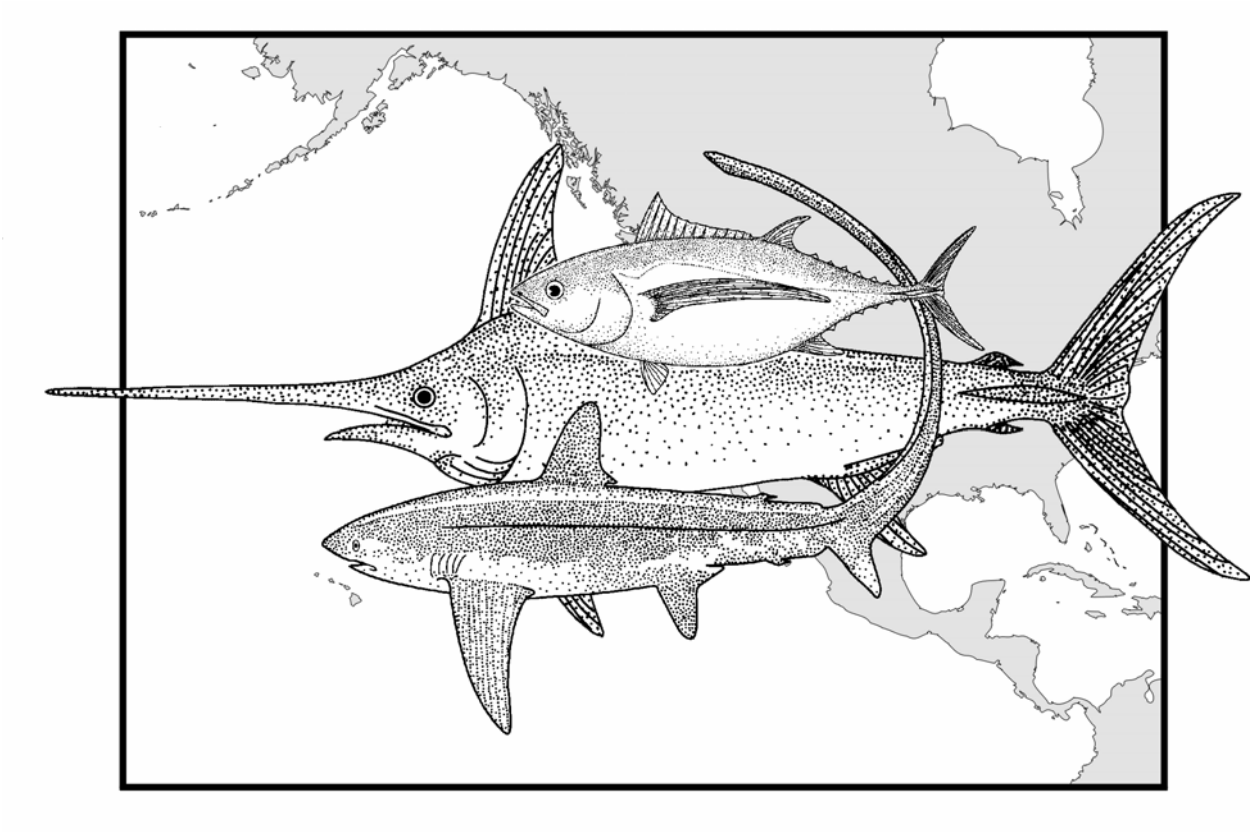
STATUS OF THE U.S. WEST COAST FISHERIES FOR HIGHLY MIGRATORY SPECIES THROUGH 2005



STOCK ASSESSMENT AND FISHERY EVALUATION

SEPTEMBER 2006

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

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

Prepared by the Pacific Fishery Management Council in conjunction with the National Marine Fisheries Service, Southwest Region under National Oceanic and Atmospheric Administration award number NA05NMF4410008.

Table of Contents

List of Tables

List of Figures

1.0 INTRODUCTION

1.1 Goals and Objectives of 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 and federal management of the stocks listed in Table 1–1. The National Marine Fisheries Service (NMFS), on behalf of the Secretary of Commerce, partially approved the HMS FMP on February 4, 2004. Implementing regulations became effective on April 7, 2004. The FMP identifies the following goals and objectives for HMS management:

1. Promote and actively contribute to international efforts for the long-term conservation and sustainable use of highly migratory species fisheries that are utilized by West Coast-based fishers, while recognizing these fishery resources contribute to the food supply, economy, and health of the nation.
2. Provide a long-term, stable supply of high-quality, locally caught fish to the public.
3. Minimize economic waste and adverse impacts on fishing communities to the extent practicable when adopting conservation and management measures.
4. Provide viable and diverse commercial fisheries and recreational fishing opportunity for highly migratory species based in ports in the area of the Pacific Council's jurisdiction, and give due consideration for traditional participants in the fisheries.
5. Implement harvest strategies which achieve optimum yield for long-term sustainable harvest levels.
6. Provide foundation to support the State Department in cooperative international management of highly migratory species fisheries.
7. Promote inter-regional collaboration in management of fisheries for species which occur in the Pacific Council's managed area and other Councils' areas.
8. Minimize inconsistencies among federal and state regulations for highly migratory species fisheries.
9. Minimize bycatch and avoid discard and implement measures to adequately account for total bycatch and discard mortalities.
10. Prevent overfishing and rebuild overfished stocks, working with international organizations as necessary.
11. Acquire biological information and develop a long-term research program.
12. Promote effective monitoring and enforcement.
13. Minimize gear conflicts.
14. Maintain, restore, or enhance the current quantity and productive capacity of habitats to increase fishery productivity for the benefit of the resource and commercial and recreational fisheries for highly migratory species.
15. Establish procedures to facilitate rapid implementation of future management actions, as necessary.
16. Promote outreach and education efforts to inform the general public about how West Coast HMS fisheries are managed and the importance of these fisheries to fishers, local fishing communities, and consumers.
17. Manage the fisheries to prevent adverse effects on any protected species covered by the Marine Mammal Protection Act (MMPA) and Migratory Bird Treaty Act (MBTA) and promote the recovery of any species listed under the ESA to the extent practicable.
18. Allocate harvest fairly and equitably among commercial, recreational and charter fisheries for HMS, if allocation becomes necessary.

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 thynnus*
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, *Conservation and management measures shall be based upon the best scientific information available*, 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:

> 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.

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. Any such measures become effective at the start of the next fishing year, April 1 of the following year, and stay in effect for at least two years. No changes to the current harvest specifications and management measures were proposed in 2005.

1.3 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, and their primary responsibilities in preparing the report, are listed below.

Ms. Michele Culver, Team Co-chair (Chapter 2 description of Washington fisheries, Chapter 6)
Washington Department of Fish and Wildlife representative

Mr. Craig Heberer (Chapter 3, description of FMP management measures and regulations)
Fisheries Biologist, NMFS Southwest Region

Dr. Suzanne Kohin (Chapter 5)
Research Fishery Biologist, NMFS Southwest Fisheries Science Center

Ms. Jean McCrae (Chapter 2 description of Oregon fisheries)
Oregon Department of Fish and Wildlife representative

Ms. Elizabeth Petras (Chapter 3, protected species regulations)
Liaison Officer, NMFS Southwest Region Office of Protected Resources

Dr. Stephen Stohs (Chapter 4)
Industry Economist, NMFS Southwest Fisheries Science Center

Dr. Dale Squires, Outgoing Team Co-chair (resigned June 2006)
Economist, NMFS Southwest Fisheries Science Center

Mr. Stephen Wertz (Chapter 2, description of California fisheries)
Associate Marine Biologist, California Department of Fish and Game

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

Ms. Donna Dealy (Chapter 4)
Computer Specialist, NMFS Southwest Fisheries Science Center

2.0 DESCRIPTION OF THE FISHERIES

2.1 Description of West Coast 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 gill net 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 1,312 in 1981 to a low of 97 in 2005. 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; however, 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. 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, and Washington.

In 2005, 97 commercial surface hook-and-line vessels landed 461 mt of albacore compared to 197 vessels that landed 1,338 mt in 2004 (Table 2–1). The volume and number of landings varied throughout ports in California with Eureka receiving a majority of the catch (Table 2–1). Nominal landings occurred January through July, increasing August through November with a peak in October (Table 2–2). The ex-vessel revenue was $1.1million in 2005 compared to $2.4 million in 2004.

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, 2004–05.

	2004 Landings		2005 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Eureka	739	167	222	88
Fort Bragg	54	59	13	43
Bodega Bay	26	26	8	5
San Francisco	25	70	11	33
Monterey	177	110	52	48
Morro Bay	14	25	5	20
Santa Barbara	3	19	6	7
Los Angeles	210	27	139	14
San Diego	90	87	5	46
Total	1,338	590	461	304

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006
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 short ton (ST), and then multiplying the conversion factor of 0.9072 for MT.

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 frozen and exported to foreign markets for processing. In 2005, exports of fresh/frozen product went to Ecuador, Japan, and Spain for canning.

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, 2004–05.

	2004		2005	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	< 1	419	< 1	41
February	< 1	199	< 1	118
March	< 1	51	1	2,601
April	< 1	206	< 1	126
May	7	11,103	0	0
June	19	42,011	1	3,710
July	27	70,092	4	18,043
August	157	291,518	76	165,744
September	574	1,013,269	87	198,167
October	467	815,213	228	558,040
November	73	141,216	64	129,904
December	13	42,996	< 1	148
Total	1,338	2,428,292	461	1,076,641

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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).

Landings for 2005 are reminiscent of the late 1980s and early 1990s totals when they were also below the 1,000 mt bench mark (Table 4–35 and 4–36). 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 oceanographic conditions. Additionally, industry representatives have indicated that in recent years lower operating cost and better landing facilities outside of California have resulted in a decrease in California landings. Commercial landings of albacore in Oregon and Washington in 2005 were 3,665 mt and 4,402 mt, respectively.

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 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, and market squid. However, they will target the tropical yellowfin and skipjack tunas when intrusions of warm water from the south bring fish 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 228 in 1986 to a low of one in 2003. In general, the relocation of large cannery operations overseas to offset declining revenues, due to the cost of domestic production compared to foreign production, can be attributed to the decline in vessels. Currently there are no canneries operating 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, and Washington.

Yellowfin Tuna: In 2005, seven purse seine vessels landed 283 mt of yellowfin compared to nine vessels that landed 474 mt in 2004 (Table 2–3). A majority of the fish were caught in the SCB in spring time and landed within the Los Angeles port complex. The annual landing trend has been one of decline since 1976, when more than 125,000 mt of fish were landed in California ports.

The ex-vessel revenue was $304,037 in 2005 compared to $435,085 in 2004 (Table 2–3). Exports of fresh yellowfin from California went to fresh fish markets in Japan and Canada; and frozen products also went to Canada, Mexico, South Korea, and Vietnam for processing in 2005.

Table 2–3. Monthly commercial landings (round mt), number of deliveries, and ex-vessel revenue for yellowfin tuna landed at sites within the Los Angeles port complex by California's purse seine fleet, 2004–05.

	2004			2005		
	Landings		Ex-vessel	Landings		Ex-vessel
Month	(mt)[1]	(number)	(dollar)[2]	(mt)[1]	(number)	(dollar)[2]
February	96	9	87,456	0	0	0
March	77	6	79,720	0	0	0
April	72	6	102,612	43	7	108,050
May	0	0	0	141	10	131,624
June	88	8	98,552	4	1	2,854
July	0	0	0	0	0	0
August	0	0	0	82	6	53,765
September	141	16	66,746	12	4	7,744
Total	474	45	435,086	282	28	304,037

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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).

Skipjack Tuna: In 2005, 10 purse seine vessels landed 522 mt of skipjack compared to 10 vessels that landed 304 mt in 2004 (Table 2–4). Skipjack landed in California are caught primarily in the SCB and seaward of the Mexican EEZ. The annual landings trend has been one of decline following the historic high of 79,111 mt in 1980.

The ex-vessel revenue was $291,183 in 2005 compared to $108,853 in 2004. Annual landings and ex-vessel revenues have been relatively flat since 1985, averaging 2,641 mt and $2.7 million. No exports of skipjack tuna from California were reported in 2005.

Table 2–4. Monthly commercial landings (round mt), number of deliveries, and ex-vessel revenue for skipjack tuna landed at sites within the Los Angeles port complex by California's purse seine fleet, 2004–05.

	2004			2005		
	Landings		Ex-vessel	Landings		Ex-vessel
Month	(mt)[1]	(number)	(dollar)[2]	(mt)[1]	(number)	(dollar)[2]
February	130	2	43,046	0	0	0
March	13	1	5,021	0	0	0
April	48	1	15,745	74	1	49,011
May	0	0	0	83	2	55,181
June	1	1	522	0	0	0
July	0	0	0	0	0	0
August	0	0	0	200	8	90,149
September	112	15	44,519	165	5	96,842
Total	304	20	108,853	522	16	291,183

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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).

Bluefin Tuna: In 2005, six purse seine vessels landed 201 mt of bluefin compared to zero vessels in 2004. All fish were caught in August, south of Cortez Bank in the SCB and landed at sites within the Los Angeles port complex (Tables 2–5). The ex-vessel revenue was $119,162 in 2005. Exports of fresh bluefin tuna from California went to Japan while fresh and frozen products went to Canada in 2005.

Table 2–5. Monthly commercial landings (round mt), number of deliveries, and ex-vessel revenue for bluefin tuna landed at sites within the Los Angeles port complex by California's purse seine fleet, 2004–05.

	2004			2005		
	Landings		Ex-vessel	Landings		Ex-vessel
Month	(mt)[1]	(number)	(dollar)[2]	(mt)[1]	(number)	(dollar)[2]
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	0	0	0	0	0	0
May	0	0	0	0	0	0
June	0	0	0	0	0	0
July	0	0	0	0	0	0
August	0	0	0	201	7	119,162
September	0	0	0	0	0	0
Total	0	0	0	201	7	119,162

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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.

2.1.1.3 Harpoon Fishery for Swordfish

California's harpoon fishery for swordfish developed in the early 1990s. Prior to 1980, harpoon and hook-and-line gears were the only methods of take authorized to commercially harvest 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 23 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 plan. To participate in the harpoon fishery a 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, and Washington.

Table 2–6. Annual commercial landings (round mt) and number of deliveries for swordfish landed in California's major port complexes by the harpoon fleet, 2004–05.

	2004		2005	
	Landings		Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Monterey	2	5	0	0
Santa Barbara	1	4	0	0
Los Angeles	51	177	55	205
San Diego	15	80	19	106
Total	69	266	74	311

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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 2–7. Monthly commercial landings (round mt) and ex-vessel revenue (dollars) for swordfish landed in California by the harpoon fleet, 2004–05.

	2004		2005	
	Landings	Ex-vessel	Landings	Ex-vessel
Month	(mt)[1]	(dollar)[2]	(mt)[1]	(dollar)[2]
May	<1	1,890	<1	5,823
June	10	101,817	3	37,706
July	14	139,554	19	198,924
August	17	168,236	25	227,863
September	23	213,740	7	161,918
October	4	34,094	6	51,269
November	1	9,061	8	60,456
December	<1	1,565	6	38,961
Total	69	669,955	74	782,920

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006
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).

In 2005, 24 harpoon vessels landed 74 mt of swordfish compared to 28 vessels that landed 69 mt in 2004 (Table 2–6). Fishing effort was concentrated in coastal waters off San Diego and Orange Counties in the SCB and landings occurred May through December, peaking in August (Table 2–7).

The ex-vessel revenue for 2005 was $782,920 compared to $669,955 in 2004 (Table 2–7). 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 for harpooned fish was $7.84 compared to $3.41 for drift gillnet caught fish in 2005. Harpooned swordfish support domestic seafood restaurant businesses and is advertised as a bycatch-free fishery.

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 1980's 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, seasons, and area closures. The limited entry program was established in 1980 and about 150 permits were initially issued. The permit is transferable under very limited conditions and it is linked to an individual fisherman, not a vessel; thus the value of the vessel does not become artificially inflated, allowing permittees to buy new vessels as needed. Since 1984, the number of permits has declined from a high of 251 in 1986 to a low of 90 in 2005; however, only 38 vessels participated in the swordfish fishery in 2005 (Table 2–8). 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 sea birds. 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, and Washington.

Table 2–8. Historical number of annual drift gillnet permits issued and number of active vessels, 1981–2005.

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

Source: CDFG License and Revenue Branch (LRB), extracted May 31, 2006.
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 August 15 through January 31.

Table 2–9. Annual commercial landings (round mt) and number of deliveries for swordfish landed in California's major port complexes by the drift gillnet fleet, 2004–05.

	2004 Landings		2005 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Eureka	< 1	1	0	0
Fort Bragg	0	0	0	0
Bodega Bay	0	0	0	0
San Francisco	0	0	0	0
Monterey	3	4	30	23
Morro Bay	14	15	30	25
Santa Barbara	16	28	6	20
Los Angeles	9	22	9	21
San Diego	140	354	145	320
Total	182	424	220	409

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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 multiply 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 2–10. Monthly commercial landings (round mt) and ex-vessel revenue for swordfish landed in California by the drift gillnet fleet, 2004–05.

	2004		2005	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	8	57,470	15	109,284
February	< 1	1,306	< 1	735
March	0	0	0	0
April	0	0	0	0
May	0	0	< 1	1,265
June	0	0	0	0
July	0	0	< 1	565
August	1	10,790	< 1	3,987
September	2	9,035	4	21,327
October	17	100,416	32	185,654
November	76	409,947	87	440,819
December	77	355,502	82	421,191
Total	182	944,466	220	1,184,827

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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).

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 January 1 through January 31, and from August 15 to August 31. Since 2000, the number of vessels participating in the swordfish fishery has decreased from 69 in 2001 to 38 in 2005.

In 2005, 38 drift gillnet vessels landed 220 mt of swordfish compared to 35 vessels that landed 182 mt in 2004 (Table 2–9). Landings occurred at ports from San Diego to Monterey and the majority occurred from October to December. Over 85 percent of the reported effort occurred in the SCB.

The ex-vessel revenue was $1.2 million in 2005 compared to $1.0 million in 2004 (Table 2–10). Most of the swordfish landed in California supports 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 (Table 2–11). 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 2–11. Annual commercial landings (round mt) and number of deliveries for common thresher shark landed in California's major port complexes by the drift gillnet fleet, 2004–05.

	2004 Landings		2005 Landings	
Port Complex[1]	(mt)[2]	(number)	(mt)[2]	(number)
Eureka	4	1	0	0
Fort Bragg	0	0	0	0
Bodega Bay	0	0	0	0
San Francisco	0	0	0	0
Monterey	< 1	1	5	8
Morro Bay	6	11	5	8
Santa Barbara	18	44	17	50
Los Angeles	3	14	25	39
San Diego	35	118	103	157
Total	66	189	155	262

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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.

In 2005, 42 drift gillnet vessels landed 155 mt of common thresher shark compared to 40 vessels that landed 66 mt in 2004 (Table 2–11). Landings occurred throughout the open season but a majority occurred October through December at ports from San Diego to Monterey (Table 2–11). Fishing effort

was focused in the SCB.

The ex-vessel revenue for 2005 was $224,939 compared to $109,561 in 2004 (Table 2–12). Fresh thresher shark support domestic seafood restaurant businesses.

Table 2–12. Monthly commercial landings (round mt) and ex-vessel revenue for common thresher shark landed in California ports by the drift gillnet fleet, 2004–05.

	2004		2005	
Month	Landings (mt)[1]	Ex-vessel (dollar)[2]	Landings (mt)[1]	Ex-vessel (dollar)[2]
January	17	34,779	8	16,024
February	1	2,190	0	0
March	0	0	0	0
April	0	0	< 1	60
May	1	2,336	3	5,116
June	< 1	659	18	31,152
July	2	3,255	1	2,360
August	< 1	824	< 1	306
September	9	8,779	7	14,029
October	6	9,145	26	48,966
November	15	25,653	57	73,336
December	14	21,942	35	33,591
Total	66	109,561	155	224,939

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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.

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 2005, two longline vessels made landings compared to 20 vessels that landed 898 mt in 2004 (Table 2–13). Federal data confidentiality rules do not allow reporting information unless aggregated for three or more vessels. Thus 2005 landings and associated revenues cannot be reported since less than three vessels were involved. The relatively low landings reported in 2005 are reminiscent of the 1980s when only three vessels participated in the high seas fishery and landings ranged from 0 to 12 mt.

Although it cannot be reported for data confidentiality reasons, ex-vessel revenue in 2005 was low, consistent with the nominal landings reported in that year. Annual landings and ex-vessel revenues have been declining since 2000 when landings and ex-vessel revenue totaled 1,885 mt and $8.1 million,

respectively (Tables 4–13 and 4–19).

Table 2–13. Annual commercial landings (round mt) and number of deliveries for swordfish landed in California's major port complexes by the longline fleet, 2004 to 2005.

Port Complex[1]	2004 Landings (mt)[2]	2004 Landings (number)	2005 Landings (mt)[2]	2005 Landings (number)
San Francisco	45	3	*	*
Monterey	0	0	*	*
Morro Bay	0	0	*	*
Santa Barbara	11	7	*	*
Los Angeles	842	73	*	*
San Diego	0	0	*	*
Total	898	83	*	*

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
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 2–14. Monthly commercial landings (round mt) and ex-vessel revenue for swordfish landed in California ports by the longline fleet, 2004–05.

Month	2004 Landings (mt)[1]	2004 Ex-vessel (dollar)[2]	2005 Landings (mt)[1]	2005 Ex-vessel (dollar)[2]
January	133	464,832	*	*
February	213	841,026	*	*
March	229	834,455	*	*
April	298	942,834	*	*
May	25	75,454	*	*
June	0	0	*	*
July	0	1,131	*	*
August	0	0	*	*
September	0	0	*	*
October	0	0	*	*
November	0	0	*	*
December	0	4	*	*
Total	898	3,159,736	*	*

Source: California's Commercial Fisheries Information System (CFIS), market receipt data, extracted June 20, 2006.
Additional processing information:
[1]-Landings in pounds are converted to round weight mt by dividing the landed weights by 2000 for ST, and then multiply 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.

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 3,665 mt in 2005; a 24 percent decrease from 2004 landings of 4,789.7 mt (Table 2–15). Reasons cited by fishermen for the decrease included high fuel prices, fish located far from shore, rough ocean conditions, and lots of natural bait.

Table 2–15. Oregon commercial albacore landings (mt) by month, 2004–05.

Month	2004	2005
May	0.2	
June	215.7	23.5
July	1,537.2	498.6
August	1,358.7	1,612.3
September	1,173.2	857.7
October	516.7	664.6
November	4.0	7.8
Total	4,806	3,664.5

Data source: ODFW fish ticket landings data, extracted January 2006.

Landings of albacore into Oregon ports began in mid-June and continued through October. There was an initial surge of landings in early July when tuna were close to shore. Cold water upwelling in mid-July pushed the albacore well offshore. The peak of landings occurred in early August (Table 2–15). Landings tapered off in September. The salmon season reopened on September 1st and many boats switched to fishing for salmon. Total landings for 2005 were 3,664.5 mt (Table 2–16). Newport generally receives the majority of Oregon deliveries, followed by Astoria and Charleston. Seven other ports also received deliveries in 2005 (Table 2–16). The estimated number of trips landed into Oregon ports decreased from 1,424 trips in 2004 to 981 trips in 2005. The average for the last five years is 1,081 landings. The average landing was 3.7 mt, higher than the average for 2004 and 2003, 3.1 mt and 3.2 mt respectively.

Table 2–16. Oregon commercial albacore landings (mt) by port, 2004–05.

Port	2004	2005
Astoria	974.3	1,260.2
Garibaldi	79.3	89.8
Pacific City	2.4	0.5
Depoe Bay	5.4	1.2
Newport	2,214.6	1,364.1
Florence	23.3	10.3
Winchester Bay	44.8	70.9
Charleston	1,427.7	847.6
Bandon	1.0	
Port Orford	5.2	2.0
Gold Beach	2.1	
Brookings	25.7	17.6
Total	4,806	

Data source: ODFW fish ticket landings data, extracted January 2006.

Albacore markets remained fairly stable during 2005 with fish going to European, Asian, Ecuadorean (Star Kist), and custom packers and off-vessel sales (directly to the public). Ex-vessel prices increased in 2005 from prices in 2004 and 2003 for all product forms (Table 2–17).

Table 2–17. Nominal ex-vessel price-per-pound (not adjusted for inflation) for albacore tuna in Oregon, 2004–05.

Product Form	2004	2005
frozen	$0.75 to $1.50	$1.10 to $1.45
fresh	$0.65 to $1.00	$0.75 to $1.50
off-vessel (whole)	$1.75	$1.75 to $1.90
off-vessel (loins)	$3.50	

Data source: ODFW fish ticket landings data, extracted January 2006.

2.1.2.2 Drift Gillnet Fishery for Swordfish and Shark

The Oregon commercial drift gillnet 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 has dropped considerably. In Oregon, the drift gillnet fishery for swordfish is managed under the Developmental Fisheries Program, which limits the number of permits available. Although 10 permits are available each year, only one permit was issued and no landings were made in 2005 (Table 2–18).

Table 2–18. Oregon landings (mt) with drift gillnet gear, 2004–05.

Species	2004	2005
swordfish	0.03	
thresher shark	0.07	
bluefin tuna		
shortfin mako		
opah		
Total	0.10	0

Data source: ODFW fish ticket landings data, extracted March 2006.

2.1.3 Washington

The HMS fisheries—commercial and recreational—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 Washington, usually around late September.

The albacore fisheries off Washington include commercial troll, bait boats, charter boats, and recreational fishing boats. There is no state commercial fishing license requirement for albacore tuna in Washington; however, beginning in June 2006, a recreational fishing license is required.

2.1.3.1 Surface Hook-and-Line Fishery for Albacore

The two major ports along Washington's coast that have the highest HMS landings are Westport and Ilwaco. There are several other ports along the coast and in Puget Sound that typically receive albacore landings as well (Table 2–19). Landings at individual 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 a fish buyer for processing.

Table 2–19. Washington commercial albacore landings (mt) by port, 2004–05.

Port	2004	2005
Anacortes	6.7	2.1
Bellingham Bay	309.5	233.2
Port Angeles	5.8	1.9
Port Townsend	8.5	7.5
Seattle	7.8	5.8
Olympia	0.0	1.0
Neah Bay	1.2	3.9
La Push	7.3	5.1
Aberdeen	1.2	20.0
Grayland	0.0	2.3
Westport	3,179.0	2,803.9
Tokeland	4.9	29.0
Bay Center	0.0	0.3
Long Beach	0.2	0.3
Chinook	29.7	13.9
Ilwaco	3,746.0	1,271.2
Nahcotta	0.3	0.0
South Bend	0.2	0.0
Cathlamet	0.8	0.0
Total	**7,309.1**	**4,401.6**

Data source: WDFW fish ticket landings data, extracted March 2006

Large amounts of albacore tuna have been landed in Washington in recent years and, in general, the tuna fishery has remained stable since the early 1990s. In recent years, 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.

As provided for under the U.S./Canada albacore treaty, some Washington ports also receive albacore landings from Canadian vessels, although the majority of Washington's albacore landings come from U.S. vessels fishing in U.S. waters (Table 2–20).

Table 2–20. U.S. and Canadian albacore landings into Washington, 2004–05.

