

Shoreside Hake Observation Program: 2003

prepared by

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INTRODUCTION

The Shoreside Hake Observation Program (SHOP) was established in 1992 to provide information for evaluating bycatch in the directed Pacific hake (*Merluccius productus*) fishery and for evaluating conservation measures adopted to limit the catch of salmon, other groundfish and prohibited species. Though instituted as an experimental monitoring program, it has been continued annually to account for all catch in targeted hake trip landings, enumerate potential discards, and accommodate the landing and disposal of non-sorted catch from these trips. Limits to bycatch of Chinook salmon were set in 1991 under the NMFS initiation of the Biological Opinion for groundfish management (NMFS 1991). High numbers of salmon bycatch in 1995 resulted in a reinitiation of section seven of the 1996 Biological Opinion (NMFS 1996a). The bycatch rate is now limited to 0.05 Chinook salmon per metric ton of Pacific hake with an associated total catch of 11,000 chinook for the coastwide Pacific hake fishery. In 1995, the SHOP's emphasis changed from a high observation rate (50% of landings), to a lower rate (10% of landings) and increased collection of biological information (*e.g.*, otoliths, length, weight, sex, and maturity) from Pacific hake and selected bycatch species (yellowtail (*Sebastes flavidus*), widow (*S. entomelas*), yelloweye (*S. ruberrimus*), darkblotched (*S. crameri*), bocaccio (*S. paucispinis*), canary (*S. pinniger*) rockfish, along with sablefish (*Anoplopoma fimbria*), Pacific mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*). The required observation rate was decreased as studies indicated that fish tickets were a good representation of what was actually landed. Focus shifted again due to 1997 changes in the allocation of yellowtail rockfish and increases in yellowtail bycatch rates. Since then, yellowtail and widow bycatch in the shoreside hake fishery has been dramatically reduced

because of increased awareness by fishermen of the bycatch and allocation issues involved in the SHOP program.

The SHOP is a cooperative effort between the fishing industry and state and federal management agencies to observe and collect information on directed Pacific hake landings at shoreside processing plants. Participating vessels apply for and carry exempted fishing permits (EFPs) issued by the National Oceanic and Atmospheric Administration (NOAA), Sustainable Fisheries Division. Permit terms require vessels to land unsorted catch at designated shoreside processing plants. Permitted vessels are not penalized for landing prohibited species (*e.g.*, Pacific salmon, Pacific halibut, Dungeness crab), nor are they held liable for overages of groundfish trip limits. Participants in the SHOP are mid-water trawlers carrying EFPs, designated shoreside processing plants in California, Oregon, and Washington, the Pacific Fishery Management Council (PFMC), NOAA, the Pacific States Marine Fisheries Commission (PSMFC), the Oregon Department of Fish and Wildlife (ODFW), the California Department of Fish and Game (CDFG), and the Washington Department of Fish and Wildlife (WDFW).

Beginning in 1999, written agreements were made with designated processors to provide a better understanding of the roles and responsibilities of the processors and agencies involved, and to provide a mechanism to enforce bycatch reduction measures, specifically for yellowtail rockfish. The agreements set a vessel-specific maximum rate for yellowtail rockfish bycatch at 12 kg of yellowtail rockfish per metric ton of hake. In 2003 an analysis of single tow trips between 1995 and 2002 was done. Because there was no relationship between the weight of hake and the weight of yellowtail caught per ton of hake, the bycatch rate cap was changed to a trip average of 800kg(1764 lbs) of yellowtail. This cap reflected the 12 kg/mt of hake rate cap used in previous years. Non-cumulative rate check-points were set for when 30, 55, and 85 percent of the shoreside Pacific hake quota had been landed. If a vessel exceeded the average of 800 kg/trip at any of these points it was not permitted to participate in the shoreside Pacific hake fishery for one day for each 66 kg increment over the bycatch cap (*i.e.* no hake could be landed by this vessel for a set period of time) (for previous annual bycatch rates see Wiedoff and Parker (2002) or the website listed in the references). This strategy, especially knowledge of the operating requirements of the EFP and the fishery goals, has dramatically reduced yellowtail rockfish and widow rockfish bycatch.

2003 HAKE FISHERY

The PFMC's optimum yield (OY) increased from 129,600 mt to 148,200 mt metric tons (mt) in 2003 (Table 1). The tribal fishery was allocated 16.9% of the OY (25,000 mt) and began harvesting on June 13th, 2003. Commercial fisheries received 83.1% of the U.S. OY. Allocations were 42% to vessels landing at shoreside processing plants (50,904 mt) (up from 44,906 mt in 2002), 34% to catcher/processors (41,208 mt), and 24% to catcher vessels delivering to motherships (29,088 mt). The 2003 directed shoreside hake fishery

began on 01 April 2003 off California (south of 42° N), and on 15 June 2003 off Oregon and Washington (north of 42° N). To avoid pre-empting more northerly segments of the fishery, the California component of the hake fishery is limited to 5% of the total shoreside allocation until the northern component of the shoreside fishery begins. The directed season for mothership and catcher/processor at-sea processing (north of 42° N) began on the 15th of May 2003.

As of September 25, 2003 the mothership, catcher/processor and tribal fisheries continue to harvest the allocations. The mothership fishery has completed 89.4% (26,021 mt), catcher/processor fishery 89.7% (36,981 mt) and the tribal 89.0% (22,274mt). (Preliminary Report #7, NOAA, Seattle; www.nwr.noaa.gov). It is expected that the at-sea sectors will harvest their full allocations. Even though the shoreside allocation was increased, the 30-day shoreside season is the shortest since 1992 or program inception (Table 1). The shoreside directed fishery closed on July 14th at 12:00p.m. and harvested 51,061 mt (0.31% over the allocated amount) (Table 1).

Thirty-nine Exempted Fishing Permits were approved in 2003 but only thirty-five midwater trawlers participated in the SHOP. The number of participating vessels was average for the past 10 years. Unsorted, EFP Pacific hake landings were observed at nine processing plants; Eureka (1), Charleston (1), Newport (3), Astoria (2), Westport (1) and Ilwaco (1). 691 landings were made under the EFP within Oregon, Washington and California along with 9 non-EFP hake deliveries in 2003 weighing 135 mt (Table 2). Hake landing weight distributions in Figure 1 show dual modes (most frequent) at 60 and 70 mt (Figure 1). The percentage of hake weight observed by samplers varied between states, with a low of 7.9% in Eureka, 10.3% in Washington, and a high of 42.7% in Oregon. Overall, 30% of Pacific hake landings at shoreside processors were observed in 2003, exceeding the 10% program goal (Table 3). California EFP's were delayed by one week due to permit language changes; therefore landings did not occur until week two of the fishery. Only three vessels participated in the California portion of the shoreside season and hake was landed at a fairly constant pace with the exception of week five (fishing week 5/3) (Table 2). Discussions with fisherman revealed heavy winds and strong currents scattered fish, making it difficult to find dense populations. When the northern portion opened, the pace increased each week. The vast majority of Pacific hake was landed in Oregon(72%); Washington and California landings represented 28% of the shoreside fishery total (Table 3). Within Oregon, 40% of the hake catch was delivered to Newport and 32% of the total to Astoria and Charleston. Within the state of Oregon, 2.2% of hake were weighbacks (hake with no marketable value due to inappropriate size or quality). The percentages of weighbacks were greater in ports to the south, possibly indicating the harvest of smaller fish in those areas.

BYCATCH

Rockfish

Bycatch of yellowtail rockfish declined from 1999 to 2002 (see Wiedoff and Parker, 2002 for review) and the catch in 2003 was more than a 90% drop from 1999. However, compared to 2002 bycatch totals of yellowtail increased only 8.04%, with a total catch of 48.7 mt in 2003 (Tables 1 and 3). Landings of yellowtail increased in ports to the north, which is expected since population distribution is more dense north of the California/Oregon border. Plots of tow locations show high interception rates in and around the Columbia River canyon. In the 2003 shoreside fishery, vessel bycatch checks were conducted and no vessel exceeded the average landing cap of 800 kg/trip. Westport had the highest average rate while Eureka had the lowest. Individual vessel bycatch rates for all species categories are listed in Table 4.

The widow rockfish bycatch increased 25% from its low, 2002 level (Figure 2). However it should be noted that more than half of the 8.97 mt of widow rockfish landed in 2003 was from a single trip. Their abundance has been the most variable over time and may be confounded by changes in hake tow locations since widow bycatch typically increases towards the south. Surprisingly, the catch rates for widow rockfish were higher in Washington and Oregon, than California (Table 4). The low bycatch rate for widow rockfish is welcome because of the overfished status and reductions in the OY for widow rockfish in place for 2004. Bycatch totals of 8.97 mt instead of 300–500 mt in the 1990's will allow more flexibility in managing the groundfish limited entry fishery and remove some management pressure from the hake fishery.

