}$), which is WCPFC's adopted interim Limit Reference Point for bigeye tuna. The SC13 summary report indicated that recent $SB_{2011\text{-}2014}/SB_{MSY}$ had a mean of 1.21, which is well above the established overfished reference point (0.6 SB/SB_{MSY}) for bigeye tuna under the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (PFEP).

Fourteen model scenario runs were conducted. The baseline scenario reflects the implementation of CMM 2017-01. The other scenarios include the same assumptions for non-US longline fleets except scalars on the 2015 US longline bigeye catch component. The Alternative 1 scenario represents no action and no transfers of US Territorial allocation to Hawaii longline vessels, thus, the Alternative 1 projection includes less US longline and US Territory catch than the 2015 level. The 4 potential outcomes for Alternative 2 include total catch limits of 2,000 mt per US Territory and allocation limits of 1,000, 2,000, and 3,000 metric tons of bigeye to permitted US longline vessels from 1, 2, or 3 Territories (A-C, respectively) and then also adding full utilization of Territorial catch limits up to a maximum of 6,000 metric tons (D). For Alternative 4, 9 potential outcomes were evaluated that reflect the implementation of 1, 2, or 3 specified fishing agreements subject to various allocation limits per territory (1,000 mt, 1,500, and 2,000 mt; Potential Outcomes E-M). Impacts from Alternative 3 within the range provided under Outcomes D-L are for brevity are not repeated. Tables 31-34 provide the results of the analysis with respect to the alternatives and potential outcomes.

Table 31. Alternatives 1 and 2 F/F_{MSY}, $SB/SB_{F=0}$ values in 2045 based on SPC projections

Source: Kingma and Bigelow 2018.

Note: Alternative 3 is not analyzes separated below due the similarities between it and Alternatives 2 and 4.

	Alternative 1: No Action		**Alternative 2: 2,000 mt Catch Limit and 1,000 mt Allocation Limit for each U.S. Territory**							
			Potential Outcome A		***Potential Outcome B***		***Potential Outcome C***		***Potential Outcome D***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,000 mt of BET Transfers**		**2 Fishing Agreements and 2,000 mt of BET Transfers**		**3 Fishing Agreements and 3,000 mt of BET Transfers**		**3 Fishing Agreement and 3,000 mt of BET transfers and Full Utilization of BET in Territories**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**4,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,000		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000		**9,554 mt** HI: 3,554 AS: 1,000 GU: 1,000 CNMI: 1,000 Transfers: 3,000	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.988**	**0.5**	**0.994**	**1.1**	**1.000**	**1.7**	**1.014**	3.2
$SB_{2045}/SB_{F=0}$	**0.286**	**0.00**	**0.283**	**-1.0**	**0.280**	**-2.1**	**0.278**	**-2.8**	**0.271**	-5.2

Table 32: Alternatives 1 and 4(a) F/F_{MSY}, $SB/SB_{F=0}$ values in 2045 based on SPC projections
Source: Kingma and Bigelow 2018.

	Alternative 1: No Action		**Alternative 4 (a): No total catch limits, but allocation limits of 1,000 per territory**					
			Potential Outcome E		***Potential Outcome F***		***Potential Outcome G***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,000 mt of BET Transfers**		**2 Fishing Agreements and 2,000 mt of BET Transfers**		**3 Fishing Agreements and 3,000 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**4,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,000		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.988**	**0.5**	**0.994**	**1.1**	**1.000**	**1.7**
$SB_{2045}/SBF=0$	**0.286**	**0.00**	**0.283**	**-1.0**	**0.280**	**-2.1**	**0.278**	**-2.8**

Table 33: Alternatives 1 and 4(b) F/F_{MSY}, $SB/SB_{F=0}$ values in 2045 based on SPC projections
Source: Kingma and Bigelow 2018.

	Alternative 1: No Action		**Alternative 4(b): No total catch limits, but allocation limits of 1,500 per territory**					
			Potential Outcome H		***Potential Outcome I***		***Potential Outcome J***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,500 mt of BET Transfers**		**2 Fishing Agreements and 3,000 mt of BET Transfers**		**3 Fishing Agreements and 4,500 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**5,463 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,500		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000		**8463 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 4,500	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.991**	**0.8**	**1.000**	**1.7**	**1.008**	**2.5**
$SB_{2045}/SBF=0$	**0.286**	**0.00**	**0.282**	**-1.4**	**0.278**	**-2.8**	**0.274**	**-4.2**

Table 34: Alternatives 1 and 4(c) F/F_{MSY}, $SB/SB_{F=0}$ values in 2045 based on SPC projections
Source: Kingma and Bigelow 2018.

	Alternative 1: No Action		**Alternative 4(c): No total catch limits, but allocation limits of 2,000 per territory**					
			Potential Outcome K		***Potential Outcome L***		***Potential Outcome M***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 2,000 mt of BET Transfers**		**2 Fishing Agreements and 4,000 mt of BET Transfers**		**3 Fishing Agreements and 6,000 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**7,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 4,000		**9,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 6,000	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.994**	**1.1**	**1.005**	**2.2**	**1.016**	**3.4**
$SB_{2045}/SBF=0$	**0.286**	**0.00**	**0.280**	**-2.1**	**0.275**	**-3.8**	**0.270**	**-5.6**

4.1.1 Potential Impacts of Alternative 1 (No Management Action)

Under Alternative 1, NMFS would not specify a bigeye tuna catch or allocation limit for any U.S. participating territory in 2018. Under this alternative, the U.S. longline fishery based mostly in Hawaii would be subject to an annual longline WCPO bigeye tuna limit of 3,554 mt in 2018. When these limits are reached, NMFS would prohibit catch and retention of longline caught bigeye tuna in the WCPO through the end of the year. Based on recent levels of bigeye tuna catch by vessels to which the limit applies, the bigeye tuna limit of 3,554 mt may be reached in between July and September 2018.

Based on historical fishery performance, vessels operating in the longline fisheries of American Samoa are expected to catch around 529 mt of bigeye tuna in 2018. This is the average level of catch for the period 2011-2016. No active longline vessels are based in CNMI and Guam currently.

Without specified fishing agreements, the combined 2018 catch of bigeye tuna by the longline fisheries of the U.S. territories American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt) and the U.S. longline fisheries (3,554 mt) in the WCPO is expected to be 4,083 mt, (529 + 0 + 0 + 3,554 = 4,083 mt).

4.1.1.1 Potential Impacts to Bigeye Tuna

Under Alternative 1 (No Management Action), the Council/PIFSC analysis, (Appendix 1, Table 31) indicates that the F_{2045}/F_{MSY} would be 0.983. This supports a conclusion that, under Alternative 1, in combination with the full implementation of CMM 2017-01, WCPO bigeye tuna would not be subject to overfishing in 2045.

With respect to spawning biomass, the analysis indicates that $SB_{2045}/SB_{F=0}$ is 0.286, which is above the WCPFC LRP ($SB_{2045}/SB_{F=0} = 0.20$) and PFEP's MSST ($B/B_{MSY}$ 0.6).[7] These values are above the MSST of 0.6 and above the level necessary to produce MSY on a continuing basis. Under this Alternative, bigeye stock status is not in an overfished condition when projected to 2045.

Under Alternative 1, it is likely that the U.S. bigeye limit of 3,554 would be reached between July and September 2018. If this occurs, retention of bigeye tuna in the WCPO by Hawaii longline fishing vessels is restricted. However, in accordance with federal regulations at 50 CFR Part 300, Subpart O, the limit does not apply to bigeye tuna caught by longline gear outside the WCPO, such as in the eastern Pacific Ocean or EPO (generally east of 150° W. long.). The regulations also provide vessels operating in the longline fisheries of the U.S. participating territories with an exception to the restriction. The exception includes vessels that land bigeye tuna in a U.S. territory, vessels included in a specified fishing agreement under 50 CFR 665.819(d), and vessels that have an American Samoa and Hawaii longline permit (dual AS/HI longline permitted vessel) and lands in Hawaii, provided the fish was not caught in the U.S. EEZ around Hawaii. Catches of bigeye tuna by exempted vessels are attributed to the applicable U.S. participating territory to which the vessel is associated in accordance with 50 CFR Part 300,

[7] $0.6SB_{MSY}$ is ~ $0.14SB_{F=0}$

Subpart O. See 50 CFR 300, Subpart O for specific regulations governing the WCPO bigeye tuna limit applicable to vessels of the United States.

During a restriction in the WCPO, U.S. longline vessels based in Hawaii are expected to shift effort into the EPO. However, vessels 24 m in length and greater that fish for bigeye tuna in the EPO would be subject to the U.S. EPO bigeye tuna limit of 750 mt established by the IATTC. When the EPO limit is reached, NMFS would restrict retention of bigeye tuna by vessels longer than 24 m. As explained in Section 3.1, bigeye tuna in the EPO is not subject to overfishing or overfished. Therefore, vessels less than 24 m in length can continue fishing for and retaining bigeye tuna, and EPO bigeye tuna stock is not expected to be negatively affected under the No-Management alternative.

During a catch and retention restriction in the WCPO, it is expected that an increased amount of foreign caught bigeye tuna would be imported to Honolulu to fill any market gaps. Fresh bigeye tuna imports into Hawaii showed a significant increase in 2012 and has remained stable through 2016, indicating that there is substantial market demand for bigeye tuna in Hawaii.
A potential consequence of Alternative 1 is that less monitored and less environmentally friendly foreign fisheries targeting bigeye tuna would fill market gaps left by U.S. fisheries that are constrained by federal regulations from fishing to optimum yield (See Chan and Pan, 2012).

4.1.1.2 Potential Impacts to Other Non-Target Stocks

CNMI and Guam longline fisheries

As noted in Section 3.2.1, there has been no longline fishing in the US EEZ around CNMI or Guam since 2011, and no longline fishing activities are expected to occur in 2018. High operating costs associated with vessel-docking along with poor market access may be contributing factors to the lack of longline fishing in the Marianas (WPFMC and NMFS 2014). Without an active fishery in Guam or the CNMI, Alternative 1 is not expected to result in changes in the conduct of longline fisheries in Guam or the CNMI in 2018, including target or non-target species, area fished, seasonality, or intensity of fishing.

American Samoa longline fishery

As described in Chapter 3.2.2, the largest pelagic fishery in American Samoa is the commercial longline fishery targeting albacore tuna, which is sold to the local Pago Pago cannery. The amount of albacore landed by the American Samoa longline fishery in 2016 was 3,433,832 lb (1,558 mt). The 2016 WCPO catch of south Pacific albacore was estimated at 71,407 mt, thus the American Samoa longline fishery represents approximately 2.2 percent of the total annual south Pacific albacore catch. The stock of south Pacific albacore is not overfished and overfishing is not occurring, but catch rates have been reducing over the last decade, resulting in difficult operating conditions for the American Samoa-based longline fleet.

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 no 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 Alternative 1 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 at this time. For these reasons, there would be no additional large impacts to target or non-target stocks.

NMFS strives to achieve an annual observer coverage rate of 20 percent in the American Samoa longline fishery. 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 and mostly returned alive. Bycatch levels are shown in Section 3.2.3. 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 Alternative 1.

Hawaii longline fisheries

As described in section 3.2.4, the combined Hawaii longline fishery (deep-set and shallow-set) 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. Additionally, as the larger of the two longline fisheries, effort for bigeye tuna in the deep-set fishery influences catches of non-target species for the longline fishery as a whole.

It is expected that if the WCPO U.S. longline limit for bigeye tuna were reached, and if catch and retention of bigeye tuna in the WCPO were restricted, a number of Hawaii longline vessels would likely shift fishing effort for bigeye tuna to the eastern Pacific Ocean or EPO, while other vessels may begin targeting swordfish in the WCPO, or stop fishing altogether until January 1, 2019. The catch of non-target species would be expected to be similar to recent levels or reduced if less fishing occurs.

Because the Council and NMFS closely monitor catches based on landings data, changes in the catch of non-target stocks are expected to be detected and subject to additional management measures, as appropriate.

Given the limited entry status of the Hawaii longline fisheries (both deep-set and shallow-set), there is a low likelihood of the fisheries expanding under the Alternative 1, and thus substantial increases in catches of target or non-target species are not anticipated under this 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 would consider recommending future management measures to the Secretary to rebuild the stock or reduce fishing mortality.

4.1.2 Potential Impacts of Alternative 2 (Council recommended)

Under Alternative 2, longline fisheries in the U.S. participating territories would each be subject to a 2,000-mt (4,409,240 lb) catch limits for bigeye tuna. Additionally, each U.S. participating territory would be able to allocate up to 1,000 mt (2,204,620 lb) of its 2,000 mt bigeye tuna catch limit to FEP-permitted longline vessels under specified fishing agreements. Specified fishing agreements under Alternative 2 would support responsible fisheries development in the U.S. participating territories by providing project funds for approved MCPs.

NMFS cannot predict the number of specified fishing agreements that the U.S. participating territories may negotiate and submit to NMFS in 2018. For this reason, the EA analyses four possible fishery outcomes for Alternative 2, depending on the number of specified fishing agreements that are actually authorized in 2018.

