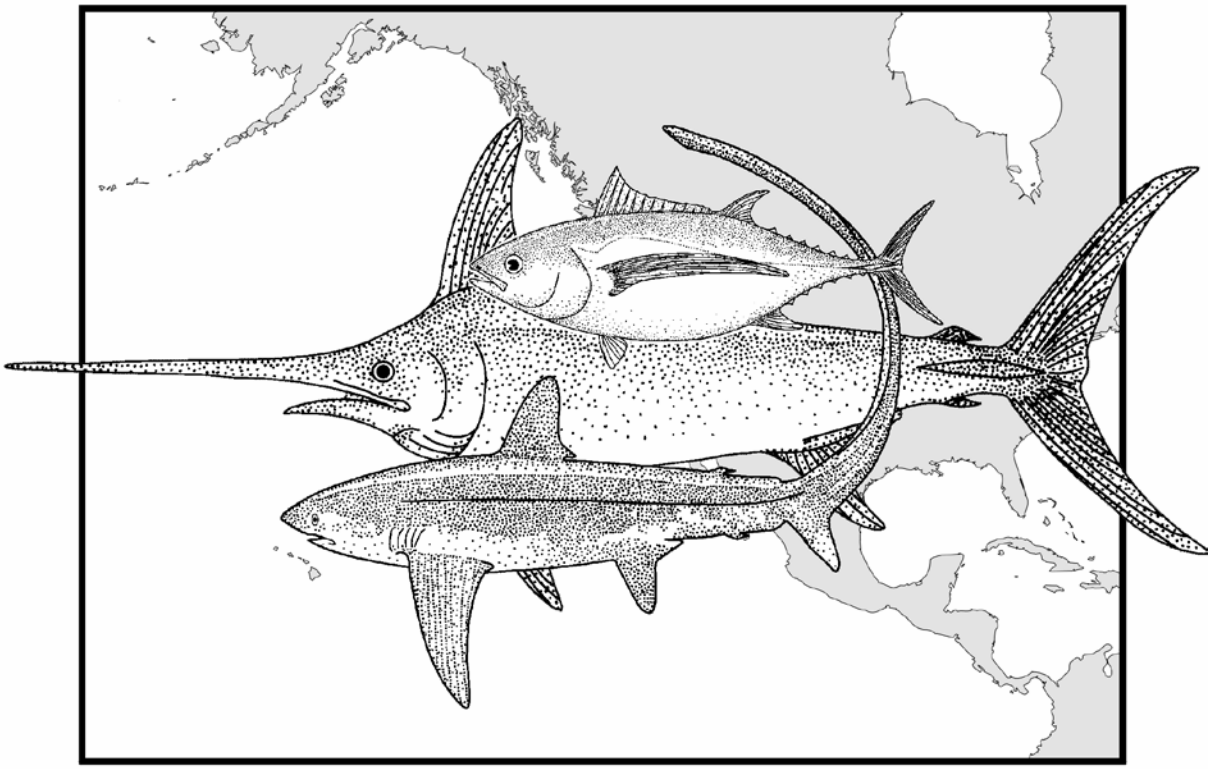
STATUS OF THE U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES THROUGH 2009



STOCK ASSESSMENT AND FISHERY EVALUATION

SEPTEMBER 2010

PACIFIC FISHERY MANAGEMENT COUNCIL
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Acronyms

ACL	annual catch limit
AFRF	Albacore Fishermen's Research Foundation
ASCALA	Age-Structure Catch-At-Length Analysis
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
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
PSA Tag	pop-up 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-Leatherback Sea Turtle Utilization 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

1.0 INTRODUCTION

1.1 The Fishery Management Plan

The Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) was developed by the Pacific Fishery Management Council (Council) in response to the need to coordinate state, Federal, and international management of the stocks listed in Table 1–1.[1] 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. A list of current HMS FMP regulations is provided in Table 3-1 on page 27.

On June 7, 2007, NMFS approved Amendment 1 to the HMS FMP. The FMP was amended to incorporate recommended international measures to end overfishing of the Pacific stock of bigeye tuna (*Thunnus obesus*) in response to formal notification from NMFS that overfishing was occurring on this stock. Amendment 1 also served as a means to substantially reorganize the original combined FMP and Final Environmental Impact Statement, published in August 2003. Much of the descriptive material in the combined document was moved to a series of appendices, substantially shortening the body of the FMP. An electronic copy of the current FMP and the aforementioned appendices are available on the Council's website at http://www.pcouncil.org/hms/hmsfmp.html.

Table 1-1. HMS FMP management unit species.

Common Name	Scientific Name
striped marlin	*Tetrapturus audax*
swordfish	*Xiphias gladius*
common thresher shark	*Alopias vulpinus*
pelagic thresher shark	*Alopias pelagicus*
bigeye thresher shark	*Alopias superciliosus*
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, dolphinfish)	*Coryphaena hippurus*

1.2 Purpose of the SAFE Report

Federal regulations (40 CFR 600.315(e)) pursuant to National Standard 2 in the Magnuson-Stevens Act (MSA), state that "Conservation and management measures shall be based upon the best scientific information available…," which the Council addresses in part by the annual requirement to prepare a Stock Assessment and Fishery Evaluation (SAFE) report for each FMP. Section 4.3 in the HMS FMP describes the requirements for a SAFE report. The SAFE report is produced annually and summarizes

[1] Throughout this document "West Coast" is used to denote the geographic region comprising the coastal areas of Washington, Oregon, and California.

biological and socioeconomic conditions related to HMS stocks and fisheries. The Council may use this information in making decisions about needed management measures.

1.3 The Management Cycle

The HMS FMP also establishes an annual cycle 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. 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 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 2008 the Council considered management changes for the second biennial period, April 1, 2009–March 31, 2011.

1.4 Highly Migratory Species Management Team

This SAFE report was prepared by the members of the Highly Migratory Species Management Team (HMSMT). The HMSMT members at the time this report was published (September 2010), and their primary responsibilities in preparing the report, are listed below.

Mr. Brian Hallman (designee: Mr. Ricardo Belmondo)
Assistant Director
Inter-American Tropical Tuna Commission

Mr. Craig Heberer, (chapter 3, description of FMP management, compliance, and regulatory measures; Chapter 6, research and data needs)
Fisheries Biologist, NMFS Southwest Region

Ms. Leeanne M. Laughlin (chapter 2, description of California fisheries)
Associate Marine Biologist, California Department of Fish and Game

Dr. Suzy Kohin (chapter 5)
Research Fishery Biologist, NMFS Southwest Fisheries Science Center

Ms. Cyreis Schmitt (chapter 2 description of Oregon fisheries)
Oregon Department of Fish and Wildlife representative

Dr. Stephen Stohs, Team Chair (chapter 4)
Industry Economist, NMFS Southwest Fisheries Science Center

Ms. Lorna Wargo (chapter 2, description of Washington fisheries, chapter 6, research and data needs)
Marine Resources Policy Coordinator, Washington Department of Fish and Wildlife

Ms. Heidi Hermsmeyer (chapter 3, description of international regulatory aspects of the HMS FMP)
Fishery Policy Analyst, NMFS Southwest Region

Changes in HMSMT membership through June 2010: Ms. Lorna Wargo replaced Mr. Corey Niles as the

Washington Department of Fish and Wildlife member of the HMSMT in November 2009. Dr. Kevin Piner, NMFS SWFSC, left the HMSMT in September 2009 and Dr. Suzy Kohin was appointed in his place in April 2010. Ms. Heidi Hermsmeyer, NMFS Southwest Region, replaced Mr. Lyle Enriquez in June 2010.

In addition to HMSMT members, the following people contributed to this SAFE report:

Dr. Kit Dahl (chapter 1, compilation of the report)
Staff Officer, Pacific Fishery Management Council

Mr. Craig D'Angelo (section 3.1.6)
Contractor, NMFS Southwest Region

Ms. Donna Dealy (chapter 4, commercial fisheries data)
Computer Specialist, NMFS Southwest Fisheries Science Center

Ms. Elizabeth Petras (section 3.2)
Natural Resources Specialist, NMFS Southwest Region Protected Resources Division

1.5 Council Highly Migratory Species Activities, September 2009-June 2010

Note: Written materials distributed at Council meetings are available at http://www.pcouncil.org/bb/bbarchives.html and summaries of decisions taken at these meetings are available at http://www.pcouncil.org/decisions/archivedecisions.html.

Biennial Harvest Specifications

In June 2010 the Council initiated the third cycle for adopting biennial harvest specifications and management measures since the HMS FMP was implemented. The Council decided to consider a regulatory change proposed by the Washington Department of Fish and Wildlife (WDFW). The WDFW proposal would place a per-trip limit on the Washington recreational albacore tuna fishery. Consistent with the biennial process, the HMSMT will prepare a draft regulatory analysis to help the Council adopt a range of alternatives for public review at the September Council meeting. Final action is scheduled for the November 2010 meeting. If approved by NMFS after notice-and-comment rulemaking, regulations to implement the Council's proposal would then become effective on or after April 1, 2011, at which point Washington would have to adopt conforming measures for state waters.

Recommendations to Regional Fishery Management Organizations

At their November 2009 meeting, the Council made recommendations to the U.S. delegation to the Western and Central Pacific Fishery Commission (WCPFC), which met December 7-11, 2009, in Tahiti, French Polynesia. The Council supported the adoption of complementary measures between the WCPFC and the Inter-American Tropical Tuna Commission (IATTC) to not increase fishing effort on Pacific bluefin tuna, especially on age 0+ recruits; recommended that WCPFC requirements for transshipment vessels specify that observers are only required on the carrier vessel and not on the fishing vessel, if an albacore troll vessel; and encouraged continued support of research on the North Pacific albacore stock.

At their June 2010 meeting the Council made the following recommendations for action in the IATTC and/or WCPFC forums.

- The U.S. delegation to the IATTC should develop a proposal for managing the purse seine fishery through a total allowable catch limit.
- The U.S. delegation to the WCPFC Northern Committee should propose a more effective and comprehensive Pacific bluefin tuna conservation measure, specifically to address juvenile mortality, for adoption by the WCPFC.
- The United States should pursue participation in the coordination meeting on bluefin tuna conservation between Japan, Mexico and the IATTC secretariat scheduled for August 30, and should encourage the IATTC to move forward with a proposal for a bluefin tuna conservation measure.
- The United States should support proposals that would increase compliance with IATTC management measures, especially those related to illegal, unreported, and unregulated (IUU) fishing.
- The U.S. delegations to the IATTC and WCPFC should advocate for more comprehensive data reporting and collection by members of the IATTC and WCPFC.

The Northern Committee meeting occurs September 7-11, 2010, in Fukuoka, Japan. The IATTC annual meeting occurs September 27 to October 1, 2010, in Antigua, Guatemala.

The Council also asked the NMFS Southwest Region to work with the NMFS Pacific Islands Regional Office to reexamine regulations related to vessel monitoring system requirements for vessels that have a WCPFC Area Endorsement on their High Seas Fishing Compliance Act permit, in order to consider how to reduce their financial impact on U.S. West Coast albacore vessels.

Amendment 2 to the HMS FMP

When the MSA was reauthorized in 2007 new provisions were added relative to National Standard 1 ("Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry."). Specifically, §303(a)(15) states that FMPs shall "…establish a mechanism for specifying annual catch limits in the plan …, implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability." NMFS published a final rule in the Federal Register on January 16, 2009, (74 FR 3178) with detailed guidance on implementing this and other new MSA provisions related to preventing overfishing.

In November 2009 the HMSMT presented a preliminary range of alternatives for Amendment 2 and sought Council guidance. In April 2010 the Council adopted a range of alternatives for public review and in June 2010 took final action to adopt a preferred alternative. The Council proposed the following changes to the HMS FMP to comply with the revised National Standard 1 Guidelines:

- Defining management unit species as: albacore tuna, bigeye tuna, skipjack tuna, bluefin tuna, yellowfin tuna, striped marlin, swordfish, blue shark, common thresher shark, shortfin mako shark, and dorado (dolphin);
- Defining ecosystem component species as: bigeye thresher shark, common mola, escolar, lancetfishes, louvar, pelagic stingray, pelagic thresher shark, and wahoo;
- Applying the international exception to all management unit species;
- Adding language describing the need for the Council to coordinate with the Western Pacific Fishery Management Council to determine the primary FMP at the stock level for managed species found in both the HMS FMP and the Pelagics FMP. The Council approved the current listing of Council lead roles for various species, noting the listing was not to be a permanent feature of the FMP;

- Adding language describing how maximum sustainable yield (MSY) or MSY proxies are to be estimated using methods consistent with data availability category and specification of Acceptable Biological Catch (ABCs) and Annual Catch Limits (ACLs), as described in National Standard 1 Guidelines, in the case any managed species become no longer subject to the international exception at some future point;
- Adding language describing that estimates of MSY and optimum yield (OY) (currently included in the FMP) can be adjusted through the biennial management process described in the HMS FMP based on new information, which provides for NMFS review of Council recommendations;
- While not a change to the FMP, the Council confirmed that status determination criteria and OY will be estimated using methods as currently described in the FMP.

These changes are subject to review and approval/disapproval by NMFS with the expectation that the revised FMP would become effective in 2011 along with accompanying federal regulations.

Limited Entry for the West Coast North Pacific Albacore Fishery

In early 2009 NMFS commissioned a study of potential management options for the U.S. West Coast North Pacific albacore fisheries. The HMSMT and HMSAS reviewed drafts of the "white paper" in 2009 and a finalized version was submitted to the Council at their April 2010 meeting. Based on information in the paper the Council considered the necessity of establishing a license limitation, or limited entry program for the West Coast albacore fishery.

In April 2009 the Council conducted scoping on the issue and decided it was not necessary to proceed with development of a limited entry program at this time. It directed the HMSMT, with assistance from the HMSAS and support from NMFS, to gather additional information about characteristics of domestic and international albacore fishing fleets. This information would be used to develop any U.S. proposals for albacore conservation and management at the international RFMO level and appropriate domestic management measures, should action be necessary in response to an updated stock assessment expected in 2011. The Council asked to receive a report on these matters in the first half of 2011.

Related to the limited entry question, the Council considered whether to take action to change the current March 9, 2000, control date for HMS fisheries but concluded that no action was necessary, since a limited entry program will not be developed in the foreseeable future.

Critical Habitat Designation for Pacific Leatherback Sea Turtles

On January 5, 2010, NMFS published a proposed rule to designate critical habitat for the endangered leatherback sea turtle (*Dermochelys coriacea*), in selected areas of the U.S. West Coast Exclusive Economic Zone (EEZ). Critical habitat is defined in the Endangered Species Act (ESA) as areas whose physical and biological features are essential to the conservation of the species and which may require special management considerations or protection. Such areas may be within the area occupied by the species at the time of ESA listing or outside that area, if warranted. Section 7 of the ESA requires Federal agencies to ensure they do not fund, authorize, or carry out any actions that will destroy or adversely modify critical habitat.

The proposed rule identified two areas for designation covering approximately 70,600 square miles of marine habitat off the West Coast. The comment period on the proposed rule was extended to April 23, 2010 (75 FR 7434), allowing the Council to develop comments at the April 2010 meeting. Council comments included:

- Support of the finding that fishing does not adversely affect the functions (known as Primary Constituent Elements), of passage and prey, which were identified for leatherback critical habitat. Impacts of fishing on leatherbacks are best addressed through the provisions in Section 7 of the ESA.
- Concern about the 70,600 square mile extent of the area proposed for critical habitat designation and the potential precedent setting nature of such a designation. The Council noted that marine critical habitat designation for leatherbacks in the Caribbean is based on the location of nesting beaches, which appears inconsistent with the proposed West Coast designation.
- Concern that the proposed rule and supporting biological and socioeconomic reports did not provide sufficient explanation of the methodology used to determine which areas to designate, the boundaries of those areas, and their extent.
- A recommendation that Tribal Usual and Accustomed Areas in marine areas not be included in the designation.
- Concern about inter-annual variation in oceanographic conditions not being addressed in the designation.
- Suggestion that future developments in ecosystem-based management be applied to critical habitat designations.

2.0 DESCRIPTION OF THE FISHERIES

2.1 Commercial Fisheries

2.1.1 California

2.1.1.1 Surface Hook-and-Line Fishery for Albacore

Albacore is an economically valuable fishery in California and has been a target of commercial fishermen for more than 100 years. Troll and live bait are the principal commercial gears, although some albacore is caught using purse seine, longline, and drift gillnet gear as well. Since 1980, the number of surface hook-and-line vessels landing albacore in California ports has ranged annually from a high of 1,310 in 1981 to a low of 67 in 2008. The fishing season varies from year to year, depending on oceanographic conditions, which strongly influence the occurrence of fish within range of the California-based fleet, and economics. A typical season runs July through October, with landings peaking in the fall. A general resident or non-resident commercial fishing license and a current California Department of Fish and Game (CDFG) vessel registration are required to catch and land albacore in the state of California. Additionally, 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, 3–200 nautical miles) and to U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

In 2009, 130 commercial surface hook-and-line vessels landed over 348 mt of albacore compared to 72 vessels that landed 383 mt in 2008 (Table 2–1). The volume and number of landings varied throughout ports in California. More than half of the 2009 landings were delivered to the Eureka area. An increase in albacore fishing vessels may have occurred as closures of salmon fisheries in 2009 found salmon fishermen targeting albacore instead. In 2008, the highest share of landings was delivered to Los Angeles (Table 2–1). Nominal landings occurred from January through June. Landings substantially increased in July, peaked in August, and declined the rest of the year (Table 2–2), though remaining at significant levels through November. Ex-vessel revenue was $0.89 million in 2009, a decrease of around seven percent compared to about $0.96 million in 2008.

Table 2–1. Annual commercial landings (round mt) and number of deliveries for albacore landed in California's major port complexes by the surface hook-and-line fleet, 2008–09.

	2008 Landings		2009 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Eureka	111	94	206	233
Fort Bragg	*	*	12	35
Bodega Bay	*	*	8	10
San Francisco	8	8	22	61
Monterey	33	20	37	63
Morro Bay	8	8	*	*
Santa Barbara	*	*	7	35
Los Angeles	215	14	51	16
San Diego	2	21	6	18
Total	**383**	**199**	**348**	**475**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]- Port Complex: composed of two or more ports within one of the nine geographic statistical reporting areas.

[2]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for short ton (ST), and then multiplying the conversion factor of 0.9072 for MT.
* -Withheld for data confidentiality reasons.

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. There were 477 mt of fresh and frozen albacore valued at about $1.3 million exported from California in 2009, up from 113 mt valued at $0.3 million in 2008.

Table 2–2. Monthly commercial landings (round mt) and ex-vessel revenue for albacore landed in California ports by the surface hook-and-line fleet, 2008–09.

	2008		2009	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January			2	3,498
February	*	*		
March	*	*	*	*
April	*	*	*	*
May			*	*
June	*	*	*	*
July	7	15,065	53	131,604
August	61	141,195	134	318,460
September	60	171,303	76	236,406
October	249	623,172	52	127,400
November	4	9,533	27	66,618
December	*	*	*	*
Total	**383**	**963,005**	**348**	**890,742**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT.
[2]-Ex-vessel revenues are nominal (not adjusted for inflation).
* -Withheld due to data confidentiality requirements.

The recent decline in landings and revenues does not necessarily reflect a decline in the albacore population but more likely reflects a shift in fishing effort by California-based vessels into waters off Oregon and Washington where albacore have been more available due to favorable oceanographic conditions. Additionally, industry representatives have indicated that in recent years lower operating costs and better landing facilities outside of California have resulted in a decrease in California landings.

2.1.1.2 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 EPO tuna catch. More than 90 percent of the catch for these species in the U.S. EEZ portion of the eastern Pacific Ocean (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 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. Since 1981, the

number of purse seine vessels that have landed tuna in California has ranged from a high of 51 in 1986 to a low of fewer than three in 2008. The decline in the number of domestic vessel correlates with the relocation of large cannery operations. Increased labor costs for domestic production has contributed to these facilities being moved overseas, where labor costs are less. Currently there are no canneries functioning as primary offloaders of tuna in California. A general resident or non-resident commercial fishing license and a current CDFG vessel registration are required to catch and land tuna caught in purse seine gear. Additionally, the HMS FMP requires a logbook and federal permit with a purse seine gear endorsement for all U.S. vessels that fish for HMS within the West Coast EEZ and to U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

Yellowfin Tuna: Less than three boats landed yellowfin tuna in 2009, similar to 2008. Landings and revenue for yellowfin tuna for 2008-2009 could not be reported because of federal data confidentiality rules that do not allow reporting information unless aggregated for three or more vessels. However, the annual landing trend has been one of decline since 1976, when more than 125,000 mt of fish were landed in California ports.

In 2009, California landings of yellowfin tuna originated from waters within the US EEZ. About 203 mt of yellowfin was exported in 2009; exports of fresh yellowfin from California went to Japan and the Philippines in 2009; frozen products also went to Indonesia for processing.

Skipjack Tuna: In 2009, less than three vessels landed skipjack, similar to 2008. Landings and revenue for skipjack tuna for 2007-2008 could not be reported because of federal data confidentiality rules that do not allow reporting information unless aggregated for three or more vessels. However, the annual landings trend has been one of decline following the historic high of 79,111 mt in 1980. Annual landings and ex-vessel revenues have been relatively flat since 1985, averaging 2,641 mt and $2.7 million.

Skipjack landed in California are caught primarily in the SCB and seaward of the Mexican EEZ. There were 600 mt of exports of frozen skipjack tuna from California reportedly valued at about $734 thousand in 2009, an increase from 169 mt valued at about $201 thousand in 2008, with most going to New Zealand, Russia, and Spain.

Bluefin Tuna: In 2009, six vessels landed 410 mt of bluefin tuna with an ex-vessel revenue of $426 thousand; all landings occurred in the Los Angeles area and the majority of the landings took place in August (173 mt / $190 thousand) and September (190 mt / $196 thousand). In 2008, there were no bluefin tuna landed by purse seine vessels in California, although a small amount (less than 2 mt) was landed incidentally by other gears. In 2009, 54 mt of bluefin valued at $198 thousand were exported. All exports of bluefin tuna from California were frozen, and went mostly to Canada, with a small amount exported to Italy.

2.1.1.3 Harpoon Fishery for Swordfish

California's 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 gill net fishery was authorized by the State Legislature and soon afterward drift gillnets replaced harpoons as the primary method for catching swordfish, and the number of harpoon permits decreased from a high of 1,223 in 1979 to a low of 25 in 2001. Fishing effort typically occurs in the SCB 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.

To participate in the harpoon fishery a state permit and logbook are required 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 to U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their catch in California, Oregon, or Washington.

Table 2–3. Annual commercial landings (round mt) and number of deliveries for swordfish landed in California's major port complexes by the harpoon fleet, 2008–09.

	2008 Landings		2009 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Santa Barbara	3	11	1	3
Los Angeles	25	128	28	127
San Diego	20	78	21	98
Total	**48**	**217**	**49**	**228**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]- Port Complex: comprised of two or more ports within one of the nine geographic statistical reporting areas.
[2]-Landings in pounds are converted to round weight in mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT. A conversion factor of 1.45 was multiplied by the reported dressed weight to obtain a round weight estimate.

Table 2–4. Monthly commercial landings (round mt) and ex-vessel revenue (dollars) for swordfish landed in California by the harpoon fleet, 2008–09.

Month	2008 Landings (mt)[1]	2008 Ex-vessel (dollar)[2]	2009 Landings (mt)[1]	2009 Ex-vessel (dollar)[2]
January				
February				
March				
April				
May	*	*		
June	4	50,509	*	*
July	13	144,723	9	96,438
August	15	138,669	10	106,352
September	6	56,373	17	143,398
October	4	35,384	10	82,526
November	3	22,147	2	16,110
December	*	*	*	*
Total	**48**	**457,045**	**49**	**459,558**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for mt. A conversion factor of 1.45 was multiplied by the reported dressed weight to obtain a round weight estimate.
[2]-Ex-vessel revenues are nominal (not adjusted for inflation).
* -Withheld for data confidentiality reasons.

In 2009, 28 harpoon vessels landed 48 mt of swordfish, comparable to 2008, when 31 vessels landed a similar amount (Table 2–3). Fishing effort was concentrated in coastal waters off San Diego and Orange Counties in the SCB, especially from fishing blocks between the coast and Santa Catalina and San Clemente Islands. Landings occurred June through December, peaking in August (Table 2–4).

The ex-vessel revenue for 2009 was $459,558 comparable to 2008 with a similar amount (Table 2–4). Because harpoon vessels spend less time on the water and are a low-volume fishery, their catch is often fresher than drift-gillnet-caught fish, so markets tend to pay more for harpooned fish. The average ex-vessel price-per-pound of landed weight for harpooned fish was $6.14 compared to $2.81 for drift gillnet caught fish in 2009. Harpooned swordfish support domestic seafood restaurant businesses and is advertised as a bycatch-free fishery, although some mako and thresher shark is taken as well.

2.1.1.4 Drift Gillnet Fishery for Swordfish and Shark

Swordfish: 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 2,367 mt by 1985. 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 to 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. The number of permits has declined from a high of 251 in 1986 to a low of 84 as of 2009, and only 46 vessels participated in the swordfish fishery in 2009 (Table 2–5). Annual fishing effort has also decreased from a high of 11,243 sets in the 1986 fishing season to 1,043 sets in 2005. Industry representatives attribute the decline in vessel participation and annual effort to regulations implemented to protect threatened and endangered marine mammals, sea turtles, and seabirds.

Table 2–5. Annual drift gillnet permits issued and number of active vessels, 1981–2009.

Year	Active[1] Vessels	Permits Issued	Year	Active[1] Vessels	Permits Issued
1980	100	*	1995	117	185
1981	118	*	1996	111	167
1982	166	*	1997	108	120
1983	193	*	1998	98	148
1984	214	226	1999	84	136
1985	228	229	2000	78	127
1986	204	251	2001	69	114
1987	185	218	2002	50	106
1988	154	207	2003	43	100
1989	144	189	2004	40	96
1990	134	183	2005	42	90
1991	114	165	2006	45	88
1992	119	149	2007	46	86
1993	123	117	2008	46	85
1994	138	162	2009	46	84

Source: CDFG License and Revenue Branch (LRB), extracted May 18, 2010.
Additional processing information:
[1]-some vessels only land thresher and/or swordfish from year to year so the highest number of active vessels for both components of the fishery were reported for this gear.
*-actual number of permits issued by LRB not available but the California State Legislature set a cap of 150 in 1982.

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. 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 percent of the fishing effort occurs from August 15 through January 31.

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 EPO 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 leatherbacks sea turtles. A smaller closure was implemented to protect Pacific loggerhead turtles from drift gillnet gear during a forecasted or occurring 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 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.

Table 2–6. Annual commercial landings (round mt) and number of deliveries for swordfish landed in California's major port complexes by the drift gillnet fleet, 2008–09.

Port Complex[1]	2008 Landings (mt)[2]	2008 Landings (number)	2009 Landings (mt)[2]	2009 Landings (number)
Bodega Bay				
San Francisco				
Monterey	18	8	8	7
Morro Bay	46	28	45	35
Santa Barbara	21	22	8	17
Los Angeles	72	32	18	30
San Diego	249	279	173	223
Total	**406**	**369**	**252**	**312**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010, Additional processing information:
[1]- Port Complex: comprised of two or more ports within one of the nine geographic statistical reporting areas.
[2]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT. A conversion factor of 1.45 was multiplied by the reported dressed weight to obtain a round weight.
* -Withheld for data confidentiality reasons.

Table 2–7. Monthly commercial landings (round mt) and ex-vessel revenue for swordfish landed in California by the drift gillnet fleet, 2008–09.

Month	2008 Landings (mt)[1]	2008 Ex-vessel (dollar)[2]	2009 Landings (mt)[1]	2009 Ex-vessel (dollar)[2]
January	10	79,079	16	63,936
February	*	*		
March				
April				
May				
June				
July				
August	*	*	1	5,643
September	27	169,361	21	92,054
October	95	431,121	29	126,529
November	155	611,537	64	295,558
December	118	403,318	121	488,706
Total	**406**	**1,703,446**	**252**	**1,072,426**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT. A conversion factor of 1.45 was multiplied by the reported dressed weight to obtain a round weight.
[2]-Ex-vessel revenues are nominal (not adjusted for inflation).
* -Withheld for data confidentiality reasons.

In 2009, 32 drift gillnet vessels landed 405 mt of swordfish compared to 37 vessels that landed 405 mt in 2008 (Table 2–6). Landings occurred at ports from San Diego to Monterey, and the majority occurred from October to December. About 68 percent of the reported effort occurred in the SCB.

The ex-vessel revenue was $1.1 million in 2009 compared to $1.7 million in 2009 (Table 2–7). The

revenue decline was primarily driven by a decreased number of landings, as the ex-vessel price per pound of landings increased from $1.90 in 2008 to $1.94 in 2009, while the number of landings decreased from 406 mts in 2008 to 252 mts for 2009. Most of the swordfish landed in California supports the domestic seafood restaurant businesses.

Thresher Shark: 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, peaking in 1985, when 228 vessels landed more than 1,000 mt of shark. Following 1985, swordfish replaced thresher shark as the primary target species because there was a greater demand for swordfish and it commands a higher price-per-pound. 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.

Table 2–8. Annual commercial landings (round mt) and number of deliveries for common thresher shark landed in California's major port complexes by the large mesh drift gillnet fleet, 2008–09.

	2008 Landings		2009 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Bodega Bay	0	0	0	0
Monterey	1	5	*	*
Morro Bay	16	16	*	*
Santa Barbara	28	50	7	15
Los Angeles	18	27	9	20
San Diego	35	100	18	79
Total	**98**	**198**	**39**	**125**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010. Additional processing information:
[1]- Port Complex: comprised of two or more ports within one of the nine geographic statistical reporting areas.
[2]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT. A conversion factor of 1.70 was multiplied by the reported dressed weight to obtain a round weight.
* -Withheld for data confidentiality reasons.

In 2009, 32 drift gillnet vessels landed 39 mt of common thresher shark compared to 39 vessels that landed 98 mt in 2008 (Table 2–8). Landings occurred throughout the open season but a majority occurred in January (finishing the previous season), then October through December at ports from San Diego to Monterey (Table 2–8). Fishing effort was focused in the SCB.

The ex-vessel revenue for 2009 was $64,936 compared to $175,681 in 2008 (Table 2–9). Fresh thresher shark landings support domestic seafood restaurant businesses. The decline in revenues was not only due to a drop in landings from 98 to 39 mt, but also because the ex-vessel price declined from $0.82 to $0.76 per pound of landings.

Table 2–9. Monthly commercial landings (round mt) and ex-vessel revenue for common thresher shark landed in California ports by the large mesh drift gillnet fleet, 2008–09.

	2008		2009	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	13	26,846	8	16,034
February	3	7,022		
March				
April				
May	*	*		
June	>1	783		
July	*	*		
August	7	13,118	3	5,425
September	8	15,595	1	1,976
October	34	54,789	1	1,708
November	15	27,476	13	19,434
December	17	29,566	13	20,359
Total	**98**	**175,681**	**39**	**64,936**

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for MT. A conversion factor of 1.70 was multiplied by the reported dressed weight to obtain a round weight.
[2]-Ex-vessel revenues are nominal (not adjusted for inflation).

2.1.1.5 High Seas Longline Fishery for Swordfish

California prohibits pelagic longline fishing within the EEZ and the retention of striped marlin. Vessels operating outside of the EEZ can land fish in California ports if the operator has a general resident or non-resident commercial fishing license and a current CDFG vessel registration. 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, and Washington. Under federal regulations only 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. Targeting tunas with deep-set longline gear is permitted outside the EEZ under the HMS FMP.

In recent years, federal regulations were promulgated to protect endangered sea turtles east and west of 150° W longitude and north of the equator have impacted the number of landings of swordfish in California ports. In 2009, 4 longline vessels landed 106 mt of swordfish with an ex-vessel value of $386,008; in 2008, five longline vessels landed 58 mt with a value of $195,496; Annual longline-caught swordfish landings and ex-vessel revenues have been declining since 2000 when landings and ex-vessel revenue totaled 1,873 mt and $8.0 million, respectively (Tables 4–13 and 4–19).

2.1.2 Oregon

2.1.2.1 Surface Hook-and-Line Fishery for Albacore

Albacore has been fished commercially off of Oregon since the mid-1930s when the fishery expanded north from the traditional grounds off southern California. For many years, both bait boats and jig boats

fished for albacore off Oregon, but in recent years, predominantly jig-caught (troll-caught) fish have been landed. The current fleet consists primarily of small to medium (20 ft to 60 ft) "combination" boats, which may fish crab, salmon, or bottom fish at other times of the year, and large freezer boats (most longer than 60 ft) that travel the north and south Pacific, principally fishing albacore.

Oregon albacore landings have been highly variable through the years, ranging from a low of 12.3 mt in 1936 to a high of over 17,000 mt in 1968. In the last decade, annual landings in Oregon have averaged nearly 4,000 mt.

Sampling of Oregon's commercial albacore fishery is a cooperative effort between the ODFW, NMFS, and Pacific States Marine Fisheries Commission.

Commercial landings of albacore into Oregon totaled 4,599 mt in 2009, 14 percent more than the 4,026 mt landed in 2008, but similar to 2007 landings (Table 2-10). Landings of albacore into Oregon ports began with a small landing in mid-June and continued through early October. The peak of landings occurred during the first week of August. Rough ocean conditions at the end of July and in mid-September caused two brief declines in landings. About the middle of August, successful troll fishing from jig boats became increasingly difficult and many left the fishery for the remainder of the season. The few boats which continued jig fishing in late October and early November experienced excellent fishing before unfavorable weather ended the season. Large schools of fish were present 50 to 75 miles offshore from Oregon's major ports through the first week of November, and bait vessels had excellent success fishing on these schools.

A total of 418 vessels made at least one landing of albacore in 2009, up 24 percent from 377 vessels in 2008. These vessels made 1,314 landings in 2009, which is a 31 percent increase from 902 landings in 2008.

Newport received the majority of Oregon deliveries in 2009 and half of the statewide total landed. Astoria had 26 percent of the landings by weight, followed by Charleston with 20 percent. Eleven other ports also receiving deliveries are displayed in Table 2-11. The average landing in 2009 was 3.5 mt, down 20 percent from the 4.4 mt average in 2008.

Table 2-10. Oregon commercial albacore landings (mt) by month, 2007-2009.

Month	2007	2008	2009
May	0	0	0
June	45.3	0	22.1
July	1513.0	1107.0	1610.0
August	1805.8	1859.6	1932.0
September	1015.3	686.8	819.8
October	336.6	371.8	195.6
November	22.9	1.0	19.3
Total	**4738.9**	**4026.2**	**4598.8**

Data source: ODFW fish ticket landings data, extracted July 2010.

Table 2-11. Oregon commercial albacore landings (mt) by port, 2007-2009.

Port	2007	2008	2009
Astoria	1297.6	1213.8	1184.4
Garibaldi	186.1	103.7	97.5
Pacific City	2.8	3.5	4.5
Depoe Bay	5.5	1.6	2.9
Newport	2166.3	1469.0	2297.7
Florence	21.7	11.5	9.1
Winchester Bay	52.6	61.0	40.1
Charleston	975.5	1140.0	922.1
Bandon	1.5	1.4	1.3
Port Orford	12.1	3.4	12.1
Gold Beach	4.6	0.8	5.8
Brookings	12.6	16.4	20.3
Smaller Ports	0.0	0.0	1.0
Total	**4738.9**	**4026.2**	**4598.8**

Data source: ODFW fish ticket landings data, extracted July 2010.

Albacore markets and prices (Table 2-12) were much weaker during 2009 than in 2008. Ex-vessel revenue generated from albacore in 2009 totaled $10.2 million, down 4 percent from 2008's ex-vessel value of $10.7 million. The average, weighted, price per pound for albacore in Oregon for 2009 was $1.01 per pound. This is down $0.19 per pound from 2008 but $0.23 per pound higher than the 25-year average of $0.78 per pound (1985-2009). At the start of the season, prices for blast frozen albacore were $1.15 per pound, lower than in 2008, and quickly diminished further with the first wave of landings, when dealers paid $0.85 - $0.95 per pound. These lower prices represented prices in the brine frozen market, where a majority of blast frozen fish were sold in 2009. Brine markets started with prices ranging from $0.80 to $0.95, and by the end of July had increased to prices of $0.90 to $1.05. Additional demand from Spain, Portugal and France triggered another boost in prices in early August, with prices ranging from $1.00 to $1.15 per pound. Fresh, iced prices at the beginning of the season ranged from $0.90 to $1.00 per pound, dropping as low as $0.80 at larger dealers for most of July and August. These prices did increase slightly in late August and September to a range of $0.85 to $1.00. Demand and prices for fresh fish at alternative, smaller markets were strong throughout the 2009 season in all Oregon ports, with prices ranging from $1.00 to $1.75 per pound. To improve the value of their albacore, some local commercial fishers sold their catches directly off their vessels to the public, and received between $1.50 and $2.25 per pound. Demand remained strong in this market throughout the albacore season.

Table 2-12. Ex-vessel[1] price-per-pound for albacore tuna in Oregon, 2007-2009.

Product Form	2007	2008	2009
frozen	$0.90 to $1.20	$0.90 to $1.45	$0.85 to $1.15
fresh	$0.65 to $1.00	$0.90 to $1.50	$0.80 to $1.75
off-vessel (whole)	$1.75 to $2.00	$1.75 to $2.25	$1.50 to $2.25

[1]Ex-vessel revenues are nominal values (not adjusted for inflation).
Data source: ODFW fish ticket landings data, December 2009.

2.1.2.2 Drift Gillnet Fishery for Swordfish and Shark

The Oregon commercial DGN fishery historically existed as an extension of the California fishery. In Oregon, the DGN fishery for swordfish has 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 had 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.

2.1.3 Washington

The commercial and recreational highly migratory species fisheries off the Washington coast are primarily for albacore tuna, although there are occasional smaller landings of thresher shark and blue shark. While there is not a fixed season, albacore fisheries generally begin in early to mid-July and continue until the tuna are no longer accessible off the Washington coast, usually around late September.

The albacore fisheries off Washington include commercial troll, bait boats, charter boats, and recreational fishing boats. There is no state commercial fishing license requirement for albacore tuna in Washington; however, a delivery permit is required to land commercially caught albacore into Washington. If fishers do not already have a fishing permit, which includes a delivery permit, fishers will need to purchase a delivery permit from the state.

Ilwaco and Westport are the two Washington ports with the highest HMS landings of albacore from the commercial surface hook-and-line fishery and account for more than 90 percent of the annual landings into the state (Table 2-13). Several other ports along the coast and in Puget Sound receive albacore landings as well.[1] Landings at these ports vary and are a direct reflection of market conditions. Many vessels, particularly in Westport, sell their product directly to the public off the dock rather than to fish buyers for processing.

Table 2–13. Washington commercial albacore landings (mt) by port group, 2004–09 (listed in order of annual average).

Port Group	2004	2005	2006	2007	2008	2009
Ilwaco & Columbia River	4,267.1	1,658.1	5,534.3	2,698.0	2662.0	2,922.0
Westport & Grays Harbor	3,213.3	2,842.9	2,673.9	3,119.3	3917.7	4,186.7
North Puget Sound[a]	753.8	298.6	334.4	85.4	131.3	170.1
South Puget Sound[b]	7.8	5.8	63.2	9.4	6.5	11.5
Willapa Bay & Pacific County	29.8	14.0	22.3	7.0	5.2	3.2
Neah Bay & La Push	1.3	3.9	7.2	36.5	2.4	5.7
Total	8,309.7	4,904.3	8,707.1	5,980.4	6,725.1	7,299.2

Data source: WDFW fish ticket landings data, extracted May 2010.
(a) Port Angeles to Anacortes.
(b) Everett to Olympia.

In recent years, large amounts of albacore tuna have been landed into Washington, and in general, the tuna fishery has remained stable since the early 1990s. Variability in tuna landings has likely been an indication of changes in availability of tuna, rather than effort, as the number of participating vessels and the effort expended has been fairly consistent. Total ex-vessel revenues for the state surpassed $16 million in 2009. Vessels were paid an average of $1.16 per pound in 2008 but in 2009 vessels were paid an average of $1.01 per pound. This is up from the 2004–2007 price of $0.86 per pound, perhaps because

[1] In Washington, port of landing is not directly recorded on the marine fish receiving ticket and so must be indirectly assigned based on the address of the fish dealer or buyer. Therefore some landings may be wrongly attributed.

of the extreme spike in fuel prices in the summer of 2008. Washington, Oregon, and California all saw marine diesel prices reach or exceed an average pre-tax price of $4.40 per gallon in 2008 and then fall back to around $2.35 per gallon in 2009.[2]

As provided for under the U.S.–Canada albacore treaty, some Washington ports also receive albacore landings from Canadian vessels (Table 2-14). Canadian landings into the state rebounded slightly in 2008 and 2009 but were still short of 2004 levels. Anecdotal evidence suggests this drop was attributable to new rules implemented by U.S. Customs and Border Protection under the U.S. Trade Act of 2002 rather than to any shift in Canadian catch or effort.

Table 2–14. U.S. and Canadian albacore landings into Washington, 2004–09.

	U.S. Vessels		Canadian Vessels		Total	
	mt	$	mt	$	mt	$
2004	7,433.8	13,437,940	875.9	2,367,778	8,309.7	15,805,718
2005	4,520.8	9,786,500	383.5	1,069,562	4,904.3	10,856,062
2006	8,542.6	14,758,745	164.5	355,611	8,707.1	15,114,357
2007	5,905.4	10,277,642	75.0	168,055	5,980.4	10,445,697
2008	6,340.8	16,065,465	384.3	1,159,756	6,725.1	17,225,833
2009	6,864.1	15,246,286	435.1	1,078,547	7,299.2	16,324,833

Data source: WDFW fish ticket landings data, extracted May 2010.
Note: U.S. landings include landings by tribal fishers and landings of albacore caught by U.S. vessels in Canadian waters.

2.2 Description of West Coast Recreational Fisheries

2.2.1 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; a nominal amount of fish, primarily tunas and dorado, are taken by free divers using spear guns. Fishing occurs in the EEZ waters of the U.S. as well as Mexico aboard commercial passenger fishing vessels (CPFVs) and private boats. A fishing season is dependent on oceanographic conditions, which strongly influence the availability of fish within range of the California-based fleet; a typical season begins in late spring and runs through fall. Anglers 16 years and older must have a resident or non-resident annual or short-term recreational fishing license to catch and land any ocean fish in California, and an Ocean Enhancement Stamp is required if fishing within ocean waters south of Point Arguello, Southern California. California does not have size or slot limit restrictions but it does have daily possession limits for some of the MUS. Table 2–15 shows the daily possession limits for MUS for California recreational anglers for 2009.

[2] Pacific States Marine Fisheries Commission's Fisheries Economics Data Program (http://www.psmfc.org/efin/proj_desc.html).

Table 2–15. California's recreational daily possession limits for highly migratory MUS included within the fishery management plan.

Species	1-Fish	2-fish	10-fish[2]	25-fish	No limit[1]
Tunas					
Albacore[3]			X	X	
Bigeye			X		
Bluefin[3]			X		
Skipjack					X
Yellowfin			X		
Billfishes					
Striped Marlin	X				
Swordfish		X			
Sharks					
Blue		X			
Common Thresher		X			
Mako		X			
Other Fish					
Dorado			X		

[1]-In general, no more than 20 finfish in combination of all species, with not more than 10 of any one species, may be taken or possessed by any one person, unless otherwise authorized, e.g. skipjack tunas (CCR, Title 14, 27.60).
[2]-California authorizes boat limits for two or more persons that are licensed to fish in ocean waters off California (CCR, Title 14, Section 27.60). This authorization does not apply to fishing trips originating in California where fish are taken in other jurisdictions.
[3]- Prior to November 2008, these species had no limit; however, since then new regulations have become effective: albacore south of Point Conception – 10 fish, albacore north of Point Conception – 25 fish; bluefin tuna - 10 fish statewide. These limits are in addition to the general 20 fish bag limit.

Vessel operators that charge a fee to passengers to sport fish from any vessel must have a CPFV license and a current CDFG vessel registration, and the operator must submit a monthly log of their fishing activity. Additionally, the HMS FMP requires a Federal permit with a recreational gear endorsement for all U.S. CPFVs that fish for HMS within the West Coast EEZ and that pursue HMS on the high seas and land their catch in California, Oregon, and Washington.

Fishery statistics are available from both PSMFC, through their Recreational Fisheries Information Network (RecFIN) website,[3] and the CDFG CPFV logbook program. The RecFIN provides estimates based on field sampling of catch and a telephone survey for effort—California data is 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 catches of highly migratory MUS constitute a relatively rare event 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.

