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OBSERVATIONS OF FOREIGN AND JOINT VENTURE FISHING FLEETS  
OFF THE COAST OF WASHINGTON, OREGON, AND CALIFORNIA, 1979

by

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During 1979 the Northwest and Alaska Fisheries Center continued with its program of placing observers on foreign fishing vessels and joint-venture vessels operating off the coast of Washington, Oregon, and California. This program had its beginning in this region in 1975 when observers were placed on foreign vessels by invitation of the host country; the program was greatly accelerated under provisions of the United States Fishery Conservation and Management Act of 1976 (FCMA). Provisions of that Act require that foreign vessels accept U.S. observers and during the 1979 season, 29 observers were placed with Soviet and Polish fishing fleets and Soviet processing vessels of the US-USSR joint-venture fishery.

The purpose of observers is to collect data which allow the United States to estimate the foreign catch, determine the incidence and total catch of prohibited species, help assess the biological status of various stocks of fish, and report on suspected violations of U.S. regulations.

This report summarizes observers' schedules and the results of the data obtained in 1979.

#### Observer Schedules and Coverage

The observer schedule by nation and fishery is listed in Table 1. The target species for all vessels and the joint-venture fishery was Pacific hake (whiting), Merluccius productus.

In 1979 a total of 17 observers sampled aboard 27 of the 38 Soviet vessels participating in the fishery on the Soviet quota. Coverage of these

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vessels by observers was 874 observer days out of 2,601 vessel days on the grounds or 33.6 percent. For the Polish fleet, 5 observers sampled on 8 of the 11 vessels that partook of the fishery. Coverage of this fleet was 227 observer days out of 652 vessel days on the grounds or 34.8 percent. Total coverage of the foreign fleets in the Washington, Oregon, California region was 33.8 percent. The observer coverage in 1979 was very similar to the coverage of about 35 percent obtained during 1978.

In the joint-venture fishery in which U.S. fishing vessels delivered catches to Soviet processing vessels, 7 observers sampled for varying periods on the 7 processing vessels assigned to this fishery. Coverage by observers was 286 observer days out of 498 vessel days of the joint-venture fishery or 57.4 percent.

Table 1.--Observer schedule by nation and vessel class, Washington, Oregon, California foreign trawl and joint-venture fishery, 1979.<sup>1/</sup>

Nation	Vessel name	Vessel class	Sampling period - 1979	Observer
USSR	Nadezhda	LST	6/06 - 6/13	Jaqua
"	Revolyuetsioner	"	6/06 - 6/30	Blum
"	Zelenograd	"	6/05 - 6/30	Bickerstaff
"	Nikoley Zaytsev	"	6/06 - 6/29	Brenton
"	Priozersk	"	6/06 - 6/29	Toner
"	Alexei Makhalin	"	6/07 - 6/30	Long
"	Pyotr Ovchinnikov	"	6/08 - 6/30	Trask
"	Kazatin	"	6/08 - 6/30	Johnson
"	Mys Lopatka	"	6/15 - 6/19	Jaqua
"	Mark Resheinikov	"	7/01 - 7/31	Trask
"	Mys Sinjavina	"	7/02 - 7/27	Toner
"	Mys Belkina	"	7/02 - 7/31	Brenton
"	Klyuchevskoy	"	7/04 - 7/31	Bickerstaff
"	Koluvan	"	7/03 - 7/31	Johnson
"	Posyet	"	7/03 - 8/02	Long
"	Tretjakovo	"	8/05 - 8/29	Anschell
"	Mys Skalisty	"	8/06 - 9/14	Ginsberg
"	Poima	"	8/07 - 9/12	Dupee
"	Zelenograd	"	8/07 - 9/03	Dunning
"	Kulunda	"	8/07 - 8/14	Lacy
"	Mys Yudina	"	8/08 - 10/05	Bell
"	Mys Chaikovskogo	"	8/07 - 9/09	Fast
"	Pyotr Ovchinnikov	"	8/17 - 9/11	Lacy
"	Klyuchevskoy	"	9/01 - 9/11	Anschell
"	Mys Grozny	"	9/08 - 10/06	Dunning
"	Akmolinsk	"	9/09 - 10/02	Umeda
"	Priamurie	"	9/06 - 10/04	Shippen
"	Aralsk	"	9/14 - 10/06	Anschell
"	Nikolay Zaytsev	"	9/14 - 10/05	Fast
"	Arzamas	"	9/16 - 10/06	Lacy
"	Mys Egorova	"	9/16 - 10/06	Dupee
"	Taman	"	9/16 - 10/07	Ginsberg
Poland		LST		
"	Awior	"	6/06 - 7/11	Smith
"	Vega	"	6/07 - 7/02	Goetz
"	Perseus	"	6/19 - 6/25	DeBow
"	Marlin	"	6/26 - 7/03	DeBow
"	Marlin	"	7/04 - 7/17	Goetz
"	Lepus	"	7/12 - 8/01	Smith
"	Perseus	"	7/24 - 7/31	Goetz
"	Saturn	"	8/05 - 9/13	Baumgartner
"	Tazar	"	8/09 - 8/31	Jensen
"	Awior	"	9/16 - 9/19	Baumgartner
"	Lepus	"	9/17 - 10/08	Jensen
"	Otol	"	9/21 - 10/06	Baumgartner

Table 1.--continued

Nation	Vessel name	Vessel class	Sampling period - 1979	Observer
US-USSR	18 Siezd VLKSM	LST	6/10 - 7/08	Dawson
"	Aleksandrovsk	"	6/17 - 7/31	Haaga
"	Akmolinsk	"	6/18 - 6/24	Jaqua
"	Ugolny	"	6/30 - 7/29	Jaqua
"	Iuzhnomorsk	"	7/03 - 8/01	Blum
"	Nadezhdinsk	"	7/12 - 7/28	Dawson
"	Nadezhdinsk	"	8/06 - 9/23	Murtagh
"	Ugolny	"	8/07 - 9/01	Thompson
"	Aleksandrovsk	"	8/09 - 9/01	Umeda
"	Nadezhda	"	9/22 - 10/15	Thompson
"	18 Siezd VLKSM	"	10/05 - 10/15	Murtagh

1/ The target species of all fisheries was Pacific hake (whiting)  
Merluccius productus.

