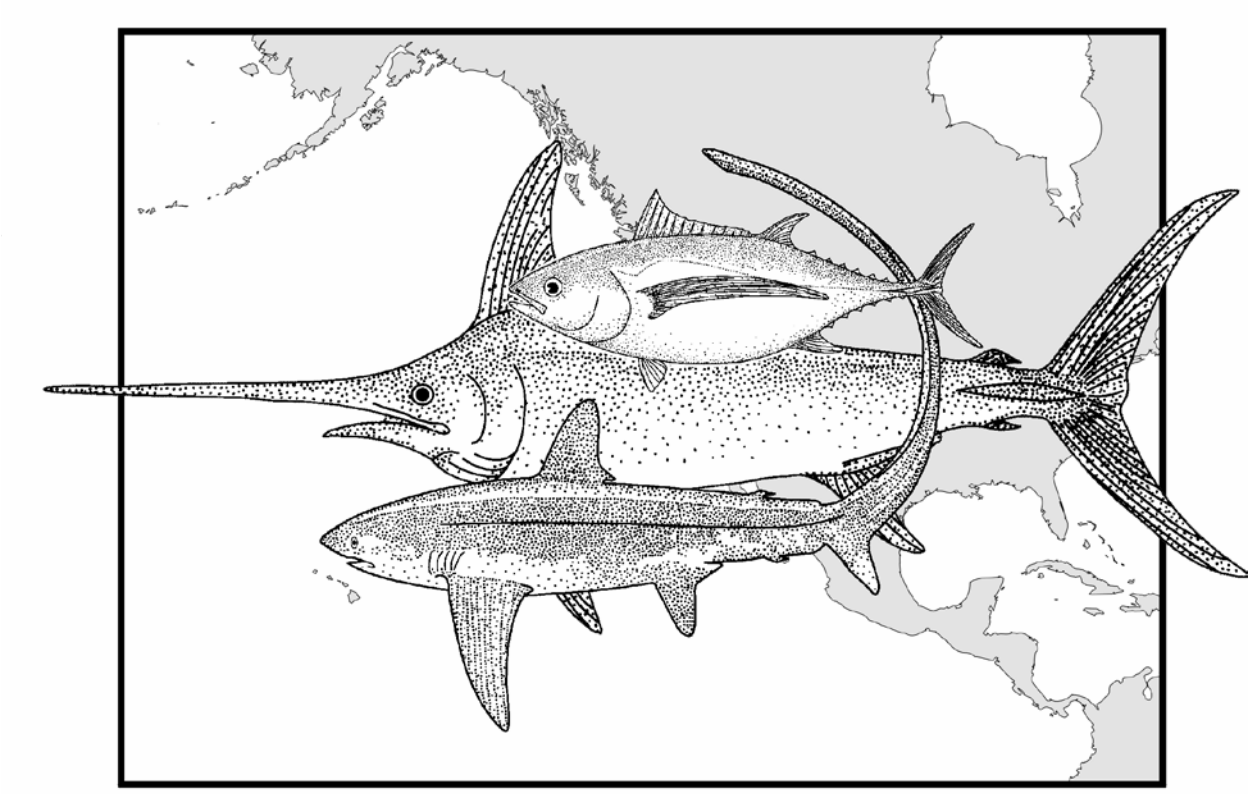
STATUS OF THE U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES THROUGH 2015



STOCK ASSESSMENT AND FISHERY EVALUATION

JANUARY 2017

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

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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
NRIFSF	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

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 three times since its implementation. 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.

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 (*Dasyetis 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.

1.1. The Management Cycle

The HMS FMP also establishes an annual process for the delivery of the SAFE report to the Council, intended to coincide with the management cycle: a draft report is provided in June for initial decision-making on the need for new harvest specifications and management measures. The final report is delivered in September to provide the recommendations and information necessary to develop and implement any harvest specifications and management measures. NMFS implements the Council's recommended management measures through the Federal regulatory process, if they are found to be consistent with the MSA and other applicable law. Any such measures become effective at the start of the next fishing year, April 1 of the following year, or when the rulemaking process is complete, 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.

1.2. Highly Migratory Species Management Team

Current members of the HMSMT may be found in the Roster.

2. Council HMS Activities in 2015

Written briefing materials submitted at Council meetings by downloaded from the Council's briefing book archive webpage.

2.1. November 2015

2.1.1. Swordfish Fishery Management Policy Connections

The Council reiterated its recommendation to NMFS to issue an exempted fishing permit (EFP) to test the use of modified large mesh drift gillnet (DGN) gear for fishing by two boats inside the Pacific Leatherback Conservation Area (PLCA), with fishing triggered at times and areas by favorable oceanographic conditions–for example, when jellyfish (and theoretically sea turtle) abundance has greatly diminished and swordfish abundance is high. The EFP will test generally whether "eco-set triggered fishing" can result in substantially higher swordfish catch and far less bycatch. The Council confirmed it is their intent that if this initial small-scale testing proved successful, it would lead to a subsequent EFP with more vessels in order to gather a higher volume of scientific data. If innovations tested by this and subsequent EFPs prove successful in reliably demonstrating superior target catch and lower bycatch than the current full fleet DGN fishery, this should lead to allowing DGN vessels to access all or portions of the PLCA at times when swordfish catch rates are higher and protected species bycatch is lower. The Council also stated the expectation that any future fishery that includes all or portions of the PLCA would operate under protected species hard caps like those adopted by the Council in September 2015. In consideration of NMFS' heightened focus on leatherback turtles, the Council directed further work on estimating the global benefits to leatherback turtles that could be provided by a significantly better performing DGN fishery replacing foreign-caught swordfish in the U.S. marketplace.

The Council also recognized the promise of deep-set buoy gear (DSBG) to be an economically viable low/no bycatch gear for catching swordfish. For that reason, the Council expressed its interest to move forward rapidly to authorize DBSG under the Highly Migratory Species Fishery Management Plan while considering the need for a permitting regime to regulate use of this gear.

Initiating a Council process to authorize shallow-set longline gear outside the Exclusive Economic Zone was given lower priority, but still judged to be important in recognition that Hawaii-permitted shallow-set longline vessels are currently landing significant amounts of swordfish on the West Coast.

2.2. September 2015

2.2.1. Update on International Issues

The Council will submit comments on the proposed rule (80 FR 48172) to revise NMFS regulations to implement the import provisions of the Marine Mammal Protection Act.

The Council heard about the management strategy evaluation (MSE) for North Pacific albacore being performed by the International Scientific Committee for Tuna and Tuna-like Species (ISC). Member countries of the Western and Central Pacific Fisheries Commission (WCPFC) Northern Committee have been requested to submit candidate operational objectives, biological reference points, and harvest control rules to the ISC Chair and ISC Albacore Working Group Chair by November 19. The Council tasked the Highly Migratory Species Management Team and Highly Migratory Species Advisory Subpanel with review and completion of a template of necessary MSE inputs and any other relevant recommendations on objectives and management strategies for the MSE. During the workload planning agenda item, the Council decided to not schedule a Council floor session on this matter at the November Council Meeting,

but instead to forward the HMS Advisory Body recommendations directly to the Council representatives to the WCPFC meeting in December. An October webinar will be considered to develop the HMS Advisory Body recommendations."

2.2.2. Swordfish Management and Monitoring Plan and Hardcaps

The Council briefly discussed the content of the draft West Coast Swordfish Fishery Management and Monitoring Plan. The Council plans to discuss the structure, concordance, and general questions about current policies for swordfish fisheries at its November 2015 meeting

The Council took final action in adopting final preferred alternatives for management of the California large mesh drift gillnet fishery including hard caps for high priority protected species, performance objectives for non-ESA listed marine mammals and finfish, and fishery monitoring objectives. See the HMS blog on the Council's website and the forthcoming Council fall newsletter for more detail on the final preferred alternatives.

2.2.3. Scoping of Amendment 4 to the FMP: Authorizing a Shallow-Set Longline Fishery Outside of the EEZ

The Council decided to suspend this agenda item and take it up at a future Council meeting, as a result of extreme length of the September Council meeting at its mid-meeting point. During future meeting planning, the Council scheduled this matter for its March 2016 meeting.

2.3. September 2015

2.3.1. Update on International Issues

The Council will submit comments on the proposed rule (80 FR 48172) to revise NMFS regulations to implement the import provisions of the Marine Mammal Protection Act.

The Council heard about the management strategy evaluation (MSE) for North Pacific albacore being performed by the International Scientific Committee for Tuna and Tuna-like Species (ISC). Member countries of the Western and Central Pacific Fisheries Commission (WCPFC) Northern Committee have been requested to submit candidate operational objectives, biological reference points, and harvest control rules to the ISC Chair and ISC Albacore Working Group Chair by November 19. The Council tasked the Highly Migratory Species Management Team and Highly Migratory Species Advisory Subpanel with review and completion of a template of necessary MSE inputs and any other relevant recommendations on objectives and management strategies for the MSE. During the workload planning agenda item, the Council decided to not schedule a Council floor session on this matter at the November Council Meeting, but instead to forward the HMS Advisory Body recommendations directly to the Council representatives to the WCPFC meeting in December. An October webinar will be considered to develop the HMS Advisory Body recommendations."

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2.4. June 2015

2.4.1. International Issues including Inter-American Tropical Tuna Commission (IATTC) Meeting and North Pacific Albacore Management Strategy Evaluation

With respect to Pacific bluefin tuna, the Council recommended NMFS gather more data on the occurrence of adult fish in the Eastern Pacific Ocean (EPO) to help determine whether a separate spawning population occurs in this region.

With respect to bigeye tuna, the Council intends to work with the Western Pacific Fishery Management Council (WPFMC) to develop an equitable allocation of the current EPO 500 mt catch limit between Hawaii and west coast longline vessels larger than 24 meters.

With respect to the MSE for North Pacific albacore tuna to be conducted by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, the Council will provide recommendations to the U.S. delegation to the next Western and Central Pacific Fisheries Commission Northern Committee meeting.

2.4.2. Final Approval of Resubmitted Exempted Fishing Permit (EFP) Application

The Council recommended that NMFS issue an EFP to the Alliance of Communities for Sustainable Fisheries based on their application (see Agenda Item E.2, Attachment 1, June 2015). The Council recommended 11 points of changes and adjustments to the proposed activities and additional conditions, consolidated into the 6 points below.

1. No more than two large mesh drift gillnet vessels could fish under the EFP.
2. 100 percent observer coverage.
3. One leatherback sea turtle mortality or injury as determined by the onboard observer would terminate the EFP. Similar caps would be applied to other protected species and striped marlin.
4. Fishing is prohibited in leatherback sea turtle critical habitat and other restrictions on the area of operation.
5. The EFP applicants will consult with scientists about current ocean climate conditions that are thought to be favorable for identification of optimal time/area locations to conduct test fishery operations. This would involve the use of near-real-time oceanographic data to predict general times and areas where target catch rates are expected to be high relative to bycatch rates, especially of protected species.
6. The EFP applicants will collect data on catch and bycatch, gear deployment, and ocean conditions.

2.4.3. Swordfish Management and Monitoring Plan Hardcaps

The Council adopted additional alternatives and directed the Highly Migratory Species Management Team (HMSMT) to analyze them for Council final action in September 2015. These alternatives would be variations on the current hard cap alternatives 4 and 5, where a two-year average of takes of high priority protected species would be counted against the hard caps in those alternatives. The two-year period for counting takes against the caps would be aligned with the two-year biennial management period, or would be a rolling period where takes in the current fishing season and the previous fishing season would be counted against the caps.

The Council also directed the HMSMT to further develop the Swordfish Fishery Management and Monitoring Plan and to continue investigating optimal levels of observer coverage to detect rare event bycatch while considering the costs of observer coverage. The Council also expressed interest in obtaining more detail on alternatives that include performance standards for finfish bycatch.

2.5. March 2015

2.5.1. Final Exempted Fishing Permit Approval

The Council reviewed five Exempted Fishing Permit (EFP) applications submitted in response to a solicitation for proposals to test alternative gears and methods for the current California large mesh gillnet fishery targeting swordfish. The Council adopted the following to apply to all EFPs recommended to move forward.

- 100 percent observer coverage
- EFP fishing prohibited in waters north of the Washington/Oregon border (46° 15’ N. lat.) and in the first year EFP fishing is prohibited in waters north of the Oregon/California border
- NMFS to close fishing under any EFP for the remainder of the year if the amount of an Endangered Species Act (ESA) -listed species taken in that EFP fishery is the lower of either double the amount of incidental take estimated in an ESA biological opinion prepared for that activity or 10 animals
- EFPs testing buoy gear only will be permitted in Federal waters

The Council recommended the following applications to NMFS for EFP issuance for the 2015 fishing season:

1. Application submitted by Pete Dupuy, John Gibbs, David Haworth to test pelagic longline gear inside the west coast Exclusive Economic Zone (Agenda Item H.3.a, Attachment 1) with the following additional conditions:

1. A bycatch limit for marlins is to be developed by NMFS; the fishery would close for the remainder of the year if the bycatch limit is reached
2. Fishing is prohibited within 50 miles of the mainland shore and islands
3. Applicants must specify the level of expected fishing effort beyond the first six months of the term of the EFP
4. Only one vessel to be permitted versus three as proposed by the applicants
5. Application submitted by Pfleger Institute of Environmental Research (PIER) to test buoy gear (Agenda Item H.3.a, Attachment 2) without additional conditions

6. Application submitted by Tim and Laura Perguson to test several new gear types. The Council recommends that NMFS issue an EFP for only that portion of the proposal intended to test buoy gear.
7. Application submitted by Stephen R. Mintz to test buoy gear (Agenda Item H.3.a, Attachment 4) with the following additional condition: NMFS is to work with the applicant to identify specific procedures for data collection, analysis, and reporting including the appropriate agencies to which information will be provided

The Council requested revisions the Alliance of Communities for Sustainable Fisheries (ACSF) application (Agenda Item H.3.a, Attachment 5) to provide sufficient detail on the scientific design to allow SSC review. The resubmitted application will be considered at the June 2015 meeting for final action.

2.5.2. Drift Gillnet Management and Monitoring Plan Including Final Action on Hard Caps

The Council deferred final action on adopting hard caps for the drift gillnet fishery until the June 2015 meeting, in recognition of Secretarial review for implementing final action on hard caps could not be completed in time for the 2015 fishing season. The Council also expanded the scope of the management and monitoring plan to be the "Swordfish Management and Monitoring Plan (SMMP)." The Council also made revisions to the description of the proposed action and the purpose and need statement for the SMMP. The Council affirmed its commitment to continue progress on finfish performance standards and revisit potential measures at a future date.

The Council provided the following direction to the Highly Migratory Species Management Team (HMSMT) in moving forward with developing the SMMP:

- Analyze a second preliminary preferred alternative proposed by the California Department of Fish and Wildlife (CDFW). The CDFW alternative does not replace the preliminary preferred alternative that the Council adopted in September 2014. This additional alternative would establish hard caps based on observed entanglement in drift gillnet fishing gear of the high priority protected species identified in the Council Preliminary Preferred Alternative.
- Analyze an additional alternative for performance objectives for non-ESA listed marine mammals based on the highest level observed during any one year during a five-year period (2010-2014).
- Analyze historical fishery performance under the range of alternatives, including the CDFW PPA, for hard caps on high priority species or species of concern.
- With assistance from NMFS staff including provision of all existing observer data, the HMSMT was tasked with analyzing observer coverage levels necessary to estimate protected species bycatch with reasonable accuracy.

The Council requested the SSC to review the current bycatch estimation methodology used to produce bycatch estimates for the past five years. It was also requested to review the HMSMT analysis of observer coverage levels when completed.

The HMSMT and SSC are scheduled to report their results to the Council in June 2015.

3. Changes to HMS FMP Regulations

Modifications to HMS FMP regulations at **50 CFR 660 Subpart K** since implementation of the FMP are listed below.

2015

Regulations under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to revise the prohibited species policy for highly migratory species off the U.S. West Coast. This action is necessary to accurately reflect the intent of the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species. Citation: 80 FR 46519. Published: August 5, 2015. Effective: August 5, 2015.