	U.S. Vessels		Canadian Vessels		Total	
	lbs	value	lbs	value	lbs	value
2004	16,247,282	$13,396,313	1,930,900	$2,367,778	18,178,182	$15,764,091
2005	9,837,433	$9,781,600	845,384	$1,069,562	10,682,817	$10,851,162

Data source: WDFW fish ticket landings data, extracted March 2006

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, are taken by free divers using spear guns. Fishing occurs in the EEZ waters of the U.S. as well as Mexico aboard commercial passenger fishing vessels (CPFVs) and private boats. A fishing season is dependent on oceanographic conditions, which strongly influence the 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 2–21 shows the daily possession limits for MUS for California recreational anglers.

Table 2–21. 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]
Tunas				
Albacore	X			
Bigeye				X
Bluefin	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., albacore, bluefin, and 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.

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 (www.psmfc.org/recfin), and the CDFG CPFV logbook program. The RecFIN provides estimates based on field sampling of catch and a telephone survey for effort, while the state's logbook program provides a census of most vessels. The fact that catches of highly migratory MUS constitute a relatively rare event is why logbooks are preferred over RecFIN 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, RecFIN data are the best available for making catch estimates of anglers fishing from private boats.

Table 2-22. Annual number of highly migratory MUS kept and thrown back by recreational anglers fishing from commercial passenger fishing vessels (CPFV) in U.S. EEZ waters, 2004–05.

	2004 Number of Fish		2005 Number of Fish	
Species	(kept)	(thrown back[2])	(kept)	(thrown back[2])
Tunas				
Albacore	20,092	111	15,625	73
Bigeye	63	0	2	0
Bluefin	483	10	722	1
Skipjack	735	383	2,212	535
Yellowfin	8,330	117	5,343	20
Billfishes				
Striped Marlin	1	2	4	6
Swordfish	2	0	0	0
Sharks				
Blue	6	92	26	77
Common Thresher[1]	20	3	24	10
Shortfin Mako	250	57	121	35
Other Fish				
Dorado	671	20	664	12
Total	30,653	759	24,743	769

Source: California's Commercial Fisheries Information System (CFIS), CPFV logbook data, extracted June 20, 2006
Additional Processing Information:
[1]-The annual totals for common thresher shark included 1pelagic thresher kept in 2005 and 1 thrown back in 2004; and 1 bigeye thresher thrown back in 2005 and 1 kept in 2004.
[2]-The condition (live or dead) of fish thrown back fish is not available.

With the exception of sharks, most HMS MUS are caught by anglers fishing from CPFVs in the Mexican EEZ (Table 4–48). But for some species reported catches from the U.S. EEZ can sometimes reach 100 percent of the yearly total for the fleet. In 2005, approximately 131 CPFVs logged 1,242 days at-sea within the U.S. EEZ compared to 153 CPFVs that logged 1,498 days at-sea in 2004. The total number of MUS kept by anglers declined from 30,653 fish in 2004 to 24,743 fish in 2005 (Table 2–22). Albacore was the leading species in 2005, followed by yellowfin, skipjack, and bluefin tuna. In recent years, the CPFV fleet experienced some of the best fishing ever for several MUS species when the U.S. and Mexican EEZ catches are combined (Table 4–48). Over 312,700 albacore were landed in 2002 while 1999, 2003, and 2001 produced the second through fourth best years in history. Exceptional bluefin tuna catches also occurred during this period. During 1999, 36,390 fish were landed making it the best year in

history while 2002, 2003, 2001, and 2000 produced the third through sixth best years in history. CPFV anglers caught 86,737 yellowfin tuna in 2000 making it the fourth best year on record while 1998 produced the fifth best year on record for this species.

Catch estimates for private boats are presented in Table 2–23. The estimates are for vessels fishing exclusively in the U.S. EEZ. Many private vessels fish in the EEZ of Mexico but the number and catch of these vessels is unknown. In 2005, about 19,000 MUS were caught by private boaters compared to 38,000 MUS caught in 2004. Despite the overall decrease in MUS catches from 2004 to 2005, estimates of shortfin mako shark catches doubled from 7,000 to 14,000 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 2–23. Estimated number of highly migratory MUS kept and thrown back alive by recreational anglers fishing from private vessels in U.S. EEZ waters, 2004–05.

	2004 Number of Fish (x1,000)		2005 Number of Fish (x1,000)	
Species	**(kept)**	**(thrown back alive)**	**(kept)**	**(thrown back alive[1])**
Tunas				
Albacore	28	1	5	< 1
Bigeye	< 1	0	0	0
Bluefin	< 1	0	< 1	0
Skipjack	< 1	< 1	< 1	0
Yellowfin	3	< 1	< 1	0
Billfishes				
Striped Marlin	< 1	<1	< 1	0
Swordfish	0	0	0	0
Sharks				
Blue	< 1	1	< 1	24
Common Thresher	4	< 1	< 1	2
Shortfin Mako	3	5	14	7
Other Fish				
Dorado	< 1	< 1	< 1	0
Total	38	7	19	33

Source: Pacific States Marine Fisheries Commission, Recreational Fisheries Information System, California Recreational Fisheries Survey data, extracted July 28, 2006.
Additional Processing Information:
[1]-The angler reported the fish was thrown back alive after capture.

2.2.2 Oregon

In 2005, the recreational albacore fishery off Oregon showed a decreased from the last two years, both in number of trips (Table 2–24) and in number of fish (Table 2–25). However, catch and effort in general is still increasing over years prior to 2003, especially in the private boat sector. Catch per unit of effort (CPUE) decreased in 2005 (2.1 fish/trip) from 2004 (4.3 fish/trip) (Table 2–26). During 2005, the recreational fishery contributed approximately 45.5 mt (5,015 fish at about 20 lbs average weight) to the total albacore landings. This was down from the 2004 catch of approximately 125.1 mt. Private boats accounted for approximately 58 percent of the total recreational landings. Newport accounted for almost one-half of the trips and number of fish.

Table 2–24. Oregon albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port, 2004–05.

Port	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
Astoria	58	72	95	175	153	247
Garibaldi	57	80	88	120	145	200
Pacific City	12	5	132	57	144	62
Depoe Bay	255	151	420	405	675	556
Newport	679	611	700	587	1379	1198
Winchester Bay	156	77	98	14	254	91
Coos Bay	68		565	19	633	19
Bandon	48	14	54		102	14
Port Orford						
Gold Beach						
Brookings	47	12	505	39	552	51
Total	1380	1022	2657	1416	4037	2438
Private boat (%)					65.8%	58.1%

Data Source: ODFW Ocean Recreational Boat Survey, extracted March 2006.

Table 2–25. Oregon albacore catch (number of fish) for charter and private boats, and combined, by year and port, 2004–05.

Port	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
Astoria	188	275	499	317	687	592
Garibaldi	183	170	819	155	1002	325
Pacific City	62	3	1932	53	1994	56
Depoe Bay	592	186	2259	943	2851	1129
Newport	2498	1043	2894	1472	5392	2515
Winchester Bay	768	327	624	8	1392	335
Coos Bay	192		2258	12	2450	12
Bandon	216	46	167		383	46
Port Orford					0	
Gold Beach					0	
Brookings	273	3	812	2	1085	5
Total	4972	2053	12264	2962	17236	5015
Private boat (%)					71.2%	59.1%

Data Source: ODFW Ocean Recreational Boat Survey, extracted March 2006.

Table 2–26. Oregon albacore catch per unit of effort (number of fish/angler trip), for charter and private boats, and combined, by year, by port, 2004–05.

Port	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
Astoria	3.2	3.8	5.3	1.8	4.5	2.4
Garibaldi	3.2	2.1	9.3	1.3	6.9	1.6
Pacific City	5.2	0.6	14.6	1.0	13.8	0.9
Depoe Bay	2.3	1.2	5.4	2.3	4.2	2.0
Newport	3.7	1.7	4.1	2.5	3.9	2.1
Winchester Bay	4.9	4.2	6.4	0.6	5.5	3.7
Coos Bay	2.8		4.0	0.6	3.9	0.6
Bandon	4.5	3.3	3.1		3.8	3.3
Port Orford						
Gold Beach						
Brookings	5.8	0.2	1.6	0.1	2.0	0.1
Total	3.6	2.0	4.6	2.1	4.3	2.1

Data Source: ODFW Ocean Recreational Boat Survey, extracted March 2006.

2.2.3 Washington

In 2005, the recreational albacore fishery off Washington had the same number of angler trips as in 2004 (Table 2–27); however, the overall catch decreased (Table 2–28), with a marked reduction in catch during the month of July. In July 2004, charter boats off Westport caught albacore while targeting salmon less than 10 miles off the coast as a result of warmer water temperatures of up to 5 °F higher than usual—an anomalous event that was not repeated in 2005.

Table 2–27. Washington albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port area, 2004–05.

Port Area	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
North Coast	16	40	39	64	55	104
Westport	937	817	57	163	994	980
Ilwaco	264	185	188	240	452	425
Total	1,217	1,042	284	467	1,501	1,509
Private boat (%)					18.9%	30.9%

Data source: WDFW Ocean Sampling Program, extracted June 2006

Table 2–28. Washington albacore catch (number of fish) for charter and private boats, and combined, by year and port area, 2004–05.

Port Area	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
North Coast	192	133	70	155	262	288
Westport	11,948	10,198	156	450	12,104	10,648
Ilwaco	905	711	928	516	1,833	1,227
Total	13,045	11,042	1,154	1,121	14,199	12,163
Private boat (%)					8.1%	9.2%

Data source: WDFW Ocean Sampling Program, extracted June 2006

Charter boat trips make up the majority of albacore trips in Washington and generally tend to have higher

catches per angler (Table 2-29). Beginning in 2005, a mandatory charter boat tuna logbook program was implemented. Average catch per angler reported in the logbook data was 12 fish. The average weight reported in the logbooks was 19 lbs in Westport and 20.5 lbs in Ilwaco, for an overall average of 19.1 lbs.

Table 2-29. Washington albacore catch per unit of effort (number of fish/angler trip) for charter and private boats, and combined, by year and port, 2004–05.

Port Area	Charter		Private		Combined	
	2004	2005	2004	2005	2004	2005
North Coast	12.0	3.3	1.8	2.4	4.8	2.8
Westport	12.8	12.5	2.7	2.8	12.2	10.9
Ilwaco	3.4	3.8	4.9	2.2	4.1	2.9
Total	10.7	10.6	4.1	2.4	9.5	8.1

Data source: WDFW Ocean Sampling Program, extracted June 2006

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 provisions of the HMS FMP. Copies of the regulations published in the HMS FMP final rule (69 FR 18444), along with an abridged Compliance Guide explaining pertinent details, 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 final rule implements rules and regulations necessary for federal management of U.S. fishing vessels targeting HMS within the U.S. 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 (3-200 nautical miles) 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 and for Western Pacific longline permitted vessels landing into West Coast ports.

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 Council, serves as a mechanism to cooperate with other regional Councils to achieve consistent management of U.S. fisheries in the Pacific Ocean. Federal measures impacting these fisheries, which arise from several different federal laws, can 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 determine how recommendations of international bodies should be applied to domestic fisheries of the U.S. 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 U.S. 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.

[1] The Code of Federal Regulations at 50 CFR part 660 is available online at: http://www.access.gpo.gov/nara/cfr/waisidx_03/50cfr660_03.html

3.1.1 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[2]). 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.

3.1.2 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).

3.1.3 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 the harvest guidelines have been reached, NMFS will initiate a review of the species 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 3–1. In general, prohibited species must be released immediately if caught, unless other provisions for their disposition are established in accordance with HMS FMP guidelines.

In addition, U.S. citizens fishing in waters covered under the HMS FMP are bound by the rules and

[2] 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.

regulations set forth in the Shark Finning Prohibition Act of 2002.[3] 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.

Table 3–1. 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

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.

3.1.4 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.

1. Small-mesh gillnetters and 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.

2. 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.

3. 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.

[3] 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.

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.

3.1.5 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 and 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 1,189 albacore logbooks from 385 vessels were submitted to the NMFS Southwest Fisheries Science Center (SWFSC) in La Jolla, California, for 2005. Of this total, 149 logbooks submitted did not have a corresponding PacFIN receipt. A total of 1,793 albacore landing receipts from 560 vessels were recorded in the PacFIN database for 2005. This equates to 632 PacFIN records for which the SWFSC did not receive a logbook.[4] As such, mandatory submission of logbooks by HMS-permitted U.S. albacore vessels covered approximately 69 percent of the catch. Catch sampling for sizes of albacore caught, or size composition, was about 2 percent of the catch (in numbers of fish). In 2005, port samplers measured 21,362 albacore from troll vessel landings in California, Oregon, and Washington.[5]

The 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, 21 of 24 active vessels submitted logbooks and logged 1,154 days at-sea in 2005 compared to 23 of 28 active vessels that logged 1,116 days at-sea in 2004.

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, 42 drift gillnet vessels made 1,043 sets for swordfish and/or thresher shark in 2005 compared to 38 drift gillnet vessels that made 1,050 sets in 2004.

Beginning in 2005, Washington recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips. According to the logbooks received, 18 charter vessels fished for albacore completing 120 trips and landing 11,999 albacore. At the two main sport fishing ports of Ilwaco

[4] These 632 records do not necessarily relate to 632 trips without logbooks because some of the PacFIN records (unquantifiable at this time) consist of multiple landing receipts for each trip.

[5] US-Can06 MS-4-13-2.pdf. Document prepared for the U.S.-Canada Bi-lateral Albacore Tuna Treaty Annual Consultations and Negotiations, April 24-25, 2006, Vancouver, B.C., Canada.

and Westport, the average weight of landed albacore was 20.5 lbs and 19.0 lbs respectively, based on port sampling data. A description of the Washington Ocean Sampling Program (i.e., dockside sampling) results for 2004 and 2005 is in Chapter 2.

Beginning in 2005, Oregon recreational charter fishing vessels began completing and submitting logbooks for albacore tuna trips. According to the logbooks received, eight charter vessels fished for albacore completing 56 trips and landing 1,176 albacore. The average weight for the landed albacore was 20.5 lbs.

In 2005, 131 California-based CPFVs targeted HMS in U.S. waters and logged 1,200 days at-sea compared to 153 vessels that logged about 1,500 days at-sea in 2004. 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 2004, CRFS field sampler interviewed 393 CPFV tuna anglers and 18 in 2005.

3.1.6 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 2005, the SWR Observer Program observed the following HMS fisheries:

- Drift gillnet: 23 trips and 225 sets for a coverage rate of approximately 20 percent.
- Albacore troll: Three trips and 25 sets, coverage rate much less than 1 percent.
- Tuna Purse Seine: Three trips and 10 sets, coverage rate approximately 10 percent.
- Pelagic tuna longline: One trip and 10 sets, coverage rate approximately 50 percent.
- HMS CPFV: No trips observed in 2005, coverage will begin in 2006 with NMFS funding assistance to support State Observer efforts in Oregon and Washington. The NMFS Observer Program will cover California CPFV trips in conjunction with CDFG and the contract manager, Frank Orth and Associates.

3.1.7 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 intends to develop 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-office.html.

3.1.8 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, flonder, 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.

There were no changes to HMS state regulations in California, Oregon, or Washington for 2005.

3.2 Protected Resources Regulations

Longline and drift gillnet vessels encounter endangered and threatened species of sea turtles and marine mammals while targeting HMS. Longline vessels also 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 Endangered Species Act (ESA) and the Marine Mammal Protection Act (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 protected resources were analyzed as part of the ESA section 7 consultation and 2004 biological opinion (BO) on the HMS FMP. The BO included an Incidental Take Statement (ITS) 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 3–2).

Table 3–2. 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.

3.2.1 Drift Gillnet Fishery

The HMS FMP final rule contains measures to protect marine mammals and sea turtles that may interact with the drift gillnet fishery. A suite of time and area drift gillnet closures to protect marine mammals in the U.S. EEZ were adopted into the HMS FMP (see 50 CFR 660.713). Additional protections for marine mammals include the use of pingers and extenders as specified in the Pacific Offshore Cetacean Take Reduction Plan, found at 50 CFR 229.31.

The HMS FMP includes a time and area closure for the drift gillnet fishery from August 15 to November 15 in the area north of Point Conception to approximately central Oregon to protect endangered leatherback sea turtles. In addition, drift gillnet fishing is prohibited in an area south of Point. Conception during declared El Niño events to protect loggerhead sea turtles. See 50 CFR 660.713(c) for specific areas and terms of the closures. Drift gillnet fishing is also prohibited north of 46°16' N. latitude (off Washington) to address bycatch of sea turtles and marine mammals, and to minimize incidental catch of thresher shark.

3.2.2 Shallow-set Longline Fishery

The HMS FMP final rule prohibits the use of shallow-set longline gear targeting HMS within the HMS FMP management area. This rule provides protection for threatened loggerhead and endangered leatherback sea turtles. The rule also details proper handling and release requirements for incidentally-captured sea turtles and seabirds, requires vessel monitoring systems (VMS) on vessels if requested to carry one by NMFS Office of Law Enforcement, and requires vessel owners and operators to attend a NMFS protected species workshop. Complete details are found at 50 CFR 660.712 and 223.206. They are also posted on the NMFS Southwest Region website.

3.2.3 Deep-set Tuna Longline Fishery

A single West Coast-based U.S. longline vessel was active in 2005 using deep-set tuna longline gear. The vessel operated in the high seas zone outside of the U.S. EEZ. NMFS policy on data confidentiality precludes release of catch and landing information for this single vessel.

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 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 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 EPO. There are 14 member nations to the IATTC Convention: Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Spain, the United States, Vanuatu, and Venezuela. Canada, China, the European Union, Honduras, Korea, 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.

Under the Agreement on the International Dolphin Conservation Program, the IATTC has significant responsibilities for the implementation of the International Dolphin Conservation Program. More information on the IATTC and the current resolutions can be found at www.IATTC.org.

3.3.1.1 Summary of IATTC Resolutions With Implications for the HMS FMP

IATTC Resolution C-05-02 on Northern Albacore Tuna

The Resolution on Northern Albacore Tuna passed 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. Within this Resolution nations will need to report their catches of North Pacific albacore tuna by gear type to the IATTC every six months. At the June 2006 IATTC meeting in Korea, 2005 catch reports were submitted by Canada, Chinese Taipei, Korea, and the United States.[6]

This Resolution calls upon the WCPFC to consider taking such action as may be necessary to ensure the effective conservation and management of North Pacific albacore tuna throughout its range and to work in close concert with the IATTC.

IATTC Resolution C-04-09 on Tuna Conservation Measures

The Resolution on Tuna Conservation Measures was adopted in June 2004, establishing a multi-annual program on the conservation of tuna in the EPO for 2004, 2005, and 2006. The resolution includes conservation measures for yellowfin, bigeye, and skipjack tunas. Purse seine vessels fishing in the EPO are affected by these conservation measures. The conservation resolution includes a national choice of one of two possible 6- week closures of the Convention Area. The possible choices are either a 6-week closure in the summer or winter. Longline vessels fishing for bigeye tuna are restricted to a national catch not to exceed their national catch for the year 2001. The 2004 conservation resolution introduced a precedent-setting multi-year management framework with a review of the stocks' response in 2005 and 2006. The multi-annual plan allows the industry to plan and minimize economic impacts. Pole-and-line and sportfishing vessels are not subject to this resolution. Also, members of the IATTC agreed to compliance measure prohibiting landings, transshipments, and commercial transactions involving tunas caught in contravention of the conservation measures in this resolution.

In response to IATTC Resolution C-04-09, NMFS published a final rule on September 2, 2005 (70 FR 52324) to close the U.S. longline fishery directed at bigeye tuna in the Convention Area for the remainder of 2005 because the bigeye tuna catch in the Convention Area had reached the reported level of catch made in 2001 (i.e., greater than 150 mt). This action is consistent with recommendations by the IATTC that have been approved by the Department of State under the Tuna Conventions Act with the intention to limit fishing mortality on the bigeye tuna stock caused by longline fishing in the Convention Area and

[6] IATTC website, COM-7-04-Compliance-report-2005REV.pdf

contribute to the long-term conservation of the bigeye tuna stock at levels that support healthy fisheries.

In response to IATTC Resolution C-04-09, NMFS published a final rule on November 22, 2005 (70 FR 70549) to implement the 2005 and 2006 management measures to prevent overfishing of the EPO tuna stocks, consistent with recommendations by the IATTC that have been approved by the Department of State under the Tuna Conventions Act. The purse seine fishery for tuna in the ETP was closed for a 6-week period beginning November 20, 2005, through December 31, 2005. A similar closure is scheduled to be implemented next season for the period November 22, 2006, through December 31, 2006.

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." As reported at the June 2006 IATTC meeting in Korea, the United States and Chinese Taipei have submitted reports pursuant to this resolution.[7]

IATTC Resolution C-04-05 (Revised) on Bycatch

The IATTC adopted resolutions pertaining to bycatch in 2000, 2001, and 2002. The current revised resolution on bycatch was passed at the 2005 meeting with the intent to consolidate the operative parts of the earlier resolutions into one comprehensive resolution on bycatch. The revised resolution on bycatch continues to include full retention of juvenile tunas and non-target species. The revised resolution was extended until January 2007, with the addition of a review of compliance on the full retention of juvenile tunas. This compliance review will take place in the Permanent Working Group on Compliance in 2006.

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 Convention establishes a 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 Fishery Commission. Initial staffing for the Commission is in progress at its site in Pohnpei, Federated States of Micronesia. A noteworthy aspect of the Convention is the fact that it will exercise management control into the high seas zones outside national EEZs in contrast to some other regional fishery management organizations.

[7] www.IATTC.org: COM-7-04-Compliance-report-2005REV.pdf

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 (69FR23715). 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.

Regulations as part of the treaty establish vessel marking, record keeping, and reporting requirements for U.S. albacore tuna fishing vessel operators and for Canadian albacore tuna fishing vessel operators when they are fishing in U.S. waters. In addition, the U.S. and Canada have agreed to establish limits on reciprocal fishing access so that, over a period of three years, the number of fishing vessels that will be permitted to fish under the Treaty will decrease. The fishing access limit can be set by each nation as either a maximum number of individual vessels from one nation that can fish in waters of the other nation for up to four months in a single year, or a maximum number of vessel months that vessels of one nation can spend in the waters of the other nation in a single year.

The mandatory reporting requirement calls for United States albacore fishing vessels to report to ShipCom, LLC, the company selected to accept hail-in, hail-out messages, 24 hours before entering Canadian waters and within 24 hours after leaving Canadian waters. In addition, Canadian regulations require vessels to report to the Canadian Coast Guard at least 24 hours prior to entering Canadian waters and 72 hours before leaving Canadian waters.

The preliminary Canadian north Pacific albacore tuna catch in 2005 was 4,810 mt (Stocker, 2005). The catch in 2005 decreased by 39 percent from the 7,842 mt caught in 2004. In 2005, 33 percent of the catch came from the Canadian EEZ, 63 percent from the U.S. EEZ, and 4 percent from the high seas. The effort percentage estimates are similar to the catch percentage estimates (i.e., 62 percent of troll effort in U.S. EEZ). Logbook coverage for the Canadian troll fleet was 94 percent for the 149 Canadian vessels that fished in U.S. waters in 2005. A total of 35 U.S. vessels fished in Canadian waters in 2005.

In respect to the status of the U.S.-Canada Treaty, which is set to expire in 2007, the two countries met in Canada in April of 2006 to exchange data and discuss issues. The representatives determined it would be best to meet in the fall after the 2006 season has ended to determine what should be done for managing assess to each others waters for 2007.

4.0 STATISTICAL SUMMARIES OF CATCH, REVENUE, AND EFFORT

4.1 Commercial Fisheries

Table 4–1. West Coast commercial HMS landings, revenues, and average price by species, 2004–05.

	2004			2005		
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	14,469	$27,344	$0.86	9,084	$21,003	$1.05
Yellowfin	488	$446	$0.41	286	$316	$0.50
Skipjack	307	$109	$0.16	523	$292	$0.25
Bigeye	22	$148	$3.05	10	$60	$2.72
Bluefin	10	$38	$1.72	207	$137	$0.30
Unspecified Tuna	9	$55		<0.5	$1	
Tunas subtotal	**15,305**	**$28,140**	**$0.83**	**10,110**	**$21,809**	**$0.98**
Swordfish	**1,186**	**$4,836**	**$1.85**	**294**	**$1,872**	**$2.89**
Sharks						
Common Thresher	115	$198	$0.78	179	$271	$0.69
Pelagic Thresher	2	$2	$0.45	<0.5	$1	NA
Bigeye Thresher	5	$4	$0.36	10	$6	$0.27
Shortfin Mako	54	$99	$0.83	33	$58	$0.80
Blue	1	$1	$0.45	1	$2	$0.91
Sharks subtotal	**177**	**$304**	**$0.78**	**223**	**$338**	**$0.69**
Dorado	**1**	**$6**	**$2.72**	**<0.5**	**$1**	
Total HMS	**16,669**	**$33,286**	**$0.91**	**10,627**	**$24,020**	**$1.03**

Interpretation: The total West Coast commercial HMS catch was 10.6 thousand mt in 2005, down 36 percent (6.0 thousand metric tons) from 2004. Tunas represented 95 percent of the total catch by weight. Although albacore tuna catch was down 37 percent from the catch, observed in the previous year, it was nonetheless the largest component of tuna catch representing about 90 percent of the total by weight. Skipjack was the next largest component of tuna catch.

Swordfish were the category with the next largest share of landings behind tuna at less than 3 percent of the total weight. Swordfish landings by weight were down by 75 percent (-892 metric tons) from 2004 to 2005. The common thresher shark comprised the largest component of the sharks category in 2005. Total commercial shark landings by weight increased by 26 percent (46 mt) from 2004 to 2005.

Total current dollar West Coast commercial HMS ex-vessel revenue of $24.0 million decreased from $33.3 million in the previous year, or a decrease of 28 percent. Tunas comprised 91 percent of the 2005 revenue total. Albacore generated by far the most important component of revenue for any single species,

at $21.0 million. Swordfish was the next highest contributor to total revenue at $1.9 million.

The average price for tuna was 17 percent higher in 2005 than in 2004. The overall increase in price was largely driven by the 22 percent increase in the price of albacore from $0.86 in 2004 to $1.05 in 2005.

The overall average West Coast commercial HMS fish price increased from $0.91 in 2004 to $1.03 in 2005, or 13 percent. The increase in overall average price was not sufficient to offset the effect on revenue of the 36 percent drop in landings by weight.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006 (landings) and June 28, 2006 (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, 2004–05.

	2004			2005		
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	13,392	$24,469	$0.83	8,305	$18,878	$1.03
Drift gillnet	336	$1,232	$1.66	470	$1,684	$1.63
Harpoon	70	$674	$4.37	74	$682	$4.18
Pelagic longline	951	$3,439	$1.64	*	*	*
Purse seine	791	$545	$0.31	1,026	$716	$0.32
Total HMS	**15,540**	**$30,359**	**$0.89**	**9,875†**	**$21,960†**	**$1.01†**

*Not reported due to data confidentiality requirements.

†Total does not include pelagic longline.

Interpretation: Table 4–2 shows the total West Coast commercial HMS catch for the indicated fisheries was 9.9 thousand mt in 2005, down 36 percent (-5.6 thousand metric tons) from 2004. The surface hook-and-line fishery represented 84 percent of the total catch.

Total current dollar West Coast commercial HMS ex-vessel revenue for these fisheries of $22.1 million decreased from $30.4 million in the previous year, for a percentage decrease of 27.3 percent (-$8.3 million). The overall average West Coast commercial HMS fish price for these fisheries increased from $0.89 in 2004 to $1.01 in 2005. The increase in average price was insufficient to offset the effect of less catch by weight on total revenues.

