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A JAPANESE GILL-NET FISHERY FOR BOTTOMFISH IN THE GULF OF ALASKA

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ABSTRACT

The Seiju Maru No. 3 was 1 of 4 factoryships authorized by the Japanese Fisheries Agency to fish in the Gulf of Alaska and adjacent areas for bottomfish during the spring and summer of 1963. She was accompanied by three catcher vessels which fished bottom gill nets at depths of 150 to 1,000 meters (492 to 3,280 feet) for rockfishes and sablefish (Anoplopoma fimbria). Fishing began April 23 south of Unalaska Island; thereafter to September 20 the fleet moved generally from west to east. Observers from the United States accompanied the fleet to collect data to assist in the evaluation of the effect on Pacific halibut (Hippoglossus stenolepis) of fishing for other bottomfish.

Fishing was concentrated on sablefish from early May; success increased as the fleet moved eastward. Sablefish were most abundant between 500 and 900 meters (1,640 and 2,953 feet); blackthroat rockfish (Sebastodes aleutianus) between 300 and 600 meters (984 and 1,968 feet); and arrowtooth flounder (Atheresthes stomias) and Pacific ocean perch (Sebastodes alutus) between 200 and 500 meters (656 and 1,640 feet). Eighty-six halibut were captured at depths of 200 to 800 meters (656 to 2,625 feet); most were taken between 400 and 500 meters (1,312 and 1,640). With one exception (May 4), halibut catches contributed less than 1 percent of the daily landings. All halibut were dead when landed.

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INTRODUCTION

To advise on the kinds of information needed to assess the effects on Pacific halibut (Hippoglossus stenolepis) of a proposed Japanese fishery for bottomfish in the Gulf of Alaska[1/], the International North Pacific Fisheries Commission (INPFC), at its Ninth Annual meeting in Seattle, November 16, 1962, appointed the Gulf of Alaska Groundfish Committee. The Committee recommended (INPFC Document 601) on February 18, 1963, in Tokyo, Japan, that the official responsibility of compiling, tabulating, and analyzing the commercial catch records be delegated to the Japanese Fisheries Agency. The Committee also recommended that trained observers from Japan, Canada, or the United States collect information supplementary to that contained in fishing logbook records to assist in the evaluation of the effect on halibut of fishing for other bottomfish. In addition, it recommended biological observations on commercially important species.

This report deals with observations and data collected aboard the Seiju Maru No. 3 factoryship, April 23-September 20, 1963, by two observers from the U. S. Bureau of Commer-

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1/Under the International Convention for the High Seas Fisheries of the North Pacific Ocean (INPFC 1954), Japan agreed to abstain from fishing for halibut originating along the coast of North America.

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cial Fisheries. George Tanonaka was aboard the factoryship on April 27-June 28, and Jiro Nishimoto from June 29-September 20.

FISHING OPERATIONS

The Seiju Maru No. 3 (table 1), a refrigerated factoryship chartered by the Yutaka Fishing Company of Tokyo, Japan, was accompanied by three catcher vessels which fished bottom gill nets for bottomfish in the Gulf of Alaska and adjacent areas during April-September 1963. This test-fishing with bottom gill nets was conducted to explore the commercial possibilities of capturing bottomfish in areas where depth, bottom topography, and steepness of the continental slope normally prevent trawling.

Table 1 - Positions of Bureau of Commercial Fisheries-Atomic Energy Commission Trawling Stations off the Columbia River, Oreg.

Station Designation	Depth (Fathoms)	Position		Station Designation	Depth (Fathoms)	Position	
		N. Lat.	W. Long.			N. Lat.	W. Long.
1A	50	46°08.2'	124°12.3'	14A	375	45°56.7'	124°51.0'
2A	75	46°07.4'	124°31.6'	15A	400	45°53.6'	124°52.6'
3A	100	46°03.4'	124°39.4'	16A	425	45°59.2'	124°52.1'
4A	125	46°02.2'	124°43.1'	17A	450	45°54.1'	124°55.5'
5A	150	46°02.8'	124°43.8'	18A	475	45°52.2'	124°52.5'
6A	175	45°59.6'	124°44.1'	19A	500	46°02.7'	124°57.3'
7A	200	46°00.3'	124°45.4'	23A	600	45°44.5'	124°53.9'
8A	225	45°58.2'	124°45.0'	25A	650	45°44.3'	124°54.0'
9A	250	45°58.2'	124°46.2'	29A	750	45°36.3'	124°53.7'
10A	275	45°59.9'	124°49.1'	31A	800	46°01.8'	125°04.5'
11A	300	45°57.5'	124°48.8'	33A	850	45°54.0'	125°08.8'
12A	325	45°58.0'	124°50.3'	35A	900	45°50.0'	125°10.6'
13A	350	45°56.0'	124°49.5'	41A	1,050	45°42.2'	125°13.0'

Principal species caught were arrowtooth flounder (Atheresthes stomias), Pacific ocean perch (Sebastodes alutus), blackthroat rockfish (Sebastodes aleutianus), and sablefish (Anoplopoma fimbria). The fleet also "trial-fished" for Pacific herring (Clupea harengus pallasii) with surface gill nets during April and occasionally during the remainder of the trip, but had no success.