[3] www.psmfc.org/recfin

Table 2-16. Annual number of highly migratory MUS kept and thrown back by recreational anglers fishing from California commercial passenger fishing vessels (CPFV) in U.S. EEZ waters , 2008–09.

Species	2008 Number of Fish (kept)	2008 Number of Fish (thrown back[2])	2009 Number of Fish (kept)	2009 Number of Fish (thrown back[2])
Tunas				
Albacore	4,530	6	3,358	236
Bigeye	0	0	0	0
Bluefin	3,158	86	1,961	6
Skipjack	821	122	1,720	339
Yellowfin	5,597	59	5,515	97
Billfishes				
Striped Marlin	1	0	4	0
Swordfish	2	0	0	0
Sharks				
Blue	17	246	11	291
Common Thresher[1]	45	99	40	0
Shortfin Mako	104	275	43	304
Other Fish				
Dorado	5,621	270	1,342	78
Total	**19,896**	**1,163**	**13,994**	**1,351**

Source: California's Commercial Fisheries Information System (CFIS), CPFV logbook data, extracted August 6, 2010.
Additional Processing Information:
[1]-The annual totals for common thresher shark included 1 pelagic thresher kept in 2009.
[2]-The condition (live or dead) of fish thrown back is not available; includes "lost to seals."

With the exception of sharks, most HMS MUS are caught by anglers fishing from CPFVs in the Mexican EEZ (Table 4–63). However, for some species the entire reported catch for the fleet comes from California (U.S. waters). In 2009, approximately 145 CPFVs logged 734 days at-sea within the U.S. EEZ compared to 121 CPFVs that logged 903 days at-sea in 2008. The total number of MUS kept by anglers decreased from 19,896 fish in 2008 to 13,994 fish in 2009 (Table 2–16); the number of most MUS caught declined except for yellowfin tuna, which remained about the same and skipjack tuna which increased. Tunas made up about 90 percent of the numbers of MUS caught in 2009.

Catch estimates for private boats are presented in Table 2–17. The estimates are for vessels fishing exclusively in the U.S. EEZ. Many private vessels fish in the EEZ of Mexico but the total number and catch of these vessels is unknown, although RecFIN does capture some of this data. In 2009, about 17,000 MUS were caught by private boaters compared to 42,000 MUS caught in 2008 (including released and thrown back fish); however, at the time of this update, angler-reported kept dead fish (B1) did not appear to be up-to-date for 2009. In 2009, 74 percent of the total shortfin mako sharks captured were released alive; for thresher sharks 47 percent of the total were caught and released. Blue sharks were released alive at a much higher rate, 99 percent in 2009, presumably because they are not usually the target species and have little value as a food fish. Sharks assume much greater importance when ranking catches among private boaters, because they are best fished by one or two anglers from a small vessel. By contrast, CPFVs are two to three times larger than private boats and may carry 20 times the number of anglers as a private boat. Private boat catch estimates from RecFIN must be used with caution because sampling anglers that pursue HMS is a rare occurrence and as such can lead to significantly higher or lower catch estimates than the actual catch level.

Table 2–17. Estimated number of highly migratory MUS kept and thrown back alive by recreational anglers fishing from California private vessels in U.S. EEZ waters, 2008–09.

Species	2008 Number of Fish (kept[1])	2008 Number of Fish (reported dead[2])	2008 Number of Fish (released alive[2])	2009 Number of Fish (kept[1])	2009 Number of Fish (reported dead[2])	2009 Number of Fish (released alive[2])
Tunas						
Albacore	2,052	1,523	28	7,969	0	33
Bigeye	0	9	15	0	0	14
Bluefin	68	332	0	142	0	7
Skipjack	240	25	148	244	0	1,640
Yellowfin	2,974	3,741	133	1,346	0	242
Billfishes						
Striped Marlin	0	0	111	7	0	51
Swordfish	0	0	0	0	0	0
Sharks						
Blue	28	17	2,353	17	0	1,431
Common Thresher	624	176	585	800	0	700
Shortfin Mako	306	98	1,523	332	0	924
Other Fish						
Dorado	9,535	7,362	7,877	630	0	319
Total	15,827	13,283	12,773	11,487	0	5,361

Source: Pacific States Marine Fisheries Commission, Recreational Fisheries Information System, California Recreational Fisheries Survey data, extracted August 6, 2010.
Additional Processing Information:
[1]-Examined by sampler.
[2]-The angler reported the fish as dead or thrown back alive after capture; not available for 2009.

2.2.2 Oregon

Recreational fishing for albacore off Oregon in 2009 was excellent, consistent with recent record-setting years. Catches have ranged from a low of 2,901 fish in 2000 to a high of 58,922 fish in 2007. In 2009, recreational fishers landed an estimated 42,055 albacore, with a total weight of 366.4 mt, the second highest catch on record and far above the previous five-year average (2004-2008) of 18,000 albacore.

Access to albacore for recreational vessels off Oregon is highly variable due to distance to the fish, weather conditions, fuel prices, and other factors. Compared to 2008, sport fishing effort and catches in 2009 were 46 percent and 73 percent higher, respectively, even though 2008 was also a good year for the fishery. Weather and ocean conditions were much calmer in 2009 than in 2008 and allowed more sport vessels to target albacore. Large schools of albacore moved within sport fishing range about three weeks earlier than in 2008. Also, fuel prices were lower than in 2008. All these factors combined led to increased sport fishing activity and success in 2009.

Private boats accounted for approximately 80 percent of the total recreational landings (Table 2-18). Newport accounted for 31 percent of all recreational trips and 34 percent of the catch, although Coos Bay was a close second (Tables 2-18 and 2-19). Anglers from private boats were more successful, averaging 4.4 albacore per trip, compared to anglers from charter boats, who averaged 3.2 albacore per trip.

Table 2-18. Oregon albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port, 2007-2009.

Port	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Astoria	311	390	330	338	422	59	649	812	389
Garibaldi	111	164	117	1,263	960	1,059	1,374	1,124	1,176
Pacific City	9	5	1	209	35	92	218	40	93
Depoe Bay	683	245	432	1,644	743	694	2,327	988	1,126
Newport	1,463	1,089	1,260	2,415	1,475	1,991	3,878	2,564	3,251
Florence	0	0	0	30	67	15	30	67	15
Winchester Bay	12	0	12	367	231	370	379	231	382
Coos Bay	69	109	240	1,712	960	2,962	1,781	1,069	3,202
Bandon	231	107	222	132	0	239	363	107	461
Gold Beach	30	0	48	12	0	28	42	0	76
Brookings	57	14	20	932	85	166	989	99	186
Total	**2,976**	**2,123**	**2,682**	**9,054**	**4,978**	**7,675**	**12,030**	**7,101**	**10,357**
Private boat (%)							75%	70%	74%

Data Source: ODFW Ocean Recreational Boat Survey, extracted December 2009. NS = no sampling in port.

Table 2-19. Oregon albacore catch (number of fish) for charter and private boats, and combined, by year and port, 2007-2009.

Port	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Astoria	907	1,167	1,016	1,832	1,809	247	2,739	2,976	1,263
Garibaldi	628	440	322	4,943	3,993	4,119	5,571	4,433	4,441
Pacific City	70	98	4	1,910	314	767	1,980	412	771
Depoe Bay	2,139	670	942	9,100	2,666	3,458	11,239	3,336	4,400
Newport	4,920	3,126	3,419	14,825	6,267	10,887	19,745	9,393	14,306
Florence	0	0	0	65	287	41	65	287	41
Winchester Bay	36	0	31	1,571	460	969	1,607	460	1,000
Coos Bay	301	269	850	8,370	2,153	12,036	8,671	2,422	12,886
Bandon	1,607	333	1,727	624	0	813	2,231	333	2,540
Gold Beach	256	0	161	210	0	21	466	0	182
Brookings	319	81	41	4,289	136	184	4,608	217	225
Total	**11,183**	**6,184**	**8,513**	**47,739**	**18,085**	**33,542**	**58,922**	**24,269**	**42,055**
Private boat (%)							81%	75%	80%

Data Source: ODFW Ocean Recreational Boat Survey, extracted December 2009.

Table 2-20. Oregon albacore catch per unit of effort (number of fish/ angler trip), for charter and private boats, and combined, by year, by port, 2007-2009.

Port	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Astoria	2.9	3.0	3.1	5.4	4.3	4.2	4.2	3.7	3.2
Garibaldi	5.7	2.7	2.8	3.9	4.2	3.9	4.1	3.9	3.8
Pacific City	7.8	19.6	4.0	9.1	9.0	8.3	9.1	10.3	8.3
Depoe Bay	3.1	2.7	2.2	5.5	3.6	5.0	4.8	3.4	3.9
Newport	3.4	2.9	2.7	6.1	4.2	5.5	5.1	3.7	4.4
Florence	-	-	-	2.2	4.3	2.7	2.2	4.3	2.7
Winchester Bay	3.0	-	2.6	4.3	2.0	2.6	4.2	2.0	2.6
Coos Bay	4.4	2.5	3.5	4.9	2.2	4.1	4.9	2.3	4.0
Bandon	7.0	3.1	7.8	4.7	-	3.4	6.1	3.1	5.5
Gold Beach	8.5	-	3.4	17.5	-	0.8	11.1	-	2.4
Brookings	5.6	5.8	2.1	4.6	1.6	1.1	4.7	2.2	1.2
Overall	**3.8**	**2.9**	**3.2**	**5.3**	**3.6**	**4.4**	**4.9**	**3.4**	**4.1**

Data Source: ODFW Ocean Recreational Boat Survey, extracted December 2009.

2.2.3 Washington

The recreational albacore fishery in Washington leveled off in 2008 and 2009 with slightly fewer trips taken and a slight drop in the catch from 2007 (Table 2-21and 2-22). Catch per unit effort dropped slightly in both the charter and private boat fleets to below 2007 levels (Table 2-23).

Table 2–21. Washington albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port area, 2007–09.

Port Area	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
North Coast	63	63	48	305	165	194	368	228	242
Westport	1,026	919	1013	456	635	550	1,482	1,554	1,563
Ilwaco	637	516	568	1,105	1,130	1082	1,742	1,646	1,650
Total	1,726	1,498	1,629	1,866	1,930	1,826	3,592	3,428	3,455
Private boat (%)	—	—	—	—	—	—	**51.9%**	**56.3%**	**52.9%**

Data source: WDFW Ocean Sampling Program, extracted May 2010.

Table 2–22. Washington albacore catch (number of fish) for charter and private boats, and combined, by year and port area, 2007–09.

Port Area	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
North Coast	223	240	406	1,065	474	1,158	1,287	714	1,564
Westport	12,668	10,981	12,978	1,971	2,439	2,134	14,639	13,420	15,112
Ilwaco	3,029	2,575	3,887	6,127	4,818	4,044	9,156	7,393	7,931
Total	15,920	13,796	17,271	9,163	7,731	7,336	25,083	21,527	24,607
Private boat (%)	—	—	—	—	—	—	**36.5%**	**35.9%**	**29.8%**

Data source: WDFW Ocean Sampling Program, extracted May 2010.

Table 2–23. Washington albacore catch per unit of effort (number of fish/angler trip) for charter and private boats, and combined, by year and port, 2007–09.

Port Area	Charter			Private			Combined		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
North Coast	3.5	3.8	8.5	3.5	2.9	6.0	3.5	3.1	6.5
Westport	12.3	11.9	12.8	4.3	3.8	3.9	9.9	8.6	9.7
Ilwaco	4.8	5.0	6.8	5.5	4.3	3.7	5.3	4.5	4.8
Total	**9.2**	**9.2**	**10.6**	**4.9**	**4.0**	**4.0**	**7.0**	**6.3**	**7.1**

Data source: WDFW Ocean Sampling Program, extracted May 2010.

It appears that private boat effort has remained fairly constant (Table 2-21). However, the private boat sector's proportion of the overall albacore catch decreased slightly compared to 2007 (Table 2-22).

Beginning in 2005, a mandatory charter boat tuna logbook program was implemented to provide additional information on location and effort in the charter albacore fishery.[4] Average catch per angler as reported in logbooks was 12.0 in 2005, then increased to 12.8 in 2006 and 2007 and declined in both 2008 and 2009 to 12.1 and 11.6, respectively (Table 2-24). The average weight (pounds) per tuna caught and reported in the logbooks was 19.1 in 2005, and subsequently decreased to 16.1 in 2006, increased to 19.8 in 2007 and decreased to 18.2 in both 2008 and 2009.

Table 2–24. Washington albacore catch per unit of effort (number of fish/angler trip) and average weight (pounds) per tuna caught by year, 2005–09 as reported in charter logbook program.

Year	Average CPUE	Average Weight per Albacore (pounds)
2005	12.0	19.1
2006	12.8	16.1
2007	12.8	19.8
2008	12.1	18.2
2009	11.6	18.2

2.3 Highly Migratory Species Taken in Non-HMS Fisheries

2.3.1 California

In California, HMS MUS are occasionally taken by fisheries targeting other species (Table 2-25). In 2009, about 100 kg of albacore were taken incidentally to groundfish trolling for sablefish and rockfish, and about 400 kg were taken incidentally to coastal pelagic species. About 500 kg of thresher shark was taken incidentally to trawling for halibut and other groundfish. However, 2.2 mt was taken in set longline gear, and about 55 mt was taken in set gillnet and small mesh drift gill net fisheries. Although the amount of thresher shark taken in set gill net gear is significant, they are caught incidentally to fisheries for California halibut and white seabass, which command a much higher ex-vessel price; set gill net is not subject to the restrictions on HMS that small mesh drift gill net is. Both thresher shark and albacore were also taken in coastal pelagic species (CPS) purse seines; however, less than three vessels landed both species, and landings could not be reported because of Federal data confidentiality rules.

[4] This logbook data does not factor into Washington's official catch of record, which is calculated from data collected and analyzed by the Ocean Sampling Program (OSP).

Table 2–25. Landings (mt) of HMS Species in non-HMS gears.

	CPS Purse Seine	Troll (other fish)	Trawl	Set Longline	Set Gillnet	Small mesh DGN
Albacore tuna	*	0.1			.1	
Thresher Shark	*		0.5	2.2	45.3	9.5
Mako shark					3.4	13.6
Blue shark						1.4

*-Withheld for data confidentiality reasons.
Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted May 18, 2010.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiplying the conversion factor of 0.9072 for mt. A conversion factor of 1.7 for thresher and 1.45 for mako was multiplied by the reported dressed weight to obtain a round weight.

2.3.2 Oregon

In Oregon, most Highly Migratory Species (MUS) are rarely landed by gears targeting other species. During 2009, less than 1 mt of these HMS species, consisting of small amounts of blue shark and other unidentified shark species, were landed by non-HMS fisheries (Table 2-26). Very small amounts of blue shark and unidentified sharks were taken incidentally by bottom longline gear targeting sablefish. Approximately 0.5 mt of unidentified sharks were also taken with midwater trawl gear.

Table 2-26. Landings (mt) of HMS Species with non-HMS gear in Oregon, 2009.

Species	Bottom Longline	Midwater Trawl	Bottom Trawl	Baitfish Net	Total
Blue Shark	0.01	0	0	0	0.01
Unid. shark	<0.01	0.54	0	0	0.54

Data source: ODFW fish ticket landings data, extracted July 2010.

3.0 REGULATIONS CURRENTLY IN PLACE

3.1 Summary of the HMS FMP Management Measures and Regulations

On April 7, 2004, NMFS published a final rule to implement the approved provisions of the HMS FMP (69 FR 18444), with the exception of the Reports and Record Keeping requirements, which were granted a delayed effectiveness pending collection-of-information clearance by the Office of Management and Budget (OMB). Clearance of these delayed requirements, which covers logbooks, permits, vessel monitoring systems, and pre-trip notifications, was received by OMB and became effective on February 10, 2005 (70 FR 7022). In addition, five HMS FMP regulatory amendments have been prepared and finalized since the original final rule was put in place (Table 3-1).

Table 3-1. History of HMS FMP regulatory amendments.

Title of Regulation	Federal Register Number	Date Published	Date Effective
Revised Method for Renewing and Replacing Permits Issued under the HMS FMP.	72 FR 10935	6/12/07	4/11/07
Amended Regulatory Text Governing Closures of the Swordfish Drift Gillnet Fishery in the Pacific Loggerhead Sea Turtle Conservation Area during an El NiZo Event	72 FR 31756	6/8/07	7/9/07
Amended Vessel Identification Regulations for HMS Recreational Charter Vessels	72 FR 43563	8/6/07	9/5/07
Daily Bag Limits for Sport Caught Albacore and Bluefin Tuna in the EEZ off California	72 FR 58258	10/15/07	11/14/07
Establishment of an HMS Permit Fee	74 FR 37177	7/28/09	08/27/09

A textual summary of the HMS regulations contained in Table 3.1 can be found in the 2009 HMS SAFE report which is available on-line (http://www.pcouncil.org/highly-migratory-species/stock-assessment-and-fishery-evaluation-safe-documents/). Copies of the current suite of HMS FMP regulations along with an HMS FMP Compliance Guide can be found on the NMFS Southwest Region website at: http://swr.nmfs.noaa.gov. Since fishery rules frequently change, fishermen must familiarize themselves with the latest regulations and are responsible for complying with the current official regulations set forth in the Code of Federal Regulations at 50 CFR Part 660.[1]

The HMS FMP regulations are necessary for Federal management of U.S. fishing vessels targeting HMS within the West Coast EEZ of California, Oregon, and Washington and the adjacent high seas waters. This HMS FMP applies to all U.S. vessels that fish for HMS within the EEZ off California, Oregon, or Washington and to U.S. vessels that pursue HMS on the high seas (seaward of the EEZ) and land their fish in California, Oregon, or Washington. The HMS FMP does not apply to U.S. vessels that fish for HMS on high seas and land into a non-U.S. port. Additional restrictions apply under the High Seas Fishing Compliance Act[2] and for Western Pacific longline permitted vessels landing into West Coast ports.[3]

Regulations for HMS in Washington, Oregon, and California vary from state to state. The HMS FMP contains Federal measures for HMS fisheries, which provide a region-wide management regime applicable to all vessels landing in West Coast ports. State regulations not superseded by the initial Federal regulations will continue to remain in effect until such time as the Council determines they should be supplanted by Federal regulations. Some of the state regulations are inconsistent from state to state, but

1 50 CFR part 660 is available online at http://www.access.gpo.gov/nara/cfr/waisidx_03/50cfr660_03.html
2 http://www.nmfs.noaa.gov/ia/services/highseas.htm
3 http://www.wpcouncil.org/pelagic.htm

these inconsistencies do not pose management problems that require immediate Federal action.

The HMS FMP, under the management auspices of the Pacific Council, serves as a mechanism to cooperate with other regional and international management bodies to work towards consistent management of U.S. fisheries in the Pacific Ocean. Federal measures impacting these fisheries, which arise from several different Federal laws, may be more efficiently addressed within the Council framework, and related regulations can be viewed together. An important goal of the HMS FMP is to assure that issues of national and international concern are addressed, and to determine how recommendations of international bodies should be applied to domestic fisheries of the West Coast.

The HMS FMP identifies 13 highly migratory species as management unit species (listed in Table 1–1) and defines the legal gear types and management measures used to harvest them.

The fishing gears described below are authorized for the commercial and recreational harvest of HMS in the EEZ by all permitted vessels, and beyond the EEZ by vessels landing into West Coast ports. Gear that is not defined as legal gear is prohibited from harvesting HMS under the HMS FMP. Specific management measures regulating the use of legal gear types will be developed if necessary, using the framework procedures of the HMS FMP.

3.1.2 HMS Commercial Gear

Harpoon: Fishing gear consisting of a pointed dart or iron attached to the end of a line several hundred feet in length, the other end of which is attached to a flotation device. Harpoon gear is attached to a pole or stick that is propelled only by hand, and not by mechanical means.

Surface Hook-and-Line: One or more hooks attached to one or more lines (includes troll, rod and reel, handline, albacore jig, live bait, and bait boat; excludes pelagic longline and mousetrap gear[4]). Surface hook-and-line is always attached to the vessel.

Drift Gillnet: A panel of netting, suspended vertically in the water by floats along the top and weights along the bottom, which is neither stationary nor anchored to the bottom. The HMS FMP final rule defines drift gillnet gear as 14 inch (35.56 cm) stretched mesh or greater.

Purse Seine: A floated and weighted encircling net that is closed by means of a purse line threaded through rings attached to the bottom of the net (includes encircling net, purse seine, ring net, drum purse seine, lampara net).

Pelagic Longline: A main line that is suspended horizontally in the water column, which is neither stationary nor anchored, and from which dropper lines with hooks (gangions) are attached.

3.1.3 HMS Recreational Gear

Rod-and-Reel (pole-and-line): A hand-held (including rod holder) fishing rod with a manually or electrically operated reel attached.

Spear: A sharp, pointed, or barbed instrument on a shaft. Spears can be operated manually or shot from a gun or sling.

Hook-and-Line: One or more hooks attached to one or more lines (excludes mousetrap gear).[4]

3.1.4 Landings and Gear Use Regulations

At this time there are no quotas for HMS species, although there are harvest guidelines. A quota is a specified numerical harvest objective, the attainment of which triggers the closure of the fishery or fisheries for that species. A harvest guideline is a numerical harvest level that is a general objective and is not a quota. If a harvest guideline has been reached, NMFS will initiate a review of the species in question according to provisions in the HMS FMP and in consideration of Council guidance. The HMS FMP establishes annual harvest guidelines of 340 mt for common thresher sharks and 150 mt for shortfin mako sharks. Because total catches and basic population dynamic parameters for these shark species are poorly known, they are being managed using precautionary harvest guidelines.

The HMS FMP final rule prohibits the retention of the species listed below in Table 3-2. In general, prohibited species must be released immediately if caught while targeting HMS, unless other provisions for their disposition are established in accordance with HMS FMP guidelines.

Table 3-2. Prohibited Species covered under the HMS FMP final rule.

Common Name	Scientific Name
great white shark	*Carcharodon carcharias*
basking shark	*Cetorhinus maximus*
megamouth shark	*Megachasma pelagio*
Pacific halibut	*Hippoglossus stenolepis*
pink salmon	*Onchorhynchus gorbuscha*
Chinook salmon	*O. tshawytscha*
chum salmon	*O. keta*
sockeye salmon	*O. nerka*
coho salmon	*O. kisutch*

U.S. citizens fishing in waters covered under the HMS FMP are bound by the rules and regulations set forth in the Shark Finning Prohibition Act of 2000.[5] The Act prohibits, among other things, any person subject to U.S. jurisdiction from: 1) engaging in shark finning, 2) possessing shark fins aboard a U.S. fishing vessel without the corresponding carcass, or 3) landing shark fins without a corresponding carcass. The Act requires an annual report to Congress detailing progress made in addressing the elements of the Act. The report highlights work being conducted by NMFS to monitor and conserve HMS shark populations under Pacific Council management. A copy of the Shark Finning Report to Congress for 2009 can be viewed at: www.nmfs.noaa.gov/by_catch/docs/SharkFinningReport09.pdf

The HMS FMP prohibits the sale of striped marlin by all vessels as a means to provide for and maximize recreational fishing opportunities for this species. Striped marlin is considered to have far greater value as a recreational target species than as a commercial target species. Prohibiting sale removes the incentive for commercial fishermen to take striped marlin.

[4] Mousetrap gear means a free-floating set of gear thrown from a vessel, composed of a length of line with a float on one end and one or more hooks or lures on the opposite end.

[5] Copies of the Act can be downloaded at: http://www.nmfs.noaa.gov/sfa/hms/hmsdocuments.html. Copies of the Small Entity Compliance Guide Outlining the Regulations to Implement Shark Finning Prohibition Act can be viewed at: http://swr.nmfs.noaa.gov/pir/cg2.htm.

3.1.5 Incidental Landings

The HMS FMP authorizes incidental commercial landings of HMS, within limits, for non-HMS gear such as bottom longline, trawl, pot gear, small mesh drift gillnet, set/trammel gillnets, and others. Incidental catch refers to harvest of HMS that are unavoidably caught while fishing for other species or fishing with gear that is not legal for the harvest of HMS.

Small-mesh drift gillnetters and bottom set net gillnetters are not permitted to land swordfish but would be permitted to land other HMS, with the restriction of 10 fish per landing of each non-swordfish HMS.

Bottom longline (set line) fishery landings are restricted to three HMS sharks, or 20 percent of total landings by weight of HMS sharks, whichever is greater.

For trawl, pot gear, and other non-HMS gear, a maximum of 1 percent of total weight per landing for all HMS shark species combined is allowed (i.e., blue shark, shortfin mako shark, and bigeye, pelagic, and common thresher sharks) or two HMS sharks, whichever is greater.

A drift gillnet vessel with a stretched mesh size less than 14 inches may not target HMS, although an incidental landing of 10 HMS per trip, other than swordfish, will be allowed to minimize bycatch while fishing for state managed species.

Albacore surface hook-and-line vessels may not deploy small-mesh drift gillnets to target albacore as was customarily practiced by selected vessels prior to passage of the HMS FMP final rule.

In Washington, it is unlawful to land thresher shark taken by any means from state and offshore waters of the Pacific Ocean north of the Washington-Oregon boundary and south of the U.S.-Canada boundary. It is unlawful to land any thresher shark in Washington taken south of the Washington-Oregon boundary unless each thresher shark landed is accompanied by a minimum of two swordfish.

In Oregon, it is unlawful to take thresher shark, swordfish or other HMS species for commercial purposes with gillnets in State waters. It is also unlawful, based on a 2009 Oregon State regulation change, to land any of these species in Oregon if taken with gillnets, including fish taken outside State waters. However, thresher shark, swordfish, or other HMS species taken with authorized commercial gear (i.e., approved gear other than gillnet) may be landed in Oregon provided that catch, season and other applicable regulatory measures are adhered to.

3.1.6 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 and/or landing HMS 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.

Table 3-3 shows the number of HMS permits issued to date. Keep in mind that the permit data presented reflects valid permits at the time of SAFE publication and does not necessarily reflect total number of active vessels (i.e., vessels with catch and effort history in a given fishery year).

Table 3-3. HMS permits recorded in the permit database for each year since the regulation became effective on February 10, 2005.

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**

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

3.1.7 HMS Data Collection

Catch, effort, and catch disposition data are critical for monitoring HMS fisheries, assessing the status of the stocks, and evaluating the effectiveness of management. All commercial fishing operations conducted with HMS FMP approved gear, 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 day of the fishing trip must be submitted to NMFS or the appropriate state management agency within 30 days of each landing or transshipment of HMS. Each form must be signed and dated by the fishing vessel operator.

A total of 1,220 albacore trips from 466 vessels were submitted to the NMFS Southwest Fisheries Science Center (SWFSC) in La Jolla, California, in 2009 compared to 1,538 trips from 628 vessels in 2008. A total of 10,686 mt of albacore was landed in 2009 compared to 10,672 mt in 2008. A total of 6,143 mt of albacore were recorded as catch in mandatory logbook submissions for 2008 compared to 7,419 mt in 2007. This equates to a 60 percent logbook comparison estimate for 2008 using the landed catch versus logbook reported catch methodology.

CDFG implemented a harpoon logbook and permit program in 1974. The logbook has been modified over time, but the primary focus has been to document catch, effort, and oceanographic conditions on the fishing grounds. According to market receipt data, there were 26 active vessels in 2009 compared to 31 active vessels that fished in 2008. Logbook data from 2009 are not yet available.

The gillnet logbook program was implemented in 1980 to study the development of the drift gillnet shark fishery to determine the effects of the fishery on swordfish and striped marlin. Logbook data for 2009 are not yet available.

Washington recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips in 2005. According to the logbooks received for 2009, 22 charter vessels completed a total of 189 trips and landed approximately 22,930 albacore. Both catch and effort increased in 2009. In 2007 and 2008 the recreational charter fleet averaged around 105 albacore per vessel trip but in 2009, they averaged 121 albacore per vessel trip. While logbook data are providing additional information on location, effort, and landings in Washington's charter albacore fishery, the official record of catch for albacore comes from dockside sampling by the Washington Ocean Sampling Program (OSP). Results from the OSP data are reported in Chapter 2 for 2005-2007.

Oregon recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips in 2005. Logbook data for 2009 are not yet available. Non-logbook estimates of Oregon recreational HMS catch and effort for the 2009 are provided in Section 2.2.2.

Based on available logbook data, 145 California CPFVs targeted HMS in 2009. These vessels logged 734 days at-sea within the U.S. EEZ in 2009 compared to 121 CPFVs that logged 903 days at-sea in 2008. In addition to the CPFV logbook program, CDFG implemented its California Recreational Fishery Survey (CRFS) in 2004 to provide catch and effort estimates for marine recreational finfish fisheries. It is a collaborative effort between the CDFG and the PSMFC, and is funded by state and Federal sources. In 2009, CRFS field samplers interviewed 130 CPFV tuna anglers compared to 123 in 2008 (from RecFIN, extracted August 10, 2010).

3.1.8 Observer Requirements

All U.S. fishing vessels operating in HMS fisheries (including catcher/processors, at-sea processors, and vessels that embark from a port in Washington, Oregon, or California and land catch in another area), may be required to carry a NMFS-certified observer on board to collect scientific data when directed to do so by the NMFS Regional Administrator. NMFS shall advise the permit holder or the designated agent of any observer requirement at least 24 hours (not including weekends and Federal holidays) before any trip. Pre-season informational letters were sent out to the various HMS fleets explaining the requirements for carrying an observer, which includes, among other things, providing bunk space and food equivalent to that given crew members.

During 2009, the NMFS Southwest Region Observer Program observed the following HMS fisheries:

- Drift gillnet: 7 trips and 101 sets for a coverage rate of approximately 13.2 percent.
- Albacore troll: Albacore trips did not carry federal observers in 2009 due to funding limitations.
- Tuna Purse Seine: No tuna directed trips were conducted by the West Coast-based coastal purse seine fleet in 2009.
- Pelagic tuna longline: 4 trips and 50 sets, 100 percent coverage.
- HMS CPFV: CPFV trips did not carry federal observers in 2009 due to funding limitations.

3.1.9 U.S. Pacific Albacore Logbook and HMS Permits Compliance Check for 2009

3.1.9.1 Enforcement of Regulations

Penalties for violating the regulations and prohibitions outlined in the HMS FMP final rule are determined on a case-by-case basis; they can include significant civil penalties and permit sanctions. NOAA has implemented a summary settlement penalty program to increase compliance with logbook reporting requirements, and is developing a civil administrative penalty schedule for the HMS FMP Final Rule. The NOAA Summary Penalty Program for the West Coast HMS fishery can be found at 50 CFR 660, Subpart K. The Program focuses on the reporting compliance for logbooks and sets the penalty schedule for failure to timely complete, or timely submit, a logbook as required by regulation as follows: 1–5 days late, $500; 6 or more days late, $100/day.

3.1.9.2 Compliance Check

In 2009 769 vessels made commercial landings of HMS species with HMS approved gear. Of those, 83 were identified as having made an HMS commercial landing while not possessing a valid NMFS Pacific HMS permit, for a permit compliance rate of 89 percent. For the 2008 season, 73 commercial vessels were identified as not having possessed a valid HMS permit. The total number of vessels having made HMS landings was 587, resulting in a permit compliance rate of 88 percent. The CPFV portion of the 2009 compliance check identified 20 vessels as having caught HMS without having a valid permit in 2009. For 2008, there were 37 CPFVs identified as having caught HMS without a valid HMS permit.

Vessels which appeared to be in noncompliance with NMFS Pacific HMS regulations were either sent a certified warning letter or referred to the NOAA Fisheries Office for Law Enforcement for investigation.

3.2 Protected Resources Regulations

Longline and drift gillnet vessels on rare occasions encounter endangered and threatened species of sea turtles and marine mammals while targeting HMS. Longline vessels also on rare occasions encounter a number of sea birds, including the endangered short-tailed albatross. Endangered and threatened marine species are protected through a number of Federal laws, including the ESA and the MMPA. The HMS FMP final rule adopted measures to minimize interactions of HMS gears with protected species and to ensure that the fisheries are operating consistent with Federal law. 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 to ESA-listed protected resources were analyzed as part of the section 7 consultation and 2004 biological opinion (BO) on the HMS FMP. The BO included an Incidental Take Statement with anticipated mortalities and entanglements of ESA-listed marine mammals and sea turtles that are likely to interact with the drift gillnet vessels targeting HMS species (see Table 3-4). The BO considered the impacts of the then proposed shallow-set longline fishery and found that the fishery would result in jeopardy to threatened loggerhead sea turtles. As a result, this component of the proposed HMS fishery was prohibited.

Table 3-4. Anticipated incidental takes of listed species in the HMS fisheries.

Species Estimated	Entanglement	Estimated Mortalities	Conditions Resulting in Take
Fin whale	4 in 3 years	2 in 3 years	
Humpback whale	4 in 3 years	0	
Sperm whale	4 in 3 years	2 in 3 years	
Green turtle	4	1	SSTs in fishing area similar to Nov 99
Leatherback turtle	3	2	
Loggerhead turtle	5	2	Only in El Niño years
Olive ridley turtle	4	1	SSTs in fishing area similar to Nov 99

Note: SST – sea surface temperature.

Except where noted, the anticipated mortalities are annual estimates. Takes of listed marine mammals are rare events and are calculated over a three-year time period, consistent with the MMPA permit required under section 101(a)(5)(E) for incidental take of ESA-listed marine mammals in fisheries. Takes of green, olive ridley, and loggerhead sea turtles are uncommon 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.

The MMPA requires that all commercial fisheries in the U.S. be categorized and included on an annual List of Fisheries (LOF). The fisheries are placed in one of three categories based upon the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. The current 2010 LOF was published November 16, 2009 (74 FR 58859). The drift gillnet fishery is listed as a category I fishery; the tuna purse seine fishery is listed as a category II fishery. Owners of vessels in these fisheries are required to register with NMFS and obtain a marine mammal authorization to lawfully incidentally take marine mammals. They may also be required to accommodate an observer aboard the vessel upon request by NMFS. Other HMS fisheries are listed under category III. (The pelagic longline fishery was listed as a

category III fishery, from a category II fishery, in the final 2010 LOF.) Any incidental injuries or mortalities of marine mammals occurring during fishing operations must be reported to NMFS. Injury/mortality report forms and instructions for submitting forms to NMFS can be downloaded from: http://www.nmfs.noaa.gov/pr/interactions/mmap/.

On January 5, 2010, NMFS published a proposed rule to designate areas off the U.S. west coast as critical habitat for endangered leatherback sea turtles. Existing leatherback critical habitat is at Sandy Point Beach and adjacent waters on the western end of St. Croix in the U.S. Virgin Islands. This area is a known nesting beach for leatherback sea turtles in the Atlantic Ocean. NMFS was petitioned in October 2007 to designate the drift gillnet leatherback sea turtle conservation area as critical habitat, an area of roughly 200,000 square miles. NMFS is proposing an area of approximately 70,000 square miles from Point Vicente to Point Arena, California and from the Umpqua River in Oregon to Cape Flattery, Washington. NMFS held two public hearings on the proposed critical habitat, presented the information to the Council and various sub-committees in April, and accepted comments through April 23, 2010. A final decision on the proposed critical habitat is expected in 2011.

3.3 International Regulatory Aspects of the HMS FMP

Management of Pacific HMS fisheries is complicated by the wide-ranging behavior of the stocks, the many jurisdictions that are involved, and a lack of reliable data. Many HMS are distributed throughout the Pacific Ocean and vessels from the United States and many other nations harvest them. Effective management of the stocks throughout their ranges requires international cooperation. The HMS FMP and its associated fisheries are affected by the conservation and management measures adopted by regional fishery management organizations (RFMOs); in particular, those adopted by the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fisheries Commission (WCPFC). In addition, the U.S.-Canada Albacore Treaty and the associated bilateral negotiations between the United States and Canada affect the HMS FMP and albacore fisheries based out of the U.S. West Coast.

3.3.1 The Inter-American Tropical Tuna Commission

The IATTC is an international convention that was established in 1950 for the conservation and management of fisheries for tunas, tuna-like species, and other species of fish taken incidentally by tuna fishing vessels in the eastern Pacific Ocean (EPO). Currently, there are 16 member nations to the IATTC Convention: Colombia, Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, Spain, United States, Vanuatu, and Venezuela. Belize, Canada, China, Cook Islands, the European Union, and Kiribati are Cooperating Non-Parties, and Chinese Taipei (Taiwan) is a Cooperating Fishing Entity.

The IATTC is responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels in the EPO. The Tuna Conventions Act of 1950 provides the United States with the Federal authority to implement the measures adopted by the IATTC. The HMS FMP can at times be used to implement or supplement recommendations of the IATTC or other international fishery management bodies, particularly for U.S. fisheries based out of the west coast that primarily operate in domestic waters.

In 2003, the IATTC adopted a resolution that approved the Antigua Convention, a major revision of the original convention establishing the IATTC. This new text brings the convention current with respect to internationally accepted laws on the conservation and management of oceanic resources, including a mandate to take a more ecosystem-based approach to management. The Antigua Convention will enter into force on August 27, 2010. Implementing legislation packages for the Antigua Convention have been

sent to the House Committee on Foreign Affairs and the Senate Commerce Science and Transportation Committee; however, Congress has not yet passed such legislation.

IATTC resolutions are domestically implemented in regulations at 50 CFR 300, Subpart C.

The next IATTC meeting is scheduled for September 27-October 1, 2010, in Antigua, Guatemala.

3.3.1.1 An Update of IATTC Resolutions

Since the Antigua Convention enters into force on August 27, 2010, the Parties to the IATTC decided to hold the annual meeting in September 2010 rather than in June as has been the practice in the past. Therefore, if resolutions are adopted at the September meeting, they are not reflected in this 2010 HMS SAFE; however, updates will be provided in next year's document and will also appear on the IATTC website as they become available.

The active IATTC Resolutions may be accessed at the following IATTC website: http://www.iattc.org/ResolutionsActiveENG.htm.

Proposals that will likely be discussed at the September 2010 IATTC meeting

Seabird Proposal – The U.S. delegation, in cooperation with the European Union, presented a proposal at the 2009 IATTC annual meeting on mitigation measures to prevent/reduce sea bird bycatch in longline fisheries. The proposal was modeled after the technical specifications the WCPFC adopted last year. The proposal was not adopted in 2009; thus it will likely be discussed again at the 2010 meeting.

Proposal to Modify the IUU Vessel Listing Procedures – The U.S. delegation introduced a proposal at the June 2009 annual meeting to revise the IATTC measure that establishes a list of vessels presumed to have engaged in illegal, unregulated and unreported (IUU) fishing activities. The measure currently in place lacks some of the necessary details to provide clear guidance to the Secretariat on the creation and management of the IUU list and does not ensure due process for the vessels and their flag states. The proposal received support and many members submitted comments to further revise the proposal; however, it was not adopted. It will likely be revisited at the 2010 meeting.

Proposal to Prohibit Fishing on Data Buoys – The U.S. delegation is considering whether to present a proposal which would, if adopted, require that Commission members prohibit their fishing vessels from fishing in the vicinity of data buoys on the high seas in the Convention Area. This measure is meant to prevent vandalism and damage to data buoys.

3.3.2 Western and Central Pacific Fisheries Commission

The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPO) entered into force in June 2004. The objective of the Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stock in the WCPO. The United States signed the Convention in 2000 and ratified it in 2007, thereby becoming a member of the WCPFC. The U.S. domestic procedures for ratification of the Convention were completed in June 2007.

There are 25 Members of the Commission: Australia, China, Canada, Cook Islands, European Union, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, the United States, and Vanuatu. American Samoa, Guam, French Polynesia, New

Caledonia, Tokelau, Wallis, Futuna, and the Commonwealth of the Northern Mariana Islands are Participating Territories, and Belize, Indonesia, Senegal, Mexico, El Salvador, Ecuador, and Vietnam are Cooperating Non-members.

WCPFC conservation and management measures are accessible on the following WCPFC website: http://www.wcpfc.int/conservation-and-management-measures. The NOAA Fisheries Pacific Islands Regional Office (PIRO) has the lead on implementing the measures adopted by the WCPFC. Documentation and background information on recent rulemakings can be found at http://www.fpir.noaa.gov/IFD/ifd_documents_data.html.

WCPFC conservation and management measures are domestically implemented in regulations at 50 CFR 300, Subpart O.

The next meeting of the WCPFC will be in December 2010 in Pohnpei, Federated States of Micronesia.

3.3.2.1 An Update of WCPFC Conservation and Management Measures

The last WCPFC annual meeting was held in December 2009 in Tahiti. Several conservation and management measures (CMMs) were adopted and a number of existing measures were revised. Each of these decisions is summarized below.

CMM 2009-01 - *WCPFC Record of Fishing Vessels and Authorization to Fish* - This measure replaces CMM 2004-01. The changes relate primarily to the operation in the Convention Area of carrier and bunker vessels that are not flagged to members or cooperating non-members of the Commission. Regulatory action appears to be needed to ensure that U.S. vessels conduct transshipment and bunkering in the Convention Area only with authorized vessels (see paragraph 2 in the CMM).

CMM 2009-02 - *Conservation and Management Measure on the Application of High Seas FAD Closures and Catch Retention* - This new measure adds specificity to the seasonal FAD closure and catch retention elements of CMM 2008-01, which is aimed at conserving bigeye tuna and yellowfin tuna stocks. Although not reflected in CMM 2009-02 itself, the Commission decided that any member that had already implemented those elements in a manner compatible with, but not necessarily identical to, the new measure would be given some flexibility in implementing CMM 2009-02 for 2010. The United States is apparently the only member of the Commission to have promulgated regulations implementing the seasonal FAD closure and catch retention elements of CMM 2008-01 (see the final rule at 74 FR 38544).

CMM 2009-03 - *Conservation and Management for Swordfish* - This measure replaces CMM 2008-05. The main changes are a new provision for cases in which annual catch limits are exceeded, and adjustments to the specification of Commission members' baseline catches. None of the changes raise the need for regulatory action. However, the United States will periodically review the need for regulatory action with respect to the most substantive elements of the measure - namely, the measure's limits on swordfish catches and the number of vessels fishing for swordfish in the South Pacific Ocean.

CMM 2009-04 - *Conservation and Management of Sharks* - This measure replaces CMM 2008-06. The only change is the addition of silky shark as a "key shark species," which is relevant in terms of reporting and research.

CMM 2009-05 - Conservation and Management Measure Prohibiting Fishing on Data Buoys - This new measure requires that Commission members prohibit their fishing vessels from fishing in the vicinity of data buoys on the high seas in the Convention Area.

CMM 2009-06 - Conservation and Management Measure on the Regulation of Transshipment - This new measure regulates transshipment activities in the Convention Area and includes notice and reporting requirements for vessels involved in transshipment, both at sea and at port. NOAA Fisheries Service intends to develop and implement appropriate regulations to implement this measure under authority of the Act.

CMM 2009-07 - Conservation and Management Measure for Pacific Bluefin Tuna - This new measure requires that Commission members limit fishing effort in the North Pacific Ocean for Pacific bluefin tuna during 2010.

CMM 2009-08 - Charter Notification Scheme - This new measure requires that Commission members notify the Commission of any charter arrangements involving vessels flagged to other nations.

3.3.3 The U.S.-Canada Albacore Treaty

The Treaty entered into force in 1982 and has been renegotiated several times to address limitations on the catch or effort on North Pacific albacore tuna by fishing vessels of one country operating in the jurisdiction of the other country. The Treaty allows fishing in the host country beyond 12 nautical miles during a fishing season that runs from June through October. The Treaty requires that the United States and Canada annually exchange lists of fishing vessels that may fish for albacore tuna in each other's waters. The vessels agree to abide by the provisions of the Treaty, which include vessel marking, recordkeeping, and reporting. The Treaty also allows the fishing vessels of each country to enter designated fishing ports of the other country to conduct several types of business transactions including the landing of albacore without payment of duties; transshipment of catches to any port of the flag state; selling catches for export or locally; and obtaining fuel, supplies, repairs, and equipment on the same basis as albacore tuna vessels of the other country. The Treaty allows Canadian albacore vessels to land their catch in the ports of Bellingham and Westport, Washington; Astoria, Coos Bay, and Newport, Oregon; and Eureka, California.

The current 3-year fishing regime (2009-2011), which allows 110 Canadian vessels to fish in the U.S. EEZ and an unlimited number of U.S. vessels in the Canadian EEZ, ends December 2011. It is expected that renegotiation meetings will begin in May 2011. Canada and the United States held consultations to review the 2009 fishing season, to discuss management arrangements, and to exchange updates on the status of the recently renewed Pacific Albacore Treaty in Victoria, British Columbia in May 2009. Both parties agreed to provide the other with a list of vessels authorized to fish off each other's coast. Canada's list is to be provided by June 1st in each applicable year (i.e., 2009-2011), and the United States is to provide a provisional list, which can be amended throughout the season, by July 1st in each applicable year.

