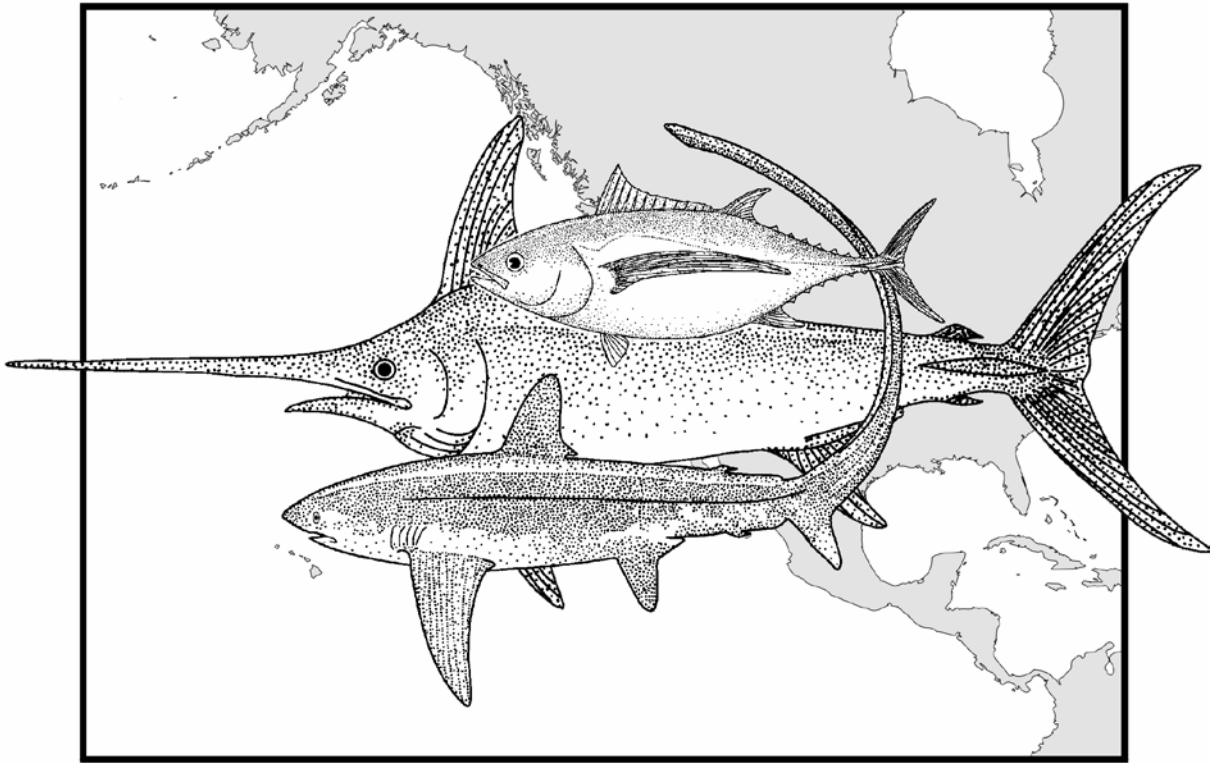


STATUS OF THE U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES THROUGH 2018



STOCK ASSESSMENT AND FISHERY EVALUATION

JANUARY 2019

PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 101
PORTLAND, OREGON 97220
WWW.PCOUNCIL.ORG

Cover illustration by Roy Allen, Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, California

Printed: February 20, 2019



Prepared by the Pacific Fishery Management Council in conjunction with the National Marine Fisheries Service, Southwest Region under National Oceanic and Atmospheric Administration award number NA10NMF4410014.

Table of Contents

1.	INTRODUCTION.....	1
1.1.	SAFE Document Production Schedule.....	1
1.2.	Amendments to the Fishery Management Plan.....	1
1.3.	Management Unit Species and Ecosystem Component Species.....	1
1.4.	The Management Cycle.....	2
1.5.	Highly Migratory Species Management Team.....	3
2.	COUNCIL HMS ACTIVITIES IN 2018.....	5
2.1.	November 2018 Council Decisions.....	5
	Recommend International Management Activities.....	5
	Biennial Harvest Specifications and Management Measures – Preliminary Action.....	5
	Deep-Set Buoy Gear Authorization – Range of Alternatives and Limited Entry Criteria.....	5
2.2.	September 2018 Council Decisions.....	6
	Final Recommendations on Non-Deep-Set Buoy Gear Exempted Fishing Permits (EFPs).....	6
	Recommend International Management Activities.....	6
	Biennial Harvest Specifications and Management Measures.....	6
	Drift Gillnet Performance Metrics Methodology.....	7
	Swordfish Management and Monitoring Plan.....	7
2.3.	June 2018 Council Decisions.....	7
	Recommendations for International Management Activities.....	7
	Drift Gillnet (DGN) Performance Metrics.....	8
	Deep-Set Buoy Gear (DSBG) Authorization - Final Range of Alternatives and Preliminary Preferred Alternative for Number of Limited Entry Permits.....	8
	Preliminary Review of New Non-Deep-Set Buoy Gear Exempted Fishing Permit Applications and Resubmission of Previous DSBG Applications.....	8
	Swordfish Management Project Planning and Observer Coverage.....	8
2.4.	March 2018 Council Decisions.....	9
	Deep-Set Buoy Gear Authorization – Final Range of Alternatives/Preliminary Preferred Alternative.....	9
	Proposed Deep-Set Buoy Gear Exempted Fishing Permits.....	9
3.	CHANGES TO HMS FMP REGULATIONS IN 2018.....	11
4.	MONITORING AND ENFORCEMENT.....	13
4.1.	Status of HMS Permits.....	13
4.2.	HMS Fisheries Data Collections.....	13
5.	PROTECTED RESOURCES REGULATIONS.....	15
5.1.	HMS FMP Endangered Species Act Consultations.....	15
5.2.	Sea Turtles Listed Under the ESA.....	16
5.3.	Marine Mammal Protection Act.....	17
5.4.	Marine Mammals of Concern for West Coast HMS Fisheries.....	18
6.	INTERNATIONAL MANAGEMENT.....	21
6.1.	RFMOs.....	21
6.2.	2018 IATTC and WCPFC Outcomes.....	21
	Fifteenth Regular Session of the Western and Central Pacific Fisheries Commission, Honolulu, Hawaii, USA, December 10-14, 2018. Provisional Outcomes Document.....	21
	93rd IATTC Meeting, August 24, 27-30, 2018, San Diego, California, USA.....	22
7.	REGULATIONS FOR INTERNATIONAL HMS FISHERIES AND RELATED ACTIVITIES IN THE PACIFIC PUBLISHED IN 2018.....	23

8.	COMMERCIAL FISHERIES DESCRIPTIONS	25
8.1.	Surface Hook-and-Line Fishery for Albacore.....	25
8.2.	Drift Gillnet Fishery for Swordfish and Shark.....	26
8.3.	Harpoon Fishery for Swordfish.....	27
8.4.	High Seas Longline Fishery for Swordfish and Tuna.....	28
8.5.	Coastal Purse Seine Fishery for Yellowfin, Skipjack, and Bluefin Tunas.....	29
9.	RECREATIONAL FISHERIES DESCRIPTIONS	31
9.1.	Albacore.....	31
9.2.	Other HMS (Southern California).....	31
10.	FISHERY PERFORMANCE IN 2017	33
10.1.	Commercial Fisheries	33
10.1.1.	HMS Landings - Coastwide Perspective (see Table 26a & b).....	33
10.1.2.	Landings by Species (see Table 1).....	34
10.1.3.	Landings by Fishery (see Table 2).....	35
10.2.	Recreational Fisheries.....	36
10.2.1.	Albacore catch in Washington, Oregon, and California (Tables R1, R2, and R3)	36
10.2.2.	Other HMS in Southern California (Tables R4 and R5, Tables R6 and Table R7)	37
11.	U.S.-CANADA ALBACORE TREATY DATA EXCHANGE	39
12.	PACIFIC-WIDE HMS CATCH	49
12.1.	Global Tuna Catch	49
12.2.	Pacific-Wide Catch of Bigeye, Skipjack, and Yellowfin Tuna.....	50
12.3.	Catch of Target Tunas in Eastern Pacific.....	51
12.4.	Catch of Target Tunas in the Western Pacific	52
12.5.	Northern Stocks – North Pacific albacore, Pacific bluefin tuna, and swordfish in the North Pacific 53	
12.5.1.	North Pacific Albacore.....	54
12.5.2.	Pacific Bluefin Tuna	54
12.5.3.	North Pacific Swordfish.....	55
13.	STATUS OF HMS STOCKS.....	57
13.1	HMS Stock Assessments	57
13.1.1.	Organizations That Conduct HMS Stock Assessments	57
	Inter-American Tropical Tuna Commission (IATTC).....	57
	Secretariat of the Pacific Community Oceanic Fisheries Program (SPC-OFP).....	58
	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) 58	
	National Marine Fisheries Service (NMFS).....	59
13.1	Assessment of Stock Status.....	59
	Current Status Determination Criteria for HMS FMP Stocks.....	60
	RFMO Consideration of Biological Reference Points and Harvest Strategies	65
13.2	Catches of HMS Management Unit Species in West Coast Fisheries	65
13.3	Current Stock Assessments for Species Managed under the HMS FMP.....	66
14.	COMMONLY-USED WEB LINKS IN HIGHLY MIGRATORY SPECIES MANAGEMENT AND RESEARCH.....	69

List of Tables

Table 4-1. HMS permits recorded in the permit database for each year since the regulation became

effective on February 10, 2005. The permit data presented reflects valid permits and does not necessarily reflect total number of active vessels (i.e., vessels with catch and effort history in a given fishery year).	13
Table 4-2. Summary of fisheries data collections.	14
Table 5-1. Biological opinions for west coast HMS fisheries	16
Table 5-2. Key population parameters for marine mammals used as bycatch performance metrics in the DGN fishery.	19
Table 11-1. Catch of Albacore by Canadian and U.S. albacore troll and pole-and-line vessels in the North Pacific Ocean ¹	41
Table 11-2. Landings of Albacore (by country of landing port) by Canadian (top panel) and U.S. (bottom panel) albacore troll and pole-and-line vessels in the North Pacific Ocean.	43
Table 11-3. Distribution of Canadian (top panel) and U.S. (bottom panel) albacore troll and pole-and-line fleet fishing effort in the North Pacific Ocean ¹	46
Table 13-1. Current assessments for key stocks.	61
Table 13-2. Stock assessment information for the purposes of determining whether HMS stocks are subject to overfishing.	62
Table 13-3. Stock assessment information for the purposes of determining whether HMS stocks are overfished.	63
Table 13-4. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2012–16.	65

List of Figures

Figure 6-1. Global map of tuna RFMO jurisdictions. (Source: http://www.fao.org/fishery/topic/16917/en).	21
Figure 8-1. Number of vessels and real (inflation adjusted) ex-vessel revenue from North Pacific albacore (\$1,000s) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 20087-20176, Canadian vessels included.	26
Figure 8-2. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) in the West Coast drift gillnet fishery, 2008-2017.	27
Figure 8-3. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) in the West Coast harpoon fishery, 2008-2017.	28
Figure 8-4. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) from Hawaii permitted longline vessels in West Coast ports, 2008-2017 (no landings occurred in 2007). *In these years revenue data are confidential (less than 3 vessels or dealers) and therefore suppressed.	29
Figure 8-5. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) from HMS tunas in the West Coast purse seine fishery, 2008-2017. *In these years revenue data are confidential (less than 3 vessels or dealers) and therefore suppressed.	30
Figure 10-1. Landings (shoreside commercial and tribal) by species management group (mt), 1998-2017. ('All Other' includes crab, shellfish, shrimp, and other state managed species.)	33
Figure 10-2. Real (inflation adjusted, 1,000s of 2015 dollars) ex-vessel revenue by management group in West Coast ports from the PFMC management area, 1988-2017.	34
Figure 10-3. Landings of HMS (metrics tons) by species and groups, 2008-2017. (Source: HMS SAFE Table 3.)	35
Figure 10-4. West Coast commercial HMS ex-vessel revenue by fishery, 2017. (Confidential data excluded)	36
Figure 10-5. Recreational albacore catch (number of kept fish) for charter and private boats, 2015-2017.	37
Figure 10-6. Retained catch of selected HMS, combined private boat and charter in U.S. waters, 2015-	

2017.....	38
Figure 10-7. Retained catch of selected HMS, combined U.S. private boat and charter fishing in Mexico waters, 2015-2017.....	38
Figure 12-1. Annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna by ocean area, 2017-2016.....	49
Figure 12-2. Annual catch of bigeye, skipjack, and yellowfin tuna (mt) in the EPO and WCPO, 2007-2016.....	50
Figure 12-3. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the EPO by flag state, 2012-2016. Other flag states include Belize, Canada, Chile, China, Chinese Taipei, Costa Rica, French Polynesia, Japan, Korea, Nicaragua, Peru, Spain, and Vanuatu.....	51
Figure 12-4. Average annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the Eastern Pacific Ocean, 2012-2016, by gear type.	51
Figure 12-5. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by flag state, 2012-2016. Other flag states include Marshall Islands, Federated States Of Micronesia, Solomon Islands, Spain, Vanuatu, New Zealand, Ecuador, Fiji, El Salvador, Tuvalu, French Polynesia, Australia, Cook Islands, New Caledonia, Samoa, Tonga, Tokelau, Eastern Pacific US Purse Seine Fleet, and Belize.....	52
Figure 12-6. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by gear type, 2012-2016.....	52
Figure 12-7. Reported catch of North Pacific albacore, Pacific bluefin tuna, and North Pacific swordfish, 2007-2016.	53
Figure 12-8. Average annual reported catch (mt) of North Pacific albacore by ISC members, 2012-2016.	54
Figure 12-9. Average annual catch (mt) of North Pacific albacore by gear type, 2012-2016. Other gear types include setnet, drift gillnet, purse seine, handline, and recreational.....	54
Figure 12-10. Average annual reported catch (mt) of Pacific bluefin tuna by ISC members, 2012-2016.	54
Figure 12-11. Average annual catch (mt) of Pacific bluefin tuna by gear type, 2012-2016. Other gear types include setnet, pole and line, drift gillnet, other gillnet, trawl, and recreational.	54
Figure 12-12. Average annual reported catch (mt) of North Pacific swordfish by ISC members, 2012-2016.....	55
Figure 12-13. Average annual catch (mt) of swordfish by gear type, 2012-2016. Net gear types include setnet, drift gillnet, and other gillnet. Other gear types include harpoon and handline.	55

Acronyms

ACL	annual catch limit
AFRF	American Fishermen's Research Foundation
B	biomass
B ₀	initial (unfished) biomass
BO	Biological Opinion
BREP	Bycatch Reduction Engineering Program
CDFG	California Department of Fish and Game
CFR	Code of Federal Regulations
CMM	Conservation and Management Measure
Council	Pacific Fishery Management Council
CPFV	commercial passenger fishing vessel
CPUE	catch per unit of effort
CRFS	California Recreational Fisheries Survey
DFO	Department of Fisheries and Oceans (Canada)
DGN	drift gillnet
EEZ	exclusive economic zone
EFH	essential fish habitat
EPO	eastern Pacific Ocean
ESA	Endangered Species Act
F	fishing mortality rate
FL	fork length
FMP	fishery management plan
FR	Federal Register
HAPC	Habitat Area of Particular Concern
HMS	highly migratory species
HMS FMP	Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species
HMSAS	Highly Migratory Species Advisory Subpanel
HMSMT	Highly Migratory Species Management Team
IATTC	Inter-American Tropical Tuna Commission
ISC	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific
IUU	illegal, unregulated, and unreported fishing
LOF	List of Fisheries
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevens Act, Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
mt	metric ton
MUS	management unit species
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPO	North Pacific Ocean
NRISF	National Research Institute of Far Seas Fisheries (Japan)
ODFW	Oregon Department of Fish and Wildlife
OMB	Office of Management and Budget
OSP	Washington Ocean Sampling Program
OY	optimum yield

PacFIN	Pacific Fisheries Information Network
PIER	Pfleger Institute of Environmental Research
PIFSC	NMFS Pacific Islands Fisheries Science Center
PIRO	NMFS Pacific Islands Regional Office
PSAT	pop-off satellite archival tag
PSMFC	Pacific States Marine Fisheries Commission
RecFIN	Recreational Fisheries Information Network
RFMO	regional fishery management organization
SAC	IATTC Scientific Advisory Committee
SAFE	stock assessment and fishery evaluation
SBR	spawning biomass ratio
SCB	Southern California Bight
SEPO	Southeast Pacific Ocean
SLUTH	Swordfish and Leatherback Use of Temperate Habitat (Workshop)
SPOT Tag	smart position and/or temperature tag
SSB	spawning stock biomass
SST	sea surface temperature
SWFSC	Southwest Fisheries Science Center (NMFS)
SWR	Southwest Regional Office (NMFS)
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	western and central Pacific Ocean
WDFW	Washington Department of Fish and Wildlife

1. Introduction

1.1. **SAFE Document Production Schedule**

The HMS FMP describes a schedule under which a final stock assessment and fishery evaluation (SAFE) document is delivered in November each year, containing information through the preceding year. However, since 2014 the [SAFE has been maintained on the Council website](#) with regular updates throughout the year. An “archive copy” (like this document) is then produced in January of the following year. This makes it possible to include information for all of the preceding year. The exception is the tables and figures reporting landings and participation for commercial and recreational fisheries, which are lagged by a year due to the time it takes for the data to flow into relevant databases. (These data tables are only maintained online and not reproduced in this archive copy but summary statistics are reported in Chapters 8 and 9.) Thus, this archive copy, produced in January 2019, covers the calendar year 2018.

1.2. **Amendments to the Fishery Management Plan**

[The Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species](#) (HMS FMP) was developed by the Pacific Fishery Management Council in response to the need to coordinate state, Federal, and international management. The National Marine Fisheries Service (NMFS), on behalf of the U.S. Secretary of Commerce, partially approved the HMS FMP on February 4, 2004. The majority of HMS FMP implementing regulations became effective on April 7, 2004. Reporting and recordkeeping provisions became effective on February 10, 2005.

The HMS FMP has been amended four times since its implementation (with a fifth amendment in process as of January 2017). [Amendment 1](#), approved by NMFS on June 7, 2007, incorporates recommended international measures to end overfishing of the Pacific stock of bigeye tuna (*Thunnus obesus*). [Amendment 2](#), approved by NMFS on June 27, 2011, makes the FMP consistent with revised National Standard 1 Guidelines. [Amendment 3](#), adopted in 2015, added a suite of lower trophic level species to the FMP’s list of ecosystem component (EC) species. Consistent with the objectives of the Council’s FMPs and its Fishery Ecosystem Plan, Amendment 3 prohibits future development of directed commercial fisheries for the suite of EC species shared between all four FMPs (“Shared EC Species”) until and unless the Council has had an adequate opportunity to both assess the scientific information relating to any proposed directed fishery and consider potential impacts to existing fisheries, fishing communities, and the greater marine ecosystem. Secretarial approval of [Amendment 4](#) was approved on April 24, 2018. Amendment 4 revises and updates portions of the FMP to bring descriptions of the management context for HMS fisheries up to date and to better describe the Council’s role in the process of making stock status determinations including evaluations of the best scientific information available (BSIA). This amendment also changes the biennial meeting schedule to better align it with the National Marine Fisheries Service’s process for conducting HMS stock status determinations. [Amendment 5](#) was approved December 14, 2017. This amendment creates a Federal permit for the California large mesh drift net fishery.

1.3. **Management Unit Species and Ecosystem Component Species**

The HMS currently managed under the FMP are:

- Striped marlin (*Kajikia audax**)
- Swordfish (*Xiphias gladius*)
- Common thresher shark (*Alopias vulpinus*)
- Shortfin mako shark (bonito shark) (*Isurus oxyrinchus*)

- Blue shark (*Prionace glauca*)
- North Pacific albacore (*Thunnus alalunga*)
- Yellowfin tuna (*Thunnus albacares*)
- Bigeye tuna (*Thunnus obesus*)
- Skipjack tuna (*Katsuwonus pelamis*)
- Pacific bluefin tuna (*Thunnus orientalis*)
- Dorado, a.k.a. mahi mahi or dolphinfish (*Coryphaena hippurus*)

*The scientific name for this species was previously *Tetrapturus audax*.

In addition, Amendment 2 added eight EC species to the FMP. The EC category is identified in the revised National Standard 1 Guidelines. The list was compiled from monitored species previously identified in the plan and by moving two management unit species to the EC category. The EC species are:

- Bigeye thresher shark (*Alopias superciliosus*)
- Common mola (*Mola mola*)
- Escolar (*Lepidocybium flavobrunneum*)
- Lancetfishes (Alepisauridae)
- Louvar (*Luvarus imperialis*)
- Pelagic sting ray (*Dasyatis violacea*)
- Pelagic thresher shark (*Alopias pelagicus*)
- Wahoo (*Acathocybium solandri*)

EC species are not considered “in the fishery” but Councils should consider measures to mitigate and minimize bycatch of these species, to the extent practicable, consistent with National Standard 9. MSY, OY, and other reference points do not need to be specified for EC species. Identification of EC species will help the Council to track these species over time, periodically evaluate their status, and assess whether any management is needed under the FMP, in which case an EC species could be reclassified as a managed species.

1.4. The Management Cycle

The HMS FMP also establishes a process for the delivery of the SAFE report to the Council, intended to coincide with the management cycle.

At the September Council meeting in even numbered years a draft SAFE report provides an update to the Council on status of the HMS fisheries and, as appropriate, proposed adjustments to the numerical estimates of maximum sustainable yield (MSY), optimum yield (OY), and status determination criteria (SDC). If necessary, Council directs HMSMT to prepare draft regulatory analysis to implement revised estimates of reference point values, ACLs, or other harvest objectives and/or management measures.

At the November Council meeting in even numbered years a final SAFE report on the status of HMS stocks and fisheries is presented to Council. If necessary, the Council directs HMSMT to prepare a draft regulatory analysis to implement revised estimates of reference point values, ACLs, or other harvest objectives and/or management measures. The Council adopts for public review proposed actions addressing concerns from current and previous SAFE reports.

At the next Council meeting, in March of odd numbered years, the Council adopts final recommendations to NMFS, Department of State, and Congress for international measures to end overfishing and/or rebuild stocks and proposed regulations necessary for domestic fishery management.

Any management measures proposed by the Council are implemented during the next fishing year, which starts on April 1, and stay in effect unless action is taken to modify the action. Council meetings in 2006 initiated the first biennial management cycle under the HMS FMP with consideration of measures to be implemented during the April 1, 2007–March 31, 2009 biennium. In 2010 the Council considered management changes for the third biennial period, April 1, 2011–March 31, 2013. In 2012 the Council did not consider any regulatory changes for the April 1, 2013–March 31, 2015 biennium. In 2014 the Council considered an adjustment to recreational bag limits for Pacific bluefin tuna in Southern California and recommended reducing the bag limit to two fish per day per angler with a six fish maximum per angler for multi-day trips. This action also included requirements at processing of recreationally-caught bluefin at sea to allow species identification. The final rule implementing this regulation was published in the Federal Register ([80 FR 44887](#)) on July 28, 2015 and became effective on July 30, 2015. In 2016 and 2018 the Council did not recommend any regulatory changes for the next biennial periods (April 1, 2017–March 31, 2021).

