NOAA FISHERIES
Pacific Islands Regional Office

Environmental Assessment for a Rule to Implement Decisions of the Western and Central Pacific Fisheries Commission for:

Fish Aggregating Device Design Requirements in Purse Seine Fisheries, IMO Number Requirements, and Bycatch Restrictions

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION AND PURPOSE AND NEED

The National Marine Fisheries Service (NMFS) has prepared this Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. § 4321, *et seq*.) and related authorities, such as the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508) and the National Oceanic and Atmospheric Administration's (NOAA) Administrative Order (NAO) 216-6A (April 22, 2016) – Compliance with the National Environmental Policy Act, and its associated Companion Manual (January 13, 2017).[1]

The National Marine Fisheries Service (NMFS) is undertaking a rulemaking to implement recent decisions of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC or Commission). The rule would implement specific provisions of four recent WCPFC decisions: CMM 2018-01[2], "Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean"; CMM 2018-06, "Conservation and Management Measure for WCPFC Record of Fishing Vessels and Authorisation to Fish"; CMM 2019-04, "Conservation and Management Measure for Sharks"; and CMM 2019-05, "Conservation and Management Measure on Mobulid Rays". The first two decisions, CMM 2018-01 and CMM 2018-06, were adopted by the Commission at its fifteenth regular annual session, in December 2018. The third and fourth decisions, CMM 2019-04 and CMM 2019-05, were adopted by the Commission at its sixteenth regular annual session in December 2019.

1.1 Background

The United States ratified the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Convention) in 2007.[3] The area of application of the Convention (Convention Area), which encompasses the WCPO, is shown in Figure 2.

The Convention text indicates that the agreement is focused on HMS and stocks thereof within the Convention Area (see the Convention text for the specific HMS covered)[4]. The Convention provides for the conservation and management of target stocks, non-target species, and species belonging to the same ecosystem or dependent upon or associated with the target stocks.

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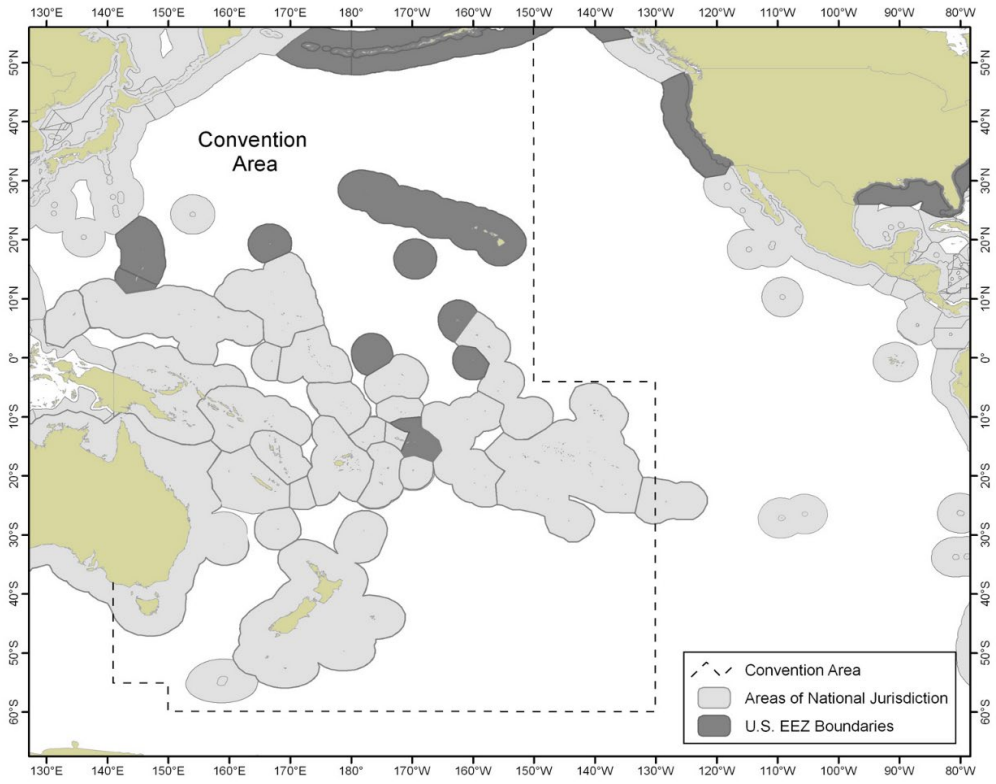
[1] This EA is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the revised CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020 (see 85 FR 43304). This review began on September 9, 2020, and the agency has decided to proceed under the 1978 regulations.

[2] CMM 2020-01 is the most recent WCPFC decision on tropical tunas and maintains the text of CMM 2018-01. Under CMM 2020-01, the measures set out in CMM 2018-01 continue to be in force until February 15, 2022.

[3] The Convention was opened for signature in Honolulu on September 5, 2000, and entered into force in June 2004; the Convention entered into force for the United States in 2007. The full text of the Convention is available at: WCPFC Convention Text on the Conservation and Management of High Migratory Fish Stocks.

[4] Though not specifically stated in the Convention text, it has also been agreed that southern bluefin tuna (*Thunnus maccoyii*) that are found in the Convention Area will continue to be solely managed by the Commission for the Conservation of Southern Bluefin Tuna.

Figure 1. The Convention Area (high seas in white; U.S. Exclusive Economic Zone in dark gray; foreign jurisdictions in light gray).



Source: NOAA Fisheries Pacific Islands Regional Office.

The Commission adopts decisions and conservation and management measures that Commission Members, Cooperating Non-Members, and Participating Territories (collectively referred to as WCPFC members) are obligated to implement through their respective national laws and procedures. The Western and Central Pacific Fisheries Convention Implementation Act (WCPFCIA; 16 U.S.C. 6901 *et seq*.) authorizes the Secretary of Commerce, in consultation with the Secretary of State and the Secretary of the Department in which the Coast Guard is operating, to develop such regulations as are needed to carry out the obligations of the United States under the Convention. The authority to promulgate regulations to implement the provisions of the Convention and WCPFC decisions has been delegated by the Secretary of Commerce to NMFS.

CMM 2018-01, "Conservation and Management Measure for Bigeye, Yellowfin, and Skipjack Tuna in the Western and Central Pacific Ocean," was adopted by the Commission at its fifteenth regular annual session, in December 2018. As noted above, CMM 2020-01 is the most recent in a series of CMMs for the management of tropical tuna stocks under the purview of the Commission and maintains the text of CMM 2018-01. Under CMM 2020-01, the measures set out in CMM 2018-01 continue to be in force until February 15, 2022. The purpose of CMM 2018-01 is to ensure the sustainability of the stocks of bigeye tuna (*Thunnus obesus*), yellowfin tuna (T*hunnus albacares*), and skipjack tuna (*Katsuwonus pelamis*) in the WCPO until the establishment of specific harvest strategies for those stocks. CMM 2018–01 is similar in many respects to its predecessor WCPFC conservation and management measures for tropical tunas, and NMFS has already implemented most provisions of CMM 2018–01 through prior rulemaking. The proposed rule would implement the provisions of CMM 2018-01 regarding

non-entangling FADs for purse seine fishing vessels, which became effective January 1, 2020. Paragraph 19 of CMM 2018-01 states that, "[t]o reduce the risk of entanglement of sharks, sea turtles or any other species, as from 1st January 2020, [WCPFC members] shall ensure that the design and construction of any FAD to be deployed in, or that drifts into, the [Convention Area] shall comply with the following specifications:

- The floating or raft part (flat or rolled structure) of the FAD can be covered or not. To the extent possible the use of mesh net should be avoided. If the FAD is covered with mesh net, it must have a stretched mesh size less than 7 cm (2.5 inches) and the mesh net must be well wrapped around the whole raft so that there is no netting hanging below the FAD when it is deployed.
- The design of the underwater or hanging part (tail) of the FAD should avoid the use of mesh net. If mesh net is used, it must have a stretched mesh size of less than 7 cm (2.5 inches) or tied tightly in bundles or "sausages" with enough weight at the end to keep the netting taut down in the water column. Alternatively, a single weighted panel (less than 7 cm (2.5 inches) stretched mesh size net or solid sheet such as canvas or nylon) can be used."

This provision of CMM 2018-01 was adopted in order to address concerns regarding the risk of FAD entanglements with sharks, sea turtles and other protected species.

CMM 2018-06, "WCPFC Record of Fishing Vessels and Authorization to Fish," includes an amendment that expands an existing requirement to obtain an International Maritime Organization (IMO) number to smaller vessels used for commercial fishing for HMS in the Convention Area. The CMM states that effective April 1, 2020, members "shall ensure that all their motorized inboard fishing vessels of less than 100 GRT (or 100 GRT) down to a size of 12 meters in length overall (LOA), authorized to be used for fishing in the Convention Area beyond the flag [members] area of national jurisdiction have an IMO" number issued. The existing requirement to obtain an IMO number, implemented by NMFS through a prior rulemaking, applies to vessels that are at least 100 GRT (see 50 CFR 300.217(c)). The proposed rule analyzed in this EA would expand the requirement to vessels less than 100 GRT down to a size of 12 meters LOA. This amendment was adopted in order to improve the Commission's monitoring, control, and surveillance (MCS) capabilities. IMO numbers are a useful tool in order to quickly and accurately identify vessels and trace and verify their activity over time, regardless of a change in name, ownership, or flag.

CMM 2019-04, "Conservation and Management Measure for Sharks", effective November 1, 2020, combines and replaces five management measures related to sharks that had previously been adopted by the Commission (CMM 2010-07, Conservation and Management Measure for Sharks; CMM 2011-04, Conservation and Management Measure for Oceanic Whitetip Sharks; CMM 2012-04, Conservation and Management Measure on the Protection of Whale Sharks from Purse Seine Operations; CMM 2013-08, Conservation and Management Measure for Silky Sharks; and CMM 2014-05, Conservation and Management Measure for Sharks). Most of the provisions of CMM 2019-04 have already been promulgated through existing U.S. regulations. However, there are two new provisions in the measure that would be implemented through the proposed rule that are analyzed in this EA. The regulations at 50 CFR 300.226 prohibit the retention, transshipment, storage, or landing of any oceanic whitetip shark (*Carcharhinus longimanus*) and silky shark (*Carcharhinus falciformis*), and require the release of oceanic

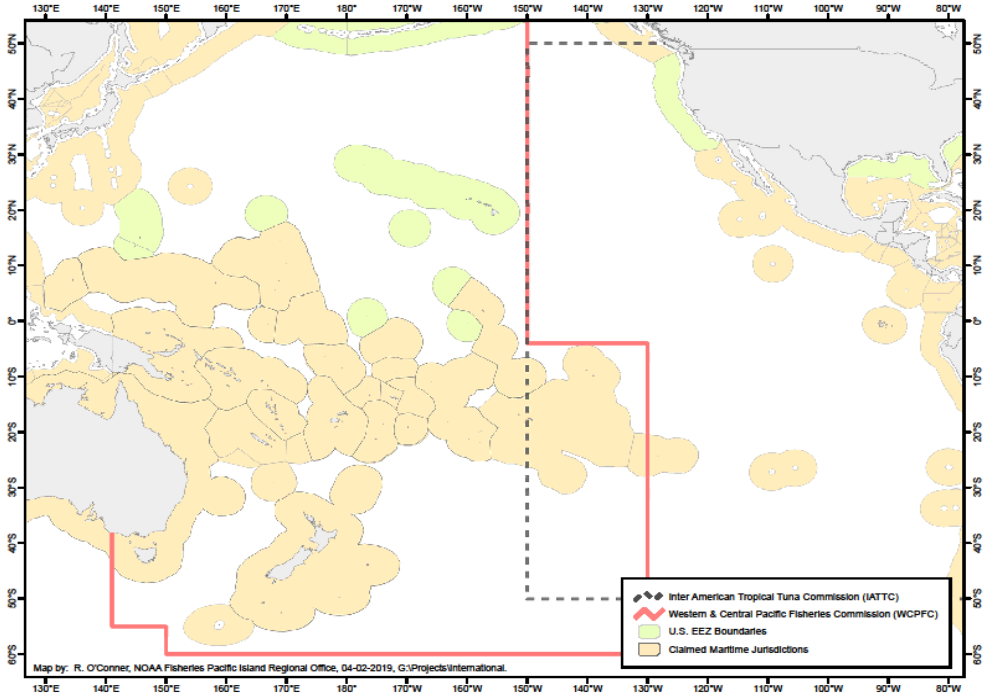
whitetip shark and silky shark as soon as possible after the shark is caught and brought alongside the vessel. CMM 2019-04 includes an amendment that would allow for increased flexibility for purse seine fishing vessels in cases where an oceanic whitetip shark or silky shark are not seen during fishing operations and are delivered into the vessel hold. CMM 2019-04 also includes an amendment that requires that sharks be hauled alongside the vessel before being cut free in order to facilitate species identification. The second provision would only apply to vessels on which an observer or electronic monitoring camera is present.

CMM 2019-05, "Conservation and Management Measure on Mobulid Rays Caught in Association with Fisheries in the WCPFC Convention Area" was adopted by the Commission at its sixteenth regular annual session in December 2019. The main objective of CMM 2019-05 is to ensure the conservation of mobulid rays (i.e., the family Mobulidae, which includes manta rays and devil rays (*Mobula spp*.)) in the WCPO by reducing incidental take and associated mortalities in the Convention Area. The measure, effective January 1, 2021, includes provisions that require Commission Members to: 1) prohibit vessels from targeted fishing or intentional setting on mobulid rays in the Convention Area; 2) prohibit vessels from retaining on board, transshipping, or landing any part or whole carcass of mobulid rays caught in the Convention Area; 3) require vessels to promptly release mobulid rays, alive and unharmed, to the extent practical, as soon as possible and in a manner that will result in the least possible harm to the individuals captured; 4) provide for an exemption in cases where a mobulid ray is unintentionally caught and frozen as part of a purse seine vessel's operation; and 5) require vessels to allow observers to collect biological samples of mobulid rays that are dead at haul-back.

1.2 Application in the Overlap Area

The United States is also a member of the Inter-American Tropical Tuna Commission (IATTC). The convention areas for the IATTC and WCPFC overlap in the Pacific Ocean waters within a rectangular area bounded by 50° S. latitude, 4° S. latitude, 150° W. longitude, and 130° W. longitude ("overlap area"). Figure 2 below shows the area of overlap.

Figure 2: WCPFC and IATTC Overlap Area



Source: R. O'Connor, NOAA Fisheries Pacific Islands Regional Office, April 2019.

Historically, regulations implementing the conservation measures adopted by the IATTC (50 CFR part 300, subpart C) and the WCPFC (50 CFR part 300, subpart O) both applied to U.S. vessels fishing for highly migratory species (HMS) in the overlap area. In 2012, the IATTC and the WCPFC adopted recommendations/decisions that provide that each member belonging to both commissions is to decide, for vessels of that member listed in both WCPFC Record of Fishing Vessels (Record) and IATTC Regional Vessel Register List (Register), under which of the two commissions those vessels shall operate when fishing in the overlap area, as regards the application of the conservation and management measures of that commission.[5]

In 2020, NMFS published a rule (85 FR 37376) specifying that that all NMFS regulations implementing IATTC resolutions apply in the overlap area. NMFS regulations implementing WCPFC conservation and management measures that place limits or restrictions on catch, fishing effort, and bycatch mitigation no longer apply in the overlap area. Accordingly, none of the above listed WCPFC conservation and management measures will apply in the overlap area, with the exception of IMO number requirements.

[5] See IATTC Recommendation C-12-11, "IATTC-WCPFC Overlap Area," and WCPFC decision documented in "Summary Report of the Ninth Regular Session of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean," Manila, Philippines, 2-6 December, 2012, paragraph 80.

1.3 Purpose and Need

The purpose of the proposed rule is to implement certain provisions of CMMs 2018-01, 2018-06, 2019-04 and 2019-05, regarding non-entangling FADs, IMO numbers, sharks, and mobulid rays, for U.S. fishing vessels fishing for HMS in the Convention Area. The need for the proposed rule is to satisfy the obligations of the United States as a Contracting Party to the Convention, pursuant to the authority of the WCPFCIA.

2 PROPOSED ACTION AND ALTERNATIVES

In an environmental review document, agencies must assess the environmental impacts of a proposal and reasonable and feasible alternatives to the proposal in comparative form. The purpose of this comparison of alternatives is to provide the decision maker and the public with a clear basis for choosing among the alternatives.[6]

This chapter provides a description of the proposed action analyzed in this EA. The chapter also includes a description of the No-Action Alternative (i.e., the existing conditions and the conditions that would result if the proposed action were not implemented under any of the action alternatives).

2.1 Proposed Action

The proposed action is the promulgation of a proposed rule to implement the relevant provisions of four recently adopted CMMs (CMM 2018-01, CMM 2018-06, CMM 2019-04 and CMM 2019-05). As described above, the proposed rule would implement nine specific provisions – one provision regarding FAD design requirements, one provision regarding IMO number requirements, two provisions regarding sharks, and five provisions regarding mobulid rays.

Non-entangling FAD Requirements

Under the proposed rule, NMFS would implement the FAD design requirements set forth in Paragraph 19 of CMM 2018-01. These provisions would be implemented in a manner that is consistent with NMFS's implementation of the FAD design requirements in Resolution C-18-05 of the Inter-American Tropical Tuna Commission (IATTC), which manages tuna purse seine fisheries in the eastern Pacific Ocean (EPO). U.S. purse seine vessels sometimes fish in the WCPO and EPO on the same fishing trip and FADs are known to drift from the EPO into the WCPO, so ensuring consistent FAD design requirements would enable NMFS to better implement and enforce both the WCPFC and IATTC decisions on FAD designs.

Under the proposed rule, if the FAD design includes a raft (e.g., flat raft or rolls of material) and if mesh netting is used as part of the structure, the mesh netting must have a stretched mesh size less than 7 centimeters (cm) and the mesh net must be tightly wrapped such that no netting hangs below the FAD when deployed. Additionally, any netting used in the subsurface structure of the FAD must be tightly tied into bundles ("sausages") or have a stretched mesh size less than 7 cm in a panel that is weighted on the lower end with at least enough weight to keep the netting taut in the water column. These requirements are the same as those specified at 50 CFR 300.28(e), which implement the Inter-American Tropical Tuna Commission's (IATTC) FAD design requirements for the eastern Pacific Ocean (EPO) specified in Resolution C-18-05. This element of the proposed rule would apply to all purse seine vessels used for commercial fishing for HMS on the high seas and exclusive economic zones (EEZs) in the Convention Area (excluding the overlap area).

[6] See the 1978 CEQ Regulations for Implementing the Procedural Provisions of NEPA at 40 CFR §1502.14.

IMO Number Requirement

As described above, NMFS has implemented existing requirements to obtain an IMO number, which apply to vessels that are at least 100 GRT (see 50 CFR 300.217(c)) through a prior rulemaking. The existing regulations apply to all U.S. fishing vessels (including those participating in the fisheries of the U.S. Participating Territories) that are used for commercial fishing for highly migratory fish stocks in the Convention Area either on the high seas or in waters under the jurisdiction of a foreign nation, and the gross tonnage of which is at least 100 GRT (gross register tons) or 100 GT (gross tons). The owner of any such fishing vessel is required to ensure that an ''IMO number'' has been issued for the vessel. An ''IMO number" is the number—sometimes called an IMO ship identification number— issued for a ship or vessel under the ship identification number scheme established by the International Maritime Organization. Under the proposed rule, the existing regulations would be revised to include vessels less than 100 GRT down to a size of 12 meters in LOA. This element of the proposed rule would apply to vessels used for commercial fishing for HMS in the Convention Area (including the overlap area), either on the high seas or in waters under the jurisdiction of a foreign nation.

Revised Purse Seine Restrictions for Oceanic Whitetip Shark and Silky Shark and Additional Shark Release Requirement for All Vessels

The proposed rule would implement two specific provisions of CMM 2019-04: (1) an exemption for purse seine vessels in specific cases where an oceanic whitetip shark or silky shark is not seen during fishing operations and are delivered into the vessel hold; and (2) a requirement for vessels to haul any incidentally caught sharks alongside the vessel before being cut free in order to facilitate species identification.

Existing U.S. regulations under 50 CFR 300.226 prohibit the retention of oceanic whitetip shark (*Carcharhinus longimanus*) and silky shark (*Carcharhinus falciformis*) on all vessels used for commercial fishing for HMS in the Convention Area. The proposed rule would establish an exemption to the requirement for purse seine fishing vessels in the case of any silky shark or oceanic whitetip shark that is not seen during the fishing operation and is delivered into the vessel hold and frozen. In such a case, under the proposed rule, oceanic whitetip shark and silky shark could be stored and landed, but the vessel owner or operator would be required to notify the observer and surrender the whole shark to the responsible government authorities or discard the shark at the first point of landing or transshipment. In U.S. ports the responsible government authority is the NOAA Office of Law Enforcement divisional office nearest to the port. Under the proposed rule, it would be prohibited to sell or barter oceanic whitetip shark and silky shark surrendered in this manner, but they could be donated for purposes of human consumption, consistent with any applicable laws and policies. U.S. purse seine vessels do not target or intentionally retain oceanic whitetip or silky sharks in the Convention Area, however, they are sometimes caught incidentally and discarded. The proposed rule would provide relief from the current prohibitions on the retention of oceanic whitetip and silky sharks that are unintentionally caught and frozen during purse seine operations; this is an infrequent event for U.S. purse seine vessels.

The proposed rule would also require that any shark be hauled alongside the vessel before being cut free (if on a line or entangled in a net) in order to facilitate species identification by the

observer on board. This element of the proposed rule only apply in the event that there is an observer or electronic monitoring present.

Both of the above listed elements of the proposed rule would apply to all U.S. vessels used for commercial fishing for HMS on the high seas and in EEZs in the Convention Area (excluding the overlap area).