Regulations to modify the existing Pacific bluefin tuna (PBF) *Thunnus orientalis* recreational daily bag limit in the Exclusive Economic Zone (EEZ) off California, and to establish filleting-at-sea requirements for any tuna species in the U.S. EEZ south of Point Conception, Santa Barbara County, under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Citation: 80 FR 44887. Published: July 28, 2015. Effective: July 30, 2015.

2014

Advance Notice Of Proposed Rulemaking (ANPR) announcing a control date of June 23, 2014, that may be used as a reference for allocation decisions when considering potential future management actions to limit the number of participants in the large-mesh drift gillnet (DGN) fishery that targets swordfish and thresher sharks. This ANPR is intended to promote public awareness of the Council's interest and the potential for a future rulemaking. Citation: 79 FR 64161. Published: October 28, 2014. Effective: N/A.

2013

Temporary regulations under the authority of Section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to: implement an immediate closure of the California thresher shark/swordfish drift gillnet (mesh size ≥14 inches) (DGN) fishery if one sperm whale is observed killed or seriously injured in DGN gear off California, and require all DGN fishing vessels to carry a NMFS-trained observer from August 15, 2013 to January 31, 2014 in a 100% observer coverage area (Zone). Citation: 78 FR 54547. Published: September 4, 2013. Effective: September 4, 2013. (Renewed/extended May 22, 2014, **Expired June 23, 2014**. Citation: 79 FR 29377.)

2012

Final rule under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to modify retention limits for swordfish harvested in the U.S. West Coast-based deep-set tuna longline (DSLL) fishery. Citation: 77 FR 15973. Published: March 19, 2012. Effective: April 18, 2012.

2011

Final rule under authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to implement Amendment 2 to the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP). Citation: 76 FR 56327. Published: September 13, 2011. Effective: October 13, 2011.

2009

Final rule to initiate collection of a permit fee for vessel owners participating in commercial and charter recreational fishing for highly migratory species (HMS) in the Exclusive Economic Zone (EEZ) off the

West Coast of California, Oregon, and Washington. Citation: 74 FR 37177. Published: July 28, 2009. Effective: August 29, 2009.

2007

Final rule to implement daily bag limits for sport-caught albacore tuna (*Thunnus alalunga*) and bluefin tuna (*Thunnus orientalis*) in the Exclusive Economic Zone (EEZ) off California under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP). Citation: 72 FR 58258. Published: October 15, 2007. Effective: November 14, 2007.

Final rule to amend vessel identification regulations of the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS). Citation: 72 FR 43563. Published: August 06, 2007. Effective: September 5, 2007

Final rule to amend text in the regulations governing closures of the drift gillnet fishery in the Pacific Loggerhead Conservation Area during El Nino events under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP). Citation: 72 FR 31756. Published: June 8, 2007. Effective: June 9, 2007.

Rule to revise the method for renewing and replacing permits issued under the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS). Citation: 72 FR 10935. Published: March 12, 2007. Effective: April 11, 2007.

2004

Final rule to implement the approved portions of the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (FMP), which was submitted by the Pacific Fishery Management Council (Pacific Council) for review and approval by the Secretary of Commerce and was partially approved on February 4, 2004, under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Citation: 69 FR 18444. Published: April 07, 2004. Effective: May 7, 2004

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. Number of valid HMS permits recorded in each year, 2005-2013, by state.

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	

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 (albacorer 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 (Rmax) times the minimum estimate of abundance (Nmin) 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 taken from the 2015 U.S. Marine Mammal Stock Assessment Report, shows estimates of these parameters for strategic stocks and other stocks of concern.

Table 5-2. Key population parameters for selected marine mammals occurring in the west coast EEZ.

Species	Stock Area	N est	CV N est	N min	Rmax	Fr	PBR
Guadalupe Fur Seal	Mexico to California	7,408	n/a	3,028	0.12	0.5	91
Killer whale	Eastern N Pacific Southern Resident	78	n/a	78	0.035	0.1	0.14
Mesoplodont beaked whales	California/Oregon/Washington	694	0.65	389	0.04	0.5	3.9
Cuvier's beaked whale	California/Oregon/Washington	6,590	0.55	4,481	0.04	0.5	45
Sperm whale	California/Oregon/Washington	2,106	0.58	1,332	0.04	0.1	2.7

Species	Stock Area	N est	CV N est	N min	Rmax	Fr	PBR
Gray whale	Western N Pacific	140	0.04	135	0.062	0.1	0.06
Humpback whale	California/Oregon/Washington	1,918	0.03	1,855	0.08	0.3	11
Blue whale	Eastern N Pacific	1,647	0.07	1,551	0.04	0.3	2.3
Fin whale	California/Oregon/Washington	3,051	0.18	2,598	0.04	0.3	16
Sei whale	Eastern N Pacific	126	0.53	83	0.04	0.1	0.17
Blue whale	Central N Pacific	81	1.14	38	0.04	0.1	0.1
Sea Otter	Southern	2,826	n/a	2,723	0.06	0.1	8

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.

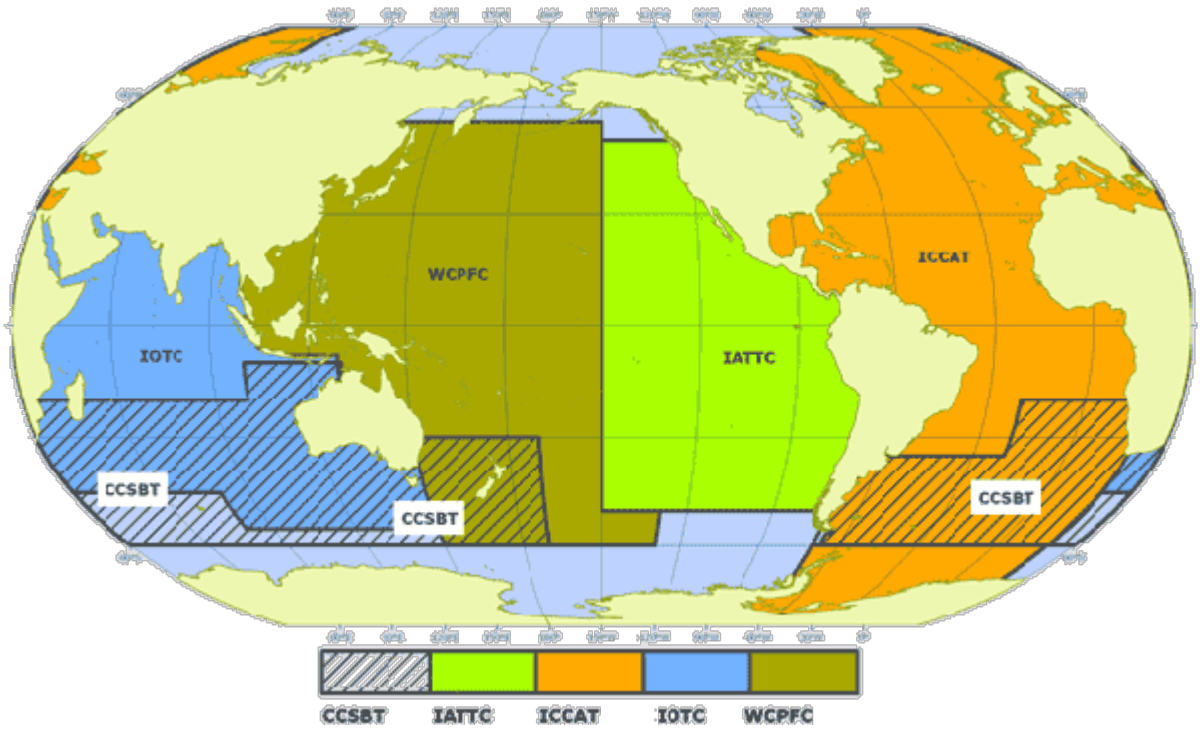

Figure 6-1. Global map of tuna RFMO jurisdictions. (Source: http://www.fao.org/fishery/topic/16917/en).

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. IATTC and WCPFC Outcomes in 2015

The 89th IATTC meeting, June 29-July 3, 2015, Guayaquil, Ecuador

Resolutions adopted

- C-15-01 *Amends and replaces* C-05-07 IUU Vessel list
- C-15-02 Interpretation paragraph 6 of resolution C-02-03
- C-15-03 *Amends and replaces* C-13-04 FADs
- C-15-04 Conservation of Mobulid Rays
- C-15-05 *Amends and replaces* C-12-04 Financing FY 2013-2017 and beyond
- C-15-06 Financing FY 2016
- C-15-07 *Amends and replaces* C-13-05 Procedures for confidential data

Twelfth Regular Session of the Western and Central Pacific Fisheries Commission, Kuta, Bali, Indonesia 3 December 3-8, 2015

Conservation Measures adopted (effective February 7, 2016):

- CMM 2015-01 Conservation and Management Measure for bigeye, yellowfin and skipjack tuna in the Western and Central Pacific Ocean
- CMM 2015-02 Conservation and Management Measure for South Pacific Albacore
- CMM 2015-03 Conservation and Management Measure for Mitigating Impacts of Fishing on Seabirds
- CMM 2015-04 Conservation and Management Measure to establish a multi-annual rebuilding plan for Pacific bluefin tuna
- CMM 2015-05 Conservation and Management Measure on charter notification scheme
- CMM 2015-06 Conservation and Management Measure on a Target Reference Point for WCPO Skipjack Tuna
- CMM 2015-07 Conservation and Management Measure for Compliance Monitoring Scheme
- suppl_CMM 2012-04 Guidelines for the safe release of encircled animals including whale sharks
- suppl_CMM 2014-05 Workplan for the adoption of Harvest Strategies under CMM 2014-05

7. Regulations for International HMS Fisheries and Related Activities in the Pacific Published in 2015

The following *Federal Register* Final Rule Notices modifying the Code of Federal Regulations, Title 50, Chapter III were published in 2015. For earlier years consult previous editions of the SAFE.

80 FR 64382. 10/23/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Treatment of U.S. Purse Seine Fishing With Respect to U.S. Territories. (Notice of decision on petition for rulemaking; advance notice of proposed rulemaking; request for comments.)

80 FR 62488. 10/16/2015. International Affairs; High Seas; Fishing Compliance Act; Permitting and Monitoring of U.S. High Seas Fishing Vessels. **Effective date: 01/14/2016**.

80 FR 60533. 10/7/2015. International Fisheries; Pacific Tuna Fisheries; Establishment of Tuna Vessel Monitoring System in the Eastern Pacific Ocean

80 FR 59037. 10/1/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Fishing Effort and Catch Limits and Other Restrictions and Requirements

80 FR 51478. 8/25/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Purse Seine Fishing Restrictions During Closure Periods

80 FR 51476. 8/25/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Fishing Effort Limits in Purse Seine Fisheries for 2015

80 FR 46515. 8/5/2015. International Fisheries; Pacific Tuna Fisheries; 2015 Bigeye Tuna Longline Fishery Closure in the Eastern Pacific Ocean

80 FR 43634. 7/23/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Bigeye Tuna Catch Limits in Longline Fisheries for 2015

80 FR 38986. 7/8/2015. International Fisheries; Pacific Tuna Fisheries; 2015 and 2016 Commercial Fishing Restrictions for Pacific Bluefin Tuna in the Eastern Pacific Ocean

80 FR 32313. 6/8/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Closure of Purse Seine Fishery in the ELAPS in 2015

80 FR 29220. 5/21/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Fishing Effort Limits in Purse Seine Fisheries for 2015

80 FR 8807. 2/19/2015. International Fisheries; Western and Central Pacific Fisheries for Highly Migratory Species; Fishing Restrictions Regarding the Oceanic Whitetip Shark, the Whale Shark, and the Silky Shark

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 2015, 572 surface hook-and-line vessels landed 11,255 mt of albacore in West Coast ports, generating $29.3 million in ex-vessel revenue. Albacore landings by weight in 2015 were 1,176 mt below landings in 2014, but ex-vessel revenue was down by $4 million. (See Table 5)

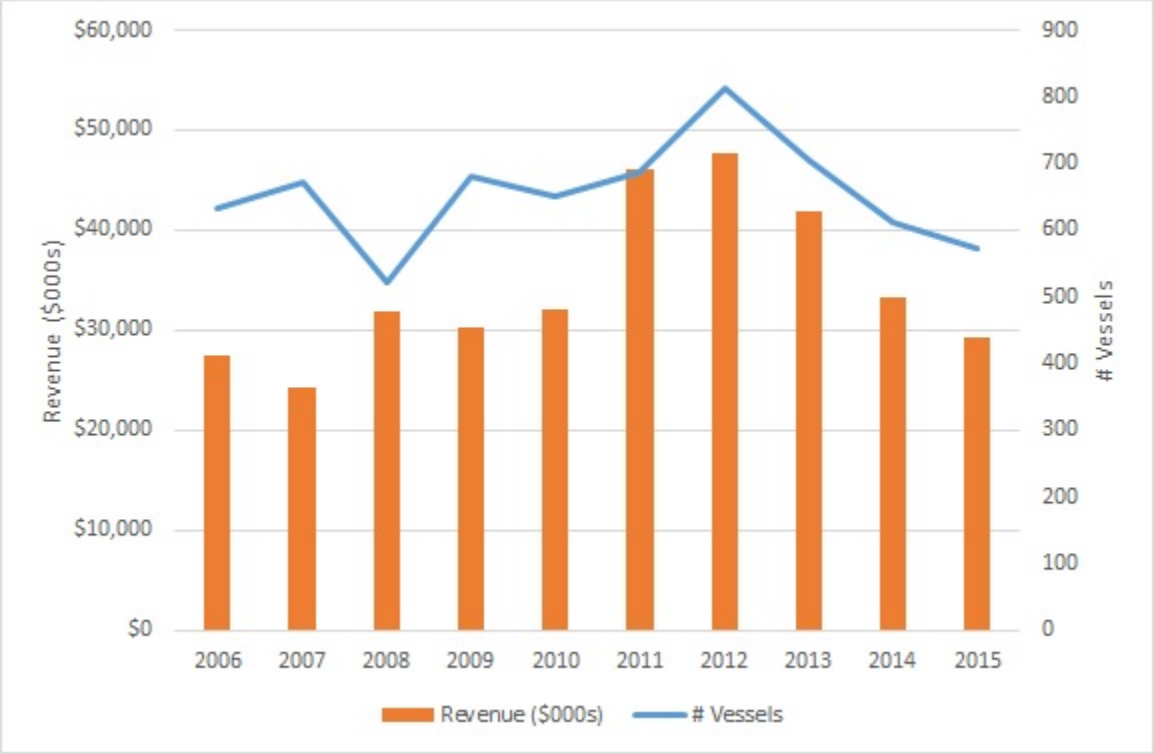

Figure 8-1.Number of vessels and real (inflation adjusted) ex-vessel revenue from North Pacific albacore ($1,000s) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 2005-2015, Canadian vessels included.

8.2. Drift Gillnet Fishery for Swordfish and Shark

California's swordfish fishery transformed from primarily a harpoon fishery to a drift gillnet fishery in the early 1980s; landings soared to a historical high of 2,198 mt by 1985. Initial development of the drift gillnet fishery in the late 1970s was founded on catches of common thresher shark. The thresher shark fishery rapidly expanded, with 228 vessels landing more than 1,000 mt of shark in 1985. Following 1985, swordfish replaced thresher shark as the primary target species because there was a greater demand for swordfish which commanded a higher price-per-pound and possibly also due to the 1986 establishment of a shark conservation measure. Annual thresher shark landings declined in subsequent years because of the switch to swordfish to maximize economic returns and the implementation of management measures to protect the thresher shark resource.

