NOAA FISHERIES
Pacific Islands Regional Office

# Environmental Assessment for a Rule for Area of Overlap Between the Convention Areas of the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission

RIN 0648-BH59

Prepared by:
National Marine Fisheries Service
Pacific Islands Regional Office

Contact Information:
Regional Administrator
NMFS Pacific Islands Regional Office
Attn.: International Fisheries Division
1845 Wasp Boulevard, Building 176
Honolulu, HI 96818

Tel: (808) 725-5000
Fax: (808) 725-5215

# 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 Code of Federal Regulations (CFR) Parts 1500-1508) and the National Oceanic and Atmospheric Administration's (NOAA) Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities (Companion Manual for NOAA Administrative Order 216-6A).

The United States is a member of both the Inter-American Tropical Tuna Commission (IATTC) and the Commission on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC). 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"). See Figure 1 below. 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, for a period of not less than three years, of the conservation and management measures of that commission.[1] The WCPFC-IATTC joint decision on the overlap area broadly indicates that a member of both commissions, such as the United States, may decide and notify both commissions which commission's conservation and management measures it intends to apply.

In accordance with the WCPFC decision and IATTC recommendation regarding the overlap area, NMFS undertook a notice and comment rulemaking and issued a final rule on April 26, 2016 (81 FR 24501, effective May 26, 2016; hereafter "2016 final rule"), excluding the overlap area from the description of the IATTC Convention Area for the purpose of the regulations implementing conservation measures of the IATTC (50 CFR part 300, subpart C), except that regulations regarding the IATTC Register regulations at 50 CFR 300.22(b) continue to apply in the overlap area. The requirement for U.S. vessels that fish for tuna and other highly migratory species (HMS) to be listed on the IATTC Register continues to apply in the overlap area because the IATTC Register is used to implement the Agreement on the International Dolphin Conservation Program (AIDCP), which is a separate international agreement that applies to purse seine vessels that fish in the eastern Pacific, including the overlap area. The AIDPC has not adopted a decision that would allow the United States to exempt vessels from AIDCP requirements even if only WCPFC requirements apply in the overlap area.

[1] 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 (hereafter "WCPFC-IATTC joint decision on the overlap area").

The 2016 final rule did not remove any WCPFC regulations from applying in the overlap area. Thus, all regulations implementing conservation measures of the WCPFC apply in the overlap area to vessels of all gear types listed in both WCPFC Record and IATTC Register.

In the preamble to the 2016 final rule, NMFS stated that it may re-evaluate the location of fishing effort in three years to consider revising the rule in light of any substantial changes in the fisheries. To begin that re-evaluation process, NMFS issued an advance notice of proposed rulemaking (ANPR) to seek public input about whether U.S. fishing vessels fishing in the area should be governed by conservation measures adopted by IATTC or conservation measures adopted by WCPFC (83 FR 27305; published June 12, 2018). U.S. purse seine industry provided comments on the ANPR requesting that NMFS remove WCPFC regulations and implement IATTC regulations in the overlap area for economic reasons, stating that the U.S. purse seine fleet has increased interest in fishing in the IATTC Convention Area in recent years. Based on the comments received on the ANPR, as well as additional analysis conducted by NMFS, NMFS is undertaking a rulemaking to change management of the overlap area so that IATTC regulations would apply in the overlap area and some or all WCPFC regulations would no longer apply in the overlap area. This EA presents an analysis of the effects on the human and natural environment that could result from the rule.

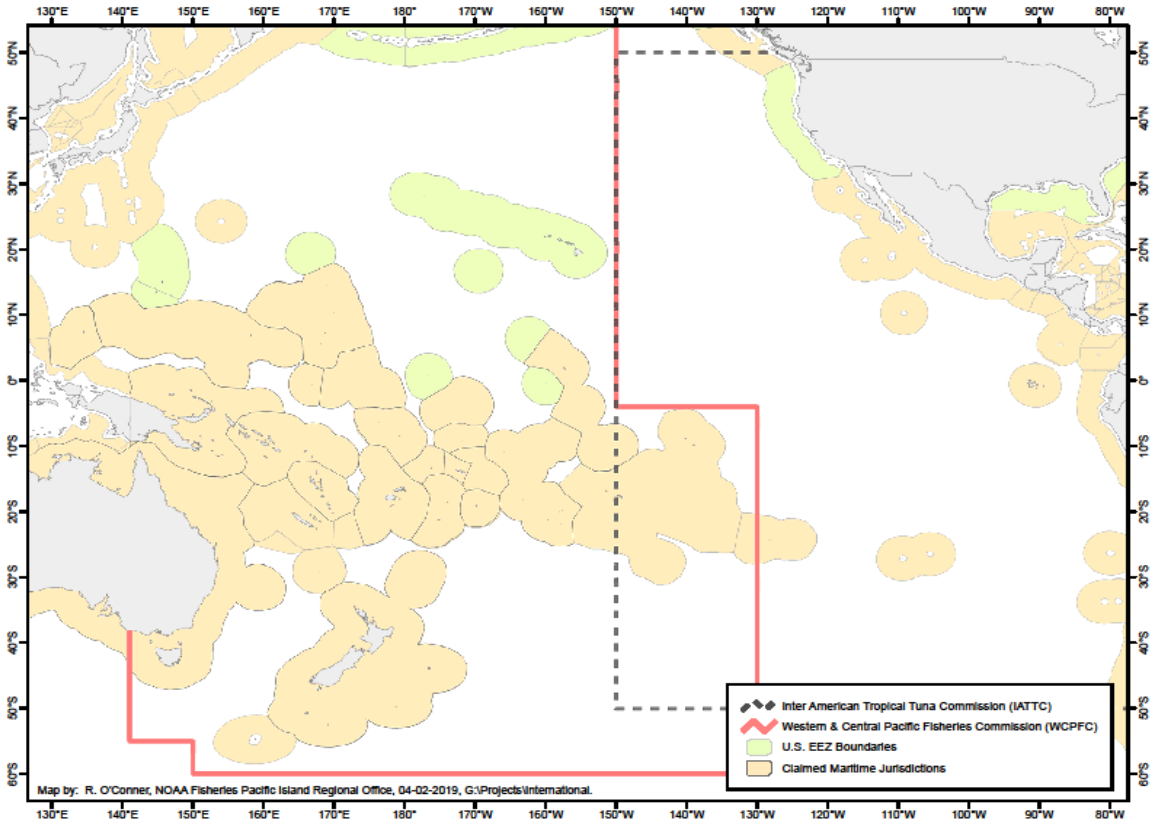


**Figure 1. Overlap Area of the WCPFC and IATTC.**
Source: R. O'Connor, NOAA Fisheries Pacific Islands Regional Office, April 2019.

## 1.1 Background on Conventions and U.S. Laws

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.[2] The area of application of the Convention (WCPFC 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)[3]. 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.

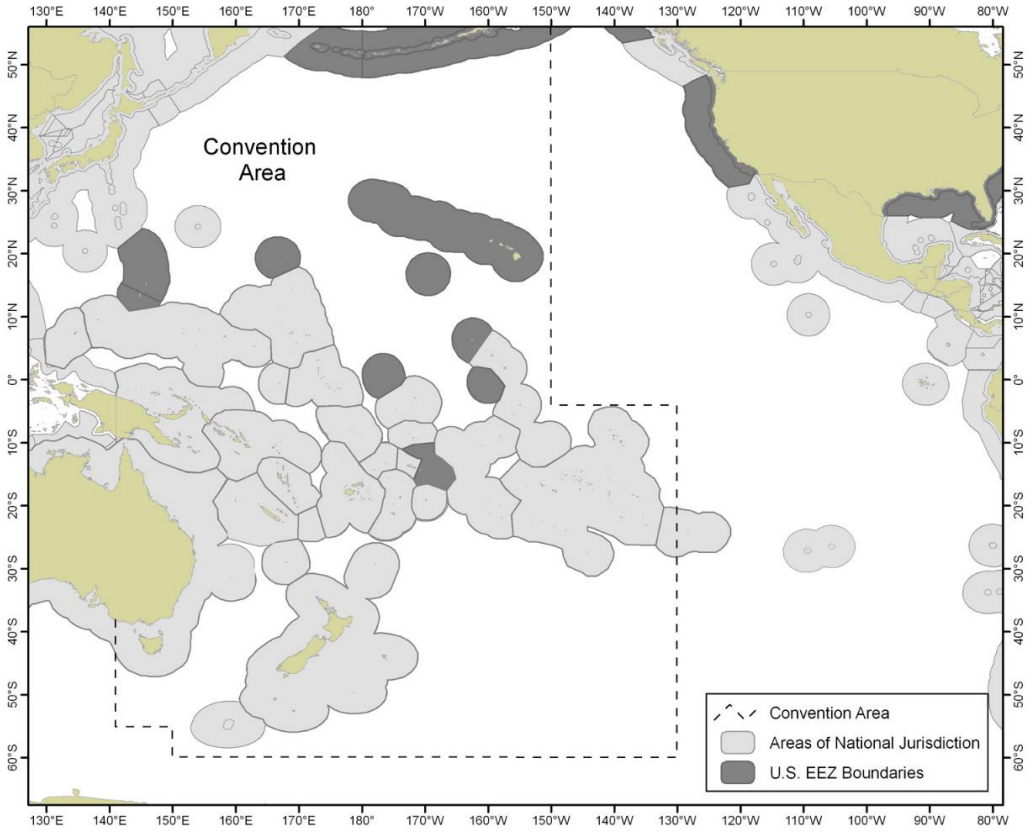


**Figure 2. The Convention Area (high seas in white; U.S. Exclusive Economic Zone in dark gray; foreign jurisdictions in light gray).**
Source: NOAA Fisheries Pacific Islands Regional Office.

[2] 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.

[3] 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.

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.

The United States is also a Contracting Party to the Antigua Convention and a member of the IATTC. The Tuna Conventions Act (TCA; 16 U.S.C. 951– 962), as amended on November 5, 2015, by Title II of Public Law 114–81, provides that the Secretary of Commerce, in consultation with the Secretary of State and, with respect to enforcement measures, the Secretary of the Department of Homeland Security, may promulgate such regulations as may be necessary to carry out the United States' international obligations under the Convention, including recommendations and decisions adopted by the IATTC. The Secretary's authority to promulgate such regulations has been delegated to NMFS.

The rule would amend NMFS' regulations that implement WCPFC and IATTC decisions. Thus, NMFS is undertaking this rule under authority of the WCPFCIA and the TCA.

## 1.2 Purpose and Need

The purpose of the proposed action is for NMFS to implement the WCPFC and IATTC decisions on the overlap area for the United States in accordance with the conservation and management objectives of both commissions for the sustainable management of HMS. The need for the proposed action is to satisfy the obligations of the United States as a Contracting Party to the Convention and the Antigua Convention, pursuant to the authority of the WCPFCIA and the TCA.

# 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.[4]

This chapter provides a description of the proposed action analyzed in this EA and the alternative means of implementing the proposed action. 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 to change NMFS' management of the overlap area so that IATTC regulations would apply in the overlap area and some or all WCPFC regulations would no longer apply in the overlap area. The relevant language of the WCPFC and IATTC decisions on the overlap area states as follows: "In the case of vessels listed in the record/register of both organizations, the corresponding flag Member shall decide and notify to both Commissions under which of the two commissions those vessels shall operate when fishing in the overlap area, as regards the application, for a period of not less than three years, of the conservation and management measures of that Commission."[5] During development of the 2016 final rule, NMFS stated that rather than apply IATTC measures to an individual vessel or gear type and WCPFC measures to another vessel or gear type, NMFS would apply the WCPFC's management measures to the entire U.S. fleet because each commission develops a comprehensive and self-contained package of management measures to address similar conservation objectives. If one set of management measures were applied to some vessels and another set to others, management would fail to address the conservation objectives of either organization (see proposed rule at 80 FR 80742, published December 28, 2015). NMFS continues to believe that there should be uniformity in management of the overlap area for the U.S. fleet as a whole.

NMFS identified three action alternatives that meet the purpose and need for the proposed action, as set forth in Chapter 1 of this EA. The No-Action Alternative would also meet the purpose and need for the proposed action. NMFS analyzed the three action alternatives as well as the No-Action Alternative in an environmental assessment (2019 EA) published in conjunction with a proposed rule to implement one of the action alternatives (Alternative 2, described below; see 84 FR 60040, published November 7, 2019). NMFS received 10 comment letters on the proposed rule, four of which were from representatives of U.S. purse seine industry.

---

[4] See the CEQ's Regulations for Implementing the Procedural Provisions of NEPA at 40 CFR §1502.14.

[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.

Comments from U.S. purse seine industry representatives were generally supportive of the proposed rule, but expressed concern regarding continued application of certain measures related to monitoring, control, and surveillance (MCS) measures in the overlap area. In particular, U.S. purse seine industry representatives indicated that the continued requirement for vessels to carry WCPFC observers in the overlap area would make fishing in the overlap area more logistically complicated and unduly burdensome than if the rule did not require those regulations to continue to apply in the overlap area. If this requirement continues, vessels would continue to need to carry two observers (an IATTC observer and a WCPFC observer) or to carry a cross-endorsed observer[6] when fishing in the overlap area. The commenters requested NMFS to modify the proposed rule so that vessels fishing exclusively in the IATTC Area, including the overlap area, only be required to carry IATTC observers.

The Chair of the Governor's Fisheries Task Force of American Samoa also expressed concern regarding requirements to carry WCPFC observers and IATTC observers in the overlap area, and stated that U.S. purse seine vessels operating from American Samoa may not be able to fish in the overlap area if they cannot obtain an IATTC observer or a cross-endorsed observer. The comment implied that only WCPFC observer requirements should apply in the overlap area.

One commenter requested that the WCPFC fish aggregating device (FAD) management measures remain in effect in the overlap area instead of being replaced by the IATTC FAD management measures, stating that the WCPFC FAD management measures have more conservation benefits for juvenile tunas.

Other commenters expressed support for the proposed rule or requested clarification regarding the intent of the proposed rule.

NMFS reexamined the proposed rule and is removing some additional regulations implementing WCPFC conservation and management measures from application in the overlap area in a final rule.

Table 1, below, shows the regulations implementing IATTC and WCPFC conservation and management measures that would apply in the overlap area under the final rule.

[6] A cross-endorsed observer is an observer that is "cross-endorsed" pursuant to a Memorandum of Cooperation between the WCPFC and the IATTC that specifies a process to allow the observer to meet the observer requirements of both organizations.

## Table 1. Table of Regulations under the Final Rule

| **Regulations Implementing WPCFC Decisions** | | **Regulations Implementing IATTC Decisions** | | |
|---|---|---|---|---|
| **50 CFR 300 Subpart O** | **Applies in Overlap Area under Final Rule?** | **50 CFR 300 Subpart C or 50 CFR 216** | **Applies in Overlap Area under Final Rule?** | **Changed from Proposed Rule** |
| § 300.223(a) Purse seine fishing effort limits. | No | § 300.25(e) Purse seine closures. | Yes | No |
| § 300.223(b) Purse seine fish aggregating devices (FADs) | No | § 300.28 Purse seine FAD restrictions | Yes | No |
| § 300.223(d) Purse seine catch retention | No | § 300.27(a) Tuna retention requirements for purse seine vessels | Yes | No |
| § 300.223(f) Purse seine sea turtle mitigation | No | § 300.27(c) Purse seine sea turtle handling and release | Yes | No |
| § 300.223(g)-(h) Purse seine whale shark mitigation | No | § 300.27(g)-(h) Purse seine whale shark restrictions for purse seine vessels | Yes | No |
| § 300.224 Longline fishing restrictions. | No | § 300.25(a) Longline tuna catch limits | Yes | No |
| § 300.226 Oceanic whitetip shark and silky shark. | No | § 300.27(d) Oceanic whitetip shark restrictions; § 300.27(e)-(f) Silky shark restrictions | Yes | No |
| No comparable requirements | N/A | § 300.25(b) Use of tender vessels | Yes | No (though not included in description of proposed rule) |
| No comparable requirements | N/A | § 300.25(f) Restrictions on fishing in proximity to data buoys | Yes | No |
| No comparable requirements | N/A | § 300.25(g) Pacific bluefin tuna catch limits | Yes | No |
| No comparable requirements | N/A | § 300.27(b) Release requirements for non-tuna species on purse seine vessels | Yes | No |
| No comparable requirements | N/A | § 300.27(i)-(j) Mobulid ray restrictions | Yes | No |
| No comparable requirements | N/A | § 300.27(k) Shark handling and release requirements for purse seine vessels | Yes | No |
| No comparable requirements | N/A | § 300.27(l) Shark line prohibition for longline vessels | Yes | No |
| § 300.212 WCPFC vessel | Yes | § 300.22(b) IATTC vessel | Yes | No |

| | | | | |
|---|---|---|---|---|
| permit endorsements | | register requirements | | |
| § 300.213 Vessel information requirements for fishing in foreign exclusive economic zones (EEZs) | Yes | No comparable requirements | N/A | No |
| § 300.214 Compliance with Laws of Other Nations. | Yes | No comparable requirements | N/A | No |
| § 300.215(c)(3), (c)(4), and (c)(5) Accommodating observers. | Yes | § 216.24(e) Purse seine observers* | Yes | No |
| § 300.215(b), (c)(1), (c)(2) and (d) Observers and Transshipment observers | No | No comparable requirements | N/A | Yes |
| § 300.216(b)(1) Purse seine transshipment at sea | Yes | § 300.25(c) Purse seine transshipment requirements | Yes | No |
| § 300.216(b)(2)-(3) and (c) Transshipping, bunkering and net sharing. | No | No comparable requirements | N/A | Yes |
| § 300.217 Vessel identification. | Yes | § 300.22(b)(3)(ii) IMO numbers | Yes | No |
| § 300.218 Reporting and recordkeeping requirements. | Yes** | § 300.22 Recordkeeping and reporting requirements | Yes | Yes** |
| § 300.219 Vessel monitoring system. | Yes | § 300.26 Vessel Monitoring System. | Yes | No |
| § 300.221 Facilitation of enforcement and inspection. | Yes | No comparable requirements | N/A | No |
| § 300.223(e) Purse seine observer coverage | No | § 216.24(e) Purse seine observers* | Yes | Yes |
| No comparable requirements | N/A | § 216.24 Requirements for U.S. purse seine vessels fishing under the requirements of the Agreement on the International Dolphin Conservation Program (*e.g.*, vessel and operator permit requirements, requirements for fishing on dolphins, *etc.*)* | Yes | No |

* These regulations also implement provisions of the Marine Mammal Protection Act and the Agreement on the International Dolphin Conservation Program, and are not located at 50 CFR part 300, subpart C, but instead are located at 50 CFR part 216, subpart C.

** The transshipment reporting requirements at 50 CFR 300.218(b) and (d), the discard reporting requirements at 50 CFR 300.218(e), the net sharing reporting requirements at 50 CFR 300.218(f), the daily purse seine fishing effort reports at 50 CFR 300.218(g), and the whale shark reporting requirements at 50 CFR 300.218(h) no longer apply in the overlap area. The whale shark reporting requirements were described as no longer applicable in the overlap area under the proposed rule. However, the other requirements listed here that no longer apply in the overlap area are changes from the proposed rule.

**Note:** Titles of regulation sections have been modified in some instances to include additional descriptive information.

Implementation of the final rule is within the range of alternatives considered in the 2019 EA, as it would remove more regulations related to WCPFC conservation and management measures for MCS from application in the overlap area than Alternative 2, but fewer regulations related to WCPFC conservation and management measures for MCS from application in the overlap area than Alternative 1. NMFS has examined the economic effects of the final rule as a separate alternative, Alternative 3, in this document.

Based on comments received on the proposed rule, NMFS is now aware that several U.S. purse seine vessels that fish exclusively in the IATTC Area will likely fish in the overlap area under the final rule. These vessels are already subject to all the regulations implementing IATTC resolutions that apply to the overlap area under the final rule when fishing in the IATTC Area. However, these vessels will be subject to the regulations implementing WCPFC conservation and management measures that continue to apply in the overlap area, which would lead to some increased costs, as analyzed in the 2020 Regulatory Impact Review (2020 RIR) and the final regulatory flexibility analysis (FRFA), which are incorporated by reference in this document.

The No-Action Alternative and the three action alternatives analyzed in this EA are described in further detail below.

In developing the action alternatives, consideration also needs to be given to a specific provision of Conservation and Management Measure (CMM) 2018-01, *Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean*, which relates to management of the tropical tuna stocks. Paragraph 10 of the CMM states that where WCPFC members choose to apply IATTC measures rather than WCPFC measures in the overlap area, "any calculation of limits for the Convention Area (excluding the overlap area) that are done on the basis of historical catch or effort levels, shall exclude historical catch or effort within the overlap area." None of the limits in CMM 2018-01 that apply to U.S. fishing vessels are done on the basis of historical catch or effort levels. Therefore, under the action alternatives there is no need to exclude historical catches or effort in the overlap area in the calculation of any limits that would apply in the rest of the WCPFC area. In other words, for limits that have already been established in regulations (e.g., the longline bigeye catch limits at 50 CFR 300.224, the fish aggregating device (FAD) prohibition periods at 50 CFR 300.223(b), and the purse seine fishing effort limits at 50 CFR 300.223(a)), NMFS would not need to adjust them.

## 2.2 The No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the overlap area and the regulations promulgated in the 2016 final rule would remain in place. Thus, regulations implementing WCPFC decisions would apply in the overlap area and, with the exception of the requirements regarding the IATTC Register, regulations implementing IATTC decisions would not apply in the overlap area.

## 2.3 Action Alternative 1: Application of only IATTC decisions in the overlap area

Under Action Alternative 1, only regulations implementing IATTC decisions would apply in the overlap area (Table 2). Existing WCPFC regulations would be modified to no longer apply to the overlap area and existing IATTC regulations would be modified to apply to the overlap area.