1.5. *Highly Migratory Species Management Team*

Current members of the HMSMT may be found in the [Roster](#) on the Council website.

2. Council HMS Activities in 2018

Written briefing materials submitted at Council meetings by downloaded from the Council's [briefing book archive webpage](#).

2.1. November 2018 Council Decisions

Recommend International Management Activities

The Council agreed to send one member of the Highly Migratory Species Advisory Subpanel (HMSAS) to participate in the March 5-7 North Pacific albacore management strategy evaluation workshop to be held by the International Scientific Committee for Tuna and Tuna-like Species (ISC) in Yokohama, Japan. The HMSAS member will report back to the Council on workshop outcomes.

The Council tasked the Highly Migratory Species Management Team (HMSMT) to work with the HMSAS in summarizing historical North Pacific albacore catch and effort to provide support for Inter-American Tropical Tuna Commission (IATTC) discussions on defining effort. The HMSMT is anticipated to report back on findings at the March 2019 meeting.

In response to [IATTC Resolution C-18-01](#), which establishes a 600 mt 2019-20 commercial catch limit for west coast fisheries catch Pacific bluefin tuna, NMFS is developing regulations for trip limits to ensure the catch limits are not exceeded and the annual sublimit is no more than 425 mt. The Council made recommendations on these regulations at the September 2018 meeting. In November, NMFS reported on the measures it was planning to implement, which incorporate most of the Council's September recommendations (see [Supplemental NMFS Report 2](#)). In response, the Council recommended NMFS incorporate the following changes into the proposed regulations:

- Allow purse seine landings up to 2 mt without pre-trip notifications.
- Reduce the purse-seine pre-trip notification requirement from 48 hours to 24 hours.

Biennial Harvest Specifications and Management Measures – Preliminary Action

The Council endorsed the estimates of status determination criteria for the management unit species in the HMS FMP contained in [HMSMT Report 1](#) and reviewed the notification it received from NMFS that Eastern Pacific Ocean yellowfin tuna is subject to overfishing. The Council will take up its response to this notification in June 2019.

Deep-Set Buoy Gear Authorization – Range of Alternatives and Limited Entry Criteria

The Council adopted a final range of alternatives for authorizing use of deep-set buoy gear (DSBG) as described in [HMSMT Report 1](#), including modifications and the range of qualification rankings found in [Supplemental HMSMT Report 2](#), except that Alternative 3, Stand-Alone drift gillnet (DGN) Permit Trade-in, is removed from the range. The Council also incorporated both the alternative proposed in [Supplemental HMSAS Report 1](#), and the public comment provided by Ms. Tara Brock in [Supplemental Comment 2](#) as part of the final range of alternatives.

The Council adopted a preliminary preferred alternative for a limited entry permit program for vessels fishing in Federal waters east of 120° 28' 18" W. longitude. As described under Alternative 2 in [HMSMT Report 1](#), all other Federal waters offshore of California and Oregon would be "open access."

The Council's preliminary preferred alternative (PPA) is a variation of Alternative 1 described in [Supplemental HMSMT Report 2](#). Alternative 1 provides an ordered list of qualifying criteria to be used to determine the order of applicants to whom a limited entry DSBG permit would be issued. Individuals could only possess one limited entry permit. Fifty permits would be issued initially with up to 25 permits issued annually in subsequent years until either a maximum of 300 permits are issued or NMFS or the Council determines that less than 300 permits should be issued. The Council PPA prioritizes active DSBG EFP and DGN fishery participants. Details of the ranking criteria for permit issuance may be found in the [Council motion](#) for this agenda item.

2.2. September 2018 Council Decisions

Final Recommendations on Non-Deep-Set Buoy Gear Exempted Fishing Permits (EFPs)

The Council approved the [Hall EFP](#) testing deep-set longline inside the Exclusive Economic Zone and forwarded it to National Marine Fisheries Service (NMFS) for processing.

Recommend International Management Activities

The Council recommended the following Pacific bluefin tuna catch limits and management measures for 2019 and 2020 West Coast Highly Migratory Species (HMS) fisheries:

1. In 2019, apply a 15 mt commercial fishery trip limit until landings reach 200 mt. Once landings have reached this level, the trip limit is reduced to 2 mt. The 2019 annual overall catch limit is 300 mt. The fishery is closed for the balance of the year when this limit is reached.
2. For 2020, apply a 15 mt commercial fishery trip limit until cumulative 2019-2020 landings reach 475 mt. Once this cumulative biennial level is reached, the trip limit is reduced to 2 mt. The fishery is closed for the balance of the year once the biennial limit of 600 mt is reached.
3. Consistent with Inter-American Tropical Tuna Commission (IATTC) Resolution [C-18-01](#), underages or overages in any one year are applied to the following year.
4. Pacific bluefin tuna landings must be reported within 24 hours of landing using the California E-tix reporting system.
5. NMFS will develop a method to close the fishery or reduce the trip limit via United States Coast Guard radio transmittal, or other means that will halt additional fishing in the most timely manner possible.

The Council also recommended that the 2019 ISC Pacific bluefin Management Strategy Evaluation workshop be held at a location on the U.S. West Coast.

The Council directed its HMS Management Team (HMSMT) to analyze fishing effort in the West Coast North Pacific albacore fishery to support discussions at the IATTC about specifying effort limits consistent with Resolution C-05-02. Based on the comparable Western and Central Pacific Fisheries Commission (WCPFC) conservation and management measure, the WCPFC Northern Committee (NC) defined the effort limit as the 2002-2004 average level. A fishing effort analysis could also support a change in the NC effort definition, to harmonize it with any limit adopted by the IATTC.

Biennial Harvest Specifications and Management Measures

The Council directed its HMSMT to develop a Stock Assessment and Fisheries Evaluation (SAFE) report for Council consideration, incorporating the estimates of maximum sustainable yield (MSY) and status determination criteria (SDC) [recommended by NMFS](#). The Council requested its Scientific and Statistical Committee (SSC) to review these estimates for their suitability in management. The Council

will consider SSC comments and the contents of the SAFE report at its November 2018 meeting. The Council may then adopt the estimates of MSY, optimum yield, and SDC presented in the SAFE document for management use and, as appropriate, recommend them to the IATTC and WCPFC. As part of this process, the Council also asked NMFS to provide information relative to the need to establish acceptable biological catch and annual catch limits for Council-managed HMS stocks.

The Council directed the HMSMT and HMS Advisory Subpanel to begin developing a long-term management strategy for Pacific bluefin tuna, recognizing that the stock is rebuilding and there is an opportunity for U.S. catch limits to increase in future years.

Drift Gillnet Performance Metrics Methodology

The Council adopted the regression tree methodology for reviewing the performance of the drift gillnet (DGN) fishery in relation to bycatch of rarely encountered non-marketable species. The Council directed the HMSMT to:

1. Develop proposed metrics for 22 bycatch species encountered in the DGN fishery using the regression tree method.
2. Compare a single estimate within a year with a multi-year trend to measure performance in the DGN fishery.
3. Compare performance indicator uncertainty under different levels of DGN fishery observer coverage.
4. Develop a proposed process, including potential bycatch reduction measures, that the Council would consider if the fishery is not performing within such metrics.

The Council directed the HMSMT to report back to the Council on these matters at the March 2019 meeting.

Swordfish Management and Monitoring Plan

The Council recommended that edits identified in the [Highly Migratory Species Management Team report](#) be added to the Swordfish Monitoring and Management Plan (SMMP), and then hold the plan in draft form. Further revision or adoption of the SMMP for public review was not scheduled. The Council did [schedule](#) several future HMS actions, including the development of a deep-set buoy gear fishery, review of proposed drift gillnet performance metrics and analyses, and scoping the development of a shallow-set longline fishery beyond the U.S. economic exclusive zone (outside 200 miles).

2.3. June 2018 Council Decisions

Recommendations for International Management Activities

The Council recommended that the U.S. oppose proposals to increase catch limits for Pacific bluefin tuna at the Inter-American Tropical Tuna Commission (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC) Northern Committee meetings. At its August meeting, the IATTC will be negotiating a new measure for Pacific bluefin management in the eastern Pacific Ocean (EPO) for 2019 and beyond. Immediately following, the Joint Working Group of the Northern Committee and IATTC will meet to discuss long-term Pacific bluefin management and the Northern Committee could propose a revised Conservation and Management Measure for adoption by the WCPFC. In both these forums there will likely be pressure to increase catch limits, because of a recent increase in recruitment resulting in more optimistic projections of stock rebuilding. However, the Council notes these projection results are

due to a single year of increased recruitment so it is still highly uncertain that rebuilding targets can be met.

The Council also noted new permit requirements for U.S. vessels intending to fish for albacore in Canadian waters during the 2018 season starting on June 15. The Council asked NMFS to work with the Canadian government to resolve any impediments to access and to keep stakeholders informed.

Drift Gillnet (DGN) Performance Metrics

The Council directed its SSC to review current and proposed methodologies for setting and evaluating bycatch performance metrics for the California large mesh drift gillnet fishery. The HMSMT, with assistance with NMFS, was tasked with preparing the requisite information for SSC review. Based on SSC recommendations, the Council will consider changes to the performance metrics and adopt changes, if any, for the next report on the metrics in June 2019.

Deep-Set Buoy Gear (DSBG) Authorization - Final Range of Alternatives and Preliminary Preferred Alternative for Number of Limited Entry Permits

The Council revised the range of options for the number of permits and the manner of issuance under the limited entry alternative. (Limited entry would apply to the area east of a line extending due south from Point Conception). These options would allow a phased in approach whereby the Council would issue an initial number of permits and could then issue additional permits in subsequent years up to a cap of 300 permits. These options for initial issuance and total issuance are:

1. Not more than 50 permits per year, not to exceed 300 total.
2. Not more than 100 permits per year, not to exceed 300 total.
3. Not more than 300 permits maximum.

The options are meant to allow flexibility such that the Council would not be obligated to issue the whole of the specified annual number, nor would the Council have to issue all permits up to the specified cap. Rather, these options facilitate the analysis of a phase-in approach, which would allow the Council to proceed cautiously to reach a level of permits that best meets management objectives.

The Council specified an estimate of 500 vessels for the purposes of analyzing an open access fishery.

Preliminary Review of New Non-Deep-Set Buoy Gear Exempted Fishing Permit Applications and Resubmission of Previous DSBG Applications

The Council reviewed two EFP applications. Mr. David Hutto submitted a revised application to use DSBG, as requested by the Council in March 2018. The Council recommended that NMFS issue the EFP to Mr. Hutto based on his revised application. Dr. John Hall submitted an [application to test short \(<5 nm\) deep-set pelagic longline gear within the West Coast Exclusive Economic Zone \(EEZ\)](#). The Council approved this application for public review, noting that fishing in waters off Washington should not be allowed, and will make a final recommendation at its September 2018 meeting.

Swordfish Management Project Planning and Observer Coverage

The Council recommended making basic revisions to the draft Swordfish Management and Monitoring Plan based on recommendations from [NMFS](#), the [HMSMT](#), and Highly Migratory Species Advisory Subpanel ([HMSAS](#)). The Council will review the draft plan, with the intention of adopting a final plan at

a future meeting once more information on ongoing initiatives becomes available. These include SSC review of bycatch estimation methodologies that could be used for DGN fishery performance standards; trials of electronic monitoring in the DGN fishery, especially for unobservable vessels; results from EFPs the Council previously recommended for issuance or is currently considering; and establishing a regulatory framework for a DSBG fishery.

Increased monitoring of the DGN fishery is an objective of the SMMP. The Council reaffirmed its preferred alternative adopted in September 2015. The Council's preferred alternative, as reaffirmed, is in the near term to achieve a 30 percent monitoring coverage level through a combination of human observers and electronic monitoring and work toward the objective of monitoring all vessels. In doing so, NMFS should find ways to ensure all vessels are capable of observation by electronic monitoring (including those vessels that cannot currently accommodate human observers). The Council will further consider its proposal at a future time as information becomes available on initiatives to enhance DGN fishery monitoring.

2.4. *March 2018 Council Decisions*

Deep-Set Buoy Gear Authorization – Final Range of Alternatives/Preliminary Preferred Alternative

The Council adopted a range of alternatives to authorize a deep-set buoy gear (DSBG) fishery based on the [preliminary range adopted in September 2017](#) and provided guidance to the Highly Migratory Species Management Team (HMSMT) on analyses to support a decision on the number of limited entry permits that may be issued. In September 2018 the Council will consider potential qualifying criteria for a limited entry permit. In March 2019 the Council is scheduled to select its final preferred alternatives including qualifying criteria for a limited entry permit.

Proposed Deep-Set Buoy Gear Exempted Fishing Permits

The Council made a recommendation to NMFS on issuance of the 13 DSBG EFP applications submitted for review at this meeting based on [input from its HMSMT](#).

The Council also decided to suspend the current practice of accepting DSBG EFP applications at every meeting at which HMS items are on the agenda. Those applications for which the Council requested revision and resubmission will be reviewed again at the June 2018 Council meeting, when a final recommendation will be made. The Council will next consider new DSBG EFP applications in June 2019, following the process outlined in [Council Operating Procedure 20](#).

3. Changes to HMS FMP Regulations in 2018

Modifications to HMS FMP regulations at [50 CFR 660 Subpart K](#) in 2018 are listed below. A list of regulations since implementation of the FMP may be found in online SAFE or previous archive versions.

On March 14, 2018 NMFS issued regulations to implement Amendment 5 to the HMS FMP, which establishes a Federal limited entry (LE) permit system for the California/Oregon large-mesh drift gillnet (DGN) fishery using standards that are very similar to those used in the existing State of California LE permit program for the DGN fishery. The regulations became effective April 13, 2018. Details of this rulemaking may be found at [83 FR 11146](#).

On May 7, 2018, NMFS issued regulations to implement Amendment 4 to the Fishery Management Plan for U.S. West Coast Highly Migratory Species (HMS FMP) with an effective date of June 6, 2018. Amendment 4 brings descriptions of the management context for HMS fisheries up to date, better describes the Council's role in the process of making stock status determinations for highly migratory species (HMS), including the Council's evaluations of the best scientific information available (BSIA), and changes the schedule of the Council's three-meeting biennial management cycle for HMS stocks. Details of this rulemaking may be found at [83 FR 19981](#)

4. Monitoring and Enforcement

4.1. Status of HMS Permits

The reporting and recordkeeping requirements of the HMS FMP became effective February 10, 2005, and formalized the requirement for an HMS permit. Title 50, Section 660.707 of the Code of Federal Regulations outlines the required HMS permit with an endorsement for a specific gear for all U.S. commercial and recreational charter fishing vessels fishing for HMS within the U.S. EEZ off the States of California, Oregon, and Washington. The permit requirements also apply for U.S. commercial fishing vessels that land or transship HMS shoreward of the outer boundary of the U.S. EEZ off the States of California, Oregon, and Washington. The permit must be on board the vessel and available for inspection by an authorized officer. The following table shows the number of valid HMS permits by year.

HMS permits recorded in the permit database for each year since the regulation became effective on February 10, 2005. The permit data presented reflects valid permits and does not necessarily reflect total number of active vessels (i.e., vessels with catch and effort history in a given fishery year).

Table 4-1. HMS permits recorded in the permit database for each year since the regulation became effective on February 10, 2005. The permit data presented reflects valid permits and does not necessarily reflect total number of active vessels (i.e., vessels with catch and effort history in a given fishery year).

Year	California	Oregon	Washington	Other	Total
2005	677	626	298	135	1,736
2006	800	684	339	152	1,975
2007	785	561	318	108	1,772
2008	826	569	331	84	1,810
2009	903	650	381	54	1,988
2010	887	620	383	80	1,970
2011	862	650	340	106	1,958
2012	826	625	348	113	1,912
2013	842	647	378	140	2,007
2014	851	597	433	75	1,956
2015	867	608	441	86	2,002
2016	828	576	414	77	1,895

Notes: The permits are issued to the vessel owner(s) not to the vessels themselves. The totals indicate the number of valid permits in each year and cannot be added across years. The “Other” column includes non-west coast home ports/states and permits issued with no home port/state designated.

4.2. HMS Fisheries Data Collections

Catch, effort, size composition, and landings data are critical for monitoring HMS fisheries and assessing the status of HMS stocks. The SWFSC monitors seven Pacific Ocean HMS fisheries. Logbook, observer, landing, and size composition data from these fisheries come from various sources, as shown in the table below.

Table 4-2. Summary of fisheries data collections.

Fishery	Logbooks	Observer	Landings	Size Composition
North Pacific Albacore Troll	F		P/S/I	D
Large Mesh Drift Gillnet	S	F	P	O
Harpoon	S		P	
EPO Purse Seine	I	I	C/P	D
California Longline	F	F	H	H
California HMS Sport	S			D (PBF)
Albacore Sport (OR/WA)	F			

LEGEND

Logbooks/Observer: F – federal; S – state; I – international

Landings monitored by: P – PacFIN; C – cannery; H – Hawaii

Size composition: O – observer; D – dock-side

All HMS permit holders, including HMS recreational charter vessels, are required to maintain logbooks. All information specified on the logbook forms must be recorded on the forms within 24 hours after the completion of each fishing day. The original logbook form for each fishing trip must be submitted to NMFS within 30 days of the end of each trip. Each form must be signed and dated by the fishing vessel operator.

The CDFW implemented a harpoon logbook and permit program in 1974. Logbooks are submitted to CDFW and forwarded to SWFSC for editing and keypunching.

The gillnet logbook program was implemented in 1980 by the CDFW. Logbooks are submitted to CDFW and forwarded to SWFSC for editing and keypunching.

Purse-seine vessels based on the west coast primarily target CPS but occasionally target HMS (albacore bluefin tuna) when they are available and market conditions are favorable. Logbook data are required to be submitted to NMFS when these vessels target HMS.

Participants in the west-coast based longline fisheries submit logbook data to SWFSC. Logbook data are maintained at SWFSC and are combined with Hawaii longline data for international reporting. PacFIN data are not used in the estimation of total annual catch estimates for Pacific HMS pelagic longline fisheries.

CPFV vessel owners based in California submit logbook data to CDFW who in turn make the data available to SWFSC. SWFSC staff extracts and summarize the HMS component of the data for reporting purposes. CPFV fisheries in Washington and Oregon occasionally target albacore during the summer months when fish are close enough to shore. When targeting albacore, CPFV vessel owners complete a CPFV logbook and submit the data to SWFSC where the data are maintained and combined with summarized CPFV data from California.

5. Protected Resources Regulations

5.1. *HMS FMP Endangered Species Act Consultations*

Longline and drift gillnet vessels on rare occasions encounter endangered and threatened species of sea turtles and marine mammals while targeting HMS. HMS longline vessels also infrequently encounter a number of sea birds. Endangered and threatened marine species are protected through a number of Federal laws, including the ESA and the MMPA. The HMS FMP final rule (69 FR 18444) adopted measures to minimize interactions of HMS gears with protected species and to ensure that the HMS fisheries are operating consistent with Federal laws. These measures include time and area closures, gear requirements, and safe handling and release techniques for protected seabirds and sea turtles. Refer to 50 CFR 660.712, 713, and 720 and 50 CFR 229.31 and 223.206 for the complete list and text of the regulations.

Impacts of HMS FMP fisheries on species listed under the Endangered Species Act (ESA) (including marine mammals and sea turtles) have been analyzed in section 7 consultations and biological opinions (BOs), which are listed below. BOs include an Incidental Take Statement with anticipated mortalities and entanglements of ESA-listed marine mammals and sea turtles that are likely to interact with vessels targeting HMS fish species.

The 2004 BO for the HMS FMP considered the impacts of the proposed shallow-set longline fishery and found that the fishery was likely to jeopardize the continued existence of threatened loggerhead sea turtles. As a result, the shallow-set longline HMS fishery was prohibited when the FMP was implemented.

The US Fish and Wildlife Service also conducted a section 7 consultation on the HMS FMP for the endangered short-tailed albatross and brown pelican. (The brown pelican has subsequently been de-listed.)

More information on the ESA and endangered and threatened species under NMFS' jurisdiction may be found the [NMFS website](#).

The table below lists BOs prepared for west coast HMS fisheries managed under the HMS FMP through 2015.

Table 5-1. Biological opinions for west coast HMS fisheries

Date	Title
2/4/04	Biological Opinion on Highly Migratory Species FMP (NMFS)
N/D	Biological Opinion on Highly Migratory Species FMP (USFWS)
10/23/06	Issuance of an Exempted Fishing Permit to allow the use of drift gillnet gear in an area and time that is currently prohibited under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species. Issuance of a Marine Mammal Protection Act section 101(a)(5)(E) permit, authorizing take of endangered fin, humpback, and sperm whales
11/28/07	Shallow-set Longline exempted fishing permit under the U.S. West Coast Highly Migratory Species Fisheries
7/29/08	Updated Shallow-set Longline exempted fishing permit under the FMP for West Coast Highly Migratory Species Fisheries
4/8/11	Authorization of (1) the deep-set tuna longline fishery managed under the Fishery Management Plan for U.S. West Coast Highly Migratory Species, and (2) continued operation of Highly Migratory Species fishery vessels in the deep-set tuna longline fishery under permits pursuant to the High Seas Fishing Compliance Act
5/2/13	Re-initiation of ESA Section 7 Consultation on the Effects of the U.S. West Coast Highly Migratory Species Drift Gillnet Fishery on ESA Listed Species
8/18/16	Continued operation of the west coast based deep-set longline fishery managed under the Fishery Management Plan for U.S. West Coast Highly Migratory Species Fisheries

5.2. Sea Turtles Listed Under the ESA

Takes of green, olive ridley and loggerhead sea turtles are uncommon in the California drift gillnet fishery except under certain environmental conditions (e.g., El Niño or higher than usual sea surface temperatures) when turtles may move into the areas of drift gillnet fishing. Takes of leatherbacks are also rare, likely due to the time/area closure which has been in effect since the 2001 season and subsequent reductions in fishing effort. Since 2001, only two leatherbacks have been observed taken (released alive) in the drift gillnet fishery, one in 2009 and another in October 2012.

On April 6, 2016, NMFS and the USFWS published a final rule to list 11 DPSs of green turtles (*Chelonia mydas*) under the ESA ([81 FR 20057](#)). Green sea turtles found off the U.S. west coast comprise the East Pacific DPS, which is listed as threatened. NMFS is currently in the process of the consideration of designating critical habitat for green sea turtles in the marine environment off the U.S. west coast.

On January 29, 2012 NMFS published a final rule that designates areas off the U.S. west coast as critical habitat for endangered leatherback sea turtles ([77 FR 4170](#)). The final rule designates as critical habitat an area of approximately 41,914 square miles from Point Arguello to Point Arena, California, and from Cape Blanco in Oregon to Cape Flattery, Washington.