Source and Calculations: The data were extracted from PacFIN in August 2006, 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. Data for Canadian surface hook-and-line vessels fishing in the U.S. EEZ are excluded from the table.

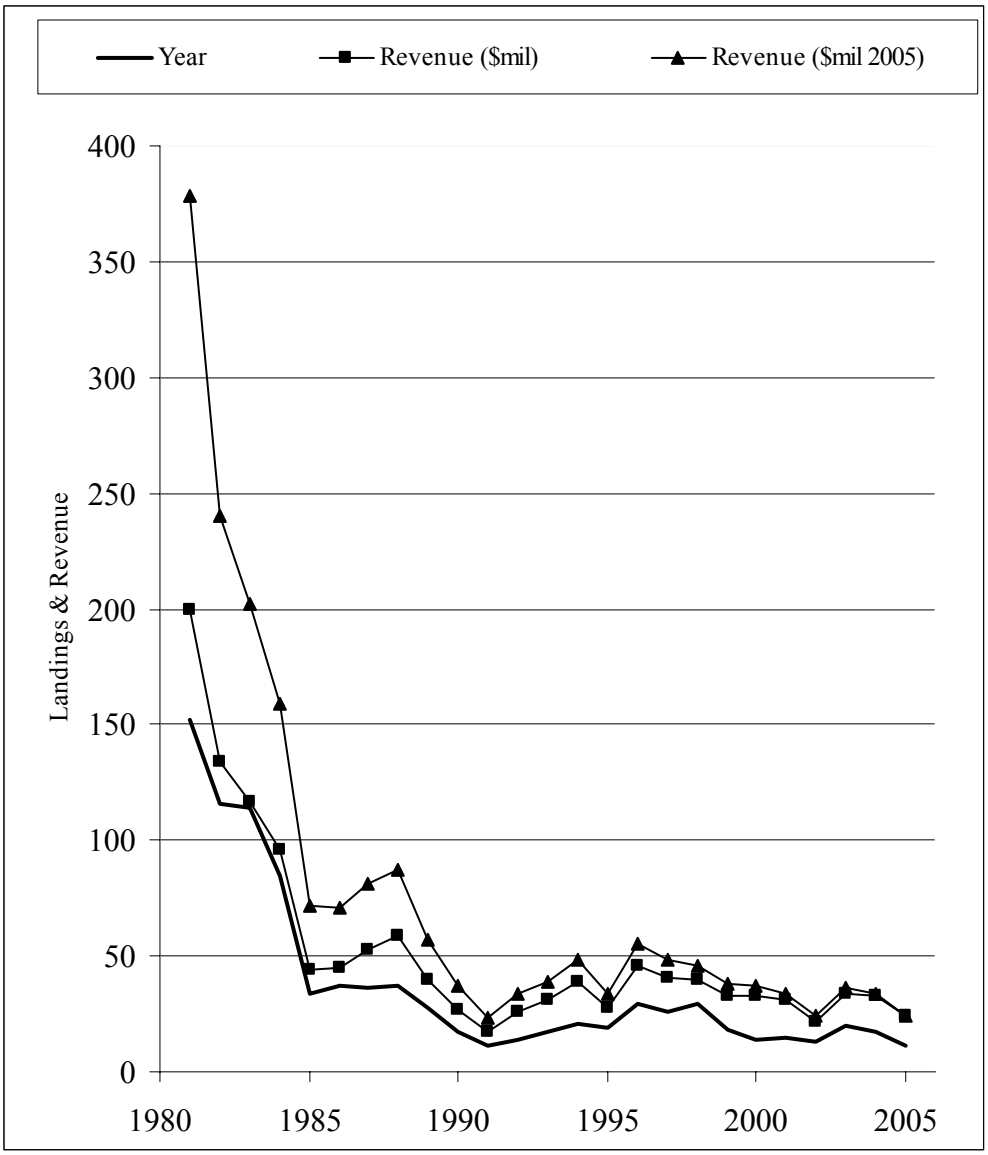


Figure 4–1. West Coast commercial HMS landings and revenues, 1981–2005.

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 2005 dollars from 1981 through 2005, 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 (2005) dollars fell from over $365 million in 1981 to a level permanently below $100 million after 1984. The drops in landings and revenues are primarily explained by the substantial decline in tuna landings for during the 1980s for species other than albacore.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006 (landings) and June

28, 2006 (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 2005 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, 1981–2005.

Year	Landings (1000 round mts)	Revenue ($mil)	Revenue (2005 $mil)
1981	152	$200	$378
1982	116	$134	$240
1983	114	$117	$202
1984	85	$96	$159
1985	34	$44	$72
1986	37	$45	$71
1987	36	$53	$81
1988	37	$59	$87
1989	28	$40	$57
1990	17	$27	$37
1991	11	$17	$23
1992	14	$26	$34
1993	17	$31	$39
1994	21	$39	$48
1995	19	$28	$34
1996	29	$46	$55
1997	26	$41	$48
1998	29	$40	$46
1999	18	$33	$38
2000	14	$33	$37
2001	15	$31	$34
2002	13	$22	$24
2003	20	$34	$36
2004	17	$33	$34
2005	11	$24	$24

Table 4–4. West Coast commercial landings of HMS by all HMS and non-HMS gears, 1981–2005.

	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	4,908	19,520	8,863	6	804	11	1,636	500	1	9	322	3	<0.5	36,583
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	6,151	3,795	4,539	26	559	16	1,767	275	1	44	122	<0.5	17	17,312
1994	10,686	5,056	2,111	47	916	33	1,700	330	<0.5	37	128	12	41	21,097
1995	6,528	3,038	7,037	49	714	1	1,161	270	5	31	95	5	5	18,939
1996	14,173	3,347	5,455	62	4,688	3	1,191	319	1	20	96	1	10	29,366
1997	11,292	4,775	6,070	82	2,251	11	1,459	320	35	32	132	1	5	26,465
1998	13,801	5,799	5,846	53	1,949	12	1,408	361	2	11	100	3	3	29,348
1999	9,770	1,353	3,759	108	186	12	2,033	320	10	5	63	<0.5	17	17,636
2000	9,042	1,158	780	87	312	1	2,657	296	3	5	80	1	43	14,465
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	1,714	301	2		82	41	<0.5	12,972
2003	16,670	465	349	35	36	<0.5	2,135	301	4	6	70	1	6	20,078
2004	14,469	488	307	22	10	9	1,186	115	2	5	54	1	1	16,669
2005	9,084	286	523	10	207	<0.5	294	179	<0.5	10	33	1	<0.5	10,627

Source: PacFIN, extracted June 23, 2006.

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, 1981–2005.

	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	12,240,375	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	117,487,859
1984	17,208,633	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	96,222,373
1985	8,293,123	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	44,489,598
1986	6,178,085	18,079,443	904,609	90,227	4,636,698	198,248	12,726,490	1,690,483	194	66,647	428,259	1,320	757	45,001,460
1987	5,127,832	27,878,667	4,426,717	176,504	2,057,402	448,231	11,115,940	1,183,866	1,840	22,123	715,138	1,853	357	53,156,470
1988	9,110,214	27,030,132	9,249,827	26,156	2,070,411	80,548	9,719,489	979,905	821	9,764	649,799	2,258	527	58,929,851
1989	3,785,598	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	39,740,936
1990	5,619,553	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	26,690,239
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	1,810	6,247	26,051,949
1993	11,667,651	4,821,735	3,282,778	211,513	752,369	72,678	8,953,927	458,513	462	28,190	221,401	608	42,223	30,514,048
1994	20,070,706	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	38,932,636
1995	11,570,364	3,044,670	4,752,641	258,727	1,057,948	5,136	6,569,508	477,755	8,777	24,896	165,215	2,796	5,479	27,943,912
1996	27,222,294	3,230,957	3,986,113	260,306	4,035,455	28,296	6,063,792	603,006	1,557	17,745	166,763	587	9,815	45,626,686
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	278	10,858	40,649,959
1998	18,733,488	5,861,959	5,213,131	271,919	2,965,485	61,688	5,981,719	625,489	2,584	9,428	176,313	5,977	10,492	39,919,672
1999	17,767,485	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	33,009,593
2000	17,156,838	1,321,954	483,242	579,384	577,458	2,298	11,792,948	589,105	2,738	4,636	133,619	867	63,293	32,708,380
2001	20,715,878	465,558	33,633	320,855	473,821	3,069	8,696,689	595,542	2,767	8,428	75,799	1,520	19,397	31,412,956
2002	14,296,619	588,677	128,245	87,304	43,512	6,325	6,374,092	503,487	1,946		124,521	18,659	725	22,174,112
2003	24,477,272	451,273	159,961	262,768	76,079	21	7,851,693	487,783	2,814	3,779	115,685	876	10,370	33,900,374
2004	27,344,151	446,577	109,254	147,696	38,312	54,879	4,835,907	197,655	2,500	4,060	98,827	972	5,637	33,286,427
2005	21,002,429	316,368	292,121	60,141	136,848	913	1,872,431	271,451	588	6,234	57,758	1,610	1,188	24,020,080

Source: PacFIN, extracted June 28, 2006.

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 (2005 $) from HMS landings by all HMS and non-HMS gears, 1981–2005.

	Revenues (2005 $)													
	Tunas							Sharks						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Dorado	Total
1981	50,311,353	187,257,739	125,817,583	2,977,531	2,350,162	137,886	6,363,827	2,799,002			307,943	112,033	5,313	378,440,372
1982	14,360,160	133,121,749	72,412,237	2,159,719	4,808,907	176,837	9,145,504	3,540,566		27,115	606,380	33,653	1,708	240,394,535
1983	21,049,657	101,789,782	62,336,775	79,012	1,827,875	164,214	11,684,029	2,535,190	14,530	157,274	395,229	7,988	1,195	202,042,750
1984	28,524,172	61,392,681	41,091,835	289,084	1,500,011	4,293,704	19,263,259	2,721,992	12,801	78,101	314,592	4,095	7,081	159,493,408
1985	13,339,428	23,628,934	3,407,061	28,459	4,532,106	1,654,926	21,578,101	2,922,848	1,152	155,111	309,039	3,429	606	71,561,200
1986	9,723,142	28,453,640	1,423,684	142,000	7,297,290	312,006	20,029,100	2,660,502	306	104,890	673,998	2,078	1,191	70,823,827
1987	7,855,135	42,706,291	6,781,122	270,381	3,151,657	686,628	17,028,095	1,813,520	2,818	33,889	1,095,494	2,839	547	81,428,416
1988	13,496,614	40,044,641	13,703,448	38,750	3,067,276	119,330	14,399,244	1,451,712	1,216	14,465	962,665	3,345	780	87,303,486
1989	5,403,366	29,723,440	5,630,737	3,447	1,815,184	181,730	11,788,758	1,347,644	213	35,271	788,718	4,946	693	56,724,147
1990	7,723,409	12,896,624	2,609,779	12,055	1,579,688	77,996	9,822,630	877,721	2,312	47,592	1,015,934	14,161	2,670	36,682,571
1991	3,749,751	5,307,309	3,575,017	56,846	154,523	28,099	8,421,672	1,286,518		33,433	551,278	1,187	1,550	23,167,183
1992	14,905,752	4,773,418	1,830,927	58,062	1,466,285	27,554	9,821,672	602,308	782	18,989	299,926	2,349	8,109	33,816,133
1993	14,802,906	6,117,400	4,164,905	268,350	954,541	92,208	11,359,968	581,721	586	35,766	280,895	771	53,569	38,713,586
1994	24,935,651	5,618,488	2,175,685	381,596	2,079,884	68,636	11,922,023	725,951	52	41,592	306,979	19,949	93,041	48,369,527
1995	14,086,150	3,706,684	5,786,025	314,983	1,287,982	6,253	7,997,940	581,635	10,685	30,309	201,139	3,404	6,670	34,019,859
1996	32,523,649	3,860,164	4,762,381	310,999	4,821,332	33,806	7,244,674	720,437	1,860	21,201	199,239	701	11,727	54,512,170
1997	23,415,349	5,865,708	6,469,064	422,823	3,259,731	25,732	7,224,947	694,874	73,446	40,860	267,277	327	12,761	47,772,899
1998	21,775,530	6,813,854	6,059,667	316,075	3,447,036	71,705	6,953,062	727,059	3,004	10,959	204,944	6,948	12,195	46,402,038
1999	20,356,881	1,682,182	3,148,725	752,888	1,215,894	69,400	9,676,591	707,712	21,109	6,732	127,313	84	54,829	37,820,340
2000	19,238,437	1,482,344	541,873	649,679	647,519	2,577	13,223,759	660,580	3,070	5,199	149,830	972	70,972	36,676,811
2001	22,684,930	509,810	36,830	351,352	518,858	3,360	9,523,312	652,148	3,030	9,229	83,004	1,664	21,241	34,398,768
2002	15,387,600	633,599	138,032	93,966	46,832	6,808	6,860,501	541,908	2,094		134,023	20,083	780	23,866,226
2003	25,819,907	476,027	168,735	277,182	80,253	22	8,282,377	514,539	2,968	3,986	122,030	924	10,939	35,759,889
2004	28,105,819	459,017	112,297	151,810	39,379	56,407	4,970,611	203,160	2,570	4,173	101,580	999	5,794	34,213,616
2005	21,002,429	316,368	292,121	60,141	136,848	913	1,872,431	271,451	588	6,234	57,758	1,610	1,188	24,020,080

Source: PacFIN, extracted June 28, 2006.

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 2005.

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

Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.

Aquaculture fish ticket/fish ticket line info is excluded.

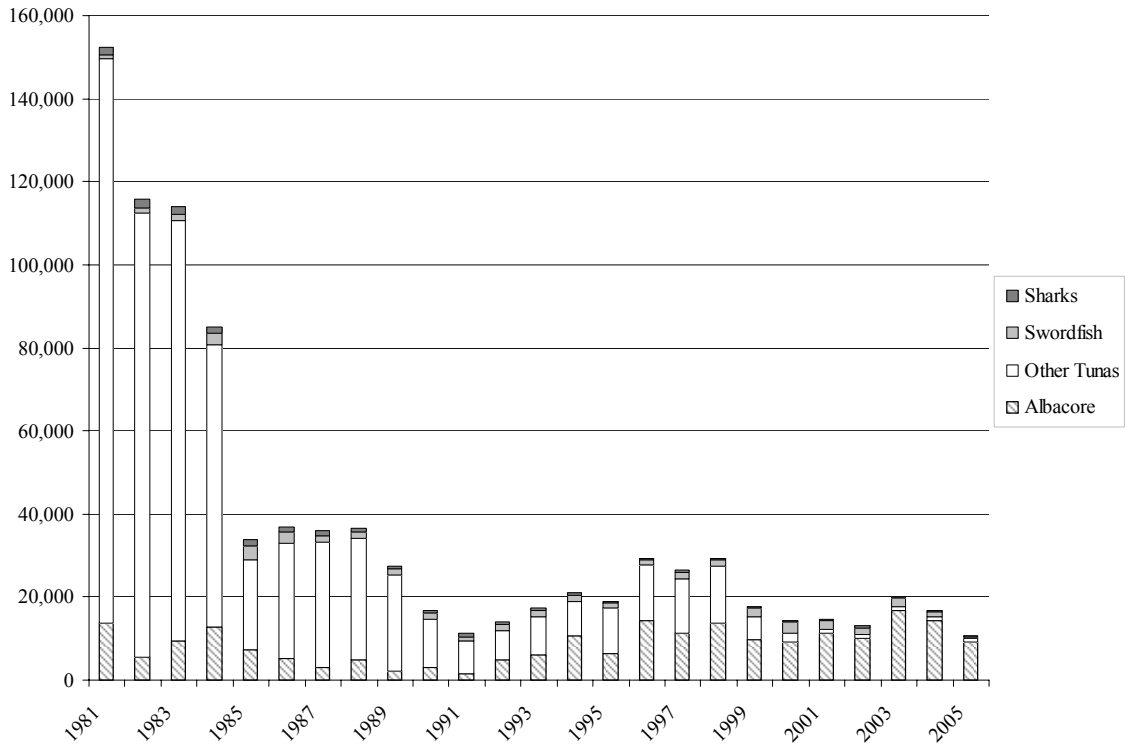


Figure 4–2. West Coast commercial landings of albacore, other tunas, swordfish, and sharks, 1981–2005.

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 2005. Swordfish, followed by sharks, comprise 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 June 23, 2006. They represent a portion of the table of West Coast commercial landings of HMS 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 4–7. West Coast commercial landings of albacore, other tunas, swordfish, and sharks, 1981–2005.

	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	4,908	29,204	1,636	835	36,583
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	6,151	8,935	1,767	442	17,295
1994	10,686	8,163	1,700	507	21,056
1995	6,528	10,839	1,161	406	18,934
1996	14,173	13,555	1,191	437	29,356
1997	11,292	13,189	1,459	520	26,460
1998	13,801	13,659	1,408	477	29,345
1999	9,770	5,418	2,033	398	17,619
2000	9,042	2,338	2,657	385	14,422
2001	11,194	963	2,195	425	14,777
2002	10,029	803	1,714	426	12,972
2003	16,670	885	2,135	382	20,072
2004	14,469	836	1,186	177	16,668
2005	9,084	1,026	294	223	10,627

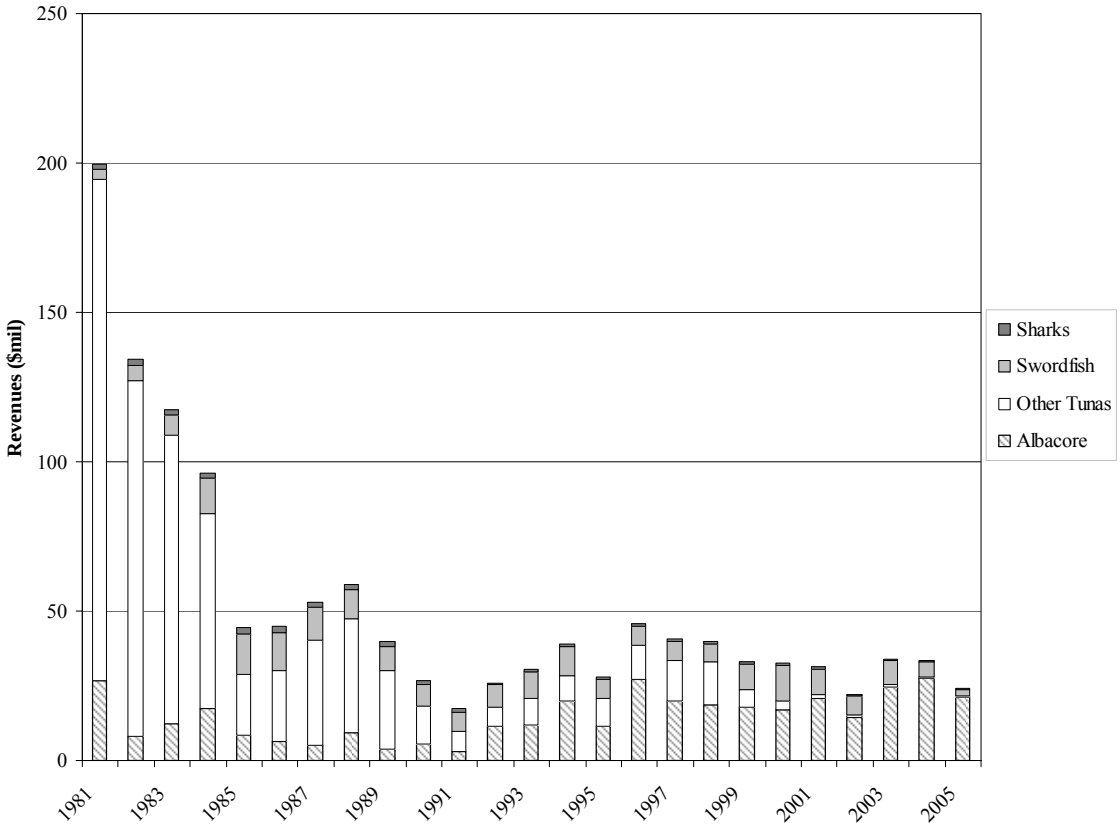


Figure 4–3. West Coast commercial revenues for albacore, other tunas, swordfish, and sharks, 1981–2005.

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 and nominal and real ex-vessel revenue 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 2005.

Source and Calculations: The data were extracted from PacFIN on June 28, 2006. 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, 1981–2005.

	Revenues ($)				
Year	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	12,240,375	96,643,938	6,794,263	1,808,588	117,487,164
1984	17,208,633	65,498,660	11,621,524	1,889,284	96,218,101
1985	8,293,123	20,672,448	13,415,105	2,108,545	44,489,221
1986	6,178,085	23,909,225	12,726,490	2,186,903	45,000,703
1987	5,127,832	34,987,521	11,115,940	1,924,820	53,156,113
1988	9,110,214	38,457,074	9,719,489	1,642,547	58,929,324
1989	3,785,598	26,170,589	8,259,204	1,525,060	39,740,451
1990	5,619,553	12,497,361	7,146,946	1,424,436	26,688,296
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	712,122	26,045,702
1993	11,667,651	9,141,073	8,953,927	709,174	30,471,825
1994	20,070,706	8,310,021	9,596,037	880,983	38,857,747
1995	11,570,364	9,119,122	6,569,508	679,439	27,938,433
1996	27,222,294	11,541,127	6,063,792	789,658	45,616,871
1997	19,924,121	13,651,037	6,147,707	916,236	40,639,101
1998	18,733,488	14,374,182	5,981,719	819,791	39,909,180
1999	17,767,485	5,995,343	8,445,728	753,183	32,961,739
2000	17,156,838	2,964,336	11,792,948	730,965	32,645,087
2001	20,715,878	1,296,936	8,696,689	684,056	31,393,559
2002	14,296,619	854,063	6,374,092	648,613	22,173,387
2003	24,477,272	950,102	7,851,693	610,937	33,890,004
2004	27,344,151	796,718	4,835,907	304,014	33,280,790
2005	21,002,429	806,391	1,872,431	337,641	24,018,892

Table 4–9. Commercial landings (round mt) in the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	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	<0.5	2	1	5,006
1987	2,891	<0.5	5	2		2	1		1	1	2,903
1988	4,625	<0.5	18	2		1	<0.5		2	1	4,649
1989	2,167	1	7	8	<0.5	10	<0.5	<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		<0.5	1	<0.5	1,645
1992	4,754	1	13	2	<0.5	7			1	<0.5	4,778
1993	5,763	18	90	5	9	4			3	1	5,893
1994	10,541	<0.5	1	<0.5	<0.5	1			<0.5	<0.5	10,543
1995	6,405	1	1	<0.5	<0.5	<0.5	<0.5		8	<0.5	6,415
1996	13,287	42	<0.5	<0.5		<0.5			10	1	13,340
1997	10,825	8	1	1	<0.5	5	<0.5		12	2	10,854
1998	12,611	116	4	3	<0.5	2	<0.5		5	1	12,742
1999	8,793	24	15	1	<0.5	1	<0.5		2	4	8,840
2000	8,059	2	22	<0.5	<0.5	1	<0.5		3	3	8,090
2001	10,218	10	<0.5	1	<0.5	3	<0.5		9	5	10,246
2002	9,311	2	2	<0.5	<0.5	<0.5	<0.5		7	5	9,327
2003	13,473	3		<0.5	<0.5	1	<0.5		4	1	13,482
2004	13,384	1		<0.5	<0.5	<0.5	<0.5		4	3	13,392
2005	8,301	<0.5		<0.5		1			3	<0.5	8,305

Source: PacFIN, extracted August 22, 2006.
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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	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	<0.5	2	1	5,006
1987	2,891	<0.5	5	2		2	1		1	1	2,903
1988	4,626	<0.5	18	2		1	<0.5		2	1	4,650
1989	2,167	1	7	8	<0.5	10	<0.5	<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		<0.5	1	<0.5	1,645
1992	4,815	1	13	2	<0.5	7			1	<0.5	4,839
1993	5,785	18	90	5	9	4			3	1	5,915
1994	10,564	<0.5	1	<0.5	<0.5	1			<0.5	<0.5	10,566
1995	6,473	1	1	<0.5	<0.5	<0.5	<0.5		8	1	6,484
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	13,571	116	4	3	<0.5	2	<0.5		5	2	13,703
1999	9,506	24	15	1	<0.5	1	<0.5		2	5	9,554
2000	8,955	2	22	<0.5	<0.5	1	<0.5		3	3	8,986
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	16,607	3		<0.5	<0.5	1	<0.5		4	2	16,617
2004	14,453	1		<0.5	<0.5	<0.5	<0.5		4	3	14,461
2005	9,060	<0.5		<0.5		1			3	<0.5	9,064

Source: PacFIN, extracted August 22, 2006.

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, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	270	808			91	9		6		6	7			88	1,285
1982	208	634		13	125	1	5	10		5	2			14	1,017
1983	242	150		17	38		6	11		<0.5	7	<0.5		20	491
1984	286	95		2	11		10	4		5	<0.5			13	426
1985	197	110		2	15		7	<0.5		1	<0.5			13	345
1986	78	455		2	21		8	2		<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		<0.5													<0.5
1990															
1991	51	8		4	2		<0.5	<0.5						2	67
1992	60	2		<0.5	5		1	1			<0.5			3	72
1993	162	16	<0.5	7	11		15	7		<0.5				10	228
1994	762	268	<0.5	32	71	<0.5	52	27	<0.5	4	2			112	1,330
1995	700	202	5	29	75	<0.5	31	31	<0.5	2	2	<0.5		92	1,169
1996	726	241	1	20	80	<0.5	63	41		1	6	<0.5		132	1,311
1997	664	249	34	27	114	<0.5	43	58	<0.5	1	4			109	1,303
1998	906	281	2	9	81	1	63	45	<0.5	2	2	<0.5		151	1,543
1999	597	152	7	4	46	<0.5	94	19		1	<0.5	<0.5		105	1,025
2000	635	156	3	3	52	<0.5	40	30	<0.5	2	2	<0.5		84	1,007
2001	351	273	1	<0.5	26		51	16		2	1			64	785
2002	298	216	2		59		14	4		3	1			71	668
2003	202	241	4	6	50	<0.5	8	22		1	1			53	588
2004	175	66	<0.5	5	23		10	9		2	1			45	336
2005	220	155		9	18		8	6	<0.5	1	<0.5	<0.5		53	470

Source: PacFIN, extracted August 7, 2006.

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

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

Additional processing info:

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

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

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–12. Commercial landings (round mt) in the West Coast harpoon fishery, 1981–2005.

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	73	1				<0.5	74

Source: PacFIN, extracted July 18, 2006.

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 pelagic longline fishery, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	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	3	<0.5	<0.5	<0.5			7	19
1984	12	3		<0.5	2		2	2	3	2	<0.5			4	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			43				3	49
1988	<0.5	1			152	1		<0.5		27	<0.5			5	186
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	2	<0.5	3				18	73
1992	63	2		<0.5	2	<0.5	1	<0.5		21	<0.5			2	91
1993	27	<0.5			1	<0.5	<0.5	5	1	1	1			2	38
1994	722	19		3	20	12	49	56	32	4	<0.5			15	932
1995	271	11		1	7	5	4	58	5	8	2			4	376
1996	346	2			5	<0.5	3	68	9	6	<0.5			5	444
1997	663	4		2	3	<0.5	6	83	1	32	<0.5			2	796
1998	418	3			4	<0.5	9	96	1	9	1			20	561
1999	1,325	5			7		66	161	17	1				4	1,586
2000	1,885	5	<0.5	<0.5	6	<0.5	22	99	41	12		3		11	2,084
2001	1,749	20		1	7	2	22	73	15	7	<0.5			53	1,949
2002	1,320	2			3	41	1	12	<0.5	12	<0.5			2	1,393
2003	1,810	<0.5			3		2	29	1	4				4	1,853
2004	898	1		<0.5	2		2	31	1	13	<0.5			3	951
2005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Not reported due to data confidentiality requirements.