**Table 2. Regulations implementing WCPFC decisions and IATTC decisions and their application in the overlap area under Action Alternative 1 (AA1), Action Alternative 2 (AA2), and Action Alternative 3 (AA3).**

Regulations have been organized to illustrate general similarities or differences between WCPFC and IATTC decisions. Titles of regulation sections have been modified in some instances to include additional descriptive information.

| **Regulations Implementing WCPFC Decisions 50 CFR Part 300 Subpart O** | **Applies in Overlap Area** | | | **Regulations Implementing IATTC Decisions 50 CFR Part 300 Subpart C** | **Applies in Overlap Area** | | |
|---|---|---|---|---|---|---|---|
| | **AA1** | **AA2** | **AA3** | | **AA1** | **AA2** | **AA3** |
| §300.223(a) Purse seine effort limits. | No | No | No | §300.25(e) Purse seine closures. | Yes | Yes | Yes |
| §300.223(b) Purse seine fish aggregating devices | No | No | No | §300.28 Purse seine FAD restrictions | Yes | Yes | Yes |
| §300.223(d) Purse seine catch retention | No | No | No | §300.27(a) Tuna retention requirements for purse seine vessels | Yes | Yes | Yes |
| §300.223(f) Purse seine sea turtle mitigation | No | No | No | §300.27(c) Purse seine sea turtle handling and release | Yes | Yes | Yes |
| §300.223(g)-(h) Purse seine whale shark mitigation | No | No | No | §300.27(g)-(h) Purse seine whale shark restrictions for purse seine vessels | Yes | Yes | Yes |
| §300.224 Longline fishing restrictions. | No | No | No | §300.25(a) Longline tuna catch limits | Yes | Yes | Yes |
| §300.226 Oceanic whitetip shark and silky shark. | No | No | No | §300.27(d) Oceanic whitetip shark restrictions; §300.27(e)-(f) Silky shark restrictions | Yes | Yes | Yes |
| No comparable requirements | NA*** | NA | NA | §300.22(f) Restrictions on fishing in proximity to data | Yes | Yes | Yes |

| **Regulations Implementing WCPFC Decisions 50 CFR Part 300 Subpart O** | **Applies in Overlap Area** | | | **Regulations Implementing IATTC Decisions 50 CFR Part 300 Subpart C** | **Applies in Overlap Area** | | |
|---|---|---|---|---|---|---|---|
| | **AA1** | **AA2** | **AA3** | | **AA1** | **AA2** | **AA3** |
| | | | | buoys | | | |
| No comparable requirements | NA | NA | NA | §300.22(g) Pacific bluefin tuna catch limits | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §300.27(b) Release requirements for non-tuna species on purse seine vessels | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §300.22(i)-(j) Mobulid ray restrictions | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §300.22(k) Shark handling and release requirements for purse seine vessels | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §300.22(l) Shark line prohibition for longline vessels | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §300.25(b) Use of tender vessels | Yes | Yes | Yes |
| §300.212 WCPFC vessel permit endorsements | No | Yes | Yes | §300.22(b) IATTC vessel register requirements | Yes | Yes | Yes |
| §300.213 Vessel information requirements for fishing in foreign EEZs | No | Yes | Yes | No comparable requirements | NA | NA | NA |
| §300.214 Compliance with Laws of Other Nations. | No | Yes | Yes | No comparable requirements | NA | NA | NA |
| §300.215 Observers. | No | Yes | No, except for §300.215(c)(3), (c)(4), and (c)(5) | §216.24(e) Purse seine observers** | Yes | Yes | Yes |
| §300.216 Transshipping, bunkering and net sharing. | No | Yes | No, except for §300.216(b)(1) Purse seine transshipment | §300.25(c) Purse seine transshipment requirements | Yes | Yes | Yes |

| **Regulations Implementing WCPFC Decisions 50 CFR Part 300 Subpart O** | **Applies in Overlap Area** | | | **Regulations Implementing IATTC Decisions 50 CFR Part 300 Subpart C** | **Applies in Overlap Area** | | |
|---|---|---|---|---|---|---|---|
| | **AA1** | **AA2** | **AA3** | | **AA1** | **AA2** | **AA3** |
| | | | at sea | | | | |
| §300.217 Vessel identification. | No | Yes | Yes | §300.22(b)(3)(ii) IMO numbers | Yes | Yes | Yes |
| §300.218 Reporting and recordkeeping requirements. | No | Yes | Yes* | §300.22 Recordkeeping and reporting requirements | Yes | Yes | Yes |
| §300.219 Vessel monitoring system. | No | Yes | Yes | §300.26 Vessel Monitoring System. | Yes | Yes | Yes |
| §300.221 Facilitation of enforcement and inspection. | No | Yes | Yes | No comparable requirements | Yes | Yes | Yes |
| §300.223(e) Purse seine observer coverage | No | Yes | No | §216.24(e) Purse seine observers** | Yes | Yes | Yes |
| No comparable requirements | NA | NA | NA | §216.24 Requirements for U.S. purse seine vessels fishing under the requirements of the AIDCP (e.g., vessel and operator permit requirements, requirements for fishing on dolphins, etc.)** | Yes | Yes | Yes |

*Regulations in this section associated with regulations that would be removed would also be removed.
**These regulations also implement provisions of the Marine Mammal Protection Act and the Agreement on the International Dolphin Conservation Program and thus, are not located at 50 CFR Part 300 Subpart C, but instead at 50 CFR Part 216 Subpart C.
*** NA indicates "not applicable."

The following discussion details the regulatory changes that would take place under Action Alternative 1.

*Purse seine fishing effort restrictions*

Under Action Alternative 1, regulations implementing WCPFC decisions for purse seine fishing effort would no longer apply in the overlap area, while regulations implementing IATTC decisions for purse seine fishing effort would go into effect in the overlap area.

Beginning in 2009, NMFS implemented annual limits on purse seine fishing effort on the high seas and in the U.S. EEZ in the WCPFC Area between 20° N latitude and 20° S latitude (50 CFR 300.223(a)). Under Action Alternative 1, such purse seine fishing effort limits set forth in WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include purse seine effort controls that would apply in the overlap area (50 CFR 300.25(e)). These regulations implementing IATTC decisions specify that any U.S. purse seine vessel must observe a 72-day closure period during each of the calendar years 2019 and 2020. Although it is difficult to predict exactly what conservation and management measures the WCPFC or IATTC may adopt in future years, NMFS anticipates that both commissions will likely continue to adopt purse seine fishing effort restrictions that are similar to those adopted previously.

*FAD management measures*

NMFS has implemented WCPFC FAD management measures ((50 CR 300.223(b)). These include specific time periods during which purse seine vessels are prohibited from setting on FADs in the WCPFC Area in the area between 20° N latitude and 20° S latitude. Currently, the prohibition periods are from July 1 through September 30 in each calendar year for the entire WCPFC Area and on the high seas from November 1 through December 31 in each calendar year. There is also a limit of 350 drifting active FADs per each U.S. purse seine vessel fishing in the WCPFC Area. Under Action Alternative 1, these regulations that implement WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include FAD management measures that would apply in the overlap area (50 CFR 300.28). These FAD management measures detailed at 50 CFR 300.28 include the following: (1) FAD identification requirements that require a unique code to be marked on the radio or satellite buoy or the FAD; (2) U.S. vessel owners and operators of purse-seine vessels of well volume 1,200 $m^3$ or more must not have more than 450 active FADs; (3) U.S. vessel owners and operators of purse-seine vessels for vessels of volume 426-1,199 $m^3$ must not have more than 300 active FADs; (4) U.S. vessel owners and operators of purse-seine vessels of well volume 13-425 $m^3$ must not have more than 120 active FAD; (5) U.S. vessel owners and operators of purse-seine vessels of well volume 0-212 $m^3$ must not have more than 70 active FADs; (6) U.S. vessel owners, operators, and crew of purse seine vessels of class size 4-6 (more than 182 metric tons carrying capacity) must not deploy a FAD during 15 days prior to the start of the vessel's selected purse seine closure period at 50 CFR 300.25(e)(1); (7) 15-days prior to the start of the vessel's selected closure period at 50 CFR 300.25(e)(1), vessel owners, operators, and crew of purse seine vessels of class size 6 must remove from the water a number of FADs equal to the number of FADs set upon by the vessel during the same 15 day period; (8) if the FAD design includes a raft and if mesh netting is used as part of the structure, the mesh netting shall have a mesh size less than 7 centimeters and the mesh net must be tightly wrapped such that no netting hangs below the FAD when deployed; and (9) any netting used in the subsurface structure of the FAD must be tightly tied into bundles or have stretched mesh size less than 7 centimeters in a panel that is weighted on the lower end with at least enough weight to keep the netting taut in the water column.

*Catch retention and incidental catch release requirements*

NMFS has implemented tuna catch retention requirements for purse seine vessels in the WCPFC Area. An owner and operator of a fishing vessel of the United States equipped with purse seine gear must ensure the retention on board at all times while at sea any bigeye tuna, yellowfin tuna, or skipjack tuna, except in the following circumstances as follows: fish that are unfit for human consumption, including but not limited to fish that are spoiled, pulverized, severed, or partially consumed at the time they are brought on board, may be discarded; if at the end of a fishing trip there is insufficient well space to accommodate all the fish captured in a given purse seine set, fish captured in that set may be discarded, provided that no additional purse seine sets are made during the fishing trip; and if a serious malfunction of equipment occurs that necessitates that fish be discarded. Under Action Alternative 1, these regulations that implement WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include incidental catch and tuna retention requirements for purse seine vessels that would now apply in the overlap area (50 CFR 300.27(a)-(b)). The incidental catch release requirements for non-tuna species would apply to all purse seine vessels. Tuna retention requirements would apply to class size 4-6 purse seine fishing vessels and require bigeye, skipjack, and yellowfin tuna caught using purse seine gear be retained on board and landed, except for fish deemed unfit for human consumption for reasons other than size or if there is insufficient well capacity to accommodate the entire catch on the last set of a trip. All purse seine vessels would also be required to release all billfish, ray (not including mobulid ray, as explained in more detail below), dorado, and other fish species, except tuna, tuna-like species, and fish retained for consumption aboard the vessel, as soon as practicable after being identified on board the vessel during the brailing operation.

*Sea turtle interaction mitigation requirements*

NMFS has implemented specific sea turtle handling requirements for U.S. purse seine vessels fishing in the WCPFC Area (50 CFR 300.223(f)). These include possession and use of specific handling gear as well as specific handling requirements. Under Action Alternative 1, these regulations that implement WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include requirements for purse seine vessel interactions with sea turtles (50 CFR 300.27(c)). This regulation specifies special handling and release requirements when a sea turtle is either spotted in the purse seine net, entangled in the net, or brought on board the vessel alive.

*Whale shark interaction mitigation requirements*

NMFS has implemented specific requirements to mitigate interactions between U.S. purse seine vessels and whale sharks in the WCPFC Area. These include a prohibition on setting on whale sharks and requirements for when whale sharks are encircled in purse seine nets (50 CFR 300.223(g)-(h)). Under Action Alternative 1, these regulations to implement WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include requirements to mitigate interactions between purse seine vessels and whale sharks (50 CFR 300.27(g) - (h)). These regulations require owners, operators, and crew to not set or attempt to set a purse seine on

or around a whale shark if the animal is sighted prior to the commencement of the set or the attempted set. If caught in the purse seine net, the crew, operator, and owner would be required to release as soon as possible, any whale shark that is encircled in a purse seine net, and must ensure that all reasonable steps are taken to ensure its safe release without towing the whale shark out of the purse seine net (e.g., using towing ropes).

*Longline bigeye tuna catch limits.*

NMFS has implemented a specific bigeye tuna catch limit for U.S. longline vessels fishing in the WCPFC Area. The limit is 3,554 metric tons of bigeye tuna per calendar year (50 CFR 300.224(a)). Under Action Alternative 1, these regulations implementing WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include an annual catch limit for longline-caught bigeye tuna that would apply in the overlap area (50 CFR 300.25(a)). The annual limit is 750 metric tons of bigeye tuna for vessels over 24 meters in overall length. The regulations include a number of requirements that are triggered if and when the annual limit is reached, including restrictions on transshipment by longline vessels in the IATTC Convention Area without a valid permit, and restrictions on using longline gear inside and outside of the IATTC Convention Area on the same trip.

*Oceanic whitetip shark interaction mitigation requirements.*

NMFS has implemented specific requirements regarding interactions with oceanic whitetip shark for all U.S. commercial fishing vessels fishing for HMS in the WCPFC Area (50 CFR 300.226). These requirements include a prohibition on the retention, transshipment, storage or landing of oceanic whitetip shark, and specific requirements for releasing oceanic whitetip shark that are caught by vessels. Under Action Alternative 1, these regulations implementing WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include similar requirements for oceanic whitetip shark that would apply in the overlap area (50 CFR 300.27(d)). These regulations prohibits the crew, operator, or owner from retaining on board, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of an oceanic whitetip shark and requires the release unharmed, to the extent practicable, all oceanic whitetip shark when brought alongside the vessel.

*Silky shark interaction mitigation requirements.*

NMFS has implemented specific requirements regarding interactions with silky sharks for all U.S. commercial fishing vessels fishing for HMS in the WCPFC Area (50 CFR 300.226). These requirements include a prohibition on the retention, transshipment, storage or landing of silky sharks, and specific requirements for releasing silky sharks that are caught by vessels. Under Action Alternative 1, these regulations implementing WCPFC conservation and management measures would no longer apply in the overlap area. However, regulations implementing IATTC conservation and management measures include similar requirements for silky sharks that would apply in the overlap area (50 CFR 300 300.27(e) and (f)). These regulations prohibit the crew, operator, and owner of a commercial purse seine fishing vessel from retaining on board, transshipping, storing, or landing any part or whole carcass of a silky shark caught by the vessel.

Additionally, longline vessel crews, operators, and owners are required to limit the retained catch of silky shark to a maximum of 20 percent in weight of the total catch during each fishing trip.

*Restrictions on fishing in proximity to data buoys*

Although the WCPFC has adopted a decision for the conservation and management of data buoys, which NMFS may implement through regulations, NMFS regulations regarding fishing on data buoys do not currently apply in the overlap area. Under Action Alternative 1, regulations implementing IATTC management measures for fishing on data buoys would go into effect in the overlap area (50 CFR 300.25(f)) Except when the fishing vessel is operated as part of a scientific research program, a longline or purse seine fishing vessel may not be used to fish for highly migratory species within one nautical mile of an anchored data buoy in the IATTC Convention Area. A fishing vessel, or any fishing gear, equipment, or watercraft deployed by such a fishing vessel, cannot be used to interact with, or engage in conduct that could impair the function of, a data buoy.

*Pacific bluefin tuna catch limits*

There are currently no regulations implementing WCPFC decisions on Pacific bluefin tuna. Under Action Alternative 1, NMFS regulations implementing IATTC decisions on Pacific bluefin tuna would go into effect in the overlap area (50 CFR 300.25(g)). These regulations impose biennial, annual and per trip catch limits to the U.S. commercial fishery for Pacific bluefin tuna. This regulation also requires a purse seine vessel owner or operator to provide a pre-trip notification to NMFS 24 hours in advance of departing on the fishing trip during specific periods as notified by NMFS.

*Mobulid ray restrictions*

There are no NMFS regulations implementing WCPFC decisions on mobulid rays that apply in the overlap area. Under Action Alternative 1, NMFS regulations implementing IATTC decisions on mobulid rays would go into effect in the overlap area (50 CFR 300.27(i)-(j). These restrictions prohibit the crew, operator, and owner of a U.S. commercial fishing vessel from retaining on board, transshipping, storing, landing, selling, or offering for sale any part or whole carcass of a mobulid ray, except in the case of any mobulid ray caught on an observed purse seine vessel that is not seen during fishing operations and is delivered into the vessel hold. Specific handling and release requirements also apply.

*Shark handling and release requirements for purse seine vessels*

There are no NMFS regulations implementing WCPFC handling and release requirements for sharks other than the whale shark, oceanic whitetip shark, and silky shark that currently apply in the overlap area and as described above. Under Action Alternative 1, regulations implementing IATTC decisions for general shark handling and release requirements would go into effect (50 CFR 300.27(k)) in the overlap area. The crew, operator, and owner of a U.S. commercial purse seine fishing vessel would be required to promptly release unharmed, to the extent practicable, any shark (whether live or dead) caught in the IATTC Convention Area, as soon as it is seen in the net or on the deck, without compromising the safety of any persons. If a shark is live when

caught, the crew, operator, or owner must follow release procedures specified in the rule. A specific shark line prohibition for longline vessels would also go into effect and would require that any U.S. longline vessel used to fish for tuna or swordfish be prohibited from using any shark line in the IATTC Convention Area (50 CFR 300.27(l)).

*Reporting and recordkeeping requirements*

WCPFC regulations for reporting and recordkeeping that currently apply in the overlap area would not apply under Action Alternative 1. Regulations for reporting and recordkeeping that implement IATTC decisions would go into effect under Action Alternative 1 and apply in the overlap area. These regulations are described in detail below.

The requirement to report on purse seine interactions with whale sharks implementing a WCPFC decision and specified at 50 CFR 300.218(h), would no longer apply in the overlap area. However, a corresponding whale shark reporting requirement implementing a IATTC decision would apply in the overlap area (50 CFR 300.22(a)(2)).

WCPFC regulations implementing reporting and recordkeeping requirements that would not continue to apply in the overlap area include catch and effort reporting requirements (50 CFR 300.218(a)), transshipment reporting requirements (50 CFR 300.218(b)), transshipment notification requirements (50 CFR 300.218(c)), reporting requirements for discards of bigeye, yellowfin, or skipjack tuna from purse seine vessels (50 CFR 300.218(e)), reporting requirements for purse seine net sharing (50 CFR 300.218(f)), and reports of daily purse seine fishing effort (50 CFR 300.218(g)). The reporting and recordkeeping requirements implementing IATTC decisions that would apply in the overlap area include specific logbook reporting requirements (50 CFR 300.22(a)), reporting FAD-related data from purse seine vessels (50 CFR 300.22(a)(3)(i)) and reporting on active FADs (50 CFR 300.22(a)(3)(ii)).

*WCPFC Record of Fishing Vessels and IATTC Regional Vessel Register requirements*

WCPFC regulations regarding the WCPFC Record would no longer apply in the overlap area under Action Alternative 1. These requirements include providing certain information to obtain an endorsement on a permit under the regulations implementing the High Seas Fishing Compliance Act (50 CFR 300 Subpart R) and requirements to provide certain information when fishing only in foreign EEZs (50 CFR 300.212 and 50 CFR 300.213). As mentioned above, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the IATTC RVR requirements at 50 CFR 300.22(b) and would continue to be subject to those requirements under Action Alternative 1.

*Vessel Identification Requirements*

WCPFC regulations for vessel identification would no longer apply in the overlap area. These include specific vessel marking requirements and requirements to obtain IMO numbers (50 CFR 300.217). In order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the IMO number requirements as part of the IATTC RVR requirements at 50 CFR 300.22(b) and would continue to be subject to these requirements. The IMO number requirements at 50 CFR 300.217 and 50 CFR 300.22(b) are essentially the

same – applicable to vessels that are 100 gross register tons or greater and have provisions for exemptions. However, NMFS recently published a final rule to expand the requirement for vessel owners to obtain IMO numbers to include smaller U.S. vessels fishing for tuna and tuna-like species in the IATTC Area (84 FR 70040; December 20, 2019; corrected in 85 FR 8198; February 13, 2020), which is not yet in effect.

*Observers*

WCPFC regulations regarding observers would no longer apply in the overlap area under Action Alternative 1. These requirements include pre-trip notification requirements for vessels that are required to carry observers to monitor at-sea transshipments (50 CFR 300.215(b)), specific provisions for accommodating observers on vessels (50 CFR 300.215(c)), at-sea transshipment observer coverage requirements (50 CFR 300.215(d)), and purse seine observer coverage requirements (50 CFR 300.223(e)). As mentioned above, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the observer provisions set forth at 50 CFR 216.24(e), and these provisions would continue to apply under Action Alternative 1. These requirements include specific provisions for how research and observation duties are to be carried out, specific requirements regarding marine mammals, and specific provisions for accommodating observers.

*Transshipment and net sharing*

WCPFC regulations regarding transshipment and net sharing would no longer apply in the overlap area. These include prohibitions on at-sea transshipment and bunkering for purse seine vessels (50 CFR 300.216(b)(1)), requirements for at-sea transshipment observer coverage (50 CFR 300.216(b)(2)), general restrictions on transshipment and bunkering for all vessels engaged in commercial fishing of HMS in the WCPFC Area (50 CFR 300.216(b)(3)), and restrictions regarding net sharing (50 CFR 300.216(c)) that allow net sharing only between purse seine vessels in limited circumstances. Regulations that implement IATTC decisions for transshipment would go into effect under Action Alternative 1 and would also apply in the overlap area. These regulations include prohibitions on at-sea transshipment for purse seine vessels (50 CFR 300.25(c)) that are identical to one component of the WCPFC transshipment regulations.

*Vessel monitoring system (VMS)*

WCPFC requirements regarding VMS would no longer apply in the overlap area under Action Alternative 1 (50 CFR 300.219). Requirements implementing IATTC decisions regarding VMS would go into effect under Action Alternative 1 and would apply in the overlap area (50 CFR 300.26). The requirements to implement IATTC decisions apply only to commercial fishing vessels 24 meters or more in overall length.

*Other MCS Measures*

WCPFC requirements regarding compliance with laws of other nations (50 CFR 300.214), and facilitation of enforcement and inspection (50 CFR 300.221) would no longer apply in the overlap area under Action Alternative 1. The regulations implementing IATTC decisions do not include specific provisions regarding compliance with laws of other nations or facilitation of

enforcement and inspection. The prohibition on the use of tender vessels in the IATTC Area under 50 CFR 300.25(b) would go into effect in the overlap area.

## 2.4 Action Alternative 2: Application of IATTC decisions and limited WCPFC decisions in the overlap area

Under Action Alternative 2, regulations implementing IATTC decisions would apply in the overlap area, and most decisions applying conservation and management measures of the WCPFC would be removed from application in the overlap area (Table 2**).** Regulations that are necessary for the United States to fulfill its obligations under the Convention would continue to apply in the overlap area. These regulations are shown in Table 2, above.

As described for Action Alternative 1, excluding application of the WCPFC-adopted limits on catch and fishing effort in the overlap area would not require adjustment of the limits applied in the remainder of the WCPFC Area.

All relevant IATTC decisions would apply to the overlap area, including limits on purse seine effort, limits on longline bigeye tuna catches, and FAD restrictions.

