U.S. SWORDFISH FISHERIES IN THE NORTH PACIFIC OCEAN[1]

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INTRODUCTION

The United States is a major harvesting and consuming nation for swordfish (*Xiphias gladius*). U.S. fisheries in the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean harvested 4,281 metric tons (mt) in 2003 (NMFS, Fisheries Statistics and Economics Division, 2004). Of this total, more than half (2,291 mt; 54%) was taken in the U.S. North Pacific Ocean fisheries. This report summarizes historical trends and recent developments in the several U.S. North Pacific Ocean fisheries.

1. FISHERIES AND CATCHES

U.S. swordfish fisheries of the North Pacific Ocean can be categorized according to three distinct gear types (harpoon, drift gill net, and longline). Harpoon fishing for swordfish is the oldest of the three, dating back to the early 1900's (Coan et al., 1998). This fishery primarily supplied the local market for swordfish until the late 1970s. Harpoon landings reached a record high in 1978, subsided to a more typical level the following year, and remained at relatively low levels thereafter (Fig. 1). The California drift gill net fishery began in 1980 but expanded rapidly enough so as to replace the harpoon fishery as the largest U.S. swordfish fishery after only one year. These landings continued to increase to a peak in 1985, but then began to decrease, although 1992 and 1993 yielded relatively high landings. Swordfish-directed longlining began in Hawaii in 1988 and grew rapidly to peak in 1993. This longline fishery was by far the largest U.S. swordfish fishery in the North Pacific Ocean from 1990 through 2000. It was replaced by the California-based longline fishery as the largest fishery from 2001 to 2003. It should be noted that some gear used to catch swordfish in California could not be identified; landings from such records are listed under "other" fishing gear landings (Table 1). In certain years, landings by "other" gear were substantial, especially during 1984-86.

California Harpoon Fishery

Harpoon gear consists of a handle about 3-5 m long attached to a metal shank approximately 0.6 m long tipped with a removable bronze or iron dart (Coan et al.,1998). The dart is attached to a mainline15-46 m long which terminates with floats and markers. Harpoon fishermen search for swordfish at the sea surface. The prevalent method is to sight swordfish while they are "finning" or basking on the surface in blue/green water of 12°-26°C. When a fish is spotted and harpooned, the handle is pulled free from the dart and the mainline, marker flag, and floats are played out until free from the vessel. The fish is allowed to tire itself before being hauled aboard.

The California harpoon fishery started in the early 1900s. The number of harpoon vessels peaked at 309 in 1978 (Fig. 2). Participation dropped below 200 vessels in the early 1980s and continued to decline into the late 1990's. There were only 34 active vessels in 2003.

The fishing area typically ranges from San Diego to San Francisco but sometimes extends as far north as Oregon (Coan et al.,1998). Most fishing effort occurs within 200 miles of shore. The fishery usually begins in April or May in waters off San Diego, peaks in July or August, and ends in December in waters off San Francisco.

Harpoon landings have been recorded since 1918. Harpoon landings of swordfish varied substantially ranging from 16 t in 1991 to 1,699 t in 1978. Swordfish landings were 107 t in 2003 (Table 1). The fishery also has small catches of sharks, mainly common thresher sharks (*Alopias vulpinus*).

One important factor in the harpoon fishery is the use (or lack thereof) of spotter aircraft. Swordfish CPUE (number of fish per day) for vessels using spotter aircraft was about twice that of vessels that did not have assistance from aircraft. However, aircraft were not used from 1978 through 1983 (Coan et al., 1998). The trends for swordfish CPUE using spotter aircraft and no aircraft assistance were similar, varying roughly in parallel, with the aircraft assisted CPUE higher. Harpoon swordfish CPUE values for vessels with and without aircraft assistance were close in 2003, at 0.51 and 0.46, respectively.

California Drift Gill Net Fishery

Drift gill nets used in this fishery are made of 3-strand twisted nylon with 33-48 cm mesh size, with float and lead lines (Hanan et al., 1993). The drift gill net is stored on a large net reel. The length of the gill net ranges from 1.5-1.8 km. Fishing depth is controlled by tying buoy lines (5.5-7.9 m long) from the float line to bumper-balls at regular intervals. The nets are set in the evenings and retrieved before sunrise.

The California drift gill net fishery began in the late 1970s, with sharks (common thresher shark, *Alopias vulpinus*, and shortfin mako shark, *Isurus oxyrinchus*) as the target species. Swordfish was also a large component of the catch (Hanan et al., 1993).

Swordfish catch by this fishery was initially low, but increased in the early 1980s when regulations were changed to allow for greater landings of swordfish. The number of active drift gill net vessels peaked at 220 during 1985-86 and decreased to record low of 37 vessels during 2002-2003 (Fig. 4). California Department of Fish and Game (CDFG) currently limits the participants in the fishery to 150 permitted vessels.

Drift gill net fishing effort is concentrated in the Southern California Bight (waters off Point Conception down to Mexico), but can extend past San Francisco and San Clemente Island as far north as Oregon. Most of the fishing effort occurs within 200 miles of shore. The drift gill net fishery begins in May and lasts about 10 months with peak swordfish catches in October and November.

Swordfish landings by the drift gill net fishery grew from 160 mt in 1980 to a peak of 2,368 mt in 1985 and declined thereafter. Swordfish landings by the drift gill net fishery was relatively low in the past three years with a near-record low catch of 216 mt in 2003 (Table 1). The drift gill net fishery also had incidental catches of other pelagic species that included tunas and other pelagic fish. Interactions with marine mammals and turtles also occur in this fishery (Herrick and Hanan 1988).

Drift gill net CPUE rose from 0.6 swordfish per set in 1981-82 and peaked at 2.7 swordfish per set in the 1984-85 season (Fig. 5). This level was reached again in the 1992-93 season. Drift gill net CPUE declined after the 1992-93 season to a low of 1.3 fish per set in the 2002-2003 season.