Source: PacFIN, extracted August 3, 2006.

Additional processing info:

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.

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, 1981–2005.

Year	Tunas						Sword-fish	HMS sharks	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	Other	Total
	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecifie									
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	1		88	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

Source: PacFIN, extracted August 15, 2006.

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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	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	11,877,767	14,586	7,531	1,597	33	20,309	15,495		36,075	3,880	11,977,273
1984	12,147,062	20,053	96,217	6,080	706	6,947	928		6,422	4,278	12,288,693
1985	7,995,264	4,278	30,921	7,017	6	6,384	239		10,802	2,311	8,057,222
1986	5,867,829	7,248	6,427	180		19,050	160	26	9,451	634	5,911,005
1987	4,690,640	1,150	33,310	3,440		2,305	657		6,838	436	4,738,776
1988	8,539,846	952	96,331	3,566		766	614		11,362	538	8,653,975
1989	3,692,144	1,833	34,556	11,295	31	18,112	1	19	8,305	2,485	3,768,781
1990	5,413,557	79	13,332	560	74	6,163	85		2,792	1,529	5,438,171
1991	2,760,714	71	11,721	602		189		562	3,479	522	2,777,860
1992	11,073,621	2,195	55,452	2,361	281	6,144			6,120	670	11,146,844
1993	10,852,169	154,056	442,687	7,992	23,216	4,992			10,385	1,806	11,497,303
1994	19,817,924	603	6,797	302	180	590			537	344	19,827,277
1995	11,355,237	914	3,260	173	21	152	16		22,290	3,029	11,385,092
1996	25,635,696	38,596	2,608	295		440			26,524	997	25,705,156
1997	19,093,866	14,949	4,390	1,628	371	11,951	89		37,637	3,725	19,168,606
1998	17,341,958	138,138	17,122	5,018	525	4,788	279		16,340	5,263	17,529,431
1999	16,133,740	115,448	77,899	2,623	1,413	4,347	455		9,742	7,708	16,353,375
2000	15,297,868	4,497	100,831	252	298	1,927	522		9,445	5,233	15,420,873
2001	18,768,337	27,752	2,037	2,210	544	7,797	178		33,158	12,397	18,854,410
2002	13,239,791	6,838	9,996	664	170	916	1,241		21,889	7,792	13,289,297
2003	19,641,768	11,045		62	567	2,764	558		14,013	5,758	19,676,535
2004	24,435,884	2,513		520	655	1,834	1,061		22,772	3,425	24,468,664
2005	18,860,750	1,437		181		1,587			12,332	1,698	18,877,985

Source: PacFIN, extracted August 23, 2006.

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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	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	11,915,817	14,586	7,531	1,597	33	20,309	15,495		36,075	3,879	12,015,322
1984	12,150,346	20,053	96,217	6,080	706	6,947	928		6,422	4,278	12,291,977
1985	7,995,264	4,278	30,921	7,017	6	6,384	239		10,802	2,311	8,057,222
1986	5,867,829	7,248	6,427	180		19,050	160	26	9,451	634	5,911,005
1987	4,690,640	1,150	33,310	3,440		2,305	657		6,838	436	4,738,776
1988	8,542,696	952	96,331	3,566		766	614		11,362	538	8,656,825
1989	3,692,144	1,833	34,556	11,295	31	18,112	1	19	8,305	2,485	3,768,781
1990	5,413,557	79	13,332	560	74	6,163	85		2,792	1,529	5,438,171
1991	2,760,714	71	11,721	602		189		562	3,479	522	2,777,860
1992	11,218,614	2,195	55,452	2,361	281	6,144			6,120	670	11,291,837
1993	10,893,637	154,056	442,687	7,992	23,216	4,992			10,385	1,806	11,538,771
1994	19,859,543	603	6,797	302	180	590			537	345	19,868,897
1995	11,479,040	914	3,260	173	21	152	16		22,290	3,029	11,508,895
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	18,442,370	138,138	17,122	5,018	525	4,788	279		16,340	5,264	18,629,844
1999	17,398,920	115,448	77,899	2,623	1,413	4,347	455		9,742	7,708	17,618,555
2000	17,009,755	4,497	100,831	252	298	1,927	522		9,445	5,233	17,132,760
2001	20,441,923	27,752	2,037	2,210	544	7,797	178		33,158	12,398	20,527,997
2002	14,250,013	6,838	9,996	664	170	916	1,241		21,889	7,792	14,299,519
2003	24,426,934	11,045		62	567	2,764	558		14,085	5,757	24,461,772
2004	27,305,672	2,513		520	655	1,834	1,061		22,772	3,425	27,338,452
2005	20,956,624	1,437		181		1,587			12,332	1,698	20,973,859

Source: PacFIN, extracted August 23, 2006.
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, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	1,110,316	766,185			78,538	5,109		12,191		6,569	4,419			144,187	2,127,514
1982	1,000,168	675,288		6,837	116,517	653	7,330	17,851		5,820	904			19,748	1,851,116
1983	952,577	166,931		25,634	37,715		11,115	18,232		714	5,677	10		20,143	1,238,748
1984	1,096,570	144,390		2,427	13,638		15,242	6,022		8,410	293			9,482	1,296,474
1985	793,604	181,145		2,456	19,129		7,399	911		1,151	126			12,258	1,018,179
1986	377,053	673,561		2,756	29,629		8,793	4,777		311	65			10,566	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		841													841
1990															
1991	361,574	11,891		1,849	3,238		851	1,205						707	381,315
1992	241,122	2,748		74	7,744		1,080	2,559			310			3,498	259,135
1993	918,433	25,086	118	5,221	21,315		23,922	23,511		1,019				10,951	1,029,576
1994	4,536,655	489,369	42	27,214	128,789	7	91,871	132,327	40	5,531	851			155,818	5,568,514
1995	4,190,569	347,696	8,681	22,921	131,822	105	49,903	87,312	13	1,961	1,654	15		136,998	4,979,650
1996	3,919,230	448,255	1,557	16,802	138,649	56	106,175	123,890		1,084	2,557	492		205,497	4,964,244
1997	3,166,095	438,184	61,815	24,976	192,721	6	69,147	259,817	494	2,268	3,506			143,233	4,362,262
1998	3,967,255	484,999	2,440	7,744	139,393	4,810	76,514	208,872	2,457	3,411	1,761	88		212,476	5,112,220
1999	2,785,199	277,240	13,704	3,899	80,790	19	101,957	89,334		1,304	122	715		187,884	3,542,167
2000	2,747,621	287,686	2,143	2,999	86,541	164	66,184	123,217	545	1,293	2,253	20		138,928	3,459,594
2001	1,541,152	449,885	465	402	42,706		70,729	38,695		1,273	399			107,927	2,253,633
2002	1,499,163	368,415	1,725		86,811		19,494	11,258		2,429	833			199,253	2,189,381
2003	1,040,566	390,859	2,676	3,577	81,652	11	13,466	67,074		825	279			133,917	1,734,902
2004	901,913	109,638	227	3,795	40,559		22,379	31,046		1,987	386			119,954	1,231,884
2005	1,184,545	225,161		6,094	29,998		17,819	20,780	90	1,182	9	4		198,240	1,683,922

Source: PacFIN, extracted August 8, 2006.

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

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

Additional processing info:

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

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

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–18. Nominal commercial ex-vessel revenues ($) for the West Coast harpoon fishery, 1981–2005.

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			8,259	759,892
2001	468,289	1,152			50	2,748	472,239
2002	678,934	1,259				1,141	681,334
2003	840,133	562				1,768	842,463
2004	670,001	2,457				1,643	674,101
2005	678,284	1,229				2,872	682,385

Source: PacFIN, extracted July 19, 2006.

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 pelagic longline fishery, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	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	7,857	13	204	35			2,882	24,823
1984	62,804	3,979		334	3,325		2,831	7,567	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			10,302	21,465
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	16,726	36	4,576				80,015	293,471
1992	298,852	3,302		365	3,348	184	1,790	5,204		29,917	2			2,760	345,724
1993	153,383	63			1,350	20	545	37,080	1,937	4,110	951			2,993	202,432
1994	3,401,896	14,328		3,532	31,969	15,812	81,097	339,409	57,737	11,850	120			18,662	3,976,412
1995	1,064,427	17,409		360	6,685	2,318	5,351	311,205	5,365	17,114	7,223			7,224	1,444,681
1996	1,319,868	4,255			6,349	44	3,702	310,754	9,077	12,759	88			5,709	1,672,605
1997	2,115,438	8,211		7,342	3,992	6	10,507	367,004	2,707	110,693	140			2,819	2,628,859
1998	1,454,529	5,286			9,372	116	21,315	540,202	3,995	24,087	1,010			62,470	2,122,382
1999	4,893,372	7,067			11,204		133,630	1,188,768	44,608	2,317				6,667	6,287,633
2000	8,067,896	8,318	404	655	9,283	94	37,304	674,861	53,566	52,271		776		14,687	8,920,115
2001	6,527,196	20,572		7,380	9,680	1,206	39,876	392,412	17,425	14,348	997			69,995	7,101,087
2002	4,161,507	3,024			5,068	18,253	1,882	101,166	555	43,730	24			9,072	4,344,281
2003	5,879,612	621			5,415		3,679	227,083	1,556	12,964				10,295	6,141,225
2004	3,160,052	2,310		65	4,816		4,363	202,879	3,224	53,520	360			7,079	3,438,668
2005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Not reported due to data confidentiality requirements.

Source: PacFIN, extracted August 4, 2006.

Additional processing info:

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.

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, 1981–2005.

	Tunas						Sword-	HMS		Ground-	Coastal				
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	Sharks	Dorado	fish	Pelagics	Crab	Salmon	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	720		59,188	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

Source: PacFIN, extracted August 15, 2006.
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 (2005 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, with Canadian vessels excluded, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	49,483,571	34,109		328	136	4,757	1,881		252,611	2,669	49,780,062
1982	13,138,687	9,832	23,631	4,953	996	10,147	22		24,730	958	13,213,956
1983	20,426,083	25,083	12,950	2,747	57	34,925	26,646		62,038	6,672	20,597,201
1984	20,134,364	33,239	159,485	10,077	1,171	11,515	1,538		10,646	7,090	20,369,125
1985	12,860,325	6,881	49,736	11,287	10	10,268	385		17,375	3,716	12,959,983
1986	9,234,859	11,406	10,114	283		29,982	252	41	14,874	998	9,302,809
1987	7,185,416	1,761	51,026	5,270		3,531	1,006		10,475	670	7,259,155
1988	12,651,623	1,410	142,713	5,283		1,135	909		16,833	797	12,820,703
1989	5,269,975	2,617	49,324	16,122	44	25,851	1	27	11,854	3,547	5,379,362
1990	7,440,293	108	18,323	769	102	8,470	117		3,837	2,103	7,474,122
1991	3,665,800	94	15,564	799		251		747	4,620	692	3,688,567
1992	14,373,859	2,850	71,978	3,065	365	7,975			7,944	868	14,468,904
1993	13,768,294	195,453	561,643	10,139	29,454	6,333			13,176	2,292	14,586,784
1994	24,621,597	749	8,445	375	224	733			667	428	24,633,218
1995	13,824,248	1,113	3,969	210	25	185	19		27,137	3,688	13,860,594
1996	30,628,072	46,113	3,115	352		525			31,690	1,192	30,711,059
1997	22,439,612	17,569	5,160	1,913	436	14,045	105		44,232	4,377	22,527,449
1998	20,158,035	160,569	19,902	5,833	610	5,566	324		18,993	6,120	20,375,952
1999	18,485,036	132,273	89,251	3,005	1,619	4,980	521		11,162	8,834	18,736,681
2000	17,153,922	5,042	113,064	283	334	2,161	585		10,591	5,869	17,291,851
2001	20,552,274	30,389	2,230	2,420	595	8,539	195		36,309	13,578	20,646,529
2002	14,250,125	7,360	10,759	714	182	986	1,336		23,559	8,388	14,303,409
2003	20,719,165	11,651		65	598	2,916	589		14,782	6,073	20,755,839
2004	25,116,543	2,583		534	674	1,885	1,090		23,406	3,520	25,150,235
2005	18,860,750	1,437		181		1,587			12,332	1,698	18,877,985

Source: PacFIN, extracted August 23, 2006.
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 2005.
Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.
Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.
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 4–22. Real commercial ex-vessel revenues (2005 $) for the West Coast albacore surface hook-and-line (troll and baitboat) fishery, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	49,483,571	34,109		328	136	4,757	1,881		252,611	2,669	49,780,062
1982	13,165,248	9,832	23,631	4,953	996	10,147	22		24,730	957	13,240,516
1983	20,491,516	25,083	12,950	2,747	57	34,925	26,646		62,038	6,673	20,662,635
1984	20,139,807	33,239	159,485	10,077	1,171	11,515	1,538		10,646	7,090	20,374,568
1985	12,860,325	6,881	49,736	11,287	10	10,268	385		17,375	3,716	12,959,983
1986	9,234,859	11,406	10,114	283		29,982	252	41	14,874	998	9,302,809
1987	7,185,416	1,761	51,026	5,270		3,531	1,006		10,475	670	7,259,155
1988	12,655,846	1,410	142,713	5,283		1,135	909		16,833	796	12,824,925
1989	5,269,975	2,617	49,324	16,122	44	25,851	1	27	11,854	3,547	5,379,362
1990	7,440,293	108	18,323	769	102	8,470	117		3,837	2,103	7,474,122
1991	3,665,800	94	15,564	799		251		747	4,620	692	3,688,567
1992	14,562,064	2,850	71,978	3,065	365	7,975			7,944	868	14,657,109
1993	13,820,905	195,453	561,643	10,139	29,454	6,333			13,176	2,292	14,639,395
1994	24,673,305	749	8,445	375	224	733			667	428	24,684,926
1995	13,974,970	1,113	3,969	210	25	185	19		27,137	3,688	14,011,316
1996	32,353,666	46,113	3,115	352		525			31,690	1,192	32,436,653
1997	23,282,616	17,659	5,160	1,913	568	14,045	105		44,232	4,378	23,370,676
1998	21,437,138	160,569	19,902	5,833	610	5,566	324		18,993	6,120	21,655,055
1999	19,934,601	132,273	89,251	3,005	1,619	4,980	521		11,162	8,833	20,186,245
2000	19,073,509	5,042	113,064	283	334	2,161	585		10,591	5,869	19,211,438
2001	22,384,936	30,389	2,230	2,420	595	8,539	195		36,309	13,578	22,479,191
2002	15,337,437	7,360	10,759	714	182	986	1,336		23,559	8,388	15,390,721
2003	25,766,808	11,651		65	598	2,916	589		14,857	6,073	25,803,557
2004	28,066,268	2,583		534	674	1,885	1,090		23,406	3,521	28,099,961
2005	20,956,624	1,437		181		1,587			12,332	1,698	20,973,859

Source: PacFIN, extracted August 23, 2006.
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 2005.
Landed weights in lbs are multiplied by the prices per pound in each fish ticket line and then divided by the corresponding deflator.
Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.
Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–23. Real commercial ex-vessel revenues (2005 $) for the West Coast drift gillnet fishery, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	2,106,063	1,453,310			148,972	9,692		23,124		12,461	8,381			273,493	4,035,496
1982	1,787,930	1,207,165		12,222	208,289	1,167	13,104	31,910		10,404	1,616			35,303	3,309,110
1983	1,638,138	287,069		44,082	64,857		19,114	31,354		1,227	9,763	17		34,642	2,130,263
1984	1,817,619	239,333		4,023	22,606		25,264	9,981		13,940	486			15,719	2,148,971
1985	1,276,507	291,371		3,951	30,769		11,901	1,466		1,851	203			19,714	1,637,733
1986	593,410	1,060,058		4,337	46,631		13,838	7,519		490	102			16,629	1,743,014
1987	56,944	245,823	159	2,526	5,387		2,620	125		7,341	188			8,029	329,142
1988	4,924	199,887					10,506			658				209	216,184
1989		1,200													1,200
1990															
1991	480,114	15,789		2,455	4,299		1,130	1,600						940	506,327
1992	312,982	3,567		97	10,052		1,402	3,322			402			4,540	336,364
1993	1,165,228	31,826	150	6,623	27,042		30,350	29,829		1,292				13,897	1,306,237
1994	5,636,296	607,988	52	33,810	160,007	8	114,139	164,401	49	6,871	1,057			193,590	6,918,268
1995	5,101,740	423,296	10,568	27,905	160,484	128	60,754	106,296	16	2,387	2,013	18		166,789	6,062,394
1996	4,682,473	535,549	1,860	20,074	165,649	67	126,851	148,017		1,295	3,055	588		245,519	5,930,997
1997	3,720,878	514,965	72,646	29,352	226,491	6	81,263	305,344	580	2,665	4,121			168,333	5,126,644
1998	4,611,479	563,756	2,836	9,001	162,029	5,591	88,939	242,790	2,856	3,964	2,047	102		246,979	5,942,369
1999	3,191,107	317,644	15,701	4,467	92,564	22	116,815	102,353		1,494	140	819		215,269	4,058,395
2000	3,080,984	322,590	2,403	3,363	97,041	184	74,214	138,167	611	1,449	2,526	22		155,784	3,879,338
2001	1,687,639	492,647	510	440	46,765		77,452	42,373		1,394	437			118,185	2,467,842
2002	1,613,565	396,529	1,857		93,436		20,982	12,117		2,614	896			214,458	2,356,454
2003	1,097,643	412,299	2,823	3,773	86,131	12	14,205	70,753		870	294			141,262	1,830,065
2004	927,036	112,692	233	3,901	41,689		23,002	31,911		2,042	396			123,296	1,266,198
2005	1,184,545	225,161		6,094	29,998		17,819	20,780	90	1,182	9	4		198,240	1,683,922

Source: PacFIN, extracted August 8, 2006.

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 2005.

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

Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–24. Real commercial ex-vessel revenues (2005 $) for the West Coast harpoon fishery, 1981–2005.

Year	Swordfish	HMS Sharks	Tunas		Dorado	Other	Total
			Albacore	Other			
1981	2,601,756	19,356	7,496	731		22,815	2,652,154
1982	1,501,405	3,553		261		2,205	1,507,424
1983	546,937	3,374				16,771	567,082
1984	966,482	14,044	547	249		3,358	984,680
1985	2,060,468	2,769	363	397		2,814	2,066,811
1986	2,827,002	3,829	83	530		1,894	2,833,338
1987	2,524,065	7,740	6,358	3,180		129,548	2,670,891
1988	2,189,422	9,525	12,669			1,306	2,212,922
1989	714,295	2,180	3,006	93		1,791	721,365
1990	741,234	8,066		148		1,115	750,563
1991	238,945	2,689				92	241,726
1992	761,605	7,952	1,605	173		1,732	773,067
1993	1,437,150	2,398	9,807			1,270	1,450,625
1994	1,581,671	2,003	3,094			3,588	1,590,356
1995	925,381	4,965				2,133	932,479
1996	756,305	3,843	258			780	761,186
1997	802,927	6,543	234		106	794	810,604
1998	468,342	1,863				890	471,095
1999	697,734	929				6,703	705,366
2000	841,594	895	339			9,260	852,088
2001	512,800	1,261			55	3,009	517,125
2002	730,744	1,355				1,228	733,327
2003	886,217	593				1,865	888,675
2004	688,664	2,525				1,689	692,878
2005	678,284	1,229				2,872	682,385

Source: PacFIN, extracted July 18, 2006.

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 2005.

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

Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–25. Real commercial ex-vessel revenues (2005 $) for the West Coast pelagic longline fishery, 1981–2005.

		Sharks					Tunas								
Year	Sword-fish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Albacore	Other	Dorado	Ground-fish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	2,928				32,008	90,352	91,439	2,409		4,891	216			2,191	226,434
1982	547	2,543			9,728	21,599	131,239	3,498	561	42	37			416	170,210
1983	869	76			1,509	748	20,582	13,511	22	351	61			4,958	42,687
1984	104,100	6,596		554	5,511		4,693	12,542	4,463	3,075	4			8,707	150,245
1985	1,209	3,092			40	142	1,190			14,038				263	19,974
1986		6,049			2,571	164				8,733	52			16,212	33,781
1987		439			10,646	607	251			110,559				9,069	131,571
1988	2,372	3,439			476,906	803		585		66,604	37			8,204	558,950
1989					16,688	635				43					17,367
1990		734			42,818	3,202	62	5,522		267	7			269	52,881
1991	194,270	264			59,396	472	700	22,209	48	6,077				106,248	389,684
1992	387,918	4,286		474	4,345	238	2,324	6,755		38,834	3			3,582	448,759
1993	194,599	80			1,713	25	692	47,044	2,457	5,214	1,207			3,797	256,828
1994	4,226,483	17,801		4,388	39,718	19,645	100,754	421,679	71,731	14,723	149			23,185	4,940,256
1995	1,295,869	21,194		438	8,139	2,822	6,515	378,872	6,532	20,835	8,793			8,794	1,758,803
1996	1,576,903	5,083			7,586	52	4,423	371,271	10,845	15,244	105			6,821	1,998,333
1997	2,486,118	9,650		8,629	4,691	7	12,349	431,313	3,181	130,090	164			3,312	3,089,504
1998	1,690,723	6,145			10,894	135	24,776	627,923	4,643	27,999	1,174			72,613	2,467,025
1999	5,606,522	8,097			12,837		153,105	1,362,016	51,109	2,655				7,639	7,203,980
2000	9,046,755	9,327	453	734	10,410	106	41,830	756,741	60,065	58,613		870		16,468	10,002,372
2001	7,147,609	22,527		8,081	10,600	1,320	43,666	429,711	19,082	15,712	1,091			76,648	7,776,047
2002	4,479,073	3,254			5,455	19,646	2,026	108,886	597	47,067	25			9,766	4,675,795
2003	6,202,122	655			5,712		3,881	239,539	1,641	13,675				10,860	6,478,085
2004	3,248,075	2,375		66	4,950		4,484	208,530	3,313	55,011	370			7,278	3,534,452
2005	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Not reported due to data confidentiality requirements.

Source: PacFIN, extracted August 4, 2006.

Additional processing info:

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.

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 2005.

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

Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.

Aquaculture fish ticket/fish ticket line info is excluded.

Table 4–26. Real commercial ex-vessel revenues (2005 $) for the West Coast purse seine fishery, 1981–2005.

	Tunas						Sword-	HMS		Ground-	Coastal				
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified	fish	Sharks	Dorado	fish	Pelagics	Crab	Salmon	Other	Total
1981	687,854	184,732,823	118,207,010	2,944,888	2,314,083	103,648					225,776			2,758	309,218,840
1982	1,029,203	130,864,459	69,399,817	2,139,478	4,791,564	96,603					9,215				208,330,338
1983	26,396	95,780,255	58,424,370		1,792,071	42,973	3,088	448			11,416			1,010	156,082,027
1984	7,993,141	58,848,953	39,353,523	237,471	1,455,380	4,278,036	144,367	1,078			99,648			10,036	112,421,633
1985	46,570	22,827,634	2,755,537	1,302	4,499,873	1,650,353	11,388	740			80,731			1,540	31,875,668
1986	101,702	27,786,796	1,013,386	20,987	7,201,626	287,338	287,388	4,083			12,911			3,860	36,720,077
1987	106,462	39,872,402	6,306,075	230,701	3,139,893	654,880		1,379			3,071			13,758	50,328,621
1988	395,089	38,155,233	11,514,718	1,007	3,018,524	100,332					37,543				53,222,445
1989	65,626	27,319,050	4,444,375		1,757,583	160,139	9,926	385	183		8,992			200	33,766,459
1990	192,219	12,680,021	2,596,295		1,470,353	44,451					59,730				17,043,070
1991		4,514,316	3,052,308		130,429	10,603					48,410			4,402	7,760,468
1992	25,040	2,189,664	715,622	3,799	1,411,413	3,811	67,333	4,574	3,371	286	80,595			14,794	4,520,302
1993	1,525	1,333,754	1,328,393	5,365	722,363	1,116	125,250	2,029	222	17	21,357			13,523	3,554,914
1994		3,894,942	1,339,566		1,817,825	4,216					45,151			155,739	7,257,439
1995		3,423,059	4,628,547		1,148,773						19,077			24,911	9,244,367
1996	1,045	3,189,236	4,352,691		4,618,840						83,583			30,168	12,275,563
1997	4,294	5,635,314	6,260,382		2,943,232	4,930	7,834	2,244	1,674		20,356			60,823	14,941,083
1998	189,381	4,426,803	5,483,070		2,666,547						192,113			127,006	13,084,920
1999	38,286	1,601,258	3,130,624		412,617						6,118	825		67,814	5,257,542
2000	7,418	1,464,499	533,294		332,684						27,455				2,365,350
2001	68,814	450,211	31,313		368,847						5,576				924,762
2002	385	621,908	137,869				2,823							48	763,033
2003	17,365	466,635	160,536		15,689										660,225
2004	1,580	447,204	111,885												560,669
2005		304,037	291,183		119,162						1,708				716,090

Source: PacFIN, extracted August 15, 2006.

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 2005.

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

Deflators were downloaded from the Bureau of Economic Analysis on March 7, 2006.

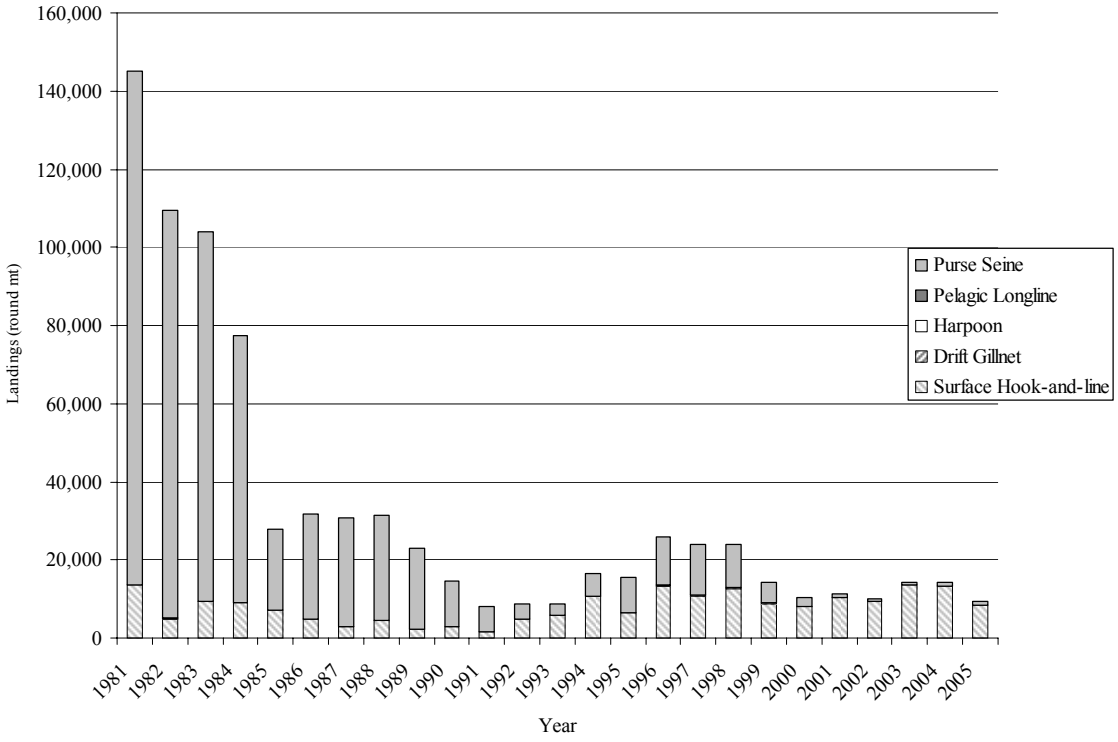


Figure 4–4. West Coast commercial tuna landings by fishery, 1981–2005.