For Action Alternative 2, the regulatory changes would be the same as described above under Action Alternative 1 for the following categories: purse seine fishing effort restrictions; FAD management measures; catch retention and incidental catch release requirements; sea turtle interaction mitigation requirements; whale shark interaction mitigation requirements; longline bigeye tuna catch limits; oceanic whitetip shark interaction mitigation requirements; silky shark interaction mitigation requirements; restrictions on fishing in proximity to data buoys; Pacific bluefin tuna catch limits; mobulid ray restrictions; and shark handling and release requirements.

A detailed description of the regulatory changes that would differ from Action Alternative 1 is provided below.

*Reporting and recordkeeping requirements*

WCPFC regulations for reporting and recordkeeping that currently apply in the overlap area would continue to apply under Action Alternative 2, except for the requirement to report on purse seine interactions with whale sharks – that requirement is connected to the regulations implementing the WCPFC decision on whale sharks that would no longer apply. Regulations for reporting and recordkeeping that implement IATTC decisions would go into effect under Action Alternative 2 and apply in the overlap area. These regulations are described as detailed below.

The requirement to report on purse seine interactions with whale sharks implementing a WCPFC decision and specified at 50 CFR 300.218(h), would no longer apply in the overlap area. However, a corresponding whale shark reporting requirement implementing a IATTC decision would apply in the overlap area (50 CFR 300.22(a)(2)).

WCPFC reporting and recordkeeping that would continue to apply in the overlap area include catch and effort reporting requirements (50 CFR 300.218(a)), transshipment reporting requirements (50 CFR 300.218(b)), transshipment notification requirements (50 CFR

300.218(c)), reporting requirements for discards of bigeye, yellowfin, or skipjack tuna from purse seine vessels (50 CFR 300.218(e)), reporting requirements for purse seine net sharing (50 CFR 300.218(f)), and reports of daily purse seine fishing effort (50 CFR 300.218(g)). Additional reporting and recordkeeping requirements implementing IATTC decisions would also apply in the overlap area. These regulations include specific logbook reporting requirements (50 CFR 300.22(a)), reporting FAD-related data from purse seine vessels (50 CFR 300.22(a)(3)(i)) and reporting on active FADs (50 CFR 300.22(a)(3)(ii)).

*WCPFC Record of Fishing Vessels and IATTC Regional Vessel Register requirements*

WCPFC requirements for inclusion on the WCPFC Record of Fishing Vessels would continue to apply in the overlap area under Action Alternative 2. These requirements include providing certain information to obtain an endorsement on a permit under the regulations implementing the High Seas Fishing Compliance Act (50 CFR 300 Subpart R) and requirements to provide certain information when fishing only in foreign EEZs (50 CFR 300.212 and 50 CFR 300.213). Additionally, as mentioned above, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the IATTC RVR requirements at 50 CFR 300.22(b) and would continue to be subject to those requirements.

*Vessel Identification Requirements*

WCPFC requirements for vessel identification would continue to apply in the overlap area under Action Alternative 2. These include specific vessel marking requirements and requirements to obtain IMO numbers (50 CFR 300.217) that would apply under Action Alternative 2, which would not apply under Action Alternative 1. Additionally, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the IMO number requirements as part of the IATTC RVR requirements at 50 CFR 300.22(b) and would continue to be subject to these requirements. The IMO number requirements at 50 CFR 300.217 and 50 CFR 300.22(b) are essentially the same – applicable to vessels that are 100 gross register tons or greater and have provisions for exemptions. However, NMFS recently published a final rule to expand the requirement for vessel owners to obtain IMO numbers to include smaller U.S. vessels fishing for tuna and tuna-like species in the IATTC Area (84 FR 70040; December 20, 2019; corrected in 85 FR 8198; February 13, 2020), which is not yet in effect.

*Observers*

WCPFC requirements regarding observers would continue to apply in the overlap area. These requirements include pre-trip notification requirements for vessels that are required to carry observers to monitor at-sea transshipments (50 CFR 300.215(b)), specific provisions for accommodating observers on vessels (50 CFR 300.215(c)), at-sea transshipment observer coverage requirements (50 CFR 300.215(d)), and purse seine observer coverage requirements (50 CFR 300.223(e)). Additionally, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the observer provisions set forth at 50 CFR 216.24(e), and these provisions would continue to apply under Action Alternative 2. These requirements include specific provisions for how research and observation duties are to be carried out, specific requirements regarding marine mammals, and specific provisions for accommodating observers. Currently, vessels fishing in the overlap area are required to comply

with the observer provisions of WCPFC regulations and regulations implementing requirements arising under the IATTC and AIDCP. In some cases, this requires a vessel to carry an observer that is designated as a cross-endorsed observer, pursuant to a Memorandum of Cooperation between the WCPFC and the IATTC that allows such observers to meet the observer requirements of both organizations, or two separate observers – one to carry out responsibilities arising under the WCPFC and another to carry out responsibilities arising under the IATTC and AIDCP. The existing observer coverage requirements for the overlap area would not change under Action Alternative 2.

*Transshipment and net sharing*

WCPFC requirements regarding transshipment and net sharing would continue to apply in the overlap area. These include prohibitions on at-sea transshipment and bunkering for purse seine vessels (50 CFR 300.216(b)(1)), requirements for at-sea transshipment observer coverage (50 CFR 300.216(b)(2)), general restrictions on transshipment and bunkering for all vessels engaged in commercial fishing of HMS in the WCPFC Area (50 CFR 300.216(b)(3)), and restrictions regarding net sharing (50 CFR 300.216(c)) that allow net sharing only between purse seine vessels in limited circumstances. Regulations that implement IATTC decisions for transshipment would go into effect under Action Alternative 2 and would also apply in the overlap area. These regulations include prohibitions on at-sea transshipment for purse seine vessels (50 CFR 300.25(c)). The transshipment regulations implementing IATTC decisions are identical to one component of the WCPFC transshipment regulations, and thus application of both the WCPFC and IATTC transshipment prohibition to purse seine vessels operating in the overlap area would not subject these vessels to additional or contradictory requirements.

*Vessel monitoring system (VMS)*

WCPFC requirements regarding VMS would continue to apply in the overlap area under Action Alternative 2 (50 CFR 300.219) and would apply to commercial fishing vessels of all sizes. Requirements implementing IATTC decisions regarding VMS would also go into effect under Action Alternative 2 and would apply in the overlap area (50 CFR 300.26). The requirements to implement IATTC decisions apply only to commercial fishing vessels 24 meters or more in overall length. However, given that the WCPFC requirements apply and would continue to apply under Action Alternative 2 to vessels of all sizes, there would be no new VMS requirements under Action Alternative 2 and all U.S. commercial fishing vessels fishing for HMS in the overlap area would still be required to continuously operate the VMS at all times, with certain exceptions.

*Other MCS Measures*

WCPFC requirements regarding compliance with laws of other nations (50 CFR 300.214), and facilitation of enforcement and inspection (50 CFR 300.221) would continue to apply in the overlap area under Action Alternative 2. The regulations implementing IATTC decisions do not include specific provisions regarding compliance with laws of other nations or facilitation of enforcement and inspection. The prohibition on the use of tender vessels in the IATTC Area under 50 CFR 300.25(b) would go into effect in the overlap area.

## 2.5 Action Alternative 3 (application of IATTC decisions and WCPFC regulations necessary for meeting obligations under the Convention in the overlap area)

Under Action Alternative 3, regulations implementing IATTC decisions would apply in the overlap area, and most decisions applying conservation and management measures of the WCPFC would be removed from application in the overlap area (Table 2)**.** Regulations that are necessary for the United States to fulfill its obligations under the Convention would continue to apply in the overlap area. These regulations are shown in Table 2**,** above.

All relevant IATTC decisions would apply to the overlap area, including limits on purse seine effort, limits on longline bigeye tuna catches, and FAD restrictions.

For Action Alternative 3, the regulatory changes would be the same as described above under Action Alternative 1 for the following categories: purse seine fishing effort restrictions; FAD management measures; catch retention and incidental catch release requirements; sea turtle interaction mitigation requirements; whale shark interaction mitigation requirements; longline bigeye tuna catch limits; oceanic whitetip shark interaction mitigation requirements; silky shark interaction mitigation requirements; restrictions on fishing in proximity to data buoys; Pacific bluefin tuna catch limits; mobulid ray restrictions; and shark handling and release requirements. The regulatory changes would be the same as described above under Action Alternative 2 for the following categories: WCPFC Record and IATTC RVR requirements, vessel identification requirements, VMS requirements, and other MCS measures.

A detailed description of the regulatory changes that would differ from Action Alternative 2 is provided below.

*Reporting and recordkeeping requirements*

The only WCPFC reporting and recordkeeping regulations that would continue to apply in the overlap area include catch and effort reporting requirements (50 CFR 300.218(a)). The transshipment reporting requirements (50 CFR 300.218(b)), transshipment notification requirements (50 CFR 300.218(d)), reporting requirements for discards of bigeye, yellowfin, or skipjack tuna from purse seine vessels (50 CFR 300.218(e)), reporting requirements for purse seine net sharing (50 CFR 300.218(f)), and reports of daily purse seine fishing effort (50 CFR 300.218(g)) would no longer apply in the overlap area.

As for Action Alternative 2, the requirement to report on purse seine interactions with whale sharks implementing a WCPFC decision and specified at 50 CFR 300.218(h), would no longer apply in the overlap area. However, a corresponding whale shark reporting requirement implementing a IATTC decision would apply in the overlap area (50 CFR 300.22(a)(2)).

As for the other action alternatives, additional reporting and recordkeeping requirements implementing IATTC decisions would also apply in the overlap area. These regulations include specific logbook reporting requirements (50 CFR 300.22(a)), reporting FAD-related data from purse seine vessels (50 CFR 300.22(a)(3)(i)) and reporting on active FADs (50 CFR 300.22(a)(3)(ii)).

*Observers*

The majority of the WCPFC requirements regarding observers would no longer apply in the overlap area. The requirements that would no longer apply include the pre-trip notification requirements for vessels that are required to carry observers to monitor at-sea transshipments (50 CFR 300.215(b)), the general requirement to carry observers if directed by NMFS to do so (50 CFR 300.215(c)(1)), at-sea transshipment observer coverage requirements (50 CFR 300.215(d)), and purse seine observer coverage requirements (50 CFR 300.223(e)). The requirements that would continue to apply in the overlap area include the requirements regarding accommodating WCPFC observers at 50 CFR 300.215(c)(3),(c)(4), and (c)(5).

Additionally, as for Action Alternative 1 and Action Alternative 2, in order to comply with the provisions of the AIDCP, vessels fishing in the overlap area are already required to comply with the observer provisions set forth at 50 CFR 216.24(e), and these provisions would continue to apply under Action Alternative 3. These requirements include specific provisions for how research and observation duties are to be carried out, specific requirements regarding marine mammals, and specific provisions for accommodating observers. Currently, vessels fishing in the overlap area are required to comply with the WCPFC observer provisions and regulations implementing requirements arising under the IATTC and AIDCP.

*Transshipment and net sharing*

WCPFC requirements regarding transshipment and net sharing would no longer apply in the overlap area, except for the prohibition on purse seine transshipments at sea at 50 CFR 300.216(b)(1), under Action Alternative 3. The requirements that would no longer apply include requirements for at-sea transshipment observer coverage (50 CFR 300.216(b)(2)), general restrictions on transshipment and bunkering for all vessels engaged in commercial fishing of HMS in the WCPFC Area (50 CFR 300.216(b)(3)), and restrictions regarding net sharing (50 CFR 300.216(c)) that allow net sharing only between purse seine vessels in limited circumstances. Regulations that implement IATTC decisions for transshipment would go into effect under Action Alternative 3 and would also apply in the overlap area. These regulations include prohibitions on at-sea transshipment for purse seine vessels (50 CFR 300.25(c)). Thus, application of both the WCPFC and IATTC transshipment prohibition to purse seine vessels operating in the overlap area would not subject these vessels to additional or contradictory requirements.

# 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 the overlap area operate. This chapter is organized as follows: (1) physical environment including the 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).

In many instances the following sections include information on the WCPO as a whole, as they are based on recent EAs for the WCPO that have included the overlap area and are relevant for this EA. Information on ports and transit activities is also included where relevant.

## 3.1 Physical Environment of the WCPO

The physical reach of the overlap area (as shown in Figure 1) is bounded by 50° S. latitude, 4° S. latitude, 150° W. longitude, and 130° W. 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. ENSO events cause inter-annual physical and biological variation. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. In turn, the eastward-flowing countercurrent tends to dominate circulation, bringing warm, low-salinity, and low-nutrient water to the eastern margins of the Pacific Ocean. As the easterly trade winds are reduced, the normal nutrient-rich upwelling system slows, leaving warm, nutrient poor surface water pooled in the eastern Pacific Ocean (EPO) (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).

The bulk of marine life is found near divergences and convergences that concentrate forage species, and also near upwelling zones along ocean current boundaries, and temperature, oxygen, salinity, light, and depth gradients (Niller and Reynolds 1984; Roden 1980; Seki et al. 2002). Biologically, these convergent fronts appear to represent zones of enhanced trophic transfer (Bakun 1996; Olson et al. 1994). The dense cooler phytoplankton-rich water sinks below the warmer water creating a convergence of phytoplankton (Polovina et al. 2000; Roden 1980). Buoyant organisms, such as jellyfish as well as vertically swimming zooplankton, can maintain their vertical position in the weak down-welling, and aggregate in the front to graze on the down-welled phytoplankton (Bakun 1996; Olson et al. 1994). The increased level of biological productivity in these zones attracts higher trophic level prey and their predators such as sharks.

Figure 3 illustrates the two main subtropical gyres (the north Pacific subtropical gyre in the northern hemisphere and the South Pacific subtropical gyre in the southern hemisphere) and the other major Pacific Ocean currents.

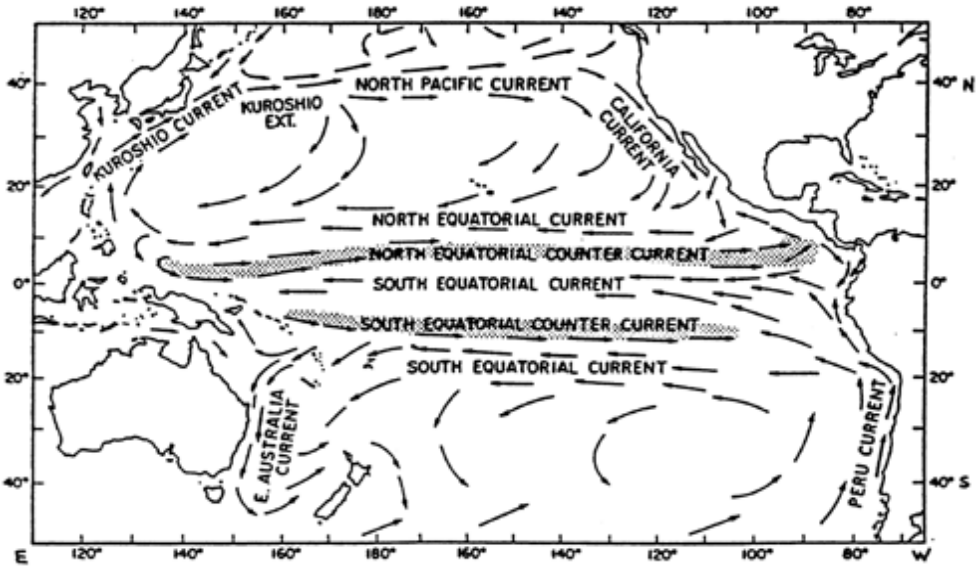


**Figure 3. The dominant ocean current systems in the Pacific Ocean.**
Source: Alex Wild, "A Review of the Biology and Fisheries for Skipjack Tuna in the Pacific Ocean"

Subtropical gyres rotate clockwise in the northern hemisphere and counter clockwise in the southern hemisphere in response to trade and westerly wind forces. Due to this, the central Pacific Ocean (~20° N latitude to 20° S latitude) experiences weak mean currents flowing from east to west, while the northern and southern portions of the Pacific Ocean experience a weak mean current flowing from west to east. Embedded in the mean flow are numerous mesoscale eddies -turbulent or spinning flows on scales of a few hundred kilometers created from wind and current interactions with the ocean's bathymetry (Stewart 2005). These eddies, which can rotate either clockwise or counter clockwise, typically have important biological impacts, such as creating areas of high biological productivity.

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. Most of these creatures are small phytoplankton and zooplankton, but larger crustaceans and mollusks are vulnerable to dissolution as well, especially in juvenile stages (Farby et al. 2008). 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). Iron, another limiting nutrient, is blown into the ocean through dust clouds. An overdose from any of these sources can cause eutrophication of coastal waters, including blooms of algae that can produce a toxin that can be consumed by shellfish and transmitted to their consumers, including humans (Paerl 1997). Eutrophication can also block sunlight and starve photosynthetic benthic life. Nutrients are also often transported in particulate form which can accumulate and smother benthic communities.

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 could be affected by the proposed rule: U.S. WCPO purse seine fishery, U.S. EPO purse seine fishery, Hawaii-based deep-set and shallow-set longline fisheries, the American Samoa longline fishery, and the U.S. albacore troll fishery. 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). This applies to all fisheries in the following sections, along with specific management measures unique to each fishery. Detailed descriptions of each of these fisheries and their existing management measures are provided in the sections below.

### 3.2.1 The U.S. WCPO and EPO Purse Seine Fisheries

Vessels of the U.S. WCPO and EPO purse seine fisheries target skipjack tuna (*Katsuwonus pelamis*) and to a lesser extent yellowfin tuna (*Thunnus albacares*) throughout the equatorial regions of the WCPO and in the EPO. As shown in Table 3 below, more vessels fish in the WCPO, though there has been an increase in the number of vessels fishing in the EPO in recent years.

The U.S. WCPO purse seine fleet operates mostly in the EEZs of Pacific Island Countries between 10° N and 10° S within the WCPFC Convention Area. Historically, most of the U.S. WCPO purse seine fleet operated out of Pago, Pago, American Samoa. However, more recently some of the vessels that have entered the fleet operate under a different business model, and transship most of their catch in Pacific Island ports in the region. Gillett et al. (2002) provide a detailed description of the historical development and expansion of the U.S. WCPO purse seine fleet from its basis in the EPO. The U.S. WCPO 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. As shown in Table 3 below, operations in the EPO and in the overlap area have increased in recent years. 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.

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 4). 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.

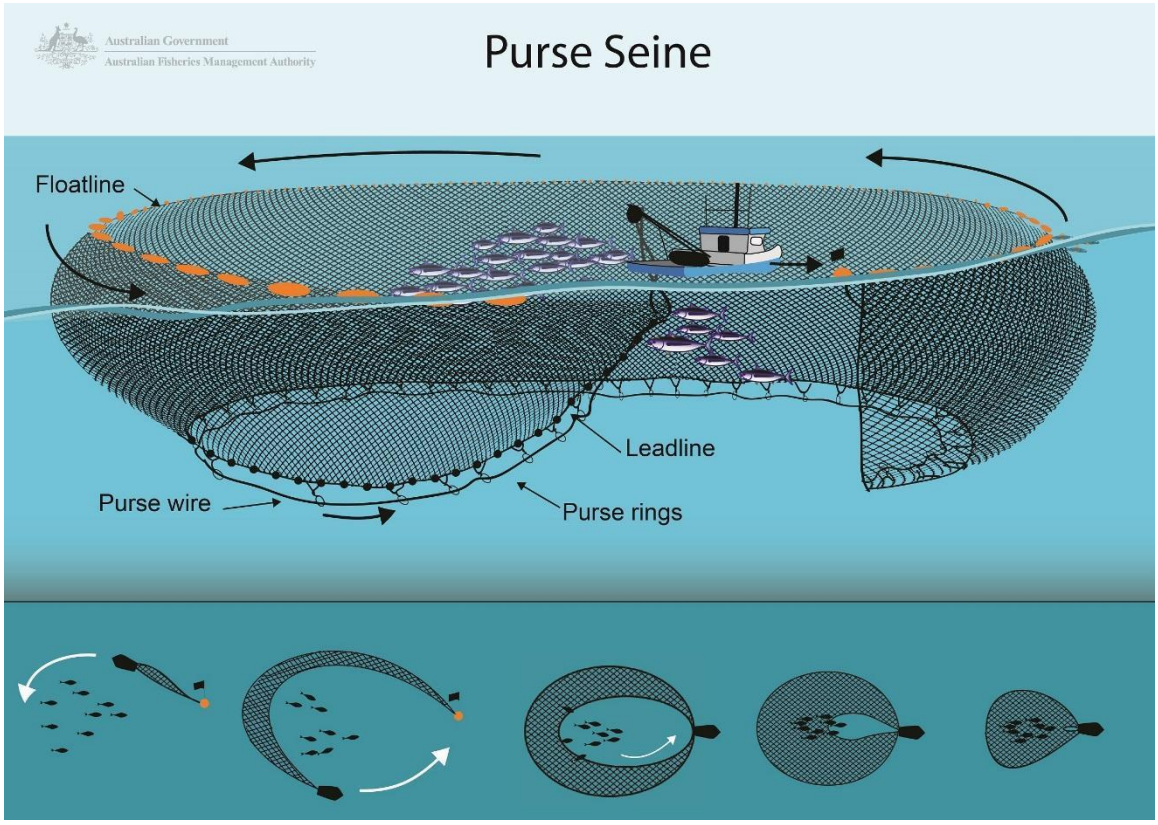


**Figure 4. Diagram of a purse seine net; purse seine fishing is mainly used to catch fish species that swim in large schools near the ocean surface.**
Source: Reprinted from the Australian Fisheries Management Authority, Purse Seine Methods and Gear, last accessed September 18, 2018; Reprinted with permission.

#### 3.2.1.1 Management of the U.S. Purse Seine Fleet in the Overlap Area

The fishing activities of U.S. purse seine vessels in the Pacific Ocean 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 (also known as the South Pacific Tuna Treaty (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), the TCA and implementing regulations (50 CFR Subpart C), 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), and regulations implementing the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (West Coast FMP) (50 CFR Part 660) also regulate U.S. purse seine vessels fishing in the Pacific Ocean. Beginning in 2010, U.S. purse seine vessels fishing in the WCPFC area have been required to carry WCPFC observers on all trips, with certain exceptions to collect data on bycatch and discards. Observers for the fleet are deployed by the Forum Fisheries Agency (FFA).