The drift gillnet fishery is managed by a limited entry permit system, with mandatory gear standards and seasonal area closures used to address various conservation concerns. The permit is linked to an individual fisherman, not a vessel, and is only transferable under very restrictive conditions; thus the value of the vessel does not become artificially inflated. To keep a permit active, current permittees are required to purchase a permit from one consecutive year to the next; however, they are not required to make landings using drift gillnet gear. In addition, a general resident or non-resident commercial fishing license and a current vessel registration are required to catch and land fish caught in drift gillnet gear. A logbook is also required. The HMS FMP requires a federal permit with a drift gillnet 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. About

150 permits were initially issued when the limited entry program was established in 1980 and peaked at 251 permits in 1986. In recent years the number of extant permits has declined below 50.

Historically, the California drift gillnet fleet operated within EEZ waters adjacent to the state and as far north as the Columbia River, Oregon, during El Niño years. In addition some Oregon-based vessels participated in this fishery. In Oregon, the DGN fishery for swordfish had been managed under the Developmental Fisheries Program, which authorized up to ten annual permits to fish for swordfish with DGN gear. For the past several years, the fishery was inactive and no one applied for permits. As part of a substantial reduction in the Developmental Fisheries Program, the Oregon Fish and Wildlife Commission removed swordfish from the program, beginning in 2009. Consequently, state permits to fish with DGN gear off Oregon are no longer allowed.

Fishing activity is highly dependent on seasonal oceanographic conditions that create temperature fronts which concentrate feed for swordfish. Because of the seasonal migratory pattern of swordfish and seasonal fishing restrictions, over 90% of the fishing effort in recent years has occurred from August 15 through January 31.

The drift gillnet fishery has been subject to a number of seasonal closures over the years. Since 1982, the drift gillnet fishery has been closed inside the entire West Coast EEZ from February 1 to April 30. In 1986, a closure was established within 75 miles of California mainland from June 1 through Aug 14 to conserve common thresher sharks; this closure was extended to include May in 1990 and later years. In 2001, NMFS implemented two Pacific sea turtle conservation areas on the West Coast with seasonal drift gillnet restrictions to protect endangered leatherback and loggerhead turtles. The larger of the two closures spans the EEZ north of Point Conception, California (34°27’ N. latitude) to mid-Oregon (45° N. latitude) and west to 129° W. longitude. Drift gillnet fishing is prohibited annually within this conservation area from August 15 to November 15 to protect leatherback sea turtles. A smaller closure was implemented to protect Pacific loggerhead turtles from drift gillnet gear during a forecasted or concurrent El Niño event, and is located south of Point Conception, California and west of 120° W. longitude from June 1 – August 31 (72 FR 31756). Since the leatherback closure was enacted the number of active participants in the drift gillnet fishery declined by nearly half, from 78 vessels in 2000 to 40 in 2004, and has remained under 50 vessels since then.

As indicated above, both participation and fishing effort (measured by the number of sets) have declined over the years. Industry representatives attribute the decline in vessel participation and annual effort to regulations implemented to protect marine mammals, endangered sea turtles, and seabirds. In addition, if oceanic or other conditions are unfavorable for swordfish, permittees may concentrate on more favorable fisheries, such as albacore; however, permittees may return to swordfish fishing once conditions improve.

In 2015 18 drift gillnet vessels landed 66 mt of swordfish and 18 mt of common thresher shark. (See Table 12.) Overall, the fishery generated $454,000 in ex-vessel revenue in 2015.

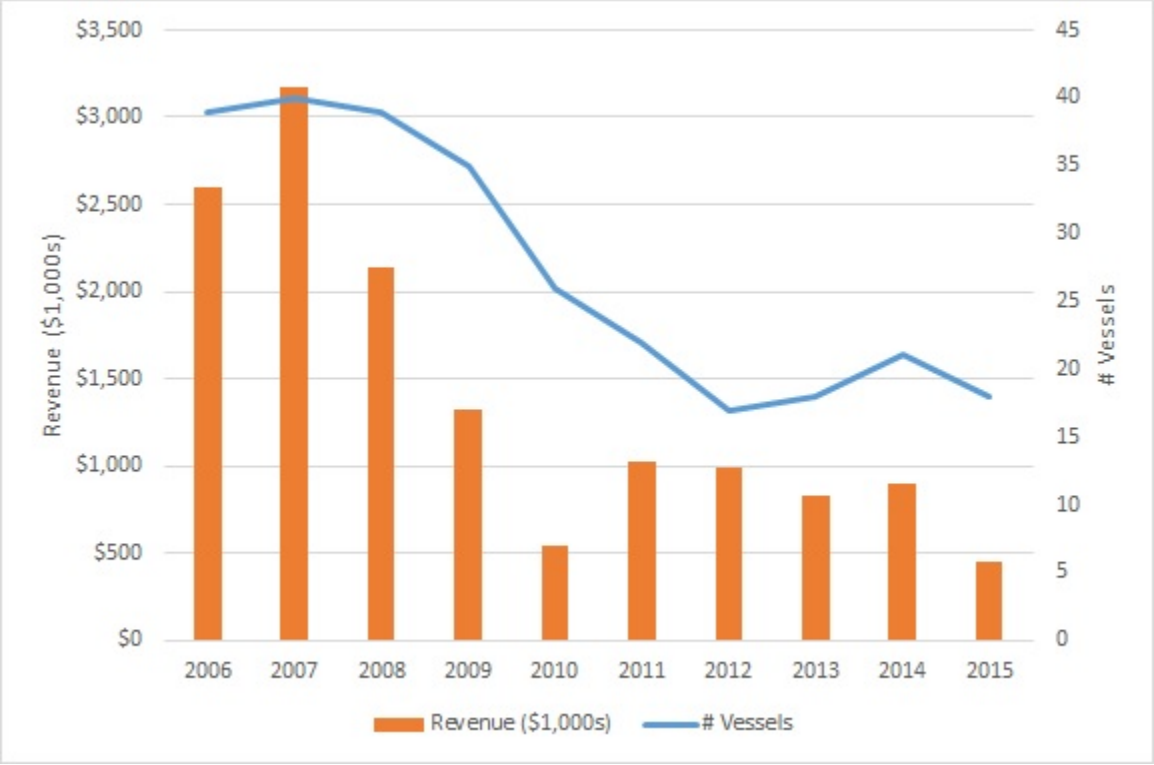

Figure 8-2. Number of vessels and commercial landings (round mt) in the West Coast drift gillnet fishery, 1990-2015.

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 2015 twelve harpoon vessels landed 5 mt of swordfish, generating $73,000 in ex-vessel revenue. (See Table 16.)

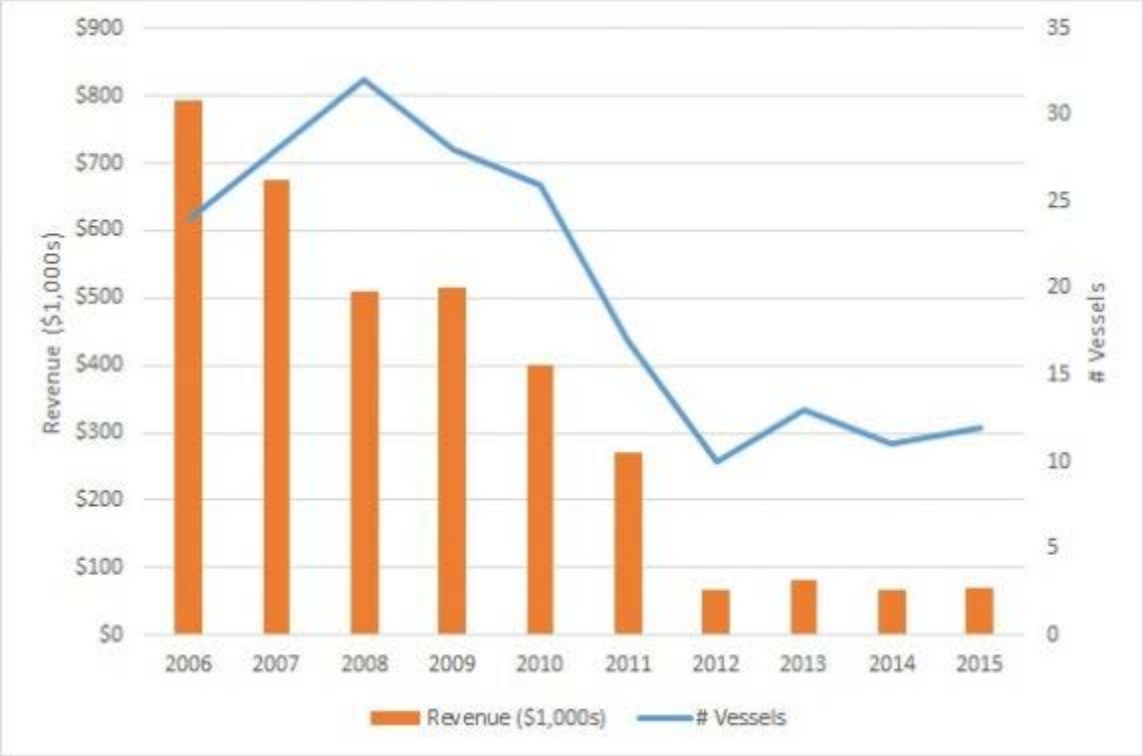

Figure 8-3. Number of vessels and commercial landings (round mt) in the West Coast harpoon fishery, 1990-2015.

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 2015, sixteen Hawaii-permitted vessels landed 840 mt of HMS in West Coast ports generating $5.2 million in ex-vessel revenue. (See Table 20.)

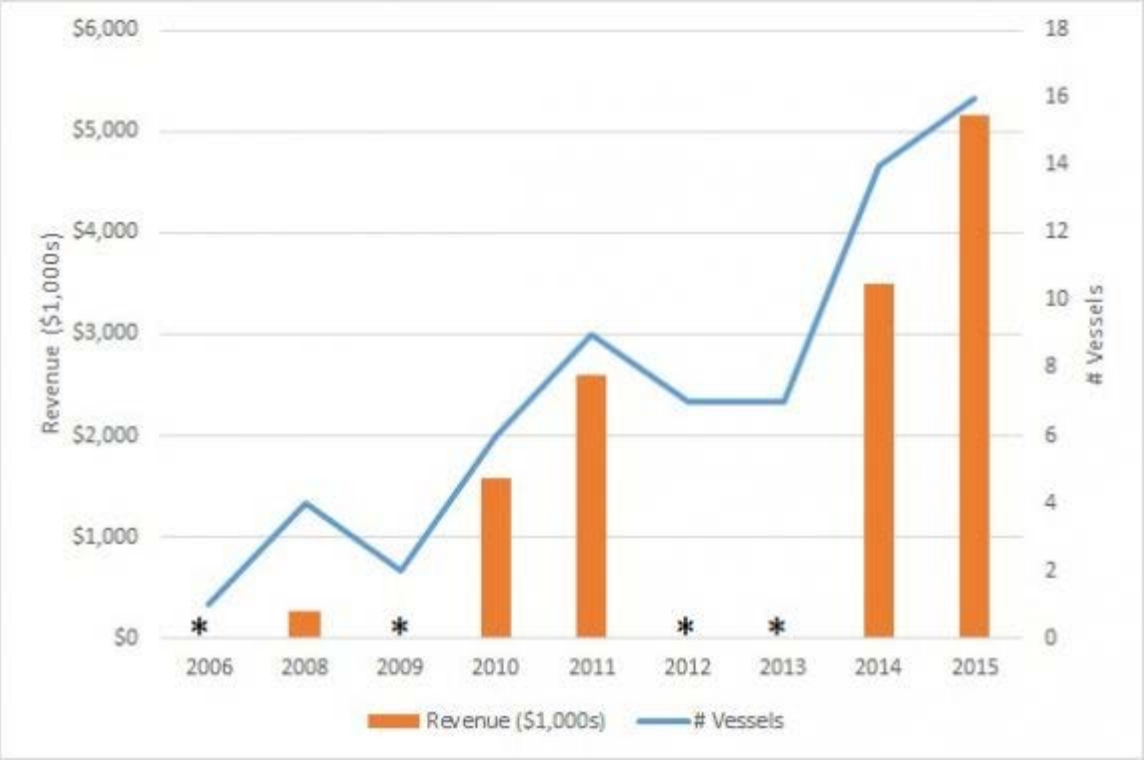

Figure 8-4. Number of vessels and commercial landings (round mt) by Hawaii permitted longline vessels in West Coast ports, 1990-2015 (confidential landings data excluded).

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 2015 eleven purse seine vessels landed 758 mt of HMS generating $625,000 in ex-vessel revenue. (See Table 22.)

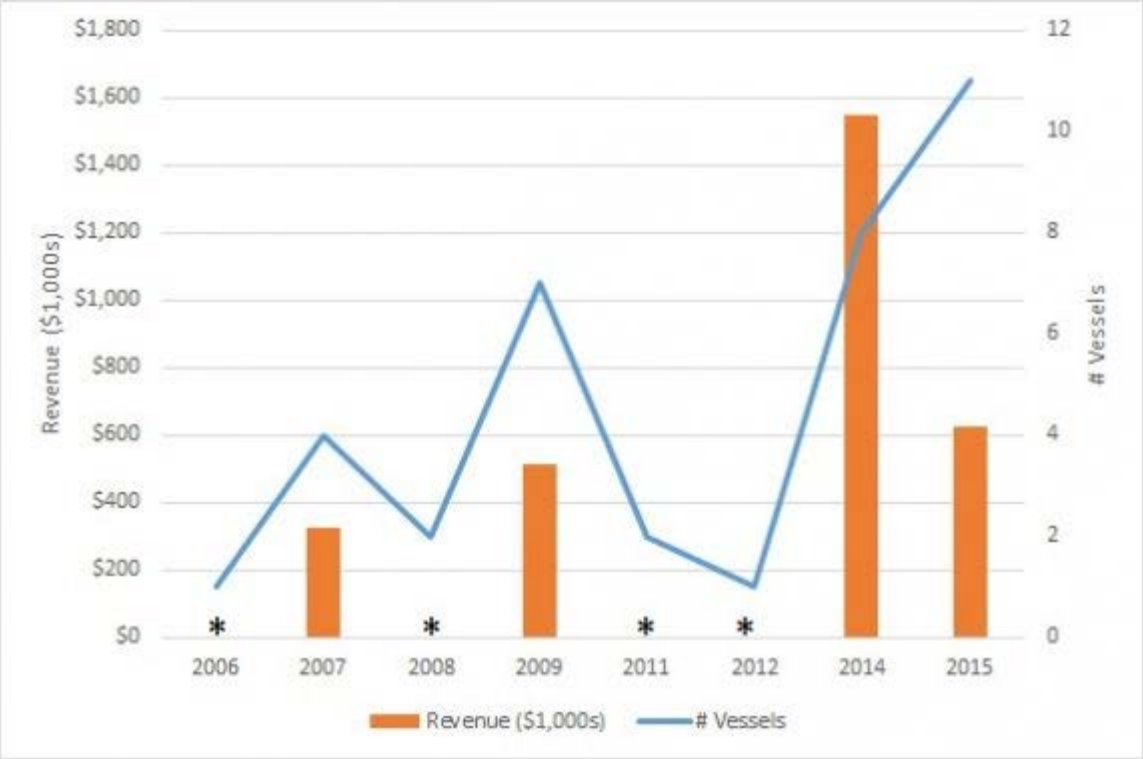

Figure 8-5. Number of vessels and commercial landings (round mt) for HMS tunas in the West Coast purse seine fishery, 1990-2015 (confidential data excluded).

9. Recreational Fisheries Descriptions

Time series of 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 2015

10.1. Commercial Fisheries

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

- In 2015, 12,746 round metrics tons of HMS, valued at $34.3 million, were caught in the PFMC management area (the U.S. West Coast EEZ) and landed in west coast ports. This represents 6% of total shoreside landings and 10% of total ex-vessel revenue.
- Over the 1981-2015 period, as a fraction of total landings, HMS have averaged 5% with a minimum proportion of 2% and a maximum of 22%. The equivalent figures for real ex-vessel revenue are 12%, 7%, and 31% respectively.