Canada highlighted a number of Marine Protected Areas at the 2009 meeting, including the Bowie Seamount, where most commercial fishing is prohibited. This affects both Canadian and U.S. fleets. Information on Marine Protected Areas is available on the following Department of Fisheries and Oceans Canada website: http://www.dfo-mpo.gc.ca/oceans/marineareas-zonesmarines/mpa-zpm/index-eng.htm. Canada and the United States agreed that it was not necessary for Canadian vessels to hail to Shipcom, and that Tofino (the Canadian Coast Guard) hails were sufficient and hail information could be provided to the United States. Vessels need only hail in and hail out with Tofino at the start and stop of the harvesting season (this simplifies matters for harvesters following schools back and forth across the border who were concerned about being required to hail continuously as they moved back and forth from Canada to the United States).

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) will complete its full stock assessment on North Pacific albacore in 2011. The next bilateral meeting between the United States and Canada will be hosted by the United States in the spring of 2010.

U.S-Canada Albacore Treaty measures are domestically implemented in regulations at 50 CFR 300, Subpart L.

Tables 4-9 (Canadian vessels excluded) and 4-10 (all landings) provide data on the commercial landings in the West Coast albacore surface hook-and-line fishery from 1981-2009 all landings, and Tables 4-19 and 4-20 provide the real commercial ex-vessel revenues.

3.4 Bycatch and Other Monitored Species

NMFS monitors catch and bycatch in HMS fisheries through onboard observer programs. During the 2009/2010 fishing year, observers were placed on deep-set pelagic longline and drift gillnet fishing vessels. Less than three vessels participated in the deep-set pelagic longline fishery, so data confidentiality rules prevent those observations from being reported here. Observer coverage in this fishery was 100 percent. The drift gillnet fishery for swordfish and sharks has been observed by NMFS since 1990.

Table 3–5 summarizes the total catch and final disposition, by species, of all fish, marine mammals, sea turtles, and seabirds observed caught in the California/Oregon drift gillnet fishery during the 2009/2010 fishing season. Data were collected at sea by contract observers, and represent a total of 108 sets. Estimated total fishing effort for the season was 832 sets.

Table 3-5. NMFS California/Oregon Drift Gillnet Observer Program Observed Catch - 2009/2010 Fishing Season May 1, 2009, through January 31, 2010 (Source: NMFS SWR Observer Program).

Species	Total Caught	Number Kept	Number Returned			Number Damaged	Catch per 100 Sets
			Alive	Dead	Unknown		
Swordfish	227	220	0	7	0	20	210.2
Striped Marlin	1	0	0	1	0	0	0.9
Unidentified Billfish	1	0	0	1	0	0	0.9
Albacore	69	68	0	1	0	16	63.9
Bluefin Tuna	50	49	0	1	0	9	46.3
Skipjack Tuna	4	3	0	1	0	1	3.7
Yellowfin Tuna	3	3	0	0	0	0	2.8
Unidentified Tuna	3	1	0	2	0	2	2.8
Common Thresher Shark	22	22	0	0	0	1	20.4
Bigeye Thresher Shark	14	6	0	8	0	0	13.0
Longfin Mako Shark	4	4	0	0	0	0	3.7
Shortfin Mako Shark	100	97	1	2	0	1	92.6
Blue Shark	65	0	22	42	1	1	60.2
Hammerhead Shark	1	0	0	1	0	0	0.9
Salmon Shark	1	0	0	1	0	0	0.9
Spiny Dogfish	1	0	1	0	0	0	0.9
Common Mola	1462	0	1455	5	2	2	1353.7
Louvar	17	17	0	0	0	5	15.7
Opah	306	303	0	3	0	28	283.3
Pacific Bonito	15	8	0	7	0	0	13.9
Pacific Mackerel	38	27	8	3	0	2	35.2
Pacific Pomfret	9	9	0	0	0	2	8.3
Pelagic Stingray	1	0	1	0	0	0	0.9
Bullet Mackerel	33	28	0	4	1	0	30.6
Crestfish	1	1	0	0	0	0	0.9
Yellowtail	3	3	0	0	0	0	2.8
Remora	1	0	1	0	0	0	0.9
Leatherback Sea Turtle	1	0	1	0	0	0	0.9
Unidentified Common Dolphin	1	0	0	1	0	0	0.9
Pacific White-sided Dolphin	2	0	0	2	0	0	1.9
California Sea Lion	5	0	0	5	0	0	4.6

4.0 STATISTICAL SUMMARIES OF CATCH, REVENUE, AND EFFORT

4.1 Commercial Fisheries

Table 4–1. West Coast commercial HMS landings, revenues, and average prices by species, 2008–2009.

	2008			2009		
Species	Landings (round mt)	Ex-vessel revenue ($1000)	Average price ($/ round lb)	Landings (round mt)	Ex-vessel revenue ($1000)	Average price ($/ round lb)
Tunas						
Albacore	11,131	$28,853	$1.18	12,264	$27,470	$1.02
Yellowfin	65	$126	$0.88	45	$166	$1.68
Skipjack	3	$4	$0.56	5	$5	$0.48
Bigeye	27	$206	$3.45	12	$97	$3.67
Bluefin	1	$3	N.A.	415	$442	$0.48
Unspecified Tuna	1	$3	N.A.			N.A.
Tunas subtotal	**11,228**	**$29,195**	**$1.18**	**12,741**	**$28,180**	**$1.00**
Swordfish	**531**	**$2,373**	**$2.03**	**407**	**$1,924**	**$2.14**
Sharks						
Common Thresher	147	$281	$0.87	105	$195	$0.84
Pelagic Thresher	<0.5	<$0.5	N.A.	<0.5	<$0.5	N.A.
Bigeye Thresher	6	$5	N.A.	7	$5	N.A.
Shortfin Mako	35	$67	$0.87	29	$52	$0.82
Blue	<0.5	<$0.5	N.A.	1	<$0.5	N.A.
Sharks subtotal	**188**	**$353**	**$0.85**	**142**	**$252**	**$0.82**
Dorado	**2**	**$9**	**N.A.**	**1**	**$4**	**N.A.**
Total HMS	**11,949**	**$31,930**	**$1.21**	**13,291**	**$30,360**	**$1.04**

Interpretation: The total West Coast commercial HMS catch was 13.3 thousand mt in 2009, up 11 percent from 11.9 thousand mt in 2008. Tunas represented 96 percent of the total catch by weight in 2009. Albacore tuna catch was up 10 percent from the catch in the previous year, and was once again the largest component of tuna catch, representing about 96 percent of the total by weight. Bluefin was the next largest component of tuna catch at 415 mt.

Swordfish was the category with the next largest share of landings behind tuna at 3 percent of the total weight. Swordfish landings by weight were down by 23 percent (124 mt) from 2008 to 2009. Common thresher shark again comprised the largest component of commercial shark landings by weight in 2009. Total commercial shark landings by weight decreased by 24 percent (46 mt) from 2008 to 2009.

Total current dollar West Coast commercial HMS ex-vessel revenue of $30.4 million declined from $31.9

million in the previous year, for a decrease of 5 percent ($1.5 million). Tunas comprised 93 percent of the 2009 revenue total. Albacore generated by far the most important component of revenue for any single species, at $27.5 million. Swordfish was the next highest contributor to total revenue at $1.9 million. The average price for tuna was 15 percent lower in 2009 than in 2008. The overall average West Coast commercial HMS fish price decreased from $1.21 in 2008 to $1.04 in 2009, or roughly 14 percent.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010 (landings and revenues), and represent the latest two years of current dollar revenues and landings data shown in Tables 4-4 and 4–5. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line, then dividing by 2204.6. Revenues were computed for each species as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data. Average prices are estimated as revenue divided by round pounds, where the latter are metric tons multiplied by 2204.6. Estimated averages are subject to rounding error for categories with small revenues or landings.

Table 4–2. West Coast commercial HMS landings, revenues, and average prices by fishery, 2008-2009.

	2008			2009		
Fishery	Landings (round mt)	Ex-vessel revenue ($1000)	Average price ($/ round lb)	Landings (round mt)	Ex-vessel revenue ($1000)	Average price ($/ round lb)
Surface Hook-and-line**	9,777	$24,915	$1.16	11,579	$25,819	$1.01
Drift gillnet	670	$2,355	$1.59	446	$1,477	$1.50
Harpoon	49	$460	$4.26	50	$462	$4.19
Longline	*	*	*	***	***	***
Purse seine	*	*	*	943	$820	$0.39
Total HMS	**10,496**	**$27,730**	**$1.20**	**13,018**	**$28,579**	**$1.00**

* Not reported due to data confidentiality requirements (fewer than three vessels).

** Canadian vessels are excluded.

*** Not produced for 2009, due to no new data which is not confidential.

Interpretation: Table 4–2 shows that the total West Coast commercial HMS catch for the indicated fisheries was 13.0 thousand mt in 2009, up 23 percent (about 2.4 thousand metric tons) from 2008. The surface hook-and-line fishery represented 89 percent of the total catch.

Total current dollar West Coast commercial HMS ex-vessel revenue for these fisheries of $28.6 million increased from $28.2 million in the previous year, for a percentage increase of 1.4 percent ($388 thousand). The overall average West Coast commercial HMS fish price per round metric ton of catch for these fisheries decreased from $1.20 in 2008 to $1.00 in 2009 (17 percent decline).

Source and Calculations: The data were extracted from PacFIN on various dates in August 2009, and represent the latest two years of current dollar revenues and landings data in Tables 4–9 through 4–18. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line, then dividing by 2204.6. Revenues were computed for each species as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data. Average prices are estimated as revenue divided by round pounds, where the latter are metric tons multiplied by 2204.6. Estimated averages are subject to rounding error for categories with small revenues or landings. Data for Canadian surface hook-and-line vessels fishing in the U.S. EEZ are excluded from the table.

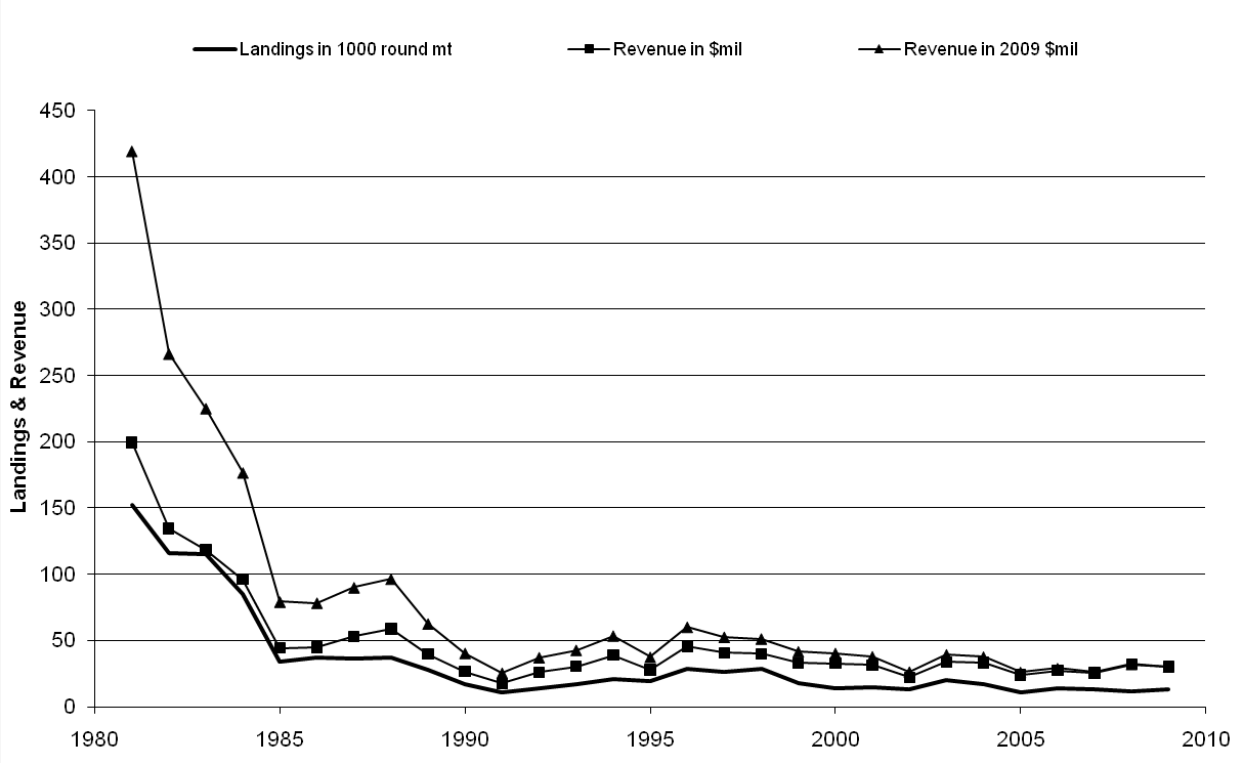

Figure 4–1. West Coast commercial HMS landings and revenues, 1981–2009.

Interpretation: Figure 4–1 shows aggregate Pacific Coast HMS commercial landings in thousands of round metric tons against aggregate revenues in millions of both current and 2009 dollars from 1981 through 2009, and the accompanying tables below (Tables 4–3 through 4–6) show commercial landings and revenues by species. Data for the graph are displayed in the far right columns of the three accompanying tables.

The most striking feature of Figure 4-1 is a precipitous drop in both commercial landings and revenues over the period from 1981 through 1985. Landings fell from a level of about 150,000 mt in 1981 to a level which remained permanently below 50,000 mt from 1985 onwards. Revenues in real (2009) dollars fell from $528 million in 1981 to a level permanently below $200 million after 1984. Landings have recently occurred at levels between 10-20 mt, while real revenues since 2001 have ranged between $25 million and $40 million in 2009 dollars.

The drops in landings and revenues are primarily explained by the substantial decline in tuna landings during the 1980s for species other than albacore. This drop in tuna landings reflects a decline in purse seine landings and revenues, which is largely explained by structural changes in the tuna purse seine fishing industry after 1980. In 1980, there were 20 U.S. tuna processing plants in operation; this number declined to seven in 1990, while the U.S. fleet of purse seiners in the Eastern Pacific Ocean (EPO) declined from 135 vessels in 1981 to fewer than 20 vessels in years after 1998.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010 (landings and revenues). Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line then dividing by 2204.6. Current dollar revenues were computed as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data. Revenues in current dollars were adjusted to 2009 dollars using the implicit GDP deflator as calculated by the Bureau of Economic Analysis. Data for the graph were calculated by summing revenues and landings across all species in each year.

Table 4–3. West Coast commercial HMS landings and revenues, 1981–2009.

Year	Landings (1000 round mt)	Revenue ($mil.)	Revenue (2009 $mil.)
1981	152	$200	$419
1982	116	$134	$266
1983	115	$118	$225
1984	85	$96	$177
1985	34	$44	$79
1986	37	$45	$78
1987	36	$53	$90
1988	37	$59	$97
1989	28	$40	$63
1990	17	$27	$41
1991	11	$17	$26
1992	14	$26	$37
1993	17	$31	$43
1994	21	$39	$54
1995	19	$28	$38
1996	29	$46	$60
1997	26	$41	$53
1998	29	$40	$51
1999	18	$33	$42
2000	14	$33	$41
2001	15	$31	$38
2002	13	$22	$26
2003	20	$34	$39
2004	17	$33	$38
2005	11	$24	$26
2006	14	$27	$29
2007	13	$26	$26
2008	12	$32	$32
2009	13	$30	$30

Table 4–4. West Coast commercial landings of HMS by all HMS and non-HMS gears, 1981–2009.

	Landings (round mt)													
	Tunas							Sharks						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Dorado	Total
1981	13,712	76,091	57,869	1,168	868	40	749	1,521			182	92	4	152,296
1982	5,410	61,769	41,904	968	2,404	51	1,112	1,848		28	351	27	1	115,873
1983	9,578	55,741	44,995	21	764	55	1,763	1,331	9	96	217	7	1	114,578
1984	12,654	35,063	31,251	126	635	1,014	2,890	1,279	9	57	160	2	4	85,144
1985	7,301	15,025	2,977	7	3,254	468	3,418	1,190	<0.5	95	149	1	<0.5	33,885
1986	5,243	21,517	1,361	29	4,731	143	2,530	974	<0.5	48	312	2	2	36,892
1987	3,160	23,201	5,724	50	823	129	1,803	562	2	20	403	2	<0.5	35,879
1988	4,912	19,520	8,863	6	804	11	1,636	500	1	9	322	3	<0.5	36,587
1989	2,214	17,615	4,505	1	1,019	77	1,358	504	<0.5	17	255	6	<0.5	27,571
1990	3,028	8,509	2,256	2	925	46	1,236	357	1	31	373	20	1	16,785
1991	1,676	4,178	3,407	7	104	11	1,029	584		32	219	1	<0.5	11,248
1992	4,902	3,350	2,586	7	1,087	10	1,546	292	<0.5	22	142	1	3	13,948
1993	6,166	3,795	4,539	26	559	16	1,767	275	1	44	122	<0.5	17	17,327
1994	10,751	5,056	2,111	47	916	33	1,700	330	<0.5	37	128	12	41	21,162
1995	6,530	3,038	7,037	49	714	1	1,162	270	5	31	95	5	5	18,942
1996	14,173	3,347	5,455	62	4,688	3	1,198	319	1	20	96	1	10	29,373
1997	11,292	4,775	6,070	82	2,251	11	1,459	320	35	32	132	1	5	26,465
1998	13,915	5,799	5,846	53	1,949	12	1,408	361	2	11	100	3	3	29,462
1999	9,770	1,353	3,759	108	186	12	2,033	320	10	5	63	<0.5	17	17,636
2000	9,074	1,159	780	86	313	1	2,645	296	3	5	80	1	43	14,486
2001	11,191	655	58	53	196	1	2,195	373	2	2	46	2	16	14,790
2002	10,029	544	236	10	11	2	1,725	301	2		82	41	<0.5	12,983
2003	16,671	465	349	35	36	<0.5	2,135	301	4	6	70	1	6	20,079
2004	14,540	488	307	22	10	9	1,186	115	2	5	54	1	1	16,740
2005	9,055	285	523	10	207	<0.5	297	179	<0.5	10	33	1	<0.5	10,600
2006	12,786	77	48	35	1	1	541	160	<0.5	4	46	<0.5	3	13,702
2007	11,586	104	5	13	45	<0.5	550	204	2	5	45	10	2	12,571
2008	11,131	65	3	27	1	1	531	147	<0.5	6	35	<0.5	2	11,949
2009	12,264	45	5	12	415		407	105	<0.5	7	29	1	1	13,291

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 9, 2010.
Additional processing info:
Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–5. West Coast nominal commercial ex-vessel revenues from HMS landings by all HMS and non-HMS gears, 1981–2009.

	Revenues ($)														
	Tunas							Sharks							
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Dorado	Total
1981	26,524,145	98,722,280	66,331,030	1,569,755	1,239,005	72,694	3,355,010	1,475,634			162,347	59,064	2,801	199,513,765
1982	8,033,073	74,468,306	40,507,405	1,208,147	2,690,102	98,923	5,115,995	1,980,592		15,168	339,209	18,826	956	134,476,702
1983	12,242,167	59,475,802	36,652,119	45,946	1,062,909	95,490	6,800,233	1,474,213	8,449	91,455	229,826	4,645	695	118,183,949
1984	17,208,448	37,038,204	24,790,704	174,405	904,956	2,590,391	11,621,524	1,642,178	7,723	47,119	189,794	2,470	4,272	96,222,188
1985	8,292,769	14,690,108	2,118,170	17,693	2,819,048	1,028,867	13,415,105	1,817,135	716	96,433	192,917	2,132	377	44,491,470
1986	6,178,084	18,079,443	904,609	90,227	4,636,698	198,248	12,726,490	1,690,791	194	66,647	428,259	1,320	757	45,001,767
1987	5,127,832	27,878,667	4,426,717	176,504	2,057,402	448,231	11,115,940	1,184,091	1,840	22,123	715,138	1,853	357	53,156,695
1988	9,117,601	27,030,132	9,249,827	26,156	2,070,411	80,548	9,719,489	979,905	821	9,764	649,799	2,275	527	58,937,255
1989	3,785,613	20,824,242	3,944,894	2,415	1,271,718	127,320	8,259,204	944,161	149	24,711	552,576	3,465	485	39,740,953
1990	5,620,990	9,383,584	1,898,875	8,771	1,149,381	56,750	7,146,946	638,630	1,682	34,628	739,193	10,303	1,943	26,691,676
1991	2,823,937	3,996,935	2,692,345	42,810	116,371	21,161	6,342,361	968,877		25,179	415,168	894	1,167	17,447,205
1992	11,483,392	3,677,441	1,410,546	44,731	1,129,626	21,228	7,566,616	464,018	602	14,629	231,063	1,816	6,247	26,051,955
1993	11,697,562	4,821,735	3,282,778	211,513	752,369	72,678	8,953,927	458,513	462	28,190	221,401	622	42,223	30,543,973
1994	20,188,895	4,522,321	1,751,209	307,147	1,674,099	55,245	9,596,037	584,318	42	33,478	247,088	16,057	74,889	39,050,825
1995	11,572,603	3,044,670	4,752,641	258,727	1,057,948	5,136	6,569,451	477,901	8,777	24,896	165,215	2,796	5,479	27,946,240
1996	27,222,294	3,230,957	3,986,113	260,306	4,035,455	28,296	6,063,794	603,006	1,557	17,745	167,111	587	9,815	45,627,036
1997	19,924,121	4,991,131	5,504,526	359,780	2,773,705	21,895	6,147,707	591,268	62,496	34,768	227,426	327	10,858	40,650,008
1998	18,895,247	5,861,959	5,213,131	271,919	2,965,485	61,688	5,981,719	625,489	2,584	9,428	176,313	5,996	10,492	40,081,450
1999	17,771,262	1,468,209	2,748,208	657,121	1,061,233	60,572	8,445,728	617,691	18,424	5,876	111,119	73	47,854	33,013,370
2000	17,188,570	1,329,357	483,242	576,919	580,722	2,298	11,753,472	589,035	2,738	4,636	133,621	720	63,293	32,708,623
2001	20,680,501	465,558	33,633	320,855	473,557	3,069	8,696,689	595,548	2,767	8,428	75,799	1,294	19,397	31,377,095
2002	14,256,910	588,677	128,245	87,304	43,477	6,325	6,403,254	503,487	1,946		124,521	18,510	725	22,163,381
2003	24,435,697	451,273	159,961	262,768	76,106	21	7,851,693	487,796	2,814	3,779	115,728	390	10,370	33,858,396
2004	27,414,167	446,577	109,254	147,696	38,312	54,879	4,835,731	197,188	2,500	4,060	98,827	489	5,637	33,355,317
2005	20,823,045	315,699	292,193	60,141	136,847	913	1,899,245	271,767	588	6,234	57,788	426	1,290	23,866,176
2006	23,776,441	174,912	40,350	205,677	3,790	1,895	2,748,856	301,669	271	4,509	79,586	309	17,984	27,356,249
2007	21,633,438	149,568	4,361	94,734	58,106	46	3,131,178	337,770	2,903	4,334	78,569	1,984	10,092	25,507,083
2008	28,853,123	125,508	3,675	205,536	3,340	3,485	2,372,762	280,885	434	5,459	67,255	177	9,192	31,930,831
2009	27,469,749	166,286	5,332	97,103	441,540		1,923,879	195,492	72	5,453	52,428	2,361	3,770	30,363,465

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 9, 2010.
Additional processing info:
Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–6. West Coast real commercial ex-vessel revenues (2009 $) from HMS landings by all HMS and non-HMS gears, 1981–2009.

	Revenues (2009 $)														
	Tunas							Sharks							
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Dorado	Total
1981	55,746,417	207,486,928	139,409,478	3,299,190	2,604,047	152,782	7,051,302	3,101,374			341,209	124,136	5,887	419,322,750
1982	15,913,378	147,520,417	80,244,463	2,393,317	5,329,046	195,964	10,134,696	3,923,519		30,048	671,968	37,293	1,893	266,396,002
1983	23,327,300	113,330,416	69,840,167	87,549	2,025,360	181,956	12,957,761	2,809,095	16,100	174,266	437,930	8,851	1,324	225,198,075
1984	31,604,129	68,022,414	45,529,300	320,302	1,661,995	4,757,376	21,343,478	3,015,937	14,183	86,536	348,565	4,537	7,845	176,716,597
1985	14,782,119	26,185,577	3,775,704	31,538	5,025,041	1,833,988	23,912,844	3,239,100	1,277	171,894	343,880	3,800	671	79,307,433
1986	10,774,475	31,530,245	1,577,623	157,354	8,086,324	345,742	22,194,786	2,948,711	339	116,231	746,876	2,303	1,320	78,482,329
1987	8,691,241	47,251,977	7,502,910	299,160	3,487,122	759,713	18,840,576	2,006,933	3,118	37,496	1,212,099	3,141	605	90,096,091
1988	14,939,540	44,289,911	15,156,197	42,858	3,392,448	131,980	15,925,757	1,605,613	1,345	15,998	1,064,720	3,727	863	96,570,957
1989	5,976,655	32,876,922	6,228,125	3,812	2,007,764	201,011	13,039,476	1,490,624	235	39,013	872,396	5,471	766	62,742,270
1990	8,545,136	14,265,102	2,886,706	13,334	1,747,310	86,272	10,864,922	970,857	2,557	52,642	1,123,736	15,663	2,953	40,577,190
1991	4,146,142	5,868,352	3,952,936	62,855	170,858	31,069	9,311,939	1,422,518		36,968	609,554	1,312	1,714	25,616,217
1992	16,468,366	5,273,829	2,022,868	64,149	1,620,000	30,443	10,851,307	665,449	864	20,979	331,368	2,604	8,959	37,361,185
1993	16,413,023	6,765,448	4,606,115	296,778	1,055,661	101,976	12,563,388	643,346	648	39,554	310,651	872	59,244	42,856,704
1994	27,743,432	6,214,540	2,406,498	422,079	2,300,534	75,917	13,186,803	802,966	58	46,005	339,546	22,065	102,912	53,663,355
1995	15,577,606	4,098,358	6,397,417	348,266	1,424,079	6,914	8,842,981	643,291	11,815	33,512	222,393	3,763	7,375	37,617,770
1996	35,960,759	4,268,107	5,265,671	343,865	5,330,852	37,378	8,010,296	796,573	2,057	23,442	220,755	775	12,966	60,273,496
1997	25,862,047	6,478,622	7,145,024	467,005	3,600,344	28,421	7,979,890	767,482	81,121	45,129	295,205	424	14,094	52,764,808
1998	24,252,659	7,524,013	6,691,222	349,017	3,806,295	79,178	7,677,730	802,836	3,317	12,101	226,304	7,696	13,466	51,445,834
1999	22,481,039	1,857,317	3,476,543	831,273	1,342,483	76,625	10,684,033	781,393	23,307	7,433	140,568	93	60,537	41,762,644
2000	21,283,519	1,646,059	598,368	714,363	719,071	2,846	14,553,581	729,364	3,390	5,741	165,454	892	78,371	40,501,019
2001	25,039,958	563,698	40,723	388,491	573,383	3,715	10,529,954	721,090	3,350	10,205	91,778	1,566	23,486	37,991,397
2002	16,986,667	701,390	152,800	104,020	51,802	7,537	7,629,279	599,889	2,318		148,363	22,054	863	26,406,982
2003	28,503,088	526,389	186,587	306,507	88,774	24	9,158,630	568,991	3,282	4,408	134,991	455	12,097	39,494,223
2004	31,095,924	506,553	123,927	167,531	43,458	62,249	5,485,176	223,671	2,836	4,605	112,099	555	6,394	37,834,978
2005	22,854,840	346,503	320,704	66,010	150,199	1,002	2,084,563	298,284	645	6,842	63,427	467	1,416	26,194,902
2006	25,275,264	185,938	42,894	218,643	4,029	2,014	2,922,139	320,685	288	4,793	84,602	328	19,118	29,080,735
2007	22,355,521	154,561	4,507	97,896	60,046	47	3,235,690	349,044	2,999	4,478	81,192	2,051	10,429	26,358,461
2008	29,191,748	126,981	3,718	207,949	3,379	3,526	2,400,610	284,181	439	5,524	68,044	179	9,300	32,305,578
2009	27,469,749	166,286	5,332	97,103	441,540		1,923,879	195,492	72	5,453	52,428	2,361	3,770	30,363,465

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 9, 2010.
Additional processing info:
Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.
Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.
Aquaculture fish ticket/fish ticket line info is excluded.

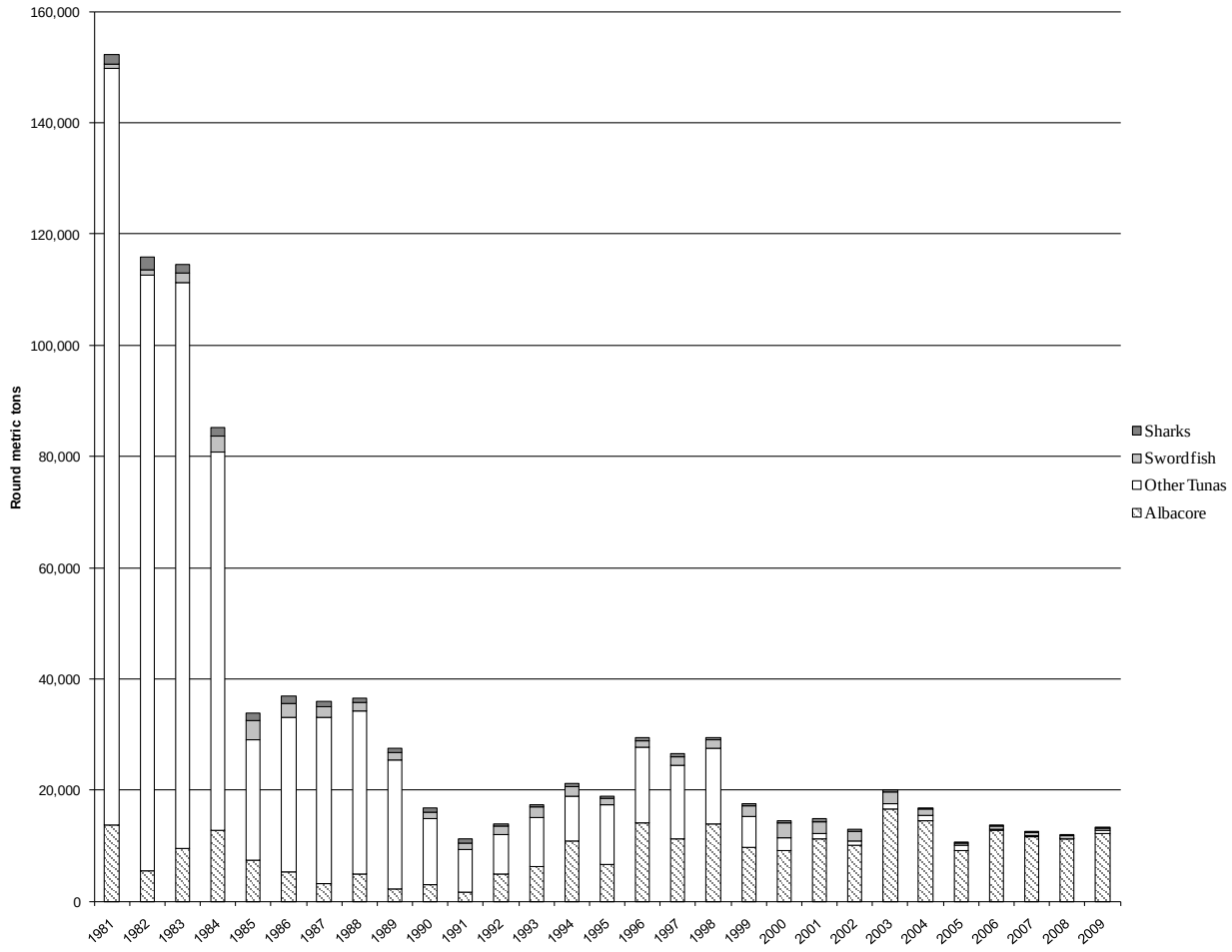

Figure 4–2. West Coast commercial landings of albacore, other tunas, swordfish, and sharks, 1981–2009.

Interpretation: Figure 4–2 shows West Coast HMS commercial landings in round metric tons grouped into categories of similar species. The accompanying table shows the numeric values for the landings in metric tons.

The principal species targeted are the tunas, with albacore gradually supplanting other tunas as a share of the catch over the period from 1981 through 2009. Swordfish, followed by sharks, comprises a far smaller share of recent total landings, with a steadily declining share over time.

The most striking feature of Figure 4-2 is a large drop in aggregate commercial landings from a level of about 150,000 mt in 1981 to a level which stabilized near 20,000 mt by 1990. The drop is primarily explained by the substantial decline in tuna landings during the 1980s for species other than albacore.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. They replicate a portion of Table 4–4, which displays West Coast commercial landings of HMS by species. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–7. West Coast commercial landings of albacore, other tunas, swordfish, and sharks, 1981–2009.

	Landings (round mt)				
Year	Albacore	Other Tunas	Swordfish	Sharks	Total
1981	13,712	136,036	749	1,795	152,292
1982	5,410	107,096	1,112	2,254	115,872
1983	9,578	101,576	1,763	1,660	114,577
1984	12,654	68,089	2,890	1,507	85,140
1985	7,301	21,731	3,418	1,435	33,885
1986	5,243	27,781	2,530	1,336	36,890
1987	3,160	29,927	1,803	989	35,879
1988	4,912	29,204	1,636	835	36,587
1989	2,214	23,217	1,358	782	27,571
1990	3,028	11,738	1,236	782	16,784
1991	1,676	7,707	1,029	836	11,248
1992	4,902	7,040	1,546	457	13,945
1993	6,166	8,935	1,767	442	17,310
1994	10,751	8,163	1,700	507	21,121
1995	6,530	10,839	1,162	406	18,937
1996	14,173	13,555	1,198	437	29,363
1997	11,292	13,189	1,459	520	26,460
1998	13,915	13,659	1,408	477	29,459
1999	9,770	5,418	2,033	398	17,619
2000	9,074	2,339	2,645	385	14,443
2001	11,191	963	2,195	425	14,774
2002	10,029	803	1,725	426	12,983
2003	16,671	885	2,135	382	20,073
2004	14,540	836	1,186	177	16,739
2005	9,055	1,025	297	223	10,600
2006	12,786	162	541	210	13,699
2007	11,586	167	550	266	12,569
2008	11,131	97	531	188	11,947
2009	12,264	477	407	142	13,290

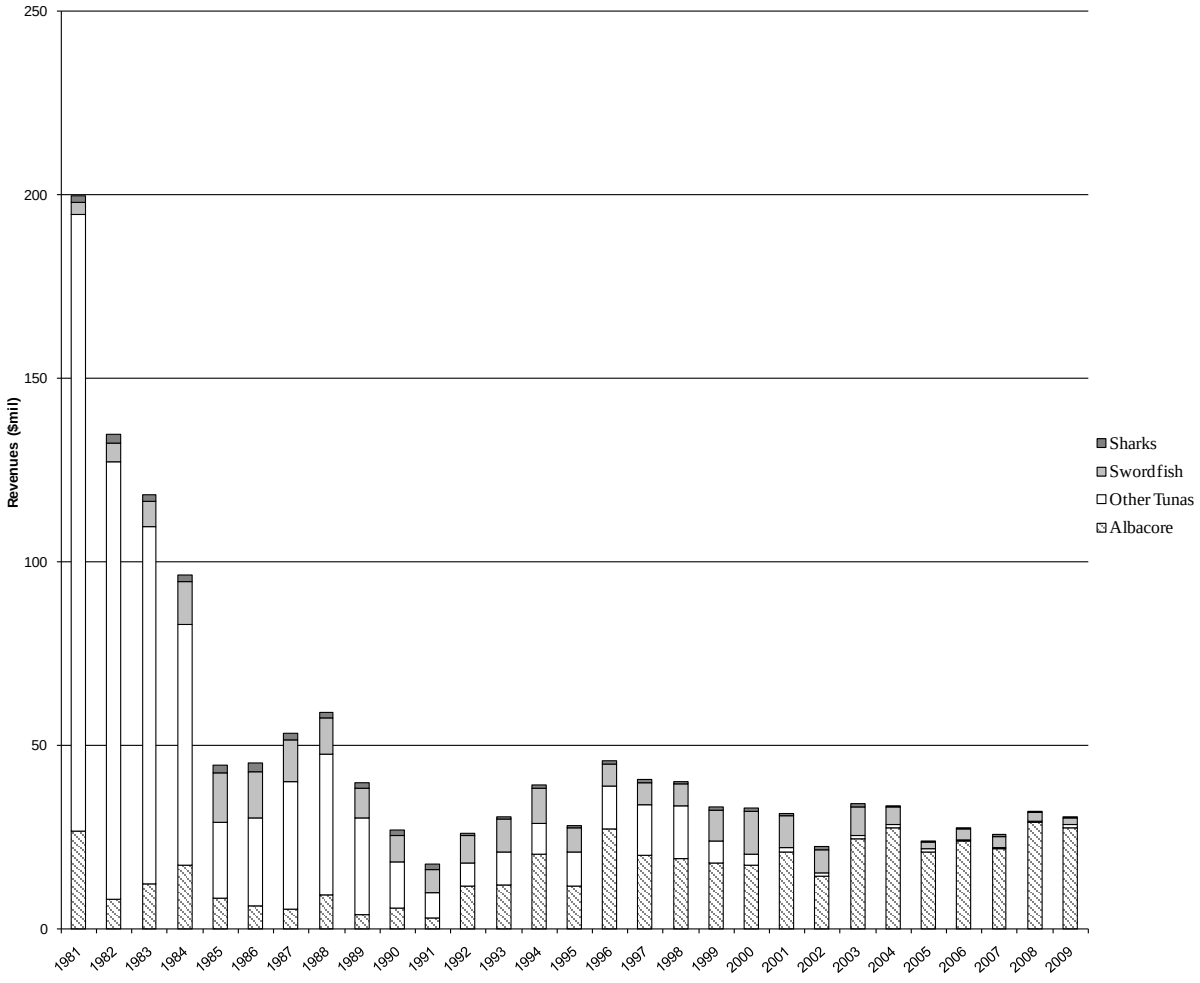

Figure 4–3. West Coast commercial revenues for albacore, other tunas, swordfish, and sharks, 1981–2009.

Interpretation: Figure 4–3 shows West Coast HMS commercial revenues in current dollars grouped into categories of similar species. Table 4–8 shows the numeric values for the revenues. Tables 4–9 through 4–23 show landings as well as nominal and real ex-vessel revenues by fishery.

The principal component of revenues is the tunas, with albacore gradually supplanting other tunas as a share of the revenues over the period from 1981 through 2009.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. Aquaculture fish ticket / fish ticket line information is excluded from the data. Data were obtained by copying from or summing across applicable columns of Table 4–5. Current dollar revenues were computed as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–8. West Coast commercial revenues for albacore, other tunas, swordfish, and sharks, 1981–2009.

Year	Revenues ($)				
	Albacore	Other Tunas	Swordfish	Sharks	Total
1981	26,524,145	167,934,764	3,355,010	1,697,045	199,510,964
1982	8,033,073	118,972,883	5,115,995	2,353,795	134,475,746
1983	12,242,167	97,332,266	6,800,233	1,808,588	118,183,254
1984	17,208,448	65,498,660	11,621,524	1,889,284	96,217,916
1985	8,292,769	20,673,886	13,415,105	2,109,333	44,491,093
1986	6,178,084	23,909,225	12,726,490	2,187,211	45,001,010
1987	5,127,832	34,987,521	11,115,940	1,925,045	53,156,338
1988	9,117,601	38,457,074	9,719,489	1,642,564	58,936,728
1989	3,785,613	26,170,589	8,259,204	1,525,062	39,740,468
1990	5,620,990	12,497,361	7,146,946	1,424,436	26,689,733
1991	2,823,937	6,869,622	6,342,361	1,410,118	17,446,038
1992	11,483,392	6,283,572	7,566,616	712,128	26,045,708
1993	11,697,562	9,141,073	8,953,927	709,188	30,501,750
1994	20,188,895	8,310,021	9,596,037	880,983	38,975,936
1995	11,572,603	9,119,122	6,569,451	679,585	27,940,761
1996	27,222,294	11,541,127	6,063,794	790,006	45,617,221
1997	19,924,121	13,651,037	6,147,707	916,285	40,639,150
1998	18,895,247	14,374,182	5,981,719	819,810	40,070,958
1999	17,771,262	5,995,343	8,445,728	753,183	32,965,516
2000	17,188,570	2,972,538	11,753,472	730,750	32,645,330
2001	20,680,501	1,296,672	8,696,689	683,836	31,357,698
2002	14,256,910	854,028	6,403,254	648,464	22,162,656
2003	24,435,697	950,129	7,851,693	610,507	33,848,026
2004	27,414,167	796,718	4,835,731	303,064	33,349,680
2005	20,823,045	805,793	1,899,245	336,803	23,864,886
2006	23,776,441	426,624	2,748,856	386,344	27,338,265
2007	21,633,438	306,815	3,131,178	425,560	25,496,991
2008	28,853,123	341,544	2,372,762	354,210	31,921,639
2009	27,469,749	710,261	1,923,879	255,806	30,359,695

Table 4–9. Commercial landings (round mt) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	13,493	14		<0.5	<0.5	4	2	37	1	13,551
1982	4,977	4	4	2	1	4	<0.5	3	<0.5	4,995
1983	9,309	16	3	1	<0.5	23	34	14	1	9,401
1984	8,909	13	25	5	<0.5	5	2	1	4	8,964
1985	7,010	2	11	4	<0.5	4	<0.5	2	2	7,035
1986	4,980	2	1	<0.5		20	<0.5	2	1	5,006
1987	2,891	<0.5	5	2		2	1	1	1	2,903
1988	4,629	<0.5	18	2		1	<0.5	2	1	4,653
1989	2,167	1	7	8	<0.5	10	<0.5	2	2	2,197
1990	2,926	<0.5	2	<0.5	<0.5	3	<0.5	1	1	2,933
1991	1,641	<0.5	2	1		<0.5		1	<0.5	1,645
1992	4,756	1	13	2	<0.5	7		1	<0.5	4,780
1993	5,778	18	90	5	9	4		3	2	5,909
1994	10,606	<0.5	1	<0.5	<0.5	1		<0.5	1	10,609
1995	6,407	1	1	<0.5	<0.5	<0.5	<0.5	8	1	6,418
1996	13,207	42	<0.5	<0.5		<0.5		10	1	13,260
1997	10,825	8	1	1	<0.5	5	<0.5	12	2	10,854
1998	12,724	116	4	3	<0.5	2	<0.5	5	2	12,856
1999	8,794	24	15	1	<0.5	1	<0.5	2	4	8,841
2000	8,098	2	22	<0.5	<0.5	1	<0.5	3	1	8,127
2001	10,220	10	<0.5	1	<0.5	3	<0.5	9	6	10,249
2002	9,293	2	2	<0.5	<0.5	<0.5	<0.5	7	4	9,308
2003	13,490	3		<0.5	<0.5	1	<0.5	4	2	13,500
2004	13,393	1		<0.5	<0.5	<0.5	<0.5	4	3	13,401
2005	8,217	<0.5		<0.5		1		3	1	8,222
2006	12,374	1		<0.5	<0.5	<0.5	<0.5	<0.5	1	12,376
2007	11,143	<0.5			<0.5	<0.5	<0.5	1	1	11,145
2008	9,768	6	<0.5		<0.5	<0.5	<0.5	<0.5	3	9,777
2009	11,569	7	<0.5	<0.5	<0.5	<0.5	<0.5	1	2	11,579

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–10. Commercial landings (round mt) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	13,493	14		<0.5	<0.5	4	2	37	1	13,551
1982	4,988	4	4	2	1	4	<0.5	3	<0.5	5,006
1983	9,341	16	3	1	<0.5	23	34	14	1	9,433
1984	8,912	13	25	5	<0.5	5	2	1	4	8,967
1985	7,010	2	11	4	<0.5	4	<0.5	2	2	7,035
1986	4,980	2	1	<0.5		20	<0.5	2	1	5,006
1987	2,891	<0.5	5	2		2	1	1	1	2,903
1988	4,630	<0.5	18	2		1	<0.5	2	1	4,654
1989	2,167	1	7	8	<0.5	10	<0.5	2	2	2,197
1990	2,926	<0.5	2	<0.5	<0.5	3	<0.5	1	1	2,933
1991	1,641	<0.5	2	1		<0.5		1	<0.5	1,645
1992	4,815	1	13	2	<0.5	7		1	<0.5	4,839
1993	5,800	18	90	5	9	4		3	1	5,930
1994	10,629	<0.5	1	<0.5	<0.5	1		<0.5	1	10,632
1995	6,474	1	1	<0.5	<0.5	<0.5	<0.5	8	1	6,485
1996	14,075	42	<0.5	<0.5		<0.5		10	1	14,128
1997	11,223	8	1	1	<0.5	5	<0.5	12	3	11,253
1998	13,685	116	4	3	<0.5	2	<0.5	5	2	13,817
1999	9,506	24	15	1	<0.5	1	<0.5	2	5	9,554
2000	8,986	2	22	<0.5	<0.5	1	<0.5	3	2	9,016
2001	11,015	10	<0.5	1	<0.5	3	<0.5	9	6	11,044
2002	9,995	2	2	<0.5	<0.5	<0.5	<0.5	7	4	10,010
2003	16,608	3		<0.5	<0.5	1	<0.5	4	2	16,618
2004	14,523	1		<0.5	<0.5	<0.5	<0.5	4	3	14,531
2005	9,028	<0.5		<0.5		1		3	1	9,033
2006	12,772	1		<0.5	<0.5	<0.5	<0.5	<0.5	1	12,774
2007	11,500	<0.5			<0.5	<0.5	<0.5	1	1	11,502
2008	11,128	6	<0.5		<0.5	<0.5	<0.5	<0.5	3	11,137
2009	12,219	7	<0.5	<0.5	<0.5	<0.5	<0.5	1	2	12,229

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–11. Commercial landings (round mt) in the West Coast drift gillnet fishery, 1981–2009.

