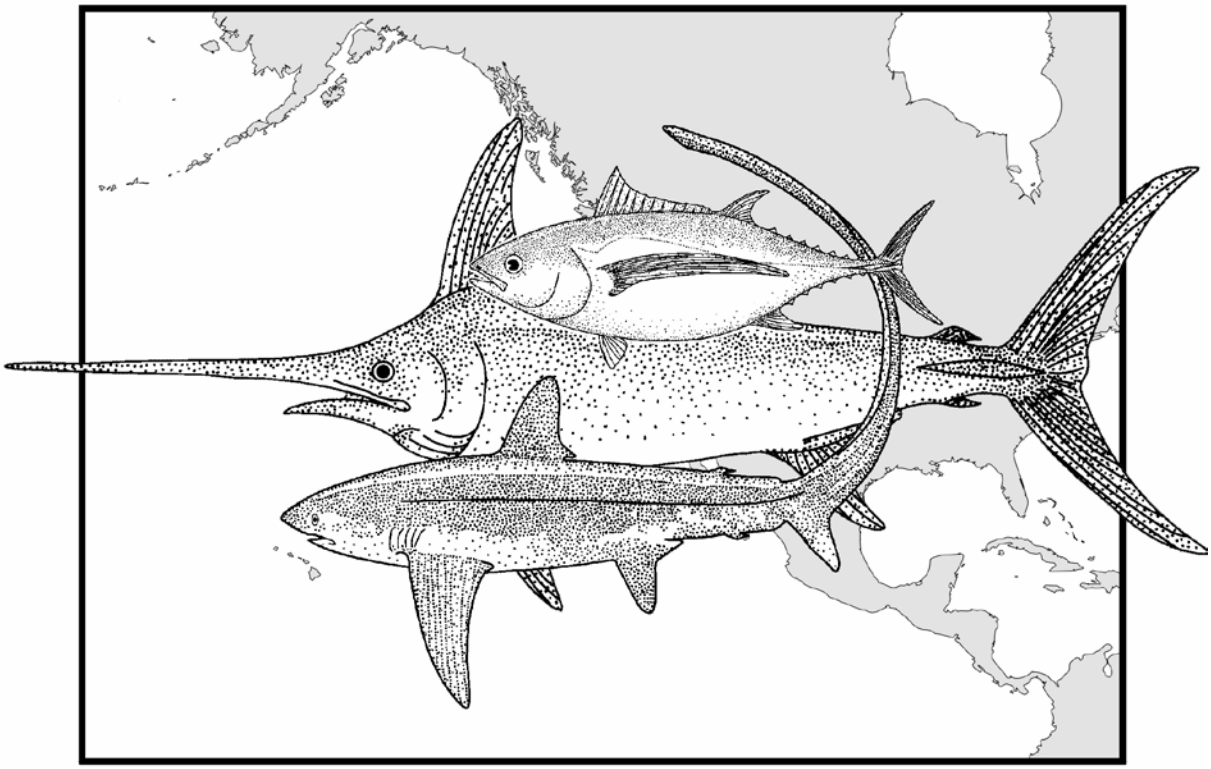
STATUS OF THE U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES THROUGH 2008



STOCK ASSESSMENT AND FISHERY EVALUATION

OCTOBER 2009

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Acronyms Used In Highly Migratory Species Management

ABC	allowable biological catch
ADAPT	an age-disaggregated virtual population stock assessment model
AIDCP	Agreement on the International Dolphin Conservation Program
AMSY	average maximum sustainable yield
A-SCALA	age-structure catch-at-length analysis
ASPIC	a non-equilibrium surplus production stock assessment model
ATCA	Atlantic Tunas Convention Act
B	biomass
$\tilde{B}$	equilibrium biomass
B_0	initial (unfished) biomass
B_x	biomass under condition x, where x may be year or some type of reference point (e.g. MSY, Recent, FLAG, etc.)
BO	Biological Opinion
CalCOFI	California Cooperative Oceanic Fisheries Investigations
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CFGC	California Fish and Game Commission
CFR	Code of Federal Regulations
Council	Pacific Fishery Management Council
CPFD	catch per fishing day
CPFV	commercial passenger fishing vessel
CPS	coastal pelagic species
CPUE	catch per unit of effort
CRFS	California Recreational Fisheries Survey
CWP	central-western Pacific
CYRA	Commission (IATTC) yellowfin regulatory area
CZMA	Coastal Zone Management Act
DAH	domestic annual harvest
DAP	domestic annual processing
DEIS	draft environmental impact statement
DGN	drift gillnet
DML	dolphin mortality limit
DOS	U.S. Department of State
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
EFL	eye-to-fork length
EFP	exempted fishing permit
EIS	environmental impact statement
EPO	eastern Pacific Ocean
EPOTFA	Eastern Pacific Ocean Tuna Fishing Agreement

ESA	Endangered Species Act
ESU	evolutionarily significant unit
ETP	eastern tropical Pacific
F	fishing mortality rate
$F_{x\%}$	fishing mortality rate producing x% of the maximum spawning potential in the absence of fishing
$F_{0.1}$	F_{MSY} proxy reference point defined by a line having a slope 0.1 times that of the yield per recruit curve near the origin
F_x	fishing mortality rate under condition x, where x may be year or some type of reference point (e.g. MSY, Recent, 2003, etc.)
F_{Max}	fishing mortality rate producing the maximum yield per recruit
FAD	fish aggregating device
FAO	Food and Agriculture Organization of the United Nations
FEAM	Fishery Economic Assessment Model
FFA	(South Pacific) Forum Fishery Agency
FL	fork length
FMP	fishery management plan
FR	Federal Register
FY	fiscal year
GIS	geographic information system
GLM	general linear model
h	steepness of the stock-recruitment relationship
HAPC	habitat area of particular concern
HMS	highly migratory species
HMS FMP	Highly Migratory Species Fishery Management Plan
HMSAS	Highly Migratory Species Advisory Subpanel
HMSMT	Highly Migratory Species Management Team
HSFCA	High Seas Fishing Compliance Act
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IDCPA	International Dolphin Conservation Program Act
IPOA	International Plan of Action
ISC	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific
ITQ	individual transferable quota
ITS	incidental take statement
IUCN	International Union for the Conservation of Nature and Natural Resources or the World Conservation Union
IUU	Illegal, Unreported, and Unregulated fisheries
JFL	jaw-to-fork length
JVP	joint venture processing
LMSY	local MSY
LOF	List of Fisheries
LOS	Law of the Sea

M	natural mortality
MBTA	Migratory Bird Treaty Act
MFMT	maximum fishing mortality threshold
MHLC	Multi-Lateral High Level Conference for Conservation and Management of Highly Migratory Species of the Central and Western Pacific
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSA	Magnuson-Stevens Act, Magnuson-Stevens Fishery Conservation and Management Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
MT	metric ton
MUS	management unit species
NAICS	North American Industry Classification System
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NNB	net national benefits
NOAA	National Oceanic and Atmospheric Administration
NPALBW	North Pacific Albacore Workshop
NPDES	national pollutant discharge elimination system
NPFMC	North Pacific Fishery Management Council
NPO	North Pacific Ocean
NPOA	National Plan of Action
NPTZ	North Pacific transition zone
NRIFSF	National Research Institute of Far Seas Fisheries
NS	National Standards (of the Magnuson-Stevens Act)
NWI	National Wetlands Inventory
NWPO	northwest Pacific Ocean
ODFW	Oregon Department of Fish and Wildlife
OMB	Office of Management and Budget
ORBS	Ocean Boat Recreational Survey
OTC	Oxytetracycline
OY	optimum yield
PacFIN	Pacific Fisheries Information Network
PBF	Pacific bluefin tuna
PBR	potential biological removal
PFMC	Pacific Fishery Management Council
PGR	population growth rate
POCTRP	Pacific Offshore Cetacean Take Reduction Plan
POCTRT	Pacific Offshore Cetacean Take Reduction Team

POFI	Pacific Oceanic Fishery Investigations
PRA	Paperwork Reduction Act
PRBO	Point Reyes Bird Observatory
PSAT	Pop-up Satellite Archival Tag
PSMFC	Pacific States Marine Fisheries Commission
RA	Regional Administrator (of NMFS)
RecFIN	Recreational Fisheries Information Network
RFA	Regulatory Flexibility Act
RFMO	regional fishery management organization
RIR	Regulatory Impact Review
RPA	reasonable and prudent alternative
SAC	Sportfishing Association of California
SAFE	stock assessment and fishery evaluation
SAR	stock assessment report (for marine mammal stocks)
SBR	spawning biomass ratio (ratio of spawning biomass to that of the unfished stock)
SBR_{AMSY}	spawning biomass ratio supporting the average maximum sustainable yield
SCB	Southern California Bight
SCTB	Standing Committee on Tuna and Billfish
SDC	status determination criteria
SEB	Shore and Estuary Boat sampling program
SEPO	southeast Pacific Ocean
SFA	Sustainable Fisheries Act of 1996 (amendment to the Magnuson-Stevens Act)
SHBS	statistical habitat based standardization
SIC	Standard Industrial Classification
SPC	Secretariat of the Pacific Community
SPOT	Smart Position or Temperature tag
SPTT	South Pacific Tuna Treaty
SSB	spawning stock biomass
SSB_0	initial (unfished) spawning stock biomass
SSB_x	spawning stock biomass under condition x, where x may be year or some type of reference point (e.g. MSY, Recent, 2004, etc.)
SSC	Scientific and Statistical Committee
SST	sea surface temperature
SWFSC	Southwest Fisheries Science Center (NMFS)
SWR	Southwest Regional Office (NMFS)
TALFF	total allowable level of foreign fishing
TRP	(Pacific Offshore Cetacean) Take Reduction Plan
TRT	(Pacific Offshore Cetacean) Take Reduction Team
UNIA	United Nations Implementing Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
USCG	U.S. Coast Guard

USFWS	U.S. Fish and Wildlife Service
VPA	virtual population analysis
VMS	vessel monitoring system
WCBA	Westport Charter Boat Association
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	western and central Pacific Ocean
WDFW	Washington Department of Fish and Wildlife
WPFMC	Western Pacific Fishery Management Council
YPR	yield per recruit
ZMRG	zero mortality rate goal

1.0 INTRODUCTION

1.1 The Fishery Management Plan

The Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) was developed by the Pacific Fishery Management Council (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 Secretary of Commerce, partially approved the HMS FMP on February 4, 2004. The majority of HSM FMP implementing regulations became effective on April 7, 2004. Reporting and recordkeeping provisions became effective on February 10, 2005.

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 Web site 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 (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*
northern 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, state that "Conservation and management measures shall be based upon the best scientific information available…," which the Council addresses in part by the annual require preparation of a stock assessment and fishery evaluation (SAFE) report for each FMP. The HMS FMP summarizes the requirements for a SAFE report as follows:

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

The SAFE report is a document or set of documents that provides the Council with a summary of information concerning the most recent biological condition of stocks and the marine ecosystems in the management unit and the social and economic condition of the recreational and commercial fishing interests, fishing communities, and the fish processing industries. It summarizes, on a periodic basis, the best available scientific information concerning the past, present, and possible future condition of the stocks, marine ecosystems, and fisheries being managed under Federal regulation.

The Secretary of Commerce has the responsibility to assure that a SAFE report or similar document is prepared, reviewed annually, and changed as necessary. The Secretary or Council may utilize any combination of talent from Council, state, Federal, university, or other sources to acquire and analyze data and produce the SAFE report.

The SAFE report provides information to the Council and Southwest Region of NMFS for determining annual harvest levels from each stock, documenting significant trends or changes in the resource, marine ecosystems, and fishery over time, and assessing the relative success of existing state and Federal fishery management programs. Information on bycatch and safety for each fishery should also be summarized. In addition, the SAFE report may be used to update or expand previous environmental and regulatory impact documents, and ecosystem and habitat descriptions.

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. The National Marine Fisheries Service (NMFS) implements Council 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 effect for at least two years unless emergency 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 2009), and their primary responsibilities in preparing the report, are listed below.

Mr. Lyle Enriquez (Chapter 3, observer requirements)
Fishery Biologist, NMFS Southwest Region

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

Mr. Craig Heberer, (chapter 3, description of FMP management measures and regulations,

international regulatory issues)
Fisheries Biologist, NMFS Southwest Region

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

Mr. Corey Niles (chapter 2 description of Washington fisheries, chapter 6, research and data needs)
Marine Resources Policy Coordinator, Washington Department of Fish and Wildlife

Dr. Kevin Piner (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

Note: Dr. Kevin Piner replaced Dr. Suzy Kohin on the HMSMT in March 2009.

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. Heidi Hermsmeyer (section 3.3)
Resource Management Specialist, NMFS Sourthwest Region

Ms. Diane Jeon (chapter 4)
Student Intern, 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 2008-June 2009

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 2008 the Council initiated the second cycle for adopting biennial harvest specifications and management measures since the HMS FMP was implemented. At the HMSMT's recommendation, the Council decided to pursue management measures for the recreational thresher shark fishery in Southern

California. This recreational fishery component has rapidly expanded in the last few years and occurs in an area that is reproductively important to the stock and has been closed to commercial fishing for that very reason. Although data are limited, there is concern that the fishery, if unchecked, could result in local depletion. At the September 2008 meeting the Council adopted a range of alternatives for thresher shark management measures. These included seasonal area closures for both the recreational and commercial fisheries, mandatory data reporting for recreational fishing tournaments, bag limits, and gear modifications to reduce tail hooking. A preliminary preferred alternative was identified, consisting of seasonal closures and mandatory tournament data reporting. At the September 2008 meeting the Council also considered whether to revise vessel marking requirements to make them consistent with new requirements of the WCPFC for vessels fishing west of 150° W longitude but decided not to take action on this issue. The Council took final action at the November 2008 meeting on the thresher shark measures. In their final action, the Council rejected the seasonal closures proposed in their preliminary preferred alternative and instead made several non-regulatory recommendations for improved public outreach, research, data collection, and fishery monitoring. The HMSMT put together a proposal through the Marine Recreational Information Program (MRIP) to address the noted thresher shark recreational data collection needs. The proposal was received favorably by the MRIP Executive Steering Committee and FY 2009 funding was awarded. Planning aspects for the project are underway with field work/data collection slated for the spring of 2010. Further details are presented in section 6.2.

Amendment to the HMS FMP to Authorize a Shallow-set Longline Fishery for Swordfish

In 2007 the Council initiated work on an FMP amendment to authorize a shallow-set longline fishery, targeting swordfish, in waters outside the West Coast EEZ. The portion of the HMS FMP authorizing this fishery was disapproved by NMFS because of a finding under the Endangered Species Act that it could jeopardize the continued existence of threatened loggerhead sea turtles. However, new fishing gear, successfully tested elsewhere, has demonstrated substantial decreases in the rate of sea turtle takes. In September 2008 the Council refined the range of alternatives previously adopted for public review. In addition to requiring various mitigation measures to reduce sea turtle takes, the alternatives included a limited entry license program for the fishery. In April 2009 the Council took final action on this issue, rejecting authorization of a new longline fishery by choosing the no action alternative.

Recommendations to Regional Fishery Management Organizations

At their November 2008 meeting the Council made recommendations to the U.S. delegation to the WCPFC, which met December 8-12, 2008, in Busan, Korea. The Council expressed concern over the status of North Pacific bluefin tuna and recommended adoption of appropriate conservation and management measures; recommended better compliance efforts for CMM (conservation and management measure) 2005-03, requiring members to limit fishing effort on North Pacific albacore; endorsed a U.S. proposal for the development of an interim management objective for North Pacific albacore; and recommended that the WCPFC Northern Committee add striped marlin to the list of species under their management authority.

In April 2009 the Council made recommendations to the U.S. delegation to the IATTC in advance of the IATTC's annual meeting, June 8-12, 2009, in La Jolla, California. The IATTC had not adopted management measures for bigeye and yellowfin tuna since the previous resolution expired at the end of 2007. The Council recommended setting total allowable catch levels for these stocks as a management measure in addition to the time and area closures previously in place for the purse seine fishery. They also made a recommendation consistent with that described above for albacore tuna, since IATTC Resolution C-05-02 parallels WCPFC CMM 2005-03. The Council also called for the IATTC to conduct a new stock assessment for the component of the North Pacific striped marlin stock occurring in the Eastern Pacific Ocean.

In April 2009 the Council also reviewed and authorized the Executive Director to sign a memorandum of understanding between the Pacific, Western Pacific, and North Pacific Councils and the Departments of Commerce and State relative to Council participation in regional fishery management organization forums.

At their June 2009 meeting the Council made recommendations to the U.S. delegation to the WCPFC's Northern Committee. The Northern Committee develops conservation and management recommendations for HMS stocks occurring principally north of 20° N latitude. The Northern Committee meets September 7-10, 2009, in Nagasaki, Japan. Since this is scheduled to take place before the Council's September meeting recommendations were made at the June meeting. The Council made recommendations relative to albacore tuna, striped marlin, and swordfish.

Amendment 2 to the HMS FMP

When the Magnuson-Stevens Act 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 April 2009 the Council initiated preliminary scoping on developing an amendment to the HMS FMP to address these requirements. Two issues were discussed. First, the MSA includes an exception to the requirement to set annual catch limits for stocks subject to management under an international agreement. Because the two regional Pacific fishery management organizations, the Inter-American Tropical Tuna Commission (IATTC) and the Western and Central Pacific Fishery Commission (WCPFC), have very broad definitions of the stocks they manage there is considerable latitude in interpreting this exception. Potentially all of the management unit species included in the HMS FMP could fall under this exception. Second, the HMS FMP includes a list of "monitored species," which had been previously recorded as bycatch in HMS fisheries but are not actively managed under the HMS FMP. The National Standard 1 Guidelines require all species listed in the FMP to be managed according to MSA 303(a) requirements, unless classified as "ecosystem component species", but do not provide specific guidance on this type of monitored species category. Once these threshold questions are addressed, the Council will have to consider the application of the annual catch limit framework outlined in the Guidelines to any stocks not subject to the international exception. The FMP must be amended and any implementing regulations put in place by the start of the HMS fishing year 2011.

North Pacific Albacore "White Paper" Report

In early 2009 NMFS commissioned a study of potential management options for the U.S. West Coast North Pacific albacore fisheries. In June 2009 the HMSMT and HMSAS reviewed a preliminary draft of this "white paper" and met with the report authors (Dr. R. Michael Laurs, consultant and retired NMFS fishery scientist, and Dr. Joe Powers, professor at Louisiana State University). Once finalized this report will be presented to the Council to help inform any potential management actions the Council may wish to initiate for the West Coast albacore fishery.

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 2008, 67 commercial surface hook-and-line vessels landed over 371 mt of albacore compared to 152 vessels that landed 770 mt in 2007 (Table 2–1). The volume and number of landings varied throughout ports in California. More than half of the 2008 landings were delivered to the Los Angeles area. In 2007, the highest share of landings was delivered to Eureka (Table 2–1). Nominal landings occurred June through August, increased in September, and peaked in October (Table 2–2). The ex-vessel revenue was $0.9 million in 2008, a decrease of around forty percent compared to about $1.5 million in 2007.

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, 2007–08.

	2007 Landings		2008 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Eureka	458	143	105	92
Fort Bragg	8	23	*	*
Bodega Bay	26	100	*	*
San Francisco	3	7	8	24
Monterey	106	50	33	17
Morro Bay	14	23	8	15
Santa Barbara	1	6	2	2
Los Angeles	150	14	213	12
San Diego	4	24	2	21
Total	770	390	371	183

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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 113 mt of fresh and frozen albacore valued at about $0.3 million exported from California in 2008, down from 542 mt valued at $1 million in 2007.

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, 2007–08.

	2007		2008	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	*	*		
February			*	*
March				
April				
May				
June	3	6,036	*	*
July	18	43,450	7	15,065
August	40	79,699	56	132,427
September	166	325,608	59	167,303
October	525	1,009,656	249	623,172
November			4	9,312
December	*	*	*	*
Total	752	1,464,449	375	947,279

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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 for data confidentiality reasons.

The recent decline does not necessarily reflect a decline in the albacore population but 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

In the U.S. EEZ portion of the eastern Pacific Ocean (EPO) more than 90 percent of the yellowfin, skipjack, and bluefin tuna catch, a relative minor component of overall EPO tuna catch, 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 fleet. Similarly, vessel operators will switch to 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 2008, similar to 2007. Landings and revenue for yellowfin 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 landing trend has been one of decline since 1976, when more than 125,000 mt of fish were landed in California ports.

In 2008, California landings of yellowfin tuna originated from waters outside the US EEZ. Exports of fresh yellowfin from California went to fresh fish markets in Canada. Frozen products also went to Indonesia for processing in 2008.

Skipjack Tuna: In 2008, less than three vessels landed skipjack, similar to 2007. 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 169 mt of exports of frozen skipjack tuna from California valued at about $201 thousand reported in 2008, most going to Chinese Taipei, Indonesia and the Philippines, an increase from 53 mt valued at about $56 thousand in 2007.

Bluefin Tuna: In 2008, there were no bluefin tuna landed by purse seine vessels in California, although a small amount (less than a ton) was landed incidentally by other gears. Landings and revenue for bluefin tuna for 2007 could not be reported because of Federal data confidentiality rules that do not allow reporting information unless aggregated for three or more vessels. Similar to 2007, all exports of fresh bluefin tuna from California went to Japan in 2007, while frozen went to Canada.

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, 2007–08.

Port Complex[1]	2007 Landings (mt)[2]	2007 Landings (number)	2008 Landings (mt)[2]	2008 Landings (number)
Santa Barbara	2	13	3	11
Los Angeles	34	123	25	128
San Diego	23	81	20	78
Total	59	217	48	217

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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.

Table 2–4. Monthly commercial landings (round mt) and ex-vessel revenue (dollars) for swordfish landed in California by the harpoon fleet, 2007–08.

Month	2007 Landings (mt)[1]	2007 Ex-vessel (dollar)[2]	2008 Landings (mt)[1]	2008 Ex-vessel (dollar)[2]
January				
February				
March				
April			*	*
May			*	*
June	4	48,212	4	50,509
July	14	155,461	13	144,723
August	30	288,982	15	138,669
September	9	85,261	6	56,373
October	2	16,477	4	35,384
November	*	*	3	22,147
December	*	*	2	7,951
Total	59	594,393	48	458,482

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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 2008, 32 harpoon vessels landed 48 mt of swordfish compared to 28 vessels that landed 59 mt in 2007 (Table 2–3). Fishing effort was concentrated in coastal waters off San Diego and Orange Counties in the SCB, especially from blocks southeast of Santa Catalina and San Clemente Islands. Landings occurred June through November, peaking in August (Table 2–4).

The ex-vessel revenue for 2008 was $455,756 compared to $597,707 in 2007 (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 $6.26 compared to $2.80 for drift gillnet caught

fish in 2008. 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 and landings soared to a historical high of 2,371 mt by 1985. The drift gillnet fishery is a limited entry program, managed with gear, season, and area closures. A limited entry program was established in 1980 and about 150 permits were initially issued. The permit is transferable under very restrictive conditions. It is linked to an individual fisherman, not a vessel; thus the value of the vessel does not become artificially inflated. Since 1984, the number of permits has declined from a high of 251 in 1986 to a low of 84 in 2008; and only 46 vessels participated in the swordfish fishery in 2008 (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. 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.

Table 2–5. Annual drift gillnet permits issued and number of active vessels, 1981–2008.

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	84
1994	138	162			

Source: CDFG License and Revenue Branch (LRB), extracted August 12, 2009.
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 has 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 that 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 nearly halved, 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, 2007–08.

	2007		2008	
	Landings		Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Bodega Bay	*	*		
San Francisco				
Monterey	46	18	17	8
Morro Bay	93	39	46	28
Santa Barbara	56	57	21	22
Los Angeles	51	57	72	32
San Diego	238	426	249	279
Total	484	597	405	369

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009, 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, 2007–08.

	2007		2008	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	111	617,756	10	79,079
February	*	*	*	*
March				
April				
May				
June				
July				
August	1	6,646	*	*
September	5	34,206	27	169,361
October	82	506,605	95	431,121
November	184	804,717	155	611,537
December	107	549,598	118	403,318
Total	490	2,519,728	405	1,694,416

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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 2008, 43 drift gillnet vessels landed 405 mt of swordfish compared to 46 vessels that landed 490 mt in 2007 (Table 2–6). Landings occurred at ports from San Diego to Monterey and the majority occurred from October to December. Over 93 percent of the reported effort occurred in the SCB.

The ex-vessel revenue was $1.7 million in 2008 compared to $2.5 million in 2007 (Table 2–7). 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, 2007–08.

Port Complex[1]	2007 Landings (mt)[2]	2007 Landings (number)	2008 Landings (mt)[2]	2008 Landings (number)
Bodega Bay	*	*		
Monterey	4	8	1	5
Morro Bay	6	20	16	16
Santa Barbara	36	58	31	60
Los Angeles	48	46	18	26
San Diego	65	179	35	102
Total	158	311	101	209

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009. 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 2008, 40 drift gillnet vessels landed 101 mt of common thresher shark compared to 43 vessels that landed 158 mt in 2008 (Table 2–8). Landings occurred throughout the open season but a majority occurred 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 2008 was $181,381 compared to $245,389 in 2007 (Table 2–9). Fresh thresher shark landings support domestic seafood restaurant businesses.

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, 2007–08.

Month	2007 Landings (mt)[1]	2007 Ex-vessel (dollar)[2]	2008 Landings (mt)[1]	2008 Ex-vessel (dollar)[2]
January	17	36,654	13	26,846
February			3	7,022
March				
April				
May				
June				
July				
August	6	12,018	8	14,262
September	11	20,661	11	20,868
October	41	75,777	34	54,905
November	51	63,132	15	28,236
December	32	35,147	17	29,242
Total	158	243,389	101	181,381

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted August 12, 2009.
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 Mangement 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 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 2008, five longline vessels landed 77 mt with a value of $195,496; landings in 2007 could not be reported because of Federal data confidentiality rules that do not allow reporting information unless aggregated for three or more vessels. 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, fishing principally albacore.

Oregon albacore landings have been highly variable through the years, ranging from a low of 12.5 mt in 1936 to a high of over 17,000 mt in 1968. In the last decade, annual landings in Oregon have averaged about 3,700 mt.

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

Commercial landings of albacore into Oregon totaled 3,858 mt in 2008, 19 percent less than the 4,742 mt landed in 2007, but nearly identical to 2006 landings (Table 2-10). Landings of albacore into Oregon ports began with a small landing in early July and continued through early October. The peak of landings occurred during the first week of August. Rough ocean conditions during mid-August and mid-September caused two brief declines in landings. Large schools of fish were present less than 50 miles offshore from Newport and less than 100 miles offshore from Charleston throughout October, and bait vessels had excellent success until the end of the month.

A total of 329 vessels made at least one landing of albacore in 2008, down 28 percent from 422 vessels in

2007. These vessels made 882 landings in 2008, which is a 36 percent decrease from 1,374 landings in 2007.

Newport received the majority of Oregon deliveries in 2008 with 37 percent of the total landings, followed by Astoria with 31 percent and Charleston with 27 percent, with nine other ports also receiving deliveries (Table 2-11). The average landing in 2008 was 4.6 mt, higher than the 3.4 mt in 2007.

Table 2-10. Oregon commercial albacore landings (mt) by month, 2006-2008.

Month	2006	2007	2008
May	0	0	0
June	6.7	45.3	0
July	704.7	1522.1	1106.9
August	1261.5	1805.8	1834.4
September	1043.3	1006.2	673.4
October	816.4	336.6	242.1
November	17.1	25.7	1.1
Total	**3864.2**	**4741.7**	**3857.9**

Data source: ODFW fish ticket landings data, extracted August 2009.

Table 2-11. Oregon commercial albacore landings (mt) by port, 2006-2008.

Port	2006	2007	2008
Astoria	1795.0	1290.0	1189.3
Garibaldi	97.2	186.1	103.2
Pacific City	1.2	2.8	3.5
Depoe Bay	0.6	5.4	1.6
Newport	1307.2	2175.4	1440.8
Florence	19.9	20.2	11.5
Winchester Bay	89.3	52.6	61.0
Charleston	532.1	975.4	1024.9
Bandon	1.0	1.5	1.4
Port Orford	15.3	12.1	3.5
Gold Beach	0.4	4.6	0.8
Brookings	4.6	12.6	16.4
Total	**3864.2**	**4741.7**	**3857.9**

Data source: ODFW fish ticket landings data, extracted August 2009.

Albacore markets and prices (Table 2-12) were good during the 2008 season. Ex-vessel value of albacore in 2008 totaled a record setting $10.6 million, a 13 percent increase from 2007's ex-vessel value of $9.4 million. The weighted average price per pound for albacore in Oregon for 2008 was $1.20 per pound, another record value. This was $.30 per pound higher than 2007 and $.42 per pound higher than the 24-year average (1985-2008). Most fishermen selling directly from their vessels to the public received between $1.75 and $2.25 per pound. Demand remained strong in this market throughout the albacore season, with many vessels and other small dealers hoping for extended fishing opportunities late into the fall. Markets for blast frozen albacore also started off extremely strong, with an ex-vessel price range of $1.20 and 1.30 per pound, with some dealers paying up to $1.45 per pound for top quality fish. However, the market became saturated in September, causing dealers to lower their blast prices or stop buying blast frozen albacore altogether. In addition, brine/bled markets started off strong in 2008. Several dealers worked on a new brine/bled loin market targeted at the United States, Canada, Japan, and parts of Europe.