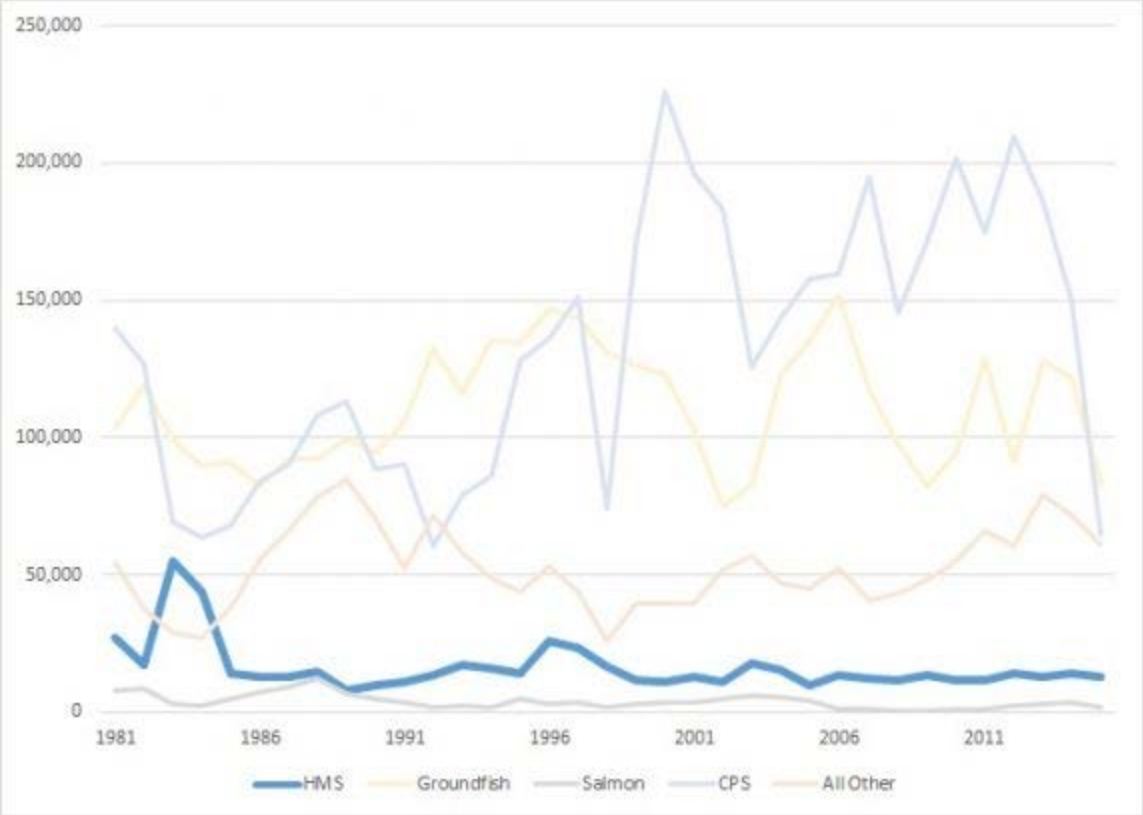

Figure 10-1. Landings (shoreside commercial and tribal) by species management group (mt), 1981-2015. ('All Other' includes crab, shellfish, shrimp, and other state managed species.)

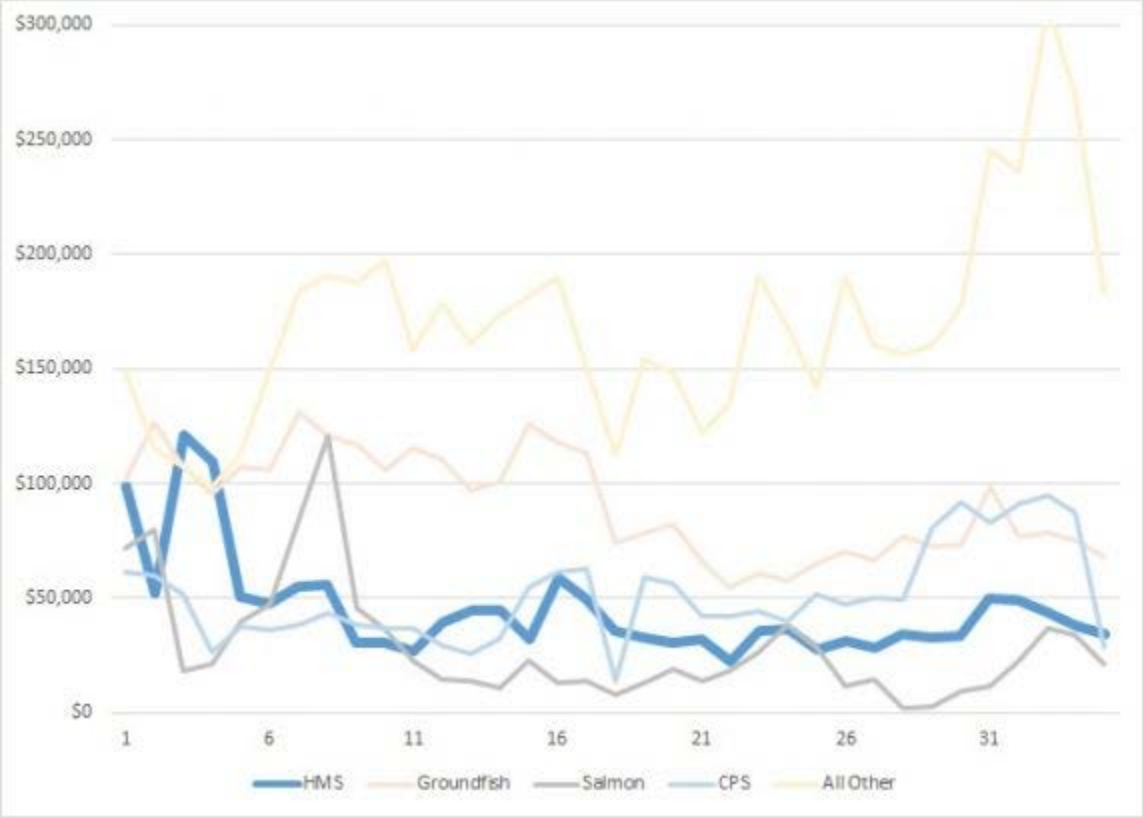

Figure 10-2. Real (inflation adjusted, 1,000s of 2015 dollars) ex-vessel revenue by management group in West Coast ports from the PFMC management area, 1981-2015.

10.1.2. Landings by Species (see Table 1)

- 11,305 mt of albacore tuna was landed in 2015 worth $29.5 million. This was a decline of 1,161 mt, or $3.6 million from 2013. The decline in revenue also reflects slightly lower prices in 2015 compared to 2014. Albacore accounted for 86% of HMS landings by weight and 80% by value.
- 1,197 mt of other HMS FMP tunas (bluefin, bigeye, yellowfin, skipjack) were landed in 2015 worth $3.7 million. Bigeye tuna was the biggest component of these landings and accounted for the largest share of revenue ($2.9 million).
- 564 mt of swordfish was landed in 2015 worth $3.3 million, a slight decrease from 2014.
- 43 mt of common thresher shark and 17 mt of shortfin mako shark were landed in 2015 worth a combined $113,000. This reflects a 4 mt decline in landings or $5,000 less in revenue for these species compared to 2014.
- Dorado landings increased from 17 mt in 2014 to 20 mt in 2015.

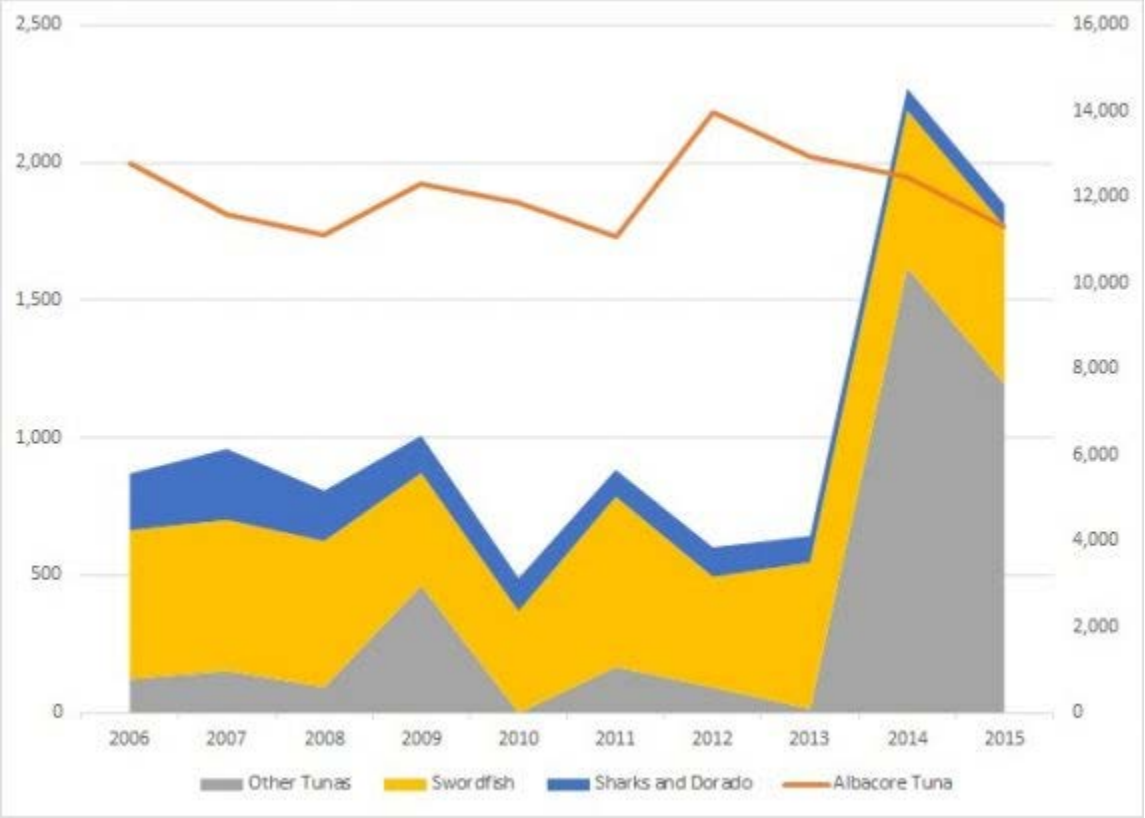

Figure 10-3. Landings of HMS (metrics tons) by species and groups, 2005-2015. (Source: HMS SAFE Table 3.)

10.1.3. Landings by Fishery (see Table 2)

- 572 troll or baitboat (surface hook-and-line) vessels reported 11,255 mt of albacore landed in 2015, or 99.6% of all albacore landed (Table 5). Out of these landings 10 Canadian vessels accounted for 224 mt (Table 9).
- In 2015, 70% of troll or baitboat landings occurred in Washington State, followed by 30% in Oregon. Less than 1% of these landings occurred in California. Compared to 2014, California's share declined by about 1% and Oregon's by 2%, while Washington's share increased by 3% (Table 10).
- 18 California drift gillnet vessels reported landings in 2015. These vessels landed 66 mt of swordfish in 2014 worth $400,000. 18 mt of common thresher shark and 6 mt of shortfin mako shark were landed in 2015. (Table 12 and Table 13).
- 12 harpoon vessels landed 5 mt of swordfish in 2015. The landed value was $71,000. (Table 16 and Table 17).

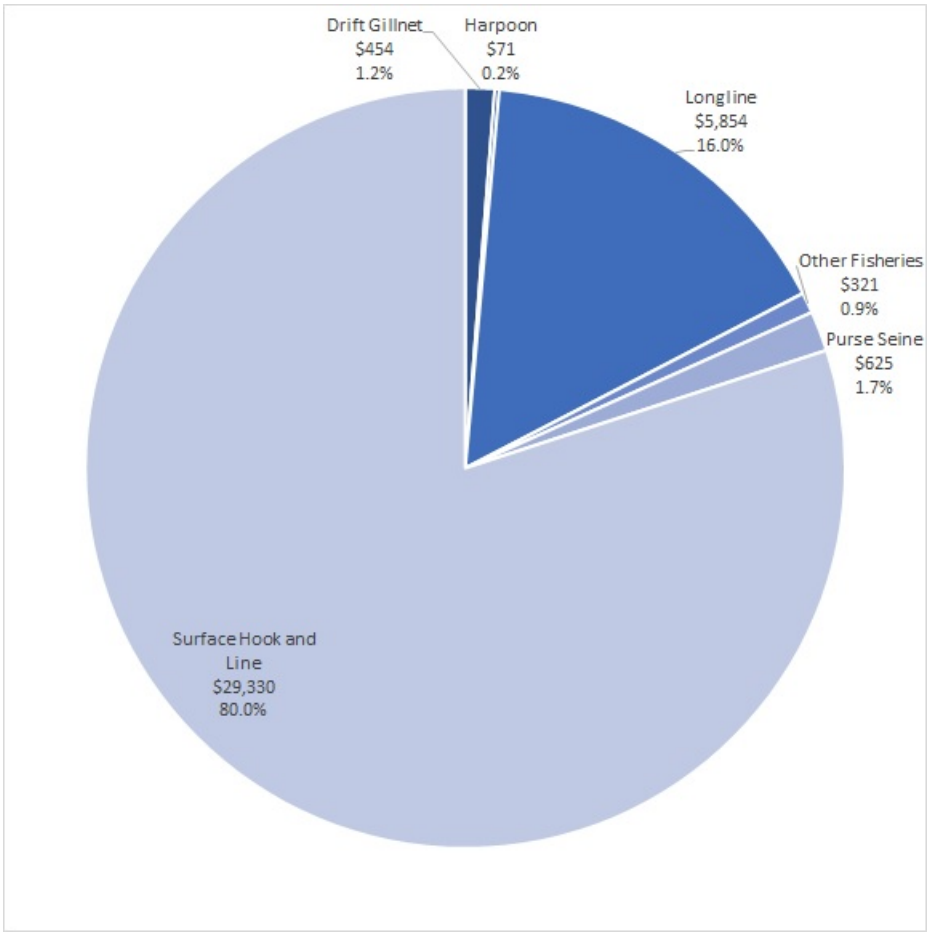

Figure 10-4. Distribution of HMS landings by fishery, 2015. Confidential data not included.

10.2. Recreational Fishery Performance in 2015

10.2.1. Albacore catch in Washington and Oregon

- In Washington combined private and charter catch of albacore rose from 67,862 fish in 2014 to 79,355 fish in 2015. Catch per angler increased from 6.5 fish in 2014 to 6.7 fish in 2015.
- In Oregon combined private and charter catch of albacore declined from 48,134 fish in 2014 to 34,156 fish in 2015. Catch per angler declined from 4 fish in 2014 to 2.9 fish in 2015

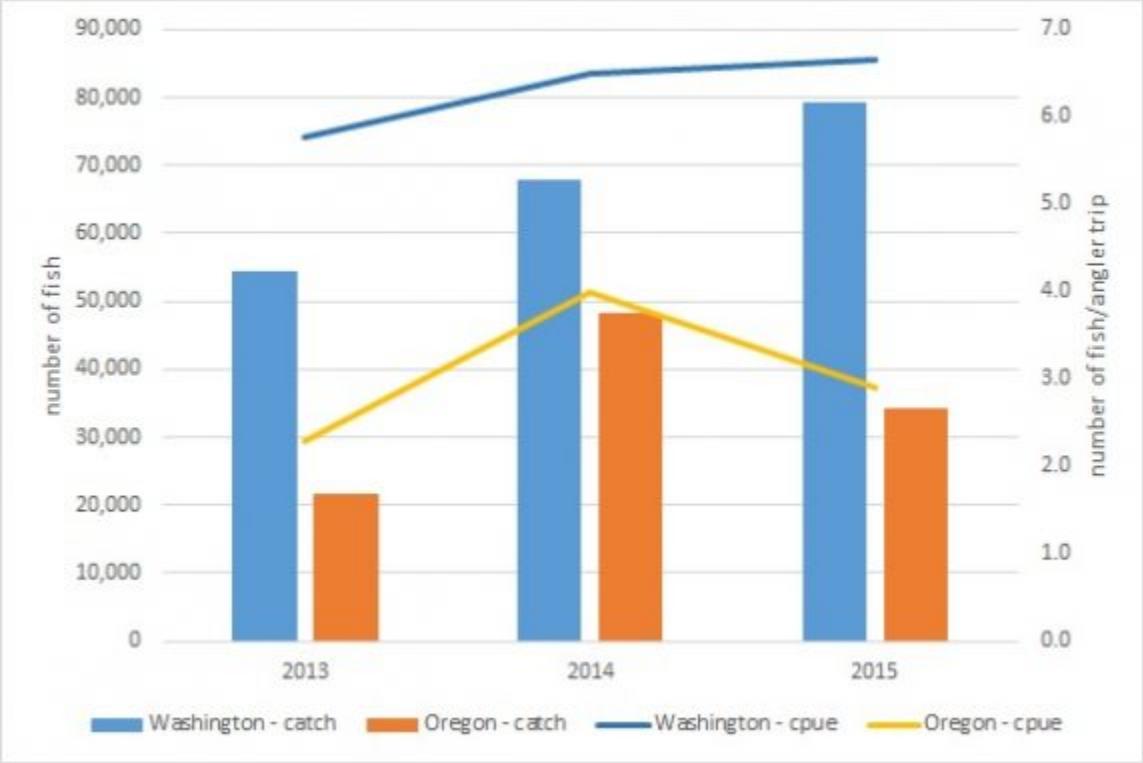

Figure 10-5. Combined private and charter albacore catch (number of fish) and CPUE (number of fish per angler) in Washington and Oregon, 2013-2015.