#### 3.2.1.2 Participation, Effort, and Catch

Participation in the U.S. purse seine fleet in the Pacific Ocean increased from the late 1980s to the mid-1990s, peaking at approximately 50 vessels, and gradually decreased until a low was reached in 2006. The fleet has since increased to about the levels of the mid 1990s, and has been relatively stable for the past five years. As of October 2019, there were 33 U.S. purse seine vessels on the WCPFC Record and 32 U.S. purse seine vessels on the IATTC Register, one of which was listed as inactive. Sixteen vessels are listed on both the WCPFC Record and IATTC Register**.** Table 3 shows the performance of the U.S. purse seine vessels fishing in the Pacific Ocean – WCPO, EPO, and overlap area – from 2008 through 2018– the most recent ten years for which data are available. NMFS has prepared a Regulatory Impact Review (RIR) for the proposed rulemaking (see *Regulatory Impact Review: Area of Overlap Between the Convention Area of the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission* (NMFS 2019a)), which provides economic information for the fleet, and is incorporated by reference here.

As shown in Table 3, for the U.S. purse seine vessels fishing in the Pacific Ocean skipjack tuna generally account for the majority of the catch, followed by yellowfin tuna, with bigeye tuna accounting for only a small proportion. Based on data compiled by SPC for the WCPFC area (including the overlap area) (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 WCPFC 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 4 shows the breakdown of catch by set type for the U.S. purse seine fleet in the WCPFC area between the years 2010-2016.

**Table 3. Number of vessels, fishing days and catch of tuna by the U.S. purse seine fishery in the Pacific Ocean, 2008-2018.**

Tuna catch, in metric tons, is the sum of skipjack tuna, yellowfin tuna and bigeye tuna catches. For confidentiality reasons, totals for years and areas with less than three vessels are withheld.

| | WCPFC | | | Overlap Area | | | IATTC | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Vessels | Fishing Days | Retained Tuna (mt) | Vessels | Fishing Days | Retained Tuna (mt) | Vessels | Fishing Days | Retained Tuna (mt) |
| 2008 | 34 | 5,862 | 165,955 | < 3 | - | - | < 3 | - | - |
| 2009 | 39 | 6,362 | 198,191 | < 3 | - | - | < 3 | - | - |
| 2010 | 37 | 7,075 | 192,151 | < 3 | - | - | < 3 | - | - |
| 2011 | 37 | 5,665 | 164,253 | < 3 | - | - | 3 | 20 | 57 |
| 2012 | 39 | 7,500 | 205,615 | < 3 | - | - | < 3 | - | - |
| 2013 | 40 | 6,224 | 184,978 | < 3 | - | - | < 3 | - | - |
| 2014 | 40 | 6,295 | 218,593 | < 3 | - | - | 3 | 32 | 784 |
| 2015 | 38 | 5,073 | 185,250 | < 3 | - | - | 9 | 284 | 12,791 |
| 2016 | 35 | 3,227 | 110,173 | 18 | 774 | 33,734 | 13 | 261 | 6,537 |
| 2017 | 35 | 3,925 | 123,294 | 8 | 16 | 317 | 17 | 443 | 11,841 |
| 2018 | 34 | 5,669 | 193,061 | 7 | 37 | 483 | 16 | 485 | 13,368 |

Source: NMFS unpublished data.

**Table 4. Annual U.S. WCPO purse seine catch estimates in metric tons by set type (unassociated and associated), 2010-2016.**

| Year | Skipjack | | Yellowfin | | Bigeye | | Totals |
|---|---|---|---|---|---|---|---|
| | Unass. | Ass. | Unass. | Ass. | Unass. | Ass. | |
| 2010 | 110,502 | 87,172 | 21,508 | 18,052 | 798 | 7,111 | 245,524 |
| 2011 | 46,843 | 110,613 | 12,826 | 21,423 | 274 | 11,261 | 203,240 |
| 2012 | 99,644 | 109,551 | 23,266 | 18,687 | 810 | 7,744 | 259,759 |
| 2013 | 95,327 | 111,748 | 9,255 | 25,052 | 442 | 12,332 | 254,271 |
| 2014 | 119,355 | 143,189 | 19,977 | 20,331 | 566 | 9,588 | 313,005 |
| 2015 | 110,696 | 97,000 | 14,372 | 10,602 | 713 | 4,694 | 238,007 |
| 2016 | 76,268 | 93,977 | 9,763 | 14,265 | 485 | 6,380 | 201,152 |
| Total | 658,635 | 753,250 | 110,967 | 128,412 | 4,088 | 59,110 | 1,714,958 |

Source: WCPFC 2017 (https://www.wcpfc.int/node/30076)

El Niño Southern Oscillation (ENSO) conditions influence where the best fishing grounds are at any given time. The eastern areas of the WCPO tend to be comparatively more attractive to the U.S. purse seine fleet during El Niño events, when warm surface water spreads from the western

Pacific to the eastern Pacific and large, valuable yellowfin tuna become more vulnerable to purse seine fishing and trade winds lessen in intensity. Thus, the overlap area is likely to be more important fishing grounds to the fleet during El Niño events. As of August 8, 2019, ENSO neutral conditions were present, and NOAA forecast with about 50-55 percent probability that they would most likely persist through the Northern Hemisphere through winter 2019-2020 (NWS 2019). ENSO conditions cannot be usefully forecast beyond that period.

As indicated in Figure 5, 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.[7] 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 determinants 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, 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.

[7] The WCPFC set forth a definition of FAD in CMM 2009-01 for the purposes of its FAD management measures and the IATTC set forth a definition of FAD in Resolution C-19-01 for the purposes of its FAD management measures. NMFS regulations at 50 CFR 300.211 set forth a definition of FAD for the domestic implementation of WCPFC FAD management measures and NMFS regulations at 50 CFR 300.21 set forth a definition of FAD for the domestic implementation of IATTC FAD management measures. All of these definitions are tied specific management measures. In this document, the term FAD refers to associated sets more broadly, unless a specific management measure is being discussed, in which case, the specific management authority definition would apply.

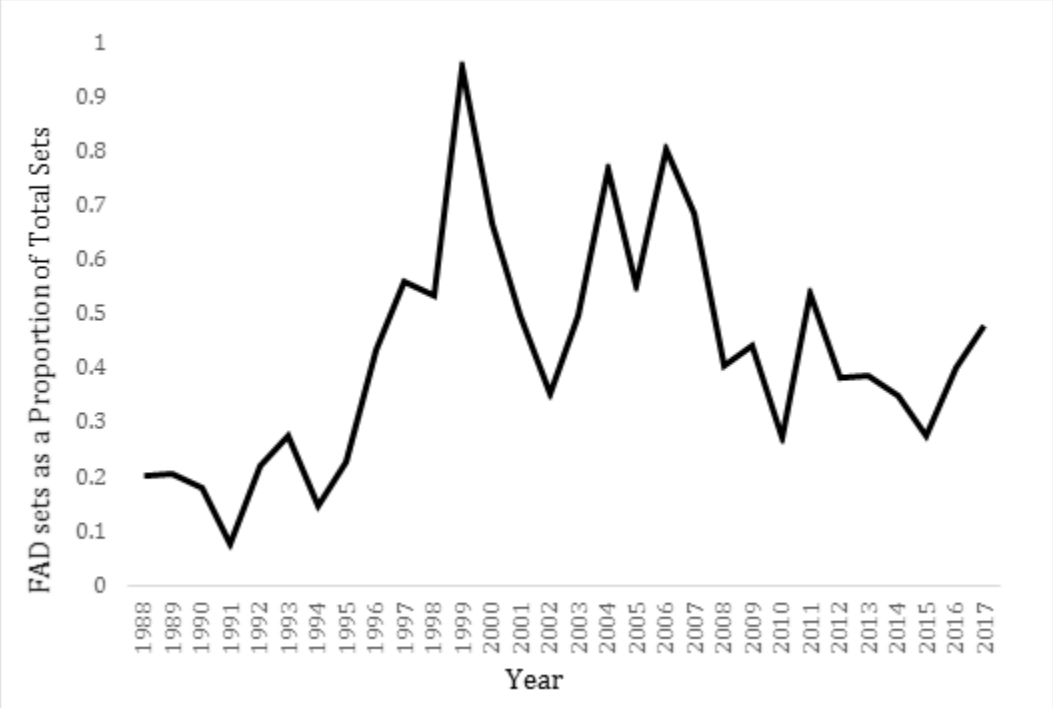


**Figure 5. FAD sets as proportion of all sets by U.S. WCPO purse seine fleet, 1988-2017.**
Source: NMFS unpublished data.

### 3.2.2 Longline Fisheries in the Pacific Ocean

The U.S. longline fisheries operating in the WCPFC area and the IATTC area include the Hawaii-based fisheries, which include a tuna-targeting deep-set fishery and a swordfish-targeting shallow-set fishery, and the American Samoa longline fishery, which targets albacore. Some Hawaii-permitted vessels also hold American Samoa longline permits. Dual-permitted vessels land their catch in Hawaii or American Samoa. 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.

The *Environmental Assessment for Bigeye Tuna Catch and Allocation Limits for Pelagic Longline Fisheries in U.S. Pacific Island Territories (RIN 0648-XG925)* includes detailed information on the longline fisheries operating in the Pacific Ocean (NMFS 2019b). Information from this document is incorporated by reference here and excerpted below.

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 temporarily prohibit longline fishing in the Southern Exclusion Zone (SEZ), an area in the EEZ south of Hawaii (84 FR 5356, February 21, 2019). An SEZ closure is triggered under regulations implementing the False Killer Whale Take Reduction Plan if there are two or more observed serious injuries or mortalities of false killer whales in the EEZ around Hawaii in a given year. Some longline 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 general, deep-set longline vessels operate out of Hawaii ports, with the vast majority based in Honolulu. Infrequently, deep-set trips originate from other ports such as Long Beach or San Francisco, California, or Pago Pago, American Samoa, and then fishermen land their catches in Hawaii. Fishermen departing from California begin fishing on the high seas, outside the U.S. EEZ. Fishermen departing from American Samoa usually begin fishing near the Equator or farther north in the North Pacific where they expect higher catch rates of bigeye tuna.

The shallow-set (swordfish-targeting) longline fishery operates in the U.S. EEZ around Hawaii and on the high seas to the north and northeast of the MHI seasonally. Effort typically increases in October and peaks in March, after which effort declines through the summer months.

For both the deep- and shallow-set longline fisheries, federal regulations prohibit the longline vessels from operating within any marine national monument, including monument areas encompassing the U.S. EEZ around Johnston Atoll, and Jarvis and Wake Islands.

NMFS manages Hawaii's deep-set and shallow-set longline fishery under a single limited access fishery with a maximum of 164 vessel permits. Based on logbook data, 145 permitted vessels conducted longline fishing activities in 2017. Of these vessels, 29 were greater than 24 m in length, and 18 vessels participated in the Hawaii-based swordfish fishery.

The longline fishery based in American Samoa is a limited access fishery with a maximum of 60 vessels under the federal permit program. Vessels range in size from under 40 to over 70 feet long. The fishery primarily targets albacore for canning in the local Pago Pago cannery, although the fishery also catches and retains other tunas (e.g., bigeye, yellowfin, and skipjack), and other pelagic species (e.g., billfish, mahimahi, wahoo, oilfish, moonfish (opah), and sharks) for sale and home consumption. 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. Additionally, around 25 American Samoa longline limited access permit holders also hold Hawaii longline limited access permits.

There is also a small longline fleet based on the U.S. West Coast, managed under the West Coast FMP, implemented by regulations at 50 CFR Part 660. Due to the small number of vessels in this fleet, information regarding this fleet is confidential.

Some of the Hawaii-based longline vessels also make landings on the U.S. West Coast. All longline vessels landing HMS on the U.S. west coast must also possess a permit issued under the West Coast FMP.

U.S. longline vessels (including the Hawaii-based and American Samoa-based longline fleets, as well as the small fleet off the West Coast) have not operated in the overlap area since 2010, and

NMFS has not identified any factors that would be expected to increase longline fishing activity in the overlap area. The overlap area is distant from the general areas of operation of the U.S. longline fisheries in the Pacific Ocean.

### 3.2.3 U.S. Albacore Troll Fisheries in the Pacific Ocean

U.S. vessels that fish with troll gear in the Pacific Ocean targeting albacore 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 WCPFC area from November through April. The North Pacific albacore troll fishery occurs mostly in the EPO from April through November (Childers and Pease 2012).

U.S. vessels fish for albacore in the Pacific with troll gear (artificial lures with barbless hooks that are towed behind a vessel, also called jigs). The basic troll vessel gear 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 5 and Table 6, below, show catch and effort data for the U.S. North Pacific and South Pacific albacore troll fisheries, respectively, from 2006 through 2017, the years for which the most recent data is available. The information in the tables includes information regarding total activity in all areas in the Pacific Ocean (Childers and Pease 2012).

**Table 5. U.S. North Pacific Albacore Troll Fishery - Numbers of Vessels, Catch, and Effort, 2006-2017.**

| Year | Landings (mt) | Effort | | | Catch Per Unit Effort (fish/day) |
|---|---|---|---|---|---|
| | | Trips | Catch Per Unit Effort (fish/day) | Vessels | |
| 2006 | 12,524 | 1,857 | 10,892 | 601 | 87 |
| 2007 | 11,887 | 2,212 | 11,552 | 628 | 70 |
| 2008 | 11,761 | 1,460 | 11,138 | 503 | 70 |
| 2009 | 12,793 | 2167 | 13,339 | 690 | 76 |
| 2010 | 12,661 | 2003 | 13,076 | 632 | 66 |
| 2011 | 10,143 | n/a | 13,983 | 656 | n/a |
| 2012 | 14,149 | n/a | 15,520 | 841 | n/a |
| 2013 | 12,310 | n/a | 13,509 | 703 | n/a |
| 2014 | 13,369 | n/a | 12,394 | 625 | n/a |
| 2015 | 11,558 | n/a | 11,734 | 587 | n/a |
| 2016 | 10,798 | n/a | 12,581 | 571 | n/a |
| 2017 | 7,216 | n/a | 12,545 | 494 | n/a |

Sources: U.S. data submitted to the WCPFC (NMFS unpublished data and Childers and Pease (2012). The catch totals include an unknown proportion of pole and line catch. Trips and CPUE data have not been provided in annual reports since 2010.

Table 6 shows the number of U.S. albacore troll vessels in the South Pacific albacore troll fishery fishing in the WCPO, overlap area, and EPO in recent years and the fishing days spent in the overlap area. Vessels in the North Pacific albacore troll fishery do not fish in the overlap area and thus, this fishery is not discussed further in this EA.

**Table 6. Number of U.S. Albacore Troll Vessels Fishing in the Southern Hemisphere in the WCPO (west of 150° W), Overlap Area, and EPO (east of 130° E) and Vessel-Days Fished in Each Area; 2008-2017.**

| | W of 150 W | | Area of Overlap | | East of 150 W | |
|---|---|---|---|---|---|---|
| Year | Vessels | Vessel-Days | Vessels | Vessel-Days | Vessels | Vessel-Days |
| 2008 | 3 | 162 | 3 | 93 | ** | ** |
| 2009 | 4 | 180 | 4 | 17 | 0 | 0 |
| 2010 | 6 | 339 | 5 | 58 | 3 | 7 |
| 2011 | 6 | 310 | 3 | 7 | 0 | 0 |
| 2012 | 9 | 378 | 9 | 152 | 6 | 17 |
| 2013 | 6 | 325 | 0 | 0 | 0 | 0 |

| | W of 150 W | | Area of Overlap | | East of 150 W | |
|---|---|---|---|---|---|---|
| **Year** | **Vessels** | **Vessel-Days** | **Vessels** | **Vessel-Days** | **Vessels** | **Vessel-Days** |
| 2014 | 13 | 816 | 12 | 189 | 0 | 0 |
| 2015 | 6 | 295 | 4 | 128 | 0 | 0 |
| 2016 | 6 | 277 | 6 | 216 | 0 | 0 |
| 2017 | 13 | 656 | 12 | 256 | 4 | 30 |

Source: NMFS unpublished data.
** indicates confidential data.

## 3.3 Biological Environment

This section describes the primary biological resources in the WCPFC area, including the overlap area, as well as ecological interactions between the species.

### 3.3.1 Biodiversity and Ecosystem Function

The following description of a marine fisheries food web is taken from Begon et al. 2006, and Nybakken 1997. Primary producers such as diatoms, dinoflagellates, coccolithophores, and cyanobacteria, are organisms that utilize solar energy to convert carbon dioxide into oxygen. Primary producers are considered the first trophic (or eating) level. The next trophic level includes the zooplankton; planktonic animals such as copepods and larval stages of fish. These microorganisms drift through the water column grazing on phytoplankton (plant-like plankton) and are referred to as "grazers". Copepods are the most abundant zooplankton and make up most of the animal biomass in the ocean. The third trophic level is made up of the molluscan bivalves, amphipods, and larval forms of fish and crustaceans. Small bait fish make up the next trophic level. These include small fish such as sardines, which in turn are eaten by big fish, the next trophic level. This level is made up of predators, species that tend to migrate from coastal to deep ocean waters. They are also prey to the apex predators, species at the top-most trophic levels. Species at this trophic level include tunas, billfish, and sharks. Dominant predators as well as apex predators often feed opportunistically, eating anything they encounter. Digested or dead organic matter drifts towards the ocean bottom where both suspended decomposers and bottom feeders utilize the dead matter's energy completing the food web cycle. Both biotic and abiotic factors interact with each other to create this cycle.

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. Figure 6 below, depicts a food chain from the central North Pacific Ocean. 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.

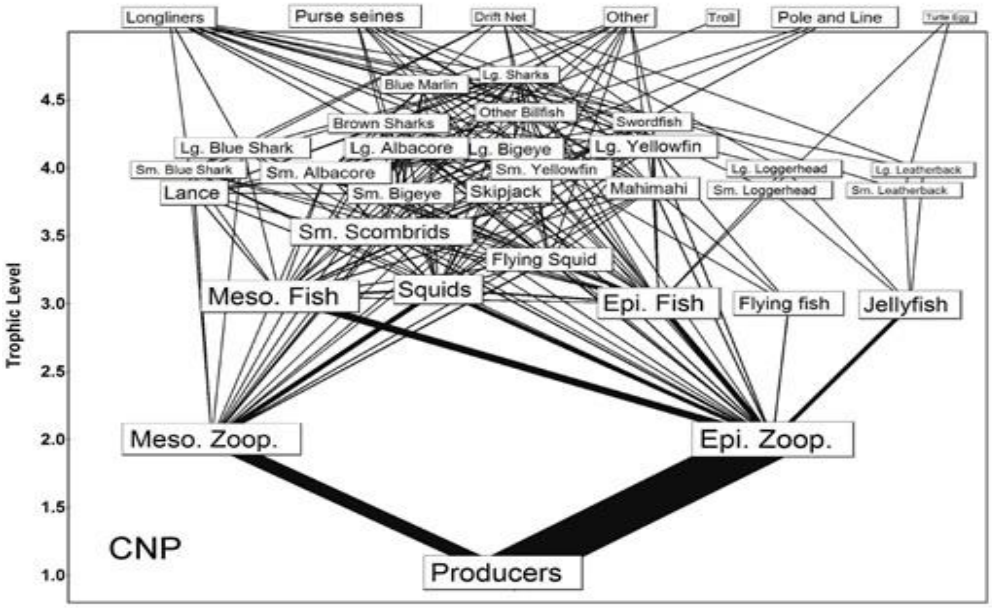


**Figure 6. An idealized food chain model from the central North Pacific Ocean.**
Source: Hinke et al. 2004.

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 7 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 2019c).

**Table 7. Stock status summary of main target HMS for the fisheries in the Overlap Area in the Pacific Ocean**.

| Species | Stock | Overfishing? | Overfished? |
|---|---|---|---|
| Albacore (*Thunnus alalunga)* | North Pacific | No | No |
| | South Pacific | No | No |
| Bigeye tuna (*Thunnus obesus)* | Eastern Pacific | No | No |
| | Western and Central Pacific | No | No |
| Skipjack tuna *(Katsuwonus pelamis)* | Eastern Pacific | No | No |
| | Western and Central Pacific | No | No |
| Swordfish (*Xiphias gladius*) | Eastern Pacific | Yes | No |
| | Western and Central North Pacific | No | No |
| Yellowfin tuna (*Thunnus albacares)* | Eastern Pacific | Yes | No |
| | Western and Central Pacific | No | No |

Source: https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2019-quarterly-updates

As shown in Table 7 above, using the MSA stock status determination criteria, the stock of EPO yellowfin tuna is considered to be experiencing overfishing, as is the EPO stock of swordfish. The following sections provide more information on each of the target species (shown in Table 7 above). Information from the *Programmatic Environmental Assessment for the Implementation of Decisions of the Western and Central Pacific Fisheries Commission on Management of Tropical Tunas in the Western and Central Pacific Ocean from 2015-2020* (NMFS 2015a) is

incorporated by reference below, and details can be found in that document for albacore tuna, bigeye tuna, skipjack tuna, swordfish, and yellowfin tuna.

#### 3.3.1.1 Albacore (*Thunnus alalunga*)

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 surface-dwelling 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 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.

#### 3.3.1.2 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.

#### 3.3.1.3 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.

#### 3.3.1.4 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.

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 3 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).

Swordfish are worldwide in distribution in all tropical, subtropical, and temperate seas, ranging from around 50° N to 50° S (Nakamura 1985). Swordfish are found in waters with a wide range of SSTs, from 5°-27° C, but are normally found in areas with SSTs above 13° C (Nakamura 1985). Archival tagging experiments indicate that they spend prolonged periods in deep, cooler water and can therefore tolerate water temperatures that are considerably cooler than at the surface (Takahashi et al. 2003). Studies have noted a general pattern of remaining at depth, sometimes near the bottom, during the day and rising near the surface during the night in what is believed to be a foraging strategy. Oceanographic features such as frontal boundaries that tend to concentrate forage species (especially cephalopods) apparently have a significant influence on adult swordfish distributions in the North Pacific. Swordfish are relatively abundant near boundary zones where sharp gradients of temperature and salinity exist (Palko et al. 1981). Until the mid-1990s, distant water fishing Asian fleets like those from Japan, Korea and Chinese Taipei caught the majority of swordfish. Targeted fleets from Australia and New Zealand then began to compete. In 2004 the Spanish longline fleet entered the market adding to the upswing in swordfish catch (Williams and Terawasi 2014). The U.S. longline fleets catch swordfish primarly in the North Pacific

#### 3.3.1.5 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 achipelagic 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.