Brine/bled markets started at $0.95 to $1.13 per pound, increasing throughout the entire fishing season to $1.10 to $1.20 per pound. Spanish demand for brine/unbled albacore was mostly stable through the season, with slight increases in September and October. Fresh iced fish started around $0.90 per pound, and increased through the entire season to $1.25 per pound at larger dealers, and $1.35 to $1.50 per pound at smaller, local dealers.

Table 2–12. Ex-vessel price-per-pound for albacore tuna in Oregon, 2006-2008.

Product Form	2006	2007	2008
frozen	$0.60 to $1.00	$0.90 to $1.20	$0.90 to$1.45
fresh	$0.60	$0.65 to $1.00	$0.90 to $1.50
off-vessel (whole)	$1.75 to $2.00	$1.75 to $2.00	$1.75 to $2.25
off-vessel (loins)	$4.00		

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

2.1.2.2 Drift Gillnet Fishery for Swordfish and Shark

The Oregon commercial DGN fishery is an extension of the California fishery. However, with implementation of the seasonal closure off northern California and southern Oregon, fishing effort off Oregon dropped considerably. In Oregon, the DGN fishery for swordfish is managed under the Developmental Fisheries Program, which limits the number of permits available. Although 10 permits are available each year, no permits were issued and no landings were made in 2008, just as in 2006 and 2007.

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.

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.

[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.

Table 2–13. Washington commercial albacore landings (mt) by port group, 2004–07 (listed in order of annual average).

Port Group	2004	2005	2006	2007	2008
Ilwaco & Columbia River	4,267.1	1,658.1	5,534.3	2,698.0	2,664.7
Westport & Grays Harbor	3,213.3	2,842.9	2,673.9	3,119.3	3,894.1
North Puget Sound[a]	753.8	298.6	334.4	85.4	131.1
South Puget Sound[b]	7.8	5.8	63.2	9.4	6.9
Willapa Bay & Pacific County	29.8	14.0	22.3	7.0	0.7
Neah Bay & La Push	1.3	3.9	7.2	36.5	2.4
Total	8,309.7	4,904.3	8,707.1	5,980.4	6,699.6

Data source: WDFW fish ticket landings data, extracted Aug 2009.
(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 has been fairly consistent. Total ex-vessel revenues for the state surpassed $17 million in 2008. Vessels were paid an average of $1.17 per pound in 2008, up from the 2004–2007 price of $0.86 per pound, perhaps because 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.[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 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, 2004–08.

	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	6,315.3	15,993,820	384.3	1,159,756	6,699.6	17,153,576

Data source: WDFW fish ticket landings data, extracted August 2009.
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 all of the 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

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

Mexico aboard commercial passenger fishing vessels (CPFVs) and private boats. A fishing season is dependent on oceanographic conditions, which strongly influence the occurrence of fish within range of the California-based fleet, but 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 2008.

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

Species	No limit[1]	1-Fish	2-fish	10-fish[2]	25-fish
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. 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, 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 , 2007–08.

Species	2007 Number of Fish (kept)	2007 Number of Fish (thrown back[2])	2008 Number of Fish (kept)	2008 Number of Fish (thrown back[2])
Tunas				
Albacore	36,974	260	4,530	6
Bigeye	0	0	0	0
Bluefin	176	0	3,158	86
Skipjack	67	16	821	122
Yellowfin	1083	6	5,596	59
Billfishes				
Striped Marlin	93	6	1	4
Swordfish	0	0	2	0
Sharks				
Blue	19	214	17	246
Common Thresher[1]	40	15	45	98
Shortfin Mako	108	67	76	272
Other Fish				
Dorado	72	0	5,621	270
Total	38,632	578	19,867	1,163

Source: California's Commercial Fisheries Information System (CFIS), CPFV logbook data, extracted June 24, 2009
Additional Processing Information:
[1]-The annual totals for common thresher shark included 6 bigeye thresher kept in 2006.
[2]-The condition (live or dead) of fish thrown back fish 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 4–64b). However, for some species the entire reported catch for the fleet comes from the California (U.S. waters). In 2008, approximately 119 CPFVs logged 898 days at-sea within the U.S. EEZ compared to 160 CPFVs that logged 1,221 days at-sea in 2007. The total number of MUS kept by anglers decreased from 38,632 fish in 2007 to 19,867 fish in 2008 (Table 2–16), although the focus changed from albacore in 2007 to yellowfin tuna and dorado in 2008, which together totaled fifty-six percent of the kept fish.

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 2008, about 34,000 MUS were caught by private boaters compared to 38,000 MUS caught in 2007 (including released and thrown back fish). In 2008, 83 percent of the total shortfin mako sharks captured were released alive; for thresher sharks 45 percent of the total were caught and released. Blue sharks were released alive at a much higher rate, 98 percent in 2008, 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 unusually high or low catch estimates with high variances.

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, 2007–08.

Species	2007 Number of Fish (kept[1])	2007 Number of Fish (reported dead[2])	2007 Number of Fish (released alive[2])	2008 Number of Fish (kept[1])	2008 Number of Fish (reported dead[2])	2008 Number of Fish (released alive[2])
Tunas						
Albacore	20,576	6,295	773	2,052	13	28
Bigeye	95	0	0	0	9	15
Bluefin	26	0	0	68	0	0
Skipjack	40	44	97	240	0	148
Yellowfin	262	502	10	2,972	196	133
Billfishes						
Striped Marlin	0	0	126	0	0	111
Swordfish	6	0	0	0	0	0
Sharks						
Blue	187	4	1,911	28	17	2,353
Common Thresher	677	54	528	623	85	585
Shortfin Mako	522	188	1,460	306	9	1,523
Other Fish						
Dorado	213	97	72	9,535	2,626	7,877
Total	22,604	7,183	4,977	15,824	2,954	12,773

Source: Pacific States Marine Fisheries Commission, Recreational Fisheries Information System, California Recreational Fisheries Survey data, extracted August 12, 2009.
Additional Processing Information:
[1]-Examined by sampler.
[2]-The angler reported the fish as dead or thrown back alive after capture.

2.2.2 Oregon

Recreational fishing for albacore off Oregon has grown in popularity during the past decade. Catches have ranged from a low of 2,901 fish in 2000 to a high of 58,928 fish in 2007. The 2008 recreational Oregon albacore fishery yielded the second highest catch in history. An estimated 24,300 albacore, weighing approximately 218 mt, were landed for the year. Although the catch was down by more than 50 percent from last year, it is above the five-year average (2004-2008) of an estimated 18,000 albacore.

Access to albacore for recreational vessels off Oregon is highly variable due to distance to the fish and weather conditions. For the 2007 season, albacore were often available within 20 miles of shore along much of the Oregon Coast, and weather conditions allowed sport boats to travel offshore for a large part of the season. Weather conditions for the 2008 season were more typical of NE Pacific conditions, with albacore largely limited to areas outside of 30-50 miles, and sporadic weather windows that limited access. Albacore did not move into the range of most sport boats until the end of July in 2008, while in recent years significant sport boat catches began in early July. These oceanic conditions coupled with record high fuel prices significantly reduced sport fishing effort during the 2008 season (Table 2-18).

Private boats accounted for approximately 75 percent of the total recreational landings (Table 2-19). Newport accounted for 36 percent of the trips and 39 percent of the catch.

Table 2–18. Oregon albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port, 2006-2008.

Port	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Astoria	108	312	390	188	339	420	296	651	810
Garibaldi	38	111	164	642	1,264	963	680	1,375	1,127
Pacific City	0	9	5	80	209	34	80	218	39
Depoe Bay	94	683	245	385	1,645	735	479	2,328	980
Newport	646	1,463	1,089	646	2,414	1,476	1,292	3,877	2,565
Winchester Bay	0	12	0	12	367	228	12	379	228
Coos Bay	10	69	109	145	1,711	973	155	1,780	1,082
Bandon	83	231	107	76	133	0	159	364	107
Port Orford	0	30	0	NS	NS	NS	0	30	0
Gold Beach	0	57	14	6	12	0	6	69	14
Brookings	108	312	390	179	933	85	287	1245	475
Total	**979**	**2,977**	**2,123**	**2,359**	**9,057**	**4,981**	**3,338**	**12,034**	**7,104**
Private boat (%)							70.7%	75.3%	70.1%

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

Table 2-19. Oregon albacore catch (number of fish) for charter and private boats, and combined, by year and port, 2006-2008.

Port	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Astoria	231	907	1167	804	1,832	1,809	1,035	2,739	2,976
Garibaldi	204	628	440	3,160	4,943	3,993	3,364	5,571	4,433
Pacific City		70	98	92	1,910	314	92	1,980	412
Depoe Bay	113	2,139	670	1,413	9,100	2,666	1,526	11,239	3,336
Newport	1,653	4,920	3,126	1,875	14,825	6,267	3,528	19,745	9,393
Winchester Bay		36	0	0	1,571	287	0	65	287
Coos Bay	50	301	0	816	8,370	460	866	1,607	460
Bandon	398	1,607	269	517	624	2,153	915	8,671	2,422
Port Orford			333			0			333
Gold Beach		256	0	0	210	0	0	466	0
Brookings		319	81	303	4,289	136	303	4,608	217
Total	**2,649**	**11,183**	**6,184**	**8,980**	**47,739**	**18,085**	**11,629**	**58,922**	**24,269**
Private boat (%)							59.1%	77.2%	74.5%

Data Source: ODFW Ocean Recreational Boat Survey, extracted January 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, 2006-2008.

Port	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Astoria	2.1	2.9	3.0	4.3	5.4	4.3	3.2	4.2	3.7
Garibaldi	5.7	5.7	2.7	4.9	3.9	4.2	5.0	4.1	3.4
Pacific City	-	7.8	19.6	1.2	9.1	9.2	1.2	9.1	14.4
Depoe Bay	1.2	3.1	2.7	3.7	5.5	3.6	3.2	4.8	3.2
Newport	2.6	3.4	8.6	2.9	6.1	4.3	2.7	5.1	6.4
Winchester Bay	-	3.0	-	0.0	4.3	2.0	0.0	0.2	2.0
Coos Bay	5.0	4.4	2.5	5.6	4.9	2.2	5.6	0.9	2.3
Bandon	4.8	7.0	3.1	6.8	4.7	-	5.8	23.8	3.1
Gold Beach	-	8.5	-	0.0	17.5	-	0.0	11.1	-
Brookings	-	5.6	5.8	1.7	4.6	1.6	1.7	4.7	3.7
Total	**2.7**	**4.7**	**2.9**	**3.8**	**6.6**	**3.6**	**3.5**	**6.8**	**3.3**

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

2.2.3 Washington

The recreational albacore fishery in Washington leveled off in 2008 with slightly fewer trips taken and an estimated 14 percent 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 2006 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, 2006–08.

Port Area	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
North Coast	44	63	63	101	305	165	145	368	228
Westport	1,207	1,026	919	199	456	635	1,406	1,482	1,554
Ilwaco	556	637	516	540	1,105	1,130	1,096	1,742	1,646
Total	1,807	1,726	1,498	840	1,866	1,930	2,647	3,592	3,428
Private boat (%)	—	—	—	—	—	—	31.7%	51.9%	56.3%

Data source: WDFW Ocean Sampling Program, extracted August 2009.

Table 2–22. Washington albacore catch (number of fish) for charter and private boats, and combined, by year and port area, 2006–08.

Port Area	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
North Coast	234	223	240	445	1,064	474	679	1,287	714
Westport	18,517	12,688	10,981	734	1,971	2,439	19,251	14,639	13,420
Ilwaco	2,395	3,029	2,575	2,254	6,127	4,818	4,649	9,156	7,393
Total	21,146	15,940	13,796	3,433	9,162	7,731	24,579	25,082	21,527
Private boat (%)	—	—	—	—	—	—	14.0%	36.5%	35.9%

Data source: WDFW Ocean Sampling Program, extracted August 2009.

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, 2006–08.

Port Area	Charter			Private			Combined		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
North Coast	5.3	3.5	3.8	4.4	3.5	2.9	4.7	3.5	3.1
Westport	15.3	12.3	11.9	3.7	4.3	3.8	13.7	9.9	8.6
Ilwaco	4.3	4.8	5.0	4.2	5.5	4.3	4.2	5.3	4.5
Total	11.7	10.4	9.2	4.1	6.0	4.0	9.3	8.1	6.3

Data source: WDFW Ocean Sampling Program, extracted August 2009.

As in 2007, the number private boat effort increased in both number of trips and in the overall proportion of albacore trips taken in Washington (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 reported in the 2005 logbook data was 12 fish while the 2006 logbook data reported a slightly higher average of 12.8 fish per angler. The average weight of albacore reported in the logbooks was 19.1 lbs in 2005 and 16.1 lbs in 2006. In 2007, the logbook average weight increased slightly to 19.8 lbs and the average catch per angler remained steady at 12.8 fish per angler. Logbooks collected in 2008 recorded a slight drop to an average weight of 18.2 lbs and average catch per angler of 12.1 fish.

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 2-24). In 2008, less than 1 mt of albacore were taken incidentally to salmon trolling, with much smaller amount taken incidentally to groundfish trolling for sablefish and rockfish. About 200 kg of thresher shark was taken incidentally to trawling for halibut and other groundfish. However, 2.5 mt was taken in set longline gear, and about 36 mt was taken in set gillnet and small mesh drift gill net fisheries.

Table 2–24. Landings (mt) of HMS Species in non-HMS gears.

	CPS Purse Seine	Salmon Troll	Trawl	Set Longline	Set Gillnet	Small mesh DGN
Albacore tuna	0.4	0.4				
Thresher Shark	0.1		0.2	2.5	27.6	8.6

2.3.2 Oregon

In Oregon, most Highly Migratory Species (MUS) are rarely landed by gears targeting other species. During 2008, less than 1 mt of these HMS species, consisting of small amounts of blue shark, thresher shark and other unidentified shark species were landed by non-HMS fisheries (Table 2-25). Blue sharks were taken incidentally by bottom longline gear targeting sablefish and by midwater trawls for Pacific

[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).

whiting. Thresher sharks were taken incidentally in midwater trawls for Pacific whiting and in baitfish nets for Pacific sardine.

Table 2-25. Landings (mt) of HMS Species with non-HMS gear in Oregon, 2008.

Species	Bottom Longline	Midwater Trawl	Bottom Trawl	Baitfish Net	Total
Blue Shark	0.14	0.04	0	0	0.18
Thresher Shark	0.04	0.28	0.02	0	0.34
Unid. shark	0	0.53	0	0.02	0.55

2.3.3 Washington

None reported.

2.4 Non HMS FMP Fisheries of Importance to the West Coast

In Oregon during July 2008, one vessel landed its catch of HMS species taken under its Pacific pelagic fisheries permit issued under the Western Pacific Fishery Management Council FMP. This landing of HMS species taken outside the West Coast EEZ with deep-set longline gear is a highly unusual occurrence in Oregon. The HMS species landed included bluefin tuna, opah, Pacific pomfret, swordfish, albacore, wahoo, dorado, and marlin. Data confidentiality rules preclude the listing of landing amounts.

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 Niño 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

3.1.1 Summary of the Regulatory Changes to the HMS FMP

The revised method for renewing and replacing permits issued under the HMS FMP modifies the renewal process by substituting the last day of the month corresponding to the last digit of the vessel's identification number with the last day of the vessel owner's birth month as the expiration date. The rule also requires that vessel owners requesting a duplicate permit must submit a completed application form to NMFS. These regulations are needed to improve the efficiency and timeliness of the permit system.

The amendment to the regulatory text governing closures of the large-mesh Swordfish/Thresher Shark Drift Gill Net fishery in the Loggerhead Conservation Area was implemented to avoid jeopardizing loggerhead sea turtles, which are listed as threatened under the Endangered Species Act, by clarifying the time period in which the area is to be closed and the methods that NMFS will use to determine if an El Niño event is occurring or forecast to occur. The rule also corrected an inaccurate cross-reference in the regulations governing special requirements for fishing activities to protect threatened and endangered sea turtles under the HMS FMP.

The amendment to vessel identification regulations for HMS recreational charter vessels exempted these vessels from complying with the vessel identification requirements. The regulation is intended to relieve a restriction for which the costs outweigh the benefits. Current state and Federal (U.S. Coast Guard) marking requirements are sufficient for law enforcement personnel to adequately identify HMS recreational charter vessels at-sea and the added burden to vessel owners of additional vessel marking requirements was deemed unnecessary.

The establishment of daily bag limits for sport caught albacore and bluefin tuna in the EEZ off California was implemented as a conservation measure as part of the 2007–2009 biennial management cycle as

established in the HMS FMP Framework provisions for changes to routine management measures. The rule establishes a daily bag limit of 10 albacore per day south of Point Conception and 25 albacore per day north of Point Conception. This differential limit was granted in recognition of the reduced window of opportunity for sport fishermen targeting tunas north of Point Conception, due in part to the rougher weather typically encountered in that zone. The final rule does not establish daily bag limits in Federal waters of Oregon or Washington as it was determined that additional regulatory measures were not needed at this time given the comparatively minimal level of effort and reduced weather-related fishing opportunities. The state of California implemented companion regulations for the establishment of daily bag limits for albacore and bluefin tuna to cover nearshore waters under their jurisdiction (0-3 nm).

When NMFS published the final rule to implement the HMS FMP (69 FR 18444) there were mandatory permit requirements established under section 50 CFR 660.707. The HMS FMP permit requirements included authority to collect permit fees which NMFS opted not to exercise at that time. NMFS is now exercising the option to charge an administrative fee for the recovery of HMS permit processing and issuance expenses as authorized under Section 303(b)(1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), 16 U.S.C. 1853(b)(1). Section 304(d) of the MSA specifies that such fees may not exceed the administrative costs of issuing the permits. This final rule specifies that an application for an HMS permit, including the renewal of an existing permit, must include a fee payable by the vessel owner. The amount of the fee will be determined in accordance with the NOAA Finance Handbook available at (http://www.corporateservices.noaa.gov/~finance/Finance%20Handbook.htm) and specified on the application form. At this time, the fee amount is approximately $30 covering the 2-year permit period.

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 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

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

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]

[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.

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*

An Exempted Educational Activity (EEA) permit was granted by NMFS SWR to the Monterey Bay Aquarium for the capture, handling, transport, and display of great white sharks taken in the EEZ off California during 2007 and 2008. A total of five great white sharks were handled by the Aquarium under this permit during 2007 and 13 in 2008. The majority of these animals were incidentally captured by bottom set net fishermen and transported to the Aquarium's holding pen located off the Malibu, California coastline. The Aquarium tagged and released all of these sharks save for one individual in 2007 and one in 2008 which were successfully transferred and displayed at the Aquarium facility in Monterey. Both animals were tagged and released back to the wild after being displayed. After review of the data collected under the EEA permits for 2007 and 2008, NMFS has determined that a Federal EEA permit for 2009 will not be required for this program.

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 2008 can be viewed at: www.nmfs.noaa.gov/by_catch/docs/SharkFinningReport08.pdf.

[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.

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.

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 *will not* be 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 will not be able to 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 for commercial purposes with gillnets, except as bycatch in the swordfish fishery. In the swordfish fishery, under a developmental fisheries permit, thresher shark may be retained at a ratio of one thresher for every two swordfish retained. Thresher shark, taken with gear legal for other ocean food fish and within catch and season restrictions for other food fish, may be landed in Oregon.

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

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.

Washington recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips in 2005. According to the logbooks received for 2008, 18 charter vessels completed a total of 168 trips and landed 17,886 albacore. This was a decrease in effort and catch from 2007 (18 vessels/197 trips/20,753 fish). 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 2004–08.

Based on available logbook data, 98 California Commercial Passenger Fishing Vessels (CPFVs) targeted HMS in 2008. These vessels logged 2,549 days at-sea within the U.S. EEZ in 2008 compared to 140 CPFVs that logged 2,871 days at-sea in 2007. In addition to the CPFV logbook program, CDFG implemented its California Recreation 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 2008, CRFS field samplers interviewed 123 CPFV tuna anglers compared to 20 in 2007. (from Recfin, extracted August 25, 2009)

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 logbooks from 466 vessels were submitted to the NMFS Southwest Fisheries Science Center (SWFSC) in La Jolla, California, in 2008 compared to 1,538 logbooks from 628 vessels in 2007. A total of 10,254 mt of albacore was landed for 2008 compared to 11,887 mt in 2007. 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 compliance rate 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 logbook and market receipt data, 28 of 31 active vessels submitted logbooks and logged 660 days at-sea in 2008 compared to 29 of 29 active vessels that logged 817 days at-sea in 2007. CDFG will be looking into logbook compliance in the near future.

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. According to logbook records, 38 drift gillnet vessels made 936 sets for swordfish and/or thresher shark in 2008 compared to 38 drift gillnet vessels that made 1,211 sets in 2007.

Washington recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips in 2005. According to the logbooks received for 2008, 18 charter vessels completed a total of 165 trips and landed 17,710 albacore. This was a decrease in effort and catch from 2007 (18 vessels/197 trips/20,069 fish). 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 2004–08.

Oregon recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips in 2005. According to the logbooks received for 2008, 3 charter vessels completed a total of 14 trips and landed 503 albacore. For 2007, five charter vessels completed 39 trips and landed 1,708 albacore.
Based on available logbook data, 98 California Commercial Passenger Fishing Vessels (CPFVs) targeted HMS in 2008. These vessels logged 2,549 days at-sea within the U.S. EEZ in 2008 compared to 140 CPFVs that logged 2,871 days at-sea in 2007. In addition to the CPFV logbook program, CDFG implemented its California Recreation 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 2008, CRFS field samplers interviewed 123 CPFV tuna anglers compared to 20 in 2007. (from Recfin, extracted August 25, 2009)

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 2008, the NMFS Southwest Region Observer Program observed the following HMS fisheries:

- Drift gillnet: 25 trips and 146 sets for a coverage rate of approximately 13.2 percent.
- Albacore troll: Albacore trips did not carry Federal observers in 2008 due to funding limitations.
- Tuna Purse Seine: No tuna directed trips were conducted by the West Coast-based coastal purse seine fleet in 2008.
- Pelagic tuna longline: 3 trips and 41 sets, 100 percent coverage.
- HMS CPFV: CPFV trips did not carry Federal observers in 2008 due to funding limitations.

3.1.9 U.S. Pacific Albacore Logbook and HMS Permits Compliance Check for 2008

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, which will be available to the public at: http://www.gc.noaa.gov/enforce-office3.html.

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 2008, 587 vessels made commercial landings of HMS species with HMS approved gear. Of those, 73 were identified as having made an HMS commercial landing while not possessing a valid NMFS Pacific HMS permit, for a permit compliance rate of 88 percent.

For the 2007 season, 91 commercial vessels were identified as not having possessed a valid HMS permit. The total number of vessels having made HMS landings was 714, resulting in a permit compliance rate of 87 percent.

Pacific HMS-permitted vessels, fishing for albacore with troll, baitboat, or hook & line gear, are further required to turn in logbooks to NMFS. Based on 2008 fish ticket landings data, albacore logbooks should have been submitted for 437 vessels. However, no logbooks were received at all for 80 vessels, while an additional 40 vessels only partially submitted their total required number of logbooks. The overall compliance rate in logbook submission for 2008 was 73 percent.

For 2007, 674 vessels were required to turn in logbooks. Of those, 225 failed to turn in any logbooks, while 323 vessels only partially submitted their total number of required logbooks. The overall logbook compliance rate for 2007 was 19 percent.

The Commercial Passenger Fishing Vessel (CPFV) portion of the 2008 compliance check identified 37 vessels as having caught HMS without having a valid permit in 2008. For 2007, there were 58 CPFVs identified as having caught HMS without a valid HMS permit. Of note, for both 2007 and 2008, the vessels identified were all based out of California.

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.

3.1.10 Changes in State HMS Regulations

Since implementation of the HMS FMP in 2004 an HMS-related change, described below, was made to Oregon sportfishing regulations.

Prior to 2003, tuna and miscellaneous species (which included sharks and billfish) were included in Oregon's 25 fish-in-aggregate bag limit along with flounder, surfperch, sole greenling, rockfish, and cabezon. In 2003, tuna, surfperch, and sanddab were put into one category with a 25 fish in aggregate

limit, and rockfish, greenling, flounder, sole, cabezon, and miscellaneous species were in a second category with a 10 fish in aggregate bag limit. In 2004, an "offshore pelagic species" category was created, which is defined as "all species of tuna and mackerel (family Scombridae), swordfish, all species of billfish (family Istiophoridae), all species of jacks (family Carangidae), opah, dorado, Pacific pomfret, and all species of sharks." This offshore pelagic species category has a bag limit of 25 in the aggregate. White shark and basking shark are prohibited and must be immediately released unharmed. The 2008 Oregon sport fishing pamphlet is available online at http://www.dfw.state.or.us/resources/fishing/.

Regulations for "offshore pelagic species" are on page 91 of the pamphlet.

There have been no changes to HMS state regulations in California or Oregon since 2006. Washington instituted a recreational license requirement for albacore effective June 7, 2006. Washington law requires a recreational license to fish for, take, or harvest fish, shellfish, and seaweed except for specific exemptions provided for in statute (*see* Wash. Rev. Code § 77.32.010). The Washington State Legislature removed albacore for the list of exempted species during its 2006 Regular Session (*see* Washington State Legislature, Senate Bill 6159.SL).

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 209 LOF was published December 1, 2008 (73 FR 73022). The drift gillnet fishery is listed as a category I fishery; the pelagic longline fishery and tuna purse seine fishery are both listed at category II fisheries. 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. 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/.

3.3 International Regulatory Aspects of the HMS FMP

Management of HMS fisheries is complicated by the wide-ranging behavior of the stocks and the many jurisdictions that are involved. The fish are distributed throughout the Pacific Ocean and vessels from the U.S. and many other nations harvest them. Effective management of the stocks throughout their ranges requires international cooperation. The HMS FMP and associated fisheries are affected by international regulations, primarily resolutions enacted by the Inter-American Tropical Tuna Commission (IATTC), but also by other regional fisheries management organizations (RFMOs) and treaties. These include the recently formed Western and Central Pacific Fisheries Commission (WCPFC) and the U.S.-Canada Albacore Treaty.

3.3.1 The Inter-American Tropical Tuna Commission

The Inter-American Tropical Tuna Commission (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 Chinese Taipei are Cooperating Non-Parties or Cooperating Fishing Entities.

The IATTC has a variety of responsibilities, including the scientific study of tunas and tuna-like species, recommending conservation and management measures, and implementing programs to reduce bycatch.

The Tuna Convention Act of 1950 provides limited Federal authority to regulate activities of U.S. fishing vessels in the EPO. Under this authority, NMFS promulgates regulations to implement recommendations of the IATTC that have been approved by the U.S. Department of State. The HMS FMP provides a mechanism that could be used to implement or supplement recommendations of the IATTC or other international fishery management bodies, particularly for U.S. fisheries based on the West Coast in domestic waters.

At the June 2009 IATTC Meeting the Resolution on a Multiannual Program for the Conservation of Tuna

in the Eastern Pacific Ocean in 2009-2011 (Resolution C-09-01) was adopted. The measure was initially adopted ad referendum to allow Columbia to have additional consultations with their government prior to adopting the measure; they adopted the measure and it entered into force on July 15, 2009. This measure implements time-area closures for the purse seine fishery and catch limits on bigeye tuna for the longline fishery in the EPO. Specifically, the resolution obligated IATTC Parties and cooperating non-Parties to prohibit fishing on skipjack, bigeye, and yellowfin tuna in the IATTC Convention Area by all purse seine vessels of greater than 182 metric tons carrying capacity during a closure period of 59 days in 2009, 62 days in 2010, and 73 days in 2011. Countries have two options for when to implement the respective closure period for each applicable year. Purse seine vessels of capacity class size 4 (between 182 and 272 metric tons carrying capacity) may make one single fishing trip of up to 30 days duration during the specified closure periods, provided that any such vessel carries an observer of the On-Board Observer Program of the Agreement on the International Dolphin Conservation Program (AIDCP). For 2009, the United States is proposing to implement the closure period from November 21, 2009, to January 18, 2010, for its purse seine fleet. In addition, the Resolution C-09-01 includes a closure for purse seine vessels in an area to the west of the Galapagos Islands (defined as the area between 96º and 110ºW longitude and 4ºN and 3ºS latitude) between 0000 hours on 29 September to 2400 hours on 29 October in each year. Beginning in 2010, all applicable purse seine vessels will also be required to first retain on board and then land all bigeye, skipjack, and yellowfin tuna caught, except fish considered unfit for human consumption for reasons other than size. A single exception of this will be the final set of a trip, when there may be insufficient well space remaining to accommodate all the tuna caught in that set. For the longline fleet, country-specific catch limits for bigeye tuna were adopted for China, Japan, Korea, and Chinese Taipei for the years of 2009-2011. Other IATTC Parties and cooperating non-Parties are limited to the greater of 500 metric tons or their respective catches of bigeye tuna in 2001. The U.S. catch of bigeye tuna in longline fisheries in the EPO for 2001 was only about 150 metric tons; therefore, the U.S. longline catch limit of bigeye tuna would be 500 metric tons in the EPO for 2009 and 2010. The bigeye tuna catch limit only applies to longline vessels over 24 meters in length.