		Sharks					Tunas									
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Yellow-fin	Bigeye	Bluefin	Other	Dorado	Ground-fish	Coastal Pelagics	Other	Total
1981	270	808			91	9		1	1	<0.5	4		6	7	88	1,285
1982	208	634		13	125	1	5	1	1	<0.5	8		5	2	14	1,017
1983	244	150		17	38		7	3	1	1	6		<0.5	7	18	492
1984	286	95		2	11		10	2	<0.5	1	1		5	<0.5	13	426
1985	197	110		2	15		7	<0.5		<0.5	<0.5		1	<0.5	13	345
1986	78	455		2	21		8	1	<0.5	1			<0.5	<0.5	10	576
1987	6	94	<0.5	1	2		1			<0.5			2	<0.5	4	110
1988	1	81					4						<0.5		<0.5	86
1989		*														*
1990																
1991	51	8		4	2		<0.5	<0.5		<0.5	<0.5				2	67
1992	60	2		<0.5	5		1	<0.5	<0.5	<0.5	<0.5			<0.5	4	72
1993	162	16	<0.5	7	11		15			6	1		<0.5		10	228
1994	762	268	<0.5	32	71	<0.5	52	<0.5	<0.5	24	2	<0.5	4	2	113	1,330
1995	701	202	5	29	75	<0.5	31	1	<0.5	17	12	<0.5	2	2	92	1,169
1996	734	241	1	20	80	<0.5	63	1	<0.5	38	2		1	6	131	1,318
1997	664	249	34	27	114	<0.5	43	3	2	51	2	<0.5	1	4	108	1,302
1998	906	281	2	9	81	1	63	1	4	36	4	<0.5	1	2	151	1,542
1999	597	152	7	4	46	<0.5	94	<0.5	1	16	1		1	<0.5	106	1,025
2000	635	155	3	3	52	<0.5	40	1	2	26	<0.5	<0.5	2	2	87	1,008
2001	351	273	1	<0.5	26		51	3	<0.5	13	<0.5		2	1	64	785
2002	298	216	2		59		14	1		3	<0.5		3	1	71	668
2003	199	241	4	6	50	<0.5	8	<0.5	6	9	7		1	1	54	586
2004	182	68	<0.5	5	23		10	<0.5		9	<0.5		2	1	45	345
2005	220	155		9	19		8	1		5	<0.5	<0.5	1	<0.5	52	470
2006	443	98	<0.5	4	35		3	<0.5		1	3	<0.5	1	2	107	697
2007	478	167	2	4	33	<0.5	3	<0.5		2	<0.5		2	<0.5	138	829
2008	405	110		6	25		1	<0.5		1	<0.5	<0.5	3	4	115	670
2009	250	48		6	22	1	3	<0.5		2			<0.5	<0.5	114	446

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 23, 2010.

Note 1: There is no drift gillnet gear for Washington.

Note 2: Significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entangling net, trammel net, several trawl, encircling net, set gillnet and unknown gears, and therefore are not reported here.

Additional processing info:

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–12. Commercial landings (round mt) in the West Coast harpoon fishery, 1981–2009.

Year	Swordfish	HMS Sharks	Tunas		Dorado	Other	Total
			Albacore	Other			
1981	272	10	2	<0.5		4	288
1982	156	2		<0.5		1	159
1983	58	1				44	103
1984	105	7	<0.5	<0.5		1	113
1985	275	1	<0.5	<0.5		1	277
1986	296	1	<0.5	<0.5		1	298
1987	237	3	1	1		40	282
1988	199	3	1			<0.5	203
1989	62	1	<0.5	<0.5		<0.5	63
1990	65	3		<0.5		<0.5	68
1991	20	1				<0.5	21
1992	75	3	<0.5	<0.5		1	79
1993	169	1	1			1	172
1994	157	1	<0.5			<0.5	158
1995	97	2				<0.5	99
1996	81	1	<0.5			1	83
1997	84	3	<0.5		<0.5	<0.5	87
1998	48	1				<0.5	49
1999	81	<0.5				2	83
2000	90	<0.5	<0.5			5	95
2001	52	1			<0.5	1	54
2002	90	1				1	92
2003	107	<0.5				<0.5	107
2004	69	1				<0.5	70
2005	76	1				1	78
2006	72	3				<0.5	75
2007	59	<0.5					59
2008	48	1					49
2009	49	1				<0.5	50

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 19, 2010.
Note 1: Only California has harpoon landings.
Note 2: Some of the non-swordfish species may have been taken by dual-gear permit holders, who may have fished with drift gillnets but landed under harpoon.
Additional processing info:
Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–13. Commercial landings (round mt) in the West Coast purse seine fishery, 1981–2009.

	Tunas						Sword-	HMS		Ground-	Coastal		
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	sharks	Dorado	fish	Pelagics	Other	Total
1981	181	75,063	54,338	1,156	854	28					203	2	131,825
1982	367	60,665	39,905	962	2,400	27					29		104,355
1983	11	52,217	42,191		754	12	1	<0.5			25	1	95,212
1984	3,552	33,326	29,941	117	624	1,011	23	1			268	2	68,865
1985	22	14,609	2,504	1	3,240	467	1	<0.5			308	<0.5	21,152
1986	54	21,018	977	8	4,698	136	41	2			65	1	27,000
1987	43	21,527	5,353	42	820	122		3			13	8	27,931
1988	151	18,470	7,391	<0.5	795	7					63		26,878
1989	24	16,118	3,565		1,007	70	1	<0.5	<0.5		29	<0.5	20,814
1990	71	8,354	2,244		876	39					137		11,721
1991		3,497	2,957		100	8					94	3	6,659
1992	8	1,721	1,159	1	1,064	3	10	2	1	<0.5	323	7	4,299
1993	1	951	1,619	2	497	<0.5	17	1	<0.5	<0.5	91	11	3,190
1994		3,566	1,283		880	8					66	123	5,926
1995		2,795	5,616		689						38	39	9,177
1996	11	2,683	5,049		4,639						244	53	12,679
1997	2	4,659	5,926		2,189	7	1	1	1		33	73	12,892
1998	136	3,753	5,310		1,739						256	159	11,353
1999	48	1,297	3,742		99						56	89	5,331
2000	4	1,152	775		255						218		2,404
2001	51	631	55		149						42		928
2002	<0.5	541	236				1					<0.5	778
2003	44	463	337		19								862
2004	1	484	306										791
2005		283	522		201						19		1,026
2006		*	*										*
2007	77	99	5		42						140		364
2008	*	*	*								*		*
2009	39	15	4		410						474		943

* Not reported due to data confidentiality requirements (fewer than three vessels).
Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 24, 2010.
Note: There is no purse seine gear for Washington.
Additional processing info:
Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.
Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–14. Nominal commercial ex-vessel revenues ($) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	26,087,739	17,982		173	72	2,508	991	133,177	1,406	26,244,048
1982	7,349,782	5,500	13,219	2,771	557	5,676	13	13,834	535	7,391,887
1983	11,879,532	14,586	7,531	1,597	33	20,309	15,495	36,075	3,880	11,979,038
1984	12,146,877	20,053	96,217	6,080	706	6,947	928	6,422	4,278	12,288,508
1985	7,994,910	4,278	30,921	7,017	6	6,384	239	10,802	2,311	8,056,868
1986	5,867,829	7,248	6,427	180		19,050	160	9,451	659	5,911,004
1987	4,690,640	1,150	33,310	3,440		2,305	657	6,838	436	4,738,776
1988	8,547,233	952	96,331	3,566		766	614	11,362	538	8,661,362
1989	3,692,159	1,833	34,556	11,295	31	18,112	1	8,305	2,504	3,768,796
1990	5,414,995	79	13,332	560	74	6,163	85	2,792	1,529	5,439,609
1991	2,760,714	71	11,721	602		189		3,479	1,084	2,777,860
1992	11,078,583	2,195	55,452	2,361	281	6,144		6,120	670	11,151,806
1993	10,882,080	154,056	442,687	7,992	23,216	4,992		10,385	1,806	11,527,214
1994	19,936,113	603	6,797	302	180	590		537	345	19,945,467
1995	11,359,888	914	3,204	173	21	152	16	22,290	3,028	11,389,686
1996	25,487,600	38,596	2,608	295		440		26,524	998	25,557,061
1997	19,093,866	14,949	4,390	1,628	371	11,951	89	37,637	3,725	19,168,606
1998	17,503,716	138,138	17,122	5,018	525	4,788	279	16,340	5,264	17,691,190
1999	16,139,022	115,448	77,899	2,623	1,413	4,347	455	9,742	7,708	16,358,657
2000	15,344,331	4,497	97,814	223	298	1,889	522	9,445	5,233	15,464,252
2001	18,743,953	27,752	2,037	2,210	544	7,801	178	33,018	12,398	18,829,891
2002	13,168,361	6,838	9,996	664	170	904	1,241	21,797	7,789	13,217,760
2003	19,626,793	11,045		62	567	2,764	558	14,013	5,709	19,661,511
2004	24,324,409	2,513		520	655	1,834	1,241	22,741	3,332	24,357,245
2005	18,507,118	1,437		181		1,587		12,332	3,318	18,525,973
2006	22,832,059	1,575		252	167	985	124	3,480	991	22,839,633
2007	20,669,326	1,222			223	1,942	82	3,958	1,420	20,678,173
2008	24,847,705	49,130	1,200		479	1,308	3,193	5,091	6,629	24,914,735
2009	25,801,651	11,286	291	639	42	252	92	3,446	1,754	25,819,453

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–15. Nominal commercial ex-vessel revenues ($) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	26,087,739	17,982		173	72	2,508	991	133,177	1,406	26,244,048
1982	7,364,640	5,500	13,219	2,771	557	5,676	13	13,834	535	7,406,745
1983	11,917,582	14,586	7,531	1,597	33	20,309	15,495	36,075	3,879	12,017,087
1984	12,150,161	20,053	96,217	6,080	706	6,947	928	6,422	4,278	12,291,792
1985	7,994,910	4,278	30,921	7,017	6	6,384	239	10,802	2,311	8,056,868
1986	5,867,829	7,248	6,427	180		19,050	160	9,451	659	5,911,004
1987	4,690,640	1,150	33,310	3,440		2,305	657	6,838	436	4,738,776
1988	8,550,083	952	96,331	3,566		766	614	11,362	538	8,664,212
1989	3,692,159	1,833	34,556	11,295	31	18,112	1	8,305	2,504	3,768,796
1990	5,414,995	79	13,332	560	74	6,163	85	2,792	1,529	5,439,609
1991	2,760,714	71	11,721	602		189		3,479	1,084	2,777,860
1992	11,218,614	2,195	55,452	2,361	281	6,144		6,120	670	11,291,837
1993	10,923,548	154,056	442,687	7,992	23,216	4,992		10,385	1,806	11,568,682
1994	19,977,732	603	6,797	302	180	590		537	345	19,987,086
1995	11,481,279	914	3,204	173	21	152	16	22,290	3,029	11,511,078
1996	27,080,019	38,596	2,608	295		440		26,524	997	27,149,479
1997	19,811,178	15,026	4,390	1,628	484	11,951	89	37,637	3,725	19,886,108
1998	18,604,129	138,138	17,122	5,018	525	4,788	279	16,340	5,263	18,791,602
1999	17,402,696	115,448	77,899	2,623	1,413	4,347	455	9,742	7,708	17,622,331
2000	17,040,770	4,497	97,814	223	298	1,889	522	9,445	5,233	17,160,691
2001	20,406,546	27,752	2,037	2,210	544	7,801	178	33,018	12,398	20,492,484
2002	14,210,280	6,838	9,996	664	170	904	1,241	21,797	7,789	14,259,679
2003	24,385,886	11,045		62	567	2,764	558	14,013	5,708	24,420,603
2004	27,375,701	2,513		520	655	1,834	1,241	22,741	3,332	27,408,537
2005	20,762,541	1,437		181		1,587		12,332	3,318	20,781,396
2006	23,731,153	1,575		252	167	985	124	3,480	991	23,738,727
2007	21,494,041	1,222			223	1,942	82	3,958	1,421	21,502,889
2008	28,847,990	49,130	1,200		479	1,308	3,193	5,091	6,630	28,915,021
2009	27,414,388	11,286	291	639	42	252	92	3,446	1,754	27,432,190

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–16. Nominal commercial ex-vessel revenues ($) for the West Coast drift gillnet fishery, 1981–2009.

		Sharks					Tunas									
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Yellow-fin	Bigeye	Bluefin	Other	Dorado	Ground-fish	Coastal Pelagics	Other	Total
1981	1,110,316	766,185			78,538	5,109		2,611	1,422	779	7,379		6,569	4,419	144,187	2,127,514
1982	1,000,168	675,288		6,837	116,517	653	7,330	2,454	1,950	304	13,142		5,820	904	19,749	1,851,116
1983	958,547	166,931		25,634	37,715		11,142	6,611	1,469	1,404	8,761		714	5,677	20,152	1,244,757
1984	1,096,570	144,390		2,427	13,638		15,242	3,440	671	1,445	466		8,410	293	9,482	1,296,474
1985	793,604	181,145		2,456	19,129		7,399	597		84	230		1,151	126	12,258	1,018,179
1986	377,053	673,561		2,756	29,629		8,793	2,954	240	1,584			311	65	10,565	1,107,511
1987	37,173	160,473	104	1,649	3,517		1,710			82			4,792	122	5,242	214,864
1988	3,324	134,924					7,092						444		140	145,924
1989		*														*
1990																
1991	361,574	11,891		1,849	3,238		851	540		249	416				707	381,315
1992	241,122	2,748		74	7,744		1,080	1,004	270	1,236	49			310	3,498	259,135
1993	918,433	25,086	118	5,221	21,315		23,922			22,230	1,281		1,019		10,951	1,029,576
1994	4,536,655	489,369	42	27,214	128,658	7	91,871	1,004	2,332	119,757	9,234	40	5,498	851	155,380	5,567,912
1995	4,190,568	347,670	8,681	22,921	131,822	105	49,903	2,423	2,794	72,431	9,663	13	1,655	1,654	136,335	4,978,638
1996	3,919,232	448,255	1,557	16,802	138,997	56	106,175	2,393	1,246	117,324	2,928		1,084	2,557	205,989	4,964,595
1997	3,166,095	438,116	61,815	24,976	192,721	6	69,147	11,359	18,445	227,816	2,196	494	2,268	3,506	143,043	4,362,003
1998	3,967,255	484,999	2,440	7,744	139,352	4,810	76,514	3,765	19,454	178,318	7,335	2,457	1,481	1,761	212,564	5,110,249
1999	2,785,199	277,240	13,704	3,899	80,790	19	101,957	909	9,899	76,870	1,655		1,304	122	188,600	3,542,167
2000	2,750,462	287,306	2,143	2,999	86,543	164	66,123	943	17,921	103,172	732	545	1,298	2,253	138,393	3,460,997
2001	1,541,152	449,885	465	402	42,706		70,729	4,040	673	33,467	516		1,273	399	107,926	2,253,633
2002	1,499,163	368,415	1,725		86,811		19,518	1,517		9,662	88		2,429	833	199,253	2,189,414
2003	1,032,796	390,859	2,676	3,577	81,652	11	13,466	517	36,417	26,316	3,824		825	279	133,917	1,727,132
2004	944,192	111,421	227	3,795	40,804		23,390	697		31,074	144		2,024	386	120,036	1,278,190
2005	1,184,545	225,273		6,094	30,020		17,819	4,188		16,488	105	90	1,182	9	198,205	1,684,018
2006	1,996,530	183,839	218	3,828	56,660		4,079	1,755		2,959	2,970	87	1,346	1,951	291,604	2,547,826
2007	2,469,238	259,852	2,870	3,758	53,815	157	7,129	102		11,602	79		2,349	349	419,552	3,230,852
2008	1,708,969	198,218		5,419	46,066		1,705	813		2,515	102	52	3,129	3,096	385,191	2,355,275
2009	1,070,068	80,797		4,687	36,935	2,309	7,993	16		7,161			241	59	266,576	1,476,842

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 23, 2010.

Note 1: There is no drift gillnet gear for Washington.

Note 2: Significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entangling net, trammel net, several trawl, encircling net, set gillnet and unknown gears, and therefore corresponding revenues are not reported here.

Additional processing info:

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–17. Nominal commercial ex-vessel revenues ($) for the West Coast harpoon fishery, 1981–2009.

Year	Swordfish	HMS Sharks	Tunas		Dorado	Other	Total
			Albacore	Other			
1981	1,371,646	10,204	3,952	385		12,029	1,398,216
1982	839,886	1,988		146		1,233	843,253
1983	318,044	1,962				9,752	329,758
1984	583,079	8,473	330	150		2,026	594,058
1985	1,280,993	1,721	225	247		1,751	1,284,937
1986	1,796,277	2,433	53	337		1,203	1,800,303
1987	1,647,710	5,053	4,150	2,076		84,568	1,743,557
1988	1,477,860	6,429	8,552			882	1,493,723
1989	500,435	1,527	2,106	65		1,256	505,389
1990	539,322	5,869		108		811	546,110
1991	179,949	2,025				70	182,044
1992	586,740	6,126	1,236	133		1,336	595,571
1993	1,132,762	1,890	7,730			1,000	1,143,382
1994	1,273,087	1,613	2,490			2,888	1,280,078
1995	760,108	4,078				1,752	765,938
1996	633,027	3,217	216			652	637,112
1997	683,211	5,567	200		90	675	689,743
1998	402,914	1,603				766	405,283
1999	608,982	811				5,851	615,644
2000	750,533	798	302			8,381	760,014
2001	468,289	1,152			50	2,748	472,239
2002	678,934	1,259				1,141	681,334
2003	839,197	562				1,768	841,527
2004	670,001	2,457				1,643	674,101
2005	709,760	1,229				1,921	712,910
2006	680,036	5,013				709	685,758
2007	597,707	1,305					599,012
2008	458,482	1,436					459,918
2009	459,656	1,846				589	462,091

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Note 1: Only California has revenues from harpoon landings.

Note 2: Some of the non-swordfish species may have been taken by dual-gear permit holders, who may have fished with drift gillnets but landed under harpoon.

Additional processing info:

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–18. Nominal commercial ex-vessel revenues ($) for the West Coast purse seine fishery, 1981–2009.

	Tunas						Sword-	HMS		Ground-	Coastal		
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	Sharks	Dorado	fish	Pelagics	Other	Total
1981	362,636	97,391,144	62,318,736	1,552,545	1,219,984	54,643					119,029	1,456	163,020,173
1982	575,736	73,205,578	38,822,258	1,196,824	2,680,401	54,040					5,155		116,539,991
1983	15,349	55,980,011	34,377,044		1,042,089	24,989	1,796	261			6,638	587	91,448,764
1984	4,822,262	35,503,573	23,741,980	143,266	878,031	2,580,939	87,097	651			60,118	6,054	67,823,971
1985	28,953	14,191,940	1,713,118	810	2,797,571	1,026,024	7,080	460			50,191	956	19,817,103
1986	64,622	17,655,730	643,905	13,335	4,575,913	182,575	182,606	2,595			8,204	2,452	23,331,937
1987	69,499	26,028,704	4,116,606	150,602	2,049,722	427,505		900			2,005	8,980	32,854,523
1988	266,685	25,754,782	7,772,435	680	2,037,504	67,724					25,342		35,925,150
1989	45,978	19,139,726	3,113,729		1,231,363	112,194	6,955	270	128		6,300	138	23,656,781
1990	139,859	9,225,983	1,889,065		1,069,829	32,343					43,459		12,400,537
1991		3,399,732	2,298,693		98,226	7,985					36,458	3,315	5,844,409
1992	19,291	1,686,917	551,315	2,927	1,087,353	2,936	51,873	3,524	2,597	220	62,091	11,397	3,482,441
1993	1,202	1,051,265	1,047,039	4,229	569,367	880	98,722	1,599	175	14	16,833	10,658	2,801,983
1994		3,135,039	1,078,217		1,463,167	3,393					36,342	125,354	5,841,512
1995		2,811,700	3,801,888		943,602						15,670	20,463	7,593,323
1996	875	2,669,391	3,643,203		3,865,969						69,959	25,249	10,274,646
1997	3,654	4,795,089	5,326,959		2,504,396	4,195	6,666	1,909	1,425		17,321	51,754	12,713,368
1998	162,925	3,808,379	4,717,085		2,294,031						165,275	109,262	11,256,957
1999	33,416	1,397,578	2,732,409		360,132						5,340	59,908	4,588,783
2000	6,615	1,306,040	475,592		296,687						24,484		2,109,419
2001	62,841	411,133	28,595		336,831						5,092		844,492
2002	358	577,814	128,094				2,623					45	708,934
2003	16,153	442,370	152,188		14,874								625,584
2004	1,537	435,085	108,853										545,475
2005		304,037	291,183		119,162						1,708		716,090
2006		*	*										*
2007	119,394	119,395	3,958		45,267						55,587		343,600
2008	*	*	*								*		*
2009	41,701	14,185	3,655		426,260						334,695		820,495

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 24, 2010.

Note: There is no purse seine gear for Washington.

Additional processing info:

Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–19. Real commercial ex-vessel revenues (2009 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	54,829,211	37,793		363	150	5,270	2,084	279,900	2,960	55,157,731
1982	14,559,789	10,895	26,187	5,488	1,103	11,245	25	27,405	1,062	14,643,199
1983	22,636,304	27,793	14,349	3,044	63	38,699	29,525	68,740	7,393	22,825,910
1984	22,308,314	36,829	176,708	11,165	1,297	12,758	1,704	11,795	7,857	22,568,427
1985	14,251,177	7,625	55,118	12,509	11	11,379	427	19,255	4,117	14,361,618
1986	10,233,395	12,640	11,208	314		33,224	280	16,483	1,148	10,308,692
1987	7,950,237	1,948	56,457	5,830		3,906	1,113	11,589	744	8,031,824
1988	14,004,969	1,559	157,842	5,843		1,256	1,005	18,618	882	14,191,974
1989	5,829,112	2,895	54,557	17,832	48	28,594	2	13,111	3,953	5,950,104
1990	8,231,977	120	20,267	851	112	9,369	130	4,244	2,326	8,269,396
1991	4,053,317	104	17,210	883		278		5,108	1,590	4,078,490
1992	15,887,829	3,148	79,523	3,386	403	8,811		8,777	961	15,992,838
1993	15,268,809	216,158	621,141	11,213	32,574	7,004		14,571	2,536	16,174,006
1994	27,396,060	829	9,341	415	247	811		738	473	27,408,914
1995	15,291,274	1,230	4,313	232	28	204	22	30,004	4,079	15,331,386
1996	33,669,221	50,986	3,445	389		581		35,039	1,317	33,760,978
1997	24,784,353	19,405	5,699	2,113	482	15,513	116	48,854	4,834	24,881,369
1998	22,466,585	177,304	21,976	6,441	674	6,146	358	20,972	6,757	22,707,213
1999	20,416,220	146,044	98,543	3,318	1,788	5,499	575	12,324	9,752	20,694,063
2000	18,999,914	5,568	121,117	276	369	2,339	646	11,695	6,481	19,148,405
2001	22,695,184	33,602	2,466	2,676	658	9,446	215	39,979	15,012	22,799,238
2002	15,689,695	8,147	11,910	791	202	1,077	1,479	25,970	9,281	15,748,552
2003	22,893,728	12,883		72	661	3,224	651	16,346	6,659	22,934,224
2004	27,591,208	2,851		589	743	2,080	1,408	25,795	3,780	27,628,454
2005	20,312,938	1,577		199		1,741		13,535	3,643	20,333,633
2006	24,271,350	1,674		268	177	1,047	132	3,699	1,055	24,279,402
2007	21,359,229	1,263			231	2,007	85	4,090	1,466	21,368,371
2008	25,139,321	49,707	1,214		484	1,323	3,231	5,151	6,707	25,207,138
2009	25,801,651	11,286	291	639	42	252	92	3,446	1,754	25,819,453

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and cheking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–20. Real commercial ex-vessel revenues (2009 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	54,829,211	37,793		363	150	5,270	2,084	279,900	2,960	55,157,731
1982	14,589,223	10,895	26,187	5,488	1,103	11,245	25	27,405	1,061	14,672,632
1983	22,708,807	27,793	14,349	3,044	63	38,699	29,525	68,740	7,393	22,898,413
1984	22,314,345	36,829	176,708	11,165	1,297	12,758	1,704	11,795	7,857	22,574,458
1985	14,251,177	7,625	55,118	12,509	11	11,379	427	19,255	4,117	14,361,618
1986	10,233,395	12,640	11,208	314		33,224	280	16,483	1,148	10,308,692
1987	7,950,237	1,948	56,457	5,830		3,906	1,113	11,589	744	8,031,824
1988	14,009,639	1,559	157,842	5,843		1,256	1,005	18,618	882	14,196,644
1989	5,829,112	2,895	54,557	17,832	48	28,594	2	13,111	3,953	5,950,104
1990	8,231,977	120	20,267	851	112	9,369	130	4,244	2,326	8,269,396
1991	4,053,317	104	17,210	883		278		5,108	1,590	4,078,490
1992	16,088,647	3,148	79,523	3,386	403	8,811		8,777	962	16,193,657
1993	15,326,993	216,158	621,141	11,213	32,574	7,004		14,571	2,536	16,232,190
1994	27,453,253	829	9,341	415	247	811		738	473	27,466,107
1995	15,454,677	1,230	4,313	232	28	204	22	30,004	4,078	15,494,788
1996	35,772,812	50,986	3,445	389		581		35,039	1,317	35,864,569
1997	25,715,444	19,504	5,699	2,113	628	15,513	116	48,854	4,834	25,812,705
1998	23,879,000	177,304	21,976	6,441	674	6,146	358	20,972	6,757	24,119,628
1999	22,014,796	146,044	98,543	3,318	1,788	5,499	575	12,324	9,752	22,292,639
2000	21,100,508	5,568	121,117	276	369	2,339	646	11,695	6,481	21,248,999
2001	24,708,253	33,602	2,466	2,676	658	9,446	215	39,979	15,012	24,812,307
2002	16,931,109	8,147	11,910	791	202	1,077	1,479	25,970	9,281	16,989,966
2003	28,444,985	12,883		72	661	3,224	651	16,346	6,659	28,485,481
2004	31,052,293	2,851		589	743	2,080	1,408	25,795	3,779	31,089,538
2005	22,788,432	1,577		199		1,741		13,535	3,643	22,809,127
2006	25,227,121	1,674		268	177	1,047	132	3,699	1,055	25,235,173
2007	22,211,472	1,263			231	2,007	85	4,090	1,467	22,220,615
2008	29,186,554	49,707	1,214		484	1,323	3,231	5,151	6,707	29,254,371
2009	27,414,388	11,286	291	639	42	252	92	3,446	1,754	27,432,190

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–21. Real commercial ex-vessel revenues (2009 $) for the West Coast drift gillnet fishery, 1981–2009.

		Sharks					Tunas									
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Yellow-fin	Bigeye	Bluefin	Other	Dorado	Ground-fish	Coastal Pelagics	Other	Total
1981	2,333,578	1,610,310			165,066	10,739		5,488	2,989	1,636	15,508		13,807	9,287	303,037	4,471,445
1982	1,981,315	1,337,734		13,544	230,818	1,294	14,521	4,862	3,863	602	26,034		11,530	1,791	39,121	3,667,029
1983	1,826,500	318,084		48,845	71,865		21,231	12,597	2,800	2,674	16,694		1,360	10,818	38,402	2,371,870
1984	2,013,902	265,179		4,457	25,047		27,992	6,318	1,232	2,653	856		15,446	538	17,417	2,381,037
1985	1,414,624	322,897		4,378	34,098		13,189	1,064		150	410		2,052	225	21,849	1,814,936
1986	657,574	1,174,678		4,806	51,673		15,335	5,151	418	2,763			543	113	18,426	1,931,480
1987	63,005	271,988	176	2,795	5,960		2,899			139			8,122	207	8,885	364,176
1988	5,447	221,078					11,620						728		229	239,102
1989		*														*
1990																
1991	530,867	17,458		2,714	4,754		1,249	793		366	611				1,039	559,851
1992	345,793	3,941		107	11,105		1,549	1,440	387	1,772	71			445	5,016	371,626
1993	1,288,667	35,198	166	7,325	29,907		33,565			31,191	1,798		1,429		15,367	1,444,613
1994	6,234,238	672,488	58	37,397	176,800	9	126,248	1,380	3,205	164,569	12,689	54	7,555	1,169	213,524	7,651,383
1995	5,640,824	467,990	11,685	30,853	177,442	141	67,173	3,262	3,761	97,497	13,008	17	2,228	2,226	183,519	6,701,626
1996	5,177,321	592,146	2,057	22,196	183,616	74	140,257	3,161	1,645	154,986	3,867		1,432	3,377	272,115	6,558,250
1997	4,109,677	568,686	80,237	32,419	250,157	7	89,755	14,745	23,942	295,711	2,851	641	2,943	4,551	185,675	5,661,997
1998	5,092,100	622,512	3,131	9,939	178,863	6,174	98,209	4,832	24,970	228,877	9,415	3,153	1,901	2,260	272,833	6,559,169
1999	3,523,338	350,715	17,335	4,932	102,201	24	128,977	1,150	12,523	97,243	2,094		1,650	154	238,584	4,480,920
2000	3,405,723	355,753	2,653	3,713	107,161	203	81,876	1,167	22,191	127,751	906	674	1,607	2,789	171,367	4,285,534
2001	1,866,027	544,721	563	486	51,709		85,639	4,891	815	40,522	624		1,542	483	130,678	2,728,700
2002	1,786,206	438,955	2,055		103,433		23,255	1,807		11,512	105		2,894	992	237,405	2,608,619
2003	1,204,708	455,919	3,122	4,173	95,243	13	15,708	603	42,479	30,696	4,460		962	325	156,207	2,014,618
2004	1,070,998	126,385	257	4,305	46,284		26,531	791		35,248	164		2,295	437	136,158	1,449,853
2005	1,300,127	247,254		6,689	32,949		19,558	4,596		18,096	115	99	1,297	10	217,545	1,848,335
2006	2,122,388	195,428	231	4,070	60,232		4,336	1,866		3,145	3,157	92	1,431	2,074	309,986	2,708,436
2007	2,551,657	268,525	2,965	3,883	55,611	162	7,367	105		11,989	82		2,427	360	433,559	3,338,692
2008	1,729,026	200,544		5,483	46,607		1,725	822		2,544	104	53	3,166	3,133	389,710	2,382,917
2009	1,070,068	80,797		4,687	36,935	2,309	7,993	16		7,161			241	59	266,576	1,476,842

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 23, 2010.

Note 1: There is no drift gillnet gear for Washington.

Note 2: Significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entangling net, trammel net, several trawl, encircling net, set gillnet and unknown gears, and therefore corresponding revenues are not reported here.

Additional processing info:

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–22. Real commercial ex-vessel revenues (2009 $) for the West Coast harpoon fishery, 1981–2009.

Year	Swordfish	HMS Sharks	Tunas		Dorado	Other	Total
			Albacore	Other			
1981	2,882,820	21,447	8,306	810		25,280	2,938,663
1982	1,663,799	3,938		290		2,443	1,670,470
1983	606,029	3,738				18,583	628,350
1984	1,070,852	15,561	606	275		3,721	1,091,015
1985	2,283,409	3,068	402	440		3,121	2,290,440
1986	3,132,677	4,243	92	588		2,098	3,139,698
1987	2,792,729	8,564	7,034	3,518		143,337	2,955,182
1988	2,421,530	10,535	14,012			1,445	2,447,522
1989	790,078	2,411	3,325	103		1,981	797,898
1990	819,888	8,922		163		1,233	830,206
1991	264,204	2,973				102	267,279
1992	841,446	8,786	1,773	191		1,914	854,110
1993	1,589,395	2,652	10,845			1,405	1,604,297
1994	1,749,466	2,216	3,422			3,969	1,759,073
1995	1,023,164	5,490				2,358	1,031,012
1996	836,231	4,249	285			863	841,628
1997	886,826	7,227	259		117	876	895,305
1998	517,154	2,057				983	520,194
1999	770,376	1,026				7,401	778,803
2000	929,338	988	374			10,377	941,077
2001	567,004	1,395			61	3,327	571,787
2002	808,929	1,500				1,359	811,788
2003	978,884	656				2,062	981,602
2004	759,983	2,786				1,865	764,634
2005	779,015	1,349				2,108	782,472
2006	722,904	5,328				755	728,987
2007	617,658	1,349					619,006
2008	463,863	1,452					465,316
2009	459,656	1,846				589	462,091

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 19, 2010.

Note 1: Only California has revenues from harpoon landings.

Note 2: Some of the non-swordfish species may have been taken by dual-gear permit holders, who may have fished with drift gillnets but landed under harpoon.

Additional processing info:

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–23. Real commercial ex-vessel revenues (2009 $) for the West Coast purse seine fishery, 1981–2009.

	Tunas						Sword-	HMS		Ground-	Coastal		
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	Sharks	Dorado	fish	Pelagics	Other	Total
1981	762,161	204,689,248	130,976,746	3,263,020	2,564,070	114,845					250,166	3,058	342,623,314
1982	1,140,523	145,018,974	76,906,216	2,370,888	5,309,827	107,051					10,211		230,863,691
1983	29,248	106,669,228	65,505,039		1,985,688	47,616	3,421	497			12,649	1,118	174,254,504
1984	8,856,313	65,203,991	43,603,270	263,115	1,612,545	4,740,016	159,957	1,195			110,409	11,120	124,561,931
1985	51,609	25,297,576	3,053,685	1,443	4,986,758	1,828,920	12,620	820			89,466	1,707	35,324,604
1986	112,699	30,791,298	1,122,960	23,256	7,980,316	318,407	318,462	4,525			14,307	4,277	40,690,507
1987	117,794	44,116,447	6,977,298	255,257	3,474,105	724,585		1,525			3,398	15,224	55,685,633
1988	436,973	42,200,200	12,735,433	1,113	3,338,528	110,968					41,523		58,864,739
1989	72,588	30,217,439	4,915,897		1,944,053	177,129	10,980	426	202		9,946	221	37,348,881
1990	212,616	14,025,514	2,871,792		1,626,374	49,168					66,068		18,851,531
1991		4,991,531	3,374,972		144,217	11,723					53,528	4,867	8,580,838
1992	27,665	2,419,213	790,643	4,198	1,559,376	4,211	74,391	5,054	3,724	316	89,044	16,344	4,994,179
1993	1,686	1,475,045	1,469,116	5,934	798,887	1,235	138,519	2,244	246	19	23,619	14,954	3,931,504
1994		4,308,147	1,481,677		2,010,674	4,663					49,941	172,261	8,027,363
1995		3,784,763	5,117,631		1,270,160						21,093	27,545	10,221,192
1996	1,156	3,526,276	4,812,685		5,106,961						92,416	33,354	13,572,848
1997	4,743	6,224,155	6,914,537		3,250,774	5,445	8,653	2,478	1,849		22,482	67,178	16,502,294
1998	209,119	4,888,177	6,054,531		2,944,462						212,136	140,243	14,448,668
1999	42,272	1,767,967	3,456,558		455,575						6,755	75,785	5,804,912
2000	8,191	1,617,187	588,895		367,369						30,317		2,611,960
2001	76,088	497,800	34,623		407,835						6,166		1,022,512
2002	426	688,448	152,620				3,125					54	844,673
2003	18,842	516,004	177,520		17,349								729,714
2004	1,743	493,518	123,472										618,733
2005		333,703	319,595		130,789						1,874		785,962
2006		*	*										*
2007	123,379	123,380	4,090		46,778						57,442		355,069
2008	*	*	*								*		*
2009	41,701	14,185	3,655		426,260						334,695		820,495

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 24, 2010.

Note: There is no purse seine gear for Washington.

Additional processing info:

Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

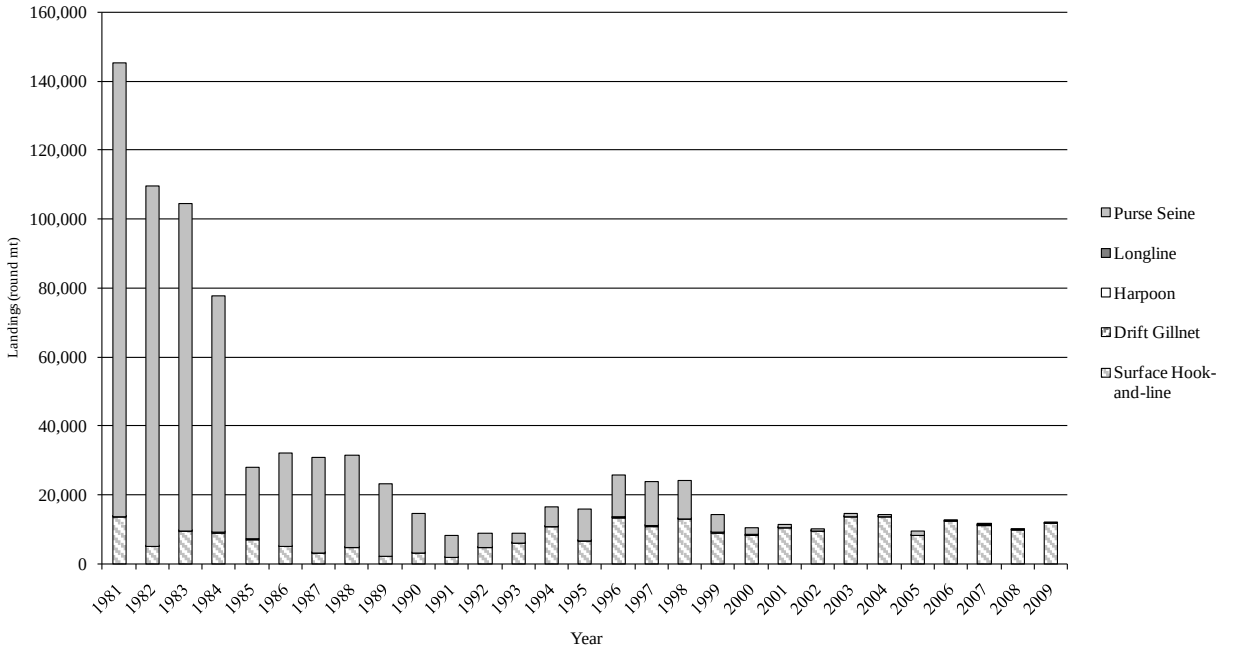

Figure 4–4. West Coast commercial tuna landings by fishery, 1981–2009.

Interpretation: Figure 4–4 and Table 4–24 display West Coast commercial tuna landings by fishery over the years 1981–2009 for the surface hook-and-line, drift gillnet, harpoon, longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on various dates in July and August 2009. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket / fish ticket line information is excluded from the data. Canadian surface hook-and-line fishery data are also excluded.

Table 4–24. West Coast commercial tuna landings by fishery, 1981–2009.

Year	Landings (round mt)					
	Surface Hook-and-line	Drift Gillnet	Harpoon	Longline	Purse Seine	Total
1981	13,507	6	2	26	131,620	145,161
1982	4,981	15		43	104,326	109,365
1983	9,325	18		9	95,185	104,537
1984	8,922	14	<0.5	3	68,571	77,510
1985	7,012	7	<0.5		20,843	27,862
1986	4,982	10	<0.5		26,891	31,883
1987	2,891	1	1		27,907	30,801
1988	4,629	4	1		26,814	31,448
1989	2,168		<0.5		20,784	22,952
1990	2,926			1	11,584	14,511
1991	1,641			2	6,562	8,205
1992	4,757	1	<0.5	1	3,956	8,715
1993	5,796	22	1	5	3,070	8,894
1994	10,606	78	<0.5	104	5,737	16,525
1995	6,408	61		61	9,100	15,630
1996	13,249	104	<0.5	71	12,382	25,806
1997	10,833	101	<0.5	89	12,783	23,806
1998	12,840	108		106	10,938	23,992
1999	8,818	112		228	5,186	14,344
2000	8,100	69	<0.5	122	2,186	10,477
2001	10,230	67		95	886	11,278
2002	9,295	18		14	777	10,104
2003	13,493	30		31	863	14,417
2004	13,394	19		33	791	14,237
2005	8,217	14		17	1,006	9,254
2006	12,375	7		65		12,447
2007	11,143	5		18	223	11,389
2008	9,774	2		26		9,802
2009	11,576	5		***	468	12,049

* Not reported due to data confidentiality requirements (fewer than three vessels).

*** Not produced for 2009, due to no new data which is not confidential.

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted August 2010, various dates.

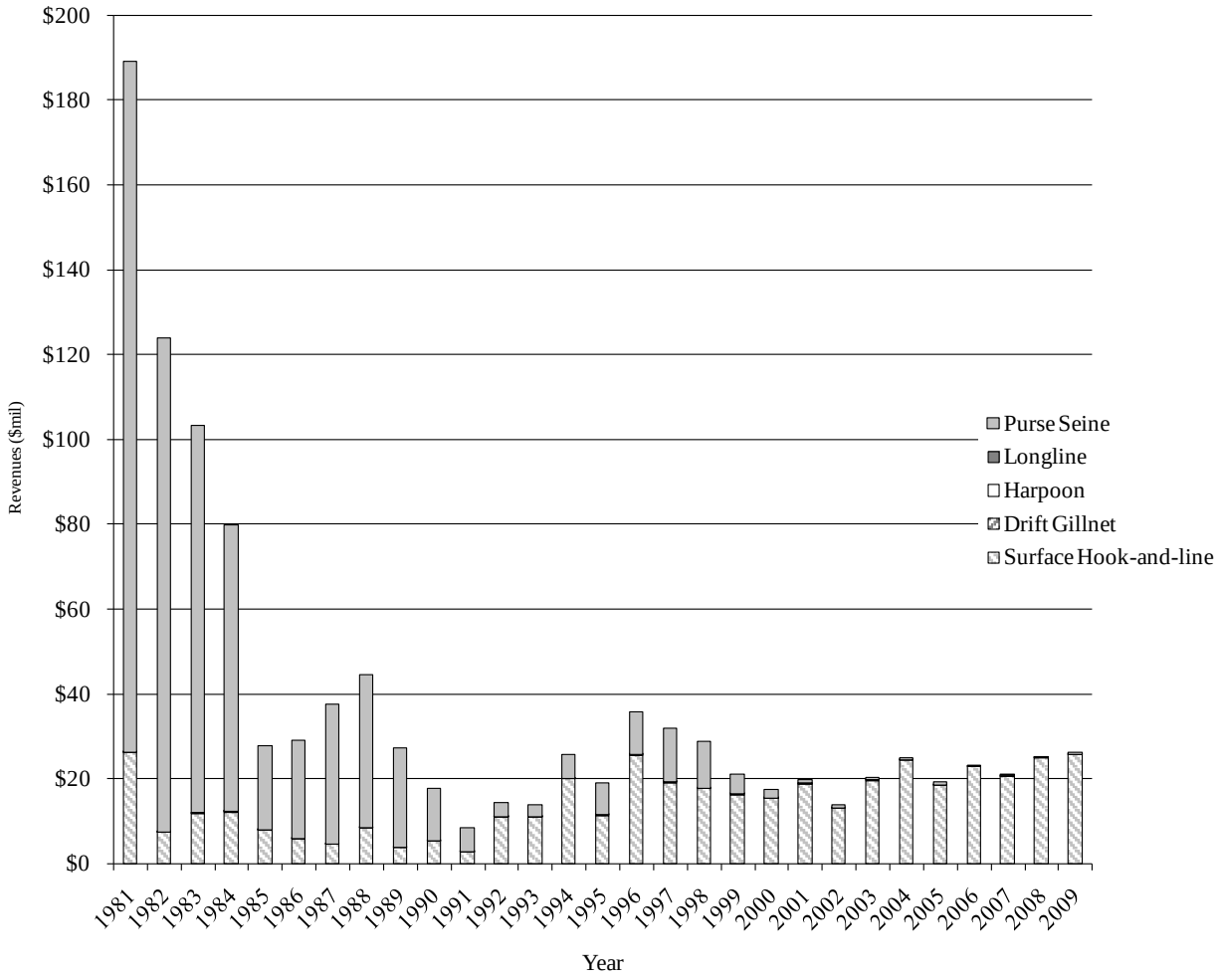

Figure 4–5. West Coast commercial tuna revenues by fishery, 1981–2009.