4.1.2.1 Potential Impacts to Bigeye Tuna

Outcome A: One specified fishing agreement

Based on the information described in Section 2.2, under one specified fishing agreement, the combined catch of bigeye tuna by the longline fisheries of the U.S. territories (American Samoa, Guam and the CNMI) and the longline fisheries of Hawaii, including catch under one specified fishing agreement is expected to be 5,083 mt in 2018 (529 + 0 + 0 + 3,554 + 1,000 = 5,083 mt). Under Outcome A, the Council/PIFSC's analysis indicates that the projected F_{2045}/F_{MSY} = 0.988, $SB_{2045}/SB_{F=0}$ = 0.283. These values a indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

Compared to Alternative 1, Alternative 2-Outcome A would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.988 vs 0.983 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=o}$ = 0.283 vs 0.286 under Alternative 1). However, these changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1.

Outcome B: Two specified fishing agreements

Based on the information described in Section 2.2, two specified fishing agreements would allow allocation of up to 2,000 mt of bigeye tuna from two U.S. participating territories. Therefore, under Outcome B, the combined catch of bigeye tuna would be 6,083, which figure includes the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt), and the CNMI

(0 mt), plus the U.S. longline fisheries based in Hawaii (3,554 mt) and the allocation of (2,000 mt) (529 mt + 0 + 0 + 3,554 + 2,000 = 6,083 mt).

Applying the Council/PIFSC analysis to Alternative 2-Outcome B, the projected F_{2045}/F_{MSY} = 0.994, $SB_{2045}/SB_{F=0}$ = 0.280. These values are similar to projected values under one specified fishing agreement (described above). Compared to Alternative 1, Alternative 2-Outcome B would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.994 vs. 0.988 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.280 vs. 0.286 under Alternative 1). These changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1. The projections associated with Outcome B indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

Outcome C: Three specified fishing agreements and Partial Utilization of Territorial Limits

Based on the information described in Section 2.2, three specified fishing agreements would allocate up to 3,000 mt of bigeye tuna from three U.S. participating territories. Therefore, under Alternative 2-Outcome C, the combined catch of bigeye tuna in 2018 would be 7,083. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and the allocation (3,000 mt) (529 + 0 + 0 + 3,554 + 3,000 = 7,083 mt).

Applying the Council/PIFSC analysis Alternative 2-Outcome C, the projected F_{2045}/F_{MSY} = 1.00 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.278. Compared to Alternative 1, Alternative 2-Outcome C would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.00 vs. 0.978 under Alternative 1) and a slight decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.271 vs 0.286 under Alternative 1). These values are less favorable for bigeye tuna compared to the recruitment projections under Outcomes A and B. However, these changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1. The projections associated with Outcome C indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

Outcome D: Three specified fishing agreements and Full Utilization of Territorial Limits

Based on the information described in Section 2.2, three specified fishing agreements would allocate 3,000 mt of bigeye and each territory is assumed to fully utilize the remaining 1,000 mt of their 2,000 mt limit for a total of an additional 3,000 mt. In Alternative 2-Outcome D, the 2018 expected bigeye catch would be 9,554 mt., which represents an assumed catch of the U.S. territories non-allocated limits, American Samoa (1,000 mt), Guam (1,000 mt), and the CNMI (1,000 mt), added to the catch by U.S. longline fisheries from Hawaii (3,554 mt), plus 3,000 mt allocated under three specified fishing agreement (1,000 + 1,000 + 1,000 + 3,554 + 3,000 = 9,554 mt).

Applying the Council/PIFSC's analysis Alternative 2-Outcome D, the projected F_{2045}/F_{MSY} = 1.014 and the projected $SB_{2045}/SB_{F=0}$ = 0.271. This indicates that bigeye tuna would technically

meet the definition of overfishing (although F2045/FMSY would be statistically indistinguishable from the overfishing threshold of 1.0) and the stock would not be overfished in 2045 as a result of Potential Outcome D. These values are less favorable for bigeye tuna when considered with the projections under Outcomes A, B and C of Alternative 2; however, this outcome is unlikely to occur. This is because it requires longline fisheries in each of the U.S. territories to each catch 1,000 mt of bigeye tuna (i.e., 3,000 mt combined) in 2018. However, as previously discussed, no bigeye tuna is expected to be caught by longline vessels in CNMI or Guam in 2018 because there are currently no active longline vessels based in those islands. Although the fishing mortality rate under Outcome D would be F_{2045}/F_{MSY} =1.014, this value is virtually indistinguishable from the overfishing threshold of F/F_{MSY} >1.0.

Compared to Alternative 1, Alternative 2-Outcome D would result in a small increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.014 vs. 0.983 under Alternative 1) and a decrease in spawning biomass ($SB2_{045}/SB_{F=0}$ = 0.271 vs 0.286 under Alternative 1). Although these values are less favorable for bigeye tuna compared to the values under Alternative 1, the effects of Alternative 2-Outcome D do not represent a change in the status of bigeye tuna stocks and the stock would remain not subject to overfishing and not overfished in 2045; the same as under Alternative 1.

4.1.3 Potential Impacts of Alternative 3

For potential impacts to bigeye associated with a varying number of potential agreements authorized in 2018 under this alternative, see the analysis below, in particular for Outcomes E-L. If the Territories either caught and/or allocated all 2,000 mt of their 2,000 mt catch limit, the potential impact would be as described above for Outcome D.

4.1.4 Potential Impacts of Alternative 4

Under Alternative 4, longline fisheries in the U.S. participating territories would not be subject to a total bigeye catch limit; however, each U.S. participating territory would be able to allocate up to a) 1,000 mt, b) 1,500 mt, or c) 2,000 mt per year to FEP-permitted longline vessels under specified fishing agreements.

NMFS cannot predict the number of specified fishing agreements that the U.S. participating territories may negotiate and submit to NMFS in 2018. For this reason, the EA analyses 9 possible fishery outcomes (E-M) for Alternative 4, depending on the number of specified fishing agreements that are actually implemented in 2018.

4.1.4.1 Potential Impacts to Bigeye Tuna

3(a) Outcome E: One specified fishing agreement (1,000 mt)

Under Alternative 4(a), with one specified fishing agreement totaling 1,000 mt, the combined catch of bigeye tuna by the longline fisheries of the U.S. territories (American Samoa, Guam and the CNMI) and the longline fisheries of Hawaii, including catch under one specified fishing agreement is expected to be 5,083 mt in 2018 (529 + 0 + 0 + 3,554 + 1,000 = 5,083 mt).

Under Outcome E, the Council/PIFSC's analysis indicates that the projected F_{2045}/F_{MSY} = 0.988, $SB_{2045}/SB_{F=0}$ = 0.283. These values a indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

Compared to Alternative 1, Alternative 4(a)-Outcome E would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.988 vs 0.983 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=o}$ = 0.283 vs 0.286 under Alternative 1). However, these changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1.

3(a) Outcome F: Two specified fishing agreements (2,000 mt total)

Two specified fishing agreements under Alternative 4(a) would allow allocation of up to 2,000 mt of bigeye tuna from two U.S. participating territories. Therefore, under Outcome F, the combined catch of bigeye tuna would be 6,083, which figure includes the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt), and the CNMI (0 mt), plus the U.S. longline fisheries based in Hawaii (3,554 mt) and the allocation of (2,000 mt) (529 mt + 0 + 0 + 3,554 + 2,000 = 6,083 mt).

Applying the Council/PIFSC analysis to Alternative 4(a)-Outcome F, the projected F_{2045}/F_{MSY} = 0.994, $SB_{2045}/SB_{F=0}$ = 0.280. These values are similar to projected values under one specified fishing agreement (described above). Compared to Alternative 1, Alternative 3(a)-Outcome F would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.994 vs. 0.988 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.280 vs. 0.286 under Alternative 1). These changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1. The projections associated with Outcome F indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(a) Outcome G: Three specified fishing agreements (3,000 mt total)

Three specified fishing agreements under Alternative 3(a) would allocate up to 3,000 mt of bigeye tuna from three U.S. participating territories. Therefore, under Alternative 4(a)-Outcome G, the combined catch of bigeye tuna in 2018 would be 7,083. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and the allocation (3,000 mt) (529 + 0 + 0 + 3,554 + 3,000 = 7,083 mt).

Applying the Council/PIFSC analysis, Alternative 4(a)-Outcome G, the projected F_{2045}/F_{MSY} = 1.00 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.278. Compared to Alternative 1, Alternative 4(a)-Outcome G would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.00 vs. 0.978 under Alternative 1) and a slight decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.271 vs 0.286 under Alternative 1). However, the projections associated with Outcome G indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(b) Outcome H: One specified fishing agreement (1,500 mt)

Under Alternative 4(b), with one specified fishing agreement totaling 1,500 mt, the combined catch of bigeye tuna by the longline fisheries of the U.S. territories (American Samoa, Guam and the CNMI) and the longline fisheries of Hawaii, including catch under one specified fishing agreement is expected to be 5,083 mt in 2018 (529 + 0 + 0 + 3,554 + 1,500 = 5,583 mt). Under Outcome H, the Council/PIFSC's analysis indicates that the projected F_{2045}/F_{MSY} = 0.991, $SB_{2045}/SB_{F=0}$ = 0.282. These values a indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

Compared to Alternative 1, Alternative 4(b)-Outcome H would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.991 vs 0.983 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=o}$ = 0.282 vs 0.286 under Alternative 1). However, these changes are minor such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1. The projections associated with Outcome H indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(b) Outcome I: Two specified fishing agreements (3,000 mt total)

Two specified fishing agreements under Alternative 4(a) would allocate up to 3,000 mt of bigeye tuna from two U.S. participating territories. Therefore, under Alternative 4(B)-Outcome I, the combined catch of bigeye tuna in 2018 would be 7,083. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and the allocation (3,000 mt) (529 + 0 + 0 + 3,554 + 3,000 = 7,083 mt).

Applying the Council/PIFSC analysis, Alternative 4(b)-Outcome I, the projected F_{2045}/F_{MSY} = 1.00 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.278. Compared to Alternative 1, Alternative 3(a)-Outcome I would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.00 vs. 0.978 under Alternative 1) and a slight decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.271 vs 0.286 under Alternative 1). However, the projections associated with Outcome I indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(b) Outcome J: Three specified fishing agreements (4,500 mt total)

Three specified fishing agreements under Alternative 4(b) would allocate up to 4,500 mt of bigeye tuna from three U.S. participating territories. Therefore, under Alternative 4(b)-Outcome J, the combined catch of bigeye tuna in 2018 would be 8,583. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and the allocation (4,500 mt) (529 + 0 + 0 + 3,554 + 4,500 = 8,583 mt).

Applying the Council/PIFSC analysis, Alternative 4(b)-Outcome J, the projected F_{2045}/F_{MSY} = 1.008 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.274. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be statistically indistinguishable from the overfishing threshold of 1.0) and the stock would not be overfished in 2045 as a result of Potential Outcome J. Compared to Alternative 1, Alternative 4(a)-Outcome J would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.008 vs. 0.978 under

Alternative 1) and a slight decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.274 vs 0.286 under Alternative 1). Although the fishing mortality rate under Outcome J would be F_{2045}/F_{MSY} =1.008, this value is virtually indistinguishable from the overfishing threshold of F/F_{MSY} >1.0. Thus, the projections associated with Outcome J indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(c) Outcome K: One specified fishing agreement (2,000 mt)

One specified fishing agreements under Alternative 4(c) would allow allocation of up to 2,000 mt of bigeye tuna from one U.S. participating territory. Therefore, under Outcome K, the combined catch of bigeye tuna would be 6,083, which figure includes the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt), and the CNMI (0 mt), plus the U.S. longline fisheries based in Hawaii (3,554 mt) and the allocation of (2,000 mt) (529 mt + 0 + 0 + 3,554 + 2,000 = 6,083 mt).

Applying the Council/PIFSC analysis to Alternative 4(c)-Outcome K, the projected F_{2045}/F_{MSY} = 0.994, $SB_{2045}/SB_{F=0}$ = 0.280. These values are similar to projected values under one specified fishing agreement (described above). Compared to Alternative 1, Alternative 4(c)-Outcome K would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 0.994 vs. 0.983 under Alternative 1) and a slight decrease in both spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.280 vs. 0.286 under Alternative 1). These changes are minor, such that the effects do not represent a change in the status of bigeye tuna stocks compared to Alternative 1. The projections associated with Outcome K indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(c) Outcome L: Two specified fishing agreements (4,000 mt total)

Two specified fishing agreements under Alternative 4(c) would allocate up to 4,000 mt of bigeye tuna from two U.S. participating territories. Therefore, under Alternative 4(c)-Outcome L, the combined catch of bigeye tuna in 2018 would be 8,083. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and the allocation (4,000 mt) (529 + 0 + 0 + 3,554 + 3,000 = 8,083 mt).

Applying the Council/PIFSC analysis, Alternative 4(c)-Outcome L, the projected F_{2045}/F_{MSY} = 1.005 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.275. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be statistically indistinguishable from the overfishing threshold of 1.0) and the stock would not be overfished in 2045 as a result of Potential Outcome L. Compared to Alternative 1, Alternative 4(c)-Outcome L would result in a slight increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.005 vs. 0.983 under Alternative 1) and a slight decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.275 vs 0.286 under Alternative 1). Although the fishing mortality rate under Outcome L would be F_{2045}/F_{MSY} =1.005, this value is virtually indistinguishable from the overfishing threshold of F/F_{MSY} >1.0. Thus, the projections associated with Outcome L indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

3(c) Outcome M: Three specified fishing agreements (6,000 mt total)

Three specified fishing agreements under Alternative 4(c) would allocate up to 6,000 mt of bigeye tuna from three U.S. participating territories. Therefore, under Alternative 4(c)-Outcome M, the combined catch of bigeye tuna in 2018 would be 10,083. This figure represents the longline fisheries of the U.S. territories, American Samoa (529 mt), Guam (0 mt) and the CNMI (0 mt), plus the U.S. longline fisheries in Hawaii (3,554 mt), and three fishing agreements (6,000 mt) (529 + 0 + 0 + 3,554 + 4,500 = 8,583 mt).