3.3.1.1 An Update of IATTC Resolutions

Resolutions Adopted at the June 2009 IATTC Meeting

The only other resolution adopted at the June 2009 IATTC meeting dealt with budgetary considerations. Full texts of IATTC Resolutions may be accessed at http://www.iattc.org/ResolutionsENG.htm.

Other Items of Interest

IATTC and WCPFC Consultative Meeting on Data Sharing - This consultative meeting was postponed repeatedly. When this meeting finally met, no memorandum of understanding regarding data sharing was agreed to or solidified.

Clarification in the minutes on the definition "transshipping" in regards to transfer of live bluefin tuna – For the minutes the United States stated "Our understanding is that as used in Resolutions C-06-02, C-06-04, C-98-05, and C-98-10, the restrictions on transshipment at sea do not apply to the transfer of live bluefin tuna from the control of one purse seine vessel to the control of another vessel."

Other Discussions and Unresolved Issues

Seabirds - The U.S. delegation, in cooperation with the European Union, presented a proposal on mitigation measure to prevent/reduce sea bird bycatch in longline fisheries. The proposal was modeled after the technical specifications the WCPFC adopted last year. The proposal therefore included a

controversial mitigation technique referred to as the "light flier tori line," preferred by Japanese fishers and an important element of any measure if Japan was to join consensus. The proposal appeared to have general support and was briefly discussed in plenary where the delegation from Mexico voiced their opposition to the measure based on the area of application covering waters adjacent to Mexico. As it was the final day of the meeting and consensus was not going to be reached quickly, the Commission agreed to discuss the proposal again at a later date, and to review the operational matters in the IATTC's Bycatch Working Group.

IUU Vessel List - Prior to the start of the June 2008 IATTC meeting, the U.S. delegation circulated to all Members a proposal to revise the IATTC measure that establishes a list of vessels presumed to have engaged in illegal, unregulated and unreported (IUU) fishing activities. The current measure adopted by the Commission lacks 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 Parties submitted comments to further revise the proposal. There was significant concern about waters under jurisdictional disputes and whether or not vessels fishing in these areas would be considered IUU. The proposal was presented and initially discussed in an ad hoc working group but could not be called for a decision during the Commission meeting due to time constraints.

IATTC Resolution C-05-02 on Northern Albacore Tuna

The Resolution on Northern Albacore Tuna was agreed to at the June 2005 IATTC meeting in Lanzarote, Spain, and calls upon nations to not increase the total level of fishing effort for North Pacific albacore tuna in the EPO. Resolution C-05-02 on northern albacore tuna calls upon all Parties (CPCs) to take the necessary measures to ensure that the level of fishing effort by their vessels fishing for North Pacific albacore tuna is not increased. It also calls upon all CPCs to report all catches of North Pacific albacore, by gear type, to the IATTC every six months. In regards to compliance, Canada, Chinese Taipei, Japan, Korea, and the United States submitted the required catch reports for 2007. The United States and Chinese Taipei reported their catch for the entire North Pacific stock of albacore, whereas other CPCs reported catches from the EPO only. The IATTC reports that it is very difficult, if not impossible, to monitor compliance with this resolution because of the way that it is structured and given the requirement to limit effort without effort data being available whereas catch data are available. Another complicating factor is that the resolution calls for limiting effort to “current” levels, but to date “current” has not been defined. The IATTC Secretariat asked the Parties to include a definition of “current effort” for albacore tuna under resolution C-05-02 Northern Albacore Tuna. This request from the Secretariat was introduced during the Eighth Meeting of the Permanent Working Group on Compliance at which point the U.S. indicated it had begun formulating a definition; however, the task has proved to be complex. At the June 2008 IATTC 78th Meeting, on the agenda the IATTC Secretariat asked the Parties to include a definition of “current effort” for albacore tuna under resolution *C-05-02 Northern Albacore Tuna*. At the 78th Meeting of the IATTC, time ran out, this issue was not addressed on the agenda, and therefore no action was taken.

For up-to-date reporting compliance by nations Party to the IATTC under this Resolution, please refer to - http://www.iattc.org/CatcheReportNorthernAlbacoreENG.htm.

IATTC Resolution C-05-03 on the Conservation of Sharks Caught in Association with Fisheries in the Eastern Pacific Ocean

The Resolution on the Conservation of Sharks passed at the June 2005 meeting in Lanzarote, Spain, banning the practice of shark finning. The resolution mandates shark data collection and assessment

programs while encouraging research into shark nursery areas and ways to avoid incidental bycatch of sharks. The resolution, co-sponsored by the United States, the European Union, Japan, and Nicaragua, calls upon nations to implement National Plans of Action for Shark Conservation in accordance with the United Nations Food and Agricultural Organization 1999 International Plan of Action for Sharks.

Resolution C-05-03 on the conservation of sharks caught in association with fisheries in the EPO includes the following reporting requirements: "each CPC shall annually report data for catches, effort by gear type, landing and trade of sharks by species, where possible, in accordance with IATTC reporting procedures, including available historical data. CPCs shall send to the Director, by May 1, at the latest, a comprehensive annual report of the implementation of this Resolution during the previous year." At the 9th Meeting of the IATTC Permanent Working Group on Compliance held in June, 2008, the Compliance Committee reported that only the United States of America met the annual reporting requirement of this resolution.

3.3.2 Western and Central Pacific Fishery Commission

The international Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean entered into force on April 19, 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 western and central Pacific Ocean …." The United States signed the Convention in 2000 and ratified it in 2007, thereby becoming a member of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, now more commonly referred to as the Western and Central Pacific Fisheries Commission. There are 25 Members of the Commission. The U.S. territories of American Samoa and Guam and the Commonwealth of the Northern Mariana Islands also participate in the Commission as "Participating Territories".

The Convention and subsequent decisions of the Commission establish a number of monitoring, control and surveillance (MCS) schemes, including a regional observer program and electronic vessel monitoring system, maintenance of a list of vessels engaged in IUU fishing, and precedent-setting procedures that allow inspectors of Contracting Parties to board and inspect the fishing vessels of other Contracting Parties on the high seas in the Convention Area.

To date the Commission has adopted the following conservation and management measures:

- For bigeye and yellowfin tuna
    - limiting bigeye longline catches to specified levels
    - limiting purse seine effort to specified levels
    - prohibiting purse seine fishing on fish aggregating devices during certain months of the year
    - closing certain areas of high seas to purse seine fishing
    - requiring that 100 percent of tunas caught by purse seine vessels be retained
    - limiting fishing capacity in other fleets to recent levels)
- For North Pacific albacore
    - limiting fishing effort to recent levels
- For South Pacific albacore
    - limiting vessel numbers to recent levels
- For South Pacific swordfish
    - limiting vessel numbers and catches to recent levels
- For South Pacific striped marlin

    - limiting vessel numbers to recent levels
- For sharks
    - restricting finning practices
- For seabirds
    - requiring the use of mitigation methods on longline vessels
- For sea turtles
    - requiring the use of specific mitigation methods
- For gear
    - Prohibiting the use of large-scale driftnets on the high seas in the Convention Area.

Details on these measures and others can be found at the Commission's website: http://www.wcpfc.int.

The NMFS Pacific Islands Region Office (PIRO) is in the process of developing regulations to implement for U.S. fisheries the applicable provisions of the Convention, including its MCS schemes, and the conservation and management measures. Documentation and background information on the NMFS PIRO rulemaking efforts to date can be found at http://www.fpir.noaa.gov/IFD/ifd_documents_data.html

3.3.3 The U.S.-Canada Albacore Treaty

The U.S.-Canada Albacore Treaty is a 1981 agreement between the governments of Canada and the United States, amended in 2002, and codified by law in April 2004 (69 FR 23715). It allows U.S. vessels to fish for albacore in Canadian waters seaward of 12 miles from shore and Canadian vessels to fish for albacore in U.S. waters seaward of 12 miles from shore. The treaty also allows Canadian vessels to use certain U.S. ports to obtain supplies and services and to land fish, and it allows U.S. vessels to use certain Canadian ports for the same purposes. The treaty also calls for exchange of fisheries data between the governments of the two nations.

When the Treaty was amended in 2002, it had a default provision that if no agreement was reached to extend the arrangement or negotiate a new limit regime after 3 years, specific fishing limits would be triggered (i.e., 94 Canadian vessels allowed in U.S. waters for four months or 376 vessel months). This regime was first used for the 2007 fishing season and repeated again in 2008. Neither country reached the assigned limits during the 2008 season: approximately 35 U.S. vessels (compared to 20 in 2007) fished in Canadian waters using approximately 73 vessel months (approximately 22 in 2007). The Canadian fleet consisted of 116 vessels (compared to 110 in 2007) and used 359 vessel months (339 in 2007).

The Treaty allows Canadian albacore vessels to land their catch in the ports of Bellingham and Westport, Washington; Astoria, Coos Bay, and Newport, Oregon; Eureka, California. From 2004 to 2007, Canadian landing had continuously declined but this trend was reversed in 2008 with the second highest tonnage of 1359 mt landed since 1996 when 3100 mt were landed in 2003. In addition, the number of landings[6] of 122 more than tripled compared to 2007 when only 36 landings were made. Similarly, the number of boats offloading more than doubled in 2008 when 42 vessels made landings compared to 22 in 2007. The levels of both measures are reminiscent of the 2004 fishing season. The increase in landings may be attributed to better prices offered by U. S. processors and the high cost of fuel.

The United States hosted annual discussions between the two nations in December 2008, in Long Beach, California. Agreement was reached on new provisions for the 2009-2011 fishing regime. Beginning in 2009, access will be limited only by the number of vessels, that is, access limitations based on vessel

[6] Landing statistics are based on the number of fish tickets with the assumption that each ticket represents a single trip.

months will no longer be used. As a result, U.S. vessels will no longer be required to hail in and out with ShipCom, the company selected to accept hail-in, hail-out messages, before entering or leaving Canadian waters, which was required for tracking vessel months. The number of Canadian vessels fishing in U.S. waters during the new 3-year regime will be limited to 110 and the number of U.S. vessels fishing in Canada would be reflective of "historical levels." In addition, the Canadians will be allowed to fish in U.S. waters from June 15 through October 31.

3.4 Bycatch and Other Monitored Species

NMFS monitors catch and bycatch in HMS fisheries through onboard observer programs. During the 2008/2009 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. Observed catch and bycatch from the 2008/2009 fishing year are summarized below (Table 3-3). Data were collected at sea by contract observers and represent a total of 146 sets. Observer coverage was between 13 percent and 14 percent of total fishing effort. Previous summaries can be found at http://swr.nmfs.noaa.gov/psd/codgftac.htm.

Table 3-5. NMFS California/Oregon Drift Gillnet Observer Program observed catch, 2008–09 fishing season (May 1, 2008, through January 31, 2009).

Species	Total Caught	Number Kept	Number Returned			Number Damaged	Catch per 100 Sets
			Alive	Dead	Unknown		
Swordfish	491	483		8		74	336.3
Striped Marlin	9			9		5	6.2
Blue Marlin	1			1			0.7
Albacore	55	50		5		11	37.7
Bluefin Tuna	30	29		1		6	20.5
Skipjack Tuna	1	1				1	0.7
Yellowfin Tuna	3	2		1		1	2.1
Common Thresher Shark	160	144	6	10			109.6
Bigeye Thresher Shark	15	6		9			10.3
Pelagic Thresher Shark	1	1					0.7
Shortfin Mako Shark	108	105	2	1		3	74.0
Blue Shark	228		112	108	8	11	156.2
Smooth Hammerhead Shark	2			2			1.4
Scalloped Hammerhead Shark	1			1			0.7
Common Mola	1023		987	36		2	700.7
Louvar	8	6		2		5	5.5
Opah	143	127	2	14		46	97.9
Pacific Bonito	142	32	5	105		10	97.3
Pacific Mackerel	139	29	1	109			95.2
Pacific Pomfret	5	4		1			3.4
Pelagic Stingray	5		5				3.4
Bullet Mackerel	75	4		71		2	51.4
Pacific Sardine	5	5					3.4
Unidentified Fish	4		3	1		1	2.7
Humboldt Squid	1	1					0.7
Short-Beaked Common Dolphin	9			9			6.2
Risso's Dolphin	1			1			0.7
Pacific White-sided Dolphin	3			3			2.1
Northern Right Whale Dolphin	1			1			0.7
California Sea Lion	7			7			4.8

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, 2007–2008.

	2007			2008		
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	11,586	$21,664	$0.85	11,100	$28,795	$1.18
Yellowfin	104	$150	$0.65	65	$126	$0.88
Skipjack	5	$4	$0.36	3	$4	$0.60
Bigeye	13	$95	$3.31	27	$206	$3.46
Bluefin	45	$58	$0.58	1	$3	$1.36
Unspecified Tuna	<0.5	<$0.5	N.A.	1	$3	$1.36
Tunas subtotal	**11,753**	**$21,971**	**$0.85**	**11,197**	**$29,137**	**$1.18**
Swordfish	**550**	**$3,131**	**$2.58**	**531**	**$2,373**	**$2.03**
Sharks						
Common Thresher	204	$338	$0.75	147	$281	$0.87
Pelagic Thresher	2	$3	N.A.	<0.5	<0.5	N.A.
Bigeye Thresher	5	$4	$0.36	6	$5	$0.38
Shortfin Mako	45	$79	$0.80	35	$67	$0.87
Blue	10	$2	N.A.	<0.5	<0.5	N.A.
Sharks subtotal	**266**	**$426**	**$0.73**	**188**	**$353**	**$0.85**
Dorado	**2**	**$10**	**$2.27**	**2**	**$9**	**$2.04**
Total HMS	**12,571**	**$25,538**	**$0.92**	**11,918**	**$31,872**	**$1.21**

Interpretation: The total West Coast commercial HMS catch was 11.9 thousand mt in 2008, down 5 percent from 12.6 thousand mt in 2007. Tunas represented 94 percent of the total catch by weight in 2008. Albacore tuna catch was down 4 percent from the catch in the previous year, and was once again the largest component of tuna catch, representing about 99 percent of the total by weight. Yellowfin was the next largest component of tuna catch at 65 mt.

Swordfish was the category with the next largest share of landings behind tuna at 4 percent of the total weight. Swordfish landings by weight were down by 3 percent (19 mt) from 2007 to 2008. The common thresher shark comprised the largest component of commercial shark landings by weight in 2008. Total commercial shark landings by weight decreased by 29 percent (78 mt) from 2007 to 2008.

Total current dollar West Coast commercial HMS ex-vessel revenue of $31.9 million rose from $25.5 million in the previous year, for an increase of 25 percent ($6.3 million). Tunas comprised 91 percent of the 2008 revenue total. Albacore generated by far the most important component of revenue for any single species, at $28.8 million. Swordfish was the next highest contributor to total revenue at $2.4 million.

The average price for tuna was 39 percent higher in 2008 than in 2007. The overall average West Coast commercial HMS fish price increased from $0.92 in 2007 to $1.21 in 2008, or roughly 32 percent.

Source and Calculations: The data were extracted from PacFIN on July 29, 2009 (landings and revenues), and represent the latest two years of current dollar revenues and landings data 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 Highly Migratory Species landings, revenues, and average prices by fishery, 2007-2008.

	2007			2008		
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***	11,145	$20,678	$0.84	9,747	$24,827	$1.16
Drift gillnet	829	$3,231	$1.77	629	$2,220	$1.60
Harpoon	59	$599	$4.61	49	$460	$4.26
Pelagic longline	**	**	**	**	**	**
Purse seine	364	$344	$0.43	*	*	*
Total HMS	**12,397**	**$24,852**	**$0.91**	**10,425**	**$27,508**	**$1.20**

* 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).
*** Canadian vessels are excluded.

Interpretation: Table 4–2 shows that the total West Coast commercial HMS catch for the indicated fisheries was 10.4 thousand mt in 2008, down 16 percent (about 2 thousand metric tons) from 2007. The surface hook-and-line fishery represented 93 percent of the total catch.

Total current dollar West Coast commercial HMS ex-vessel revenue for these fisheries of $27.5 million increased from $24.9 million in the previous year, for a percentage increase of 10.7 percent ($2.6 million). The overall average West Coast commercial HMS fish price for these fisheries increased from $0.91 in 2007 to $1.20 in 2008 (32 percent).

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 4–20. 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.

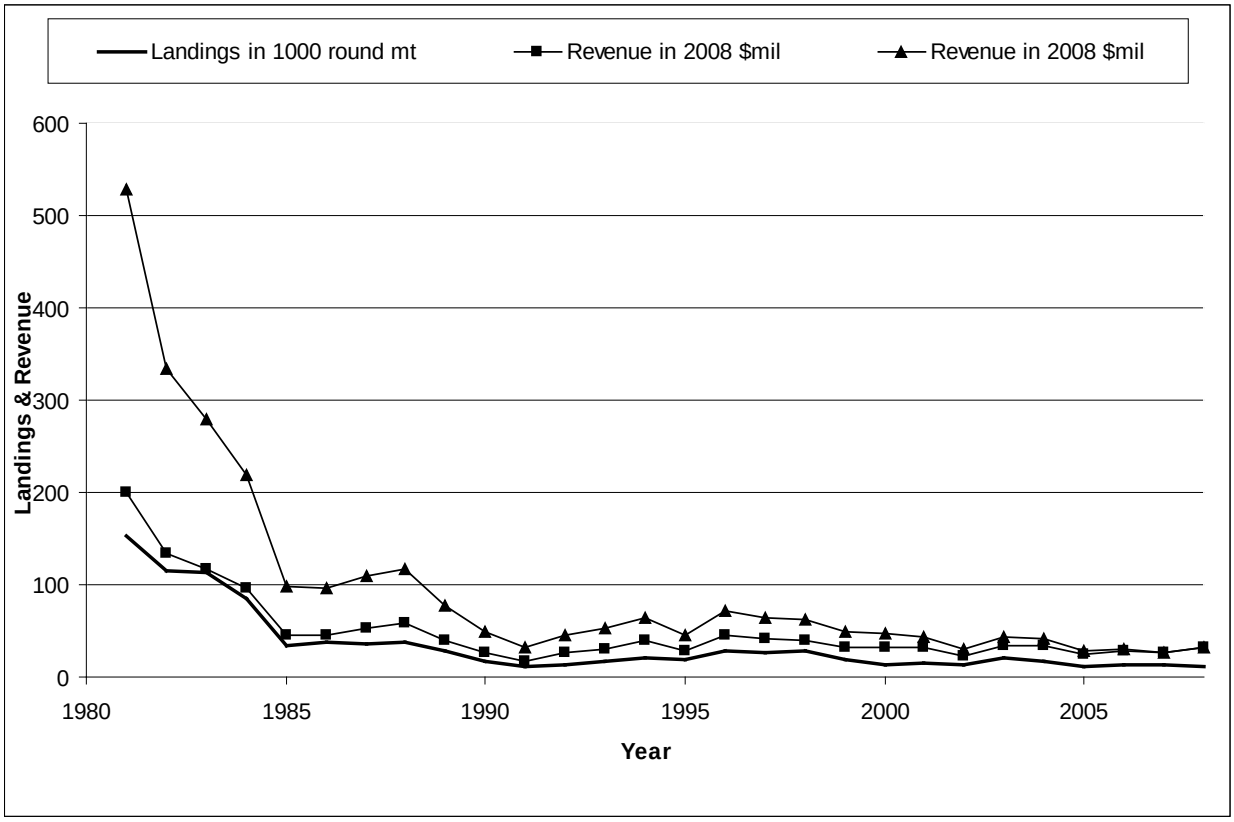

Figure 4–1. West Coast commercial HMS landings and revenues, 1981–2008.

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 2008 dollars from 1981 through 2008, 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 the graph 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 (2008) dollars fell from $528 million in 1981 to a level permanently below $200 million after 1984.

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 July 29, 2009 (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 2008 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, 1981–2008.

Year	Landings (1000 round mt)	Revenue ($mil.)	Revenue (2008 $mil.)
1981	152	$200	$528
1982	116	$134	$335
1983	114	$117	$280
1984	85	$96	$219
1985	34	$44	$98
1986	37	$45	$96
1987	36	$53	$109
1988	37	$59	$117
1989	28	$40	$76
1990	17	$27	$49
1991	11	$17	$31
1992	14	$26	$46
1993	17	$31	$52
1994	21	$39	$65
1995	19	$28	$45
1996	29	$46	$72
1997	26	$41	$63
1998	29	$40	$61
1999	18	$33	$49
2000	14	$33	$47
2001	15	$31	$43
2002	13	$22	$30
2003	20	$34	$44
2004	17	$33	$42
2005	11	$24	$28
2006	14	$27	$30
2007	13	$26	$27
2008	12	$32	$32

Table 4–4. West Coast commercial landings of HMS by all HMS and non-HMS gears, 1981–2008.

	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	55,482	44,591	21	764	55	1,761	1,331	9	96	217	7	1	113,913
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	3,252	468	3,418	1,190	<0.5	95	149	1	<0.5	33,883
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	11,194	655	58	53	196	1	2,195	373	2	2	46	2	16	14,793
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	12,788	77	48	35	1	1	540	160	<0.5	4	46	<0.5	3	13,703
2007	11,586	104	5	13	45	<0.5	550	204	2	5	45	10	2	12,571
2008	11,100	65	3	27	1	1	531	147	<0.5	6	35	<0.5	2	11,918

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 July 29, 2009.
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, 1981–2008.

	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	12,242,140	59,190,758	36,248,835	45,946	1,062,909	95,490	6,794,263	1,474,213	8,449	91,455	229,826	4,645	695	117,489,624
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	2,817,610	1,028,867	13,415,105	1,817,135	716	96,433	192,129	2,132	377	44,489,244
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	944,159	149	24,711	552,576	3,465	485	39,740,951
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	17,203,982	1,329,357	483,242	576,919	580,722	2,298	11,753,472	589,033	2,738	4,636	133,621	918	63,293	32,724,231
2001	20,716,101	465,558	33,633	320,855	473,557	3,069	8,696,689	595,548	2,767	8,428	75,799	1,822	19,397	31,413,223
2002	14,299,676	588,677	128,245	87,304	43,477	6,325	6,403,254	503,487	1,946		124,521	18,726	725	22,206,363
2003	24,477,280	451,273	159,961	262,768	76,106	21	7,851,693	487,796	2,814	3,779	115,728	832	10,370	33,900,421
2004	27,479,776	446,577	109,254	147,696	38,312	54,879	4,835,731	197,240	2,500	4,060	98,827	489	5,637	33,420,978
2005	20,957,923	315,699	292,193	60,141	136,847	913	1,899,245	271,767	588	6,234	57,788	426	1,290	24,001,054
2006	23,829,800	174,912	40,350	205,677	3,790	1,895	2,702,084	300,393	271	4,509	79,336	309	17,945	27,361,271
2007	21,663,546	149,568	4,361	94,734	58,106	46	3,131,178	337,770	2,903	4,334	78,569	1,984	10,092	25,537,191
2008	28,795,339	125,553	3,675	205,536	3,340	3,485	2,372,770	281,225	434	5,459	67,255	334	9,192	31,873,597

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 July 29, 2009.
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 (2008 $) from HMS landings by all HMS and non-HMS gears, 1981–2008.

	Revenues (2008 $)													
	Tunas							Sharks						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Dorado	Total
1981	70,225,431	261,377,496	175,618,294	4,156,088	3,280,396	192,464	8,882,737	3,906,894			429,832	156,378	7,416	528,233,426
1982	19,992,716	185,336,751	100,814,846	3,006,836	6,695,128	246,199	12,732,690	4,929,299		37,750	844,224	46,853	2,379	334,685,671
1983	29,175,740	141,064,724	86,389,024	109,499	2,533,148	227,575	16,192,237	3,513,377	20,137	217,958	547,726	11,070	1,656	280,003,871
1984	39,252,848	84,484,955	56,548,139	397,821	2,064,226	5,908,739	26,508,951	3,745,843	17,616	107,479	432,923	5,635	9,744	219,484,919
1985	18,213,856	32,264,679	4,652,252	38,860	6,188,470	2,259,757	29,464,321	3,991,072	1,573	211,800	421,984	4,682	827	97,714,133
1986	13,184,132	38,581,824	1,930,450	192,545	9,894,789	423,065	27,158,536	3,608,176	415	142,225	913,911	2,818	1,615	96,034,501
1987	10,512,161	57,151,838	9,074,860	361,838	4,217,716	918,882	22,787,905	2,427,410	3,772	45,352	1,466,048	3,799	732	108,972,313
1988	18,137,261	53,769,907	18,400,293	52,031	4,118,582	160,230	19,334,572	1,949,285	1,633	19,422	1,292,617	4,525	1,047	117,241,405
1989	7,280,025	40,046,620	7,586,335	4,644	2,445,611	244,846	15,883,085	1,815,691	287	47,520	1,062,646	6,664	934	76,424,908
1990	10,332,703	17,249,235	3,490,579	16,123	2,112,832	104,320	13,137,768	1,173,952	3,092	63,654	1,358,811	18,940	3,571	49,065,580
1991	5,039,146	7,132,289	4,804,327	76,393	207,658	37,761	11,317,561	1,728,903		44,930	740,841	1,595	2,083	31,133,487
1992	20,086,394	6,432,467	2,467,284	78,242	1,975,907	37,131	13,235,292	811,646	1,053	25,589	404,168	3,176	10,927	45,569,276
1993	19,968,524	8,231,025	5,603,923	361,068	1,284,345	124,067	15,284,955	782,712	788	48,123	377,947	1,061	72,078	52,140,616
1994	33,586,584	7,523,409	2,913,340	510,974	2,785,059	91,906	15,964,127	972,081	70	55,694	411,059	26,713	124,586	64,965,602
1995	18,747,130	4,932,238	7,699,078	419,127	1,713,831	8,320	10,642,234	774,179	14,218	40,331	267,642	4,529	8,876	45,271,733
1996	43,148,350	5,121,188	6,318,137	412,595	6,396,346	44,849	9,611,339	955,787	2,468	28,127	264,878	930	15,557	72,320,551
1997	30,995,832	7,764,671	8,563,358	559,708	4,315,036	34,062	9,563,950	919,832	97,224	54,088	353,806	508	16,892	63,238,967
1998	28,913,920	8,970,098	7,977,248	416,097	4,537,850	94,396	9,153,358	957,137	3,954	14,427	269,798	9,175	16,055	61,333,513
1999	26,417,811	2,182,561	4,085,339	976,841	1,577,572	90,043	12,554,970	918,227	27,388	8,734	165,183	109	71,138	49,075,916
2000	24,465,276	1,890,439	687,204	820,420	825,828	3,268	16,714,266	837,647	3,893	6,593	190,018	1,305	90,007	46,536,164
2001	28,637,132	643,570	46,493	443,537	654,627	4,242	12,021,964	823,263	3,825	11,651	104,782	2,519	26,814	43,424,419
2002	19,287,396	794,007	172,977	117,755	58,642	8,532	8,636,706	679,103	2,624		167,954	25,257	977	29,951,930
2003	31,726,870	584,930	207,338	340,594	98,647	27	10,177,178	632,270	3,647	4,899	150,004	1,079	13,442	43,940,925
2004	34,149,094	554,961	135,770	183,541	47,610	68,198	6,009,359	245,110	3,107	5,045	122,812	608	7,005	41,532,220
2005	24,457,840	368,420	340,989	70,185	159,700	1,065	2,216,414	317,151	686	7,275	67,439	497	1,505	28,009,166
2006	26,451,105	194,153	44,789	228,302	4,207	2,103	2,999,316	333,436	301	5,005	88,063	343	19,919	30,371,042
2007	22,875,973	157,939	4,605	100,036	61,358	48	3,306,418	356,674	3,065	4,576	82,966	2,095	10,657	26,966,410
2008	28,795,339	125,553	3,675	205,536	3,340	3,485	2,372,770	281,225	434	5,459	67,255	334	9,192	31,873,597

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 July 29, 2009.
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 2008.
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.