This year the SHOP focused on tracking bycatch of other species that are listed as overfished (Table 3 and 4). No yelloweye were recorded on fish tickets and the canary bycatch was low with only 0.11 mt landed (Table 2). Overall, rockfish bycatch rates decreased substantially in recent years and helped the hake fishery have minimal impact on other mixed-species fisheries. It is obvious that hake fishermen are actively avoiding pelagic rockfishes coast wide and are working towards a hake fishery with the lowest bycatch possible. Although there is substantial variation in bycatch rates within a port, the larger overall latitudinal trend for any several is visible (Table 4). Sustained low bycatch rates on widow, yelloweye and canary rockfish will help the fishery avoid unwanted restrictions due to overall rockfish mortality.

Sablefish

Sablefish bycatch abundance had been declining steadily and dramatically since 1995 (Figure 2). No obvious shift in fleet distribution or other hake fishery-dependent factor has been attributed to this drop in relative abundance. However, in 2001 and 2002, sablefish bycatch dramatically increased. The catch in 2002 increased over 63% from 2001 (Figure 2). The 2000 sablefish assessment predicted a strong year class to enter the fishery in 2001. An analysis of the 2001-2002 catch, revealed juveniles (one and two years old, respectively), recruiting to the bottom, were captured on the shelf prior to

moving to deeper water. With a large 2001 year class, we expected a moderate catch of sablefish in 2003. A total of 41.5 mt of sablefish were landed in 2003 with a majority of the catch taken off Newport (Table 3). A substantial increase in the landings occurred in fishing weeks 14 and 15 (weekend date 7/5 and 7/12)(Table 2). The "hot spots" were localized off Newport and vessels attempted to move out of those areas. This cyclic increase was also observed in 2001(Parker 2001) and in 2002 (Wiedoff and Parker 2002). Only 1.2 mt of sablefish were landed in Washington and California combined.

Mackerel

Beginning in 2000, mackerel were tracked as separate categories. Mackerel bycatch information has been listed as Pacific mackerel and jack mackerel. Either jack or Pacific mackerel can be the largest, single species bycatch component of the hake fishery, with different species predominating in different years. This year jack mackerel numbers were significantly larger than Pacific mackerel (68 mt vs 4 mt)(Table 2). Overall, landings for both species increased compared to 2002 (Figure 2).

Salmon

A total of 425 salmon (all Chinook (*Oncorhynchus tshawytscha*)) were taken as bycatch in the 2003 shoreside hake fishery and turned over to state agencies by processors: 209 in Oregon, 12 in Washington, and 204 in California (Table 3). The low number of salmon reported in WA may be a symptom of lack of observer presence in Ilwaco in 2003. The shoreside component as a whole was well below the 0.050 Chinook salmon per mt hake cap. The shoreside rate represents an incidental catch rate of 0.008 salmon per metric ton of hake for the entire EFP fishery (Table 5). Rates for individual salmon species can be found in table 6 for 1992-2003.

The SHOP collected biological data and checked for adipose fin clips on all salmon. Of the 209 Chinook landed in Oregon, 27 fish (12.9%) were hatchery fish as identified by an adipose clip and 10 with a left ventral clip. 28 of the 204 Chinook landed in California were adipose clipped (13.7%). No hatchery fish were landed in Washington. Fish size varied between ports. The coast wide average Chinook size was 59.5 cm, with a mode at 58 and 61cm (Table 7 and Figure 3). Trends in average weight and length declined between 1998 and 2001. Then in 2002 average fish size and weight began to increase (Table 6 and Figure 4). A weekly average bycatch rate for the shoreside fishery shows a variable and sometimes high average at the start of the fishery. Overall, the weekly average bycatch rate for all salmon has been well below the fishery cap for the past eleven years (Figure 5).

Samplers at shoreside plants noted 48 salmon incidentally taken in 211 observed landings of 16,997 mt of hake, which results in an observed rate of 0.003 salmon/mt hake (Table 3). These 48 fish are included in the total of 425 made available to state agencies. The highest weekly bycatch rate occurred in the eighth week of the California fishery (weekending 5/24). 143 fish were landed in six trips which resulted in the fisheries

highest salmon interception rate of 0.469 salmon/mt hake (Table 5). Discussions with fishers have revealed no changes in fishing behavior that would account for a change in the salmon interception rate, so it is likely that the rates reflect salmon moving through fishing areas. All fish were either turned over to food share cooperatives and hunger relief agencies or disposed of due to quality issues.

Pacific halibut and Dungeness crab

The 2003 shoreside hake fishery landed sixteen Pacific halibut. All fish were landed in Oregon with thirteen in Newport, two in Charleston and one in Astoria. This is comparable to the fourteen caught in 2002 and reflects a normal catch rate. Only two Dungeness crab were landed for the entire fishery (Table 3).

Other species

This year the SHOP individually tracked many species previously listed in the "other" category because several species in this category are overfished and of special concern to managers (Tables 2 and 4). Yelloweye rockfish, canary rockfish, darkblotched rockfish, bocaccio, lingcod (*Ophiodon elongatus*), Pacific ocean perch (*S. alutus*), walleye pollock (*Theragra chalcogramma*) and miscellaneous rockfish are separate categories.

Miscellaneous species such as Pacific cod (*Gadus macrocephalus*), Pacific herring (*Clupea harengus pallasii*), American shad (*Alosa sapidissima*), spiny dogfish (*Squalus ancanthias*), squids, sharks, skates, sardine, octopus and flatfish other than halibut, now constitute the "other" category (Tables 2 and 4). These "other" species totaled 15.37 mt in 2003 and is comparable to 18.07 mt in 2002. In 2003, American shad and spiny dogfish shark (Table 3) dominated the "other" category. The SHOP will continue to monitor the composition of the "other" category to insure major species are recorded accurately.

BIOLOGICAL SAMPLING

In addition to documenting bycatch composition, shoreside samplers collected a variety of biological information from several species that are used in stock assessment analyses (Table 8). Samples were adequate to measure size for most species, although distributions for darkblotched and canary rockfish suffered from low sample sizes (Table 9 and Figure 6). All distributions were unimodal except for jack mackerel and yellowtail, which were bimodal. Mean length of jack mackerel increased from 48 cm in 2002 to 52 cm in 2003. Most of the sablefish caught in 2003 were slightly larger than previous years; average size was ~1177g with a mean length of 48 cm (Table 9 and Figure 7). Sizes of sablefish in Oregon varied between ports with larger fish landed in Astoria and smaller in Newport. Samplers measured 2,608 Pacific hake for length-frequency information, and collected 1,580 Pacific hake otolith samples, along with length and weight information (Table 8). The size distribution for hake differed by port with smaller fish landed in Astoria and larger fish in Westport (Figure 8). The overall average length of 43 cm for

hake landed in Oregon has been fairly constant during the primary season from 1995-2003 (Figure 9). Size distributions for these years can be seen in Figure 10. Pacific hake information and samples have been provided to NOAA FRAM Division in Newport, Oregon for incorporation into subsequent hake stock assessments. Yellowtail rockfish otoliths and length-frequency information are provided to Sandra Rosenfeld at the Department of Fisheries Marine Fish & Shellfish Division in Olympia, Washington for future stock assessments on this species. Biological samples of Pacific mackerel are provided to the CDFG for their stock assessment work on this species. Biological samples of widow rockfish are sent to Don Pearson NMFS in Santa Cruz, California. Sablefish, jack and pacific mackerel, darkblotched, bocaccio and canary rockfish have been retained at ODFW and are available for future assessment efforts.

PROGRAM COSTS

In 2003, the cost of the Oregon-Washington portion of the SHOP was approximately \$70,327 (approximately \$40,519 for coordination and data processing costs, and an estimated \$29,808 for samplers) (Table 11). Since 1995, most program funding has been provided by industry through PSMFC. Government costs (state agencies providing sampling personnel, infrastructure, summary and analysis during winter months, data tracking, and council support on bycatch issues) are not included in the above summary. These costs have become more substantial over time due to the increasing attention paid to bycatch issues and are quite considerable now, amounting to months of staff time costing more than \$20,000.

Oregon shoreside processing plants hired 6 samplers to make observations at 5 processors. The WDFW and the CDFG provided minimal shoreside landing observations with state staff. Participating processors, and those contributing to the cost of the program in 2003, are Ocean Gold Seafood, Jessie's Ilwaco Fish, Pacific Coast Seafood, Point Adam's Packing, Ocean Beauty, Pacific Shrimp, Trident Seafood, Bandon Pacific and Pacific Choice Seafood.