Fishing Restrictions for Mobulid Rays

The proposed rule would also implement provisions of CMM 2019-05 for mobulid rays, as described above. Under the proposed rule all U.S. commercial fishing vessels fishing for HMS in the Convention Area would be prohibited from setting on, targeting, retaining, transshipping, or landing any part or whole carcass of a mobulid ray in the Convention Area. The proposed rule would also require the release of any mobulid ray unharmed, to the extent practicable, as soon as possible, in a manner that would result in the least possible harm to the individuals captured, taking into consideration the safety of the crew. Notwithstanding the above provisions, the proposed rule would also allow observers to collect biological samples of mobulid rays caught in the Convention Area that are dead at haul back. Under the proposed rule, U.S. purse seine vessels would be allowed to store and land any mobulid ray that is not seen during fishing operations and is delivered into the vessel hold and frozen as part of a purse seine operation. The vessel owner or operator would be required to notify the observer and surrender the whole mobulid ray, at the first point of landing, to the responsible government authorities, or other competent authority, or discard where possible. In U.S. ports the responsible government authority is the NOAA Office of Law Enforcement divisional office nearest to the port. Mobulid rays surrendered in this manner would be prohibited from being sold or bartered, but could be donated for purposes of human consumption, consistent with relevant laws and policies. These requirements are similar to those specified at 50 CFR 300.27, which implement IATTC mobulid ray restrictions in the EPO, as specified in Resolution C-15-04. Regulations at 50 CFR 300.27 require that any mobulid ray caught in the IATTC Convention Area be released unharmed as soon as possible, and prohibit vessels from retaining on board, transshipping, storing, landing, or selling any part or whole carcass of a mobulid ray that is caught in the IATTC Convention Area, except in any case where a mobulid ray that is not seen during fishing operations and is delivered into the vessel hold. All of the above listed mobulid ray elements of the proposed rule would apply to U.S. vessels used for commercial fishing for HMS on the high seas and EEZs in the Convention Area (excluding the overlap area).

As a contracting party to the Convention, the United States is obligated to implement provisions arising under the Convention. The Convention created the WCPFC, and decisions of the Commission are subject to their terms. The WCPFCIA provides the authority to promulgate such regulations as may be necessary to carry out the obligations of the United States under the Convention. NMFS has considered the obligations of the United States under the Convention, as well as the authority provided under the WCPFCIA in developing the action alternatives for this EA.

NMFS has identified one action alternative that would meet the purpose and need for the proposed action: implementation of the listed provisions as described above. Alternatives initially considered but excluded from detailed analysis are described in Section 2.3 below.

2.2 Alternatives Considered in Detail

2.2.1 The No-Action Alternative

The No-Action Alternative, would cause no changes to "the status quo" and would result in conditions that are treated as the baseline for the purposes of assessing the impacts of the action alternative. The inclusion of the No-Action Alternative serves the important function of facilitating comparison of the effects of the action alternatives and is a required part of a NEPA document. Under the No-Action Alternative, the U.S. fleets commercially fishing for HMS in the WCPO would continue to be managed under existing laws and regulations, which are described in Chapter 3 of this document, but none of the elements of the proposed action, described above in Section 2.1, would be implemented. Under the No-Action Alternative, the United States would not be fulfilling its obligations as a Contracting Party to the Convention.

2.2.2 The Action Alternative

The Action Alternative, would implement the nine elements of the proposed action, as described above in Section 2.1.

2.3 Alternatives Excluded from Detailed Analysis

NMFS considered two alternative means for implementing the provisions of CMMs 2019-04 and 2019-05 and excluded those alternatives from detailed analysis:

(1): CMM 2019-04 also includes a provision requiring WCPFC members to ensure that the owners and operators of their vessels follow any applicable safe release guidelines for oceanic whitetip shark and silky shark. The WCPFC has adopted recommended guidelines for the safe release of sharks; however, the WCPFC guidelines are non-binding. NMFS considered including those guidelines as part of an action alternative analyzed in this EA. However, because use of the best handling practices is not a binding obligation, NMFS has not included implementation of the guidelines a part of an action alternative. Therefore, this EA does not include analysis of implementation of such guidelines.

(2): CMM 2019-05 also includes a provision requiring WCPFC members to ensure that owners and operators of their vessels are made aware of proper handling and release techniques for mobulid rays. The measure also includes best handling practices for the safe release of mobulid rays, and states that members should encourage their vessels to use them. NMFS considered including those guidelines as part of an action alternative. NMFS does intend to make vessels aware of the WCPFC handling and release guidelines through outreach and education. However, because use of the best handling practices is not a binding obligation, NMFS has not included implementation of the guidelines as part of an action alternative. Therefore, this EA does not include analysis of implementation of such guidelines.

3 AFFECTED ENVIRONMENT

This chapter describes the existing physical and biological environment in which the U.S. commercial fishing vessels used for commercial fishing in Convention Area operate. This chapter is organized as follows: (1) description of the physical environment, including discussion of oceanography, climate change, and habitat change; (2) description of the U.S. fisheries that could be affected by the proposed action; and (3) the biological environment including biodiversity and ecosystem function, target stocks, protected resources, and essential fish habitat (EFH).

3.1 Physical Environment of the WCPO

The physical reach of the WCPFC Convention Area (as shown in Figure 1 in Section 1.1), comprises all waters of the Pacific Ocean bounded to the south and to the east by the following line: from the south coast of Australia due south along the 141° meridian of east longitude to its intersection with the 55° parallel of south latitude; thence due east along the 55° parallel of south latitude to its intersection with the 150° meridian of east longitude; thence due south along the 150° meridian of east longitude to its intersection with the 60° parallel of south latitude; thence due east along the 60° parallel of south latitude to its intersection with the 130° meridian of west longitude; thence due north along the 130° meridian of west longitude to its intersection with the 4° parallel of south latitude; thence due west along the 4° parallel of south latitude to its intersection with the 150° meridian of west longitude; thence due north along the 150° meridian of west longitude.

3.1.1 Oceanography

The WCPO contains several major currents and one major gyre that control most of the mixing patterns and nutrient flow of the system.

Currents and mixing patterns are influenced by large-scale oceanographic events, such as El Niño Southern Oscillation (ENSO), or La Niña, which change the characteristics of water temperature and productivity (Kamikuri et al. 2009).

El Niño affects the ecosystem dynamics in the equatorial and subtropical Pacific by significantly warming the upper ocean layer, raising the thermocline in the western Pacific and lowering it in the east, strong variations in the intensity of ocean currents, low trade winds with frequent westerlies, high precipitation at the dateline and drought in the western Pacific (Sturman and McGowan 1999). A La Niña event exhibits the opposite conditions: cooler than normal sea-surface temperatures in the central and eastern tropical Pacific Ocean that can impact global weather patterns.

These events affect the habitat range and movements of pelagic species. Geographic distribution of all species, especially HMS, varies with seasonal changes in the physical and chemical ocean environment. Suitable physical environment for these species depends on gradients in temperature, oxygen, or salinity, all of which are influenced by oceanic conditions on various scales. In the pelagic environment, physical conditions such as isotherm and isohaline boundaries often determine whether or not the surrounding water mass is suitable for pelagic fish.

Additionally, areas of high trophic transfer as found in fronts and eddies are important habitat for foraging, migration, and reproduction for many species (Bakun 1996).

Subtropical gyres rotate clockwise in the northern hemisphere and counter clockwise in the southern hemisphere in response to trade and westerly wind forces.

Variability within the ocean–atmosphere system results in changes in winds, rainfall, currents, water column mixing, and sea-level heights, which can have profound effects on regional climates as well as on the abundance and distribution of marine organisms. In the tropical Pacific there is a limited seasonal variation, yet there is a strong inter-annual variability, which in turn affects the entire Pacific Ocean (Langley et al. 2004). The scientific community has become increasingly aware of the occurrence and importance of long-term (decadal-scale) oceanographic cycles and of their relationship to cycles in the population sizes of some species of fish (Chavez et al. 2003). These naturally occurring cycles can either mitigate or accentuate the impact of fishing mortality on all species, especially those targeted in HMS fisheries. ENSO events, including mesoscale events, such as El Niño and La Niña, and shorter term phenomena such as cyclonic eddies near the Hawaiian Islands (Seki et al. 2002), impact the recruitment and fishing vulnerability of HMS.

3.1.2 Climate Change

Climate change can affect the marine environment by impacting the established hydrologic cycle (e.g., a change in precipitation and evaporation rates) (Bala et al. 2010). This in turn may cause a shift in food web dynamics, such as a reduction in primary productivity, which affects HMS migration and distribution (Dambacher et al. 2010, Loukos et al. 2003). Climate change has been associated with other effects to the marine environment, including rising oceanic temperatures, pH, changes in ice cover, salinity, oxygen levels, and circulation (Intergovernmental Panel on Climate Change 2007). These effects are leading to shifts in the range, abundance, and behaviors of algae, plankton, fish and other sea life (Solomon et al. 2007). Coral reefs are also being damaged through ocean acidification and sea level rise (Carpenter et al. 2008, Mayfield et al. 2012, and Munday et al. 2012). There are many predictions pertaining to the rate of change and potential maximums of sea level rise but studies indicate the change is caused by rising global temperatures and ice melt (Rahmstorf, 2007). Sea level changes could potentially damage the nesting, breeding, foraging, and migratory sites of coastal marine sea birds (Galbraith et al. 2002) and other vertebrate megafauna such as pinnipeds and chelonioidea (Baker et al. 2006).

Climate change is also increasing the incidence of disease in aquatic organisms (Roessig et al. 2004, Hoegh-Guldberg and Bruno 2010, van Woesik et al. 2012), as well as the spread of invasive species (Hoegh-Guldberg and Bruno 2010). Studies on planktonic ecosystems demonstrate that climate change is affecting phytoplankton abundance and distribution, which in turn affects consumers ranging from zooplankton to megafauna (Hays et al. 2005). Changes in plankton affect ecosystem services such as oxygen production, carbon sequestration, and biogeochemical cycling (Edwards et al. 2010). All of these studies concluded that fish, seabirds, and marine mammals will need to adapt to shifts in spatial distribution of primary and secondary production within pelagic marine ecosystems (Hoegh-Guldberg and Bruno 2010, Dambacher et al. 2010).

Studies conducted by Perry et al. (2005) indicate that climate change is impacting marine fish distributions, which in turn may have important ecological impacts on ecosystems and commercial fisheries. Climate change may impact commercial fisheries by: (1) increasing ocean stratification leading to less primary production, which in turn leads to less overall energy for fish production; (2) decreasing spawning habitat leading to decreased stock sizes; and (3) changes in currents that may lead to changes in larval dispersal and retention, which could also lead to decreases in stock sizes (Roessig et al. 2004).

Ainsworth et al. (2011) also investigated potential climate change impacts on commercially valuable species of fish, stimulating changes in (1) primary productivity; (2) species range shifts; (3) zooplankton community size structure; (4) ocean acidification; and (5) ocean deoxygenation. Climate change may also impact marine carrying capacity and relative suitable habitats for fish stocks, theoretically either positively or negatively affecting the levels of growth and survival of certain fish populations (Kaeriyama et al. 2012).

3.1.3 Habitat Change

Ocean habitat can be affected by changes in pH, nutrient influxes, pollution, and construction activities. The global average pH has risen 0.1 units (Farby et al. 2008) since the beginning of the Industrial Revolution, due to increased levels of CO_2 both anthropogenically and naturally released. Any creature that produces a carbonate shell is vulnerable to the carbonic acid (it dissolves carbonate) that is produced by the reaction between atmospheric CO_2 and seawater. Coral reefs are also damaged by increasing acidity levels (Hoegh-Guldberg et al. 2007). These organisms form, feed, or support many levels of the food chain, as well as provide many other important ecosystem services, therefore, any major loss of diversity or productivity could impact higher trophic levels and the environment as a whole.

Areas near coastlines are especially sensitive to nutrient influxes. Rivers discharge elements like phosphorous and nitrogen from both natural sources like green waste or from human activity such as fertilizer runoff, sewage discharge, urban storm water, and deposition of atmospheric particles from fossil fuel combustion (Paerl 1997, Slomp and Cappellen 2004).

Other impacts to ocean habitat come from pollution and construction. The following are examples of pollution: CO_2, nitrogen and phosphorus, radioactive waste, plastic and other trash, chemicals and pharmaceuticals, oil spills, and even noise and heat. The construction of shoreline or at sea structures can also impact habitat by altering substrate, removing areas from biological use, creating noise and vibration pollution, as well as disturbing/disrupting sediment dynamics. Animals can be blocked from traditional habitat or breeding grounds, scared away, disoriented or poisoned.

Overexploitation of any species can disrupt ecosystem balance. Overexploitation can come from fishing pressure or natural pressures from higher trophic levels. A reduction in a prey species can cause higher trophic levels to collapse; conversely, by removing top predators, mid and low trophic level species may expand due to the elimination of competition and predation, which may in turn cause overgrazing on the lowest trophic levels (Hinke et al. 2004, Halpern et al. 2006).

3.2 Fisheries that Could Be Affected by the Proposed Action

Vessels of the United States in the following HMS commercial fisheries in the WCPFC Convention Area could be affected by the requirements of the proposed rule: the purse seine fishery operating in the WCPO, Hawaii-based deep-set and shallow-set longline fisheries, American Samoa longline fishery, U.S. albacore troll fisheries, and the tropical troll, hand line, and pole and line fisheries (Hawaii, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI)). All U.S. vessels that fish (as defined under 50 CFR § 300.2) on the high seas are required to have a permit in accordance with the High Seas Fishing Compliance Act (HSFCA) and, if fishing on the high seas in the Convention Area, a WCPFC Area Endorsement (50 CFR § 300.212). These requirements apply to fisheries described in the following sections. Detailed descriptions of each of these fisheries and their existing management measures are provided in the sections below.

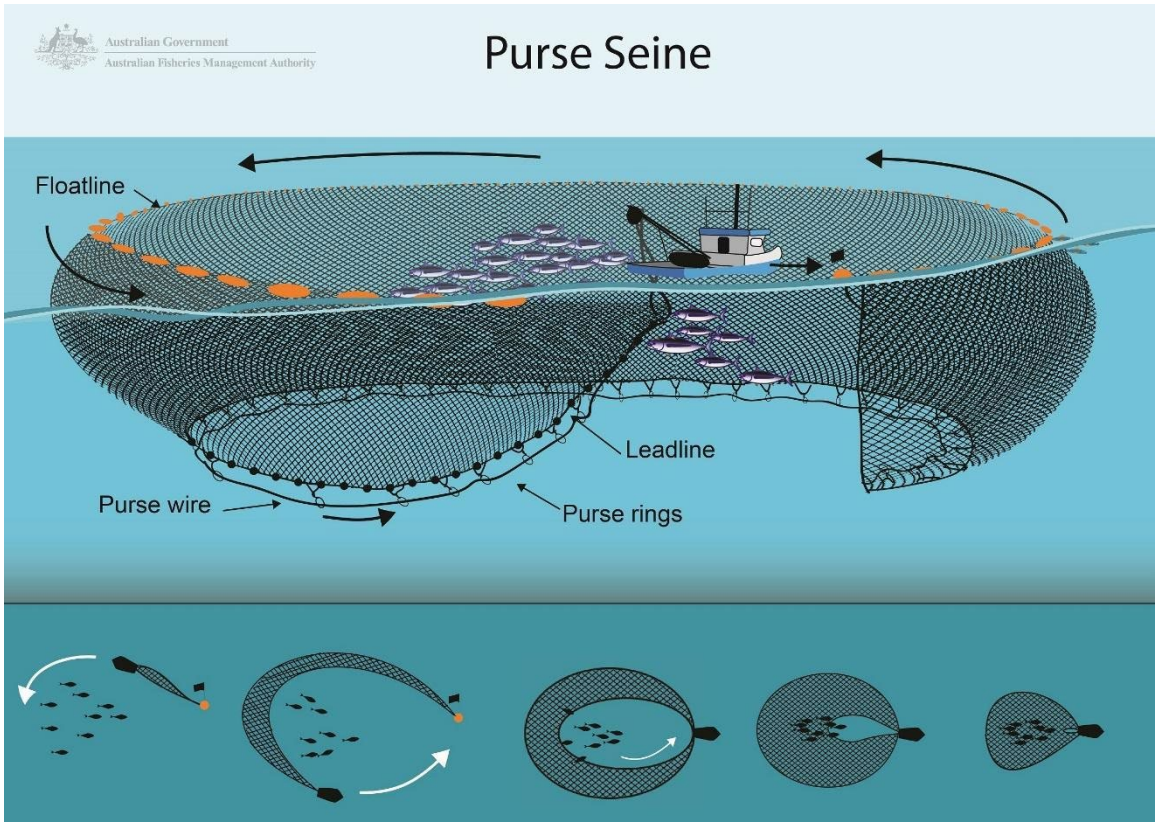
3.2.1 Purse Seine Fishery Operating in the WCPO

Vessels in the purse seine fishery target skipjack tuna (*Katsuwonus pelamis*) and to a lesser extent yellowfin tuna throughout the equatorial regions of the CA. The purse seine fleet operates mostly in the EEZs of Pacific Island Countries between 10° N and 10° S within the CA. Gillett et al. (2002) provide a detailed description of the historical development and expansion of the purse seine fleet from its bases in the Eastern Pacific Ocean (EPO). The U.S. fleet developed a year-round fishery along the equator, generally within a rectangular area bounded by 10° N-10° S latitude and 135° E-170° E longitude, and encompassing the EEZs of Federated States of Micronesia, Papua New Guinea, Solomon Islands, Nauru, Marshall Islands, and the Gilbert Islands group of Kiribati. Fishing grounds continued to expand eastward throughout the 1980s, eventually encompassing the Phoenix and Line Islands (Kiribati); the U.S. possessions of Howland, Baker, and Jarvis; Tokelau; and the high seas between these EEZ areas. U.S. purse seiners typically target skipjack and yellowfin tuna found in association with drifting logs/flotsam or FADs and also unassociated free-swimming schools of tuna ("school sets"). The relative proportion of the different set types has varied considerably over time as oceanographic conditions and technology have changed. As of 2021, a majority of the vessels in the purse seine fishery operate out of American Samoa. As such, it is now considered the American Samoa-based purse seine fishery.

Large modern purse seiners are one of the most complex fishing vessels in terms of both technology and machinery. Hydraulic systems on large "super seiners," require more than 1,600 meters of piping, and are equipped with at least four auxiliary engines in addition to the main propulsion engine (or engines). Specifically, the technique for catching tuna involves employing a net that is set vertically in the water, with floats attached to the upper edge and chains for weight on the lower edge (Figure 3). A series of rings is attached to the lower edge of the net, and a pursing cable passes through the rings, enabling a winch on board the vessel to draw the net closed on the bottom. Purse seine nets can be up to 1,500 meters or more in length and 150 meters in depth. When the net is deployed from the purse seine vessel, a large skiff carrying the end of the net is released from the stern of the fishing vessel. The purse seine vessel encloses the school of tuna, keeping it in visual contact if on the surface, or using sonar if below the surface, and then retrieves most of the net onto the vessel. The fish are confined in the "sack" portion of the net, which consists of finer mesh webbing that prohibits their escape. The catch is removed from the sack onto the vessel with large "scoops (known as brails) holding several metric tons

(mt), and then is placed in brine tanks for freezing and later storage. Joseph (2003) and NMFS (2004a) provide a detailed description of tuna purse seining and the fleets involved in the Pacific Ocean fisheries. Although these studies are ten or more years old, basic vessel design is approximately the same while fishing gear has significantly improved.

Figure 3: Diagram of a purse seine net; purse seine fishing is mainly used to catch fish species that swim in large schools near the ocean surface.



Source: Reprinted from the Australian Fisheries Management Authority, Purse Seine Methods and Gear, last accessed September 18, 2018; Reprinted with permission.

3.2.1.1 Management and Regulations

The fishing activities of the purse seine fleet are governed in large part by the Treaty on Fisheries between the Governments of certain Pacific Islands States and the Government of the United States of America (SPTT or Treaty). 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). The High Seas Fishing Compliance Act and implementing regulations (50 CFR 300 Subpart R), the WCPFCIA and implementing regulations (50 CFR 300 Subpart O), and regulations implementing the Fishery Ecosystem Plan (FEP) for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagics FEP) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (50 CFR Part 665) also regulate this fishery.

The main fishery management regulations are:

- All U.S. vessels that fish (as defined under 50 CFR § 300.2) on the high seas are required to have a permit in accordance with the HSFCA and, if fishing on the high seas in the areas of application of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, a WCPFC Area Endorsement (50 CFR § 300.212);

- To fish in the areas to which the terms of the SPTT applies, a U.S. purse seine vessel must have a license issued by the Pacific Islands Forum Fisheries Agency (FFA) as Treaty Administrator on behalf of the Pacific Island Parties (PIPs). Under the amended SPTT, vessels purchase a certain amount of fishing days each year to fish in the waters of the PIPs.

- Operators of U.S. purse seine vessels are prohibited from transshipping fish at sea in the CA and from transshipping fish caught in the CA anywhere else (50 CFR § 300.216);

- Holders of Treaty licenses are required to submit both reports on their fishing activities to NMFS and the FFA, which serves as the Treaty Administrator (50 CFR § 300.34);

- Owners and operators of U.S. purse seine vessels must ensure the submission of reports of transshipments of fish in the CA or of fish caught in the CA (50 CFR § 300.218(b));

- Owners and operators of U.S. purse seine vessels must ensure that a report of at-sea discards of any bigeye tuna, yellowfin tuna, or skipjack tuna caught in the CA is completed (50 CFR § 300.218(e));

- Owners and operators of U.S. purse seine vessels must ensure that reports of whale shark encirclements are completed (50 CFR § 300.218(h)).

- U.S. purse seine vessels are required to carry and operate mobile transmitting units to provide automated position information as part of a vessel monitoring system administered by NMFS and by the FFA (50 CFR § 300.219);

- U.S. purse seine vessels are required to be identified in accordance with the 1989 United Nations Food and Agriculture Organization standard specifications for the marking and identification of fishing vessels, which requires that the vessel's international radio call sign be marked on the hull and deck (50 CFR § 300.217(b));

- Owners and operators of U.S. purse seine vessels operating the CA have been subject to fishing day effort limits on the high seas and in the U.S. EEZ each year since 2009 (50 CFR § 300.223(a)).