### 3.3.3 Non-Target Stocks

As described in the following tables that are based on observer data, the U.S. purse seine fisheries operating in the Pacific Ocean catch a small amount of non-target species that are not considered protected resources. Some of the catch is retained. Species that are considered protected resources (i.e., ESA and MMPA-listed species) are described in Chapter 3 of the EA. Table 8 below shows information for the U.S. WCPO purse seine fishery and includes information on non-target species caught in the overlap area.

In general, albacore troll fisheries catch minimal non-target species (Kelleher 2005). Non-target species of the longline fisheries operating in the Pacific Ocean include other species of tuna, billfish and sharks. Detailed information regarding these species is included in Section 3.1 of NMFS 2019b and is incorporated here by reference. As stated above, there has been no U.S. longline activity in the overlap area since 2010 and thus, no catch of non-target species in the overlap area in recent years.

A total of ~814.6 metric tons of billfish, sharks, tuna, and other fishes were documented as non-target catch from 2002-2014 in the U.S. WCPO purse seine fishery operating in the WCPFC area, including the overlap area (logbook data). Tuna, described above, accounted for the majority of the overall catch (approximately 99%). The following table displays the most common non-target species that were caught and their relative percentage of makeup. Table 8 only displays non-target stocks that contributed to at least 2% or more of the total catch, since many species were just caught once or twice and contributed minimally to the overall non-target catch. In general, blue marlin, rainbow runner, and silky sharks contributed to larger amounts of non-target stocks caught, whereas there were very minimal catches of ocean triggerfish (spotted) and manta rays (Table 8).

**Table 8. Non-target (bycatch) species, metric tons (2002-2014), and relative percentage of total contribution from the U.S. WCPO purse seine fishery logbook data.**

| Species | Metric Tons (2002-2014) | Relative percentage of total non-target catch |
|---|---|---|
| **Billfish Total** | 762.4 | |
| Blue Marlin | 429.1 | 56.3% |
| Black Marlin | 201.6 | 26.4% |
| Striped Marlin | 105.1 | 13.8% |
| **Other Fish Total** | 4,199.3 | |
| Rainbow Runner | 1,551.1 | 36.9% |
| Mahi Mahi/Dolphinfish | 855.8 | 20.4% |
| Wahoo | 505.1 | 12.0% |
| Mackerel Scad/Saba | 388.6 | 9.3% |
| Oceanic Triggerfish (unidentified) | 295.2 | 7.0% |
| Bigeye Scad | 94.7 | 2.3% |
| Amberjack/Giant Yellowtail | 93.9 | 2.2% |
| Ocean Triggerfish (spotted) | 88.9 | 2.1% |
| **Shark Total** | 1,382.8 | |
| Silky Shark | 854.2 | 61.8% |
| Manta Rays (Unidentified) | 51.4 | 3.7% |

Source: NMFS unpublished data.

## 3.4 Protected Resources

This section provides information on protected resources in the WCPFC area, including the overlap area. U.S. purse-seine and albacore troll vessels operating in the area have the potential to interact with a range of protected species (such as marine mammals, turtles, and seabirds). Table 9 lists the species listed as endangered or threatened under the U.S. Endangered Species Act (ESA) that have the potential to be affected by any changes to fishing patterns and practices in the overlap area.

### 3.4.1 Threatened and Endangered 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[8] 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 9 shows the ESA-listed species with which the fisheries analyzed in this EA could interact

**Table 9. Listing Status of Species in the WCPO (Including the Overlap Area) Listed as Endangered or Threatened Under the U.S. Endangered Species Act.**

| 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 |

[8] 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 |
|---|---|---|---|
| *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** | | | |
| *Artocephalus townsendi* | Guadalupe Fur Seal | Threatened | NMFS |
| *Balaenoptera borealis* | Sei whale | Endangered | NMFS |
| *Balaenoptera musculus* | Blue whale | Endangered | NMFS |
| *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 |

| Scientific Name | Common Name | ESA | Agency with Jurisdiction |
|---|---|---|---|
| *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** | | | |
| *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 |

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

Sources: NOAA Fisheries Species Directory; ECOS Threatened and Endangered Species; Last accessed August 2019.

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 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 U.S. purse seine fisheries, longline fisheries, and albacore troll fisheries in the Pacific Ocean currently operate:

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

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

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

NMFS. 2019d. 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).

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

The 2006 BiOp for the U.S. WCPO purse seine fishery analyzed the effects of the fishery on the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricate*), the leatherback turtle (*Demochelys 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 novaengliae*), 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 U.S. WCPO 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 speciosea*, *Acropora tenella*, *Anacropora spinosa*, *Euphyllia paradivisa*, *Isopara crateriformis*, *Montipora australiensis*, *Pavona diffluens*, *Porites napopora*, and *Seriatopora aculeata*); the giant manta ray (*Manta 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 U.S. WCPO 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 U.S. WCPO 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 WCPO purse seine fishery – the Western North Pacific DPS.

NMFS prepared a Biological Assessment (BA) (NMFS 2017b) for the U.S. WCPO 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 U.S. WCPO 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 U.S. WCPO 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 U.S. WCPO 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 U.S. WCPO 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 U.S. WCPO 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 U.S. WCPO 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); 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.

As set forth in the analysis in Chapter 5 of the BA, NMFS determined that the U.S. WCPO 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 U.S. WCPO 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, and January 15, 2020, 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 2004 BiOp for the U.S. EPO purse seine fishery analyzed the effects of the fishery on green turtles, hawksbill turtles, leatherback turtles, loggerhead turtles, olive ridley turtles, fin whales, humpback whales, and sperm whales, and concluded that the continued authorization of the

fishery under all applicable management measures was not likely to jeopardize the continued existence of these species.

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 hawsbill 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 October 4, 2018, 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 April 3, 2019, due to reaching several reinitiation triggers. The fishery exceeded 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 April 3, 2019, 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).

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 east 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.

Based on the information available to date from the ESA consultation histories of the U.S. WCPO purse seine fishery, the U.S. EPO purse seine fishery, the Hawaii shallow-set longline fishery, the Hawaii deep-set longline fishery, the American Samoa longline fishery, and the South Pacific albacore troll fishery, continued authorization of these fisheries under existing management regimes for the foreseeable future would not have a substantial effect on ESA-listed species or designated critical habitat.

### 3.4.2 Marine Mammals

All marine mammals also receive protection under the Marine Mammal Protection Act (MMPA; 16 U.S.C. § 1361, *et seq*.). The marine mammals found in the WCPFC area, including the overlap area, but not listed under the ESA as threatened or endangered (i.e., not included in Table 9, above) are listed in Table 10, below.

**Table 10. Non ESA-Listed Marine Mammals that Occur in the WCPFC area.**

| Species name | Common name |
|---|---|
| *Balaenoptera acutorostrata* | Minke whale |
| *Balaenoptera bonaerensis* | Antarctic minke whale |
| *Balaenoptera edeni* | Bryde's whale |
| *Berardius arnuxii* | Arnoux's beaked whale |
| *Callorhinus ursinus* | Northern Fur Seal |
| *Caperea marginata* | Pygmy right whale |
| *Delphinus delphis* | Short-beaked common dolphin |
| *Feresa attenuate* | Pygmy killer whale |
| *Globicephala macrorhynchus* | Short-finned pilot whale |
| *Globicephala melas* | Long-finned pilot whale |
| *Grampus griseus* | Risso's dolphin |
| *Hyperoodon planifrons* | Southern bottlenose whale |
| *Indopacetus pacificus* | Longman's beaked whale |
| *Kogia breviceps* | Pygmy sperm whale |
| *Kogia sima* | Dwarf sperm whale |
| *Lagenodelphis hosei* | Fraser's dolphin |
| *Lagenorhynchus cruciger* | Hourglass dolphin |
| *Lagenorhynchus obliquidens* | Pacific white sided dolphin |
| *Lagenorhynchus obscurus* | Dusky dolphin |
| *Lissodelphis peronei* | Southern right whale dolphin |
| *Mesoplodon bowdoini* | Andrew's beaked whale |
| *Mesoplodon densirostris* | Blainville's Beaked Whale |
| *Mesoplodon ginkgodens* | Ginkgo-toothed whale |
| *Mesoplodon grayi* | Gray's beaked whale |
| *Mesoplodon hectori* | Hector's beaked whale |
| *Mesoplodon layardii* | Strap-toothed whale |
| *Mesoplodon stejnegeri* | Stejneger's beaked whale |
| *Mesoplodon traversii* | Spade-toothed whale |
| *Mirounga angustirostris* | Northern Elephant Seal |
| *Orcinus orca* | Killer whale |
| *Peponocephala electra* | Melon headed whale |
| *Phocoena dioptrica* | Spectacled porpoise |
| *Phocoena phocoena* | Harbor porpoise |
| *Phocoenoides dalli* | Dall's porpoise |
| *Pseudorca crassidens* | False killer whale[9] |
| *Stenella attenuate* | Pantropical spotted dolphin |
| *Stenella coeruleoalba* | Striped dolphin |
| *Stenella longirostris* | Spinner dolphin |
| *Steno bredanensis* | Rough toothed dolphin |
| *Tursiops truncates* | Bottlenose dolphin |
| *Ziphius cavirostris* | Cuvier's beaked whale |

Sources: NMFS 2015a; NOAA Endangered Species Conservation.

The U.S. WCPO purse seine fishery is listed as a Category II fishery under the regulations implementing the MMPA, meaning that it is a commercial fishery determined to have occasional

[9] As stated in Table 9 above, the Main Hawaiian Islands insular false killer whale distinct population segment has been listed as endangered. Several humpback whale DPS are also not listed under the ESA

incidental mortality and serious injury of marine mammals. See 85 FR 21079 (published April 16, 2020; effective May 18, 2020) for the List of Fisheries for 2020. The U.S. EPO purse seine 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.

Pursuant to NMFS' reinitiated ESA consultation for the U.S. WCPO purse seine fishery, NMFS is evaluating whether this fishery has adverse effects on ESA-listed marine mammals, and if so, whether these fisheries are subject to additional requirements under MMPA section 101(a)(5)(E). As stated above, the blue whale, the sei whale, and the sperm whale are the three ESA-listed marine mammals that may be adversely affected by the U.S. WCPO purse seine fishery. In memoranda dated December 5, 2017, May 17, 2018, and December 6, 2018, and June 28, 2019, and January 15, 2020, NMFS determined that continuation of the fishery during the period of ESA 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).

For the U.S. EPO purse seine fishery, the 2004 BiOp analyzed the effects of the fishery on fin whales, humpback whales, and sperm whales, and concluded that the continued authorization of the fishery under all applicable management measures was not likely to jeopardize the continued existence of these species.

The Hawaii deep-set longline fishery is a Category I fishery, meaning that it is a commercial fishery with frequent serious injuries and mortalities of marine mammals. As stated above, humpback whales, sperm whales, MHI insular false killer whales are the ESA-listed marine mammals that may be adversely affected by the fishery. By memorandum dated October 4, 2018, 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) for these species.

The Hawaii shallow-set longline fishery and American Samoa longline fishery are Category II fisheries. The 2019 BiOp 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 American Samoa longline fishery is not known to interact with ESA-listed marine mammals.

The South Pacific albacore troll fishery is a Category II fishery, and, as discussed in above, is not known to interact with ESA-listed marine mammals.

Section 101(a)(5)(E) of the MMPA requires the Secretary of Commerce to allow the incidental, but not intentional, taking of individuals from marine mammal stocks that are designated as depleted because of a listing as threatened or endangered under the ESA in the course of commercial fishing operations if it is determined that three criteria are met:

1. Incidental mortality and serious injury will have a negligible impact on the affected species or stock;

2. A recovery plan has been developed or is being developed; and

3. Where required under Section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with Section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

On October 16, 2014, NMFS authorized a permit under the MMPA section 101(a)(5)(E), addressing the Hawaii longline shallow-set and deep-set fisheries' interactions with ESA-listed species or depleted stocks of marine mammals (79 FR 62106). The permit authorizes the incidental, but not intentional, taking of ESA-listed humpback whales (central North Pacific or CNP stock), sperm whales (Hawaii stock), and MHI insular false killer whales to vessels registered in the Hawaii deep-set and shallow-set fisheries. In issuing this permit, NMFS determined that incidental taking by the Hawaii longline fisheries will have a negligible impact on the affected stocks of marine mammals. Since the issuance of this permit, the CNP humpback whale was designated a DPS and is not a listed species under the ESA (81 FR 62259, September 8, 2016).

### 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[10].

### 3.4.4 Other Protected Resources

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". No NWRs or National Monuments occur in the overlap area.

The Coastal Zone Management Act of 1972 (CZMA; 16 U.S.C. § 1456(c)(1)(C)) and the regulations implementing the federal consistency requirements of the CZMA set forth certain procedures to determining whether federal actions are consistent with the policies of the coastal zone management programs of U.S. states and territories. NMFS sent letters to American Samoa, Guam, Hawaii, and the Commonwealth of the Northern Mariana Islands on February 7, 2019, determining that the proposed action is consistent to the maximum extent practicable with the enforceable policies of each coastal zone management program. The overlap area does not include any portion of the coastal zone of a U.S. state or territory.

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 affected environment.

[10] 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.

# 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 each of the action alternatives as well as the No-Action Alternative, which are described in Chapter 2. Cumulative impacts are addressed in Chapter 5.[11]

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 each of the alternatives. The following sections analyze the environmental impacts the anticipated changes to the fisheries could cause to each of the potentially affected resources in the affected environment. The chapter concludes with a summary that compares the different impacts of the alternatives.

## 4.1 The Purse Seine Fisheries in the Pacific Ocean

The direct and indirect effects to the U.S. WCPO and EPO purse seine fisheries from implementation of each of the alternatives 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 2020 RIR, prepared under Executive Order 12866, for the proposed action, which is incorporated by reference into this document. The potential impacts from implementation of each of the alternatives to each of the potentially affected resources are analyzed in the following sections.

### 4.1.1 The No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the overlap area and the regulations promulgated in the 2016 final rule would remain in place. Thus, WCPFC regulations would continue to apply in the overlap area and, with the exception of the requirements regarding the IATTC Register, IATTC regulations would not apply in the overlap area. Thus, no resulting direct or indirect effects to the U.S. WCPO and EPO purse seine fisheries would be expected under the No-Action Alternative.

### 4.1.2 Action Alternative 1

Under this alternative, only regulations implementing IATTC decisions would apply in the overlap area. Table 2 lists the WCPFC regulations and the IATTC regulations and their applicability in the overlap area under Action Alternative 1. The following sections discuss the

[11] According to the 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.

changes in management measures for HMS and associated species and the changes in management measures for MCS that would take place under Action Alternative 1.

#### 4.1.2.1 Management Measures for HMS and Associated Species

Under Action Alternative 1, the change in application from WCPFC fishing effort limits and FAD restrictions to IATTC fishing closures and FAD restrictions could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area. The WCPFC-derived regulations implement provisions of CMM 2018-01, scheduled to be in effect through 2020. CMM 2018-01 calls for U.S. purse seine fishing effort on the high seas in the WCPFC Area to be limited to 1,270 fishing days per year, and fishing effort in the U.S. EEZ in the WCPFC Area to be limited to 558 fishing days per year.[12] The measure's FAD restrictions include a three-month closure on setting on FADs throughout the WCPFC area (July-September), and an additional two-month closure just on the high seas, as well limits on the number of active FADs per vessel and FAD design requirements, which enter into effect January 1, 2020. For the additional high seas closure, WCPFC members have a choice between April-May and November-December. Aside from the FAD design requirements, which entered into effect on January 1, 2020, NMFS has already established the FAD restrictions for 2019 and subsequent years in regulations.

The IATTC regulations implement provisions of Resolution C-17-02, which is also scheduled to be in effect through 2020. The relevant provision for purse seine vessels is a 72-day closure on purse seine fishing throughout the IATTC Area. As shown in the RIR, these IATTC regulations for U.S. purse seine vessels would provide greater fishing opportunities and flexibility than those of the WCPFC, since the overlap area would not be subject to the WCPFC purse seine effort limits or FAD restrictions. It is not possible to predict the degree to which those opportunities would be taken advantage of, but the greater opportunities and the flexibility they provide indicate that application of the IATTC regulations in the overlap area under Action Alternative 1 would likely result in U.S. purse seine vessels spending more time fishing in the overlap area. The IATTC regulations also implement active FAD limits and FAD design requirements, which are similar to those in CMM 2018-01. However, NMFS has not yet implemented the WCPFC FAD design requirements. Under the regulations implementing WCPFC CMM 2018-01 at 50 CFR 300.223(b)(3), there is limit of 350 drifting active FADs per vessel in the WCPFC area, while under the regulations implementing IATTC Resolution C-17-02, 50 CFR 300.28(c) and (d), the limit on the number of FADs is based on the size of the purse seine vessel (for large vessels the limit is 450 active FADs per vessel in the IATTC area at any one time, and there are specific reporting requirements for active FADs, as well as restrictions on FAD deployments and removals). U.S. purse seine vessels are already complying with the IATTC requirements when fishing in the EPO, and data from 2014-2018 indicate that all current U.S. purse seine vessel that fished in the overlap area also fished in the IATTC Area. Thus, the change from WCPFC regulations to IATTC regulations for these provisions would not be expected to substantially affect the fishing patterns and practices of U.S. purse seine vessels.

[12] NMFS has promulgated regulations that implement a combined fishing effort limit for the high seas and U.S. EEZ of 1,616 fishing days in 2019 (to take into account an overage of the 2018 high seas effort limit) and 1,828 fishing days in 2020 and subsequent years (see 50 CFR 300.223(a)).

The greater fishing opportunities and flexibility could extend into the WCPO as well, since the days U.S. purse seine vessels fish in the overlap area would no longer count towards the effort limit on the high seas, and more fishing days could be available to vessels fishing in the WCPFC area outside the overlap area. It is also possible that the effort limit would be reached later in the year than if the WCPFC effort limits applied in the overlap area.

The other regulatory changes for management measures for HMS and associated species would not be expected to substantially affect the fishing patterns and practices of the U.S. purse seine vessels fishing in the overlap area. The WCPFC catch retention measures that would be removed under Action Alternative 1 would be very similar to the IATTC catch retention and bycatch mitigation measures that would go into effect. The main differences between the two sets of regulations are that the IATTC regulations only apply to large purse seine vessels and do not include an exception to the retention requirements in the case of serious malfunction of equipment. All of the vessels that are on both the WCPFC Record and IATTC Register (and thus, currently authorized to fish in the overlap area) are large purse seine vessels and it is anticipated that serious malfunction of equipment while these vessels are fishing in the overlap area would be a rare event. Thus, the differences in the catch retention provisions would not be expected to substantially affect the fishing behavior of the U.S. purse seine vessels fishing in the overlap area under Action Alternative 1.

Similarly, both the WCPFC regulations and IATTC regarding interactions between purse seine vessels and sea turtles set forth similar and detailed steps that must be taken in such circumstances and thus, it is unlikely that implementation of Action Alternative 1 would affect the fishing patterns and practices of the U.S. purse seine vessels fishing in the overlap area.

Regarding regulations for whale sharks, the WCPFC regulations and IATTC regulations regarding purse seine interactions with whale sharks are essentially identical in terms of requirements for vessels fishing in the overlap area, and thus, implementation of Action Alternative 1 would be unlikely to affect the fishing patterns and practices of the U.S. purse seine vessels operating in the overlap area.

The prohibition on retention of oceanic whitetip sharks and silky sharks for U.S. purse seine vessels is essentially the same under the WCPFC-derived regulations and the IATTC-derived regulations, so it is unlikely that there would be any effects to the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area under Action Alternative 1.

Under Action Alternative 1, there would be additional IATTC regulations for U.S. purse seine vessels for fishing on data buoys, mitigation measures for mobulid rays, specific shark handling and release requirements for purse seine vessels, and specific release requirements for non-tuna species, as well as active FAD reporting requirements and FAD design requirements. There are a limited number of data buoys in the overlap area – according to information for the National Data Buoy Center website there is one anchored data buoy within the overlap area – limited catch of mobulid rays and sharks, and limited retention of non-tuna species (Table 8), and as discussed, above, the active FAD reporting requirements and FAD design requirements are not expected to substantially affect the fishing patterns and practices of the fleet, as U.S. purse seine vessel owners and operators fishing in the overlap area also fish in the EPO and are subject to and familiar with implementing IATTC-derived regulation. At the most, Action Alternative 1

could have minor effects on the fishing patterns and practices of U.S. purse seine vessel operating in the overlap area, need additional time at sea during fishing operations to comply with specific mitigation measures regarding data buoys, mobulid rays, sharks, and non-tuna species that would enter into effect in the overlap area under IATTC regulations, which in turn could increase overall time at sea and time conducting other fishing operations.

#### 4.1.2.2 Management Measures for MCS

The changes in requirements for the majority of the MCS measures under Action Alternative 1 (requirements related to reporting and recordkeeping, the WCPFC Record and IATTC RVR, vessel identification, transshipment and net sharing, VMS, compliance with laws of other nations, and facilitation of enforcement and inspection), as described in detail in Chapter 2 of this EA, would not be expected to substantially affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area, as they would be mostly administrative in nature. The change in requirements may minimally affect some reporting and recordkeeping activities of vessel owners and operators, as well as response to enforcement officials, since there would no longer be specific requirements for high seas boarding and inspection. The regulations implementing IATTC decisions would not be expected to lead to substantial effects on the fishing patterns and practices of U.S. purse seine vessels. The regulations at 50 CFR 300.22 for purse seine vessels that would go into effect in the overlap area include reporting requirements, which are similar to or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements, as described above (the requirement at 50 CFR 300.22(a) to maintain a logbook under which submission of any logbook required by state or federal regulations is sufficient for small purse seine vessels; some additional reporting requirements apply to large purse seine vessels, as well as some FAD reporting requirements; the whale shark encirclement reporting requirements at 50 CFR 300.22(a) are essentially identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements), and VMS requirements at 50 CFR 300.26, which are also similar or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements. The prohibition on purse seine transshipments at sea (50 CFR 300.25(c)) is essentially identical to the prohibition on purse seine transshipments at sea under WCPFC regulations (50 CFR 300.216(b)(1)). The other regulations implementing IATTC decisions that would apply in the overlap area to U.S. purse seine vessels are requirements related to the IATTC RVR (50 CFR 300.22(b)), purse seine observers (50 CFR 216.24(e)), and AIDCP requirements (50 CFR 216.24), which are already in effect in the overlap area, so would be the same as under the no-action alternative.