AREAS FOR IMPROVEMENT IN 2004

Good communication between vessels, processors and state agency staff yielded a season with few administrative difficulties. In order to effectively reduce bycatch within the directed shoreside fishery, timely submission of high bycatch areas or "hotspots" is encouraged. We list some of the issues that need to be addressed in 2004, to keep the hake fishery monitoring accurate and efficient.

- Continue to investigate whether it is feasible and what the obstacles are to convert the Pacific hake EFP program into a normal monitored fishery. Several technical, legal, sampling and observation issues need to be addressed for this to happen. Some progress has been made at the PFMC council level to begin this process. The

environmental assessment required for this step is under review by NOAA, states, and industry.

- Look more closely at salmon bycatch and search for possible predictors or indicators for salmon bycatch levels for a given season prior to the start of the season.
- Incorporate widow rockfish into the penalty box framework to maintain incentives to minimize bycatch on these species.
- It may be necessary to check for at-sea discard by placing observers on some vessels or by using video monitoring during haulback and return to port.

References

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Note: This report and past shoreside hake observation reports are available on the internet at <http://hmsc.oregonstate.edu/odfw/reports/whiting.html>

Table 1. Summary of the EFP shoreside component of the US Pacific hake fishery through 2003.
Weights are in metric tons.

Year	US optimum yield (mt)	Shoreside allocation (mt)	Hake landed (mt)	Percent under/over	Yellowtail bycatch (mt)	Widow bycatch (mt)	Participating vessels	Start date	End date	Number of participating processors
1992	208,800	80,000	56,127	-29.84	59.37	84.20	23	4/15	10/30	7
1993	142,000	42,000	41,926	-0.18	137.89	155.68	24	4/15	8/24	13
1994	260,000	97,000	72,367	-25.39	255.5	216.76	33	4/15	11/23	8
1995	178,400	75,776	73,937	-2.43	273.82	221.92	35	4/15	7/25	15
1996	212,000	87,001	84,680	-2.67	521.62	586.83	37	5/15	9/10	11
1997	232,000	86,900	87,499	+0.69	233.02	157.92	38	6/15	8/22	12
1998	232,000	86,900	87,627	+0.84	501.06	360.02	35	6/15	10/13	13
1999	232,000	83,800	83,388	-0.49	481.39	191.74	36	6/15	9/13	14
2000	232,000	83,800	85,653	+2.21	189.81	82.54	36	6/15	9/15	14
2001 ¹	190,400	72,618	73,326	+0.97	95.86	43.60	29	6/15	9/26	13
2002 ²	129,600	44,906	45,276	+0.82	41.37	5.32	29	6/15	7/17	8
2003 ³	148,200	50,904	51,061	+0.31	48.7	8.97	35	6/15	7/14	9

1 In 2001, the fishery closed on 8/21/01. The Makah tribe then returned 10,000 mt of its allocation to NMFS, which reallocated it to the other fishery sectors. The shoreside component then reopened from 9/17 - 9/26/01.

2 The Pacific hake stock was officially declared overfished in 2002.

3 In 2003, the fishery closed on 7/14/03 at 12:00 p.m.

Table 2. Weekly EFP Pacific hake landings and bycatch for Washington, Oregon, and California, 04/01/2003 - 07/14/2003. Data from fish tickets and observed landings in mt. Best available data as of 9/30/2003.

Week ending date	4/5	4/12	4/19	4/26	5/3	5/10	5/17	5/24	5/31	6/7	6/14	6/21	6/28	7/5	7/12	7/19	EFP Total	NonEFP Total	Fishery Total
Number of EFP hake landings	0	3	5	3	0	4	4	6	5	7	2	129	152	156	170	45	691	9	700
Hake landed (mt)		142	221	99	0	161	169	305	234	196	39	9,675	11,644	11,779	12,584	3,812	51,061	135	51,196
Cumulative hake landed (mt)	0	142	363	462	462	624	793	1,098	1,332	1,528	1,567	11,242	22,886	34,665	47,249	51,061			
% of hake quota landed	0	0.28	0.71	0.91	0.91	1.23	1.56	2.16	2.62	3.00	3.08	22.08	44.96	68.10	92.82	100.31	100.31		
Num. of landings observed		1							1	1	1	41	55	41	57	12	33%		210
Num. of salmon		6	37	5			10	143		3		79	80	34	24	4	425		425
Num. of Pacific halibut												8	2		6		16		16
Num. of Dungeness crab															2		2		2
Yellowtail rockfish (mt)												8.44	8.26	12.27	16.62	3.11	48.70		48.70
Widow rockfish (mt)		0.03	0.01					0.19	0.13	t		1.05	1.24	5.05	1.26	0.02	8.97		8.97
Yelloweye rockfish (mt)																	0.00		0.00
Canary rockfish (mt)												0.01	0.00	0.03	0.04	0.03	0.11		0.11
Darkblotched rockfish (mt)		t										0.01	0.01	t	0.13	0.12	0.26		0.26
Boccacio (mt)															t		0.00		0.00
Pacific ocean perch (mt)												0.00	0.02	t	0.20	0.07	0.30		0.30
Misc. rockfish* (mt)		0.06	0.01	0.02		2.96	4.97	0.44	0.02	0.38	0.20	0.08	0.40	0.05	0.42	0.03	10.03		10.03
Sablefish (mt)							0.16		t			3.71	4.98	19.41	12.25	1.02	41.54		41.54
Pacific mackerel (mt)													0.78	0.74	2.80	0.11	4.42		4.42
Jack mackerel (mt)												0.51	4.74	32.19	30.22	0.27	67.92		67.92
Lingcod (mt)		t										0.12	0.13	0.07	0.09	t	0.40		0.40
Walleye pollock (mt)												1.12					1.12		1.12
Other** (mt)									0.01			3.16	2.19	6.82	2.77	0.49	15.43		15.43

* Misc. rockfish include chilipepper, greenstripe, redstripe, sharpchin, shortbelly, and shortspine thornyhead.

** Other species include Pacific cod, Pacific herring, American shad, sardine, flatfish (other than halibut), squid, shark, skates, octopus and jellyfish.

t = trace; less than 0.004 mt

Table 3. Cumulative shoreside hake fishery report for Oregon, 2003. Overall fishery total includes Oregon, Washington, and California totals and non-EFP trips. Washington and California data are combined for confidentiality.

Best available data as of 9/30/03.

	Oregon only			CA/OR/WA		
	Observed total	EFP fishery total	Non-EFP fishery total	Observed total	Overall fishery total	Percent landing category observed
Hake harvest (mt)	15,543	36,594	55	16,997	51,196	
Number of deliveries	183	514	6	211	700	
Percent of deliveries observed	36%	0	0	30%	0	
Salmon catch (no)	41	209		425	425	100%
Pacific halibut (no)	3	16		16	16	100%
Dungeness crab (no)	1	2		2	2	100%
Yellowtail rockfish (kg)	2,514	17,576		8,093	48,704	17%
Widow rockfish (kg)	338	5,517		383	8,971	4%
Yelloweye rockfish (kg)	0	0		0	0	0%
Canary rockfish (kg)	56	93		68	109	62%
Darkblotched rockfish (kg)	36	256		39	259	15%
Boccacio (kg)	0	0		0	4	0%
Pacific ocean perch (kg)	13	286		14	297	5%
*Misc. rockfish (kg)	673	511		771	10,029	8%
Sablefish (kg)	21,293	40,396		21,325	41,544	51%
Pacific mackerel (kg)	139	1,708		156	4,421	4%
Jack mackerel (kg)	38,621	67,495		39,328	67,921	58%
Lingcod (kg)	120	368		134	405	33%
Walleye pollock (kg)	0	0		1,124	1,124	100%
Pacific herring (kg)	466	834		575	1,108	52%
American shad (kg)	503	1,266		1,922	8,479	23%
Spiny dogfish (kg)	388	4,123		417	4,222	10%
**Misc. species (kg)	258	1,317		647	1,624	40%

*Misc. rockfish includes chilipepper, greenstripe, redstripe, sharpchin, shortbelly, shortspine thornyhead, and other slope and shelf rockfishes.

**Misc. species include: Pacific cod, squid, shark, skate, flatfish (except halibut), sardine, and octopus.

Table 4. Annual average bycatch by port and vessel for major bycatch species in 2003. Vessel rates are calculated as the average kg bycatch/trip and port rates are the average of all landings for each port. Vessels landing in more than one port show rates for each port. Bycatch is based on fish ticket weights.