- Owners, operators, and crew of U.S. purse seine vessels must comply with certain restrictions on the use of FADs. Pursuant to a final rule published on July 18, 2018 (see 83 FR 33851), these restrictions apply from July 1 through September 30, in the entire CA and from November 1 through December 31, just on the high seas in the CA in each calendar year. (50 CFR § 300.223(b));

- U.S. purse seine vessels must retain all catch of bigeye, yellowfin, and skipjack tuna, subject to certain exceptions (50 CFR § 300.223(d));

- Owners and operators of U.S. purse seine vessels fishing in the CA must follow certain sea turtle interaction mitigation measures (50 CFR § 300.223(f));

- U.S. purse seine vessels must not set or attempt to set on around a whale shark (*Rhincodon typus*) and must release any whale shark that is encircled (50 CFR § 300.223(g));

- U.S. purse seine vessels cannot retain on board, tranship, store, or land any part or whole carcass of an oceanic whitetip shark (*Carcharhinus longimanus)* or silky shark (*Carcharhinus falciformis*) and must release any oceanic whitetip shark or silky shark as soon as possible (50 CFR § 300.226);

- U.S. purse seine vessels equal to or greater than 50 feet (15.2 meters) in length overall generally cannot fish in a certain portion of the U.S. EEZ around American Samoa (50 CFR § 665.806(b)); and
- For the last 30 years, pursuant to the terms of the Treaty, U.S. purse seine vessels were required to carry observers on at least twenty percent of their trips. However, beginning in 2010, purse seine vessels have been required to carry WCPFC observers on all trips, with certain exceptions. Observers for the fleet are deployed by the Pacific Islands Forum Fisheries Agency (FFA)[7].

In addition, beyond the closed areas cited above, in 2006 Kiribati formed the Phoenix Islands Protected Area (PIPA) in a portion of its EEZ, which is about 140,000 square miles in size. On January 1, 2015, Kiribati banned all commercial fishing within the PIPs. This prohibition applies to the purse seine fleet.

3.2.1.2 Participation, Effort, and Catch

Participation in the purse seine fishery increased from the late 1980s to the mid-1990s, peaking at approximately 50 vessels, and gradually decreased to 14 vessels in 2006. The fleet rebuilt itself up to 40 vessels from 2007-2013, saw gradual declines in participation from 2015-2018, and then from 2019-2021 rapidly declined to 16 vessels in 2021. Table 1 shows the performance of the purse seine fishery in the CA from 2010 through 2020– the most recent years for which data are available.

Table 1: Performance and retained catch of the U.S. purse seine fishery in the Convention Area, 2010-2020.

[7] Due to the impacts of COVID-19, purse seine vessels have been exempted from 100% observer coverage requirements between March 2020 and January 2022 (see 86 FR 31178 and 86 FR 48916). This analysis assumes 100% observer coverage on purse seine vessels, as required under the WCPFC and the Treaty under normal circumstances.

Year	Active vessels*	Sets	Fishing days**	Skipjack tuna retained catches (mt)	Yellowfin tuna retained catches (mt)	Bigeye tuna retained catches (mt)
2010	37	8,652	8,110	207,074	32,494	4,838
2011	36	6,295	7,831	169,154	24,442	7,838
2012	39	8,704	8,589	215,702	31,679	5,503
2013	40	7,699	8,344	226,609	23,277	8,157
2014	40	9,486	6,447	268,603	40,959	2,802
2015	39	7,772	6,763	219,550	17,019	1,595
2016	37	5,503	5,596	177,839	18,089	4,709
2017	34	5,091	5,629	139,941	23,197	3,267
2018	34	5,661	5,706	167,140	20,558	6,958
2019	31	5,033	4,350	144,839	18,022	3,014
2020	23	3,302	3,701	115,950	11,003	9,451

Sources: NMFS unpublished data

*Number of vessels indicates the total number of unique vessels contributing to the data for a given year.

** A fishing day is defined as any day in which a fishing vessel of the United States equipped with purse seine gear searches for fish, deploys a FAD, services a FAD, or sets a purse seine, with the exception of setting a purse seine solely for the purpose of testing or cleaning the gear and resulting in no catch.

As shown in Table 1, the purse seine fleet catches mostly skipjack and yellowfin tuna. Based on data compiled by SPC (SPC 2013), FAD sets generally yield higher catch rates (mt/day) for skipjack tuna than unassociated sets. Data from SPC also indicates that unassociated sets generally yield a higher catch rate for yellowfin tuna than FAD sets. This may be explained from the occurrence of unassociated sets in the more eastern areas of the Convention Area containing "pure" schools of large, adult yellowfin, which account for a larger catch (by weight) than the (mostly) juvenile yellowfin encountered in FAD sets (SPC 2012).

Table 2 shows the breakdown of catch by set type for the purse seine fleet between the years 2010-2019.

Table 2: Annual purse seine catch estimates in metric tons by set type (unassociated and associated), 2010-2019.

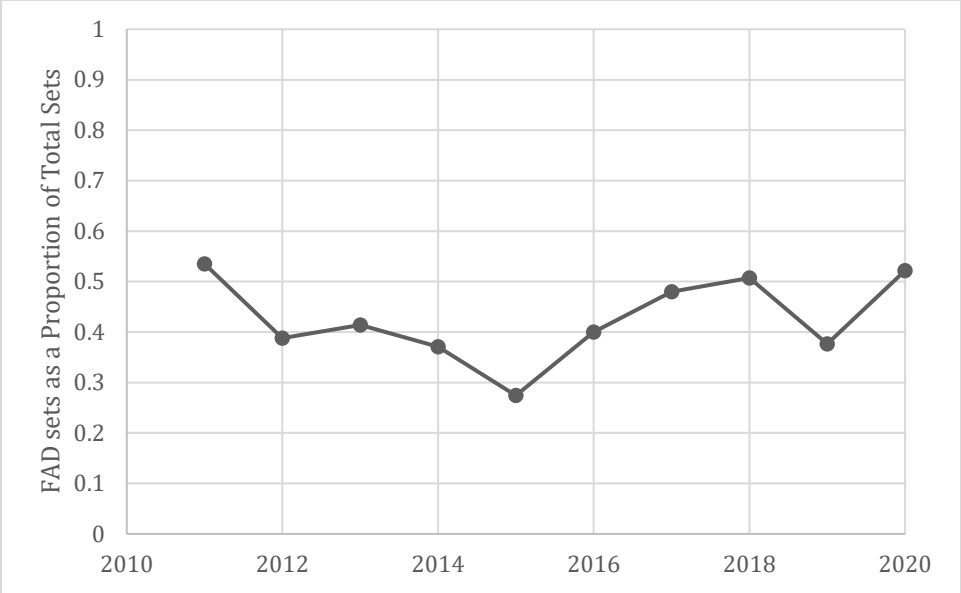
Year	Skipjack		Yellowfin		Bigeye		Totals
	Unass.	Ass.	Unass.	Ass.	Unass.	Ass.	
2010	109,791	90,676	22,013	15,556	1,005	6,104	245,524
2011	48,931	112,004	10,893	20,448	120	10,845	203,240
2012	98,583	109,242	24,024	18,627	1183	8,043	259,759
2013	97,147	112,516	8,170	25,108	769	10,450	254,273
2014	117,160	146,857	22,317	17,850	419	8,402	313,005
2015	111,940	96,195	13,307	11,076	606	4,955	238,079

2016	75,602	88,209	10,518	17,923	396	8,489	201,152
2017	43,630	82,305	15,397	17,639	302	7,177	166,449
2018	54,131	101,631	15,003	16,590	192	9,905	197,451
2019	69,218	69,146	12,283	10,632	276	4,829	166,441
Total	1,068,425	1,469,543	210,386	264,280	7,445	108,626	3,129,323

Source: WCPFC 2020 (https://meetings.wcpfc.int/node/12051)

As indicated in Figure 4, over the last fifteen years, FADs, or what are more broadly referred to as associated sets, which includes sets on natural or floating objects, have been responsible for more than 90% of all sets made by the fleet in some years, and less than 30% in other years. There are many factors that cause this variability, not all of which are fully understood (i.e., other than perhaps by the purse seine vessel operators themselves). However, some general determinates can be postulated: FADs provide a guaranteed location of fish although the size of the schools associated with FADs can vary considerably. New FAD electronics including sonar devices can better indicate the volume or biomass of tuna held by a FAD. In times of high relative fuel prices, FADs may provide a risk-adverse option for vessel operators. FAD sets that yield no tuna are typically rare while free unassociated sets have a much higher likelihood of sets with little or no catch. FADs provide a source of fish that may or may not be economically viable to operators – especially those that offload to canneries. Small skipjack along with juvenile yellowfin and bigeye tuna are very often associated with FADs or floating objects – however, not all fleets or operators can find markets for "small fish," especially when ex-vessel price is low or fish demand is reduced. But in times of high fish demand when canneries are not rejecting fish based on size, FAD fishing can present an attractive scenario for many operators. On the other hand, although skipjack is the main target of the WCPO fishery, yellowfin tuna can provide an important component to vessel profitability given there is typically a premium paid for larger yellowfin, which are typically found in unassociated schools. Operators may be willing to search for these unassociated schools if fuel price is reasonable and larger unassociated fish schools can be found.

Figure 4: FAD sets as proportion of all sets by the purse seine fleet, 2011-2020.



Source: NMFS unpublished data.

3.2.2 Longline Fisheries Operating in the WCPO

The longline fisheries operating in the CA include the Hawaii-based fisheries, which include a tuna-targeting deep-set fishery and swordfish-targeting shallow-set fishery, and the American Samoa-based fishery which targets tuna[8]. These longline fisheries are managed under the Pelagics FEP, implemented by regulation at 50 CFR Part 665, as well as by regulations implemented under the WCPFCIA at 50 CFR Part 300 Subpart O. Summaries of management measures for the respective longline fisheries are available on the NMFS Pacific Islands Regional Office web site[9].

There is also a small longline fleet based on the U.S. West Coast, managed under the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (West Coast HMS FMP), implemented by regulations at 50 CFR Part 660. This fleet has not fished in the CA in recent years and is not expected to do so in the foreseeable future, so it is not considered further in this EA.

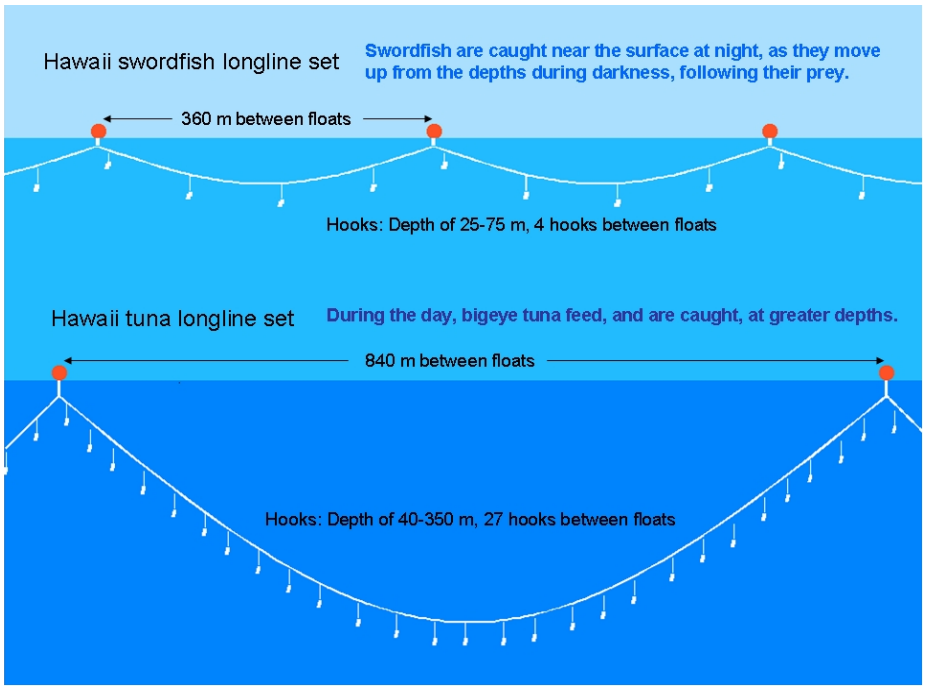
Longline fishing gear consists of a main line strung horizontally, supported at regular intervals by vertical float lines connected to surface floats. Descending from the main line are branch lines, each ending in a single, baited hook. The main line droops in a curve from one float to the next and bears some number (2-25) of branch lines between floats. Fishing depth is determined by the length of float lines and branch lines, and the amount of sag in the main line between floats. Figure 5 illustrates typical gear configurations in the shallow-set and deep-set Hawaii-

[8] There has also been limited longlining activity based in Guam and CNMI, which may resume in the future; the activities of longline vessels operating out of Guam and CNMI are not described further in this chapter.
[9] *https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#hawaii-longline-limited-entry*

longline fisheries. Western Pacific Regional Fishery Management Council (WPRFMC) 2013 and WPRFMC 2009a provide more detailed descriptions of longline fishing in the WCPO.

The Hawaii-based longline fleet is the largest U.S. longline fleet operating in the Convention Area. The fleet has historically operated, and continues to operate, in two distinct fisheries based on gear deployment: deep-set longline by vessels that target primarily bigeye tuna and shallow-set longline by those that target swordfish (*Xiphias gladius)*. Fishing effort is mainly exercised to the north and south of the Hawaiian Islands between the Equator and 40° N and longitudes 140° W and 180° W. However, the majority of deep-set fishing occurs south of 30° N. Most fishing occurs in the U.S. EEZ around Hawaii and in adjacent high seas waters.

Figure 5: Diagram of Longline Fishing in Hawaii.



Source: NMFS Pacific Islands Fisheries Science Center.

3.2.2.1 Hawaii-Based Deep-Set and Shallow-Set Longline Fisheries

The Hawaii-based longline fleet consists of 145 permitted (under the FMP) vessels.[10] Out of the 145 permitted vessels, all but three also have a high seas fishing permit (issued under the HSFCA, as of April 28, 2021). The following are existing management measures that this fishery is required to comply with: Hawaii Longline Limited Access Permit, Marine Mammal Authorization Program certificate, Protected Species Workshop Certificate, State of Hawaii Commercial Marine License, and Western Pacific Receiving Vessel Permit.[11]

[10] Last accessed April 28, 2021; *https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#hawaii-longline-limited-entry*

[11] See *https://www.fisheries.noaa.gov/resource/document/hawaii-pelagic-longline-regulation-summary* for more information.

Vessels range from 14 to 30 meters in length and can carry an average of 115 mt. Crew size ranges from four to nine. The maximum duration of a fishing trip for vessels targeting tuna for the fresh fish market in Hawaii is three weeks. Some of the newer vessels in the fleet are larger and have onboard ice systems, allowing for greater range than in the past (NMFS unpublished data).

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 main Hawaiian Islands (MHI). However, federal regulations and other applicable laws prohibit longline fishing inside the 200 nm U.S. EEZ around the Northwestern Hawaiian Islands, to minimize interactions with protected species shoreward from 50 nm. Longline fishing within 50 to 75 nm from the shoreline in the MHI is prohibited to minimize the potential for gear conflicts with small boat fisheries and interactions with protected species. Federal regulations also temporarily prohibited longline fishing in the Southern Exclusion Zone (SEZ), an area in the EEZ south of Hawaii, beginning February 22, 2019 (84 FR 5356). The temporary closure was triggered by regulations implementing the False Killer Whale Take Reduction Plan, which requires closure of the area if there are two or more observed serious injuries or mortalities of false killer whales in the EEZ in a given year. The SEZ is the portion of the U.S. EEZ around Hawai'i bounded by 165° 00' W on the west, 154° 30' W on the east, the Papahanaumokuakea Marine National Monument and the Main Hawaiian Islands Longline Fishing Prohibited Area on the north, and the EEZ boundary on the south. Some fishing also occurs in the U.S. EEZ around U.S. Pacific Remote Island Areas (PRIA) of Kingman Reef and Palmyra Atoll (5°N). In June 2020, NMFS determined that a criterion of the Take Reduction Plan was met. Consequently, NMFS reopened the SEZ to Hawaii deep-set longline fishing as of August 25, 2020 (85 FR 50959).

An additional small amount of fishing takes place around Palmyra Atoll, Kingman Reef, and Howland and Baker Islands, which are located in two areas that are open to commercial vessels within the Pacific Remote Islands Marine National Monument (PRIMNM).

Table 3 shows the performance of the Hawaii-based deep-set longline fishery and Table 4 shows the performance of the Hawaii-based shallow-set longline fishery from 2011-2020.

Table 3: Hawaii-based deep set longline fishery performance factors in the WCPFC area, 2011-2020.

Year	Active Vessels	Number of Sets	Total Hooks Set	Total Retained Catch (mt)	Bigeye tuna retained catch(mt)	Swordfish retained catch (mt)	Yellowfin tuna retained catch (mt)	Albacore retained catch (mt)
2011	127	14,274	33,671,822	8,694	4,654	160	877	598
2012	127	15,881	38,380,990	9,113	5,024	211	852	586
2013	135	14,628	36,222,991	8,185	4,427	207	684	295
2014	137	13,717	34,620,536	8,707	5,044	215	587	185
2015	136	13,160	33,429,940	9,724	5,691	268	777	216
2016	134	15,027	39,111,740	10,822	6,136	305	1,257	242

2017	135	14,041	37,720,153	10,165	5,261	300	2,017	88
2018	135	16,011	43,989,557	10,295	5,167	382	2,054	68
2019	140	18,157	51,011,895	11,302	5,960	335	1,763	99
2020	134	17,010	48,336,527	9,498	6,029	196	1,350	53

Source: NMFS unpublished data. This table represents total amount of bigeye tuna catch landed by the Hawaii-based longline fleet, including catch attributed to the U.S. Participating Territories.

Table 4: Hawaii-based shallow set longline fishery performance factors in the WCPFC area, 2011-2020.

Year	Active Vessels	Number of Sets	Total Hooks Set	Total Retained Catch (mt)	Bigeye tuna retained catch(mt)	Swordfish retained catch (mt)	Yellowfin tuna retained catch (mt)	Albacore retained catch (mt)
2011	20	829	867,812	840	34	707	16	8
2012	17	822	898,835	788	23	690	12	6
2013	10	435	478,043	459	18	376	10	2
2014	18	619	691,755	737	14	665	10	1
2015	17	473	524,952	478	14	421	6	0
2016	9	363	394,278	393	10	334	11	0
2017	15	596	622,363	784	31	668	45	3
2018	8	153	171,212	299	16	249	24	2
2019	13	178	215,465	255	14	220	13	1
2020	9	151	187,184	132	8	109	8	3

Source: NMFS unpublished data. This table represents total amount of bigeye tuna catch landed by the Hawaii-based longline fleet, including catch attributed to the U.S. territories participating in the WCPFC (American Samoa, Guam, or the CNMI, collectively U.S. Participating Territories).

3.2.2.2 American Samoa Longline Fishery

The American Samoa Longline Limited Entry Program is managed under the Pelagics FEP. The regulations implementing the program are codified at 50 CFR 665.816. The American Samoa Longline Limited Entry Program allows for as many as 60 vessels. Permits are issued by vessel size class and permit holders are restricted to using vessels within their size class or smaller.[12] The class sizes are as follows: Class A vessels are 40 feet (12.2 m) long or smaller; Class B (and B-1) vessels are longer than 40 feet (14.2 m), but no longer than 50 feet (15.2 m); Class C (and C-1) vessels are longer than 50 feet (15.2 m), but no longer than 70 feet (21.3 m); and Class D

[12] On July 7, 2021, NMFS published a proposed rule to modify the American Samoa longline fishery limited entry program to consolidate vessel class sizes, modify permit eligibility requirements and reduce the minimum harvest requirements for small vessels (86 FR 37982).

(and D-1) vessels are longer than 70 feet (21.3 m). The following are additional management measures that this fishery is required to comply with: Western Pacific Receiving Vessel Permit, Marine Mammal Authorization Program certificate, Marine National Monuments, and Protected Species Workshop Certificate.[13]

Currently, the American Samoa longline fleet can be characterized as primarily a large vessel fleet. As of April 2021, there are 44 vessels permitted under the American Samoa Longline Limited Entry.[14]

American Samoa longline fishing vessels operate in the EEZ around American Samoa, on the high seas in international waters, and occasionally in the EEZs of countries adjacent to American Samoa. In order to reduce the potential for gear conflicts and catch competition, there are area closures for longline and purse seine vessels greater than 50 feet in length, generally within 50 nm of emergent lands in American Samoa.[15]

Albacore tuna (*Thunnus alalunga*) continue to be the dominant species of catch in the American Samoa longline fishery. Table 5 shows catch and effort information from 2011-2020.

Table 5: American Samoa-based longline fishery performance factors in the Convention Area, 2011-2020.

Year	Active Vessels	Number of Sets	Hooks Set	Total Retained Catch (mt)	Albacore retained catch (mt)	Bigeye tuna retained catch (mt)	Swordfish retained catch (mt)	Yellowfin tuna retained catch (mt)
2011	24	3,891	11,073,923	3,566	2,487	175	11	593
2012	25	4,210	12,111,590	4,395	3,345	185	12	376
2013	22	3,411	10,183,968	2,781	2,119	87	9	367
2014	23	2,748	7,667,329	2,328	1,503	96	8	484
2015	21	2,785	7,806,376	2,548	1,786	83	7	455
2016	20	2,451	6,908,896	2,176	1,527	71	6	385
2017	15	2,488	7,008,822	2,311	1,495	63	6	559
2018	14	2,213	6,010,306	2,016	1,542	53	6	261
2019	18	1,882	5,104,187	1,400	1,050	31	4	189
2020	11	1,227	3,401,313	852	507	21	2	217

Source: NMFS unpublished data.