Interpretation: Figure 4–4 and Table 4–27 display West Coast commercial tuna landings by fishery over the years 1981–2005 for the surface hook-and-line, drift gillnet, harpoon, pelagic longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006. 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, 1981–2005.

Year	Landings (round mt)					
	Surface Hook-and-line	Drift Gillnet	Harpoon	Pelagic Longline	Purse Seine	Total
1981	13,507	6	2	26	131,620	145,161
1982	4,981	15	0	43	104,326	109,365
1983	9,325	17	0	9	94,524	103,875
1984	8,922	14	0	4	68,571	77,511
1985	7,012	7	0	0	20,843	27,862
1986	4,982	10	0	0	26,891	31,883
1987	2,891	1	2	0	27,907	30,801
1988	4,625	4	1	0	26,814	31,444
1989	2,168	0	0	0	20,784	22,952
1990	2,926	0	0	1	11,584	14,511
1991	1,641	0	0	2	6,562	8,205
1992	4,755	2	0	1	3,956	8,714
1993	5,781	22	1	5	3,070	8,879
1994	10,541	79	0	105	5,737	16,462
1995	6,406	62	0	62	9,100	15,630
1996	13,329	104	0	71	12,382	25,886
1997	10,833	101	0	89	12,783	23,806
1998	12,727	108	0	105	10,938	23,878
1999	8,817	113	0	227	5,186	14,343
2000	8,061	70	0	121	2,186	10,438
2001	10,228	67	0	95	886	11,276
2002	9,313	18	0	13	777	10,121
2003	13,476	30	0	31	863	14,400
2004	13,385	19	0	33	791	14,228
2005	8,301	14	0	*	1,006	9,321†

*Not reported due to data confidentiality requirements.

†Total does not include pelagic longine.

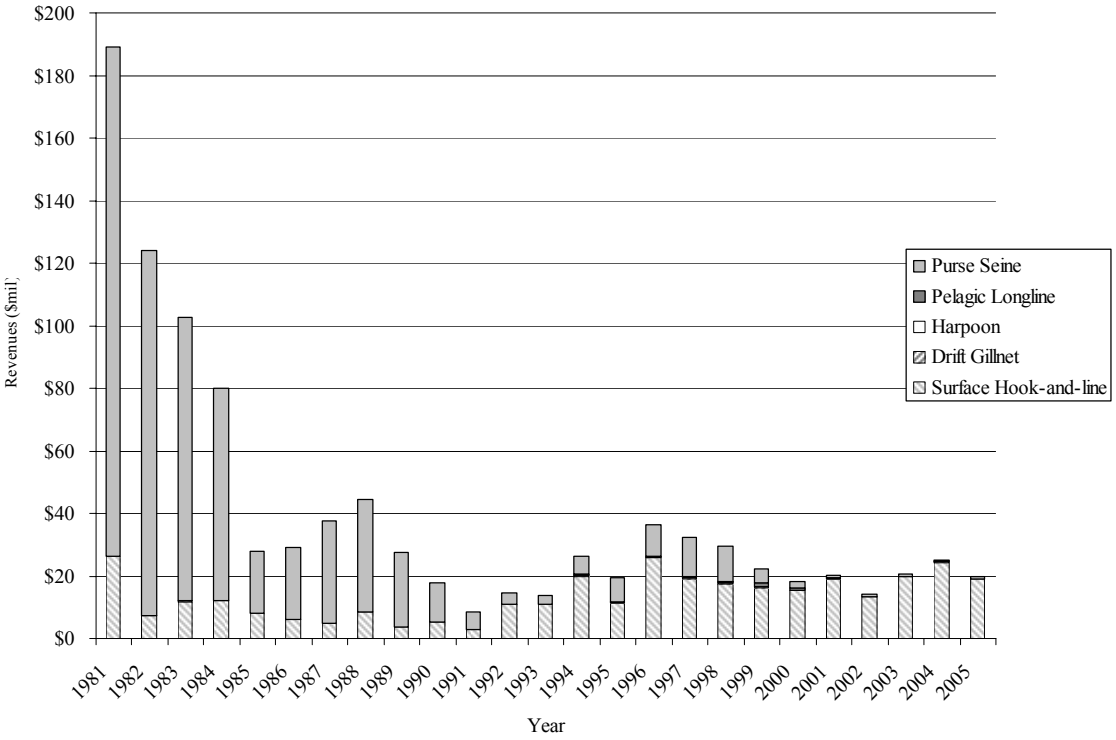


Figure 4–5. West Coast commercial tuna revenues by fishery, 1981–2005.

Interpretation: Figure 4–5 and Table 4–28 display West Coast commercial tuna revenues by fishery over the years 1981–2005 for the surface hook-and-line, drift gillnet, harpoon, pelagic longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on June 28, 2006. 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, 1981–2005.

	Revenues ($)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Pelagic Longline	Purse Seine	Total
1981	26,105,721	12,191	4,337	49,477	162,899,688	189,071,414
1982	7,355,282	25,181	146	75,372	116,534,837	123,990,818
1983	11,892,353	29,347	0	19,826	90,752,417	102,693,943
1984	12,167,115	21,264	480	10,398	67,670,051	79,869,308
1985	7,999,542	8,310	472	740	19,758,416	27,767,480
1986	5,875,077	13,570	390	0	23,136,080	29,025,117
1987	4,691,790	1,792	6,226	164	32,842,638	37,542,610
1988	8,540,798	7,092	8,552	395	35,899,810	44,456,647
1989	3,693,977	0	2,171	0	23,642,990	27,339,138
1990	5,413,636	0	108	4,063	12,357,079	17,774,886
1991	2,760,785	2,056	0	17,254	5,804,636	8,584,731
1992	11,075,816	3,639	1,369	6,994	3,350,739	14,438,557
1993	11,006,225	47,433	7,730	37,625	2,673,982	13,772,995
1994	19,818,527	224,198	2,490	420,506	5,679,816	26,145,537
1995	11,356,151	137,215	0	316,556	7,557,190	19,367,112
1996	25,674,292	230,065	216	314,456	10,179,438	36,398,467
1997	19,108,815	328,964	200	377,511	12,634,293	32,449,783
1998	17,480,096	285,386	0	561,517	10,982,420	29,309,419
1999	16,249,188	191,291	0	1,322,398	4,523,535	22,286,412
2000	15,302,365	189,401	302	712,165	2,084,934	18,289,167
2001	18,796,089	109,424	0	432,288	839,400	20,177,201
2002	13,246,629	30,752	0	103,048	706,266	14,086,695
2003	19,652,813	80,540	0	230,762	625,894	20,590,009
2004	24,438,397	53,425	0	207,242	545,475	25,244,539
2005	18,862,187	38,599	0	*	714,382	19,615,168†

*Not reported due to data confidentiality requirements.

†Total does not include pelagic longine.

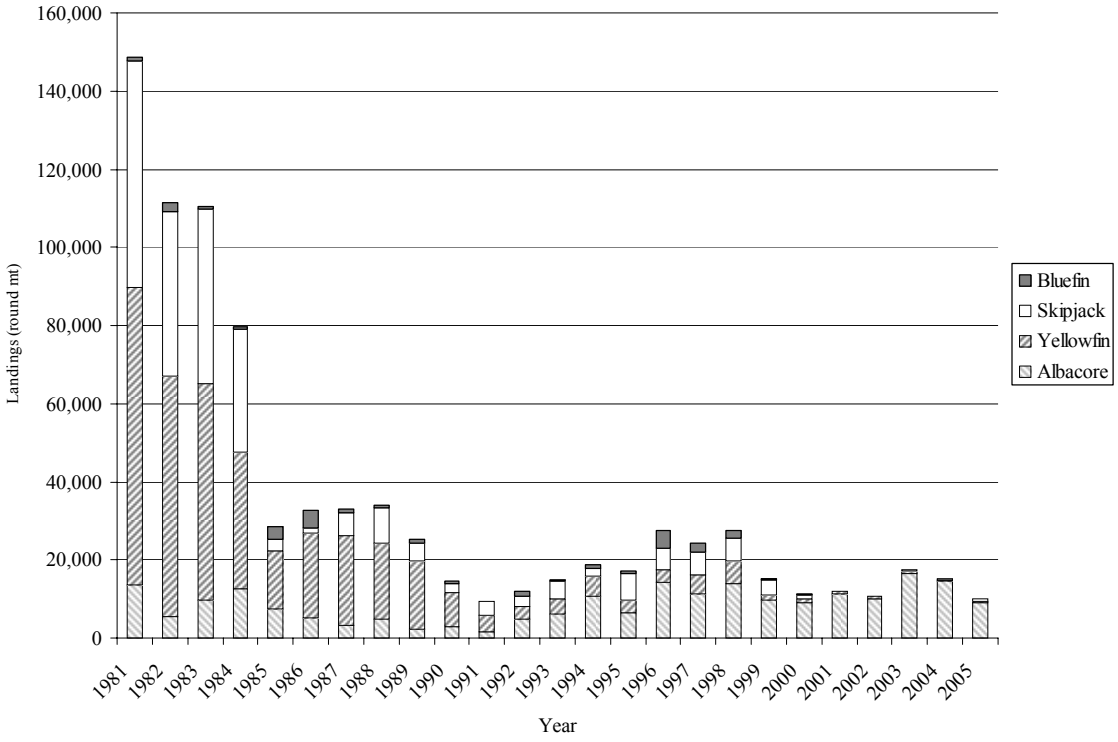


Figure 4–6. Species composition of coastwide commercial tuna landings, 1981–2005.

Interpretation: Figure 4–6 shows West Coast HMS commercial tuna landings in round metric tons for all gear types from 1981 through 2005 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 consisted of four varieties: albacore, yellowfin, skipjack, and bluefin. The levels of yellowfin and skipjack landings declined precipitously during the 1980s, and by 1995 were supplanted by albacore 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 June 23, 2006. They represent a portion of the table of West Coast commercial landings by species 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, 1981–2005.

	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	4,908	19,520	8,863	6	804	11	34,112
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	6,151	3,795	4,539	26	559	16	15,086
1994	10,686	5,056	2,111	47	916	33	18,849
1995	6,528	3,038	7,037	49	714	1	17,367
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	13,801	5,799	5,846	53	1,949	12	27,460
1999	9,770	1,353	3,759	108	186	12	15,188
2000	9,042	1,158	780	87	312	1	11,380
2001	11,194	655	58	53	196	1	12,157
2002	10,029	544	236	10	11	2	10,832
2003	16,670	465	349	35	36	<0.5	17,555
2004	14,469	488	307	22	10	9	15,305
2005	9,084	286	523	10	207	<0.5	10,110

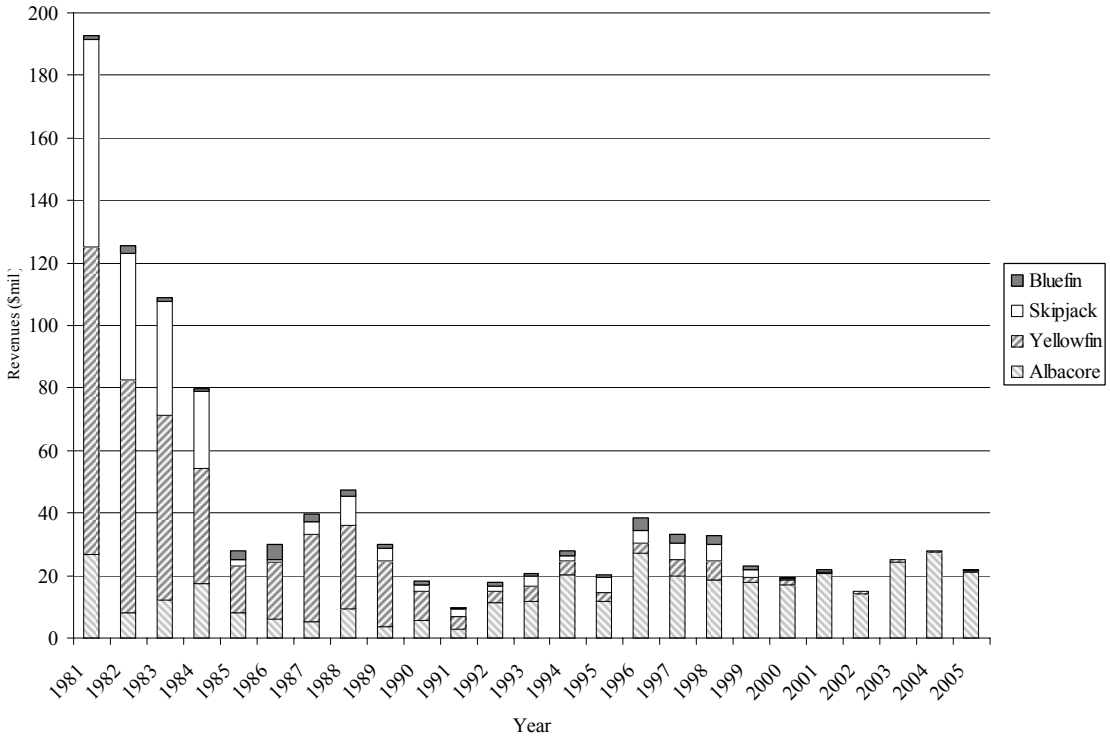


Figure 4–7. Species composition of coastwide commercial tuna revenues, 1981–2005.

Interpretation: Figure 4–7 shows West Coast HMS commercial tuna revenues in current dollars from 1981 through 2005 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 consisted of four varieties: albacore, yellowfin, skipjack, and bluefin. The levels of yellowfin and skipjack revenues declined precipitously during the 1980s, and by 1995 were supplanted by albacore 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 June 28, 2006. They represent a portion of Table 4-4, 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, 1981–2005.

	Revenues ($)						
Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Unspecified Tuna	Total
1981	26,524,145	98,722,280	66,331,030	1,569,755	1,239,005	72,694	194,458,909
1982	8,033,073	74,468,306	40,507,405	1,208,147	2,690,102	98,923	127,005,956
1983	12,240,375	59,190,758	36,248,835	45,946	1,062,909	95,490	108,884,313
1984	17,208,633	37,038,204	24,790,704	174,405	904,956	2,590,391	82,707,293
1985	8,293,123	14,690,108	2,118,170	17,693	2,817,610	1,028,867	28,965,571
1986	6,178,085	18,079,443	904,609	90,227	4,636,698	198,248	30,087,310
1987	5,127,832	27,878,667	4,426,717	176,504	2,057,402	448,231	40,115,353
1988	9,110,214	27,030,132	9,249,827	26,156	2,070,411	80,548	47,567,288
1989	3,785,598	20,824,242	3,944,894	2,415	1,271,718	127,320	29,956,187
1990	5,619,553	9,383,584	1,898,875	8,771	1,149,381	56,750	18,116,914
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	11,667,651	4,821,735	3,282,778	211,513	752,369	72,678	20,808,724
1994	20,070,706	4,522,321	1,751,209	307,147	1,674,099	55,245	28,380,727
1995	11,570,364	3,044,670	4,752,641	258,727	1,057,948	5,136	20,689,486
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	18,733,488	5,861,959	5,213,131	271,919	2,965,485	61,688	33,107,670
1999	17,767,485	1,468,209	2,748,208	657,121	1,061,233	60,572	23,762,828
2000	17,156,838	1,321,954	483,242	579,384	577,458	2,298	20,121,174
2001	20,715,878	465,558	33,633	320,855	473,821	3,069	22,012,814
2002	14,296,619	588,677	128,245	87,304	43,512	6,325	15,150,682
2003	24,477,272	451,273	159,961	262,768	76,079	21	25,427,374
2004	27,344,151	446,577	109,254	147,696	38,312	54,879	28,140,869
2005	21,002,429	316,368	292,121	60,141	136,848	913	21,808,820

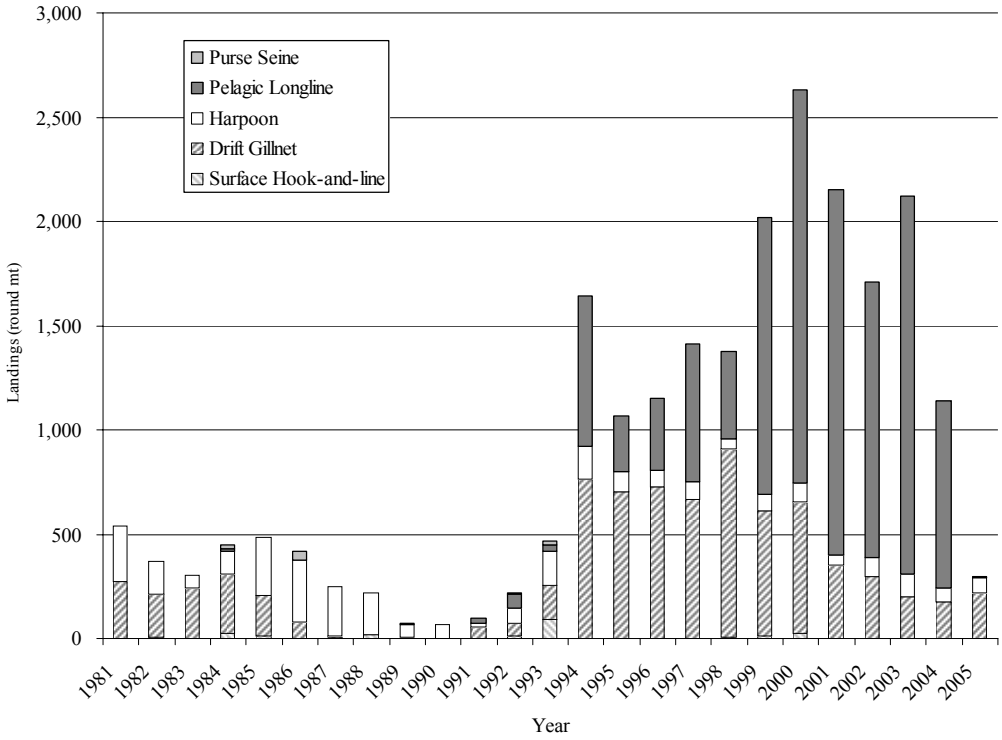


Figure 4–8. West Coast commercial swordfish landings by fishery, 1981–2005.

Interpretation: Figure 4–8 and Table 4–31 display West Coast commercial swordfish landings by fishery over the years 1981–2005 for the surface hook-and-line, drift gillnet, harpoon, pelagic longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006. 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, 1981–2005.

	Landings (round mt)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Pelagic Longline	Purse Seine	Total
1981	0	270	272	<0.5	0	542
1982	4	208	156	<0.5	0	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	0	41	416
1987	5	6	237	0	0	248
1988	18	1	199	<0.5	0	218
1989	7	0	62	0	1	70
1990	2	0	65	0	0	67
1991	2	51	20	27	0	100
1992	13	60	75	63	10	221
1993	90	162	169	27	17	465
1994	1	762	157	722	0	1,642
1995	1	700	97	271	0	1,069
1996	<0.5	726	81	346	0	1,153
1997	1	664	84	663	1	1,413
1998	4	906	48	418	0	1,376
1999	15	597	81	1,325	0	2,018
2000	22	635	90	1,885	0	2,632
2001	<0.5	351	52	1,749	0	2,152
2002	2	298	90	1,320	1	1,711
2003	0	202	107	1,810	0	2,119
2004	0	175	69	898	0	1,142
2005	0	220	73	*	0	293†

*Not reported due to data confidentiality requirements.

†Total does not include pelagic longine.

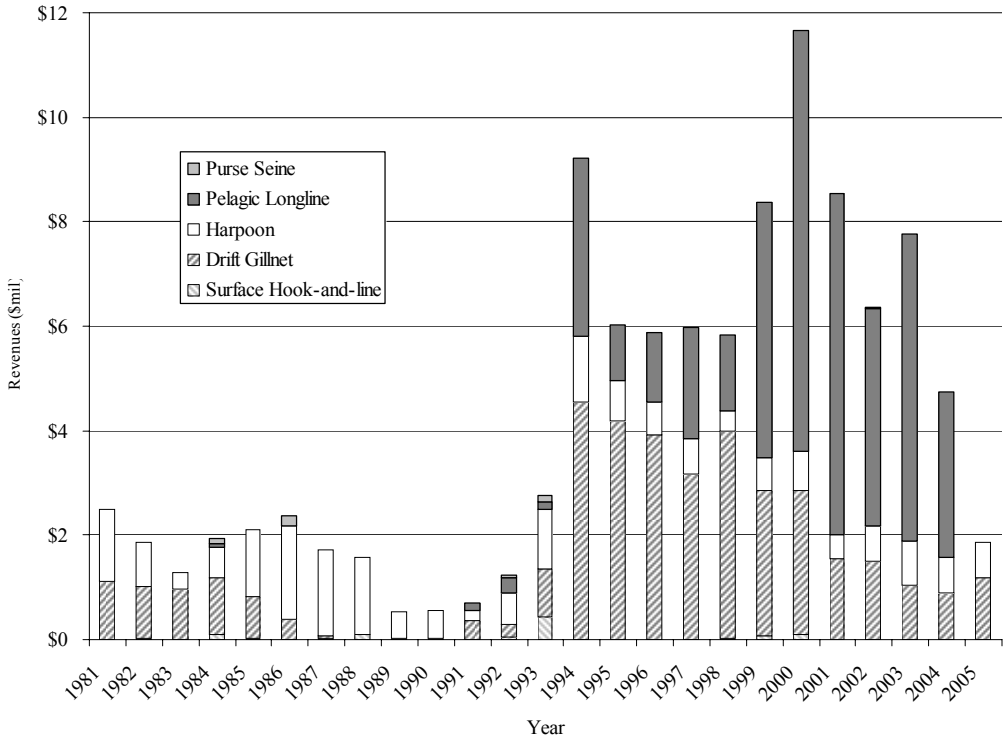


Figure 4–9. West Coast commercial swordfish revenues by fishery, 1981–2005.

Interpretation: Figure 4–9 and Table 4–32 display West Coast commercial swordfish revenues by fishery in current dollars over the years 1981–2005 for the surface hook-and-line, drift gillnet, harpoon, pelagic longline, and purse seine fisheries, respectively.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006 (landings) and June 28, 2006 (revenues). 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, 1981–2005.

	Revenues ($)					
Year	Surface Hook-and-line	Drift Gillnet	Harpoon	Pelagic Longline	Purse Seine	Total
1981	0	1,110,316	1,371,646	1,544	0	2,483,506
1982	13,219	1,000,168	839,886	306	0	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	0	182,606	2,362,363
1987	33,310	37,173	1,647,710	0	0	1,718,193
1988	96,331	3,324	1,477,860	1,601	0	1,579,116
1989	34,556	0	500,435	0	6,955	541,946
1990	13,332	0	539,322	0	0	552,654
1991	11,721	361,574	179,949	146,305	0	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	0	9,218,435
1995	3,260	4,190,569	760,108	1,064,427	0	6,018,364
1996	2,608	3,919,230	633,027	1,319,868	0	5,874,733
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	0	5,841,820
1999	77,899	2,785,199	608,982	4,893,372	0	8,365,452
2000	100,831	2,747,621	750,533	8,067,896	0	11,666,881
2001	2,037	1,541,152	468,289	6,527,196	0	8,538,674
2002	9,996	1,499,163	678,934	4,161,507	2,623	6,352,223
2003	0	1,040,566	840,133	5,879,612	0	7,760,311
2004	0	901,913	670,001	3,160,052	0	4,731,966
2005	0	1,184,545	678,284	*	0	1,862,829†

*Not reported due to data confidentiality requirements.

†Total does not include pelagic longine.

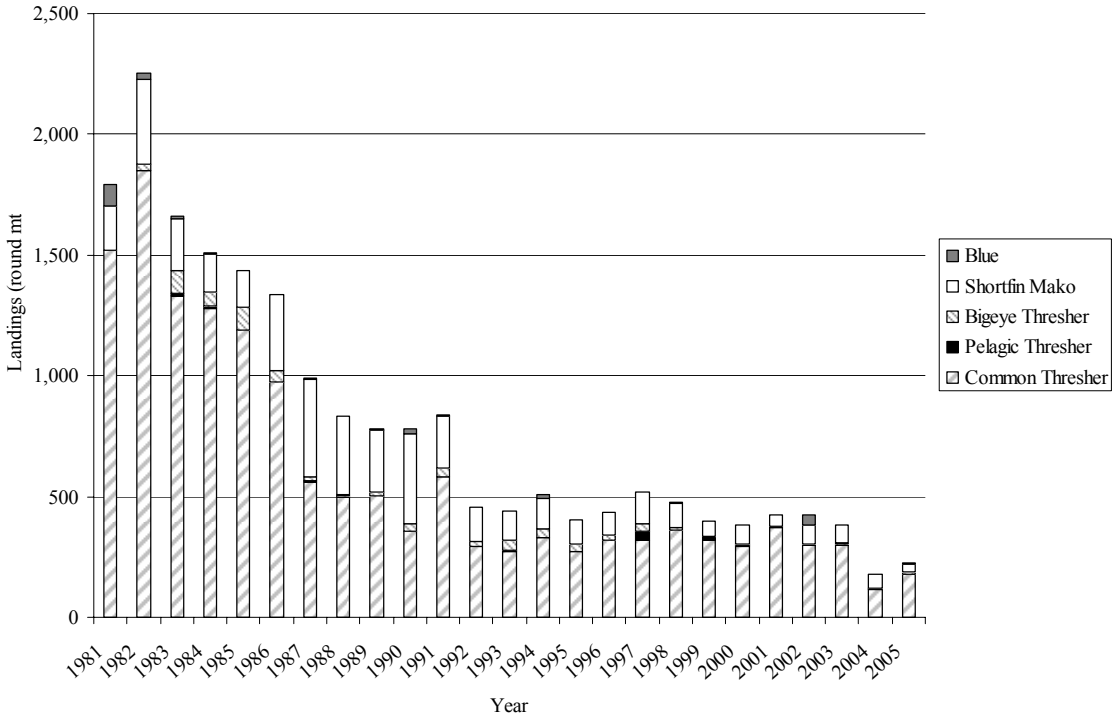


Figure 4–10. Species composition of coastwide commercial shark landings, 1981–2005.

Interpretation: Figure 4–10 shows West Coast commercial shark landings in round metric tons for all gear types from 1981 through 2005. 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 the a level as high as 2,000 metric tons in the early 1980s down to a level near 500 metric tons or below 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. For 2004–05 total West Coast commercial shark landings were below 250 mt in each year. In a broader sense, the decline in landings reflects fewer drift gillnet vessels.

Source and Calculations: The data were extracted from PacFIN on June 23, 2006. They represent a portion of the 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, 1981–2005.