Applying the Council/PIFSC analysis, Alternative 4(c)-Outcome M, the projected F_{2045}/F_{MSY} = 1.016 and spawning biomass would be $SB_{2045}/SB_{F=0}$ = 0.270. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be statistically indistinguishable from the overfishing threshold of 1.0) and the stock would not be overfished in 2045 as a result of Potential Outcome M. Compared to Alternative 1, Alternative 4(c)-Outcome J would result in an increase in the fishing mortality rate (F_{2045}/F_{MSY} = 1.014 vs. 0.978 under Alternative 1) and a decrease in spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.270 vs 0.286 under Alternative 1). Although the fishing mortality rate under Outcome M would be F_{2045}/F_{MSY} =1.016, this value is virtually indistinguishable from the overfishing threshold of F/F_{MSY} >1.0. Thus, the projections associated with Outcome M indicate bigeye tuna would not be subject to overfishing and not overfished in 2045.

4.1.4.2 Potential Impacts to Other Non-Target Stocks

Catches of non-target species in the Hawaii deep-set longline fishery are driven by the fishing effort for bigeye tuna. Based on recent levels of bigeye tuna catch by vessels to which the limit applies, it is likely that the 2018 US bigeye longline catch limit of 3,554 mt will be reached sometime between July and September. Under Alternative 1, no specified fishing agreements would be authorized and after the WCPO limit is reached, Hawaii longline vessels would have to fish in the EPO for the remainder of the year. If the entire fleet fishes in the EPO for the remainder of the year, the amount of effort and catch is anticipated to similar to previous years. However, if the EPO is too far, or conditions unsafe, for some vessels, effort and catch make be lower than in years where Hawaii longline vessels can continue to fish in the WCPO under a Territory fishing agreement.

Under Alternatives 2, 3, and 4 U.S. participating territories could enter into a specified fishing agreement with Pelagic permitted vessels in Hawaii. Under a specified fishing agreement, pelagic permitted vessels would be able to fish to the allocation limit. Therefore, fishing effort under Alternatives 2 and 3 could potentially be higher than that under Alternative 1, and as such, the catch of non-target species could be higher under Alternatives 2, 3, and 4 versus Alternative 1.However, the difference in effort level is not expected to result in adverse effects to non-target stocks.

This EA analyses evaluates the impact to non-target stocks based on the assumption that three specified fishing agreements would be executed. As described in Section 3.1, recent catch levels

of non-target stocks by the U.S. longline fleet, including the Hawaii longline fishery, represent a small percent (generally less than 1 percent) of each stock's estimated MSY. For non-target stocks that NMFS has determined to be subject to overfishing or overfished, the potential for additional catch under Alternatives 2, 3, and 4 could result in additional impacts compared to Alternative 1. As noted in Section 3.1.7, the EPO stock of North Pacific swordfish is subject to overfishing because F_{2012}/F_{MSY} = 1.11, but is not overfished because B_{2012}/B_{MSY} =1.87. Based on federal logbook records, the catch of swordfish by Hawaii longline vessels operating within the boundary of the EPO stock is less than 5 mt annual mt (NMFS unpublished data). This level of catch is around 1 percent of the stock's estimated MSY of 5,490 mt.

Under Alternatives 2, 3, and 4 catch of EPO swordfish is not expected to increase by any appreciable amount compared to 2012 levels when the fishery operated under a specified fishing agreement. This is because Hawaii longline vessels would likely remain in the WCPO (generally west of 150° W. long.) and not fish in the core area of the EPO swordfish stock. Under Alternative 1, Hawaii longline vessels targeting bigeye tuna in the WCPO would move to the EPO which may potentially result in increased catch of EPO swordfish.

As noted in Section 3.1.8, North Pacific striped marlin is also subject to overfishing because the fishing mortality F/F_{MSY} is > 1.0 (1.25) and is overfished because the spawning biomass (938 mt) is lower than the minimum stock size threshold (MSST) of 1,628 mt. In 2016, total striped marlin catch by all U.S. longline fisheries in the North Pacific Ocean was 341 mt (NMFS 2017 U.S. Part 1 annual report to the WCPFC). This level of catch is below the WCPFC-agreed upon U.S. catch limit of 457 mt as proscribed in CMM 2010-01.

Since 2014, the U.S. deep-set longline fishery in Hawaii operated under the same catch and allocation limits proposed under Alternative 2. For this reason, under Alternatives 2,3, and 4 catch of North Pacific striped marlin is expected to be similar to the level reported since 2014 and not expected to exceed the WCPFC-agreed upon limit of 457 mt. Additionally, the Council has recommended NMFS implement this limit under the authority of the Magnuson-Stevens Act, and prohibit the retention of striped marlin by U.S. longline fishing vessels when 95 percent of the limit (or 435 mt) is projected to be reach. NMFS is currently reviewing that action for consistency with the Magnuson-Stevens Act and other applicable laws.

The WCPFC has agreed to other CMMs that limit the effort of fisheries that target North Pacific albacore and Pacific bluefin tuna. However, the U.S. longline fishery operating in the WCPO and longline fisheries of the US Territories do not target North Pacific albacore or bluefin tuna. For this reason, the CMMs do not apply to these longline fisheries.

Under Alternatives 2, 3, and 4 catches of North Pacific albacore by U.S. longline fisheries operating in the North Pacific is expected to be similar to the level reported in 2016, which was 244 mt (Table 10). Since 2012, less than 10 mt of North Pacific bluefin has been caught by U.S. longline fisheries annually.

Under Alternatives 2,3, and 4 the yellowfin catch of all U.S. longline vessels operating in the WCPFC statistical area would be expected to be around the 5-yr average of around 1,160 mt per

year. Yellowfin tuna is not subject to overfishing or in an overfished condition in the WCPO, according to the most recent stock assessment (Tremblay-Boyer et al. (2017)).

4.2 Potential Impacts to Longline Fishery Participants and Fishing Communities

4.2.1 Potential Impacts of Alternative 1 (No Management Action)

American Samoa and Hawaii have home-based pelagic longline fleets, but CNMI and Guam have currently little domestic longline capacity.

Under Alternative 1, no Territory bigeye specifications would be established, and therefore a territory could not allocate any bigeye tuna to FEP-permitted vessels under a specified fishing agreement in 2018. This alternative would have minor to moderately negative consequences for fisheries in the territories, the Hawaii longline fishery, and Hawaii seafood consumers depending upon when the U.S. bigeye limit is reached. This alternative would eliminate a mechanism to facilitate the infusion of capital into fisheries development projects identified in the MCPs, which result from the implementation of specified fishing agreements.

When the U.S. longline limit for bigeye tuna is reached in 2018, NMFS will prohibit by regulation the retention and landing of bigeye tuna in the WCPO. Thereafter, U.S. longline vessels fishing in the WCPO 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. There could be a negative economic impact to certain longline vessels based in Hawaii that would not be able to switch to swordfish or fish in the EPO. For example, some of the Hawaii longline fleet's smaller vessels may not transit to the EPO to fish (the demarcation between the WCPO and EPO is 150 degrees W, which approximately 435 nm from Honolulu Harbor).

In addition to potential economic impacts described above, potential safety-at-sea issues arise under Alternative 1. Federal regulations prohibit Hawaii longline vessels from being longer than 101 ft and many active vessels range from 60-75 ft long. Longline vessels fishing for bigeye in Hawaii's EEZ or the high seas generally fish throughout the year and often in varied weather conditions. To switch gears to fish for swordfish and/or to fish in the EPO for bigeye tuna generally involve longer trips and greater distances from the home port. Fishing during the winter months, when strong storms are common in the North Pacific, may pose minor to moderate safety-at-sea concerns. Therefore, minor to moderate safety-at-sea issues arise if vessels have to travel greater distances and are their operational areas are limited spatially when fishing for bigeye tuna in the WCPO is prohibited.

The impact of a prohibition under Alternative 1 may reduce the supply of bigeye tuna caught by Hawaii longline vessels. This occurred in 2009 and 2010 (74 FR 68190, December 23, 2009; and 75 FR 68725, November 9, 2010). Because the restrictions in 2009 and 2010 occurred toward the end of the year (December and November, respectively), and during the holiday season when fresh, high-quality tuna is 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 restriction 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. Also, sub-premium quality tuna (though still good quality fish) was sold at a lower than average price.

As a direct result of the bigeye tuna restriction on longline fishery in the WCPO that went into effect on November 22, 2010, Hawaii small boat non-longline fishermen increased their catch of bigeye tuna and benefitted economically from the sales of those 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 longline restriction on bigeye occurred on December 29, 2009 (WPFMC 2012). However, impacts to the seafood market remain, as these small vessel fleets are not be able to replace the Hawaii longline fleet in terms of volume and value, as typically bigeye tuna caught by longline receives a higher price at market than troll- or handline-caught bigeye tuna.

4.2.2 Potential Impacts of Alternative 2 (Council recommended)

Under Alternative 2, the U.S. participating 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 be allocated each year to FEP-permitted vessels. 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 longline vessels located in the Marinas because the fishery is currently inactive.

The American Samoa-based longline fishery has around 15 active vessels, but the fishery is 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 to reach a 2,000-mt limit in the near term. However, if American Samoa entered into a specified fishing agreement, which allocated 1,000 mt of bigeye tuna to other vessels, catches by American Samoa longline vessels fishing in the South Pacific and North Pacific, combined with the 1,000 mt of allocated bigeye tuna could get close to a 2,000-mt limit (see Table 10). In 2012, for example,1,505 mt of bigeye tuna was reported for American Samoa, with 771 mt of that amount caught by Hawaii longline vessels operating under a specified fishing agreement with the Territory. Preliminary 2017 catch statistics indicate that longline bigeye catches attributed to the American Samoa longline fishery were near 1,500 mt.

If the 2,000 mt limit were reached, and if the fishery was prohibited from retaining or landing bigeye tuna, minor to moderately adverse impacts to fishery participants could result. However, any Participating Territory government that makes agreements with FEP-permitted vessels could control the amount of catch allocated (i.e. not allocate all 1,000 mt), and thus reserve a greater portion of the 2,000 mt limit to local vessels and reduce potential impacts to local fishery participants.

Federal regulations implementing Amendment 7 at 50 CFR 665.819 require that specified fishing agreements direct funds to the Western Pacific Sustainable Fisheries Fund (WP SFF) to support fisheries development projects identified in a U.S. participating territory's MCP, or that vessels operating under such agreements must land in the territory to which the agreement applies. Pursuant to Section 204(e) of the Magnuson-Stevens Act, the Council, in close coordination with a particular U.S. participating territory, would use the WP SFF to implement fishery development projects identified in that territory's MCP.

Under Alternative 2, fishing communities in U.S. participating territories would benefit indirectly through fishery improvement projects funded from specified fishing arrangements, with the number of territories benefiting depending on the number of agreements. 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. Funding from past agreements have funded fisheries development projects in the US Participating Territories including boat ramps, ice machines and designs for longline dock extension in American Samoa, a 250ft fishing platform on Guam, and in CNMNI, community MCP projects and improvements to Garapan Fishing Base in CNMI (WPFMC 2016).

Also under Alternative 2, the U.S. participating 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 specified fishing agreements allow catch to be attributed to the territory to which the agreement applies, and demonstrate the aspirations of the U.S. participating territories to participate in the larger, internationally managed WCPO fisheries.

Under Alternative 2, the Hawaii longline fishery participants also stand to realize minor to moderately positive benefits from the ability to enter into agreements with a U.S. participating territory. In general, benefits from arrangements for fishery participants include a reduction in the need to fish for seasonally-variable bigeye tuna in the EPO (which saves fuel costs), the ability to supply locally caught fresh, high quality tuna, and a stable income. The local community benefits from the continued availability of fresh, high quality tuna and lower consumer prices due to consistent product availability.

If the U.S. bigeye tuna limit was reached, some Hawaii longline vessels would begin to fish under a specified fishing agreement where their catch would be attributed to the U.S. territory to which the agreement applies. As specified fishing agreements involve funding contributions from fishery participants, they have the choice to enter into fishing agreements or not. In addition, the EPO may be available for most U.S. longline vessels based in Hawaii 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 due to the aforementioned factors including the seasonal and inter-annual availability of bigeye tuna in the EPO.

For all of these reasons, Alternative 2 is likely to have minor to moderately positive benefits for U.S. participating territories, participants in Hawaii longline fisheries and fishing communities of Hawaii.

4.2.3 Potential Impacts of Alternative 3

Under Alternative 3, the U.S. participating territories would subject to a total longline bigeye limit (2,000 mt), and would be limited in the amount of catch that could be allocated under specified fishing agreements (up to 2,000 mt per territory). Like Alternative 1, no bigeye tuna is expected to be caught by longline vessels based in CNMI or Guam in 2018 because there are currently no active longline fisheries based in those islands. For American Samoa, bigeye tuna catches by longline vessels possessing an American Samoa limited access permit are expected to be similar to the average annual catch in 2011-2016, which is approximately 529 mt annually. For American Samoa only, there would be a concern on how much bigeye tuna American Samoa could allocate so as to ensure that a sufficient amount of quota would remain available for American Samoa longline fishery participants; however, this could be alleviated through monitoring and forecasting of fleet catches and the process by which the Council reviews specified fishing agreements prior to authorization.