### Observer Sampling Procedures

Sampling procedures were designed to provide data on species composition of the catch, the incidence of prohibited species (salmon, Oncorhynchus spp. and Pacific halibut, Hippoglossus stenolepis) occurring in the catch, and the age and size composition of certain species. The same procedures were used by observers whether sampling tows made by foreign vessels or the codends delivered to processing vessels by U.S. fishing vessels. Observers first underwent a week to ten-day training period in Seattle prior to the observer trip, at which time they were trained in shipboard sampling procedures, species recognition, and the proper way to complete data forms. These forms provide information on position and depth of fishing, catch rates and species composition, incidence of salmon and halibut, and age and size composition of various landed species.

On board the vessel the observer determined species composition by either taking representative basket samples of various trawl hauls, then counting and weighing each species group in the samples, or by a direct method of separating out, counting, and weighing all species other than hake in a trawl haul. The weight and number of hake were then determined by subtracting the weight of other species from the estimated haul weight to give the weight of hake and dividing this total by the average weight of hake to give the number of hake. This latter method was generally used on vessels fishing for hake when the catches were averaging about 99 percent of this species. This whole haul sampling method also provided the numbers of the prohibited species in the haul. Other techniques to determine the incidence of prohibited species were to monitor conveyor belts used to transfer catches and record the numbers of salmon and halibut per unit weight of catch. For species for which additional biological information was desired, length frequencies were taken from

random samples and otolith samples were taken from length stratified subsamples. Upon return to Seattle the data were checked, then keypunched onto cards for computer analysis.

### Results

The following sections summarize the results of observer sampling for species composition, incidence of prohibited species, and other biological information.

#### Estimates of foreign and joint-venture fishery catches

The U.S. estimates of foreign catches were obtained by applying average daily catch rates from observers on host vessels to the total number of vessels on the grounds (vessel days). Data on fleet vessel days on the grounds were obtained from the summary of vessel check in and check out as required by the United States from all foreign fishing vessels. In order to provide an estimate of all foreign catches we used a blend of estimates from observer data and the foreign reported data. In this technique we arbitrarily used observer data when observer coverage of the fleet was at least 20 percent, and the foreign reported catch when observer coverage was less than 20 percent. Because all reported catches were only estimates of the true tonnage landed, we further qualified the U.S. estimated catch by accepting the foreign reported data when the reported data were within 10 percent of the estimate based on observer data. The U.S. estimate was summarized biweekly in reports, then totaled to form the estimated catch for the season.

For the joint-venture fisheries the estimated catch by species was derived from observers' estimates for the vessel on which observers sampled and from the Soviet reported catches for vessels not carrying observers. The variation in number of U.S. vessels delivering catches to various Soviet processors precluded our making catch estimates for the non-observed vessels.

Pacific hake (whiting) formed about 98 percent of the foreign vessel catches as well as the U.S. joint-venture vessels, Table 2. The second and third dominant species in the catch were jack mackerel, Trachurus symmetricus, forming about 0.9 percent of the catch, and the various species of rockfish, which made up 0.8 percent of the catch. Sablefish, Anoplopoma fimbria, and flounders made up a small proportion of the catch.

The total of around 115,000 mt of hake taken by the USSR and Poland was approximately 75 percent of the quota of 155,400 mt allocated to these nations in 1979. The regulations stipulated that the catch of sablefish could not exceed 0.1 percent and rockfish 0.8 percent of the hake allocation. When it was determined in early October that the sablefish allocation was about to be reached or exceeded, the fishery was closed even though the hake quota was not attained.

The other fish category was composed of a variety of species, of which king-of-the-salmon (Trachipterus altivelis), squid, dogfish sharks (Squalus acanthias), and salmon constituted the greatest proportion by weight. The impact of the foreign fleets on salmon will be discussed in the following section.

#### Incidence and incidental catch of salmon

The incidence of salmon (number of salmon per metric ton of catch and their average weight kg) for foreign trawlers and the joint-venture fisheries is given in Table 3. Area divisions of the region off Washington, Oregon, and California are shown in Figure 1. Salmon occurred in the foreign trawl catches in nearly all months of the fishery in the Columbia and Eureka areas. Exceptions were late in the summer in the Eureka area and in the very limited sampling in the Monterey area. The seasonal average incidence of salmon ranged from 0.015 to 0.113 salmon per mt with the highest incidence occurring

Table 2.--Estimated groundfish catch by the foreign and joint-venture fisheries off the Washington, Oregon, and California coast, 1979.<sup>1/</sup>

Species groups	Estimated Catch							
	USSR		Poland		Total		Joint-venture	
	(mt)	Percent	(mt)	Percent	(mt)	Percent	(mt)	Percent
Hake (whiting)	96,837	98.15	18,073	97.10	114,910	97.98	8,834	97.57
Jack mackerel	710	.72	316	1.70	1,026	.87	77	.85
Rockfish	790	.80	149	.80	939	.80	71	.78
Sablefish	157	.16	41	.22	198	.17	51	.56
Flounders	12	.01	2	.01	14	.01	T	T
Other fish	156	.16	32	.17	188	.16	21	.23
Total	98,662		18,613		117,275		9,054	

<sup>1/</sup> Figures rounded to nearest mt

T indicates Trace, less than .05 mt and .005 percent.

Table 3.--Average incidence (no. per metric ton of catch) and average weight (kg) of salmon taken in the Soviet, Polish, and US-USSR joint venture trawl fishery off Washington, Oregon, and California, 1979.

Statistical Areas						
Month	Monterey		Eureka		Columbia	
	Incidence	Average weight kg.	Incidence	Average weight kg.	Incidence	Average weight kg.
<u>USSR VESSELS</u>						
June	-	-	0.021	4.74	0.016	3.27
July	-	-	0.012	6.64	0.111	6.12
August	0	-	0.002	8.75	0.028	4.62
September	-	-	0	-	0.180	3.52
October	-	-	0	-	0.102	3.97
Season	0	-	0.015	5.33	0.113	4.05
<u>POLISH VESSELS</u>						
June	0	-	0.045	4.94	0.004	3.90
July	-	-	0.003	8.70	0.017	4.47
August	-	-	0	-	0.043	3.92
September	-	-	-	-	0.021	3.78
October	-	-	-	-	0.119	3.75
Season	0	-	0.028	5.09	0.035	3.87
<u>US-USSR JOINT VENTURE FISHERIES<sup>1/</sup></u>						
June	-	-	0	-	0	-
July	-	-	-	-	0.030	4.54
August	-	-	-	-	0.298	2.35
September	-	-	-	-	0.071	4.45
October	-	-	-	-	0.181	3.94
Season	-	-	0	-	0.133	2.71

<sup>1/</sup> U.S. fishing vessels delivering groundfish catches to Soviet processing vessels.