Hawaii-based Longline Fishery

Longline gear consists of a single continuous mainline about 30 to 80 km in length with floats attached to the mainline supporting the gear horizontally in the water column. Branchlines with baited hooks are attached to the mainline between the floats. There are two basic techniques used when vessel operators target either swordfish (shallow set) or tunas (deep set). Vessels targeting swordfish typically set longline gear in the evening and haul gear the following morning, attach 2-5 hooks between floats, use squid for bait, and attach chemical lightsticks to the branchlines. The gear is set relatively shallow so a line thrower is not needed. In contrast, vessels targeting tunas usually set the longline gear in the morning and haul in the afternoon, use 15-30 (or more) hooks between floats, sanma for bait, no lightsticks, and a line thrower, which causes the longline to sag between floats, thereby resulting in a "deep set". The Hawaii-based longline fishery was limited to the deep set longline technique from 2002 throughout 2003. As a result, only tunas were targeted, although a few swordfish were also caught incidentally.

The number of Hawaii-based longline vessels increased rapidly from 37 vessels in 1987 and peaked at 141 vessels in 1991 as U.S. longliners from the Gulf of Mexico and the Atlantic swordfish fisheries joined the Hawaii-based longline fishery (Fig. 6). Swordfish longline techniques from the Atlantic Ocean were introduced to Hawaii by this

group of fishermen and helped establish Hawaii as a major producer of swordfish. A federal moratorium implemented in 1991 limited the number of longline permits to 167 in light of this rapid expansion but vessel participation never reached the limit. Some longline vessels during this time fished exclusively for swordfish throughout the year, but swordfish-directed effort declined slowly thereafter. The moratorium on permits was replaced with a limited entry program in 1994 which capped participation in Hawaii's longline fishery at 164 vessels. Vessel activity ranged from 100 to 125 vessels thereafter with 110 active longline vessels in 2003. The Hawaii-based longline fleet set their gear "deep" and targets tunas exclusively.

A lawsuit was filed by the Earthjustice Legal Defense Fund against NMFS in U.S. District Court in February 1999 on behalf of two non-government organizations, the Center for Marine Conservation (now called the Ocean Conservancy) and the Turtle Island Restoration Network. The lawsuit was related to interactions between longline gear and sea turtles. Several regulations imposed by Court order with the intention of reducing turtle interactions affected swordfish-directed longline effort. The regulations that had the greatest impact on swordfish-directed effort were those that closed prime swordfish fishing grounds north of the main Hawaiian Islands on December 27, 1999 and limited the number of swordfish-directed sets on June 23, 2000. The final Environmental Impact Statement (EIS), approved on March 31, 2001, replaced the Court order regulations and prohibited shallow longline fishing using lightsticks, which essentially ended swordfish-directed longline effort by this fishery. In response to these new restrictions, some Hawaii-based longline vessels relinquished their federal Hawaii longline limited entry permits, relocated to California, and continued fishing for swordfish. Other longline vessel operators opted to stay in Hawaii and complied with the new regulations by reconfiguring their gear to fish deep for tunas. The consequences of these multiple changes were a higher level of effort and swordfish catch in California during 1999-2003 as well as record bigeye tuna catches by the Hawaii-based longline fishery in 2002 and 2003.

The Hawaii-based longline fishery ranged from 5° to 35° N and 145° to 175° W in 2003 but has extended as far as the equator to 50° N and 130° W to 170° E. Most of the Hawaii-based longline effort is on the high seas and in the Main Hawaiian Islands (MHI) Exclusive Economic Zone (EEZ). Swordfish-directed effort was highest during the first half of the year while tuna-directed effort was highest in the last quarter of the year.

The Hawaii-based longline fishery was the largest producer of swordfish of all the U.S. North Pacific Ocean swordfish fisheries from 1990 through 2000. Swordfish landings[2] from this fishery began to increase in 1989 when a few vessels successfully targeted swordfish. Swordfish-directed effort increased rapidly thereafter with swordfish catch peaking at 5,909 mt in 1993 (Table 1). Swordfish catch dropped to 3,176 mt the

[2]Swordfish landings is based on estimated whole weight. The conversion factor for processed swordfish (typically landed without head, guts, and tail) was 1.45.

following year and stabilized with catch ranging from 2,502 mt to 3,263 mt throughout 1994-2000. Swordfish catch by the Hawaii-based longline fishery decreased significantly below 300 mt during 2001-2003 as a result of the prohibition on shallow sets to reduce sea turtle interactions. Other species caught by the Hawaii-based longline fishery include bigeye tuna (*Thunnus obesus*), yellowfin tuna (*T. albacares*), albacore (*T. alalunga*), bluefin tuna (*T. thunnus orientalis*), marlins (Istophoridae), mahimahi (*Coryphaena hippurus*), moonfish (*Lampris guttatus*), ono (*Acanthocybium solandri*), pomfrets (Bramidae), oilfish (Gempylidae) and blue shark (*Prionace glauca*).

Swordfish CPUE (number of fish per 1,000 hooks) varies substantially according to targeting practice (Fig. 7). Swordfish CPUE for trips that specifically targeted swordfish ranged from 10.3 fish in 1994 to 15.4 fish in 1991 and 1997. Swordfish CPUE was 11.7 in 2001, the last year in which CPUE for this trip type was available. Swordfish-targeted trips usually had their highest CPUE during the first and second quarters and lowest CPUE in the third quarter. Tuna-targeted trips had negligible swordfish CPUE relative to swordfish trips but are presented because they were only continuous measure of longline swordfish CPUE for the entire time period. Tuna trip swordfish CPUE was 0.1 in 2003.