Best available data as of 9/30/03

Vessel	Yellowtail rockfish	Widow rockfish	Sablefish	Pacific mackerel	Jack mackerel	Yelloweye rockfish	Canary rockfish	Darkblotched rockfish	Boccacio rockfish	Lingcod	Pac.ocean perch	Walleye pollock	Misc. rockfish	Other species
Astoria														
COLLIER BROTHERS	73.31	0.18	200.21	0.00	18.14		0.15	0.00		0.20	0.28		0.10	25.00
GEORGE ALLEN	135.53	1.34	38.90	0.00	66.27		0.10	0.79		0.00	0.10		3.47	11.00
NICOLE	89.41	0.17	6.92	0.00	6.09		0.19	0.10		0.84	0.43		1.19	42.00
PERSEVERANCE	82.03	0.14	64.15	1.74	1.17		0.19	6.06		1.70	1.46		0.42	26.00
PERSISTENCE	0.09	0.00	6.17	0.00	10.61		0.00	0.14		0.00	0.00		0.00	7.83
PREDATOR	145.91	0.10	47.75	0.00	12.07		0.08	0.45		2.97	1.34		0.08	20.72
RAVEN	67.75	0.10	48.56	0.00	163.29		0.38	3.01		0.12	0.14		0.02	42.32
SEA CLIPPER	92.10	0.05	34.40	15.88	51.56		0.00	0.10		0.10	0.86		0.00	14.54
SEEKER	60.80	0.17	61.14	0.00	11.77		0.17	2.27		2.10	4.77		7.09	50.08
Astoria Total	87.29	0.27	58.61	2.01	39.60	0.00	0.15	1.53	0.00	0.94	1.10	0.00	1.48	28.00
Newport														
BAY ISLANDER	0.03	8.16	43.54		499.29		0.00	0.00		0.23	3.06		0.00	1.10
BLUE FOX	3.14	0.29	38.43		205.33		0.00	0.00		0.00	0.00		0.04	3.70
CAPE FOULWEATHER	0.52	0.10	119.61		246.27		1.19	0.00		0.87	0.00		2.72	5.20
CAPE KIWANDA	0.00	1.36	1.36		0.00		0.00	0.00		0.00	0.00		0.00	0.00
EXCALIBUR	0.30	0.24	104.83		45.45		0.05	0.02		1.34	0.10		0.23	0.60
LISA MELINDA	0.43	0.42	131.18		484.97		0.08	0.04		0.36	0.00		0.09	5.50
MISS BERDIE	15.69	0.30	190.31		295.29		0.47	0.03		0.45	0.00		18.30	11.00
MISS SARAH	2.12	0.25	98.59		44.20		0.29	0.02		1.12	0.04		1.98	7.30
MISS SUE	2.43	0.12	157.77		234.84		0.06	0.00		0.36	0.00		0.24	11.00
PACIFIC	0.54	0.00	87.34		166.49		0.10	0.00		0.72	0.00		1.04	5.10
PACIFIC RAM	4.97	3.68	92.91		59.17		0.40	0.04		0.91	0.80		2.08	5.20
PEGASUS	1.88	0.47	67.04		62.65		0.00	0.14		0.51	0.05		2.20	2.00
STORMIE C	0.32	0.00	100.00		68.76		0.11	0.32		0.00	0.00		2.61	0.80
Newport Total	3.01	1.27	103.17	0.00	205.11	0.00	0.19	0.04	0.00	0.57	0.37	0.00	2.80	5.10
Charleston														
JEANNETTE MARRIE	1.78	170.08	0.60	9.46	8.89		0.08			1.12			2.18	190.00
LAST STRAW	97.98	12.40	6.22	41.63	0.97		0.29			0.67			0.07	24.00
Charleston Total	49.00	92.67	3.36	25.25	5.01	0.00	0.18	0.00	0.00	0.90	0.00	0.00	1.14	110.00
Westport														
BETTY A	108.84	0.11	1.14	0.52	13.46		0.09	0.00	0.00	0.00	0.06	0.00	0.00	17.00
BLUE HORIZON	233.91	0.00	0.67	0.88	0.00		0.31	0.05	0.00	0.43	0.05	0.00	0.16	14.00
CHELLISSA	271.35	25.10	0.81	73.68	7.46		0.00	0.00	0.00	0.35	0.00	0.00	3.06	84.00
JAMIE MARIE	350.19	47.20	0.00	39.70	0.00		0.13	0.00	0.19	0.60	0.11	0.00	0.00	15.00
PACIFIC CHALLENGER	470.54	0.91	0.00	31.00	0.00		0.32	0.00	0.00	0.45	0.35	66.12	0.78	350.00
Westport Total	280.91	15.21	0.53	28.26	4.34	0.00	0.17	0.01	0.04	0.36	0.11	11.71	0.74	87.00
Illwaco														
MUIR MILACH	201.05	44.71	34.20		0.50						0.02			0.90
ST JANET	0.00	370.81	0.00		0.00						0.00			0.00
TATIANA	6.35	0.00	11.34		0.00						0.00			0.00
Illwaco Total	94.56	37.18	21.22	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.40
Eureka														
FISHWISH		0.30	6.78		0.00			0.08		0.08			810.00 ¹	0.00
PACIFIC		16.65	0.00		0.00			0.00		0.00			75.70	0.70
TATIANA		0.00	0.00		0.00			0.00		0.00			0.00	0.00
Eureka Total	0.00	7.76	3.54	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.00	0.00	457.00	0.30
Grand Mean All Ports	72.04	20.17	51.51	6.13	79.57	0.00	0.15	0.39	0.01	0.53	0.40	1.89	26.74	28.39
Average Composition	25%	7%	18%	2%	28%	0	0	0	0	0	0	1%	1%	1%

*Other species include Pacific cod, Pacific herring, American shad, sardine, flatfish (other than halibut), squid, shark, skates, octopus and jellyfish.

1 High average is due to several large landings of almost all chilipepper rockfish.

Table 5. Weekly bycatch rate of salmon (number of salmon/mt of hake) in the shorebased Pacific hake fishery, 1992-2003. Rates for 1992-1994 are based on observations. Rates for 1995-2003 are based on salmon turned over to state agencies by processors. Rates include all salmon species landed. See table 7 and text for salmon species composition. Total rates are all salmon landed per metric ton of hake.

Month	1992*	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
April		0.088	0.042	0.069	0.000		0.000				0.000	0.000
		0.076	0.074	0.398	0.003	0.000	0.054			0.105	0.001	0.037
		0.019	0.052	0.422	0.000	0.000	0.000			0.031	0.000	0.167
			0.135	0.031	0.018	0.000	0.000	0.000	0.026	0.000	0.102	0.050
May		0.038	0.015	0.041	0.000	0.000	0.000		0.298	0.012	0.000	0.000
	0.019	0.034	0.002	0.040	0.000	0.001	0.049	0.013	0.132	0.008	0.028	0.000
	0.097	0.054	0.004	0.019	0.029	0.010	0.101	0.000	0.022	0.058	0.000	0.059
	0.056	0.014	0.003	0.011	0.136	0.003	0.205	0.000	0.137	0.126	0.000	0.469
June	0.028	0.019	0.000	0.004	0.024	0.000	0.053	0.000	0.280	0.014	0.000	0.000
	0.015	0.021	0.017	0.008	0.007	0.000	0.041	0.000	0.186	0.000	0.011	0.015
	0.004	0.000	0.007	0.032	0.007	0.000	0.028	0.000	0.034	0.000	0.023	0.000
	0.001	0.001	0.007	0.013	0.000	0.011	0.006	0.002	0.005	0.030	0.012	0.008
July	0.000	0.001	0.001	0.035	0.001	0.005	0.005	0.005	0.072	0.082	0.013	0.007
	0.000	0.011	0.001	0.024	0.000	0.010	0.001	0.013	0.049	0.045	0.009	0.003
	0.002	0.010	0.003	0.011	0.004	0.016	0.002	0.007	0.011	0.022	0.006	0.002
	0.003	0.004	0.001		0.003	0.025	0.011	0.053	0.040	0.227	0.115	0.001
August	0.008	0.002	0.001		0.002	0.034	0.050	0.064	0.018	0.027		
	0.002	0.003	0.003		0.001	0.012	0.013	0.017	0.093	0.012		
	0.004	0.008	0.002		0.001	0.025	0.033	0.029	0.027	0.010		
	0.005	0.003	0.001		0.000	0.014	0.014	0.021	0.018	0.006		
September	0.014	0.003	0.000		0.000	0.022	0.014	0.020	0.029	0.027		
	0.015		0.002		0.000		0.010	0.009	0.053	0.003		
	0.002		0.004		0.000		0.028	0.004	0.027	NA		
	0.009		0.008		0.000		0.069	0.003	0.027	NA		
October	0.017		0.001				0.094	0.011	0.008	0.001		
	0.005		0.003				0.025			0.001		
	0.016		0.010				0.003					
	0.012		0.000				0.005					
	0.001		0.002			0.008						
	0.003		0.039									
	0.014											
Total rate (#/mt)	0.007	0.008	0.008	0.040	0.008	0.018	0.020	0.021	0.039	0.041	0.025	0.008
Total salmon landed	380	333	566	2,972	674	1,561	1,713	1,712	3,330	2,997	1,148	425

*Oregon Only

Note: Bold text indicates highest weekly rate for season.