Table 1a - Vessel Specifications and Complement of Seiju Maru No. 3 Fleet

Name	Type	Tonnage (Metric)	Dimensions (Feet)			Speed (Knots)	Horse-power	Ship's Complement	Navigational Equipment
			Length	Width	Depth				
Seiju Maru No. 3	Refrigerated Factoryship	1,184.2	214.3	36.1	17.4	11	1,700	1/85	Radar, loran, direction-finder, depth-recorder, auto-gyro compass.
Kaiko-Maru No. 2	Catcher	83.7	77.1	17.1	8.7	8	270	18	Radar, direction-finder, depth-recorder.
Kyokko Maru No. 3	Catcher	74.9	79.7	16.1	7.8	9	270	18	Radar, direction-finder, depth-recorder.
Mitsu Maru No. 23,	Catcher	84.1	81.0	17.4	8.5	9	270	18	Radar, direction-finder, depth recorder.

1/Personnel of factoryship included 50 fish processors and miscellaneous personnel, 30 ship's crew, and 5 company personnel.

Table 1b - Holding Capacity of Factoryship

Location	Volume	Weight	Utility
	Cubic Feet	Metric Tons	
Below deck: Hold no. 1	1,302.6	19.4	Dry storage
" " 2	15,309.0	227.5	Gear storage
" " 3	17,815.9	265.0	Cold storage
" " 4	17,494.7	260.2	" "
Total	51,922.2	772.1	
Main deck freezing room no. 1	204.7	3.0	Sharp freezing
" " 2	204.7	3.0	" "
" " 3	204.7	3.0	" "
Total	614.1	9.0	

Table 1 gives the vessel specifications and ship's complement of the Seiju Maru No. 3. leet.

AREA: Fishing by the fleet of the Seiju Maru No. 3, as authorized by the Japanese Fish-ries Agency, was restricted to an area in the Gulf of Alaska bounded by longitudes 170° W. nd 145° W., on the south by latitude 50° N., and on the north by the 150-meter depth contour. ctual fishing, however, was only between the 150- and 1,000-meter (492- and 3,280-foot) epths (fig. 1). The actual fishing areas are divided into statistical areas as determined by e Gulf of Alaska Groundfish Committee.2/