NMFS received comments on the proposed rule indicating that some U.S. purse seine vessels that currently fish exclusively in the IATTC may be interested in fishing in the overlap area after the final rule goes into effect. As indicated in these comments, for vessels that currently fish exclusively in the IATTC Area, the purse seine observer coverage requirements at 50 CFR 300.223(e), requiring a WCPFC observer or a cross-endorsed observer on U.S. purse seine vessels on all fishing trips in the overlap area would be a new requirement for those vessels that would be costly and the requirement currently acts as a deterrent to fishing activities in the overlap area. The comments indicated that these vessels do not currently fish in the overlap area due to the requirement to carry WCPFC observers or cross-endorsed observers. Thus, it is likely that some purse seine vessels that do not currently fish in the overlap area – vessels that currently

fish solely in the IATTC area – would fish in the overlap area under Action Alternative 1 because the purse seine observer coverage requirements at 50 CFR 300.223(e) would no longer be in effect. Thus, under Action Alternative 1, there could be a small increase in fishing effort in the overlap area in addition to the increase anticipated from the change from the WCPFC purse seine fishing effort limits and FAD restrictions to the IATTC purse seine fishing seasonal closures and FAD restrictions, described above. Given that the additional increase in fishing effort would be from a small proportion of the vessels in the fleet and that it is not possible to predict the degree to which any of the new fishing opportunities would be taken advantage of, this increase in fishing effort would not be expected to be substantial.

Overall, the regulatory changes under Action Alternative 1 would not be expected to substantially affect the existing behavior of vessel owners and operators.

### 4.1.3 Action Alternative 2

Under this alternative, as shown in Table 2 of this EA, only WCPFC management measures for HMS and associated species would be removed in the overlap area. All other WCPFC management measures would continue to apply in the overlap area. All IATTC management measures would also apply in the overlap area. As stated above for Action Alternative 1, the regulatory changes regarding the change in application from WCPFC fishing effort limits and FAD restrictions to IATTC fishing closures and FAD restrictions could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area and U.S. purse seine vessels fishing in the WCPO. The effects would be identical to the effects under Action Alternative 1, described in Section 4.1.3 (i.e., the potential for increased fishing in the overlap area and in other areas of the WCPO, and minor effects on the fishing patterns and practices of U.S. purse seine vessel operating in the overlap area, if vessel owners and operators need additional time at sea during fishing operations to comply with specific mitigation measures regarding data buoys, mobulid rays, sharks, and non-tuna species that would enter into effect in the overlap area under IATTC regulations, which in turn could increase overall time at sea and time conducting other fishing operations).

The other change in requirements under Alternative 2, as described in detail above, also would not be expected to substantially affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area.

The IATTC regulations and the effects of application of those regulations in the overlap area would be the same as for Alternative 1. Additionally, some WCPFC regulations would remain in place under Alternative 2. Most U.S. purse seine vessels that would fish in the overlap area fish in the WCPFC Area and are familiar with those requirements. However, NMFS received comments on the proposed rule indicating that some U.S. purse seine vessels that currently fish exclusively in the IATTC may be interested in fishing in the overlap area after the final rule goes into effect.

The regulations regarding vessel identification requirements and VMS requirements would not be expected to bring any new costs, as U.S. purse seine vessels fishing in the IATTC Area are already subject to similar or identical requirements, as discussed above. The requirements for complying with the laws of other nations also are not expected to bring any new costs, as it is

unlikely any U.S. purse seine vessels would fish in areas subject to the laws of other nations. Similarly, vessel information requirements for fishing in foreign EEZs at 50 CFR 300.213 would not be expected to bring any new costs. Applying for and obtaining the WCPFC Area Endorsements would result in some minor compliance costs – the application fee for the five-year authorization is $58 and the estimated time for completing the application is one hour. Submission of the vessel information for fishing in foreign EEZs is estimated to take 1.5 hours, so again, there would be some minor compliance costs associated with this requirement. The reporting and recordkeeping requirements also would bring some compliance costs, but these costs are not expected to be substantial. The fishing report requirements at 50 CFR 300.218(a) may be fulfilled by completion of the IATTC reporting requirements at 50 CFR 300.22. The transshipment reporting requirements at 50 CFR 300.218(b) and (d) would not be expected to bring substantial costs, since purse seine vessels would be prohibited from transshipment at sea in the overlap area, and it unlikely U.S. purse seine vessels would be conducting any transshipment in port in the overlap area. The purse seine discard reporting requirements at 50 CFR 300.218(e) would also not be expected to cause substantial costs. The discard forms are estimated to each take 30 minutes to complete and cost $1 per response. Similarly, the net sharing reporting requirements at 50 CFR 300.218(f) are not expected to cause substantial costs. The net sharing reports are provided as part of the daily logbook reporting requirements and are not separate reports. The daily purse seine fishing effort reports at 50 CFR 300.218(g) are not expected to cause substantial costs. The reports are estimated to take 10 minutes to complete and cost $1 per response. The requirements for facilitation of enforcement and inspection would bring some costs, but these costs are also unlikely to be substantial. Maintaining appropriate documentation on board the vessel, monitoring certain radio frequencies, and adhering to gear stowage requirements is not expected to lead to substantial costs. Facilitating high seas boarding and inspections would only lead to costs when they occur. WCPFC CMM 2006-08, "Western and Central Pacific Fisheries Commission Boarding and Inspection Procedures" details the specific procedures that inspection vessels must follow when conducting such boarding and inspections and requires inspections to be completed within four hours unless evidence of a serious violation is found. Thus, such high seas boarding and inspections, if they do occur, would not be expected to lead to substantial costs unless evidence of a serious violation is found; it is difficult to predict how often that would occur and what type of compliance costs would be incurred in such a situation.

As indicated in comments on the proposed rule, for vessels that currently fish exclusively in the IATTC Area, the purse seine observer coverage requirements at 50 CFR 300.223(e), requiring a WCPFC observer or a cross-endorsed observer on U.S. purse seine vessels on all fishing trips in the overlap area would be a new requirement for those vessels that would be costly and would act as a deterrent to fishing activities in the overlap area. The comments indicated that these vessels do not currently fish in the overlap area due to the requirement to carry WCPFC observers or cross-endorsed observers. Action Alternative 2 would be identical to the no-action alternative in this respect, and for that reason, such vessels would not be expected to fish in the overlap area under Action Alternative 2. Thus, overall, the effects on fishing patterns and practices under Action Alternative 2 would be substantially similar to the effects on fishing patterns and practices under Action Alternative 1.

### 4.1.4 Action Alternative 3

Under Action Alternative 3, fewer WCPFC regulations would remain in place in the overlap area than under Action Alternative 2, but more WCPFC regulations would remain in place in the overlap area than under Action Alternative 1. Under Action Alternative 3, U.S. purse seine vessels would not need to carry WCPFC observers or cross-endorsed observers on all fishing trips in the overlap area and would not need to complete transshipment reporting requirements, discard reporting requirement, net sharing reporting requirements, and daily purse seine fishing effort reporting requirements, and would not be able to conduct net sharing activities; the other requirements for U.S. purse seine vessels would be the same as for Action Alternative 2.

As stated above and as for Action Alternative 1, based on the comments to the proposed rule, it is likely that purse seine vessels that do not currently fish in the overlap area – vessels that currently fish solely in the IATTC area – would fish in the overlap area under Action Alternative 3 because the purse seine observer coverage requirements at 50 CFR 300.223(e) would no longer be in effect. Thus, under Action Alternative 3, there could be a small increase in fishing effort in the overlap area in addition to the increase anticipated from the change from the WCPFC purse seine fishing effort limits and FAD restrictions to the IATTC purse seine fishing seasonal closures and FAD restrictions, described above. Given that the additional increase in fishing effort would be from a small proportion of the vessels in the fleet and that it is not possible to predict the degree to which any of the new fishing opportunities would be taken advantage of, the effects to fishing patterns and practices under of the fleet under Action Alternative 3 would be substantially the same as for Action Alternative 1 and Action Alternative 2.

## 4.2 U.S. South Pacific Albacore Troll Fishery

The South Pacific albacore troll fishery would not be expected to be substantially affected from implementation of the No-Action Alternative or any of the action alternatives. The regulatory changes for management measures for HMS and associated species that would go into effect under each of the action alternatives (as described in Chapter 2 of this EA) would not be expected to substantially affect the fishing patterns and practices of the U.S. albacore troll vessels fishing in the overlap area. The catch and effort regulations currently in place in the WCPO and EPO do not directly affect the fishery. The WCPFC bycatch mitigation measures that would be removed under the action alternatives would be very similar to the IATTC bycatch mitigation measures that would go into effect. There would be additional IATTC regulations for fishing on data buoys and mitigation measures for mobulid rays, but there are a limited number of data buoys in the overlap area – according to information from the National Data Buoy Center there is only one anchored data buoy in the overlap area – and in general, there is minimal bycatch in albacore troll fisheries (Kelleher 2005).

The regulatory changes for MCS management measures that would go into effect under each of the action alternatives in the overlap area (as set forth in Table 2) would not be expected to substantially affect the fishing patterns and practices of vessels in the albacore troll fishery. Under Action Alternative 1, the change in requirements may minimally affect some reporting and recordkeeping activities of vessel owners and operators, as well as response to enforcement officials, since there would no longer be specific requirements for high seas boarding and inspection under Action Alternative 1 and some additional reporting and recordkeeping

requirements that would go into effect.[13] The regulations implementing IATTC decisions would be the same under each of the action alternatives and would not be expected to lead to substantial economic burden on U.S. albacore troll vessels. The regulations at 50 CFR 300.22 for albacore troll vessels that would go into effect in the overlap area include reporting requirements, which are similar to or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements, as described above (the requirement at 50 CFR 300.22(a) to maintain a logbook under which submission of any logbook required by state or federal regulations is sufficient), and VMS requirements at 50 CFR 300.26, which are also similar or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements. The other regulations implementing IATTC decisions that would apply in the overlap area to U.S. albacore troll vessels are requirements related to the IATTC RVR (50 CFR 300.22(b)) and are already in effect in the overlap area, so would be the same under the no-action alternative as well as all the action alternatives.

Under Action Alternative 2, the requirements to obtain WCPFC Area Endorsements at 50 CFR 300.212, the requirements to provide information for fishing in foreign EEZs under 50 CFR 300.213, the requirements to comply with the laws of other nations under 50 CFR 300.214, the requirements regarding observers at 50 CFR 300.215, the requirements regarding transshipment and bunkering at 50 CFR 300.216, the requirements regarding vessel identification at 50 CFR 300.217, the requirements for reporting and recordkeeping at 50 CFR 300.218, the requirements for VMS at 50 CFR 300.219, and the requirements for facilitating enforcement and inspection at 50 CFR 300.221 would not be expected to affect the fishing patterns and practices of U.S. albacore troll fishing vessels. These requirements are already in effect in the WCPFC Area, including the overlap area, so the albacore troll fishing vessels that fish in the overlap area are likely already familiar with complying with these requirements.

NMFS does not have any information to indicate that albacore troll vessels that do not currently fish in the WCPFC Area would be interested in fishing in the overlap area at some point in the future. However, if an albacore troll vessel that does not fish in the WCPFC Area – a vessel that currently fishes exclusively in the IATTC Area – decides to fish in the overlap area at some point in the future, the economic effects under Action Alternative 2 would not be expected to be substantial. The regulations regarding vessel identification requirements and VMS requirements would not be expected to bring any new costs, as albacore troll vessels fishing in the IATTC Area are already subject to similar or identical requirements, as discussed above. The regulations regarding WCPFC observers may bring new costs, as they would require accommodating of WCPFC observers for at-sea transshipments, but albacore vessels are not currently conducting frequent at-sea transshipments, so whether this cost would be incurred or how much would be incurred is difficult to predict. The requirements for complying with the laws of other nations also are not expected to bring any new costs, as it is unlikely any U.S. albacore troll vessels that may fish in the overlap area would fish in areas subject to the laws of other nations. Similarly, vessel information requirements for fishing in foreign EEZs at 50 CFR 300.213 would not be expected to bring any new costs. Applying for and obtaining the WCPFC Area Endorsements would result in some minor compliance costs – the application fee for the five-year authorization

[13] Noting that the IATTC regulations regarding FAD data reporting and active FADs would not apply as they are applicable only to purse seine vessels.

is $58 and the estimated time for completing the application is one hour. Submission of the vessel information for fishing in foreign EEZs is estimated to take 1.5 hours, so again, there would be some minor compliance costs associated with this requirement. The reporting and recordkeeping requirements also would bring some compliance costs, but these costs are not expected to be substantial. The fishing report requirements at 50 CFR 300.218(a) may be fulfilled by completion of the IATTC reporting requirements at 50 CFR 300.22. The transshipment reporting requirements at 50 CFR 300.218(b) and (d) would only be required for transshipments, which may or may not take place in the overlap area. The requirements for facilitation of enforcement and inspection would bring some costs, but these costs are also unlikely to be substantial. Maintaining appropriate documentation on board the vessel, monitoring certain radio frequencies, and adhering to gear stowage requirements is not expected to lead to substantial costs. Facilitating high seas boarding and inspections would only lead to costs when they occur. WCPFC CMM 2006-08, "Western and Central Pacific Fisheries Commission Boarding and Inspection Procedures" details the specific procedures that inspection vessels must follow when conducting such boarding and inspections and requires inspections to be completed within four hours unless evidence of a serious violation is found. Thus, such high seas boarding and inspections, if they do occur, would not be expected to lead to substantial costs unless evidence of a serious violation is found; it is difficult to predict how often that would occur and what type of compliance costs would be incurred in such a situation. Overall, the costs under Action Alternative 2 for U.S. albacore troll vessels that currently fish in the WCPFC Area or that currently fish in the IATTC Area outside the overlap area and that may fish in the overlap area at some point in the future is not expected to be substantial or to substantially affect fishing patterns and practices.

Under Action Alternative 3, U.S. albacore troll vessels would experience fewer costs than under Action Alternative 2, but more than under Action Alternative 1. Under Action Alternative 3, albacore troll vessels would not need to accommodate transshipment observers for at-sea transshipments and would not need to complete transshipment reporting requirements; the other requirements for U.S. albacore troll vessels would be the same as for Action Alternative 2. Again, it is unknown whether any transshipments would take place in the overlap area. Overall, the costs under Action Alternative 3 for U.S. albacore troll vessels that currently fish in the WCPFC Area or that currently fish in the IATTC Area outside the overlap area and that may fish in the overlap area at some point in the future is not expected to be substantial or to substantially affect fishing patterns and practices.

### 4.3 U.S. Longline Fisheries in the Pacific Ocean

The U.S. longline fisheries in the Pacific Ocean would not be expected to be substantially affected from implementation of the No-Action Alternative or any of the action alternatives. The regulatory changes for management measures for HMS and associated species that would go into effect under each of the action alternatives (as described in Chapter 2 of this EA) would not be expected to substantially affect the fishing patterns and practices of U.S. longline vessels fishing in the Pacific Ocean. As noted in Chapter 3, U.S. longline vessels have not operated in the overlap area since 2010, and NMFS has not identified any factors that would be expected to increase longline fishing activity in the overlap area. The overlap area is distant from the general areas of operation of the U.S. longline fisheries in the Pacific Ocean. Moreover, the longline bigeye tuna catch limit for the WCPFC area is 3,554 metric tons (mt) per year, while the longline

bigeye tuna catch limit for the IATTC area through 2020 is 750 mt per year for vessel over 24 meters in overall length. Thus, at least for large vessels that are capable of making the trip to the overlap area, the change in management of the overlap area from WCPFC regulations to IATTC regulations is not expected to provide an increased incentive to fish in the overlap area. The IATTC regulations also include a catch limit for Pacific bluefin tuna, which is caught in small amounts by the longline vessels. The IATTC regulations at 50 CFR 300.27(f) do allow some retention of silky sharks by longline vessels, but U.S. longline vessels generally do not retain silky shark, and the recently-adopted IATTC resolution on silky sharks requires either a full retention ban for silky sharks or the implementation of a port inspection program, which NMFS may implement via regulations, as necessary and appropriate (see Resolution C-19-05).

The WCPFC bycatch mitigation measure that would be removed under the action alternatives for oceanic whitetip sharks would be very similar to the IATTC bycatch mitigation measure that would go into effect, as detailed in Chapter 2 of this EA. There would be a new prohibition on the use of shark lines for longline vessels, but U.S. longline vessels fishing in the Pacific Ocean do not target sharks by using shark lines. There would be additional IATTC regulations for fishing on data buoys and mitigation measures for mobulid rays, but there are a limited number of data buoys in the overlap area – according to information from the National Data Buoy Center there is only one anchored data buoy in the overlap area – and limited catch of mobulid rays. If U.S. longline vessels fish in the overlap area at some point in the future, at the most, the action alternatives could have minor effects on the fishing patterns and practices of those vessels, if more time is needed to comply with specific mitigation measures regarding data buoys, mobulid rays, and sharks.

The regulatory changes for MCS management measures that would go into effect under the alternatives in the overlap area (as set forth in Table 2) would not be expected to substantially affect the fishing patterns and practices of vessels in U.S. longline fisheries fishing in the Pacific Ocean. Under Action Alternative 1, if U.S. longline vessels fish in the overlap area at some point in the future, the change in requirements may minimally affect some reporting and recordkeeping activities of vessel owners and operators, as well as response to enforcement officials, since there would no longer be specific requirements for high seas boarding and inspection under Action Alternative 1.[14] The regulations implementing IATTC decisions would be the same under each of the action alternatives and would not be expected to lead to substantial economic burden on U.S. longline vessels that may fish in the overlap area at some point in the future. The regulations at 50 CFR 300.22 for longline vessels that would go into effect in the overlap area include reporting requirements, which are similar to or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements, as described above (the requirement at 50 CFR 300.22(a) to maintain a logbook under which submission of any logbook required by state or federal regulations is sufficient), and VMS requirements at 50 CFR 300.26, which are also similar or identical to requirements currently in effect in the overlap area under the regulations implementing WCPFC requirements. The other regulations implementing IATTC decisions that would apply in the overlap area to U.S. longline vessels are requirements related to the IATTC RVR (50 CFR 300.22(b)) and are already in effect in the

[14] Noting that the IATTC regulations regarding FAD data reporting and active FADs would not apply as they are applicable only to purse seine vessels.

overlap area, so would be the same under the No-Action Alternative as well as all the action alternatives.

Under Action Alternative 2, the requirements to obtain WCPFC Area Endorsements at 50 CFR 300.212, the requirements to provide information for fishing in foreign EEZs under 50 CFR 300.213, the requirements to comply with the laws of other nations under 50 CFR 300.214, the requirements regarding observers at 50 CFR 300.215, the requirements regarding transshipment and bunkering at 50 CFR 300.216, the requirements regarding vessel identification at 50 CFR 300.217, the requirements for reporting and recordkeeping at 50 CFR 300.218, the requirements for VMS at 50 CFR 300.219, and the requirements for facilitating enforcement and inspection at 50 CFR 300.221 would not be expected to affect the fishing patterns and practices of U.S longline fishing vessels. These requirements are already in effect in the WCPFC Area, including the overlap area, so it is likely that any longline fishing vessels that would fish in the overlap area would likely already be familiar with complying with these requirements.

NMFS has no information to indicate that longline vessels not fishing in the WCPFC Area – or vessels exclusively fishing in the IATTC Area – would be interested in fishing in the overlap area at some point in the future. However, if such vessels do decide to fish in the overlap area, the regulations regarding vessel identification requirements and VMS requirements would not be expected to bring any new costs, as U.S. longline vessels fishing in the IATTC Area are already subject to similar or identical requirements, as discussed above. The requirements for complying with the laws of other nations also are not expected to bring any new costs, as it is unlikely any U.S. longline vessels would fish in areas subject to the laws of other nations. Similarly, vessel information requirements for fishing in foreign EEZs at 50 CFR 300.213 would not be expected to bring any new costs. Applying for and obtaining the WCPFC Area Endorsements would result in some minor compliance costs – the application fee for the five-year authorization is $58 and the estimated time for completing the application is one hour. Submission of the vessel information for fishing in foreign EEZs is estimated to take 1.5 hours, so again, there would be some minor compliance costs associated with this requirement. The reporting and recordkeeping requirements also would bring some compliance costs, but these costs are not expected to be substantial. The fishing report requirements at 50 CFR 300.218(a) may be fulfilled by completion of the IATTC reporting requirements at 50 CFR 300.22. The transshipment reporting requirements at 50 CFR 300.218(b) and (d) would only be required for transshipments, which may or may not take place in the overlap area. The requirements for facilitation of enforcement and inspection would bring some costs, but these costs are also unlikely to be substantial. Maintaining appropriate documentation on board the vessel, monitoring certain radio frequencies, and adhering to gear stowage requirements is not expected to lead to substantial costs. Facilitating high seas boarding and inspections would only lead to costs when they occur. WCPFC CMM 2006-08, "Western and Central Pacific Fisheries Commission Boarding and Inspection Procedures" details the specific procedures that inspection vessels must follow when conducting such boarding and inspections and requires inspections to be completed within four hours unless evidence of a serious violation is found. Thus, such high seas boarding and inspections, if they do occur, would not be expected to lead to substantial costs unless evidence of a serious violation is found; it is difficult to predict how often that would occur and what type of compliance costs would be incurred in such a situation. Overall, the costs under Action Alternative 2 for U.S. longline vessels that may fish in the overlap area at some point in the future is not expected to be substantial or to substantially affect fishing patterns and practices.

Under Action Alternative 3, U.S. longline vessels that may fish in the overlap area at some unknown point in the future would experience fewer costs than under Action Alternative 2, but more than under Action Alternative 1. Under Action Alternative 3, longline vessels would not need to accommodate transshipment observers for at-sea transshipments and would not need to complete transshipment reporting requirements; the other requirements for U.S. longline vessels would be the same as for Action Alternative 2.