[13] See *https://www.fisheries.noaa.gov/resource/document/american-samoa-pelagic-longline-regulation-summary* for more information.
[14] Last accessed April 28, 2021: *https://www.fisheries.noaa.gov/pacific-islands/resources-fishing/pacific-islands-permit-holders#hawaii-longline-limited-entry*.
[15] Regulations specified at 50 CFR 665.818(b) allow for an exemption for certain vessels greater than 50 feet in length to fish in waters between 12 and 50 nm.

3.2.3 Albacore Troll Fisheries Operating in the WCPO

U.S. vessels that fish with troll gear targeting albacore in the WCPFC Convention Area can be described as part of the north Pacific albacore troll fishery and the south Pacific albacore troll fishery. The south Pacific albacore troll fishery occurs almost exclusively in the Convention Area from November through April. The north Pacific albacore troll fishery occurs mostly outside the Convention Area from April through November (Childers and Pease 2012).

U.S. vessels fish for albacore with troll gear in the WCPO (artificial lures with barbless hooks that are towed behind a vessel, also called jigs). The basic troll vessel gear configuration consists of between 8 and 12 lines towed up to 30 meters behind the vessel. Lateral spacing of the lines is accomplished by using outriggers or long poles extended to each side of the vessel with fairleads spreading 3 or more lines to each side, with the remainder attached to the stern. Terminal gear is generally chrome-headed jigs with varying colored plastic fringed skirts and a double barbless undulated hook. The gear is relatively inexpensive. Retrieval is done by hand or by powered gurdies, similar to salmon troll vessels (Childers and Pease, 2012).

The albacore troll fleets are managed under the West Coast HMS FMP. Table 6 and Table 7, below, show catch and effort data for the U.S. north Pacific and south Pacific albacore troll fisheries, respectively, from 2008 through 2019, the years for which the most recent data is available. The information in the tables includes information regarding total activity – meaning activity both inside and outside the Convention Area. Based on the most recent available information, the albacore troll fleet generally fishes on the high seas when in the Convention Area (Childers and Pease 2012).

Table 6: North Pacific Albacore Troll Fishery Catch and Effort Data, 2011-2020.

Year	Vessels	Vessel-Days	Albacore retained catch (mt)
2011	11	195	87
2012	2	*	*
2013	0	0	0
2014	3	7	*
2015	4	8	0
2016	0	0	0
2017	14	571	335
2018	4	123	12
2019	3	4	1
2020	3	28	19

*Cannot be provided for confidentiality reasons

Source: NMFS data provided to the WCPFC.

Table 7: South Pacific Albacore Troll Fishery, Catch, and Effort Data, 2011-2020.

Year	Vessels	Vessel-Days	Albacore retained catch (mt)
2011	6	285	402
2012	10	401	259
2013	6	395	436
2014	13	784	447
2015	6	296	152
2016	6	323	168
2017	13	660	465
2018	11	789	429
2019	9	620	872
2020	18	1,385	1,894

Source: NMFS data provided to the WCPFC.

3.2.4 Tropical Troll and Handline Fleets

The tropical troll and handline fleets include troll and handline fleets based out of Hawaii, and troll fleets based out of American Samoa, Guam and the CNMI. The vessels in these fleets fish within the U.S. EEZ.

Table 8: Performance of the U.S. Tropical Troll and Handline Fleets in Hawaii, American Samoa, Guam, and Commonwealth of the Northern Marianas Islands, 2011-2020.

Year	Number of Vessels	Bigeye tuna retained catch (mt)	Skipjack tuna retained catch (mt)	Yellowfin tuna retained catch (mt)	Mahimahi retained catch (mt)	Wahoo retained catch (mt)	Billfish retained catch(mt)
2011	2,214	406	403	858	381	166	240
2012	2,196	453	397	1029	540	229	177
2013	2,304	541	553	973	428	214	170
2014	2,212	349	378	967	561	269	186
2015	2,119	261	406	959	417	212	235
2016	2,137	224	423	817	387	146	202
2017	2,018	147	398	882	239	116	185
2018	1,963	144	540	938	332	190	201
2019	1,931	261	493	705	352	166	208
2020	1,742	162	487	584	217	74	129

Source: U.S. data submitted to the WCPFC *(https://www.wcpfc.int/).*

3.2.5 Hawaii Pole-and-line Fishery

The Hawaii-based pole-and-line fleet targets skipjack and juvenile yellowfin tuna, using live bait on lures, which are composed of barbless hooks with feather skirts (WPRFMC 2009a). A small amount of juvenile bigeye tuna is taken in this fishery when the fleet conducts fishing activities on FADs (WPRFMC 2009a).

Since 2010, the estimated number of participants has fluctuated but generally was 3 or fewer, therefore catch data is confidential due to fewer than three participants and appears in the "other gear" category since 2009 (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/hawaii-aku-boat-pole-and-line-fishery*).

3.3 Biological Environment

This section describes the primary biological resources in the WCPFC Convention Area as well as ecological interactions between the species.

3.3.1 Biodiversity and Ecosystem Function

Primary producers such as diatoms, dinoflagellates, coccolithophores, and cyanobacteria are organisms that utilize solar energy to convert carbon dioxide into oxygen. They are considered the first trophic level. There are various trophic levels that consist of progressively larger organisms (Begon et al, 2006; Nybakken, 1997). When there is an overlap in the primary forage trophic level, as when multiple fishes act on top predator tunas, there are indirect effects seen within their own forage groups. Hinke et al. (2004) concluded that the primary food webs for individual fisheries were relatively simple. Precise ecosystem analysis, however, is difficult because the interactions among a broad group of species are not always apparent or recognized. Each stock has a unique recruitment history so the variability in biomass over time and among stocks cannot necessarily all be attributed to fishing (Sibert et al., 2006). Cox et al. (2002) also found that declines in top predators could results in an increase in smaller tunas that serve as prey to larger tunas. Predation as a component of natural mortality is still unclear, as are the effects of fishing mortality on these predation rates and abundance.

Organisms at the top of the food web tend to be larger and less abundant. This is mainly due to the amount of energy it takes to survive at the top of a food web. Marine food webs are highly connected because of the openness of marine ecosystems, general lack of specialists, potential for long life spans, and significant size changes across the life histories of many species (Link 2002). Few fully charted examples of open water marine food webs exist. Those that do demonstrate limitations such as low species diversity, high species aggregation, limited spatiotemporal studies, and low chances of detecting important factors such as species richness, interactions or links (Link 2002).

Understanding an ecosystem depends on the identification of its food web and the exchanges between the different trophic levels in the food chain. Food webs show the dynamics of biomass production, sinks, and partitioning. Even minor changes in abiotic factors can cause far-reaching changes in the spatial distribution of primary and secondary pelagic production (Richardson et al. 2004). For example, increases in sea surface temperatures may lead to increases or decreases in phytoplankton abundance depending on the *in situ* water temperature (Richardson et al. 2004).

Tuna removal by commercial fisheries or other changes in biotic balances could have lasting effects lower down the food chain. Models done by Hinke et al. (2004), and observations by Halpern et al. (2006) demonstrate that by removing top predators, mid and low trophic level species may expand due to the elimination of competition and predation, and that top down food web control may be more important to ecosystem balance than previously thought. As apex predators, bigeye, skipjack and yellowfin tuna are in the top trophic level with distinct energy pathways supporting each species (Hinke et al. 2004). They are opportunistic feeders, a quality that complicates trophic impact analysis (Cox et al. 2002).

Additionally, fishing a species at maximum sustainable yield (MSY) may lead to the erosion of their trophic structure and have negative effects on recruitment (Sibert et al. 2006). Reducing population biomass too dramatically has been postulated as possibly leading to the outright collapse of the food chain (Sibert et al. 2006).

In 2010, the SPC Ocean Fisheries Programme reported some of its findings on an ongoing study of the WCPO tuna ecosystem that attempts to model and understand species relationships, with an end goal of assessing future environmental and fishery impacts on tuna stock health. In the analysis of stomach contents, yellowfin, bigeye and skipjack tuna were split into three size categories (baby, small, and large) to account for growth-related diet shifts as well as whether they filled a predominantly predator or prey role. All three tunas were found to primarily eat smaller fish, followed by mollusks and crustaceans (Allain 2010).

3.3.2 Target Stocks

Table 10 summarizes the U.S. official designation of the current status of the main target stocks in the fisheries that would be affected by the proposed action. The table expresses overfishing (indicating excessively high exploitation rate) and overfished (indicating excessively low stock size) status in terms of the status determination criteria specified in the relevant FMPs or FEPs, as required by the Magnuson Stevens Act (MSA). Stock status with respect to these two criteria is presented as reported in the NMFS quarterly stock status updates (NMFS 2021a).

Table 9: Stock status summary of main target HMS for all fisheries in the Convention Area in the Pacific Ocean.

Species	Stock	Overfishing?	Overfished?
Albacore (*Thunnus alalunga)*	North Pacific	No	No
	South Pacific	No	No
Bigeye tuna (*Thunnus obesus)*	Pacific	No	No
Blue marlin (*Makaira nigricans)*	Pacific	No	No
Mahimahi (dolphinfish, *Coryphaena hippurus*)	Pacific	Unknown	Unknown
Skipjack tuna *(Katsuwonus pelamis)*	Western and Central Pacific	No	No
	Eastern Pacific	No	No
Swordfish *(Xiphias gladius)*	Western and Central North Pacific	No	No
Yellowfin tuna (*Thunnus albacares)*	Western and Central Pacific	No	No
	Eastern Pacific	Yes	No
Wahoo (*Acanthocybium solandri)*	Pacific	Unknown	Unknown

Sources: https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates; last accessed June 2021

As shown in Table 9 above, using the MSA stock status determination criteria, only the stock of EPO yellowfin tuna is considered to be experiencing overfishing.[16]

The following sections provide more information on each of the target species (shown in Table 9 above). Information from NMFS 2015a is incorporated by reference below, and details can be found in NMFS 2015a for albacore tuna, bigeye tuna, skipjack tuna, swordfish, and yellowfin tuna.

3.3.2.1 Albacore (*Thunnus alalunga*)

Longlining is one of the main fishing methods that target albacore. Longliners tend to catch larger individual fish at lower latitudes (Gillet and Langley 2007).

Information suggests that separate northern and southern stocks of albacore, with separate spawning areas and seasons exist in the Pacific. Temperature plays a large role in the distribution of the species. In the north Pacific, albacore are distributed in a swath centered on 35° N and range as far as 50° N at the western end of their range. In the central south Pacific (150° E to 120° W) they are concentrated between 10° S and 30° S; in the west they may be found as far south as 50º S. They are absent from the equatorial eastern Pacific. Albacore are both surfaced welling and deep-swimming. Deep-swimming albacore are generally more concentrated in the western Pacific but with eastward extensions along 30° N and 10° S (Foreman 1980). The 15.6° to 19.4° C sea surface temperature (SST) isotherms mark the limits of abundant distribution although deep-swimming albacore have been found in waters between 13.5° and 25.2° C (Saito

[16] NMFS made this stock status determination in late 2018, based on the IATTC's 2018 stock assessment.

1973). Laurs and Lynn (1991) describe north Pacific albacore distribution in terms of the North Pacific Transition Zone, which lies between the cold, low salinity waters north of the sub-arctic front and the warm, high salinity waters south of the sub-tropical front. This band of water, roughly between 40° and 30-35° N (the zone is not a stable feature) also helps to determine migration routes. Albacore are found to a depth of at least 38 meters and will move into water as cold as 9° C at depths of 200 meters.

Albacore follow complex migration patterns that differ between the north and south Pacific stocks. Most migration is undertaken by pre-adults between two and five years old. A further sub-division of the northern stock, each with separate migration routes, is also suggested. Generally speaking, a given year class migrates east to west and then east again in a band between 30° N and 45° N, leaving the northeast Pacific in September-October, reaching waters off Japan the following summer and returning to the east in the summer of the following year. In the south Pacific Ocean, mature albacore spawn in tropical and sub-tropical waters between about 10° S and 25° S during the austral summer. Spawning success appears to be related to the prevailing oceanographic conditions with stronger recruitment occurring during La Niña conditions (i.e., positive Southern Oscillation Index) (Langley et al. 2006). Juvenile albacore recruit to surface fisheries in New Zealand coastal waters and in the vicinity of the sub-tropical convergence zone (about 40° S) in the central Pacific about one year later, at a size of 45-50 centimeters (fork length).

Albacore are noted for their tendency to concentrate along thermal fronts, particularly the Kuroshio front east of Japan and the North Pacific Transition Zone. Laurs and Lynn (1991) note that they tend to aggregate on the warm side of upwelling fronts. Near continental areas they prefer warm, clear oceanic waters adjacent to fronts with cool turbid coastal water masses. Further offshore, fishing success correlates with biological productivity found a converging ocean mass.

3.3.2.2 Bigeye Tuna (*Thunnus obesus*)

Several studies on the taxonomy, biology, population dynamics, and exploitation of bigeye tuna have been carried out, including comprehensive reviews by Collette and Nauen (1983), and Whitelaw and Unithan (1997). Miyabe (1994) and Miyabe and Bayliff (1998) reviewed the biology and fisheries for bigeye tuna in the Pacific Ocean.

This species is a mixture between a tropical and temperate water tuna, characterized by equatorial spawning, high fecundity, and rapid growth during the juvenile stage with movements between temperate and tropical waters during its life cycle. Bigeye tuna are trans-Pacific in distribution, occupying epipelagic and mesopelagic waters of the Indian, Pacific, and Atlantic Oceans. The distribution of the species within the Pacific stretches between northern Japan and the north island of New Zealand in the western Pacific and from 40° N to 30° S in the eastern Pacific (Calkins 1980). Molecular analyses (Grewe et al. 1998) and tagging projects executed by the SPC (Langley et al. 2008) indicate that a single stock exists for Pacific bigeye tuna, however a tagging study done by Schaefer and Fuller (2009) revealed a low degree of mixing between eastern Pacific and western Pacific groups demonstrating relatively strong regional fidelity.

Matsumoto et al. (2013) conducted a tagging study that showed bigeye also observed some degree of school fidelity. Large, mature-sized bigeye tuna are sought by sub-surface fisheries,

primarily longline fleets. Smaller, juvenile fish are taken in many surface fisheries, either as a targeted catch or as a bycatch with other tuna species (Miyabe and Bayliff 1998). Large numbers are taken by purse seiners fishing on FADs in equatorial waters, however these fish tend to be of a smaller size as larger bigeye are less likely to associate with FADs (Schaefer and Fuller 2009).

Basic environmental conditions favorable for survival include clean, clear oceanic waters between 13°C and 29°C. They have been observed to stay above the 20° C isotherm all the time when associated with a FAD, but free swimming schools tend to go below the 20°C isotherm during the day and come above it at night (Matsumoto et al. 2013). Juvenile bigeye occupy an ecological niche similar to juvenile yellowfin of a similar size. Preferred water temperature often varies with the size and maturity of pelagic fish. Adults usually have a wider temperature tolerance than sub-adults. Thus, during spawning, adults usually move to warmer waters, the preferred habitat of their larval and juvenile stages.

3.3.2.3 Blue Marlin *(Makaira nigricans)*

Blue marlin live throughout tropical and subtropical waters of the Indian, Pacific, and Atlantic Oceans. They may grow to be more than 12 feet long and may weigh up to 2,000 pounds. Female blue marlin may grow larger than males and may live 20 years, whereas males may reach 7 feet in length and live up to 10 years. They grow fast and may reach 3-6 feet in the first 1 to 2 years of life, which is when males mature. However, females mature later around age 3 to 4. Blue marlin eat mostly tuna and other open water fishes. They spawn between May and September.[17]

According to the 2013 NMFS stock assessment[18], Pacific blue marlin are not overfished and not subject to overfishing.

3.3.2.4 Mahimahi (dolphinfish, *Coryphaena hippurus)*

Pacific mahimahi are found in the Pacific and Western Pacific and are caught from California to Hawaii and the U.S. Pacific Island territories. Most of the U.S. commercial harvest of Pacific mahimahi comes from Hawaii.

Pacific mahimahi grow fast, up to 7 feet and 88 pounds, and can live up to 5 years. They are capable of reproducing young, around 4-5 months old. They are believed to spawn every 2-3 days throughout their entire spawning season (perhaps year-round), releasing 33,000 to 66,000 eggs each time. They are top predators that feed in surface waters during the day and eat a wide variety of species including small pelagic fish, juvenile tuna, invertebrates, billfish, jacks, pompano, and pelagic larvae or nearshore, bottom-living species. Predators include large tuna, marine mammals, marlin, sailfish, and swordfish.

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[17] See *https://www.fisheries.noaa.gov/species/pacific-blue-marlin* for more information.
[18] See *http://isc.fra.go.jp/pdf/ISC16/ISC16_Annex_10_Stock_Assessment_Update_for_Blue_Marlin_in_the_Pacific_Ocean_through_2014(ISC2016).pdf* for more information.

Although this population is not formally assessed, scientists assume mahimahi populations are stable because the species is highly productive and widely distributed throughout the tropical/subtropical Pacific. They can handle relatively high fishing rates, but precautionary management seeks to maintain current harvest levels, as the overfishing status is unknown[19].

The Hawaii commercial troll fishery (including Hawaii offshore handline fishery), Guam Troll, and CNMI troll fisheries all catch and retain mahimahi as a target species, with the Hawaii commercial troll fishery retaining the largest amounts of catch.

3.3.2.5 Skipjack Tuna (*Katsuwonus pelamis*)

Skipjack tuna are concentrated mostly in tropical waters; though they also seasonally expand into subtropical waters in both the north and south Pacific.

They can tolerate a temperature range of 15° C to 33° C, but they are more commonly found in waters above 20° C (Dizon et al. 1977). The main characteristics of skipjack tuna are fast growth, early maturity (ten months to one year), high fecundity, year-round spawning (Hunter et al. 1986) over broad tropical regions, a relatively short life span compared to bigeye, albacore, and bluefin tunas, high and variable recruitment and few age classes on which the fishery depends.

Historically, bait boats (pole-and-line) were the main gear used in catching skipjack tuna but since the 1950s, purse seiners have come to dominate the fishery. Some skipjack tuna are also caught incidentally by longliners, particularly those using shallow gear (typically hooked when retrieving the gear). In the WCPO, fishing for skipjack tuna occurs in the waters of a number of island nations and is carried out by both small domestic fleets and distant water fleets from developed nations.

Genetic studies of the Pacific population of skipjack tuna suggest that some mixing of fish occurs across the Pacific Ocean, but for management purposes, the stocks in the western Pacific have been considered by most scientists to be independent of those in the eastern Pacific. Tagging data showing limited movement of skipjack from the eastern Pacific to the western Pacific support the same conclusion (Joseph 2003). Like bigeye, skipjack tuna also displays diel vertical migrations especially in relation to FADs. A tagging study done by Matsumoto et al. (2014) showed that skipjacks' swimming depth was deeper during the day than at night, a pattern that was more obvious when they were not associated with a FAD. Those swimming with a FAD still showed some vertical migration patterns, but they were not as pronounced.

3.3.2.6 Swordfish (*Xiphias gladius*)

The biology of swordfish is covered in some detail by prior analysis by NMFS (2005). Ward and Elscot (2000) also authored an extensive review of the biology of swordfish and status of swordfish fisheries around the world.

[19] See *https://www.fisheries.noaa.gov/species/pacific-mahimahi* for more information.

Information on the age and growth of swordfish is the subject of intense study, and findings have been somewhat contradictory. Age studies based on otolith analysis and other methods (length, frequency, vertebrae, fin rays, inter alia) are reviewed by Ehrhardt et al. (1996). Wilson and Dean (1983) estimated a maximum age of nine years for males and 15 years for females from otolith analysis. Larvae and juveniles occur in warmer tropical and subtropical regions where spawning also occurs. Swordfish have separate sexes with no apparent sexual dimorphism, although females attain a larger size. Fertilization is external and the fish are believed to spawn close to the surface. Maturity is thought to occur between four and five years for females and between three and four years for males. In the equatorial Pacific spawning occurs year round; in the north Pacific it occurs in the warmer months of March through July (NMFS SWFSC 2014).

3.3.2.7 Yellowfin tuna (*Thunnus albacares*)

Several studies on the taxonomy, biology, population dynamics, and exploration of yellowfin tuna exist, including comprehensive reviews by Collette and Nauen (1983) and Suzuki (1994).

This is a tropical tuna characterized by rapid growth rate and fast development to maturity. Estimates of length at maturity for central and western Pacific yellowfin tuna vary widely with some studies supporting an advanced maturity schedule for yellowfin tuna in coastal or archipelagic waters (Cole 1980). However, most estimates suggest that the majority of yellowfin tuna reach maturity between two and three years of age on the basis of length-age estimates for the species. Longevity for the species may not be explicitly defined, but a maximum age of six to seven years is commonly used in stock assessment. Under appropriate conditions, yellowfin tuna exhibit high spawning frequency and fecundity (Cole 1980). Spawning occurs in broad areas of the Pacific. Spawning fish require surface salinity and temperature that remain above 24° C (Itano 2000). This means that spawning can occur throughout the year in tropical waters and seasonally at higher latitudes in areas such as Hawaii (Suzuki 1994).Yellowfin tuna are trans-Pacific in distribution, occupying the surface waters of all warm oceans, and form the basis of large surface and sub-surface fisheries.

The adult distribution in the Pacific lies roughly within latitudes 40° N to 40° S as indicated by catch records of the Japanese purse seine and longline fishery (Suzuki et al. 1978). Blackburn (1965) suggests the range of yellowfin tuna distribution is bounded by water temperatures between 18° C and 31° C with commercial concentrations occurring between 20° C and 30° C. Yellowfin are apex predators that rely on a wide diverse food base, but most heavily prey upon small teleost fish and crustaceans. As juveniles they prey mostly on zooplankton (Graham et al. 2007). Yellowfin tuna are also known to aggregate around drifting flotsam, anchored buoys, and large marine animals (Hampton and Bailey 1993). A 2013 study (Weng et al.) observed juvenile yellowfin behavior around a subsurface FAD.