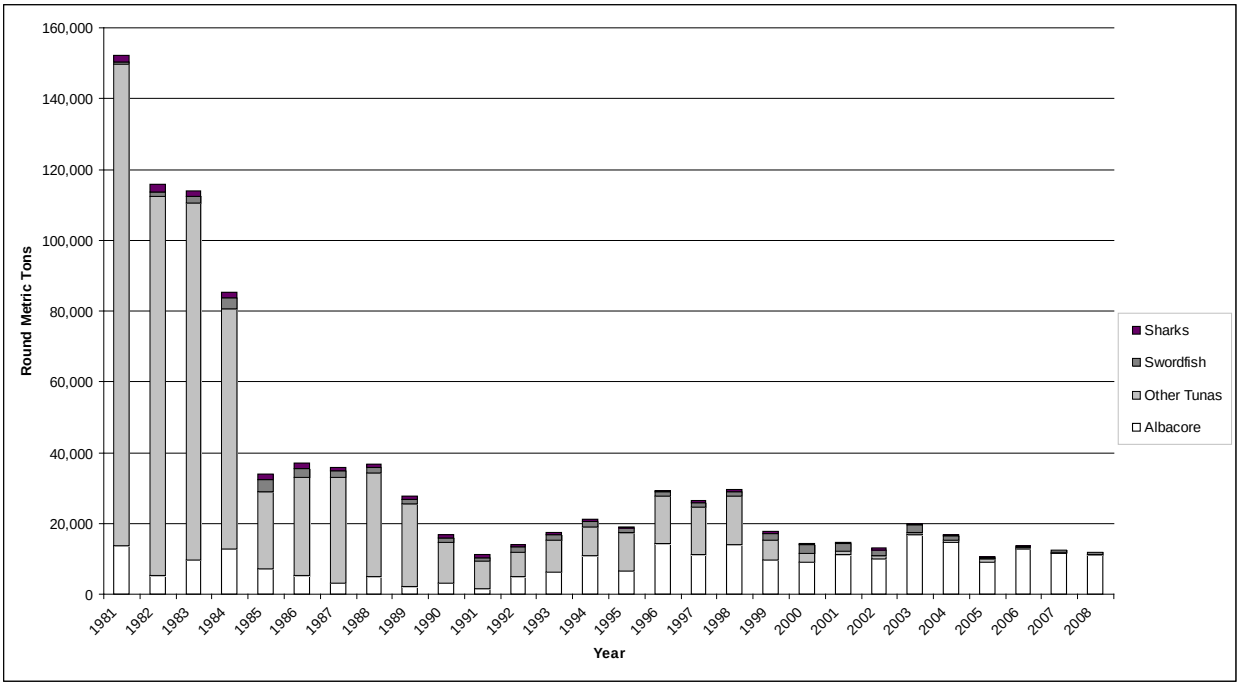

Figure 4–2. West Coast commercial landings of albacore, other tunas, swordfish, and sharks, 1981–2008.

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 2008. 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 the graph 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 July 29, 2009. They represent 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, 1981–2008.

	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	100,913	1,761	1,660	113,912
1984	12,654	68,089	2,890	1,507	85,140
1985	7,301	21,729	3,418	1,435	33,883
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	11,194	963	2,195	425	14,777
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	12,788	162	540	210	13,700
2007	11,586	167	550	266	12,569
2008	11,100	97	531	188	11,916

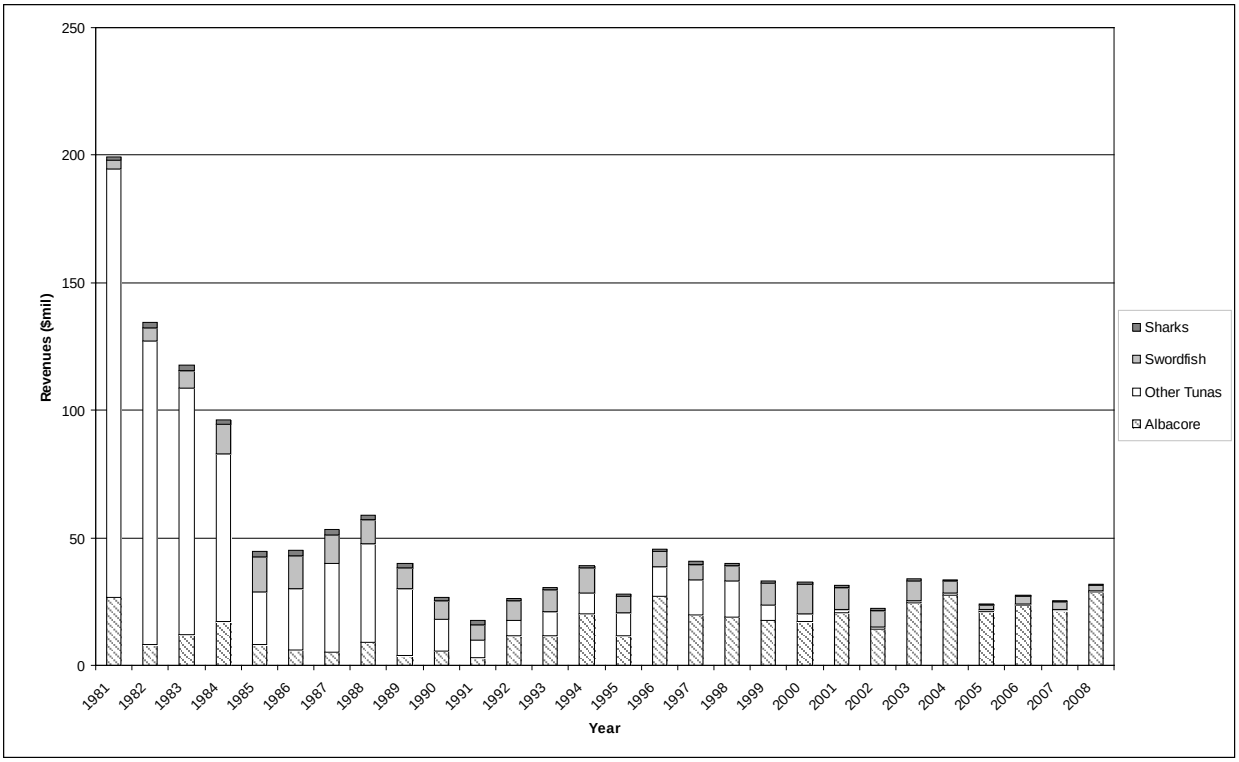

Figure 4–3. West Coast commercial revenues for albacore, other tunas, swordfish, and sharks, 1981–2008.

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 4–26 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 2008.

Source and Calculations: The data were extracted from PacFIN on July 29, 2009. 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, 1981–2008.

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	12,242,140	96,643,938	6,794,263	1,808,588	117,488,929
1984	17,208,448	65,498,660	11,621,524	1,889,284	96,217,916
1985	8,292,769	20,672,448	13,415,105	2,108,545	44,488,867
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	1,525,060	39,740,466
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	17,203,982	2,972,538	11,753,472	730,946	32,660,938
2001	20,716,101	1,296,672	8,696,689	684,364	31,393,826
2002	14,299,676	854,028	6,403,254	648,680	22,205,638
2003	24,477,280	950,129	7,851,693	610,949	33,890,051
2004	27,479,776	796,718	4,835,731	303,116	33,415,341
2005	20,957,923	805,793	1,899,245	336,803	23,999,764
2006	23,829,800	426,624	2,702,084	384,818	27,343,326
2007	21,663,546	306,815	3,131,178	425,560	25,527,099
2008	28,795,339	341,589	2,372,770	354,707	31,864,405

Table 4–9. Commercial landings (round mt) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2008.

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	10,223	10	<0.5	1	<0.5	3	<0.5	9	6	10,252
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	12,376	1		<0.5	<0.5	<0.5	<0.5	<0.5	1	12,378
2007	11,143	<0.5			<0.5	<0.5	<0.5	1	1	11,145
2008	9,738	6	<0.5		<0.5	<0.5	<0.5	<0.5	3	9,747

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 14, 2009.

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, 1981–2008.

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	11,018	10	<0.5	1	<0.5	3	<0.5	9	6	11,047
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	12,774	1		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12,775
2007	11,500	<0.5			<0.5	<0.5	<0.5	1	1	11,502
2008	11,097	6	<0.5		<0.5	<0.5	<0.5	<0.5	3	11,106

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 14, 2009.
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, 1981–2008.

		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	242	150		17	38		6	3	1	1	6		<0.5	7	20	491
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	93	1,170
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	109	1,303
1998	906	281	2	9	81	1	63	1	4	36	4	<0.5	2	2	151	1,543
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	99	<0.5	4	35		3	<0.5		1	3	<0.5	1	2	106	697
2007	478	167	2	4	33	<0.5	3	<0.5		2	<0.5		2	<0.5	138	829
2008	372	107		6	24		1	<0.5		<0.5	<0.5	<0.5	3	4	112	629

* 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 August 6, 2009.
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.
Reported 2008 swordfish landings are less than totals shown in Tables 2-6 and 2-7 due to the exclusion of 33.6 mt of California swordfish landings coded in PacFIN as GLN (set gill net).

Table 4–12. Commercial landings (round mt) in the West Coast harpoon fishery, 1981–2008.

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	71	3				<0.5	74
2007	59	<0.5					59
2008	48	1					49

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 12, 2009.
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 longline fishery, 1981–2008.

		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	<0.5				19	72	25	1					2	<0.5	1	120
1982	<0.5	1			6	18	42		1			<0.5	<0.5	<0.5	2	70
1983	<0.5	<0.5			1	2	6	2	1		<0.5	<0.5	<0.5	<0.5	7	19
1984	12	3		<0.5	2		2	<0.5	<0.5	1	<0.5	3	2	<0.5	5	30
1985	<0.5	1			<0.5	<0.5	<0.5						10		1	12
1986		2			1	<0.5							6	<0.5	4	13
1987		<0.5			3	<0.5	<0.5						40		3	46
1988	<0.5	1			152	1				<0.5			25	<0.5	6	185
1989					5	1							<0.5			5
1990		<0.5			15	4	<0.5				1		<0.5	<0.5	<0.5	20
1991	27	<0.5			23	<0.5	<0.5	<0.5	2	<0.5	<0.5	<0.5	3		23	78
1992	63	2		<0.5	2	<0.5	1			<0.5	<0.5		21	<0.5	2	91
1993	27	<0.5			1	<0.5	<0.5	2	3	<0.5		1	1	1	2	38
1994	722	19		3	20	12	49	4	40	6	5	32	4	<0.5	16	932
1995	271	11		1	7	5	4	5	48	4		5	8	2	5	376
1996	346	2			5	<0.5	3	4	59	3	2	9	6	<0.5	5	444
1997	663	4		2	3	<0.5	6	2	77	2	2	1	32	<0.5	2	796
1998	418	3			4	<0.5	9	2	48	38	9	1	9	1	24	566
1999	1,325	5			7		66	4	103	44	11	17	1		3	1,586
2000	1,873	5	<0.5	<0.5	7	<0.5	23	<0.5	83	16		41	12		10	2,070
2001	1,749	20		1	7	2	22	16	52	5	<0.5	15	7	<0.5	54	1,950
2002	1,331	2			3	41	1	2	10	1		<0.5	12	<0.5	1	1,404
2003	1,810	<0.5			3		2	<0.5	29	<0.5	<0.5	1	4		4	1,853
2004	898	1		<0.5	2		2	<0.5	22		9	1	13	<0.5	3	951
2005	**	**			**		**	**	**		**	**	**		**	**
2006	**	**			**		**	**	**	**	**	**	**	**	**	**
2007	**	**		**	**		**	**	**	**	**	**	**	**	**	**
2008	**	**			**		**	**	**		**	**	**		**	**

** 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 August 13, 2009.
Additional processing info:
Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline 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. Commercial landings (round mt) in the West Coast purse seine fishery, 1981–2008.

	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	51,960	41,787		754	12	1	<0.5			25	<0.5	94,550
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	*	*	*								*		*

* 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 August 11, 2009.
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 4–15. Nominal commercial ex-vessel revenues ($) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2008.

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	15,359,743	4,497	97,814	252	298	1,889	522	9,445	5,233	15,479,693
2001	18,779,553	27,752	2,037	2,210	544	7,801	178	33,018	12,398	18,865,491
2002	13,211,127	6,838	9,996	664	170	915	1,241	21,884	7,984	13,260,819
2003	19,667,255	11,045		62	567	2,764	558	14,013	5,747	19,702,011
2004	24,389,902	2,513		520	655	1,834	1,241	22,741	3,332	24,422,738
2005	18,641,996	1,437		181		1,587		12,332	3,318	18,660,851
2006	22,837,820	1,575		252	167	985	124	3,480	991	22,845,394
2007	20,669,326	1,222			223	1,942	82	3,958	1,420	20,678,173
2008	24,760,637	49,130	1,200		479	1,308	3,193	4,877	6,629	24,827,453

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 August 14, 2009.

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 4–16. Nominal commercial ex-vessel revenues ($) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2008.

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	17,056,182	4,497	97,814	252	298	1,889	522	9,445	5,233	17,176,132
2001	20,442,146	27,752	2,037	2,210	544	7,801	178	33,018	12,398	20,528,084
2002	14,253,046	6,838	9,996	664	170	915	1,241	21,884	7,984	14,302,738
2003	24,427,159	11,045		62	567	2,764	558	14,085	5,747	24,461,987
2004	27,441,311	2,513		520	655	1,834	1,241	22,741	3,331	27,474,146
2005	20,897,418	1,437		181		1,587		12,332	3,319	20,916,274
2006	23,736,913	1,575		252	167	985	124	3,480	992	23,744,488
2007	21,494,041	1,222			223	1,942	82	3,958	1,421	21,502,889
2008	28,760,922	49,130	1,200		479	1,308	3,193	4,877	6,629	28,827,738

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 14, 2009.

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 4–17. Nominal commercial ex-vessel revenues ($) for the West Coast drift gillnet fishery, 1981–2008.

		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	952,577	166,931		25,634	37,715		11,115	6,611	1,469	1,404	8,749		714	5,677	20,152	1,238,748
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	128,789	7	91,871	1,004	2,332	119,757	9,234	40	5,531	851	155,818	5,568,514
1995	4,190,568	347,696	8,681	22,921	131,822	105	49,903	2,423	2,794	72,431	9,663	13	1,961	1,654	137,014	4,979,649
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	438,184	61,815	24,976	192,721	6	69,147	11,359	18,445	227,816	2,196	494	2,268	3,506	143,234	4,362,262
1998	3,967,255	484,999	2,440	7,744	139,393	4,810	76,514	3,765	19,454	178,318	7,335	2,457	3,411	1,761	212,564	5,112,220
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	287,592	2,143	2,999	86,543	164	66,123	943	17,921	103,172	732	545	1,298	2,253	139,054	3,461,944
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	184,337	218	3,828	56,998		4,079	1,755		2,959	2,970	87	1,346	1,951	292,126	2,549,184
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	1,587,128	192,482		5,250	44,228		1,479	858		1,000	43	52	3,104	3,096	381,654	2,220,374

* 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 August 7, 2009.

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.

Reported 2008 swordfish revenues are less than the total shown in Table 2-7 due to the exclusion of 33.6 mt of California swordfish landings coded in PacFIN as GLN (set gill net).

Table 4–18. Nominal commercial ex-vessel revenues ($) for the West Coast harpoon fishery, 1981–2008.

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	636,273	5,013				709	641,995
2007	597,707	1,305					599,012
2008	458,482	1,436					459,918

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 12, 2009.
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 4–19. Nominal commercial ex-vessel revenues ($) for the West Coast longline fishery, 1981–2008.

		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	1,544				16,874	47,633	48,207	1,270					2,579	114	1,155	119,376
1982	306	1,422			5,442	12,083	73,415		1,957			314	24	21	231	95,215
1983	506	44			878	435	11,969	4,580	2,038		1,239	13	204	35	2,882	24,823
1984	62,804	3,979		334	3,325		2,831	1,533	1,872	3,625	537	2,693	1,855	3	5,252	90,643
1985	752	1,923			25	88	740						8,727		163	12,418
1986		3,843			1,634	104							5,549	33	10,317	21,480
1987		286			6,950	396	164						72,173		5,921	85,890
1988	1,601	2,322			321,911	542				395			44,957	25	5,539	377,292
1989					11,692	445							30			12,167
1990		534			31,154	2,330	45				4,018		194	5	196	38,476
1991	146,305	199			44,731	355	528	345	12,198	1,679	2,504	36	4,576		76,649	290,105
1992	298,852	3,302		365	3,348	184	1,790			5,191	13		29,917	2	2,760	345,724
1993	153,383	63			1,350	20	545	10,047	22,551	4,482		1,937	4,110	951	2,993	202,432
1994	3,401,896	14,328		3,532	31,969	15,812	81,097	23,125	243,157	54,001	19,126	57,737	11,850	120	18,662	3,976,412
1995	1,064,427	17,409		360	6,685	2,318	5,351	25,720	255,427	30,058		5,365	17,114	7,223	7,224	1,444,681
1996	1,319,868	4,255			6,349	44	3,702	12,414	247,126	25,364	25,850	9,077	12,759	88	5,709	1,672,605
1997	2,115,438	8,211		7,342	3,992	6	10,507	9,848	332,874	10,264	14,018	2,707	110,693	140	2,819	2,628,859
1998	1,454,529	5,286			9,372	116	21,315	5,870	247,283	233,639	53,410	3,995	24,087	1,010	62,470	2,122,382
1999	4,893,372	7,067			11,204		133,630	17,355	603,992	510,766	56,655	44,608	2,317		6,667	6,287,633
2000	8,028,596	8,318	404	655	9,751	105	38,081	551	550,115	125,444		53,566	52,268		13,924	8,881,778
2001	6,527,196	20,572		7,380	9,680	1,466	39,876	39,410	318,716	32,897	1,125	17,425	14,344	997	69,995	7,101,079
2002	4,190,669	3,024			5,068	18,256	1,882	9,169	87,304	4,694		555	43,730	24	9,071	4,373,446
2003	5,879,612	621			5,415		3,685	290	225,967	822	4	1,556	12,944		10,294	6,141,210
2004	3,160,052	2,315		65	4,816		4,363	1,226	147,696		53,958	3,224	53,520	360	7,078	3,438,673
2005	**	**			**		**	**	**		**	**	**		**	**
2006	**	**			**		**	**	**	**	**	**	**	**	**	**
2007	**	**		**	**		**	**	**	**	**	**	**	**	**	**
2008	**	**			**		**	**	**		**	**	**		**	**

** 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 August 13, 2009.

Additional processing info:

Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline 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 4–20. Nominal commercial ex-vessel revenues ($) for the West Coast purse seine fishery, 1981–2008.

	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	55,696,219	33,973,771		1,042,089	24,989	1,796	261			6,638	586	90,761,698
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	16,462	442,370	152,188		14,874								625,893
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	*	*	*								*		*

* 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 August 11, 2009.

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 4–21. Real commercial ex-vessel revenues (2008 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	69,069,999	47,610		458	190	6,639	2,625	352,599	3,726	69,483,846
1982	18,292,140	13,688	32,900	6,895	1,386	14,127	31	34,430	1,334	18,396,931
1983	28,311,564	34,761	17,947	3,807	79	48,401	36,927	85,975	9,246	28,548,707
1984	27,707,292	45,742	219,474	13,868	1,611	15,846	2,116	14,650	9,758	28,030,357
1985	17,559,653	9,395	67,914	15,413	14	14,021	526	23,726	5,072	17,695,734
1986	12,522,042	15,467	13,715	384		40,654	342	20,169	1,406	12,614,179
1987	9,615,907	2,357	68,285	7,052		4,725	1,346	14,018	899	9,714,589
1988	17,002,651	1,893	191,627	7,094		1,524	1,220	22,603	1,071	17,229,683
1989	7,100,307	3,526	66,455	21,721	59	34,830	2	15,970	4,815	7,247,685
1990	9,954,034	145	24,507	1,029	136	11,329	157	5,132	2,812	9,999,281
1991	4,926,328	126	20,916	1,074		338		6,209	1,932	4,956,923
1992	19,378,315	3,840	96,994	4,130	492	10,747		10,706	1,171	19,506,395
1993	18,576,443	262,984	755,696	13,643	39,631	8,522		17,728	3,083	19,677,730
1994	33,166,051	1,003	11,308	502	299	982		894	573	33,181,612
1995	18,402,539	1,481	5,190	279	34	246	26	36,109	4,908	18,450,812
1996	40,398,796	61,177	4,133	467		697		42,042	1,581	40,508,893
1997	29,704,210	23,257	6,830	2,532	577	18,592	139	58,552	5,794	29,820,483
1998	26,784,570	211,382	26,200	7,679	803	7,327	427	25,003	8,055	27,071,446
1999	23,991,411	171,619	115,800	3,899	2,101	6,462	676	14,483	11,458	24,317,909
2000	21,842,638	6,395	139,098	358	424	2,687	742	13,431	7,442	22,013,215
2001	25,960,122	38,363	2,815	3,055	751	10,784	246	45,643	17,141	26,078,920
2002	17,819,162	9,223	13,483	895	229	1,235	1,674	29,517	10,769	17,886,187
2003	25,492,229	14,316		80	735	3,583	723	18,164	7,449	25,537,279
2004	30,309,310	3,123		646	814	2,279	1,542	28,260	4,141	30,350,115
2005	21,755,159	1,677		211		1,852		14,391	3,873	21,777,163
2006	25,350,005	1,748		280	185	1,093	138	3,863	1,101	25,358,413
2007	21,826,109	1,290			236	2,051	87	4,180	1,499	21,835,452
2008	24,760,637	49,130	1,200		479	1,308	3,193	4,877	6,629	24,827,453

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 August 14, 2009.
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 2008.
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 4–22. Real commercial ex-vessel revenues (2008 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	69,069,999	47,610		458	190	6,639	2,625	352,599	3,726	69,483,846
1982	18,329,118	13,688	32,900	6,895	1,386	14,127	31	34,430	1,334	18,433,909
1983	28,402,245	34,761	17,947	3,807	79	48,401	36,927	85,975	9,246	28,639,388
1984	27,714,783	45,742	219,474	13,868	1,611	15,846	2,116	14,650	9,757	28,037,847
1985	17,559,653	9,395	67,914	15,413	14	14,021	526	23,726	5,072	17,695,734
1986	12,522,042	15,467	13,715	384		40,654	342	20,169	1,406	12,614,179
1987	9,615,907	2,357	68,285	7,052		4,725	1,346	14,018	899	9,714,589
1988	17,008,321	1,893	191,627	7,094		1,524	1,220	22,603	1,070	17,235,352
1989	7,100,307	3,526	66,455	21,721	59	34,830	2	15,970	4,815	7,247,685
1990	9,954,034	145	24,507	1,029	136	11,329	157	5,132	2,812	9,999,281
1991	4,926,328	126	20,916	1,074		338		6,209	1,932	4,956,923
1992	19,623,253	3,840	96,994	4,130	492	10,747		10,706	1,171	19,751,333
1993	18,647,231	262,984	755,696	13,643	39,631	8,522		17,728	3,083	19,748,518
1994	33,235,289	1,003	11,308	502	299	982		894	574	33,250,851
1995	18,599,189	1,481	5,190	279	34	246	26	36,109	4,907	18,647,461
1996	42,922,839	61,177	4,133	467		697		42,042	1,580	43,032,935
1997	30,820,128	23,376	6,830	2,532	752	18,592	139	58,552	5,795	30,936,696
1998	28,468,445	211,382	26,200	7,679	803	7,327	427	25,003	8,055	28,755,321
1999	25,869,922	171,619	115,800	3,899	2,101	6,462	676	14,483	11,457	26,196,419
2000	24,255,094	6,395	139,098	358	424	2,687	742	13,431	7,443	24,425,672
2001	28,258,427	38,363	2,815	3,055	751	10,784	246	45,643	17,140	28,377,224
2002	19,224,502	9,223	13,483	895	229	1,235	1,674	29,517	10,768	19,291,526
2003	31,661,905	14,316		80	735	3,583	723	18,256	7,449	31,707,047
2004	34,101,293	3,123		646	814	2,279	1,542	28,260	4,141	34,142,098
2005	24,387,231	1,677		211		1,852		14,391	3,873	24,409,235
2006	26,348,000	1,748		280	185	1,093	138	3,863	1,101	26,356,408
2007	22,696,981	1,290			236	2,051	87	4,180	1,499	22,706,324
2008	28,760,922	49,130	1,200		479	1,308	3,193	4,877	6,629	28,827,738

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 14, 2009.

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 2008.

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 (2008 $) for the West Coast drift gillnet fishery, 1981–2008.

		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	2,939,678	2,028,555			207,938	13,528		6,914	3,765	2,061	19,536		17,393	11,699	381,747	5,632,814
1982	2,489,218	1,680,657		17,016	289,988	1,625	18,244	6,108	4,854	757	32,708		14,485	2,250	49,148	4,607,058
1983	2,270,203	397,833		61,091	89,882		26,489	15,756	3,501	3,345	20,850		1,700	13,530	48,032	2,952,212
1984	2,501,299	329,356		5,536	31,108		34,767	7,848	1,531	3,295	1,063		19,184	669	21,630	2,957,286
1985	1,743,036	397,860		5,394	42,014		16,250	1,311		185	505		2,528	278	26,920	2,236,281
1986	804,637	1,437,389		5,881	63,229		18,764	6,303	512	3,380			664	138	22,549	2,363,446
1987	76,205	328,973	213	3,381	7,209		3,506			168			9,824	251	10,746	440,476
1988	6,612	268,398					14,107						884		279	290,280
1989		*														*
1990																
1991	645,207	21,218		3,299	5,777		1,518	964		444	742				1,264	680,433
1992	421,762	4,807		130	13,545		1,889	1,756	472	2,162	86			542	6,120	453,271
1993	1,567,827	42,823	201	8,912	36,386		40,836			37,948	2,187		1,739		18,696	1,757,555
1994	7,547,255	814,123	70	45,273	214,256	11	152,838	1,670	3,880	199,229	15,362	66	9,201	1,416	259,223	9,263,873
1995	6,788,544	563,252	14,063	37,131	213,546	170	80,841	3,926	4,526	117,335	15,654	21	3,176	2,679	221,958	8,066,822
1996	6,212,128	710,500	2,468	26,632	220,316	88	168,291	3,793	1,974	185,963	4,640		1,718	4,053	326,504	7,869,068
1997	4,925,474	681,680	96,165	38,854	299,815	9	107,572	17,672	28,695	354,412	3,417	768	3,528	5,455	222,827	6,786,343
1998	6,070,781	742,157	3,733	11,850	213,303	7,360	117,084	5,761	29,769	272,867	11,224	3,759	5,219	2,694	325,269	7,822,830
1999	4,140,328	412,130	20,371	5,795	120,098	29	151,563	1,351	14,716	114,272	2,460		1,939	181	280,364	5,265,597
2000	3,911,350	408,976	3,047	4,265	123,070	233	94,032	1,340	25,485	146,718	1,041	774	1,846	3,203	197,748	4,923,128
2001	2,130,428	621,903	643	555	59,035		97,774	5,584	930	46,263	713		1,760	551	149,196	3,115,335
2002	2,022,070	496,918	2,327		117,091		26,326	2,046		13,032	119		3,276	1,123	268,752	2,953,080
2003	1,338,686	506,622	3,469	4,637	105,835	14	17,455	670	47,203	34,110	4,956		1,069	361	173,580	2,238,667
2004	1,173,347	138,463	282	4,716	50,708		29,066	866		38,616	179		2,515	479	149,169	1,588,406
2005	1,382,361	262,893		7,112	35,033		20,795	4,887		19,241	122	105	1,379	10	231,307	1,965,245
2006	2,216,151	204,615	241	4,249	63,267		4,528	1,948		3,284	3,297	97	1,494	2,165	324,261	2,829,597
2007	2,607,432	274,395	3,030	3,968	56,826	166	7,528	108		12,251	83		2,480	368	443,036	3,411,671
2008	1,587,128	192,482		5,250	44,228		1,479	858		1,000	43	52	3,104	3,096	381,654	2,220,374

* 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 August 7, 2009.

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 2008.

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 4–24. Real commercial ex-vessel revenues (2008 $) for the West Coast harpoon fishery, 1981–2008.

Year	Swordfish	HMS Sharks	Tunas		Dorado	Other	Total
			Albacore	Other			
1981	3,631,575	27,017	10,463	1,020		31,846	3,701,921
1982	2,090,308	4,947		364		3,070	2,098,689
1983	757,969	4,675				23,242	785,886
1984	1,330,016	19,327	753	342		4,620	1,355,058
1985	2,813,513	3,781	495	543		3,844	2,822,176
1986	3,833,284	5,192	113	719		2,567	3,841,875
1987	3,377,839	10,359	8,508	4,255		173,368	3,574,329
1988	2,939,845	12,789	17,012			1,754	2,971,400
1989	962,376	2,937	4,050	125		2,413	971,901
1990	991,401	10,788		198		1,491	1,003,878
1991	321,108	3,613				126	324,847
1992	1,026,308	10,716	2,162	233		2,335	1,041,754
1993	1,933,700	3,227	13,195			1,708	1,951,830
1994	2,117,928	2,683	4,142			4,806	2,129,559
1995	1,231,343	6,607				2,838	1,240,788
1996	1,003,372	5,099	342			1,034	1,009,847
1997	1,062,867	8,661	310		140	1,051	1,073,029
1998	616,549	2,452				1,172	620,173
1999	905,281	1,206				8,696	915,183
2000	1,067,311	1,134	429			11,919	1,080,793
2001	647,344	1,592			69	3,800	652,805
2002	915,746	1,698				1,539	918,983
2003	1,087,748	729				2,291	1,090,768
2004	832,609	3,053				2,043	837,705
2005	828,289	1,434				2,241	831,964
2006	706,264	5,564				787	712,615
2007	631,159	1,378					632,537
2008	458,482	1,436					459,918

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 12, 2009.
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 2008.
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 4–25. Real commercial ex-vessel revenues (2008 $) for the West Coast longline fishery, 1981–2008.