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 10-1. Catch of Albacore by Canadian and U.S. Albacore Troll and Pole-and-Line Vessels in the North Pacific Ocean [1].

	Canadian Fleet [2, 3]					U.S. Fleet [5, 9]				
Year	*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 [8]	66.5	33.4	0.1	4,324	99	96.1	3.7	0.2	11,571	83

Data Sources and Notes:

1. Locations are based on logbook records, which are self-reported by vessels.
2. Canadian data during 1995-2011 are taken from Canadian Tuna Database version 13.02.11.
3. Percentage 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).
4. Canadian logbook coverage rates are calculated by dividing the number of logbook reporting vessels with the total number of vessels.
5. USA catch in various zones are based on the percentage of catch recorded by logbooks in each zone.

6. USA 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.
7. USA 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).
8. Preliminary data subject to change. Canadian data from Canadian tuna database version 16.04.27
9. Proportion of US catch in high seas zone was estimated from logbook data, and includes catches in U.S. EEZ off Alaska due to shapefile used. Catches in waters off Alaska were limited and do not affect the estimates substantially.

Table 10-2. 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

	Canadian Fleet [1]										
	Landings (metric tons) [2]					Number of Landings			Number of Landing Vessels		
Year	*Canadian Ports*	*U.S. Ports (DFO estimates)* [3]	*U.S. Ports (NOAA estimates)* [4]	*Other Ports* [5,8]	*Total* [10]	*Canadian Ports*	*U.S. Ports (DFO estimates)* [3]	*U.S. Ports (NOAA estimates)* [4]	*Canadian Ports*	*U.S. Ports (DFO estimates)*	*U.S. Ports (NOAA estimates)* [9]
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 [12]	3,812	244	224	241	4,298	357	16	18	154	11	10

	US fleet[13]										
	Landings (metric tons)					Number of Landings			Number of Vessels that landed fish [7]		
Year	*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 [12]	756	522	11049		11,805	30	19	2,386	19	12	562

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 , 3/15/2016, 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 16.04.27
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 10-3. 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].

	Canadian Fleet [1]						
Year	*Number of vessels/months allowed to fish in US EEZ*	*Number of vessels that fished in US EEZ* [3]	*Number of vessels that fished in Canadian EEZ* [5]	*Vessel Months Used* [4]	*Fishing Effort in US EEZ (boat fishing days)* [2]	*Fishing Effort in Canadian EEZ (boat fishing days)* [2]	*Fishing Effort on high seas (boat fishing days)* [2]
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 [9]	45 vessels	42	161	N/A	1,380	3,797	17

	U.S. Fleet[11]					
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* [8,11]	*Fishing Effort in US EEZ (boat fishing days)* [7]	*Fishing Effort in Canadian EEZ (boat fishing days)* [10]	*Fishing Effort on high seas (boat fishing days)* [7]
1995	Unlimited	472	71	4,222	2,727	19,064
1996	Unlimited	658	6	8,950	39	23,705
1997	Unlimited	1160	46	13,840	1,687	29,950
1998	Unlimited	838	3	5,490	47	15,716
1999	Unlimited	772	19	22,033	469	12,952
2000	Unlimited	707	12	24,910	181	11,020
2001	Unlimited	929	15	16,879	127	8,252
2002	Unlimited	696	31	18,730	452	6,383
2003	Unlimited	782	9	18,848	131	2,670
2004	170 vessels or 680 vessel fishing months	727	21	21,287	417	2,258
2005	140 vessels or 560 vessel fishing months	552	31	19,603	631	1,738
2006	125 vessels or 500 vessel fishing months	615	32	19,021	189	1,959
2007	94 vessels or 376 vessel fishing months	651	14	21,717	297	340
2008	94 vessels or 376 vessel fishing months	477	39	21,462	884	2,648
2009	Historical level	655	27	23,568	531	1,330
2010	Historical level	609	51	21,403	683	3,793
2011	Historical level	640	30	25,325	236	1,935
2012	0	816	0	33,970	0	893
2013	Historical level	703	21	21,608	187	737
2014	Historical level	625	36	27,216	549	351
2015 [9]	Historical level	587	39	26,437	481	385

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. Estimates of US effort in US EEZ in number of vessels and boat fishing days are expanded. Annual effort is calculated as annual catch divided by annual CPUE muliplied by average weight (Childers and Pease, 2012)
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 16.04.27
10. Estimates of US effort in Canadian EEZ in number of vessels and boat fishing days are not expanded.
11. Proportion of US effort in high seas zone was estimated from logbook data, and includes effort in U.S. EEZ off Alaska due to shapefile used. Effort in waters off Alaska were limited and do not affect the estimates substantially.

12. Pacific-Wide HMS Catch

12.1. Global Tuna Catch

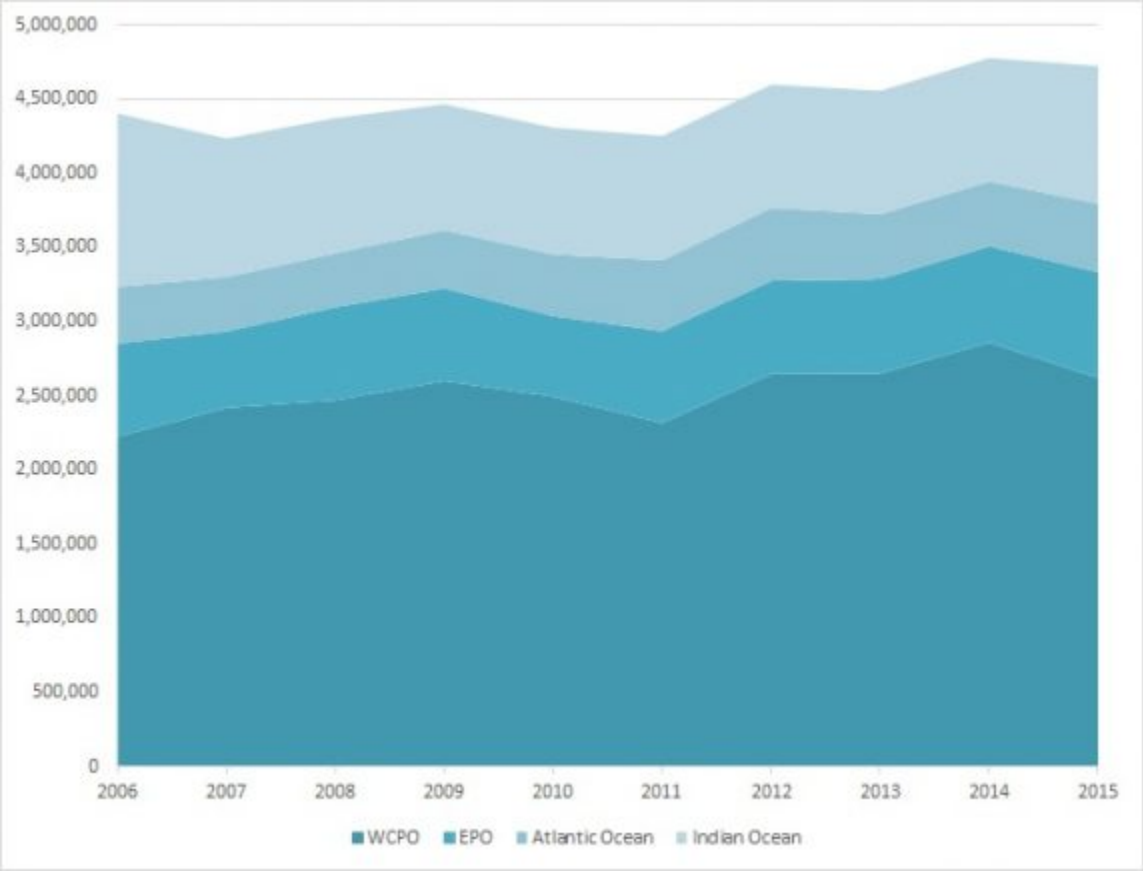

Figure 12-1. Annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna by ocean area.

Catch of the principal tuna species (albacore, bigeye, skipjack and yellowfin) was 4.7 million metric tons in 2015. 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 14%.

Source: Oceanic Fisheries Programme Secretariat of the Pacific Community. 2015. Western and Central Pacific Fisheries Commission Tuna Fishery Yearbook 2015. Western and Central Pacific Fisheries Commission. Pohnpei, Federated States of Micronesia. November 9, 2016. Table 92. Global catches of albacore, bigeye, skipjack and yellowfin, by ocean area (mt).

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

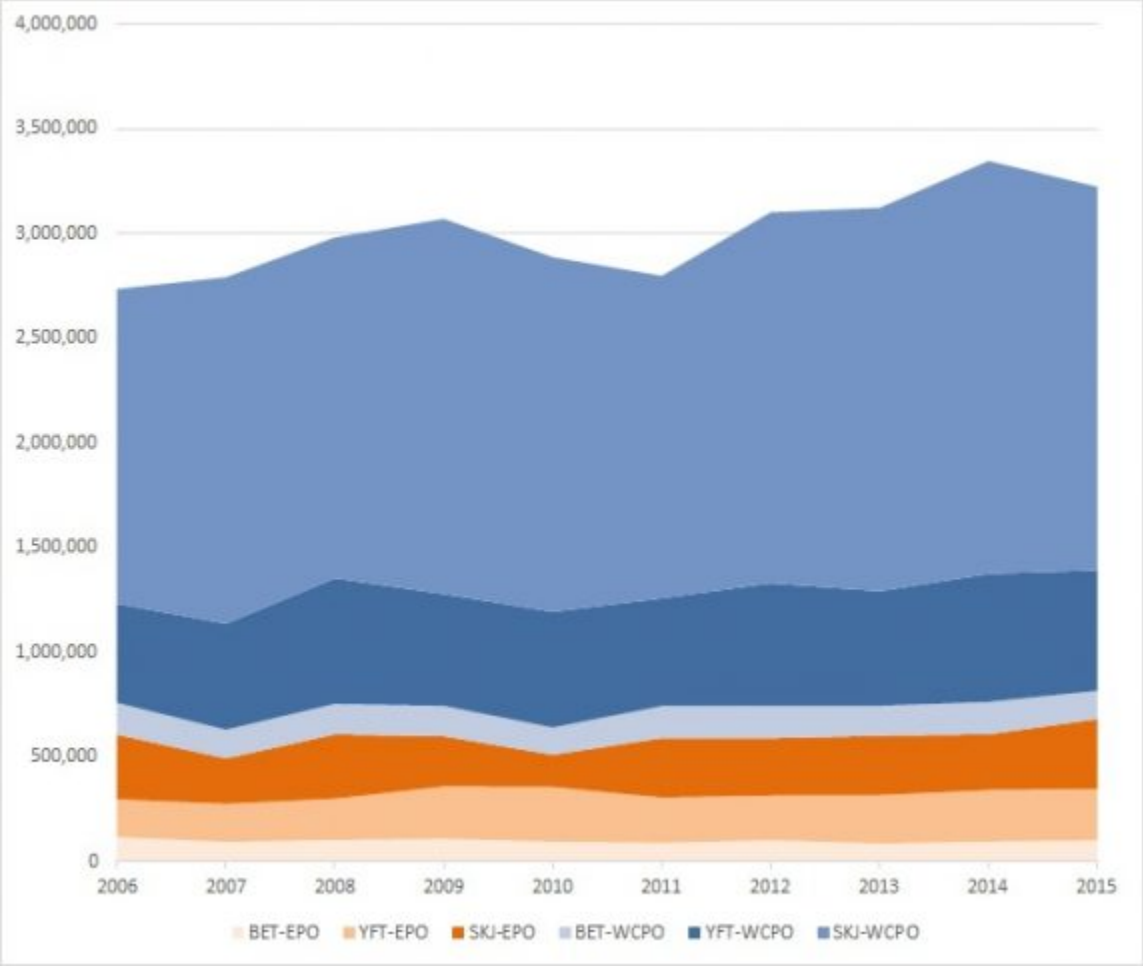

Figure 12-2. Annual catch of bigeye, skipjack, and yellowfin tuna in the EPO and WCPO, 2006-2015.

During this 10-year period the WCPO accounted for 80% of Pacific catch of bigeye, skipjack, and yellowfin tuna. Annual average landings of these three species for the entire Pacific was 2.96 million metric tons. Catch in 2015 was the second highest on record at 3.22 million metric tons. Skipjack catch in the WCPO was the largest share of Pacific-wide catch at 57%. Landings in 2015 were higher than the 10-year average for all species/regions except for WCPO bigeye tuna, where 2015 landings were 93% of the 10-year average.

Source: Inter-American Tropical Tuna Commission. 2016. Tunas, Billfishes and Other Pelagic Species in the Eastern Pacific Ocean in 2015. Document IATTC-90-04a. Table A-1. Annual catches of yellowfin, skipjack, and bigeye tunas, by all types of gear combined, in the Pacific Ocean. Supplemented by Western and Central Pacific Fisheries Commission Tuna Fishery Yearbook for 2015.

12.3. Catch of Target Tunas in Eastern Pacific

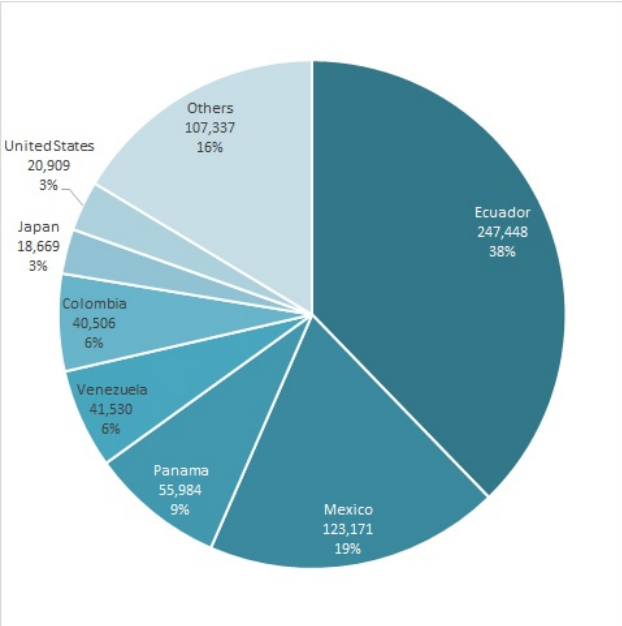

Figure 12-3. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the EPO by flag state, 2011-2015. Other flag states include Nicaragua, China, Chinese Taipei, Spain, Korea, Vanuatu, Canada, French Polynesia, Costa Rica, Peru, Belize, and

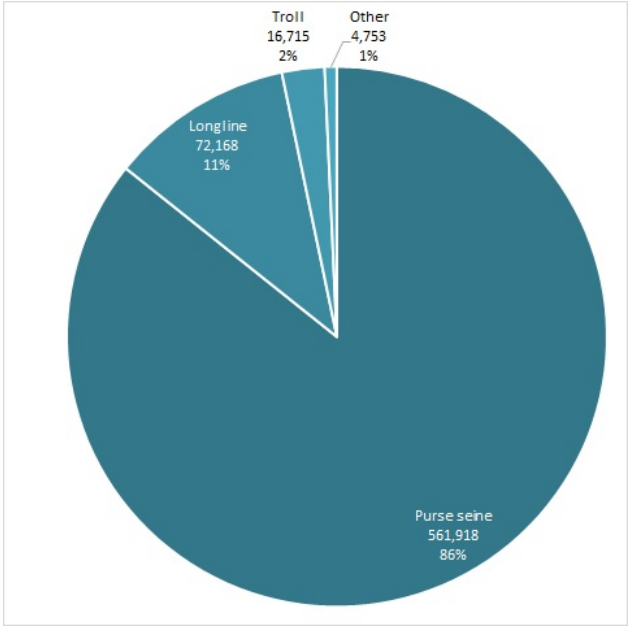

Figure 12-4. Average annual catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the EPO by gear type, 2011-2015.