Table 6. Salmon incidentally taken in the shoreside hake fishery from 1992-2003. Rate is calculated as number of fish/mt hake.

Year	Hake (mt)	Number of chinook	Rate of chinook	Number of coho	Rate of coho	Number of pink	Rate of pink	Number of chum	Number of sockeye	Total number of salmon	Total rate of salmon
1992	56,127	380	0.007	0	0.000	0	0.000	0	0	380	0.007
1993	41,926	310	0.007	1	0.000	22	0.001	0	0	333	0.008
1994	72,367	563	0.008	3	0.000	0	0.000	0	0	566	0.008
1995	73,937	2,954	0.040	2	0.000	15	0.000	1	0	2,972	0.040
1996	84,680	674	0.008	0	0.000	0	0.000	0	0	674	0.008
1997	87,499	1,558	0.018	3	0.000	0	0.000	0	0	1,561	0.018
1998	87,627	1,699	0.019	8	0.000	0	0.000	5	1	1,713	0.020
1999	83,388	1,696	0.020	5	0.000	11	0.000	0	0	1,712	0.021
2000	85,653	3,306	0.039	23	0.000	0	0.000	1	0	3,330	0.039
2001	73,326	2,627	0.036	35	0.000	303	0.004	32	0	2,997	0.041
2002	45,276	1,062	0.023	14	0.000	0	0.000	72	0	1,148	0.025
2003	51,061	425	0.008	0	0.000	0	0.000	0	0	425	0.008

Note: Numbers are from the shoreside hake observation program (prohibited species).

Table 7. Biological characteristics of observed Chinook salmon in the 1998-2003 Shoreside Hake Observation Program. Condition factor calculated as $(W(g)/L(cm)^3)100$.

Year	Female				Male			
	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish
1998	63	1940	0.778	539	62	1852	0.777	447
1999	60	1499	0.699	808	61	1676	0.738	595
2000	54	1146	0.769	817	53	1102	0.740	746
2001	52	1102	0.784	695	50	904	0.723	915
2002	53	1058	0.711	398	50	970	0.776	433
2003	60	1433	0.663	207	60	1499	0.694	181

Table 8. Summary of sampling conducted in each port during the 2003 SHOP. Samples consist of length-frequency only samples and biological samples (otoliths, length, weight, sex, and maturity).

Port	Species	Length-frequency samples		Biological samples		
		Fish per sample	Fish sampled	Fish per sample	Number of Samples	Fish sampled
Astoria						
	Pacific hake	100	600	20	32	640
	Jack mackerel			30	4	120
	Pacific mackerel			30		
	Widow rockfish			30-50		
	Yellowtail rockfish			30-50	4	160
	Canary rockfish			any	7	11
	Sablefish			30	5	150
	Darkblotched rockfish			any	6	67
	Chinook salmon					35
Newport						
	Pacific hake	100	600	20	33	660
	Jack mackerel			30	11	330
	Pacific mackerel			30		
	Widow rockfish			30-50		
	Yellowtail rockfish			30-50	2	110
	Canary rockfish			any	15	27
	Sablefish			30	6	180
	Darkblotched rockfish			any	2	20
	Bocaccio			any		
	Chinook salmon					163
Charleston						
	Pacific hake	100	300	20		
	Jack mackerel			30		
	Pacific mackerel			30		
	Widow rockfish			30-50		
	Yellowtail rockfish			30-50		
	Canary rockfish			any		
	Sablefish			30		
	Chinook salmon					11
Westport						
	Pacific hake	100	508	20	5	100
	Widow rockfish				1	6
	Yellowtail rockfish				9	450
	Chinook salmon			all		8
Ilwaco						
	Chinook salmon			all		4
Eureka						
	Pacific hake	100	600	20	9	180
	Widow rockfish				1	16
	Chilipepper rockfish				4	127
	Chinook salmon					204
Total						
	Pacific hake	100	2,608	20	79	1,580
	Jack mackerel			30	15	450
	Pacific mackerel			30		
	Widow rockfish			30-50	1	16
	Yellowtail rockfish			30-50	15	720
	Canary rockfish			any	22	38
	Sablefish			30	11	330
	Bocaccio			any		
	Darkblotched rockfish			any	8	87
	Chilipepper rockfish			any	4	127
	Chinook salmon					425

Table 9. Biological characteristics of bycatch species sampled in the 2003 Oregon Shoreside Hake Observation Program. Condition factor is calculated as $(W(g)/L(cm)^3)*100$.

Species	Female				Male			
	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish
Jack mackerel	52	1536	1.092	189	51	1632	1.230	251
Yellowtail rockfish	47	1443	1.390	136	44	1143	1.342	134
Canary rockfish	43	1882	2.367	22	42	1642	2.216	15
Darkblotched rockfish	26	280	1.593	23	27	354	1.799	20
Sablefish	48	1177	1.064	156	47	1129	1.087	154

Table 10. Biological characteristics of Pacific hake sampled in the SHOP. Condition factor is calculated as $(W(g)/L(cm)^3)*100$.

Year	Female				Male			
	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish	Mean length (cm)	Mean weight (gm)	Condition factor	Number of fish
1998	41	459	0.666	748	41	429	0.622	852
1999	42	494	0.667	856	40	454	0.709	744
2000	46	431	0.443	1295	45	401	0.440	1141
2001	45	644	0.707	802	45	627	0.688	798
2002	43	563	0.714	913	43	536	0.682	658
2003	41	530	0.769	702	41	516	0.749	854

Table 11. 2003 Shoreside Hake Observation Program budget. Total fixed costs include costs for supplies, travel, vehicle use, and salaries. Estimated observer costs are for Oregon ports only.

ITEM	May	June	July	August	September	Total (May-June)	PSMFC Portion	ODFW Portion
Total Fixed Costs	\$5,100	\$4,850	\$11,332	\$11,332	\$4,225	\$36,838	\$21,883	\$18,636
Indirect Fixed Costs						\$3,681		
Total Estimated Observer Costs		5962	11923	11923		\$29,808		
Total Industry Costs	\$5,100	\$10,812	\$23,255	\$23,255	\$4,225	\$70,327		

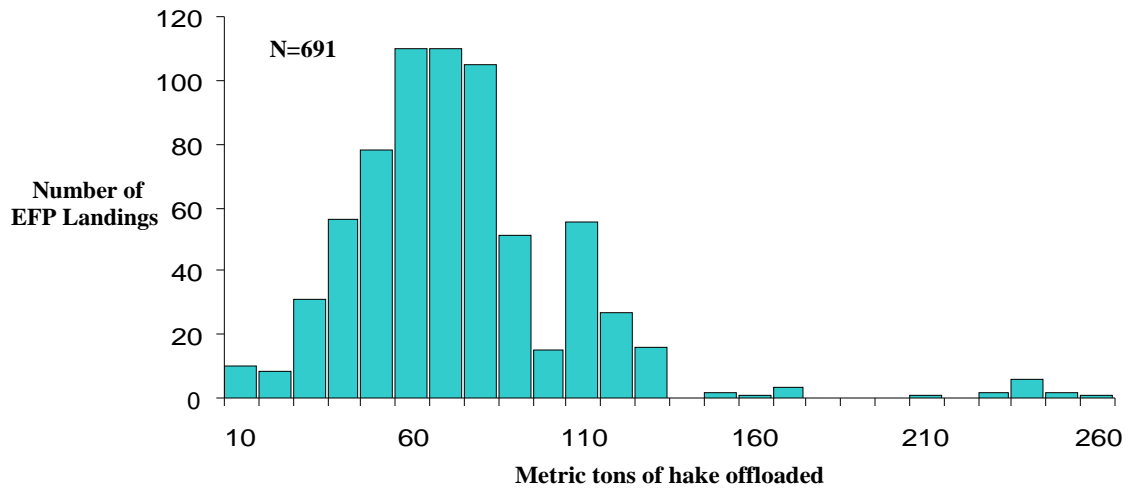


Figure 1. Frequency distribution of hake landing weights in the 2003 shoreside EFP hake fishery.