Potential impacts for Hawaii longline fishery participants and fishing community of American Samoa, Guam, and CNMI would be the same as described for Alternative 4 below.

4.2.4 Potential Impacts of Alternative 4

Under Alternative 4, longline fisheries of the U.S. Participating Territories would not be subject to an annual total longline catch limits for bigeye tuna; however, an annual limit of 1,000 mt, 1,500 mt, or 2,000 mt would apply to specified fishing agreements with FEP-permitted vessels. No total annual catch limits for the U.S. Participating Territories is consistent with CMM 2017-01.

Without an annual total catch limit, American Samoa longline limited entry permit holders would not be subject to potential closure for exceeding the catch limit, which was identified as a concern under Alternative 2; thus, this alternative would have minor positive benefits to fishery participants.

Alternative 4 would involve specified fishing agreements between the USPTs and permitted FEP vessels, which results in funding to support fisheries development projects identified in a U.S. participating territory's MCP. Fishing communities in U.S. participating territories would benefit

indirectly through fishery improvement projects funded from specified fishing 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 Alternative 4, the U.S. participating territories stand to realize minor to moderately positive benefits from developing catch history within WCPFC managed fisheries. The agreements between the USPTs and the United States are recognized in CMM 2017-01.

As opposed to Alternative 1, the Hawaii longline fishery participants also stand to realize minor to moderately positive benefits from the ability to enter into agreements with a U.S. participating territory. In general, benefits from arrangements for fishery participants include a reduction in the need to fish for seasonally-variable bigeye tuna in the EPO (which saves fuel costs), the ability to supply locally caught fish, consistent fishing grounds, and a stable income. The local community benefits from the continued availability of fresh, high quality tuna and lower consumer prices due to more product being available.

Like Alternatives 2 and 3, if the U.S. bigeye tuna limit were reached, Hawaii longline vessels could enter into a specified fishing agreement where their catch would be attributed to the U.S. territory to which the agreement applies. In addition, the EPO may be available for most U.S. longline vessels based in Hawaii 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. Fishing in the EPO during the November and December is a less desirable option, as bigeye catch rates are believed to increase in the Hawaiian Archipelago during these months, whereas 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. Profits could be lower for fishermen who must fish in the EPO due to the aforementioned factors including the seasonal and inter-annual availability of bigeye tuna in the EPO.

Increases from status quo in the amount of bigeye that could allocated under a specified fishing agreement (3(b):1,500 mt or 3(c): 2,000 mt) could result increases in individual funding contributions under associated agreements.

Overall, Alternative 4 is likely to have minor to moderately positive benefits for U.S. participating territories, participants in Hawaii longline fisheries and fishing communities of Hawaii.

4.3 Potential Impacts to Protected Species

Longline fisheries have the potential to interact with several protected species identified in Section 3 as this gear type involves baited hooks suspended in depths near the surface to about 300 m. Because there are no active longline fisheries in CNMI and Guam, the analysis will focus on potential impacts of the American Samoa and Hawaii longline fisheries.

The current levels of interactions for the American Samoa and Hawaii longline fisheries are described in section 3.3. These fisheries operate under separate NMFS Biological Opinions and associated 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). Under the Alternatives considered, longline fisheries in all U.S. participating territories and Hawaii would continue to be managed under applicable Pelagic FEP regulations, and protected species statutes, including the ESA, MMPA, and MBTA.

4.3.1 Potential Impacts of Alternative 1 (No Management Action)

4.3.1.1 American Samoa Longline Fishery

NMFS has evaluated the potential impact of the American Samoa longline fishery on ESA-listed species under its jurisdiction.

On May 8, 2015, NMFS reinitiated consultation under section 7 of the ESA to evaluate the effects of the American Samoa longline fishery on ESA-listed species, potential changes to the regulations as recommended by the Council, but not yet implemented by NMFS (NMFS 2015). NMFS issued a biological opinion on October 30, 2015 and NMFS specifically evaluated the potential effects of the American Samoa longline fishery on leatherback and olive ridley sea turtles, the Indo-West Pacific DPS and the six ESA listed reef corals during the period of consultation NMFS determined that the fishery is not likely to jeopardize the continued existence of ESA-listed species under NMFS jurisdiction, and would not result in irreversible or irretrievable commitments of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measure for the fishery.

Under this alternative, fishing effort is not expect to change for the American Samoa longline fishery and expected to remain at recent levels. Anticipated level of interactions with protected species would be expected to be similar to recent levels, which are below the levels evaluated in the most recent biological opinions (see Tables 18, 19, 24, and 29).

Due to the recent ESA-listings for oceanic white tip shark and giant manta ray, NMFS will be reinitiating consultation on longline fisheries managed under the Pelagics FEP.

Reef Corals

In American Samoa, coral reef habitat is generally in nearshore waters from 0-3 nm from shore, although some coral reef habitat can be found further offshore. In contrast, pelagic fisheries generally operate and target pelagic fish species in the water column dozens to a thousand miles offshore, far away from the islands and coral reef habitat areas. Because the American Samoa longline fishery occurs deeper than ESA-listed coral depth and fishermen typically avoid coral reef structures during transit in Territorial and Federal waters to protect their vessels, under the No Management Alternative, the likelihood of damage to corals from pelagic fishing gear or transiting vessels is extremely unlikely to occur.

4.3.1.2 Hawaii Longline Fisheries

On September 19, 2014, NMFS completed a no-jeopardy biological opinion (2014 BiOp) that included an analysis of the potential impacts of the Hawaii deep-set longline fishery on protected species, including sea turtles, humpback whales, sperm whales, the Main Hawaiian Islands (MHI) insular false killer whale DPS, and scalloped hammerhead DPS's. NMFS initiated consultation on the Hawaii deep-set longline fishery for olive ridley sea turtle, North Pacific DPS of loggerhead sea turtle, and the six green sea turtle DPS on April 13, 2016. NMFS completed this consultation on March 24, 2017 and concluded that the continued operation of the Hawaii deep-set longline fishery will have no substantial effect on the overall population of olive ridley, North Pacific DPS of loggerhead sea turtle, and the six green sea turtle DPS. In making this determination, NMFS found that the overall population for all sea turtle species would remain large enough to maintain genetic heterogeneity, broad demographic representation, and successful reproduction, and to retain the potential for recovery.

During a bigeye catch and retention restriction under Alternative 1, Hawaii longline fishing effort is expected to shift to the EPO, where interactions with protected species may also occur. Due to the distance involved in transiting to the EPO, and potential for less boats to venture to that zone due to safety at sea issues, 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.

The current and maximum likely levels of fishing effort by longline fisheries managed under the FEP would continue to be subject to the level of take authorized under the ESA and regulations under other applicable laws. For example, under MMPA false killer whale take reduction plan regulations, if the fishery injures two 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). As noted in Section 3.3, NMFS is required to re-initiate consultation under ESA section 7 if any ITS applicable to the Hawaii deep-set longline fishery (Table 16 and 26) or the shallow-set fishery (Table 18) is exceeded or another criterion for reinitiation is triggered.

Although fishing effort under this alternative may be lower, anticipated level of interactions with protected species would be expected to be similar to recent levels, which are below the levels evaluated in the most recent biological opinions (see Tables 15, 22, 26, and 29).

Longline fisheries managed under the Pelagic FEP are among the most responsible fisheries in the world as they are highly monitored, and subject to a suite of effective protected species mitigation requirements. Catch restrictions that reduce the ability of U.S. longline fisheries managed under the Pelagic 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. Although a specific study on interaction rates with protected species by the longline deep-set fishery versus foreign fisheries has not been conducted, foreign fishing operations, which are not subject to ESA and MMPA are expected to have higher protected species interaction levels compared

longline fisheries managed under the Magnuson-Stevens Act and Pelagic FEP. Thus, restricting the Hawaii longline fishery may result in more interactions with protected sea turtles by foreign fleets that continue to fish to fill the void left by a restricted Hawaii longline fleet (see Chan and Pan 2012).

For example, in 2012 there was a 350 percent increase in foreign imports of bigeye tuna into Hawaii from the Marshall Islands compared to 2011 (see Figure 7). An analysis by Gilman et al. (2013) 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.

4.3.2 Potential Impacts of Alternative 2 (Council recommended)

4.3.2.1 American Samoa Longline Fishery

Because the American Samoa longline fishery primarily targets south Pacific albacore tuna, the fishery's impact on protected species identified in Section 3.3 is expected to be the same regardless of whether NMFS specifies a catch limit for bigeye tuna or not. However, as a result of Alternative 2, funding may become available to support fisheries development projects identified in the American Samoa MCP, which may lead to a diversification of the American Samoa longline fishery from primarily an albacore fishery to a fishery that is able to harvest and market 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 the same as in Alterative 1 and not expected to increase beyond levels at which the fishery has been authorized, and the interactions currently authorized by NMFS are not expected to be exceeded under Alternative 2.

4.3.2.2 Hawaii Longline Fisheries

Hawaii longline vessels operating under specified fishing agreements under the proposed action 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 2014 BiOp and 2017 Supplemental BiOP evaluated the effects of the fishery operating under specified fishing agreements and based on this information, NMFS has determined that the fishery would not jeopardize the continued existence of any ESA-listed species. Under Alternative 2, impacts to protected species from Hawaii longline vessels operating under one, two or three fishing agreements are expected to be within authorized baseline levels identified Section 3.3 and are not expected to result in large adverse effects to any protected species.

4.3.2.3 Guam and CNMI Longline Fisheries

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.

4.3.3 Potential Impacts of Alternatives 3 and 4

4.3.3.1 American Samoa Longline Fishery

Because the American Samoa longline fishery primarily targets south Pacific albacore tuna, the fishery's impact on protected species identified in Section 3.3 is expected to continue as described. However, as a result of Alternatives 3 and 4, funding may be available to support fisheries development projects identified in the American Samoa MCP, which may lead to a diversification of the American Samoa longline fishery from primarily an albacore fishery to a fishery that is able to harvest and market 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 the same as in Alterative 1 and not expected to increase beyond levels at which the fishery has been authorized, and the interactions currently authorized by NMFS are not expected to be exceeded under Alternatives 3 and 4.

4.3.3.2 Hawaii Longline Fisheries

Hawaii longline vessels operating under specified fishing agreements under the proposed action 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 2014 BiOp and 2017 Supplemental BiOp has evaluated the effects of the fishery operating under specified fishing agreements and based on this information, NMFS has determined that the fishery would not jeopardize the continued existence of any ESA-listed species. Under Alternatives 3 and 4, impacts to protected species from Hawaii longline vessels operating under one, two or three fishing agreements are expected to be within authorized baseline levels identified Section 3.3 and are not expected to result in large adverse effects to any protected species.

4.3.3.3 Guam and CNMI Longline Fisheries

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.

4.4 Potential Impacts to Marine Habitats 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.

In 1999, the Council developed and NMFS approved EFH definitions for management unit species (MUS) of the Bottomfish and Seamount Groundfish FMP (Amendment 6), Crustacean FMP (Amendment 10), Pelagic FMP (Amendment 8), and Precious Corals FMP (Amendment 4) (74 FR 19067, April 19, 1999). NMFS approved additional EFH definitions for coral reef ecosystem species in 2004 as part of the implementation of the Coral Reef Ecosystem FMP (69 FR8336, February 24, 2004). EFH definitions were also approved for deepwater shrimp through an amendment to the Crustaceans FMP in 2008 (73 FR 70603, November 21, 2008).

Ten years later, in 2009, the Council developed and NMFS approved five new archipelagic-based fishery ecosystem plans (FEP). The FEP incorporated and reorganized elements of the Councils' species-based FMPs into a spatially-oriented management plan (75 FR 2198, January 14, 2010). EFH definitions and related provisions for all FMP fishery resources were subsequently carried forward into the respective FEPs. In addition to and as a subset of EFH, the Council described habitat areas of particular concern (HAPC) for all MUS. In considering the potential impacts of a proposed fishery management action on EFH, all designated EFH must be considered. Table 35 summarizes the designated areas of EFH and HAPC for all FEP MUS by life stage.

Table 35. EFH and HAPC for FEP MUS

MUS	Species Complex	EFH	HAPC
Pelagic MUS	**Tunas:** albacore (*Thunnus alalunga)*, bigeye (*T. obesus*), yellowfin (*T. albacare*s), Bluefin (*T. orientalis*), skipjack (*Katsuwonus pelamis*), kawakawa (*Euthynnus affinis*), Other tunas (*Auxis* spp., *Scomber* spp., *Allothunnus* spp.); **Billfishes:** striped marlin (*Tetrapturus audax*), shortbill spearfish (*T. angustriostris*), swordfish (*Xiphias gladius*), sailfish (*Istiophorus platypterus*), blue marlin (*Makaira nigricans*), black marline (*Istiompax indica*); **Sharks:** pelagic thresher (*Alopias pelagicus*), bigeye thresher (*A. superciliosus*), common thresher (*A. vulpinus*), silky shark (*Carcharhinus falciformis*), oceanic whitetip (*C. longimanus*); blue shark (*Prionace glauca*), shortfin mako (*Isurus oxyrinchus*), longfin mako (*I. paucus*), salmon shark (*Lamna ditropis*); **Other pelagic MUS:** mahimahi (*Coryphaena spp*.), wahoo (*Acanthocybium solandri*), moonfish (*Lampris* spp.), oilfish (Gempylidae), pomfret (Bramidae); **Squid:** diamondback squid (*Thysanoteuthis rhombus*), neon flying squid (*Ommastrephes bartramii*), purpleback flying squid (*Sthenoteuthis oualaniensis*).	**Eggs and larvae:** the water column down to 1,000 meters (m) depth from shoreline out to EEZ boundary **Juvenile/adults:** the water column down to 200 meters depth from shoreline out to EEZ boundary	The water column down to 1,000 m that lies above seamounts and banks.