California-based Longline Fishery

The California-based longline fishery began in 1991 when three vessels based in San Pedro fished waters outside the U.S. EEZ (Vojkovich and Barsky 1998). The longline fleet increased more than 10–fold from 3 in 1991 to 31 vessels in 1994. Participation in the California-based longline fishery peaked at 44 vessels in 2000 but has since decreased to 24 vessels in 2003 (Fig. 8). The California-based longline fleet is composed predominantly of vessels that targeted swordfish in Hawaii and migrated to California as a result of the turtle interaction lawsuit. The configuration of the swordfish longline gear in the California-based longline fishery is the same as in the Hawaii-based longline fishery.

California does not allow pelagic longline fishing within the EEZ; therefore, the California-based longline fishery operated exclusively on the high seas in the same area as Hawaii-based longline fishery. When this fishery first began, effort typically peaked late in the year. Recently, relatively high levels of effort continued throughout the winter months as the fleet began fishing closer to Hawaii.

Swordfish landings by the California-based longline fishery increased from 39 t in 1991 to 740 t in 1994, ranged from 279 mt to 644 mt during 1995-98 and peaked at 1,908 mt in 2000. The landings total for 2003 was 1,812 mt (Table 1). The California-based longline fishery was the largest U.S. swordfish fishery in the North Pacific Ocean from 2001 to 2003. Incidental catches in the California-based longline fishery include: sharks, yellowfin tuna, bluefin tuna, bigeye tuna, albacore, mahimahi, moonfish, and oilfish. Marlins are also caught but CDFG regulations prohibit landing them. Although interactions with marine mammals, birds, and turtles are seldom reported in logbooks

submitted by fishermen, there is some evidence that these species are also caught incidentally.

California-based longline CPUE (fish per 1000 hooks) varied 3.6-fold (from 6.3 in 1995 to 22.4 in 2002) from 1994-2003 (Fig. 9). Longline CPUE was 21.7 in 2003.

2. DATA SOURCES

Hawaii

There are six types of data sets on swordfish in Hawaii: Federal daily longline logbooks; market data; State of Hawaii commercial fishermen catch reports; reports by at-sea observers deployed by NMFS; research cruise reports from NOAA ships *Townsend Cromwell* and *Oscar Elton Sette*; and voluntary tag and release data from fishermen (Tables 2 and 3). Cross-referencing certain data sets allows NMFS scientists to evaluate the accuracy of the data. Each of the six types of data sets contains unique information, but in the aggregate these data sets provide considerable insight to the performance of the fishery as well as the biology and ecology of swordfish and other pelagic species caught.

Federal longline logbooks have been mandatory for Hawaii-based longline vessels since November 1990. The Federal longline logbook data represent the most complete coverage of all data sets for the Hawaii-based longline fishery. Logbooks must be maintained by vessel operators and submitted after each trip. Data recorded in the logbooks include: vessel, date, fishing location, effort and gear configuration, catches by species. Data on interactions with protected species are sometimes recorded but considered unreliable.

Market data on longline landings were first collected at the Honolulu fish auction by the NMFS in 1987. The sample size from the market ranged from 25%- 90% of fish landed by the Hawaii-based longline fishery throughout 1987-2000. Individual fish weights were recorded to the nearest half pound. Weights were raised to an estimated whole weight when processing or damage was observed. Sex of fish was not available as most swordfish were landed in processed form (headed, finned, and gutted). The responsibility for collecting market data was transferred from to the State of Hawaii in 2002. Coverage of the market data is now at high levels (96% in 2002 and 90% in 2003).

The State of Hawaii Division of Aquatic Resources (HDAR) commercial fisheries data have been collected from 1948 to the present. The HDAR requires longline fishermen to submit longline trip reports listing the pelagic species caught. The HDAR longline data includes: number caught, pounds caught, pounds sold and total value for each species.

Data collection by at-sea observers was initiated in 1990 when Hawaii-based longline vessels volunteered to take observers aboard to investigate longline fishery interactions with Hawaiian monk seals (*Monachus schauinslandi*) (Dollar 1991). A mandatory observer program began in February 1994 (Dollar, 1994) using statistical guidelines to improve the estimates of incidental take of sea turtles (Dinardo 1993). Observers covered about 5% of the total longline trips from 1994-1999. Observer coverage was then increased in response to new regulations and has remained at or above 20% from the latter part of 2000 through 2003. The observer data are similar to logbooks, although more detailed. In particular, the observer data are used to assess the fleet-wide impact of longlining on protected and endangered species.

The NOAA research vessel *Townsend Cromwell* began a series of research cruises devoted to collecting detailed data on swordfish biology and ecology in 1991. The cruises deployed standard monofilament longline gear to catch swordfish. Hook timers and time-depth recorders (TDRs) were used to collect information on fishing depth of the gear and on swordfish behavior. Observations on condition of the catch and biological measurements were recorded. Biological samples such as muscle tissue, gonads, stomach, otoliths, and anal fin rays were also collected. Some live swordfish specimens were tagged and released. Oceanographic conditions were monitored with expendable bathythermographs (XBTs), conductivity-temperature depth (CTD) casts, thermosalinograph (TSG), and acoustic Doppler current profile (ADCP) transects (Boggs, pers. commun.). The *Townsend Cromwell* was decommissioned in 2002 and replaced with the research vessel *Oscar Elton Sette.*

Swordfish tagging is conducted with the voluntary participation of longline fishermen and on research cruises. Tag, release, and recapture information such as names of fishermen, gear type, tagging and recovery location, and size estimates of fish are collected (Kazama, pers. commun.).