		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	4,087				44,677	126,114	127,633	3,362					6,827	302	3,058	316,060
1982	762	3,540			13,543	30,072	182,715		4,870			780	59	51	580	236,972
1983	1,205	105			2,092	1,036	28,524	10,914	4,857		2,953	30	486	84	6,872	59,158
1984	143,256	9,077		763	7,584		6,458	3,497	4,270	8,269	1,224	6,142	4,231	6	11,981	206,758
1985	1,651	4,222			54	194	1,625						19,168		360	27,274
1986		8,202			3,487	222							11,841	71	22,015	45,838
1987		587			14,247	812	336						147,956		12,138	176,076
1988	3,185	4,618			640,365	1,078				786			89,432	49	11,017	750,530
1989					22,484	856							58			23,398
1990		982			57,269	4,282	83				7,386		357	9	361	70,729
1991	261,072	355			79,820	634	941	616	21,767	2,996	4,467	64	8,166		136,777	517,675
1992	522,743	5,775		639	5,856	321	3,132			9,080	22		52,331	4	4,826	604,729
1993	261,835	108			2,305	34	931	17,151	38,495	7,652		3,306	7,015	1,624	5,109	345,565
1994	5,659,451	23,836		5,876	53,184	26,305	134,914	38,471	404,520	89,837	31,818	96,052	19,714	200	31,048	6,615,226
1995	1,724,326	28,201		583	10,830	3,756	8,669	41,666	413,781	48,692		8,691	27,724	11,700	11,703	2,340,322
1996	2,092,039	6,744			10,064	69	5,868	19,676	391,705	40,203	40,972	14,387	20,224	139	9,051	2,651,141
1997	3,290,974	12,774		11,422	6,210	9	16,346	15,320	517,850	15,968	21,808	4,211	172,205	218	4,385	4,089,700
1998	2,225,752	8,089			14,342	178	32,617	8,982	378,398	357,520	81,729	6,113	36,859	1,546	95,590	3,247,715
1999	7,274,226	10,505			16,656		198,648	25,799	897,862	759,278	84,220	66,311	3,444		9,912	9,346,861
2000	11,417,230	11,828	575	931	13,867	149	54,154	784	782,303	178,390		76,175	74,328		19,801	12,630,515
2001	9,022,942	28,438		10,202	13,381	2,027	55,123	54,479	440,581	45,476	1,555	24,088	19,828	1,378	96,757	9,816,255
2002	5,652,372	4,078			6,836	24,623	2,539	12,366	117,755	6,331		749	58,983	32	12,239	5,898,903
2003	7,621,013	805			7,018		4,776	376	292,893	1,065	5	2,017	16,778		13,344	7,960,090
2004	3,926,994	2,877		80	5,984		5,422	1,524	183,541		67,053	4,006	66,510	447	8,798	4,273,236
2005	**	**			**		**	**	**		**	**	**		**	**
2006	**	**			**		**	**	**	**	**	**	**	**	**	**
2007	**	**		**	**		**	**	**	**	**	**	**	**	**	**
2008	**	**			**		**	**	**		**	**	**		**	**

** 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 August 13, 2009.

Additional processing info:

Only fish tickets where at least 1 lb of any highly migratory species (except striped marlin) was landed for the longline 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 2008.

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 4–26. Real commercial ex-vessel revenues (2008 $) for the West Coast purse seine fishery, 1981–2008.

	Tunas						Sword-	HMS		Ground-	Coastal		
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	Sharks	Dorado	fish	Pelagics	Other	Total
1981	960,118	257,853,175	164,995,328	4,110,525	3,230,035	144,673					315,142	3,852	431,612,848
1982	1,432,893	182,194,072	96,620,851	2,978,656	6,670,982	134,494					12,829		290,044,777
1983	36,580	132,736,460	80,967,043		2,483,530	59,553	4,279	621			15,820	1,401	216,305,287
1984	10,999,686	80,984,428	54,155,977	326,793	2,002,808	5,887,178	198,670	1,484			137,130	13,810	154,707,964
1985	63,591	31,170,525	3,762,613	1,778	6,144,457	2,253,513	15,550	1,010			110,236	2,101	43,525,374
1986	137,903	37,677,615	1,374,104	28,457	9,765,073	389,617	389,684	5,537			17,507	5,235	49,790,732
1987	142,474	53,359,376	8,439,127	308,736	4,201,972	876,395		1,845			4,110	18,412	67,352,447
1988	530,505	51,232,906	15,461,378	1,352	4,053,120	134,721					50,411		71,464,393
1989	88,418	36,807,166	5,987,941		2,368,006	215,757	13,374	519	247		12,115	267	45,493,810
1990	257,093	16,959,528	3,472,545		1,966,598	59,453					79,888		22,795,106
1991		6,066,616	4,101,879		175,278	14,248					65,057	5,917	10,428,995
1992	33,743	2,950,704	964,344	5,120	1,901,964	5,136	90,735	6,164	4,543	385	108,607	19,933	6,091,378
1993	2,051	1,794,580	1,787,366	7,219	971,947	1,502	168,526	2,730	299	23	28,735	18,195	4,783,173
1994		5,215,503	1,793,739		2,434,150	5,645					60,459	208,541	9,718,037
1995		4,554,836	6,158,899		1,528,595						25,385	33,149	12,300,864
1996	1,387	4,231,084	5,774,612		6,127,705						110,888	40,020	16,285,696
1997	5,684	7,459,691	8,287,118		3,896,074	6,526	10,370	2,970	2,216		26,945	80,514	19,778,108
1998	249,311	5,827,665	7,218,187		3,510,376						252,908	167,195	17,225,642
1999	49,675	2,077,565	4,061,853		535,353						7,938	89,056	6,821,440
2000	9,408	1,857,281	676,325		421,910						34,818		2,999,742
2001	86,869	568,334	39,529		465,622						7,039		1,167,393
2002	482	779,356	172,773				3,538					60	956,209
2003	21,338	573,389	197,262		19,279								811,268
2004	1,910	540,680	135,271										677,861
2005		354,810	339,810		139,062						1,993		835,675
2006		*	*										*
2007	126,076	126,077	4,179		47,800						58,697		362,830
2008	*	*	*								*		*

* 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 August 11, 2009.

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 2008.

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.

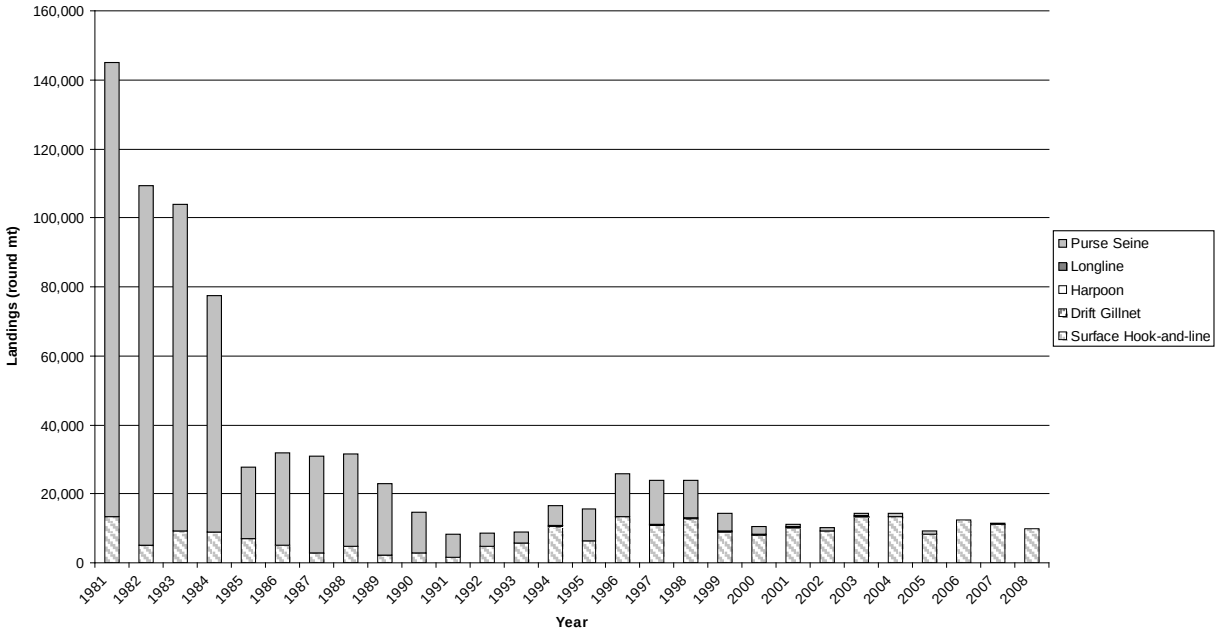

Figure 4–4. West Coast commercial tuna landings by fishery, 1981–2008.

Interpretation: Figure 4–4 and Table 4–27 display West Coast commercial tuna landings by fishery over the years 1981–2008 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 4–27. West Coast commercial tuna landings by fishery, 1981–2008.

	Landings (round mt)					
Year	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	17		9	94,524	103,875
1984	8,922	14	<0.5	3	68,571	77,510
1985	7,012	7	<0.5	0	20,843	27,862
1986	4,982	10	<0.5	0	26,891	31,883
1987	2,891	1	1	0	27,907	30,801
1988	4,629	4	1	0	26,814	31,448
1989	2,168		<0.5	0	20,784	22,952
1990	2,926			1	11,584	14,511
1991	1,641	<0.5		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	0	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	10,233	67		95	886	11,281
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		**	1,006	9,237
2006	12,377	7		**	*	12,384
2007	11,143	5		**	223	11,371
2008	9,744	1		**	*	9,745

* 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).

Surface hook-and-line landings exclude Canadian vessels.

Source: PacFIN, extracted July and August 2009 (various dates).

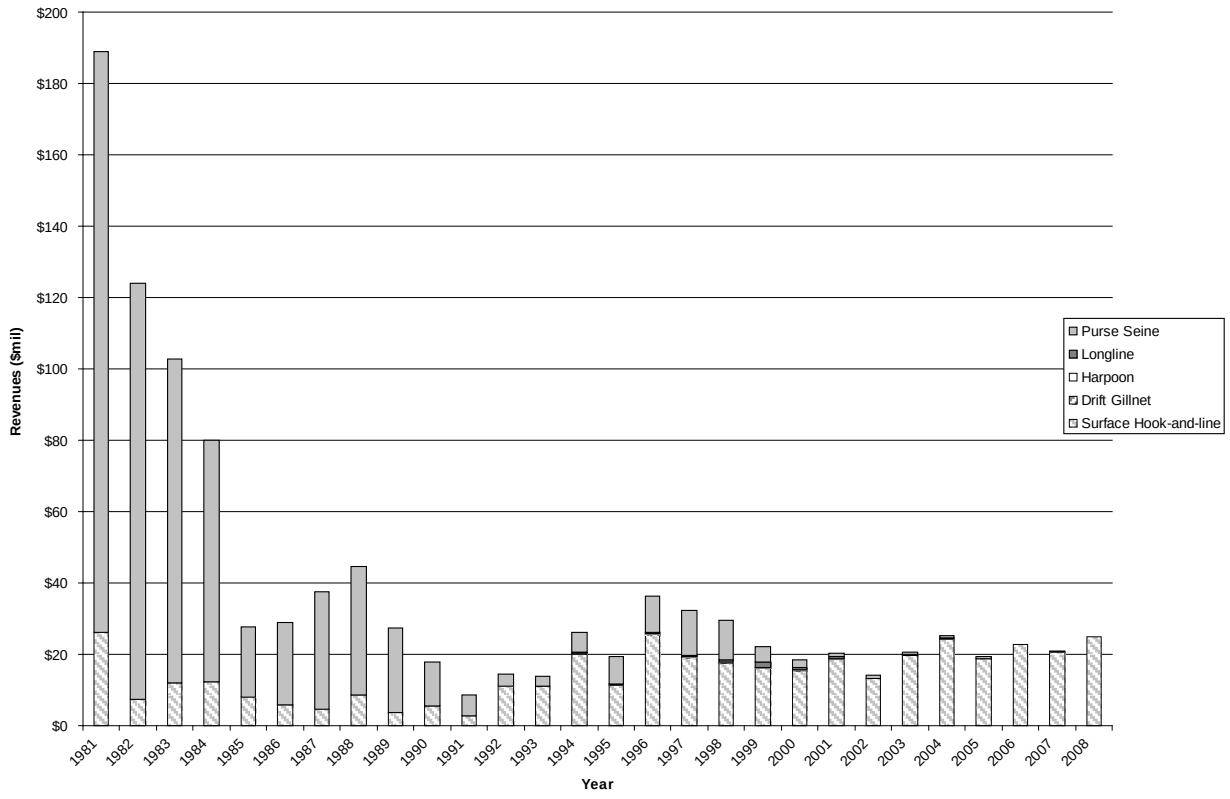

Figure 4–5. West Coast commercial tuna revenues by fishery, 1981–2008.

Interpretation: Figure 4–5 and Table 4–28 display West Coast commercial tuna revenues by fishery over the years 1981–2008 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 4–28. West Coast commercial tuna revenues by fishery, 1981–2008.

	Revenues ($)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Longline	Purse Seine	Total
1981	26,105,721	12,191	4,337	49,477	162,899,688	189,071,414
1982	7,355,282	25,180	146	75,372	116,534,837	123,990,817
1983	11,894,118	29,348		19,826	90,752,417	102,695,709
1984	12,166,930	21,264	480	10,398	67,670,051	79,869,123
1985	7,999,188	8,310	472	740	19,758,416	27,767,126
1986	5,875,077	13,571	390		23,136,080	29,025,118
1987	4,691,790	1,792	6,226	164	32,842,638	37,542,610
1988	8,548,185	7,092	8,552	395	35,899,810	44,464,034
1989	3,693,992		2,171		23,642,990	27,339,153
1990	5,415,074		108	4,063	12,357,079	17,776,324
1991	2,760,785	2,056		17,254	5,804,636	8,584,731
1992	11,080,778	3,639	1,369	6,994	3,350,739	14,443,519
1993	11,036,136	47,433	7,730	37,625	2,673,982	13,802,906
1994	19,936,716	224,198	2,490	420,506	5,679,816	26,263,726
1995	11,360,802	137,214		316,556	7,557,190	19,371,762
1996	25,526,196	230,066	216	314,456	10,179,438	36,250,372
1997	19,108,815	328,963	200	377,511	12,634,293	32,449,782
1998	17,641,854	285,386		561,517	10,982,420	29,471,177
1999	16,254,470	191,290		1,322,398	4,523,535	22,291,693
2000	15,364,240	188,891	302	714,191	2,084,934	18,352,558
2001	18,807,305	109,425		432,024	839,400	20,188,154
2002	13,217,965	30,785		103,049	706,266	14,058,065
2003	19,678,300	80,540		230,768	625,894	20,615,502
2004	24,392,415	55,305		207,243	545,475	25,200,438
2005	18,643,433	38,600		**	714,382	19,396,415
2006	22,839,395	11,763		**	*	22,851,158
2007	20,670,548	18,912		**	288,014	20,977,474
2008	24,809,767	3,380		**	*	24,813,147

* 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.

Surface hook-and-line landings revenues exclude Canadian vessels.

Source: PacFIN, extracted August 2009 (various dates).

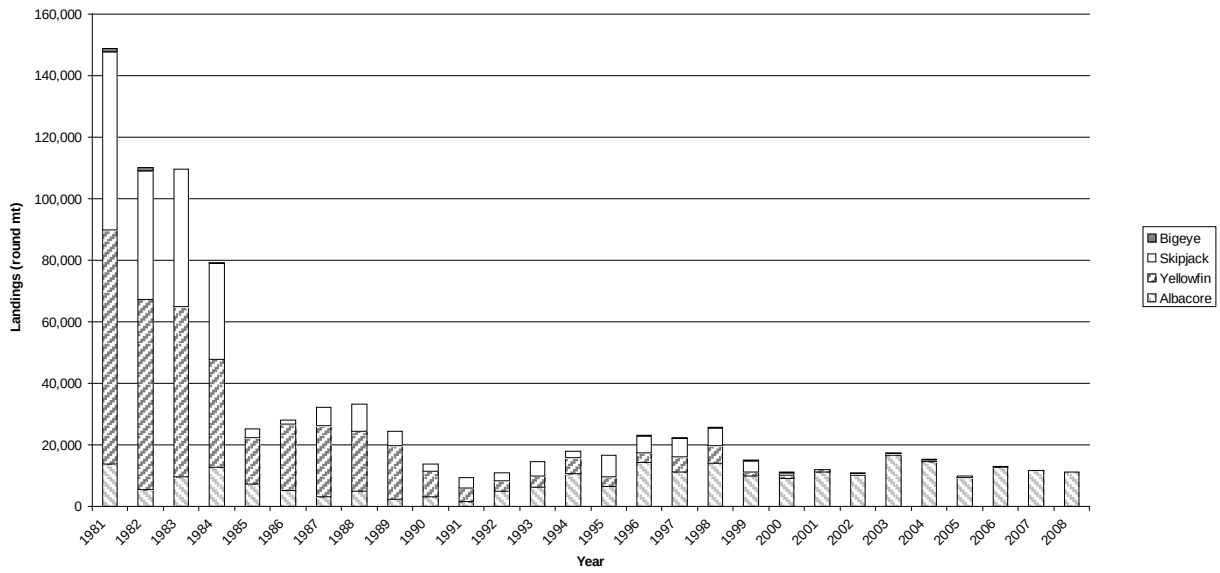

Figure 4–6. Species composition of coastwide commercial tuna landings, 1981–2008.

Interpretation: Figure 4–6 shows West Coast HMS commercial tuna landings in round metric tons for all gear types from 1981 through 2008 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 the accompanying table.

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, and only albacore landings remained near their long-term average.

Source and Calculations: The data were extracted from PacFIN on July 29, 2009. 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 4–29. Species composition of coastwide commercial tuna landings, 1981–2008.

	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	55,482	44,591	21	764	55	110,491
1984	12,654	35,063	31,251	126	635	1,014	80,743
1985	7,301	15,025	2,977	7	3,252	468	29,030
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	11,194	655	58	53	196	1	12,157
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	12,788	77	48	35	1	1	12,950
2007	11,586	104	5	13	45	<0.5	11,753
2008	11,100	65	3	27	1	1	11,197

Source: PacFIN, extracted July 29, 2009.

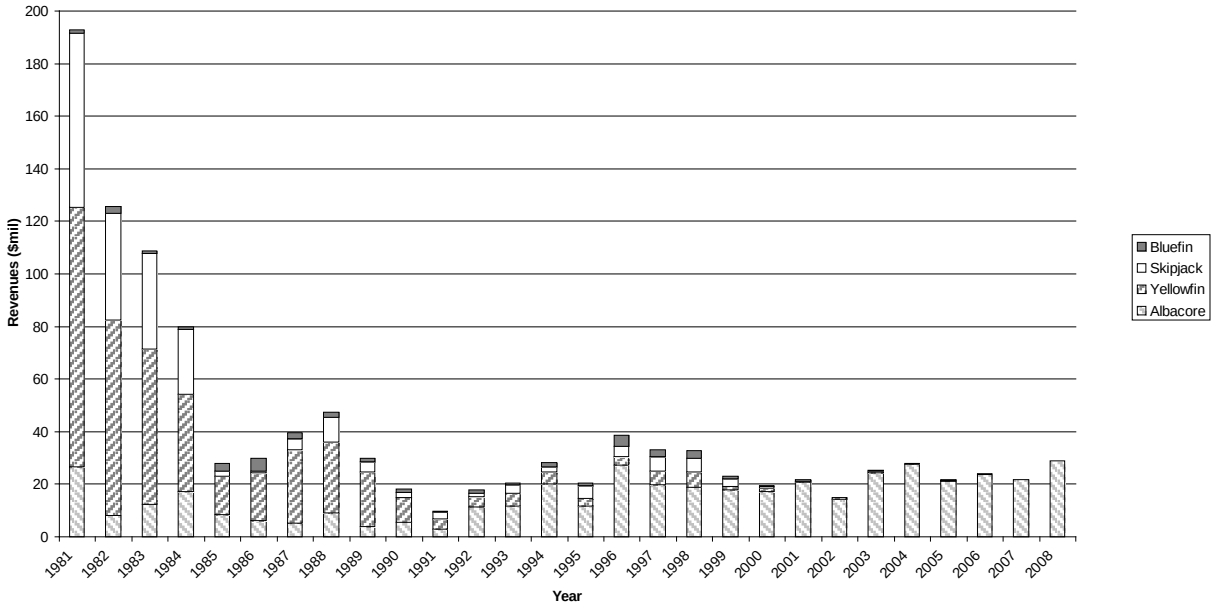

Figure 4–7. Species composition of coastwide commercial tuna revenues, 1981–2008.

Interpretation: Figure 4–7 shows West Coast HMS commercial tuna revenues in current dollars from 1981 through 2008 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 the accompanying table.

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 constituent of commercial revenues. By 2000, yellowfin, skipjack, and bluefin revenues had all declined to far below their levels in the early 1980s, and albacore revenues were an increasingly dominant share of the total.

Source and Calculations: The data were extracted from PacFIN on July 29, 2009. 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 4–30. Species composition of coastwide commercial tuna revenues, 1981–2008.

Year	Revenues ($)						
	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	12,242,140	59,190,758	36,248,835	45,946	1,062,909	95,490	108,886,078
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	2,817,610	1,028,867	28,965,217
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	17,203,982	1,329,357	483,242	576,919	580,722	2,298	20,176,520
2001	20,716,101	465,558	33,633	320,855	473,557	3,069	22,012,773
2002	14,299,676	588,677	128,245	87,304	43,477	6,325	15,153,704
2003	24,477,280	451,273	159,961	262,768	76,106	21	25,427,409
2004	27,479,776	446,577	109,254	147,696	38,312	54,879	28,276,494
2005	20,957,923	315,699	292,193	60,141	136,847	913	21,763,716
2006	23,829,800	174,912	40,350	205,677	3,790	1,895	24,256,424
2007	21,663,546	149,568	4,361	94,734	58,106	46	21,970,361
2008	28,795,339	125,553	3,675	205,536	3,340	3,485	29,136,928

Source: PacFIN, extracted July 29, 2009.

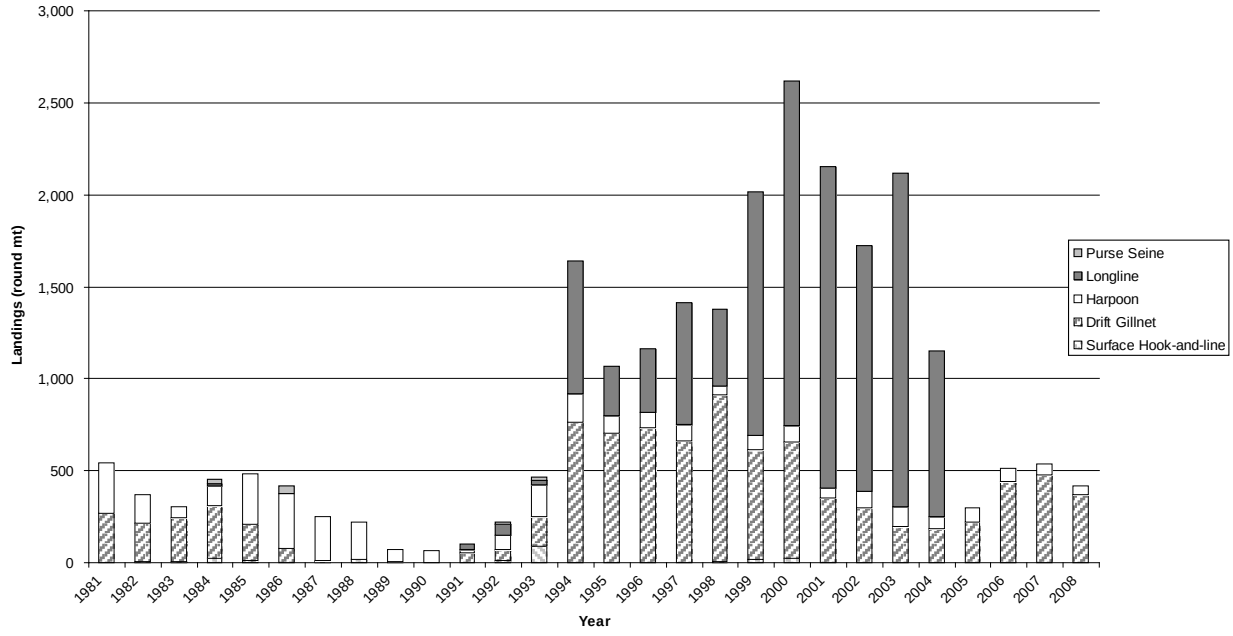

Figure 4–8. West Coast commercial swordfish landings by fishery, 1981–2008.

Interpretation: Figure 4–8 and Table 4–31 display West Coast commercial swordfish landings by fishery over the years 1981–2008 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 4–31. West Coast commercial swordfish landings by fishery, 1981–2008.

Year	Landings (round mt)					
	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	242	58	<0.5	1	304
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	**		296
2006		443	71	**		514
2007		478	59	**		537
2008	<0.5	372	48	**		420

** 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 July and August 2009 (various dates).

Reported 2008 drift gillnet landings are less than totals shown in Tables 2-6 and 2-7 due to the exclusion of 33.6 mt of California swordfish landings coded in PacFIN as GLN (set net gear).

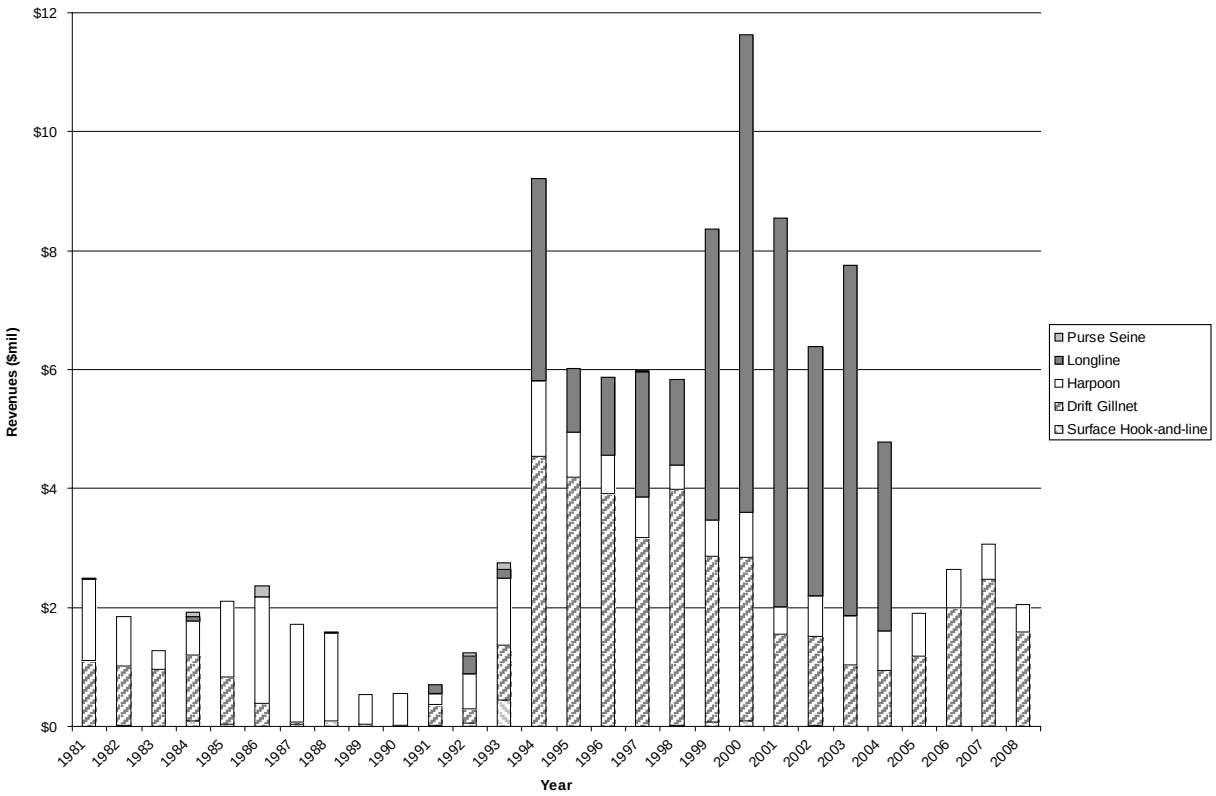

Figure 4–9. West Coast commercial swordfish revenues by fishery, 1981–2008.

Interpretation: Figure 4–9 and Table 4–32 display West Coast commercial swordfish revenues by fishery in current dollars over the years 1981–2008 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 4–32. West Coast commercial swordfish revenues by fishery, 1981–2008.