MUS	Species Complex	EFH	HAPC
Bottomfish MUS	**American Samoa, Guam and CNMI bottomfish species:** lehi (*Aphareus rutilans*) uku (*Aprion virescens*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), blacktip grouper *(Epinephelus fasciatus)*, Lunartail grouper *(Variola louti)*, ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), ambon emperor *(Lethrinus amboinensis)*, redgill emperor *(Lethrinus rubrioperculatus)*, taape (*Lutjanus kasmira*), yellowtail kalekale (*Pristipomoides auricilla*), opakapaka (*P. filamentosus*), yelloweye snapper (*P. flavipinnis*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), and amberjack (*Seriola dumerili*).	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm). **Juvenile/adults:** the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm)
	Hawaii bottomfish species: uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*), ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), opakapaka (*Pristipomoides filamentosus*), yellowtail kalekale (*P. auricilla*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), hapuupuu (*Epinephelus quernus*), lehi (*Aphareus rutilans*)	**Eggs and larvae:** the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms) **Juvenile/adults:** the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm) Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai
Seamount Groundfish MUS	**Hawaii Seamount groundfish species (50–200 fm):** armorhead (*Pseudopentaceros wheeleri*), raftfish/butterfish (*Hyperoglyphe japonica*), alfonsin (*Beryx splendens*)	**Eggs and larvae:** the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35° **Juvenile/adults:** all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 200 and 600 m (100 and 300 fm)	No HAPC designated for seamount groundfish

MUS	Species Complex	EFH	HAPC
Crustaceans MUS	**Spiny and slipper lobster complex (all FEP areas):** spiny lobster (*Panulirus marginatus*), spiny lobster (*P. penicillatus, P.* sp.), ridgeback slipper lobster (*Scyllarides haanii*), Chinese slipper lobster (*Parribacus antarcticus*) **Kona crab :** Kona crab (*Ranina ranina*)	**Eggs and larvae:** the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm) **Juvenile/adults:** all of the bottom habitat from the shoreline to a depth of 100 m (50 fm)	All banks in the NWHI with summits less than or equal to 30 m (15 fathoms) from the surface
	Deepwater shrimp (all FEP areas): (*Heterocarpus* spp.)	**Eggs and larvae:** the water column and associated outer reef slopes between 550 and 700 m **Juvenile/adults:** the outer reef slopes at depths between 300-700 m	No HAPC designated for deepwater shrimp.
Precious Corals MUS	**Shallow-water precious corals (10-50 fm) all FEP areas:** black coral (*Antipathes dichotoma*), black coral (*Antipathis grandis*), black coral (*Antipathes ulex*) **Deep-water precious corals (150–750 fm) all FEP areas:** Pink coral (*Corallium secundum*), red coral (*C. regale*), pink coral (*C. laauense*), midway deepsea coral (*C.* sp nov.), gold coral (*Gerardia* sp.), gold coral (*Callogorgia gilberti*), gold coral (*Narella* sp.), gold coral (*Calyptrophora* sp.), bamboo coral (*Lepidisis olapa*), bamboo coral (*Acanella* sp.)	EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank EFH has also been designated for three beds known for black corals in the Main Hawaiian Islands between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai	Includes the Makapuu bed, Wespac bed, Brooks Banks bed For Black Corals, the Auau Channel has been identified as a HAPC

MUS	Species Complex	EFH	HAPC
Coral Reef Ecosystem MUS	**Coral Reef Ecosystem MUS (all FEP areas)**	EFH for the Coral Reef Ecosystem MUS includes the water column and all benthic substrate to a depth of 50 fm from the shoreline to the outer limit of the EEZ	Includes all no-take MPAs identified in the CREFMP, all Pacific remote islands, as well as numerous existing MPAs, research sites, and coral reef habitats throughout the western Pacific

None of the alternatives are anticipated to 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 so 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.

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 both of the Alternatives.

There are presently no known districts, sites, highways, cultural resources, structures or objects listed in or eligible for listing in the National Register of Historic Places in the U.S. EEZ around

American Samoa, Guam, CNMI and Hawaii and areas of the high seas in international waters where pelagic longline fishing activities are conducted. Additionally, longline fishing activities are not known to result in adverse impacts to scientific, historic, archeological or cultural resources because fishing activities occur generally miles offshore. Additionally, longline fishing is not known to be a potential vector for spreading alien species as most vessels fish in far away from coastal areas far offshore. It is therefore anticipated that Alternatives 1 and 2 would not increase the potential for the spread of alien species into or within nearshore waters in Hawaii or any of the U.S. participating territories.

4.5 Potential Impacts to Administration and Enforcement

4.5.1 Potential Impacts of Alternative 1 (No Management 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 2018. As a consequence, specified fishing agreements 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 be unnecessary 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 catch and retention through a notice published in the *Federal Register* and by other means.

4.5.2 Potential Impacts of Alternatives 2, 3, and 4

Under Alternatives 2,3,and 4 the administrative costs would be 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. Additional costs would result from monitoring and attributing catches made by vessels identified in a specified fishing agreement to the U.S. participating territory to which the agreement applies.

The 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 require PIFSC tracking the fishery and projecting the date the U.S. bigeye tuna 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 boarding at sea. Under Alternatives 2 and 3, PIFSC would also need to forecast the date a territorial catch limit and allocation limit would be reached. This has been ongoing since 2011. Therefore, changes to the level of monitoring or an increase in costs are not expected since this is the status quo.

4.6 Potential Cumulative Effects

Cumulative effects refer to the 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 agency (Federal or non-federal) or person undertakes such other actions. Further, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative impact analysis examines whether the direct and indirect effects of the Alternatives considered on a given resource, interact with the direct and indirect effects of other actions on that same resource to determine the overall, or cumulative effects, on that resource. Section 3 describes the elements of the human environment that could be affected by the Alternatives considered. Section 3 describes the baseline for assessing the direct and indirect impacts of the proposed action, as presented in Section 2.

The following cumulative effects analysis is organized by the following issues: target and non-target species, protected species, and fishery participants and communities. Because pelagic longline fishing activities authorized occur far offshore and in deep oceanic waters away from land, populated areas, and marine protected areas such as marine national monuments, neither of the Alternatives considered would have an effect on air/water quality, coral reefs, benthic marine habitats. As such, these resources will not be considered in this cumulative effects analysis.

4.6.1 Cumulative Effects on Target and Non-Target Stocks

4.6.1.1 Past, Present and Reasonably Foreseeable Management Actions

NMFS Management Actions

The Council has recommended NMFS implement or authorize several actions, which are presently in various stages of development and/or review and have yet to be transmitted to NMFS for Secretarial review under the Magnuson-Stevens Act. These include the following action:

- American Samoa longline limited access permit program modifications to support fishery participation by small vessels (< 50ft) in the fishery and reduce program complexity;
- Exemption to the American Samoa Large Vessel Prohibited Area;
- Modification to the American Samoa longline swordfish trip limit

In general, the Alternatives considered would not have interactive effects with the proposed actions listed as they vary in management scope and impact, and the public will have an opportunity to review and comment on the actions at a later date.

International Management Actions

Both the WCPFC and IATTC continue to adopt management measures that are applicable to fisheries that catch bigeye tuna. To meet the conservation management objectives of these RFMOs, international cooperation is required. The United States will continue to participate in these RFMOs and implement conservation and managements that apply to US fisheries.

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
- Ocean noise
- Marine debris
- Ocean productivity related to global climate change

Fluctuations in the Pelagic Ocean Environment

Catch rates of pelagic fish species fluctuate temporally and spatially 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.

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 of 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 Corporation, 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 or other loosely connected 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[8] 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 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[9]) 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.[10] 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

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

[9] 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.

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

fishery data collection, and coordination with international organizations, will be important to facilitate adaptive fishery management.

4.6.1.2 Effects Analysis on Target and Non-Target Stocks

As described in section 4.1, the direct and indirect impact of the Alternatives considered are expected 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 harvested across a range of fishing gears, with primary impacts from longline and purse seine fisheries. In both the WCPO and EPO, bigeye tuna is not overfished or experiencing overfishing according to stock status determination criteria described in the Pelagic FEP (WPFMC 2017).

Alternatives 2 and 3 would involve NMFS-oversight of limited allocation of bigeye tuna catch limits under three fishing arrangements. In accordance with federal regulations at 50 CFR 665.819, FEP permitted longline vessels cannot be identified in more than one specified fishing agreement at a time. For this reason, vessels can only operate under one specified fishing agreement at a time. Given this controlling measure, combined with the U.S. WCPO bigeye tuna catch limit of 3,554 mt in 2018, and the current and expected levels of vessel participation, it is likely that the level of effort and associated catches in 2018 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. As discussed in Section 3.1.1, 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 core equatorial zone of heavy purse seine and longline fishing (NMFS unpublished data; NMFS PIFSC 2013).

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 U.S. participating territories and the Hawaii longline fishery under all alternatives are expected to result in catches of non-target species within historical baseline levels, although there could be slightly less effort by Hawaii-based fisheries under Alternative 1 compared to Alternatives 2, 3, and 4.

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.

With regard 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 supplied with the current amount of domestic landings. The adherence to the U.S. bigeye tuna catch limits has left the Hawaii market accessible for foreign imports. If the Hawaii based longline fishery reaches its annual catch limit in any one year and is restricted from landing bigeye tuna caught in the WCPO, as could occur under Alternative 1, it is believed that foreign imports would fill the market demand in Hawaii. The effect of adhering to the U.S. bigeye tuna limit is expected to result in the same amount or more 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 domestic longline fisheries.

4.6.2 Cumulative Effects on Protected Species

4.6.3 Past, Present, and Reasonably Foreseeable Future Management 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. Due to the recent listing of oceanic white tip shark and giant manta ray, NMFS will be reinitiation ESA-consultation on pelagic longline fisheries managed under the Pelagics FEP.

4.6.3.1 Effects Analysis on Protected Species

As previously described in Section 4, the Council and NMFS have taken significant steps to reduce sea turtle and seabird interactions in longline fisheries, and ongoing work is being conducted to further reduce interactions. Longline fisheries managed under the Pelagic FEP are 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.

Under all alternatives, 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. Therefore, impacts to protected species 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.

4.6.4 Cumulative Effects to Fishery Participants and Fishing Communities

4.6.4.1 Past, Present, and Reasonably Foreseeable Future Management Actions

As noted in Section 3.2.6, the Council has identified American Samoa, CNMI, Guam, and each of the inhabited Hawaiian Islands as a fishing community. In accordance with the Magnuson-Stevens Act, the Council and NMFS will continue to assess the impact of management actions on fishery participants and fishing communities, and where possible, minimize negative effects while developing appropriate measures for the conservation and management of fishery resources.

External Factors

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, where the U.S. now imports nearly 85 percent of consumed seafood.[11] 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 U.S. fish products lose market channels to imported seafood products, it may also be hard for U.S. fishermen to regain those channels. As described previously, the Territories face significant barriers to developing responsible longline fisheries, which include lack of infrastructure, transportation, and access to markets.

In addition, a reliance on foreign imports in Hawaii and 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

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

7. Labor and urban drift

All of these seven fundamentals are especially critical to Hawaii and the U.S. participating territories. 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. Alternative 1 would not allow the territories to enter into specified fishing agreements in 2018 whereas Alternatives 2, 3, and 4 would allow for such agreements and could promote potential opportunities to develop fisheries in the U.S. participating territories, which could help offset other factors that are affecting fishing communities in the U.S. territories.

With regard to the Hawaii fishing communities, which also face the issues such as rising operational costs and increasing seafood imports, Alternative 1 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 depend on fish products provided by Hawaii longline fishery throughout the year. Alternatives 2, 3 and 4 would provide the Hawaii longline fishery the opportunity to supply U.S. markets with bigeye tuna caught in the WCPO through fishing agreements with one or more U.S. participating territory. 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.

4.6.5 Effects Analysis on Fishery Participants and Fishing Communities

Regardless of which Alternative is selected, Western Pacific pelagic fisheries will continue to be managed sustainably. The Alternatives are not 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 U.S. participating territories to make fishing agreements with FEP-permitted vessels. As a result, a territory could not allocate any bigeye tuna. Alternative 1 also does not provide long-term stability for fishery participants in the Hawaii longline fishery and vessel owners and captains would need to prepare for restrictions each year. However, this may encourage fishery participants to explore other management options, such as catch shares or individual fishing quotas.

Alternatives 2, 3, and 4 would provide minor to moderate benefits to fishery participants and provide fisheries development funding to the U.S. territories through the Western Pacific Sustainable Fisheries Fund. These Alternatives are 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 less cumulative impacts of external stressors on fishing participants and communities, as compared to the Alternative 1.

4.6.6 Climate Change

NMFS and the Council evaluated the potential impacts of climate change on the resources that are considered in this draft EA. We also considered the potential impacts of the Alternatives considered in the face of climate change.