- indicates no sampling in area/month.

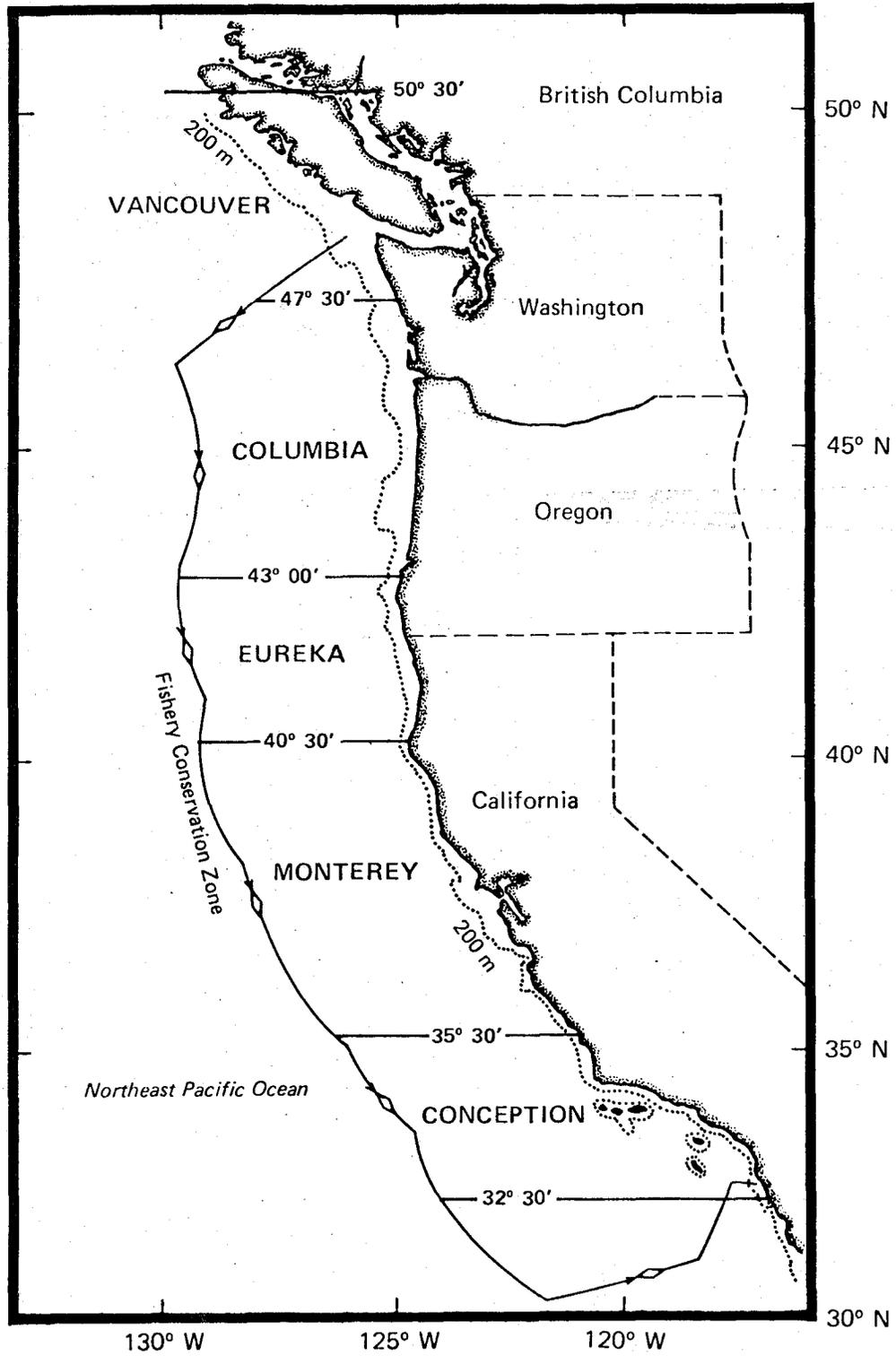


Figure 1.--Statistical areas of Washington, Oregon, and California trawl fishery region.

in the Columbia area on Soviet vessels. The incidence on the joint-venture vessels was similar to that on Soviet vessels in the Columbia area. The salmon averaged around 4 to 5 kg (9 to 11 lbs.) in the Soviet and Polish catches and about 3 kg (7 lbs.) in the joint-venture vessel catches.

The salmon were taken coastwide with few exceptions, Figure 2. The highest incidence rates among the 1/2° lat. by 1° long. areas were off central Oregon in block 44° to 44°30'N (0.241) and north of the Columbia River in block 47° to 47°30'N (0.127).

The estimated incidental catch of salmon by foreign and joint-venture trawlers was computed by multiplying the average incidence rate for each month/area by the estimated foreign or U.S. vessel catches for the appropriate month/area. The results, Table 4, show an estimated salmon catch of 8,667 fish (29.8 mt) with 7,044 estimated to have been taken by foreign trawlers and 1,623 fish by U.S. trawlers in the joint-venture fisheries. The total salmon catch by the foreign trawlers represents a 19 percent increase over the 5,905 fish estimated to have been taken in 1978 (French, Nelson, and Wall, 1979). The main reason for the larger salmon catch in 1979 compared to that of 1978 was the increased catch by Soviet vessels in 1979. The Soviets took an estimated 6,390 salmon in 1979 (nearly 3,800 in September) versus about 2,880 fish in 1978. The Polish vessels, however, took substantially fewer fish in 1979 compared to 1978--654 salmon versus about 2,700 fish.