## 4.4 Physical Environment and Climate Change

None of the alternatives (No-Action Alternative or any of the action alternatives) 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 increase in fishing effort in the overlap area or other areas of the WCPO would not affect the seafloor or benthic habitats. None 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, none of the alternatives would be expected to contribute to climate change. Under all the action alternatives, the regulatory changes from implementation of WCPFC purse seine fishing effort limits and FAD restrictions to IATTC purse seine fishing closures and FAD restrictions in the overlap areas could increase fuel use if there is an overall increase in fishing effort by U.S. purse seine fishing vessels, which could be further increased by the additional minor increase in fishing effort under Action Alternative 1 or Action Alternative 3 from U.S. purse seine vessels that currently fish exclusively in the IATTC Area beginning to fish in the overlap area. However, given that the catch and effort of U.S. purse seine vessels varies substantially from year to year, as shown in Table 3 in Chapter 3 of this EA, 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.), and the action alternatives would not be expected to lead to increased emissions of greenhouse gases affecting climate change.

## 4.5 Target Stocks

This section presents the analysis of the potential impacts that could be caused by the No-Action Alternative and each of the action alternatives to the stocks of albacore, bigeye tuna, skipjack tuna, and yellowfin tuna in the Pacific Ocean.

### 4.5.1 The No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the overlap area and the regulations promulgated in the 2016 final rule would remain in place. Thus, WCPFC-derived regulations would continue to apply in the overlap area and, with the exception of the requirements regarding the IATTC Register, IATTC regulations would not apply in the overlap area. Thus, there would be no direct changes to the fisheries that operate in the overlap area and no resulting direct or indirect effects to the target stocks of the fisheries.

### 4.5.2 Action Alternative 1

As stated in Section 4.1 above, under Action Alternative 1, the change in application from WCPFC purse seine fishing effort limits and FAD restrictions to IATTC purse seine fishing closures and FAD restrictions, as well as the removal of the WCPFC purse seine observer coverage requirements, could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area, leading to greater effort in the overlap area and possibly greater flexibility and fishing opportunities in the WCPO as a whole. In addition, 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 data buoys, mobulid rays, sharks, and non-tuna species that would enter into effect in the overlap area under IATTC regulations, which in turn could increase overall time at sea and time conducting other fishing operations, but these changes would not be expected to affect the target stocks of U.S. purse seine vessels.

The potential increase in fishing effort by U.S. purse seine vessels could lead to greater fishing mortality on the target stocks of U.S. purse seine vessels (skipjack tuna and yellowfin tuna) and bigeye tuna, which is caught in small quantities by the fleet. As stated in Table 7 in Chapter 3 of this EA, aside from the EPO stock of yellowfin tuna, the stocks of skipjack tuna, yellowfin tuna, and bigeye tuna in the Pacific Ocean are not currently in an overfished condition or experiencing overfishing. In addition, both the WCPFC and IATTC took into consideration that only one RFMO's management measures could apply to the overlap area for countries that are members of both organizations when developing the decisions for tropical tunas regarding the overlap area. Moreover, because many other factors contribute to the status of the stocks (fishing activities by non-U.S. fleets, oceanographic conditions, etc.), and because the overlap area is a small area of the total area of the overall area available for fishing in the Pacific Ocean (see Figure 1 above), the direct and indirect effects to the target stocks and bigeye tuna from implementation of Action Alternative 1 would be expected to be small. Table 3 in Chapter 3 shows the proportion of catch of the target stocks in the overlap area compared to catch in the WCPO and EPO for U.S. purse seine vessels. The effects are also expected to be too small to affect biodiversity or ecosystem functions.

One commenter to the proposed rule stated that the use of FADs can pose a serious risk to young fish populations, specifically juvenile yellowfin and bigeye tuna. The commenter requested that the more stringent FAD restrictions enacted through the WCPFC regulations remain in effect and not be replaced by regulations implementing IATTC measures. According to the commenter, populations of younger yellowfin and bigeye tuna tend to congregate near FADs much more frequently than their adult counterparts. The commenter stated that FADs are believed to be effective because they provide fish with a sense of security from lurking predators in the open sea, and that younger fish seek this protection much more than adult fish. The commenter provided information regarding the behavioral tendencies of fish around FADs and cited a publication by the Pew Environment Group. According to the commenter, FADs place juvenile fish populations at risk of being overfished, which can lead to sharp declines in overall fish populations, and place our natural resources in jeopardy. The commenter stated that the

regulations implementing the WCPFC 5-month FAD prohibition period should remain in effect in the overlap area.

As stated above, many other factors contribute to the status of the stocks (fishing activities by non-U.S. fleets, oceanographic conditions, etc.), and because the overlap area is a small part of the total area available for fishing in the Pacific Ocean, the direct and indirect effects to fish stocks from implementation of this final rule is expected to be small. Moreover, the stocks of skipjack tuna, yellowfin tuna, and bigeye tuna in the Pacific Ocean are not currently in an overfished condition or experiencing overfishing (except the EPO stock of yellowfin tuna).

As described above, the regulatory changes under Alternative 1 would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, effects to target stocks from this fishery would not be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, effects to target stocks from U.S. longline fisheries would not be expected.

### 4.5.3 Action Alternative 2

The effects to the target stocks of the U.S. purse seine fleet and to bigeye tuna under Action Alternative 2 would be the same as under Action Alternative 1, because the changes to fishing patterns and practices of the U.S. purse seine fleet would be essentially the same under all of the action alternatives, as discussed in Section 4.1 above. As stated in Section 4.1.2 of this EA, Action Alternative 1 may lead to a minor additional increase in purse seine fishing effort in the overlap area, due to purse seine vessels that do not currently fish in the overlap area beginning to fish in the overlap area when the WCPFC purse seine observer coverage requirements are removed. However, overall, the additional regulatory changes to management measures for MCS under Action Alternative 1 that would not take place under Action Alternative 2 would not be expected to substantially affect the fishing patterns and practices of the U.S. purse seine fleet.

As described above, the regulatory changes under Alternative 2 would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, effects to target stocks from this fishery would not be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, effects to target stocks from U.S. longline fisheries would not be expected.

### 4.5.4 Action Alternative 3

The effects to the target stocks of the U.S. purse seine fleet and to bigeye tuna under Action Alternative 3 would be the same as under Action Alternative 1, because the changes to fishing patterns and practices of the U.S. purse seine fleet would be essentially the same under either alternative, as discussed in Section 4.1 above. As stated in Section 4.1.4 of this EA, Action

Alternative 1 and Action Alternative 3 may lead to a minor additional increase in purse seine fishing effort in the overlap area over Action Alternative 2 and the No-Action Alternative, due to purse seine vessels that do not currently fish in the overlap area beginning to fish in the overlap area when the WCPFC purse seine observer coverage requirements are removed. However, overall, the additional regulatory changes to management measures for MCS under Action Alternative 3 that would not take place under Action Alternative 2 would not be expected to substantially affect the fishing patterns and practices of the U.S. purse seine fleet.

As described above, the regulatory changes under Alternative 3 would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, effects to target stocks from this fishery would not be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, effects to target stocks from U.S. longline fisheries would not be expected.

## 4.6 Non-Target Species

This section presents the analysis of the potential impacts that could be caused by the No-Action Alternative and each of the action alternatives analyzed in depth in this EA to non-target species caught by U.S. purse seine vessels in the affected environment. Impacts to non-target species that are considered protected resources are discussed in the following section.

### 4.6.1 No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the overlap area and the regulations promulgated in the 2016 final rule would remain in place. Thus, WCPFC regulations would continue to apply in the overlap area and, with the exception of the requirements regarding the IATTC Register, IATTC regulations would not apply in the overlap area. Thus, there would be no direct changes to the fisheries that operate in the overlap area and no resulting direct or indirect effects to the non-target species caught by the affected fisheries in the affected environment.

### 4.6.2 Action Alternative 1, Action Alternative 2, and Action Alternative 3

As stated in Section 4.1 above, under Action Alternatives 1, 2, and 3, the change in application from WCPFC fishing effort limits and FAD restrictions to IATTC fishing closures and FAD restrictions could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area, leading to greater effort in the overlap area and possibly greater flexibility and fishing opportunities in the WCPO as a whole. The removal of the WCPFC purse seine observer coverage requirements under Action Alternatives 1 and 3 could cause an additional minor increase in fishing effort in the overlap area, due to purse seine vessels that do not currently fish in the overlap area beginning to fish in the overlap area when the WCPFC purse seine observer coverage requirements are removed.

The potential increase in fishing effort could lead to greater fishing mortality on the non-target species caught by U.S. purse seine vessels in the affected environment, as shown in Table 8 of Chapter 3. However, the IATTC regulations that would go into effect also include additional mitigation measures for mobulid rays, sharks, and non-tuna species that could reduce the impacts of fishing on non-target species caught by U.S. purse seine vessels. Moreover, because many other factors contribute to the status of the stocks of non-target species (fishing activities by non-U.S. fleets, oceanographic conditions, etc.), and the overlap area is a small area of the overall area available for fishing in the Pacific Ocean (see Figure 1 above), the direct and indirect effects to the stocks of non-target species caught by U.S. purse seine vessels in the affected environment would be expected to be small. These effects are also expected to be too small to affect biodiversity or ecosystem functions.

As described above, the regulatory changes under the action alternatives would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, effects to non-target stocks from this fishery would not be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, effects to non-target stocks from U.S. longline fisheries would not be expected.

## 4.7 Protected Resources

This section presents the analysis of the potential impacts that could be caused by the No-Action Alternative and each of the action alternatives analyzed in depth in this EA to protected resources in the affected environment.

### 4.7.1 No-Action Alternative

Under the No-Action Alternative, there would be no change from existing management of the overlap area and the regulations promulgated in the 2016 final rule would remain in place. Thus, WCPFC regulations would continue to apply in the overlap area and, with the exception of the requirements regarding the IATTC Register, IATTC- regulations would not apply in the overlap area. Thus, there would be no direct changes to the fisheries that operate in the overlap area and no direct or indirect effects to protected resources other than those under existing conditions in the affected environment.

### 4.7.2 Action Alternative 1, Action Alternative 2, and Action Alternative 3

As stated in Chapter 3 of this EA, NMFS completed a Biological Opinion for the U.S. purse seine fishery operating in the WCPO in 2006 and for the U.S. purse seine fishery operating in the EPO in 2004. NMFS has also completed informal ESA Section 7 consultation for species under the jurisdiction of USFWS for the U.S. WCPO purse seine fishery. Letter from NMFS dated August 28, 2017; concurrence letter from USFWS dated October 11, 2017.

As stated in Chapter 3 of this EA, NMFS has reinitiated formal ESA Section 7 consultation for several species under the jurisdiction of NMFS for the U.S. WCPO purse seine fishery, including

for operations in the overlap area. The species include 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; the following DPSs of the scalloped hammerhead shark: Indo-West Pacific DPS and Eastern Pacific DPS; the oceanic whitetip shark; and the giant manta ray. In memoranda dated December 5, 2017, May 17, 2018, and December 6, 2018, and June 28, 2019, and January 15, 2020, 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).

Information regarding each of these species is provided in the 2017 BA, which is incorporated by reference in this EA.

Effects to protected species from the implementation of the No-Action Alternative would not appreciably alter expected interaction rates with protected species in a manner not considered in previous consultations for the U.S. WCPO purse seine fishery, as there would be no changes to existing fishing operations.

Under Action Alternative 1, as described in Section 4.1, the regulatory changes regarding the change in application from WCPFC fishing effort limits and FAD restrictions to IATTC fishing closures and FAD restrictions, as well as the removal of the WCPFC purse seine observer coverage provisions, could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area and U.S. purse seine vessels fishing in the WCPO. The effects would include the potential for increased fishing in the overlap area and in other areas of the WCPO, and minor effects on the fishing patterns and practices of U.S. purse seine vessel operating in the overlap area, if vessel owners and operators need additional time at sea during fishing operations to comply with specific mitigation measures regarding data buoys, mobulid rays, sharks, and non-tuna species that would enter into effect in the overlap area under IATTC regulations, which in turn could increase overall time at sea and time conducting other fishing operations. The addition of the IATTC management measures for MCS under this alternative would not be expected to substantially affect the existing behavior of vessel owners and operators. The change in requirements may minimally affect some reporting and recordkeeping activities of vessel owners and operators, as well as response to enforcement officials, as detailed in Section 4.1 above. However, vessel owners and operators already comply with IATTC management measures for MCS in the EPO outside the overlap area.

To the extent that there is an increase in fishing effort under Action Alternative 1, any effects in terms of interactions with protected resources would be expected to be small compared to typical year-to-year variations in interactions with species driven by changing oceanic and economic conditions. Moreover, implementation of Action Alternative 1 would lead to some additional mitigation for mobulid rays and sharks, which could have some minor beneficial effects on ESA-listed mobuild rays and sharks. Thus, implementation of Action Alternative 1 is not expected to lead to substantial effects on ESA-listed species to an extent not already evaluated in ESA consultations or ESA Section 7(a)(2) and 7(d) determinations.

The potential effects to ESA-listed species would be essentially the same under Action Alternative 2 and Action Alternative 3 as for Action Alternative 1. As described in Section 4.1, the regulatory changes regarding the change in application from WCPFC fishing effort limits and FAD restrictions to IATTC fishing closures and FAD restrictions could affect the fishing patterns and practices of U.S. purse seine vessels fishing in the overlap area and U.S. purse seine vessels fishing in the WCPO; under Alternative 3, as for Alternative 1, the removal of the WCPFC purse seine observer coverage provisions could lead to additional vessels fishing in the overlap. The effects would include the potential for increased fishing in the overlap area and in other areas of the WCPO, and minor effects on the fishing patterns and practices of U.S. purse seine vessel operating in the overlap area, if vessel owners and operators need additional time at sea during fishing operations to comply with specific mitigation measures regarding data buoys, mobulid rays, sharks, and non-tuna species that would enter into effect in the overlap area under IATTC regulations, which in turn could increase overall time at sea and time conducting other fishing operations. The addition of the IATTC management measures for MCS under this alternative would not be expected to substantially affect the existing behavior of vessel owners and operators. The change in requirements may minimally affect some reporting and recordkeeping activities of vessel owners and operators, as well as response to enforcement officials, as detailed in Section 4.1 above. However, vessel owners and operators already comply with IATTC management measures for MCS in the EPO outside the overlap area.

To the extent that there is an increase in fishing effort under Action Alternative 2 or 3, any effects in terms of interactions with protected resources would be expected to be small compared to typical year-to-year variations in interactions with species driven by changing oceanic and economic conditions. Moreover, implementation of Action Alternative 2 or Action Alternative 3 would lead to some additional mitigation for mobulid rays and sharks, which could have some minor beneficial effects on ESA-listed mobuild rays and sharks. Thus, implementation of Action Alternative 2 or Action Alternative 3 is not expected to lead to substantial effects on ESA-listed species to an extent not already evaluated in ESA consultations.

As stated in Chapter 3 of this EA, the U.S. WCPO purse seine fishery is listed as a Category II fishery 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. The U.S. EPO purse seine 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. Consequently, the No-Action Alternative or any of the action alternatives is not expected to cause any impacts to marine mammals not previously considered or authorized by the commercial taking exemption under section 118(c) of the MMPA. Pursuant to NMFS' reinitiated ESA consultation for the U.S. WCPO purse seine fishery, NMFS is evaluating whether this fishery has adverse effects on ESA-listed marine mammals, and if so, whether this fishery is subject to additional requirements under MMPA section 101(a)(5)(E). As stated in Chapter 3, NMFS has determined that the fishery would not jeopardize the continued existence of ESA-listed marine mammals during the period of consultation. To the extent that either action alternative causes an increase in fishing effort, any effects in terms of interaction rates with marine mammals would likely be small compared to typical year-to-year variations in such interactions driven by changing oceanic and economic conditions.

As described above, the regulatory changes under the action alternatives would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, any change in effects to ESA-listed species or marine mammals from this fishery would not be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, any changes in effects to ESA-listed species or marine mammals from U.S. longline fisheries would not be expected.

#### 4.7.1.1 Other Protected Resources

The changes in fishing patterns and practices of the U.S. WCPO purse seine fleet would not affect the 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 fleet would take place in areas of the ocean far from shorelines and would not affect the seafloor or benthic habitats since purse seine fishing does not involve contact with the seafloor (Chapter 3 of this EA provides a description of purse seine fishing). Also, because any effects to fish stocks would be small, 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). Shipwrecks would be the only known cultural objects potentially within the affected environment. However, as stated above, purse seine fishing operations do not come into contact with the seafloor, so the operations of the purse seine vessels would not be expected to affect any material from shipwrecks, which typically rests on ocean bottoms.

As described above, the regulatory changes under the action alternatives would not be expected to substantially affect the fishing behavior of vessels in the U.S. South Pacific albacore troll fishery, and thus, no effects to other protected resources would be expected. Similarly, because U.S. longline vessels are not expected to operate in the overlap area in the foreseeable future, and because the regulatory changes would not be expected to substantially affect the fishing behavior of longline vessels should they resume operations in the overlap area, no effects to other protected resources would be expected.

### 4.8 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 either Action Alternative 1 or Action Alternative 2 would not be expected to be substantial. Thus, implementation of any of the

action alternatives would not be expected to result in disproportionately high and adverse human health or environmental effects on vessel owners or operators. None of the alternatives considered would result in significant and adverse environmental effects on minority or low-income populations.

## 4.9 Comparison of Alternatives

Table 11 below summarizes and compares the impacts of the No-Action Alternative, Action Alternative 1, Action Alternative 2, and Action Alternative 3.

## Table 11. Comparison of Alternatives.

| Alternative | Effects on Fleets | Effects on Bigeye, Yellowfin, Skipjack | Effects on Non-target Species | Effects on Protected Resources | Effects on Environmental Justice |
|---|---|---|---|---|---|
| No-Action Alternative | None | Same as under existing conditions | Same as under existing conditions | ESA-listed species examined under ESA Section 7 consultations; other protected resources not affected | None |
| Alternative 1 | Possible increase in purse seine fishing effort | Small direct and indirect effects due to potential for increased fishing mortality | Small direct and indirect effects due to potential for increased fishing mortality | ESA-listed species examined under ESA Section 7 consultations; other protected resources not affected | None |
| Alternative 2 | Possible increase in purse seine fishing effort | Small direct and indirect effects due to potential for increased fishing mortality | Small direct and indirect effects due to potential for increased fishing mortality | ESA- listed species examined under ESA Section 7 consultations; other protected resources not affected | None |
| Alternative 3 | Possible increase in purse seine fishing effort | Small direct and indirect effects due to potential for increased fishing mortality | Small direct and indirect effects due to potential for increased fishing mortality | ESA- listed species examined under ESA Section 7 consultations; other protected resources not affected | None |

# 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 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 Action Alternative 1, Action Alternative 2, or Action Alternative 3. 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.
- 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.
- Actions by the United States to implement the terms of the renegotiated SPTT, the specific details of which are unknown at this time.

## 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, implementation of any of the action alternatives 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 alternatives or the No-Action Alternative would not be expected to be substantial.

### 5.2.2 Cumulative Impacts to Bigeye, Skipjack, and Yellowfin Tuna

As discussed in Chapter 4, there could be some small direct and indirect effects to bigeye, skipjack, and yellowfin tuna stocks in the affected environment from implementation of any of the action alternatives when compared to the No-Action Alternative. These effects would result from the potential for increased fishing pressure on the stocks.

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. WCPFC CMM 2018-01 includes specific objectives for these three stocks – that the stocks are maintained at levels capable of producing maximum sustainable yield. So, implementation of CMM 2018-01 by the United States and others could result in maintaining the stock status of bigeye tuna, skipjack tuna, and yellowfin tuna in the WCPO as neither overfishing nor overfished. However, it is difficult to predict the results of full implementation of CMM 2018-01. Similarly, IATTC Resolution C-17-02 has similar objectives. 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. However, as discussed in Chapter 4 of this EA, implementation of any of the action alternatives could lead to some increased U.S. purse seine fishing effort in the overlap area and thus, associated increased fishing pressure on the stocks of bigeye tuna, skipjack tuna, and yellowfin tuna.

Based on all information to date, the cumulative impacts from implementation of any of the action alternatives 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, 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 any of the action alternatives when compared to the No-Action Alternative. These effects would result from the potential for increased fishing pressure on the stocks. Given that the other identified past, present, and reasonably foreseeable future actions are fishery management actions with the general objective of sustainable management of living marine resources, they would be expected to have small effects on non-target species. If the actions are focused on conservation and management of the non-target species they could decrease fishing pressure on the stocks. Overall, 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 4, the U.S. WCPO purse seine fishery (including operations in the overlap area) is subject to consultation requirements under Section 7 of the ESA and NMFS has determined 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 under ESA Section 7(d). As discussed in Chapter 4, the action alternatives or No-Action Alternative would not be expected to increase or decrease interactions with protected resources, although it is possible there would be slight increase in interactions with protected species under the action alternatives due the potential increase in purse seine fishing effort in the overlap area compared to the No-Action Alternative. However, to the extent there is a spatial shift in fishing effort to the overlap area, any effects in terms of interaction rates with protected species would be small compared to typical year-to-year variations in such interactions driven by changing oceanic and economic conditions. Based on all information to date, the other identified actions are not expected to have substantial effects on protected resources. Thus, the cumulative effects on protected resources would not be expected to be substantial.

### 5.2.5 Cumulative Impacts to Environmental Justice

As stated in Chapter 4, the action alternatives or the No-Action Alternative would not 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 populations. Thus, the cumulative effects on minority or low-income populations would not be expected to be substantial.

# 6 CONSULTATION

Table 12 lists the agencies, NOAA units, and entities that were contacted for information during preparation of this EA.

**Table 12. 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 |
| North Pacific Fishery Management Council |
| Pacific Fishery Management Council |
| Department of State – Office of Marine Conservation |
| U.S. Coast Guard – 14th Coast Guard District |
| Western Pacific Fishery Management Council |

# 7 LITERATURE CITED

Ainsworth, C. H., J.F . Samhouri, D.S. Busch, W.W.L. Cheung, J. Dunne, J. and T.A. Okey. 2011. Potential impacts of climate change on Northeast Pacific marine foodwebs and fisheries. *Ices Journal of Marine Science* 68(6): 1217-1229.