California

There are four types of data on the California-based longline fishery: CDFG landing receipts; CDFG and Federal daily longline logbooks; dockside sampling of swordfish landings collected by the CDFG; and data collected at sea by NMFS observers. Landing receipts have been collected by the CDFG since the start of the fishery in 1991 (Table 2). Daily longline logbook data were first collected by the CDFG on a voluntary basis from 1993 to 1994. Collecting and submitting CDFG longline logbook data (Pacific Offshore) became mandatory in 1995. This system was replaced in 1999 by a NMFS longline logbook data reporting system in response to Federal requirements under the High Seas Fisheries Compliance Act. Data recorded in the logbooks include: vessel, date, fishing location, effort and gear configuration, as well as numbers of fishes caught by species and interactions with protected species. Collection of longline caught swordfish size samples began in 1991 in conjunction with drift gill net swordfish samples (Childers and Halko 1994) but was discontinued in 2000. NMFS began placing observers

on longline vessels from 2001 to investigate interactions with sea turtles and collect detailed catch and effort data.

The California drift gill net fishery is monitored by use of CDFG landing receipts, vessel logbooks, size sampling, and a CDFG and NMFS observer program. Landing receipts have been collected by the CDFG since the fishery's inception in 1980 (Table 2). Drift gill net fishermen are required to collect logbook data were on daily operations and catch. Location was recorded in 10 minute squares. CDFG sampled drift gill net swordfish catch for length at local markets beginning in 1981 (Table 3). An observer program to monitor the drift gill net fishery was initiated and maintained by CDFG from 1980 to 1989 and has continued since 1990 under NMFS. The observer program is used to monitor bycatch, especially of marine mammals. The NMFS observer program also collects size samples of swordfish.

The California harpoon fishery is also monitored through landing receipts, vessel logbook, and size sampling by the CDFG. Landings have been collected since the early 1900s through a landings receipt system (Table 2). A mandatory vessel logbook system for the harpoon fishery started in 1974. These logbooks are completed daily and record catches by location in the CDFG 10-minute square codes. Information on aircraft assistance, water color, sea surface temperature and condition, harpooning success, and areas searched is also included. Size sampling of swordfish landings began in 1981 in conjunction with the drift gill net sampling (Table 3). The sampling program was discontinued in 2000.

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Table 1.--U.S. North Pacific swordfish landings* (metric tons).
Dashes indicate no fishery.

	California				Hawaii	Total U.S.
Year	Harpoon	Gill net	Other	Longline	Longline	North Pacific
1970	612	---	10	---	5	622
1971	99	---	3	---	1	102
1972	171	---	4	---	0	175
1973	399	---	4	---	0	403
1974	406	---	22	---	0	428
1975	557	---	13	---	0	570
1976	42	---	13	---	0	55
1977	318	---	19	---	17	337
1978	1,699	---	13	---	9	1,712
1979	329	---	57	---	7	386
1980	566	160	62	---	5	788
1981	267	461	20	1	3	749
1982	156	911	43	2	5	1,112
1983	58	1,321	378	1	5	1,758
1984	96	2,101	678	14	3	2,889
1985	211	2,368	792	46	2	3,417
1986	236	1,594	696	4	2	2,530
1987	211	1,287	300	4	24	1,802
1988	180	1,092	344	19	24	1,635
1989	54	1,050	224	29	281	1,357
1990	50	1,028	137	18	2,437	1,233
1991	16	836	137	39	4,508	1,028
1992	74	1,332	44	95	5,700	1,545
1993	169	1,400	36	165	5,909	1,770
1994	153	799	8	740	3,176	1,700
1995	96	755	31	279	2,713	1,161
1996	81	752	10	347	2,502	1,190
1997	84	707	3	664	2,881	1,458
1998	48	924	13	422	3,263	1,407
1999	81	606	2	1,333	3,100	2,022
2000	90	646	9	1,908	2,949	2,653
2001	52	375	5	1,763	220	2,195
2002	90	302	3	1,320	204	1,715
2003	107	216	0	1,811	147	2,134

*Based on estimated whole weight and does not include discards.

Table 2.--U.S. North Pacific swordfish catch-effort data catalog.

Year	Country/State	Gear	Data set*	Measurement of catch	Type of effort	Time strata	Geographic resolution
1974	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
1975	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1976	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1977	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1978	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1979	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1980	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	
1981	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1982	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1983	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1984	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1985	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1986	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1987	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1988	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
1989	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	—

Table 2 (continued).--U.S. North Pacific swordfish catch-effort data catalog.

Year	Country/State	Gear	Data Set*	Measurement of catch	Type of effort	Time strata	Geographic resolution
1990	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(V)	NO. FISH	NO. HOOKS	DAY	1 MIN
1991	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(V)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1992	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(V)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1993	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(V)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1994	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1995	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1996	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN

Table 2 (continued).--U.S. North Pacific swordfish catch-effort data catalog.

Year	Country/State	Gear	Data Set*	Measurement of catch	Type of effort	Time strata	Geographic resolution
1997	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	LB	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1998	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
1999	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
2000	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
2001	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
2002	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN
2003	USA/CA	GILL NET	LB	NO. FISH	SETS/DAYS	DAY	10 MIN
	USA/CA	GILL NET	OBS(M)	NO. FISH	SETS/DAYS	DAY	1 MIN
	USA/CA	HARPOON	LB	NO. FISH	PURSUITS/DAY	DAY	10 MIN
	USA/CA	LONGLINE	LB	NO. FISH	SETS/HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	CR	NO.&WT. FISH	DAYS/TRIP	TRIP	---
	USA/HI	LONGLINE	OBS(M)	NO. FISH	NO. HOOKS	DAY	1 MIN
	USA/HI	LONGLINE	RC	NO. FISH	NO. HOOKS	DAY	1 MIN

*CR=STATE CATCH REPORT, LB=LOGBOOK DATA, OBS=OBSERVER DATA (V=VOLUNTARY, M=MANDATORY), RC=RESEARCH CRUISE DATA

Table 3.--U.S. North Pacific swordfish size frequency data catalog.