The species composition of salmon taken in the trawl fishery was approximately 93 percent chinook salmon (O. tshawytscha), 6 percent coho salmon (O. kisutch), 0.8 percent chum salmon (O. keta), and 0.2 percent sockeye salmon (O. nerka). The predominant species, chinook salmon, averaged about 70 cm (27 in.) long, Figure 3. The coho salmon averaged about 63 cm (25 in.) long.

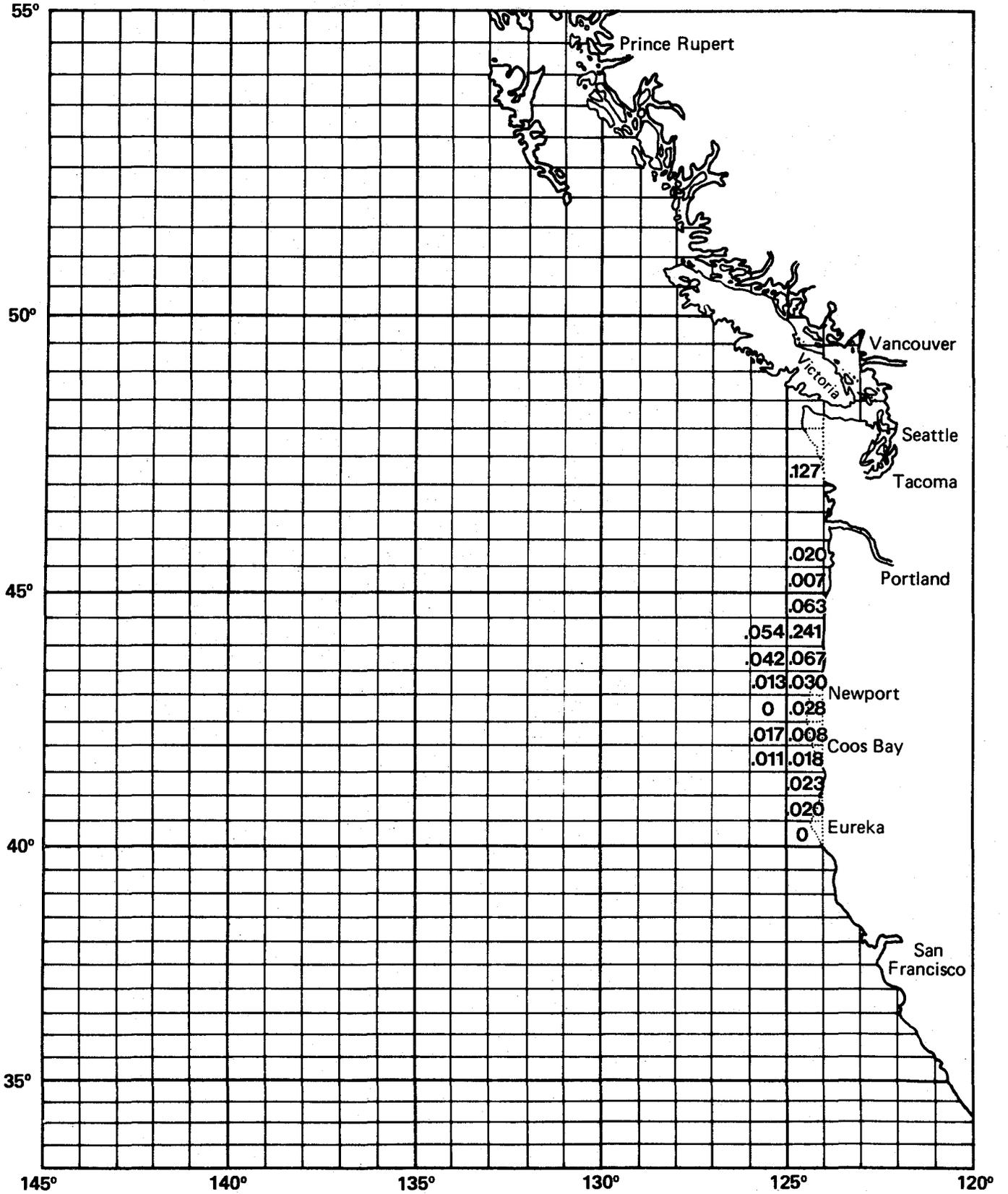


Figure 2.--Average incidence of salmon (number of salmon per metric ton of catch) in the foreign and joint-venture trawl fishery, 1979.

Table 4.--Estimated catch of salmon (in numbers of fish and metric tons) by foreign trawlers and joint venture vessels off Washington, Oregon, and California, 1979.

Month	Statistical Area						Total Salmon	Total weight mt
	Monterey		Eureka		Columbia			
	No Salmon	Weight mt	No Salmon	Weight mt	No Salmon	Weight mt		
<u>USSR VESSELS</u>								
June	-	-	368	1.744	139	0.454	507	2.198
July	-	-	138	0.916	1,168	7.148	1,307	8.064
August	-	-	23	0.201	380	1.756	403	1.957
September	-	-	-	-	3,784	13.320	3,784	13.320
October	-	-	-	-	389	1.544	389	1.544
Total			529	2.861	5,860	24.222	6,390	27.083
<u>POLISH VESSELS</u>								
June	-	-	145	0.716	2	0.008	147	0.724
July	-	-	8	0.070	12	0.054	20	0.124
August	-	-	-	-	275	1.078	275	1.078
September	-	-	-	-	72	0.272	72	0.272
October	-	-	-	-	140	0.525	140	0.525
Total			153	0.786	501	1.937	654	2.723
<u>JOINT VENTURE VESSELS<sup>1/</sup></u>								
June	-	-	-	-	-	-	-	-
July	-	-	-	-	63	0.286	63	0.286
August	-	-	-	-	1,490	3.502	1,490	3.502
September	-	-	-	-	12	0.053	12	0.053
October	-	-	-	-	58	0.229	58	0.229
Total					1,623	4.070	1,623	4.070
Grand Total			682	3.647	4,875	19.288	8,667	29.806

<sup>1/</sup> U.S. fishing vessels delivering groundfish catches to Soviet processing vessels.