Interpretation: Figure 4–5 and Table 4–25 display West Coast commercial tuna revenues by fishery over the years 1981–2009 for the surface hook-and-line, drift gillnet, harpoon, longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on various dates in August 2009. Aquaculture fish ticket / fish ticket line information is excluded from the data. Canadian surface hook-and-line fishery data are also excluded.

Table 4–25. West Coast commercial tuna revenues by fishery, 1981–2009.

Year	Revenues ($)					
	Surface Hook-and-line	Drift Gillnet	Harpoon	Longline	Purse Seine	Total
1981	26,105,721	2,611	4,337	49,477	162,899,688	189,061,834
1982	7,355,282	9,784	146	73,415	116,534,837	123,973,464
1983	11,894,118	17,753		16,549	91,439,482	103,367,902
1984	12,166,930	18,682	480	4,364	67,670,051	79,860,507
1985	7,999,188	7,996	472	740	19,758,416	27,766,812
1986	5,875,077	11,747	390		23,136,080	29,023,294
1987	4,691,790	1,710	6,226	164	32,842,638	37,542,528
1988	8,548,185	7,092	8,552		35,899,810	44,463,639
1989	3,693,992		2,171		23,642,990	27,339,153
1990	5,415,074		108	45	12,357,079	17,772,306
1991	2,760,785	1,391		873	5,804,636	8,567,685
1992	11,080,778	2,084	1,369	1,790	3,350,739	14,436,760
1993	11,036,136	23,922	7,730	10,592	2,673,982	13,752,362
1994	19,936,716	92,875	2,490	104,222	5,679,816	25,816,119
1995	11,360,802	52,326		31,071	7,557,190	19,001,389
1996	25,526,196	108,568	216	16,116	10,179,438	35,830,534
1997	19,108,815	80,506	200	20,355	12,634,293	31,844,169
1998	17,641,854	80,279		27,185	10,982,420	28,731,738
1999	16,254,470	102,866		150,985	4,523,535	21,031,856
2000	15,348,828	67,066	302	38,632	2,084,934	17,539,762
2001	18,771,705	74,769		79,286	839,400	19,765,160
2002	13,175,199	21,035		11,051	706,266	13,913,551
2003	19,637,838	13,983		3,975	625,585	20,281,381
2004	24,326,922	24,087		5,589	545,475	24,902,073
2005	18,508,555	22,007		21,150	714,382	19,266,094
2006	22,833,634	5,834		142,325		22,981,793
2007	20,670,548	7,231		31,293	288,014	20,997,086
2008	24,896,835	2,518		13,921		24,913,274
2009	25,812,937	8,009		***	485,801	26,306,747

* Not reported due to data confidentiality requirements (fewer than three vessels).

** Not reported do to data confidentiality requirements based on non-PacFIN data sources (mandatory logbooks, permits, etc).

*** Not produced for 2009, due to no new data which is not confidential.

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted August 2010 (various dates).

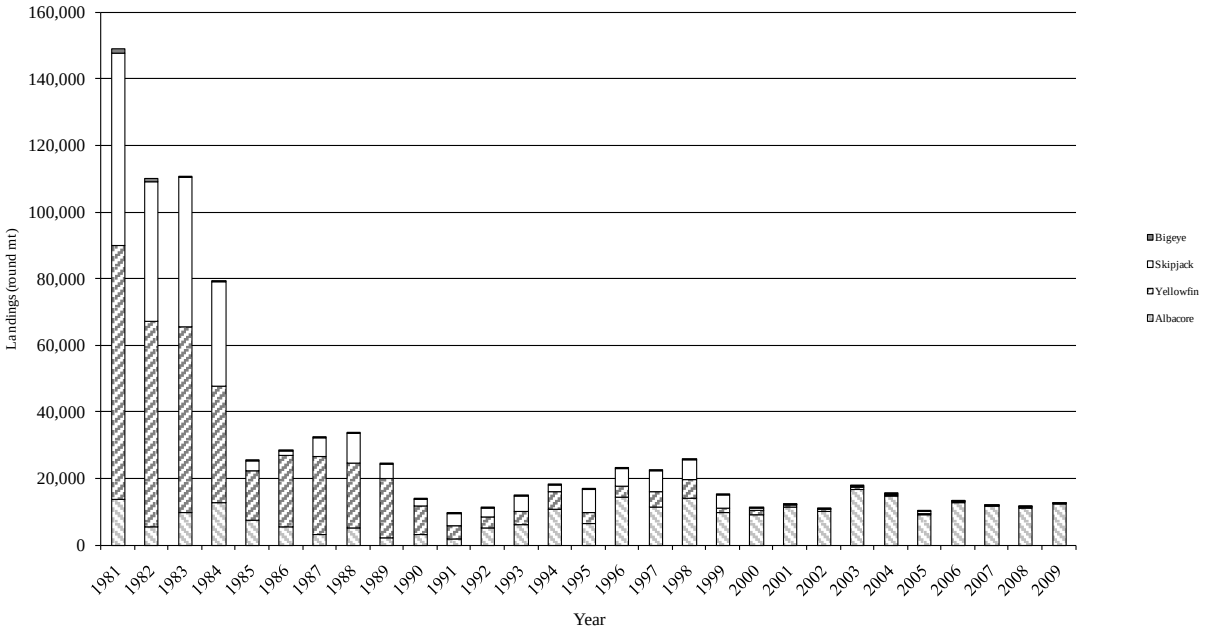

Figure 4–6. Species composition of coastwide commercial tuna landings, 1981–2009.

Interpretation: Figure 4–6 shows West Coast HMS commercial tuna landings in round metric tons for all gear types from 1981 through 2009 for the four principal species. The landings of these species, and other tuna species which comprise a smaller part of the catch, are shown in accompanying Table 4-26.

The principal species of tuna targeted by commercial fishers consists of four varieties: albacore, yellowfin, skipjack, and bluefin. The levels of yellowfin and skipjack landings declined precipitously during the 1980s and by 1996 albacore had supplanted yellowfin and skipjack as the most important constituent of commercial landings. By 2000, yellowfin, skipjack, and bluefin landings had all declined to far below their levels in the early 1980s; only albacore landings remained near their long-term average.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. They represent a portion of West Coast commercial landings by species, displayed in Table 4–4. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–26. Species composition of coastwide commercial tuna landings, 1981–2009.

	Landings (round mt)						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified Tuna	Total
1981	13,712	76,091	57,869	1,168	868	40	149,748
1982	5,410	61,769	41,904	968	2,404	51	112,506
1983	9,578	55,741	44,995	21	764	55	111,154
1984	12,654	35,063	31,251	126	635	1,014	80,743
1985	7,301	15,025	2,977	7	3,254	468	29,032
1986	5,243	21,517	1,361	29	4,731	143	33,024
1987	3,160	23,201	5,724	50	823	129	33,087
1988	4,912	19,520	8,863	6	804	11	34,116
1989	2,214	17,615	4,505	1	1,019	77	25,431
1990	3,028	8,509	2,256	2	925	46	14,766
1991	1,676	4,178	3,407	7	104	11	9,383
1992	4,902	3,350	2,586	7	1,087	10	11,942
1993	6,166	3,795	4,539	26	559	16	15,101
1994	10,751	5,056	2,111	47	916	33	18,914
1995	6,530	3,038	7,037	49	714	1	17,369
1996	14,173	3,347	5,455	62	4,688	3	27,728
1997	11,292	4,775	6,070	82	2,251	11	24,481
1998	13,915	5,799	5,846	53	1,949	12	27,574
1999	9,770	1,353	3,759	108	186	12	15,188
2000	9,074	1,159	780	86	313	1	11,413
2001	11,191	655	58	53	196	1	12,154
2002	10,029	544	236	10	11	2	10,832
2003	16,671	465	349	35	36	<0.5	17,556
2004	14,540	488	307	22	10	9	15,376
2005	9,055	285	523	10	207	<0.5	10,080
2006	12,786	77	48	35	1	1	12,948
2007	11,586	104	5	13	45	<0.5	11,753
2008	11,131	65	3	27	1	1	11,228
2009	12,264	45	5	12	415		12,741

Source: PacFIN, extracted August 9, 2010.

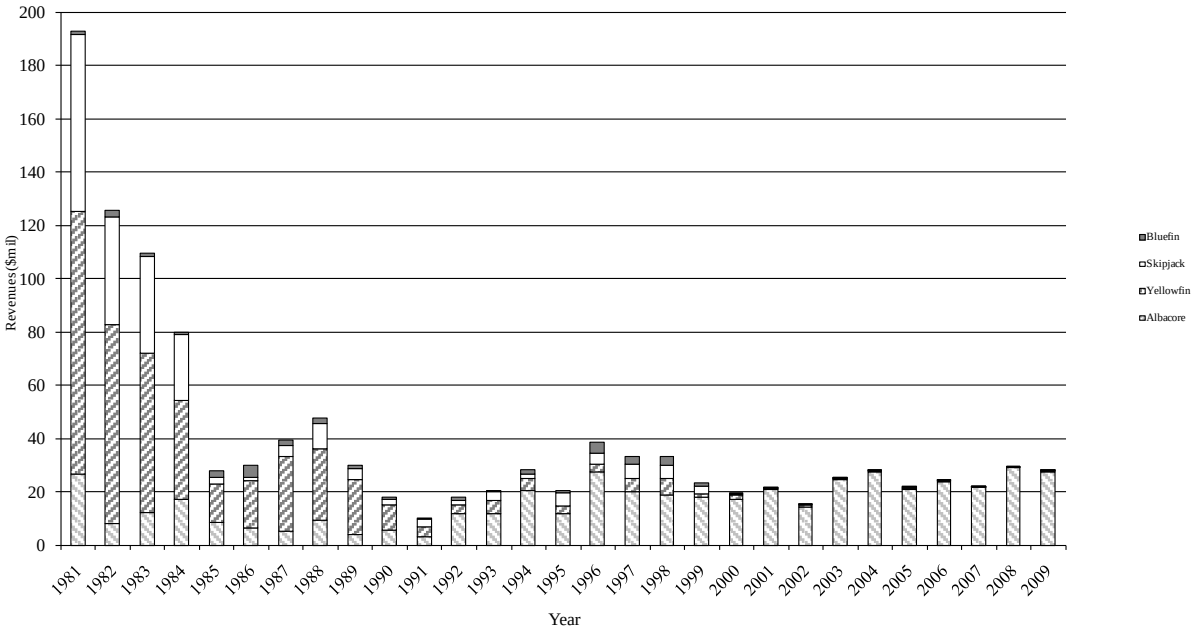

Figure 4–7. Species composition of coastwide commercial tuna revenues, 1981–2009.

Interpretation: Figure 4–7 shows West Coast HMS commercial tuna revenues in current dollars from 1981 through 2009 for the four principal species across all gear types. The revenues of these species and other tuna species, which comprise a smaller part of the catch, are shown in accompanying Table 4-27.

The principal species of tuna targeted by commercial fishers consists of four varieties: albacore, yellowfin, skipjack, and bluefin. The levels of yellowfin and skipjack revenues declined precipitously during the 1980s, and by 1992 albacore had supplanted yellowfin and skipjack as the most important component of commercial revenues.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. They represent a portion of Table 4-5, which tabulates West Coast commercial current dollar revenues by species. Current dollar revenues were computed as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–27. Species composition of coastwide commercial tuna revenues, 1981–2009.

	Revenues ($)						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified Tuna	Total
1981	26,524,145	98,722,280	66,331,030	1,569,755	1,239,005	72,694	194,458,909
1982	8,033,073	74,468,306	40,507,405	1,208,147	2,690,102	98,923	127,005,956
1983	12,242,167	59,475,802	36,652,119	45,946	1,062,909	95,490	109,574,433
1984	17,208,448	37,038,204	24,790,704	174,405	904,956	2,590,391	82,707,108
1985	8,292,769	14,690,108	2,118,170	17,693	2,819,048	1,028,867	28,966,655
1986	6,178,084	18,079,443	904,609	90,227	4,636,698	198,248	30,087,309
1987	5,127,832	27,878,667	4,426,717	176,504	2,057,402	448,231	40,115,353
1988	9,117,601	27,030,132	9,249,827	26,156	2,070,411	80,548	47,574,675
1989	3,785,613	20,824,242	3,944,894	2,415	1,271,718	127,320	29,956,202
1990	5,620,990	9,383,584	1,898,875	8,771	1,149,381	56,750	18,118,351
1991	2,823,937	3,996,935	2,692,345	42,810	116,371	21,161	9,693,559
1992	11,483,392	3,677,441	1,410,546	44,731	1,129,626	21,228	17,766,964
1993	11,697,562	4,821,735	3,282,778	211,513	752,369	72,678	20,838,635
1994	20,188,895	4,522,321	1,751,209	307,147	1,674,099	55,245	28,498,916
1995	11,572,603	3,044,670	4,752,641	258,727	1,057,948	5,136	20,691,725
1996	27,222,294	3,230,957	3,986,113	260,306	4,035,455	28,296	38,763,421
1997	19,924,121	4,991,131	5,504,526	359,780	2,773,705	21,895	33,575,158
1998	18,895,247	5,861,959	5,213,131	271,919	2,965,485	61,688	33,269,429
1999	17,771,262	1,468,209	2,748,208	657,121	1,061,233	60,572	23,766,605
2000	17,188,570	1,329,357	483,242	576,919	580,722	2,298	20,161,108
2001	20,680,501	465,558	33,633	320,855	473,557	3,069	21,977,173
2002	14,256,910	588,677	128,245	87,304	43,477	6,325	15,110,938
2003	24,435,697	451,273	159,961	262,768	76,106	21	25,385,826
2004	27,414,167	446,577	109,254	147,696	38,312	54,879	28,210,885
2005	20,823,045	315,699	292,193	60,141	136,847	913	21,628,838
2006	23,776,441	174,912	40,350	205,677	3,790	1,895	24,203,065
2007	21,633,438	149,568	4,361	94,734	58,106	46	21,940,253
2008	28,853,123	125,508	3,675	205,536	3,340	3,485	29,194,667
2009	27,469,749	166,286	5,332	97,103	441,540		28,180,010

Source: PacFIN, extracted August 9, 2010.

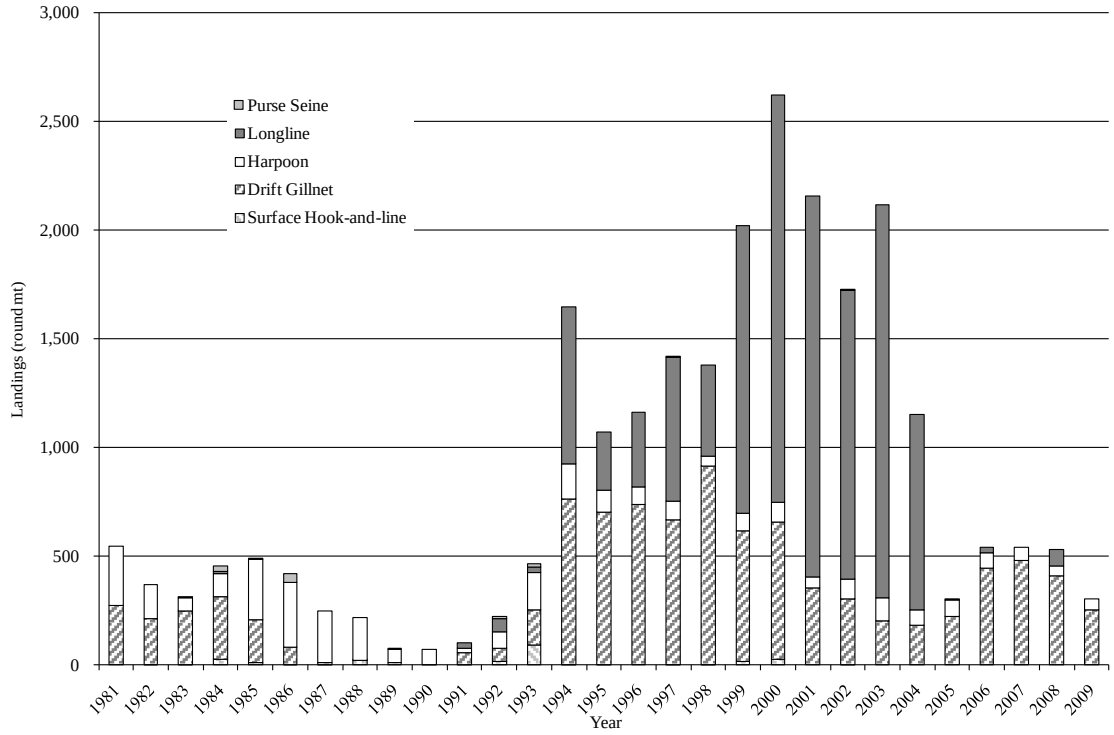

Figure 4–8. West Coast commercial swordfish landings by fishery, 1981–2009.

Interpretation: Figure 4–8 and Table 4–28 display West Coast commercial swordfish landings by fishery over the years 1981–2009 for the surface hook-and-line, drift gillnet, harpoon, longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on various dates in July and August 2009. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket / fish ticket line information is excluded from the data. Canadian surface hook-and-line fishery data are also excluded.

Table 4–28. West Coast commercial swordfish landings by fishery, 1981–2009.

	Landings (round mt)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Longline	Purse Seine	Total
1981		270	272	<0.5		542
1982	4	208	156	<0.5		368
1983	3	244	58	<0.5	1	306
1984	25	286	105	12	23	451
1985	11	197	275	<0.5	1	484
1986	1	78	296		41	416
1987	5	6	237			248
1988	18	1	199	<0.5		218
1989	7		62		1	70
1990	2		65			67
1991	2	51	20	27		100
1992	13	60	75	63	10	221
1993	90	162	169	27	17	465
1994	1	762	157	722		1,642
1995	1	701	97	271		1,070
1996	<0.5	734	81	346		1,161
1997	1	664	84	663	1	1,413
1998	4	906	48	418		1,376
1999	15	597	81	1,325		2,018
2000	22	635	90	1,873		2,620
2001	<0.5	351	52	1,749		2,152
2002	2	298	90	1,331	1	1,722
2003		199	107	1,810		2,116
2004		182	69	898		1,149
2005		220	76	1		297
2006		443	72	25		540
2007		478	59	<0.5		537
2008	<0.5	405	48	77		530
2009	<0.5	250	49	***		299

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

*** Not produced for 2009, due to no new data which is not confidential.

Source: PacFIN, extracted August 2010 (various dates).

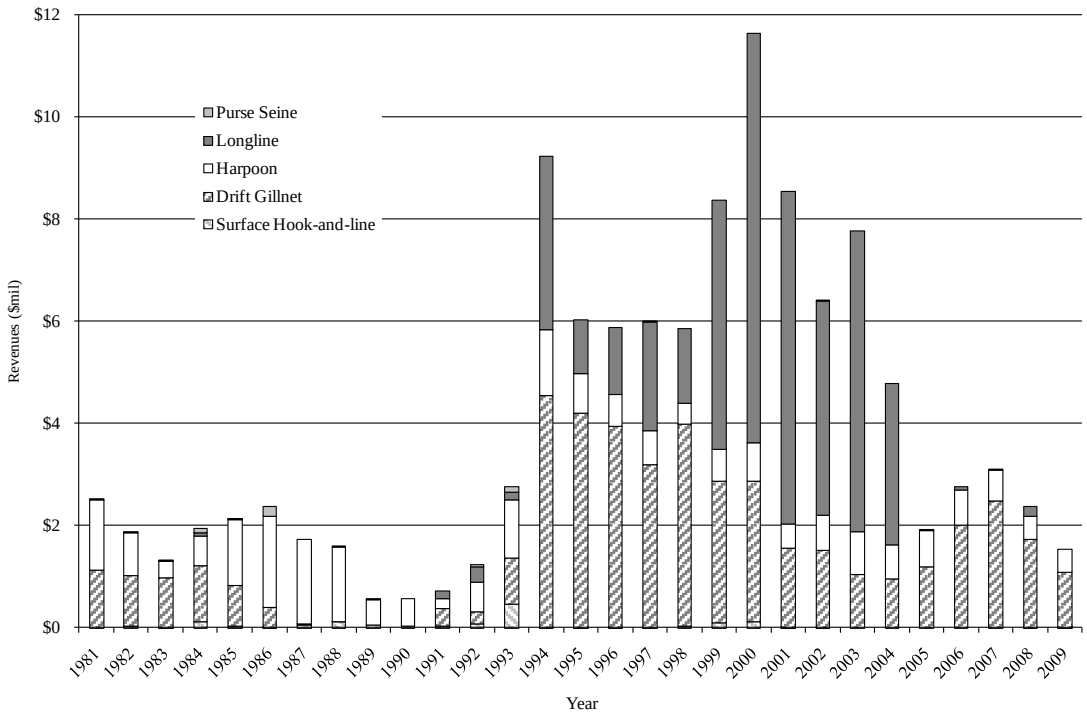

Figure 4–9. West Coast commercial swordfish revenues by fishery, 1981–2009.

Interpretation: Figure 4–9 and Table 4–29 display West Coast commercial swordfish revenues by fishery in current dollars over the years 1981–2009 for the surface hook-and-line, drift gillnet, harpoon, longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on various dates in August 2009. Aquaculture fish ticket / fish ticket line information is excluded from the data. Canadian surface hook-and-line fishery data are also excluded.

Table 4–29. West Coast commercial swordfish revenues by fishery, 1981–2009.

	Revenues ($)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Longline	Purse Seine	Total
1981		1,110,316	1,371,646	1,544		2,483,506
1982	13,219	1,000,168	839,886	306		1,853,579
1983	7,531	958,547	318,044	506	1,796	1,286,424
1984	96,217	1,096,570	583,079	62,804	87,097	1,925,767
1985	30,921	793,604	1,280,993	752	7,080	2,113,350
1986	6,427	377,053	1,796,277		182,606	2,362,363
1987	33,310	37,173	1,647,710			1,718,193
1988	96,331	3,324	1,477,860	1,601		1,579,116
1989	34,556		500,435		6,955	541,946
1990	13,332		539,322			552,654
1991	11,721	361,574	179,949	146,305		699,549
1992	55,452	241,122	586,740	298,852	51,873	1,234,039
1993	442,687	918,433	1,132,762	153,383	98,722	2,745,987
1994	6,797	4,536,655	1,273,087	3,401,896		9,218,435
1995	3,204	4,190,568	760,108	1,064,427		6,018,307
1996	2,608	3,919,232	633,027	1,319,868		5,874,735
1997	4,390	3,166,095	683,211	2,115,438	6,666	5,975,800
1998	17,122	3,967,255	402,914	1,454,529		5,841,820
1999	77,899	2,785,199	608,982	4,893,372		8,365,452
2000	97,814	2,750,462	750,533	8,028,596		11,627,405
2001	2,037	1,541,152	468,289	6,527,196		8,538,674
2002	9,996	1,499,163	678,934	4,190,669	2,623	6,381,385
2003		1,032,796	839,197	5,879,612		7,751,605
2004		944,192	670,001	3,160,052		4,774,245
2005		1,184,545	709,760	4,939		1,899,244
2006		1,996,530	680,036	68,553		2,745,119
2007		2,469,238	597,707	3,312		3,070,257
2008	1,200	1,708,969	458,482	195,469		2,364,120
2009	291	1,070,068	459,656	***		1,530,015

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

*** Not produced for 2009, due to no new data which is not confidential.

Source: PacFIN, extracted August 2010 (various dates).

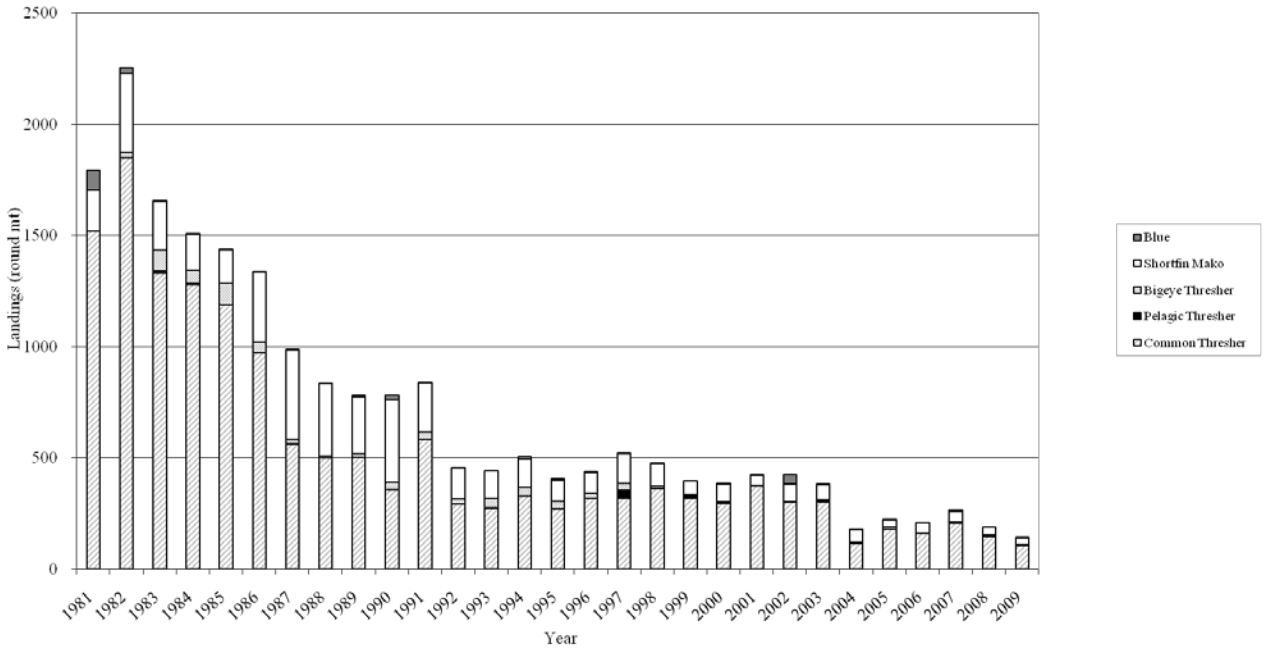

Figure 4–10. Species composition of coastwide commercial shark landings, 1981–2009.

Interpretation: Figure 4–10 shows West Coast commercial shark landings in round metric tons for all gear types from 1981 through 2009. The numeric data used to produce the graph are shown below in Table 4–30.

The graph shows a general pattern of decline in landings from a level as high as 2,000 metric tons in the early 1980s down to a level near or below 500 metric tons from 1992 onwards. The decline was primarily driven by a downward trend in common thresher landings, and to a lesser extent by a similar decline in shortfin mako landings. In both 2004 and 2005, total West Coast commercial shark landings were below 250. In a broader sense, the decline in landings reflects a decrease in drift gillnet vessels.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. They represent a portion of Table 4–4, which displays West Coast commercial landings by species. Landings in pounds were converted to round weight in metric tons by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–30. Species composition of coastwide commercial shark landings, 1981–2009.

	Landings (round mt)					
Year	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Total
1981	1521			182	92	1795
1982	1848		28	351	27	2254
1983	1331	9	96	217	7	1660
1984	1279	9	57	160	2	1507
1985	1190	<0.5	95	149	1	1435
1986	974	<0.5	48	312	2	1336
1987	562	2	20	403	2	989
1988	500	1	9	322	3	835
1989	504	<0.5	17	255	6	782
1990	357	1	31	373	20	782
1991	584		32	219	1	836
1992	292	<0.5	22	142	1	457
1993	275	1	44	122	<0.5	442
1994	330	<0.5	37	128	12	507
1995	270	5	31	95	5	406
1996	319	1	20	96	1	437
1997	320	35	32	132	1	520
1998	361	2	11	100	3	477
1999	320	10	5	63	<0.5	398
2000	296	3	5	80	1	385
2001	373	2	2	46	2	425
2002	301	2		82	41	426
2003	301	4	6	70	1	382
2004	115	2	5	54	1	177
2005	179	<0.5	10	33	1	223
2006	160	<0.5	4	46	<0.5	210
2007	204	2	5	45	10	266
2008	147	<0.5	6	35	<0.5	188
2009	105	<0.5	7	29	1	142

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted August 9, 2010.

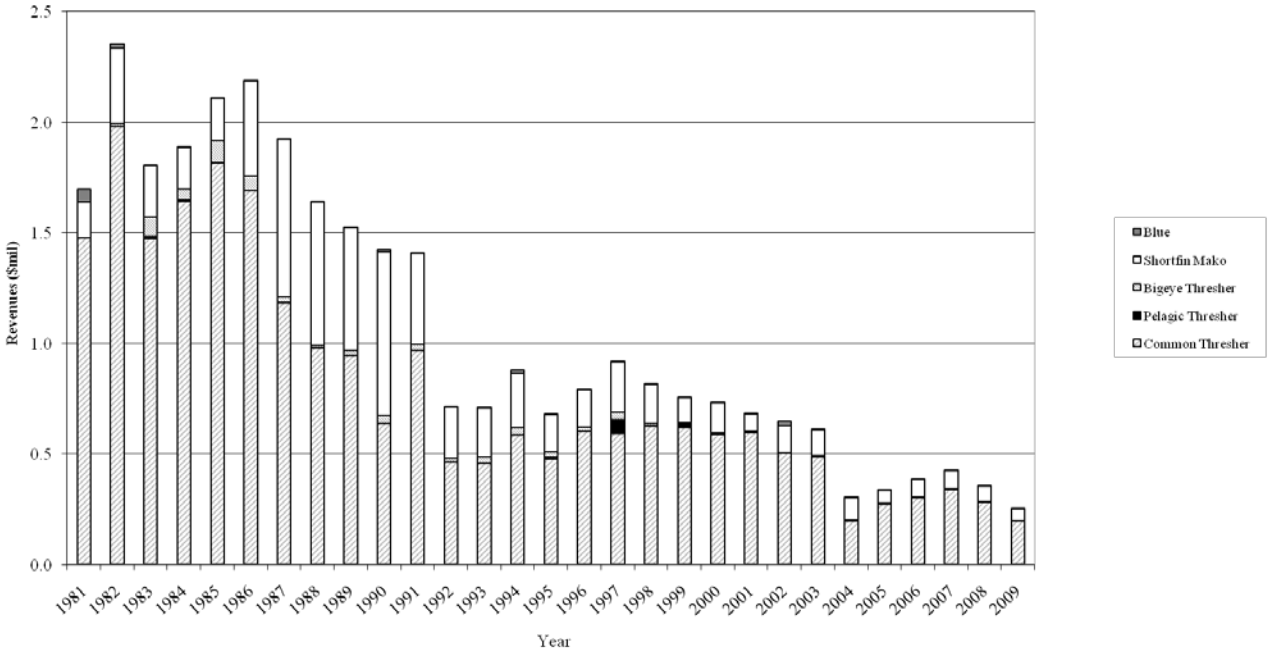

Figure 4–11. Species composition of coastwide commercial shark revenues, 1981–2009.

Interpretation: Figure 4–11 shows West Coast commercial shark revenues in current dollars by species for all gear types from 1981 through 2009. The numeric data used to produce the graph are shown in Table 4–31.

The graph shows a long-term downward trend in commercial shark revenues from levels approaching $2.5 million in the early 1980s to a level below $500 thousand after 2004. The decline was primarily driven by a downward trend in common thresher revenue, and to a lesser extent by a similar decline in shortfin mako revenue. A key factor underlying the decline in revenues is a drop in the number of drift gillnet vessels.

Source and Calculations: The data were extracted from PacFIN on August 9, 2010. They represent a portion of the Table 4–5, which displays West Coast commercial current dollar revenues by species. Current dollar revenues were computed as the sum total of landed weights in pounds multiplied by the prices per pound in each fish ticket line. Aquaculture fish ticket / fish ticket line information is excluded from the data.

Table 4–31. Species composition of coastwide commercial shark revenues, 1981–2009.

	Revenues ($)					
Year	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Total
1981	1,475,634			162,347	59,064	1,697,045
1982	1,980,592		15,168	339,209	18,826	2,353,795
1983	1,474,213	8,449	91,455	229,826	4,645	1,808,588
1984	1,642,178	7,723	47,119	189,794	2,470	1,889,284
1985	1,817,135	716	96,433	192,917	2,132	2,109,333
1986	1,690,791	194	66,647	428,259	1,320	2,187,211
1987	1,184,091	1,840	22,123	715,138	1,853	1,925,045
1988	979,905	821	9,764	649,799	2,275	1,642,564
1989	944,161	149	24,711	552,576	3,465	1,525,062
1990	638,630	1,682	34,628	739,193	10,303	1,424,436
1991	968,877		25,179	415,168	894	1,410,118
1992	464,018	602	14,629	231,063	1,816	712,128
1993	458,513	462	28,190	221,401	622	709,188
1994	584,318	42	33,478	247,088	16,057	880,983
1995	477,901	8,777	24,896	165,215	2,796	679,585
1996	603,006	1,557	17,745	167,111	587	790,006
1997	591,268	62,496	34,768	227,426	327	916,285
1998	625,489	2,584	9,428	176,313	5,996	819,810
1999	617,691	18,424	5,876	111,119	73	753,183
2000	589,035	2,738	4,636	133,621	720	730,750
2001	595,548	2,767	8,428	75,799	1,294	683,836
2002	503,487	1,946		124,521	18,510	648,464
2003	487,796	2,814	3,779	115,728	390	610,507
2004	197,188	2,500	4,060	98,827	489	303,064
2005	271,767	588	6,234	57,788	426	336,803
2006	301,669	271	4,509	79,586	309	386,344
2007	337,770	2,903	4,334	78,569	1,984	425,560
2008	280,885	434	5,459	67,255	177	354,210
2009	195,492	72	5,453	52,428	2,361	255,806

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted August 9, 2010.

Table 4–32. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	9,113	14		<0.5	<0.5	1	2	3	2	9,135
1982	3,859	3	4	2	1	4	<0.5	2	<0.5	3,875
1983	7,270	16	3	1	<0.5	20	34	4	1	7,349
1984	8,109	13	25	5	<0.5	5	2	<0.5	4	8,163
1985	6,147	2	11	4	<0.5	4	<0.5	2	1	6,171
1986	3,019	2	1	<0.5		20	<0.5	2	<0.5	3,044
1987	1,324	<0.5	5	2		2	1	1	<0.5	1,335
1988	931	<0.5	17	2		<0.5		<0.5	1	951
1989	823	1	7	8	<0.5	10	<0.5	2	1	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5	<0.5	2	765
1991	642	<0.5	2	1		<0.5			1	646
1992	1,184	<0.5	13	2	<0.5	6		<0.5	2	1,207
1993	1,461	18	89	5	9	3			1	1,586
1994	3,055	<0.5	1	<0.5	<0.5	1		<0.5	<0.5	3,057
1995	777	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	3	780
1996	5,038	42	<0.5	<0.5		<0.5		<0.5	2	5,082
1997	3,288	7	1	1	<0.5	5	<0.5	3	2	3,307
1998	2,232	116	4	3	<0.5	1	<0.5	1	2	2,359
1999	5,339	6	15	1	<0.5	1	<0.5	<0.5	5	5,367
2000	1,798	2	22	<0.5	<0.5	1	<0.5	1	2	1,826
2001	2,796	8	<0.5	1	<0.5	2	<0.5	3	6	2,816
2002	2,659	2	2	<0.5	<0.5	<0.5	<0.5	3	3	2,669
2003	1,696	3		<0.5	<0.5	1	<0.5	2	3	1,705
2004	1,336	1		<0.5	<0.5	<0.5	<0.5	2	2	1,341
2005	455	<0.5				1		<0.5	1	457
2006	201	1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	202
2007	772	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	772
2008	376	1			<0.5	<0.5	<0.5		1	378
2009	346	7	<0.5	<0.5	<0.5		<0.5		1	354

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–33. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	9,113	14		<0.5	<0.5	1	2	3	2	9,135
1982	3,859	3	4	2	1	4	<0.5	2	<0.5	3,875
1983	7,270	16	3	1	<0.5	20	34	4	1	7,349
1984	8,109	13	25	5	<0.5	5	2	<0.5	4	8,163
1985	6,147	2	11	4	<0.5	4	<0.5	2	1	6,171
1986	3,019	2	1	<0.5		20	<0.5	2	<0.5	3,044
1987	1,324	<0.5	5	2		2	1	1	<0.5	1,335
1988	931	<0.5	17	2		<0.5		<0.5	1	951
1989	823	1	7	8	<0.5	10	<0.5	2	1	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5	<0.5	2	765
1991	642	<0.5	2	1		<0.5			1	646
1992	1,184	<0.5	13	2	<0.5	6		<0.5	2	1,207
1993	1,461	18	89	5	9	3			1	1,586
1994	3,055	<0.5	1	<0.5	<0.5	1		<0.5	<0.5	3,057
1995	777	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	3	780
1996	5,047	42	<0.5	<0.5		<0.5		<0.5	2	5,091
1997	3,290	7	1	1	<0.5	5	<0.5	3	1	3,308
1998	2,232	116	4	3	<0.5	1	<0.5	1	2	2,359
1999	5,360	6	15	1	<0.5	1	<0.5	<0.5	5	5,388
2000	1,798	2	22	<0.5	<0.5	1	<0.5	1	2	1,826
2001	2,796	8	<0.5	1	<0.5	2	<0.5	3	6	2,816
2002	2,659	2	2	<0.5	<0.5	<0.5	<0.5	3	3	2,669
2003	1,696	3		<0.5	<0.5	1	<0.5	2	3	1,705
2004	1,336	1		<0.5	<0.5	<0.5	<0.5	2	2	1,341
2005	455	<0.5				1		<0.5	1	457
2006	201	1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	202
2007	772	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	772
2008	376	1			<0.5	<0.5	<0.5		1	378
2009	346	7	<0.5	<0.5	<0.5		<0.5		1	354

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–34. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	3,505					1		25	<0.5	3,531
1982	853	<0.5				<0.5		1	<0.5	854
1983	1,509	<0.5				3	<0.5	5	<0.5	1,517
1984	733	<0.5				<0.5		1	<0.5	734
1985	692					<0.5		<0.5	<0.5	692
1986	1,116	<0.5				<0.5		1		1,117
1987	1,038							1		1,038
1988	1,794					<0.5		2	<0.5	1,796
1989	490					<0.5		<0.5		490
1990	943					<0.5	<0.5	1		944
1991	571							1	<0.5	572
1992	1,719			<0.5		<0.5		1		1,720
1993	2,147					1		3		2,151
1994	2,131			<0.5				<0.5	<0.5	2,131
1995	2,283	1			<0.5	<0.5		6		2,290
1996	3,595	<0.5				<0.5		10		3,606
1997	3,867	<0.5			<0.5	1		9		3,877
1998	4,292			<0.5		1		4	<0.5	4,296
1999	1,632	6		<0.5		<0.5		2		1,640
2000	3,282	<0.5		<0.5		<0.5		2		3,284
2001	3,572	<0.5		<0.5		<0.5		6		3,579
2002	1,924							3		1,927
2003	3,807	<0.5						1		3,809
2004	4,632	<0.5		<0.5		<0.5	<0.5	2		4,635
2005	3,258			<0.5		<0.5		1		3,260
2006	3,680	<0.5		<0.5		<0.5	<0.5		1	3,681
2007	4,469				<0.5	<0.5	<0.5	<0.5	1	4,470
2008	3,196	5	<0.5		<0.5	<0.5			1	3,202
2009	4,416	<0.5		<0.5		<0.5		<0.5	1	4,417

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–35. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	3,505					1		25	<0.5	3,531
1982	863	<0.5				<0.5		1	1	865
1983	1,540	<0.5				3	<0.5	5	1	1,549
1984	736	<0.5				<0.5		1	<0.5	737
1985	692					<0.5		<0.5	<0.5	692
1986	1,116	<0.5				<0.5		1		1,117
1987	1,038							1		1,038
1988	1,795					<0.5		2	<0.5	1,797
1989	490					<0.5		<0.5		490
1990	943					<0.5	<0.5	1		944
1991	571							1	<0.5	572
1992	1,767			<0.5		<0.5		1		1,768
1993	2,157					1		3		2,160
1994	2,131			<0.5				<0.5	<0.5	2,131
1995	2,283	1			<0.5	<0.5		6		2,290
1996	4,059	<0.5				<0.5		10		4,069
1997	4,158	<0.5			<0.5	1		9		4,169
1998	4,810			<0.5		1		4	<0.5	4,814
1999	2,065	6		<0.5		<0.5		2		2,073
2000	3,972	<0.5		<0.5		<0.5		2		3,974
2001	4,064	<0.5		<0.5		<0.5		6		4,070
2002	1,978							3		1,982
2003	4,118	<0.5						1		4,120
2004	4,878	<0.5		<0.5		<0.5	<0.5	2		4,880
2005	3,668			<0.5		<0.5		1		3,670
2006	3,864	<0.5		<0.5		<0.5	<0.5		<0.5	3,864
2007	4,748				<0.5	<0.5	<0.5	<0.5	1	4,749
2008	4,026	5	<0.5		<0.5	<0.5			2	4,033
2009	4,574	<0.5		<0.5		<0.5		<0.5	1	4,575

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–36. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	875				N.A.	1		9	<0.5	885
1982	266				N.A.					266
1983	530				N.A.	1		4		535
1984	67				N.A.					67
1985	172				N.A.					172
1986	845				N.A.					845
1987	529				N.A.				<0.5	529
1988	1,904		1		N.A.	<0.5	<0.5	<0.5	1	1,906
1989	855				N.A.	<0.5				855
1990	1,225				N.A.					1,225
1991	428	<0.5			N.A.	<0.5		<0.5		428
1992	1,852	<0.5			N.A.	<0.5			1	1,853
1993	2,171		1	<0.5	N.A.	<0.5		<0.5	<0.5	2,172
1994	5,420				N.A.					5,420
1995	3,347		<0.5		N.A.			1	<0.5	3,348
1996	4,573				N.A.					4,573
1997	3,670				N.A.	<0.5				3,670
1998	6,201				N.A.					6,201
1999	1,822	12			N.A.				<0.5	1,834
2000	3,017				N.A.					3,017
2001	3,852	1			N.A.	1		<0.5		3,853
2002	4,710				N.A.	<0.5		1	1	4,712
2003	7,986				N.A.					7,986
2004	7,425				N.A.				<0.5	7,425
2005	4,504				N.A.			1	<0.5	4,505
2006	8,493				N.A.					8,493
2007	5,902				N.A.			<0.5	1	5,903
2008	6,197				N.A.	<0.5		<0.5		6,197
2009	6,807				N.A.			1		6,808

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–37. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981–2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	875				N.A.	1		9	<0.5	885
1982	266				N.A.					266
1983	530				N.A.	1		4		535
1984	67				N.A.					67
1985	172				N.A.					172
1986	845				N.A.					845
1987	529				N.A.				<0.5	529
1988	1,904		1		N.A.	<0.5	<0.5	<0.5	1	1,906
1989	855				N.A.	<0.5				855
1990	1,225				N.A.					1,225
1991	428	<0.5			N.A.	<0.5		<0.5		428
1992	1,864	<0.5			N.A.	<0.5			<0.5	1,864
1993	2,183		1	<0.5	N.A.	<0.5		<0.5	<0.5	2,184
1994	5,443				N.A.					5,443
1995	3,414		<0.5		N.A.			1	<0.5	3,415
1996	4,969				N.A.					4,969
1997	3,775				N.A.	<0.5				3,775
1998	6,644				N.A.					6,644
1999	2,081	12			N.A.				<0.5	2,093
2000	3,216				N.A.					3,216
2001	4,156	1			N.A.	1		<0.5		4,157
2002	5,358				N.A.	<0.5		1	<0.5	5,359
2003	10,793				N.A.			<0.5		10,793
2004	8,310				N.A.				<0.5	8,310
2005	4,904				N.A.			1	<0.5	4,905
2006	8,707				N.A.					8,707
2007	5,980				N.A.			<0.5	1	5,981
2008	6,725				N.A.	<0.5		<0.5		6,726
2009	7,299				N.A.			1		7,300