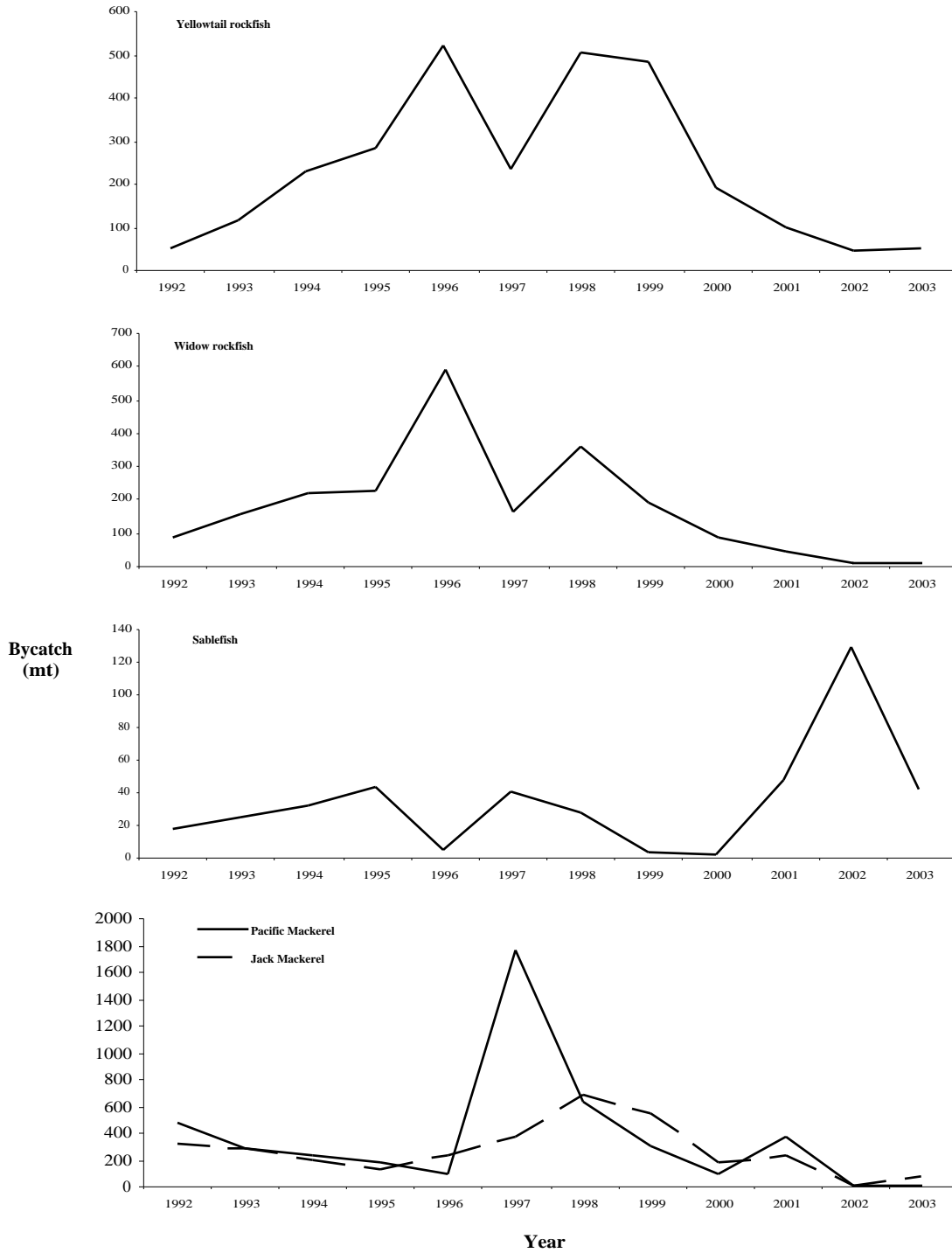


Figure 2. Trends in major bycatch components of the shoreside hake fishery, 1992-2003.
 Note: 1992 allowed sorting of bycatch

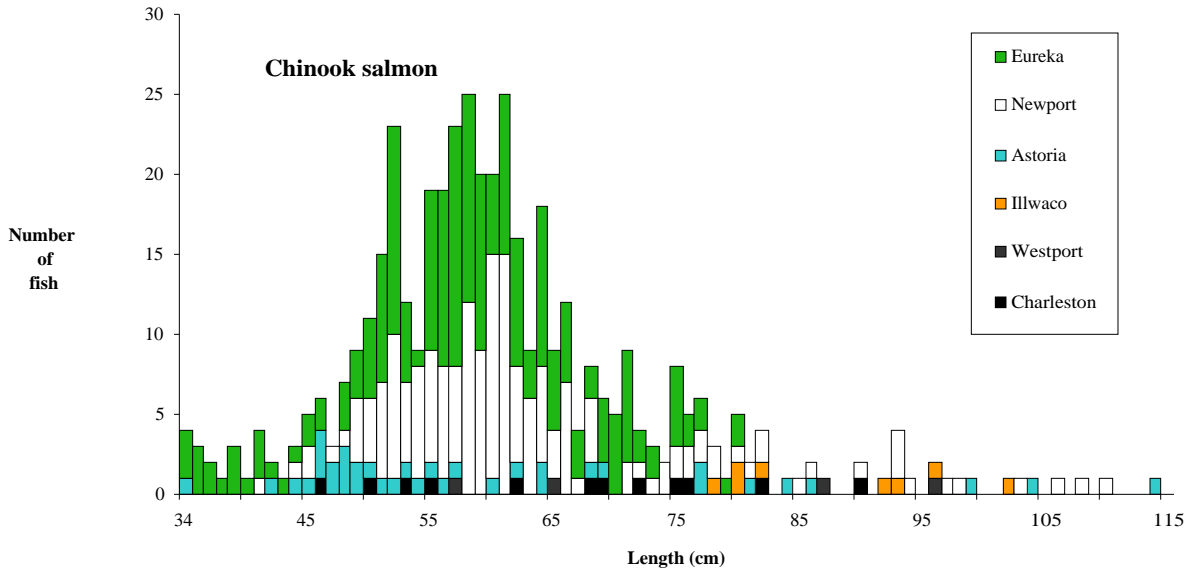


Figure 3. Length-frequency distributions of Chinook salmon by port in 2003.

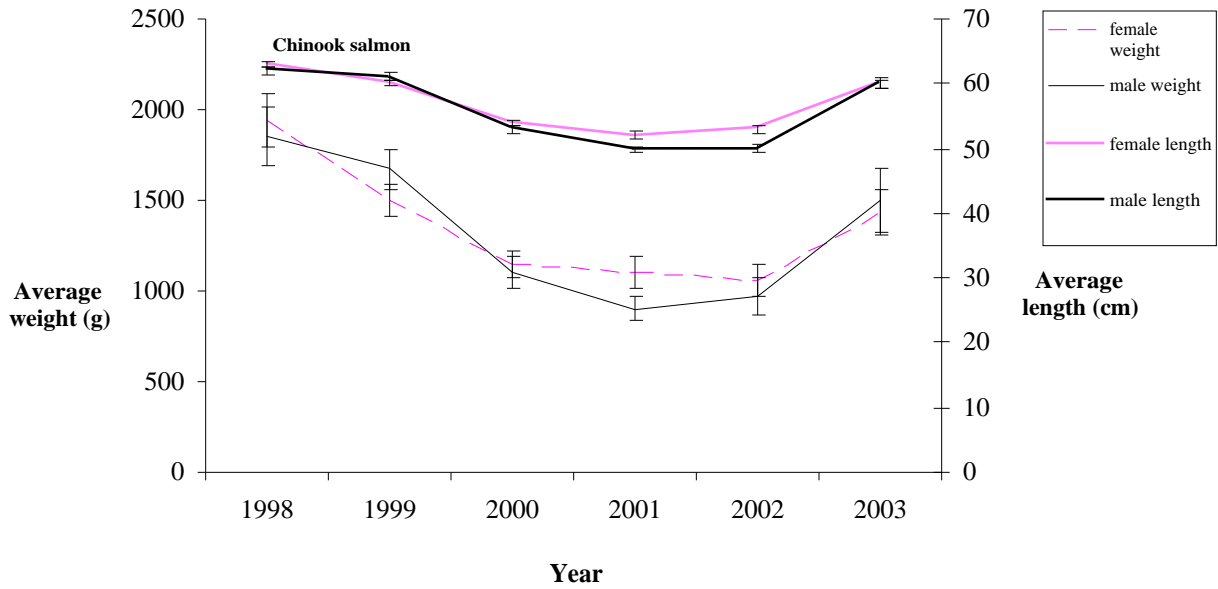


Figure 4. Trends in average weight and length for Chinook salmon, 1998-2003.