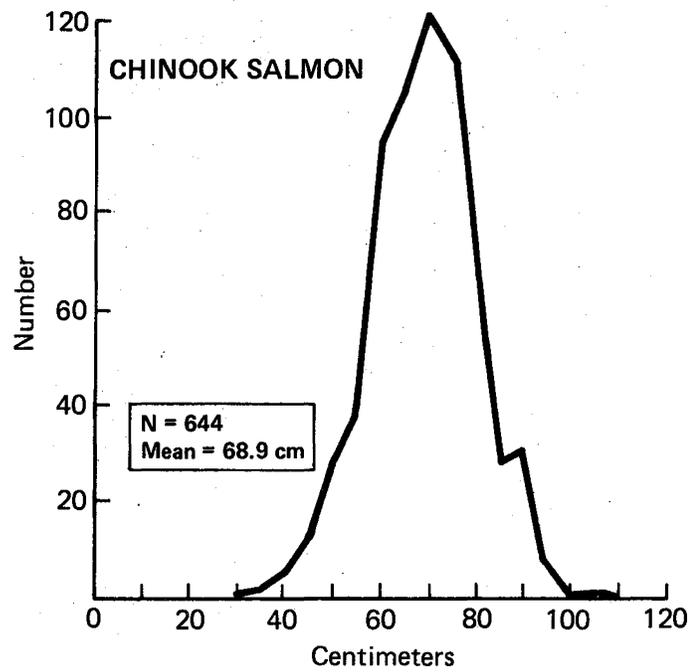


Figure 3.--Length frequency of chinook salmon taken by foreign trawlers off the coast of Washington, Oregon, and Washington, June-October, 1979.

### Incidence and incidental catch of halibut

The incidence of halibut in foreign trawl catches off Washington and Oregon in 1979 remained low, as was observed in 1977 and 1978. In total, the observers noted 8 halibut in catches in the Columbia area--3 on a Polish vessel in August, and 5 on Soviet vessels in September. The incidence rates were 0.003 and 0.001 fish per metric ton of catch for these month/areas. The fish in August averaged about 0.7 kg (1.5 lbs.) and the group taken in September averaged about 25 kg (55 lbs.). In applying the incidence rates to the groundfish catch for those same months, we estimated the halibut catch to number about 40 fish weighing about 0.53 mt (1,166 lbs.). This total is substantially below the estimated catch of about 240 fish (1.4 mt or 3,080 lbs.) in 1978 (French, Nelson, and Wall, 1979). The observers on the joint-venture vessels did not note any halibut being landed during 1979.

### Species composition and estimated catch of rockfish

Although rockfish are not targetted upon by foreign trawlers, they are taken incidentally when fishing for hake, and because rockfish constitute an important species for U.S. domestic fishermen, their take by foreign trawlers is closely monitored by observers. In 1979 the estimated catch of rockfish by foreign trawlers off Washington, Oregon, and California was approximately 939 mt, Table 5. The catch of rockfish by the U.S. vessels delivering their catch to Soviet processors was about 73 mt. The catch by the foreign vessels represents a 34 percent increase over the 703 mt estimated to have been taken in 1978. A total of 32 different species were identified by observers in the coastal fishery in 1979. The majority (92 percent) of the rockfish catch was taken in the Columbia area and the balance in the Eureka area. No rockfish were taken in the limited fishery in the Monterey area.

Table 5.--Estimated catch of rockfish (mt) by species by foreign and joint-venture fisheries off Washington, Oregon, and California, 1979.

Species of rockfish		Statistical Area						Total	Percent
		USSR		Poland		Joint-venture			
		Eureka	Columbia	Eureka	Columbia	Eureka	Columbia		
Aurora	<u>Sebastes aurora</u>	0.01	0.12	T	0.45			0.58	.06
Black	" <u>melanops</u>		2.15				0.15	2.30	0.23
Bocaccio	" <u>paucispinus</u>	1.19	5.88	0.37	1.38	0.36	0.77	9.95	0.98
Canary	" <u>pinniger</u>	0.13	27.24	0.01	8.59	0.21	2.17	38.35	3.79
Chameleon	" <u>phillipsi</u>		0.01					0.01	T
Chilipepper	" <u>goodei</u>	0.37	0.55	0.01	.02		0.01	0.96	0.09
Copper	" <u>caurinus</u>		0.04					0.04	T
Dark blotched	" <u>crameri</u>	0.52	13.36	0.01	1.65		0.01	15.55	1.54
Dusky	" <u>ciliatus</u>		0.23		0.43		0.23	0.89	0.09
Flag	" <u>rubrivinctus</u>		0.13					0.13	0.01
Greenspotted	" <u>chlorostictus</u>		0.01					0.01	T
Greenstriped	" <u>elongatus</u>		0.11		0.18		T	0.29	0.03
Longspine thornyhead	<u>Sebastolobus altivelis</u>		0.01					0.01	T
Olive	<u>Sebastes serranoides</u>	0.01	0.13					0.14	0.01
Pacific ocean perch	" <u>alutus</u>	2.74	38.54	0.01	14.87		0.61	56.77	5.61
Pink	" <u>eos</u>		5.66		2.56			8.22	0.81
Red banded	" <u>babcocki</u>	2.45	20.01		0.31		0.08	22.85	2.26
Redstripe	" <u>proriger</u>		0.02					0.02	T
Rosethorn	" <u>helvomaculatus</u>	0.01	0.35		5.22			5.58	0.55
Rougheye	" <u>aleutianus</u>	0.02	0.05	T	0.03		T	0.10	0.01
Sharpchin	" <u>zacentrus</u>		0.06		0.03			0.09	0.01
Shortbelly	" <u>jordani</u>	0.02	2.54		4.01	0.11	0.04	6.72	0.66
Shortraker	" <u>borealis</u>	0.07	9.16	T	8.15			17.38	1.72
Shortspine thornyhead	<u>Sebastolobus alascanus</u>	0.30	0.03		0.05		0.01	0.39	0.04
Silvergray	<u>Sebastes brevispinis</u>	1.17	12.08	0.01	6.20		0.02	19.48	1.93
Splitnose	" <u>diploproa</u>		0.01				T	0.01	T
Stripetail	" <u>saxicola</u>		.01				T	.01	T
Vermillion	" <u>miniatus</u>		0.73		0.06			0.79	0.08
Widow	" <u>entomelas</u>	40.18	442.95	4.79	60.31	25.92	14.22	588.37	58.18
Yelloweye	" <u>ruberrimus</u>	0.01	1.27	0.02	0.90			2.20	0.22
Yellowmouth	" <u>reedi</u>	0.02	0.50		0.05		T	0.57	0.06
Yellowtail	" <u>flavidus</u>	0.08	156.40	0.06	28.47		27.67	212.68	21.03
Total		49.30	740.30	5.30	143.90	26.60	46.00	1011.40	

T = trace

The predominant species in the foreign catches were the widow rockfish, Sebastes entomelas, followed by the yellowtail rockfish, S. flavidus. These two species formed 78 percent of the rockfish catch. The catch of about 56 mt of Pacific ocean perch made up 6 percent of the rockfish catch. These were primarily from the Columbia area.