	Landings (round mt)					
Year	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Total
1981	1,521			182	92	1,795
1982	1,848	0	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	0	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	0	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

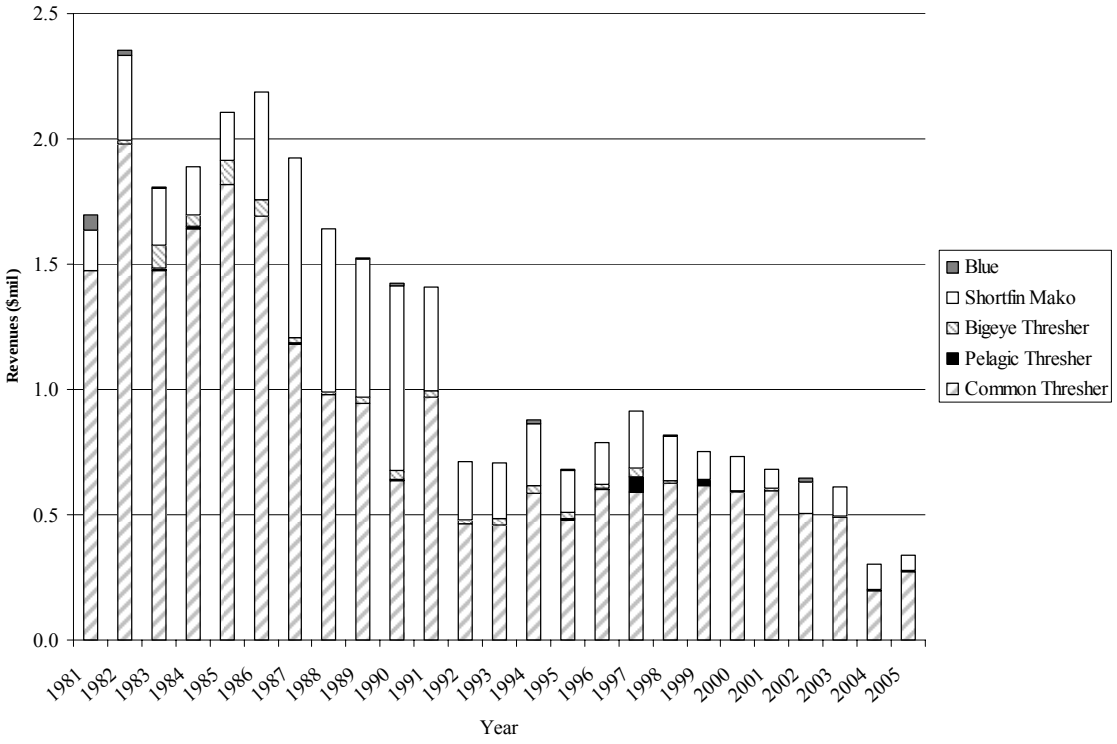


Figure 4–11. Species composition of coastwide commercial shark revenues, 1981–2005.

Interpretation: Figure 4–11 shows West Coast commercial shark revenues in current dollars by species for all gear types from 1981 through 2005. 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 in 2004 and 2005. The decline was primarily driven by a downward trend in bigeye 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. 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, 1981–2005.

	Revenues ($)					
Year	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue	Total
1981	1,475,634	0	0	162,347	59,064	1,697,045
1982	1,980,592	0	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	1,690,483	194	66,647	428,259	1,320	2,186,903
1987	1,183,866	1,840	22,123	715,138	1,853	1,924,820
1988	979,905	821	9,764	649,799	2,258	1,642,547
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	0	25,179	415,168	894	1,410,118
1992	464,018	602	14,629	231,063	1,810	712,122
1993	458,513	462	28,190	221,401	608	709,174
1994	584,318	42	33,478	247,088	16,057	880,983
1995	477,755	8,777	24,896	165,215	2,796	679,439
1996	603,006	1,557	17,745	166,763	587	789,658
1997	591,268	62,496	34,768	227,426	278	916,236
1998	625,489	2,584	9,428	176,313	5,977	819,791
1999	617,691	18,424	5,876	111,119	73	753,183
2000	589,105	2,738	4,636	133,619	867	730,965
2001	595,542	2,767	8,428	75,799	1,520	684,056
2002	503,487	1,946	0	124,521	18,659	648,613
2003	487,783	2,814	3,779	115,685	876	610,937
2004	197,655	2,500	4,060	98,827	972	304,014
2005	271,451	588	6,234	57,758	1,610	337,641

Table 4–35. Commercial landings (round mt) of the albacore surface hook-and-line (troll and baitboat) fishery in California, with Canadian vessels excluded, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	9,113	14		<0.5	<0.5	1	2		3	2	9,135
1982	3,859	3	4	2	1	4	<0.5		2	<0.5	3,875
1983	7,270	16	3	1	<0.5	20	34		4	1	7,349
1984	8,109	13	25	5	<0.5	5	2		<0.5	4	8,163
1985	6,147	2	11	4	<0.5	4	<0.5		2	1	6,171
1986	3,019	2	1	<0.5		20	<0.5	<0.5	2	<0.5	3,044
1987	1,324	<0.5	5	2		2	1		1	<0.5	1,335
1988	931	<0.5	17	2		<0.5			<0.5	1	951
1989	823	1	7	8	<0.5	10	<0.5	<0.5	2	1	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5		<0.5	2	765
1991	642	<0.5	2	1		<0.5		<0.5		1	646
1992	1,184	<0.5	13	2	<0.5	6			<0.5	2	1,207
1993	1,461	18	89	5	9	3				1	1,586
1994	3,055	<0.5	1	<0.5	<0.5	1			<0.5	<0.5	3,057
1995	777	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	3	780
1996	5,038	42	<0.5	<0.5		<0.5			<0.5	2	5,082
1997	3,288	7	1	1	<0.5	5	<0.5		3	2	3,307
1998	2,232	116	4	3	<0.5	1	<0.5		1	2	2,359
1999	5,339	6	15	1	<0.5	1	<0.5		<0.5	5	5,367
2000	1,798	2	22	<0.5	<0.5	1	<0.5		1	3	1,827
2001	2,796	8	<0.5	1	<0.5	2	<0.5		3	6	2,816
2002	2,659	2	2	<0.5	<0.5	<0.5	<0.5		3	3	2,669
2003	1,696	3		<0.5	<0.5	1	<0.5		2	3	1,705
2004	1,336	1		<0.5	<0.5	<0.5	<0.5		2	2	1,341
2005	455	<0.5				1			<0.5	<0.5	456

Source: PacFIN, extracted August 24, 2006.
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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	9,113	14		<0.5	<0.5	1	2		3	2	9,135
1982	3,859	3	4	2	1	4	<0.5		2	<0.5	3,875
1983	7,270	16	3	1	<0.5	20	34		4	1	7,349
1984	8,109	13	25	5	<0.5	5	2		<0.5	4	8,163
1985	6,147	2	11	4	<0.5	4	<0.5		2	1	6,171
1986	3,019	2	1	<0.5		20	<0.5	<0.5	2	<0.5	3,044
1987	1,324	<0.5	5	2		2	1		1	<0.5	1,335
1988	931	<0.5	17	2		<0.5			<0.5	1	951
1989	823	1	7	8	<0.5	10	<0.5	<0.5	2	1	852
1990	758	<0.5	2	<0.5	<0.5	3	<0.5		<0.5	2	765
1991	642	<0.5	2	1		<0.5		<0.5		1	646
1992	1,184	<0.5	13	2	<0.5	6			<0.5	2	1,207
1993	1,461	18	89	5	9	3				1	1,586
1994	3,055	<0.5	1	<0.5	<0.5	1			<0.5	<0.5	3,057
1995	777	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	3	780
1996	5,047	42	<0.5	<0.5		<0.5			<0.5	2	5,091
1997	3,290	7	1	1	<0.5	5	<0.5		3	1	3,308
1998	2,232	116	4	3	<0.5	1	<0.5		1	2	2,359
1999	5,360	6	15	1	<0.5	1	<0.5		<0.5	5	5,388
2000	1,798	2	22	<0.5	<0.5	1	<0.5		1	3	1,827
2001	2,796	8	<0.5	1	<0.5	2	<0.5		3	6	2,816
2002	2,659	2	2	<0.5	<0.5	<0.5	<0.5		3	3	2,669
2003	1,696	3		<0.5	<0.5	1	<0.5		2	3	1,705
2004	1,336	1		<0.5	<0.5	<0.5	<0.5		2	2	1,341
2005	455	<0.5				1			<0.5	<0.5	456

Source: PacFIN, extracted August 24, 2006.

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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	3,505					1			25		3,531
1982	853	<0.5				<0.5			1		854
1983	1,509	<0.5				3	<0.5		5		1,517
1984	733	<0.5				<0.5			1		734
1985	692					<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		1,796
1989	490					<0.5			<0.5		490
1990	943					<0.5	<0.5		1		944
1991	571								1		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		2,131
1995	2,283	1			<0.5	<0.5			6		2,290
1996	3,619	<0.5				<0.5			10		3,629
1997	3,867	<0.5			<0.5	1			9		3,877
1998	4,292			<0.5		1			4		4,296
1999	1,632	6		<0.5		<0.5			2		1,640
2000	3,282	<0.5		<0.5		<0.5			2		3,284
2001	3,572	<0.5		<0.5		<0.5			6		3,579
2002	1,924								3		1,927
2003	3,807	<0.5							1		3,808
2004	4,562	<0.5		<0.5		<0.5	<0.5		2		4,564
2005	3,297			<0.5		<0.5			1		3,299

Source: PacFIN, extracted August 24, 2006.
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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	3,505					1			25		3,531
1982	863	<0.5				<0.5			1		865
1983	1,540	<0.5				3	<0.5		5		1,549
1984	736	<0.5				<0.5			1		737
1985	692					<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		1,797
1989	490					<0.5			<0.5		490
1990	943					<0.5	<0.5		1		944
1991	571								1		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		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		4,814
1999	2,065	6		<0.5		<0.5			2		2,073
2000	3,972	<0.5		<0.5		<0.5			2		3,974
2001	4,064	<0.5		<0.5		<0.5			6		4,070
2002	1,978								3		1,982
2003	4,118	<0.5							1		4,119
2004	4,807	<0.5		<0.5		<0.5	<0.5		2		4,809
2005	3,704			<0.5		<0.5			1		3,706

Source: PacFIN, extracted August 24, 2006.

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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	875				N.A.	1			9		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.						529
1988	1,900		1		N.A.	<0.5	<0.5		<0.5		1,902
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	1,850	<0.5			N.A.	<0.5					1,850
1993	2,155		1	<0.5	N.A.	<0.5			<0.5		2,157
1994	5,355				N.A.						5,355
1995	3,344		<0.5		N.A.				1		3,345
1996	4,630				N.A.						4,630
1997	3,670				N.A.	<0.5					3,670
1998	6,087				N.A.						6,087
1999	1,821	12			N.A.						1,833
2000	2,979				N.A.						2,979
2001	3,849	1			N.A.	1			<0.5		3,851
2002	4,729				N.A.	<0.5			1		4,731
2003	7,969				N.A.						7,969
2004	7,487				N.A.						7,487
2005	4,549				N.A.				1		4,550

Source: PacFIN, extracted August 24, 2006.
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, 1981–2005.

Year	Albacore	Other Tunas	Swordfish	HMS Sharks	Dorado	Groundfish	Coastal Pelagics	Crab	Salmon	Other	Total
1981	875				N.A.	1			9		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.						529
1988	1,900		1		N.A.	<0.5	<0.5		<0.5		1,902
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					1,864
1993	2,167		1	<0.5	N.A.	<0.5			<0.5		2,169
1994	5,377				N.A.						5,377
1995	3,413		<0.5		N.A.				1		3,414
1996	4,969				N.A.						4,969
1997	3,775				N.A.	<0.5					3,775
1998	6,530				N.A.						6,530
1999	2,081	12			N.A.						2,093
2000	3,185				N.A.						3,185
2001	4,158	1			N.A.	1			<0.5		4,160
2002	5,358				N.A.	<0.5			1		5,359
2003	10,793				N.A.				<0.5		10,793
2004	8,310				N.A.						8,310
2005	4,901				N.A.				1		4,902

Source: PacFIN, extracted August 24, 2006.
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. Catch and effort fishery statistics for the U.S. South Pacific albacore troll fishery, 1986-2005.

Fishing Season	No. Trips	Catch	Effort	
		(mt)	Days	Vessels
1986	2	92	68	2
1986-87	16	751	565	7
1987-88	91	3,558	3,163	43
1988-89	80	3,239	3,749	43
1989-90	76	3,995	3,537	39
1990-91	78	5,221	6,996	56
1991-92	65	3,097	6,867	55
1992-93	45	1,036	4,687	44
1993-94	17	2,236	3,848	14
1994-95	29	1,953	1,894	21
1995-96	55	1,964	4,145	53
1996-97	26	1,617	3,063	26
1997-98	38	1,701	5,384	36
1998-99	24	1,241	2,505	21
1999-2000	39	2,562	4,957	36
2000-2001	39	2,128	6,377	33
2001-2002	12	1,218	3,602	12
2002-2003	14	1,678	2,286	14
2003-2004	12	995	1,487	11
2004-2005	10	725	1,478	10

Source: Coan and Childers, SWFSC, July 31, 2006.

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 4–42. Percentages of commercial catch and effort by fishing areas for U.S. albacore troll vessels, 1981–2005.

	Catch				Effort			
Year	U.S. EEZ	Canada EEZ	High-Seas	Total	U.S. EEZ	Canada EEZ	High-Seas	Total
1981	52	0	48	100	63	1	36	100
1982	37	0	63	100	46	0	54	100
1983	46	1	53	100	60	2	38	100
1984	35	0	65	100	51	0	49	100
1985	49	0	51	100	52	0	48	100
1986	22	0	78	100	44	0	56	100
1987	73	0	27	100	70	0	30	100
1988	91	1	8	100	91	2	7	100
1989	36	42	22	100	55	28	17	100
1990	9	42	49	100	21	44	35	100
1991	3	32	65	100	10	34	56	100
1992	59	8	33	100	60	8	32	100
1993	53	4	43	100	56	4	40	100
1994	22	11	67	100	35	13	52	100
1995	6	6	88	100	18	12	70	100
1996	14	<1	86	100	28	<1	72	100
1997	16	3	81	100	29	4	67	100
1998	15	<1	85	100	27	<1	73	100
1999	62	1	37	100	61	2	37	100
2000	65	<1	35	100	64	<1	36	100
2001	54	<1	46	100	63	1	36	100
2002	60	2	38	100	69	2	29	100
2003	81	1	18	100	83	1	16	100
2004	93	1	6	100	88	2	10	100
2005	92	2	6	100	88	3	9	100

Source: Coan and Childers, SWFSC, August 14, 2006.

Note: Data are from voluntary logbooks through 2004 with trip coverage rates of 8-40% per year; the coverage rate for 2005 is 69% and is preliminary as more logbooks may be turned in in the future.

Table 4–43. Percentages of commercial catch and effort by fishing areas for Canadian albacore troll vessels, 1995–2005.

	Catch				Effort			
Year	U.S. EEZ	Canada EEZ	High-Seas	Total	U.S. EEZ	Canada EEZ	High-Seas	Total
1995	3	86	11	100	3	94	3	100
1996	40	24	36	100	47	40	13	100
1997	29	7	64	100	45	21	34	100
1998	44	7	49	100	53	21	26	100
1999	64	17	19	100	62	22	16	100
2000	74	9	17	100	77	13	10	100
2001	75	15	10	100	76	18	6	100
2002	86	8	6	100	87	8	5	100
2003	85	8	7	100	84	11	5	100
2004	81	17	2	100	76	21	3	100
2005	63	33	4	100	62	34	4	100

Source: "The 2005 Canadian North Pacific Albacore Troll Fishery" by Max Stocker; document prepared for the Canada-U.S. Albacore Tuna Treaty Annual Consultation, Vancouver, British Columbia, April 24-25, 2006.

4.2 Recreational Fisheries

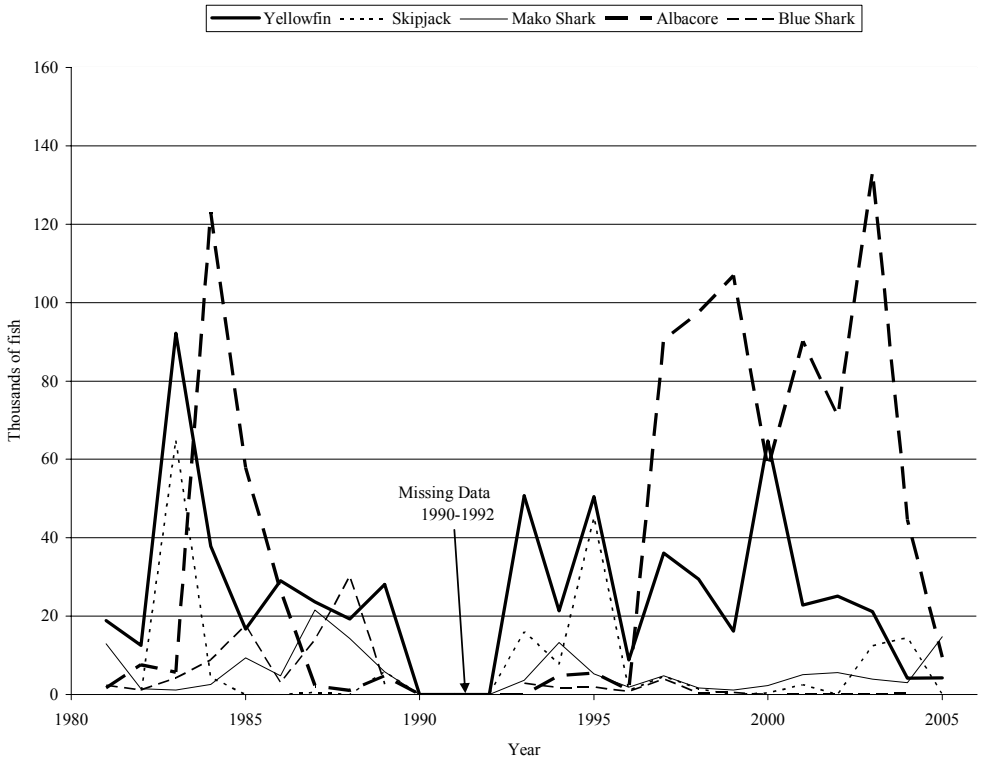


Figure 4–12. Catches by species (thousands of fish) for the West Coast recreational private sport fishing fleet, 1981–2005.

Interpretation: Figure 4–12 shows West Coast recreational private sport fishing fleet HMS catches by species, in thousands of fish. Table 4–44 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. Skipjack tuna was next most important historically, although it appears to represent a declining share of recent catch. Mako shark was the most important shark species included in the HMS private boat catch in 2005, representing the largest private sport fishing fleet share of the overall catch.

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 2005, 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 through 2003 and CRFS for 2004–05. 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 is available). No catch records were available in RecFIN for swordfish or dorado. Data for 2003–05 are preliminary and may be incomplete.

Table 4–44. Catches by species (thousands of fish) for the West Coast recreational private sport fishing fleet, 1981–2005.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye Tuna	Marlin	Mako	Common Thresher	Blue Shark	Dorado
1981	18.9			1.7			13.0		2.4	
1982	13			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	
1984	37.8	4.4	0.6	123.0	0.6	1.2	2.6	0.8	8.8	1.1
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		0.0		0.3	3.6	2.6	2.9	2
1994	21.4	7.7		4.8		0.4	13.3	3.6	1.8	0.3
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	
1997	36.1	4.7		90.5		0.4	4.8	0.5	3.9	
1998	29.5	1.5	1.6	97.5			1.7	0.6	0.4	
1999	16.2			106.9			1.1	1.3	0.5	0.2
2000	64.7	0.4		57.9	0.4		2.3	1.7	0.0	5.9
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	
2003	21.2	12.4		133.5	0.2		3.9	2.0	0.2	
2004	4.1	14.5	0.1	44.6	0.0	0.0	3.0	4.5	0.3	0.3
2005	4.2	0.0	0.2	9.5		0.0	14.7	0.4	0.1	

Source: RecFin (extracted July 2006)

Figure 4–13. Albacore fishing hours for the California CPFV fleet, 1981–2005.

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 1981–2005. Table 4–35 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 941,467 hours in 2002, with a steady decline from 2002 through 2005.

Source and Calculations: The data were extracted from the CPFV logbook database, by selecting on trip logs with market code indicating albacore was caught. For the selected records, albacore hours were computed as 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 4–45. Albacore fishing hours for the California CPFV fleet, 1981–2005.

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	26,380
1997	428,953
1998	579,861
1999	869,532
2000	596,868
2001	863,616
2002	941,467
2003	739,622
2004	600,382
2005	360,611

Source: CPFV Logbook Database.
Extracted August 2006.

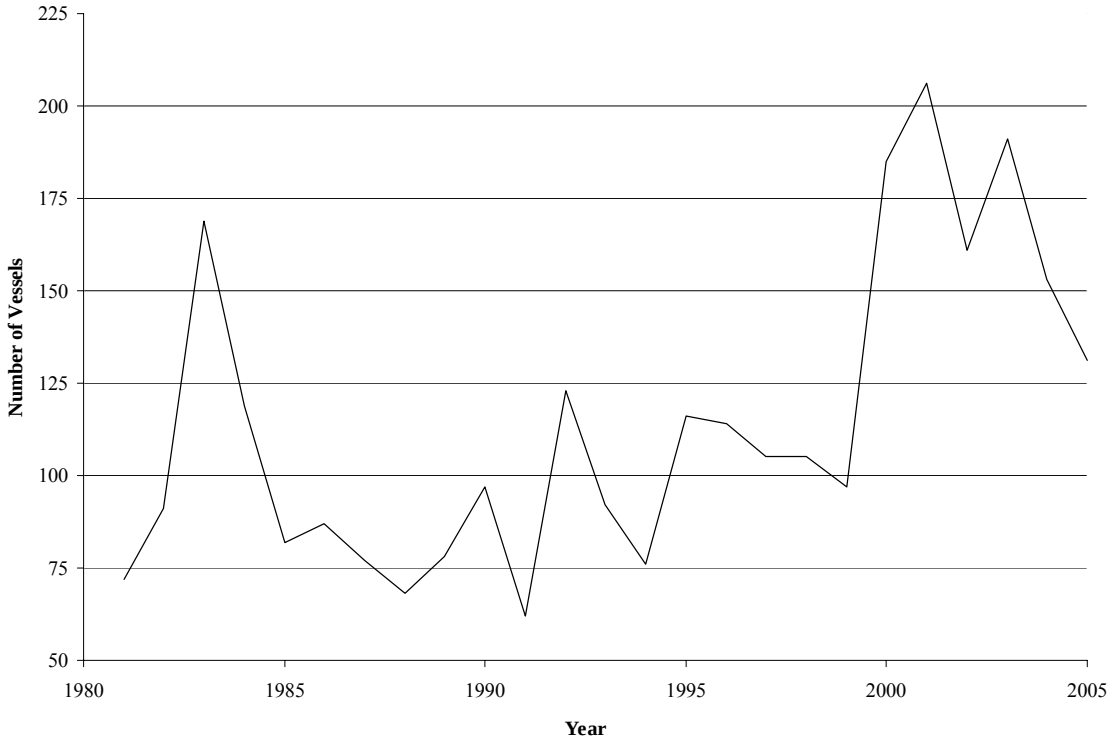


Figure 4–14. Number of vessels targeting HMS in California waters, 1981–2005.

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 2005.[8] The accompanying Table 4–46 displays the numeric values.

The number of vessels targeting HMS in California waters peaked at 206 in 2001 before falling off to a level of 131 by 2005.

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.

[8] The values are revised downwards from those shown in the 2005 SAFE report to restrict the count to only those vessels reporting landings of one of the HMS species listed in the FMP.

Table 4–46. Number of vessels targeting HMS in California waters, 1981–2005.

Year	Vessels
1981	72
1982	91
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	116
1996	114
1997	105
1998	105
1999	97
2000	185
2001	206
2002	161
2003	191
2004	153
2005	131

Source: CPFV Logbook Database.

Figure 4–15. Number of angler hours for the California CPFV Fleet, 1981–2005.

Interpretation: Figure 4–15 shows the number of angler hours for the California CPFV fleet which targeted HMS in each year from 1981 to 2005. Table 4–47 displays the numeric values.

The number of angler hours shows a sizable amount of annual variation, from as low as 263,433 in 1988 to as high as 1,979,415 in 1997. Since 1997, the number of angler hours has gradually declined to a recent level below 1.2 million hours.

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 4–47. Number of angler hours for the California CPFV Fleet, 1981–2005.

Year	Angler Hours
1981	405,035
1982	387,526
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	622,916
1996	935,102
1997	1,979,415
1998	1,774,632
1999	1,704,109
2000	1,711,107
2001	1,760,228
2002	1,649,793
2003	1,591,611
2004	1,470,050
2005	1,153,330

Source: CPFV Logbook Database.
Extracted August 2006.

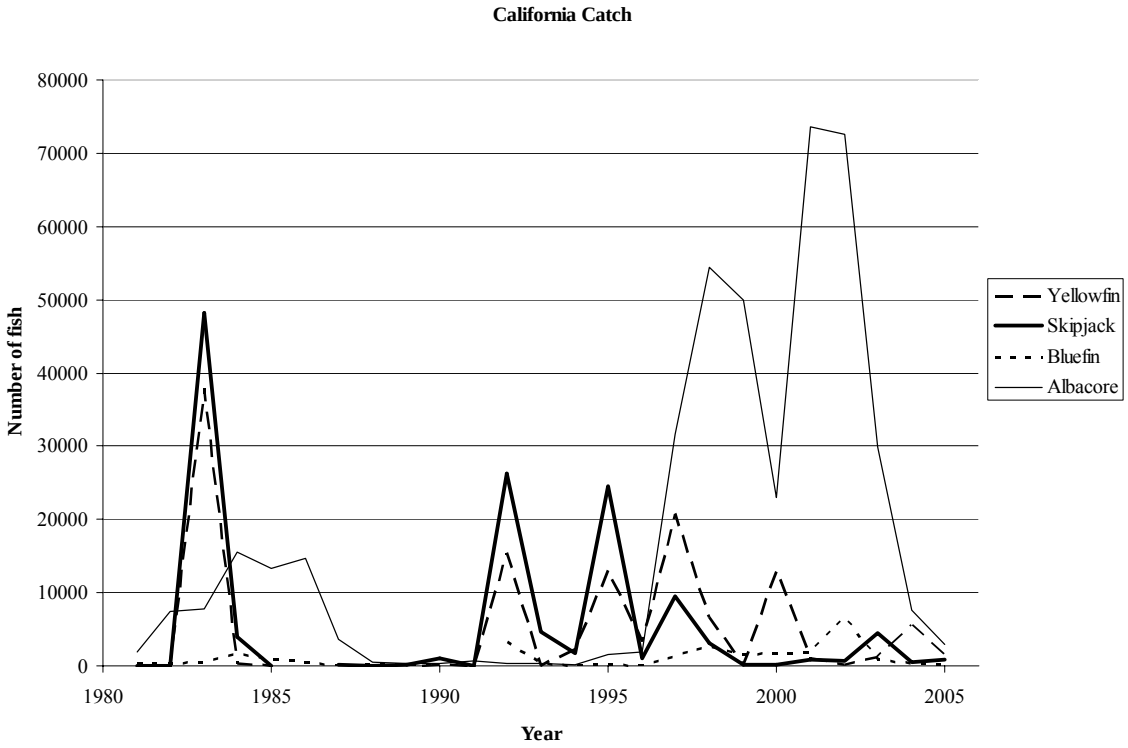


Figure 4–16. Catch by species for the California CPFV fleet in California waters, 1981–2005.

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, which are all tuna species.