	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	952,577	318,044	506	1,796	1,280,454
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	**		1,894,305
2006		1,996,530	636,273	**		2,632,803
2007		2,469,238	597,707	**		3,066,945
2008	1,200	1,587,128	458,482	**		2,046,810

** 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.

Surface hook-and-line landings revenues exclude Canadian vessels.

Source: PacFIN, extracted August 2009 (various dates).

Reported 2008 drift gillnet revenues are less than totals shown in Table 2-7 due to the exclusion of 33.6 mt of California swordfish landings coded in PacFIN as GLN (set net gear).

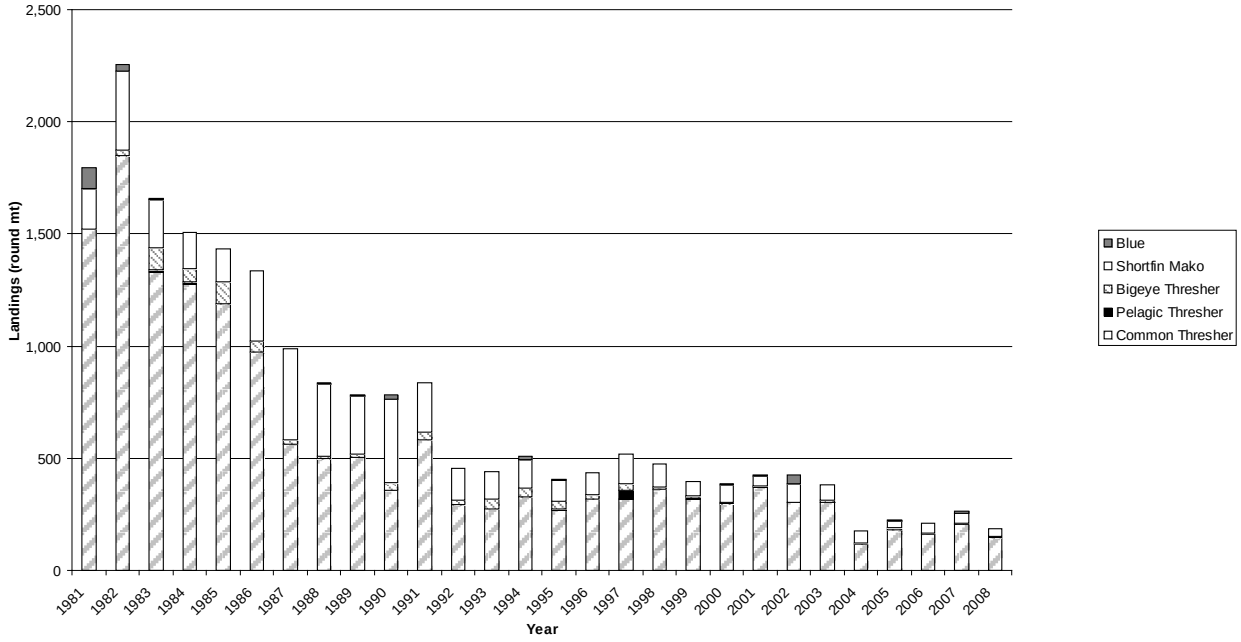

Figure 4–10. Species composition of coastwide commercial shark landings, 1981–2008.

Interpretation: Figure 4–10 shows West Coast commercial shark landings in round metric tons for all gear types from 1981 through 2008. The numeric data used to produce the graph are shown below in Table 4–33.

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 July 29, 2009. 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 4–33. Species composition of coastwide commercial shark landings, 1981–2008.

Year	Landings (round mt)					
	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Total
1981	1,521			182	92	1,795
1982	1,848		28	351	27	2,254
1983	1,331	9	96	217	7	1,660
1984	1,279	9	57	160	2	1,507
1985	1,190	<0.5	95	149	1	1,435
1986	974	<0.5	48	312	2	1,336
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

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 July 29, 2009.

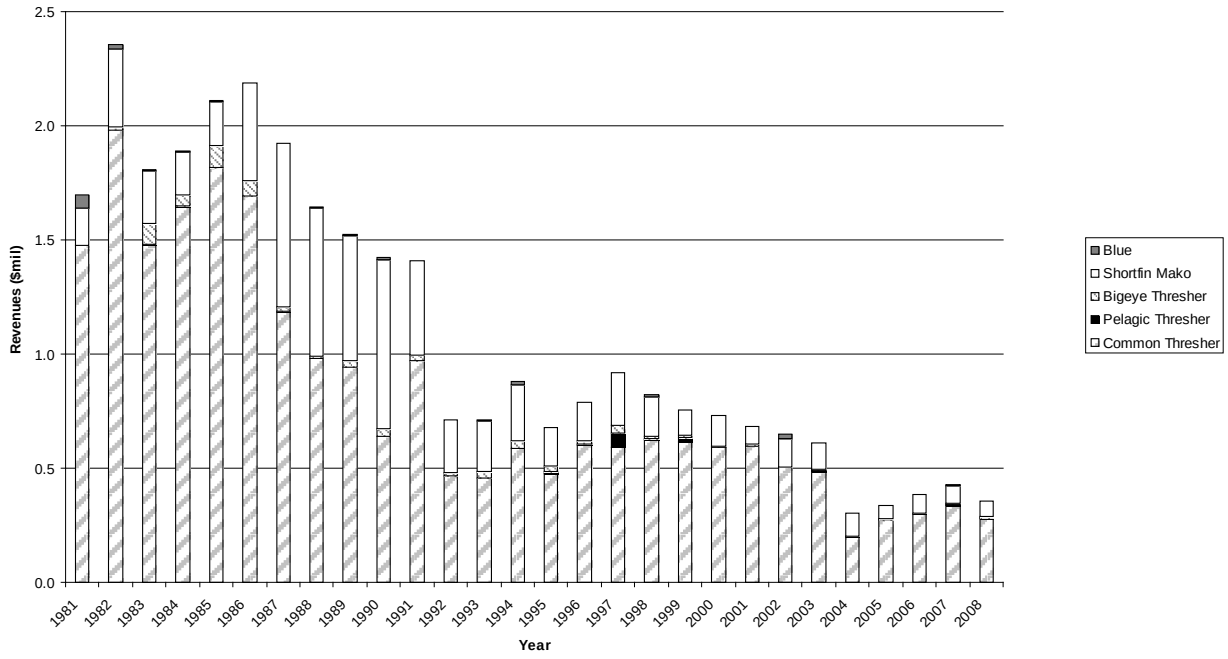

Figure 4–11. Species composition of coastwide commercial shark revenues, 1981–2008.

Interpretation: Figure 4–11 shows West Coast commercial shark revenues in current dollars by species for all gear types from 1981 through 2008. The numeric data used to produce the graph are shown in Table 4–34.

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 July 29, 2009. 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 4–34. Species composition of coastwide commercial shark revenues, 1981–2008.

Year	Revenues ($)					
	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	192,129	2,132	2,108,545
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	944,159	149	24,711	552,576	3,465	1,525,060
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	589,033	2,738	4,636	133,621	918	730,946
2001	595,548	2,767	8,428	75,799	1,822	684,364
2002	503,487	1,946		124,521	18,726	648,680
2003	487,796	2,814	3,779	115,728	832	610,949
2004	197,240	2,500	4,060	98,827	489	303,116
2005	271,767	588	6,234	57,788	426	336,803
2006	300,393	271	4,509	79,336	309	384,818
2007	337,770	2,903	4,334	78,569	1,984	425,560
2008	281,225	434	5,459	67,255	334	354,707

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 July 29, 2009.

Table 4–35. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981–2008.

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	1	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	1	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	2	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5	<0.5	1	765
1991	642	<0.5	2	1		<0.5			<0.5	646
1992	1,184	<0.5	13	2	<0.5	6		<0.5	<0.5	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	1	780
1996	5,038	42	<0.5	<0.5		<0.5		<0.5	1	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	4	5,367
2000	1,798	2	22	<0.5	<0.5	1	<0.5	1	1	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	2	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	194	1		<0.5	<0.5	<0.5	<0.5	<0.5	1	196
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

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 17, 2009.

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 4–36. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981–2008.

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	1	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	1	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	2	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5	<0.5	1	765
1991	642	<0.5	2	1		<0.5			<0.5	646
1992	1,184	<0.5	13	2	<0.5	6		<0.5	<0.5	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	1	780
1996	5,047	42	<0.5	<0.5		<0.5		<0.5	1	5,091
1997	3,290	7	1	1	<0.5	5	<0.5	3	3	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	1	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	2	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	194	1		<0.5	<0.5	<0.5	<0.5	<0.5	1	196
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

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 18, 2009.
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 4–37. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981–2008.

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	<0.5	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	3,688	<0.5		<0.5		<0.5	<0.5		1	3,689
2007	4,469				<0.5	<0.5	<0.5	<0.5	1	4,470
2008	3,190	5	<0.5		<0.5	<0.5			2	3,197

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 17, 2009.
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 4–38. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981–2008.

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	<0.5	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	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	3,872	<0.5		<0.5		<0.5	<0.5		<0.5	3,873
2007	4,748				<0.5	<0.5	<0.5	<0.5	1	4,749
2008	4,021	5	<0.5		<0.5	<0.5			1	4,027

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 18, 2009.
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 4–39. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981–2008.

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			<0.5	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	3,854	1			N.A.	1		<0.5		3,856
2002	4,710				N.A.	<0.5		1	1	4,712
2003	7,986				N.A.				<0.5	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	6,171				N.A.	<0.5		<0.5		6,172

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 17, 2009.
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 4–40. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981–2008.

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	4,158	1			N.A.	1		<0.5		4,160
2002	5,358				N.A.	<0.5		1	<0.5	5,359
2003	10,793				N.A.			<0.5	<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	6,700				N.A.	<0.5		<0.5		6,700

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 18, 2009.
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 4–41. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981-2008.

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	659	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	998	10,615,294
1997	5,675,955	14,095	4,390	1,628	266	11,221	89	8,581	3,725	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	12,398	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	491,090	1,569		42	167	221	124	3,480	927	497,620
2007	1,575,242	1,222			208	6	60	1,178	702	1,578,618
2008	956,552	2,834			371	53	3,193		1,289	964,292

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 17, 2009.

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 4–42. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981-2008.

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	659	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	12,398	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	491,090	1,569		42	167	221	124	3,480	927	497,620
2007	1,575,242	1,222			208	6	60	1,178	702	1,578,618
2008	956,552	2,834			371	53	3,193		1,289	964,292

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 18, 2009.

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 4–43. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981-2008.

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		29		3		6,943		6,178,962
2001	6,509,649	1,036		208		528		22,477		6,533,898
2002	2,871,875							10,002	120	2,881,997
2003	5,694,802	116						4,887		5,699,805
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	7,622,000	6		210		764	<0.5		64	7,623,044
2007	8,818,890				15	1,936	22	204	408	8,821,475
2008	8,234,682	46,296	1,200		108	1,211			5,340	8,288,837

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 17, 2009.
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 4–44. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981-2008.

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		29		3		6,943		7,496,296
2001	7,558,629	1,036		208		528		22,477		7,582,878
2002	2,951,707							10,002	120	2,961,829
2003	6,158,840	116						4,887		6,163,842
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	8,067,229	6		210		764	<0.5		64	8,068,273
2007	9,467,854				15	1,936	22	204	408	9,470,439
2008	10,650,742	46,296	1,200		108	1,211			5,340	10,704,897

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 18, 2009.
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 4–45. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981-2008.

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	5,505,687				N.A.					5,505,687
2001	7,352,069	755			N.A.	1,133		80		7,354,037
2002	6,477,667				N.A.	88		2,338	1,696	6,481,789
2003	11,401,527				N.A.				39	11,401,566
2004	13,497,561				N.A.				232	13,497,793
2005	9,908,456				N.A.			4,057	704	9,913,217
2006	14,724,730				N.A.					14,724,730
2007	10,275,193				N.A.			2,576	311	10,278,080
2008	15,569,403				N.A.	44		4,877		15,574,324

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 17, 2009.
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 4–46. Nominal commercial ex-vessel revenues ($) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981-2008.

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	5,884,793				N.A.					5,884,793
2001	7,965,683	755			N.A.	1,133		80		7,967,651
2002	7,439,754				N.A.	88		2,338	1,696	7,443,876
2003	15,697,394				N.A.			71	39	15,697,504
2004	15,889,027				N.A.				232	15,889,259
2005	11,022,586				N.A.			4,057	703	11,027,346
2006	15,178,595				N.A.					15,178,595
2007	10,450,945				N.A.			2,576	310	10,453,831
2008	17,153,628				N.A.	44		4,877		17,158,549

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 18, 2009.
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 4–47. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	46,945,711	47,610		458	190	3,824	2,625	44,186	2,885	47,047,489
1982	14,274,192	13,085	32,900	6,895	1,386	14,115	31	24,891	829	14,368,324
1983	22,390,300	34,582	17,947	3,807	79	44,100	36,772	35,734	8,848	22,572,169
1984	25,451,616	45,324	219,474	13,868	1,611	15,635	2,116	4,912	8,117	25,762,673
1985	15,316,272	9,395	67,914	15,413	14	14,003	526	22,193	4,333	15,450,063
1986	7,678,208	15,202	13,715	384		40,477	342	13,464	1,406	7,763,199
1987	4,454,784	2,357	68,285	7,052		4,725	1,346	6,333	827	4,545,709
1988	3,438,064	1,893	178,309	7,094		1,322		3,700	837	3,631,219
1989	2,799,008	3,526	66,455	21,721	59	34,726	2	14,254	4,815	2,944,565
1990	2,679,312	145	24,507	1,029	136	11,137	153	71	2,812	2,719,303
1991	1,943,429	100	20,916	1,074		330			1,380	1,967,229
1992	5,054,455	3,715	96,994	4,060	492	10,503		2,202	1,074	5,173,495
1993	4,955,373	262,984	746,697	12,196	39,631	6,687			2,969	6,026,537
1994	10,672,577	1,003	11,308	458	299	982		880	541	10,688,048
1995	2,298,043	958	4,784	279		75	26	1,149	4,852	2,310,166
1996	16,755,777	61,100	4,133	467		95		2,483	1,581	16,825,636
1997	8,830,048	21,928	6,830	2,532	414	17,457	139	13,350	5,794	8,898,492
1998	4,739,211	211,382	26,200	7,679	803	6,089	427	6,341	7,981	5,006,113
1999	14,763,689	79,858	115,800	3,800	2,101	5,995	676	2,383	11,232	14,985,534
2000	5,237,094	5,462	139,098	317	424	2,683	742	3,557	7,442	5,396,820
2001	6,798,222	35,887	2,815	2,768	751	8,488	246	14,462	17,141	6,880,779
2002	5,208,504	9,223	13,483	895	229	1,115	1,674	12,873	8,321	5,256,317
2003	3,332,373	14,166		80	735	3,583	723	11,830	7,398	3,370,888
2004	2,992,090	2,962		397	814	2,216	1,316	15,367	3,852	3,019,014
2005	1,236,264	1,677				1,817		1,560	3,051	1,244,369
2006	545,110	1,742		47	185	245	138	3,863	1,029	552,359
2007	1,663,403	1,290			220	6	63	1,244	741	1,666,967
2008	956,552	2,834			371	53	3,193		1,289	964,292

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 17, 2009.

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 2008.

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 4–48. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in California, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	46,945,711	47,610		458	190	3,824	2,625	44,186	2,885	47,047,489
1982	14,274,192	13,085	32,900	6,895	1,386	14,115	31	24,891	829	14,368,324
1983	22,390,300	34,582	17,947	3,807	79	44,100	36,772	35,734	8,848	22,572,169
1984	25,451,616	45,324	219,474	13,868	1,611	15,635	2,116	4,912	8,117	25,762,673
1985	15,316,272	9,395	67,914	15,413	14	14,003	526	22,193	4,333	15,450,063
1986	7,678,208	15,202	13,715	384		40,477	342	13,464	1,406	7,763,199
1987	4,454,784	2,357	68,285	7,052		4,725	1,346	6,333	827	4,545,709
1988	3,438,064	1,893	178,309	7,094		1,322		3,700	837	3,631,219
1989	2,799,008	3,526	66,455	21,721	59	34,726	2	14,254	4,815	2,944,565
1990	2,679,312	145	24,507	1,029	136	11,137	153	71	2,812	2,719,303
1991	1,943,429	100	20,916	1,074		330			1,380	1,967,229
1992	5,054,455	3,715	96,994	4,060	492	10,503		2,202	1,074	5,173,495
1993	4,955,373	262,984	746,697	12,196	39,631	6,687			2,969	6,026,537
1994	10,672,577	1,003	11,308	458	299	982		880	541	10,688,048
1995	2,298,043	958	4,784	279		75	26	1,149	4,852	2,310,166
1996	16,781,598	61,100	4,133	467		95		2,483	1,582	16,851,458
1997	8,833,423	21,928	6,830	2,532	414	17,457	139	13,350	5,794	8,901,867
1998	4,739,211	211,382	26,200	7,679	803	6,089	427	6,341	7,981	5,006,113
1999	14,817,933	79,858	115,800	3,800	2,101	5,995	676	2,383	11,232	15,039,778
2000	5,237,094	5,462	139,098	317	424	2,683	742	3,557	7,442	5,396,820
2001	6,798,222	35,887	2,815	2,768	751	8,488	246	14,462	17,141	6,880,779
2002	5,208,504	9,223	13,483	895	229	1,115	1,674	12,873	8,321	5,256,317
2003	3,332,373	14,166		80	735	3,583	723	11,830	7,398	3,370,888
2004	2,992,090	2,962		397	814	2,216	1,316	15,367	3,852	3,019,014
2005	1,236,264	1,677				1,817		1,560	3,051	1,244,369
2006	545,110	1,742		47	185	245	138	3,863	1,029	552,359
2007	1,663,403	1,290			220	6	63	1,244	741	1,666,967
2008	956,552	2,834			371	53	3,193		1,289	964,292

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 18, 2009.

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 2008.

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 4–49. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, with Canadian vessels excluded, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	17,702,488					1,981		231,427	788	17,936,684
1982	3,112,132	603				12		9,539	505	3,122,791
1983	4,397,533	179				3,397	156	39,797	398	4,441,460
1984	2,048,508	418				211		9,738	1,641	2,060,516
1985	1,806,236					18		1,533	738	1,808,525
1986	2,827,523	265				177		6,705		2,834,669
1987	3,442,905							7,685		3,450,590
1988	6,601,152					146		18,801	130	6,620,229
1989	1,704,818					75		1,717		1,706,609
1990	3,241,933					192	4	5,061		3,247,189
1991	1,747,435							4,647	553	1,752,635
1992	6,746,469			70		233		8,504		6,755,276
1993	6,596,733					1,551		17,681		6,615,965
1994	6,238,197			44				13	33	6,238,287
1995	6,560,680	523			34	171		32,078		6,593,485
1996	10,417,377	77				602		39,559		10,457,614
1997	10,602,967	1,329			163	1,116		45,202		10,650,777
1998	9,084,012			1		1,237		18,663	73	9,103,986
1999	4,472,870	52,589		99		467		12,100		4,538,124
2000	8,776,069	933		41		4		9,874		8,786,920
2001	8,998,686	1,432		288		730		31,071		9,032,207
2002	3,873,584							13,490	162	3,887,236
2003	7,381,467	150						6,334		7,387,952
2004	10,543,812	162		249		63	227	12,893		10,557,405
2005	8,955,754			211		35		8,097		8,964,097
2006	8,460,428	7		233		848	<0.5		71	8,461,587
2007	9,312,450				16	2,044	23	215	432	9,315,180
2008	8,234,682	46,296	1,200		108	1,211			5,340	8,288,837

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 17, 2009.

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 2008.

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 4–50. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Oregon, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	17,702,488					1,981		231,427	788	17,936,684
1982	3,149,110	603				12		9,539	506	3,159,770
1983	4,488,214	179				3,397	156	39,797	398	4,532,141
1984	2,055,999	418				211		9,738	1,640	2,068,006
1985	1,806,236					18		1,533	738	1,808,525
1986	2,827,523	265				177		6,705		2,834,669
1987	3,442,905							7,685		3,450,590
1988	6,606,821					146		18,801	130	6,625,898
1989	1,704,818					75		1,717		1,706,609
1990	3,241,933					192	4	5,061		3,247,189
1991	1,747,435							4,647	553	1,752,635
1992	6,941,987			70		233		8,504		6,950,794
1993	6,627,771					1,551		17,681		6,647,002
1994	6,238,197			44				13	33	6,238,287
1995	6,560,680	523			34	171		32,078		6,593,485
1996	11,776,301	77				602		39,559		11,816,538
1997	11,421,280	1,448			338	1,116		45,202		11,469,384
1998	10,008,284			1		1,237		18,663	73	10,028,258
1999	5,624,372	52,589		99		467		12,100		5,689,626
2000	10,649,409	933		41		4		9,874		10,660,261
2001	10,448,754	1,432		288		730		31,071		10,482,275
2002	3,981,261							13,490	162	3,994,913
2003	7,982,942	150						6,334		7,989,426
2004	11,363,922	162		249		63	227	12,893		11,377,515
2005	10,287,639			211		35		8,097		10,295,983
2006	8,954,633	7		233		848	<0.5		71	8,955,792
2007	9,997,734				16	2,044	23	215	432	10,000,464
2008	10,650,742	46,296	1,200		108	1,211			5,340	10,704,897

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 18, 2009.

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 2008.

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 4–51. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, with Canadian vessels excluded, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	4,421,799				N.A.	834		76,986	53	4,499,672
1982	905,816				N.A.					905,816
1983	1,523,731				N.A.	904		10,443		1,535,078
1984	207,168				N.A.					207,168
1985	437,146				N.A.					437,146
1986	2,016,311				N.A.					2,016,311
1987	1,718,218				N.A.				72	1,718,290
1988	6,963,435		13,318		N.A.	57	1,220	101	104	6,978,235
1989	2,596,481				N.A.	29				2,596,510
1990	4,032,789				N.A.					4,032,789
1991	1,235,464	26			N.A.	7		1,561		1,237,059
1992	7,577,392	125			N.A.	11			96	7,577,624
1993	7,024,337		9,000	1,447	N.A.	284		47	112	7,035,227
1994	16,255,277				N.A.					16,255,277
1995	9,543,817		406		N.A.			2,882	56	9,547,161
1996	13,225,642				N.A.					13,225,642
1997	10,271,194				N.A.	20				10,271,214
1998	12,961,346				N.A.					12,961,346
1999	4,754,852	39,172			N.A.				227	4,794,251
2000	7,829,475				N.A.					7,829,475
2001	10,163,214	1,043			N.A.	1,566		111		10,165,934
2002	8,737,074				N.A.	119		3,154	2,287	8,742,634
2003	14,778,388				N.A.				51	14,778,439
2004	16,773,408				N.A.				288	16,773,696
2005	11,563,141				N.A.			4,734	822	11,568,697
2006	16,344,467				N.A.					16,344,467
2007	10,850,257				N.A.			2,720	328	10,853,305
2008	15,569,403				N.A.	44		4,877		15,574,324

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 17, 2009.

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 2008.

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 4–52. Real commercial ex-vessel revenues (2008 $) of the albacore surface hook-and-line (troll and baitboat) fishery in Washington, 1981-2008.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Salmon	Other	Total
1981	4,421,799				N.A.	834		76,986	53	4,499,672
1982	905,816				N.A.					905,816
1983	1,523,731				N.A.	904		10,443		1,535,078
1984	207,168				N.A.					207,168
1985	437,146				N.A.					437,146
1986	2,016,311				N.A.					2,016,311
1987	1,718,218				N.A.				72	1,718,290
1988	6,963,435		13,318		N.A.	57	1,220	101	104	6,978,235
1989	2,596,481				N.A.	29				2,596,510
1990	4,032,789				N.A.					4,032,789
1991	1,235,464	26			N.A.	7		1,561		1,237,059
1992	7,626,812	125			N.A.	11			96	7,627,044
1993	7,064,088		9,000	1,447	N.A.	284		47	113	7,074,979
1994	16,324,516				N.A.					16,324,516
1995	9,740,466		406		N.A.			2,882	56	9,743,810
1996	14,364,939				N.A.					14,364,939
1997	10,565,426				N.A.	20				10,565,445
1998	13,720,949				N.A.					13,720,949
1999	5,427,616	39,172			N.A.				227	5,467,015
2000	8,368,591				N.A.					8,368,591
2001	11,011,450	1,043			N.A.	1,566		111		11,014,170
2002	10,034,737				N.A.	119		3,154	2,286	10,040,296
2003	20,346,590				N.A.			93	49	20,346,732
2004	19,745,280				N.A.				289	19,745,569
2005	12,863,328				N.A.			4,734	822	12,868,884
2006	16,848,257				N.A.					16,848,257
2007	11,035,845				N.A.			2,720	328	11,038,893
2008	17,153,628				N.A.	44		4,877		17,158,549

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 18, 2009.
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 2008.
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 4–53. Commercial catch and effort fishery statistics for the U.S. South Pacific albacore troll fishery, 1986-2008.

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	4	150	239	3

Source: Childers, SWFSC, August 12, 2009.

Note 1: Total catches for the U.S. South Pacific albacore troll fishery may include 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 4–54. Percentages of commercial catch and effort by fishing areas for U.S. albacore troll vessels, 1995–2008.

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

Zeros mean no catch or effort.
Source: Childers, SWFSC, August 12, 2009.
Note: Data for 2007 and 2008 are preliminary.

Table 4–55. Number of vessels with West Coast commercial HMS landings by fishery (HMS gear & species), 1981-2008.

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	121	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	717	151	51	44	25	905
1995	477	134	43	36	22	657
1996	726	132	31	29	23	870
1997	1,200	121	32	52	34	1,347
1998	866	113	30	70	33	1,020
1999	827	97	33	53	14	923
2000	761	91	36	70	16	893
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	680	49	28	**	4	749
2008	517	51	32	**	*	594

* 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 July 30, 2009.

[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 4–56. Number of vessels with commercial HMS landings in California by fishery (HMS gear & species), 1981-2008.

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	121	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	134	43	36	22	331
1996	290	132	31	*	23	439
1997	612	121	32	52	34	768
1998	382	112	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	51	32	**	*	149

* 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 August 4, 2009.

[1]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]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 4–57. Number of vessels with commercial HMS landings in Oregon by fishery (HMS gear & species), 1981-2008.

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	326				326
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	414				414
2008	333				333

* 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 August 4, 2009.
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 4–58. Number of vessels with commercial HMS landings in Washington by fishery (HMS gear & species), 1981-2008.

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	223		223

* 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 August 4, 2009.
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 4–59a. Selected West Coast HMS landings by port group, metric tons, 2008.

	Albacore	Yellowfin Tuna	Other Tunas	Swordfish	Common Thresher Shark	Other Sharks
North Puget Sound Ports	134	0	0	0	0	0
South Puget Sound Ports	*	0	0	0	0	0
Washington Coastal Ports	3,895	0	0	0	0	0
Columbia River Ports (Washington)	2,665	0	0	0	0	0
Columbia River Ports (Oregon)	1,210	0	0	0	0	0
Tillamook Area Ports	106	0	0	0	0	0
Newport Area Ports	1,470	0	*	*	*	*
Coos Bay Area Ports	1,214	0	0	0	0	0
Brookings Area Ports	21	0	0	0	0	0
Crescent City Area Ports	105	0	0	0	0	0
Fort Bragg Area Ports	*	0	0	0	0	0
Bodega Bay Area Ports	*	0	0	0	*	0
San Francisco Area Ports	9	0	*	*	0	*
Monterey Area Ports	33	0	*	17	1	*
Morro Bay Area Ports	8	0	0	46	18	3
Santa Barbara Area Ports	3	2	23	27	57	9
Los Angeles Area Ports	215	61	3	146	22	7
San Diego Area Ports	2	2	0	270	49	21
Total	11,100	65	31	533	147	42

Table 4-59b. Selected West Coast HMS landings by month, metric tons, 2008.

	Albacore	Yellowfin Tuna	Other Tunas	Swordfish	Common Thresher Shark	Other Sharks
January	0	0	0	10	14	1
February	*	*	*	*	6	1
March	*	*	*	*	1	*
April	*	*	*	*	0	*
May	0	0	0	*	4	*
June	*	*	*	4	13	3
July	2,095	*	*	14	7	5
August	4,787	1	0	19	16	4
September	2,940	1	0	35	15	9
October	1,271	0	1	99	36	9
November	5	*	0	186	16	7
December	1	0	0	167	18	2
Total	11,100	65	31	533	147	42

* Not reported due to data confidentiality requirements (landings by 3 or fewer vessels).
Landings rounded to the nearest whole metric ton. Any calculated or derived zeros due to rounding summarized data to less than half of the unit shown.

Interpretation: Albacore landings are concentrated in July to October and mainly occur in Washington coastal, Columbia River, and Oregon ports. Landings of other HMS peak in the late fall or winter months and occur in ports in California from San Francisco to the south.

Source and Calculation: The data were extracted from PacFIN on August 26, 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, then dividing by 2204.6.