For the U.S. vessels fishing for the joint-venture fisheries, the widow and yellowtail rockfish also were the predominant species taken making up about 93 percent of the rockfish catch. Pacific ocean perch made up about 0.8 percent of those catches.

#### Species composition and estimated catch of flatfish

The incidental catch of flatfish by foreign trawlers off the coast of Washington, Oregon, and California in 1979 was relatively small. The total estimated catch was about 14 mt, Table 6, which compares to 4 mt taken by foreign trawlers in 1978. Nearly all the flatfish were taken in the Columbia area; less than 1 percent of the catch was attributed to the Eureka area. The predominant species of the 10 that were identified by observers were the arrowtooth flounder, Atherestes stomias, and the rex sole, Glyptocephalus zachirus; these species made up 86 percent of the catch.

Observers did not record any flatfish from the catches of U.S. trawlers that were delivered to Soviet processing vessels in the joint-venture fisheries.

Table 6.--Estimated catch of flatfish by foreign trawlers, Washington, Oregon, and California coast, 1979.

Species of flatfish		Metric ton	Percent
Arrowtooth flounder	<u>Atheresthes stomias</u>	6.70	47.3
Dover sole	<u>Microstomus pacificus</u>	1.23	8.7
English sole	<u>Parophrys vetulus</u>	0.07	0.5
Flathead sole	<u>Hippoglossoides elassodon</u>	0.51	3.6
Greenland turbot	<u>Reinhardtius hippoglossoides</u>	0.03	0.2
Pacific sanddab	<u>Citharichthys sordidus</u>	0.02	0.2
Petrable sole	<u>Eopsetta jordani</u>	0.02	0.2
Rex sole	<u>Glyptocephalus zachirus</u>	5.48	38.7
Rock sole	<u>Lepidopsetta bilineata</u>	0.08	0.6
Slender sole	<u>Lyopsetta exilis</u>	0.01	0.1
Total		14.15	

### Foreign fish catches by depth

The foreign catch by depth strata of some important species is given in Table 7. Hake, the target species, was taken primarily within the 0-300 m depth range (90 percent) with about 48 percent of the catch being taken between 100-200 m.

The incidental catches of widow and yellowtail rockfish, Pacific ocean perch, and sablefish varied by depth. The widow and yellowtail rockfish were taken mainly in the 100-199 m depth strata, whereas Pacific ocean perch were taken primarily in the 200-299 m depth strata. Sablefish, which are generally taken by U.S. domestic fishermen at depths between 300 and 600 m in the summer and between 500 and 1200 m in the winter, were taken mainly between 100 and 300 m.

### Biological data on hake, sablefish, and widow rockfish

Each observer measured length samples of hake and a secondary species, usually including sablefish and some species of rockfish. Most of the rockfish that were sampled were the widow rockfish. Observers also collected stratified otolith samples for ageing the species. Ages from the otolith samples were determined by the Age Reading Unit at the Northwest and Alaska Fisheries Center.

Hake--The 1979 data on the length-frequency of hake for all areas were compared with data collected in 1977 and 1978, Figure 4. The hake averaged about 48 cm each year with the bulk of the commercial catch composed of fish between about 43 cm and 53 cm. In 1979 a group of small fish around 33 cm appeared in the commercial catches. These fish were taken primarily in September and October, the latter part of the fishing season. This size group was not recorded in 1977 or 1978. In 1978, however, a small group of fish averaging around 25 cm appeared in the samples. These small fish were also taken mainly during September and October.

Table 7.--Catch (percentage) by depth strata of some species taken by foreign trawlers off the coast of Washington, Oregon, and California, 1979.

Species of fish	Average depth of haul						
	0-99	100-199	200-299	300-399	400-499	500-599	>600
Hake	15.7	47.7	26.2	6.9	2.3	0.1	1.1
Widow rockfish	17.4	76.2	5.6	0.7	-	-	-
Yellowtail rockfish	31.0	64.4	4.1	0.4	-	-	-
Pacific ocean perch	7.0	28.3	51.0	10.6	2.8	0.1	0.2
Sablefish	4.8	41.2	30.7	15.3	7.2	0.2	0.6

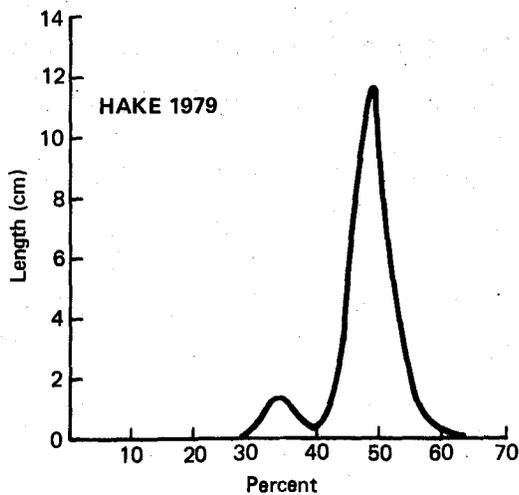
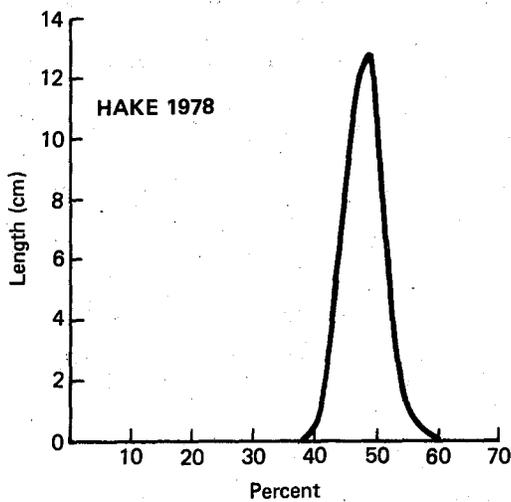
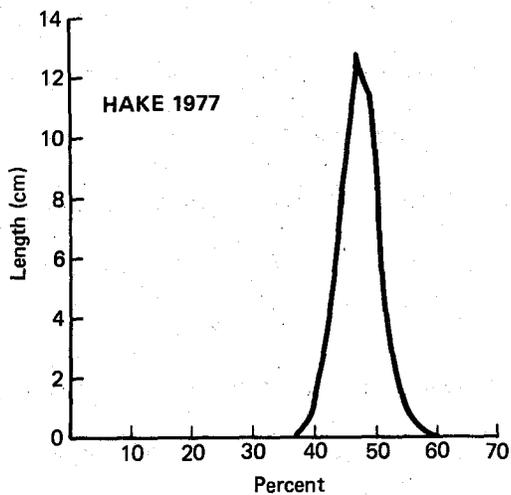