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–38. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	17,731,395	17,982		173	72	1,444	991	16,689	1,091	17,769,837
1982	5,735,370	5,258	13,219	2,771	557	5,671	13	10,001	332	5,773,192
1983	9,394,970	14,511	7,531	1,597	33	18,504	15,429	14,994	3,713	9,471,282
1984	11,157,988	19,870	96,217	6,080	706	6,854	928	2,154	3,559	11,294,356
1985	6,973,498	4,278	30,921	7,017	6	6,375	239	10,104	1,976	7,034,414
1986	3,598,008	7,124	6,427	180		18,967	160	6,309	660	3,637,835
1987	2,173,044	1,150	33,310	3,440		2,305	657	3,089	402	2,217,397
1988	1,728,315	952	89,636	3,566		664		1,860	421	1,825,414
1989	1,455,484	1,833	34,556	11,295	31	18,058	1	7,412	2,504	1,531,174
1990	1,457,546	79	13,332	560	74	6,059	83	39	1,529	1,479,301
1991	1,089,097	56	11,721	602		185			774	1,102,435
1992	2,889,632	2,124	55,452	2,321	281	6,004		1,259	614	2,957,687
1993	2,902,857	154,056	437,415	7,144	23,216	3,917			1,741	3,530,346
1994	6,415,286	603	6,797	275	180	590		529	326	6,424,586
1995	1,418,582	592	2,953	173		47	16	710	2,992	1,426,065
1996	10,571,220	38,548	2,608	295		60		1,567	996	10,615,294
1997	5,675,955	14,095	4,390	1,628	266	11,221	89	8,581	3,726	5,719,951
1998	3,097,075	138,138	17,122	5,018	525	3,979	279	4,144	5,215	3,271,495
1999	9,931,533	53,721	77,899	2,556	1,413	4,033	455	1,603	7,556	10,080,769
2000	3,682,725	3,841	97,814	223	298	1,887	522	2,501	5,233	3,795,044
2001	4,917,834	25,961	2,037	2,002	544	6,140	178	10,462	12,397	4,977,555
2002	3,861,585	6,838	9,996	664	170	827	1,241	9,544	6,168	3,897,033
2003	2,570,926	10,929		62	567	2,764	558	9,127	5,707	2,600,640
2004	2,407,735	2,383		319	655	1,783	1,059	12,366	3,101	2,429,401
2005	1,059,355	1,437				1,557		1,337	2,614	1,066,300
2006	504,401	1,569		42	167	221	124	3,480	927	510,931
2007	1,575,242	1,222			208	6	60	1,178	702	1,578,618
2008	956,535	2,834			371	53	3,193		1,290	964,276
2009	898,030	11,217	291	549	42		92		1,357	911,578

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–39. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	17,731,395	17,982		173	72	1,444	991	16,689	1,091	17,769,837
1982	5,735,370	5,258	13,219	2,771	557	5,671	13	10,001	332	5,773,192
1983	9,394,970	14,511	7,531	1,597	33	18,504	15,429	14,994	3,713	9,471,282
1984	11,157,988	19,870	96,217	6,080	706	6,854	928	2,154	3,559	11,294,356
1985	6,973,498	4,278	30,921	7,017	6	6,375	239	10,104	1,976	7,034,414
1986	3,598,008	7,124	6,427	180		18,967	160	6,309	660	3,637,835
1987	2,173,044	1,150	33,310	3,440		2,305	657	3,089	402	2,217,397
1988	1,728,315	952	89,636	3,566		664		1,860	421	1,825,414
1989	1,455,484	1,833	34,556	11,295	31	18,058	1	7,412	2,504	1,531,174
1990	1,457,546	79	13,332	560	74	6,059	83	39	1,529	1,479,301
1991	1,089,097	56	11,721	602		185			774	1,102,435
1992	2,889,632	2,124	55,452	2,321	281	6,004		1,259	614	2,957,687
1993	2,902,857	154,056	437,415	7,144	23,216	3,917			1,741	3,530,346
1994	6,415,286	603	6,797	275	180	590		529	326	6,424,586
1995	1,418,582	592	2,953	173		47	16	710	2,992	1,426,065
1996	10,587,510	38,548	2,608	295		60		1,567	997	10,631,585
1997	5,678,124	14,095	4,390	1,628	266	11,221	89	8,581	3,726	5,722,120
1998	3,097,075	138,138	17,122	5,018	525	3,979	279	4,144	5,215	3,271,495
1999	9,968,024	53,721	77,899	2,556	1,413	4,033	455	1,603	7,555	10,117,259
2000	3,682,725	3,841	97,814	223	298	1,887	522	2,501	5,233	3,795,044
2001	4,917,834	25,961	2,037	2,002	544	6,140	178	10,462	12,397	4,977,555
2002	3,861,585	6,838	9,996	664	170	827	1,241	9,544	6,168	3,897,033
2003	2,570,926	10,929		62	567	2,764	558	9,127	5,707	2,600,640
2004	2,407,735	2,383		319	655	1,783	1,059	12,366	3,101	2,429,401
2005	1,059,355	1,437				1,557		1,337	2,614	1,066,300
2006	504,401	1,569		42	167	221	124	3,480	927	510,931
2007	1,575,242	1,222			208	6	60	1,178	702	1,578,618
2008	956,535	2,834			371	53	3,193		1,290	964,276
2009	898,030	11,217	291	549	42		92		1,357	911,578

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–40. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	6,686,230					748		87,410	298	6,774,686
1982	1,250,455	242				5		3,833	202	1,254,737
1983	1,845,205	75				1,426	65	16,699	167	1,863,637
1984	898,066	183				92		4,269	720	903,330
1985	822,379					8		698	336	823,421
1986	1,324,977	124				83		3,142		1,328,326
1987	1,679,449							3,749		1,683,198
1988	3,318,399					73		9,451	66	3,327,989
1989	886,505					39		893		887,437
1990	1,763,611					104	2	2,753		1,766,471
1991	979,262							2,604	311	982,177
1992	3,856,956			40		133		4,862		3,861,991
1993	3,864,366					908		10,358		3,875,632
1994	3,749,780			27				8	19	3,749,834
1995	4,049,908	323			21	105		19,802		4,070,158
1996	6,572,323	49				380		24,958		6,597,709
1997	6,815,587	854			105	717		29,056		6,846,319
1998	5,936,402			<0.5		809		12,196	48	5,949,455
1999	3,008,900	35,377		67		314		8,140		3,052,796
2000	6,171,331	656		<0.5		3		6,943		6,178,933
2001	6,509,649	1,036		208		528		22,477		6,533,898
2002	2,871,875							10,002		2,881,877
2003	5,694,424	116						4,887		5,699,427
2004	8,484,606	130		200		51	182	10,375		8,495,544
2005	7,674,185			181		30		6,939		7,681,335
2006	7,602,928	6		210		764	<0.5		64	7,603,972
2007	8,818,890				15	1,936	22	204	408	8,821,475
2008	8,250,123	46,296	1,200		108	1,211			5,340	8,304,278
2009	9,782,752	69		90		252		842	397	9,784,402

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–41. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	6,686,230					748		87,410	298	6,774,686
1982	1,265,313	242				5		3,833	202	1,269,595
1983	1,883,255	75				1,426	65	16,699	166	1,901,686
1984	901,350	183				92		4,269	720	906,614
1985	822,379					8		698	336	823,421
1986	1,324,977	124				83		3,142		1,328,326
1987	1,679,449							3,749		1,683,198
1988	3,321,249					73		9,451	66	3,330,839
1989	886,505					39		893		887,437
1990	1,763,611					104	2	2,753		1,766,471
1991	979,262							2,604	311	982,177
1992	3,968,734			40		133		4,862		3,973,769
1993	3,882,548					908		10,358		3,893,814
1994	3,749,780			27				8	19	3,749,834
1995	4,049,908	323			21	105		19,802		4,070,158
1996	7,429,668	49				380		24,958		7,455,054
1997	7,341,599	931			218	717		29,056		7,372,520
1998	6,540,414			<0.5		809		12,196	48	6,553,467
1999	3,783,515	35,377		67		314		8,140		3,827,411
2000	7,488,665	656		<0.5		3		6,943		7,496,267
2001	7,558,629	1,036		208		528		22,477		7,582,878
2002	2,951,707							10,002		2,961,709
2003	6,158,462	116						4,887		6,163,464
2004	9,144,548	130		200		51	182	10,375		9,155,486
2005	8,815,478			181		30		6,939		8,822,628
2006	8,048,157	6		210		764	<0.5		64	8,049,201
2007	9,467,854				15	1,936	22	204	408	9,470,439
2008	10,666,183	46,296	1,200		108	1,211			5,340	10,720,338
2009	10,190,661	69		90		252		842	398	10,192,312

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–42. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	1,670,113				N.A.	315		29,078	20	1,699,526
1982	363,957				N.A.					363,957
1983	639,357				N.A.	379		4,382		644,119
1984	90,823				N.A.					90,823
1985	199,032				N.A.					199,032
1986	944,843				N.A.					944,843
1987	838,147				N.A.				35	838,182
1988	3,500,519		6,695		N.A.	29	614	51	51	3,507,959
1989	1,350,170				N.A.	15				1,350,185
1990	2,193,837				N.A.					2,193,837
1991	692,354	15			N.A.	4		875		693,248
1992	4,331,995	72			N.A.	6			55	4,332,128
1993	4,114,857		5,272	848	N.A.	167		28	64	4,121,236
1994	9,771,047				N.A.					9,771,047
1995	5,891,398		251		N.A.			1,779	35	5,893,463
1996	8,344,058				N.A.					8,344,058
1997	6,602,324				N.A.	13				6,602,336
1998	8,470,240				N.A.					8,470,240
1999	3,198,589	26,351			N.A.				152	3,225,092
2000	5,490,275				N.A.					5,490,275
2001	7,316,469	755			N.A.	1,133		80		7,318,437
2002	6,434,901				N.A.	77		2,251	1,621	6,438,850
2003	11,361,444				N.A.					11,361,444
2004	13,432,068				N.A.				232	13,432,300
2005	9,773,578				N.A.			4,057	704	9,778,339
2006	14,724,730				N.A.					14,724,730
2007	10,275,193				N.A.			2,576	311	10,278,080
2008	15,641,047				N.A.	44		5,091		15,646,182
2009	15,120,869				N.A.			2,603		15,123,472

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–43. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	1,670,113				N.A.	315		29,078	20	1,699,526
1982	363,957				N.A.					363,957
1983	639,357				N.A.	379		4,382		644,119
1984	90,823				N.A.					90,823
1985	199,032				N.A.					199,032
1986	944,843				N.A.					944,843
1987	838,147				N.A.				35	838,182
1988	3,500,519		6,695		N.A.	29	614	51	51	3,507,959
1989	1,350,170				N.A.	15				1,350,185
1990	2,193,837				N.A.					2,193,837
1991	692,354	15			N.A.	4		875		693,248
1992	4,360,248	72			N.A.	6			55	4,360,381
1993	4,138,143		5,272	848	N.A.	167		28	64	4,144,522
1994	9,812,666				N.A.					9,812,666
1995	6,012,790		251		N.A.			1,779	34	6,014,854
1996	9,062,840				N.A.					9,062,840
1997	6,791,456				N.A.	13				6,791,468
1998	8,966,640				N.A.					8,966,640
1999	3,651,158	26,351			N.A.				152	3,677,661
2000	5,869,381				N.A.					5,869,381
2001	7,930,083	755			N.A.	1,133		80		7,932,051
2002	7,396,988				N.A.	77		2,251	1,621	7,400,937
2003	15,656,498				N.A.			<0.5		15,656,498
2004	15,823,418				N.A.				232	15,823,650
2005	10,887,708				N.A.			4,057	703	10,892,468
2006	15,178,595				N.A.					15,178,595
2007	10,450,945				N.A.			2,576	310	10,453,831
2008	17,225,272				N.A.	44		5,091		17,230,407
2009	16,325,697				N.A.			2,603		16,328,300

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–44. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	37,266,488	37,793		363	150	3,036	2,084	35,075	2,293	37,347,282
1982	11,361,669	10,415	26,187	5,488	1,103	11,235	25	19,812	660	11,436,594
1983	17,902,001	27,650	14,349	3,044	63	35,260	29,401	28,571	7,074	18,047,413
1984	20,492,173	36,492	176,708	11,165	1,297	12,589	1,704	3,955	6,535	20,742,618
1985	12,430,479	7,625	55,118	12,509	11	11,364	427	18,011	3,518	12,539,062
1986	6,274,866	12,424	11,208	314		33,079	280	11,003	1,149	6,344,323
1987	3,683,125	1,948	56,457	5,830		3,906	1,113	5,236	685	3,758,300
1988	2,831,910	1,559	146,872	5,843		1,089		3,048	690	2,991,011
1989	2,297,891	2,895	54,557	17,832	48	28,509	2	11,702	3,953	2,417,389
1990	2,215,789	120	20,267	851	112	9,211	126	59	2,326	2,248,861
1991	1,599,027	82	17,210	883		272			1,136	1,618,610
1992	4,144,029	3,046	79,523	3,328	403	8,611		1,805	883	4,241,628
1993	4,073,042	216,158	613,743	10,024	32,574	5,496			2,444	4,953,481
1994	8,815,839	829	9,341	378	247	811		727	446	8,828,618
1995	1,909,519	796	3,975	232		63	22	955	4,031	1,919,593
1996	13,964,623	50,922	3,445	389		79		2,070	1,318	14,022,846
1997	7,367,543	18,296	5,699	2,113	346	14,565	116	11,139	4,834	7,424,651
1998	3,975,195	177,304	21,976	6,441	674	5,108	358	5,318	6,696	4,199,070
1999	12,563,610	67,958	98,543	3,233	1,788	5,102	575	2,028	9,559	12,752,396
2000	4,560,085	4,756	121,117	276	369	2,336	646	3,097	6,481	4,699,163
2001	5,954,515	31,433	2,466	2,424	658	7,435	215	12,667	15,013	6,026,826
2002	4,600,959	8,147	11,910	791	202	985	1,479	11,372	7,349	4,643,194
2003	2,998,864	12,748		72	661	3,224	651	10,646	6,658	3,033,524
2004	2,731,097	2,703		362	743	2,023	1,201	14,027	3,517	2,755,673
2005	1,162,721	1,577				1,708		1,467	2,870	1,170,343
2006	536,198	1,668		45	177	234	132	3,699	987	543,140
2007	1,627,821	1,263			215	6	62	1,217	725	1,631,309
2008	967,762	2,867			375	53	3,231		1,305	975,593
2009	898,030	11,217	291	549	42		92		1,357	911,578

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–45. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	37,266,488	37,793		363	150	3,036	2,084	35,075	2,293	37,347,282
1982	11,361,669	10,415	26,187	5,488	1,103	11,235	25	19,812	660	11,436,594
1983	17,902,001	27,650	14,349	3,044	63	35,260	29,401	28,571	7,074	18,047,413
1984	20,492,173	36,492	176,708	11,165	1,297	12,589	1,704	3,955	6,535	20,742,618
1985	12,430,479	7,625	55,118	12,509	11	11,364	427	18,011	3,518	12,539,062
1986	6,274,866	12,424	11,208	314		33,079	280	11,003	1,149	6,344,323
1987	3,683,125	1,948	56,457	5,830		3,906	1,113	5,236	685	3,758,300
1988	2,831,910	1,559	146,872	5,843		1,089		3,048	690	2,991,011
1989	2,297,891	2,895	54,557	17,832	48	28,509	2	11,702	3,953	2,417,389
1990	2,215,789	120	20,267	851	112	9,211	126	59	2,326	2,248,861
1991	1,599,027	82	17,210	883		272			1,136	1,618,610
1992	4,144,029	3,046	79,523	3,328	403	8,611		1,805	883	4,241,628
1993	4,073,042	216,158	613,743	10,024	32,574	5,496			2,444	4,953,481
1994	8,815,839	829	9,341	378	247	811		727	446	8,828,618
1995	1,909,519	796	3,975	232		63	22	955	4,031	1,919,593
1996	13,986,143	50,922	3,445	389		79		2,070	1,318	14,044,366
1997	7,370,358	18,296	5,699	2,113	346	14,565	116	11,139	4,834	7,427,466
1998	3,975,195	177,304	21,976	6,441	674	5,108	358	5,318	6,696	4,199,070
1999	12,609,771	67,958	98,543	3,233	1,788	5,102	575	2,028	9,558	12,798,556
2000	4,560,085	4,756	121,117	276	369	2,336	646	3,097	6,481	4,699,163
2001	5,954,515	31,433	2,466	2,424	658	7,435	215	12,667	15,013	6,026,826
2002	4,600,959	8,147	11,910	791	202	985	1,479	11,372	7,349	4,643,194
2003	2,998,864	12,748		72	661	3,224	651	10,646	6,658	3,033,524
2004	2,731,097	2,703		362	743	2,023	1,201	14,027	3,517	2,755,673
2005	1,162,721	1,577				1,708		1,467	2,870	1,170,343
2006	536,198	1,668		45	177	234	132	3,699	987	543,140
2007	1,627,821	1,263			215	6	62	1,217	725	1,631,309
2008	967,762	2,867			375	53	3,231		1,305	975,593
2009	898,030	11,217	291	549	42		92		1,357	911,578

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–46. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	14,052,606					1,573		183,712	625	14,238,516
1982	2,477,129	480				10		7,593	401	2,485,613
1983	3,516,016	143				2,716	125	31,819	318	3,551,137
1984	1,649,341	336				170		7,840	1,321	1,659,008
1985	1,465,916					15		1,244	599	1,467,774
1986	2,310,738	216				145		5,479		2,316,578
1987	2,846,524							6,354		2,852,877
1988	5,437,324					120		15,486	108	5,453,038
1989	1,399,598					62		1,409		1,401,069
1990	2,681,075					158	3	4,185		2,685,422
1991	1,437,766							3,824	455	1,442,045
1992	5,531,273			57		191		6,972		5,538,493
1993	5,422,150					1,275		14,533		5,437,957
1994	5,152,920			36				11	28	5,152,995
1995	5,451,485	434			28	142		26,655		5,478,743
1996	8,682,065	64				502		32,969		8,715,599
1997	8,846,816	1,109			136	931		37,716		8,886,708
1998	7,619,563			<0.5		1,038		15,654	62	7,636,317
1999	3,806,325	44,752		84		397		10,297		3,861,855
2000	7,641,569	812		<0.5		3		8,598		7,650,982
2001	7,881,886	1,254		252		640		27,215		7,911,246
2002	3,421,750							11,917		3,433,667
2003	6,642,277	135						5,700		6,648,112
2004	9,624,099	147		227		57	207	11,768		9,636,506
2005	8,422,989			199		33		7,616		8,430,836
2006	8,082,202	6		223		812	<0.5		69	8,083,312
2007	9,113,248				16	2,000	23	211	422	9,115,920
2008	8,346,947	46,839	1,214		109	1,225			5,404	8,401,738
2009	9,782,752	69		90		252		842	397	9,784,402

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–47. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	14,052,606					1,573		183,712	625	14,238,516
1982	2,506,562	480				10		7,593	401	2,515,046
1983	3,588,519	143				2,716	125	31,819	318	3,623,640
1984	1,655,372	336				170		7,840	1,322	1,665,040
1985	1,465,916					15		1,244	599	1,467,774
1986	2,310,738	216				145		5,479		2,316,578
1987	2,846,524							6,354		2,852,877
1988	5,441,994					120		15,486	108	5,457,708
1989	1,399,598					62		1,409		1,401,069
1990	2,681,075					158	3	4,185		2,685,422
1991	1,437,766							3,824	455	1,442,045
1992	5,691,573			57		191		6,972		5,698,794
1993	5,447,661					1,275		14,533		5,463,468
1994	5,152,920			36				11	28	5,152,995
1995	5,451,485	434			28	142		26,655		5,478,743
1996	9,814,621	64				502		32,969		9,848,156
1997	9,529,593	1,208			282	931		37,716		9,569,730
1998	8,394,832			<0.5		1,038		15,654	62	8,411,586
1999	4,786,230	44,752		84		397		10,297		4,841,760
2000	9,272,740	812		<0.5		3		8,598		9,282,153
2001	9,151,990	1,254		252		640		27,215		9,181,351
2002	3,516,868							11,917		3,528,784
2003	7,183,555	135						5,700		7,189,390
2004	10,372,673	147		227		57	207	11,768		10,385,080
2005	9,675,643			199		33		7,616		9,683,490
2006	8,555,498	6		223		812	<0.5		69	8,556,608
2007	9,783,873				16	2,000	23	211	422	9,786,545
2008	10,791,363	46,839	1,214		109	1,225			5,403	10,846,153
2009	10,190,661	69		90		252		842	398	10,192,312

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–48. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	3,510,117				N.A.	662		61,113	42	3,571,934
1982	720,992				N.A.					720,992
1983	1,218,288				N.A.	723		8,350		1,227,360
1984	166,800				N.A.					166,800
1985	354,782				N.A.					354,782
1986	1,647,791				N.A.					1,647,791
1987	1,420,588				N.A.				59	1,420,647
1988	5,735,735		10,970		N.A.	47	1,005	84	84	5,747,925
1989	2,131,623				N.A.	24				2,131,647
1990	3,335,113				N.A.					3,335,113
1991	1,016,523	22			N.A.	6		1,285		1,017,836
1992	6,212,527	103			N.A.	9			78	6,212,717
1993	5,773,617		7,397	1,189	N.A.	234		39	92	5,782,568
1994	13,427,301				N.A.					13,427,301
1995	7,930,271		338		N.A.			2,394	47	7,933,050
1996	11,022,533				N.A.					11,022,533
1997	8,569,994				N.A.	16				8,570,011
1998	10,871,826				N.A.					10,871,826
1999	4,046,286	33,335			N.A.				192	4,079,813
2000	6,798,260				N.A.					6,798,260
2001	8,858,783	914			N.A.	1,372		97		8,861,166
2002	7,666,985				N.A.	92		2,682	1,931	7,671,690
2003	13,252,588				N.A.					13,252,588
2004	15,236,012				N.A.				263	15,236,275
2005	10,727,229				N.A.			4,452	773	10,732,454
2006	15,652,950				N.A.					15,652,950
2007	10,618,160				N.A.			2,662	321	10,621,143
2008	15,824,612				N.A.	45		5,151		15,829,808
2009	15,120,869				N.A.			2,603		15,123,472

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 25, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Canadian vessels were excluded by outer joining the fish ticket tables with the state vessel table and checking the "idtype."

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–49. Real commercial ex-vessel revenues (2009 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981-2009.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	3,510,117				N.A.	662		61,113	42	3,571,934
1982	720,992				N.A.					720,992
1983	1,218,288				N.A.	723		8,350		1,227,360
1984	166,800				N.A.					166,800
1985	354,782				N.A.					354,782
1986	1,647,791				N.A.					1,647,791
1987	1,420,588				N.A.				59	1,420,647
1988	5,735,735		10,970		N.A.	47	1,005	84	84	5,747,925
1989	2,131,623				N.A.	24				2,131,647
1990	3,335,113				N.A.					3,335,113
1991	1,016,523	22			N.A.	6		1,285		1,017,836
1992	6,253,045	103			N.A.	9			78	6,253,235
1993	5,806,290		7,397	1,189	N.A.	234		39	92	5,815,241
1994	13,484,494				N.A.					13,484,494
1995	8,093,673		338		N.A.			2,394	47	8,096,452
1996	11,972,047				N.A.					11,972,047
1997	8,815,493				N.A.	16				8,815,509
1998	11,508,972				N.A.					11,508,972
1999	4,618,795	33,335			N.A.				193	4,652,323
2000	7,267,683				N.A.					7,267,683
2001	9,601,747	914			N.A.	1,372		97		9,604,130
2002	8,813,282				N.A.	92		2,682	1,931	8,817,987
2003	18,262,567				N.A.			<0.5		18,262,567
2004	17,948,523				N.A.				263	17,948,786
2005	11,950,069				N.A.			4,452	773	11,955,294
2006	16,135,426				N.A.					16,135,426
2007	10,799,778				N.A.			2,662	321	10,802,761
2008	17,427,430				N.A.	45		5,151		17,432,626
2009	16,325,697				N.A.			2,603		16,328,300

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 26, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Real values are calculated to eliminate the effects of inflation by dividing current nominal values by the current year GDP implicit price deflator, with a base year of 2009.

Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–50. Commercial catch and effort fishery statistics for the U.S. South Pacific albacore troll fishery, 1986-2009.

Fishing Season	No. Trips	Catch (mt)	No. Days	No. Vessels
1986-1987	16	751	565	7
1987-1988	91	3,558	3,163	43
1988-1989	80	3,239	3,749	43
1989-1990	76	3,995	3,537	39
1990-1991	78	5,221	6,997	56
1991-1992	65	3,097	6,867	55
1992-1993	45	1,036	4,687	44
1993-1994	17	2,236	3,848	14
1994-1995	29	1,953	1,894	21
1995-1996	55	1,964	4,152	53
1996-1997	26	1,617	3,189	26
1997-1998	38	1,701	5,384	36
1998-1999	24	1,241	2,505	21
1999-2000	39	2,562	4,958	36
2000-2001	39	2,128	6,377	33
2001-2002	12	1,218	3,602	12
2002-2003	14	1,678	2,289	14
2003-2004	12	995	1,488	11
2004-2005	8	725	1,491	8
2005-2006	10	600	1,310	8
2006-2007	6	271	813	6
2007-2008	3	150	254	3
2008-2009	4	237	197	4

Source: Childers, SWFSC, August 12, 2010.

Note 1: Total catches for the U.S. South Pacific albacore troll fishery may catch from November and December of the previous year.

Note 2: Total catches for seasons before 1996-97 may contain catch from non-U.S. vessels.

Table 4–51. Percentages of commercial catch and effort by fishing areas for U.S. albacore troll vessels, 1995–2009.

Year	Catch			Effort		
	U.S. EEZ	Canada EEZ	High-Seas	U.S. EEZ	Canada EEZ	High-Seas
1995	5	6	89	16	10	73
1996	14	0	86	27	0	73
1997	17	4	80	30	4	66
1998	15	0	85	26	0	74
1999	65	1	34	62	1	37
2000	70	0	30	69	1	31
2001	57	0	43	67	1	33
2002	64	2	34	73	2	25
2003	86	1	13	87	1	12
2004	93	1	6	89	2	9
2005	92	2	6	89	3	8
2006	82	1	16	90	1	9
2007	99	1	0	97	2	2
2008	78	6	16	85	4	11
2009	94	2	4	94	2	4

Zeros mean no catch or effort.

Source: Childers, SWFSC, August 12, 2010.

Note: Data for 2008 and 2009 are preliminary.

Table 4–52. Number of vessels with West Coast commercial HMS landings by fishery (HMS gear & species), 1981-2009.

Year	Albacore Surface Hook-and-Line	Swordfish & HMS Shark Drift Gillnet[1]	Any Species Harpoon[2]	HMS Species Longline	HMS Tuna Purse Seine[3]	Any HMS Fishery
1981	1,837	130	190	27	135	2,170
1982	761	130	162	28	124	1,113
1983	1,629	122	93	19	111	1,887
1984	1,126	103	114	14	78	1,310
1985	792	97	101	12	53	994
1986	419	64	114	6	51	621
1987	486	36	101	8	47	655
1988	533	6	84	14	43	672
1989	338	*	45	4	38	422
1990	368		52	5	33	453
1991	172	12	33	13	18	240
1992	610	19	48	20	29	704
1993	610	74	42	12	26	726
1994	718	151	51	44	25	906
1995	477	133	43	36	22	656
1996	726	132	31	29	23	870
1997	1,200	121	32	52	34	1,347
1998	866	112	30	70	33	1,020
1999	827	97	33	53	14	923
2000	763	90	36	70	16	895
2001	981	82	25	56	15	1,075
2002	736	63	32	36	4	829
2003	888	54	35	40	3	975
2004	780	46	29	40	11	878
2005	599	45	25	**	8	664
2006	635	44	24	**	*	708
2007	679	49	28	**	4	748
2008	523	50	32	**	*	598
2009	679	49	27	**	8	759

* Not reported due to data confidentiality requirements (fewer than three vessels).

** Not reported due to data confidentiality requirements based on non-PacFIN data sources (mandatory logbooks, permits, etc.)

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 10, 2010.

[1]There is no drift gillnet gear for Washington. Significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entangling net, trammel net, several trawl, encircling net, set gillnet and unknown gears, and therefore are not reported here.

[2]Only California has harpoon landings. Some of the non-swordfish species may have been taken by dual-gear permit holders, who may have fished with drift gillnets but landed under harpoon.

[3]There is no purse seine gear for Washington.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline fishery were used.

Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–53. Number of vessels with commercial HMS landings in California by fishery (HMS gear & species), 1981-2009.

Year	Albacore Surface Hook-and-Line	Swordfish & HMS Shark Drift Gillnet[1]	Any Species Harpoon[2]	HMS Species Longline	HMS Tuna Purse Seine	Any HMS Fishery
1981	1,310	130	190	27	135	1,646
1982	602	130	162	28	124	954
1983	1,243	122	93	19	111	1,501
1984	993	103	114	14	78	1,178
1985	724	*	101	6	53	919
1986	344	35	114	*	51	525
1987	289	16	101	*	47	445
1988	149	*	84	*	43	286
1989	180	*	45	4	38	264
1990	103		52	5	33	189
1991	76	12	33	*	18	143
1992	139	19	48	*	29	237
1993	202	74	42	12	26	319
1994	271	151	51	44	25	466
1995	137	133	43	36	22	330
1996	290	132	31	*	23	439
1997	612	121	32	52	34	768
1998	382	111	30	*	33	550
1999	446	95	33	53	14	544
2000	349	*	36	*	16	483
2001	474	82	25	*	15	571
2002	321	63	32	*	4	416
2003	325	*	35	40	*	416
2004	191	*	29	*	11	292
2005	97	45	25	**	8	169
2006	80	44	24	**	*	160
2007	155	49	28	**	4	230
2008	67	50	32	**	*	148
2009	127	49	27	**	8	212

* Not reported due to data confidentiality requirements (fewer than three vessels).

** Not reported due to data confidentiality requirements based on non-PacFIN data sources (mandatory logbooks, permits, etc.)

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less thar half of the unit shown.

Source: PacFIN, extracted Aug. 12, 2010.

[1]Significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entanglin net, trammel net, several trawl, encircling net, set gillnet and unknown gears, and therefore are not reported here.

[2]Some of the non-swordfish species may have been taken by dual-gear permit holders, who may have fished with drift gillnets but landed under harpoon.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline fishery were used.

Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–54. Number of vessels with commercial HMS landings in Oregon by fishery (HMS gear & species), 1981-2009.

Year	Albacore Surface Hook-and-Line	Swordfish & HMS Shark Drift Gillnet	HMS Species Pelagic Longline	HMS Tuna Purse Seine	Any HMS Fishery
1981	681				681
1982	192				192
1983	407				407
1984	177				177
1985	89	*			*
1986	90	33			122
1987	170	20	*		187
1988	262	*			*
1989	134				134
1990	211				211
1991	71				71
1992	352				352
1993	367				367
1994	328				328
1995	230	3			231
1996	385	3			385
1997	498	4			499
1998	373	6			374
1999	309	4			309
2000	375	*			*
2001	473		*		*
2002	269				269
2003	385	*		*	*
2004	450	*			*
2005	383				383
2006	368				368
2007	413				413
2008	337				337
2009	417				417

* Not reported due to data confidentiality requirements (fewer than three vessels).

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: PacFIN, extracted Aug. 12, 2010.

Additional processing info:

Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.

Only fish tickets where at least 1 lb of swordfish or any HMS shark was landed for the drift gillnet fishery were used.

Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the pelagic longline fishery were used.

Only fish tickets where at least 1 lb of any HMS tuna was landed for the purse seine fishery were used.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–55. Number of vessels with commercial HMS landings in Washington by fishery (HMS gear & species), 1981-2009.

Year	Albacore Surface Hook-and-Line	HMS Species Longline	Any HMS Fishery
1981	251		251
1982	61		61
1983	157		157
1984	45		45
1985	32	6	38
1986	47	*	*
1987	89	*	*
1988	223	*	*
1989	77		77
1990	103		103
1991	42	*	*
1992	229	*	*
1993	208		208
1994	265		265
1995	207		207
1996	215	*	*
1997	247		247
1998	220	*	*
1999	187		187
2000	179	*	*
2001	205	*	*
2002	241	*	*
2003	325		325
2004	301	*	*
2005	225		225
2006	313		313
2007	221		221
2008	225		225
2009	272		272

* Not reported due to data confidentiality requirements (fewer than three vessels).
Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN, extracted Aug. 12, 2010.
Additional processing info:
Only fish tickets where at least 1 lb of albacore was landed for the albacore surface hook-and-line (troll and baitboat) fishery were used.
Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline fishery were used.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4-56. Selected West Coast HMS landings (round mt) by port group area, 2009.

Port Group Area	Albacore	Other Tunas	Sharks	Swordfish
Puget Sound	172			
North Washington Coast	15			
South and Central WA Coast	7,112			
Astoria	1,211			
Tillamook	102			
Newport	2,275			
Coos Bay	947	1	2	
Brookings	38			
Crescent City	100			
Eureka	106			
Fort Bragg	12			
Bodega Bay	8			
San Francisco	22			114
Monterey	38			
Morro Bay	9	2	13	45
Santa Barbara	1	36	56	9
Los Angeles	90	437	18	46
San Diego	6	2	54	193
Total	**12,264**	**478**	**143**	**407**

Table 4-57. Selected West Coast HMS landings (round mt) by month, 2009.

Month	Albacore	Other Tunas	Sharks	Swordfish
January	2	12	16	96
February		*	2	
March	*	*	4	
April	*	6	4	1
May	*	*	6	
June	29	*	16	
July	3,308	<0.5	17	9
August	4,814	177	18	11
September	3,253	209	9	37
October	731	2	9	39
November	92	<0.5	21	66
December	1	8	20	148
Total	**12,264**	**478**	**143**	**407**

*Not reported due to data confidentiality requirements (fewer than 3 vessels).
Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.
Source: PacFIN accessed August 9, 2010.
Additional processing info:
Landings in lbs are converted to round weight in mt by multiplying the landed weights by the conversion factors in each fish ticket line and then dividing by 2204.6. Aquaculture fish ticket/fish ticket line info is excluded.

4.2 Recreational Fisheries

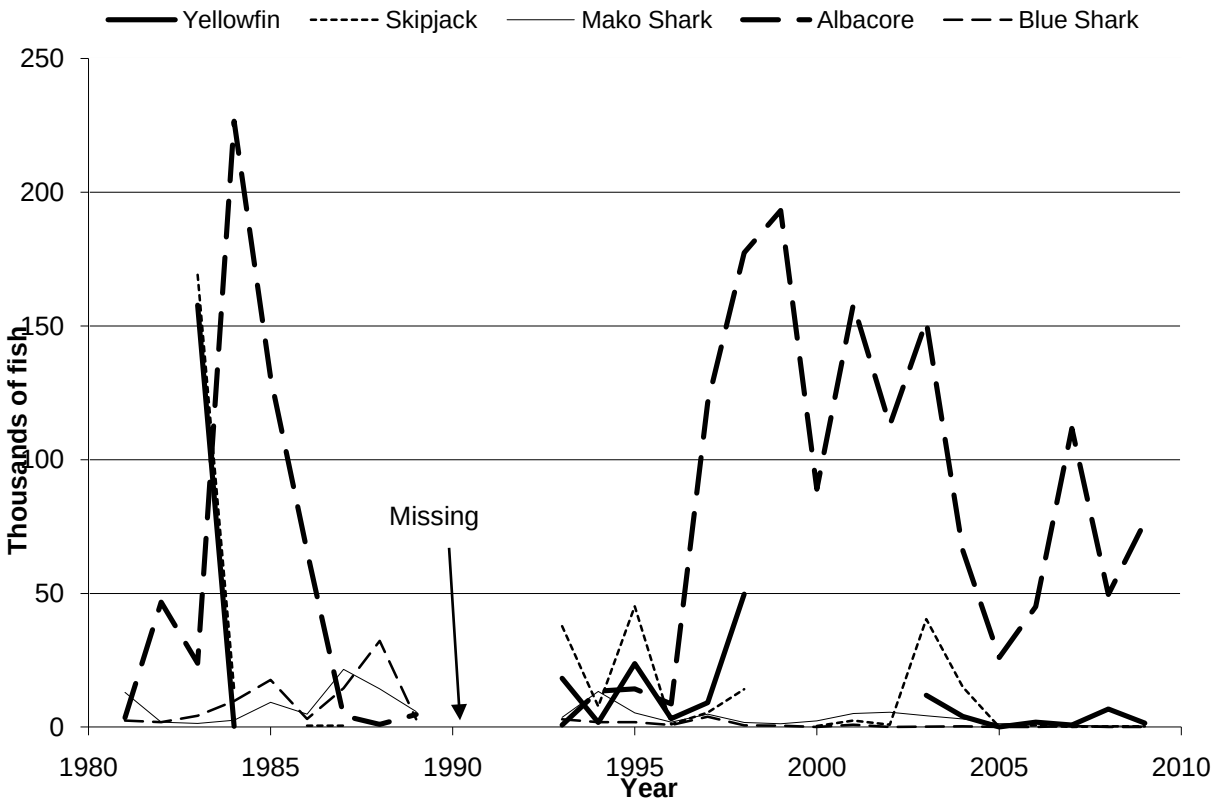

Figure 4–12. Catches by species (thousands of fish) in U.S. EEZ waters for the West Coast recreational private sport fishing fleet, 1981–2009.

Interpretation: Figure 4–12 shows West Coast recreational private sport fishing fleet HMS catches in U.S. EEZ waters by species, in thousands of fish. Table 4-58 shows the numeric values, with added columns for species representing negligible shares of the overall catch (i.e., bluefin tuna, bigeye tuna, swordfish, marlin, common thresher shark, and dorado).

Albacore represented the largest share of overall private sport fishing boat catch in 2009. Yellowfin tuna was the next most important historic component of the catch.

Source and Calculations: The data were extracted from RecFIN on August 2, 2010. The data represent thousands of fish caught for each species. Tables were created for each species by requesting "examined" and "dead" catch types (RecFIN codes A + B1) summed across the range of waves within each year from 1981 through 2009, then copied to a Microsoft Excel notebook where they were summarized. The primary source for the data was the Marine Recreational Fisheries Statistics Survey (MRFSS) survey for years 1981 through 2003 and the California Recreational Fisheries Survey (CRFS) for 2004–09. MRFSS and CRFS data are generally not comparable due to different sampling methodologies. Blank table entries represent missing values (including the years 1990–92 for which no data are available). Data for 2009 are preliminary and may be incomplete.

Table 4–58. Catches by species (thousands of fish) in U.S. EEZ waters for the West Coast recreational private sport fishing fleet, 1981–2009.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye Tuna	Swordfish	Marlin	Mako	Common Thresher	Blue Shark	Dorado
1981				3.5				13.0		2.4	
1982				46.7	2.5	1.2	0.8	1.9	2.2	1.8	
1983	157.8	169.2	3.7	23.9	1.3		0.4	1.4	3.2	4.2	6.5
1984	0.3	14.0	12.3	226.6	0.6		1.2	2.6	0.8	9.7	8.9
1985			0.8	130.7			0.7	9.3	0.5	17.7	
1986		0.5	0.2	65.8				4.8	1.4	3.0	
1987		0.5		4.2			0.9	21.6	4.8	14.5	
1988				1.0			0.8	14.3	1.4	32.2	
1989	7.0	5.8		4.7				5.8	0.8	2.9	
1990											
1991											
1992											
1993	18.2	37.8	6.5	0.8			0.3	3.6	2.7	2.9	13.3
1994	1.7	7.7		13.4			0.4	13.3	3.6	1.8	1.0
1995	23.7	45.2		14.3			0.3	5.3	2.7	1.9	
1996	3.2	1.0		8.7				1.9	0.7	0.8	2.7
1997	9.2	5.4	0.1	121.4			0.4	4.8	0.5	3.9	19.8
1998	49.7	14.2	3.6	177.4				1.7	0.8	0.6	13.9
1999			1.3	193.2				1.3	1.5	0.5	1.1
2000	114.2	0.4	6.3	89.0	0.4			2.3	2.3	0.0	85.4
2001		2.5	2.9	158.0			0.5	5.1	2.2	0.9	
2002		0.9	4.8	112.9				5.6	1.6	0.1	0.2
2003	11.9	40.4	0.2	151.8	0.2			4.2	2.2	0.2	0.2
2004	4.0	15.0	0.1	66.1	0.0		0.0	3.0	4.6	0.3	3.2
2005	0.1	0.0	0.3	26.0			0.0	1.3	0.3	0.1	0.2
2006	1.8	0.6	0.2	45.0			0.0	1.5	0.9	0.1	16.1
2007	0.8	0.1	0.0	111.7		0.0		0.7	1.6	0.4	0.3
2008	6.7	0.3	0.4	49.6				0.4	1.2	0.1	17.0
2009	1.5	0.3	0.2	76.8			0.0	0.4	1.7	0.1	0.7

Data were extracted from RecFin by going to the link entitled "Summarize Marine Recreational Estimates." Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown. No private recreational vessel catch data were available for the years 1990 to 1992. Extracted August 2, 2010.

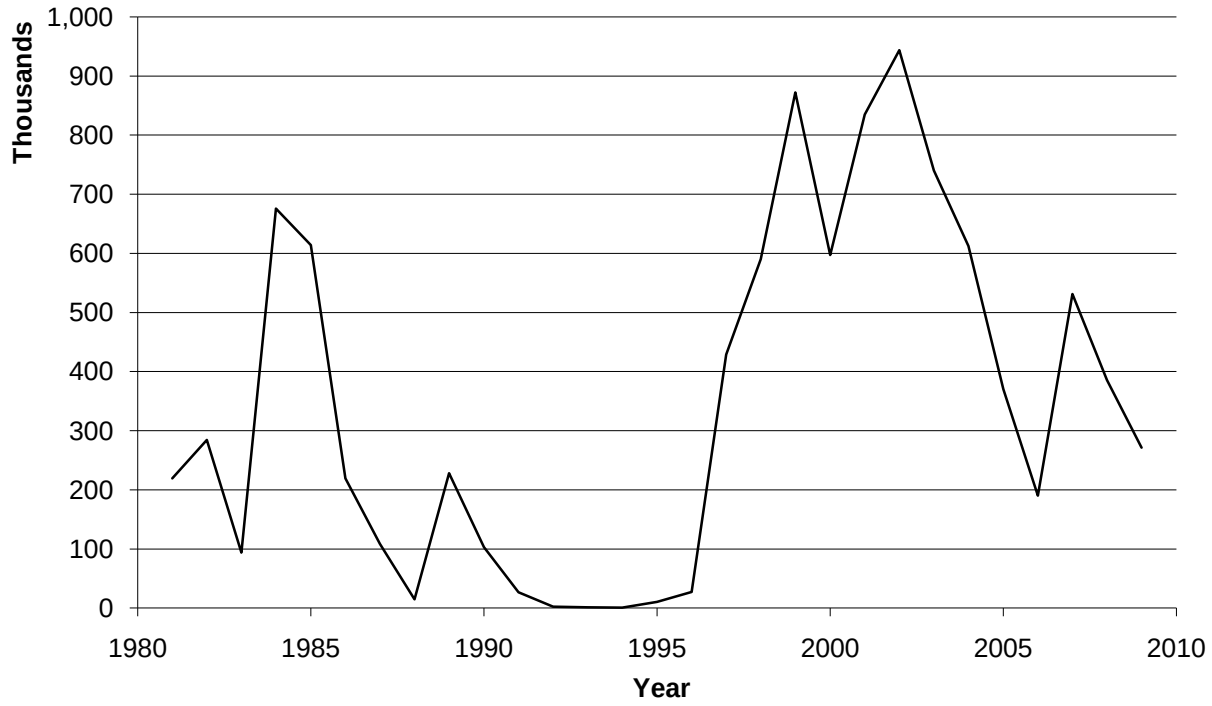

Figure 4–13. Albacore fishing hours (in thousands) for the California CPFV fleet, 1981–2009.