A climate change impact analysis is a difficult undertaking given its global nature and interrelationships among sources, causes, mechanisms of actions and impacts. We focus our analysis on whether climate change is expected to impact resources that are the focus of this analysis including: target stocks (bigeye tuna), non-target stocks and bycatch of particular management interest (striped marlin and north pacific swordfish stocks, and silky sharks), and on protected species.

Implications of climate change for the environmental effects of the Alternatives:

We note that the impacts of climate change on these resources may be positive if climate change impacts benefit a species' prey base or otherwise enhance the species' ability to survive and reproduce, or impacts may be negative if the impacts reduce a species' ability to survive and reproduce. Impacts may also be neutral.

For the current proposed specifications, the impacts of climate change on target and non-target species that are caught by the Hawaii deep-set longline fishery have been considered indirectly because the proposed bigeye tuna catch and allocation limits were based on recent fishery catches (including all fishing mortality on the stock), and in consideration of the most recent stock status.

Climate change would have similar impacts to the resources regardless of which Alternative is considered. In the coming years, the Council and NMFS will continue to monitor domestic catches of all pelagic MUS, and continue to consider information from scientifically-derived stock status reports as future catch and allocation limits are made, and as changes to fishery management are contemplated and implemented. Ongoing and future monitoring and research will allow fishery managers and scientists to consider impacts of climate change, fishing, and other environmental factors that are directly or indirectly affecting the resources.

Potential effects on climate change in terms of greenhouse gas emissions:

The U.S. longline fishery is already authorized to conduct fishing with or without a bigeye tuna specification. The proposed specification would not direct any particular level of fishing effort and, therefore, neither NMFS, nor the Council controls where fishing vessels fish beyond existing restricted fishing areas, how long a fishing trip lasts, or other decisions that are made by individual fishermen. For this reason our comparison of potential greenhouse gas emissions will be qualitative.

As described above in Section 2, the expected fishery outcomes of the alternatives considered are fairly similar. Under Alternative 1, (No Management Action), the Hawaii deep-set longline fishery would be prohibited from retaining bigeye tuna caught in the WCPO a few months before the end of the year. When this happens, there could be more fishing by the Hawaii longline fleet in the EPO (east of 150 degrees W. long). Under Alternatives 2, 3, and 4 vessels in the Hawaii

deep-set longline fleet are expected to expend slightly higher level of fishing effort in terms of number of trips and longline sets than they might under Alternative 1; however, much of the deep-set longline fishing toward the latter part of the year may be closer to the Hawaiian archipelago instead of the EPO. For these reasons, none of the alternatives are expected to result in a large change to greenhouse gas emissions.

5 Consistency with Other Applicable Laws

5.1 National Environmental Policy Act

In accordance with NEPA, NOAA Administrative Order (NAO) 216-6 - *Environmental Review Procedures for Implementing the National Environmental Policy Act* requires NMFS to consider the effects of proposed agency actions and alternatives on the human environment. As part of this process, NMFS and the Council provide opportunities for the involvement of interested and affected members of the public before a decision is made. This EA was prepared in accordance with NEPA and its implementing regulations, as well as NMFS' NAO 216-6. The NMFS Regional Administrator will use this draft EA to consider the impacts of the proposed action on the human environment, taking into consideration public comments on the proposed action presented in this document, and to determine whether the proposed action would have a significant environmental impact to require the preparation of an environmental impact statement.

5.1.1 Document Preparers

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5.1.2 Agencies and Persons Consulted

The proposed action described in this EA was developed in coordination with various federal and local government agencies that are represented on the Western Pacific Fishery Management Council.

5.1.3 Public Coordination

Opportunities for public comment on the proposed action are provided at public meetings of the Council including its advisory panels, SSC, and plans teams. In addition, the Council notified members of the public about the proposed action through media releases, newsletter articles, the *Federal Register* and the Council's website, http://www.wpcouncil.org.

5.2 Endangered Species Act

The Endangered Species Act (ESA) provides for the protection and conservation of threatened and endangered species. Section 7(a)(2) of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or

adverse modification of the critical habitat of such species. Pursuant to Section 7 of the ESA, NMFS has evaluated the pelagic longline fisheries of Hawaii, American Samoa, Guam and the Northern Mariana Islands for potential impacts on ESA-listed species under the jurisdiction of NMFS. The conclusions of these consultations are briefly summarized below.

Hawaii Deep-Set Longline Fishery

In 2014 and 2017 biological opinions, NMFS concluded that the continued operation of the Hawaii deep-set longline fishery as authorized under the Pelagic FEP is not likely to jeopardize the continued existence of ESA-listed species under NMFS jurisdiction. The BiOps also issued an ITS for humpback whales, sperm whales, the main Hawaiian islands (MHI) insular false killer whale distinct population segment (DPS), North Pacific loggerhead DPS, leatherback sea turtles, olive ridley sea turtles, green sea turtles, and the Indo-west Pacific scalloped hammerhead DPS as shown in Table 15.

American Samoa Longline Fisheries

Pursuant to the ESA, NMFS determined that the continued operation of the American Samoa longline fishery, including operations under the proposed action, would not jeopardize the continued existence of any ESA-listed species under NMFS jurisdiction or result in the irreversible or irretrievable commitments of resources that would foreclose the formulation or implementation of any reasonable and prudent alternative measures for the fishery. NMFS documented these determinations in a biological opinion issued in October 2015.

Guam and the Northern Mariana Islands

In a biological opinion dated March 29, 2001 (2001 BiOp) NMFS determined that the longline fisheries of Guam and the Northern Mariana Islands as authorized under the Pelagic FEP were not likely to jeopardize the continued existence of any ESA-listed species under NMFS jurisdiction and issued an incidental take statement (ITS) for up to 3 hardshell and 1 leatherback sea turtle annually as shown in Table 22 of this document. Since the issuance of the 2001 BiOp, the fishery has not exceeded any ITS and are currently inactive.

5.3 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the take of marine mammals in the U.S. and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA gives NMFS as delegated by the Secretary of Commerce, the authority and duties for all cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions, except walruses). With this responsibility, NMFS required to prepare and periodically review stock assessments of marine mammal stocks.

Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that classifies U.S. commercial fisheries into one of three categories. These categories are based on the level of serious injury and mortality of marine mammals that occurs incidental to each

fishery. Specifically, the MMPA mandates that each fishery be classified according to whether it has frequent, occasional, or a remote likelihood of or no known incidental mortality or serious injury of marine mammals. A Category 1 fishery is one with frequent incidental morality and serious injury of marine mammals. A Category 2 fishery is one with occasional incidental morality and serious injury of marine mammals. A Category 3 fishery is one with a remote likelihood or no known incidental morality and serious injury of marine mammals.

On December 29, 2014, (79 FR 77919), NMFS published the final LOF for 2015 which classifies the Hawaii deep-set longline fishery as a Category 1, while the Hawaii shallow-set longline fishery and the American Samoa longline fishery are both classified as Category 2 fisheries. Because there has been no documented interaction with marine mammals in longline fisheries of Guam and CNMI and because those fisheries have been inactive since 2011, they are not classified in the 2017 list of fisheries.

Because catches of bigeye tuna by longline fisheries of American Samoa have remained well below the proposed 2,000 mt limit, and because there are no active longline fisheries in Guam or the CNMI, the proposed catch limit of 2,000 mt applicable to each of the U.S. participating territories is not expected to directly result in immediate changes in the conduct of territorial longline fisheries, including gear types used, areas fished, level of catch or effort. Under the proposed allocation limits, Hawaii longline vessels operating under specified fishing agreements 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.

Because the proposed action would not modify vessel operations or other aspects of the longline fisheries of American Samoa, Guam, CNMI and Hawaii, longline fisheries as conducted under the proposed action, are not expected to affect marine mammals in any manner not previously considered or authorized the commercial fishing take exemption under section 118 of the MMPA.

5.4 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) requires a determination that a recommended management measure has no effect on the land, water uses, or natural resources of the coastal zone or is consistent to the maximum extent practicable with an affected state's enforceable coastal zone management program. It is expected that NMFS will determined that the proposed specifications are consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of American Samoa, Guam, the Northern Mariana Islands, and Hawaii.

5.5 National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies undergo a review process for all federally funded and permitted projects that will impact sites listed on, or eligible for listing on, the National Register of Historic Places. There are presently no known districts, sites, highways, cultural resources structures or objects listed in or eligible for listing in the National Register of Historic Places in the U.S. EEZ around American Samoa, Guam, CNMI,

and Hawaii, or in adjacent areas of the high seas in international waters where pelagic longline fishing activities are conducted.

5.6 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act (PRA) is to minimize the paperwork burden on the public resulting from the collection of information by or for the Federal government. It is intended to ensure that the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501(1)). The proposed action would not establish any new permitting or reporting requirements not previously addressed.

5.7 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq*.) requires government agencies to assess and present the impact of their regulatory actions on small entities including small businesses, small organizations, and small governmental jurisdictions. The assessment is done by preparing a Regulatory Flexibility Analysis and Final Regulatory Flexibility Analysis (FRFA) for each proposed and final rule, respectively. Under the RFA, an agency does not need to conduct an IRFA or FRFA if a certification can be made that the proposed rule, if adopted, will not have a significant adverse economic impact on a substantial number of small entities.

On June 12, 2014, the Small Business Administration (SBA) issued an interim final rule revising small business size standards, effective July 14, 2014 (79 FR 33647). The rule increased the size standard for finfish fishing from 19.0 to $20.5 million, for shellfish fishing from $5.0 million to $5.5 million, and for other marine fishing from $7.0 million to $7.5 million.

NMFS has previously determined that all vessels federally permitted under Pelagic FEP are small entities under the SBA's definition of a small entity, i.e., they are engaged in the business of fish harvesting (NAICS Code: 114111), are independently owned or operated, are not dominant in their field of operation, and have annual gross receipts not in excess of $20.5 million.

Even though this proposed action would apply to a substantial number of vessels, the implementation of this action would not result in significant adverse economic impact to individual vessels. Furthermore, there would be little, if any, disproportionate adverse economic impacts from the proposed rule based on gear type, or relative vessel size. The proposed action also will not place a substantial number of small entities, or any segment of small entities, at a significant competitive disadvantage to large entities.

5.8 Administrative Procedure Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II) which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NMFS is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day

waiting period from the time a final rule is published until it becomes effective, with certain exceptions.

NMFS will publish a proposed rule in the Federal Register and solicit public comments. After the public comment period ends, NMFS will issue a final rule, if the rule is approved, that incorporates responses to public comments.

5.9 Executive Order 12898 Environmental Justice

On February 11, 1994, President 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.[12]

The longline fisheries of Hawaii, American Samoa, Guam and the Northern Mariana Islands are not known to have a large adverse environmental effects on stocks of fish that may be caught by subsistence fisherman, or on other marine resources that may be targeted for subsistence consumption. The fishery does not pollute marine waters and so does not have adverse impacts to human health or on marine life. The longline fisheries are also managed through federal regulations which are intended to conserve marine resources and habitats to enhance the economic and social well-being of fishing communities, including members of minority populations and low-income populations.

None of the Alternatives is expected to have large impacts to the environment that would result in a disproportionately large and adverse effect on minority or low-income populations. Therefore, there would not be a disproportionately high and adverse impact to minority or low-income populations with respect to the availability of fish because of the proposed action.

5.10 Executive Order 12866 Regulatory Impact Review

A "significant regulatory action" means any regulatory action that is likely to result in a rule that may –

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

1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal government or communities;
2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The proposed action is not believed to result in a significant regulatory action based on the criteria listed above.

5.11 Information Quality Act

The information in this document complies with the Information Quality Act and NOAA standards (NOAA Information Quality Guidelines, September 30, 2002) that recognize information quality is composed of three elements: utility, integrity, and objectivity. National Standard 2 of the Magnuson-Stevens Act states that an FMP's conservation and management measures shall be based upon the best scientific information available. In accordance with this national standard, the information product (i.e., this EA) incorporates the best biological, social, and economic information available to date, including the most recent biological information on, and assessment of, the pelagic fishery resources and protected resources, and the most recent information available on fishing communities, including their dependence on pelagic longline fisheries, and up-to-date economic information (landings, revenues, etc.). The policy choices, i.e., proposed management measures, contained in the information product are supported by the available scientific information. The management measures are designed to meet the conservation goals and objectives of the Pelagic FEP and the Magnuson-Stevens Act, and other applicable laws.

5.12 Executive Order 13132 – Federalism

The objective of Executive Order 13132 is to guarantee the Constitution's division of governmental responsibilities between the federal government and the states. Federalism Implications (FI) is defined as having substantial direct effects on states or local governments (individually or collectively), on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. This action does not contain policies with FI under E.O. 13132, as it does not impact or alter the relationship between the federal government and the governments of the Territory of American Samoa, the Territory of Guam, the CNMI or the State of Hawaii.

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Appendix 1: Evaluation of Proposed 2018 Territorial Bigeye Tuna Catch and Allocation Limits

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Background

This report evaluates impacts on bigeye tuna stock status of a proposed U.S. management action that considers longline bigeye catch limits for the U.S. Participating Territories[13] of American Samoa, Guam, and Northern Mariana Islands. Consideration also includes limits on the amount of bigeye the U.S. Participating Territories could potential allocate under specified fishing agreements with Hawaii-permitted longline vessels. This report evaluates the impact on bigeye stock status of the various catch and allocation limit specifications under consideration by the Western Pacific Regional Fishery Management Council.