On September 22, 2011, NMFS and the U.S. Fish and Wildlife Service published a final rule to list nine distinct population segments (DPSs) of the loggerhead turtle (*Caretta caretta*) pursuant to the ESA. After considering designation of critical habitat for the two DPSs that occur within the EEZ of the United States, the North Pacific DPS (listed as endangered) and the Northwest Atlantic DPS (listed as threatened), in 2014 NMFS published a final rule ([79 FR 39855](#)) concluding “No marine areas meeting the definition of critical habitat were identified within the jurisdiction of the United States for the North Pacific Ocean DPS, and therefore we are not designating critical habitat for that DPS.”

5.3. Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) establishes a general prohibition on the “take” of any marine mammal (note that the MMPA “take” definition is somewhat different from the ESA definition). An exemption may be granted if the activity meets certain standards pursuant to MMPA Section 101. For example, section 101(a)(5)(E) provides that NMFS shall allow, for a period of up to three years, the incidental taking of marine mammal species listed under the Endangered Species Act (ESA) by persons using vessels of the United States with valid fishing permits, if NMFS makes certain determinations. NMFS must first determine, after notice and opportunity for public comment, that: 1) the incidental mortality and serious injury from commercial fisheries will have a negligible impact on the affected species or stock; 2) a recovery plan has been developed or is being developed for such species or stock under the ESA; 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.

In order to make a negligible impact determination, NMFS must consider the total human-related mortality and serious injury to the affected stock of marine mammals. This includes the known or estimated takes from all human sources, such as commercial fisheries and ship strikes. There are five criteria that NMFS adopted in 1999 to make negligible impact determinations for MMPA 101(a)(5)(E) permits (64 FR 28800; May 27, 1999). Criterion 1 is the starting point for analysis. If Criterion 1 is not satisfied, NMFS may use one of the other criteria as appropriate.

The threshold for initial determination will remain at 0.1 PBR. If total human-related serious injuries and mortalities are less than 0.1 PBR, all fisheries may be permitted.

If total human-related serious injuries and mortalities are greater than PBR, and fisheries-related mortality is less than 0.1 PBR, individual fisheries may be permitted if management measures are being taken to address non-fisheries-related serious injuries and mortalities. When fisheries-related mortality and serious injury is less than 10 percent of the total, the appropriate management action is to address components that account for the major portion of the total.

If total fisheries-related serious injuries and mortalities are greater than 0.1 PBR and less than PBR and the population is stable or increasing, fisheries may be permitted subject to individual review and certainty of data. Although the PBR level has been set up as a conservative standard that will allow recovery of a stock, there are reasons for individually reviewing fisheries if serious injuries and mortalities are above the threshold level. First, increases in permitted serious injuries and mortalities should be carefully considered. Second, as serious injuries and mortalities approach the PBR level, uncertainties in elements such as population size, reproductive rates, and fisheries-related mortalities become more important.

If the population abundance of a stock is declining, the threshold level of 0.1 PBR will continue to be used. If a population is declining despite limitations on human-related serious injuries and mortalities below the PBR level, a more conservative criterion is warranted.

If total fisheries-related serious injuries and mortalities are greater than PBR, permits may not be issued.

On January 10, 2017, NMFS issued a Federal Register notice proposing to issue a 3-year permit to authorize the incidental take of ESA-listed humpback whales and sperm whales by the California thresher shark/swordfish drift gillnet fishery (and the WA/OR/CA sablefish pot fishery) (82 FR 2955). Public comments must be received by February 9, 2017. Regulations implementing the Plan require fishermen participating in the California drift gillnet fishery targeting swordfish and thresher shark to use pingers in a staggered configuration on their nets and a minimum length of buoy lines. [The Pacific Offshore Take Reduction Plan](#) (satisfying requirement 3, above) was finalized in 1997. The Pacific Offshore Take Reduction Team meets periodically to assess the effectiveness of the Plan and, if necessary, develop recommendations for reducing marine mammal incidental serious injury and mortality in the California drift gillnet fishery.

The MMPA mandates that each commercial fishery be classified by the level of mortality and serious injury of marine mammals occurring incidental to each fishery. The [List of Fisheries](#) classifies U.S. commercial fisheries into one of three categories according to the level of incidental mortality or serious injury of marine mammals. This classification is based on the rate, in numbers of animals per year, of incidental mortality and serious injury of marine mammals due to commercial fishing operations relative to a stock's Potential Biological Removal (PBR) level, defined (50 CFR 229.2) as the maximum number of animals, not including natural mortality, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The DGN fishery is currently categorized as a Category I fishery (annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50 percent of the PBR level) due to interactions with sperm whales in 2010.

5.4. *Marine Mammals of Concern for West Coast HMS Fisheries*

As discussed above, PBR is an important threshold for making the negligible impact determination. PBR is calculated as 0.5 times the maximum potential population growth rate (R_{max}) times the minimum estimate of abundance (N_{min}) times a recovery factor (Fr). Marine mammal stocks may be defined as “strategic” if human-caused mortality exceeds PBR, the species is listed under the ESA, the population is estimated to be declining, or the stock is designated as “depleted” under the MMPA. The table below is taken from the [2017 U.S. Pacific Marine Mammal Stock Assessment Report](#) (June 2018). It shows estimates of these parameters for stocks for which the Council established bycatch performance metrics. In 2015 the Council identified these bycatch performance metrics for the California large mesh drift gillnet (DGN) fishery including take levels for selected marine mammals. At that time the Council recommended hard caps for sea turtles and selected marine mammals. In 2017 NMFS determined that the use of hard caps in this instance was unwarranted but the Council decided that take of these species should also be included as performance metrics.

Table 5-2. Key population parameters for marine mammals used as bycatch performance metrics in the DGN fishery.

Species (Stock Area)	N est	CV N est	N min	R max	Fr	PBR	Total Annual Mortality + Serious Injury	Annual Fishery Mortality + Serious Injury	Status	Revised
Minke whale (California/Oregon/Washington)	636	0.72	369	0.04	0.48	3.5	≥ 1.3	≥ 1.3	N	2005
Common dolphin, short-beaked	969,861	0.17	839,32	0.04	0.5	8393	≥40	≥40	N	2016
Common dolphin, long-beaked (California)	101,305	0.49	68,432	0.04	0.48	657	≥35.4	≥32.0	N	2016
Risso's dolphin (California/Oregon/Washington)	6,336	0.32	4,817	0.04	0.48	46	≥3.7	≥3.7	N	2016
California sea lion (U.S.)	296,750	n/a	153,33	0.12	1	9200	389	331	N	2014
Northern Elephant Seal (California Breeding)	179,000	n/a	81,368	0.12	1	4,882	8.8	4	N	2014
Northern right whale dolphin	26,556	0.44	18,608	0.04	0.48	179	3.8	3.8	N	2016
Gray whale (Eastern N Pacific)	20,990	0.05	20,125	0.062	1	624	132	4.25	N	2014
Pacific white-sided dolphin	26,814	0.28	21,195	0.04	0.45	191	7.5	1.1	N	2016
Sperm whale (California/Oregon/Washington)*	1,997	0.57	1,270	0.04	0.1	2.5	0.9	0.7	S	2017
Humpback whale (California/Oregon/Washington)*	1,918	0.03	1,876	0.08	0.3	11	≥ 9.2	≥ 7.6	S	2017
Fin whale (California/Oregon/Washington)*	9,029	0.12	8,127	0.04	0.5	81	≥ 2.0	≥ 0.2	S	2016
Short-finned pilot whale*(California/ Oregon/ Washington)	836	0.79	466	0.04	0.48	4.5	1.2	1.2	N	2016
Common Bottlenose dolphin (California Coastal)	453	0.06	346	0.04	0.48	2.7	≥2.0	≥1.6	N	2016

*Originally proposed for hard caps in the California DGN fishery; take reported to monitor fishery bycatch performance.

6. International Management

6.1. RFMOs

Regional fishery management organizations (RFMOs) are responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels both outside and within areas of national jurisdiction. These organizations agree to measures, usually by consensus, which are implemented by member countries for their flag vessels. In the Pacific Ocean the [Inter-American Tropical Tuna Commission](#) (IATTC) and the [Western and Central Pacific Fisheries Commission](#) (WCPFC) establish measures within their respective Convention Areas, as illustrated in the figure below. Notice that there is an area of overlap between the two Convention areas in the South Pacific.

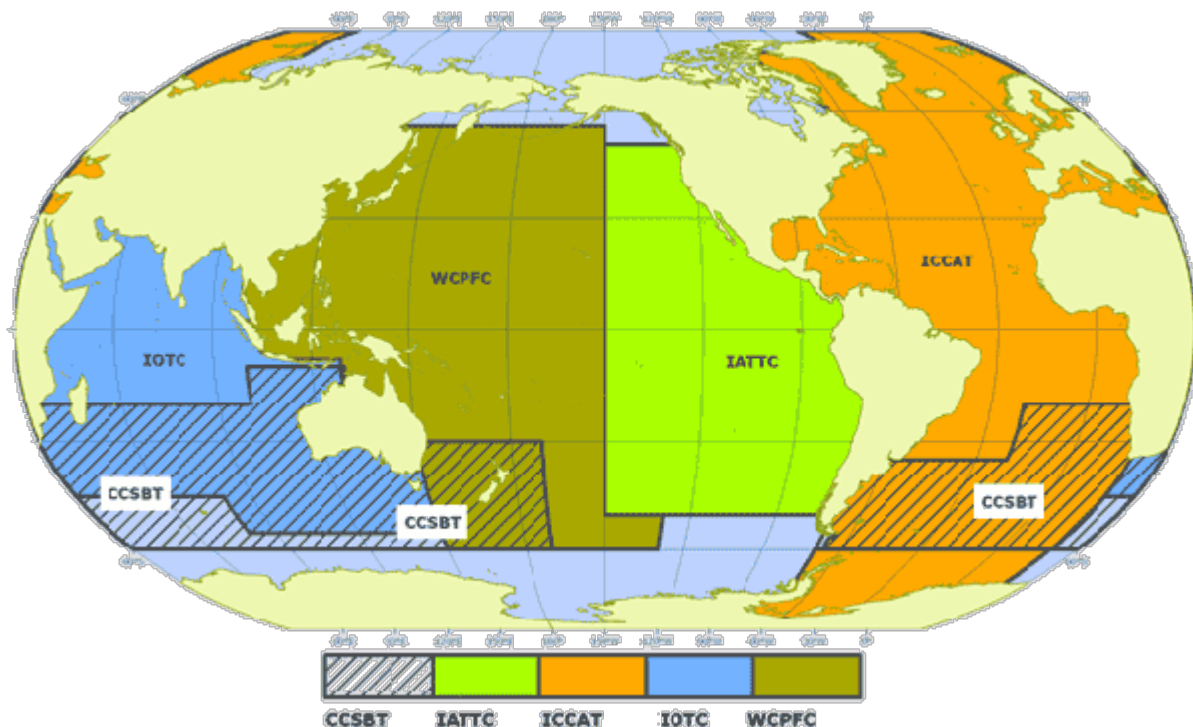


Figure 6-1. Global map of tuna RFMO jurisdictions. (Source: <http://www.fao.org/fishery/topic/16917/en>).

West Coast fisheries are more directly affected by IATTC measures since vessels mostly fish within that Convention Area. However, the WCPFC is especially active in managing northern stocks (those predominately occurring north of 20° North latitude). In the case of Pacific bluefin tuna and North Pacific albacore, tuna scientists recognize a single North Pacific stock occurring in both convention areas. Furthermore, under domestic law the Chair of the Pacific Council, or his or her designee, is allocated a spot as a Commissioner for the United States Section to the WCPFC. This provides a direct advisory role for the Pacific Council in policies and proposals that the U.S. may advocate in the WCPFC. The Council frequently provides advice to U.S. delegations to these RFMOs and Council staff attends their meetings.

6.2. 2018 IATTC and WCPFC Outcomes

Fifteenth Regular Session of the Western and Central Pacific Fisheries Commission, Honolulu, Hawaii, USA, December 10-14, 2018. [Provisional Outcomes Document](#).

Resolutions and Conservation measures adopted

- Resolution 2018-01 on Labour Standards for Crew on Fishing Vessels
- CMM 2018-01 Conservation and Management Measure for Bigeye, Yellowfin and Skipjack Tuna in the Western and Central Pacific Ocean
- CMM 2018-02 Conservation and Management Measure for Pacific Bluefin tuna
- CMM 2018-03 Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds
- CMM 2018-04 Conservation and Management Measure Regarding Conservation and Management of Sea Turtles
- CMM 2018-05, Conservation and Management Measure for the Regional Observer Programme
- CMM 2018-06 Conservation and Management Measure for WCPFC Record of Fishing Vessels and Authorisation to Fish
- CMM 2018-07 Conservation and Management Measure for Compliance Monitoring Scheme

93rd IATTC Meeting, August 24, 27-30, 2018, San Diego, California, USA.

Resolutions adopted:

- [C-18-01](#) Bluefin tuna (2019-2020)
- [C-18-02](#) Bluefin tuna (long term)
- [C-18-03](#) Amendment to [C-13-03](#) North Pacific albacore
- [C-18-04](#) Financing FY 2019
- [C-18-05](#) Amends and replaces [C-16-01](#) FADs
- [C-18-06](#) Amends and replaces [C-14-01](#) Regional Vessel Register
- [C-18-07](#) Observer safety at sea

7. Regulations for International HMS Fisheries and Related Activities in the Pacific Published in 2018

The following *Federal Register* Final Rule Notices modifying the Code of Federal Regulations, Title 50, Chapter III were published in 2018. For earlier years consult previous editions of the SAFE.

[83 FR 62732](#). 12/06/2018. International Fisheries; Pacific Tuna Fisheries; Fishing Restrictions for Fish Aggregating Devices in the Eastern Pacific Ocean. Effective Date: 01/07/2019.

[83 FR 45849](#). 09/11/2018. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Closure of Purse Seine Fishery on the High Seas in 2018. Effective Date: 09/18/2018

[83 FR 33851](#). 07/18/2018. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Fishing Limits in Purse Seine and Longline Fisheries, Restrictions on the Use of Fish Aggregating Devices in Purse Seine Fisheries, and Transshipment Prohibitions. Effective Date: 07/18/2018.

[83 FR 15503](#). 04/11/2018. International Fisheries; Pacific Tuna Fisheries; Fishing Restrictions for Tropical Tuna in the Eastern Pacific Ocean for 2018 to 2020. This rule is effective May 11, 2018, except for the amendments to 50 CFR 300.24(qq) and 300.28(e), which are effective on January 1, 2019.

[83 FR 13203](#). 03/28/2018. International Fisheries; Pacific Tuna Fisheries; Revised 2018 Commercial Fishing Restrictions for Pacific Bluefin Tuna in the Eastern Pacific Ocean; 2018 Catch Limit. Effective Date: 04/27/2018.

8. Commercial Fisheries Descriptions

Time series of HMS landings and revenue are available on the Council's website in the [current online HMS SAFE](#). Data are extracted from databases maintained by the [Pacific Fishery Information Network](#) (PacFIN)

8.1. *Surface Hook-and-Line Fishery for Albacore*

Albacore is an economically valuable fishery in all three West Coast states and has been a target of commercial fishermen for more than 100 years. Troll and bait boat (live bait) are the principal commercial gears, although some albacore is caught using purse seine, longline, and drift gillnet gear as well. The fishing season varies from year to year, depending on oceanographic conditions, which strongly influence the occurrence of fish within range of the West Coast fleet, and economics. A typical season runs July through October, with landings peaking in August-September. The HMS FMP requires a federal permit with a surface hook-and-line gear endorsement for all U.S. commercial and recreational charter fishing vessels that fish for HMS within the West Coast exclusive economic zone (EEZ, from 3– 200 nautical miles from the West Coast) and for U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

In 2001, the last operational cannery in the Port of Los Angeles closed its doors, ending a West Coast tuna-canning dynasty. Changing global market conditions and a dynamic raw material/finished goods supply environment forced the plants to close. Without domestic-based cannery operations, a majority of the albacore are landed fresh or frozen, then exported to overseas markets for processing. Comparing the 1980s to the 2000s, participation in California (measured by the number of surface hook-and-line vessels annually landing albacore) declined by 64% while participation in Oregon and Washington increased by 62% and 130% respectively. Overall, the coastwide decline was 13% based on this metric.

These trends likely reflect a shift in fishing effort into waters off Oregon and Washington where albacore have been more available due to favorable oceanographic conditions. In recent years lower operating costs and better landing facilities in Oregon and Washington compared to California may also have contributed to this shift.

In 2017, 505 surface hook-and-line vessels landed 7,438 mt of albacore in West Coast ports, generating \$34.7 million in ex-vessel revenue. Albacore landings by weight in 2017 were down by 3,017 mt from 2016 landings and ex-vessel revenue decreased by \$3.7 million. (See [Table 5](#) and [Table 6](#))

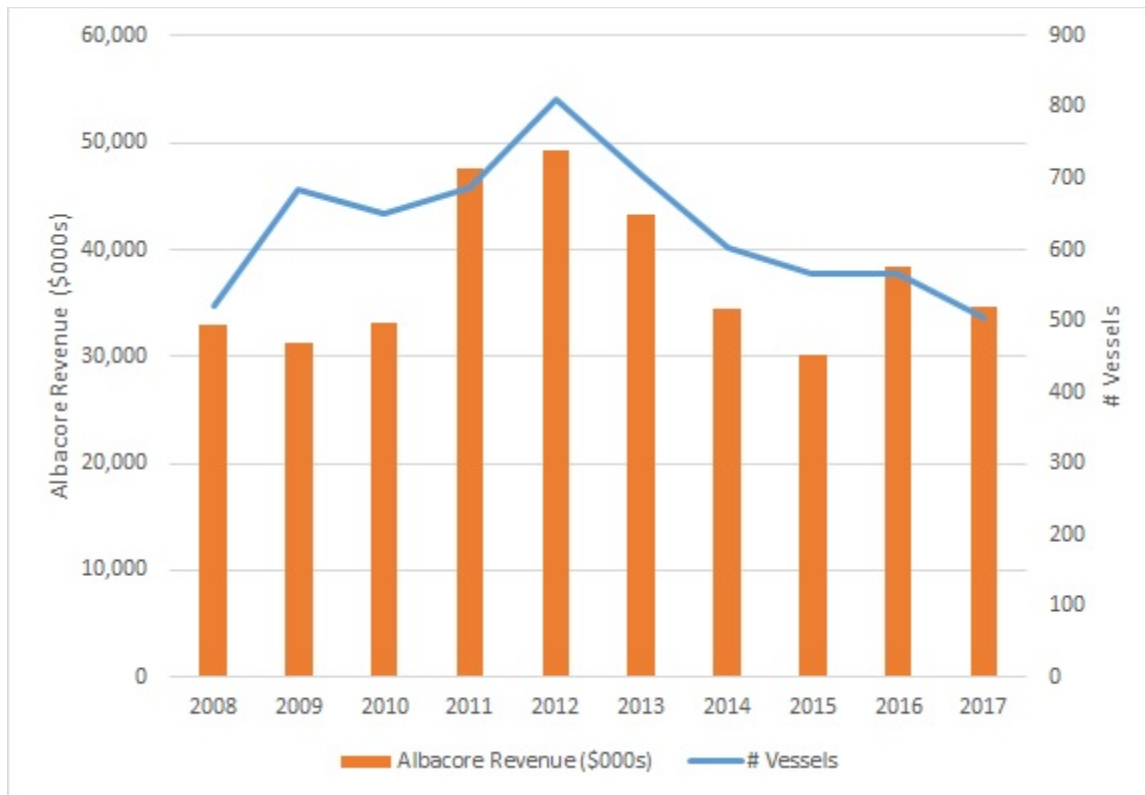


Figure 8-1. Number of vessels and real (inflation adjusted) ex-vessel revenue from North Pacific albacore (\$1,000s) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 2008-2017, Canadian vessels included.

8.2. Drift Gillnet Fishery for Swordfish and Shark

In 2017 seventeen drift gillnet vessels landed 176 mt of swordfish and 39 mt of common thresher shark and generated \$971,000 in ex-vessel revenue in 2017 (see [Table 12](#) and [Table 13](#)). Total fishery landings decreased by 18 mt and ex-vessel revenue decreased by \$419,000 from 2016.

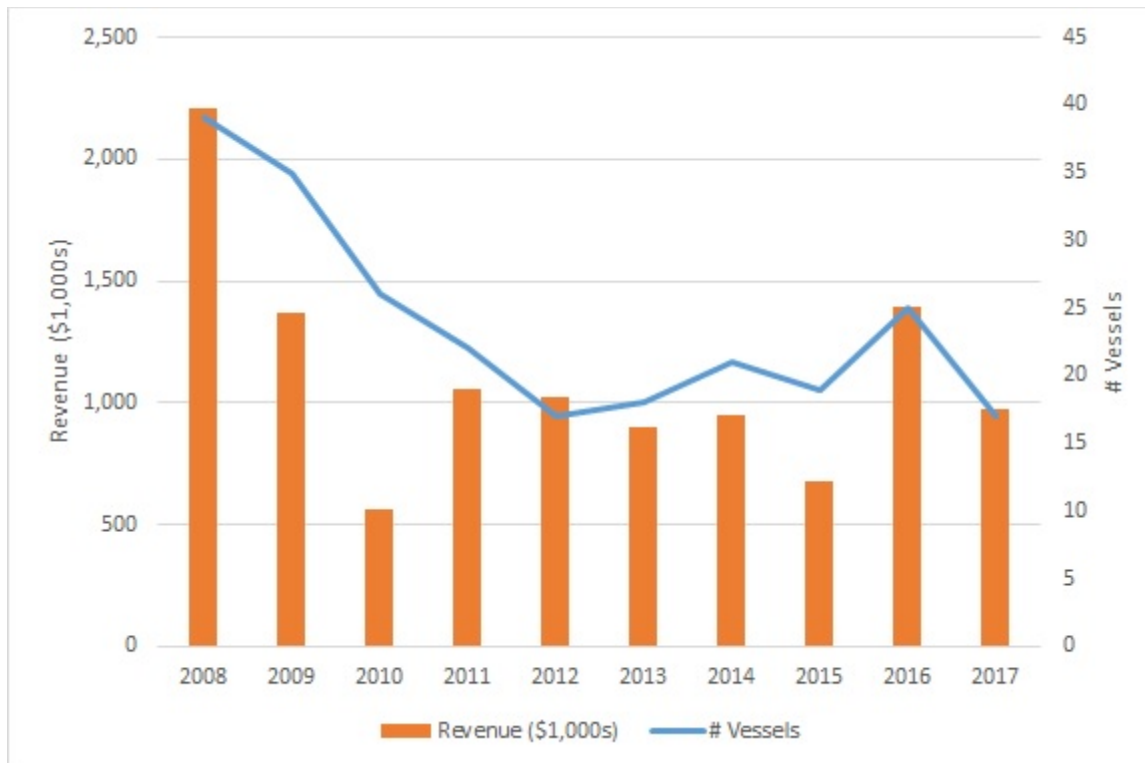


Figure 8-2. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) in the West Coast drift gillnet fishery, 2008-2017.