4.2 Recreational Fisheries

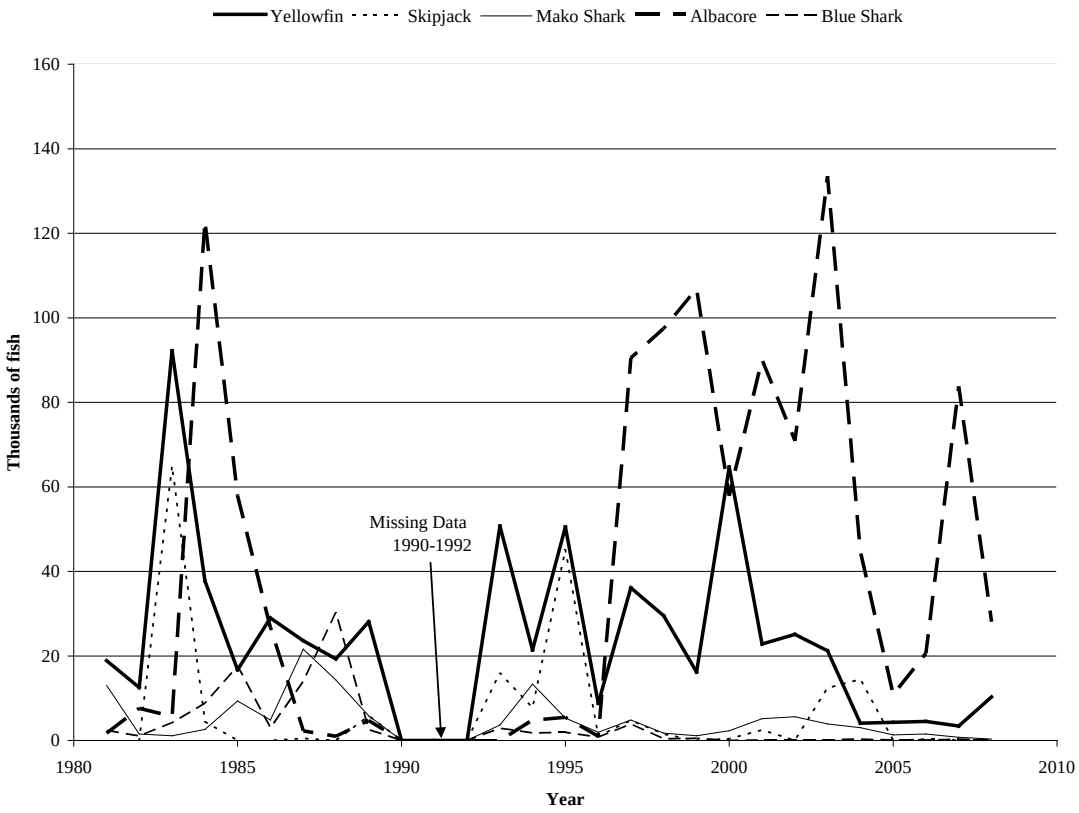

Figure 4–12. Catches by species (thousands of fish) for the West Coast recreational private sport fishing fleet, 1981–2008.

Interpretation: Figure 4–12 shows West Coast recreational private sport fishing fleet HMS catches by species, in thousands of fish. Table 4-59 shows the numeric values, with added columns for species representing negligible shares of the overall catch (bluefin tuna, bigeye tuna, marlin, common thresher shark, and dorado).

The principal species targeted are the tunas, with albacore and yellowfin comprising the most important components of the number of fish caught. Albacore represented the largest share of overall private sport fishing boat catch in 2008. Yellowfin tuna was the next most important historic component of the catch; despite a recent decline, the number of yellowfin tuna caught tripled from 2007 to 2008. The common thresher shark was the most important shark species included in the HMS private boat catch in 2008.

Source and Calculations: The data were extracted from RecFIN. 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 2008, then copied to a Microsoft Excel notebook where they were compiled. The primary source for the data was the Marine Recreational Fisheries Statistics Survey (MRFSS) survey for years 1981 through 2003 and CRFS for 2004–07. 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). No catch records were available in RecFIN for swordfish. Data for years 2003–07 are preliminary and may be incomplete.

Table 4–60. Catches by species (thousands of fish) for the West Coast recreational private sport fishing fleet, 1981–2008.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye Tuna	Marlin	Mako	Common Thresher	Blue Shark	Dorado
1981	18.9			1.7			13.0		2.4	
1982	12.5			7.6	2.5	0.8	1.5	2.2	1.1	
1983	92.2	65.0	0.6	5.7	0.6	0.4	1.1	2.4	4.2	4.7
1984	37.8	4.4	0.6	123.0	0.6	1.2	2.6	0.8	8.8	4.5
1985	16.7			57.9		0.7	9.3	0.4	17.6	
1986	29.0			26.7			4.8	1.4	3.0	
1987	23.6	0.5		2.3		0.9	21.6	4.8	13.9	
1988	19.3			1.0		0.8	14.3	0.9	30.3	
1989	28.1	5.8		4.7			5.8	0.8	2.6	
1990										
1991										
1992										
1993	50.7	16.0				0.3	3.6	2.6	2.9	6.2
1994	21.4	7.7		4.8		0.4	13.3	3.6	1.8	1.0
1995	50.5	45.2		5.5		0.3	5.3	2.7	1.9	
1996	8.8	1.0		1.0			1.9	0.7	0.8	2.7
1997	36.1	4.7		90.5		0.4	4.8	0.5	3.9	19.8
1998	29.5	1.5	1.6	97.5			1.7	0.6	0.4	11.1
1999	16.2			106.9			1.1	1.3	0.5	1.1
2000	64.7	0.4		57.9	0.4		2.3	1.7		61.0
2001	22.8	2.5	1.0	90.1			5.1	2.2	0.1	
2002	25.1		0.9	70.9			5.6	1.6	0.1	0.2
2003	21.2	12.4		133.5	0.2		3.9	2.0	0.2	0.2
2004	4.1	14.5	0.1	44.6			3.0	4.5	0.3	3.2
2005	4.3		0.1	10.8			1.3	0.3	0.1	0.2
2006	4.5	0.3	0.2	20.6			1.5	0.5	0.1	12.9
2007	3.4	0.1		83.8			0.7	0.7	0.3	0.3
2008	10.3	0.2	0.1	28.1			0.3	0.7	0.1	12.2

Data were extracted from RecFin by going to the link entitled "Summarize RecFIN Estimates."

Blank cells indicate no data exists.

Source: RecFin (extracted July 16, 2009).

No private recreational vessel catch data were available for the years from 1990-1992.

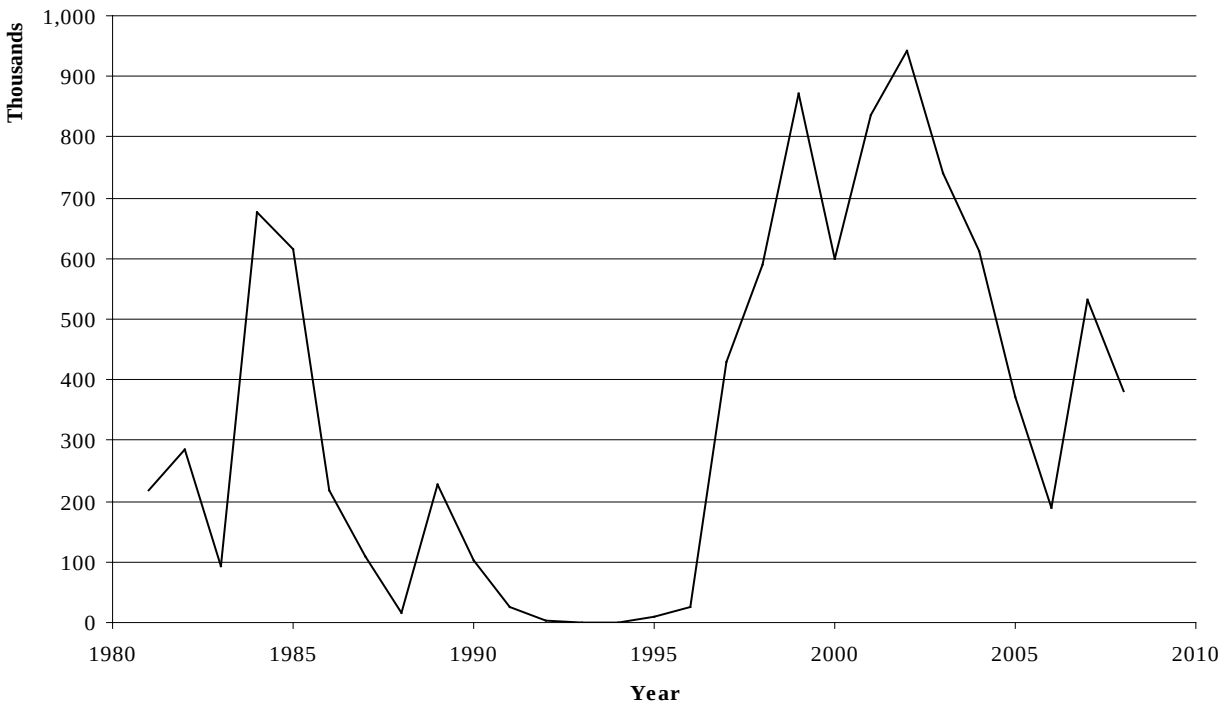

Figure 4–13. Albacore fishing hours (in thousands) for the California CPFV fleet, 1981–2008.

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 1981–2008. Table 4–60 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 942,758 hours in 2002, with a steady decline from 2002 through 2006. Albacore hours for 2007 returned to a level slightly above 500,000 hours but decreased to 382,936 hours in 2008.

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 4–61. Albacore fishing hours for the California CPFV fleet, 1981–2008.

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	598,273
2001	835,143
2002	942,758
2003	740,230
2004	612,312
2005	370,636
2006	190,450
2007	531,004
2008	382,936

Source: CPFV Logbook Database.
Extracted July 14, 2009.

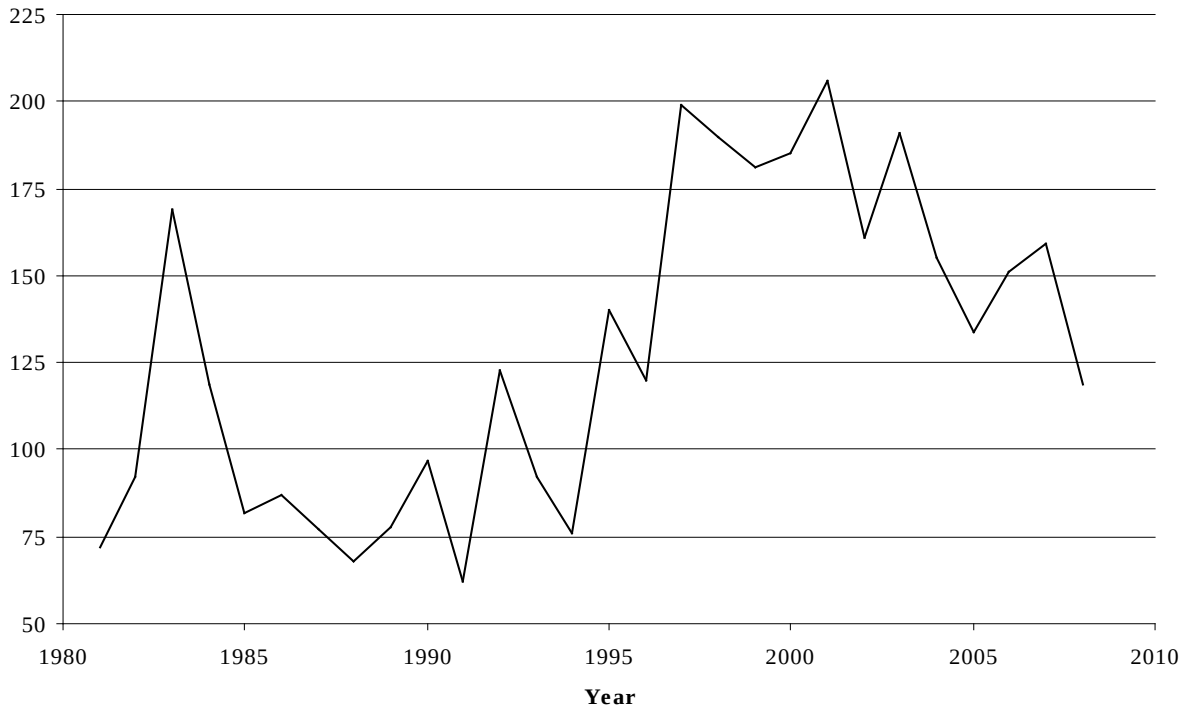

Figure 4–14. Number of CPFV vessels targeting HMS in California waters, 1981–2008.

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 2008. The accompanying Table 4–61 displays the numeric values.

The number of vessels targeting HMS in California waters peaked at 206 in 2001 before falling to a level of 119 vessels in 2008.

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 tabulated and graphed.

Table 4–62. Number of CPFV vessels targeting HMS in California waters, 1981–2008.

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	76
1995	140
1996	120
1997	199
1998	190
1999	181
2000	185
2001	206
2002	161
2003	191
2004	155
2005	134
2006	151
2007	159
2008	119

Source: CPFV Logbook Database.

Extracted July 14, 2009.

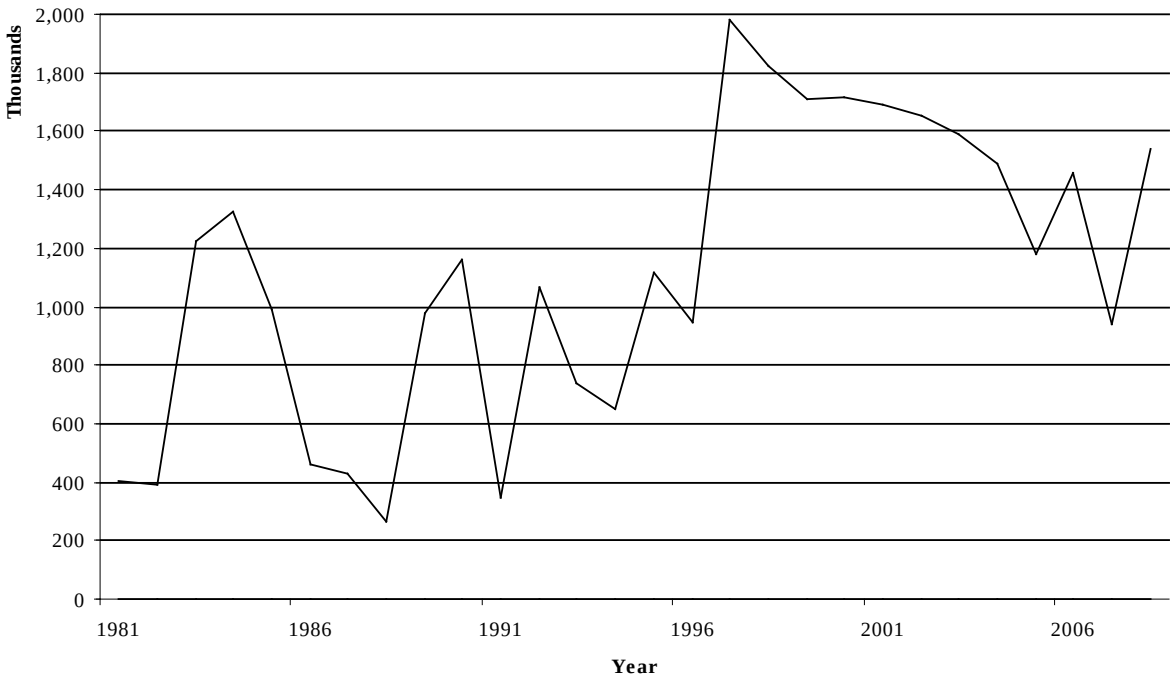

Figure 4–15. Number of angler hours (in thousands) for the California CPFV fleet, 1981–2008.

Interpretation: Figure 4–15 shows the number of angler hours for the California CPFV fleet which targeted HMS in each year from 1981 to 2008. Table 4–62 displays the numeric values.

The number of angler hours shows a sizable amount of variation over time, from as low as 263,433 in 1988 to as high as 1,980,520 in 1997. Since 1997, the number of angler hours gradually declined to a 2007 level of about 900,000 hours but rebounded to 1,541,323 hours in 2008.

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 tabulated and graphed.

Table 4–63. Number of angler hours for the California CPFV fleet, 1981–2008.

Year	Angler Hours
1981	405,227
1982	393,176
1983	1,224,248
1984	1,324,407
1985	991,618
1986	458,373
1987	430,448
1988	263,433
1989	975,309
1990	1,162,097
1991	343,925
1992	1,068,365
1993	739,969
1994	646,909
1995	1,116,171
1996	947,740
1997	1,980,520
1998	1,821,750
1999	1,707,337
2000	1,713,079
2001	1,690,341
2002	1,650,789
2003	1,591,077
2004	1,488,716
2005	1,178,741
2006	1,456,357
2007	941,046
2008	1,541,323

Source: CPFV Logbook Database.
Extracted July 14, 2009.

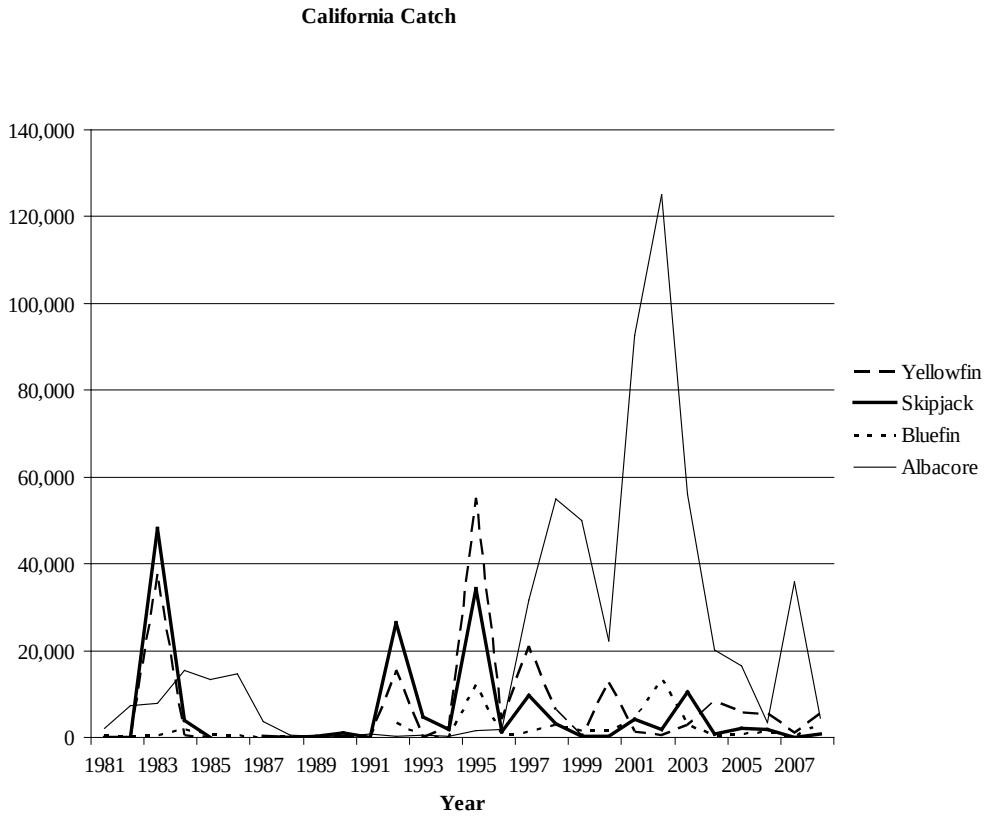

Figure 4–16. Catch in number of fish by species for the California CPFV fleet in California waters, 1981–2008.

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 4–63a, shown below, displays the numeric values, with added columns for species representing negligible shares of the overall catch (bluefin tuna, bigeye tuna, marlin, thresher 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 the number of albacore caught in California waters dropped to a level below the numbers of yellowfin tuna and dorado 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 steeply declined 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 4–64a. Catch in number of fish by species for the California Commercial Passenger Fishing Vessel fleet in California waters, 1981–2008.

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	5,596	821	3,158	4,530		2	1	76	45	17	5,621

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.
Extracted from CPFV logbook data base July 15, 2009.

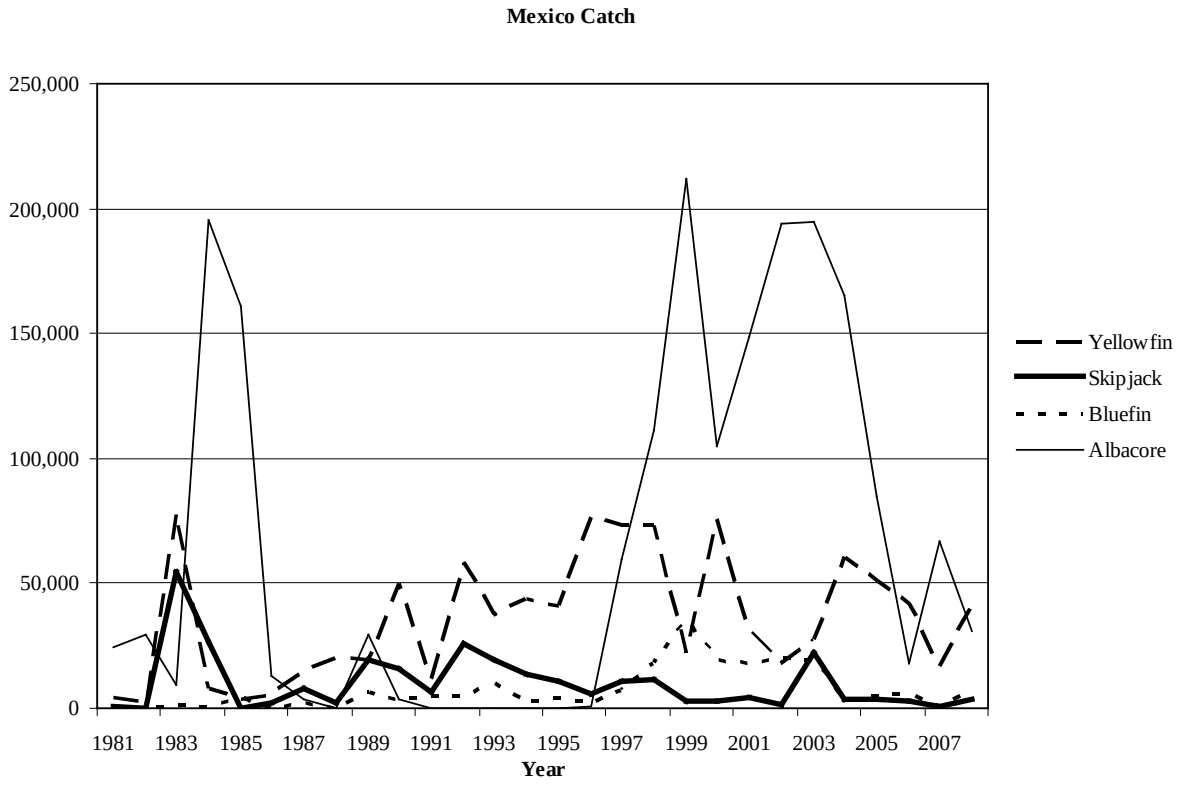

Figure 4–17. Catch in number of fish by species for the California CPFV fleet in Mexico waters, 1981–2008.

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 4–63b, shown below, displays the numeric values, with added columns for species representing negligible shares of the overall catch (bluefin tuna, bigeye tuna, marlin, thresher 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.

The principal species targeted are the tunas, with albacore of increasing importance relative to other species of tuna in recent years; however, in 2008 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 4–64b. Catch in number of fish by species for the California Commercial Passenger Fishing Vessel fleet in Mexico waters, 1981–2008.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye	Swordfish	Marlin	Mako	Thresher	Blue Shark	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	19,044	104,738	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	20,139	193,655	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	41,077	3,384	6,866	31,116	1		4	52			22,991

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.
Extracted from CPFV logbook data base July 15, 2009.

Table 65. 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 66. 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 2008. 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 HMS Management Team 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 2008 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 2009 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 2009 HMS SAFE Report (to be published in September 2010).

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).

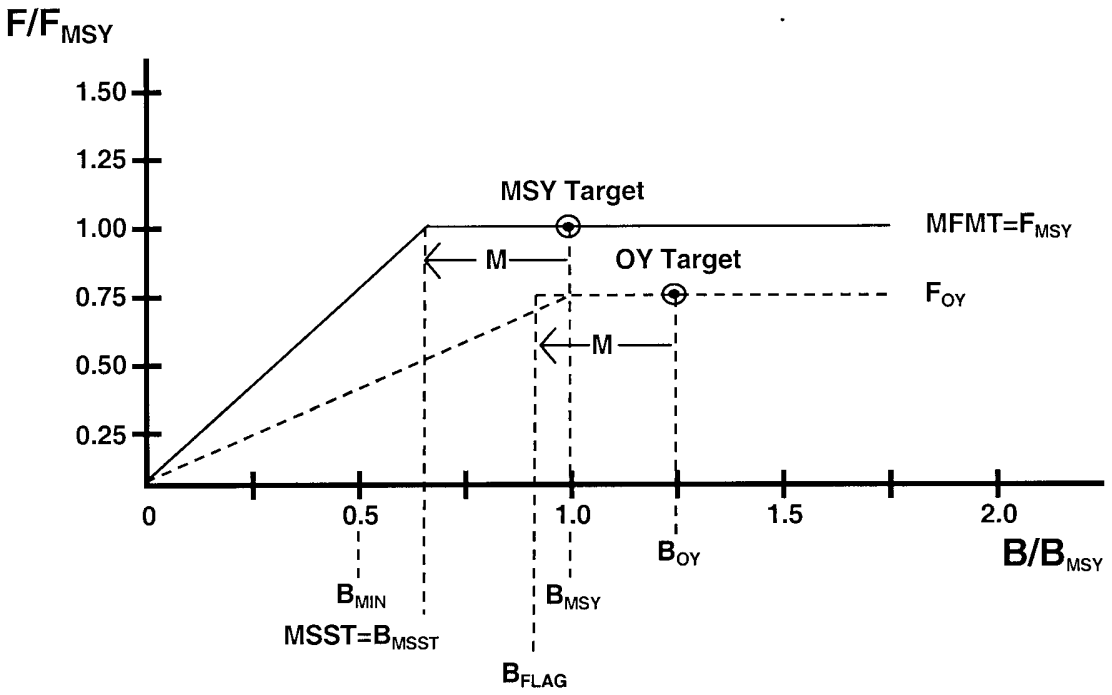

Table 5-1. General model of MSY and OY Control Rules, from Restrepo, et al. 1998.

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.

5.2 Recent and Projected Assessment Schedule

Species (Stock)	Date (Next Anticipated)	Organization Responsible for the Assessment
TUNAS		
Albacore (NPO)	2006 (2011)	ISC (ISC)
Albcore (SPO)	2008	WCPFC
Bluefin (NPO)	2008 (2012)	ISC (ISC)
Bigeye (EPO)	2008 (2009)	IATTC (IATTC)
Bigeye (WCPO)	2008 (2009)	WCPFC (WCPFC)
Skipjack (EPO)	2007 (2009)	IATTC (IATTC)
Skipjack (WCPO)	2008 (2009)	WCPFC (WCPFC)
Yellowfin (EPO)	2008 (2009)	IATTC (IATTC)
Yellowfin (WCPO)	2007 (2009)	WCPFC (WCPFC)
BILLFISHES		
Striped Marlin (EPO)	2003 (2010)	IATTC (IATTC)
Striped Marlin (NPO)	2007 (2011)	ISC (ISC)
Swordfish (SEPO)	2006	IATTC
Swordfish (NPO)	2004 (2009)	ISC (ISC)
SHARKS		
Common Thresher (WA/OR/CA EEZ)	2001	NMFS
Pelagic Thresher		
Bigeye Thresher		
Shortfin Mako		
Blue (NPO)	2001 (2008)	NMFS and NRIFSF Japan (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 2008 Pacific HMS stock assessments

5.3.1 Albacore

5.3.1.1 Albacore (NPO)

Stock status of North Pacific albacore is reviewed by the ISC Albacore Working Group with participating members from the United States, Mexico, Canada, Japan, and Taiwan. The latest assessment was completed in December 2006 (ISC 2007a) and finalized by the ISC in July 2007. The assessment report can be downloaded from
http://www.pcouncil.org/bb/2007/0907/F4a_ATT2.pdf.

Spawning stock biomass (SSB) estimates for the period 1966-2006 show fluctuations around an estimated time series average of roughly 100,000 mt. The assessment demonstrates a recent increase in SSB from 73,500 mt in 2002 to 153,300 mt in 2006 with a projected further increase to 165,800 mt in 2007. The recent increases are likely due to strong year classes in 2001 and 2003. Despite the high SSB estimates relative to the time series average, fishing mortality rates are high relative to most commonly used reference points. The population is being fished at roughly $F_{17\%}$ (i.e., at a rate resulting in a reduction of the spawning potential ratio to 17 percent of the maximum spawning potential ratio in the absence of fishing). If fishing continues at the current level, and all else being equal, then SSB is projected to decline

to an equilibrium level of 92,000 mt by 2015. Considering the high fishing mortality rates, and the fact that total catch has been in decline since 2002, the ISC recommended that all nations practice precautionary-based fishing practices.