Bigeye tuna is considered a Pacific-wide stock, but is assessed separately in the Western and Central Pacific Ocean (WCPO) and the Eastern Pacific Ocean (EPO). The most recent stock assessment for WCPO bigeye tuna was completed in July 2017 (McKechnie et al., 2017). The 2017 assessment updates the previous stock assessment prepared by the Secretariat of the Pacific Community (SPC) in 2014 by incorporating additional bigeye catch data from 2013-2015, and investigating alternative regional bigeye tuna spatial structure in combination with a new bigeye tuna growth curve, with the latter suggesting bigeye tuna is more productive than previously assumed. Unlike the 2014 stock assessment, which identified four models that most plausibly reflected the condition of the stock, the 2017 stock assessment identifies 72 plausible models called a "structural uncertainty grid."

In August 2017, the 2017 WCPO bigeye stock assessment was reviewed at the Thirteenth Regular Session of the WCPFC Scientific Committee (SC) in Rarotonga, Cook Islands. The SC endorsed the 2017 WCPO bigeye tuna stock assessment as the most advanced and comprehensive assessment yet conducted for this species. The SC also endorsed the use of the assessment model's structural uncertainty grid to characterize stock status and management advice and implications, but noted the large uncertainty in the assessment results, mainly due to the inclusion of old and new regional spatial structures and growth curves, for which the SC considered further investigation is necessary. The SC agreed to a weighting scheme for the assessment models in the grid considering five axes of uncertainty. The consensus weighting considered all options within four axes of uncertainty for (1) steepness, (2) tagging dispersion, (3) size frequency and (4) old and new regional structure to be equally likely. For the growth axis of uncertainty, the new growth curve models (n=36 models, weight=3, 108 model weight units) were weighted three times more than the old growth curve models (n=36 models, weight=1, 36

[13] American Samoa, Guam, and the Northern Mariana Islands have Participating Territory status within the WCPFC and are provided different catch and effort limits than the United States under WCPFC conservation and management measures.

model weight units). In total there were 144 models to characterize bigeye characterize stock status, uncertainty, summarize stock status in relation to reference points as provided in the 2017 WCPO bigeye stock assessment, and to calculate the probability of breaching the WCPFC-adopted spawning biomass limit reference point (LRP, $0.2*SB_{F=0}$) and the probability of F_{recent} being greater than F_{MSY} (WCPFC 2017).

The 2017 WCPO bigeye tuna stock assessment and the selected weighting grid selection by the WCPFC SC indicate that recent levels of fishing mortality were below the level that will support MSY (WCPFC 2017). Relative recent fishing mortality (F_{recent}/F_{MSY}) had a median of 0.83 with a ~23% probability that recent fishing mortality was above F_{MSY}. The central tendency of recent spawning biomass had a median ($SB_{recent}/SB_{F=0}$) = 0.32 with a 16% probability that the recent spawning biomass had breached the adopted LRP (WCPFC 2017).

At the WCPFC's 14th Regular Session held December 3–7, 2017, in Manila, Philippines, the SPC presented an evaluation of the outcomes of CMM 2015-01 on bigeye tuna stock status in year 2045 with defined management options for the tropical tuna fishery (purse seine and longline) from the Intersessional Meeting to progress the draft Bridging CMM on Tropical Tuna (SPC 2017a).[14] This evaluation was based on the 2017 bigeye tuna stock assessment (McKechnie et al. 2017) and utilized deterministic projections across the range of weighted models as agreed to by the SC at its 13th meeting held August in 2017 (WCPFC 2017).

The SPC evaluation was integral to the deliberations of the WCPFC, which subsequently agreed on a new conservation and management measure (CMM 2017-01) for tropical tunas (skipjack, yellowfin, and bigeye) at WCPFC14. An objective of CMM 2017-01 is to have the bigeye spawning biomass depletion ratio ($SB/SB_{F=0}$) to be maintained at or above the average $SB/SB_{F=0}$ for 2012-2015 (0.32). To achieve this objective, the CMM includes a number of provisions to be implemented in 2018, including longline catch bigeye limits for certain member countries, seasonal purse seine Fish Aggregation Device (FAD) closures in exclusive economic zones (EEZs) and the high seas in the area between 20˚N and 20˚S. For example, under CMM 2017-01, the U.S. longline bigeye limit was reverted back to its 2016 level of 3,554 mt. In 2017, the U.S. limit adopted by the WCPFC was 3,345 mt in 2017). Five other members have longline bigeye catch limits specified in the measure, which also were set back to their 2016 levels (Table 1), with the exception of China, which obtained a 500 mt higher limit than provided in 2016. Under CMM 2017-01, other members catching less than 2,000 mt are allowed to harvest up to 2,000 mt, while Small Island Developing States (SIDS) and Participating Territories (PTs) longline bigeye catches continued to be unlimited under the measure. The U.S. territories of American Samoa, Guam and the Commonwealth of the Northern Mariana Islands are PTs, and under CMM 2017-01 have no limits on bigeye tuna.

[14] The SPC conducted a thirty-year projection from 2016, rather than a 20-year projection due to the stock not reaching equilibrium in the 20-year horizon with the assumed purse seine effort and longline catch, and under the recruitment assumptions used. (G. Piling. SPC, pers. comm. January 2018).

* PIFSC Internal Report In-Prep.

Evaluation of Proposed 2018 Territorial Bigeye Tuna Catch and Allocation Limits

Pursuant to Amendment 7 of the PFEP, the Council is considering recommending the specification of bigeye tuna catch and allocation Limits for each of the U.S. territories. Specification alternatives under consideration include the following:

1. Alternative 1: No specification of longline catch or allocation limits for any U.S. participating territory in 2018 (No Management Action);
2. Alternative 2 (Status quo): Specify for each U.S. participating territory, a 2,000 mt longline catch limit and 1,000-mt allocation limit in 2018 (Status Quo);
3. Alternative 3: Specify for each U.S. participating territory, a 2,000-mt catch limit and that each territory can allocate up to 2,000-mt of the catch limit; and

The Council is also considering alternatives that would set no catch limit for any U.S. territories, but continue to allow each territory to allocate bigeye tuna to Hawaii longline vessels under specified fishing agreements.

4. Alternative 4: No specification of a total longline bigeye limit for any U.S. participating territory, but specify a limit on the amount of bigeye each territory can allocate under specified fishing agreements:
    a. 1,000 mt allocation limit per territory
    b. 1,500 mt allocation limit per territory
    c. 2,000 mt allocation limit per territory

For each alternative, there are different levels of bigeye tuna limits that NMFS and the Council would authorize each U.S. territories to catch, or to transfer for use by Hawaii-permitted longline vessels under specified fishing agreements. Therefore, there are a range of potential outcomes associated with Alternatives 2, 3, and 4 listed above with respect to a variable number (1, 2, or 3) of specified fishing agreements that could be established in a given year, and the magnitude of the catch (e.g. 1,000; 1,500; or 2,000 mt) per agreement. For Alternative 2, there are four potential outcomes (A-D) and 9 potential outcomes for Alternative 4 (Table 1). Due to the similarities between Alternatives 3 and 4 with regards to allocations, only Alternative 4 potential outcomes were analyzed. The potential impacts from Alternative 3 can be inferred from the evaluation of Outcome D and Outcomes E-L.

Table 1: Potential outcomes associated with Alternatives 2 and 4

Alternative 2	Alternative 4
Potential Outcome A: 1 agreement (1,000 mt)	Potential Outcome E: 1 agreement (1,000 mt)
Potential Outcome B: 2 agreements (2,000 mt)	Potential Outcome F: 2 agreements (2,000 mt)
Potential Outcome C: 3 agreements (3,000 mt)	Potential Outcome G: 3 agreements (3,000 mt)
Potential Outcome D: 3 agreements and full utilization of each Territory's 2,000 mt limit (6,000 mt)	Potential Outcome H: 1 agreement (1,500 mt)
	Potential Outcome I: 2 agreements (3,000 mt)
	Potential Outcome J: 3 agreements (4,500 mt)
	Potential Outcome K: 1 agreement (2,000 mt)
	Potential Outcome L: 2 agreements (4,000 mt)
	Potential Outcome M: 3 agreements (6,000 mt)

At the request of the Council and NMFS, SPC conducted projections with respect to the alternatives listed above and their associated potential outcomes in relation to the implementation of CMM 2017-01 with respect to future (2045) bigeye stock status. The projections were based on scalars to the Hawaii-permitted longline catch within the MULTIFAN-CL bigeye assessment model framework that represent the potential outcomes under the various alternatives.

The SPC analysis assumed full implementation of the CMM 2017-01, including the 3-month purse seine FAD closure within EEZs and the high seas and an additional two sequential months on the high seas by member countries. For longline catches, the SPC analysis assumed that countries with specified annual longline bigeye limits in excess of 2,000 mt would each catch their full annual limit, even if actual catches have been less (e.g. Japan and Indonesia; Table 2). For member countries that have bigeye longline catches less than 2,000 mt, and for SIDS and PTs without limits specified in CMM 2017-01, the SPC analysis assumed that the catches of these fleets would be continued at their average 2013-2015 levels. Under all these assumptions, the SPC estimates that the total WCPO longline bigeye catch would be increased by 9.6% of the 2013-2015 average catch under CMM 2017-01.

Table 2: 2018 longline bigeye catch limits and 2016 reported longline bigeye catches for six WCPFC members

Member Countries, Participating Territories, and Cooperating Non-Members	2018 longline bigeye catch limit (mt)	2016 longline bigeye catch (mt) reported to WCPFC
Japan	18,265	12,610
Korea	13,942	11,018
Chinese Taipei	10,481	9,488
China	8,224	8,195
Indonesia	5,889	8
United States	3,554	3,761

Source: CMM 2017-01 and SPC 2017b.

It is noted that member flag States with longline catches of bigeye of less than 2,000 mt could increase their catch to this level and remain compliant with the CMM 2017-01, and further that longline fleets of SIDS and PTs are currently unrestricted and could increase their catches of bigeye to any level.

The SPC projections utilized the short-term future bigeye tuna recruitment hypothesis. Under the short-term recruitment hypothesis, future recruitment would remain on average consistent with 2004-2013 conditions. The WCPFC Science Committee has agreed that for the purpose of evaluating the CMM, and any proposed alternatives, that the recent recruitment scenario is more appropriate because of the possibility of some bias in the estimates of early recruitment in the bigeye stock assessment (SPC 2014).

To evaluate the impacts on bigeye tuna stock status from the alternatives listed above, the SPC conducted 14 model scenario runs. The baseline scenario represents 2013-2015 average catch or

2015 for bigeye catch by Hawaii-permitted longline vessels inclusive of two specified fishing agreements in 2015, one with the CNMI and the other with Guam. All of the alternatives reflect full implementation of CMM 2017-01, including the assumption that Japan and Indonesia would catch the full amount of their bigeye catch limit. Evaluation of the alternatives and their associated scenarios utilize scalars applied to the 2015 US longline bigeye catch to account for various bigeye tuna transfer levels associated with 0, 1, 2 or 3 specified fishing agreements. The Alternative 1 scenario represents no action in relation to the US proposal to set territorial catch and allocation limits. Thus, with no transfers of Territorial allocation to Hawaii longline vessels, the Alternative 1 projection includes less catch than the 2015 level. The 4 potential outcomes for Alternative 2 include Territorial transfers of 1,000, 2,000, and 3,000 metric tons of bigeye to longline vessels from 1, 2, or 3 Territories (A-C, respectively) and then also adding full utilization of Territorial catch limits up to a maximum of 6,000 metric tons (D). For Alternative 4, nine potential outcomes were evaluated that reflect 1, 2, or 3 specified fishing agreements subject to various allocation limits per territory (1,000 mt, 1,500, and 2,000 mt).

The U.S. longline catch assumptions, which included potential transfer of allocations from U.S. Territories to eligible U.S. vessels under the various scenarios were scaled in WCPO bigeye stock assessment regions and projections were calculated using the scalars illustrated in Table 4. In accordance with Federal regulations at 50 CFR 300.224, bigeye tuna caught outside the Hawaii EEZ by longline vessels that are permitted to fish and land fish in both American Samoa and Hawaii (AS/HI Dual Permitted) is assigned to American Samoa even if the vessel does not initiate fishing from, or return to land fish in American Samoa. Such catches are shown separately, and were not scaled as they are already included in the baseline.

Results

Results of the projections are presented in Tables 5 to 8. Stock projections indicate F_{2045}/F_{MSY} increases from 0.927 to 0.983 assuming full implementation of CMM 2017-01. In other words, if CMM 2017-01 is fully implemented, bigeye tuna would not be subject to overfishing in 2045. With respect to spawning biomass and total biomass in 2045 versus biomass at MSY, SPC (2017) did not calculate these values, focusing instead on the spawning biomass ratio to that in the absence of fishing ($SB/SB_{F=0}$), which is WCPFC's adopted interim Limit Reference Point (LRP) for bigeye tuna. Specifically, WCPFC considers bigeye tuna to be overfished when $SB/SB_{F=0}$ falls below 20 percent ($SB/SB_{F=0} < 0.20$).

The SC13 summary report indicated that recent $SB_{2011\text{-}2014}/SB_{MSY}$ had a mean of 1.21, which is well above the established overfished reference point (0.6 SB/SBMSY) for bigeye tuna under the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (PFEP). Notwithstanding, for all the projections, there is low probability that the ratio of biomass to biomass at MSY would breach the PFEP overfished stock status criteria and biomass would be greater than the level necessary to produce MSY on a continuing basis.[15]

[15] The WPRFMC reference point of 0.6SBmsy is approximately 0.14 $SB_{F=0}$ for bigeye tuna. The potential outcome with the greatest impact to bigeye stock status is Alternative 3, Potential Ouctome M, which is projected to result in $SB_{2045}/SB_{F=0} = 0.270$. However, under this scenario, bigeye tuna stock status would remain above the WCPFC overfished limit reference point and the stock would not be overfished.