Purse seining and longlining are the main gear employed in catching yellowfin tuna. Small yellowfin tuna may be caught on the surface by purse seine vessels, while larger fish are typically caught deeper using longline gear (Gillett and Langley 2007). In the western Pacific, the fishery is diverse, occurring in the waters of a number of island nations and on the high sea.

As stated above, based on the stock assessment conducted by the IATTC in 2018, NMFS determined that the EPO stock of yellowfin tuna is experiencing overfishing. Yellowfin tuna is not experiencing overfishing or being overfished in the WCPO[20].

3.3.2.8 Wahoo *(Acanthocybium solandri)*

Wahoo are found in tropical and subtropical waters around the world. Although they are found in tropical waters year-round, they are also found in higher latitudes during the summer.

Wahoo grow fast, up to 8 feet and 158 pounds, though they are commonly between 3.3 and 5.4 feet long. Males are able to reproduce when they reach 2.8 feet in length, and females when they reach 3.3 feet (usually around age 1). They spawn year-round in tropical waters and during the summer in higher latitudes; individuals spawn multiple times throughout the spawning season. They feed mainly on fish, including frigate mackerel, butterfish, porcupine fish, and round herring, competing with tuna for the same food.

The population status and fishing rate of Pacific wahoo are unknown because scientists do not formally assess these populations but precautionary management seeks to maintain current harvest levels[21]. The Hawaii commercial troll fishery, Guam troll fishery, and CNMI troll fisheries all target wahoo, with the Hawaii commercial troll fishery having the largest amount retained catches.

3.3.3 Non-Target Stocks

As described in the following tables, the U.S. purse seine and longline fisheries operating in the Pacific Ocean do catch, and in some instances retain, a small amount of non-target species that are not considered protected resources. Species that are considered protected resources (i.e., ESA and MMPA-listed species) are described in Chapter 3.4 below.

The U.S. albacore troll fishery and the U.S. tropical troll fisheries (Hawaii, American Samoa, CNMI and Guam), and the Hawaii handline and pole and line fisheries, will not be discussed further in this section. The U.S. albacore troll fishery catches minimal, if any, non-target species (Kelleher 2005). The tropical troll fisheries and the Hawaii handline and pole and line fisheries also catch minimal, if any, non-target species. These fisheries may occasionally catch and release a shark, shark-bitten catch, or undersized fish. However, the majority of their catch is target species. (WPFMC 2020; Kelleher 2005; Seafood Watch 2018).

3.3.3.1 Purse Seine Fishery Operating in the WCPO

Table 10 shows non-target species caught in the purse seine fishery. Species shown compose 97% of the catch of non-target species by weight excluding tropical tunas and protected species. Species that compose more than 1% of the non-target species catch by weight are included.

[20] NOAA Fisheries. 2021. Stock SMART data records. Retrieved from www.st.nmfs.noaa.gov/stocksmart. 06/23/2021.
[21] See *https://www.fisheries.noaa.gov/species/pacific-wahoo* for more information.

Table 10: Non-target (bycatch) species, metric tons (2015-2019), and relative percentage of total contribution from purse seine fishery logbook data.

Species	Metric Tons (2015-2019)	Relative percentage of total non-target catch
Billfish		
Blue Marlin	8	8%
Black Marlin	97	3%
Striped Marlin	45	1%
Other Fish		
Albacore	36	1%
Rainbow Runner	1,065	29%
Mahi Mahi/Dolphinfish	144	4%
Wahoo	119	3%
Mackerel Scad/Saba	251	7%
Sand Whiting	213	6%
Triggerfish (unidentified)	39	3%
Ocean Triggerfish (spotted)	125	3%
Shark		
Silky Shark	698	19%
Mobula (Unidentified)	33	1%
Whale Shark	402	11%

Source: NMFS unpublished data.

3.3.3.2 U.S. Longline Fisheries Operating in the WCPO

3.3.3.2.1 Hawaii based deep-set and shallow-set fisheries

The Hawaii based deep-set longline fishery targets bigeye and yellowfin tuna. A total of 144,677 fish were released by the deep-set longline fishery in 2019. Sharks accounted for 87% of the deep-set longline bycatch. With the exception of mako and a few thresher sharks, there is no demand for other shark species in Hawaii. Of all shark species combined, 99.6% of the deep-set longline shark catch was released (WPRFMC 2020).

The Hawaii-based shallow-set fishery targets swordfish. A total of 3,286 fish were released by the shallow-set longline fishery in 2019. Sharks accounted for 94% of the shallow-set longline bycatch. With the exception of mako shark, there is almost no demand for sharks in Hawaii. Of all shark species combined, 97% of the shallow-set longline shark catch was released. Since shallow-set longline trips are often longer than deep-set trips, the higher release rate by the shallow-set sector is to conserve space for swordfish and forego keeping other pelagic species due to their short shelf life (WPRFMC 2020).

Both the deep-set and shallow-set fisheries also catch and retain some non-target tuna and billfish species. Generally, most marketable species such as tuna and billfish have low discard rates. Although the fisheries do not target striped marlin and other miscellaneous pelagic catch such as mahimahi, bluefin tuna, and wahoo, these species are highly marketable and have low rates of discard at less than 5 percent.

3.3.3.2.2 American Samoa Longline Fishery

The American Samoa longline fleet mainly targets albacore tuna. Most of the catch is sold to the local canneries. The species sold to the local canneries include four tuna species, albacore, yellowfin, bigeye, skipjack, and one non-tuna species (wahoo). A total of 6,020 fish were released by the American Samoa longline fishery in 2019. These five species sold to the local canneries composed over 97% of the total landings by the longline fleet in 2019.

Sharks accounted for approximately 50% of the American Samoa longline fleet bycatch. As noted above, the demand for shark species in American Samoa is low. Of all shark species combined, 96.8% of the shark catch was released (WPRFMC 2020).

The American Samoa longline fleet catches and retains some non-target tuna and billfish species. Generally, most marketable species such as tuna and billfish have low discard rates of less than 4 percent (WPRFMC 2020). Overall, only 7 percent of all total fish caught were released by American Samoa longline vessels in 2019.

3.4 Protected Resources

This section provides information on protected resources in the WCPFC Convention Area. Purse-seine, longline and other fishing vessels operating in the western Pacific and targeting highly migratory species, have the potential to interact with a range of protected species (such as marine mammals, turtles, and seabirds). Table 15 below shows all the ESA-listed species in the affected environment.

3.4.1 Endangered Species Act (ESA)-listed species

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 a Biological Opinion (BiOp) prepared by NMFS or USFWS. Federal agencies need not engage in formal consultation 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[22] of listed species except under limited circumstances. The consultations consider the potential interactions of fisheries with listed species, the effects of interactions on the survival and recovery of listed species, and the protection of designated critical habitat.

Table 11 shows all the ESA-listed species in the affected environment.

Table 11: Potentially Affected Species Listed as Endangered or Threatened Under the ESA

Scientific Name	Common Name	ESA	Agency with Jurisdiction
Corals			
Acropora globiceps	Coral (no common name)	Threatened	NMFS
Acropora jacquelineae	Coral (no common name)	Threatened	NMFS
Acropora lokani	Coral (no common name)	Threatened	NMFS
Acropora pharaonis	Coral (no common name)	Threatened	NMFS
Acropora retusa	Coral (no common name)	Threatened	NMFS
Acropora rudis	Coral (no common name)	Threatened	NMFS
Acropora speciosa	Coral (no common name)	Threatened	NMFS
Acropora tenella	Coral (no common name)	Threatened	NMFS
Anacropora spinose	Coral (no common name)	Threatened	NMFS
Euphyllia paradivisa	Coral (no common name)	Threatened	NMFS
Isopora crateriformis	Coral (no common name)	Threatened	NMFS
Montipora australiensis	Coral (no common name)	Threatened	NMFS
Pavona diffluens	Coral (no common name)	Threatened	NMFS
Porites napopora	Coral (no common name)	Threatened	NMFS
Seriatopora aculeate	Coral (no common name)	Threatened	NMFS
Cephalopods			
Nautilus pompilius	Chambered nautilus	Threatened	NMFS
Marine Mammals			
Arctocephalus townsendi	Guadalupe Fur Seal	Threatened	NMFS
Balaenoptera borealis	Sei whale	Endangered	NMFS
Balaenoptera musculus	Blue whale	Endangered	NMFS

[22] 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.

Scientific Name	Common Name	ESA	Agency with Jurisdiction
Balaenoptera physalus	Fin whale	Endangered	NMFS
Eschrichtius robustus	Gray whale	Endangered	NMFS
Eubalaena australis	Southern right whale	Endangered	NMFS
Physeter macrocephalus	Sperm whale	Endangered	NMFS
Eubalaena japonica	North Pacific right whale	Endangered	NMFS
Pseudorca crassidens	False killer whale, Main Hawaiian Islands Insular DPS	Endangered	NMFS
Megaptera novaeangliae	Humpback whale, Central America	Endangered	NMFS
Megaptera novaeangliae	Humpback whale, Mexico	Threatened	NMFS
Megaptera novaeangliae	Humpback whale, Western North Pacific DPS	Endangered	NMFS
Monachus schauinslandi	Hawaiian monk seal	Endangered	NMFS
Orcinus orca	Killer whale, Southern Resident	Endangered	NMFS
Dugong dugon	Dugong	Endangered	USFWS
Fish			
Carcharhinus longimanus	Oceanic Whitetip shark	Threatened	NMFS
Sphyrna lewini	Scalloped hammerhead shark, Indo-West Pacific DPS	Threatened	NMFS
Sphyrna lewini	Scalloped hammerhead shark, Eastern Pacific DPS	Endangered	NMFS
Manta birostris	Giant Manta Ray	Threatened	NMFS
Acipenser medirostris	Southern North American green sturgeon	Threatened	NMFS
Oncorhynchus mykiss	California coast steelhead	Endangered	NMFS
Oncorhynchus mykiss	California Central Valley steelhead	Threatened	NMFS
Oncorhynchus mykiss	Central California coast steelhead	Threatened	NMFS
Oncorhynchus tshawytscha	Sacramento River winter-run Chinook salmon	Endangered	NMFS
Oncorhynchus kisutch	Central California coast coho salmon	Endangered	NMFS
Turtles			

Scientific Name	Common Name	ESA	Agency with Jurisdiction
Caretta caretta	Loggerhead turtle, North Pacific DPS	Endangered	NMFS
Caretta caretta	Loggerhead turtle, South Pacific DPS	Endangered	NMFS
Caretta caretta	Loggerhead turtle, Southeast Indo-Pacific DPS	Threatened	NMFS
Chelonia mydas	Green turtle, East Indian-West Pacific DPS	Threatened	NMFS
Chelonia mydas	Green turtle, Central West Pacific DPS	Endangered	NMFS
Chelonia mydas	Green turtle, Southwest Pacific DPS	Threatened	NMFS
Chelonia mydas	Green turtle, Central South Pacific DPS	Endangered	NMFS
Chelonia mydas	Green turtle, Central North Pacific DPS	Threatened	NMFS
Chelonia mydas	Green turtle, East Pacific DPS	Threatened	NMFS
Dermochelys coriacea	Leatherback turtle	Endangered	NMFS
Eretmochelys imbricate	Hawksbill turtle	Endangered	NMFS
Lepidochelys olivacea	Olive Ridley turtle	Threatened	NMFS
Birds			
Diomedia amsterdamensis	Amsterdam albatross	Endangered	USFWS
Fregata andrewesi	Andrew's frigatebird	Endangered	USFWS
Larus relictus	Relict gull	Endangered	USFWS
Oceanodroma castro	Band-rumped storm petrel	Endangered	USFWS
Phoebastria albatrus	Short-tailed albatross	Endangered	USFWS
Pseudobulweria macgillivrayi	Fiji petrel	Endangered	USFWS
Pterodroma axillaris	Chatham Island petrel	Endangered	USFWS
Pterodroma magenta	Magenta petrel	Endangered	USFWS
Pterodroma phaeopygia sandwichensis	Hawaiian dark-rumped petrel	Endangered	USFWS
Puffinus auricularis newelli	Newell's Townsend's shearwater	Threatened	USFWS
Puffinus heinrothi	Heinroth's shearwater	Threatened	USFWS
Marine Invertebrates			
Haliotis cracherodii	Black abalone	Endangered	NMFS

Scientific Name	Common Name	ESA	Agency with Jurisdiction
Haliotis sorenseni	White abalone	Endangered	NMFS

Sources: NOAA Fisheries Species Directory; ECOS Threatened and Endangered Species.

Designated critical habitat with which the fisheries analyzed in this EA could interact include leatherback sea turtle critical habitat, Hawaiian monk seal critical habitat, MHI false killer whale critical habitat, stellar sea lion critical habitat, central California coast coho salmon critical habitat, Sacramento River winter run Chinook salmon critical habitat, California, coast steel head critical habitat, California coast steelhead critical habitat, North American green sturgeon critical habitat, and black abalone critical habitat.

Each fishery has the potential to interact with a different set of listed species and designated critical habitat, depending on the area of operation and the type of gear used. In other words, each fishery does not interact with all the species and critical habitat described above.

The following identifies the valid Biological Opinions (BiOps) under which the purse seine fishery, Hawaii-based and American Samoa longline fisheries, albacore troll fisheries, tropical troll fisheries and Hawaii handline and pole and line fisheries in the Pacific Ocean currently operate:

NMFS. 2004b. Biological Opinion on the Adoption of (1) proposed Highly Migratory Species Fishery Management Plan; (2) continued operation of Highly Migratory Species fishery vessels under permits pursuant to the High Seas Fishing Compliance Act; and (3) Endangered Species Act regulation on the prohibition of shallow longline sets east of the 150° West longitude (2004 BiOp).

NMFS. 2006. Biological Opinion on the U.S. Western and Central Pacific Purse Seine Fishery as Authorized by the South Pacific Tuna Act and the High Seas Fishing Compliance Act. National Marine Fisheries Service, Pacific Islands Region (2006 BiOp).

NMFS. 2009. Biological Opinion on the Continued Authorization of Pelagic Troll and Handline Fisheries, as Managed Under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (2009 BiOp).

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 (2012 BiOp).

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

NMFS. 2015b. Biological Opinion and Conference Opinion on Continued Operation of the American Samoa Longline Fishery (2015 BiOp).

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

NMFS. 2019. Biological Opinion on the Continued Authorization of the Hawaii Pelagic Shallow-Set Longline Fishery (2019 BiOp).

NMFS completed informal ESA Section 7 consultation for species under the jurisdiction of NMFS for the South Pacific albacore troll fishery. Memoranda dated August 10, 2004; September 17, 2004; and October 7, 2004 (2004 Memoranda). Letter dated September 17, 2020 (2020 Letter).

NMFS completed informal ESA Section 7 consultation for the continued authorization of the pole-and-line fisheries in the western Pacific. Letter from NMFS dated August 21, 2008.

NMFS has also completed informal ESA Section 7 consultation for species under the jurisdiction of USFWS for the purse seine fishery. Letter from NMFS dated August 28, 2017; concurrence letter from USFWS dated October 11, 2017.

NMFS has reinitiated formal ESA Section 7 consultation for species under the jurisdiction of NMFS for the purse seine fishery, including for operations in the overlap area. By memorandum dated September 1, 2021, NMFS determined under ESA section 7(d) that continuation of the fishery during the period of consultation is not likely to jeopardize the continued existence of any ESA-listed species and would not constitute an irreversible or irretrievable commitment of resources precluding implementation of any reasonable and prudent alternatives under ESA Section 7(d).

The 2006 BiOp for the purse seine fishery analyzed the effects of the fishery on the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricate*), the leatherback turtle (*Dermochelys coriacea*), the loggerhead turtle (*Caretta caretta*), the olive ridley turtle (*Lepidochelys olivacea*), the blue whale (*Balaenoptera musculus*), the fin whale (*Balaenoptera physalus*), the humpback whale (*Megaptera novaeangliae*), the sei whale (*Balaenoptera borealis*), and the sperm whale (*Physeter macrocephalus*).

Since completion of the 2006 BiOp, the following species that occur in the area of operation of the purse seine fishery have been listed as threatened or endangered under the ESA: (1) the Indo-West Pacific distinct population segment (DPS) and the Eastern Pacific DPS of the scalloped hammerhead shark (*Sphyrna lewini*); (2) 15 species of coral (*Acropora globiceps*, *Acropora jacquelineae*, *Acropora lokani*, *Acropora pharaonis*, *Acropora retusa*, *Acropora rudis*, *Acropora speciosa*, *Acropora tenella*, *Anacropora spinosa*, *Euphyllia paradivisa*, *Isopara crateriformis*, *Montipora australiensis*, *Pavona diffluens*, *Porites napopora*, and *Seriatopora aculeata*); the giant manta ray (*Moubula birostris*); the oceanic whitetip shark (*Carcharhinus longimanus*); and the chambered nautilus (*Nautilus pompilius*). In addition, three DPSs of loggerhead turtles have been designated in the area of operation of the purse seine fishery – the North Pacific DPS, the South Pacific DPS, and the Southeast Indo-Pacific Ocean DPS. Six DPSs of the green turtle have also been designated in areas where overlap could occur with the area of operation of the purse seine fishery. These DPSs of the green turtle include: (1) East Indian-West Pacific; (2) Central West Pacific; (3) Southwest Pacific; (4) Central South Pacific; (5) Central North Pacific; and (6) East Pacific. Finally, NMFS revised the ESA listing for the humpback whale to identify 14 DPS, listing one as threatened, four as endangered, and identifying nine others as not warranted for listing. One DPS of the humpback whale has been designated as endangered in the area of operation of the purse seine fishery – the Western North Pacific DPS.

NMFS prepared a Biological Assessment (BA) (NMFS 2017b) for the purse seine fishery in 2017. Based on the information in the BA, and pursuant to criteria (2), (3), and (4) of the regulations at 50 CFR § 402.16, NMFS reinitiated formal ESA Section 7 consultation on the effects of the purse seine fishery on the following species: the blue whale; the sei whale; the sperm whale; the following DPSs of the green turtle: East Indian-West Pacific, Central West Pacific, Southwest Pacific, Central South Pacific, Central North Pacific, and East Pacific; the hawksbill turtle; the leatherback turtle; the following DPSs of the loggerhead turtle: Southeast Indo-Pacific Ocean, South Pacific Ocean, and North Pacific Ocean; the olive ridley turtle, and the following DPSs of the scalloped hammerhead shark: Indo-West Pacific DPS and Eastern Pacific DPS. In May 2018, NMFS included the giant manta ray and the oceanic whitetip in the pending consultation.

In the BA, NMFS determined that the purse seine fishery may affect but is not likely to adversely affect the 15 ESA-listed species of coral that occur in the area of operation of the fishery. The only potential for interaction of these species with the fishery would be during entry and exit of ports by fishing vessels and while at port, including during offloading and transshipment activities. During vessel transit and during transshipment activities, there is the potential for vessel grounding, and spills and leaks of pollutants. However, as fishing vessels avoid coral reef structures to avoid groundings and damage to their hulls, the chance of interactions between the purse seine fishery and listed coral species would be extremely unlikely and therefore discountable. Due to the spatial separation between fishing operations and ESA-listed corals, exposure of ESA-listed corals or coral reef habitat to hydrocarbon-based chemicals such as fuel oils, gasoline, lubricants, and hydraulic fluids that may enter the marine environment during at-sea operations, including fishing and transiting, is unlikely. While fishing operations may cause small volumes of hydrocarbon-based chemicals to enter the marine environment, wind and waves disperse the chemicals widely, such that exposure of ESA-listed corals would be limited and therefore discountable.

Similarly, by memorandum dated December 6, 2018, NMFS determined that the purse seine fishery may affect but is not likely to adversely affect the chambered nautilus (see Memorandum from T. Graham to A. Garrett, dated December 6, 2018). The chambered nautilus occur in near shore areas, such as in coral reef structures, steep-sloped reefs, and fore reefs. They do not occur in the open ocean where the U.S. purse seine fishery operates. The only potential for interaction of these species with the fishery would be during entry and exit of ports by fishing vessels, including during offloading and transshipment activities. During vessel transit and during transshipment activities, there is the potential for vessel grounding, and spills and leaks of pollutants. However, as fishing vessels avoid coral reef and other reef structures to avoid groundings and damage to their hulls, the chance of interactions between the purse seine fishery and chambered nautilus would be extremely unlikely and therefore discountable. Due to the spatial separation between fishing operations and the chambered nautilus, exposure of the chambered nautilus to hydrocarbon-based chemicals such as fuel oils, gasoline, lubricants, and hydraulic fluids that may enter the marine environment during operations, including fishing and transiting, is unlikely. While fishing operations may cause small volumes of hydrocarbon-based chemicals to enter the marine environment, wind and waves would likely disperse the chemicals widely, such that exposure of the chambered nautilus would be limited and therefore discountable.

NMFS also determined in the BA that the purse seine fishery may affect but is unlikely to adversely affect the following two marine mammal species: (1) the fin whale because there have been no recorded interactions with fin whales in the fishery during the years for which data were analyzed (the 2008-2015 time period)[23]; and (2) the Western North Pacific DPS of the humpback whale, as the best available data does not indicate the likelihood of interactions with any ESA-listed humpback DPS.

By memorandum, dated July 29, 2020 (see Memorandum from T. Graham to A. Garrett, dated July 29, 2020), NMFS addressed supplemental information on the fishery and determined that the fishery may affect but is not likely to adversely affect the Guadalupe fur seal, the Mexico DPS of the humpback whale, and the Central America DPS of the humpback whale. The risks of interaction between these species and vessels in the fishery are limited to transit, transshipment, and landing activities. Transit, transshipment, and landing activities from vessels could expose these ESA-listed species to the following stressors: (1) vessel noise, (2) vessel collision, (3) vessel groundings, waste, discharge, and emissions. All of these potential stressors would be expected to have discountable effects on the three ESA-listed species for the reasons explained below.