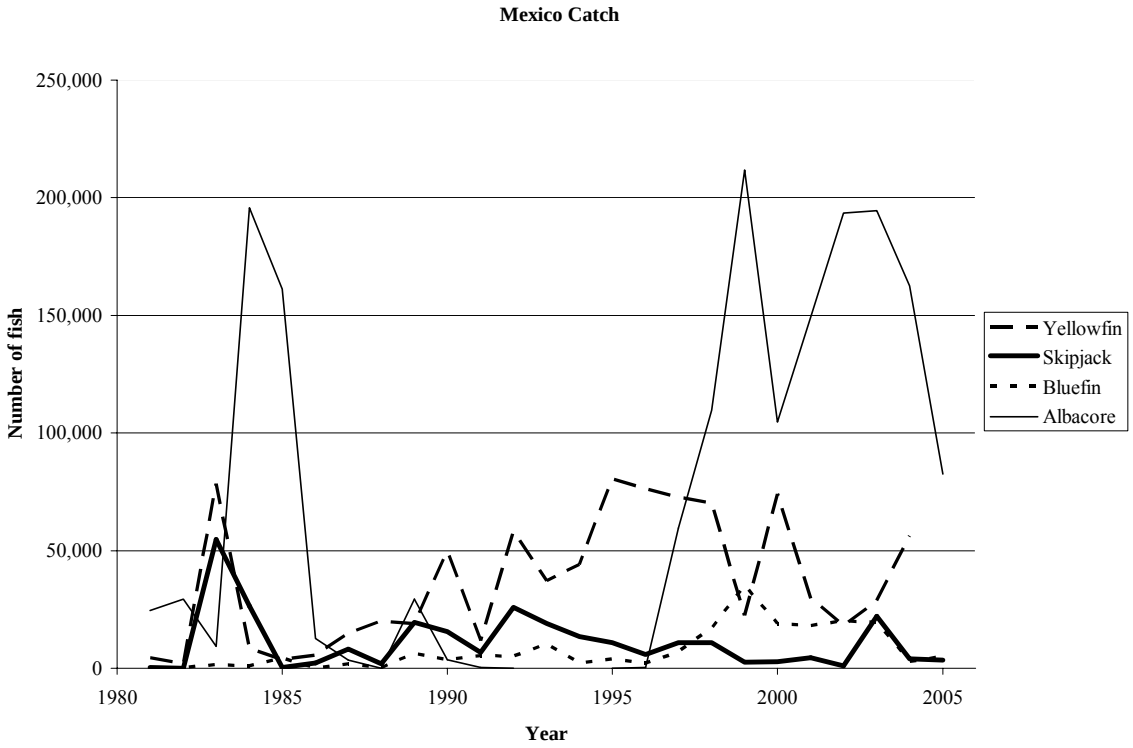


Figure 4–17. Catch by species for the California CPFV fleet in Mexico waters, 1981–2005.

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, which are all tuna species.

Table 4–48, 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 additionally displays catch data for California CPFVs fishing in Mexican waters. For several species (e.g., dorado and the tunas), recent catch in Mexican waters far exceeds that taken in U.S. 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. Blue shark was the most important shark species of the late 1980s, but has steeply declined as a share of the catch 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 4–48. Catch by species for the California Commercial Passenger Fishing Vessel fleet in California and Mexico waters, 1981–2005.

Year	Yellowfin	Skipjack	Bluefin	Albacore	Bigeye	Swordfish	Marlin	Mako	Thresher	Blue Shark	Dorado
California											
1981	81	17	419	1946	25		37	34	7	100	35
1982	86	8	381	7352	9		13	17	36	83	
1983	37816	48254	443	7833	176		28	28	136	22	1258
1984	421	3993	1765	15527	26	2	9	49	16	35	527
1985	43	40	850	13309	10		7	18	29	19	5
1986			443	14706	37		13	58	13	217	11
1987	1	167	5	3580	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	4469	1
1990	216	1008	198	275	5		7	231	51	2675	7147
1991	60	18		741			1	129	50	5802	
1992	15457	26326	3325	379	7		12	130	29	1109	1912
1993	73	4743	316	393		3	1	297	163	694	707
1994	2285	1797	10	171			5	269	30	497	64
1995	13015	24541	100	1554	1	0	7	144	59	494	12
1996	3349	1045	84	1825			5	235	31	439	353
1997	20782	9569	1354	31671	32		12	356	47	500	5651
1998	6537	3156	2822	54399	26		6	151	27	93	385
1999	230	171	1623	49907	14		1	70	47	129	392
2000	12933	190	1670	22914	60		2	170	40	208	4367
2001	1078	941	1843	73537		1		190	14	140	392
2002	217	643	6563	72640	1	2	2	184	11	15	142
2003	1191	4477	905	29966				66	26	47	23
2004	5552	547	340	7568	53	2	1	243	18	6	362
2005	1398	889	172	2886			2	106	23	26	204
Mexico											
1981	4478	418	123	24521	217	1	30	3		1	1246
1982	1752	24	273	29338	129		20	8		2	1012
1983	78482	54786	1469	9328	2077		37	1		6	3734
1984	8227	26364	1069	195758	511		278	13			6005
1985	3882	317	4298	161194	659		64	8		1	1357
1986	5505	2249	250	12616	1478		30	8		2	1855
1987	14796	8038	1946	3466	628		160	8		6	3518
1988	20056	1896	183	12	426		132	17		62	3348
1989	19059	19571	6431	29361	42		33	8	1	6	2340
1990	49524	15523	3558	3568	2191		101	12		2	24574
1991	11702	6788	5330	272	256		11	10			1301
1992	58282	25976	5261	1	42		13	6	1	1	20815
1993	37069	19080	10219		46		29	11		1	8245
1994	43999	13513	2233		15		37	17		4	5151
1995	41426	10944	3964	1	27		18	17		10	3972
1996	76511	5791	2230	346	132		16	53	1	55	24284
1997	73326	10804	6983	59520	250		12	19	2	32	24162
1998	70805	10837	17088	109772	1931	3	11	33		89	6204
1999	22418	2635	35231	211790	1092	1	2	28		72	3746
2000	75680	2840	19045	104763	494		1	36		9	12101
2001	30867	4571	18056	149351	9			49		72	3472
2002	18085	1113	20139	193450	6		1	24			2409
2003	27267	22194	19490	194501	60	2	4	37			3143
2004	60095	3933	2877	162619	400		3	54			7656
2005	50208	3502	4950	82660	36		14	40			5875

Extracted from CPFV logbook data base in August 2006

4.3 Information and Sources

Table 4–49. PacFIN species codes used to extract commercial fisheries data for this HMS SAFE report.

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

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

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

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

Table 4–50. 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 (PLANK)
PURSE SEINE (TUNA)				
C	070	SEN	NET	ENCIRCLING NETS
C	071	SEN	NET	PURSE SEINE AND RING NET
C	073	SEN	NET	DRUM PURSE SEINE
C	075	SEN	NET	LAMPARA NET
O	160	SEN	NET	TUNA SEINE[1]
LONGLINE (HMS)				
C	005	LGL	HKL	LONG LINE, SET
O	150	LGL	HKL	PELAGIC LONGLINE
W	43	LGL	HKL	SET LINE/LONG LINE[1]

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. First (Section 5**.1**), the adopted Control Rules and the Status Determination Criteria are summarized. Secondly (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. The third section (Section 5**.3**) contains selected excerpts from recent stock assessment conclusions, if there has been an update since publication of the 2004 HMS SAFE Report. These excerpts are taken directly from executive summaries of 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, the excerpts represent the most recent available information for those species to compare to past and future work. Finally, 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 HMS species. Furthermore, for most of these species, the scientific bodies developing the assessments have not agreed upon an appropriate biological reference point for use in the context of managing fisheries. Therefore, explicit definitions for both overfished and sustainable exploitation levels are not currently available.

5.1 Control Rules for Management

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

In general, a default maximum sustainable yield (MSY) control rule was adopted for most MUS, with an optimum yield (OY) target control rule for the vulnerable species (Figure 5–1).

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

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

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

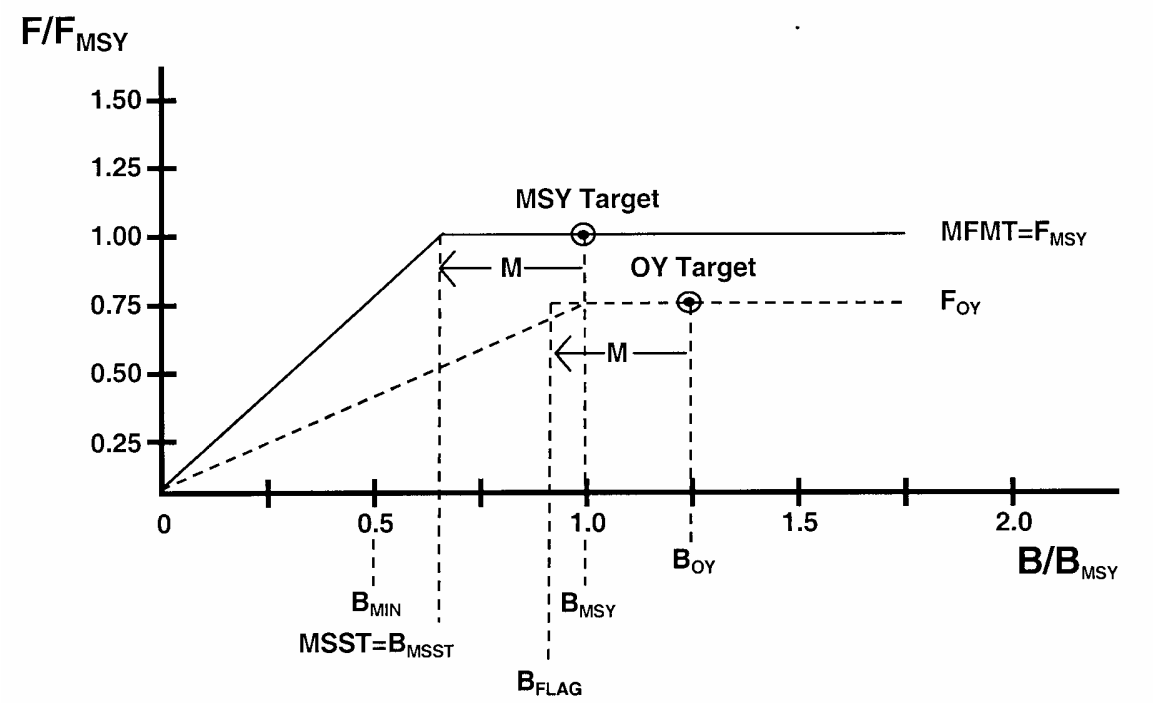


Figure 5–1. General model of MSY and OY Control Rules, from Restrepo, et al. 1998.

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

Rebuilding of overfished stocks is a unilateral requirement by the Magnuson-Stevens Act, 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 (Anticipated)	Organization Responsible for the Assessment
TUNAS		
Albacore (NPO)	2004 (2007)	North Pacific Albacore Workshop (ISC)
Bluefin (NPO)	2004 (2007)	ISC (ISC)
Bigeye (EPO)	2005 (2006)	IATTC (IATTC)
Bigeye (WCPO)	2005 (2006)	WCPFC (WCPFC)
Skipjack (EPO)	2004 (2006)	IATTC (IATTC)
Skipjack (WCPO)	2005 (2006)	WCPFC (WCPFC)
Yellowfin (EPO)	2005 (2006)	IATTC (IATTC)
Yellowfin (WCPO)	2005 (2006)	WCPFC (WCPFC)
BILLFISHES		
Striped Marlin (EPO)	2003	IATTC
Striped Marlin (NPO)	(2007)	(ISC)
Swordfish (EPO)	2004	IATTC
Swordfish (NPO)	2004 (2008)	ISC (ISC)
SHARKS		
Common Thresher (WA/OR/CA EEZ) Pelagic Thresher Bigeye Thresher Shortfin Mako	2001	NMFS
Blue (NPO)	2001 (2007)	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 in Section 8.0.

5.3 Conclusions from 2005 Pacific HMS stock assessments

5.3.1 Bigeye Tuna

5.3.1.1 Bigeye Tuna (EPO)

From Maunder and Hoyle, 2005.

There have been substantial changes in the bigeye tuna fishery in recent years. Initially, the majority of the bigeye catch was taken by longline vessels. With the expansion of the fishery on fish-aggregating devices (FADs) since 1993, the purse-seine fishery has taken an increasing proportion of the bigeye catch. The FAD fishery captures smaller bigeye, and has therefore reduced the yield per recruit and the average maximum sustainable yield (AMSY).

An age-structured catch-at-length analysis, A-SCALA, was used to assess bigeye tuna in the EPO. For further information on the most recent assessment, see IATTC Stock Assessment Report 6, available on the IATTC website (http://www.iattc.org).

The assessment was conducted as if there were a single stock in the EPO. Its results are consistent with results of other analyses of bigeye tuna on a Pacific-wide basis. In addition, analyses have shown that the results are insensitive to the spatial structure of the analysis.

On average, the fishing mortality of bigeye less than about four and a half years old has increased substantially since 1993, and that of older fish has increased slightly.

There are several important features in the estimated time series of bigeye recruitment. First, the estimates of the recruitment before 1993 are uncertain, as the floating-object fisheries, which catch small bigeye, were not operating. Second, there was a period of above-average recruitment during 1994–98, followed by a period of below-average recruitment during 1999–2000. The recruitments were above average in 2001 and 2002. Third, the estimate of the most recent recruitment is uncertain, because recently-recruited bigeye are represented in only a few length-frequency samples. The extended period of relatively high recruitments during 1994–98 coincided with the expansion of the fisheries that catch bigeye in association with floating objects.

Fishing has reduced the total biomass of bigeye present in the EPO, and it is predicted that it will be near its lowest level by the end of 2005. There has been an accelerated decline in biomass since the peak in 2000. Analysis of the levels of fishing mortality associated with each fishery indicates that, since the expansion of the purse-seine fishing on floating objects during the early to mid-1990s, the purse-seine fishery has had a much greater impact on the stock than has the longline fishery.

At the beginning of 2005, the spawning biomass of bigeye tuna in the EPO had declined from a recent high level. At that time the spawning biomass ratio (the ratio of current spawning biomass to biomass of spawners in the absence of fishing mortality; SBR) was estimated to be about 0.13, about 41 percent less than the level corresponding to the average maximum sustainable yield (SBR_{AMSY}).

All analyses considered suggest that at the start of 2005 the spawning biomass was below the level corresponding to the AMSY. The AMSY and the fishing mortality (F) multiplier are sensitive to how the assessment model is parameterized, the data that are included in the assessment, and the periods assumed to represent average fishing mortality, but under all scenarios considered, the current fishing mortality is well above the level corresponding to the AMSY.

The estimates of recruitment and biomass were only moderately sensitive to the steepness of the stock-recruitment relationship. The current status and future projections are considerably more pessimistic, in terms of stock status, if a stock-recruitment relationship ($h = 0.75$) exists.

The effects of IATTC Resolution C-04-09, which imposed a 6-week closure on the purse seine fisheries for bigeye tuna, yellowfin and skipjack tunas and a limit on longline catch of bigeye tuna for the years 2004–06, are estimated to be insufficient to allow the stock to rebuild. If the effort is reduced to levels corresponding to the AMSY, the stock will rebuild to SBR_{AMSY} within the 5-year projection period.

5.3.1.2 Bigeye Tuna (CWPO)

From Hampton, et al., 2005a.

The 2005 assessment of bigeye tuna in the western and central Pacific Ocean uses the stock assessment model and computer software known as MULTIFAN-CL. The bigeye tuna model is age (40 age classes) and spatially structured (six regions) and the catch, effort, size composition, and tagging data used in the model are classified by 20 fisheries and quarterly time periods from 1952 through 2004.

Six independent analyses are conducted to test the impact of using different methods of standardizing fishing effort in the main longline fisheries, using estimated or assumed values of natural mortality-at-age, and assuming certain arbitrary increases in fishing power for the main longline and purse seine fleets.

The catch, size and tagging data used in the assessment were the same as those used last year, with the exception that additional recent fishery data (2003 and 2004 for longline, 2003 for Philippines and Indonesia, 2004 for purse seine) was included. It should be noted that 2004 data are not complete for some fisheries. The estimation of standardized effort for the main longline fisheries using the General Linear Model (GLM) and Statistical Habitat Based Standardization (SHBS) approaches involved a new method of scaling indices of abundance among regions. Overall, the new procedure resulted in higher relative abundance in the tropical regions (3 and 4) and lower relative abundance in the northern (1 and 2) and southern (5 and 6) regions compared to the method used in previous years.

The SHBS- and GLM-based analyses produced results that were broadly comparable to those of recent assessments. Recruitment showed an increasing trend from the 1970s on, while biomass declined through the 1960s and 1970s after which it was relatively stable or declining slightly. The fisheries are estimated to have reduced overall biomass to 30–50 percent of unfished levels by 2004, with impacts more severe in the equatorial region of the WCPO, particularly in the west. Yield analyses suggest that recent average fishing mortality-at-age is near to or above the fishing mortality at MSY. On the other hand, the current level of total biomass is estimated to be above equilibrium biomass expected at MSY, with the exception of those analyses assuming fishing power increases in the main longline and purse seine fisheries. In the latter analyses, total biomass is marginally above the MSY level and the current adult biomass is below the MSY level. Current biomass is generally above equilibrium levels because of above-average recruitment since about 1990.

On the basis of all of the results presented in the assessment, we conclude that maintenance of current levels of fishing mortality carries a high risk of overfishing. Should recruitment fall to average levels, current fishing mortality would result in stock reductions to near and possibly below MSY-based reference points.

5.3.2 Skipjack Tuna (CWPO)

From Langley, et al., 2005.

The major conclusions of the skipjack assessment are essentially unchanged from the last two assessments. They are as follow:

1. The growth estimates are in general agreement with perceived length-at-age estimates of skipjack from the Pacific and other regions. Moreover, the model seemed to be able to make a consistent interpretation of the size data, which is crucial to a length-based approach. Discrepancies between the estimated growth curve and age-length observations for tagged skipjack might be due to the tropical surface fisheries selecting mainly the smaller, slower-growing skipjack from the older age-classes.
2. Similar to other tropical tunas, estimates of natural mortality are strongly age-specific, with higher rates estimated for younger skipjack.
3. While tagging data show that individual skipjack are capable of undertaking long-distance movements of several thousand kilometers, the population-level estimates of dispersal obtained from this model are in fact consistent with some degree of regional fidelity. The contribution of local recruitment to the regional sub-populations is generally 70 percent or greater.
4. Nevertheless, some of the population-level estimates of dispersal appear to be inconsistent with the other observations from the fishery and the tagging data. For example, the model estimates of quarterly movement of skipjack from the temperate northern regions towards the equatorial region are inconsistent with the seasonal peak in catch rates in the temperate fisheries. In contrast, the tagging data, albeit limited, reveals a general northern movement of fish from the equatorial regions. The southern movement estimated from the model is likely to be attributable to other structural

assumptions of the model, e.g., the fixed proportion of the total recruitment in each of the model regions.

5. Similarly, the model estimates relatively modest seasonal movements between the western and eastern equatorial regions. The performance of the fishery in the eastern region has been shown to be strongly influenced by the prevailing environmental conditions with higher stock abundance and/or availability associated with El Niño conditions (Lehodey et al. 1997). This is likely to be at least partly attributable to an eastward displacement of the skipjack biomass due to the prevailing oceanographic conditions, although this dynamic is unlikely to be captured by the parameterization of movement in the current model.
6. Recruitment showed an upward shift in the mid-1980s and is estimated to have remained at a higher level since that time. Recruitment was also estimated to have been very high during the late 1990s. The strong El Niño at around that time and the high frequency of such events during the 1990s is suspected to have had a positive effect on skipjack recruitment. Recent recruitment is estimated to be exceptionally high, but is poorly determined due to limited observations from the fishery.
7. Most (96 percent) of the recruitment is assumed to occur in the two equatorial regions. This proportion is estimated independently of the assessment model from a spatial ecosystem and populations dynamics model (SEAPODYM, see Lehodey 2004). The results of the assessment are relatively sensitive to the assumed distribution of recruitment and, consequently, the values should be revised following future developments of SEAPODYM. Estimates of recruitment from the current assessment model are also sensitive to the current regional structure of the equatorial region; a sensitivity analysis revealed that the extremely high levels of recruitment in region 6 during the mid-to-late 1980s and late 1990s were moderated by the amalgamation of the two equatorial regions.
8. The biomass trends are driven largely by recruitment. The highest biomass estimates for the model period occurred in 1983–88 and 1998–2000, immediately following periods of sustained high recruitment. The model results suggest that the skipjack population in the WCPO in recent years has been considerably higher (about 20 percent) than the overall average level for the model period.
9. The biomass trajectory is influenced by the underlying assumptions regarding the treatment of the various fishery-specific catch and effort data sets within the model. The Japanese pole-and-line fisheries are all assumed to have constant catchability, with any temporal trend in efficiency assumed to have been accounted for by the standardization of the effort series. The general increase in standardized CPUE from the Japanese equatorial pole-and-line fisheries and high CPUE in the late 1980s, therefore, provides an explanation for the general trend in both recruitment and total biomass over the model period. However, given the general increase in pole-and-line catch rates over time, it remains unclear whether the standardized effort series provides a reliable index of stock abundance.
10. The model also incorporates a considerable amount of tagging data that provides information concerning absolute stock size during the main tag recovery period. However, for the equatorial regions, the last intensive tagging program ceased in the early 1990s with most tag recoveries occurring over the following 18 months. Consequently, there has been no direct information on the level of absolute biomass from the equatorial component of the stock for at least a decade. Further, the tagging program occurred prior to the expansion of the fishery in region 6 in the mid-to-late 1990s and, consequently, given the low exploitation rates, fewer tags were recovered from this region. On this basis, the level of absolute biomass in region 6 is likely to be less well determined than for region 5. The level of biomass in region 4 is also poorly determined. This current assessment estimates that the region accounts for about 20 percent of the total biomass, although catches from the region are trivial, representing only 1−2 percent of the total. A comparison of previous model results indicates that the level of biomass estimated in this region is highly sensitive to the underlying model assumptions.
11. Fishing mortality has increased throughout most of the time-series, stabilizing to some extent in recent years. The impact of fishing is predicted to have reduced recent biomass by about 15 percent, with the higher impacts in region 5 (about 25 percent) buffered by lower impacts in region 6 (10

percent) and negligible impacts in region 4. The impacts of fishing are higher in the northern subtropical regions (1−3) that account for a small proportion of the total biomass.

12. A range of sensitivity analyses were undertaken to address some of the uncertainty in the assessment described above. However, the general stock assessment conclusions from the various sensitivity analyses were comparable to the base-case analysis. The principal conclusions are that skipjack is currently exploited at a modest level relative to its biological potential. Furthermore, the estimates of $F_{current} / \widetilde{F}_{MSY}$ and $B_{current} / \widetilde{B}_{MSY}$ reveal that overfishing of skipjack is not occurring in the WCPO, nor is the stock in an overfished state. Recruitment variability, influenced by environmental conditions, will continue to be the primary influence on stock size and fishery performance.
13. Recommended research and monitoring required to improve the skipjack tuna assessment include the following:
    - Continued monitoring and improvement in fisheries statistics is required. In particular, better data generally are required for the Philippines and Indonesian fisheries.
    - Refinement of techniques to standardize catch and effort data from the key fisheries, particularly the Japanese pole-and-line fisheries.
    - New conventional tagging experiments, undertaken regularly, would provide additional information on recent levels of fishing mortality, refine estimates of natural mortality and possibly allow some time-series behavior in movement to be incorporated into the model.
    - Further research on environmental influences on skipjack tuna recruitment and movement are required. Environmental time series identified by such research could be incorporated into the MULTIFAN-CL model.

5.3.3 Yellowfin Tuna

5.3.3.1 Yellowfin Tuna (EPO)

From Hoyle and Maunder, 2005.

An age-structured, catch-at-length analysis (A-SCALA) was used to assess yellowfin tuna in the EPO. For further information on the most recent assessment, see IATTC Stock Assessment Report 6, available on the IATTC web site: http://www.iattc.org.

The assessment is based on the assumption that there is a single stock of yellowfin tuna in the EPO. Yellowfin are distributed across the Pacific Ocean, but the bulk of the catch is made in the eastern and western parts of that ocean. The movements of tagged yellowfin tuna are generally over hundreds, rather than thousands, of kilometers, and exchange between the eastern and western Pacific Ocean appears to be limited. The stock assessment requires substantial amounts of information, including data on retained catches, discards, fishing effort, and the size compositions of the catches from the various fisheries.

Significant levels of fishing mortality have been observed in the yellowfin tuna fishery in the EPO. These levels are greatest for middle-aged yellowfin. Both recruitment and exploitation have had substantial impacts on the yellowfin biomass trajectory. Most of the yellowfin catch is taken in schools associated with dolphins, and accordingly this method has the greatest impact on the yellowfin tuna population, although it has almost the least impact per unit of weight captured of all fishing methods. It appears that the yellowfin population has experienced two different productivity regimes (1975–83 and 1984–2004), with greater recruitment during the second regime. The two recruitment regimes correspond to two regimes in biomass, the high-recruitment regime corresponding to greater biomasses. The spawning biomass ratio (the ratio of the current spawning biomass to that for the unfished stock; SBR) of yellowfin in the EPO was below the level corresponding to the average maximum sustainable yields (AMSYs) during the low-recruitment regime, but close to that level during the high-recruitment regime. The two

different productivity regimes may support two different levels of AMSY and associated SBRs, and the AMSY reported here is an average for the 1975–2004 period. The current SBR is below the SBR level corresponding to the AMSY. However, there is substantial uncertainty in the most recent estimate of SBR, and there is a moderate probability that the current SBR is above the level corresponding to the AMSY. The effort levels are estimated to be greater than those corresponding to the AMSY (based on the recent [2002–03] distribution of effort among the different fisheries). Because of the flat yield curve, however, the recent effort levels are estimated to be capable of producing, under average conditions, catch that is only slightly less than the AMSY. The analysis indicates that strong cohorts entered the fishery during 1998–2000, and that these cohorts increased the biomass during 1999–2000. However, these cohorts have now moved through the population, so the biomass decreased during 2002–04.

The conservation measures imposed in 2004 under IATTC Resolution C-04-09, described above, are predicted to result in slightly greater biomasses and SBRs than would otherwise have been the case. However, it is likely that the stock is below the AMSY level.

A sensitivity analysis was carried out to estimate the effect of a stock-recruitment relationship. The results from the analysis with a stock-recruitment relationship, suggest that the effort level is greater than that corresponding to the AMSY; however, the yield at this effort level is still only 6 percent less than the AMSY. The biomass is estimated to have been less than the biomass that would produce the AMSY for most of the modeling period, except for most of the 2000–02 period.

5.3.3.2 Yellowfin Tuna (CWPO)

From Hampton, et al., 2005b.

The 2005 assessment of yellowfin tuna in the western and central Pacific Ocean uses the stock assessment model and computer software known as MULTIFAN-CL. The yellowfin tuna model is age (28 age classes) and spatially structured (six regions) and the catch, effort, size composition and tagging data used in the model are classified by 19 fisheries and quarterly time periods from 1952 through 2004.

Six independent analyses are conducted to test the impact of using different methods of standardizing fishing effort in the main longline fisheries, using estimated or assumed values of natural mortality-at-age, and examining the effect of applying an incremental increase in effective fishing effort to mimic increased fishing efficiency.