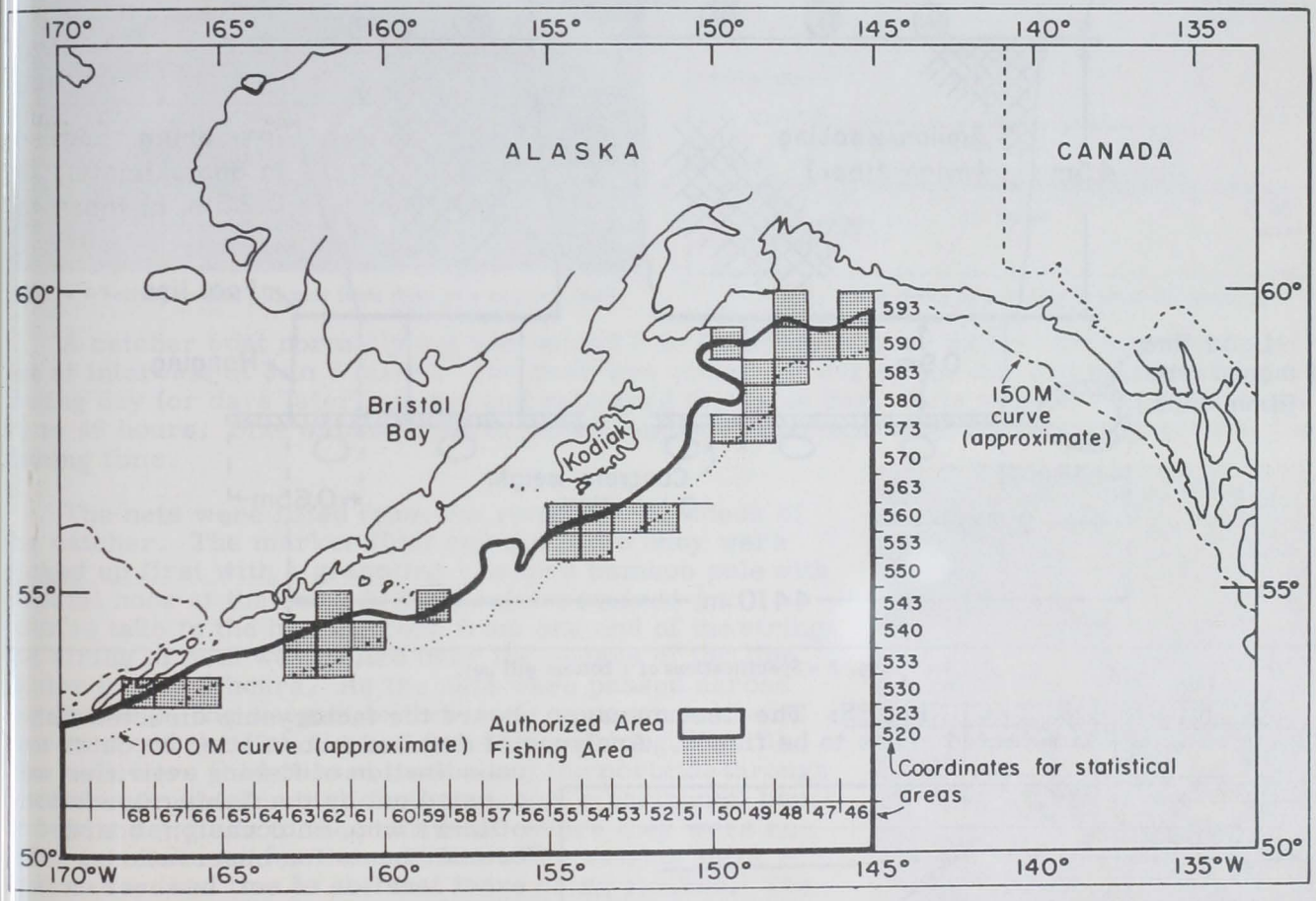

Fig. 1 - Authorized and actual fishing area of the Seiju Maru No. 3, April 24-September 20, 1963.

GEAR: Test-fishing by the Seiju Maru No. 3 fleet probably represented the first com-nercial use of bottom gill nets in Alaskan waters to fish bottomfish. The gear was essential-y a gill net constructed to fish 3 feet from the ocean bottom. A tan (shackle) of gear was a-bout 152 feet long and 14 feet deep; mesh sizes ranged from 4.5 to 5.5 inches, stretched meas-ure. The number of tans of various mesh sizes are given below:

Mesh Size (inches)	Number of Tans
4.5	50
4.7	400
*5.0	650
5.4	15
*5.5	85

*Fished only after July 6.

2/Statistical areas include intervals of 1 degree longitude and 30 minutes latitude. Area numbers are prefixed by longitude and are followed by the latitude as shown in fig. 1.

Specifications of the bottom gill net are given diagramatically in fig. 2. Nets in a string of gear had the same mesh size. Tans of varying mesh sizes were, however, combined to give experimental strings or were incorporated in strings to replace nets lost or damaged.