Source: IATTC Public Domain Data (Catch by gear and flag)

12.4. Catch of Target Tunas in the Western Pacific

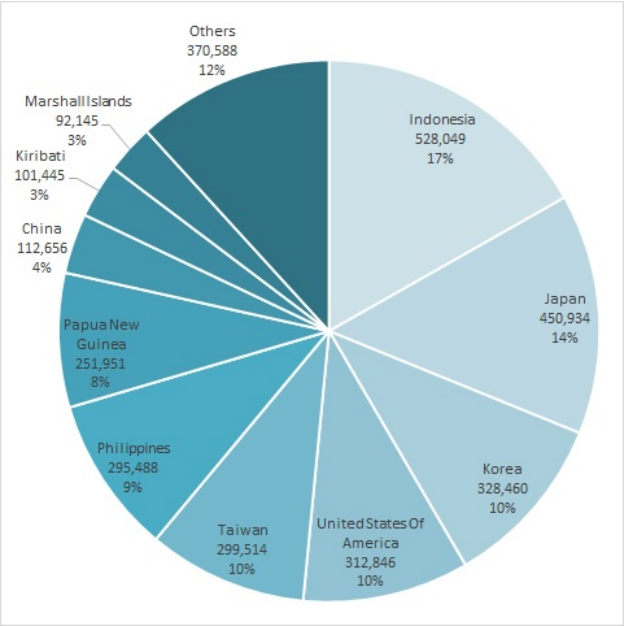

Figure 12-5. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by flag state, 2011-2015. Other flag states include Vietnam, Solomon Islands, Spain, Federated States Of Micronesia, Vanuatu, New Zealand, Ecuador, Fiji, El Salvador, Tuvalu, French Polynesia, Cook Islands, Australia, New Caledonia, Samoa, Eastern Pacific US Purse Seine Fleet, Tonga, Belize, Tokelau, Niue, Canada, and Senegal.

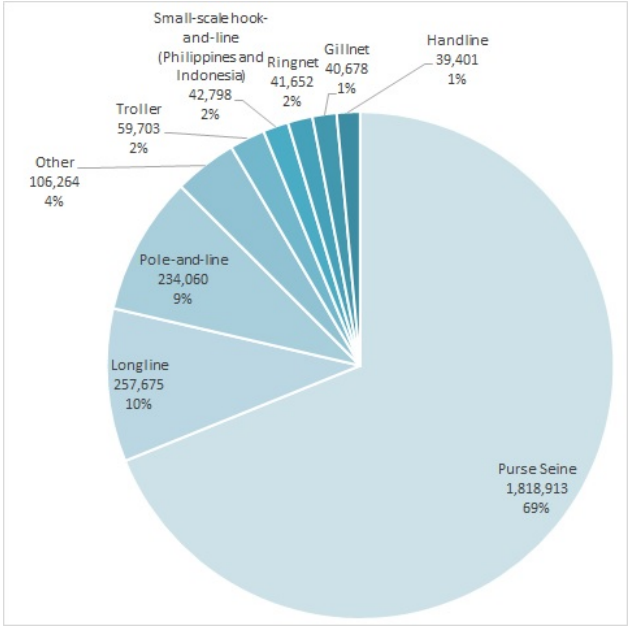

Figure 12-6. Annual average catch (mt) of albacore, bigeye, skipjack, and yellowfin tuna in the WCPO by gear type, 2011-2015.

Source: [WCPFC Tuna Fishery Yearbook 2014 – Excel files]

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

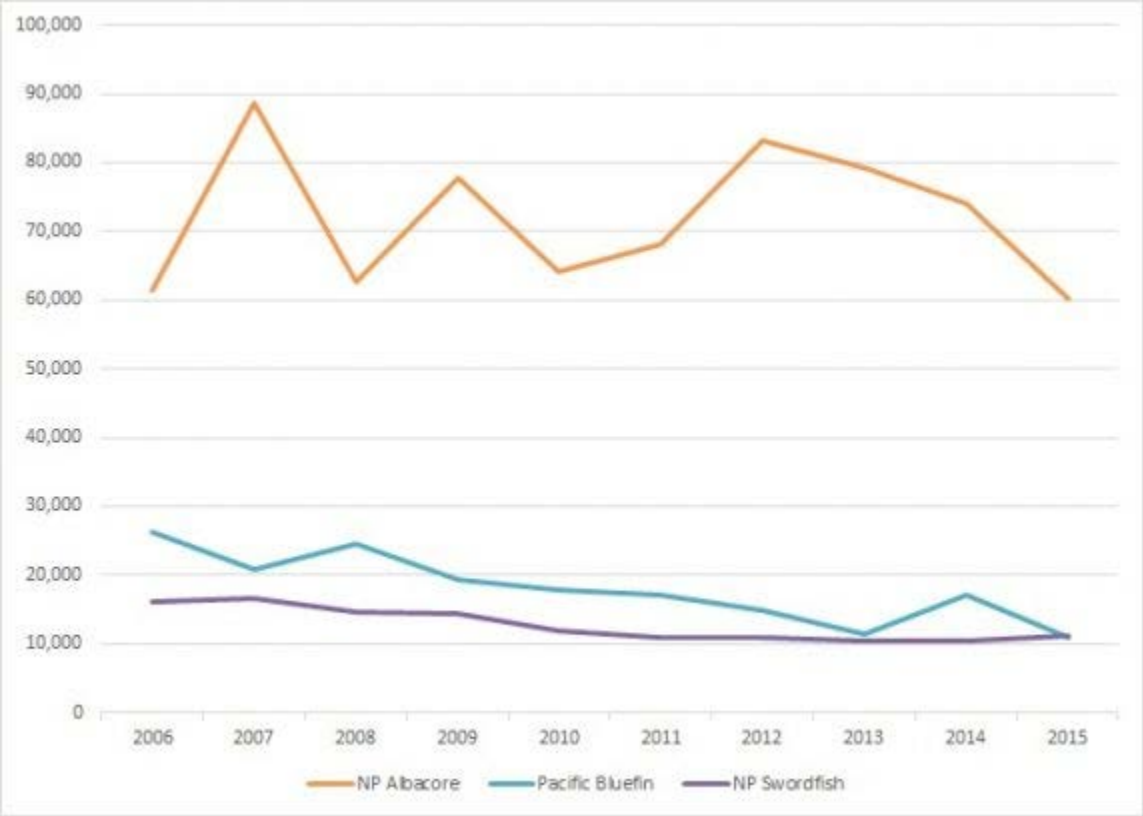

Figure 12-7. Reported catch of North Pacific albacore, Pacific bluefin tuna, and North Pacific swordfish, 2006-2015.

Reported catch of all three species in 2015 was below the annual average for this 10-year period. Reported North Pacific albacore catch in 2015 was 71,905 mt or 84% of the average, Pacific bluefin tuna catch was 18,024 mt or 61% of the average, and North Pacific swordfish was 12,707 metric tons or 87%.

Source: ISC fisheries statistics

12.5.1. North Pacific Albacore

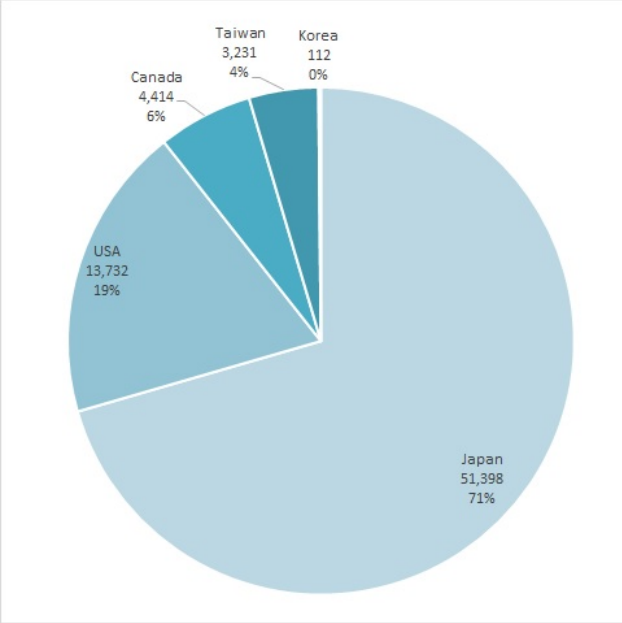

Figure 12-8. Average annual reported catch (mt) of North Pacific albacore by ISC members, 2011-2015.

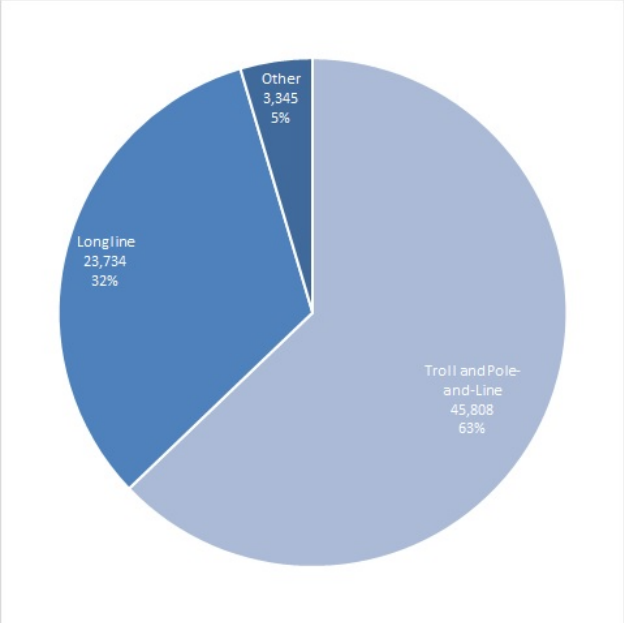

Figure 12-9. Average annual catch (mt) of North Pacific albacore by gear type, 2011-2015. Other gear types include setnet, drift gillnet, purse seine, handline, and recreational.

Source: ISC fisheries statistics

12.5.2. Pacific Bluefin Tuna

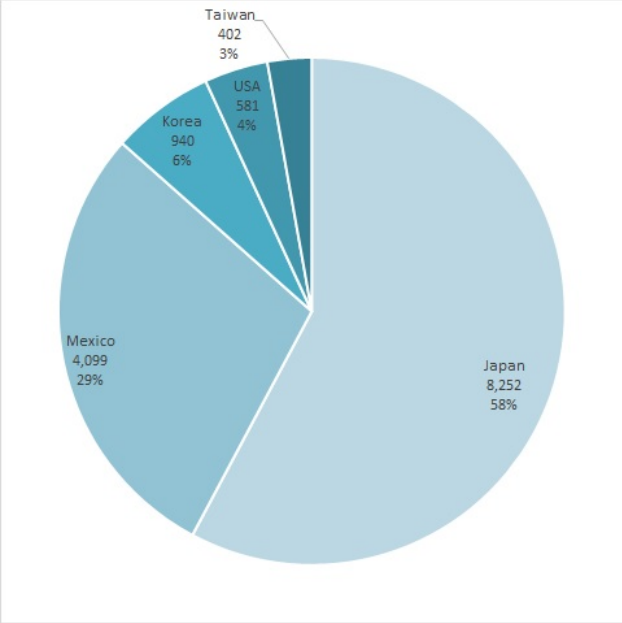

Figure 12-10. Average annual reported catch (mt) of Pacific bluefin tuna by ISC members, 2011-2015.

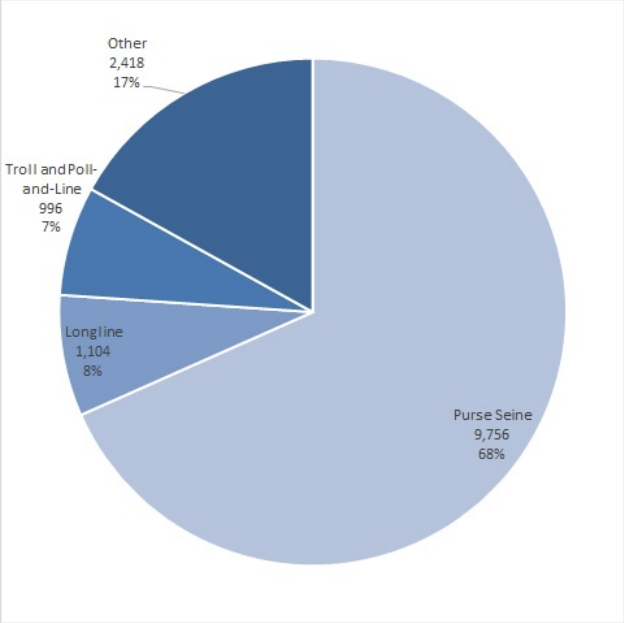

Figure 12-11. Average annual catch (mt) of Pacific bluefin tuna by gear type, 2011-2015. Other gear types include setnet, drift gillnet, other gillnet, and recreational.

Source: ISC fisheries statistics

12.5.3. North Pacific Swordfish

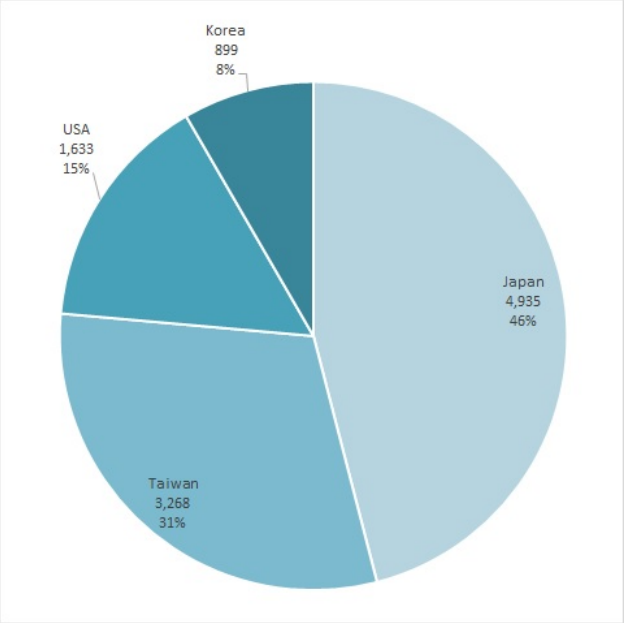

Figure 12-12. Average annual reported catch (mt) of North Pacific swordfish tuna by ISC members, 2011-2015.