8.3. Harpoon Fishery for Swordfish

California's modern harpoon fishery for swordfish developed in the early 1900s. Prior to 1980, harpoon and hook-and-line were the only legal gears for commercially harvesting swordfish. At that time, harpoon gear accounted for the majority of swordfish landings in California ports. In the early 1980s, a limited entry drift gillnet fishery was authorized by the State Legislature and soon afterward drift gillnets replaced harpoons as the primary method for catching swordfish. The number of harpoon permits subsequently decreased from a high of 1,223 in 1979 to a low of 25 in 2001. Fishing effort typically occurs in the Southern California Bight from May to December, peaking in August, depending on weather conditions and the availability of fish in coastal waters. Some vessel operators work in conjunction with a spotter airplane to increase the search area and to locate swordfish difficult to see from the vessel. This practice tends to increase the catch-per-unit-effort compared to vessels that do not use a spotter plane, but at higher operating cost.

A state permit and logbook are required to participate in the harpoon fishery in addition to a general resident or non-resident commercial fishing license and a current CDFG vessel registration. Additionally, the HMS FMP requires a federal permit with a harpoon gear endorsement for all U.S. vessels that fish for HMS within the West Coast EEZ and for U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

In 2017 twenty-one harpoon vessels landed 24 mt of swordfish, generating \$266,000 in ex-vessel revenue. (See [Table 16](#) and [Table 17](#).) Total fishery landings decreased by 1 mt and ex-vessel revenue decreased by \$30,000 from 2016.

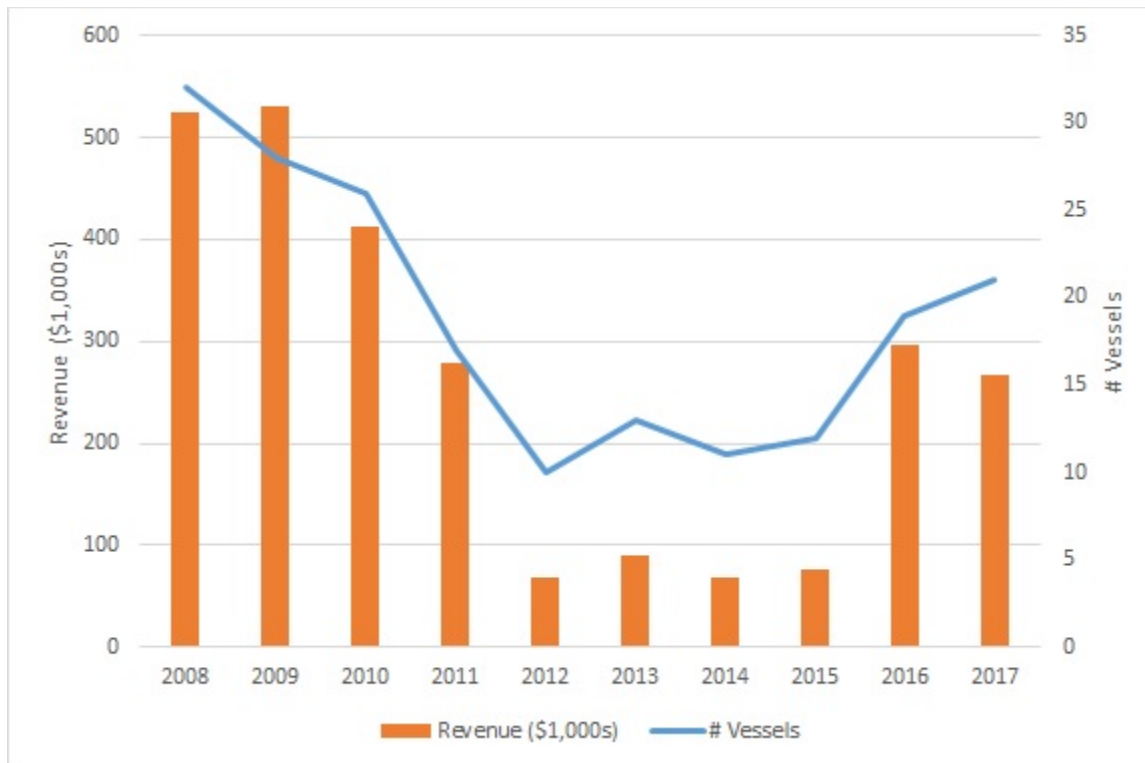


Figure 8-3. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) in the West Coast harpoon fishery, 2008-2017.

8.4. High Seas Longline Fishery for Swordfish and Tuna

California prohibits pelagic longline fishing within the EEZ and the retention of striped marlin. Both these prohibitions are incorporated in the Council's HMS FMP. Longline vessels fishing outside the West Coast EEZ intermittently land swordfish and tuna in West Coast ports.

Vessels operating outside of the EEZ can land fish in West Coast ports if the operator has the necessary state and Federal permits. The operator must comply with the High Seas Fishing Compliance Act, which requires U.S. vessel operators to maintain logbooks if they fish beyond the EEZ. Additionally, the HMS FMP requires a federal permit with a pelagic longline gear endorsement for all U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

With implementation of the HMS FMP in 2004, federal regulations were promulgated to protect endangered sea turtles east and west of 150° W longitude and north of the equator, prohibiting West Coast-based shallow-set longline fishing to target swordfish. Vessels permitted under the Western Pacific Fishery Management Council's Pelagics FMP may use shallow-set longline gear to target swordfish and may land their catch on the West Coast. West Coast swordfish landings by Hawaii-based vessels have trended upward since the fishery reopened in 2004. Landings have occurred almost exclusively in California ports.

Targeting tunas with deep-set longline gear is permitted outside the EEZ under the HMS FMP.

In 2017, eighteen Hawaii-permitted vessels landed 987 mt of HMS in West Coast ports generating \$5.8 million in ex-vessel revenue. (See [Table 20](#) and [Table 21](#).) Total fishery landings increased by 55 mt and ex-vessel revenue by \$254,000 from 2016.

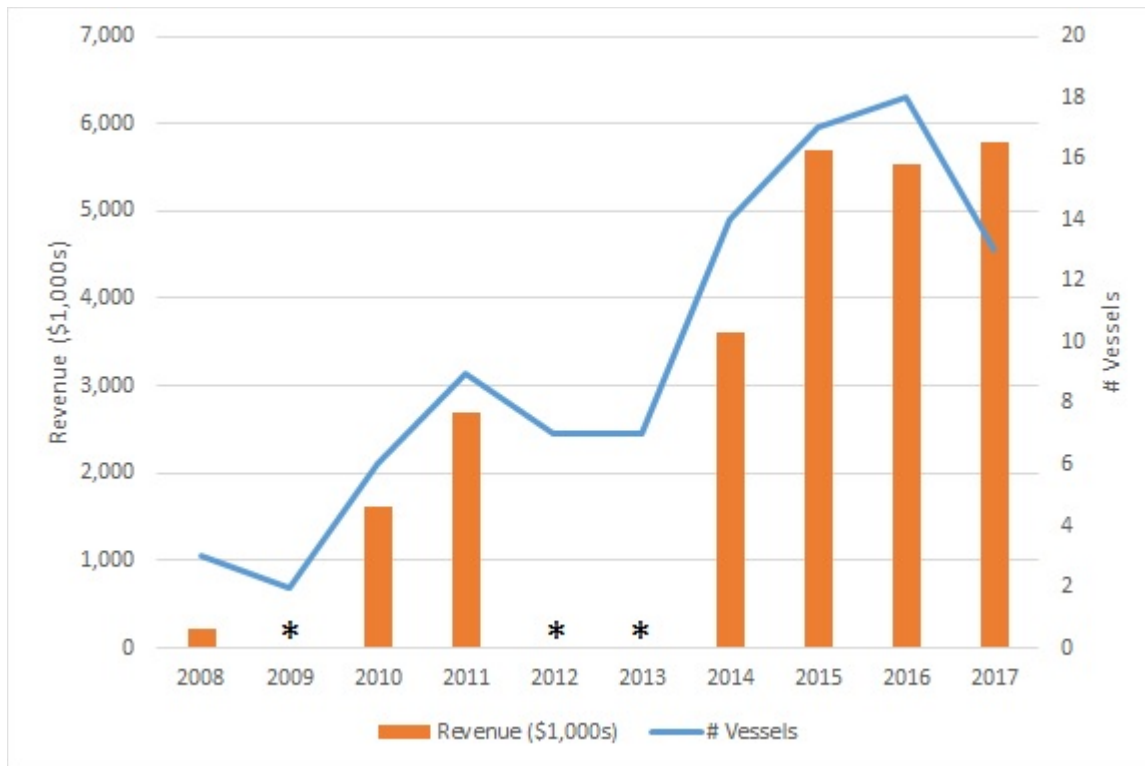


Figure 8-4. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) from Hawaii permitted longline vessels in West Coast ports, 2008-2017 (no landings occurred in 2007). *In these years revenue data are confidential (less than 3 vessels or dealers) and therefore suppressed.

8.5. Coastal Purse Seine Fishery for Yellowfin, Skipjack, and Bluefin Tunas

U.S. West Coast catch of yellowfin, skipjack, and bluefin tuna represents a relatively minor component of overall eastern Pacific Ocean (EPO) tuna catch, on average equaling approximately less than 1% of EPO-wide landings. More than 90% of the catch for these species in the U.S. EEZ EPO is made by small coastal purse seine vessels operating in the Southern California Bight (SCB) from May to October. These vessels primarily target small pelagic species, especially Pacific mackerel, Pacific sardine, anchovy, and market squid. However, they will target the tropical yellowfin and skipjack tunas when intrusions of warm water from the south, typically during periodic El Niño episodes, bring these species within range of the coastal purse seine fleet. Similarly, purse seine vessel operators will target the higher-valued temperate water bluefin tuna when they enter the coastal waters of the SCB. The number of purse seine vessels that landed tuna in California averaged 197 annually 1981-90 but subsequently declined substantially to an annual average of 4 in the 2003-2012 period.

The decline in the number of domestic vessels is correlated with the relocation of large cannery operations. Increased labor costs for cannery operations contributed to these facilities being moved overseas, where labor costs are less. Currently there are no canneries in California functioning as primary offloaders of tuna.

The HMS FMP requires a logbook and federal permit with a purse seine gear endorsement for all U.S. vessels that use purse seine gear to fish for HMS within the West Coast EEZ and for U.S. purse seine vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

In 2017 nine purse seine vessels landed 2,206 mt of HMS generating \$2.7 million in ex-vessel revenue. (See [Table 22](#) and [Table 23](#).) Total fishery landings increased by 1,521 mt and ex-vessel revenue by \$1.9 million from 2016.

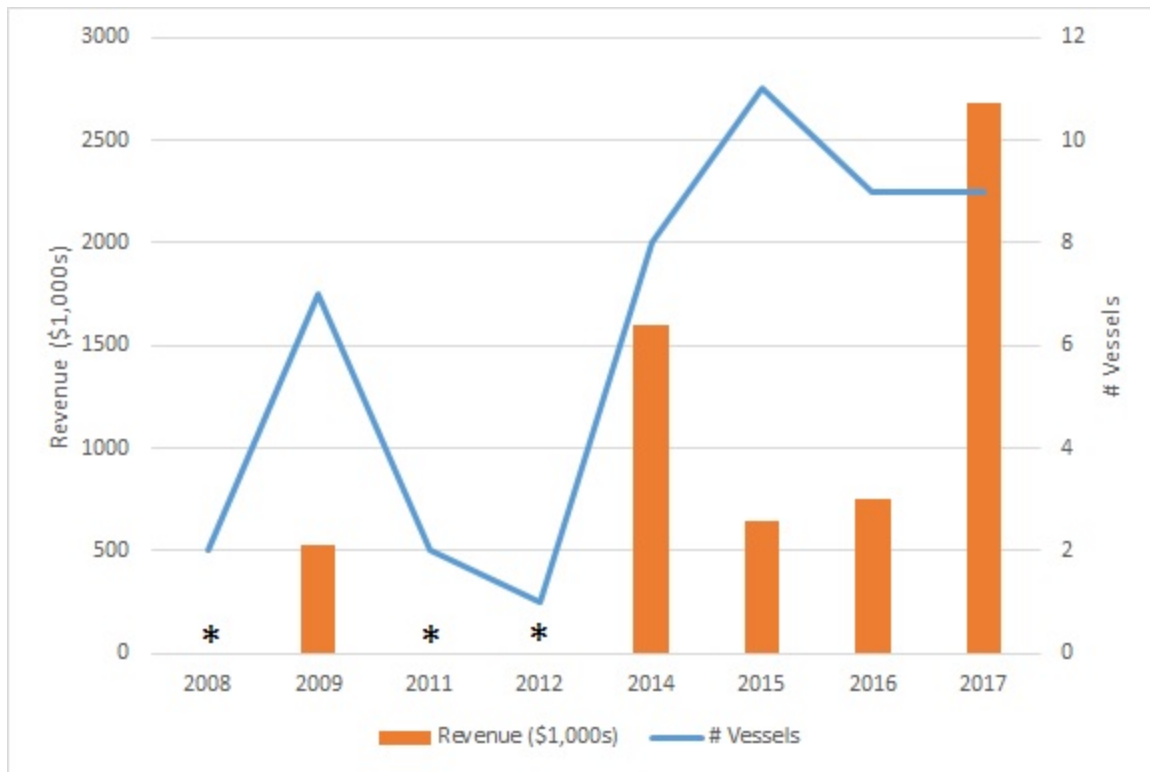


Figure 8-5. Number of vessels and real (inflation adjusted) ex-vessel revenue (\$1,000s) from HMS tunas in the West Coast purse seine fishery, 2008-2017. *In these years revenue data are confidential (less than 3 vessels or dealers) and therefore suppressed.

9. Recreational Fisheries Descriptions

Time series of recreational HMS landings and revenue are available on the Council's website in the [current online HMS SAFE](#). Data are derived from state recreational fishery sampling programs

9.1. *Albacore*

Recreational anglers fishing from private vessels and from commercial passenger fishing vessels (CPFVs) target albacore in all three West Coast states. Albacore is targeted almost exclusively with rod-and-reel gear, and success is highly dependent upon the distance from port to the fish, weather and ocean conditions, and fuel prices.

In recent years albacore have typically begin to show up within range of the recreational fishery in California in late spring, migrating northward and appearing off Oregon and Washington in mid to late June, and are available through late September or early October in most years.

9.2. *Other HMS (Southern California)*

Recreational anglers in California take the entire suite of management unit species (MUS) included within the HMS FMP using rod-and-reel gear almost exclusively; in addition, a nominal amount of fish, primarily tunas and dorado, are taken by free divers using spear guns. In Oregon and Washington anglers only occasionally take HMS species other than albacore, such as blue sharks.

CPFVs also make trips from Southern California ports (primarily San Diego) into Mexican waters. Yellowfin, bluefin, and albacore tunas as well as dorado are the most commonly caught HMS species.

Coastwide fishery statistics are available from both PSMFC, through their Recreational Fisheries Information Network (RecFIN) [website](#). The RecFIN provides estimates based on fieldsampling of catch and a telephone survey for effort.

California data are provided by the California Recreational Fisheries Survey (CRFS) program while the state's logbook program provides a record of fishing activity for most CPFVs. The fact that a much higher overall percentage of highly migratory MUS catches are represented in logbook data than in CRFS samples is why logbooks are preferred over CRFS in determining the catch of these species by anglers fishing from CPFVs. Logbooks also have the advantage of supplying catch information on MUS taken in Mexico. However, CRFS data are the best available for making catch estimates of anglers fishing from private boats. Statistics for the CPFV fishery are also available from the federal charter logbook program. In Oregon statistics for recreational fisheries, including private, CPFV, and tournament fisheries, are available from the ODFW Ocean Recreational Boat Survey Program. Beginning in 2005, a mandatory charter boat tuna logbook program was implemented in Washington to provide additional information on location and effort in the charter albacore fishery.

10. Fishery Performance in 2017

10.1. Commercial Fisheries

10.1.1. HMS Landings - Coastwide Perspective (see [Table 26a & b](#))

- Over the twenty years to 2017, as a fraction of total landings, HMS have averaged 4% with a minimum proportion of 3% and a maximum of 7%. The equivalent figures for real ex-vessel revenue are 9%, 8%, and 15% respectively.

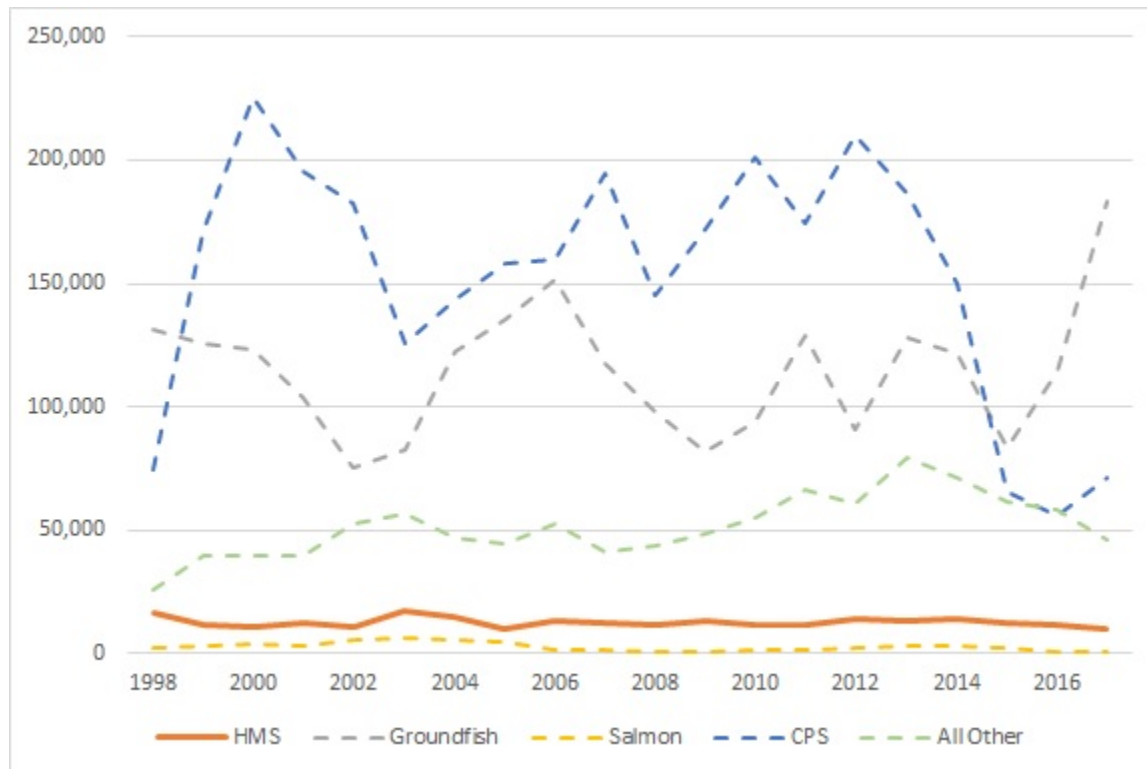


Figure 10-1. Landings (shoreside commercial and tribal) by species management group (mt), 1998-2017. ('All Other' includes crab, shellfish, shrimp, and other state managed species.)

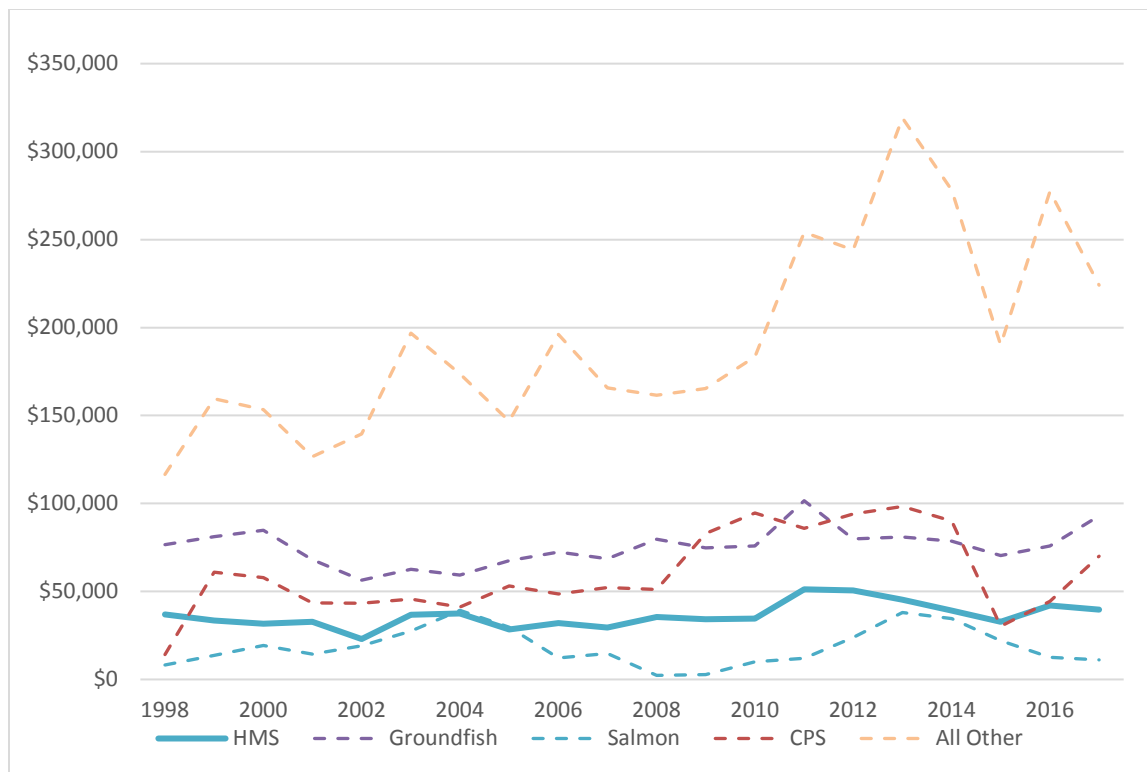


Figure 10-2. Real (inflation adjusted, 1,000s of 2015 dollars) ex-vessel revenue by management group in West Coast ports from the PFMC management area, 1988-2017.

10.1.2. Landings by Species (see [Table 1](#))

- In 2017, 11,017 round metrics tons of HMS, valued at \$45.2 million, were caught in the PFMC management area (the U.S. West Coast EEZ) and landed in west coast ports.
- 7,471 mt of albacore tuna was landed in 2017 worth \$38.9 million. This was a decline of 2987 mt and \$2.9 million from 2016. The decrease in landings was partially offset by higher prices in 2017. Albacore accounted for 68% of HMS landings by weight and 77% by value.
- 2,793 mt of other HMS FMP tunas (bluefin, bigeye, yellowfin, skipjack) were landed in 2017 worth \$6.6 million. Yellowfin tuna was the biggest component of these landings (1,747 mt) but bigeye tuna accounted for the largest share of revenue (\$3.5 million).
- 639 mt of swordfish was landed in 2017 worth \$3.8 million, landings increased by 43 mt from 2016 and ex-vessel revenue by \$69,000.
- 63 mt of common thresher shark and 38 mt of shortfin mako shark were landed in 2017 worth a combined \$166,000. This reflects a 22 mt increase in landings or \$24,000 more revenue for these species compared to 2016.
- Dorado landings decreased from 20 mt in 2016 to 11 mt in 2017.