Year	Country/State	Gear	Data set*	Time strata	Type square	Length	Interval	Weight	Interval
1981	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1982	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1983	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1984	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1985	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1986	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
1987	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
1988	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
1989	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
1990	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(V)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
1991	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5 LB/EST
1992	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(V)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1993	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(V)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST

Table 3 (continued).--U.S. North Pacific swordfish size frequency data catalog.

Year	Country/State	Data gear	Time set*	Type strata	Square	Length	Interval	Weight	Interval
1994	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1995	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1996	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1997	USA/CA	GILL NET	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	HARPOON	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/CA	LONGLINE	MKT	LAND DATE	10 MIN	Y	1 MM	Y	1 LB
	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(V)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1998	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
1999	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(V)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
2000	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST

Table 3 (continued).--U.S. North Pacific swordfish size frequency data catalog.

Year	Country/State	Data gear	Time set*	Type strata	Square	Length	Interval	Weight	Interval
2001	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
2002	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST
2003	USA/HI	LONGLINE	MKT	LAND DATE	---	N	---	Y	0.5 LB
	USA/HI	LONGLINE	OBS(M)	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	RC	DAY FISH	1 MIN	Y	1 MM	Y	0.5 LB
	USA/HI	LONGLINE	TAG	DAY FISH	1 MIN	Y	EST	Y	0.5LB/EST

*MKT=MARKET DATA, OBS=OBSERVER DATA (V=VOLUNTARY, M=MANDATORY), RC=RESEARCH CRUISE DATA, TAG=TAGGING STUDIES

Figure 1.–Catch by the U.S. swordfish fisheries of the North Pacific Ocean, 1970-2003.

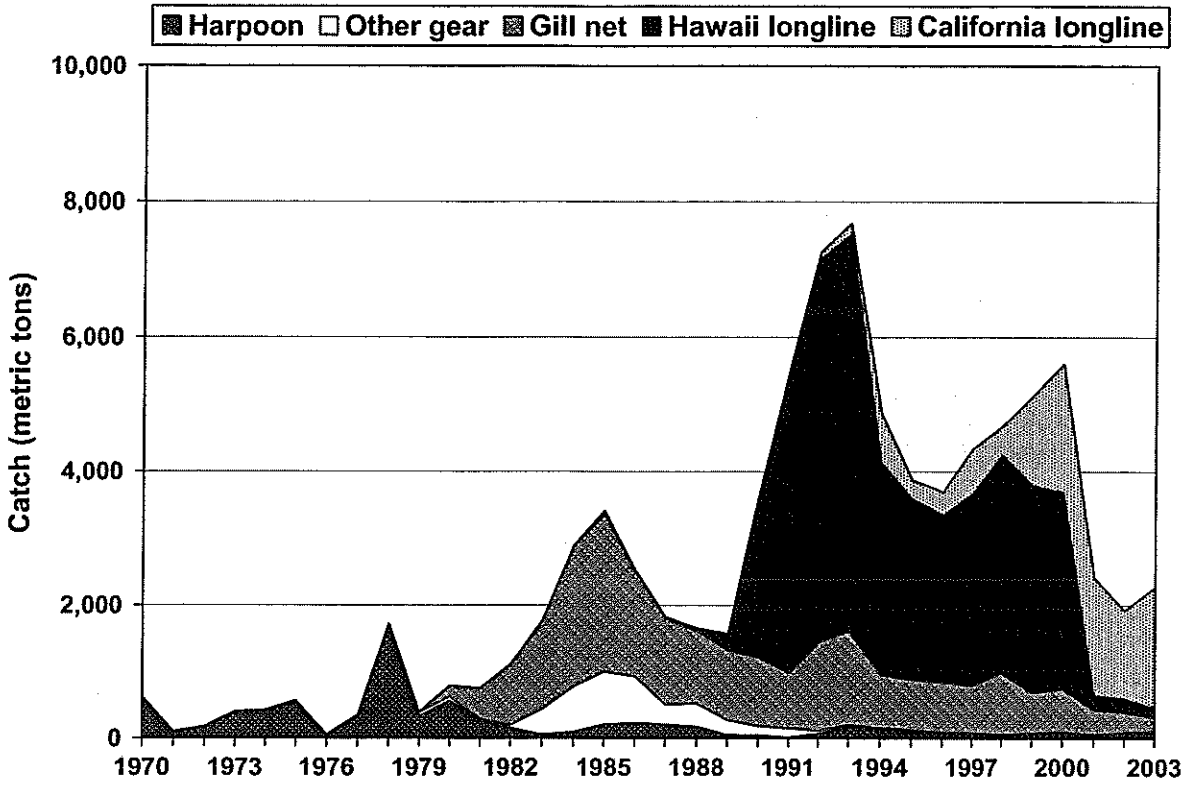

Figure 2.--Number of California harpoon vessels, 1974-2003.