The catch, size, and tagging data used in the assessment were the same as those used last year, with the exception that additional recent fishery data (2003 and 2004 for longline, 2003 for Philippines and Indonesia, 2004 for purse seine) were included. It should be noted that 2004 data are not complete for some fisheries. The estimation of standardized effort for the main longline fisheries using the GLM and SHBS approaches involved a new method of scaling indices of abundance among region. Overall, the new procedure resulted in higher relative abundance in the tropical regions (3 and 4) and lower relative abundance in the northern (1 and 2) and southern (5 and 6) regions compared to the method used in previous years.

The SBHS analyses were slightly more optimistic than the GLM-based analyses with higher recruitment, lower current fishing mortality, and higher current and equilibrium biomass. The models incorporating an incremental increase in fishing power (FPOW) were more pessimistic than the corresponding GLM models, with higher levels of stock depletion and lower yield estimates, although the levels of current biomass and exploitation rates were comparable. Most of the increased decline in longline CPUE in the early years (imposed by the increase in longline fishing power) was explained by higher earlier recruitment compared to the other models. This trend in recruitment also explains the lower values of

stock-recruitment steepness for the FPOW model options, which in turn resulted in lower estimates of equilibrium yield (MSY).

The current assessment is more pessimistic than previous yellowfin assessments for the WCPO. The most influential change in the current assessment is likely to be the differences in the two relative weightings applied to the different model regions, essentially down-weighting the proportion of the total longline exploitable biomass in the non-equatorial regions. For region 3, recent exploitation rates and levels of fishery impact are similar between the current and previous assessments. However, because the current assessment assumes that this region accounts for a much larger proportion of the total stock biomass, current exploitation rates and overall impacts on the WCPO stock are predicted to be substantially higher than previous assessments (depletion to 40–46 percent of unexploited biomass in the current GLM-based assessments compared to 51–60 percent in the equivalent 2004 assessments). Other key performance indicators for the stock are also considerably more pessimistic than last year—current stock size is lower ($B_{current} / \widetilde{B}_{MSY}$ of 1.75–1.80 for the 2004 assessment compared to 1.16–1.32 for the current assessment) and fishing mortality is higher ($F_{current} / \widetilde{F}_{MSY}$ 0.83–1.11 for the 2004 assessment compared to 1.22–1.35 for the current assessment).

The reference points that predict the status of the stock under equilibrium conditions indicate that the long-term average biomass would approximate or fall substantially below that capable of producing *MSY* at 2001–03 average fishing mortality ($\widetilde{B}_{F_{current}} / \widetilde{B}_{MSY}$ = 0.69–1.00 and $S\widetilde{B}_{F_{current}} / S\widetilde{B}_{MSY}$ = 0.62–1.00). Overall, current biomass exceeds the biomass yielding *MSY* ($B_{current} / \widetilde{B}_{MSY} > 1$) due to sustained high recent recruitment, except for the FPOW analyses.

The estimate of $F_{current} / \widetilde{F}_{MSY}$ reveals that overfishing of yellowfin is now likely to be occurring in the WCPO. While all analyses except those incorporating assumed incremental increases in fishing power indicate that the stock is not yet in an overfished state ($B_{current} / \widetilde{B}_{MSY} > 1$), further biomass decline is likely to occur at 2001–03 levels of fishing mortality.

Table 5-1. 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.

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)	1.02–2.26[3]	Unknown[3]	0.67–1.07[3]	0.7	Unknown[3]		Nineteenth NPALBW, Stocker 2005
Bluefin (NPO)	>1.0[4]	Unknown[4]	Unknown	0.75	Unknown	0.94	ISC 2004a
Bigeye (EPO)	1.75[5]	Y	0.76[5]	0.6	N		IATTC, Maunder and Hoyle 2005
Bigeye (WCPO)	0.9–1.23[6]	Possibly	1.25–1.41[6]		N		WCPFC, Hampton, et al. 2005a
Skipjack (EPO)	Unknown[7]	Unlikely[7]	Unknown[7]	0.5	Unlikely[7]		IATTC, Maunder and Harley 2004
Skipjack (WCPO)	0.17[8]	N	3.01[8]		N		WCPFC, Langley, et al. 2005
Yellowfin (EPO)	1.2[5]	Y	0.89[5]	0.5	N		IATTC, Hoyle and Maunder 2005
Yellowfin (WCPO)	1.22[8]	Y	1.32[8]		N		WCPFC, Hampton, et al. 2005b
BILLFISHES							
Striped Marlin (EPO)	<1.0[9]	N	≥1.0	0.5	N	0.63	IATTC, Hinton and Maunder 2003
Swordfish (NWPO)	Unknown[10]	Unlikely	Unknown		Unlikely		ISC 2004b
Swordfish (EPO)	<1.0[11]	N	>1.0	0.61-0.8	N		IATTC, Hinton, et al. 2004
SHARKS							
C. Thresher (CA,OR,WA)	<1.0[12]	N	~1.10	0.77	N	0.96	NMFS, PFMC HMS plan development team 2002
Pelagic Thresher	Unknown[13]	Unknown	Unknown	0.85	Unknown	1.06	
Bigeye Thresher	Unknown[14]	Unknown	Unknown	0.78	Unknown	0.97	
Shortfin Mako	<1.0[15]	N	>1.0	0.71	N	0.89	NMFS, PFMC HMS plan development team 2002
Blue	<0.5[16]	N	>1.0	0.78	N	0.97	NMFS and NRIFSF Japan, Kleiber, et al. 2001
OTHER							
Dorado	Unknown[17]	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 ($F_{40\%}$, $F_{30\%}$ and $F_{0.1}$), two estimated levels of recent fishing pressure (F=0.43 and F=0.68), and two scenarios of productivity (high R = 31 million recruits and low R = 22.5 million recruits). However, "Unknown" is indicated because of the lack of a PFMC reference point for management.

[4] Bluefin analyses indicated that F_{Recent} exceeded F_{Max}. However, "Unknown" is indicated because of the lack of a PFMC reference point for management.

[5] EPO bigeye and EPO yellowfin results are based on base case assessments assuming no stock-recruitment relationships.

(Continued on next page.)

[6] WCPO bigeye results are based on four models where longline catchability was assumed constant over time. The probability that $F_{Recent}/F_{MSY} > 1$ was high.
[7] Because of uncertainties in the estimates of growth and natural mortality, MSY-proxy reference points could not be calculated for EPO skipjack; however, the IATTC does not consider there to be a need for management due to low fishing mortalities and high biomass estimates relative to historical levels.
[8] CWPO skipjack and yellowfin results are from the base-case assessments.
[9] 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.
[10] Standardized CPUEs from swordfish fisheries indicate declining trends in the northwest Pacific; however, the fisheries are causing, at worst, modest declines in abundance.
[11] Standardized CPUEs are greater than those corresponding to AMSY and do not indicate declining abundances, although there is concern over increased fishing pressure on swordfish in the southern EPO area.
[12] U.S. West Coast EEZ regional catch and CPUE demonstrated the population increasing from estimated low levels in the early 1990s. Recent (2000-03) U.S. West Coast commercial landings average 318 mt, which is less than 0.75 × MSY proxy (MSY proxy = LMSY from the Population Growth Rate method).
[13] Status unknown, but catches are incidental and occur on the edge of the species' range, predominately during warm water years.
[14] Status unknown, but catches are incidental and occur on the edge of the species' range.
[15] Tentative results based on commercial landings and CPUE calculations. Recent (2000–03) U.S. West Coast commercial landings average 70 mt, which is less than 0.75 × MSY proxy (MSY proxy = average landings 1981–99).
[16] Analyses demonstrated that for north Pacific blue shark, fishing pressure is 2 to 15 times below F_{MSY}. U.S. West Coast catch is poorly documented because the fish are not landed.
[17] Status unknown, but dorado are highly productive and widely distributed throughout tropical/subtropical Pacific. Recent U.S. West Coast landings average 16 mt.

Table 5-2. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2000–04.

Species (stock)	Stockwide Catch	U.S. West Coast Catch		Fractional Catch
		Commercial	Recreational	
TUNAS				
Albacore (NPO)	86–104[1]	9–17	1.1–2.3	0.15
Bluefin (NPO)	16–29[1]	<0.4	0.03–0.24	0.01
Bigeye (EPO)	108–142[2]	<0.1	<0.01	<0.01
Skipjack (EPO)	146–279[2]	<0.8	<0.01–0.08	<0.01
Yellowfin (EPO)	282–439[2]	<0.5–1.1	0.1 - 0.5	<0.01
BILLFISHES				
Striped Marlin (EPO)	1.2–2.2[2]	<0.01[3]	0.02[4]	0.02
Swordfish (EPO)	11–20[2]	1.2-2.7	<0.01	0.13
SHARKS				
Common Thresher	Unknown	0.1 - 0.4	0.05–0.13	
Pelagic Thresher	Unknown	<0.01		
Bigeye Thresher	Unknown	<0.01		
Shortfin Mako	Unknown	<0.05–0.08	0.04–0.09	
Blue (NPO)	Unknown	0.01–0.06[3]	<0.01	
OTHER				
Dorado	5–13.5[5]	<0.01–0.04	0.01–0.09	

Notes:
Data are from updated commercial (Table 4–4), CPFV (Table 4–48), and private recreational (Table 4–44) catches with weight conversions of 8.6 kg/albacore, 8.9 kg/bluefin, 10.0 kg/bigeye tuna, 3.1 kg/skipjack, 5.4 kg/yellowfin, 59 kg/striped marlin, 113 kg/swordfish, 28.1 kg/common thresher, 16.7 kg/mako, 8 kg/blue shark, and 5.3 kg/dorado.
[1] International Scientific Committee Sixth Plenary Report Catch Tables, March 2006.
[2] IATTC catch tables extracted 8/7/06.
[3] Striped marlin and blue shark commercial catches include estimates from the DGN 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 8/7/06.

6.0 RESEARCH AND DATA NEEDS AND MONITORING REPORTS

6.1 Research and Data Needs

6.1.1 Stock Status and Distribution

There is substantial uncertainty on the status of stocks and estimates of MSY for many HMS species. Basic biological and life history data are unknown for some species, and understanding of distribution, abundance, and reproductive behaviors of most is poor. There is insufficient understanding of stock structures relative to the extent of fisheries, on the interchange between stocks, and on survival and fecundity schedules for investigating exploitation effects and species' resiliency to exploitation. There is also a lack of fishery independent indexes of abundance.

Species-specific stock information needs include:

All tunas
- The distribution of adults in the north Pacific by season and age, including within the West Coast EEZ

Albacore tuna
- 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)

All thresher sharks
- The stock structures 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
- Aging and growth rate, including comparisons of growth rates in other areas
- Maturity and reproductive schedules

Shortfin mako shark
- Distribution, abundance, and size in areas to the south and west of West Coast EEZ
- Age and growth rates (current growth estimates differ widely)

Blue shark
- Sex and size composition of catches (unknown because of high discard rate)
- Migratory movements of maturing fish from EEZ to high seas

Swordfish
- Age and growth data from locally-caught fish
- Distribution by season and age within the outer portions of the EEZ and high seas

Striped marlin
- Age and growth data from locally caught fish
- Stock structure differences between populations to south and west of EEZ
- Season migration differences by size, age, and sex (archival tagging)

Dorado
- Stock structure of eastern Pacific population

6.1.2 Management Unit Species Catch Data

Total catch data are likely inaccurate for most HMS fisheries due to a lack of 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:

1. 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
2. Catch composition data for harpoon gear
3. Size composition of bycatch in drift gillnet fisheries
4. 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.

6.1.3 Survivability of Released Fish

Little is known of the long-term survivorship of hooked fishes after release, to assess the effectiveness of recreational tag-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).

6.1.4 Essential Fish Habitat (EFH)

There is very little specific information on the migratory corridors and habitat dependencies of these large mobile fishes; 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. Species-specific EFH information needs include:

<u>All tunas</u>

- How oceanographic changes affect stock production, recruitment success, and migratory patterns
- Whether certain prey species are key for survivability and/or reproductive success

<u>Bigeye, Skipjack, and Yellowfin tunas and dorado</u>

- The significance of floating objects and other-species associations relative to life history

<u>Common thresher shark</u>

- The extent of pupping and nursery grounds off northern Mexico, and their relationship to those of southern California

Bigeye and Pelagic thresher sharks

- How the different ecologies of these species compare with that of common thresher shark

Shortfin mako shark

- Pupping areas off southern California and northern Mexico, and whether any are critical for stock health

6.1.5 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. More work is also needed to investigate the hooking survivorship of protected species, such as turtles and seabirds that are caught as bycatch in the HMS fisheries. More work is also required on turtle migration seasonality and routes and genetic structures of populations by species in order to better understand likely periods of interaction with fisheries and turtle life histories. 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.

6.1.6 Effects of Management Measures

For sharks, the size/age groups contributing most to population growth and maintenance need to be determined by demographic studies in order to determine how best to apply management measures, such as season and area closures, and 'slot' size limits. Additionally, the U.S. Congress identified the following data needs for sharks in the Shark Finning Prohibition Act (PL 106-557) (see also the U.S. National Plan of Action for Sharks):

- The collection of data to support stock assessment of shark populations subject to incidental or directed harvesting by commercial vessels, giving priority to species according to vulnerability of the species to fishing gear and fishing mortality, and its population status.
- Research to identify fishing gear and practices that prevent or minimize incidental catch of sharks in commercial and recreational fishing.
- Research on fishing methods that will ensure maximum likelihood of survival of captured sharks after release.
- Research on methods for releasing sharks from fishing gear that minimize risk of injury to fishing vessel operators and crews.
- Research on methods to maximize the utilization of, and funding to develop the markets for, sharks not taken in violation of a fishing management plan approved under the Magnuson-Stevens Act.
- Research on the nature and extent of the harvest of sharks and shark fins by foreign fleets and the international trade in shark fins and other shark products.

6.1.7 Economic Information

There is a general need for more and improved economic information for HMS fisheries, particularly the pelagic longline, harpoon, purse seine, and recreational fisheries.

6.2 Research Updates

The following are summaries of some, but not all, of the research projects being conducted to study the HMS MUS. It is anticipated that in future SAFE Reports more comprehensive updates will be included.

Albacore: NMFS in cooperation with the American Fishermen's Research Foundation initiated a North Pacific albacore archival tagging program in 2001 in order to address questions of stock structure and migratory behavior. Through 2005, a total of 384 archival tags were deployed of which 15 have been

recovered. Preliminary analysis demonstrates that the fish are wide ranging and many utilize the area off southern California and Baja California year round. In addition some animals migrated offshore into the Pacific going as far as the international date line and back to the U.S. West Coast within a single year. All fish exhibited a diurnal pattern of repetitive deep diving to below the thermocline during the day, while remaining closer to the surface at night (see http://swfsc.nmfs.noaa.gov/albacore_tag).

Common thresher shark: NMFS began a survey for juvenile and neonate (i.e., young-of-the-year) common thresher sharks in the coastal waters of the Southern California Bight during fall 2003. The first few years of the survey have provided information on the habitat utilized by neonates. Greater numbers of neonates were caught in the shallowest depth stratum (0–25 fm) and in areas of low water clarity. The animals are patchily distributed making a discrete definition of the nursery areas difficult; however, the survey is ongoing and should provide a reliable estimate of the nursery habitat with a few more years of sampling. In addition, migratory behaviors of common thresher sharks sub-adults and adults are being studied using satellite telemetry by the NMFS in cooperation with the Tagging of Pacific Pelagics program (TOPP). Preliminary results confirm their preference for coastal waters with occasional forays into offshore areas and to depths exceeding 500 m.

Shortfin mako and blue sharks: NMFS has been conducting a study on shortfin mako age and growth using oxytetracycline (OTC) labeling. By the end of 2005, vertebrae from fourteen OTC-labeled sharks had been analyzed in order to determine the rates of band deposition and growth. Preliminary results point toward a period of growth in juvenile mako sharks, which is more rapid than previously believed. The analyses are ongoing. In addition, migratory behaviors of shortfin mako and blue sharks are being studied using satellite telemetry by the NMFS in cooperation with the TOPP. Preliminary results demonstrate that these animals are extremely wide ranging, particularly the blue sharks; however, makos tagged in the Southern California Bight show a preference to remain in the productive waters of the California Current system. Finally, NMFS has been conducting a fishery-independent survey of juvenile shortfin mako and blue sharks annually since 1994 in the Southern California Bight. Nominal CPUE for both blue and mako sharks have been relatively steady throughout the time series with some variability between years. The data are being analyzed to determine standardized CPUEs taking into account changes in oceanographic conditions.

Other Management Unit Species: Research on the above as well as several of the other MUS is ongoing at a number of U.S. West Coast research institutions. Below is a list of some of the institutions and their web pages which describe the recent research:

Inter-American Tropical Tuna Commission - http://www.iattc.org
Monterey Bay Aquarium Tuna Research and Conservation Center - http://www.tunaresearch.org
NOAA Southwest Fisheries Science Center - http://swfsc.noaa.gov
NOAA Southwest Regional Office - http://swr.nmfs.noaa.gov
Pacific Islands Fisheries Science Center - http://www.pifsc.noaa.gov
Pfleger Institute of Environmental Research - http://www.pier.org
Scripps Institute of Oceanography - http://www-sio.ucsd.edu
Tagging of Pacific Pelagics - http://www.toppcensus.org

6.3 Monitoring Reports

The HMS FMP specifies the MUS, which are those species actively managed under the FMP. The Council considered many combinations of the following criteria in their selection of MUS, with the stipulation that any species that met the first three criteria would be included:

1. The species occurs in the Pacific Council management area
2. The species occurs in West Coast HMS fisheries
3. The species is defined as highly migratory in the Magnuson-Stevens Act or the Law of the Sea Convention

4. The species is important (moderate to high value) in the landings or to the fishery
5. The species is managed by the Western Pacific Fishery Management Council
6. Sufficient data exists to calculate a bio-analytically based MSY, including a reasonable MSY proxy that is based on catches and yields that are stable over time
7. The species occurs in fisheries which the Pacific Council wants to actively manage
8. The species possesses special biological characteristics (e.g., low productivity)

The MUS are:

Tunas:

North Pacific albacore (*Thunnus alalunga*)
yellowfin tuna (*Thunnus albacares*)
bigeye tuna (*Thunnus obsesus*)
skipjack tuna (*Thunnus pelamis*)
northern bluefin tuna (*Thunnus orientalis*)

Billfish/Swordfish:

striped marlin (*Tetrapturus audax*)
swordfish (*Xiphias gladius*)

Sharks:

common thresher shark (*Alopias vulpinus*)
pelagic thresher shark (*Alopias pelagicus*)
bigeye thresher shark (*Alopias superciliosus*)
shortfin mako shark (*Isurus oxyrinchus*)
blue shark (*Prionace glauca*)

Other:

dorado or dolphinfish (*Coryphaena hippurus*)

The HMS FMP also lists species that are included for monitoring purposes. The criteria for species included in the FMP for monitoring are those species that: 1) have a record of being caught in an HMS fishery; 2) are not covered by another FMP or state management regime; and 3) are of special concern (e.g., elasmobranches, which have relatively low productivity). The HMS FMP notes that these species, which often occur as bycatch in an HMS fishery, should be monitored on a consistent and routine basis to the extent practicable. Sampling periodically and coverage fraction will depend upon the take rates of the species that are of most concern. This monitoring is needed to evaluate the impact of HMS fisheries on incidental and bycatch species (as well as MUS), and to track the effectiveness of bycatch reduction methods. A list of monitored species is contained in Chapter 3 of the FMP, Table 3–2.

According to the FMP, the HMSMT will deliver a SAFE report that follows guidelines specified in National Standard 2 and will be used by the Council and NMFS to develop and evaluate regulatory adjustments under the framework procedure or the FMP amendment process. This information will document significant trends or changes in monitored species over time, and assess the relative success of existing state and federal fishery management programs. The SAFE report will also make recommendations to the Council concerning bycatch and incidental catch.

Since the drafting of the FMP through 2004, the only HMS fishery to have routine federal observer coverage has been the drift gillnet fishery.

With regard to bycatch and incidental catch monitoring, in June 2005, the HMSMT reviewed and discussed the conclusions presented in the report entitled, "Recommendations for U.S. West Coast Highly Migratory Species Observer Programs with Options for Levels of Significance," which was developed by an independent contractor at the request of NMFS SWFSC. The report authors reviewed the available

data for West Coast HMS fisheries and provided recommendations on the administration, oversight, and coverage levels for HMS observer programs. The proposed pilot observer programs were developed to provide statistically reliable indices of bycatch to assist managers in selecting coverage levels based on effort, fishery characteristics, and costs; the programs also include alternatives to stratify coverage proportional to fleet effort across port, vessel class, fishing area, season, and fishing gear.

The HMSMT had a thorough discussion about the administrative recommendations in the report. The HMSMT agrees with the recommendations presented in the report with regard to program administration, funding, observer assignment, and vessel selection; it is our understanding that these recommendations have been adopted and implemented by NMFS:

1. Program administration: Establish a program utilizing the services of an outside contractor.
2. Program funding: Observers are supplied by a federal contractor through NMFS.
3. Observer assignment: Observers are assigned by contractor based on sampling plan.
4. Vessel selection: The program administrator (NMFS) will randomly select vessels from those not yet observed and assign observers to those vessels until the desired level of coverage for a given fishing season is achieved or maintained.

With regard to program administration, the HMSMT notes that there are some state observer programs currently in place (e.g., CRFS coverage of the California CPFV fleet) and recommends that these programs be used to supplement the HMS observer programs as much as possible.

Regarding the duration of observer coverage, it is our understanding that vessels will be required to carry an observer on a per-trip basis. However, we want to ensure that the observed trip is as representative of effort occurring in non-observed trips as much as possible. To minimize changes in vessel effort when observed, a minimum number of sets (five) was used to determine the duration of individual vessel coverage in the drift gillnet fishery. The HMSMT recommends a similar approach for other HMS fisheries, based on an average number of sets per trip (which can be calculated using logbook and/or previous observer information).

With regard to coverage levels, the HMSMT agrees with the recommended coverage levels proposed in the report, with the exception of the pelagic longline fishery. The report recommends a 20 percent coverage level of the longline fishery; however, currently, this fishery is covered at 100 percent. The HMSMT recommends keeping the current coverage level in effect for both pelagic longline (100 percent) and drift gillnet (20 percent), and approving the proposed coverage levels for coastal purse seine (100 percent), albacore troll (5 percent), CPFV in southern California (10 percent), and albacore charterboats coastwide (20 percent) as coverage level goals; the HMSMT recognizes that, particularly at the outset of these programs, optimum coverage levels may not be achieved due to funding constraints. The HMSMT also agrees with the stratification recommendations in the report.

7.0 REFERENCES

Note: If available online, links to the references listed below may be found on the PFMC website at http://www.pcouncil.org/hms/hmssafe.html.

Hampton, J., Kleiber, P., Langley, A., Takeuchi, Y. and Ichinokawa, M. 2005. Stock assessment of bigeye tuna in the western and central Pacific Ocean. 1st Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Aug 8-19, Noumea, New Caledonia, WCPFC–SC1 SA WP–2, 77 pp.

Hampton, J., Kleiber, P., Langley, A., Takeuchi, Y. and Ichinokawa, M. 2005. Stock assessment of yellowfin tuna in the western and central Pacific Ocean. 1st Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Aug 8-19, Noumea, New Caledonia, WCPFC–SC1 SA WP–1, 79 pp.

Hinton, M.G. and Maunder, M.N. 2003. Status of striped marlin in the eastern Pacific ocean in 2002 and outlook for 2003-2004. Draft presented at 4th Meeting of the Scientific Working Group, May 19-21, La Jolla, CA, IATTC SAR-4-04 MLS, 24 pp.

Hinton, M.G., Bayliff, W.H. and Suter, J.M. 2004 Assessment of swordfish in the eastern Pacific Ocean, IATTC SAR-5-05 SWO, 25 pp.

Hoyle, S.D and Maunder, M.N. 2005. Status of yellowfin tuna in the eastern Pacific Ocean in 2004 and outlook for 2005. IATTC SAR-6 YFT, 100 pp.

ISC 2004a. Report of the 3rd ISC Pacific bluefin tuna working group. Interim Sci. Comm. for Tuna and Tuna-like species in the North Pacific Ocean, ISC/04/Plenary/6.

ISC 2004b. 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 2006. Report of the sixth meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, March 23-27, 2006, La Jolla, CA, 46 pp.

Kleiber, P., Takeuchi, Y. and Nakano, H. 2001. Calculation of plausible maximum sustainable yield (MSY) for blue shark (Prionace glauca) in the north Pacific, SWFSC Admin. Rep. H-01-02 and Dept. of Commerce.

Lehodey, P., Bertignac, M., Hampton, J., Lewis, A. and Picaut, J. 1997. El Niño Southern Oscillation and tuna in the western Pacific. Nature 389: 715−718.

Lehodey, P. 2004. A Spatial Ecosystem And Populations Dynamics Model (SEAPODYM) for tuna and associated oceanic top-predator species: Part II - Tuna dynamics and fisheries. 17th Meeting of the Standing Committee on Tuna and Billfish, Aug 9-18, 2004, Majuro, Republic of the Marshall Islands. Working Paper ECO−2.

Langley, A., Hampton, J. and Ogura, M. 2005. Stock assessment of skipjack tuna in the western and central Pacific Ocean. 1st Meeting of the Scientific Committee of the Western and Central Pacific Fisheries Commission, Aug 8-19, Noumea, New Caledonia, WCPFC–SC1 SA WP–4, 69 pp.

Maunder, M.N and Harley, S.J. 2004. Status of skipjack tuna in the eastern Pacific Ocean in 2003 and outlook for 2004, 5th Meeting of the Scientific Working Group, May 11-13, La Jolla, CA, IATTC SAR-5-05 SKJ, 48 pp.

Maunder, M.N. and Hoyle, S.D. 2005. Status of bigeye tuna in the eastern Pacific Ocean in 2004 and outlook for 2005. IATTC SAR-6 BET, 104 pp.

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.

Stocker, M. 2006. The 2005 Canadian North Pacific albacore troll fishery. Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C. 10 pp.

Stocker, M. (Ed.) 2005. Report of the nineteenth north Pacific albacore workshop. Nineteenth North Pacific Albacore Workshop, Nanaimo, B.C., Canada, Nov 25-Dec 2, 2004. Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C. 127 pp.

8.0 COMMONLY-USED ACRONYMS IN HMS MANAGEMENT

ABC	allowable biological catch
AIDCP	Agreement on the International Dolphin Conservation Program
AMSY	average maximum sustainable yield
A-SCALA	age-structure catch-at-length analysis
ATCA	Atlantic Tunas Convention Act
B	biomass
B_0	initial (unfished) bimoass
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
$F_{x\%}$	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 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 devices
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
FY	fiscal year
GIS	geographic information system
GLM	general linear model
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	World Conservation Union
JFL	jaw-to-fork length
JVP	joint venture processing
LMSY	local MSY
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

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
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
PSMFC	Pacific States Marine Fisheries Commission
RA	Regional Administrator (of NMFS)
RecFIN	Recreational Fisheries Information Network
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
RPA	reasonable and prudent alternative
SAC	Sportfishing Association of California

SAFE	stock assessment and fishery evaluation
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
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
SPTT	South Pacific Tuna Treaty
SSB	spawning stock biomass
SSB_0	initial (unfished) spawning stock bimoass
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)
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
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
WPRFMC	Western Pacific Regional Fishery Management Council
YPR	yield per recruit
ZMRG	zero mortality rate goal