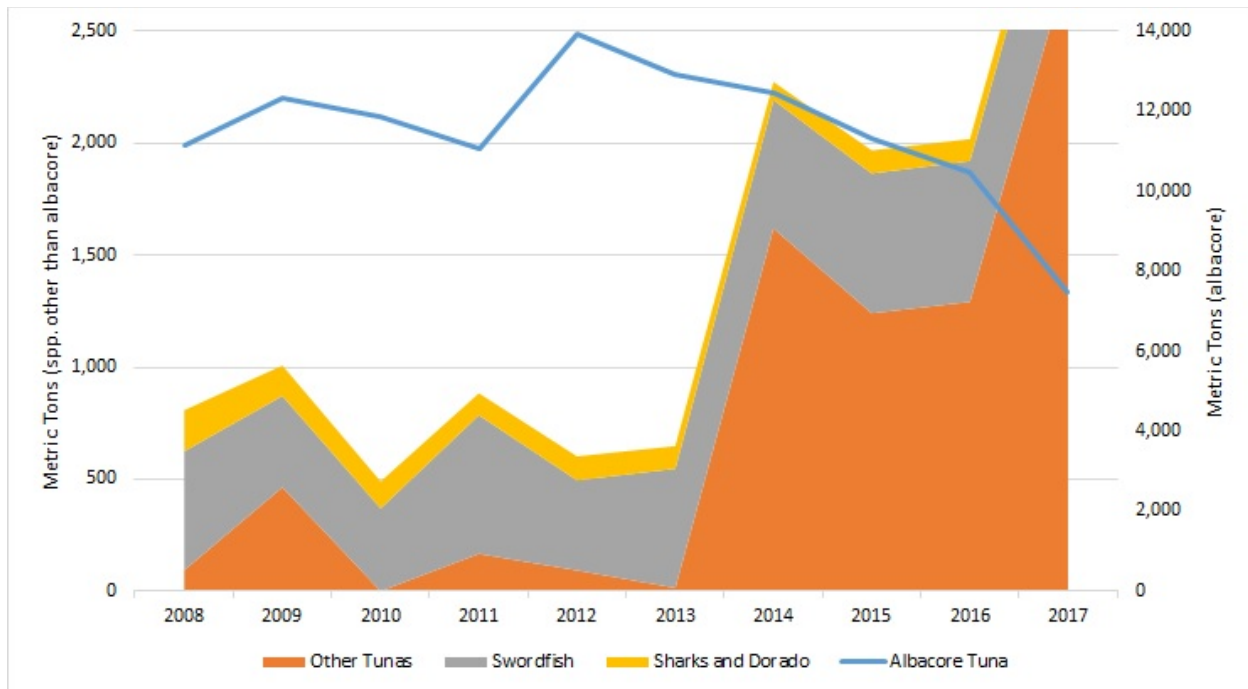


Figure 10-3. Landings of HMS (metrics tons) by species and groups, 2008-2017. (Source: HMS SAFE Table 3.)

10.1.3. Landings by Fishery (see [Table 2](#))

- Baitboat (surface hook-and-line) vessels accounted for 77% of total ex-vessel revenue by HMS fisheries in 2017. Eleven Canadian vessels made landings in U.S. ports of 236 mt ([Table 9](#)). In 2017, 69% of troll or baitboat landings occurred in Washington State, followed by 29% in Oregon and 2% in California ([Table 10](#)).
- Pelagic longline vessels accounted for 13% of ex-vessel revenue in 2017, the next highest share by fishery.
- Three percent of ex-vessel revenue came from the California drift gillnet fishery and 2% from the purse seine fishery in 2017.
- Other HMS fisheries, including harpoon, accounted for the remaining 2% of ex-vessel revenue.

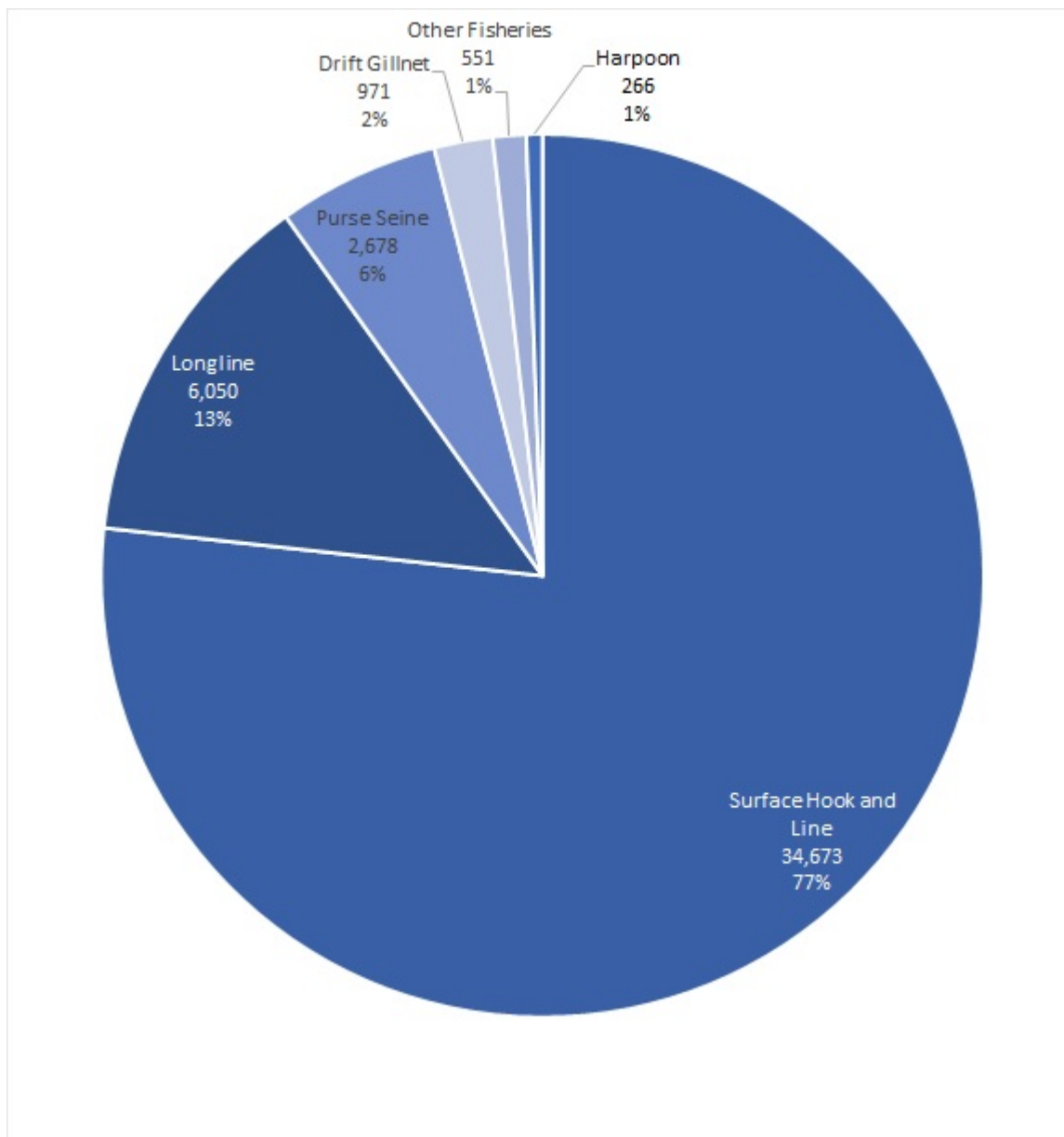


Figure 10-4. West Coast commercial HMS ex-vessel revenue by fishery, 2017. (Confidential data excluded)

10.2. Recreational Fisheries

10.2.1. Albacore catch in Washington, Oregon, and California (Tables [R1](#), [R2](#), and [R3](#))

- In Washington combined private and charter catch of albacore fell from 47,480 fish in 2016 to 30,428 fish in 2017. Catch per angler day fell from 4.3 fish in 2016 to 3.6 fish in 2017.
- In Oregon combined private and charter catch of albacore fell from 36,741 fish in 2016 to 15,854 in 2017. Catch per angler day fell from 3.7 fish in 2016 to 2.8 fish in 2017.

- In California combined private and charter catch of albacore rose from 506 fish in 2016 to 10,842 in 2017. California only reports catch per unit of effort for charter vessels, which increased from 1.4 fish per angler day to 4.5 fish per angler day.

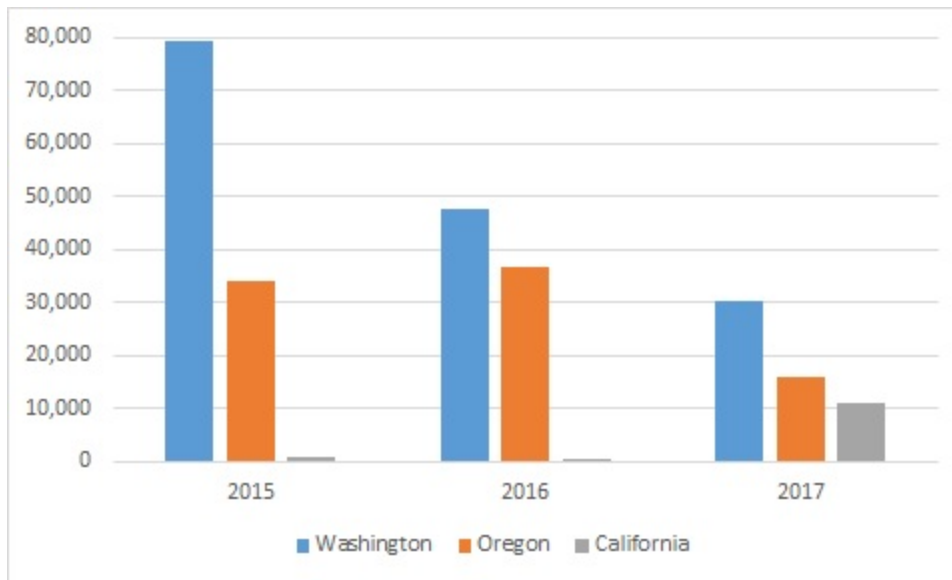


Figure 10-5. Recreational albacore catch (number of kept fish) for charter and private boats, 2015-2017.

10.2.2. Other HMS in Southern California ([Tables R4 and R5](#), [Tables R6 and Table R7](#))

- Total retained catch of HMS by private anglers fishing in U.S. waters increased from 7,749 fish in 2016 to 17,758 fish in 2017. In Mexico waters private angler catch of HMS increased from 1,509 fish in 2016 to 5,911 fish in 2017.
- Total retained catch of HMS by anglers on charter vessels fishing in U.S. waters declined from 31,139 fish in 2016 to 28,395 fish in 2017. In Mexico waters catch of HMS by anglers on charter vessels increased from 56,982 fish in 2016 to 80,691 fish in 2017.
- In U.S. waters yellowfin tuna was the most commonly retained species overall (private anglers and charter vessels combined). Retained catch of albacore showed a large jump by private anglers in 2017 compared to previous years.
- In Mexico waters yellowfin tuna was the most commonly retained species overall by a large margin, followed by dorado.

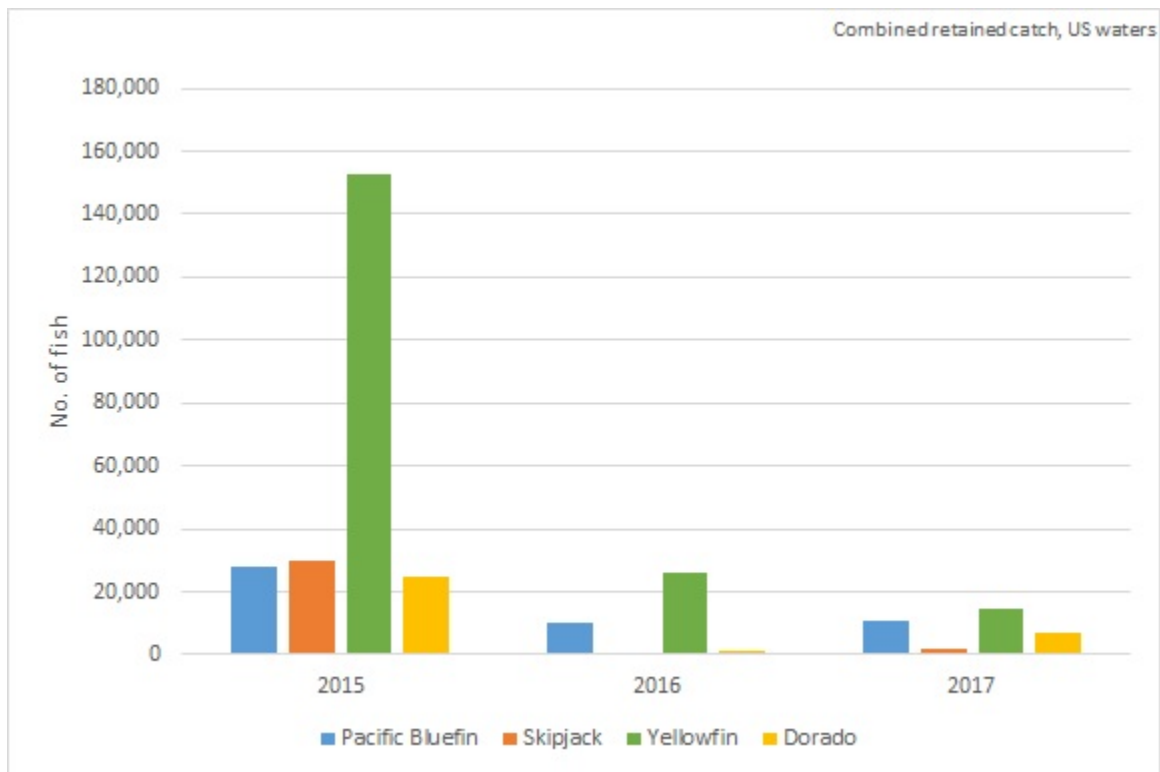


Figure 10-6. Retained catch of selected HMS, combined private boat and charter in U.S. waters, 2015-2017.

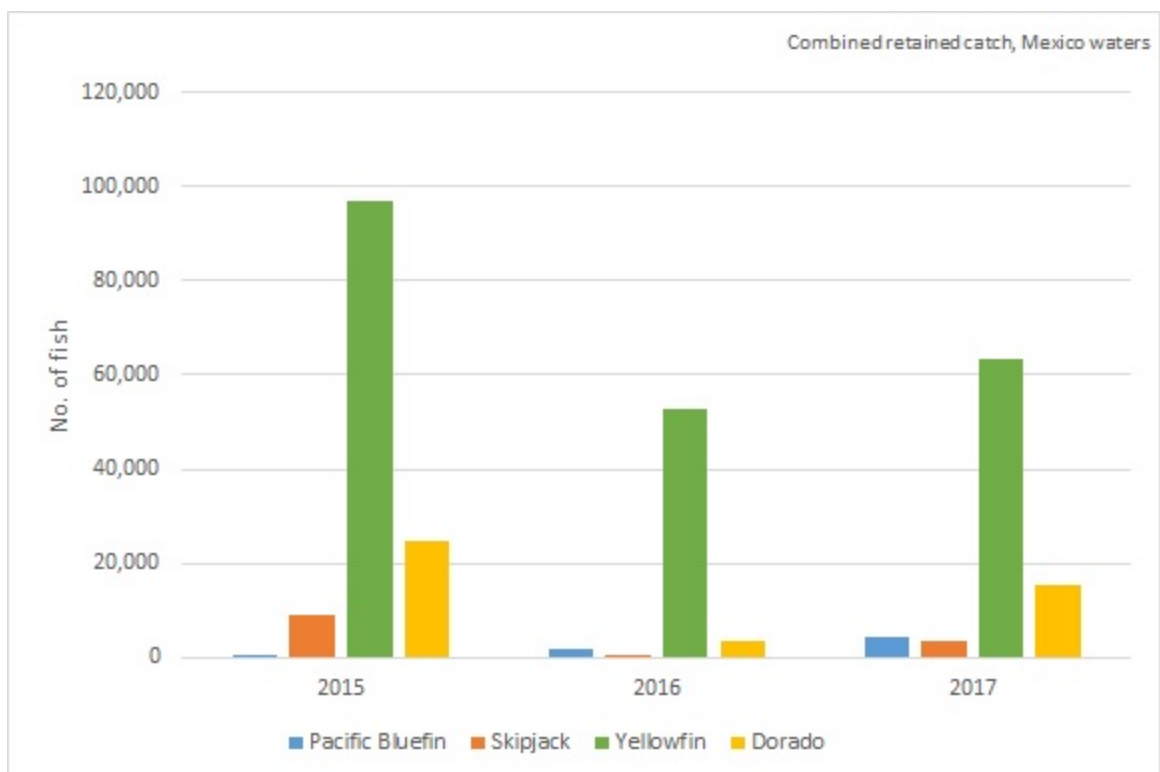


Figure 10-7. Retained catch of selected HMS, combined U.S. private boat and charter fishing in Mexico waters, 2015-2017.

11. U.S.-Canada Albacore Treaty Data Exchange

National Marine Fisheries Service and Department of Fisheries and Oceans – Canada collaborate through the Data Working Group (DWG) to develop a mutually agreed upon data summary of catch and landings of North Pacific albacore landed on west coast of Canada and the United States. The DWG has developed a Data Exchange Template, designed to provide relevant data to the delegations for the treaty between the United States and Canada on Pacific Coast Albacore Tuna vessels and Port Privileges. The summary tables are available here thanks to the respective governments' willingness to allow public dissemination of this information. (As noted in the tables, the most recent year's data are considered preliminary and may be subsequently updated.)

Data Description

U.S Fishery Data

The Data Exchange Template was designed to provide relevant data to the delegations for the treaty between the United States and Canada on Pacific Coast Albacore Tuna vessels and Port Privileges. It has been agreed that the time-series would be constrained to the years for which all of the data are reliable and comparable; therefore, not all data considered reliable has been provided. The sources are self-reported logbooks from albacore harvesters and fish tickets provided by the States of Washington, Oregon and California to the PacFIN database.

While a U.S. fishery for north Pacific albacore has existed since the early 1900's, the collection of logbook data began in 1951 as a voluntary program. In 2004 the fishery management plan for highly migratory species made logbook submission mandatory for the albacore fleet operating in or adjacent to the U.S. exclusive economic zone thereby increasing the coverage rate considerably. The average coverage rate based on the ratio of trip landings weights recorded in logbooks to the sum of landings from PacFIN and foreign ports is 40% for years 1996 through 2004 and 78% for 2005 through 2011. Although similar coverage rates of around 40% prior to 1995, the template is constrained by the year for which Canada can provide reliable data.

Since 1974 there have been attempts to coordinate State landings data. First through the Albacore Coordination Committee and later through the Pacific States Marine Fisheries Commission's database PacFIN. Within the PacFIN system, Fish Ticket data are considered complete for years since 1981. Again, data has been constrained by the year 1995 due to limitations in Canadian data.

Canadian Fishery Data

The Data Exchange Template was designed to provide relevant data to the delegations for the treaty between the United States and Canada on Pacific Coast Albacore Tuna vessels and Port Privileges. It has been agreed that the time-series would be constrained to the years for which all of the data are reliable and comparable. Canadian data sources include logbooks completed by albacore harvestors turned end at the end of the fishing season, sales slips recording the landing weight of all albacore on a trip, and hail records, which identify vessels participating in the fishery and the zone in which those vessels are fishing. Logbooks, sales slips from domestic buyers, and at-sea trans-shipment slips, completed at the time fish are landed and sold, must be returned to Fisheries and Oceans Canada (DFO) for entry into the Canadian albacore tuna catch-effort database (Stocker et al. 2007). Entering new data into the database creates a new version of the database on that date. Canadian data are always reported with the database version number, which reflects the date of data entry (YY.MM.DD). For example, Database version 12.12.01 was created 01 Dec 2012.

The Canadian fishery for north Pacific albacore tuna (*Thunnus alalunga*) began in 1939. Total catch data from 1939 to 1951 are based on landings and were estimated by converting canned weights shipped by Canadian canneries to landed weights using standard conversion factors for salmon and were reported in annual statistical reports. These data are not reliable estimates of activity by the Canadian fishery because: (1) albacore landed in United States ports were not included in the estimates, (2) albacore imported from foreign sources by Canadian processors were included in these estimates, and (3) no measure of effort is available for this period. In addition, the spatial distribution of catch and effort is unknown beyond narratives in the annual reports noting that catches were occurring in BC and WA waters.

A sales slip system was implemented in 1951 and data compiled from these records were used to estimate Canadian total annual albacore catch until 1994. This system provides a better estimate of total catch because it captures fish landed at all Canadian ports, but it still underestimates catch because sales slips do not account for albacore landed at US or other foreign ports nor do they fully account for direct sales of albacore to the public, i.e., dockside sales. Effort data were not compiled nor reported for this period. Although the sales slip system has been used to capture some of the spatial and temporal resolution of landings in other domestic, these data were not compiled nor reported for albacore.

Fishery statistics reported since 1995 are based on data compiled in the Canadian Albacore Tuna Catch and Effort Database from hails, sales slips, and logbooks. These data are considered the most reliable estimates of fishery activity by the Canadian fleet because: (1) they account for fish caught and landed in foreign waters, (2) they have high spatial and temporal resolution in catch and effort (daily position by vessel), (3) sales slip weights provide independent validation of logbook data, and (4) data are obtained from all known vessels active in the fishery in a given year.

Table 11-1. Catch of Albacore by Canadian and U.S. albacore troll and pole-and-line vessels in the North Pacific Ocean ¹.

Year	Canadian Fleet ^{2, 3}					U.S. Fleet ^{5, 9}				
	Canadian EEZ (%)	U.S. EEZ (%)	High Seas (%)	Total catch (metric tons)	Logbook coverage (%) ⁴	U.S. EEZ (%)	Canadian EEZ (%)	High Seas (%)	Total catch (metric tons) ⁶	Logbook coverage (%) ⁷
1995	88	2.2	9.8	1,761	18	5.4	5.7	88.9	8,125	63
1996	16.9	45.8	37.3	3,321	24	13.5	0.1	86.4	16,962	42
1997	7.2	30.5	62.3	2,166	30	16.5	3.5	80.0	14,325	38
1998	7.3	43.6	49.1	4,177	50	14.8	0.1	85.1	14,489	35
1999	16.6	66.8	16.6	2,734	71	65.3	0.8	33.9	10,120	35
2000	9.6	73.1	17.4	4,531	68	69.6	0.2	30.2	9,714	41
2001	13.5	72.7	13.9	5,248	81	57.0	0.3	42.7	11,349	49
2002	7.8	86.2	5.9	5,379	74	63.9	2.0	34.0	10,768	38
2003	8.0	85.3	6.6	6,847	96	86.0	0.6	13.3	14,161	36
2004	16.9	80.7	2.4	7,857	92	92.9	1.2	5.9	13,473	47
2005	33.1	62.6	4.3	4,829	94	92.0	2.3	5.8	8,479	73
2006	18.5	70.1	11.3	5,833	95	82.5	1.0	16.5	12,547	93
2007	21.5	78.5	0.1	6,041	92	98.8	0.7	0.5	11,908	86
2008	4.5	86.4	9.1	5,464	93	78.5	6.0	15.5	11,761	79
2009	7.1	91.3	1.5	5,693	97	93.1	2.5	4.4	12,340	86
2010	35.9	51.2	12.9	6,526	96	72.1	2.1	25.9	11,689	76
2011	12.4	85.7	2.0	5,415	98	94.9	0.4	4.7	10,143	84
2012	83.0	0.0	17.0	2,484	100	99.2	0.0	0.8	14,149	81
2013	59.6	37.9	2.5	5,088	99	96.4	1.5	2.1	12,310	76
2014	55.3	44.6	0.1	4,780	100	94.8	4.9	0.3	13,369	81
2015	66.5	33.4	0.1	4,391	100	96.1	3.7	0.2	11,558	83
2016	54.8	44.4	0.8	2,842	100	97.9	1.4	0.7	10,796	79
2017 ^{8, 10}	11.2	75.0	13.8	1,831	100	90.4	0.1	9.5	7,875	73

Data Sources and Notes:

¹Locations are based on logbook records, which are self-reported by vessels.