Given the size of the purse seine fishery (the small number of vessels in the fishery and the wide area they cover), the fact that the sound field produced by the vessels in the fishery is relatively small and would move with the vessel, the animals would be moving as well, vessel speeds would be slow,[24] vessel transit vectors would be predictable, sudden or loud noises would be unlikely or infrequent, and generally the sound field would be in motion, any exposure to noises generated by this fishery would be expected to be short-term and transient. Thus, it is likely that any sounds emanating from vessels in the fishery during transit would generally be ignored by animals that are temporarily exposed to the sounds.

Given the small number of vessels participating in the fishery, the small number of anticipated vessel trips,[25] the slow vessel speeds during vessel transit, transshipment and landing activities, and the expectation that ESA-listed marine species would be widely scattered, the potential for an incidental vessel strike is extremely unlikely to occur.

Although leakage, wastes, gear loss and vessel emissions would occur as a result of the transit, transshipment, and landing activities of vessels in the purse seine fishery, given the small number of vessels participating in the fishery, the small number of anticipated vessel trips, the small chance that ESA-listed resources would be exposed to measurable or detectable amounts of wastes, gear, or emissions from this fishery, and the dilution of any pollutants, any effects to ESA-listed species would be expected to be discountable. Vessels generally take precautions to

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[23] Interactions were later identified as part of the pending consultation, but NMFS does not expect the low levels of take to jeopardize the fin whale during the period of consultation (see 7(d) memo dated September 1, 2021).

[24] Purse seine vessel speed is anticipated to be about 10 knots during setting activities, 2.5 knots during the rest of fishing and brailing activities, and about 15 knots during non-fishing activities (de Souza et. al. 2016). Anecdotal information from industry indicates that U.S. purse seine vessels can sometimes travel at speeds up to 16.5 knots per day, depending on current.

[25] In the years 2014-2019, the purse seine fleet took a total of 1,494 trips, or an average of 249 trips per year. Of the total number of trips during that time period, 160 trips (or an average of 27 trips per year) involved transit in areas outside of the main fishing grounds.

avoid groundings and damage to hulls, so vessel groundings would be extremely unlikely and therefore discountable.

As set forth in the analysis in Chapter 5 of the BA, NMFS determined that the U.S. purse seine fishery may adversely affect the blue whale; the sei whale; the sperm whale; the following DPSs of the green turtle: East Indian-West Pacific, Central West Pacific, Southwest Pacific, Central South Pacific, Central North Pacific, and East Pacific; the hawksbill turtle; the leatherback turtle; the following DPSs of the loggerhead turtle: Southeast Indo-Pacific Ocean, South Pacific Ocean, and North Pacific Ocean; the olive ridley turtle; and the following DPSs of the scalloped hammerhead shark: Indo-West Pacific DPS and Eastern Pacific DPS. Subsequent to preparation of the BA, in a memorandum dated May 17, 2018, NMFS also determined that the purse seine fishery may adversely affect the oceanic whitetip shark and the giant manta ray. However, in memoranda dated December 5, 2017, May 17, 2018, and December 6, 2018, June 28, 2019, January 15, 2020, February 23, 2021, and September 1, 2021, NMFS determined that continuation of the fishery during the period of consultation is not likely to jeopardize the continued existence of any of these species and would not constitute an irreversible or irretrievable commitment of resources under ESA Section 7(d).

The 2019 BiOp for the Hawaii shallow-set longline fishery analyzed the effects of the fishery on the following: the leatherback turtle; the North Pacific DPS of the loggerhead turtle; the Eastern Pacific DPS of the green turtle; the Central North Pacific DPS of the green turtle; the East Indian-West Pacific DPS of the green turtle; the Central West Pacific DPS of the green turtle; the Southwest Pacific DPS of the green turtle; the Central South Pacific DPS of the green turtle; the olive ridley turtle; the hawksbill turtle; the Guadalupe fur seal; the Hawaiian monk seal; the MHI insular false killer whale; the Central America DPS of the humpback whale; the Mexico DPS of the humpback whale; the fin whale; the blue whale; the North Pacific right whale; the sei whale; the sperm whale; the Southern Resident DPS of the killer whale; the Eastern Pacific DPS of the scalloped hammerhead shark; the oceanic whitetip shark; the giant manta ray; the central California coast coho salmon; the Central valley spring-run Chinook salmon; the Sacramento River winter-run Chinook salmon; the Central California coast steelhead; the California coast steelhead; and the Southern North American green sturgeon. The 2019 BiOp also analyzed the effects of the fishery on the following designated critical habitat: leatherback turtle critical habitat; Hawaiian monk seal critical habitat; MHI false killer whale critical habitat; stellar sea lion critical habitat; central California coast coho salmon critical habitat; Sacramento River winter run Chinook salmon critical habitat; California coast steel head critical habitat; California coast steelhead critical habitat; North American green sturgeon critical habitat; and black abalone critical habitat. The 2019 BiOp indicated that a limited number of these species could be adversely affected by the fishery: the leatherback turtle; the North Pacific DPS of the loggerhead turtle; the six DPS of the green turtle that occur in the Pacific Ocean; the olive ridley turtle; the oceanic whitetip shark; the giant manta ray; and the Guadalupe fur seal. The 2019 BiOp concluded that the continued operation of the Hawaii shallow-set longline fishery is not likely to jeopardize the continued existence of those species.

Under the 2014 BiOp, NMFS determined that the Hawaii deep-set longline fishery was not likely to jeopardize the continued existence for humpback whales, sperm whales, MHI insular false killer whales, North Pacific loggerhead turtles, leatherback turtles, olive ridley turtles, green turtles, and the Indo-West Pacific DPS of the scalloped hammerhead shark. The 2017 Supplemental BiOp for the fishery concluded that the fishery was not likely to jeopardize the

continued existence of the North Pacific DPS of the loggerhead turtle, the olive ridley turtle, six DPS of the green turtle occurring in the Pacific Ocean, nor result in the destruction or modification of critical habitat. Consultation for the Hawaii deep-set fishery was reinitiated on October 4, 2018, due to reaching several reinitiation triggers. The fishery exceeded the incidental take statement for east Pacific green sea turtle DPS in mid-2018. Listing of the oceanic whitetip shark (83 FR 4153) and giant manta ray (83 FR 2916) as threatened species, and designation of MHI insular false killer whale (IFKW) critical habitat (83 FR 35062) also triggered the requirement for reinitiated consultation. By memorandum dated December 18, 2020, NMFS concluded that continued authorization of the fishery during the period of reinitiated consultation would not violate ESA Section 7(a)(2) and 7(d).

The 2015 BiOp concluded that the American Samoa longline fishery was not likely to jeopardize the green turtle, hawksbill turtle, leatherback turtle, olive ridley turtle, South Pacific DPS of the loggerhead turtle, Indo-West Pacific DPS of the scalloped hammerhead shark, and six species of reef-building corals. Consultation for the American Samoa deep-set longline fishery was reinitiated on May 6, 2020, due to reaching several re-initiation triggers. The fishery exceeded the anticipated take as identified in the incidental take statement for the east Indian west Pacific, southwest Pacific, central South Pacific, and east Pacific green sea turtle DPS; hawksbill; and olive ridley sea turtles in 2018. Listing of the oceanic whitetip shark (83 FR 4153), giant manta ray (83 FR 2916), and chambered nautilus (83 FR 48976) as threatened species also triggered the requirement for reinitiated consultation. By memorandum dated July 13, 2021, NMFS concluded that continued authorization of the fishery during the period of reinitiated consultation would not violate ESA Section 7(a)(2) and 7(d). The memorandum also concluded that the continued authorization of the fishery during the period of consultation would not jeopardize the recently listed oceanic whitetip shark, giant manta ray, and chambered nautilus precluding implementation of any reasonable and prudent alternatives under ESA Section 7(d).

In the 2004 Memoranda, NMFS concluded that the continued operation of the U.S. south Pacific albacore troll fishery may affect but is not likely to adversely affect listed species for the following reasons: (1) there has been no documented or reported take of any listed species in this fishery; (2) the nature of the fishery, including the gear used, makes it highly unlikely that a listed species would be taken; and (3) although there have been limited sea turtles takes in the U.S. North Pacific albacore troll fishery, according to biologists, there have been no documented sea turtle takes in any commercial troll fisheries off of the west coast of the United States, making the likelihood that a listed sea turtle would be taken by the U.S. south Pacific albacore troll fishery extremely low. The 2020 Letter concluded that a proposed action for five longline vessels to explore albacore trolling in the south Pacific Ocean may affect, but is not likely to adversely affect, the following species:

- Leatherback, loggerhead, olive ridley, green, and hawksbill sea turtles;
- Blue, fin, sei, and sperm whales;
- Indo-West Pacific DPS of scalloped hammerhead and oceanic whitetip shark,
- Giant manta ray;
- Chambered nautilus;
- Six reef-building corals – *Acropora globiceps*, *A. jacquelineae*, *A. retusa*, *A. speciosa*, *Euphyllia paradivisa*, and *Isopora crateriformis*; and

- Four giant clams (ESA-candidate species) – *Hippopus hippopus*, *Tridacna squamosa*, *T. derasa*, and *T. gigas*.

The 2004 BiOp considered the effects of longline, troll, drift gillnet, small vessel purse seine, rod and reel, and harpoon fisheries based in California, Oregon, and Washington, which includes the North Pacific albacore troll fishery. The 2004 BiOp analyzed the effects of the fisheries on the following ESA-listed species: fin whales; humpback whales; sperm whales; green turtles; hawksbill turtles; loggerhead turtles; and olive ridley turtles. The BiOp concluded that continued authorization of these fisheries is not likely to jeopardize the continued existence of those species.

In 2008, NMFS initiated informal consultation for the pole-and-line fisheries of the western Pacific region. Informal consultation was completed on August 21, 2008. NMFS concluded that continued authorization of the pole-and-line fisheries in the Western Pacific Region, as currently managed under the Pelagics FMP, is not likely to adversely affect ESA-listed marine species or their critical habitat.

The 2009 BiOp for the tropical troll and Hawaii handline and pole and line fisheries analyzed the effects of the fisheries on the following ESA-listed species: the Hawaiian monk seal; the blue whale; the fin whale; the humpback whale; the North Pacific right whale; the sei whale; the sperm whale; the hawksbill sea turtle; the leatherback sea turtle; the loggerhead sea turtle; the olive ridley sea turtle; and the green sea turtle. The BiOp concluded that the continued operation of these fisheries is not likely to jeopardize the continued existence of those species.

3.4.2 Marine Mammals

The purse seine fishery corresponds to the following fisheries on the 2021 List of Fisheries (LOF):[26] South Pacific Tuna Fisheries – purse seine gear and Western Pacific Pelagic Fisheries – purse seine gear. Both of these fisheries are listed as Category II fisheries under the regulations implementing the MMPA, meaning that it is a commercial fishery determined to have occasional incidental mortality and serious injury of marine mammals. MMPA 101(a)(5)(E) authorizations are required for commercial fisheries with frequent or occasional incidental mortality or serious injury (M&SI) of ESA-listed marine mammals, as documented on the List of Fisheries (LOF). Authorizations are not required for commercial fisheries involving a remote likelihood of or no known incidental taking of marine mammals. Because these fisheries have no documented incidental M&SI of ESA-listed marine mammals on the 2021 LOF, a 101(a)(5)(E) authorization under the MMPA is not required at this time.

The Hawaii deep-set longline fishery is a Category I fishery on the 2021 LOF, meaning that it is a commercial fishery with frequent serious injuries and mortalities of marine mammals. As stated above, humpback whales, sperm whales, and MHI insular false killer whales are the ESA-listed marine mammals that may be adversely affected by the fishery. By memorandum dated December 18, 2020, NMFS concluded that continued authorization of the fishery during the

[26] See 86 FR 3028, published January 14, 2021.

period of reinitiated consultation would not violate ESA Section 7(a)(2) and 7(d) for these species.

The Hawaii shallow-set longline fishery is a Category II fishery on the 2021 LOF, meaning that it is a commercial fishery determined to have occasional incidental mortality and serious injury of marine mammals. The 2019 Biological Opinion stated that the Guadalupe fur seal could be adversely affected by the Hawaii shallow-set longline fishery. The 2019 BiOp concluded that the continued operation of the Hawaii shallow-set longline fishery is not likely to jeopardize the continued existence of this species. The Hawaii shallow-set longline fishery is classified as a Category III fishery for MMPA 101(a)(5)(E) purposes, because it has no known interactions with ESA-listed marine mammals, therefore no MMPA section 101(a)(5)(E) permit is required (see 86 FR 24384).

On May 6, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing interactions with ESA-listed species or depleted stocks of marine mammals in the Hawaii deep-set fishery (86 FR 24384). The permit authorizes the incidental, but not intentional, taking of ESA-listed Central North Pacific humpback whales, and MHI insular false killer whales to vessels registered in the Hawaii deep-set fishery. In issuing this permit, NMFS determined that incidental taking by the Hawaii deep-set longline fishery will have a negligible impact on the affected stocks of marine mammals.

The American Samoa longline fishery and the south Pacific albacore troll fishery are Category II fisheries on the 2021 LOF. Both fisheries are classified as a Category III fisheries for MMPA 101(a)(5)(E) purposes, because there are no known interactions with ESA-listed marine mammals, therefore no MMPA section 101(a)(5)(E) permit is required.

The north Pacific albacore troll fishery, tropical troll fisheries (American Samoa, CNMI, Guam and Hawaii) and the Hawaii handline and pole and line fisheries are all Category III fisheries, meaning that there is a remote likelihood of or no known incidental mortality or serious injury of marine mammals.

3.4.3 Essential Fish Habitat (EFH)

The MSA defines essential fish habitat (EFH) as those waters and substrate necessary for federally managed species to spawn, breed, feed, and/or grow to maturity. Federal agencies whose action may adversely affect EFH must consult with NMFS in order to conserve and enhance federal fisheries habitat. Habitat areas of particular concern (HAPC) are subsets of EFH that merit special conservation attention because they meet at least one of the following four considerations:

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.

The EFH provisions (50 CFR Part 600 Subpart J) of the MSA are intended to maintain sustainable fisheries. NMFS and the Regional Fishery Management Councils must identify and describe EFH and HAPC for each managed species using the best available scientific data and must ensure that fishing activities being conducted in such areas do not have adverse effects to the extent practicable. This process consists of identifying specific areas and the habitat features within them that provide essential functions to a particular species for each of its life stages. Both the EFH and the HAPC are documented in the FEPs established under the MSA[27].

EFH and HAPC have been designated in the WCPO for pelagic, bottomfish and seamount groundfish, precious corals, crustaceans, and coral reef management unit species (MUS). Table 12 below lists the EFH for species managed under the various western Pacific FEPs. Table 13 provides the HAPC for all FEP MUS by life stage. For more information, see the FEPs (WPRFMC 2009a; 2009b; 2009c; 2009d; 2009e; 2018a; 2018b; 2018c).

Table 12: Essential Fish Habitat (EFH) for all management unit species (MUS) of western Pacific fishery ecosystem plans (FEPs)

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
Pelagic	All pelagic fisheries	Tropical and temperate	Egg/larval	The water column down to a depth of 200 m (100 fm) from the shoreline to the outer limit of the EEZ
			Juvenile/adult	The water column down to a depth of 1,000 m (500 fm)
American Samoa, Mariana, and Pacific	Bottomfish	Shallow-water and deep-water complexes	Egg/larval	The water column extending from the shoreline to the outer limit of the EEZ down

[27] The FEPs being the FEP for the American Samoa Archipelago, the FEP for the Mariana Archipelago; the FEP for the Pacific Remote Island Areas; the FEP for the Hawaii Archipelago; and the FEP for Pacific Pelagic Fisheries of the Western Pacific Region.

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
Remote Island Area (PRIA)				to a depth of 400 m (200 fm)
			Juvenile/adult	The water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)
PRIA	Coral Reef Ecosystem	Currently harvested coral reef taxa, Labridae	Egg/larval	The water column and all bottom habitat from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
		Currently harvested coral reef taxa, Octopodidae	Egg	All coral, rocky, and sand-bottom areas from 0 to 100 m (50 fm)
		Currently harvested coral reef taxa , Carcharhinidae	Egg/larval	No designation
		All other currently harvested coral reef taxa	Egg/larval Egg/larval/juvenile –Kyphosidae only Larval – Octopodidae only	The water column from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
PRIA	Coral Reef Ecosystem	Currently harvested coral reef taxa, Carcharhinidae, Labridae	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 100 m (50 fm) to the outer extent of the EEZ.
		Currently harvested coral reef taxa, Holocentridae and Muraenidae	Juvenile/adult	All rocky and coral areas and the adjacent water column from 0 to 100 m (50 fm)
		Currently harvested coral reef taxa, Kuhliidae	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 50 m (25 fm)
		Currently harvested coral reef taxa, Kyphosidae	Adult	All rocky and coral bottom habitat and the adjacent water column from 0 to 30 m (15 fm)

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
		Currently harvested coral reef taxa, Mullidae, Octopodidae, Polynemidae, Priacanthidae	Juvenile/adult	All rocky/coral bottom and sand bottom habitat and the adjacent water column from 0 to 100 m (50 fm)
		Currently harvested coral reef taxa, Mugilidae	Juvenile/adult	All sand and mud bottom and the adjacent water column from 0 to 50 m (25 fm)
		Currently harvested coral reef taxa, Scombridae (dogtooth tuna), Sphyraenidae	Juvenile/adult	Only the water column from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
		Currently harvested coral reef taxa, Aquarium Species/Taxa	Juvenile/adult	Coral, rubble, and other hard-bottom features and the adjacent water column from 0 to 100 m (50 fm)
		All other currently harvested coral reef taxa	Juvenile/adult	All bottom habitat and the adjacent water column from 0 to 100 m (50 fm)
PRIA	Coral Reef Ecosystem	Potentially harvested coral reef taxa	All life stages	The water column and all bottom habitat from the shoreline to the outer boundary of the EEZ to a depth of 100 m (50 fm)
Hawaii	Crustaceans	Kona crab	Egg/larval	The water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm)
			Juvenile/adult	All of the bottom habitat from the shoreline to a depth of 100 m (50 fm)
		Deepwater shrimp	Egg/larval	The water column and associated outer reef slopes between 550 and 700 m

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
			Juvenile/adult	The outer reef slopes at depths between 300-700 m
Hawaii	Bottomfish	Shallow stock: *Aprion virescens*	Egg	Pelagic zone of the water column in depths from the surface to 240 m, extending from the official US baseline to a line on which each point is 50 miles from the baseline
			Post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 240 m, extending from the official US baseline to the EEZ boundary
			Post-settlement	Benthic or benthopelagic zones, including all bottom habitats, in depths from the surface to 240 m bounded by the official US baseline and 240 m isobath
			Sub-adult/adult	Benthopelagic zone, including all bottom habitats, in depths from the surface to 240 m bounded by the official US baseline and 240 m isobath.
Hawaii	Bottomfish	Intermediate stocks: *Aphareus rutilans, Pristipomoides filamentosus, Hyporthodus quernus*	Eggs	Pelagic zone of the water column in depths from the surface to 280 m (*A. rutilans* and *P. filamentosus*) or 320 m (*H. quernus*) extending from the official US baseline to a line on which each point is 50 miles from the baseline

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
			Post-hatch pelagic	Pelagic zone of the water column in depths from the surface 280 m (*A. rutilans* and *P. filamentosus*) or 320 m (*H. quernus*), extending from the official US baseline to the EEZ boundary
			Post-settlement	Benthic (*H. quernus* and *A. rutilans*) or benthopelagic (*A. rutilans* and *P. filamentosus)* zones, including all bottom habitats, in depths from the surface to 280 m (*A. rutilans* and *P. filamentosus*) or 320 m (*H. quernus*) bounded by the 40 m isobath and 100 m (*P. filamentosus),* 280 m (*A. rutilans*) or 320 m (*H. quernus*) isobaths
			Sub-adult/adult	Benthic (*H. quernus*) or benthopelagic (*A. rutilans* and *P. filamentosus)* zones, including all bottom habitats, in depths from the surface to 280 m (*A. rutilans* and *P. filamentosus*) or 320 m (*H. quernus*) bounded by the 40 m isobath and 280 m (*A. rutilans and P. filamentosus*) or 320 m (*H. quernus*) isobaths

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
		Deep stocks: *Etelis carbunculus, Etelis coruscans, Pristipomoides seiboldii, Pristipomoides zonatus*	Eggs	Pelagic zone of the water column in depths from the surface to 400 m, extending from the official US baseline to a line on which each point is 50 miles from the baseline
Hawaii	Bottomfish	Deep stocks: *Etelis carbunculus, Etelis coruscans, Pristipomoides seiboldii, Pristipomoides zonatus*	Post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 400 m, extending from the official US baseline to the EEZ boundary
			Post-settlement	Benthic zone, including all bottom habitats, in depths from 80 to 400 m bounded by the official US baseline and 400 m isobath
			Sub-adult/adult	Benthic (*E. carbunculus* and *P. zonatus*) or benthopelagic (*E. coruscansi*) zones, including all bottom habitats, in depths from 80 to 400 m bounded by the official US baseline and 400 m isobaths
		Seamount groundfish	Eggs and post-hatch pelagic	Pelagic zone of the water column in depths from the surface to 600 m, bounded by the official US baseline and 600 m isobath, in waters within the EEZ that are west of 180°W and north of 28°N
			Post-settlement	Benthic or benthopelagic zone in depths from 120 m to 600 m bounded by the 120 m and 600 m

FEP	Fishery	Stock or Stock Complex	Life Stage(s)	EFH Designation
				isobaths, in all waters and bottom habitat, within the EEZ that are west of 180°W and north of 28°N
			Sub-adult/adult	Benthopelagic zone in depths from 120 m to 600 m bounded by the 120 m and 600 m isobaths, in all waters and bottom habitat, within the EEZ that are west of 180°W and north of 28°N
	Precious Coral	Deep-water	Benthic	Six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank
Hawaii	Precious Coral	Shallow-water	Benthic	Three beds known for black corals in the MHI between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai

Table 13: Habitat areas of particular concern for MUS of all Western Pacific FEPs

FEP	Fishery	Stock or Stock Complex	HAPC
Pelagic	All pelagic fisheries	Temperate and tropical species	Water column from the surface down to a depth of 1,000 m (500 fm) above all seamounts and banks with summits shallower that 2,000 m (1,000 fm) within the EEZ
American Samoa, Mariana, Pacific Remote Island Areas (PRIA)	Bottomfish	Shallow- and deep-water	All slopes and escarpments between 40 m and 280 m (20 and 140 fm)
PRIA	Coral Reef Ecosystem	Currently and potentially	All coral reef habitat in the Pacific Remote Island Areas

FEP	Fishery	Stock or Stock Complex	HAPC
		harvested coral reef taxa	
Hawaii	Crustaceans	Kona crab	All banks in the NWHI with summits less than or equal to 30 m (15 fm) from the surface
	Precious Coral	Deep-water	Makapuu, Wespac, and Brooks Bank bed
		Shallow-water	Auau Channel bed
	Bottomfish	All bottomfish stocks	Discrete areas at Kaena Point, Kaneohe Bay, Makapuu Point, Penguin Bank, Pailolo Channel, North Kahoolawe, and Hilo (please see Amendment 4 to the Hawaii Archipelago FEP, Section 3.3.3 for GPS coordinates of the locations and Appendix 2 for maps)
		Seamount groundfish	Congruent with EFH (See Table 12).