Interpretation: Figure 4–13 shows the total number of recorded hours of albacore fishing time for passengers on boats in the CPFV fleet for each year from 1981–2009 including effort in California and Mexico waters. Table 4–59 shows the numeric values which are displayed in the graph. The fishing time shows a wide range of variation over the period, from a low of 891 hours in 1994 to a high of 943,755 hours in 2002, with a steady decline from 2002 through 2006. Albacore hours for 2009 decreased to 271,175 hours, continuing to trend down from 2007 and 2008 levels.

Source and Calculations: The data were extracted from the CPFV logbook database, by selecting trip logs with the market code indicating albacore was caught. For the selected records, albacore hours were computed as the number of fishing hours multiplied by the number of passengers. The computed albacore hours were summarized in a Microsoft Excel notebook to produce the data shown in the graph above and in the table below.

Table 4–59. Albacore fishing hours for the California CPFV fleet, 1981–2009.

Year	Albacore Hours
1981	219,274
1982	284,584
1983	94,051
1984	675,921
1985	614,060
1986	219,414
1987	108,287
1988	14,775
1989	227,960
1990	103,158
1991	26,487
1992	2,248
1993	1,458
1994	891
1995	10,464
1996	27,148
1997	429,092
1998	590,152
1999	872,207
2000	597,276
2001	835,143
2002	943,755
2003	740,230
2004	612,312
2005	370,636
2006	190,450
2007	531,004
2008	385,724
2009	271,175

Source: CPFV Logbook Database.
Extracted June 28, 2010.

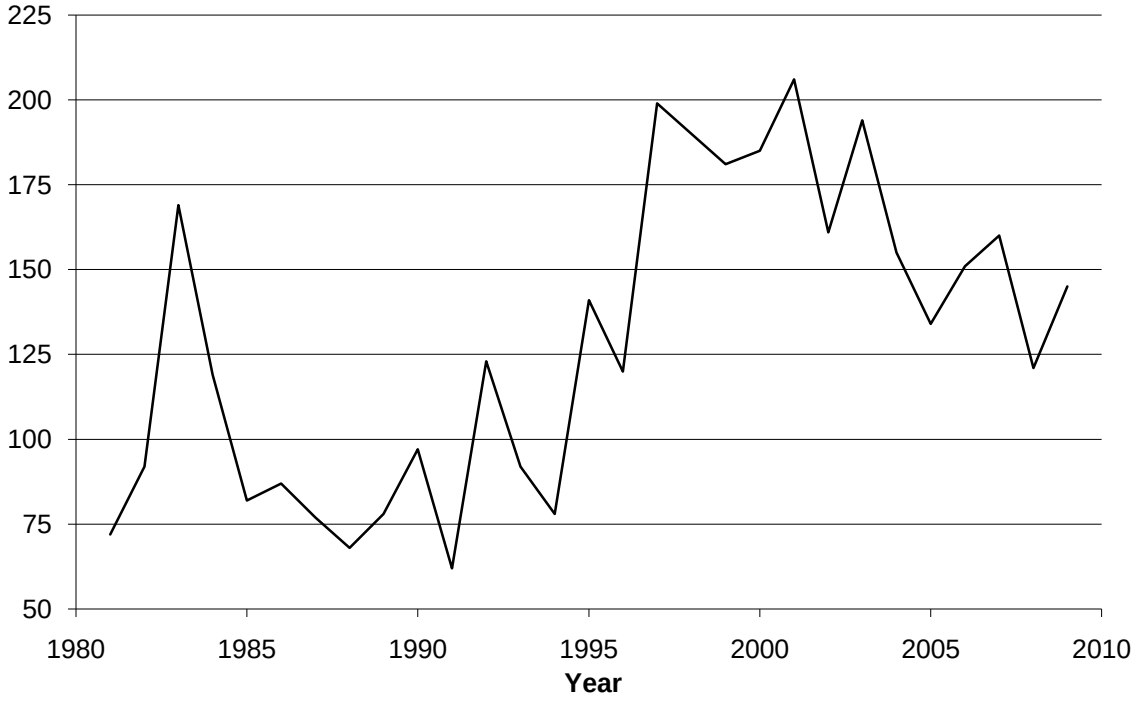

Figure 4–14. Number of CPFV vessels targeting HMS in California waters, 1981–2009.

Interpretation: Figure 4–14 shows the number of vessels in the California CPFV fleet which targeted HMS in California waters within each year from 1981 through 2009. The accompanying Table 4–60 displays the numeric values.

The number of vessels targeting HMS in California waters peaked at 206 in 2001 before falling to a level of 121 vessels in 2008. A slight rebound to a level of 145 vessels was seen in 2009.

Source and Calculations: The data were extracted from the CPFV logbook database. The raw data were copied to a Microsoft Excel notebook where they were summarized and graphed.

Table 4–60. Number of CPFV vessels targeting HMS in California waters, 1981–2009.

Year	Vessels
1981	72
1982	92
1983	169
1984	119
1985	82
1986	87
1987	77
1988	68
1989	78
1990	97
1991	62
1992	123
1993	92
1994	78
1995	141
1996	120
1997	199
1998	190
1999	181
2000	185
2001	206
2002	161
2003	194
2004	155
2005	134
2006	151
2007	160
2008	121
2009	145

Source: CPFV Logbook Database.
Extracted June 28, 2010.

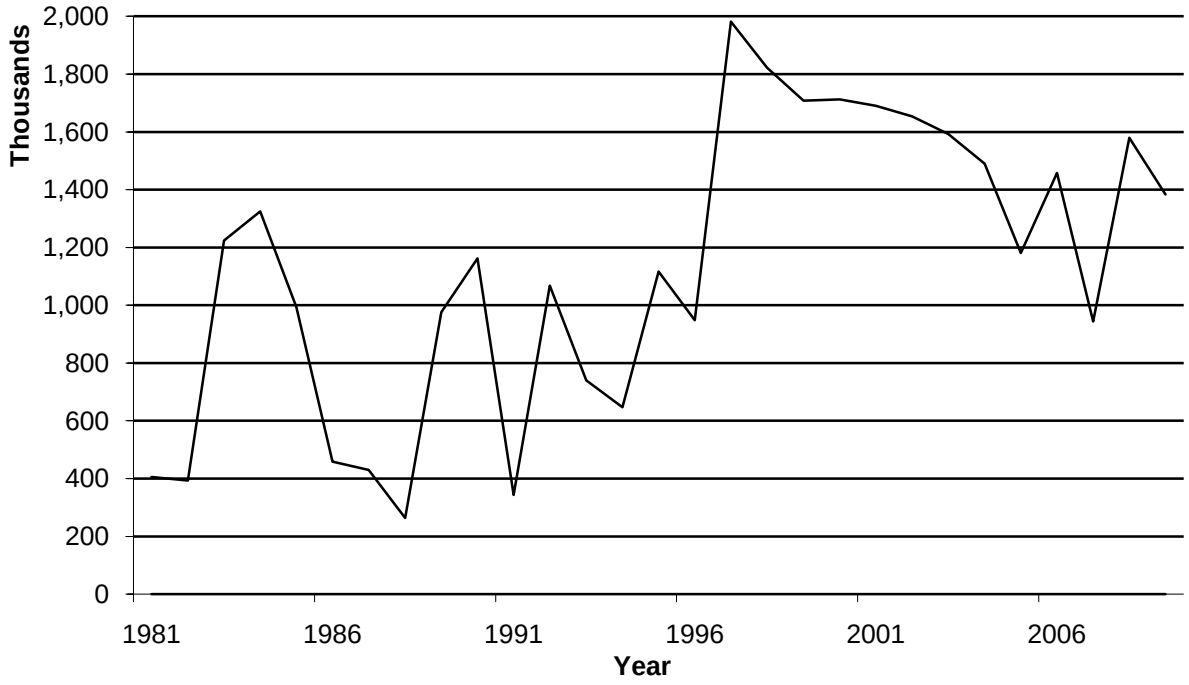

Figure 4–15. Number of angler hours (in thousands) for the California CPFV fleet, 1981–2009.

Interpretation: Figure 4–15 shows the number of angler hours for the California CPFV fleet which targeted HMS in each year from 1981 to 2009, including effort in California and Mexico waters. Table 4–61 displays the numeric values.

The number of angler hours shows a sizable variation over time, from as low as 263,433 in 1988 to as high as 1,982,207 in 1997. Since 1997, the number of angler hours gradually declined to a 2008 level of about 900,000 hours but subsequently rebounded to levels above 1,000,000 hours in 2008 and 2009.

Source and Calculations: The data were extracted from the CPFV logbook database. The raw data were copied to a Microsoft Excel notebook where they were summarized and graphed.

Table 4–61. Number of angler hours for the California CPFV fleet, 1981–2009.

Year	Angler Hours
1981	406,100
1982	393,620
1983	1,224,248
1984	1,324,407
1985	993,614
1986	458,523
1987	430,448
1988	263,433
1989	975,549
1990	1,162,217
1991	343,925
1992	1,068,365
1993	740,005
1994	647,049
1995	1,116,193
1996	948,204
1997	1,982,207
1998	1,821,848
1999	1,708,633
2000	1,712,145
2001	1,690,471
2002	1,654,025
2003	1,593,126
2004	1,490,142
2005	1,180,789
2006	1,457,769
2007	943,911
2008	1,579,081
2009	1,384,082

Source: CPFV Logbook Database.
Extracted June 28, 2010.

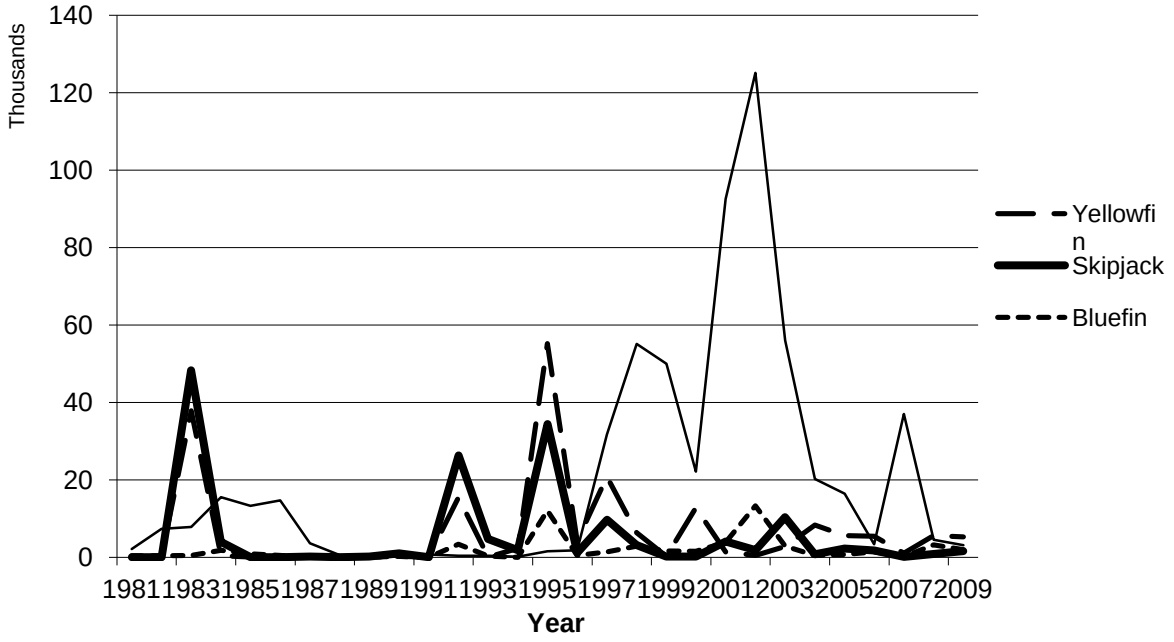

Figure 4–16. Catch in number of fish by species for the California CPFV fleet in California waters, 1981–2009.

Interpretation: Figure 4–16 shows California CPFV fleet HMS catches by species which were caught in California waters. The graph only displays the four most important constituents of the catch, all of which are tuna species.

Table 4–62, shown below, displays the numeric values, with added columns for species representing minor shares of the overall catch (i.e., bluefin tuna, bigeye tuna, swordfish, marlin, mako shark, thresher shark, blue shark, and dorado). The table displays catch data for California CPFVs fishing in California waters.

The principal species targeted are the tunas, with albacore of increasing importance relative to other species of tuna in recent years; however, in 2008-2009 the number of albacore caught in California waters dropped to a level below the numbers of yellowfin tuna which were caught. Blue shark was the most important shark species in the catch from the late 1980s through the early 1990s, but its share of the catch has declined to below that of shortfin mako and thresher shark in recent periods.

Source and Calculations: The data were extracted from the CPFV logbook database. Blank table entries represent year / species combinations for which no catch was recorded.

Table 4–62. Catch in number of fish by species for the California Commercial Passenger Fishing Vessel fleet in California waters, 1981–2009.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye	Swordfish	Marlin	Mako	Thresher	Blue Shark	Dorado
1981	81	17	419	2,127	25		37	34	7	100	35
1982	129	8	392	7,352	9		13	18	36	83	
1983	37,816	48,254	443	7,833	176		28	28	136	22	1,258
1984	421	3,993	1,765	15,527	26	2	9	49	16	35	527
1985	43	40	850	13,309	10		7	18	29	19	5
1986			443	14,706	37		13	58	13	217	11
1987	1	167	5	3,580	7		8	296	15	645	
1988	9	2	147	547	2	2	2	115	15	882	1
1989	17	165	88	367	2		7	302	45	4,469	1
1990	216	1,008	198	275	5		7	231	51	2,675	7,147
1991	60	18		741			1	129	50	5,802	
1992	15,457	26,326	3,325	379	7		12	130	29	1,109	1,912
1993	73	4,743	316	393		3	1	297	163	694	707
1994	2,285	1,797	10	171			5	269	30	497	64
1995	55,205	34,368	12,062	1,554	11	1	21	161	59	521	1,354
1996	4,203	1,199	439	1,826			5	237	31	439	646
1997	20,838	9,694	1,354	31,685	33		12	356	47	500	5,715
1998	6,339	3,162	2,828	55,065	27		6	150	28	94	378
1999	230	171	1,623	49,954	14		1	70	47	150	392
2000	12,786	190	1,562	22,150	60		2	83	40	149	4,343
2001	1,385	4,080	3,829	92,519	2	1		193	14	140	755
2002	509	1,817	13,245	125,138	2	2	2	189	11	15	298
2003	2,788	10,363	2,858	56,004				79	26	47	74
2004	8,330	735	485	20,197	63	2	1	250	18	6	671
2005	5,634	2,224	723	16,426	2		4	121	23	26	668
2006	5,407	1,765	1,349	3,402	4	3	2	178	27	18	11,329
2007	1,083	67	176	36,974			93	108	40	19	72
2008	5,597	821	3,158	4,530		2	1	77	45	17	5,621
2009	5,300	1,611	1,944	3,141			4	43	39	11	1,289

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: CPFV Logbook Database, extracted June 28, 2010.

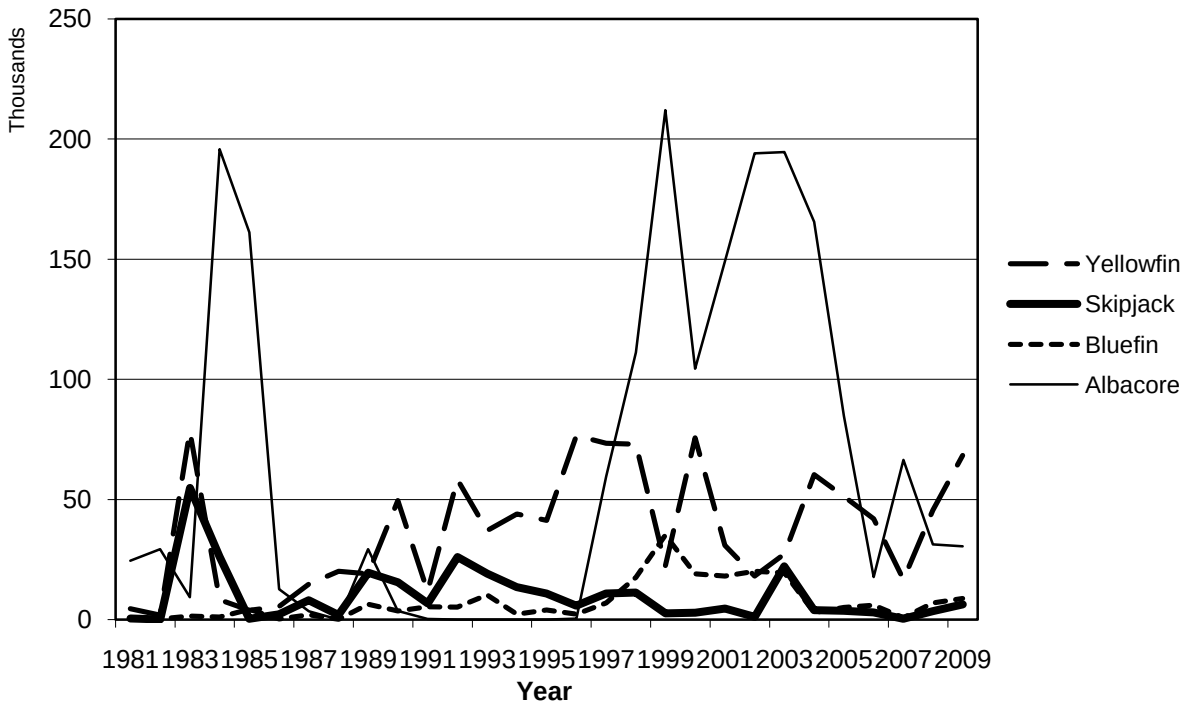

Figure 4–17. Catch in number of fish by species for the California CPFV fleet in Mexico waters, 1981–2009.

Interpretation: Figure 4–17 shows California CPFV fleet HMS catches by species which were caught in Mexico waters. The graph only displays the four most important constituents of the catch, all of which are tuna species.

Table 4–63, shown below, displays the numeric values, with added columns for species representing minor shares of the overall catch (i.e., bluefin tuna, bigeye tuna, marlin, mako shark, thresher shark, blue shark, and dorado). The table displays catch data for California CPFVs fishing in Mexico waters. For several species (e.g., dorado and the tunas), recent catch in Mexico waters far exceeds that taken in California waters for the CPFV fleet.

Albacore was an increasingly important component of the catch relative to other species of tuna in recent years; however, in 2008-2009 the number of albacore caught was exceeded by the number of yellowfin tuna caught.

Source and Calculations: The data were extracted from the CPFV logbook database. Blank table entries represent year / species combinations for which no catch was recorded.

Table 4–63. Catch in number of fish by species for the California Commercial Passenger Fishing Vessel fleet in Mexico waters, 1981–2009.

	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye	Swordfish	Str Marlin	Mako Shk	Thresher	Blue Shk	Dorado
1981	4,478	418	123	24,521	217	1	30	3		1	1,246
1982	1,906	24	273	29,338	129		20	8		2	1,099
1983	78,482	54,786	1,469	9,328	2,077		37	1		6	3,734
1984	8,227	26,364	1,069	195,758	511		278	13			6,005
1985	3,882	317	4,298	161,194	659		64	8		1	1,357
1986	5,505	2,249	250	12,616	1,478		30	8		2	1,855
1987	14,796	8,038	1,946	3,466	628		160	8		6	3,518
1988	20,056	1,896	183	12	426		132	17		62	3,348
1989	19,059	19,571	6,431	29,361	42		33	8	1	6	2,340
1990	49,524	15,523	3,558	3,568	2,191		101	12		2	24,574
1991	11,702	6,788	5,330	272	256		11	10			1,301
1992	58,282	25,976	5,261	1	42		13	6	1	1	20,815
1993	37,069	19,080	10,219		46		29	11		1	8,245
1994	43,999	13,513	2,233		15		37	17		4	5,151
1995	41,271	10,904	3,963	1	27		18	17		10	3,971
1996	76,511	5,791	2,300	364	132		16	53	1	55	24,284
1997	73,326	10,804	6,984	59,529	253		12	19	2	32	24,162
1998	72,952	11,298	17,639	111,233	1,939	3	11	34		88	6,372
1999	22,418	2,632	35,174	211,947	1,092	1	2	27		72	3,745
2000	75,660	2,834	19,030	104,394	503		1	36		9	12,101
2001	30,925	4,649	18,078	148,994	9			49		72	3,448
2002	18,085	1,113	20,153	193,999	6		1	24			2,409
2003	27,267	22,189	19,433	194,549	66	2	4	37			3,143
2004	60,338	3,934	2,906	165,570	400		3	54			7,668
2005	51,314	3,682	5,034	84,657	37		14	41			6,033
2006	41,920	2,968	6,047	17,691	7		13	65		7	35,042
2007	16,713	375	839	66,459			1	27			6,374
2008	45,511	3,471	6,908	31,323	1		4	52			23,523
2009	68,273	6,328	8,810	30,463	4		3	8			15,727

Blank cells indicate no data exists. Any calculated or derived zeros are due to rounding of summarized data to less than half of the unit shown.

Source: CPFV Logbook Database, extracted June 28, 2010.

Table 4-64. PacFIN species codes used to extract commercial fisheries data for this HMS SAFE report.

AGID	CATEGORY	SPID	MGRP[1]	DESCRIPTION
C	5	ALBC	HMSP	TUNA, ALBACORE
O	375	ALBC	HMSP	TUNA, ALBACORE
W	101	ALBC	HMSP	ALBACORE TUNA THUNNUS ALALUNGA
C	1	YTNA	HMSP	TUNA, YELLOWFIN
O	376	YTNA	HMSP	TUNA, YELLOWFIN
C	2	STNA	HMSP	TUNA, SKIPJACK
O	372	STNA	HMSP	TUNA, SKIPJACK
W	104	STNA	HMSP	SKIPJACK TUNA
C	8	ETNA	HMSP	TUNA, BIGEYE
O	377	ETNA	HMSP	TUNA, BIGEYE
C	4	BTNA	HMSP	TUNA, BLUEFIN
O	378	BTNA	HMSP	TUNA, BLUEFIN
W	102	BTNA	HMSP	BLUEFIN TUNA (THUNNUS THYNNUS)
C	6	UTNA	HMSP	TUNA, UNSPECIFIED
C	91	SWRD	HMSP	SWORDFISH
O	385	SWRD	HMSP	SWORDFISH
W	106	SWRD	HMSP	SWORDFISH XIPHIAS GLADIUS
C	155	TSRK	HMSP	SHARK, COMMON THRESHER
O	023	TSRK	HMSP	SHARK, THRESHER
W	287	TSRK	HMSP	THRESHER SHARK ALOPIUS VULPINUS
W	387	TSRK	HMSP	THRESHER SHARK (REDUCTION) ALOPIUS VULPINUS
W	487	TSRK	HMSP	THRESHER SHARK (ANIMAL FOOD) ALOPIUS VULPINUS
C	98	PSRK	HMSP	SHARK, PELAGIC THRESHER
C	97	ISRK	HMSP	SHARK, BIGEYE THRESHER
C	151	MAKO	HMSP	SHARK, BONITO (MAKO)
O	026	MAKO	HMSP	SHARK, SHORTFIN MAKO
C	167	BSRK	HMSP	SHARK, BLUE
O	031	BSRK	HMSP	SHARK, BLUE
W	282	BSRK	HMSP	BLUE SHARK PRIONACE GLAUCA
W	382	BSRK	HMSP	BLUE SHARK (REDUCTION) PRIONACE GLAUCA
W	482	BSRK	HMSP	BLUE SHARK (ANIMAL FOOD) PRIONACE GLAUCA
C	481	DRDO	HMSP	DOLPHINFISH
O	292	DRDO	HMSP	DOLPHINFISH

AGID = agency id (C=CDFG, O=ODFW, W=WDFW)
CATEGORY = state species character code
SPID = PacFIN species ID
MGRP = PacFIN species management group
DESCRIPTION = state species description

[1]PacFIN species codes in the HMSP management group that are not used include:

C	92	MRLN	HMSP	MARLIN, STRIPED
O	388	MRLN	HMSP	MARLIN, STRIPED

Table 4-65. PacFIN gear codes used to extract commercial fisheries data for this HMS SAFE report.

AGID	GEAR	GRID	GRGROUP	DESCRIPTION
SURFACE HOOK AND LINE (ALBACORE)				
C	001	POL	HKL	HOOK AND LINE
C	002	POL	HKL	LIVE BAIT
C	006	POL	HKL	JIG (ALBACORE)
C	007	TRL	TLS	TROLL (ALBACORE)
C	009	TRL	TLS	TROLL, (SALMON)
O	120	TRL	TLS	OCEAN TROLL
O	170	POL	HKL	TUNA BAITBOAT
W	41	TRL	TLS	TROLL (SALMON)
DRIFT GILLNET (SWORDFISH & SHARK)				
C	065	DGN	NET	GILL NET, DRIFT
O	140	GLN	NET	OCEAN GILLNET
HARPOON				
C	012	OTH	MSC	HARPOON/SPEAR
LONGLINE (HMS)				
C	005	LGL	HKL	LONG LINE, SET
O	150	LGL	HKL	PELAGIC LONGLINE
W	43	LGL	HKL	SET LINE/LONG LINE
PURSE SEINE (TUNA)				
C	070	SEN	NET	ENCIRCLING NETS
C	071	SEN	NET	PURSE SEINE
C	073	SEN	NET	DRUM PURSE SEINE
C	075	SEN	NET	LAMPARA NET
O	160	SEN	NET	TUNA SEINE

AGID = agency id (C=CDFG, O=ODFW, W=WDFW)
GEAR = state gear character code
GRID = PacFIN gear ID
GRGROUP = PacFIN gear group
DESCRIPTION = state gear description

5.0 UPDATED STATUS OF THE HIGHLY MIGRATORY SPECIES MANAGEMENT UNIT SPECIES

This chapter contains a brief review of the stock status for each species with respect to the Council-adopted Control Rules. Section 5.1 summarizes the adopted Control Rules and the Status Determination Criteria. In Section 5.2, a table of the recent and upcoming assessment efforts of various international scientific bodies responsible for assessing several of the stocks is presented. Section 5.3 contains summaries or excerpts from the results of stock assessments conducted in 2009. Stock structure is not fully understood for many of the species that range throughout the Pacific, thus some assessments for WCPO populations are also included, although those populations and their fisheries are not specifically managed under the HMS FMP. The summaries 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 2009 to compare to past and future work. A table summarizes the current stock status of the management unit species with respect to overfishing and overfished criteria. The conclusions presented in the table should be reasonably accurate, but should also be treated with caution.

Assessments of stock status always involve assumptions, use of uncertain parameters, 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) will never be possible over the broad range occupied by highly migratory species. Furthermore, for most of these species, the scientific bodies developing the assessments have not agreed upon appropriate biological reference points for use in the context of managing fisheries. Therefore, explicit definitions for both overfished and sustainable exploitation levels are not currently available.

Finally, Section 5.4 provides links to assessments that have already been produced in 2010 by the respective RFMOs so that readers can access the most recent publicly available assessments of the management unit species. These assessments will be reported on in the 2010 HMS SAFE Report (to be published in September 2011).

5.1 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 (Figure 5–1).

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_{MSY}, simply from natural variation. In terms of B_{MSY} the recommended level of B_{MSST} is:

$B_{MSST} = (1\text{-}M)B_{MSY}$ 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).

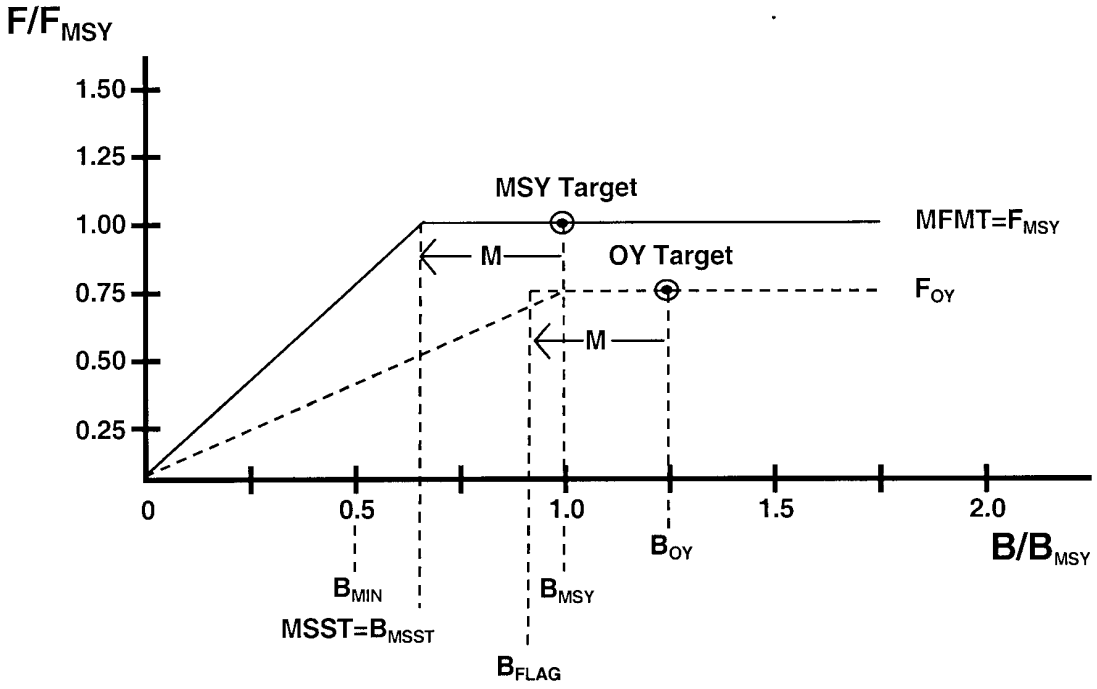

Figure 5-1. General model of MSY and OY Control Rules, from Restrepo, et al. 1998.

For the vulnerable species, which in this FMP includes the pelagic sharks, bluefin tuna, and striped marlin, there is a Minimum Biomass Flag (B_{FLAG}) for the OY Control Rule equal to $(1\text{-}M)B_{OY}$ or $0.5B_{OY}$ (whichever is greater). B_{FLAG}, which would then be equivalent to $1.25(B_{MSST}/B_{MSY})$, serves as a warning call to halt biomass reduction that would jeopardize obtaining OY (which is defined as MSY reduced by relevant socioeconomic factors, ecological considerations, and fishery-biological constraints so as to provide the greatest long-term benefits to the Nation) on average. In this FMP, the OY for vulnerable species is set at 0.75MSY (or MSY proxy), and any harvest guideline is set equal to OY.

Rebuilding of overfished stocks is a unilateral requirement by the Magnuson-Stevens Act (MSA), but internationally-fished stocks require cooperative catch reductions among the fishing nations for this rebuilding to be effective. U.S. responsibility in the rebuilding, however, will be greater the more localized the stock and the greater the domestic take of the stock's production.

Under the Magnuson-Stevens Reauthorization Act of 2006, the National Standard 1 guidelines have been revised regarding establishing annual catch limits (ACLs) and control rules. In 2009, the Council began considering a framework process under the HMS FMP to meet the new NS1 Guidelines. Implementation of the new framework is expected in 2011 and will be reported on in the 2010 HMS SAFE document.

5.2 Recent and Projected Assessment Schedule

Species (Stock)	Date (Next Anticipated)	Organization Responsible for the Assessment
TUNAS		
Albacore (NPO)	2006 (2011)	ISC (ISC)
Bluefin (NPO)	2008 (2012)	ISC (ISC)
Bigeye (EPO)	2009 (2010)	IATTC (IATTC)
Bigeye (WCPO)	2009 (2010)	WCPFC (WCPFC)
Skipjack (EPO)	2009 (2010)	IATTC (IATTC)
Skipjack (WCPO)	2008 (2010)	WCPFC (WCPFC)
Yellowfin (EPO)	2009 (2010)	IATTC (IATTC)
Yellowfin (WCPO)	2009 (2011)	WCPFC (WCPFC)
BILLFISHES		
Striped Marlin (EPO)	2003 (2010)	IATTC (IATTC)
Striped Marlin (NPO)	2007 (2011)	ISC (ISC)
Swordfish (SEPO)	2006	IATTC
Swordfish (NPO)	2009 (2012)	ISC (ISC)
SHARKS		
Common Thresher (WA/OR/CA EEZ)	2001	NMFS
Pelagic Thresher		
Bigeye Thresher		
Shortfin Mako		
Blue (NPO)	2009	NMFS and NRIFSF Japan
OTHER		
Dorado (EPO)		

Note: Text in parentheses indicates the year the next assessment is anticipated and the organization expected to conduct the assessment. The acronyms listed in this table are defined near the front of this document.

5.3 Conclusions from 2009 Pacific HMS stock assessments

5.3.1 Bigeye Tuna

5.3.1.1 Bigeye Tuna (EPO)

Stock status of bigeye tuna in the Eastern Pacific is assessed every 1–2 years by the IATTC. An updated assessment was conducted in May 2009 (Aires-da-Silva and Maunder 2009) and is based on the assumption that there is a single stock of bigeye tuna in the EPO. Below is a summary from the assessment report which can be downloaded from http://www.iattc.org/PDFFiles2/SAR10c-BET-ENG.pdf.

The results of the base-case stock assessment, which assumes no stock-recruitment relationship, demonstrate a trend seen in previous assessments. At the beginning of January 2009, the spawning biomass of bigeye tuna in the EPO was near the historic low level. At that time the spawning biomass ratio (the ratio of the spawning biomass at that time to that of the unfished stock; SBR) was about 0.17, which is about 11 percent less than the level corresponding to the maximum sustainable yield (MSY).

Recent catches are estimated to have been 19 percent greater than those corresponding to the MSY levels. If fishing mortality (F) is proportional to fishing effort, and the current patterns of age-specific selectivity are maintained, the level of fishing effort corresponding to the MSY is about 81 percent of the current (2006-2008) level of effort.

Catch of bigeye tuna by U.S. West Coast fisheries constitutes less than one percent of the Eastern Pacific-wide catch.

5.3.1.2 Bigeye Tuna (WCPO)

An updated assessment of bigeye tuna in the WCPO was conducted by the WCPFC's Scientific Committee in August 2009 (Harley et al. 2009). Below is a summary of the results excerpted from the Report of the Scientific Committee meeting. The assessment can be downloaded from http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/5th-regular-session/stock-assessment-swg/working-papers/SC5-SA-WP-04%20%5BBET%20Assessment%5D.pdf

The stock status was assessed using MULTIFAN-CL. Based on several model runs selected to represent the status of bigeye tuna in the WCPO, the assessment indicates a continued decline of the WCPO bigeye stock as noted in previous assessments. Fishing mortality in relation to MSY ($F_{current}/F_{MSY}$) is considerably greater than 1, ranging from 1.51–2.01 for a variety of assumptions with similar steepness (~0.98) in the stock recruitment relationship. The range of $F_{current}/F_{MSY}$ ratios indicates that a 34–50 percent (average of 43 percent when steepness is assumed as 0.98) reduction in fishing mortality is required from the 2004–2007 level in order to reduce fishing mortality to sustainable levels. Current spawning biomass in relation to MSY indicates that the WCPO bigeye stock is not in an overfished state if the spawning biomass reference period is 2004–2007. However, if the spawning biomass period is 2008, then the bigeye stock is overfished. The bigeye stock status is concluded to be in a slightly overfished state, or will be in the near future with high levels of overfishing occurring.

5.3.2 Skipjack Tuna

5.3.2.1 Skipjack Tuna (EPO)

Skipjack tuna is a notoriously difficult species to assess due to uncertainties about stock structure, the vulnerabilities of all age classes, and how well fishery CPUE data tracks abundance. Thus, in 2007 the IATTC developed methods to evaluate indicators of skipjack biomass, recruitment, and exploitation rate and used simple indicators of stock status based on relative values of fishery data, such as, CPUE, average weight of fish caught, and effort (Maunder and Deriso 2007). The recent report on updated stock status indicators (Maunder 2009) can be downloaded from http://iattc.org/PDFFiles2/SAR10b-SKJ.pdf.

The analyses showed that despite the constantly increasing exploitation rate, the data- and model-based indicators have yet to detect any adverse effects on the EPO skipjack stock. The purse-seine catch has been increasing since 1985, and is currently above the upper reference level. Except for a large peak in 1999, the floating-object CPUE has generally fluctuated around an average level since 1990. The unassociated CPUE has been higher than average since about 2003 and was at its highest level in 2008. The standardized effort indicator of exploitation rate has been increasing since about 1991, but declined in recent years. The biomass, recruitment, and exploitation rate have been increasing over the past 20 years. The average weight is near its lower reference level, which can be a consequence of overexploitation, but it can also be caused by recent recruitments being greater than past recruitments.

Catch of skipjack tuna by U.S. West Coast fisheries constitutes less than 1 percent of the Eastern Pacific-wide catch.

5.3.3 Yellowfin Tuna

5.3.3.1 Yellowfin Tuna (EPO) - update

Stock status of yellowfin tuna in the Eastern Pacific is assessed every year by the IATTC. An updated assessment was conducted in May 2009 (Maunder and Aires-da-Silva 2009) and is based on the assumption that there is a single stock of yellowfin tuna in the EPO, although it is likely that there is a continuous stock throughout the Pacific Ocean with exchange of individuals at a local level. Fishing is concentrated in the east and west, making separate consideration of the EPO stock relevant for management purposes. Below is a summary excerpted from the assessment report which can be downloaded from http://iattc.org/PDFFiles2/SAR10a-YFT-ENG.pdf.

The assessment in 2009 was conducted using Stock Synthesis, which is a departure from the ASCALA model used previously. The base case assessment, which does not include a stock-recruitment relationship, indicates that at the beginning of 2009, the biomass of yellowfin in the EPO appears to have been above the level corresponding to the MSY, and the recent catches have been substantially below the MSY level. If the fishing mortality is proportional to the fishing effort, and the current patterns of age-specific selectivity are maintained, the current (average of 2006-2008) level of fishing effort is less than that estimated to produce the MSY. The effort at MSY is 109 percent of the current level of effort.

In general, the recruitment of yellowfin to the fisheries in the EPO is variable, with a seasonal component. This analysis and previous analyses have indicated that the yellowfin population has experienced two, or possibly three, different recruitment productivity regimes: a period of low recruitment during 1975-1982; a period of high recruitment during 1983-2002; and a period of intermediate or low recruitment during 2003–06. Larger recruitments in 2007 and 2008 have caused the biomass to increase in recent years.

Catch of yellowfin tuna by U.S. West Coast fisheries constitutes less than 1 percent of the Eastern Pacific-wide catch.

5.3.3.2 Yellowfin Tuna (WCPO)

An updated assessment of yellowfin tuna in the WCPO was conducted by the WCPFC's Scientific Committee in August 2009 (Langley et al. 2009). Below is a summary of the results excerpted from the Report of the Scientific Committee meeting. The assessment can be downloaded from http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/5th-regular-session/stock-assessment-swg/working-papers/SC5-SA-WP-03%20%5BYFT%20Assessment%20%28rev.1%29%5D.pdf

The results are similar to those from the previous "Base 2007" assessment. There was a peak in the biomass during the late 1950s following the very high recruitments estimated during the preceding period. Biomass levels subsequently declined throughout the model period with the rate of the decline in biomass increasing from 1980 onwards. A comparison of the principal 2009 model options and the "Base 2007" show that the trends in biomass are generally comparable for the five model options, in particular for the two options without an increase in longline catchability.

The estimates of MSY for the four principal models are 552,000-637,000 mt and considerably higher than recent catches estimates for yellowfin (430,000 mt). The large difference between the MSY and recent catches is partly attributable to the stock assessment model incorporating the higher (preliminary) purse-seine catch estimates (representing an additional catch of approximately 100,000 mt per annum in recent years). The more optimistic models suggest that the stock could potentially support long-term average yields above the recent levels of catch. However, it is important to note that recent (1998-2007) levels of

estimated recruitment are considerably lower (80%) than the long-term average level of recruitment used to calculate the estimates of MSY. If recruitment remains at recent levels, then the overall yield from the fishery will be lower than the MSY estimates.

For a moderate value of steepness (0.75), $F_{current}/F_{MSY}$ is estimated to be 0.54-0.68 indicating that under equilibrium conditions the stock would remain well above the level capable of producing MSY ($B_{Fcurrent}/B_{MSY}$ = 1.39-1.59 and $SB_{Fcurrent}/SB_{MSY}$ = 1.50-1.79), while $B_{current}/B_{MSY}$ and $SB_{Fcurrent}/SB_{MSY}$ are estimated to be well above 1.0 (1.41-1.67 and 1.46-1.88, respectively). For lower values of steepness (0.55 and 0.65), $B_{current}/B_{MSY}$ and $SB_{current}/SB_{MSY}$ were estimated to be above 1.0 for all the sensitivities considered. Most of the model options with lower values of steepness also yielded estimates of $F_{current}/F_{MSY}$ below 1.0; however, the F_{MSY} reference point was approached or slightly exceeded for a subset of the model options that included the lowest value of steepness (0.55) in combination with a number of other factors.

5.3.4 Striped Marlin

5.3.4.1 Striped Marlin (EPO)

In 2009, the IATTC conducted analyses of stock status for striped marlin in the EPO based prior assessment results, and on catch and effort data through 2007 (Hinton 2009). Below is a summary excerpted from the report which can be downloaded from http://iattc.org/PDFFiles2/SAR-10d-MLS-ENG.pdf.

The stock structure of striped marlin in the Pacific is uncertain. Recent analyses have considered all catch and effort in the EPO IATTC Convention area. Analyses of stock status have been made using a number of population dynamics models (Hinton and Maunder 2004). The results from these analyses indicated that striped marlin in the EPO was at or above the level expected to provide landings at the MSY level, estimated at about 3300 to 3800 mt. The estimated MSY is substantially greater than the annual catch in recent years and the new record low estimated catch of about 1,400 mt in 2007. There is no indication of increasing fishing effort or catches in the EPO stock area. Based on the findings of Hinton and Maunder (2004), new information, and recent observations of catch and fishing effort presented, it is considered that the striped marlin stocks in the EPO are in good condition, with current and near-term anticipated fishing effort less than the fishing effort at MSY (F_{MSY}).

Catch of striped marlin by U.S. West Coast fisheries constitutes about two percent of the Eastern Pacific-wide catch.

5.3.5 Swordfish

5.3.5.1 Swordfish (NPO)

The status and stock structure of NPO swordfish was assessed by the ISC Billfish Working Group in 2009 and was finalized at the 2009 ISC Plenary meeting (ISC 2009). Below is a summary of the assessment results. The full assessment report can be downloaded from http://isc.ac.affrc.go.jp/pdf/ISC9pdf/Annex_7_ISC9_BILLWG_May09.pdf.

Modeling based on two stock structure hypotheses was conducted: 1) a single NPO swordfish stock north of the equator; and 2) and two stocks separated by an irregular boundary extending from Mexico to the southwest and including sections of the eastern South Pacific extending to 20°S latitude. Available evidence currently favors the two-stock hypothesis; consequently, the participants concentrated on interpreting results with that scenario although results based on a single NP stock were similar. A number

of stock assessment models were run; however, because analyses using the SS3 model were not completed for the two stock hypothesis, interpretation of results for stock status and conservation advice are based on information from Bayesian Surplus Production analysis only.

Results indicate that the exploitable biomass of swordfish for the Western North Pacific stock has fluctuated above the B_{MSY} level (B_{MSY} = 57,300 mt ± 11, 800 mt and MSY = 14,400 mt ± 2,000 mt) in most years used in the analysis (1951-2006). Biomass fell below B_{MSY} for some years in the 1990's but has been above B_{MSY} in the most recent 5 years (2002-2006). The exploitation rate for the Western North Pacific stock has fluctuated during the period 1951-2006, but has remained below the level required for MSY (harvest rate of swordfish relative to harvest rate at maximum sustainable yield, H_{MSY} = 26.2% ± 6.2%). The probability that the exploitation rate in 2006 exceeded the exploitation rate at MSY is low at 1 percent. Projecting exploitable biomass through 2010 by assuming (1) a constant 3-year (2004-2006) average exploitation rate for the fishery and (2) fishing operations largely remaining unchanged results in exploitable biomass levels above B_{MSY} and sufficient to sustain recent levels of catch. In short, the Western North Pacific stock of swordfish is healthy and well above the level required to sustain recent catches.