²Canadian data during 1995-2011 are taken from Canadian Tuna Database version 13.02.11.

³Percentage of Canadian catch in various zones is based catch locations recorded in logbook. Total Canadian catch data reported in this table are expanded to account for non-reporting vessels based on logbook coverage (cf. Table 2).

⁴Canadian logbook coverage rates are calculated by dividing the number of logbook reporting vessels with the total number of vessels.

⁵USA catch in various zones are based on the percentage of catch recorded by logbooks in each zone.

⁶USA total catch is the sum of landings in the USA west coast ports (from PacFIN) and landings in foreign ports. Since these data sources are considered to be complete, total catch is not expanded based on logbook coverage.

⁷USA logbook coverage rates are based on the ratio of trip landings weights recorded in logbooks to the sum of landings from PacFIN and foreign ports (see Footnote 6).

⁸Preliminary data subject to change. Canadian data from Canadian tuna database version 18.03.21

⁹Proportion of US catch in high seas zone was estimated from logbook data.

¹⁰Data entry of US logbook data for 2017 was incomplete (~50%) at the time of data exchange in June 2018, which resulted in low calculated logbook coverage. Allocation of catch into various zones for 2017 is currently highly preliminary

Table 11-2. Landings of Albacore (by country of landing port) by Canadian (top panel) and U.S. (bottom panel) albacore troll and pole-and-line vessels in the North Pacific Ocean.

a. Canadian Fleet ¹

Year	Landings (metric tons) ²					Number of Landings			Number of Landing Vessels		
		U.S. Ports (DFO estimates) ³	U.S. Ports (NOAA estimates) ⁴	Other Ports ^{5,8}	Total ¹⁰		U.S. Ports (DFO estimates) ³	U.S. Ports (NOAA estimates) ⁴		U.S. Ports (DFO estimates)	U.S. Ports (NOAA estimates) ⁹
	Canadian Ports					Canadian Ports			Canadian Ports		
1995	230	67	67	104	401	76	4	7	53	3	4
1996	662	311	868	106	1,636	93	33	102	62	20	66
1997	563	294	399	147	1,109	67	25	54	51	14	32
1998	1,892	281	961	82	2,935	173	30	67	104	16	29
1999	1,574	484	713	193	2,480	274	69	106	158	35	52
2000	2,432	537	889	424	3,745	346	79	110	160	44	57
2001	3,474	617	806	364	4,644	520	51	92	193	31	52
2002	3,866	181	702	347	4,915	465	29	71	169	17	38
2003	3,781	2,132	3,118	655	7,554	464	241	285	177	87	105
2004	2,586	977	1,130	3,590	7,306	659	141	89	198	67	52
2005	3,473	745	811	286	4,570	513	88	85	195	49	45
2006	5,281	327	397	300	5,978	495	35	31	161	18	19
2007	5,596	283	357	73	6,025	559	29	35	191	20	22
2008	3,693	1,236	1,359	122	5,174	341	106	114	123	42	46
2009	4,662	642	650	298	5,610	434	53	47	134	30	26
2010	4,961	811	958	446	6,364	502	78	76	154	45	42
2011	4,059	1,094	1,179	170	5,408	453	89	93	174	47	47
2012	2,219	0	0	265	2,484	276	0	0	174	0	0
2013	4,301	609	650	168	5,119	278	39	41	177	19	22
2014	4,130	395	415	256	4,801	339	26	28	147	12	14
2015	3,978	244	246	160	4,384	408	19	19	160	11	11
2016	2,634	186	189	22	2,845	388	17	17	150	9	9
2017 ¹²	1,583	248	236	0	1,831	240	21	20	121	12	11

b. U.S. Fleet¹³

Year	Landings (metric tons)					Number of Landings			Number of Vessels that landed fish ⁷		
	Canadian Ports (DFO estimates) ⁶	Canadian Ports (NOAA estimates)	U.S. Ports ⁹	Other Ports ¹¹	Total ¹⁰	Canadian Ports (DFO estimates) ⁶	Canadian Ports (NOAA estimates)	U.S. Ports ⁹	Canadian Ports (DFO estimates) ⁶	Canadian Ports (NOAA estimates)	U.S. Ports ⁹
1995			6,407	1,753	8,160			1,000			472
1996			13,209	2,188	15,397			1,710			658
1997			10,831	3,009	13,840			3,674			1,160
1998			12,628	1,135	13,763			2,470			838
1999			8,809	1,422	10,231			2,619			772
2000			8,086	1,574	9,660			2,230			707
2001			10,263	972	11,235			3,453			929
2002		^	9,298	163	9,461		<3	2,432		<3	696
2003		^	13,491	487	13,978		<3	2,821		<3	782
2004		444	13,367	24	13,835		10	2,727		<3	727
2005		83	8,217	9	8,309		4	1,761		3	552
2006		^	12,374		12,374		<3	2,163		<3	615
2007		674	11,143		11,817		13	2,471		9	651
2008	721	455	9,768		10,489	19	9	1,700	11	6	477
2009	721	664	11,621		12,342	16	12	2,596	11	8	655
2010	919	601	10,871		11,790	24	17	2,339	16	9	609
2011	611	282	9,840		10,451	21	12	2,560	13	8	640
2012	0	0	13,861		13,861	0	0	3,309	0	0	816
2013	514	289	12,019		12,533	16	9	2,559	12	6	684
2014	1459	1290	12,079		13,538	36	30	2,512	18	17	597
2015	756	522	11,036		11,792	30	19	2,386	19	12	562
2016	482	511	10,285		10,796	22	22	2,488	12	15	565
2017 ¹²	659	371	7,216		7,875	27	16	2,005	14	13	515

Data Sources and Notes:

¹ Canadian landings data prior to 2012 are from Canadian Tuna Database version 13.02.11

² Landings for Canadian fleet are based on salesslip weights (where available) or estimated weights in logbooks and are not expanded to account for non-reporting vessels (cf. Table 1).

³ DFO estimates of Canadian landings in US ports are based on estimated weights in logbooks and are not expanded.

⁴ NOAA estimates of landings data by Canadian fleet are derived from PacFIN and are not expanded.

⁵ Other ports category is used for landings in non-US and non-Canada ports or where the landing port was unknown due to missing data. Occasional landings in American Samoa (Pago pago) are included early in the time series.

⁶ DFO estimates of US landings in Canadian ports are from a survey of Canadian buyers/processors and are not expanded.

⁷ Number of landing vessels may be slightly inaccurate due to landing slips with invalid or missing vessel IDs (0.15 to 3.9%)

⁸ The majority of Canadian landings in 2004 did not include information on landing port but the majority of these landings were likely made in Canadian ports.

⁹ U.S. DATA Source: Pacific Fisheries Information Network (PacFIN) retrieval dated 11/01/2018, using the 'Boston method.' Number of landings estimated from unique vessel ID and Fish Ticket Dates.

¹⁰ Where both DFO and NOAA estimates exist, total is calculated by adding the greater of the two values.

¹¹ USA landings in Other Ports (non-US West Coast & non-Canadian ports) include American Samoa and Hawaii.

¹² Preliminary data subject to change. Canadian data from Canadian tuna database version 18.03.21

¹³ U.S. landings data do not include <200 mt of albacore landings in Alaskan ports made by U.S. vessels during 1994-2015.

* = no data, 0 = more than 0 mt but less than 1, ^ = confidential data (less than 3 vessels)

Table 11-3. Distribution of Canadian (top panel) and U.S. (bottom panel) albacore troll and pole-and-line fleet fishing effort in the North Pacific Ocean¹.

a. Canadian Fleet¹

	Canadian Fleet ¹						
Year	<i>Number of vessels/months allowed to fish in US EEZ</i>	<i>Number of vessels that fished in US EEZ ³</i>	<i>Number of vessels that fished in Canadian EEZ⁵</i>	<i>Vessel Months Used ⁴</i>	<i>Fishing Effort in US EEZ (boat fishing days) ²</i>	<i>Fishing Effort in Canadian EEZ (boat fishing days) ²</i>	<i>Fishing Effort on high seas (boat fishing days) ²</i>
1995	Unlimited	9	175	N/A	191	5,535	197
1996	Unlimited	83	90	N/A	4,222	2,813	1,130
1997	Unlimited	59	67	N/A	1,972	1,010	1,339
1998	Unlimited	91	92	N/A	3,234	1,274	1,507
1999	Unlimited	176	162	N/A	4,316	1,689	965
2000	Unlimited	184	131	N/A	6,738	1,189	842
2001	Unlimited	207	176	N/A	7,697	1,754	570
2002	Unlimited	200	124	N/A	7,207	686	431
2003	Unlimited	177	119	N/A	7,111	892	425
2004	170 vessels or 680 vessel fishing months	202	172	627	7,551	2,125	266
2005	140 vessels or 560 vessel fishing months	154	196	410	5,309	2,940	315
2006	125 vessels or 500 vessel fishing months	139	148	396	4,500	1,401	342
2007	94 vessels or 376 vessel fishing months	119	191	368	4,809	2,081	12
2008	94 vessels or 376 vessel fishing months	122	79	338	4,993	360	420
2009	110	107	116	N/A	5,722	675	143
2010	110	109	153	N/A	3,848	2,887	559
2011	110	108	146	N/A	6,549	1,771	285
2012	0	0	174	N/A	0	5,084	890
2013	45 vessels	43	181	N/A	1,870	4,299	296
2014	45 vessels	44	156	N/A	1,774	2,944	27
2015	45 vessels	43	161	N/A	1,435	3,792	17
2016	45 vessels	43	151	N/A	1,892	3,407	60
2017 ^{9, 12}	45 vessels	45	101	N/A	2,865	1,343	770

U.S. Fleet¹¹

Year	Number of vessels allowed to fish in Canadian EEZ ⁶	Number of vessels that fished in US EEZ ^{7,8}	Number of vessels that fished in Canadian EEZ ^{7, 8}	Fishing Effort in US EEZ (boat fishing days) ¹⁰	Fishing Effort in Canadian EEZ (boat fishing days) ¹⁰	Fishing Effort on high seas (boat fishing days) ^{10, 11}
1995	Unlimited	472	71	1,461	960	6,786
1996	Unlimited	658	6	3,574	14	10,229
1997	Unlimited	1160	46	4,520	570	10,838
1998	Unlimited	838	3	3,042	26	8,834
1999	Unlimited	772	19	12,560	273	7,859
2000	Unlimited	707	12	8,883	67	4,970
2001	Unlimited	929	15	9,280	75	5,560
2002	Unlimited	696	31	8,132	212	3,552
2003	Unlimited	782	9	10,919	126	2,395
2004	170 vessels or 680 vessel fishing months	727	21	11,079	213	1,184
2005	140 vessels or 560 vessel fishing months	552	31	9,943	316	914
2006	125 vessels or 500 vessel fishing months	615	32	9,883	96	1,043
2007	94 vessels or 376 vessel fishing months	651	14	10,713	135	233
2008	94 vessels or 376 vessel fishing months	477	39	7,947	327	1,031
2009	Historical level	655	27	12,002	262	719
2010	Historical level	609	51	10,542	342	1,961
2011	Historical level	640	30	13,619	117	941
2012	0	816	0	14,636	11	380
2013	Historical level	703	21	12,242	229	452
2014	Historical level	625	36	11,392	653	93
2015	Historical level	578	39	11,011	562	161
2016	Historical level	570	31	12,082	246	155
2017 ^{9, 12}	Historical level	520	13	11,172	36	1,271

Data Sources and Notes:

¹ Effort in different zones are based on logbook records, where locations are self-reported by vessels.

² Estimates of Canadian effort in boat fishing days are expanded using the methodology described in Stocker et al. (2007: CTRFAS 2701). 1995-2011 data from Canadian Tuna Database version 13.02.11.

³ Number of vessels that fished in US EEZ: 1995-2008 data from Canadian Tuna Database version 13.02.11, 2009-2011 data from DFO Pacific Licensing System.

⁴ Vessel Months during 1995-2011 used data from Canadian tuna database v. 13.02.11.

⁵ Number of vessels that fished in Canadian EEZ: 1995-2011 data from Tuna Database version 13.02.11.

⁶ Although the historical level of fishing effort for the US fleet was permitted in the Canadian EEZ during 2009-2011, the historical level of fishing effort is not presently quantified.

⁷ Number of US vessels that fished in US or Canadian EEZs are not expanded.

⁸ Number of US vessels that fished in US or Canadian EEZs refers to vessels that recorded fishing days in those zones in their logbooks and do not include vessels that only had transit days. Where logbook coverage rate is less than 100%, it is assumed that all US vessels that landed fish, had fished in the US EEZ.

⁹ Preliminary data subject to change. Canadian data from Canadian tuna database version 18.031.21.

¹⁰ Estimates of US effort in Canadian EEZ in number of vessels and boat fishing days are not expanded. Calculation of annual effort has changed in 2017 (Documented in ISC working paper ISC17/STATWG/WP-1).

¹¹ Proportion of US effort in high seas zone was estimated from logbook data.

12. Pacific-Wide HMS Catch

12.1. Global Tuna Catch

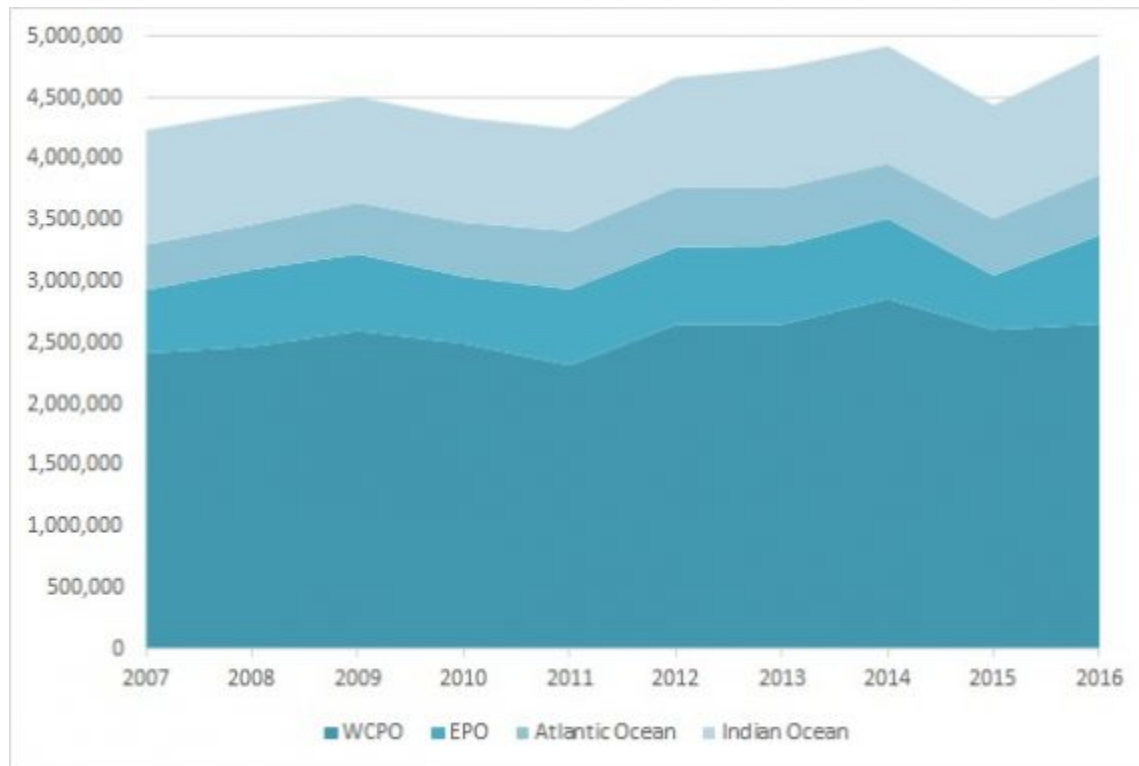


Figure 12-1. Annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna by ocean area, 2007-2016.

Catch of the principal tuna species (albacore, bigeye, skipjack and yellowfin) was 4.9 million metric tons in 2016. This is the second highest catch on record (2014 was the highest). The Western and Central Pacific Ocean (WCPO) accounted for 57% of global catch over this 10-year period. The Eastern Pacific Ocean (EPO) accounted for an additional 13%.

Source: Oceanic Fisheries Programme Secretariat of the Pacific Community. 2017. [Western and Central Pacific Fisheries Commission Tuna Fishery Yearbook 2016](#). Western and Central Pacific Fisheries Commission. Pohnpei, Federated States of Micronesia. Table 95. Global catches of albacore, bigeye, skipjack and yellowfin, by ocean area (mt).

12.2. Pacific-Wide Catch of Bigeye, Skipjack, and Yellowfin Tuna

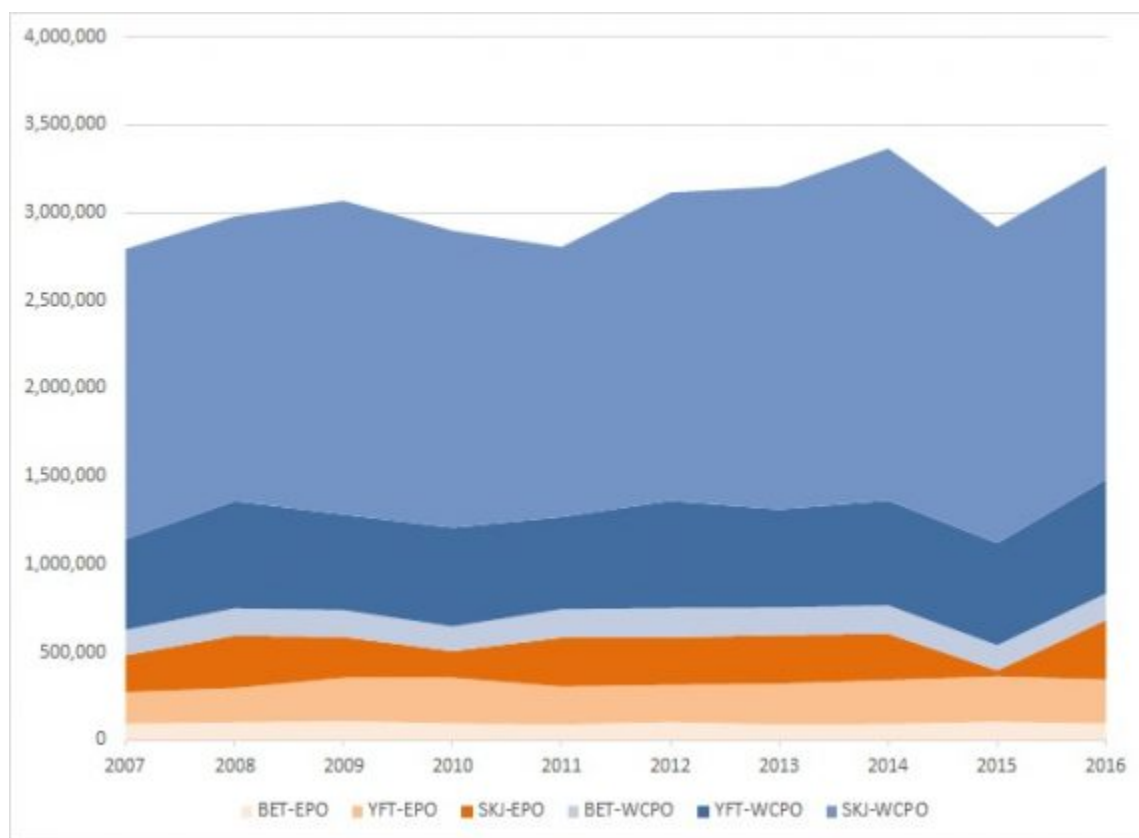


Figure 12-2. Annual catch of bigeye, skipjack, and yellowfin tuna (mt) in the EPO and WCPO, 2007-2016.

During this 10-year period the WCPO accounted for 81% of Pacific catch of bigeye, skipjack, and yellowfin tuna. Annual average landings of these three species for the entire Pacific was 3.0 million metric tons. Catch in 2016 was the second highest on record during these 10 years at 3.3 million metric tons. Skipjack catch in the WCPO was the largest share of Pacific-wide catch at 57%. Landings in 2016 were higher than the 10-year average for all species except for bigeye tuna, where 2016 landings (244,934 mt) were 98% of the 10-year average (250,292 mt).

Source: Oceanic Fisheries Programme Secretariat of the Pacific Community. 2017. [Western and Central Pacific Fisheries Commission Tuna Fishery Yearbook 2016](#). Western and Central Pacific Fisheries Commission. Pohnpei, Federated States of Micronesia. Table 80 (Total catches of albacore, bigeye, skipjack and yellowfin in the WCPFC Statistical Area) and Table 92 (Total catches of albacore, bigeye, skipjack and yellowfin in the Eastern Pacific Ocean).

12.3. Catch of Target Tunas in Eastern Pacific

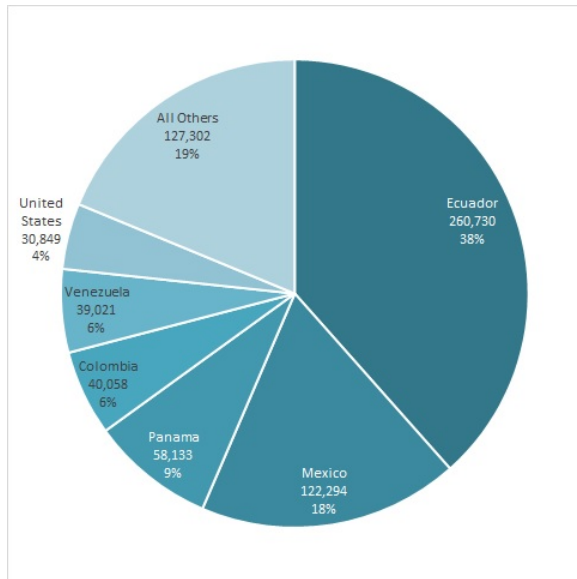


Figure 12-3. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the EPO by flag state, 2012-2016. Other flag states include Belize, Canada, Chile, China, Chinese Taipei, Costa Rica, French Polynesia, Japan, Korea, Nicaragua, Peru, Spain, and Vanuatu.