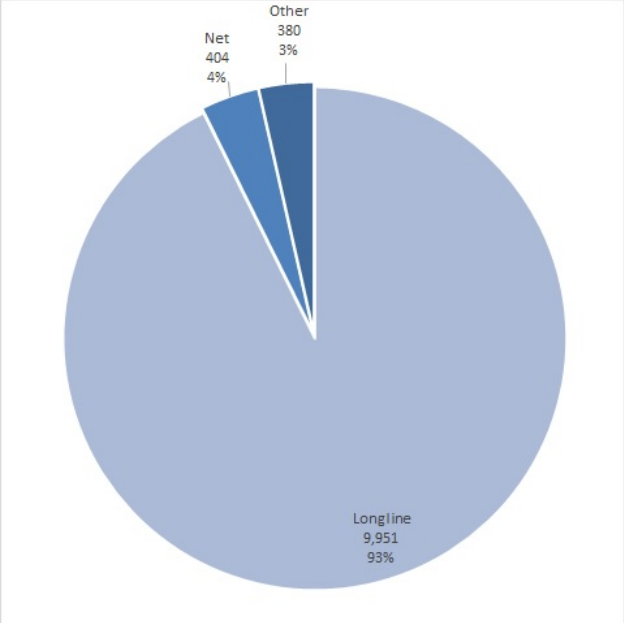

Figure 12-13. Average annual catch (mt) of swordfish by gear type, 2011-2015. Net gear types include setnet, drift gillnet, and other gillnet. Other gear types include harpoon, handline, and others/not specified.

Source: ISC fisheries statistics

13. Status of HMS Stocks

13.1. Determining Stock Status

Stock status is most reliably determined from stock assessments that integrate fishery and life history information across the range of the stock. In the case of HMS in the Pacific, most stock assessments are conducted by several international organizations.

- 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). Their report Fishery Status Reports summarizes fisheries and stock status.
- 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 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. The shark working group was formed in 2010 and has just begun to work on stock assessments. Shark species of interest include blue, shortfin, mako, bigeye thresher, pelagic thresher, silky, oceanic whitetip, and hammerhead species. ISC annual Plenary Reports provide stock status updates and conservation recommendations.

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.

13.1.1. Control Rules for Management

The Control Rules and Status Determination Criteria implemented in the HMS FMP are based on the Technical Guidance for National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (Restrepo, et al. 1998). The following is a summary of the Control Rules for Management adopted for the HMS FMP.

In general, a default maximum sustainable yield (MSY) control rule was adopted for most MUS, with an optimum yield (OY) target control rule for the vulnerable species (see figure below).

Optimum yield (OY) is defined as MSY reduced by relevant socioeconomic factors, ecological considerations, and fishery-biological constraints so as to provide the greatest average long-term benefits to the Nation.

For the less vulnerable species managed under the MSY Control Rule, the minimum stock size threshold (MSST), the minimum biomass at which recovery measures are to begin, is the ratio B_{MSST}/B_{MSY}. It specifies a lower biomass level that allows remedial action not to be triggered each time B drops below

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

(i.e., whichever is greater). B_{MSST} must not be less than $B_{MIN} = 0.5B_{MSY}$ and should allow recovery back to B_{MSY} within 10 years when F (fishing mortality) is reduced to zero (to the extent possible).

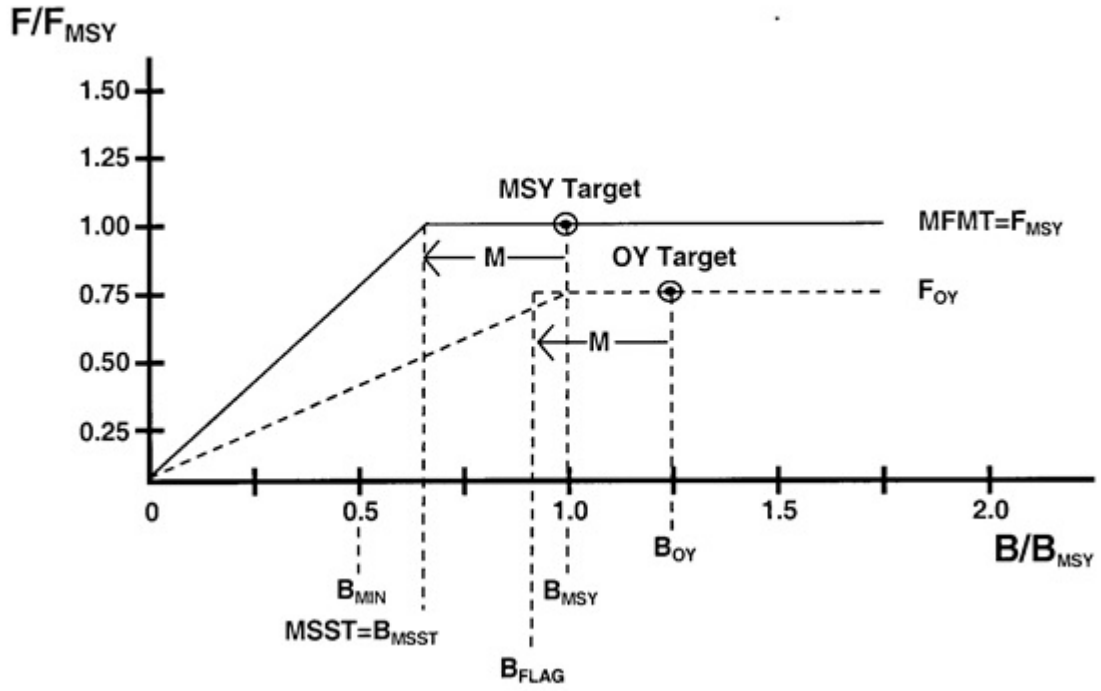

Figure 13-1. General model of MSY and OY Control Rules, from Restrepo, et al. 1998.

13.2. Stock Assessments for Species Managed under the HMS FMP

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

13.2.1. Tunas

- **North Pacific Albacore (2014):** Stock Assessment of Albacore Tuna in the North Pacific Ocean in 2014. Report of the Albacore Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean 16-21 July 2014, Taipei, Taiwan.
- **South Pacific Albacore (2015)**: Stock assessment for south Pacific albacore tuna (WCPFC-SC11-2015/SA-WP-06 Rev 1). S J Harley, N Davies, L Tremblay-Boyer, John Hampton, and S McKechnie. Oceanic Fisheries Programme, Secretariat of the Pacific Community and Te Takina Ltd.

- **Pacific Bluefin (2016):** 2016 Pacific Bluefin Tuna Stock Assessment. Report of the Pacific Bluefin Tuna Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean. Annex 9. Plenary Report, July 2016.
- **Bigeye (EPO) (2016):** Status of Bigeye Tuna in the Eastern Pacific Ocean in 2015 and Outlook for the Future. Alexandre Aires-da-Silva, Carolina Minte-Vera, and Mark N. Maunder. Inter-American Tropical Tuna Commission, Scientific Advisory Committee Seventh Meeting. May 9-13, 2016.
- **Bigeye (WCPO)(2014):** Stock assessment of bigeye tuna in the western and central Pacific Ocean Rev 1 (25 July 2014). Harley, S., N. Davies, J. Hampton and S. McKechnie.Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.
- **Skipjack (EPO) (2016):** Status of Skipjack Tuna in the Eastern Pacific Ocean in 2015. Mark N. Maunder. Inter-American Tropical Tuna Commission, Scientific Advisory Committee Sixth Meeting. May 9-13, 2016.
- **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) (2016):** Status of Yellowfin Tuna in the Eastern Pacific Ocean in 2015 and Outlook for the Future. Carolina V. Minte-Vera, Alexandre Aires-da-Silva and Mark N. Maunder. Inter-American Tropical Tuna Commission, Scientific Advisory Committee Sixth Meeting. May 9-13, 2016.
- **Yellowfin (WCPO) (2014):** Stock assessment of yellowfin tuna in the western and central Pacific Ocean Rev 1 (25 July 2014). Davies, N. S. Harley, J. Hampton and S. McKechnie. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

13.2.2. 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 (NPO) (2014):** North Pacific Swordfish (Xiphiaus Gladius) Stock Assessment in 2014. Report of the Billfish Working Group. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16-22 July 2014. Taipei, Chinese-Taipei.
- **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).

13.2.3. Sharks

- **Blue shark (NPO) (2014):** Stock Assessment and Future Projections of Blue Shark in the North Pacific Ocean. Report of the Shark Working Group. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean. 16-21 July 2014, Taipei, Chinese-Taipei.
- **Common Thresher Shark (EPO) (2016):** Status of common thresher sharks, Alopias vulpinus, along the west coast of North America. Teo, Steven L.H., Emiliano Garcia Rodriguez, and Oscar

Sosa-Nishizaki. March 2016. National Marine Fisheries Service Southwest Fisheries Science Center. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-557.

- **Shortfin Mako Shark (NPO):** Indicator-Based Analysis of the Status of Shortfin Mako Shark in the North Pacific Ocean. Report of the Shark Working Group. International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, July 15-20, 2015, Kona, Hawaii, USA.

13.2.4. Others

- **Dorado:** Not assessed

13.3. Summary of Current Status of HMS FMP Stocks

NOAA Fisheries updates the status of U.S. fish stocks quarterly. These reports provide comprehensive status updates on fish stocks included in NOAA Fisheries' Fishery Stock Status Index (FSSI), and other, non-FSSI fish stocks. NOAA Fisheries provides up-to-date information on whether a stock is overfished, subject to overfishing, or has been rebuilt. The table below is excerpted from the March 31, 2016, Quarterly Status Update.

Stock	Overfishing? (Is Fishing Mortality above Threshold?)	Overfished? (Is Biomass below Threshold?)	Approaching Overfished Condition?	Management Action Required
Albacore – North Pacific	No	No	No	NA
Bigeye thresher – North Pacific	Unknown	Unknown	Unknown	NA
Bigeye tuna – Pacific	Yes	No	No	Reduce Fishing Mortality
Blue shark – North Pacific	No	No	No	NA
Dolphinfish – Pacific	Unknown	Unknown	Unknown	NA
Pacific bluefin tuna – Pacific*	Yes	Yes	NA	Reduce Fishing Mortality, Continue Rebuilding
Pelagic thresher – North Pacific	Unknown	Unknown	Unknown	NA
Shortfin mako – North Pacific	Unknown	Unknown	Unknown	NA
Skipjack tuna – Eastern Pacific	No	No	No	NA

Stock	Overfishing? (Is Fishing Mortality above Threshold?)	Overfished? (Is Biomass below Threshold?)	Approaching Overfished Condition?	Management Action Required
Skipjack tuna – Western and Central Pacific	No	No	No	NA
Striped marlin – Eastern Pacific	No	No	No	NA
Striped marlin – Western and Central North Pacific**	Yes	Yes	NA	Reduce Fishing Mortality, Continue Rebuilding
Swordfish – Eastern Pacific	Yes	No	No	Reduce Fishing Mortality
Swordfish – Western and Central North Pacific	No	No	No	NA
Thresher shark – North Pacific	Unknown	Unknown	Unknown	NA
Yellowfin tuna – Eastern Pacific	No	No	No	NA
Yellowfin tuna – Western and Central Pacific	No	No	No	NA

*The PFMC and WPFMC were notified on April 8, 2013 that this stock is overfished. A domestic rebuilding plan will not be developed for this stock because the overfishing/overfished status is due to international fishing presssure and current measures in place will not end overfishing/rebuild the stock. Under section 304(i) of the MSA, NMFS and the Councils will maintain domestic regulations to address the impact of U.S. fishing vessels, and work with the State Department to reduce fishing and rebuild this stock. Internationally, the Western and Central Pacific Fisheries Commission (WCPFC) and the Inter-American Tropical Tuna Commission (IATTC) manage this stock.

**NMFS determined the Western and Central North Pacific stock of striped marlin to be subject to overfishing and overfished on August 29, 2013. Under section 304(i) of the Magnuson-Stevens Act, a domestic rebuilding plan will not be developed for this stock because the overfishing and overfished status is due to excessive international fishing pressure and current international measures in place will not end overfishing or rebuild the stock. In lieu of a formal domestic rebuilding plan, NMFS will inform the Western Pacific and Pacific Councils of their obligations for international and domestic management under Magnuson-Stevens Act section 304(i) to address international and domestic impacts. Internationally, the Western and Central Pacific Fisheries Commission (WCPFC), to which the U.S. is a member, has agreed to conservation and management measures, as well. NMFS will work with the Western Pacific and Pacific Councils and the State Department to determine if more effective management measures should be proposed to the WCPFC for 2014 and beyond.

13.4. Conclusions from 2016 Pacific HMS Stock Assessments

The summaries provided below are derived from the assessments or reports of working group meetings associated with the assessments and do not necessarily represent the conclusions of the Council's

HMSMT or NMFS. In many cases there has been minimal outside review of the assessment. Nevertheless, they represent the best available information for those species in 2015 to compare to past and future work.

Assessments of stock status always involve assumptions, uncertainty, and particular interpretations of fishery statistics. There are no universally-accepted standards by which to determine confidence for particular assessments, and "ground-truthing" (i.e., comparing assessment estimates to actual population counts) over the broad range occupied by highly migratory species is unrealistic. Furthermore, for many of these species, the regional fishery management organizations (RFMOs) have not agreed upon appropriate biological reference points for use in the context of managing fisheries. Therefore, explicit definitions for stock status relative to sustainable biomass and fishing effort levels are often not available.

Throughout the summaries below quoted text is taken directly from the referenced assessment document.

13.4.1. IATTC Assessments

Bigeye tuna (*Thunnus obesus*) – EPO (Document SAC-07-05a, Inter-American Tropical Tuna Commission, Scientific Advisory Committee Seventh Meeting. May 9-13, 2016)

"This report presents the most current stock assessment of bigeye tuna (Thunnus obesus) in the eastern Pacific Ocean (EPO). An integrated statistical age-structured stock assessment model (Stock Synthesis 3.23b) was used in the assessment. During 2015, the IATTC staff worked in collaboration with Japanese scientists to improve the size-composition data for bigeye caught by the Japanese longline fisheries. As a result, the major improvement in this assessment consists of changes in these data and how they are used in the model."

"EXECUTIVE SUMMARY

1. The assessment of bigeye tuna in the eastern Pacific Ocean in 2015 is similar to the previous assessment, except that separate series of length-frequency data for Japanese longline commercial and training vessels are now available, and both were used in the
2. The results of this assessment indicate a recovering trend for bigeye in the EPO during 2005-2009, subsequent to IATTC tuna conservation resolutions initiated in However, although the resolutions have continued since 2009, the rebuilding trend was not sustained during 2010-2012, and the spawning biomass ratio (SBR) gradually declined to a historically low level of 0.16 at the start of 2013. This decline may be related to a series of recent below-average recruitments which coincided with a series of strong La Niña events. More recently, the SBR is estimated to have increased slightly, from 0.16 in 2013 to 0.20 at the start of 2016; in the model, this increase is driven mainly by the recent increase in the catch per unit of effort (CPUE) of the longline fisheries that catch adult bigeye. There is uncertainty about recent and future levels of recruitment and biomass. At current levels of fishing mortality (F), and if recent levels of effort and catchability continue and recruitment remains average, the spawning biomass (S) is predicted to continue rebuilding and stabilize at about 0.22, above the level corresponding to the maximum sustainable yield (MSY) (0.21).
3. The recent fishing mortality rates are estimated to be below the level corresponding to MSY, whereas recent spawning biomasses are estimated to be slightly below that These interpretations are uncertain and highly sensitive to the assumptions made about the steepness parameter (h) of the stock-recruitment relationship, the weighting assigned to the size-composition data (in particular to the longline size-composition data), the growth curve, and the assumed rates of natural mortality (M) for bigeye.
4. The following topics should be a priority in future research into the bigeye stock assessment:

1. Investigation of the causes of model misspecification responsible for the two-regime recruitment pattern in the bigeye assessment (average length of the oldest fish in the model (*L*2), natural mortality, others).
2. Formulation of a growth curve that is more representative of the
3. Weighting of the different data
4. Fishery
5. Stock The IATTC staff will continue collaborating with the Secretariat of the Pacific Community (SPC) on a Pacific-wide assessment of bigeye. This will incorporate new tagging data in a spatially-structured population dynamics model, which will help to evaluate potential biases resulting from the current approach of conducting separate assessments for the EPO and the Western and Central Pacific Ocean (WCPO)."