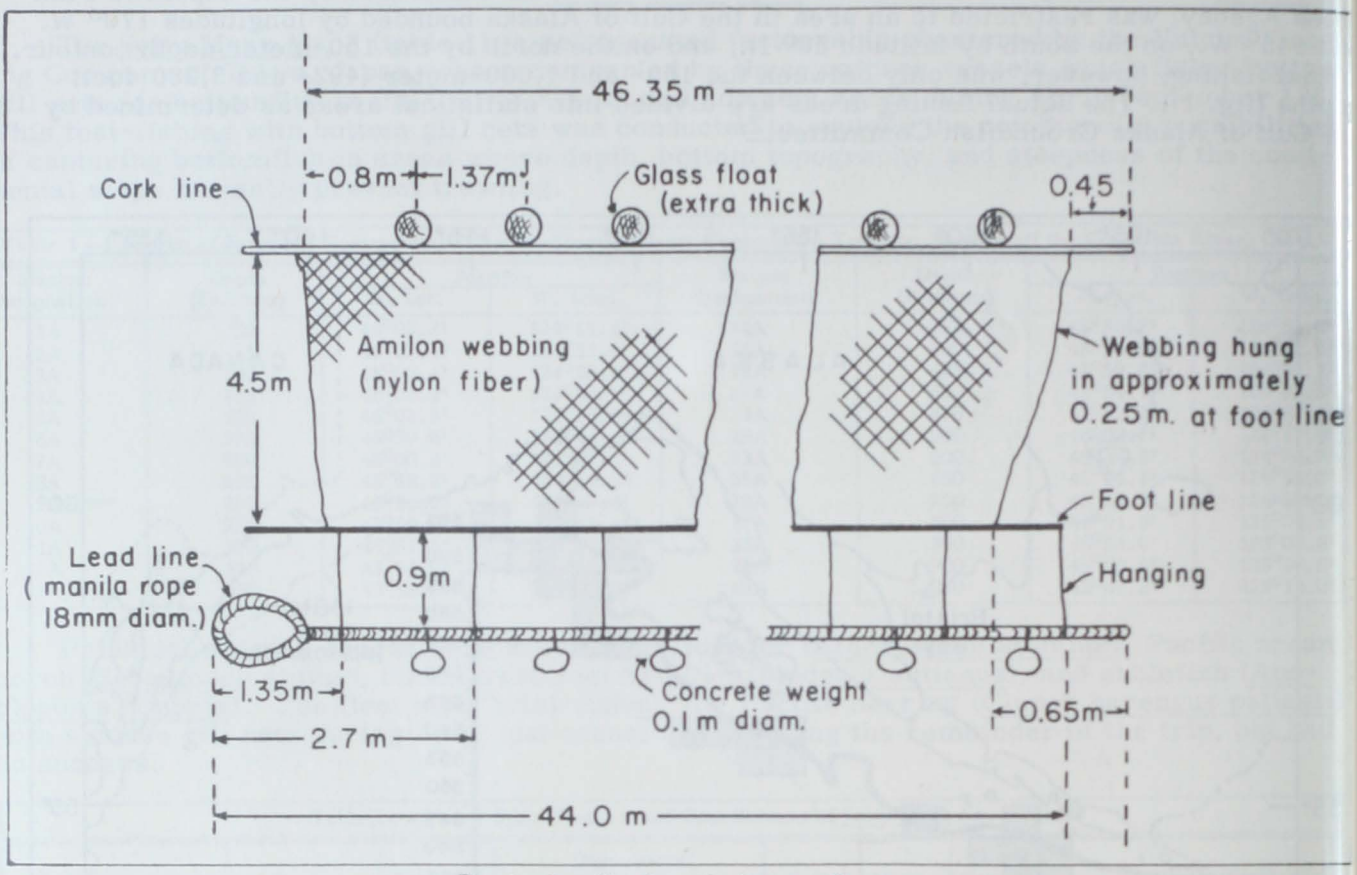

Fig. 2 - Specifications of a bottom gill net.

METHODS AND TECHNIQUES: The fleet manager aboard the factoryship directed fishing operations and selected areas to be fished. Analyses of detailed information on catch and coordination of fishing activities were carried out by the fishing-operation officers who, on occasion, boarded catcher boats for observations. The exact location of set, however, was generally left to the discretion of the master fisherman aboard each catcher boat, who considered the following items: character of sea bottom, desired depths, and direction and speed of current.

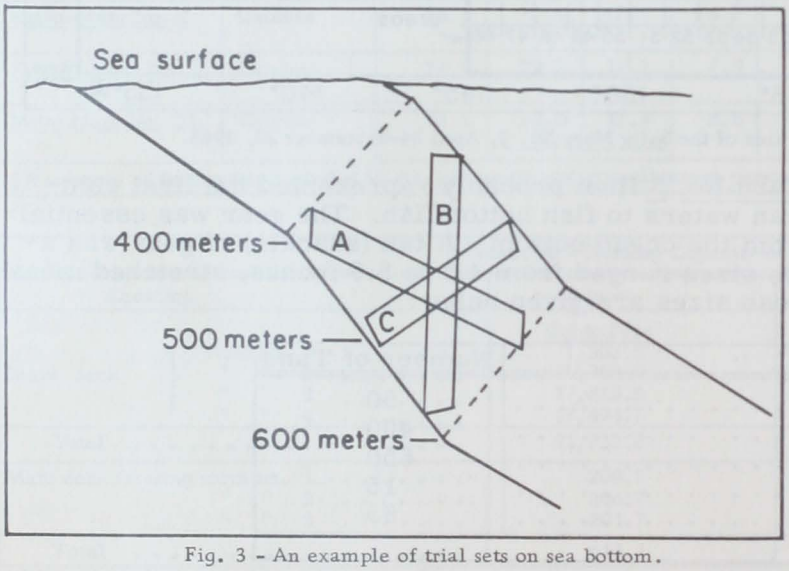

Fig. 3 - An example of trial sets on sea bottom.

Trial sets usually initiated fishing in a new area. In the example of fig. 3, catches made in trial sets "A" or "B" were observed, and if type "A" or type "B" indicated that fish were caught mostly between (for example) 450 and 550 meters, then subsequent sets were made in type "C" position for that area.

Setting of a string of gear normally took 15 to 25 minutes, depending on sea condition and depth. From 25 to 45 tans were set from the stern as the vessel moved forward at about 3 knots (see fig. 4). Items were let out in the order: flag pole and marker floats; hauling rope; anchor; gill nets; anchor; hauling rope; and another marker. A radio buoy usually was attached to one end of the string or to the first marker float (fig. 5).

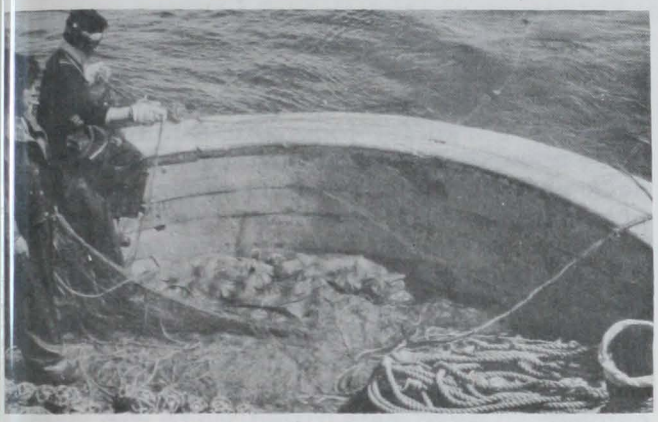

Fig. 4 - Setting sunken gill nets from stern of a catcher boat.