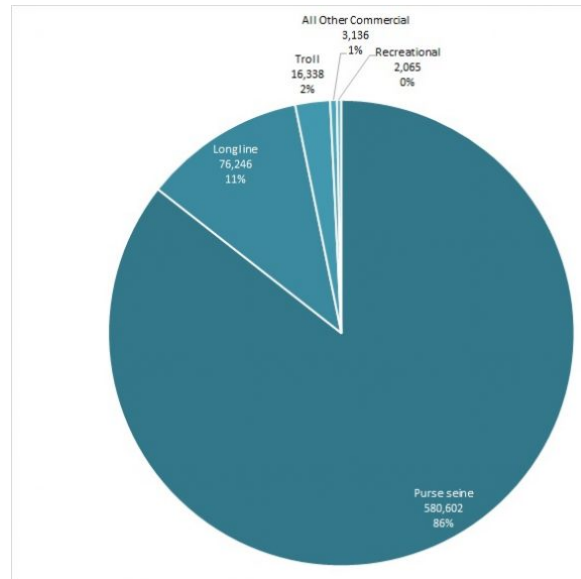


Figure 12-4. Average annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the Eastern Pacific Ocean, 2012-2016, by gear type.

Source: [IATTC Public Domain Data \(Catch by gear and flag\)](#)

12.4. Catch of Target Tunas in the Western Pacific

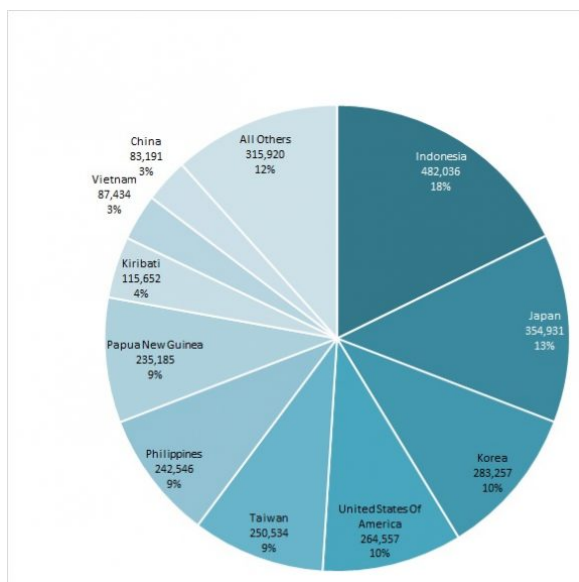


Figure 12-5. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by flag state, 2012-2016. Other flag states include Marshall Islands, Federated States Of Micronesia, Solomon Islands, Spain, Vanuatu, New Zealand, Ecuador, Fiji, Ecuador, Fiji, El Salvador, Tuvalu, French Polynesia, Australia, Cook Islands, New Caledonia, Samoa, Tonga, Tokelau, Eastern Pacific US Purse Seine Fleet, and Belize.

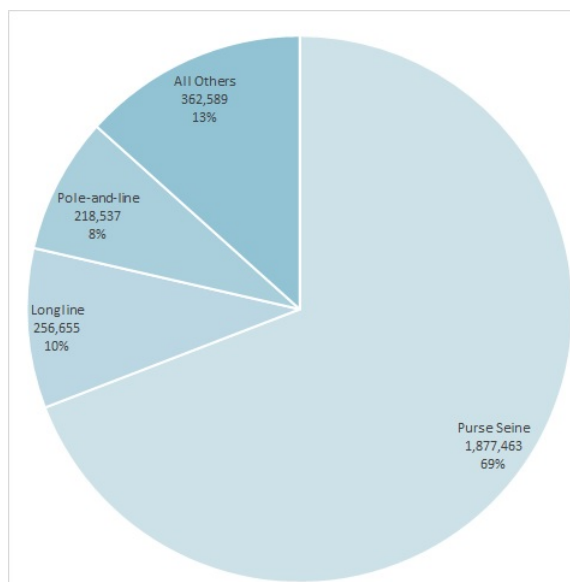


Figure 12-6. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by gear type, 2012-2016.

Source: [WCPFC Tuna Fishery Yearbook 2016 – Excel files](#)

12.5. Northern Stocks – North Pacific albacore, Pacific bluefin tuna, and swordfish in the North Pacific

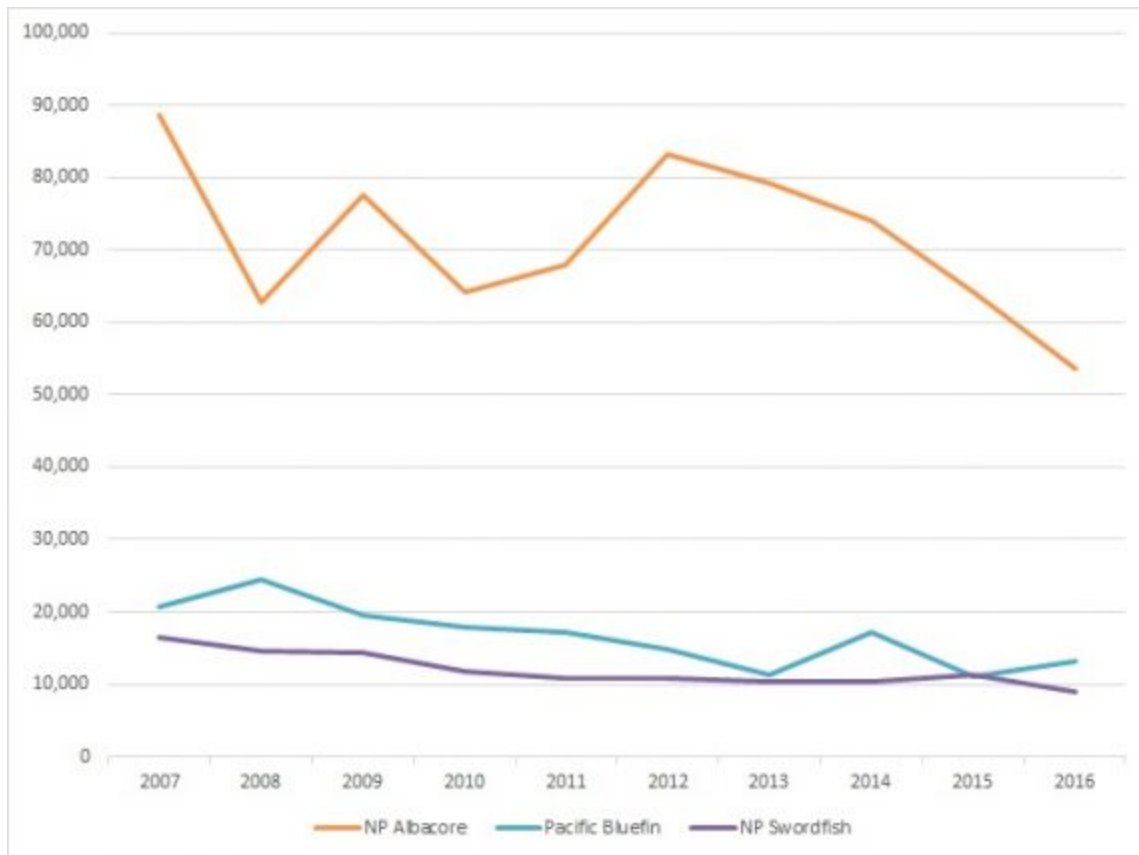


Figure 12-7. Reported catch of North Pacific albacore, Pacific bluefin tuna, and North Pacific swordfish, 2007-2016.

Reported catch of all three species in 2016 was below the annual average for this 10-year period.

Reported North Pacific albacore catch in 2016 was 53,543 mt or 75% of the average, Pacific bluefin tuna catch was 13,167 mt or 79% of the average, and North Pacific swordfish was 8,867 metric tons or 74%.

Source: [ISC fisheries statistics](#)

12.5.1. North Pacific Albacore

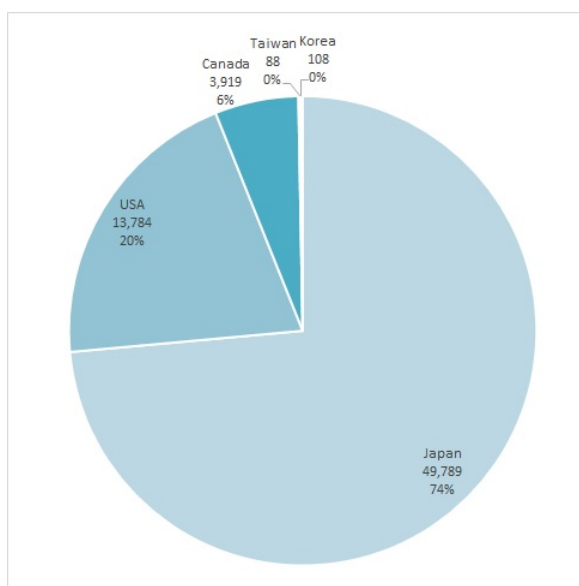


Figure 12-8. Average annual reported catch (mt) of North Pacific albacore by ISC members, 2012-2016.

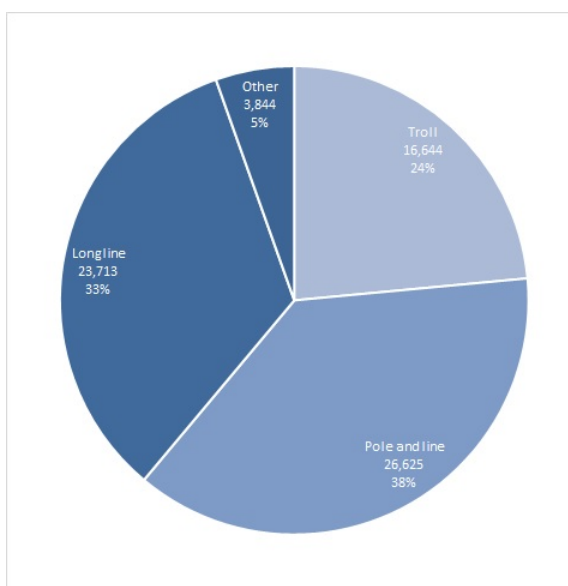


Figure 12-9. Average annual catch (mt) of North Pacific albacore by gear type, 2012-2016. Other gear types include setnet, drift gillnet, purse seine, handline, and recreational.

Source: [ISC fisheries statistics](https://www.fishbase.org/landings/landings.php)

12.5.2. Pacific Bluefin Tuna

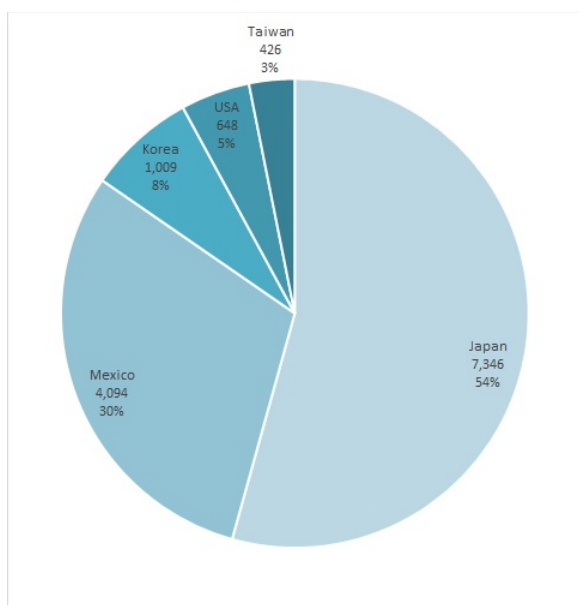


Figure 12-10. Average annual reported catch (mt) of Pacific bluefin tuna by ISC members, 2012-2016.

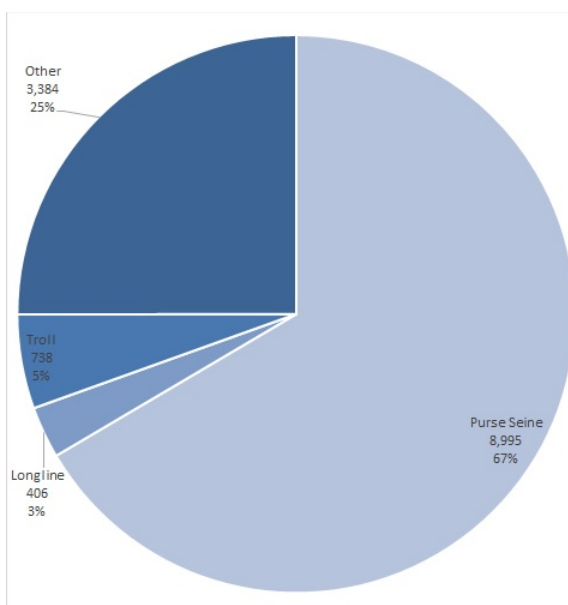


Figure 12-11. Average annual catch (mt) of Pacific bluefin tuna by gear type, 2012-2016. Other gear types include setnet, pole and line, drift gillnet, other gillnet, trawl, and recreational.

Source: [ISC fisheries statistics](https://www.fishbase.org/landings/landings.php)

12.5.3. North Pacific Swordfish

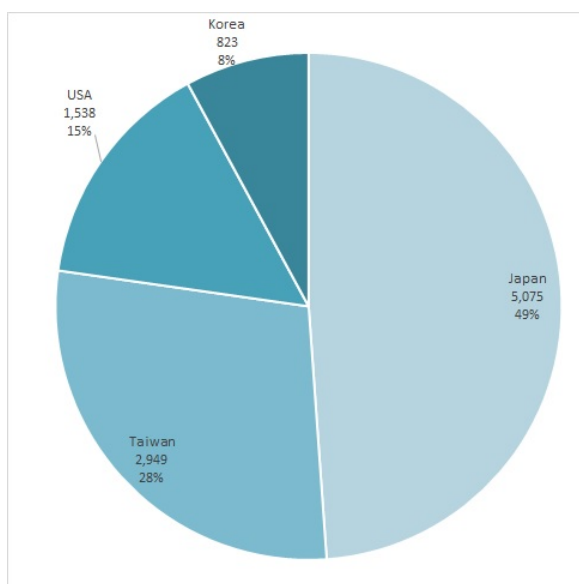


Figure 12-12. Average annual reported catch (mt) of North Pacific swordfish by ISC members, 2012-2016.

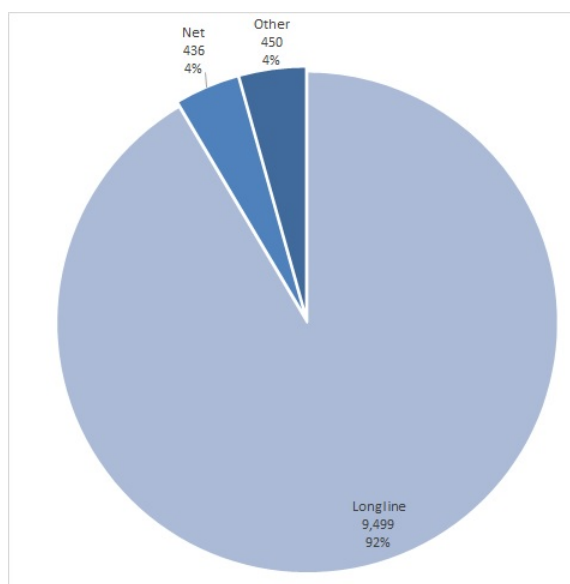


Figure 12-13. Average annual catch (mt) of swordfish by gear type, 2012-2016. Net gear types include setnet, drift gillnet, and other gillnet. Other gear types include harpoon and handline.

Source: [ISC fisheries statistics](#)

13. Status of HMS Stocks

Under the Magnuson-Stevens Act, Councils must identify status determination criteria which can be used to decide whether overfishing is occurring (fishing mortality is above a maximum fishing mortality threshold) or the stock is overfished (biomass is less than a minimum stock size threshold). Chapter 4 in the [HMS FMP](#) describes how these status determination criteria may be determined. They are derived from an estimate of maximum sustainable yield (MSY), “the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets.” Frequently MSY is difficult to estimate for HMS stocks, either due to stock dynamics or the lack of sufficient information to conduct a stock assessment. In those cases, proxy values may be determined for MSY and related status determination criteria. In general, the Council considers the biological reference points, or proxies approved by regional fishery management organizations to be the ‘best available science.

In the case of HMS in the Pacific, most stock assessments are conducted by several international organizations, established through conventions that function akin to treaties among sovereign governments. This makes it difficult, if not impossible, for the U.S., or any participating country, to unilaterally peer review the assessments sponsored by these organizations. Therefore, NMFS employs “other peer review processes” to determine whether the assessments constitute the best scientific information available for these transboundary stocks ([81 FR 54561; August 16, 2016](#)), including through participation by the U.S. government in these organizations. Once NMFS makes a best scientific information available (BSIA) determination on the outputs of an assessment produced by an international organization, the agency uses this information to determine the status of stocks relative to SDC identified in the FMP for the purposes of domestic management.

13.1 HMS Stock Assessments

13.1.1. Organizations That Conduct HMS Stock Assessments

Stock status is most reliably determined from stock assessments that integrate fishery and life history information across the range of the stock. A list of current stock assessments is provided in Section 13.3.

Inter-American Tropical Tuna Commission (IATTC)

In the Eastern Pacific Ocean (EPO) scientific staff employed by the Inter-American Tropical Tuna Commission (IATTC) conduct stock assessments mainly for tropical tunas (bigeye, yellowfin, and skipjack) and some billfish (striped marlin, swordfish). The [Fishery Status Reports](#) summarize fisheries and stock status and the most recent stock assessment reports may be accessed on their 2018 [Scientific Advisory Committee meeting page](#). All IATTC staff assessments and analyses are reviewed by the Scientific Advisory Committee.

In 2017, the IATTC Scientific Staff assessed stocks of bigeye tuna (*T. obesus*) and yellowfin tuna (*T. albacares*) in the eastern Pacific Ocean (EPO), and completed an indicator analysis for the EPO stock of skipjack tuna (*Katsuwonus pelamis*). NMFS determined that the EPO bigeye and yellowfin stocks were not subject to overfishing and not overfished based on BSIA, which is included in Table 1 and Table 2. The last status determination for skipjack was in 2011, and it was not subject to overfishing and not overfished.

In 2018, IATTC Scientific Staff assessed the EPO stock of yellowfin tuna and completed another indicator analysis for the EPO stock of skipjack tuna. The results from these stock analyses are considered BSIA and provided in Table 1 and Table 2, and NMFS' status determinations are pending.

The IATTC Scientific Staff also assessed and conducted an indicator analysis for the stock of bigeye tuna in the EPO in 2018. However, the IATTC Scientific Staff determined, and their Scientific Advisory Committee agreed, that uncertainties identified in the assessment raise questions about its use for management purposes. Therefore, the IATTC Scientific Staff completed an indicator analysis, which suggests that the stock is under increasing fishing pressure. NMFS considers the indicator analysis BSIA and its status determination is pending. The 2018 analyses were considered by the IATTC when it met in August 2018.

Secretariat of the Pacific Community Oceanic Fisheries Program (SPC-OFP)

In the Western and Central Pacific Ocean (WCPO), the Secretariat of the Pacific Community Oceanic Fisheries Program (SPC-OFP) conducts stock assessments as the science provider to the Western and Central Pacific Fisheries Commission (WCPFC). Like the IATTC, they tend to focus on the tropical tunas, but have also completed stock assessments for South Pacific albacore tuna and striped marlin. Their stock assessments may be accessed by visiting the [WCPFC stock assessment webpage](#).

In 2017, SPC staff assessed the WCPO stocks of bigeye tuna and yellowfin tuna. Both stocks were determined to not be overfished and not subject to overfishing based on the BSIA presented in Table 1 and Table 2. SPC staff also conducted an assessment of the southwest Pacific swordfish stock; however, NMFS does not make status determinations for this stock.

In 2018, SPC staff assessed the South Pacific stock of albacore. This assessment is now under review by the WCPFC Scientific Committee. NMFS does not make status determinations for this stock. The 2018 assessment will be considered by the WCPFC when it meets in December 2018.

International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC)

In the North Pacific Ocean (NPO) the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) conducts stock assessments, also as a science provider for the WCPFC, and specifically that organization's Northern Committee. The ISC has formed working groups for North Pacific albacore, Pacific bluefin tuna, billfish (marlins and swordfish), and sharks. Shark species of interest include blue, shortfin, mako, bigeye thresher, pelagic thresher, silky, oceanic whitetip, and hammerhead species. The ISC Plenary reviews assessments and analyses, and [ISC annual Plenary Reports](#) provide stock status updates and conservation recommendations. ISC stock assessments can be found on its [Stock Assessment webpage](#).

In 2017, ISC Working Groups assessed stocks of albacore (*Thunnus alalunga*) and blue shark (*Prionace glauca*) in the North Pacific Ocean (NPO). NMFS determined that neither stock was overfished nor subject to overfishing based on the BSIA.

In 2018, ISC Working Groups assessed Pacific bluefin tuna (*T. orientalis*) and shortfin mako shark (*Isurus oxyrinchus*) in the NPO, and the swordfish stock (*Xiphias gladius*) in the Western Central North Pacific Ocean (WCNPO). NMFS determined that the bluefin assessment is BSIA and status the determinations are pending for the WCNPO swordfish and shortfin mako stock. The 2018 assessments

were considered by the Western and Central Pacific Fisheries Commission (WCPFC) Northern Committee (NC) in September 2018.

National Marine Fisheries Service (NMFS)

In 2016, NMFS Southwest Fisheries Science Center (SWFSC) scientists, in collaboration with scientists from Mexico, assessed the status of the stock of common thresher shark (*Alopias vulpinus*) along the West Coast of North America. This is the first assessment completed for this stock. This assessment was peer reviewed in 2017 and revised in 2018. NMFS has determined that the information presented in section 13.1.1 reflects BSIA for this stock, and a status determination is pending.

13.1 Assessment of Stock Status

National Standard 2 requires using the best scientific information available in management. This requires periodic updating of stock status for comparing against status determination criteria. HMS FMP Chapter 4 describes the management reference points used to assess stock status and the methods for determining the values for these reference points. These reference points are:

Maximum sustainable yield (MSY): MSY is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets. For management purposes MSY is usually expressed in terms of the following reference points:

MSY fishing mortality rate (F_{MSY}): The fishing mortality rate that, if applied over the long term, would result in MSY.

MSY stock size (B_{MSY}): The long-term average size of the stock or stock complex, measured in terms of spawning biomass or other appropriate measure of the stock's reproductive potential that would be achieved by fishing at F_{MSY} .

Status determination criteria (SDC) are quantifiable thresholds (or their proxies) that are used to determine if overfishing has occurred, or if the stock or stock complex is overfished. "Overfished" relates to biomass of a stock or stock complex, and "overfishing" pertains to a rate or level of removal of fish from a stock or stock complex. SDC are:

Maximum fishing mortality threshold (MFMT): The level of fishing mortality (F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.