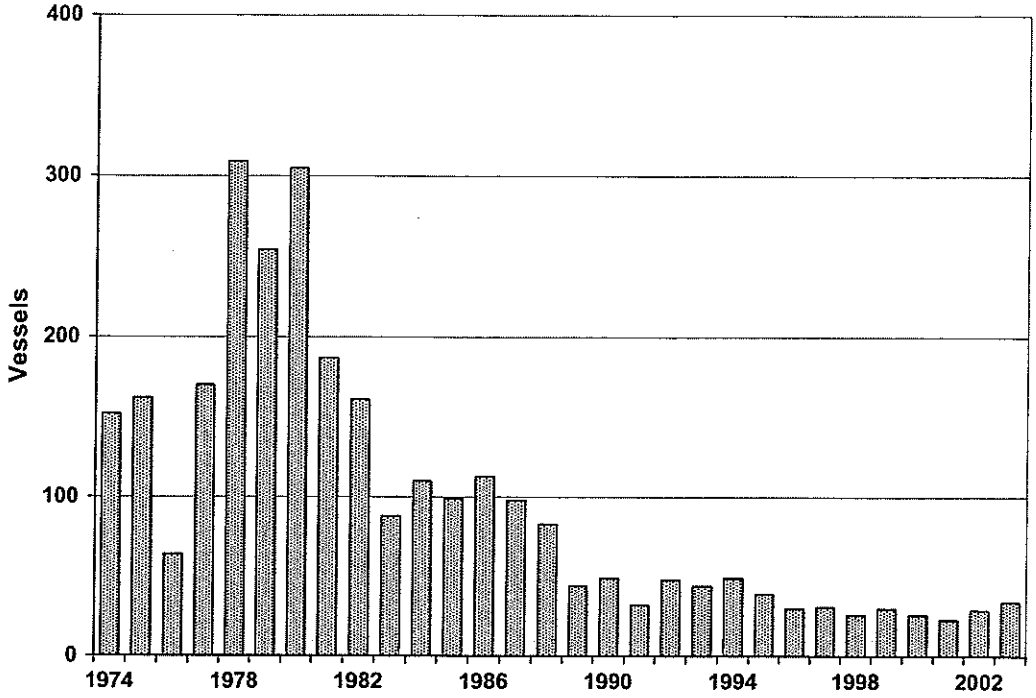

Figure 3.--California harpoon fishery swordfish catch-per-unit-effort (CPUE), 1974-2003.

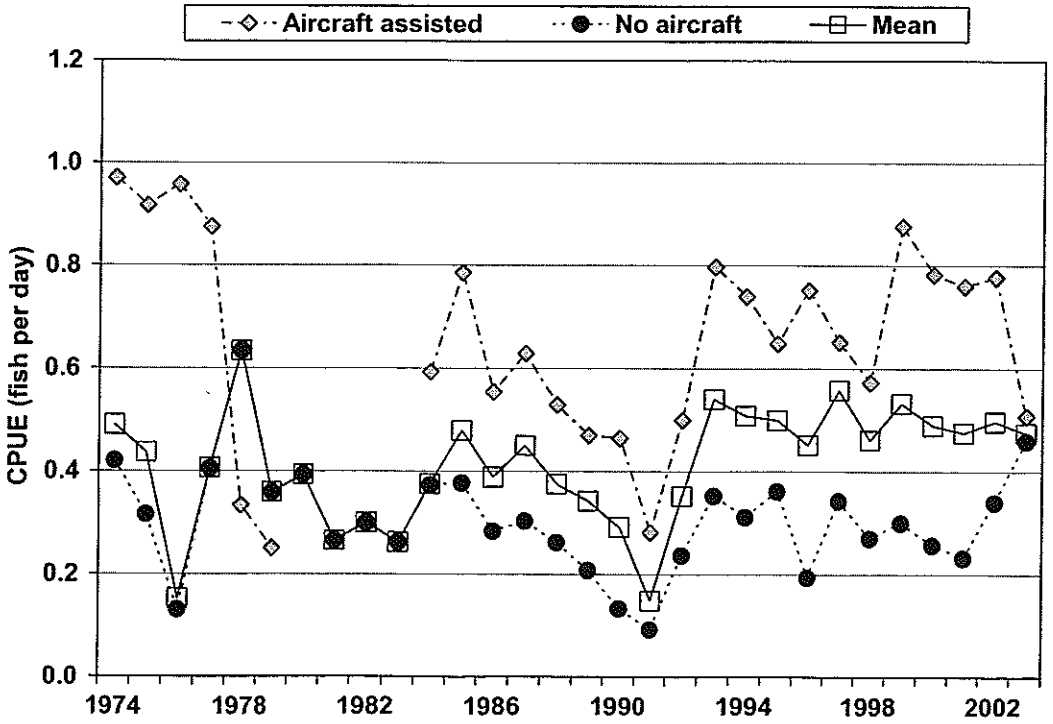

Figure 4.--Number of California drift gill net vessels, 1981-1982 through 2002-2003.