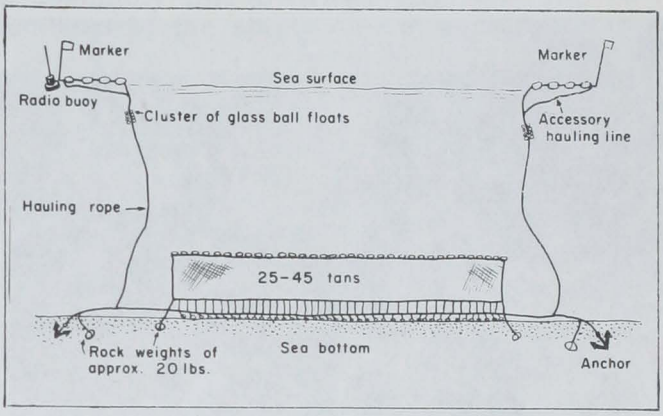

Fig. 5 - A string of gear in a typical set position.

A catcher boat normally set and hauled 2 to 4 strings of gear daily. Strings usually were set at intervals of 3 to 5 miles. The gear was either set during the day and retrieved the following day (or days later), or set and retrieved the same day. Nets were in the water from $3\frac{1}{2}$ to 48 hours. Size of catch, depth fished, and sea condition were the factors governing the fishing time.

The nets were lifted from the starboard foredeck of the catcher. The marker float and the radio buoy were picked up first with a grappling line or a bamboo pole with a metal hook at the end. A line hauler required $\frac{1}{2}$ to 1 hour to take in the hauling rope from one end of the string; the string of nets was hauled over the sheave of the line hauler in 1 to 2 hours. As the nets were passed across the foredeck, the weights (either rock or concrete) were removed and the fish cleared from the webbing (fig. 6). The nets were then passed back along the portside through a wooden or sheet-metal chute and over a horizontal bamboo-pole net guide to the rear deck, where they were coiled in readiness for the next set. The weights were retied on the lead line as the nets were being stacked. The total hauling time for a string of gear was 2 to 4 hours, depending on the depth fished, number of fish, and sea condition.

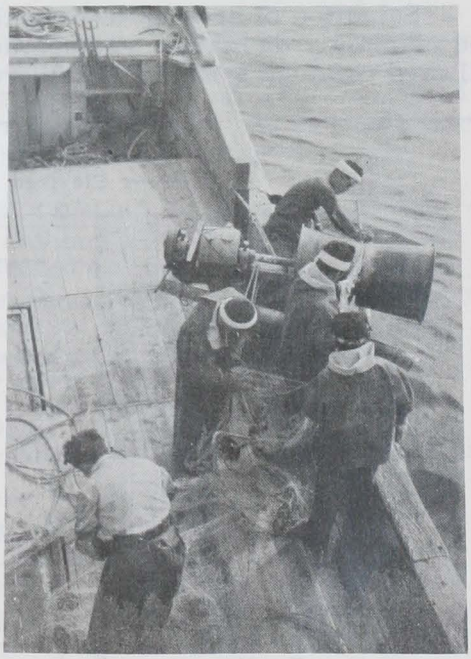

Fig. 6 - Sunken gill nets being hauled aboard a catcher boat.

The cylindrical drum line hauler was mechanically driven. Secured on the deck floor, near to the line hauler, was an "open-throated" block used by the fishermen to pull the lead line from the line hauler. A bamboo-pole guard, lashed across the starboard side of the catcher just below the line hauler, guided the net to the gurdy.

Seven to 9 crewmen normally worked on the foredeck. One guided the lead line over the sheave, two pulled the lead line from the line hauler and removed the weights, and others removed fish and disentangled the nets. Captured fish, picked out by hand or removed by shaking the net, were stowed in shallow fish holds under the foredeck. When the fish holds were

filled, the remaining fish were left on the foredeck to be placed later into transfer nets. The catchers iced their catch whenever it was not transferred to the factoryship on the day of capture.

TRANSFER OF CATCH: After drifting at night, the factoryship ran an average of 10 to 30 miles a day to receive the catch from the catcher boats. The catch usually was transferred in the late afternoon and early evening. In calm or moderate seas, the catcher boat pulled alongside the drifting factoryship to unload her catch and damaged nets (fig. 7). The entire transfer took 10 to 20 minutes. Once aboard, the catch was spilled onto the deck and pushed down to the workers for processing.

Fig. 7 - Transfer of catch from catcher boat to factoryship.

In rough seas, catcher boats were positioned approximately 200 yards from the starboard side of the factoryship. The factoryship then drifted a wire cable, equipped with floats and snap-hook line, out to the catcher. Cargo nets filled with the catch were then attached to the snap-hook line, dumped from the catcher, towed through the water, and brought aboard the factoryship.

PROCESSING

Selection of species to be retained and processing methods aboard the factoryship depended primarily on market requirements, and, secondarily, on available holding space. Species always retained were sablefish, rockfishes, and arrowtooth flounder.