Overfishing limit (OFL): The annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish. The OFL is an estimate of the catch level above which overfishing is occurring.

Minimum stock size threshold (MSST): The level of biomass below which the stock or stock complex is considered to be overfished.

Optimum yield (OY): The amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems.

HMS FMP section 4.2 describes the considerations for determining MSY. As part of the biennial process, the HMSMT will review recent stock assessments or other information as described below, and submit a draft SAFE document for review at the September Council meeting containing MSY estimates, noting if they are a change from the current value. At the request of the Council, the Scientific and Statistical Committee (SSC) will review these estimates and make recommendations to the Council on their application in management decisions. Based on this advice, the Council may recommend revisions to MSY estimates to NMFS.

HMS FMP section 4.4 describes how SDC are computed. NMFS uses the following status determination criteria to identify stocks subject to overfishing or that have become overfished as specified at MSA section 304(e).

MFMT equals F_{MSY} . The OFL is the annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish. Overfishing occurs when fishing mortality F is greater than the MFMT mortality or catch exceeds OFL for one year or more.

MSST is calculated as the greater of:

$$B_{MSST} = (1-M)B_{MSY} \text{ when } M \text{ (natural mortality)} \leq 0.5, \text{ or} \\ B_{MSST} = 0.5B_{MSY} \quad \text{when } M > 0.5$$

MSST or a reasonable proxy must be expressed in terms of spawning biomass or other reproductive potential. Should the estimated size of an HMS stock in a given year fall below this threshold, the stock is considered overfished.

In the case of species under international management, the Council should recommend that the appropriate RFMO consider adopting the SDCs determined pursuant to the HMS FMP as limit reference points for international management (see FMP Section 2.1).

Current Status Determination Criteria for HMS FMP Stocks

NMFS West Coast Region and Southwest Fisheries Science Center (SWFSC) make BSIA and status determinations for some but not all stocks of HMS FMP management unit species. The Pacific Islands Regional Office and Pacific Islands Fisheries Science Center (PIFISC) are the lead in making status and BSIA determinations for stocks occurring in the Western Pacific. Table 13-1 lists stock assessments used to make status determinations for the management unit species by the year the assessment was conducted, the organization conducting the assessment, and the lead NMFS Science Center for that stock. Table 13-2 and Table 13-3, provide estimates of the MSY, MFMT, MSST, any reference points adopted by RFMOs, and current status determinations. As noted above, NMFS uses these estimates as a basis for making status determinations.

Table 13-1. Current assessments for key stocks.

Stock	Assessment Year	Assessment Lead	Lead NMFS Science Center
North Pacific albacore tuna	2017	ISC	SWFSC
Blue shark in the NPO	2017	ISC	PIFSC/ SWFSC
Pacific bluefin tuna in the NPO	2018	ISC	SWFSC
Shortfin mako shark in the NPO	2018	ISC	PIFSC/ SWFSC
WCNPO swordfish	2018	ISC	PIFSC
Bigeye tuna in the EPO	2017	IATTC	SWFSC
Bigeye tuna in the EPO	2018	IATTC	SWFSC
Yellowfin tuna in the EPO	2017	IATTC	SWFSC
Yellowfin tuna in the EPO	2018	IATTC	SWFSC
Skipjack tuna in the EPO	2018	IATTC	SWFSC
Skipjack tuna in the EPO	2017	IATTC	SWFSC
Common thresher shark	2018	NMFS	SWFSC
Bigeye tuna in the WCPO	2017	SPC	PIFSC
Yellowfin tuna in the WCPO	2017	SPC	PIFSC

Table 13-2. Stock assessment information for the purposes of determining whether HMS stocks are subject to overfishing.

Stock	Assessment Year	MFMT (F _{MSY} or Proxy)	Current F _{msy} or proxy quantity estimate	Current F quantity estimate	RFMO Ref. point (if adopted)	F/ F _{MSY} ratio	Subject to Overfishing?
North Pacific albacore tuna	2017	1-SPR _{MSY}	0.84	1-SPR ₂₀₁₂₋₁₄ = 0.51	NA	0.61	No
Blue shark in the NPO	2017	F _{MSY}	0.35	F ₂₀₀₂₋₁₄ = 0.13	NA	0.37	No
Pacific bluefin tuna in the NPO	2018	1-SPR _{MSY}	0.788	1-SPR ₂₀₁₅₋₁₆ = 0.921	NA	1.17	Yes
Shortfin mako shark in the NPO	2018	1-SPR _{MSY}	0.26	1-SPR ₂₀₁₃₋₁₅ = 0.16	NA	0.62	Determination pending
WCNPO swordfish	2018	F _{MSY}	0.68	F ₂₀₁₃₋₁₅ = 0.32	NA	0.47	Determination pending
Bigeye tuna in the EPO	2017	F _{MSY}	NA	F ₂₀₁₄₋₁₆ = NA	NA	F ₂₀₁₄₋₁₆ / F _{MSY} = 0.87	No
Bigeye tuna in the EPO	2018	NA	NA	NA	NA	NA	Determination pending
Yellowfin tuna in the EPO	2017	F _{MSY}	NA	F ₂₀₁₄₋₁₆ = NA	NA	F ₂₀₁₄₋₁₆ / F _{MSY} = 0.97	No
Yellowfin tuna in the EPO	2018	F _{MSY}	NA	F ₂₀₁₅₋₁₇ = NA	NA	F ₂₀₁₅₋₁₇ / F _{MSY} = 1.01	Yes
Skipjack tuna in the EPO	2017	NA	NA	NA	NA	NA	No*
Skipjack tuna in the EPO	2018	NA	NA	NA	NA	NA	Determination pending
Common thresher shark	2018	1-SPR _{MSY}	0.45	1-SPR ₂₀₁₂₋₁₄ = 0.097	NA	0.21	No
Bigeye tuna in the WCPO	2017	F _{MSY}	0.5	F ₂₀₁₅ = NA†	NA	0.83	No
Yellowfin tuna in the WCPO	2017	F _{MSY}	0.12	NA	NA	0.74	No‡

*Last status determination was in 2011.

†For the 2017 WCPO bigeye tuna assessment, the ratios of F/F_{msy} and B/B_{msy} were calculated, but the separate F, F_{msy}, B, and B_{msy} estimates were not available. No minimum stock size threshold (MSST)/overfished threshold could be calculated, but because the stock was above B_{msy}, it had to be above MSST.

‡Last status determination was in 2014.

Table 13-3. Stock assessment information for the purposes of determining whether HMS stocks are overfished

Stock	Assessment Year	B _{MSY} or proxy	Current B _{MSY} or proxy quantity estimate	Current B quantity estimate	MSST (1-M* B _{MSY} or 0.5 B _{MSY})	Current B/MSST	RFMO Ref. point (if adopted)	Overfished?
North Pacific albacore tuna	2017	SSB _{MSY}	32,638 mt	SSB ₂₀₁₅ = 80,618 mt	16,972 mt	4.75	20%SSB _{current} , F=0=32,614 mt	No
Blue shark in the NPO	2017	SSB _{MSY}	179,539 mt	SSB ₂₀₁₅ = 308,286	136,450-154,608 mt*	2.0 - 2.3	NA	No
Pacific bluefin tuna in the NPO	2018	SSB _{MSY}	135,874 mt	SSB ₂₀₁₆ = 21,331 mt	101,905.5 mt	0.21	NA	Yes
Shortfin mako shark in the NPO	2018	SA _{MSY}	633,700 female sharks	SA ₂₀₁₆ = 860,200 female sharks	(1-0.128) * 633700 = 552,586 female sharks	1.6	NA	Determination pending
WCNPO swordfish	2018	SSB _{MSY}	15,702 mt	SSB ₂₀₁₆ = 29,403 mt	(1-0.22) *15702 = 12,248 mt	2.4	NA	Determination pending
Bigeye tuna in the EPO	2017	B _{MSY} (biomass of age 3+ quarters old fish at MSY)	96,360 mt	B (biomass of age 3+ quarters old fish at beginning of 2017) = 118,523	48,130 mt	2.9	NA	No
Bigeye tuna in the EPO	2018	NA	NA	NA	NA	NA	NA	Determination pending
Yellowfin tuna in the EPO	2017	S _{MSY} (unitless index of spawning biomass at MSY)	3,624	S = 3,117	1,812	1.72	NA	No
Yellowfin tuna in the EPO	2018	S _{MSY} (unitless index of spawning biomass at MSY)	3,634	S = 3,925 (S is an unitless index of spawning biomass)	1,817	2.1	NA	No
Skipjack tuna in the EPO	2017	NA	NA	NA	NA	NA	NA	No†
Skipjack tuna in the EPO	2018	NA	NA	NA	NA	NA	NA	Determination pending

Stock	Assessment Year	B _{MSY} or proxy	Current B _{MSY} or proxy quantity estimate	Current B quantity estimate	MSST (1-M* B _{MSY} or 0.5 B _{MSY})	Current B/MSST	RFMO Ref. point (if adopted)	Overfished?
Common thresher shark	2018	SSB _{MSY}	101,500 mature females	SSB = 136,800 mature females	97,500 mature females	1.4	NA	No
Bigeye tuna in the WCPO	2017	SSB _{MSY}	454,100 mt	558,543 mt	NA	NA‡	NA	No
Yellowfin tuna in the WCPO	2017	SBF=0	2,178,220 mt	NA	NA	NA	20%SBF=0 where SBF=0 is average over 2005–2014	No§

*B_{limit} = 136,450-154-608 b/c mortality changes w/ age and ranges from 0.24-0.14 for mature fish; females are 50% mature at age 5-6.

†Last status determination was in 2011.

‡For the 2017 WCPO bigeye tuna assessment, the ratios of F/F_{msy} and B/B_{msy} were calculated, but the separate F, F_{msy}, B, and B_{msy} estimates were not available. No minimum stock size threshold (MSST)/overfished threshold could be calculated, but because the stock was above B_{msy}, it had to be above MSST.

§Last status determination was in 2014.

RFMO Consideration of Biological Reference Points and Harvest Strategies

The WCPFC has adopted harvest strategies for two stocks relevant to two HMS FMP management unit species for which status determination criteria have been established: North Pacific albacore and Pacific bluefin tuna. The North Pacific albacore harvest strategy includes a biomass-based limit reference point (LRP) of 20%SSB_{current_{F=0}}. The target reference point (TRP) for this stock will be determined following a comprehensive analysis under a management strategy evaluation (MSE) approach. The Pacific bluefin harvest strategy includes an initial rebuilding target of the median SSB estimated for the period 1952 through 2014, to be reached by 2024 with at least 60% probability, and a second rebuilding target of 20%SSB_{F=0}, to be reached by 2034, or 10 years after reaching the initial rebuilding target, whichever is earlier, with at least 60% probability. SSB_{F=0} is the expected spawning stock biomass under average recruitment conditions without fishing. The Northern Committee will develop limit and target reference points through an MSE process.

The WCPFC maintains a [webpage](#) describing its current harvest strategies. The WCPFC intends to adopt harvest strategies for key stocks and fisheries in its Convention Area consistent with Conservation and Management Measure [2014-06](#).

The IATTC adopted the elements of the Pacific bluefin tuna harvest strategy in [Resolution C-18-02](#). This harvest strategy is based on recommendations from the Joint IATTC/WCPFC Northern Committee Working Group, which met concurrently during the 2016, 2017, and 2018 Northern Committee meetings.

13.2 Catches of HMS Management Unit Species in West Coast Fisheries

Table 13-4 compares estimates of stockwide and U.S. West Coast catch of HMS management unit species. This information can inform considerations of the “relative impact of U.S. fishing vessels on the stock” when the Council considers responses to a notification that a stock is subject to overfishing or overfished “due to excessive international fishing pressure.” When notified by NMFS, Magnuson-Stevens Act section 304(i) requires the Council to develop recommendations for domestic regulations and international actions taking into account this relative impact.

Table 13-4. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2012–16.

Species (stock)	Stockwide Catch	U.S. West Coast Catch		Average Annual Fractional Catch
		Commercial	Recreational ⁶	
<u>TUNAS</u>				
Albacore (NPO)	53–83 ¹	10–14	0.7-1	0.20
Bluefin (NPO)	11–15 ¹	<0.4	0.1-0.3	0.05
Bigeye (EPO)	85–105 ²	<0.05-0.5	<0.01	<0.01
Skipjack (EPO)	270–338 ²	<0.1	<0.01–0.1	<0.01
Yellowfin (EPO)	231–260 ²	0.01-1	0.1–0.8	<0.01
<u>BILLFISHES</u>				
Striped Marlin (EPO)	1.3–2.8 ²	<0.01 ³	0.02 ⁴	0.01
Swordfish (EPO)	10–11 ¹	0.5–0.7	<0.01	0.14
<u>SHARKS</u>				
Common Thresher	Unknown	<0.1	0.01-0.03	
Shortfin Mako	Unknown	<0.05	0.01-0.02	
Blue (NPO)	18-31 ¹	<0.06 ³	<0.01	<0.01
<u>OTHER</u>				
Dorado	4.5–5.5 ⁵	<0.01	0.01–0.2	0.01

Notes:

Data are from updated commercial (HMS SAFE [Table 3](#)), CPFV and private recreational catches (HMS SAFE [Tables R-1, R-4, R-6](#)) with weight conversions of 8.7 kg/albacore, 8.7 kg/bluefin, 10.0 kg/bigeye tuna, 3.0 kg/skipjack, 4.9 kg/yellowfin, 57.9 kg/striped marlin, 113 kg/swordfish, 29.2 kg/common thresher, 16.8 kg/mako, 8 kg/blue shark, and 5.6 kg/dorado.

¹ [International Scientific Committee Eighteenth Plenary Report Catch Tables](#), July 2018.

² IATTC public domain data, [EPO total estimated catch by year, flag, gear, species](#) (Oct. 2017).

³ Striped marlin and blue shark commercial catches include estimates from the drift gillnet observed catch.

⁴ Striped marlin recreational catch is estimated at 300 fish/year based on club records plus CPFV logbook recorded catch.

⁵ FAO Area 77 catch [FAO global fishery production dataset](#). Extracted October 1, 2018

⁶ 2014-2016, U.S. EEZ.

13.3 ***Current Stock Assessments for Species Managed under the HMS FMP***

The most current assessment for FMP MUS and the publication year are listed below.

Tunas

- **North Pacific Albacore (2017):** [Stock Assessment of Albacore Tuna in the North Pacific Ocean in 2017](#). Report of the Albacore Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean 12-17 July 2017, Vancouver, Canada.
- **South Pacific Albacore (2018):** [Stock Assessment of South Pacific albacore tuna](#). Tremblay-Boyer L., J. Hampton, S. McKechnie and G. Pilling. Oceanic Fisheries Programme, The Pacific Community (SPC). WCPFC-SC14-2018/ SA-WP-05 Rev. 2. August 2, 2018.
- **Pacific Bluefin (2018):** [Stock Assessment of Pacific Bluefin Tuna in the Pacific Ocean in 2018](#). ISC Pacific Bluefin Tuna Working Group. Prepared for the Eighteenth Meeting of the ISC, July 11-16, 2017, Yeosu, Republic of Korea.
- **Bigeye (EPO) (2018):** [Status of Bigeye Tuna in the Eastern Pacific Ocean in 2017 and Outlook for the Future](#). Haikun Xu, Carolina Minte-Vera, Mark N. Maunder, and Alexandre Aires-da-Silva. Prepared for the Ninth Meeting of the Inter-American Tropical Tuna Commission (IATTC) Scientific Advisory Committee, May 14-18, 2018, La Jolla, California, USA. Doc SAC-09-05 and [Stock Status Indicators for Bigeye Tuna](#). Maunder M., Cleridy E. Lennert-Cody, and Marlon Román. Prepared for the Ninth Meeting of the IATTC SAC, May 14-18, 2018, La Jolla, California USA. Doc SAC-09-16
- **Bigeye (WCPO) (2017):** [Stock Assessment of Bigeye Tuna in the Western and Central Pacific Ocean](#). S. McKechnie, G. Pilling, and J. Hampton. Scientific Committee Thirteenth Regular Session, Rarotonga, Cook Islands, August 9-17, 2017. WCPFC-SC13-2017/SA-WP-05.
- **Skipjack (EPO) (2018):** [Updated Indicators Of Stock Status for Skipjack Tuna in the Eastern Pacific Ocean](#). Maunder, M. Prepared for the Ninth Meeting of the IATTC SAC, May 14-18, 2018, La Jolla, California USA. Doc SAC-09-07
- **Skipjack (WCPO) (2016):** [Stock Assessment of Skipjack Tuna in the Western and Central Pacific Ocean](#). S. McKechnie, J Hampton, G. M. Pilling, N. Davies. Scientific Committee Twelfth Regular Session. Western and Central Pacific Fisheries Commission, August 3-11, 2016. WCPFC-SC12-2016/SA-WP-04.
- **Yellowfin (EPO) (2018):** [Status of Yellowfin Tuna in the Eastern Pacific Ocean in 2017 and Outlook for the Future](#). Carolina Minte-Vera, Mark Maunder, and Alexandre Aires-da-Silva. Prepared for the Ninth Meeting of the Inter-American Tropical Tuna Commission (IATTC) Scientific Advisory Committee, May 14-18, 2018, La Jolla, California, USA. Doc SAC-09-06
- **Yellowfin (WCPO) (2017):** [Stock Assessment of Yellowfin Tuna in the Western and Central Pacific Ocean Rev 1](#) (August 4, 2017). L. Tremblay-Boyer, S. McKechnie, and J. Hampton. Scientific Committee Thirteenth Regular Session, Rarotonga, Cook Islands, August 9-17, 2017. WCPFC-SC13-2017/SA-WP-06.

Billfishes

- **Striped marlin (WCPO) (2015):** [Stock Assessment Update for Striped Marlin \(*Kajikia audax*\) in the Western and Central North Pacific Ocean Through 2013](#). Report of the Billfish Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean, July 15-20, 2015, Kona, Hawaii, USA.
- **Striped marlin (EPO) (2009):** [Assessment of Striped Marlin in the Eastern Pacific Ocean In 2008 and Outlook for the Future](#). Michael G. Hinton. Inter-American Tropical Tuna Commission. Stock Assessment Report 10. An update with data through October 30, 2010, is reported in [Fishery Status Report No. 12, Tunas and Billfishes in the Eastern Pacific Ocean in 2013](#).
- **Swordfish (WCNPO) (2018):** [Stock Assessment of Swordfish \(*Xiphias gladius*\) in the Western and Central North Pacific Ocean Through 2016](#). ISC Billfish Working Group. Prepared for the Eighteenth Meeting of the ISC, July 11-16, 2017, Yeosu, Republic of Korea.
- **Swordfish (EPO) (2011):** [Status of Swordfish in the Eastern Pacific Ocean in 2010 and Outlook for the Future](#). Michael G. Hinton and Mark N. Maunder. Inter-American Tropical Tuna Commission Scientific Advisory Committee 2nd Meeting. La Jolla, California (USA), 9-12 May 2011.
- **Swordfish (SWPO) (2013):** [Stock Assessment of Swordfish \(*Xiphias gladius*\) in the Southwest Pacific Ocean](#). Davies, N., G. Pilling, S. Harley, and J. Hampton Secretariat of the Pacific Community (SPC), Ocean Fisheries Programme (OFP), Noumea, New Caledonia (July 17, 2013).

Sharks

- **Blue shark (NPO) (2017):** [Stock Assessment and Future Projections of Blue Shark in the North Pacific Ocean Through 2015](#). Report of the Shark Working Group. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 12-17 July 2017, Vancouver, Canada.
- **Common Thresher Shark (EPO) (2018):** [Status of Common Thresher Sharks, *Alopias vulpinus*, along the West Coast of North America: Updated Stock Assessment Based on Alternative Life History](#). Teo, S., Garcia Rodriguez, E. and Sosa-Nishizaki. O. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-595. <https://doi.org/10.7289/V5/TM-SWFSC-595>
- **Shortfin Mako Shark (NPO) (2018):** [Stock Assessment of Shortfin Mako Shark in the North Pacific Ocean through 2016](#). Report of the Shark Working Group. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. July 11-16, 2018, Yeosu, Republic of Korea.

Others

- **Dorado (SEPO) (2016):** [Exploratory Stock Assessment of Dorado \(*Coryphaena Hippurus*\) in the Southeastern Pacific Ocean \(DRAFT\)](#). Alexandre Aires-da-Silva, Juan L. Valero, Mark. N. Maunder, Carolina Minte-Vera, Cleridy Lennert-Cody, Marlon H. Román, Jimmy Martínez-Ortiz, Edgar J. Torrejón-Magallanes and Miguel N. Carranza. Inter-American Tropical Tuna Commission, Scientific Advisory Committee Sixth Meeting. May 9-13, 2016.

14. Commonly-Used Web Links in Highly Migratory Species Management and Research

International Regional Fishery Management Organizations and Scientific Bodies	
Inter-American Tropical Tuna Commission	http://www.iattc.org/HomeENG.htm
Western and Central Pacific Fisheries Commission	http://www.wcpfc.int/
International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean	http://isc.fra.go.jp/index.html/
U.S West Coast Regional Fishery Management Councils	
Pacific Fishery Management Council	http://www.pcouncil.org
Western Pacific Fishery Management Council	http://www.wpcouncil.org
State and Interstate Fisheries Commissions	
California Department of Fish and Wildlife	https://www.wildlife.ca.gov/
Oregon Department of Fish and Wildlife	http://www.dfw.state.or.us/
Pacific States Marine Fisheries Commission	http://www.psmfc.org
Washington Department of Fish and Wildlife	http://wdfw.wa.gov/
Institutions Conducting HMS Research	
American Fishermen's Research Foundation	http://www.afrf.org/
California State University, Long Beach	http://www.csulb.edu
Centro de Investigacion Cientofica y Educacion Superior de Ensenada	http://www.cicese.mx/
Inter-American Tropical Tuna Commission	http://www.iattc.org/HomeENG.htm
Monterey Bay Aquarium	http://www.montereybayaquarium.org/conservation-and-science
Monterey Bay Aquarium Tuna Research and Conservation Center	http://www.tunaresearch.org
Moss Landing Marine Lab	http://www.mlml.calstate.edu/
NOAA Pacific Islands Fisheries Science Center	http://www.pifsc.noaa.gov
NOAA Southwest Fisheries Science Center	http://swfsc.noaa.gov
NOAA West Coast Regional Office	http://www.westcoast.fisheries.noaa.gov/fisheries/migratory_species/highly_migratory_species.html

Pfleger Institute of Environmental Research	http://www.pier.org
Scripps Institute of Oceanography	http://www-sio.ucsd.edu
Tagging of Pacific Pelagics	http://www.topp.org
Sport and Commercial Fishing Industry Related Associations	
American Albacore Fishing Association	http://www.americanalbacore.com
Oregon Albacore Commission	http://www.oregonalbacore.org/
Sportfishing Association of California	https://www.californiasportfishing.org/
United Anglers of Southern California (Facebook)	https://www.facebook.com/United-Anglers-of-Southern-California-97352772114/
Western Fishboat Owner's Association	http://www.wfoa-tuna.org