Under Alternative 1, if CMM 2017-01 was fully implemented, and the total catch of bigeye by U.S. longline fisheries were held at the U.S. limit of 3,554 mt, 529 mt for the American Samoa longline fishery, and no specified fishing agreements, then the F_{2045}/F_{MSY} is projected to be 0.983, indicating the bigeye tuna would not be subject to overfishing, and spawning biomass ($SB_{2045}/SB_{F=0}$ = 0.286) would be above the WCPFC's LRP.

Under Alternative 2, there are four distinct possible fishery outcomes depending on the number of specified fishing agreements authorized. Under Potential Outcome 2A, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt, which is the average catch for 2011-2016. With one specified fishing agreement with 1,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from a U.S. territory, the projected F_{2045}/F_{MSY} = 0.988 and $SB_{2045}/SB_{F=0}$ = 0.283. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome A.

Under Potential Outcome 2B, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With two specified fishing agreements with 2,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 0.994 and $SB_{2045}/SB_{F=0}$ = 0.280. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome B.

Under Potential Outcome 2C, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With three specified fishing agreements with 3,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 1.00 while $SB_{2045}/SB_{F=0}$ = 0.278. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome C.

Under Potential Outcome 2D, the U.S. Hawaii longline fleet would catch 3,554 mt. With three fishing agreements, with 3,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories and full utilization of the remaining portion of their specified catch limit of 1,000 mt) by longline fisheries of American Samoa, Guam and the Northern Mariana Islands (for a total of 3,000 mt), the projected F_{2045}/F_{MSY} = 1.014 while $SB_{2045}/SB_{F=0}$ = 0.271. This indicates that bigeye tuna would technically meet the definition of overfishing, although it is statistically indistinguishable from the overfishing threshold of F_{2045}/F_{MSY} >1.0). The stock would not be overfished in 2045 as a result of Potential Outcome D.

Under Alternative 4, there are an additional 9 potential outcomes (E-M). Under Potential Outcome 4(a)E, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With only one specified fishing agreement 1,000 mt of bigeye catch allocated to Hawaii longline vessels, the projected F_{2045}/F_{MSY} = 0.988 and $SB_{2045}/SB_{F=0}$ = 0.283. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome E.

Under Potential Outcome 4(a)F, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With two specified fishing agreements with 2,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 0.994 and $SB_{2045}/SB_{F=0}$ = 0.280. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome F.

Under Potential Outcome 4(a) G, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With three specified fishing agreements with 3,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories , the projected F_{2045}/F_{MSY} = 1.00 while $SB_{2045}/SB_{F=0}$ = 0.278. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome G.

Under Potential Outcome 4(b)H, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With only one specified fishing agreement with 1,500 mt of bigeye catch allocated to Hawaii longline vessels, the projected F_{2045}/F_{MSY} = 0.991 and $SB_{2045}/SB_{F=0}$ = 0.282. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome H.

Under Potential Outcome 4(b)I, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With two specified fishing agreements with 3,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 1.00 while $SB_{2045}/SB_{F=0}$ = 0.278. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome I.

Under Potential Outcome 4(b)J, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With two three specified fishing agreements with 4,500 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 1.008 while $SB_{2045}/SB_{F=0}$ = 0.274. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be statistically indistinguishable from the overfishing threshold of 1.0). The stock would not be overfished in 2045 as a result of Potential Outcome J.

Under Potential Outcome 4(c)K, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With one specified fishing agreement with 2,000 mt of bigeye allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 0.994 and $SB_{2045}/SB_{F=0}$ = 0.280. This indicates that bigeye tuna would not be subject to overfishing and not overfished in 2045 as a result of Potential Outcome K.

Under Potential Outcome 4(c)L, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With two specified fishing agreements with 4,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 1.005 and $SB_{2045}/SB_{F=0}$ = 0.275. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be

statistically indistinguishable from the overfishing threshold of 1.0). The stock would not be overfished in 2045 as a result of Potential Outcome L.

Under Potential Outcome 4(c)M, the U.S. Hawaii longline fleet would catch 3,554 mt, and the American Samoa longline fishery would catch 529 mt. With three specified fishing agreements with 6,000 mt of bigeye catch allocation transferred to Hawaii longline vessels from U.S. territories, the projected F_{2045}/F_{MSY} = 1.016 and $SB_{2045}/SB_{F=0}$ = 0.270. This indicates that bigeye tuna would technically meet the definition of overfishing (although F_{2045}/F_{MSY} would be statistically indistinguishable from the overfishing threshold of 1.0). The stock would not be overfished in 2045 as a result of Potential Outcome M.

Table 3: Bigeye Tuna Catch (mt) by U.S. and Territorial Longline Fisheries in the Western and Central Pacific Ocean 2011-2016.

Longline Fishery	2016	2015	2014	2013	2012	2011	Ave. 2011-2016
U.S. Hawaii longline permitted vessels	3,761	3,427	3,823	3,654	3,660	3,565	3,648
Catch allocated to Hawaii longline vessels through a specified fishing agreement with American Samoa					815	723	769
Catch allocated to Hawaii longline vessels through a specified fishing agreement with the CNMI	884	999	1,000	792			918
Catch allocated to Hawaii longline vessels through a specified fishing agreement with Guam	939	856					897
Dual permitted U.S. Hawaii/American Samoa longline vessels	588	441	236	305	523	363	409
American Samoa longline permitted vessel	98	116	82	84	164	178	120
Guam longline vessels	0	0	0	0	0	0	0
CNMI longline vessels	0	0	0	0	0	0	0
Total Longline Bigeye Catch	**6,270**	**5,839**	**5,141**	**4,835**	**5,162**	**4,829**	**5,295**

Source: PIFSC 2017 U.S. Annual Part 1 Report to the WCPFC

Table 4: Methodology to determine scalars on U.S. longline bigeye catches to evaluate potential outcomes of the proposed action.

TUMAS Runs	U.S. HI Longline Permitted Vessel BET Catch	AS/HI Dual Longline Permitted Vessel BET Catch	AS/GU/CN MI Longline BET Catch*	BET Transfers to HI Longline Vessels	Projected U.S. Longline BET Catch (Regions 2 and 4)*	Scalar on 2015 U.S. Longline BET catch in SPC data (Regions 2 & 4)+
2015 Baseline	3,427	441	116	1,855	5,723	1
Alt. 1: No action	3,554	409[1]	120	0	3,963	0.69
Alt. 2: 2,000 mt catch limit /1,000 mt allocation limit	See below	See below	See below	See below	See below	See below
Potential Outcome A	3,554	409[1]	120	1,000	4,963	0.87
Potential Outcome B	3,554	409[1]	120	2,000	5,963	1.04
Potential Outcome C	3,554	409[1]	120	3,000	6,963	1.22
Potential Outcome D	3,554	0 (see next column)	6,000[2]	3,000	9,554	1.67
Alt 3: No total limit; allocation limits (1,000, 1,500, 2,000)	See below	See below	See below	See below	See below	See below
Potential outcome E (1,000)	3,554	409[1]	120	1,000	4,963	0.87
Potential outcome F (2,000)	3,554	409[1]	120	2,000	5,963	1.04
Potential outcome G (3,000)	3,554	409[1]	120	3,000	6,963	1.22
Potential outcome H (1,500)	3,554	409[1]	120	1,500	5,463	0.95
Potential outcome I (3,000)	3,554	409[1]	120	3,000	6,963	1.22
Potential outcome J (4,500)	3,554	409	120	4500	8,463	1.48

Potential outcome K (2,000)	3,554	409	120	2,000	5,963	1.04
Potential outcome L (4,000)	3,554	409	120	4,000	7,963	1.39
Potential outcome M (6,000)	3,554	409	120	6,000	9,963	1.74

Notes:
* The model accounts for BET catch by U.S longline vessels landing in AS in Region 6, which was 116 in 2015 and averaged 120 mt for the period 2011-2016. The projected U.S. and American Samoa catches are accounted for in deterministic projections of BET stock status in 2045 in Tables 4-8. There were no reported longline BET landings in Guam or CNMI in 2015, and currently, there are no U.S. longline vessels active in Guam or CNMI.
[1] AS/HI LL dual permit catch (409 mt) = average catch from dual American Samoa/Hawaii longline permitted vessels from 2011-2016.
[2] Potential Outcome D assumes each U.S. territory allocates 1,000 mt to Hawaii longline permitted vessel and the remainder (1,000 mt) of its specified catch limit is caught by longline vessels operating in the respective territory.

Table 5: Projections related to Alternatives 1, and 2 and percent change in F_{2045}/F_{MSY}, $SB_{2045}/SB_{F=0}$, at various scalars.

	Baseline Catch	Alternative 1: No Action		Alternative 2: 2,000 mt Catch Limit and 1,000 mt Allocation Limit for each U.S. Territory							
				Potential Outcome A		*Potential Outcome B*		*Potential Outcome C*		*Potential Outcome D*	
No. of Specified Fishing Agreements	**2015**	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,000 mt of BET Transfers**		**2 Fishing Agreements and 2,000 mt of BET Transfers**		**3 Fishing Agreements and 3,000 mt of BET Transfers**		**3 Fishing Agreement and 3,000 mt of BET transfers and Full Utilization of BET in Territories**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**5,723 mt** HI: 3,427 HI/AS Dual:441 Transfers: 1,855	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**4,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,000		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000		**9,554 mt** HI: 3,554 AS: 1,000 GU: 1,000 CNMI: 1,000 Transfers: 3,000	
			Percent Change		**Percent Change**		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.927**	**0.983**	**0.00**	**0.988**	**0.5**	**0.994**	**1.1**	**1.000**	**1.7**	**1.014**	3.2
$SB_{2045}/SB_{F=0}$	**0.313**	**0.286**	**0.00**	**0.283**	**-1.0**	**0.280**	**-2.1**	**0.278**	**-2.8**	**0.271**	-5.2

Note: The percent change is calculated with respect to values associated with Alternative 1, which includes full implementation of CMM 2017-01, with no US territory catch transfers under specified fishing agreements. The baseline catch is the average (2013-2015) total purse seine associated effort and longline catch levels within the bigeye tuna stock assessment. All alternatives assume full implementation of CMM 2017-01. Potential impacts to bigeye from Alternative 3 could fall within the range provided above for Outcomes A-D.

Table 6: Projections related to Alternative 4(a) and percent change in F_{2045}/F_{MSY}, $SB_{2045}/SB_{F=0}$, at various scalars.

	Alternative 1: No Action		**Alternative 4: No total catch limits, but allocation limits of 1,000 per territory**					
			Potential Outcome E		***Potential Outcome F***		***Potential Outcome G***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,000 mt of BET Transfers**		**2 Fishing Agreements and 2,000 mt of BET Transfers**		**3 Fishing Agreements and 3,000 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**4,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,000		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.988**	**0.5**	**0.994**	**1.1**	**1.000**	**1.7**
SB_{2045}/SBF=0	**0.286**	**0.00**	**0.283**	**-1.0**	**0.280**	**-2.1**	**0.278**	**-2.8**

Table 7: Projections related to Alternative 4 (b) and percent change in F_{2045}/F_{MSY}, $SB_{2045}/SB_{F=0}$, at various scalars.

	Alternative 1: No Action		**Alternative 4: No total catch limits, but allocation limits of 1,500 per territory**					
			Potential Outcome H		***Potential Outcome I***		***Potential Outcome J***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 1,500 mt of BET Transfers**		**2 Fishing Agreements and 3,000 mt of BET Transfers**		**3 Fishing Agreements and 4,500 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**5,463 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 1,500		**6,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 3,000		**8463 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 4,500	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.991**	**0.8**	**1.000**	**1.7**	**1.008**	**2.5**
$SB_{2045}/SBF=0$	**0.286**	**0.00**	**0.282**	**-1.4**	**0.278**	**-2.8**	**0.274**	**-4.2**

Table 8: Projections related to Alternatives 4(c) and percent change in F_{2045}/F_{MSY}, $SB_{2045}/SB_{F=0}$, at various scalars.

	Alternative 1: No Action		**Alternative 4: No total catch limits, but allocation limits of 2,000 per territory**					
			Potential Outcome K		***Potential Outcome L***		***Potential Outcome M***	
No. of Specified Fishing Agreements	**No Fishing Agreements and No BET Transfers**		**1 Fishing Agreement and 2,000 mt of BET Transfers**		**2 Fishing Agreements and 4,000 mt of BET Transfers**		**3 Fishing Agreements and 6,000 mt of BET Transfers**	
Scaled U.S. Longline BET Catch (Regions 2 and 4)	**3,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 0		**5,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 2,000		**7,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 4,000		**9,963 mt** HI: 3,554 HI/AS Dual: 409 Transfers: 6,000	
		Percent Change		**Percent Change**		**Percent Change**		**Percent Change**
F_{2045}/F_{MSY}	**0.983**	**0.00**	**0.994**	**1.1**	**1.005**	**2.2**	**1.016**	**3.4**
$SB_{2045}/SBF=0$	**0.286**	**0.00**	**0.280**	**-2.1**	**0.275**	**-3.8**	**0.270**	**-5.6**

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