Similarly, results indicate that the exploitable biomass of swordfish for the EPO stock (north of 20 °S) has fluctuated above the B_{MSY} level (EPO B_{MSY} = 24,800 mt ± 6,900 mt and MSY = 3,100 mt ± 1,400 mt) for most years. The exception was for some years in the 1950s when biomass was below the B_{MSY}. For the most recent 5 years (2002-2006), the exploitable biomass was well above the B_{MSY}. The exploitation rate during the period from 1951 to 2006 has remained well below the level required for MSY (EPO H_{MSY} = 12.7% ± 4.9%). The probability that this rate in 2006 exceeded the exploitation rate at MSY is low at 1 percent. Projecting exploitable biomass forward until 2010 by assuming (1) a constant 3-year (2004-2006) average exploitation rate and (2) fishing operations unchanged from those observed in 2006 results in exploitable biomass levels above B_{MSY} which is sufficient to sustain recent levels of catch. In short, the EPO stock of swordfish is in good condition.

Catch of swordfish by U.S. West Coast fisheries constitutes about 5.5 percent of the North Pacific-wide catch.

5.3.6 Blue Shark

5.3.6.1 Blue Shark (NPO)

The NMFS Pacific Islands Fisheries Science Center (PIFSC) and Japan's National Research Institute of Far Seas Fisheries (NRIFSF) collaborated to complete a stock assessment of North Pacific blue sharks in 2009 (Kleiber et al. 2009). A summary of the results excerpted from assessment report is below. The full assessment report can be downloaded from:
http://www.pifsc.noaa.gov/tech/NOAA_Tech_Memo_PIFSC_17.pdf.

The assessment was conducted using two models, a surplus production model and an integrated age-and spatial-structured model tested with a variety of structural assumptions. Fishery catch and effort data included in the analysis were from commercial longline and large mesh driftnet fisheries from the years 1971 through 2002 as well as small mesh driftnet fisheries operating primarily in the 1980s. The two models were found to be in general agreement. The trends in abundance in the production model and all alternate runs of the integrated model show the same pattern of decline in the 1980s followed by recovery to above the level at the start of the time series. The integrated model analyses indicated some probability (around 30%) that biomass at the end of the time series was less than B_{MSY} (overfished) and that there was a lesser probability at that time that fishing mortality was greater than F_{MSY} (overfishing occurring). There was an increasing trend in total effort expended by longline fisheries toward the end of the time

series, and this trend may have continued thereafter. It would be prudent to assume that the population is at least close to MSY level and fishing mortality may be approaching the MSY level in the future.

5.4 Links to Information or Most Recent Pacific HMS Stock Assessments through August 2010.

Note that under the new Antigua Convention, the IATTC has established a Scientific Advisory Committee (SAC) to review EPO stock assessments. The first meeting of the IATTC SAC will be held August 31 - September 3, 2010. Thus, 2010 EPO assessments were not available at the time of this SAFE Report preparation,

Species (Stock)	Organization Responsible for Assessment	Link to Assessment Report
Bluefin (NPO)	ISC; update only	http://isc.ac.affrc.go.jp/pdf/ISC10pdf/Annex_7_ISC10_PBFWG_Jul10.pdf
Bigeye (WCPO)	WCPFC	http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/6th-regular-session/stock-status-theme/working-papers/WCPFC-SC6-2010-SA-WP-04_BET_Assessment.pdf
Skipjack (WCPO)	WCPFC	http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/6th-regular-session/stock-status-theme/working-papers/WCPFC-SC6-2010-SA-WP-11_SKJ_Assessment_Rev.1.pdf
Swordfish (NPO)	ISC; update for EPO substock only	http://isc.ac.affrc.go.jp/pdf/BILL/BILL_Apr10_FINAL_WP02.pdf

Table 5-2. Recent stock status with respect to management criteria.

Note that for most of these species, the scientific bodies developing the assessments do not have a consensus biological reference point for use in the context of managing the fisheries. Levels of *F* and *B* are provided based on the most recent analyses, but in many cases the analyses have not been updated for several years. Thus, those findings should be viewed cautiously for management purposes.

Species (stock)	F_{Recent}/F_{MSY}[1]	Overfishing? ($F/F_{MSY}>1.0$)	B_{Recent}/B_{MSY}[1]	B_{MSST}/B_{MSY}	Overfished? ($B_{Recent}<B_{MSST}$)	B_{FLAG}[2] ($1.25B_{MSST}/B_{MSY}$)	Assessment
TUNAS							
Albacore (NPO)	1.67–2.31[3]	Unknown[3]	Unknown[3]	0.7	Unknown[3]		ISC 2007a
Bluefin (NPO)	3.33-7.14[4]	Unknown[4]	Unknown[4]	0.75	Unknown[4]	0.94	ISC 2008
Bigeye (EPO)	1.23[5]	Y	0.99[5]	0.6	N		IATTC, Aires-da-Silva and Maunder 2009
Bigeye (WCPO)	1.79[6]	Y	1.44[6]	0.6	N		WCPFC, Harley et al. 2009
Skipjack (EPO)	Unknown[7]	Unlikely[7]	Unknown[7]	0.5	Unlikely[7]		IATTC, Maunder 2009
Skipjack (WCPO)	0.12[8]	N	3.31[8]	0.5	N		WCPFC, Langley and Hampton 2008
Yellowfin (EPO)	0.92[5]	N	1.27[5]	0.5	N		IATTC, Maunder and Aires-da-Silva 2009
Yellowfin (WCPO)	0.58[9]	Y	1.57[9]	0.5	N		WCPFC, Langley et al. 2009
BILLFISHES							
Striped Marlin (NPO)	Unknown[10]	Unknown[10]	Unknown	0.5	Unknown		ISC 2007b
Striped Marlin (EPO)	<1.0[11]	N	≥1.0[11]	0.5	N	0.63	IATTC, Hinton and Maunder 2004; Hinton 2009
Swordfish (NEPO)	0.23[12]	N	2.41[12]	0.61-0.8	N		ISC 2009
Swordfish (NWPO)	0.54[12]	N	1.31[12]	0.61-0.8	N		ISC 2009
SHARKS							
C. Thresher (CA,OR,WA)	<1.0[13]	N	~1.10	0.77	N	0.96	NMFS, PFMC HMS plan development team 2002
Pelagic Thresher	Unknown[14]	Unknown	Unknown	0.85	Unknown	1.06	
Bigeye Thresher	Unknown[15]	Unknown	Unknown	0.78	Unknown	0.97	
Shortfin Mako	<1.0[16]	N	>1.0	0.71	N	0.89	NMFS, PFMC HMS plan development team 2002
Blue	0.86[17]	N	1.11[17]	0.78	N	0.97	NMFS and NRIFSF Japan, Kleiber et al. 2009
OTHER							
Dorado	Unknown[18]	Unknown	Unknown	0.5	Unknown		

Notes:

1 Measures of F_{MSY} and B_{MSY} are not available for all species. Various proxies for these values have been used in preparing this table. However, PFMC has not adopted the use of a particular proxy; hence the designation of Overfishing and Overfished should be considered preliminary.

2 For vulnerable species managed under the OY control rule only: bluefin tuna, striped marlin, and pelagic sharks.

3 Albacore results are based on a suite of F_{MSY} proxies ($F_{40\%}$, $F_{35\%}$, $F_{30\%}$ and $F_{0.1}$), the estimated level of recent (2002-2004) fishing pressure (F=0.75), and constant productivity (R = 27.375 million recruits). However, "Unknown" is indicated because of the lack of accepted reference points for management.

4 Bluefin analyses are based on a suite of F_{MSY} proxies commonly used as target reference points ($F_{40\%}$, $F_{30\%}$, $F_{20\%}$, $F_{0,1}$, and F_{Max}), the estimated level of recent (2002-2004) age-specific fishing mortality. However, "Unknown" is indicated because of the lack of accepted reference points for management indicated that F has exceeded F_{Max} 2-fold

during the last 2 decades. However, "Unknown" is indicated because of the lack of a PFMC reference point for management and the implausibility of some parameter estimates in the assessment model that indicate some level of model mis-specification.

5 EPO bigeye and EPO yellowfin results are based on base-case assessments assuming no stock-recruitment relationships and estimated recent (2006-2008) fishing effort.

6 WCPO bigeye results are based on Run 11, the model most comparable to the 2008 assessment.

7 Because of uncertainties in the estimates of growth and natural mortality, MSY-proxy reference points could not be calculated for EPO skipjack; however, based on new methods examining non-MSY based stock condition indicators, the IATTC does not consider there to be a need for management due increasing CPUE indices and high biomass estimates relative to historical levels.

8 WCPO skipjack results are from the base-case assessment.

9 WCPO yellowfin results are based on the 2009 base-case assessment: "CPUE low, LL sample high, LL Q incr".

10. MSY-proxy reference points were not be calculated for NP striped marlin; however, the declining biomass trend and the level of recent fishing effort relative to many commonly used MSY proxy reference points indicates overfishing may be occurring. The ISC recommended that a plan be developed to reduce F and until that plan is adopted that F not be increased.

11 Two production models demonstrate that the EPO striped marlin population is in good condition with fishing effort and landings in decline since the early 1990s.

12 Results from Bayesian Surplus Production analysis of two substocks of swordfish: one in the northwestern Pacific Ocean and the second in the northeast Pacific Ocean and provided status updates relative to MSY for each region separately.

13 U.S. West Coast EEZ regional catch and CPUE demonstrated the population increasing from estimated low levels in the early 1990s. Recent (2004-08) West Coast commercial landings average 161 mt, which is less than 0.75 × MSY proxy (MSY proxy = LMSY from the Population Growth Rate method)

14 Status unknown, but catches are incidental and occur on the edge of the species' range, predominately during warm water years.

15 Status unknown, but catches are incidental and occur on the edge of the species' range.

16 Tentative results based on commercial landings and CPUE calculations. Recent (2004–08) West Coast commercial landings average 43 mt, which is less than 0.75 × MSY proxy (MSY proxy = average landings 1981–99).

17 Results for North Pacific blue shark are based on the base-case integrated model conducted with MULTIFAN-CL; $F_{current}$ is the average F for the period 1998-2001.

18 Status unknown, but dorado are highly productive and widely distributed throughout tropical/subtropical Pacific. Recent (2004-08) West Coast landings average 110 mt.

Table 5-3. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2004–08.

Species (stock)	Stockwide Catch	U.S. West Coast Catch		Average Annual Fractional Catch
		Commercial	Recreational	
TUNAS				
Albacore (NPO)	63-93[1]	9–15	0.2–1.6	0.17
Bluefin (NPO)	20-27[1]	<0.21	0.01–0.1	<0.01
Bigeye (EPO)	93–118[2]	<0.04	<0.01	<0.01
Skipjack (EPO)	201–299[2]	<0.53	<0.02	<0.01
Yellowfin (EPO)	177–291[2]	0.07-0.5	0.1–0.34	<0.01
BILLFISHES				
Striped Marlin (EPO)	0.35–1.5[2]	<0.01[3]	<0.03[4]	0.02
Swordfish (EPO)	2.1-15.7[2]	0.3–1.2	<0.01	0.09
SHARKS				
Common Thresher	Unknown	0.1–0.2	0.01–0.13	
Pelagic Thresher	Unknown	<0.01		
Bigeye Thresher	Unknown	≤0.01		
Shortfin Mako	Unknown	0.03–0.06	0.02–0.13	
Blue (NPO)	Unknown	<0.04[3]	<0.01	
OTHER				
Dorado	4–15.7[2]	<0.01	0.03–0.26	0.014

Notes:
Data for U.S. West Coast catch are from updated commercial, CPFV and private recreational catches with weight conversions of 8.7 kg/albacore, 8.7 kg/bluefin, 10.0 kg/bigeye tuna, 3.0 kg/skipjack, 4.9 kg/yellowfin, 57.9 kg/striped marlin, 113 kg/swordfish, 29.2 kg/common thresher, 16.8 kg/mako, 8 kg/blue shark, and 5.6 kg/dorado.

1 International Scientific Committee Tenth Plenary Report Catch Tables, July 2010.

2 IATTC catch tables extracted 8/15/10.

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

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

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6.0 RESEARCH AND DATA NEEDS

6.1 Research and Data Needs

This section is intended to explicitly link HMS research and data needs to the Council's current management priorities. These priorities should be considered in light of two central characteristics of HMS research and data needs. First, the two regional fishery management organizations (RFMOs) involved with management of HMS FMP stocks—the Inter-American Tropical Tuna Commission (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC)—coordinate and conduct their own stock assessments. In addition, a third scientific organization—the International Scientific Committee (ISC) on Tuna and Tuna-like Species in the North Pacific Ocean—provides scientific advice on the status of North Pacific HMS stocks that straddle the 150^{o} W longitude boundary between the RFMOs. Although research and stock assessment of the tunas, billfishes, and pelagic sharks in HMS FMP would ideally consider stocks throughout their entire range; the reality is that not all species in the HMS FMP benefit from international scientific coordination.

Second, there is substantial uncertainty on the status of stocks and/or estimates of MSY for many HMS species. Basic biological and life history data are unknown for some species, and understanding of distribution, abundance, and reproductive behaviors of most is poor. There is insufficient understanding of stock structures relative to the extent of fisheries, on the interchange between stocks, and on survival and fecundity schedules for investigating exploitation effects and species' resiliency to exploitation. There is also a lack of fishery independent indexes of abundance. These data gaps will likely need to be considered closely during implementation of the new MSA National Standard 1 guidelines.

6.1.1 Highest Priority Issues

6.1.1.1 North Pacific Albacore

Fisheries Statistics: Timely annual submission of national fishery data to the ISC Albacore WG data manager is critical for producing timely and up-to-date stock assessments. Additional resources are needed to oversee the submission of these data, to provide database management, and to improve documentation of the entire database system, including metadata catalogs. An electronic fishticket system on the West Coast would greatly improve the availability and timeliness of fishery data. Development of an electronic logbook system could have a similar effect on the availability and timeliness of data from captains' logs. Electronic reporting systems could increase data entry convenience for industry participants and reduce processing time and costs for data managers.

Biological Studies: Biological information is a critical building block for stock assessments should be reviewed and updated regularly to capture changes in population parameters as they occur. Unfortunately, this process has not been followed for North Pacific albacore because of limited resources for routine biological studies. Consequently, the stock assessment models used by the ISC Albacore WG rely on a patchwork of biological information that was developed largely in the 1950s and 1960s.

There is a critical need to reassess the biological information and to conduct contemporary studies to update this information. More specifically, there is a critical need to conduct studies on:

- age and growth with the goal of updating growth rates and comparing with older studies;
- reproductive biology with the goal of updating the maturity ogive;
- development of new indices of abundance particularly from fisheries that regularly catch recruitment age albacore (age 1), e.g. the U.S. recreational fishery;

- migration and habitat utilization, with the goal of better informing fishery effort standardization and fishery selectivity/catchability assumptions;
- an examination of whether there are multiple sub-stocks with juveniles having different migratory behaviors (i.e., juveniles from different spawning localities with different migration routes and timetables);
- environmental factors, as they relate to recruitment, growth, maturity, and catchability of albacore; and
- albacore length data through port sampling.

Stock Assessment and Management Studies: Given recent concerns about whether the North Pacific stock of albacore is at or fast approaching full exploitation, demand for more frequent and more precise information on the status of the stock and the sustainability of the fisheries is likely to increase. With this in mind, the albacore stock assessment needs improvement in several of its facets:

- investigation of competing assessment models using simulation to ascertain each model's strength and weakness when faced with input data generated from a known albacore-like population;
- simulation studies to assist fishery managers in selecting appropriate biological reference points for albacore;
- investigation of CPUE standardization;
- evaluation of the utility of formally adding tagging data into the assessment; and
- develop new indices of abundance from fisheries that regularly catch recruitment age albacore (age 1), such as the U.S. West Coast recreational fishery.

6.1.1.2 Swordfish

Fisheries Statistics: The timeliness of data reporting, as outlined above for albacore, is equally important for swordfish.

Biological Studies: All biological studies listed above for albacore are needed for swordfish as well. In addition, age and growth data from locally caught fish should be examined, and the distribution of swordfish by season and age within the outer portions of the EEZ and high seas should be evaluated.

Stock Assessment and Management Studies: All stock assessment and management studies listed above for albacore are also needed for swordfish. In particular, there is a need for additional work on effort standardization.

Economic Studies: Explore economic viability of harpoon gear as an alternative to DGN and longline gear for swordfish. Research the best options to promote developing and testing novel gear (e.g., deep-set buoy gear) to reduce protected species interactions and increase swordfish catch. Gauge the impact on global swordfish production and trade of unilateral measures to limit West Coast fishing effort on swordfish.

6.1.1.3 Sharks

Most of the tunas covered in the HMS FMP are being assessed—with varying degrees of completeness and sophistication—on a regular basis. Some of the billfishes—particularly striped marlin and swordfish—are either being assessed or have assessments planned in the near future. On the other hand, stock assessments for sharks have been preliminary at best, and few and far between. Furthermore, comprehensive shark assessments do not appear to be on the near-term planning horizon for the RFMOs or for the ISC. This situation should not be taken to imply that sharks are unimportant. Nor should it be

inferred that sharks are less vulnerable to the effects of fishing than are the tunas and billfishes. In fact, because of the key vital rates of most sharks (especially reproductive rates that are lower than those for tunas and billfishes), many HMS shark species are likely to be more vulnerable to overfishing than other HMS.

To understand this *prima facie* inconsistency (i.e., sharks which might be more vulnerable may be either less frequently assessed than less vulnerable tunas and billfish, or even unassessed), it is necessary to understand the nature of the fisheries responsible for most of the catch of sharks over the past several decades. Internationally, these fisheries tend to be either 1) tuna-targeting fisheries that caught sharks as bycatch in their tuna fishing operations and discarded them (without recording numbers or mass) over most of their fishing history; or 2) smaller scale directed shark fisheries that tend not to report shark catch and effort in a manner suitable for stock assessment, e.g. catch reports that aggregate the catch of multiple shark species into a single 'shark' category or do not report the catch and effort at all.

As with the other transboundary species covered by the HMS FMP, most shark species cannot be assessed or managed unilaterally by the Council. Some species are highly oceanic with ranges similar to that of tunas (e.g., blue shark and mako shark). Others are more coastal—with a substantial portion of their habitat shoreward of the U.S. EEZ—but exhibit north-south migrations with significant catches in Mexican waters (e.g., common thresher shark). The net effect is that accounting for the total catch of sharks over their entire period (several decades) and areas of exploitation is not possible. Furthermore, there is a paucity of the biological samples needed to characterize the size of animals taken from the fisheries that account for most of the catch. Active biological studies (age, growth, maturity, food habits, etc.) are ongoing (NMFS, State, non-profit, and academic researchers) and understanding of the biological characteristics for at least some shark species is probably sufficient for stock assessment purposes. However, without an accurate history of total catch, effort, and the corresponding size samples, stock assessment efforts and concomitant management by the Council will be problematic.

The following specific research priorities have been identified for the two highest priority sharks species because of their importance in U.S. West Coast commercial and recreational fisheries:

Common thresher shark:

- stock structure and boundaries of the species and relationships to other populations;
- the pattern of seasonal migrations for feeding and reproduction, and where and when life stages may be vulnerable;
- improved recreational catch estimates which adaptively sample the pulse nature of fishing effort;
- improved commercial fishery monitoring in Mexican waters;
- age and growth rates, including comparisons of growth rates in other areas; and
- maturity and reproductive schedules.

Shortfin mako shark:

- distribution, abundance, and size in areas to the south and west of the West Coast EEZ; and
- age and growth rates (current growth estimates differ widely).

6.1.1.4 Interactions with Protected Species and Prohibited Species

More complete catch information and data on interactions with protected and prohibited species are needed for most HMS fisheries. There is inadequate understanding of the fisheries on some HMS stocks that are shared with Mexico (e.g., species composition of shark catches in Mexican fisheries), and

inadequate data exchange with Mexico. These fisheries are likely affecting both protected species and prohibited species of fish.

More work is needed to better understand possible impacts of the HMS fisheries on protected species of sea turtles, birds, and marine mammals. For example, there is a need to investigate the post-release survivorship of protected species, such as turtles and seabirds that are caught as bycatch in the HMS fisheries. In addition, fisheries-independent research is required to better understand distribution and habitat use by turtles and to determine the linkages to ecosystem parameters (oceanographic and biological). This includes data on turtle migration seasonality and routes, genetic stock composition of populations by species, and habitat use in order to better understand turtle life histories and likely periods of interaction with fisheries. Predictive models that integrate oceanography, ecosystem parameters (e.g., prey distribution), and habitat use of turtles are needed. More work on the sizes and structures of turtle populations by species would also enable improved application of the ESA and other laws and regulations to HMS fisheries. Continued research on the abundance and distribution of marine mammals is also critical, particularly for HMS fisheries operating within the West Coast EEZ.

Some specific research priorities include:

- Research habitat use of leatherback turtles and other species of concern to better understand the potential for reducing bycatch;
- Explore whether hotspots or temperature bands can be identified in near-real-time in order to provide information to fishermen regarding places with potentially high interaction risks;
- Explore how regulating the U.S. West Coast Pacific swordfish fishery affects international trade in swordfish and the potential unintended consequences for protected species interactions in foreign fisheries;
- Compare bycatch rates of DGN vs. shallow set longline gear for swordfish, both by mining observer data and conducting gear comparison studies in the fishery areas; and
- Develop probability-based estimates of unobserved bycatch for observer programs with less than 100 percent observer coverage.

6.1.2 High Priority Issues

6.1.2.1 Blue shark

As noted above, relatively little assessment and research activity is focused on shark species compared to the existing work being done on other HMS such as tunas. Blue shark was an important shark species in the California CPFV fishery of the late 1980s, but has steeply declined as a share of the catch in recent periods. Blue sharks are encountered in relatively small numbers coastwide in commercial and recreational fisheries. Two specific research needs identified for blue sharks are to: 1) monitor sex and size composition of catches; and, 2) determine the migratory movements of maturing fish from the EEZ to high seas.

6.1.2.2 Striped Marlin

Fisheries Statistics: The timeliness of data reporting, as outlined for albacore, is equally important for striped marlin. Additionally, the official striped marlin catch statistics are considerably less well developed than those for albacore, and significant effort is needed to ensure that the total catch from all nations is well estimated.

Biological Studies: All biological studies listed above for albacore are also needed for striped marlin. In

addition,

- Stock structure for striped marlin in the Pacific Ocean is more uncertain than for other HMS species and several stock structure hypotheses are credible. A synoptic, critical review of all available information (fisheries data, icthyoplankton data, and genetic studies) is needed to either resolve the issue or at least to reduce the number of credible hypotheses; and
- Age and growth data from locally caught fish should be examined.

Stock Assessment and Management Studies: All stock assessment and management studies listed above for albacore are also needed for striped marlin. Specific to striped marlin, there is a need for additional work on effort standardization.

6.1.2.3 Pacific Bluefin Tuna

Fisheries Statistics: The timeliness of data reporting, as outlined for albacore above, is equally important for bluefin tuna. Additionally:

- the official bluefin catch statistics need further scrutiny (e.g., there are apparent discrepancies between some of the reported catches and the corresponding Japanese import records); and
- increased port sampling of commercial bluefin length frequencies is needed in the EPO, particularly of the fish destined for the pens in farming operations.

Biological Studies: All of biological studies listed above for albacore are also needed for bluefin tuna. In addition, there is a need to develop seasonal and perhaps area-based weight-length relationships as the bluefin condition factor appears to vary both seasonally and regionally.

Stock Assessment and Management Studies: All of stock assessment and management studies listed above for albacore are also needed for bluefin tuna. In particular, there is a need for additional work on effort standardization if credible indices of abundance are to become available for bluefin tuna.

6.1.3 Other Priority Stocks and Issues

6.1.3.1 Management Unit Species Catch Data

Total catch data are likely inaccurate for most HMS fisheries due to an inadequate at-sea data collection programs, logbook programs, and shoreside sampling programs for West Coast fisheries and unreported catch by international fisheries. Catch data needs include:

- Total catch information (including incidental and bycatch) and protected species interactions for surface hook-and-line, purse seine, and recreational fisheries, and additional at-sea sampling of drift gillnet fisheries;
- Catch composition data for harpoon gear;
- Size composition of bycatch in drift gillnet fisheries; and
- Condition (e.g., live, dead, good, poor) of discarded catch in all HMS fisheries.

Additional work needs to be done to develop ways to adequately sample recreational fisheries, particularly shore-based anglers and private vessels. There is a need to develop methods for sampling private marinas and boat ramps to determine catch, and the level of bycatch and protected species interactions, as well as sample the catch for length and weight of fish caught to convert catches reported in numbers to catches by weight. Better catch and effort estimates are also needed for HMS recreational

fishing tournaments, in particular those tournaments focusing on common thresher and mako sharks.

6.1.3.2 Archival PacFIN Data Cleanup

The HMSMT has identified the need to address coding issues with the gear codes for drift gillnet and longline fishing records in the PacFIN data base. A review and subsequent revision of archival PacFIN data is needed to improve the accuracy of historical commercial landings and revenues by gear type.

6.1.3.3 Survivability of Released Fish

Little is known of the long-term survivorship of hooked fishes after release, the effectiveness of recreational catch-and-release methods on big game fishes (pelagic sharks, tunas, and billfishes) or of methods to reduce bycatch mortality in longline fishing. Controlled studies of the survivability of hooked and released pelagic sharks and billfishes are needed to determine the physiological responses to different fishing gears, and the effects of time on the line, handling, methods of release, and other factors. Appropriate discard mortality rates, by species, need to be identified in order to quantify total catch (including released catch). Alternative gears and methods to increase survivability of recreationally caught fish and to minimize unwanted bycatch in fisheries should be identified.

6.1.3.4 Essential Fish Habitat (EFH)

There is very little specific information on the migratory corridors and habitat dependencies of these large mobile fish; how they are distributed by season and age throughout the Pacific and within the West Coast EEZ, and how oceanographic changes in habitat affect production, recruitment, and migration. Research is needed to better define EFH and to identify specific habitat areas of particular concern (HAPCs), such as pupping grounds, key migratory routes, feeding areas, and where adults aggregate for reproduction. A particularly important need is to identify the pupping areas of thresher and mako sharks, which are presumed to be within the southern portion of the West Coast EEZ, judging from the occurrence of post-partum and young pups in the areas (e.g., NMFS driftnet observer data). Areas where pregnant females congregate may be sensitive to perturbation, and the aggregated females and pups there may be vulnerable to fishing.

6.1.3.5 Stock Assessment Review

Pacific HMS stock assessments are carried out by the RFMOs and by the ISC. The processes used to conduct the assessments and to have them critically reviewed varies considerably across the organizations and the species being assessed. In none of these cases, however, does the level of critical peer review approach that of the Council's STAR process. This may become an issue for the Council if international management regulations begin to affect U.S. coastal fisheries to a greater extent than they do at present. The Council may want to consider having some member(s) of its SSC participate in these international processes. This will provide the Council with a better perspective on the stock assessments and the ensuing international management advice.

6.1.3.6 Tropical Tuna Species and Dorado

The commercially important tropical tuna species, namely yellowfin, bigeye, and skipjack tuna, are principally harvested in the EPO by vessels from the Central and Latin American fishing fleets. Although a small West Coast based U.S. flag purse seine fishery opportunistically harvests these tunas, the U.S. does not have a fleet active in the main EPO fishery at present. The tropical yellowfin, bigeye and skipjack tunas are no longer taken in large numbers by West Coast based commercial fisheries.

The California commercial passenger fishing vessel (CPFV) fleet is the principal U.S. fishery for dorado which are often taken in the Mexican EEZ. Dorado can be a significant portion of the total CPFV annual catch and was the leading species in 2006, followed by yellowfin tuna and albacore tuna. Specific recommendations on dorado research include:

- Determine the stock structure of dorado in the eastern Pacific, and
- The significance of floating objects and other-species associations relative to life history

6.1.3.7 Pelagic and Bigeye Thresher Sharks

These species occur with considerably less frequency than common thresher sharks in U.S. West Coast fisheries. It is of interest to Council-managed fisheries how the different ecologies of these species compare with that of common thresher shark.

6.2 Research Updates

The following sections summarize some, but not all, of the research projects being conducted during 2009 at the NMFS Southwest Fisheries Science Center and Southwest Regional Office to study HMS MUS, fisheries, and fishery-related species. Research on other MUS not reported here is ongoing at a number of U.S. West Coast research institutions. See chapter 8 for a list of links to websites of research institutions conducting research on HMS.

6.2.1 Albacore

SWFSC scientists are working with the American Fishermen's Research Foundation (AFRF) on monitoring programs and other research efforts to improve knowledge of the biology and migration of North Pacific albacore in the waters off the U.S. Pacific coast. The cooperative research includes:

Port and onboard sampling: Since 1961, a biological data collection program, or port sampling program, has been in place for collecting size data from albacore landings made by the U.S. and Canadian troll fleets at ports along the U.S. Pacific coast. State fishery personnel collect the biological data by following sampling and data processing instructions provided by the SWFSC, where the database is maintained. In recent years, with AFRF support, fishermen have collected biological data during selected fishing trips. These data are collected to augment data collected through the port sampling program. Following procedures established by SWFSC scientists, fishermen provided length data from eleven trips during the 2007 season. The sample information provided by the fishermen was found to be generally similar to that collected through the port sampling program.

Logbook Program: The logbook sampling program also has been in place through the AFRF since 1961. Fishermen have been voluntarily submitting their fishing records to the SWFSC for decades prior to implementation of the HMS FMP. These data are primarily used to develop relative indices of abundance, which subsequently provide valuable auxiliary information for fine-tuning stock assessment models. A database for logbook data is also maintained at the SWFSC. The logbook coverage rate in 2008 was approximately 88 percent of the landings. In recent years, the SWFSC has also been working with AFRF in the design and testing of an electronic logbook to facilitate submission and data entry for the albacore troll fishery data.

Archival Tagging: The Center and AFRF have been working together to use archival tags to study migration patterns and general life history strategies of subadult (ages 2-5) North Pacific albacore. Archival tag data provide detailed information on migratory behavior and distribution. Since 2001, 552 archival tags have been deployed along the U.S. West Coast and northern Baja California, Mexico.

During 2008, one tagging trip was conducted in the northern fishery area off the Columbia River, where 48 tags were deployed. Recovery rates have been very low, with only 22 archival tags recovered to date. Two tags were recovered in 2008, both aboard longline vessels operating in the central Pacific. The data are being analyzed and ultimately will help determine stock structure and improve CPUE standardization based on habitat-use patterns, information critical to developing sound stock assessments regarding the status of this valuable marine resource. For more information see http://swfsc.noaa.gov/albacore_tag.aspx.

6.2.2 Common Thresher Shark

Nursery Survey and Pup Abundance Index: In 2003, the SWFSC began a survey to (1) determine the continuity of thresher pup distribution along the coast of the Southern California Bight and (2) develop a pup abundance index. In 2008, the sixth year of sampling took place. The SWFSC team worked with the F/V *Outer Banks* to sample in the Southern California Bight from Point Conception to the Mexican border. Forty-eight longline sets were made in relatively shallow, near-shore waters. Over the 18-day cruise, 300 common thresher sharks, two spiny dogfish (*Squalus acanthias*), 28 soupfin sharks (*Galeorhinus galeus*), two leopard sharks (*Triakis semifasciata*), and five brown smoothhound (*Mustelus henlei*) were caught. Nearly all of the thresher sharks caught were injected with oxytetracycline (OTC) for age and growth studies, tagged with conventional tags, and released. In addition, satellite tags were deployed on three thresher sharks.

While it is still too early to develop a pre-recruit index, a number of interesting patterns are emerging. Depth-stratified sampling revealed that over half of the neonates[1] were caught in shallow waters from 0 to 46 m and almost all individuals are caught shallower than 90 m. The distribution of thresher sharks is very patchy and areas of high abundance are not consistent across years. In all years a large percentage of the catch has been neonates, which were found in all areas surveyed.

Currently, the SWFSC Fisheries Resources Division is collaborating with Drs. Jeffrey Graham of Scripps Institution of Oceanography and Oscar Sosa-Nishizaki of Mexico's Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE) to examine the movements, essential fish habitat, and fisheries for thresher sharks off Baja California, Mexico. Based on tag recoveries and satellite tracks, it is clear that the thresher shark nursery spans the waters of both countries.

Tagging: The SWFSC has been using electronic tags to study the movements and behaviors of common thresher sharks as well as blue and shortfin sharks. Use of satellite technology started in 1999 and more recently has been conducted in collaboration with the Tagging of Pacific Pelagics program (www.toppcensus.org), Mexican colleagues at CICESE, and Canadian colleagues at the Department of Fisheries and Oceans Pacific Biological Station in Nanaimo, British Columbia. Overall, during the juvenile shark abundance surveys conducted in the summer of 2008, nine makos, three threshers, and four blue sharks were tagged with pop-up satellite archival tags (PSAT) and/or smart position or temperature tags (SPOT). This brings the total to 77 makos, 66 blue sharks, and 27 common threshers tagged through these collaborative projects. The specific goals of the satellite tagging program are to document and compare the movements and behaviors of these species in the California Current, and to link these data to physical and biological oceanography. This approach will allow us to characterize the habitats the sharks most frequently utilize or prefer and, subsequently, to better understand how populations might shift in response to changes in environmental conditions.

Post-release Survival in the Recreational Fishery: The common thresher shark (*Alopias vulpinus*) is the focus of a popular southern California recreational fishery that typically lands individuals by hooking

[1] newborns

them in the caudal fin. This technique reduces forward locomotion ability and ram ventilation capacity. In spring 2007, a collaborative NMFS Bycatch Reduction and Engineering Program (BREP) project was initiated by the SWFSC, the Southwest Region Sustainable Fisheries Division, and the Pfleger Institute of Environmental Research to assess the post-capture survivorship of tail-hooked adult and sub-adult common thresher sharks using pop-up satellite archival tags (PSATs) and quantified physiological indicators of capture stress in the blood. Survival of the acute effects of capture was determined from the depth and temperature records of 10-day PSAT deployments. Survivorship estimates were based on 19 common thresher sharks [160-221 cm fork length (FL); ~67 to 151 kg] captured in southern California from 2007 to 2009 using recreational stand-up tackle (36 kg). Five mortalities were observed (~26%), which include two individuals that arrived dead at the boat prior to release. All mortalities occurred in large individuals (≥180 cm FL) with fight times ≥85 min. The archived depth and temperature data from surviving sharks resembled those from previous common thresher movement studies with a diel depth distribution predominantly within the upper mixed layer. Capture induced stress parameters measured from the blood of eight additional common thresher sharks that were not tagged revealed plasma lactate and hematocrit levels that were significantly elevated with increased fight time. Similarly, all threshers showed relative heat shock protein 70 (*hsp 70*) values that were elevated when compared to values obtained from blood that was allowed to recover *in vitro* for 24 h. Collectively, findings indicate that large tail-hooked common thresher sharks with prolonged fight times (≥85 min) exhibit a heightened stress response which may contribute to an increased mortality rate. These results suggest that for larger individuals the current caudal-based capture methods used in the southern California recreational fishery may not be suitable for an effective catch-and-release based conservation strategy. An extensive outreach campaign was initiated, including a cooperative effort with a local sportfishing club, to educate thresher shark anglers in the use of modified angling techniques (e.g., the use of circle hooks) to increase the percentage of mouth-hooking interactions. A switch from the current tail-hooking focused fishery to a less stressful mouth hooking focused fishery may lead to a more effective catch-and-release strategy.

6.2.3 Shortfin Mako and Blue Sharks

Shortfin Mako Shark Genetic Study: The shortfin mako is a wide-ranging pelagic shark caught globally in temperate and tropical waters. The stock structure within their broad range is poorly understood, especially in the Pacific. In the North Atlantic, thousands of conventional tags have been deployed, and although 608 have been returned, not a single shark was recaptured south of 10°N. This suggests, at a minimum, a northern and southern stock. Although the more limited conventional tag returns in the Pacific reveal movement across the North Pacific from California to as far as Japan, the potential for separation between the North and South Pacific is not known. A study is being conducted using mitochondrial DNA analyses from samples gathered around the Pacific to test the hypothesis that shortfin makos from the North and South Pacific are genetically distinct. In addition, this study will examine corridors of gene flow for shortfin mako sharks in the Pacific Ocean.

To date, 410 samples from seven sites in the Pacific (southern California, Hawaii, Japan, New Zealand, Australia, NW South America, and Chile) and one site in the North Atlantic have been analyzed. The North Atlantic site is significantly different from all Pacific sites. Within the Pacific, analyses reveal that sharks in locations in closest proximity—California/Hawaii, NW South America/Chile, and Australia/New Zealand—show no population subdivision. Divergence was apparent between the Northern and Southern Hemispheres as well as across the North Pacific between California/Hawaii and Japan. After performing isolation by distance analyses, it appears that the corridors of gene flow are following a stepping stone model. With concern about global shark populations, a better understanding of stock structure is critical to developing accurate stock assessments and ensuring effective management. This research is being completed as a part of a master's thesis project at the University of San Diego.

***Juvenile Mako and Blue Shark Abundance Survey*:** The Southern California Bight is a known nursery

area for shortfin mako and blue sharks. The SWFSC has been monitoring the relative abundance of juvenile mako and blue sharks since 1994 using a fishery-independent longline survey. The annual survey was conducted during June and July of 2008 aboard the F/V *Ventura II*. One to two fishing sets were completed daily and a total of 6,007 hooks were fished during 29 sets. Catch included 40 shortfin mako sharks, 233 blue sharks, one common thresher shark, five pelagic rays (*Pteroplatytrygon violacea)*, and one bat ray (*Myliobatis californica)*. The cruise was conducted in two legs with 85 percent of the shortfin mako sharks caught during the second leg when higher water temperatures were encountered. The overall survey catch rate was 0.184 per 100 hook-hours for shortfin mako and 1.090 per 100 hook-hours for blue sharks. The nominal CPUE for blue sharks was somewhat higher than in 2007; however, there is a declining trend in nominal CPUE for both species over the time series of the survey.

In conjunction with the fisheries-independent survey, additional biological studies were also conducted during the 2008 cruise. Most mako and blue sharks caught were tagged with conventional tags, marked with OTC for age validation and growth studies, and DNA samples were taken for studies of population dynamics. In addition, to obtain more detailed information on movements and define the habitat of Pacific sharks, satellite tags were deployed on both blue and mako sharks (see below).

Bio-accumulation of mercury in shortfin mako and common thresher sharks: In recent years there has been considerable concern about the bio-accumulation of mercury (Hg) in top marine predators posing a public health risk. Off the West Coast the two shark species that are regularly consumed and have the potential to have high Hg concentrations are the common thresher shark and the mako shark. In 2004, NMFS initiated a study to test overall Hg levels in mako and thresher sharks as well as to examine potential ontogenetic shifts in Hg concentration.

Over the course of the study 38 common thresher sharks (63 to 241 cm FL) and 33 mako sharks (75 to 330 cm FL) were sampled. For both species we found detectable levels of Hg in the white muscle, but not in the liver and no differences in Hg levels between the sexes suggesting similar bioaccumulation patterns. There were, however, significant interspecific differences with the shortfin mako having considerably higher Hg levels than the common thresher (averages; mako 1.13 μg/g, common thresher 0.13 μg/g). This likely reflects the shortfin mako foraging at higher trophic levels, and thus accumulating greater levels of Hg, than the common thresher which primarily targets small schooling fish. We found strong linear relationships between body size and Hg level for both species with a significantly greater rate of increase for the shortfin mako. In all common thresher sharks tested, Hg levels were well below the US Food and Drug Administration's established action level of 1.0 μg/g for commercial fish. Nearly all shortfin mako muscle samples from sharks ≤ 150 cm FL (FL) had Hg levels below 1.0 μg/g, but all shortfin makos >150 cm FL had muscle Hg levels exceeding this level. The largest mako shark had a concentration of 2.90 μg/g. This research is currently in press in the California Cooperative Oceanic Fisheries Investigations Reports.

Survival of Blue Sharks Released From the Drift Gillnet Fishery: The SWFSC and Southwest Region have been working on a project to determine the survivability of blue sharks caught and released alive by the California drift gillnet fishery. Blue sharks are the second greatest bycatch species in number (behind the common mola) in this fishery. Roughly 35 percent of the blue sharks caught are released alive, but their fate is unknown. During the 2007-2008 fishing season, seven sharks in various conditions at time of release were tagged with PAT tags. During the 2008-2009 season, three additional blue sharks were tagged. The tagged sharks were tracked and results indicate that survivability is high; nine of the 10 sharks survived for at least 30 days following tagging and the tenth shark survived for at least 17 days, after which it appears the tag was ingested by another animal. Final tagging efforts of smaller sharks and those in the poorest condition will be conducted during the 2009-2010 season to conclude the study. Ultimately, blue shark mortality will be estimated based on condition and size at release. Recent changes to the observer instructions request that the condition of all released sharks be recorded on observed trips

so that the mortality estimates can be appropriately estimated for all discarded sharks.

6.2.4 Swordfish

Deep-Set Buoy Project: The future viability of the west coast swordfish fishery has been raised by stakeholders and fisheries managers as an issue of concern because the fishery has declined substantially in response to, among other factors, the increased regulation of the California/Oregon Swordfish DGN fishery. A major driver of the increased regulation centered on bycatch issues in the fishery including interactions with protected species such as sea turtles and marine mammals. The current suite of swordfish fisheries and their underlying regulatory regime is likely contributing to the underutilization of a healthy swordfish stock. Thus, development of an economically feasible/low bycatch gear for swordfish fishing along the U.S west coast may provide relief to swordfish fishermen and the communities that are supported by them. The Pfleger Institute of Environmental Research (PIER) has been awarded an S-K Grant to capture and tag swordfish off the coast of southern California using experimental deep-set buoy gear. Buoy gear has been successfully fished off the east coast of the U.S. to capture commercial quantities of swordfish without any significant bycatch issues. The PIER research will take place over a two-year span within the southern California Bight with 300 sets of deep-set buoy gear to be deployed in year one utilizing the PIER research vessel and 600 sets of buoy gear in year two using cooperative commercial fishing vessels as the research platform. The research would take place from June-November with the gear set during daylight hours at depths below the thermocline (250-400 meters). The field research is anticipated to commence in June 2011.

Commercial Swordfish Fishery Cost-and-earnings Survey: A cost-and-earnings survey of the DGN and harpoon fisheries was developed in 2009 and is currently underway which should provide valuable information about the relative economic viability of harpoon compared to DGN used to target swordfish, providing important data to address one of the issues identified at the Swordfish and Leatherback Sea Turtle Utilization of Temperate Habitat (SLUTH) Workshop held May 28-29, 2008, at UC San Diego's Scripps Institution of Oceanography.

6.2.5 Sea Turtles

NMFS, in cooperation with researchers around the world, continues to conduct sea turtle research in the Pacific. Due in part to this work, the understanding of Pacific sea turtles has increased substantially over the past several years. Proceedings of the aforementioned SLUTH workshop were summarized and published in NOAA Administrative Report LJ-09-06 (August 2009). SWFSC and SWR staffs are currently in the planning stages for conducting a second SLUTH workshop in early 2011.

A number of research projects have been planned based on priorities identified at the SLUTH workshop, including a study of the economic viability of harpoon as a substitute for other gears used to target swordfish, and a study of the effect of unilateral reduction in U.S. West Coast effort targeting swordfish on sea turtle bycatch in other fisheries.

6.2.6 Marine Recreational Information Program (MRIP) Projects

In the fall of 2008, the HMSMT developed proposals for MRIP funding to support research on the recreational fisheries for albacore and HMS sharks. The purpose of the albacore project is to evaluate the potential use of for-hire sector (CPFV) catch per unit effort (CPUE) estimates to develop an index of abundance for North Pacific albacore. The HMS shark project addresses areas of uncertainty in the current sampling program for HMS shark catch, including the potential use of adaptive sampling methods to more efficiently sample the pulse fishery for thresher sharks, and better sampling of night fishing and tournament effort on HMS sharks. Both projects have received funding, and initial scoping workshops

have been conducted to receive input from state data managers, biologists and industry representatives.

The consultant for the HMS shark project is currently working on design of an alternative sampling plan that will be submitted for review in the fall of 2010. A decision on whether or not to fund field work in support of the sampling plan will be made shortly thereafter. If approved, field sampling would take place in the spring-summer 2011.

A report has been prepared to describe existing sampling programs and to identify what additional sampling would be needed to produce an index of abundance for North Pacific albacore. A funding proposal is under development to support a pilot program which would test sampling methods for obtaining the additional data.

7.0 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/

U.S. West Coast Regional Fishery Management Councils

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

State and Interstate Fisheries Commissions

California Department of Fish and 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	
United Anglers of Southern California	http://www.unitedanglers.com
Western Fishboat Owner's Association	http://www.wfoa-tuna.org