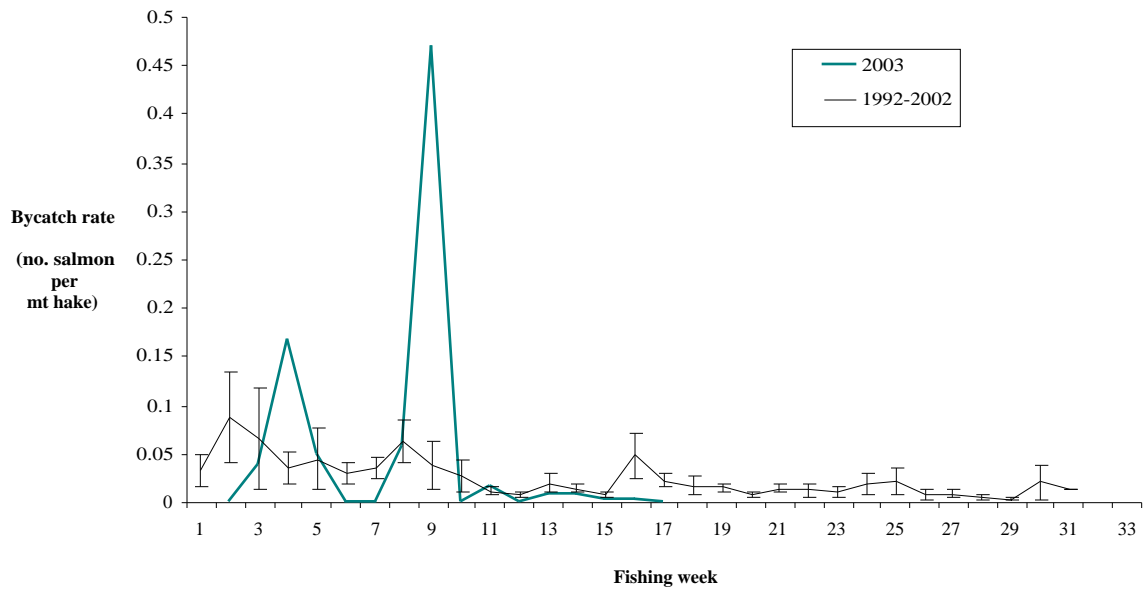


Figure 5. Weekly average bycatch rate of salmon in the 2003 shoreside Pacific hake fishery compared to a ten-year average rate.

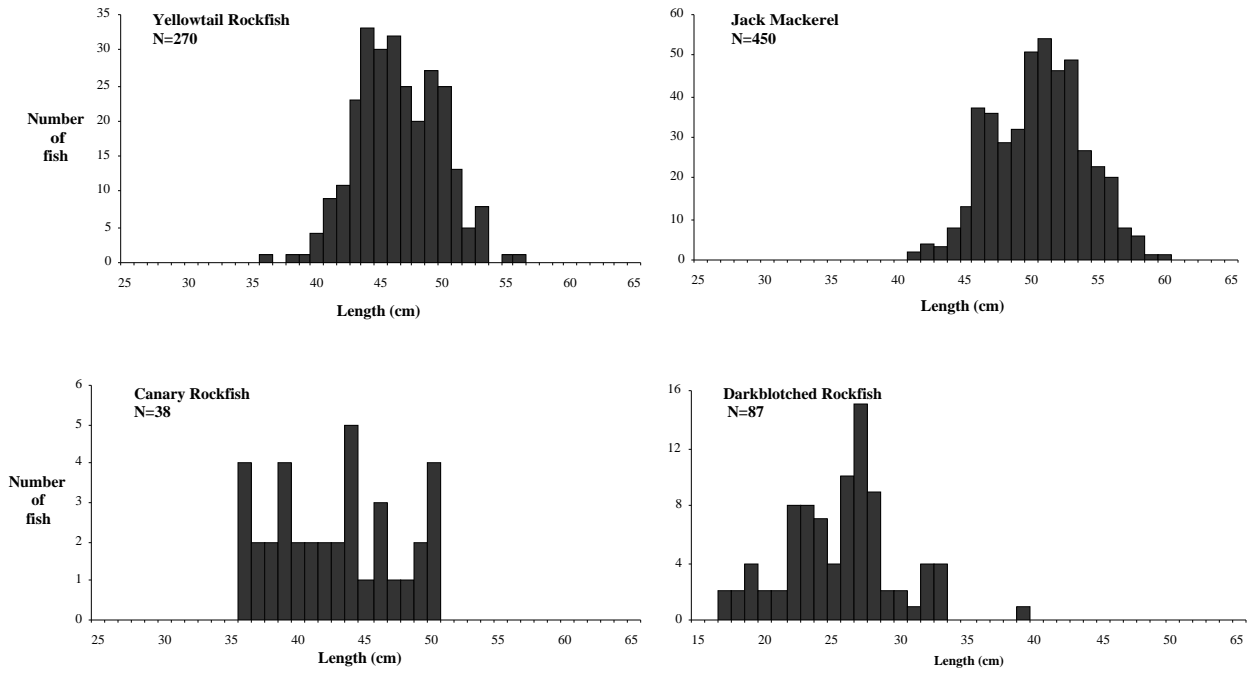


Figure 6. Length-frequency distributions for yellowtail, jack mackerel, canary and darkblotched rockfish observed in the Oregon Shoreside Hake Observation Program, 2003.
 Note: Different length range for darkblotched rockfish.

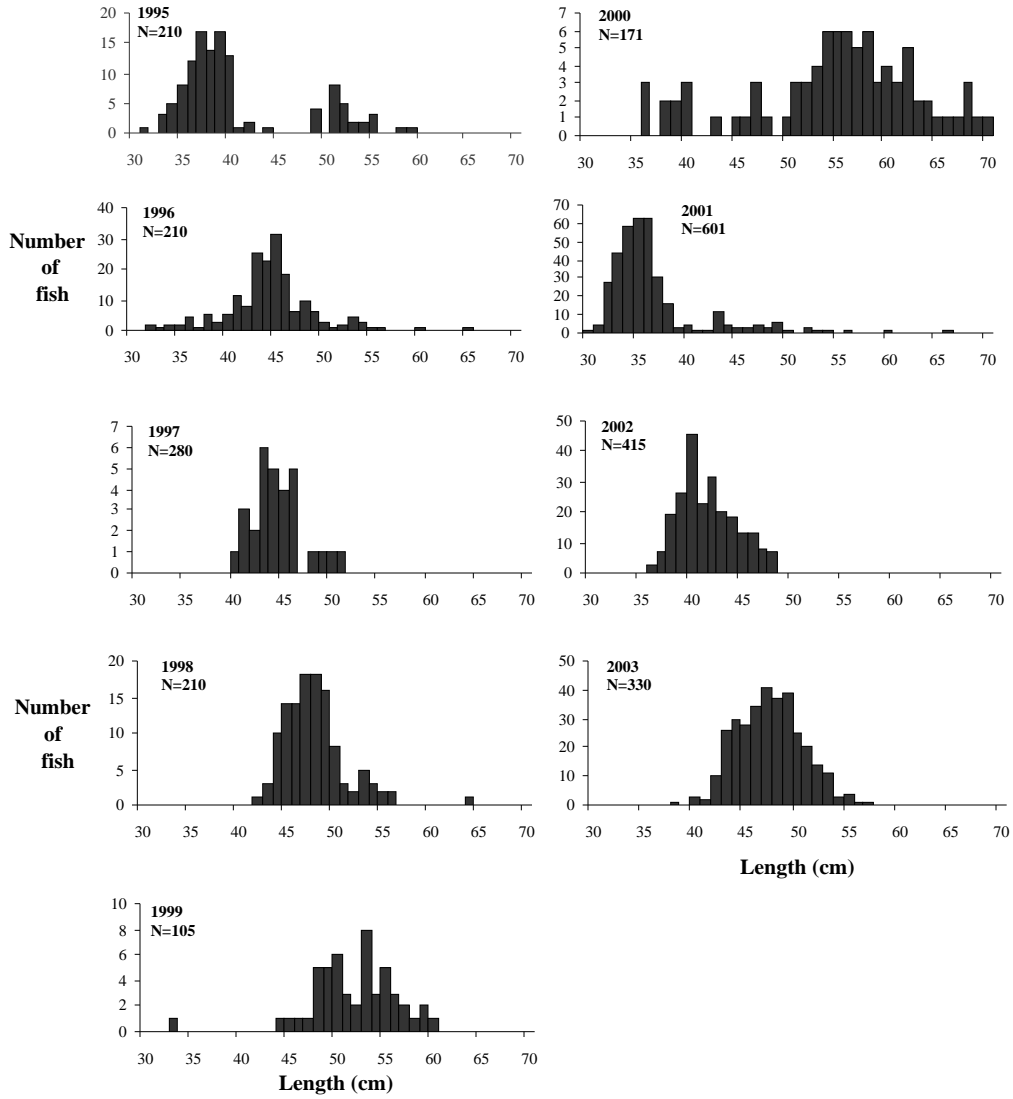


Figure 7. Length-frequency distributions of sablefish in the Oregon Shoreside Hake Observation Program, 1995-2002.