Figure 4.--Length frequency of hake taken in the foreign trawl fishery off Washington, Oregon, and California, 1977-79.

The dominance of age groups varied substantially over the three years as the various year classes moved through the fishery, Figure 5. The age composition of hake in 1979 indicated that two age groups predominated in the catch--the 6 year-old-fish and the 8 year-olds. The passage of age groups in the fishery over the three years 1977-79 is clearly marked. The 4 year-olds of 1977 predominated among the fish as 5 year-olds in 1978 and as 6 year-olds in 1979. The dominant group of 7 year-old-fish in 1977, also a strong year class in 1978 as 8 year-olds, made up only 10 percent of the catch in 1979. A difference was observed in the contribution to the catch made by the young age groups over the three years. In 1979 fish from 2 to 3 years of age made up 11 percent of the catch, whereas in 1977 and 1978 these age groups made up 3 percent of the catch.

Sablefish--The sablefish taken incidentally by foreign trawlers averaged about 48 cm (19 in.), Figure 6. These fish were from random samples and represented the average size of fish in the landings, not just those saved for processing. The average weight of sablefish was about 0.7 kg (1.5 lbs.) in June and ranged from 1.2 to 1.6 kg (2.6 to 3.5 lbs.) in October. These fish were much smaller than the size of sablefish in U.S. commercial landings. Recent data are not available but in the early 1950's (Phillips, 1954) commercial landings of sablefish off Eureka, California averaged about 31 in. (79 cm) and weighed about 9.5 lbs. (4.3 kg). Off Washington and Oregon in the early 1950's (Bell and Pruter, 1954) the sablefish in the commercial catch averaged between 7 and 8 lbs. (3.2 - 3.6 kg). The above data represent those that were landed and may not represent the average size of all fish caught.

The average size of the sablefish in the foreign trawl catches indicated that they probably were mostly pre-recruits, not yet generally available to the domestic fishery.

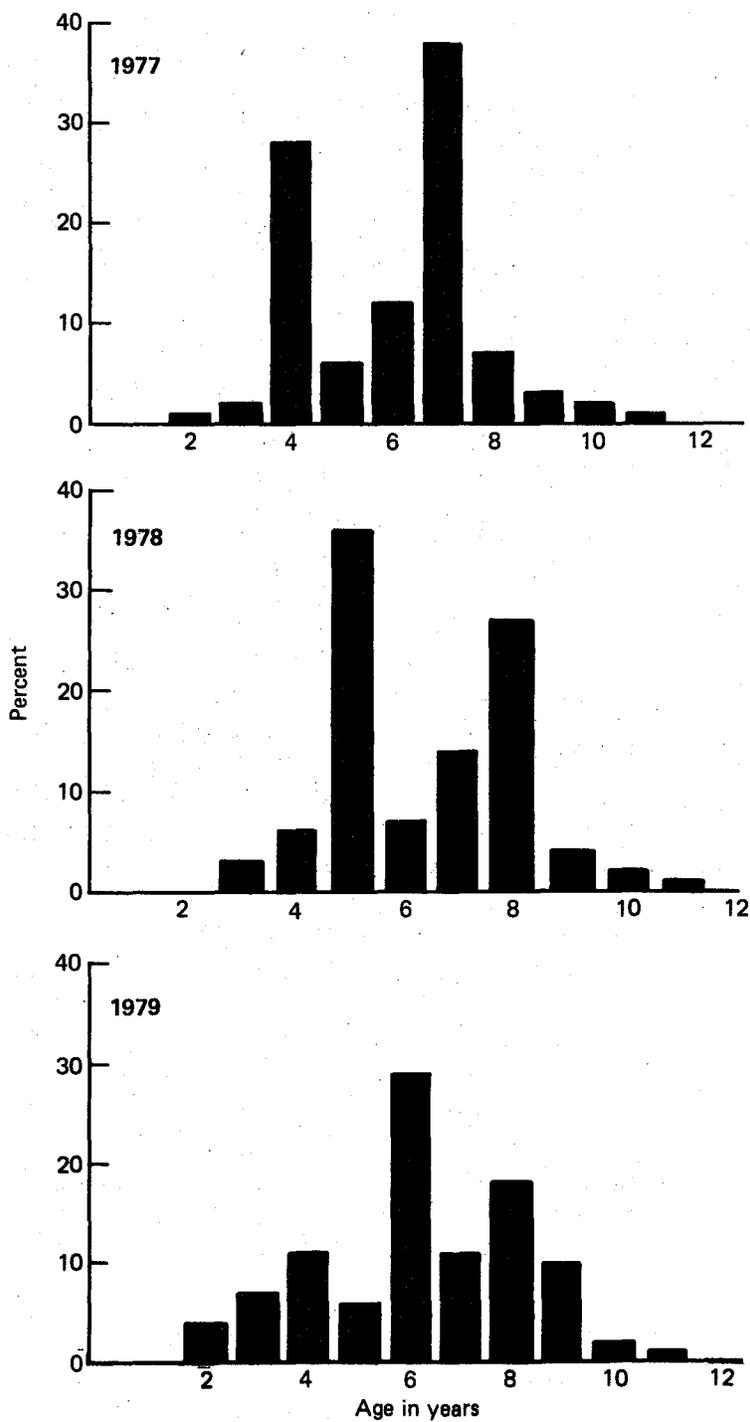


Figure 5.--Age composition of hake taken in the Columbia area by Soviet trawlers, 1977-79.