The next albacore stock assessment is scheduled for 2011.

Catch of albacore by U.S. West Coast fisheries constitutes roughly 17 percent of the North Pacific-wide catch.

5.3.1.2 Albacore (WCPO)

An updated assessment of albcore tuna in the WCPO was conducted by the WCPFC's Scientific Committee in August, 2007 (Hoyle, et al. 2008). 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/meetings/2008/4th-regular-session-scientific-committee - stock_assessment_swg.

The stock status is assessed used MULTIFAN-CL. Current (2004-2006) fishing mortality is estimated to be below F_{MSY} and biomass above B_{MSY}. The current assessment identified several sources of bias that contributed to unrealistic estimates of stock size in past assessments. Although these problems were dealt with in the current assessment, additional uncertainties and biases remain. Therefore results should be viewed as highly uncertain.

5.3.2 Bigeye Tuna

5.3.2.1 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 2008 (Aires-da-Silva and Maunder 2008) and is based on the assumption that there is a single stock of bigeye tuna in the EPO. The assessment report can be downloaded from http://www.iattc.org/PDFFiles2/SAR9-BET-ENG.pdf

The results of the base-case stock assessment, which assumes no stock-recruitment relationship, demonstrate a continuing trend seen in the previous assessments: the biomass of 3 quarter-plus age fish was at a peak level of 626,000 mt in 1986, and has been in decline to a recent and historic low level of 270,000 mt in 2007. The current spawning biomass ratio (SBR) is roughly 17 percent which is below that corresponding to MSY. Recent catches are estimated to have been at about the levels associated with MSY. Under current fishing mortality levels and patterns of age-specific selectivity, the level of fishing effort (F) corresponding to the MSY is about 82 percent of the current level of effort.

The floating object fishery that began in 1993 catches small fish below the critical size; however, the MSY of bigeye in the EPO could be maximized if the age-specific selectivity pattern of the fishery were similar to that for the longline fishery, which catches larger individuals. The two most recent estimates indicate that the bigeye spawning stock biomass in the EPO is below S_{AMSY} and that overfishing is taking place ($F > F_{AMSY}$).

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

5.3.2.2 Bigeye Tuna (WCPO)

An updated assessment of bigeye tuna in the WCPO was conducted by the WCPFC's Scientific

Committee in August 2007 (Langley, et al. 2008). 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/meetings/2008/4th-regular-session-scientific-committee#stock_assessment_swg.

The stock status is assessed using MULTIFAN-CL. The biomass under equilibrium condition is 0.68 of the biomass at MSY (B_{MSY}), indicating that the current (2003-2006) fishing mortality is above F_{MSY}. However, current total biomass is likely still above the B_{MSY} and spawning biomass is estimated to be near or possibly below that corresponding to MSY (SB_{MSY}). It is also noted that longline catchability (used as primary tuning index) may have increased or that the steepness of the spawner-recruit relation may be more moderate than used that in the base case. Both of these alternatives show that the current spawning biomass is less than SB_{MSY}.

5.3.3 Skipjack Tuna

5.3.3.1 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, beginning in 2007 the IATTC has developed a simple stock assessment model 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 assessment report (Maunder 2008) can be downloaded from http://www.iattc.org/PDFFiles2/SAR9-SKJ-ENG.pdf.

The analyses showed some inconsistencies. Indicators of biomass, recruitment, and CPUE for the unassociated purse seine fishery are near the healthy reference levels; whereas, indicators for effort, exploitation rate and average fish weight are near the unhealthy reference levels. Theoretically, average fish weight could be low due to either above average recruitment or high exploitation rates. The indicators have yet to detect any adverse consequences of relatively high exploitation rates. The results of the simple stock assessment model were similar to the 2004 assessment and there still appears to be no conservation concern for skipjack in the Eastern Pacific.

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

5.3.3.2 Skipjack Tuna (WCPO)

An updated assessment of bigeye tuna in the WCPO was conducted by the WCPFC's Scientific Committee (Langley and Hampton 2008). 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/meetings/2008/4th-regular-session-scientific-committee #stock_assessment_swg.

Stock status is assessed used MULTIFAN-CL. The status of the skipjack stock appears to be in relatively good shape. Fishing mortality is currently below F_{MSY} and biomass is above B_{MSY}. Recruitment is hypothesized to be largely driven by environmental factors; unless the environment becomes unfavorable the stock is likely to remain at healthy levels.

5.3.4 Yellowfin Tuna

5.3.4.1 Yellowfin Tuna (EPO)

Stock status of yellowfin tuna in the Eastern Pacific is assessed every year by the IATTC. An updated assessment was conducted in May 2008 (Maunder and Aires-da-Silva 2008) 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. Fishing is concentrated in the east and west, making separate consideration of the EPO stock relevant for management purposes. The assessment report can be downloaded from http://www.iattc.org/PDFFiles2/SAR9-YFT-ENG.pdf.

The 2008 base case assessment, which does not include a stock-recruitment relationship, indicates that the spawning stock size was in decline during 2002-2007 from a high point in 2001 to about the level corresponding to the AMSY. The recent fishing mortality rate (*F*), defined as an average of *F* for 2004–05, is near to that corresponding AMSY. Recent catches are significantly below MSY.

In general, the recruitment of yellowfin tuna in the Eastern Pacific has experienced two, or possibly three recruitment regimes: a period of low recruitment during 1975-1982; a period of high recruitment during 1983-2001; and now a period of intermediate or low recruitment during 2000–06. Based on the latest assessment, under the recent lower productivity regime, the spawning biomass ratio at the start of 2008 is estimated to be above AMSY and effort levels below those which would support AMSY. However, SBR in the period of 2002-2007 was below the levels corresponding to MSY and the 2008 estimate should be treated with caution.

The assessment in 2009 will be conducted using Stock Synthesis, which is a departure from the ASCALA model currently used to assess stock status.

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

5.3.4.2 Yellowfin Tuna (WCPO)

An updated assessment of yellowfin tuna in the WCPO was conducted by the WCPFC's Scientific Committee in August 2007 (Langley, et al. 2007). 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/3rd-regular-session/stock-assessment-swg-working-papers/WCPFC-SC3%20SA-SWG%20WP-01.pdf.

The 2007 stock assessment conclusions differ slightly from the 2006 assessment, particularly in relation to the ratio of the current estimate of fishing mortality compared with the fishing mortality at maximum sustainable yield (F/F_{MSY}), with the threshold in the 2007 assessment being slightly more optimistic than that in the 2006 assessment. While the point estimate of F/F_{MSY} remains slightly less than 1.0 (0.95), the probability distribution associated with the fishing mortality-based reference point indicates that there is almost an equal probability that the value of F/F_{MSY} is less than or greater than the reference point. Therefore, the possibility of overfishing is still relatively high (47 percent). The reference points that predict the status of the stock under equilibrium conditions are B/B_{MSY} (1.10) and SB/SB_{MSY} (1.12), which indicate that the long-term average biomass would remain slightly above the level capable of producing MSY at 2002–2005 average fishing mortality. Overall, current biomass exceeds the estimated biomass at MSY (B/B_{MSY} >1.0) indicating that the yellowfin stock in the WCPO is not in an overfished state, although there is a small probability (6.2 percent) that it is in an overfished state. The change in the estimated MSY in 2007 from that in 2006 may reflect changes in the data structure, fishery designations

and levels of uncertainty in the assessment, especially in estimating absolute values, and the change in the scenarios modeled between years.

The WCPO yellowfin tuna fishery can be considered to be fully exploited. Both the 2006 and 2007 assessments indicate that there is a high probability that overfishing is occurring (73 percent for the base case 2006 assessment and 47 percent for the base case 2007 assessment). In order to reduce the likelihood of overfishing, and if the WCPFC wishes to maintain average biomass at levels greater than 5 percent above B_{MSY}, reductions in the fishing mortality rate would be required.

Stock projections for 2007–2011, which attempt to simulate the conservation and management measures already adopted by the WCPFC, indicate that the point estimate of B/B_{MSY} remains above 1.0 throughout the projection period. However, the increasing uncertainty in future projections is likely to result in an increased probability of the biomass declining below B_{MSY} by the end of the projection period.

5.3.5 Bluefin Tuna

5.3.5.1 Bluefin Tuna (NPO)

Stock status of Pacific bluefin tuna is reviewed by the ISC Pacific Bluefin Tuna Working Group with participating members from the United States, Mexico, Canada, Japan, Korea and Taiwan. The latest assessment was completed in May 2008 (ISC 2008a) and reviewed by the ISC in July 2008. The report can be downloaded from : http://isc.ac.affrc.go.jp/isc8/ISC8rep.html.

Based upon the results presented in the assessment the ISC recommended that F not be increased above the most recent levels (average 2002-2004), although that level was estimated to be above F_{MSY}. However, due to implausible parameter estimates from the 2008 stock assessment the ISC recommended that the working group revisit the assessment in 2009. An intercessional meeting of the bluefin working group is planned for December 2009 to review possible model mis-specification. New assessment results are planned for the 2009 ISC Plenary.

5.3.6 Striped Marlin

5.3.6.1 Striped Marlin (NPO)

The status of a hypothesized stock of striped marlin spanning the North Pacific was conducted by the ISC Marlin Working Group in 2007 (ISC 2007b). The assessment report can be downloaded from the Council website (http://www.pcouncil.org) or http://www.pcouncil.org/hms/hmssafe/0908safe/Annex_8__ISCMARSWOWG_Mar_07.pdf.

The stock structure of striped marlin in the Pacific Ocean is not well known. A special session of the ISC's Billfish Working Group will be convened in the fall of 2009 to address the uncertainty in stock structure.

The latest stock assessment was based on analyses completed using *Stock Synthesis II* in 2006. The status is difficult to determine due to a range of uncertainties in the fishery data as well as biological uncertainties. Nonetheless, the results of two models demonstrate that biomass has declined to levels that are 6 to 16 percent of their level in 1952. In addition, landings and indices of abundance have declined markedly, and recruitment has been steadily declining with no evidence that strong year-classes have or are about to enter the fishery. There appears to be inconsistency in the indices developed for the Western Pacific and the Eastern Pacific, and it was recommended that stock structure in the NPO be investigated. Although there are no agreed upon biological reference points, the ISC Plenary recognized that current

levels of fishing effort across the North Pacific are not likely to be sustainable. It was further recommended that a committee be formed to determine ways to reduce F on striped marlin without adversely affecting target species, and until that work is completed, that fishing effort not be increased above current levels.

The next striped marlin stock assessment is scheduled for 2011.

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

5.3.7 Swordfish

5.3.7.1 Swordfish (NPO)

The status and stock structure of NPO swordfish is planned to be assessed by the ISC Billfish Working Group in February and May 2009, respectively, and will be finalized at the July ISC Plenary meeting.

5.4 Links to Information or Most Recent Pacific HMS Stock Assessments through August 2009

Species (Stock)	Organization Responsible for Assessment	Link to Assessment Report
TUNAS		
Bluefin (NPO)	ISC	http://isc.ac.affrc.go.jp/isc9/ISC9rep.html
Bigeye (EPO)	IATTC	http://www.iattc.org/PDFFiles2/SARM-10-06b-BET-assessment-2008.pdf
Bigeye (WCPO)	WCPFC	http://www.wcpfc.int/doc/sa-wp-04/harley-s-1-s-hoyle-1-a-langley-a-2-j-hampton-1-and-p-kleiber-3-stock-assessment-bigeye-
Yellowfin (EPO)	IATTC	http://www.iattc.org/PDFFiles2/SARM-10-06a-YFT-assessment-2008.pdf
Skipjack (EPO)	IATTC	http://www.iattc.org/PDFFiles2/SARM-10-07-SKJ-assessment-2008.pdf
Skipjack (WCPO)	WCPFC	http://www.wcpfc.int/doc/sa-wp-4/stock-assessment-skipjack-tuna-western-and-central-pacific-ocean
Swordfish (NPO)	ISC	http://isc.ac.affrc.go.jp/isc9/ISC9rep.html
Yellowfin (WCPO)	WCPFC	http://www.wcpfc.int/doc/sa-wp-03/langley-a-s-harley-s-hoyle-n-davies-j-hampton-and-p-kleiber-stock-assessment-yellowfin-
Albacore (WCPO)	WCPFC	http://www.wcpfc.int/doc/sa-wp-06/hoyle-s-and-n-davies-stock-assessment-albacore-tuna-south-pacific-ocean-spc-noumea-new-
Striped Marlin (EPO)	IATTC	http://www.iattc.org/PDFFiles2/SARM-10-08-MLS-Assessment-2008.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
Albacore (WCPO)	0.44	N	1.26		N		Hoyle et al. 2008
Bluefin (NPO)	>1.0[4]	Unknown[4]	Unknown	0.75	Unknown	0.94	ISC 2006
Bigeye (EPO)	1.22[5]	Y	1.15[5]	0.6	N		IATTC, Aires-da-Silva and Maunder 2008
Bigeye (WCPO)	1.44[6]	Y	1.37[6]		N		WCPFC Langley, et al. 2008
Skipjack (EPO)	Unknown[7]	Unlikely[7]	Unknown[7]	0.5	Unlikely[7]		IATTC, Maunder and Deriso 2008
Skipjack (WCPO)	0.12[8]	N	3.31[8]		N		WCPFC, Langley and Hampton. 2008
Yellowfin (EPO)	0.88[5]	N	0.96[5]	0.5	N		IATTC, Maunder and Aires-da-Silva 2008
Yellowfin (WCPO)	0.95[6]	Y	1.10[6]		N		WCPFC, Langley, et al. 2007
BILLFISHES							
Striped Marlin (NPO)	Unknown[9]	Unknown	Unknown	0.5	Unknown		ISC 2007b
Striped Marlin (EPO)	<1.0[10]	N	≥1.0		N	0.63	IATTC, Hinton and Maunder 2003
Swordfish (NWPO)	Unknown[11]	Unlikely	Unknown	0.61-0.8	Unlikely		ISC 2004
Swordfish (SEPO)	Unknown[12]	Unknown	>1.0		N		IATTC, Hinton and Maunder 2006
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	<0.5[17]	N	>1.0	0.78	N	0.97	NMFS and NRIFSF Japan, Kleiber, et al. 2001
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 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 (2005-2007) fishing effort.

[6] WCPO bigeye and yellowfin results are based on the base-case assessments.

[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 a new model 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] CWPO skipjack results are from the base-case assessment.

[9] 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.

[10] 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.

[11] Standardized CPUEs from swordfish fisheries indicate declining trends in the northwest Pacific; however, the fisheries are causing, at worst, modest declines in abundance.

[12] Specific values for F/F_{AMSY} and B/B_{AMSY} are not available; however the assessment results indicate that stock biomass is well above the level which would support AMSY.

[13] U.S. West Coast EEZ regional catch and CPUE demonstrated the population increasing from estimated low levels in the early 1990s. Recent (2000-03). West coast commercial landings average 318 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 (2000–03) West Coast commercial landings average 70 mt, which is less than 0.75 × MSY proxy (MSY proxy = average landings 1981–99).

[17] Analyses demonstrated that for North Pacific blue shark, fishing pressure is 2 to 15 times below F_{MSY}. West coast catch is poorly documented because the fish are not landed.

[18] Status unknown, but dorado are highly productive and widely distributed throughout tropical/subtropical Pacific. Recent West Coast landings average 16 mt.

Table 5-3. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2002–06.

Species (stock)	Stockwide Catch	U.S. West Coast Catch		Average Annual Fractional Catch
		Commercial	Recreational	
TUNAS				
Albacore (NPO)	62–105[1]	9–17	0.2–2.8	0.17
Bluefin (NPO)	19–27[1]	<0.2	0.03–0.3	<0.01
Bigeye (EPO)	111–132[2]	<0.05	<0.01	<0.01
Skipjack (EPO)	154–299[2]	0.05-0.5	0.01–0.1	<0.01
Yellowfin (EPO)	177–440[2]	0.08-0.5	0.1–0.3	<0.01
BILLFISHES				
Striped Marlin (EPO)	1.5–2.2[2]	<0.01[3]	0.02[4]	0.01
Swordfish (EPO)	13–20[2]	0.3–2.1	<0.01	0.07
SHARKS				
Common Thresher	Unknown	0.1–0.3	0.01–0.13	
Pelagic Thresher	Unknown	<0.01		
Bigeye Thresher	Unknown	≤0.01		
Shortfin Mako	Unknown	<0.03–0.08	0.02–0.09	
Blue (NPO)	Unknown	<0.06[3]	<0.01	
OTHER				
Dorado	4–11[5]	<0.01	0.02–0.26	0.01

Notes:
Data 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 Eighth Plenary Report Catch Tables, July 2008.

2 IATTC catch tables extracted 8/7/08.

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

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

5 FAO Area 77 catch extracted from March 27, 2008 FAO global fishery production dataset.

6.0 RESEARCH AND DATA NEEDS

6.1 Research and Data Needs

This section has been reorganized from previous versions to more explicitly link research and data needs to the Council's management priorities. These priorities should be considered in light of two central characteristics of HMS research and data needs.

First, as with management, there is an international component to research and stock assessment. The two regional fishery management organizations (RFMO) involved with management of HMS FMP stocks—the Inter-American Tropical Tuna Commission (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC)—also coordinate and conduct 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° 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 estimates of MSY and/or 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 annual catch limit (ACL) requirements and National Standard 1 guidelines. Species that are subject to management under an international agreement in which the U.S. participates will likely be exempt from the new requirements. Species like bigeye and pelagic thresher sharks—which are not managed internationally—will not likely be exempted.

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, provide database management, and 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.

Biological Studies: Biological information is a critical building block for stock assessments. It should be reviewed and updated regularly to capture changes in population parameters if 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: Recent stock assessment results as well as fishery developments suggest that the North Pacific stock of albacore is at or fast approaching full exploitation. Demand for more frequent and more precise information on status of the stock and the sustainability of the fisheries is therefore 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;

- refinement of the VPA-2Box model (the WG's current assessment model);

- investigation of the applicability of SS2 as an alternative assessment model for albacore;

- 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. 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 to reduce protected species interactions and increase swordfish catch.

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 shark species are likely to be more vulnerable to overfishing than other HMS.

To understand this *prima fascia* inconsistency (i.e., perhaps more vulnerable but not assessed), 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 catches 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 catches at all.

As with the other 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). Others are more coastal—with perhaps most of their habitat shoreward of the U.S. EEZ—but exhibit north-south migrations with significant catches in Mexican waters (e.g., thresher sharks). 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, 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 and the corresponding size samples, stock assessment efforts and concomitant management by the Council will be problematic.

The following species-specific research priorities have been identified for the two highest priority sharks 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;
- ageing 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 hooking 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 likely periods of interaction with fisheries and turtle life histories. Development of 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 into 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 on places with potentially high interaction risks.

- Explore how regulating U.S. Pacific swordfish fisheries affects international trade in swordfish and the potential unintended consequences for protected species interactions in foreign fisheries.

- Conduct a cost benefit analysis of various sea turtle conservation measures (e.g. fishery regulations vs. nesting beach protection).

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.

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 when 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 in commercial and recreational fisheries coastwide. 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
- 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 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) and 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.

6.1.3.3 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.

6.1.3.4 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.

6.1.3.5 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

6.1.3.6 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 2008 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

[1] newborns

(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: In spring 2007, a collaborative Bycatch Reduction and Engineering Program (BREP) project was initiated by the SWFSC, Southwest Region Sustainable Fisheries Division, and Pfleger Institute of Environmental Research the first post-release mortality estimate for common thresher sharks (*Alopias vulpinus)* captured in the recreational fishery off Southern California and to develop and promote alternative fishing methods which increase post-release survivorship. Although accurate and comprehensive landings data are lacking for this species, direct observations, fishing tackle sales, and weigh-station records all indicate a dramatic increase in fishing effort over the past six years. The primary technique developed in the recreational thresher shark fishery involves trolling heavy baited lures with large J-type hooks. Since thresher sharks utilize their elongate upper caudal fin lobe to stun live prey before it is consumed, more than 90 percent of sharks are foul hooked and subsequently hauled in backwards during the fight.

A total of 42 thresher sharks were caught and released over the course of the study at a sex ratio of two females to every one male. Ninety-three percent of captured thresher sharks were hooked in the dorsal lobe of the caudal fin while trolling heavy baited lures with 8/0 J-type hooks. Foul-hooked juvenile and small sub-adults (102 to 152 cm FL) incurred fight times ranging from 9 to 42 minutes on 36-kg conventional tackle and remained vigorous when brought alongside the tagging vessel prior to release. Twenty-two juvenile and sub-adults were affixed with conventional dart tags and released in good condition. Similarly, all mouth-hooked thresher sharks remained active at the side of the boat regardless of fight time. Pop-off satellite archival transmitters were deployed on 18 large sub-adult and adult thresher sharks ranging in size from 160 to 230 cm fork length. Upon capture, larger individuals were generally exhausted and lethargic following fight times ranging from 45 to 140 minutes; however, as determined by PSAT records all individuals with fight times less than 75 minutes were able to recover and survive the acute effects of capture. Immediate post-release mortality was observed in all five thresher sharks (205-230 cm FL, 3 female: 2 male) that incurred fight times in excess of 85 minutes. The resultant post-release mortality estimate in this study was 26 percent for adult and large sub-adult thresher sharks (160-230 cm FL). Results suggest that large tail-hooked thresher sharks exposed to prolonged fight times (>85 min) have increased mortality rates when compared to smaller individuals.

Experimental gear trials were conducted in 2009 to capture mouth-hooked thresher sharks for comparative blood biochemistry assessments. Artificial lead-headed lures were baited with live chub mackerel *Scomber japonicas* tethered to hookless lures using wire ties and slow trolled with a light drag clicker. Circle hooks, size 9/0, baited with dead mackerel were rigged on separate rods and dropped back towards the slow-trolled lures upon detection of a caudal-fin strike. Six of the 10 individuals caught using this drop-back technique were hooked directly in the mouth, although the use of circle hooks did not eliminate the incidence of foul-hooking in all thresher sharks. Initial gear trials indicate that the use of circle hooks may significantly reduce the number of foul-hooked sharks captured in the recreational fishery; however, additional field trials are necessary to determine the effectiveness of this gear modification and to further develop techniques to reduce overall post-release mortality. Increased accessibility to thresher sharks for tagging and blood biochemistry samples was made possible during

concurrent National Science Foundation funded research to investigate various components of common thresher shark physiology.

A strong public outreach component was incorporated into this project to compel active participants in the fishery to assist in the development of alternative fishing methods that reduce foul-hooking and increase mouth-hooking. Over 500 recreational fishermen attended the six seminars offered in 2008 and 2009, with over a dozen dedicated anglers willing to participate in the additional gear trials.

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 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.

SLUTH Workshop: An information exchange workshop entitled Swordfish and Leatherback Use of Temperate Habitat (SLUTH) was held May 28-29, 2008, at UC San Diego's Scripps Institution of Oceanography. The workshop was sponsored by the National Oceanographic and Atmospheric Administration (NOAA) Southwest Region (SWR) and the Southwest Fisheries Science Center (SWFSC), with over 40 participants, including scientists from the United States and Mexico; DGN, longline, and harpoon fishermen; seafood processors; importers/exporters; and State and Federal fisheries managers.

The purpose of the workshop was to explore a more holistic approach to turtle conservation and to determine if a more adaptive management strategy (i.e., management not based upon large, static

time/area closures) for West Coast swordfish fisheries is feasible. Objectives included reviewing current science relevant to leatherback and swordfish movement patterns, habitat utilization, trophic dynamics, population status, and management concerns; discussing approaches to promoting sustainable and economically viable West Coast-based U.S. swordfish fisheries while minimizing nontarget species impacts; developing an advisory team composed of fishermen, scientists, managers, economists, and non-governmental organizations (NGOs); providing a forum to share views, express concerns, and develop future plans; and identifying data gaps, available tools and practical next steps towards the development of a more holistic approach to turtle conservation, and further develop fishery management options. The workshop proceedings 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 2010.

6.2.5 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 plans are being developed to conduct initial scoping workshops in late 2009 with field work proposed for spring-summer 2010.

7.0 REFERENCES

Aires-da-Silva A. and M.N. Maunder. 2008. Status of bigeye tuna in the eastern Pacific Ocean in 2007 and outlook for the future. Inter-Amer. Trop. Tuna Comm., Stock Assess. Rep. 9: 101-202. (http://www.iattc.org/PDFFiles2/SAR9-BET-ENG.pdf)

FAO, 2006. State of World Fisheries and Aquaculture. Electronic edition. http://www.fao.org/docep/009/A0699e/A0699e00.htm

Hoyle, S., A. Langley and J. Hampton. 2008. Stock assessment of Albacore tuna in the south Pacific Ocean. WCPFC-SC4-2008/SA-WP8. August 4, 2008. 126 pages. (http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/4th-regular-session/stock-assessment-specialist-working-gro-/SC4-SA-WP8%20%5BALB%20assessment%5D.pdf)

ISC 2004. Report of the swordfish working group. Interim Sci. Comm. for Tuna and Tuna-like species in the North Pacific Ocean, ISC/04/Plenary/7.

ISC. 2007a. ANNEX 5 (Report of the Albacore Working Group Workshop, November 28 – December 5, 2006, Shimizu, Japan) *of* Report of the seventh meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, July 25-30, Busan, Korea. (http://www.pcouncil.org/bb/2007/0907/F4a_ATT2.pdf)

ISC 2007b. ANNEX 8 (Report of the Marlin and Swordfish Working Group Joint Workshop, March 19-26, 2007, Taipei, Taiwan) *of* Report of the seventh meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, July 25-30, Busan, Korea.

ISC. 2008. ANNEX 4 (Report of the Pacific Bluefin Tuna Working Group workshop, December 10-17, 2008, Shimizu Japan) *of* Report of the eight meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, July 15-20, Kaoshung, Taiwan.

Langley, A. and J. Hampton. 2008. Stock assessment of skipjack tuna in the western and central Pacific Ocean. WCPFC-SC4-2008/SA-WP-4. 74 pages. (http://www.wcpfc.int/system/files/stock-assessment-specialist-working-group-working-papers/SA-WP-4%20%5BSKJ%20Assessment%5D.pdf)

Langley, A., J. Hampton, P. Kleiber and S. Hoyle . 2008 Stock assessment of bigeye tuna in the western and central Pacific Ocean, including an analysis of management options. WCPFC-SC4-2008/SA-WP-1 Rev.1. July 30, 2008. 134 pages. (http://www.wcpfc.int/system/files/documents/meetings/scientific-committee/4th-regular-session/stock-assessment-specialist-working-gro-/SC4-SA-WP1-rev.1%20%5BBET%20Assessment%5D.pdf)

Langley, A., Hampton, J., Kleiber, P., Hoyle, S. 2007. Stock assessment of yellowfin tuna in the western and central Pacific Ocean, including an analysis of management options. WCPFC SC3 SA WP-1, Honolulu, Hawaii, 13-24 August 2007. (http://www.wcpfc.int/sc3/pdf/WCPFC-SC3%20SA-SWG%20WP-01.pdf)

Maunder, M.N. 2008. Updating indicators for stock status of skipjack tuna in the Eastern Pacific Ocean. Inter-Amer. Trop. Tuna Comm., Stock Assess. Rep. 9: 95-100.

Maunder, M.N. and A. Aires-da-Silva2007. Status of yellowfin tuna in the eastern Pacific Ocean in 2007 and outlook for the future. Inter-Amer. Trop. Tuna Comm., Stock Assess. Rep. 9: 1-94. (http://www.iattc.org/PDFFiles2/SAR9-YFT-ENG.pdf)

Maunder, M.N. and Deriso, R.B. 2007. Using indicators of stock status when traditional reference points are not available: evaluation and application to skipjack tuna in the eastern Pacific Ocean. Inter-Amer. Trop. Tuna Comm., Stock Assessment Report, 8: 229-248. (http://www.iattc.org/PDFFiles2/SAR8-SKJ-

ENG.pdf)

Packard Foundation, 2008. Marine Science Assessment of Capture Based Tuna Aquaculture in the Ensenada Region of Northern Baja California, Mexico. Final Report of the Bi-National Scientific Team to the Packard Foundation.

PFMC 2003. Fishery management plan and environmental impact statement for U.S. West Coast fisheries for highly migratory species.

Restrepo, V.R., Thompson, G.G., Mace, P.M. et al. 1998. Technical Guidance on the use of precautionary approaches to implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Tech. Mem. NMFS-F/SPO-31. U.S. Dept. Commerce, NOAA, NMFS, Washington D.C., 18 pp.

8.0 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
Southern California Elasmobranch Consortium	http://www.sharkbight.com
Tagging of Pacific Pelagics	http://www.toppcensus.org

Sport and Commercial Fishing Industry Related Associations

American Albacore Fishing Association	http://www.americanalbacore.com
Oregon Albacore Commission	http://www.oregonalbacore.org/

Sportfishing Association of California	http://www.sacemup.org
United Anglers of Southern California	http://www.unitedanglers.com
Western Fishboat Owner's Association	http://www.wfoa-tuna.org