Based on IATTC and HMS SAFE data, recent (2011-2015) catch of bigeye tuna by U.S. West Coast fisheries constitutes 0.19% of the EPO stock wide catch.

Yellowfin tuna (*Thunnus albacares*) – EPO (Document SAC-07-05b, Inter-American Tropical Tuna Commission, Scientific Advisory Committee Seventh Meeting. May 9-13, 2016)

"The assessment for 2016 is similar to that of 2015, and includes new and updated data. The major change was in the length-frequency data for the Japanese longline fleet, which are now available for commercial vessels and training vessels separately and by measurement type (weight or length) for 1975-2014 (Satoh *et al.* 2016). Weight-frequency data for the commercial longline fleet are also available, but they are not used in the assessment due to uncertainty in the conversion factors."

"EXECUTIVE SUMMARY

1. The assessment of yellowfin tuna in the eastern Pacific Ocean in 2015 is similar to the previous assessment, except that separate series of length-frequency data for Japanese longline commercial and training vessels are now available, and both were used in the
2. There is uncertainty about recent and future levels of recruitment and There have been two, and possibly three, different productivity regimes since 1975, and the levels of maximum sustainable yield (MSY) and the biomasses corresponding to the MSY may differ among the regimes. The population may have switched in the last ten years from a high to an intermediate productivity regime. The spawning biomass ratio (SBR) has been below average since 2006, with the exception of 2008-2010, which resulted from a high recruitment in 2006.
3. The recent fishing mortality rates (*F*) are slightly below the MSY level (*F*mult = 02), and the recent levels of spawning biomass (*S*) are estimated to be below that level (Srecent/SMSY= 0.95). As noted in IATTC Stock Assessment Report 16 and previous assessments, these interpretations are uncertain, and highly sensitive to the assumptions made about the steepness parameter (*h*) of the stock-recruitment relationship, the average size of the older fish (*L*2), and the assumed levels of natural mortality (*M*). The results are more pessimistic if a stock-recruitment relationship is assumed, if a higher value is assumed for *L*2, and if lower rates of *M* are assumed for adult yellowfin. A likelihood profile on the virgin recruitment (*R*0) parameter showed that data components diverge on their information about abundance levels. Sensitivity analyses indicated that the results are more pessimistic if the weighting assigned to length-frequency data is changed, using recommended data weighting methods, and more optimistic if the model is fitted closely to the index of relative abundance based on the catch per unit of effort (CPUE) of the northern dolphin-associated purse-seine fishery rather than of the southern longline fishery.
4. The highest fishing mortality (*F*) has been on fish aged 11-20 quarters (2.75-5 years). The average annual *F* has been increasing for all age classes since 2009, but in 2015 it showed a slight decline for the 11-20 quarter age
5. Increasing the average weight of the yellowfin caught could increase the

6. The following topics should be a priority in future research for improving the yellowfin stock assessment:
    1. Implementation of a large-scale tagging program to address hypotheses about stock structure and regional differences in life-history parameters and
    2. Improved estimates of growth, particularly for older
    3. Weighting of the different data sets that are fitted to the assessment
    4. Refinement of fisheries definitions within the assessment
    5. Implementation of time-variant selectivity, mainly for the purse-seine fisheries on floating
    6. Exploration of alternative assumptions about stock structure within the assessment
    7. Analysis of changes in spatial distribution of effort for the Southern longline fishery, and whether they invalidate the use of the CPUE of this fishery as the main abundance index in the assessment"

Based on IATTC and HMS SAFE data, recent (2011-2015) catch of yellowfin tuna by U.S. West Coast fisheries constitutes 0.14% of the EPO stock wide catch.

Skipjack tuna (*Katsuwonus pelamis*) – EPO (Document SAC-07-05c, Inter-American Tropical Tuna Commission, Scientific Advisory Committee Seventh Meeting. May 9-13, 2016)

"Skipjack tuna is a notoriously difficult species to assess. Due to its high and variable productivity (*i.e.* annual recruitment is a large proportion of total biomass), it is difficult to detect the effect of fishing on the population with standard fisheries data and stock assessment methods. This is particularly true for the stock of the EPO, due to the lack of age-composition data and the limited tagging data. The continuous recruitment and rapid growth of skipjack mean that the temporal stratification needed to observe modes in length-frequency data make the current sample sizes inadequate. Previous assessments have had difficulty in estimating the absolute levels of biomass and exploitation rates, due to the possibility of a dome-shaped selectivity curve (Maunder 2002; Maunder and Harley 2005), which would mean that there is a cryptic biomass of large skipjack that cannot be estimated. The most recent comprehensive assessment of skipjack in the EPO (Maunder and Harley 2005) is considered preliminary because it is not known whether the catch per day fished for purse-seine fisheries is proportional to abundance. The results from that assessment are more consistent among sensitivity analyses than the earlier assessments, which suggests that they may be more reliable. Analysis of currently available tagging data is unlikely to improve the skipjack stock assessment (Maunder 2012a) and a fully length- structured model produced unrealistic estimates (Maunder 2012b). In addition to the problems listed above, the levels of age-specific natural mortality are uncertain, if not unknown, and current yield-per- recruit (YPR) calculations indicate that the YPR would be maximized by catching the youngest skipjack in the model (Maunder and Harley 2005). Therefore, neither the biomass- nor fishing mortality-based reference points, nor the indicators to which they are compared, are available for skipjack in the EPO."

"1. SUMMARY

This report presents the most current stock assessment of skipjack tuna (*Katsuwonus pelamis*) in the eastern Pacific Ocean (EPO). Several alternative methods have historically been used to assess the status of skipjack tuna: a) fishery and biological indicators; b) analysis of tag data; c) a length- structured stock assessment model; d) Age-Structured Catch-at-Length Analysis (A-SCALA); and e) a Spatial Ecosystem and Population Dynamic Model (SEAPODYM). The results of all five of these methods are compared when discussing the status of skipjack in the EPO. Only the indicator approach has been updated in this report.

Skipjack are distributed across the Pacific Ocean, and it is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at a local level, although large-scale movements are thought to be rare. The bulk of the catches of skipjack are made in the eastern and western regions; the purse-seine catches are relatively low in the vicinity of the western boundary of the EPO at

150°W. The movements of tagged skipjack generally cover hundreds, rather than thousands, of kilometers, and exchange of fish between the eastern and western Pacific Ocean appears to be limited. Movement rates between the EPO and the western Pacific cannot be estimated with currently-available tagging data. In some analyses the EPO was divided into six independent sub-regions to accommodate spatial structure of the population and fishery dynamics.

Stock assessment requires substantial amounts of information and the information varies depending on the method used. The methods applied to skipjack require a variety of information, including data on retained catches, discards, indices of abundance, the size compositions of the catches of the various fisheries, tagging data, and oceanographic data. In addition, assumptions have to be made about processes such as growth, recruitment, movement, natural mortality, selectivity, and stock structure.

Biomass, recruitment, and fishing mortality are estimated to be highly variable over time. The estimates are uncertain and differ among the alternative assessment methods. A large recruitment appears to have entered the population in 1999, and led to increased biomass in that year, but the increase was temporary, due to the short-lived nature of skipjack. Biomass appears to have been above average in recent years, but this may differ among regions. SEAPODYM estimates annual biomass of skipjack 30cm or larger cycling between 1,800,000 t and 2,350,000 t from 1998 to 2008, but the quality of these estimates has yet to be determined. The average weight of skipjack started declining in 2000, but has stabilized in recent years. Previous assessments using a catch-at-length analysis (A-SCALA) to assess skipjack tuna in the EPO were considered preliminary because: 1) it was unknown if catch-per-day-fished for purse-seine fisheries is proportional to abundance; 2) it is possible that there is a population of large skipjack that is invulnerable to the fisheries; and 3) the structure of the EPO stock in relation to the western and central Pacific stocks is uncertain. These issues are also relevant to the other assessments.

Previous assessments estimated that maximum yields are achieved with infinite fishing mortality because the critical weight is less than the average weight at recruitment to the fishery. However, this is uncertain because of uncertainties in the estimates of natural mortality and growth. For this reason, no traditional reference points are available for skipjack tuna in the EPO. Consequently, indicators and reference levels have been used to evaluate the status of the stock. The main concern with the skipjack stock is the constantly increasing exploitation rate. However, exploitation rate appears to have leveled off in recent years. The data- and model-based indicators have yet to detect any adverse consequence of this increase. The average weight has declined to levels seen in the early 1980s and was below its lower reference level in 2015, which can be a consequence of overexploitation, but it can also be caused by recent recruitments being greater than past recruitments or expansion of the fishery into areas occupied by smaller skipjack. The low 2015 level is likely due to the large recruitment in 2015. However, average weight has stabilized in recent years. The tagging analyses, length-structured model, A-SCALA, and the SEAPODYM analyses do not provide any information that indicates a credible risk to the skipjack stock(s).

Susceptibility and productivity analysis (PSA; see IATTC Fishery Status Report 12, p 149) shows that skipjack has substantially higher productivity than bigeye tuna. Biomass and fishing mortality corresponding to MSY are, respectively, negatively and positively related to productivity. Therefore, since skipjack and bigeye have about the same susceptibility, which is related to fishing mortality, the status of skipjack can be inferred from the status of bigeye. The current assessment of bigeye tuna estimates that the fishing mortality is less than *F*MSY; therefore, the fishing mortality for skipjack should also be less than *F*MSY. Since effort and skipjack biomass have been relatively constant over the past 10 years, this also implies that skipjack biomass is above *B*MSY."

Key Results

1. There is uncertainty about the status of skipjack tuna in the EPO.
2. There may to be differences in the status of the stock among
3. There is no evidence that indicates a credible risk to the skipjack stock(s).

4. No additional management action is needed above and beyond that implemented for the conservation of bigeye"

Based on IATTC and HMS SAFE data, recent (2011-2015) catch of skipjack tuna by U.S. West Coast fisheries constitutes 0.01% of the EPO stock wide catch.

13.4.2. ISC Assessments

Pacific bluefin tuna *(Thunnus orientalis)*

Excerpted from stock status and conservation advice accepted at ISC16 Plenary as reported in the stock assessment (2016 Stock Assessment, Executive Summary, pages 4-15):

"Although no limit reference points have been established for the PBF stock under the auspices of the WCPFC and IATTC, the $F_{2011\text{-}2013}$ exceeds all calculated biological reference points except for F_{MED} and F_{LOSS} despite slight reductions to F in recent years … The ratio of SSB in 2014 relative to the theoretical unfished SSB ($SSB_{2014}/SSB_{F=0}$, the depletion ratio) is 2.6% and $SSB_{2012}/SSB_{F=0}$ is 2.1% indicating a slight increase from 2012 to 2014.

The steady decline in SSB from 1996 to 2010 appears to have ceased, although SSB2014 is near the historic low and the stock is experiencing exploitation rates above all calculated biological reference points except for F_{MED} and F_{LOSS}.

Under all examined [harvest] scenarios the initial goal of WCPFC, rebuilding to SSB_{MED} by 2024 with at least 60% probability, is reached and the risk of SSB falling below SSB_{LOSS} at least once in 10 years was low.

The projection results indicate that the probability of SSB recovering to the initial WCPFC target (SSB_{MED} by 2024, 38,000 t, calculated in the same manner as the previous assessment) is 69% or above the level prescribed in the WCPFC CMM if low recruitment scenario is assumed and WCPFC CMM 2015-04 and IATTC Resolution C-14-06 continue in force and are fully implemented …"

The ISC noted that the current calculation of SSB_{MED} in the projection incorporates the most recent estimates of SSB and unless a fixed period of years is specified to calculate SSB_{MED}, its calculation could be influenced by future trends in spawning biomass. NC12 selected SSB_{MED}as the median point estimate for a fixed period of time, 1952-2014. Based on the current stock assessment results, this equates to 40,994 t. According to the stock current assessment projections, the probability of the stock reaching this level by 2024 under a low recruitment scenario is 61.3% under current measures (WCPFC CMM 2015-04 and IATTC Resolution C-14-06).

Based on ISC and HMS SAFE data, recent (2011-2015) catch of Pacific bluefin tuna by U.S. West Coast fisheries constitutes 4.1% of the stock wide catch. (This includes the recreational catch estimate provided by ISC.)

13.4.3. WCPFC Scientific Committee (SPC OFP) Assessments

Skpjack tuna (*Katsuwonus pelamis)* – WCPO

2016 Stock Assessment *Executive Summary:*

"This paper describes the 2016 stock assessment of skipjack tuna *Katsuwonus pelamis* in the western and central Pacific Ocean. A further three years data were available since the last stock assessment was conducted in 2014, and the model time period extends to the end of 2015. New developments to the stock assessment include addressing the recommendations of the 2014 stock assessment report (Rice et al., 2014), exploration of uncertainties in the assessment model, particularly in response to the inclusion of additional years of data, and to improve diagnostic weaknesses of previous assessments.

This assessment is supported by the analysis of catch-per-unit-effort data for pole-and-line (Kiy- ofuji, 2016) and purse seine fisheries (Bigelow et al., 2016; Tremblay-Boyer et al., 2016), tagging data (McKechnie et al., 2016) and the data summaries for fisheries definitions used in the stock assessment (McKechnie, 2016).

Changes made in the progression from the 2014 to 2016 reference case models include: a modified tagging input file that no longer includes Japanese tag releases before 1998; changes, and exploration of the relative weightings of CPUE, length composition and tagging data; application of new features in MULTIFAN-CL; and modifications to model parameters such as selectivity to improve fit to the various data sources.

In addition to a single reference case model that we present, we report the results of one-off sensitiv- ity models to explore the impact of key data and model assumptions for the reference case model on the stock assessment results and conclusions. We also undertook a structural uncertainty analysis (model grid) for consideration in developing management advice where all possible combinations of those areas of uncertainty from the one-off models were included.

The main conclusions of the current assessment are largely consistent with previous assessments and are based on the results of the reference case model and consideration of the results of sensitivity runs (including the structural uncertainty grid). These general conclusions can be summarised concisely as:

1. The current stock assessment estimates stock status to be very similar to the 2014 assessment, with a period of moderately higher spawning biomass over the subsequent years.
2. Current catches are lower than, but approaching estimated MSY.
3. Fishing mortality of all age-classes is estimated to have increased significantly since the beginning of industrial tuna fishing, but fishing mortality still remains below the level that would result in the MSY, and is estimated to have decreased moderately in the last several years.
4. Recent levels of spawning biomass are well above the level that will support the MSY, and are well above the limit reference point, 20%SBF=0.
5. Depletion-based reference points (including $SBlatest/SBF$=0, $SBrecent/SBF$ =0 and $SB2015/SBF$ =0[2015]) for the reference case model, sensitivity analyses and uncertainty grid suggest that the skipjack stock is most probably at or close to the target reference point of 50%SBF =0.
6. Modelling assumptions explored in sensitivity and structural uncertainty analyses had a moderate impact on model output but did not change the broad conclusions about recent stock status.
7. Modelling results were most sensitive to assumptions about weighting of data components, tag mixing period and steepness, and several important avenues of research related to these assumptions have been identified and will improve future assessments."

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://iattc.org/
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.ac.affrc.go.jp/

Regional Fishery Management Councils with HMS Plans

Pacific Fishery Management Council	http://www.pcouncil.org/
Western Pacific Regional Fishery Management Council	http://www.wpcouncil.org/

State and Interstate Fisheries Commissions

California Department of Fish and Game	http://www.dfg.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 Investigación Científica y Educación Superior de Ensenada	http://www.cicese.mx/
Inter-American Tropical Tuna Commission	http://www.iattc.org
Monterey Bay Aquarium	http://www.mbayaq.org/
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 Southwest Regional Office	http://swr.nmfs.noaa.gov
Pfleger Institute of Environmental Research	http://www.pier.org
Scripps Institute of Oceanography	http://www-sio.ucsd.edu
Tagging of Pacific Pelagics	http://www.toppcensus.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	http://californiasportfishing.org/
United Anglers of Southern California	http://www.unitedanglers.com
Western Fishboat Owner's Association	http://www.wfoa-tuna.org