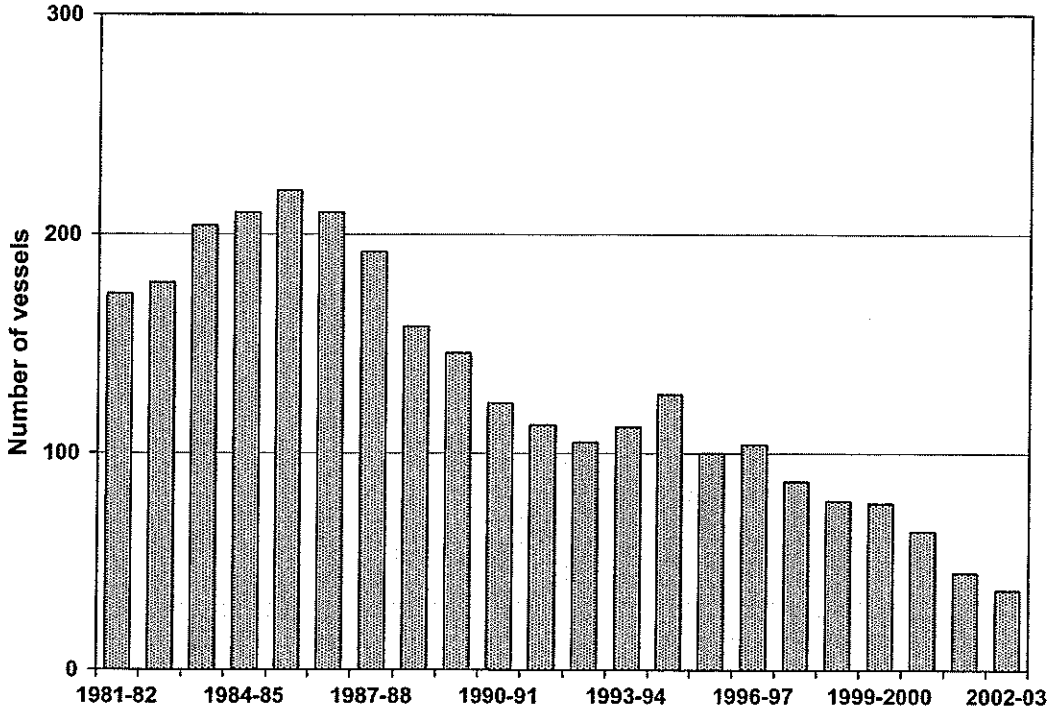

Figure 5.--California drift gill net fishery swordfish catch-per-unit-effort (CPUE), 1981-1982 through 2002-2003.

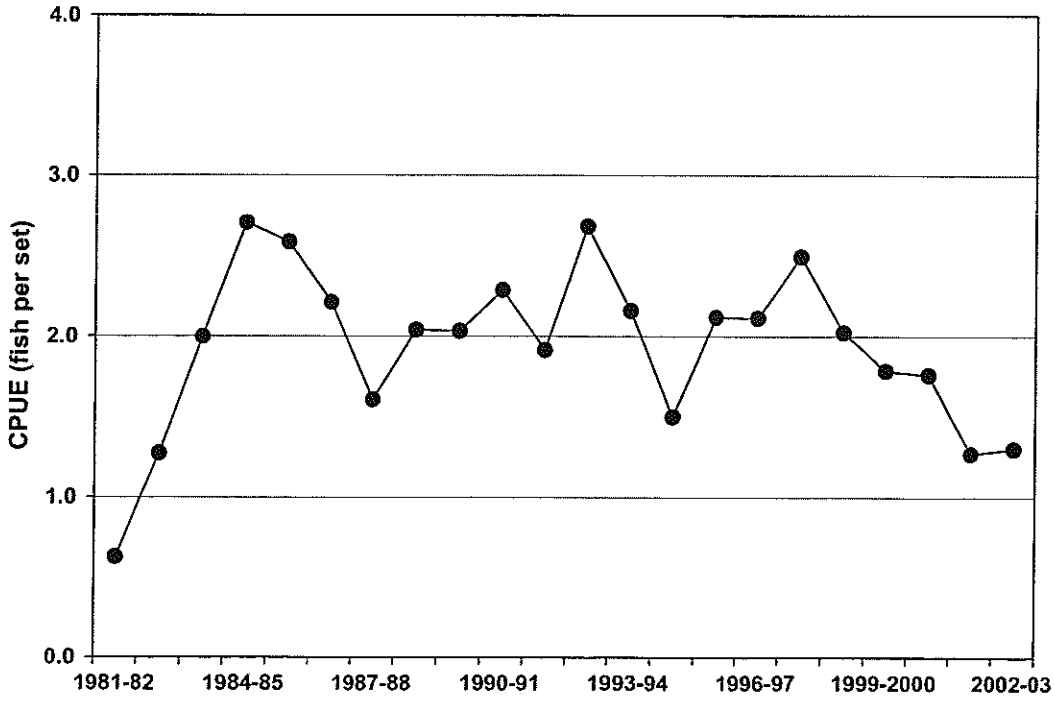

Figure 6.–Total number of active Hawaii-based longline vessels and longliners targeting swordfish, 1987-2003.

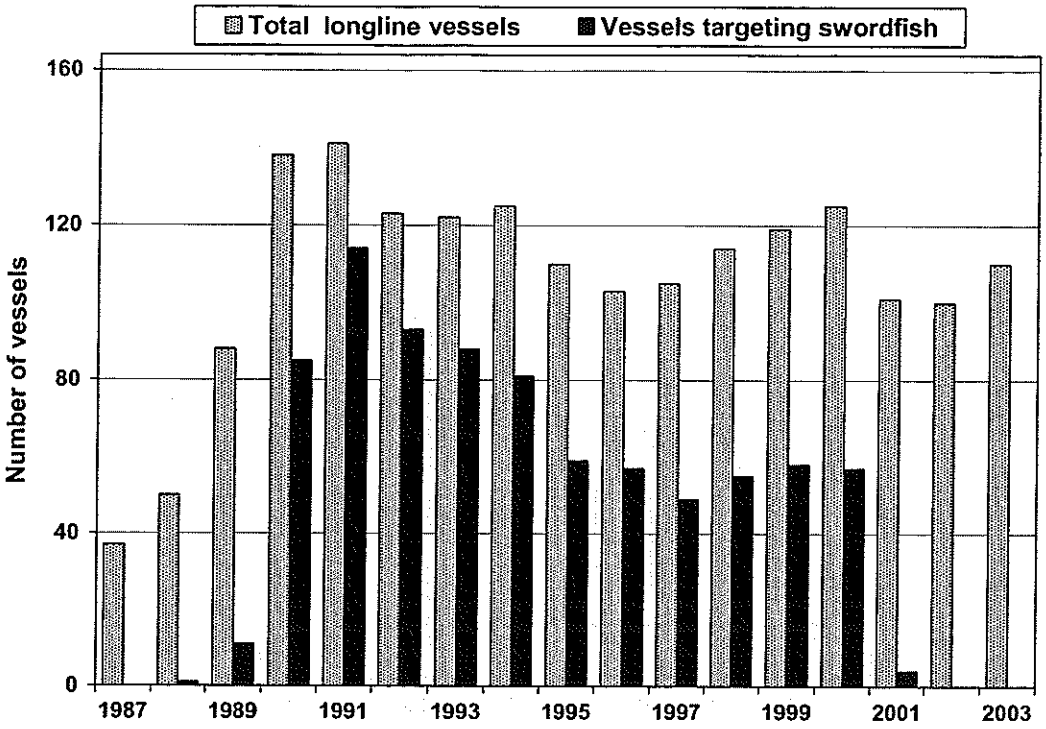

Figure 7.–Hawaii-based longline catch-per-unit-effort (CPUE) for swordfish by trip type, 1991-2003.