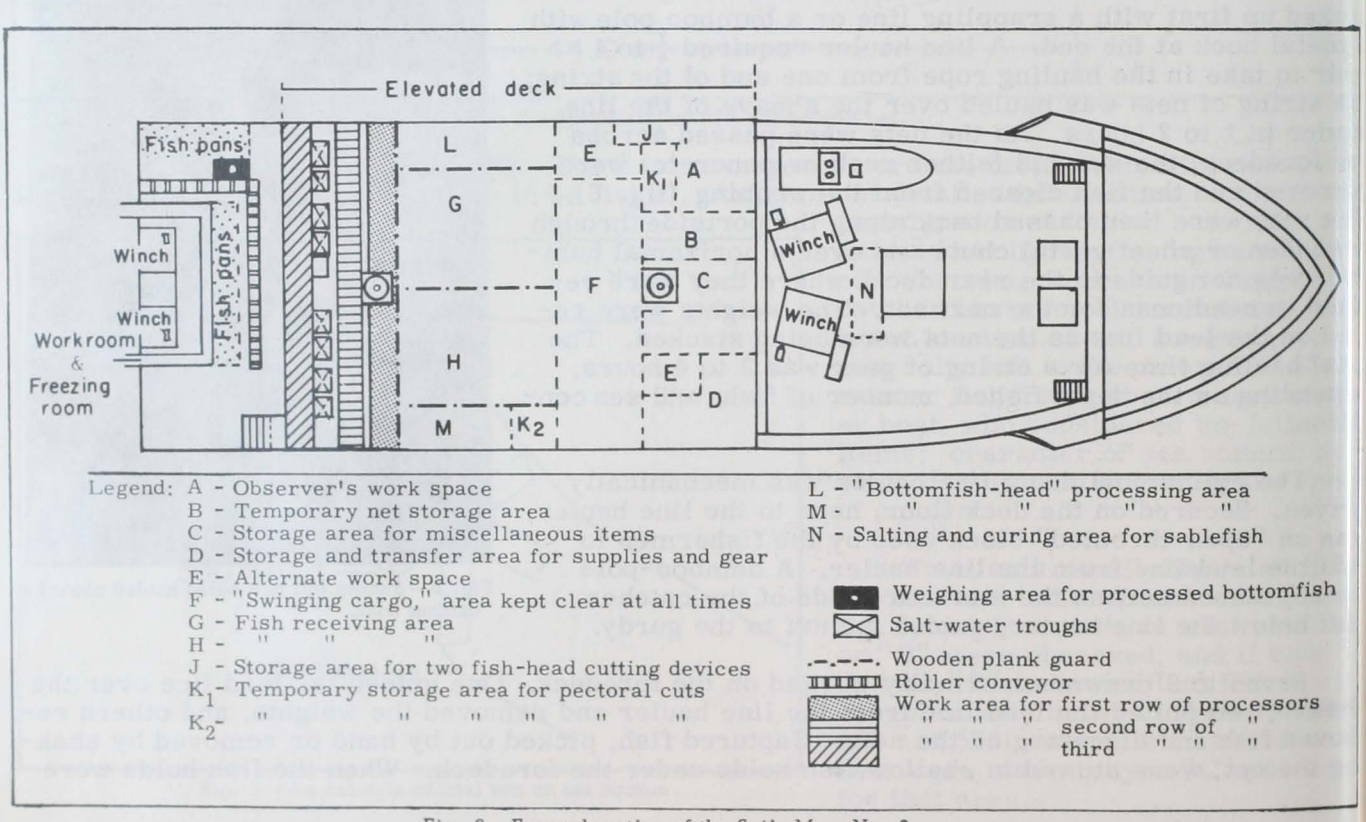

Fig. 8 - Forward section of the Seiju Maru No. 3.

Fish were processed on an elevated deck constructed about 3 feet above the regular deck. This elevated deck spanned the width of the foredeck and was about 50 feet long. A center plank-guard $1\frac{1}{2}$ feet high divided the fish receiving area of this operational deck into two sections (areas G and H of fig. 8); those two sections, in turn, had side and front plank guards to retain the catch.

SABLEFISH: Sablefish were processed in an assembly-line manner (fig. 9). The 10 workers in the top row cut and gutted the fish; members of the ship's crew working on the unloading deck also assisted. The second row of 12 workers then cleaned the body cavity with metal scoops attached to a continuously flowing sea-water system. Cleaned fish were thrown into troughs of salt water behind those workers. The wooden troughs measured approximately $2\frac{1}{2}$ feet by $1\frac{1}{2}$ feet; a piece of net attached to the trough served as a brail, enabling workmen to rinse and remove the fish by agitating and lifting the net. The third row of workers then sorted and placed the dressed fish into pans of 10- and 20-kg. (22- and 44-pound) capacity. The tails of large sablefish were cut off at this time. Pans were weighed before they were passed into the freezing units on roller conveyers.

Fig. 9 - Processing fish aboard the factoryship Seiju Maru No. 3.

Liver and pectoral sections of sablefish were also prepared (fig. 10). This was done in the side aisles and elsewhere in the unloading areas. Livers were put into pans of 10- and 20-kg. capacity and frozen; pectoral sections were piled on deck to be transferred later by bamboo baskets for washing and freezing. In addition, approximately 300 dressed sablefish (all small) were salted experimentally.

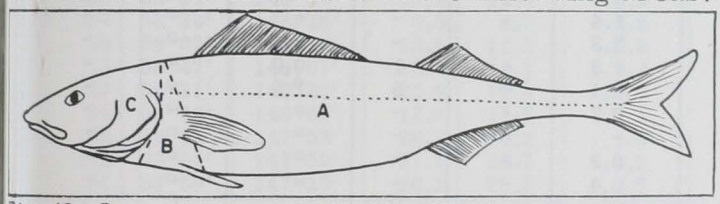

Fig. 10 - Processed sections of sablefish: (A) body section, (B) pectoral section, and (C) waste.