3.4.4 National Wildlife Refuges and Monuments

Pursuant to the National Wildlife System Administration Act of 1966 (NWSAA; 16 U.S.C. § 668dd, *et seq*.), USFWS carries out the mission of National Wildlife Refuges (NWRs), which is "to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." National Monuments are designated by the President using the authority of the Antiquities Act of 1906 (16 U.S.C. 431). This act allows the President to protect areas of "historic or scientific significance." There are 10 NWRs and four National Monuments in the CA: Guam NWR; Baker Island NWR; Howland Island NWR; Jarvis Island NWR; Johnston Island NWR; Kingman Reef NWR; Palmyra Atoll NWR; Rose Atoll NWR; Hawaiian Islands NWR; Midway Atoll NWR; Papahanaumokuakea Marine National Monument; the Marianas Trench Marine National Monument; the Pacific Remote Islands Marine National Monument; and the Rose Atoll Marine National Monument.

NMFS published a final rule that prohibits commercial fishing in the Pacific Remote Islands, and Rose Atoll, and in the Islands Units of the Marianas Trench Marine National Monuments; establishes management measures for non-commercial and recreational charter fishing in the monuments; and prohibits the conduct of commercial fishing outside the Monuments and non-commercial fishing inside the monuments during the same trip (78 FR 32996; June 3, 2013).

In September 2014, President Obama issued Presidential Proclamation 9173 (79 FR 58645, September 29, 2014) that expanded the protected areas around Wake Island, Jarvis Island, and Johnston Atoll within the Pacific Remote Islands Marine National Monument. Protected areas were expanded from 50 nautical miles to the outer limit of the U.S. EEZ, which added 308,316

square nautical miles of protected waters to the Monument. In March 2015, NMFS published a final rule to prohibit commercial fishing, while allowing for managed noncommercial fishing, in the expanded portions of the Pacific Islands Marine National Monument (see 80 FR 15693; published March 25, 2015). On August 26, 2016, President Obama issued an additional proclamation to expand the Papahanaumokuakea Marine National Monument to include over 400,000 additional square nautical miles.

3.4.4 Historic Resources

Under regulations implementing Section 106 of the National Historic Preservation Act (NHPA; 16 U.S.C. 470f), federal agencies must determine whether a proposed action would cause potential effects on historic properties. Shipwrecks would be the only historic properties potentially within the area that could be affected by the proposed action under any of the action alternatives.

4 ENVIRONMENTAL CONSEQUENCES: DIRECT AND INDIRECT EFFECTS

This chapter examines the direct and indirect environmental impacts that would be expected to result from implementation of the Action Alternative as well as the No-Action Alternative, which are described in Chapter 2. Cumulative impacts are addressed in Chapter 5.[28]

This chapter generally follows the organization of Chapter 3. The discussion of potential impacts to the fisheries is presented first to establish the changes that the affected fisheries could experience from implementation of the proposed action. The No-Action Alternative represents the baseline against which the potential environmental impacts of the action alternative can be measured. This analysis describes the changes to fishing patterns and practices that could result from implementation of the Action Alternative and analyzes the potential environmental impacts these changes to the fisheries could cause to the resources in the affected environment.

4.1 Potential Effects of the Action Alternative on Fishery Operations

The potential effects of the Action Alternative on U.S. fishing vessels used for commercial fishing for HMS on the high seas and in EEZs in the Convention Area are described below. Table 14 below presents an overview of the fisheries that will be affected by each of the elements included in the Action Alternative.

Table 14: Fisheries expected to be affected by specific elements included in the Action Alternative

	Purse Seine	Longline	Albacore Troll	Tropical Troll, Handline and Pole and Line
Non-Entangling FAD Design Requirements	X			
IMO Number Requirements		X	X	X
Shark exemption in purse seine vessels	X			
Shark identification requirements	X	X		

[28] According to the 1978 CEQ regulations implementing the Procedural Provisions of NEPA at 40 CFR §1508.7 and §1508.8, direct effects are caused by the action and occur at the same time and place; indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable; and cumulative impacts are the impacts on the 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 or person undertakes such other actions.

	Purse Seine	Longline	Albacore Troll	Tropical Troll, Handline and Pole and Line
Prohibition from targeting/setting on mobulid rays	X	X	X	X
Prohibition from retaining/transshipping/landing mobulid rays	X	X	X	X
Release mobulid rays alive and unharmed	X	X	X	X
Assist WCPFC observers in collection of information on mobulid rays	X	X		
Mobulid exemption in purse seine fisheries	X			

The potential impacts from implementation of the Action Alternative to each of the potentially affected fisheries are analyzed in the following sections. The direct and indirect effects from implementation of the Action Alternative would fall into two categories: (1) economic; and (2) changes to fishing patterns and practices. General information regarding economic impacts is provided in the discussion below to help compare the alternatives assessed and to determine whether the economic impacts are interrelated with environmental impacts. More specific information regarding economic impacts is provided in the 2021 Regulatory Impact Review, prepared under Executive Order 12866, for the proposed action, which is incorporated by reference into this document (NMFS 2021b).

4.1.1 Purse Seine Fishery Operating in the WCPO

4.1.1.1 The No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the purse seine fishery. Thus, no resulting direct or indirect effects to the purse seine fishery would be expected under the No-Action Alternative.

4.1.1.2 The Action Alternative

Under the Action Alternative all nine elements of the proposed rule, as described in Chapter 2 of this EA, would be implemented. The purse seine fishery would be affected by eight of the nine[29] elements, including: 1) non-entangling FAD design requirements; 2) an exemption in specific

[29] The expanded IMO number requirements would not apply to purse seine vessels because they are already subject to existing requirements.

cases where an oceanic whitetip or silky shark is not seen during purse seine operations and is delivered into the vessel hold; 3) requirement to haul any incidentally caught shark alongside the vessel before releasing, in order to facilitate better species identification; 4) prohibition from targeting or intentional setting on mobulid rays; 5) prohibition from retaining on board, transshipping or landing any mobulid ray; 6) requirement to release mobulid rays as soon as possible, alive and unharmed, to the extent practicable; 7) requirement to assist WCPFC observers in the collection of mobulid ray samples when requested to do so by an observer; and 8) an exemption in specific cases where a mobulid ray is not seen during purse seine operations and is delivered into the vessel hold. None of the elements applicable to the purse seine fishery would be applicable in the overlap area.

Non-Entangling FADs

This element of the action alternative would require that purse seine vessels use specific non-entangling FAD materials and designs to reduce the risk of entanglement with non-target species, as described in Chapter 2.

The non-entangling FAD design requirements could have an effect on fishing patterns and practices of purse seine vessels in certain cases. If specific non-entangling FAD materials were unavailable for some reason (e.g. netting with 7cm mesh size), or if the cost of obtaining specific materials were too high, vessels may choose to forego the opportunity to fish on FADs and fish on unassociated schools of fish instead. In such cases, it could lead to an increase in fuel usage due to increased search time. If vessels chose to fish on unassociated schools instead of FADs, they could also see some change in the composition of their catch with an increase in the proportion of yellowfin tuna and a decrease in the proportion of bigeye tuna, skipjack tuna, and other species that tend to be caught around floating objects. It is unknown exactly how many FADs used by the purse seine fleet would need to be redesigned to meet these requirements. NMFS has implemented similar regulations for requirements adopted by the IATTC (see 83 FR 15503, published April 11, 2018; 83 FR 62732, published December 6, 2018), which became effective on January 1, 2019. Most of the purse seine vessels registered on the WCPFC Record of Fishing Vessels (RFV) are also registered to fish on the IATTC RFV, so it expected that those vessels would already be responsible for implementing the design requirements included in the proposed action. NMFS anticipated costs associated with the transition in FAD design in the EPO, which would vary depending on the materials available to the vessel and which materials the vessel uses, but the measures were not expected to reduce the profitability of the fishery. Similarly, NMFS does not expect the proposed action to reduce profitability of the fishery (NMFS 2021b). In addition, all U.S. purse seine vessels currently on the WCPFC RFV are also on the International Seafood Sustainability Foundation (ISSF) ProActive Vessel Register (PVR), and are required to maintain compliance with ISSF-adopted conservation measures, which include the use of non-entangling FADs or lower entanglement risk FADs. The ISSF lower entanglement risk FADs meet the same design specifications and material requirements that would be included in this element of the proposed action. Therefore, this element is not expected to substantially affect the fishing practices of the purse seine fleet.

Exemption for Oceanic Whitetip Shark and Silky Shark

As noted in Chapter 2, current regulations at 50 CFR 300.226 prohibit the retention, transshipment, storage, or landing of oceanic whitetip shark and silky shark, and require the

release of oceanic whitetip shark and silky shark as soon as possible after the shark is caught and brought alongside the vessel. This element of the action alternative would provide an exemption to purse seine vessels in the case where an oceanic whitetip shark or silky shark is not seen during fishing operations and is delivered into the vessel hold and frozen as part of a purse seine operation. This element is meant to provide relief from existing oceanic whitetip shark and silky shark prohibitions in cases where a shark is not seen during fishing operations. In cases where a shark is unintentionally frozen and landed, vessel operators would be required to notify the observer and surrender the whole shark to the responsible government authorities or discard the shark at the first point of landing or transshipment. If a vessel were to surrender the shark to responsible authorities, it may result in increased time in port and could potentially result in slightly reduced fishing time. However, this is only expected to occur very rarely, and each event is not expected to substantially affect fishing time, so it is not expected to result in any substantial change to fishing practices or patterns in the purse seine fishery.

Shark Release Requirements

This element of the action alternative would require that any incidentally caught shark be hauled alongside the vessel before being released in order to facilitate better species identification by WCPFC observers.

For purse seine vessels, it is expected that in most cases, the fish would be released after it is brailed from the purse seine and brought on deck. In these cases, the labor involved would probably be little different than current practice for discarded sharks. If the vessel operator and crew determined that it is possible to release the fish before it is brought on deck, it may involve greater intervention and time on the part of crew members to ensure that the observer is able to properly identify species. However, it is not expected to lead to any substantial change in fishing practices by purse seine vessels.

Prohibition on Targeting or Setting on Mobulid Rays

This element of the action alternative would prohibit purse seine vessels from targeting or setting on mobulid rays on the high seas and in EEZs in the Convention Area, as described in Chapter 2.

U.S. purse seine vessels are not known to target mobulid rays, and there is no history of commercial sale of mobulid rays by U.S. purse seine vessels, although they are caught incidentally. The setting prohibition would foreclose the opportunity for a purse seine vessel to make a set in instances in which a mobulid ray is sighted prior to a set.

It would be difficult to predict the frequency of pre-set mobulid ray-sighting events because such events are not recorded. However, historical mobulid ray interaction rates can provide an upper bound estimate of the frequency of pre-set mobulid ray sighting events in the future. Table 15 shows the estimated rate of mobulid ray interactions by purse seine vessels in the Convention Area, between 2015 and 2019.

Table 15: Estimated mobulid interactions in observed sets in the purse seine fishery, 2015-2019.

	Number of observed sets per year	Number of observed sets with at least one mobulid interaction	Estimated interaction rate
2015	7477	187	3%
2016	4994	153	3%
2017	4703	110	2%
2018	5700	177	3%
2019	5385	242	4%

Source: NMFS unpublished data

As indicated in Table 15, mobulid ray interactions only occur in approximately 3% of observed purse seine sets on average in the purse seine fishery. In those instances where a mobulid ray is sighted prior to a set, the vessel operator would have to wait and/or move the vessel to find the next opportunity to make a set. This could result in longer wait times between sets or a slight increase in fuel usage, if vessels choose to leave the area. Thus, this element of the action alternative would be expected to lead to only minor changes in fishing practices by purse seine vessels.

Prohibit retention of Mobulid Rays

This element of the action alternative would prohibit purse seine vessels from retaining on board, transshipping or landing any mobulid ray caught on the high seas or in EEZs in the Convention Area, as described in Chapter 2.

Table 16 indicates the average annual number of mobulid rays caught, retained and discarded in the purse seine fishery between 2015 and 2019.

Table 16: Average number of mobulid rays retained and discarded in the purse seine fishery, 2015-2019.

	Estimated average number of mobulid rays interactions per year	Estimated average number of mobulid ray discards per year	Estimated average number of mobulid rays retained per year	Estimated average % catch retained per year
Purse Seine	279	275.8	2.2	1%

Source: NMFS unpublished data

As indicated in Table 16, only 1 percent mobulid rays that are caught are retained in the purse seine fishery. Additionally, existing requirements under 50 CFR 300.27 prohibit vessels from retaining on board, transshipping, storing, landing, or selling any part or whole carcass of a mobulid ray that is caught in the IATTC Convention Area in the EPO. Most of the purse seine

vessels registered on the WCPFC RFV are also registered to fish on the IATTC RFV, and fish in both the WCPO and the EPO, so it expected that those vessels would already be responsible for implementing the retention prohibition requirements in the EPO. Thus, this element of the action alternative would not be expected to result in any substantial change to fishing practices or patterns in the purse seine fishery.

Mobulid Release Requirement

This element of the Action Alternative would require that vessels release mobulid rays as soon as possible, taking steps to ensure the safe release of the animals. The specific methods currently used by U.S. purse seine vessels to release mobulid rays are unknown, but are believed to occur on the deck of the vessel upon brailing. It is expected that in most cases, the animal would be released after it is brailed from the purse seine and brought on deck. In these cases, the labor involved would probably be little different than current practice for discarded rays. If the vessel operator and crew determined that it is possible to release the animal before it is brought on deck, this would likely involve greater intervention and time on the part of crew members, which would be costly to the extent that time could otherwise be put to productive activities. Existing regulations under 50 CFR 300.27 require that vessels promptly release any mobulid ray caught in the IATTC Convention Area, unharmed, and as soon as it's seen in the net or on deck. As noted above, most of the purse seine vessels registered on the WCPFC RFV are also registered to fish on the IATTC RFV, and fish in both the WCPO and the EPO, so it expected that those vessels would already be responsible for implementing the release requirements in the EPO. Thus, this element of the action alternative would not be expected to result in any substantial change to fishing practices or patterns in the purse seine fishery.

Assist Observers in Collection of Mobulid Ray Samples

This element of the action alternative would be a limited exemption from the no-retention and release requirements in those cases where the vessel observer requests to collect a sample of a mobulid ray, and only in cases where the mobulid ray is dead at haul-back. It is not possible to project how often observers would request assistance in collecting samples. When it does occur, it is not expected that sample collection would be so disruptive as to substantially delay or otherwise impact fishing operations and thus would not be expected to lead to any direct or indirect effects on the purse seine fishery.

Exemption for Mobulid Rays

This element of the action alternative would provide a limited exemption from the no-retention and release requirements in the case where a mobulid ray is not seen during fishing operations and is delivered into the vessel hold and frozen as part of a purse seine operation. In cases where a mobulid ray is unintentionally frozen and landed, vessels would be required to notify the observer and surrender the whole animal to the responsible government authorities or discard it at the first point of landing or transshipment. If a vessel were to surrender the mobulid ray to the responsible authorities, it may result in increased time in port and could potentially result in slightly reduced fishing time. However, based on the estimated number of retained mobulid rays included in Table 18 above, it likely that that this would only occur very rarely, so it is not expected to result in any substantial change to fishing practices or patterns in the purse seine fishery.

4.1.2 Longline Fisheries Operating in the WCPO

4.1.2.1 The No Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the U.S. longline fisheries in the Pacific Ocean. Thus, no resulting direct or indirect effects would be expected under the No-Action Alternative.

4.1.2.2 The Action Alternative

Under the action alternative, U.S. longline vessels in the WCPO, including in the Hawaii deep-set, Hawaii shallow-set, and American Samoa longline fisheries, would be subject to the following elements of the proposed rule: 1) requirement to obtain an IMO number (for vessels less than 100 GRT down to a size of 12 meters in LOA); 2) requirement to haul any incidentally caught shark alongside the vessel before releasing, in order to facilitate better species identification; 3) prohibition on targeted fishing for mobulid rays; 4) prohibition on retaining on board, transshipping, or landing any mobulid ray; 5) requirement to release any mobulid ray, as soon as possible, alive and unharmed, to the extent practicable; and 6) requirement to allow and assist WCFPC observers in the collection of mobulid ray samples when requested to do so by an observer.

The change in IMO number requirements may minimally affect reporting and recordkeeping activities of a small number of vessel owners and operators. The requirement to obtain an IMO number would be a one-time requirement; once a number has been issued for a vessel, the vessel would be in compliance for the remainder of its life, regardless of changes in ownership. There would be minimal labor costs associated with completing the online form necessary to obtain an IMO number. Completing and submitting the application form (which can be done online and requires no fees) would take about 30 minutes per applicant, on average. Assuming a value of labor of approximately $26 per hour and communication costs of about $1 per application, the (one-time) cost to each affected entity would be about $14. Therefore it is not expected to substantially affect the fishing patterns and practices of U.S. longline vessels in the WCPO (NMFS 2021b).

Current regulations under 50 CFR 300.226 require that all commercial fishing vessels used for commercial fishing for HMS in the Convention Area release any oceanic shark or silky shark as soon as possible after the shark is caught and brought alongside the vessel. The proposed rule would specifically require that any incidentally caught shark be hauled alongside the vessel before release in order to facilitate better species identification. Because of existing regulations, it is expected that under current fishing practices, sharks are being released as they are brought to the side of the vessel, such as by cutting the line or removing the hook. For vessels where this is not the current fishing practice, the release requirement could cause minor operational changes if it leads to greater intervention and time on the part of crew members to haul the fish alongside the vessel before release. However, it is not likely that this element of the action alternative would substantially affect the fishing patterns or practices of the fleet or cause substantial operational changes to the fishery.

Under the Action Alternative, U.S. longline vessels would also be subject four mobulid ray elements in the proposed rule. U.S. longline vessels are not known to target mobulid rays, so the

first mobulid element of the proposed rule would not be expected to have any direct or indirect effects. Mobulid rays are caught incidentally in the Hawaii longline and American Samoa longline fisheries, and they are retained on occasion, so the no-retention requirement could lead to minor effects on operations if vessels are required to discard all incidentally caught animals. Table 17 indicates the average annual numbers of mobulid rays caught, retained, and discarded in each of the affected fisheries between 2015 and 2019.

Table 17: Average number of mobulid rays retained and discarded in U.S. longline fisheries in the WCPO, 2015-2019

	Estimated average # caught per year	Estimated average # of discards per year	Estimated average # retained per year	Estimated average % catch retained per year
Hawaii LL Deep	32	31.8	0.2	1%
Hawaii LL Shallow	6.4	6	0.4	4%
Am. Samoa LL	4.8	4.8	0	0%

Source: NMFS unpublished data

The specific methods currently used by longline vessels to release mobulid rays are unknown, but it is expected that the animal would be quickly released as it is brought to the side of the vessel, such as by cutting the line or removing the hook. Implementation of the requirements to release mobulid rays as soon as possible and taking reasonable steps to ensure safe release may lead to additional dedication of time by the crew, operators, and owners; however, it is unlikely to substantially affect the fishing patterns or practices of the fleet or cause substantial operational changes to the fishery.

The fourth mobulid element of the proposed rule would be a limited exemption from the no-retention and release requirements in those cases where the vessel observer requests to collect a sample of a mobulid ray, and only in cases where the mobulid ray is dead at haul-back. It is not possible to project how often observers would request assistance in collecting samples. When it does occur, it is not expected that sample collection would be so disruptive as to substantially delay or otherwise impact fishing operations and thus would not be expected to lead to any direct or indirect effects on longline fisheries operating in the WCPO.

4.1.3 Albacore Troll Fisheries Operating in the WCPO

4.1.3.1 The No Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the U.S. albacore troll fishery in the Pacific Ocean. Thus, no resulting direct or indirect effects would be expected under the No-Action Alternative.

4.1.3.2 The Action Alternative

Under the action alternative, albacore troll vessels would be subject to the following elements of the proposed rule: 1) requirement to obtain an IMO number (for vessels less than 100 GRT down

to a size of 12 meters in LOA); 2) requirement to haul any incidentally caught shark alongside the vessel before releasing, in order to facilitate better species identification; 3) prohibition on targeted fishing for mobulid rays; 4) prohibition on retaining on board, transshipping, or landing any mobulid ray; 5) requirement to release any mobulid ray, as soon as possible, alive and unharmed, to the extent practicable; and 6) requirement to allow and assist WCFPC observers in the collection of mobulid ray samples when requested to do so by an observer.