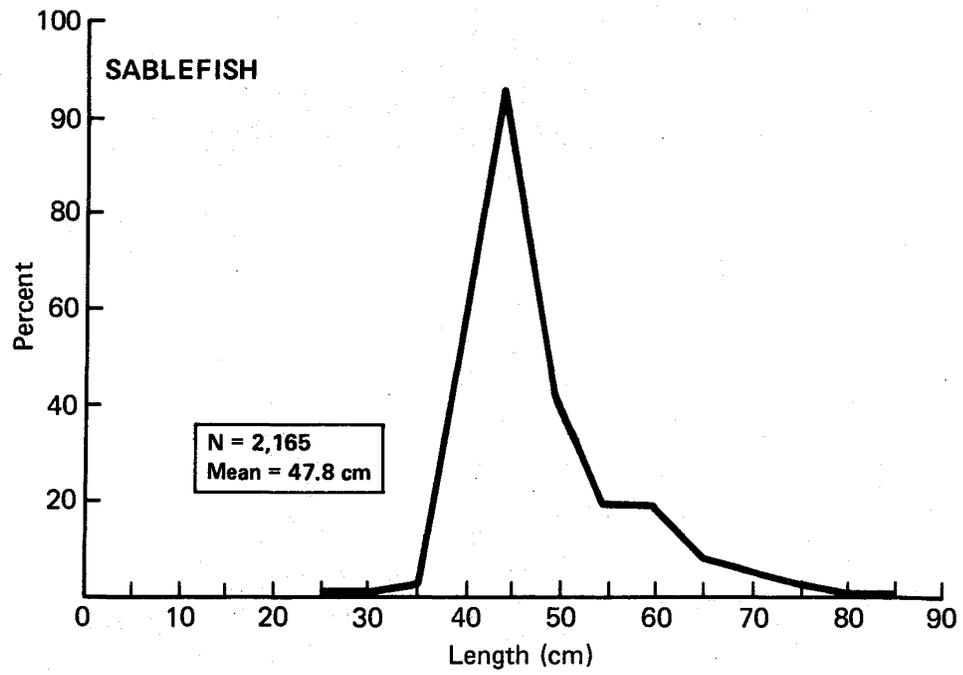


Figure 6.--Length frequency of sablefish taken by foreign trawlers off the coast of Washington, Oregon, and California, 1979.

Widow rockfish--The widow rockfish, the dominant species of rockfish in the foreign trawl catches, averaged about 42 cm, Figure 7. These fish averaged between 1 and 1.4 kg (2.2 and 3.1 lbs.).

#### SUMMARY

The Northwest and Alaska Fisheries Center placed 29 observers on foreign fishing vessels during the course of the season in 1979 off the Washington, Oregon, and California coast for the purpose of monitoring the foreign and US-USSR joint-venture fisheries. Coverage (observer days/vessel days) was about 34 percent on the foreign fleets and 57 percent on joint-venture vessels.

Based on observer data it was estimated that the foreign vessels took about 117,000 mt of fish and joint-venture vessels 9,000 mt. Pacific hake (whiting) accounted for 98 percent of the catch. Because estimates of the sablefish catch reached the quota of 0.1 percent of the Pacific hake allocation in early October, the fishery was closed although about 25 percent of the hake quota had not been taken. The incidental catch of salmon by the fleets was estimated at approximately 8,700 fish (29.8 mt), with the foreign trawlers accounting for about 7,000 fish and the joint-venture vessels 1,600 fish. Approximately 93 percent of the salmon catch was chinook salmon. The incidental catch of halibut was estimated to be about 40 fish (0.53 mt).

It was estimated the foreign fleet took about 939 mt of rockfish in 1979 and the joint-venture vessels about 73 mt. About 92 percent of the rockfish were from the Columbia area. The predominant rockfish in the catch was widow rockfish. The catch of flounders by the foreign fleets amounted to 14 mt, of which the arrowtooth flounder and rex sole predominated.

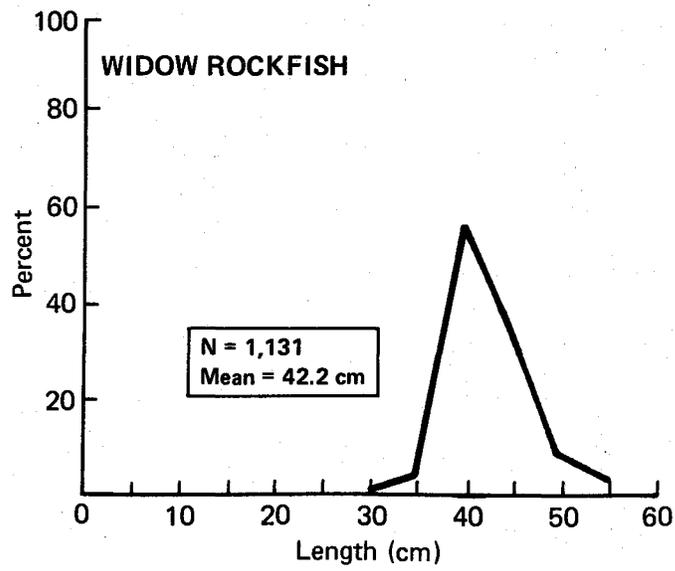


Figure 7.--Length frequency of widow rockfish taken by foreign trawlers off the coast of Washington, Oregon, and California, 1979.

Based on observer biological collections the Pacific hake averaged about 48 cm in 1979, the same as in 1977-78. The 6-year-old fish and 8 year-olds predominated in the catch in 1979. The sablefish taken incidentally to hake averaged about 48 cm and ranged from 0.7 kg in June to 1.6 kg in October. Widow rockfish averaged about 42 cm and weighed between 1 and 1.4 kg.

#### Literature Cited

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