BLACKTHROAT ROCKFISH: Normally, large catches of blackthroat rockfish were separated aboard the catchers prior to transfer to the factoryship. Once separated, the rockfish were quickly beheaded by a manually-operated cutter on the port side of the unloading deck (fig. 8), and cut laterally into two unequal portions by workers in the first row. The fish were then cleaned, rinsed, and placed in pans of 10- to 20-kg. capacity for freezing.

PACIFIC OCEAN PERCH AND ARROWTOOTH FLOUNDER: Pacific ocean perch and arrowtooth flounder were beheaded, gutted, and frozen. Small arrowtooth flounders were discarded; tails of the larger ones were cut off.

FREEZING AND PACKAGING: Temperatures for sharp freezing normally were -28° to -30° C. (-18.4° to -22.0° F.). After about 8 hours, or on the following day--depending on the quantity being frozen--the blocks of fish were removed from the pans, glazed with sea water, and packaged in prelabeled, individual paper cartons. These cartons were than placed in 1 of 2 cold-storage holds to await shipment to Japan via a supply vessel.

CATCH RECORDS

In commercial fishing like that of the Seiju Maru No. 3, time was too short to record and tabulate exact weights or number of fish captured. Consequently, the catch by weight reported by company officials was based on the following:

1. The approximate numbers of fish captured were noted aboard the catcher boats and converted to weight for each string of gear. The data were radioed to the factoryship immediately after each haul. A record was kept by the fishing-operation officer aboard the factoryship on catch by weight of major species for each string of gear.

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut 1/			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Total Catch	Sable-fish	Arrow-Tooth Flounder	Black Throat-Rockfish	Pacific Ocean Perch	Number	Avg. Wt. (Kg.)	Number	Avg. Wt. (Kg.)
April 24	53°40'	164°20'	-	-	-	-	-	-	-	-	-
25	53°22'	165°15'	-	-	-	-	-	-	-	-	-
26	54°04'	165°00'	-	-	-	-	-	-	-	-	-
27	53°25'	165°30'	-	-	-	-	-	-	-	-	-
28	54°94'	162°38'	1.3	0.6	-	0.2	0.5	-	-	-	-
29	53°53'	163°17'	1.3	1.3	-	-	-	-	-	-	-
30	54°11'	161°28'	2.6	2.2	0.2	-	0.2	5	1.6	-	-
Total			5.2	4.1	0.2	0.2	0.7	5	1.6	-	-
May 1	54°09'	160°44'	5.2	4.8	0.2	0.2	-	8	2.0	3	5.4
2	54°03'	162°11'	3.8	3.8	-	-	-	11	1.7	3	3.9
3	54°04'	161°35'	2.4	2.2	0.2	-	-	-	-	-	-
4	54°15'	159°34'	3.6	3.2	0.2	-	0.2	20	1.9	7	4.2
5	53°59'	161°46'	2.2	2.0	0.2	-	-	1	1.2	-	-
6	54°03'	161°42'	2.6	2.2	0.4	-	-	-	-	-	-
7	54°04'	161°35'	1.8	1.8	-	-	-	1	2.9	-	-
8	54°50'	157°27'	3.5	3.5	-	-	-	-	-	-	-
9	54°12'	161°17'	2.8	2.8	-	-	-	2	1.6	-	-
10	54°13'	160°49'	1.0	0.8	0.2	-	-	-	-	-	-
11	54°08'	162°24'	Running to new fishing area								
12	55°24'	155°52'	7.2	7.2	-	-	-	-	-	-	-
13	56°15'	152°55'	11.2	11.0	0.2	-	-	-	-	-	-
14	56°15'	152°58'	13.0	12.6	0.4	-	-	1	2.5	-	-
15	56°21'	152°36'	12.6	11.4	1.2	-	-	-	-	-	-
16	56°24'	152°30'	7.0	7.0	-	-	-	-	-	-	-
17	56°27'	152°08'	5.8	5.6	0.2	-	-	-	-	-	-
18	56°24'	152°13'	4.7	4.7	-	-	-	1	1.4	-	-
19	56°19'	152°15'	13.2	10.6	-	2.6	-	2	2.6	-	-
20	56°24'	152°12'	12.4	9.0	0.8	2.6	-	-	-	-	-
21	56°30'	151°50'	3.7	1.9	0.4	1.4	-	-	-	-	-
22	56°25'	152°14'	7.2	4.5	0.4	2.3	-	-	-	-	-
23	56°32'	151°50	3.2	1.7	0.2	1.3	-	1	0.9	-	-
24	56°29'	152°04'	5.3	4.5	0.4	0.4	-	5	1.9	-	-
25	56°21'	152°17'	1.6	0.9	-	0.7	-	-	-	-	-
26	56°17'	152°54'	4.1	3.9	0.2	-	-	-	-	-	-
27	56°15'	152°45'	2.7	2.3	0.2	0.2	-	-	-	-	-
28	55°59'	153°27'	5.4	5.0	-	0.4	-	-	-	-	-
29	56°00'	153°26'	8.9	8.7	0.2	-	-	-	-	1	3.5
30	56°18'	153°13'	6.7	6.5	0.2	-	-	-	-	-	-
31	55°53'	153°47'	4.1	3.7	0.4	-	-	-	-	-	-
Total			168.9	149.8	6.8	12.1	0.2	53	99.5	14	60.8
June 1	55°53'	153°49'	6.8	6.2	0.4	0.2	-	-	-	-	-
2	58°00'	148°28'	8.7	8.7	-	-	-	-	-	-	-
3	57°54'	149°14'	4.0	4.0	-	-	-	-	-	-	-
4	57°56'	148°59'	12.7	11.4	0.9	0.4	-	-	-	-	-
5	57°58'	148°57'	3.2	3.2	-	-	-	-	-	-	-
6	57°57'	148°59'	18.1	17.9	0.2	-	-	-	-	-	-
7	57°57'	148°57'	13.6	13.2	0.4	-	-	-	-	-	-
8	58°00'	148°48'	10.4	10.4	-	-	-	-	-	-	-
9	57°58'	148°37'	10.8	10.4	0.4	-	-	-	-	-	-
10	57°59'	148°35'	12.3	11.8	0.5	-	-	-	-	-	-
11	58°12'	148°38'	6.5	6.5	-	-	-	-	-	-	-
12	58°02'	148°30'	14.8	14.8	-	-	-	-	-	-	-
13	58°13'	148°27'	13.4	13.4	-	-	-	-	-	-	-
14	58°06'	148°29'	15.0	14.8	0.2	-	-	-	-	-	-
15	58°19'	148°15'	15.5	14.8	0.4	0.3	-	-	-	1	5.5
16	58°18'	148°15'	23.0	22.3	0.2	0.5	-	-	-	-	-
17	58°17'	148°21'	14.3	14.1	0.2	-	-	-	-	-	-
18	58°24'	148°11'	9.9	9.3	0.4	0.2	-	-	-	-	-
19	58°29'	148°08'	13.4	13.4	-	-	-	-	-	-	-
20	58°34'	148°05'	16.2	16.2	-	-	-	-	-	-	-
21	58°36'	148°00'	12.8	12.8	-	-	-	-	-	-	-
22	58°35'	148°02'	12.9	12.9	-	-	-	-	-	-	-
23	58°36'	148°08'	8.3	8.1	0.2	-	-	-	-	-	-
24	58°34'	148°05'	10.5	10.5	-	-	-	-	-	-	-
25	58°38'	147°59'	15.5	15.3	-	0.2	-	-	-	-	-