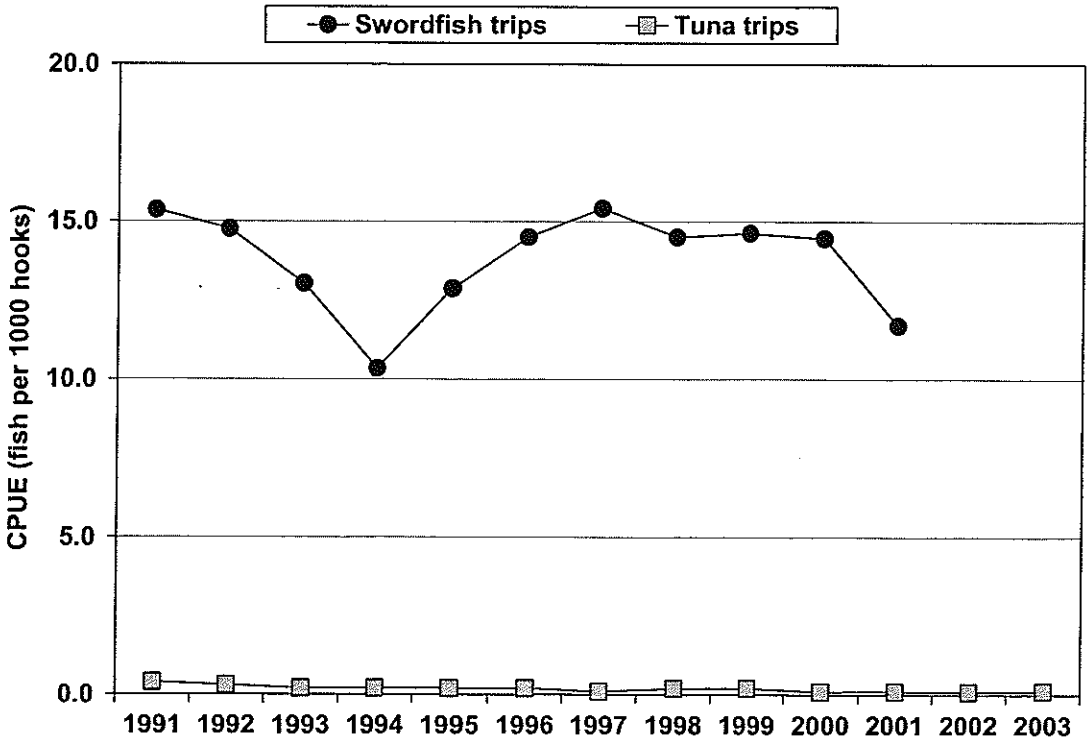

Figure 8.–Number of California longline vessels, 1991-2003.

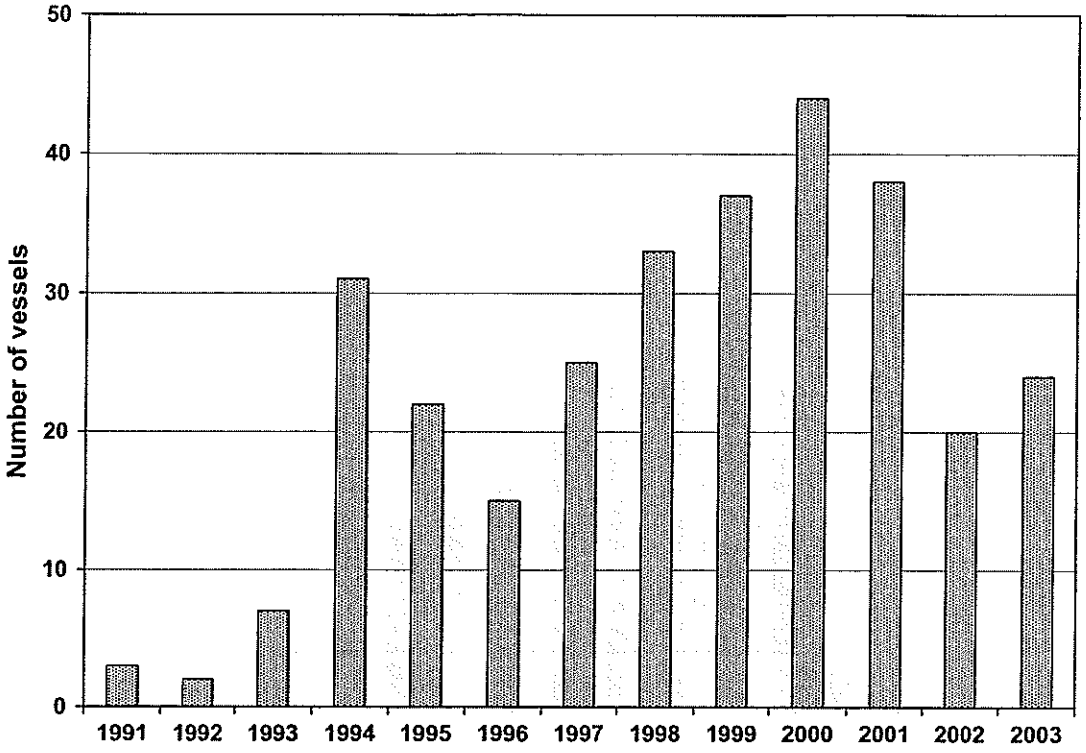

Figure 9.–California-based longline catch-per-unit-effort, 1994-2003.