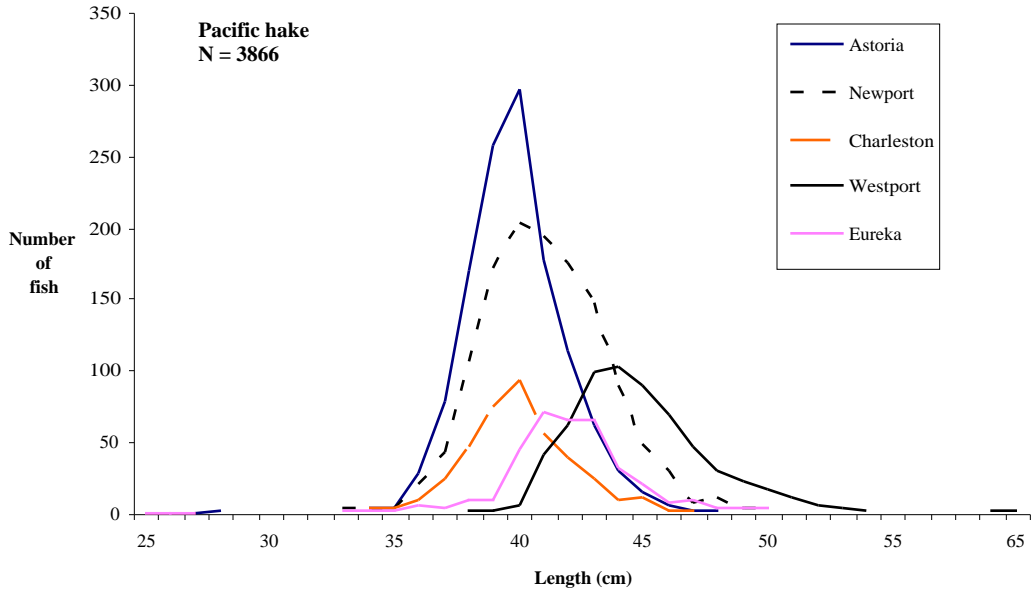


Figure 8. Length-frequency distributions of Pacific hake by port in the 2003 shoreside Pacific hake fishery. Note: No length-frequency samples were taken for the port of Illwaco.

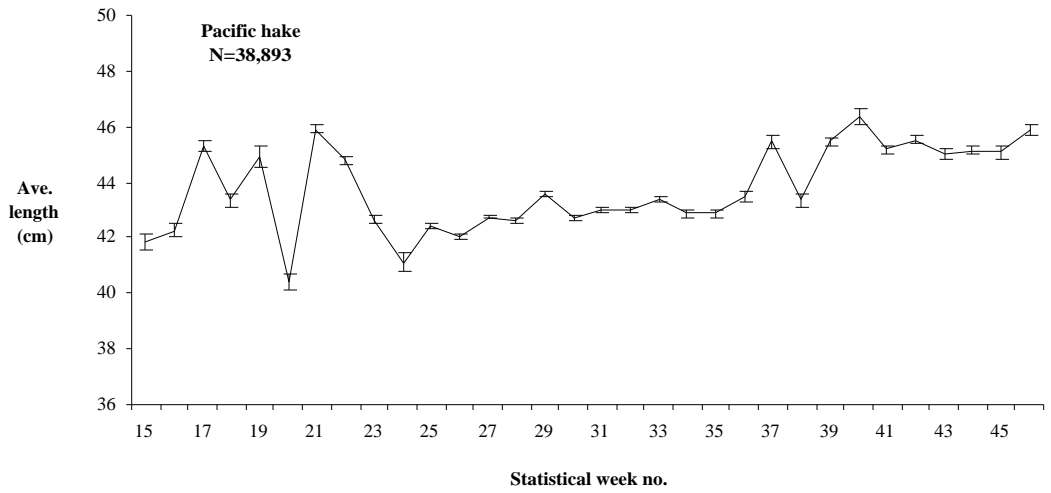


Figure 9. Average length of Pacific hake by statistical week in the shoreside Pacific hake fishery from 1995-2003.

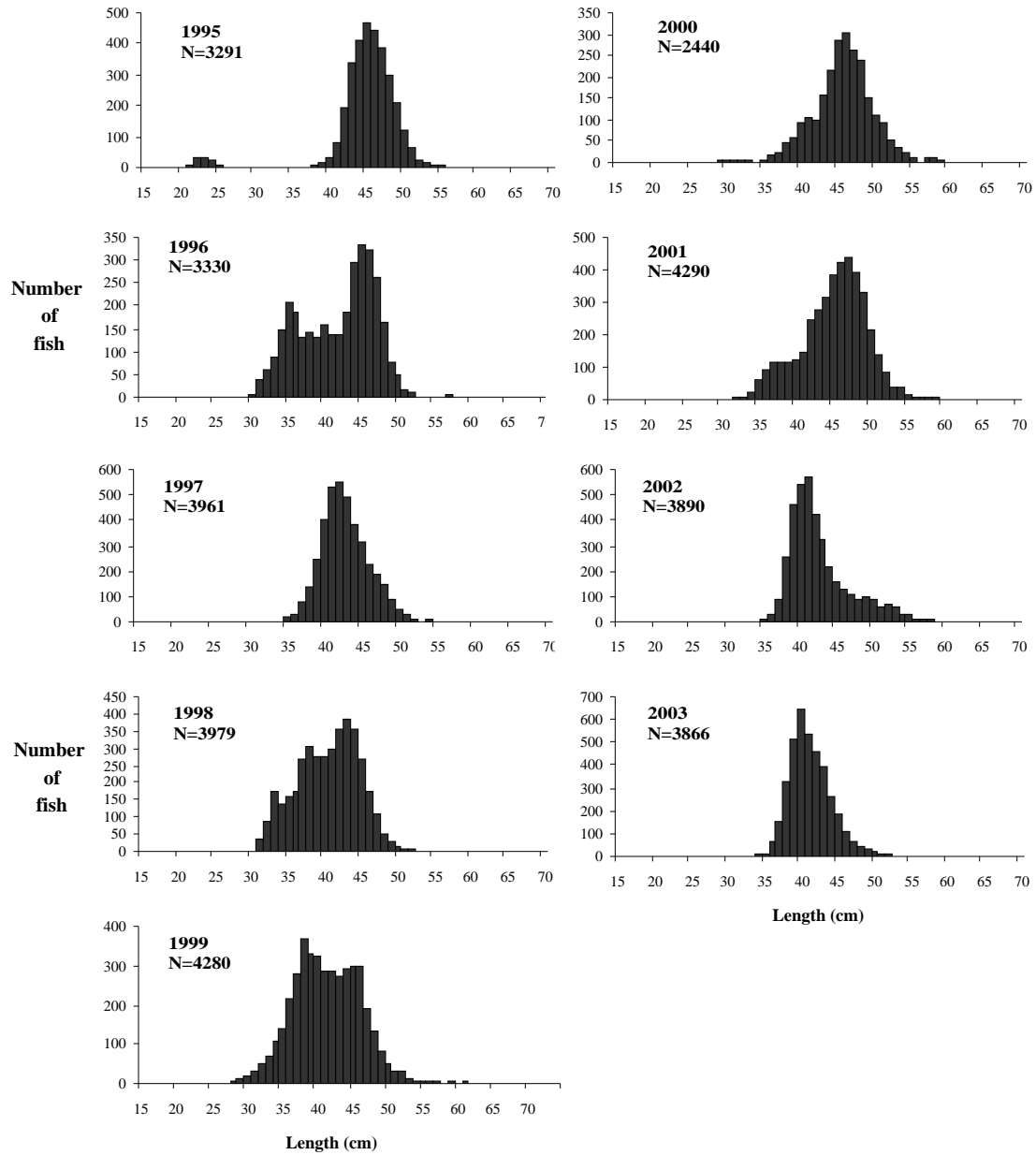


Figure 10. History of length-frequency distributions of Pacific hake in the Oregon Shoreside Hake Observation Program, 1995-2003.