Allain, V. 2010. Trophic structure of the pelagic ecosystems of the western and central Pacific Ocean. WCPFC Report SC6-2010/EB- IP10. Nukualofa, Tonga, Western and Central Pacific Fisheries Commission.

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

Bakun, A. 1996. Patterns in the ocean: Ocean processes and marine population dynamics. La Jolla, California: California Sea Grant College System.

Bala, G., K. Caldeira, and R. Nemani. 2010. Fast versus slow response in climate change: implications for the global hydrological cycle. *Climate Dynamics* 35: 423–434.

Begon, M., C.A. Townsend, and J.L. Harper. 2006. *Ecology: From Individuals to Ecosystems*. Hoboken, New Jersey: Wiley-Blackwell.

Blackburn, M. 1965. Oceanography and ecology of tunas. Oceanography and Marine Biology: An Annual Review 3:299-322.

Calkins, T.P. 1980. Synopsis of biological data on the bigeye tuna, Thunnus obesus (Lowe, 1839), in the Pacific Ocean. In Bayliff, W.H. (ed.) Synopses of Biological Data on Eight Species of Scombrids. IATTC Special Report 2. La Jolla, California, InterAmerican Tropical Tuna Commission.

Carpenter, K.E., M. Abrar, G. Aeby, R.B. Aronson, S. Banks, A. Bruckner, A. Chiriboga, J. Cortés, J.C. Delbeek, L. DeVantier, et al. 2008. One-Third of Reef-Building Corals Face Elevated Extinction Risk from Climate Change and Local Impacts. *Science* 321: 560-563.

Chavez, F.P., J. Ryan, S.E. Lluch-Cota, and C.M. Niquen. 2003. From anchovies to sardines and back: Multidecadal change in the Pacific Ocean. *Science* 299(5604):217-221.

Childers, J. and A. Pease. 2012. Summary of the 2009 and 2010 U.S.A North and South Pacific Albacore Troll and Pole-and-Line Fisheries. NOAA-NMFS Administrative Report LJ 10-02. La Jolla, California, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center.

Cole, J.S. 1980. Synopsis of biological data on the yellowfin tuna (*Thunnus albacares*) (Bonnaterre 1788) in the Pacific Ocean. IATTC Special Report 2:75-150. La Jolla, California, Inter-American Tropical Tuna Commission.

Collette, B.B. and C.E. Nauen. 1983. Scombrids of the world: An annotated and illustrated catalogue of tunas, mackerels, bonitos, and related species known to date. Rome: Food and Agriculture Organization for the United Nations.

Council on Environmental Quality. 1997. Considering cumulative effects under the National Environmental Policy Act. Washington, D.C., Executive Office of the President of the United States.

Cox, S.P., T.E. Essington, J.F. Kitchell, S.J.D. Martell, C.J. Walters, C. Boggs, and I. Kaplan. 2002. Reconstructing ecosystem dynamics in the central Pacific Ocean, 1952-1998. II. A preliminary assessment of the trophic impacts of fishing and effects on tuna dynamics. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 1736-1747.

Dambacher, J.M., J.W. Young, R.J. Olson, V. Allain, F. Galván-Magaña, M. J. Lansdell, N. Bocanegra-Castillo, V. Alatorre-Ramírez, S. P. Cooper, and L.M. Duffy. 2010. Analyzing pelagic food webs leading to top predators in the Pacific Ocean: A graph-theoretic approach. *Progress in Oceanography* 86(1-2): 152-165.

Dizon, A. E., W.H. Neill, and J.J. Magnuson. 1977. Rapid temperature compensation of volitional swimming speeds and lethal temperatures in tropical tunas (Scombridae). Environmental Biology of Fishes 2(1): 83-92.

Edwards, M., M. Heath, and A. McQuatters-Gollop. 2010. Plankton in MCCIP Annual Report Card 2010-11, MCCIP Science Review: 10.

Ehrhardt, N.M., R.J. Robbins, and F. Arocha. 1996. Age validation and growth of swordfish, Xiphias gladius, in the northwest Atlantic. Collected Volume of Scientific Papers 45(2):358-367.

Farby, V.J., B.A. Seibel, R.A. Feely, and J.C. Orr. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. ICES Journal of Marine Science 65: 414–432.

Foreman, T.J. 1980. Synopsis of biological data on the albacore, Thunnus alalunga (Bonnaterre, 1788), in the Pacific Ocean. In W.H. Bayliff (ed.) Synopses of Biological Data on Eight Species of Scombrids. IATTC Special Report No. 2, 17-70. La Jolla, California, Inter-American Tropical Tuna Commission.

Galbraith, H., R. Jones, R. Park, J. Clough, S. Herrod-Julius, B. Harrington and G. Page. 2002. Global Climate Change and Sea Level Rise: Potential Losses of Intertidal Habitat for Shorebirds. *The International Journal of Waterbird Biology* 25(2):173-183.

Gillett, R., M.A. McCoy, and D.G. Itano. 2002. Status of the United States Western Pacific tuna purse seine fleet and factors affecting its future. University of Hawaii-NOAA, Joint Institute for Marine and Atmospheric Research. SOEST 02-01; JIMAR Contribution 02-344.

Gillett, R. and A. Langley 2007. Tuna for tomorrow? Some of the science behind an important fishery in the Pacific Islands. Noumea, New Caledonia, Asian Development Bank and Secretariat of the Pacific Community.

Graham, B.S., D. Grubbs, K. Holland, and B.N. Popp. 2007. A rapid ontogenetic shift in the diet of juvenile yellowfin tuna from Hawaii. Marine Biology 150:647–658.

Grewe, P.M. and J. Hampton. 1998. An assessment of bigeye (Thunnus obesus) population structure in the Pacific Ocean based on mitochondrial DNA and DNA microsatellite analysis. Hobart, Australia, Australian Commonwealth Scientific and Research Organization.

Halpern, B.S., K. Cottenie, and B.R. Broitman. 2006. Strong top-down control in southern California kelp forest ecosystems. *Science* 312: 1230-1232.

Hampton, J. and K. Bailey. 1993. Fishing for tunas associated with floating objects: A review of the western Pacific fishery. SPC Report 31. Noumea, New Caledonia, South Pacific Commission, Tuna and Billfish Assessment Programme, South Pacific Commission.

Hays, G.C., A.J. Richardson, and C. Robinson. 2005. Climate change and marine plankton. *Trends in Ecology and Evolution* 20(6): 337-344.

Hinke, J.T., I.C. Kaplan, K. Aydin, G.M. Watters, R.J. Olson, and J.F. Kitchell. 2004. Visualizing the food-web effects of fishing for tunas in the Pacific Ocean. *Ecology and Society* 9(1): 10.

Hoegh-Guldberg, O., P. J. Mumby, A. J. Hooten, R. S. Steneck, P. Greenfield, E. Gomez, C. D. Harvell, et al. 2007. Coral reefs under rapid climate change and ocean acidification. Science 318(5857): 1737-1742.

Hoegh-Guldberg, O., and J. Bruno. 2010. The Impact of Climate Change on the World's Marine Ecosystems. *Science* 328: 1523-1528.

Hunter, J.R., B. J. Macewicz, and J.R. Sibert. 1986. The Spawning Frequency of Skipjack Tuna, *Katsuwonus Pelamis*, From the South Pacific. Fishery Bulletin 84(4): 895-903.

Intergovernmental Panel on Climate Change. 2007. Climate change 2007: Synthesis report. An assessment of the Intergovernmental Panel on Climate Change, IPCC Plenary Session XXVII, Valencia, Spain.

Itano, D.G. 2000. The reproductive biology of yellowfin tuna (*Thunnus Albacares*) in Hawaiian waters and the western tropical Pacific Ocean: Project summary. SOEST/Jimar Report SOEST contribution 00-01 JIMAR Contribution 00-328. Honolulu, Joint Institute for Marine and 133 Atmospheric Research and the School for Ocean and Earth Science and Technology, University of Hawaii.

Joseph, J. 2003. Managing fishing capacity of the world tuna fleet. FAO Fisheries Circular Number 982. Rome, Food and Agriculture Organization of the United Nations.

Kaeriyama, M., H. Seo, H. Kudo, and M. Nagata. 2012. Perspectives on wild and hatchery salmon interactions at sea, potential climate effects on Japanese chum salmon, and the need for sustainable salmon fishery management reform in Japan. *Environmental Biology of Fishes* 94(1): 165-177.

Kamikuri, S., I. Motoyama, H. Nishi, and M. Iwai. 2009. Evolution of Eastern Pacific Warm Pool and upwelling processes since the middle Miocene based on analysis of radiolarian assemblages: Response to Indonesian and Central American Seaways. *Palaeogeography, Palaeoclimatology, Palaeoecology* 280: 469-479.

Kelleher, K. 2005. Discards in the world's marine fisheries. An update. FAO Fisheries Technical Paper 470, Food and Agriculture Organization, Rome. 131 p.

Langley, A., P. William, P. Lehodey, and J. Hampton. 2004. The western and central Pacific tuna fishery 2003: Overview and status of tuna stocks, No. 6. Noumea, New Caledonia, Oceanic Fisheries Programme, Secretariat of the Pacific Community.

Langley, A., Williams, P., and Hampton, J. 2006. The western and 1476 Can. J. Fish. Aquat. Sci. Vol. 66, 2009 Published by NRC Research Press central Pacific tuna fishery: 2005 overview and status of stocks. Tuna Fisheries Assessment Report 7. Secretariat of the Pacific Community, Noumea, New Caledonia.

Langley, A., J. Hampton, P. Kleiber, and S. Hoyle. 2008. Stock Assessment of Bigeye Tuna in the Western and Central Pacific Ocean, Including an Analysis of Management Options. WCPFC-SC4-2008/SA-WP-1 Rev.1. Port Moresby, Papua New Guinea, Western and Central Pacific Fisheries Commission.

Laurs, R.M. and R.J. Lynn. North Pacific albacore ecology and oceanography. 1991. North Pacific Transition Zone Workshop, Honolulu, 9-11 May, 1988. NOAA Report TRNMFS-105. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Link, J. 2002. Does food web theory work for marine ecosystems? *Marine Ecology Progress Series* 230: 1-9.

Loukos, H., P. Monfray, L. Bopp, and P. Lehodey. 2003. Potential changes in skipjack tuna (*Katsuwonus pelamis*) habitat from a global warming scenario: modeling approach and preliminary results. *Fisheries Oceanography* 12(4-5):474-482.

Matsumoto, T., T. Kitagawa, and S. Kimura. 2013. Vertical behavior of bigeye tuna (*Thunnus obesus*) in the northwestern Pacific Ocean based on archival tag data. *Fisheries Oceanography* 23(3): 234-246.

Matsumoto, T., K. Satoha, and M. Toyonagaba. 2014. Behavior of skipjack tuna (*Katsuwonus pelamis*) associated with a drifting FAD monitored with ultrasonic transmitters in the equatorial central Pacific Ocean. *Fisheries Research* 157: 78-85.

Mayfield A.B., P. Chan, H.M. Putnam, C. Chen, and T. Yung Fan. 2012. The effects of a variable temperature regime on the physiology of 10 the reef-building coral *Seriatopora hystrix*: results from a laboratory-based reciprocal transplant. *The Journal of experimental Biology* 215(23): 4183-4195.

Miyabe, N. 1994. A review of the biology and fisheries for bigeye tuna, *Thunnus obesus*, in the Pacific Ocean. FAO Fisheries Report T336 Volume 2. Rome, Food and Agriculture Organization for the United Nations.

Miyabe, N. and W.H. Bayliff. 1998. A review of information on the biology, fisheries, and stock assessment of bigeye tuna, Thunnus obesus, in the Pacific Ocean. In Deriso, R.B., W.H. Bayliff, and N.J. Webb (eds.) Proceedings of the First World Meeting on Bigeye Tuna, 129-170. La Jolla, California: Inter-American Tropical Tuna Commission.

Munday, P.L., M.I. McCormick, and G.E. Nilsson. 2012. Impact of global warming and rising CO2 levels on coral reef fishes: what hope for the future? *Journal of Experimental Biology* 215(22): 3865-3873.

Nakamura, I. 1985. Billfishes of the world: An annotated and illustrated catalogue of marlins, sailfishes, spearfishes, and swordfishes known to date. Fisheries Synopsis 125(5):1-4.

National Marine Fisheries Service. 2004a. Environmental assessment for the third extension of the South Pacific Tuna Treaty. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 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.

National Marine Fisheries Service. 2005. Final environmental impact statement on seabird interaction avoidance measures and pelagic squid fishery management. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 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. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2010. Endangered Species Act Section Consultation Biological Opinion on Measures to Reduce Interactions between Green Sea Turtles and the American Samoa-based Longline Fishery- Implementation of an Amendment to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service, Southwest Fisheries Science Center. 2014a. Swordfish Research. Retrieved from https://swfsc.noaa.gov/textblock.aspx?Division=FRD&ParentMenuId=141&id=1127 on April 3, 2015.

National Marine Fisheries Service. 2014b. Biological Opinion on Continued Operation of the Hawaii-based Deep-set Pelagic Longline Fishery. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2015a. Programmatic Environmental Assessment for the Implementation of Decisions of the Western and Central Pacific Fisheries Commission on Management of Tropical Tunas in the Western and Central Pacific Ocean from 2015-2020. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2015b. Biological Opinion and Conference Opinion on Continued Operation of the American Samoa Longline Fishery. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2017a. Supplement to the 2014 Biological Opinion on Continued Operation of the Hawaii-based Deep-set Pelagic Longline Fishery. National Marine Fisheries Service, Pacific Islands Region.

National Marine Fisheries Service. 2017b. Endangered Species Act Consultation. Biological Assessment on the Western and Central Pacific Ocean Purse Seine Fishery. Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2019a. Regulatory Impact Review: Area of Overlap Between the Convention Area of the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission (RIN 0648-BH59). Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2019b. Environmental Assessment for Bigeye Tuna Catch and Allocation Limits for Pelagic Longline Fisheries in U.S. Pacific Island Territories (RIN 0648-XG925). Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

National Marine Fisheries Service. 2019c. Fishery Stock Status Updates. Web page accessed October 14, 2019: https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates#2019-quarterly-updates.

National Marine Fisheries Service. 2019d. Biological Opinion on the Continued Authorization of the Hawaii Pelagic Shallow-Set Longline Fishery. Honolulu, United States Department of

Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

NWS (National Weather Service). 2019. El Niño/Southern Oscillation (ENSO) Diagnostic Discussion. National Oceanic and Atmospheric Administration, National Weather Service, Climate Prediction Center. Web page accessed August 8, 2019: *www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/index.shtml*

National Marine Fisheries Service. 2020. Regulatory Impact Review: Area of Overlap Between the Convention Area of the Inter-American Tropical Tuna Commission and the Western and Central Pacific Fisheries Commission (RIN 0648-BH59). Honolulu, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office.

Niller, P.P. and R.W. Reynolds. 1984. The three-dimensional circulation near the eastern North Pacific subtropical front. Journal of Physical Oceanography 14(2): 217-230.

Nybakken, J.W. 1997. Marine biology: An ecological approach. New York: Addison-Wesley.

Olson, D.B., G.L. Hitchcock, A.J. Mariano, C.J. Ashjian, G. Peng, R.W. Nero, and G.P. Podesta. 1994. Life on the edge: Marine life and fronts. Oceanography 7(2): 52-60.

Paerl, H.W. 1997. Coastal Eutrophication and Harmful Algal Blooms: Importance of Atmospheric Deposition and Groundwater as "New" Nitrogen and Other Nutrient Sources. Limnology and Oceanography, 42(5, pt. 2): 1154-1165.

Palko, B.J., G.L. Beardsley, and W.J. Richards. 1981. Synopsis of the biology of the swordfish, Xiphias gladius. NOAA Report TR-NMFS-CIRC-441. Seattle, Washington, United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Perry, A.L., P.J. Low, J.R. Ellis, and J.D. Reynolds. 2005. Climate change and distribution shifts in marine fishes. *Science* 308(5730):1912-1915.

Polovina, J.J., D.R. Kobayashi, M.D. Parker, P.M. Seki, and H.G. Balazs. 2000. Turtles on the edge: Movement of loggerhead turtles (Caretta caretta) along oceanic fronts, spanning longline fishing grounds in the central North Pacific, 1997-1998. Fisheries Oceanography 9(1): 71-82.

Rahmstorf, S. 2007. A Semi-Empirical Approach to Projecting Future Sea-Level Rise. *Science* 315: 368-370.

Richardson, T.L., G.A. Jackson, H.W. Ducklow, and M.R. Roman. 2004. Planktonic food webs of the equatorial Pacific at 0°, 140° W: a synthesis of EqPac time-series carbon flux data. *Deep-Sea Research* I 51(9): 1245-1274.

Roden G.I. (1980) On the Subtropical Frontal Zone north of Hawaii during winter. J. Phys. Oceanogr. 10:342–362.

Roessig, J.M., C.M. Woodley, J.J. Cech, and L.J. Hansen. 2004. Effects of global climate change on marine and estuarine fishes and fisheries. *Reviews in Fish Biology and Fisheries* 14(2):251-275.

Saito, S. 1973. Studies on fishing of albacore, *Thunnus alalunga* (Bonnaterre) by experimental deep-sea tuna long-line. *Memoirs of the Faculty of Fisheries* 21(2):107-184.

Schaefer, K. M., and D.W. Fuller. 2009. Horizontal movements of bigeye tuna (Thunnus obesus) in the eastern Pacific Ocean, as determined from conventional and archival tagging experiments initiated during 2000-2005. Inter-American Tuna Commision. Bulletin 24(2): 191-249.

Secretariat of the Pacific Community. 2012. Status of the Purse Seine Fishery for 2011. A paper prepared for the Internal Meeting of the Pacific Island Parties for the U.S. Treaty Consultation 24th Annual Meeting February 25-27, 2012 Honolulu, Hawaii. Noumea, New Caledonia, Oceanic Fisheries Programme, Secretariat of the Pacific Community.

Secretariat of the Pacific Community. 2013. Preliminary review of the western and Central Pacific Ocean purse seine fishery 2012. A paper prepared for the Internal Meeting of Pacific Island Parties to the South Pacific Regional US Multilateral Treaty May 3-7, 2013 Honiara, Solomon Islands. Noumea, New Caledonia, Oceanic Fisheries Programme, Secretariat of the Pacific Community.

Secretariat of the Pacific Community. 2017. Catch and Effort Tables on Tropical Tuna CMMs. Fourteenth Regular Session of the Commission. WCPFC14-2017-IP05_rev1. Manila, Philippines: November 20, 2017. Available at: https://www.wcpfc.int/node/30076.

Seki, M.P., R. Lumpkin, and P. Flament. 2002. Hawaii cyclonic eddies and blue marlin catches: The case study of the 1995 Hawaiian International Billfish Tournament. *Journal of Oceanography* 58(5):739-745.

Sibert, J., J. Hampton, P. Kleiber, and M. Maunder. 2006. Biomass, size, and trophic status of top predators in the Pacific Ocean. *Science* 314(5806): 1773-1776.

Slomp, C.P. and P.V. Cappellen. 2004. Nutrient inputs to the coastal ocean through submarine groundwater discharge: controls and potential impact. Journal of Hydrology 295: 64–86.

Solomon, S., D. Quin, M. Manning, Z. Chen, M. Marquis, K.B. Avryt, M. Tignor et al. 2007. Summary for policy makers. *In* Climate Change 2007: The Physical Science Basis. WGI-IPCC Report 4. Cambridge and New York, Cambridge University Press.

Stewart. R.H. 2005. *Introduction to physical oceanography*. September 2005 Edition. Galveston, Texas: Department of Oceanography, Texas A&M University.

Sturman, A. P. and H.A. McGowan. 1999. Mesoscale and local climates in New Zealand. *Progress Physical Geography* 23(4): 611-635.

Suzuki, Z., P.K. Tomlinson, and M. Honma. 1978. Population structure of Pacific yellowfin tuna. Inter-American Tropical Tuna Commission Bulletin 17(5):227-446.

Suzuki, Z. 1994. A review of the biology and fisheries for yellowfin tuna (*Thunnus albacares*) in the western and central Pacific Ocean. In Shomura, R. S., J. Majkowski, and S. Langi (eds.) Interactions of Pacific Tuna Fisheries. Volume 2: Papers on biology and fisheries, 108-137. Rome, Food and Agriculture Organization for the United Nations.

Takahashi, M., H. Okamura, K. Yokawa, and M. Okazaki. 2003. Swimming behaviour and migration of a swordfish recorded by an archival tag. Marine and Freshwater Research 54(4):527-534.

U.S. Fish and Wildlife Service. 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.

van Woesik, R., P. Houk, A.L. Isechal, J.W. Idechong, S. Victor, and Y. Golbuu. 2012. Climate-change refugia in the sheltered bays of Palau: analogs of future reefs. *Ecology and Evolution* 2(10): 2474–2484.

Ward, P. and S. Elscot. 2000. Broadbill swordfish: Status of world fisheries. Report 3:208-213. Canberra, Australia, Bureau of Rural Sciences.

Weng, J.S., M.K. Hung, C.C. Lai, L.J. Wul, M.A. Lee, and K.M. Liu. 2013. Fine-scale vertical and horizontal movements of juvenile yellowfin tuna (Thunnus albacares) associated with a subsurface fish aggregating device (FAD) off southwestern Taiwan. *Journal of Applied Ichthyology* 29: 990–1000.

Whitelaw, A.W. and V.K. Unithan. 1997.Synopsis on the distribution, biology, and fisheries of the bigeye tuna (Thunnus obesus) with a bibliography. Hobart, Australia, Australian Commonwealth Scientific and Research Organization.

Williams, P. and P. Terawasi. 2014. Overview of the western and central Pacific Ocean tuna fisheries, including economic conditions – 2013. WCPFC-SC10-2014/GN WP-1. Majuro, Republic of the Marshall Islands, Western and Central Pacific Fisheries Commission.

Wilson, C. A. and J. M. Dean. 1983. The potential use of sagittae for estimating age of Atlantic swordfish, Xiphias gladius. Proceedings of the International Workshop on Age Determination of Oceanic Pelagic Fishes: Tunas, Billfishes and Sharks. NOAA Report TRNMFS-8, 151-156. United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.