The change in IMO number requirements may minimally affect reporting and recordkeeping activities of a small number of albacore troll vessel owners and operators. The requirement to obtain an IMO number would be a one-time requirement; once a number has been issued for a vessel, the vessel would be in compliance for the remainder of its life, regardless of changes in ownership. There would be minimal labor costs associated with completing the online form necessary to obtain an IMO number. Completing and submitting the application form (which can be done online and requires no fees) would take about 30 minutes per applicant, on average. Assuming a value of labor of approximately $26 per hour and communication costs of about $1 per application, the (one-time) cost to each affected entity would be about $14 (NMFS 2021b). Therefore it is not expected to substantially affect the fishing pattern and practices U.S. albacore troll vessels in the WCPO. The requirement to haul any incidentally caught shark alongside the vessel, and the requirement to assist WCPFC observers in the collection of mobulid ray samples would only be applicable in cases where an observer is on board, so in the medium term these provisions would not be expected to apply to albacore troll vessels because currently these vessels are not required to carry observers. Thus, neither of these requirements would be expected to lead to any direct or indirect effects on the fisheries.

Based on the best available data, mobulid rays are not caught in albacore troll fleet, so the targeting, non-retention and release requirements would not be expected to lead to any direct or indirect effects on the fisheries.

4.1.4 Tropical Troll, Handline and Pole and Line Fisheries

The effects of the alternatives on the operations of the Hawaii troll and handline, and Hawaii pole-and-line fisheries, American Samoa troll fleet, Guam troll fleet, and Commonwealth of the Mariana Islands troll fleet operating are described here. These fisheries use similar gear, but are spatially distinct from one another and do not engage in high seas fishing.

4.1.4.1 The No Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the tropical troll, handline and pole and line fisheries in the Pacific Ocean. Thus, no resulting direct or indirect effects would be expected under the No-Action Alternative.

4.1.4.2 The Action Alternative

Under the action alternative, tropical troll, handline and pole and line vessels would subject to the following elements of the proposed rule: 1) requirement to obtain an IMO number (for

vessels less than 100 GRT down to a size of 12 meters in LOA)[30]; 2) requirement to haul any incidentally caught shark alongside the vessel before releasing, in order to facilitate better species identification; 3) prohibition on targeted fishing for mobulid rays; 4) prohibition on retaining on board, transshipping, or landing any mobulid ray; 5) requirement to release any mobulid ray, as soon as possible, alive and unharmed, to the extent practicable; and 6) requirement to allow and assist WCFPC observers in the collection of mobulid ray samples when requested to do so by an observer.

The change in IMO number requirements may minimally affect reporting and recordkeeping activities of a small number of tropical troll vessel owners and operators. The requirement to obtain an IMO number would be a one-time requirement; once a number has been issued for a vessel, the vessel would be in compliance for the remainder of its life, regardless of changes in ownership. There would be minimal labor costs associated with completing the online form necessary to obtain an IMO number. Completing and submitting the application form (which can be done online and requires no fees) would take about 30 minutes per applicant, on average. Assuming a value of labor of approximately $26 per hour and communication costs of about $1 per application, the (one-time) cost to each affected entity would be about $14 (NMFS 2021b). Therefore it is not expected to substantially affect the fishing patterns and practices of tropical troll vessels in the WCPO. The requirement to haul any incidentally caught shark alongside the vessel, and the requirement to assist WCPFC observers in the collection of mobulid ray samples would only be applicable in cases where an observer is on board, so in the medium term these provisions would not be expected to apply to U.S. tropical troll, handline or pole and line vessels because currently these vessels are not required to carry observers. Thus, neither of the requirements would be expected to lead to any direct or indirect effects on the fisheries.

Based on the best available data, mobulid rays are not caught in the tropical troll fleet, so the targeting, non-retention and release requirements would not be expected to lead to any direct or indirect effects on the fishery. The Hawaii handline and pole and line fisheries are not known to target mobulid rays, however, they have been caught incidentally on rare occasions. Fewer than 10 interactions were reported between 2011 and 2015, and there have been zero interactions reported since 2015 (NMFS unpublished data). Therefore, the non-retention and release requirements would not be expected to impact fishing operations in the Hawaii handline or pole and line fisheries.

4.2 Physical Environment and Climate Change

Neither of the alternatives (No-Action Alternative or Action Alternative) would be expected to cause direct or indirect effects to the physical environment described in Chapter 3. The fishing activities do not come into contact with the seafloor, and thus, any change in fishing operations would not affect the seafloor or benthic habitats. Neither of the alternatives would affect existing applicable laws and regulations regarding ocean pollution (e.g., MARPOL – the International Convention for Prevention of Pollution from Ships). In addition, neither of the alternatives would be expected to contribute to climate change. Under the Action Alternative, some elements of the proposed rule could result in a change in fishing operations. If increased handling time is needed

[30] The IMO number requirement would only apply to tropical troll, handline and pole and line vessels that fish outside of the U.S. EEZ.

to haul incidentally caught sharks alongside the vessel, it could result in decreased fishing time. If vessel owners/operators/crew need to wait or change locations to make sets because of mobulid ray sightings or if vessels forego fishing on FADs because non-entangling material requirements, it could result in longer search times and associated increased use of fuel. However, these effects are anticipated to be minor, as described in Section 4.1 above, and the overall fuel use of the fleet would be expected to depend more on other factors (fuel price, market conditions, oceanographic changes affecting the location of the target tunas, etc.), so the Action Alternative would not be expected to lead to increased emissions of greenhouse gases affecting climate change.

4.3 Target Stocks

Under the No-Action Alternative, there would be no change from existing management of the fisheries and no expected direct or indirect effects to target stocks.

As described above, the regulatory changes under the Action Alternative would not be expected to substantially affect the fishing behavior of vessels in the U.S. longline fisheries, the albacore troll fishery, or the tropical troll, handline and pole and line fisheries, and thus, effects to target stocks from these fisheries would not be expected. As stated in section 4.1 above, there could be minor changes to fishing patterns and practices if vessel owners and operators need additional time at sea during fishing operations to comply with specific mitigation measures regarding sharks and mobulid rays, but these changes would not be expected to affect the target stocks of U.S. vessels in the WCPO. There could be some change to the overall composition of the catch made by U.S. purse seine vessels in the WCPO if vessels choose to forego fishing on FADs because of the non-entangling FAD design requirements in the proposed rule. Any shift from using FADs to unassociated sets could lead to a greater proportion of the catch being composed of yellowfin tuna and a reduced proportion of the catch being composed of bigeye tuna. Thus, the overall fishing mortality on bigeye tuna could decrease and the overall fishing mortality on yellowfin tuna could increase. As juvenile tunas are associated with FADs, implementation of the proposed action could lead to some reduced adverse fishery impacts on stocks by reducing fishing mortality on juvenile tunas. However, as described in section 4.1, most purse seine vessels would likely already be using non-entangling FAD materials, so this element of the proposed rule would not be expected to substantially affect the fishing patterns or practices of purse seine vessels; thus, significant effects to target stocks from this fishery under the Action Alternative would not be expected.

The IMO number requirements in the proposed action could improve the ability to verify vessel identification, which could also help combat illegal, unreported, and unregulated (IUU) fishing in the Convention Area. This could bring conservation benefits for target species through reduced likelihood of IUU fishing activities in the region and could contribute to species' abundances in the WCPO being greater than they would under the No-Action Alternative. However, the number of vessels that impacted by the revised IMO number requirements would likely be small, so the benefits are likely to be minor.

4.4 Non-Target Stocks

Under the No-Action Alternative, there would be no change from existing management of the fisheries and no expected direct or indirect effects to non-target stocks.

As described above, the regulatory changes under the Action Alternative would not be expected to substantially affect the fishing behavior of vessels in the U.S. longline fisheries, the albacore troll fishery, or the tropical troll, handline and pole and line fisheries, and thus, effects to non-target stocks from these fisheries would not be expected.

There could be some change to the overall composition of the catch made by purse seine vessels if vessels choose to forego fishing on FADs because of the non-entangling FAD design requirements in the proposed rule. Any shift from using FADs to unassociated sets could impact the composition of non-target catch. However, as described in section 4.1, most purse seine vessels would likely already be using non-entangling FAD materials, so this element of the proposed rule would not be expected to substantially affect the fishing patterns or practices of purse seine vessels, thus, effects significant effects to non-target stocks from this fishery would not be expected.

The IMO number requirements in the proposed action could improve the ability to verify vessel identification, which could also help combat illegal, unreported, and unregulated (IUU) fishing in the Convention Area. This could bring conservation benefits for non-target species through reduced likelihood of IUU fishing activities in the region and could contribute to species' abundances in the WCPO being greater than they would under the No-Action Alternative. However, the number of vessels that impacted by the revised IMO number requirements would likely be small, so the benefits are likely to be minor.

4.5 Protected Resources

Under the No-Action Alternative, there would be no change from existing management of the fisheries and no expected direct or indirect effects to protected resources other than those under existing conditions in the affected environment.

The Action Alternative is a conservation action in that it has the potential to reduce – or prevent further increases – in fishing mortality rates and therefore reduce adverse impacts for a number of ESA-listed species that interact with U.S. fisheries in the Convention Area, including mobulid rays, sea turtles, and sharks. This could result in the species' abundances in the WCPO being greater than they would under the No-Action Alternative. Implementation of the non-entangling FAD requirements included in the Action Alternative could be expected to reduce the risk of entanglements for ESA-listed species of sharks and turtles. Sea turtles and sharks are known to associate with FADs; however, very little data exists on the number of animals which may become entangled in unobserved, drifting FADs or how many may become entangled underneath observed FADs. Therefore, NMFS is unable to quantify the degree of reduction in entanglements that could result from the proposed action. Implementation of the targeting and setting prohibition and no-retention and release requirements for mobulid rays are intended to reduce the adverse impacts of fisheries on mobulid rays, including ESA-listed giant manta rays. If mobulid

rays were released before being brought on deck, it may further reduce adverse impacts and improve survivability; however, to date, very little is known about the post-release survival rates of giant manta and other species of mobulid rays. Therefore, NMFS is unable to quantify the potential increase in survivability that may result from the proposed action. The requirement to haul any incidentally caught shark alongside the vessel in order to improve species identification, could also be reasonably expected to reduce adverse impacts to sharks. To the effect that vessels will be hauling sharks closer to the vessel before cutting them free, it could be expected that they would cut the line closer to the hook and in turn reduce the amount of trailing gear left on the sharks when they are cut free, which has been proven to improve post-release survival rates in sharks (Hutchinson et al. 2021). In the event that the IMO number requirements could lead to reduced likelihood of IUU fishing activities in the Convention Area, this could bring conservation benefits for ESA-listed species and could contribute to species' abundances in the WCPO being greater than they would under the No-Action Alternative. Other elements of the Action Alternative, including the shark and ray exemption for purse seine vessels, could be expected to have neutral if any impacts to ESA-listed species.

In terms of impacts to marine mammals, as stated in section 3.4.2 above, the following list summarizes the information relative to the fisheries in this document that are in the 2021 List of Fisheries (LOF):

- The Hawaii based deep-set longline fishery is listed as a Category I fishery, meaning that it is a commercial fishery determined to have frequent mortality and serious injury of marine mammals.
- The purse seine fishery operating in the WCPO is listed as a Category II fishery, meaning that it is a commercial fishery determined to have occasional incidental mortality and serious injury (MS&I) of marine mammals. The purse seine fishery is classified as a Category III fishery with respect to ESA-listed species because there is no known MS&I of ESA-listed marine mammals. Because these fisheries have no documented incidental M&SI of ESA-listed marine mammals on the 2021 LOF, a 101(a)(5)(E) authorization under the MMPA is not required at this time.
- The Hawaii based shallow-set longline fishery is listed as a Category II fishery. Because this fishery has no documented incidental M&SI of ESA-listed marine mammals on the 2021 LOF, a 101(a)(5)(E) authorization under the MMPA is not required at this time.
- The American Samoa longline fishery and the South Pacific albacore troll fishery are Category II fisheries. Because these fisheries have no documented incidental M&SI of ESA-listed marine mammals on the 2021 LOF, a 101(a)(5)(E) authorization under the MMPA is not required at this time.
- The North Pacific Albacore troll fishery is listed as a Category III fishery, meaning that it is a commercial fishery determined to have a remote likelihood of or no known incidental mortality and serious injury of marine mammals
- The Hawaii handline and pole-and-line fisheries are listed as a Category III fishery
- The Hawaii troll, American Samoa troll, Guam troll, and CNMI troll fisheries are all listed as Category III fisheries (with no marine mammal species documented as a mortality or being injured)

The one element of the proposed action that has the potential to cause effects on marine mammals is the non-entangling FAD design requirements. However, marine mammals generally do not associate with FADs, and NMFS is unaware of any instances of marine mammal entanglements with FADs. Therefore, implementation of the proposed rule under the Action Alternative would not be expected to cause any impacts to marine mammals not previously considered or authorized by the commercial taking exemption under Section 118 of the MMPA.

Implementation of the proposed rule under the Action Alternative would not be expected to affect the following areas designated as EFH or HAPC: ocean or coastal habitats; historic properties listed in or eligible for listing in the National Register of Historic Places; or NWRs or National Monuments. Such resources would not be affected because the potential changes in fishing patterns and practices of the affected fisheries would take place in areas of the ocean far from shorelines and would not affect the seafloor or benthic habitats since none of the affected fisheries involve contact with the seafloor (see Chapter 3 for a description of fishing methods). Also, because any effects to fish stocks would be minor or negligible, as discussed above, any pelagic fish habitat designated as EFH, including the water column, or HAPC, would not be expected to experience any substantial effects – either beneficial or adverse – from implementation of any of the action alternatives, as the small effects on the stocks would be unlikely to lead to any indirect effects to fish habitat (e.g., an increase in predator or prey leading to trophic interactive effects leading to effects on habitat). In addition, as discussed above, commercial fishing is already prohibited in the Monuments. Shipwrecks would be the only known historic objects potentially within the affected environment. However, as stated above, none of the affected fisheries come into contact with the seafloor, so the operations would not be expected to affect any material from shipwrecks, which typically rests on ocean bottoms.

4.6 Effects to Biodiversity and Ecosystem Function

Under the No-Action Alternative, there would be no change from existing management of the fisheries and no expected direct or indirect effects on biodiversity and ecosystem function.

Implementation of the proposed rule under the Action Alternative could have some minor effects on current fishing patterns and practices. which could have some positive impacts to marine ecosystems and biodiversity. The change in fishing patterns and practices could result in species' abundances in the WCPO being greater than they would under the No-Action Alternative. Larger population sizes of affected species could bring benefits through safeguarding or enhancing the populations' contributions to ecosystem function, biodiversity, recreational value (e.g. through recreational diving), and existence value. These benefits cannot be quantified; however, it can be concluded that they would likely be positive or neutral.

4.7 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," states 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." As discussed throughout this chapter, the overall environmental effects from the Action Alternative would not

be expected to be substantial. Thus, implementation of the Action Alternative would not be expected to result in disproportionately high and adverse human health or environmental effects on vessel owners or operators. Neither of the alternatives considered would result in significant and adverse environmental effects on minority or low-income populations.

5 CUMULATIVE IMPACTS

This chapter presents the cumulative impacts analysis for the EA.

A cumulative impact is defined by the CEQ's regulations at 40 CFR § 1508.7[31] as "the impact on the environment which results from the incremental impact of the 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." And further: "cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The cumulative impacts analysis examines whether the direct and indirect effects of the proposed action and alternatives 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.

Before beginning a cumulative impacts analysis, the geographic area of the analysis and the time frame for the analysis must be identified to determine the appropriate scope for the analysis (CEQ 1997). The geographic area of the analysis here is the affected environment as described in Chapter 3. The time frame for this analysis is from the present through five years into the future, which NMFS considers a reasonable timeframe for the analysis.

Section 5.1 describes the identified past, present, and reasonably foreseeable future actions during the time period, and Section 5.2 presents the cumulative effects analysis.

5.1 Present, and Reasonably Foreseeable Future Actions

This section describes the other actions from the present to five years in the future that affect the same resources in the affected environment as would be affected by implementation of the Action Alternative. The analysis of cumulative impacts is presented in the following section. Past actions have been taken into consideration in the environmental baseline conditions described in Chapter 3 of this EA.

5.1.1 Other Present and Reasonably Foreseeable Future Actions

Other present and reasonably foreseeable future actions include:

- Actions by the United States for domestic management of the fisheries that operate in the Pacific Ocean

[31] As noted in Chapter 1, this EA is being prepared using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the revised CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020 (see 85 FR 43304). This review began on September 9, 2020, and the agency has decided to proceed under the 1978 regulations.

- Actions by the United States and other nations to implement any additional management measures adopted by the WCPFC or the IATTC for resources in the affected environment, details of which are unknown at this time. Any attempt at analysis would be speculative and so will not be discussed further.
- Actions by the United States to implement the terms of the renegotiated SPTT, the specific details of which are unknown at this time. Any attempt at analysis would be speculative and so will not be discussed further.

5.2 Discussion of Cumulative Impacts

This section discusses cumulative impacts to the resources in the affected environment analyzed in Chapter 4 of this EA.

5.2.1 Cumulative Impacts to Physical Resources and Climate Change

As discussed in Chapter 4 of this EA, implementation of the either the Action Alternative or the No-Action Alternative would not be expected to have substantial impacts on physical resources in the affected environment or contribute to climate change. The other present and reasonably foreseeable future actions identified in this chapter would similarly not be expected to substantially impact physical resources in the affected environment, since they are fishery management actions that would not be expected to impact physical resources. Based on all information to date, the other actions are also not expected to lead to a large increase in greenhouse gas emissions that would affect climate change. Thus, the cumulative impacts to physical resources and climate change from implementation of the Action Alternative or the No-Action Alternative would not be expected to be substantial.

5.2.2 Cumulative Impacts to Target Stocks

As discussed in Chapter 4 of this EA, there could be some small direct and indirect effects to bigeye, skipjack, and yellowfin tuna stocks in the affected environment from implementation of the Action Alternative when compared to the No-Action Alternative. These effects could result from the potential change in behavior of purse seine fishing vessels from fishing on FADs to fishing on unassociated sets. However, as noted in Chapter 4, the Action Alternative would not be expected to substantially affect the fishing patterns or practices of purse seine vessels, thus, substantial effects to bigeye, skipjack and yellowfin tuna stocks would not be expected.

The details of the other present and reasonably foreseeable future actions are unknown, and thus, specific assessment of each of their potential contributions to cumulative impacts on the stocks of bigeye tuna, skipjack tuna, and yellowfin tuna is not possible at this time. Given the WCPFC's and IATTC's objectives for sustainable management of these stocks, it is likely that the other actions would generally be focused on the conservation of the stocks.

Thus, the cumulative impacts from the identified actions on the stocks of bigeye tuna, yellowfin tuna, and skipjack tuna in the affected environment would likely be beneficial in comparison to operation of the fishery absent the management measures that are being or would be implemented under the identified actions.

Based on all information to date, the cumulative impacts from implementation of the Action Alternative or lack of implementation under the No-Action Alternative would not be expected to lead to substantial cumulative impacts on the status of the stocks of bigeye tuna, skipjack tuna, and yellowfin tuna in the affected environment.

5.2.3 Cumulative Impacts to Non-Target Species

As stated in Chapter 4 of this EA, there could be some small direct and indirect effects to non-target species caught by U.S. purse seine fishing vessels in the affected environment from implementation of the Action Alternative when compared to the No-Action Alternative. These effects could result from the potential change in behavior of purse seine vessels from fishing on FADs to fishing on unassociated sets. However, as noted in Chapter 4, the Action Alternative would not be expected to substantially affect the fishing patterns or practices of purse seine vessels. The details of the other present and reasonably foreseeable future actions are unknown, and thus, specific assessment of each of their potential contributions to cumulative impacts on non-target species is not possible at this time. Given the WCPFC's and IATTC's objectives for sustainable management of these species, it is likely that the other actions would generally be focused on the conservation of the species. Thus, the cumulative effects on non-target species would not be expected to be substantial.

5.2.4 Cumulative Impacts to Protected Resources

As discussed in Chapter 3 and Chapter 4 of this EA, the fisheries that would be affected by the Action Alternative are subject to consultation requirements under Section 7 of the ESA. As discussed in Chapter 4, the Action Alternative could actually be expected to reduce adverse impacts to some ESA-listed species, including mobulid rays, sharks and sea turtles. The details of the other present and reasonably foreseeable future actions are unknown, and thus, specific assessment of each of their potential contributions to cumulative impacts on protected resources is not possible at this time At its 186th meeting in June of 2021, the Western Pacific Fishery Management Council (the Council) recommended a number of regulatory actions for the Hawaii deep-set longline fishery, including a prohibition on the use of wire leaders and a requirement to remove trailing gear from oceanic whitetip sharks.[32] Should NMFS take action on the Council recommendation, it is likely that action would result in additional reduced adverse impacts for sharks. Given the WCPFC's and IATTC's objectives for sustainable management of these species, it is likely that the other actions would generally be focused on the conservation of the species. Thus, the overall cumulative impacts to protected resources would not be expected to be substantial but could result in an overall reduction in adverse effects to protected resources from the fisheries that would be affected by the proposed action.

5.2.5 Cumulative Impacts to Environmental Justice

As stated in Chapter 4, neither the Action Alternative nor the No-Action Alternative would substantially affect minority or low-income populations. Based on all information to date, the other actions identified in this chapter are not expected to affect minority of low-income

[32] Action Memorandum from the 186th Council Meeting, June 21-24, 2021: https://www.wpcouncil.org/wp-content/uploads/2021/02/FINAL-186th-CM-Action-Memorandum.pdf

populations. Thus, the cumulative effects on minority or low-income populations would not be expected to be substantial.

6 CONSULTATION

Table 18 lists the agencies, NOAA units, and entities that were contacted for information during preparation of this EA.

Table 18. List of agencies and offices contacted.

Agencies and offices contacted
NMFS – Headquarters – Office of International Affairs and Seafood Inspection
NMFS – Pacific Islands Regional Office – Sustainable Fisheries Division
NMFS – Pacific Islands Fisheries Science Center
NMFS – West Coast Regional Office – Sustainable Fisheries Division
NMFS – Southwest Science Center
NOAA Office of Law Enforcement
Department of State – Office of Marine Conservation
U.S. Coast Guard – 14th Coast Guard District
Western Pacific Fishery Management Council

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