(Table continued on next page.)

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963 (Contd.)

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut[1/]			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Total Catch	Sable-fish	Arrow-Tooth Flounder	Black Throat-Rockfish	Pacific Ocean Perch	Number	Avg. Wt. (Kg.)	Number	Avg. Wt. (Kg.)
June 26	58°37'	148°05'	15.4	15.4	-	-	-	-	-	-	-
27	58°31'	148°03'	14.5	14.5	-	-	-	-	-	-	-
28	58°32'	148°06'	10.2	10.0	-	0.2	-	-	-	-	-
29	58°34'	148°07'	2.0	2.0	-	-	-	-	-	-	-
30	58°22'	148°28'	16.7	15.1	-	1.6	-	-	-	2	22.8
Total			361.4	353.4	4.4	3.6	-	-	-	3	51.1
July 1	58°29'	148°17'	12.8	12.6	0.2	-	-	-	-	-	-
2	58°32'	148°10'	17.6	17.4	-	0.2	-	-	-	-	-
3	58°29'	148°07'	18.4	17.6	0.2	0.6	-	-	-	-	-
4	58°27'	148°14'	16.7	15.7	0.4	0.6	-	-	-	-	-
5	58°12'	148°35'	13.4	12.0	0.6	0.8	-	-	-	-	-
6	57°58'	148°55'	14.3	13.7	0.2	0.4	-	-	-	-	-
7	58°25'	148°57'	6.6	6.6	-	-	-	-	-	-	-
8	57°57'	148°41'	26.3	26.3	-	-	-	-	-	-	-
9	58°00'	148°45'	11.2	11.0	-	0.2	-	-	-	-	-
10	57°57'	148°55'	11.0	11.0	-	-	-	-	-	-	-
11	57°59'	149°02'	15.3	15.1	0.2	-	-	-	-	-	-
12	57°59'	149°02'	15.0	14.8	0.2	-	-	-	-	-	-
13	57°58'	149°01'	14.6	14.6	-	-	-	-	-	-	-
14	57°58'	148°50'	12.5	12.3	-	0.2	-	-	-	-	-
15	57°55'	149°04'	8.6	8.4	-	0.2	-	-	-	2	25.1
16	58°00'	148°34'	2.5	2.5	-	-	-	-	-	-	-
17	58°00'	148°34'	7.0	7.0	-	-	-	-	-	-	-
18	58°08'	148°40'	7.5	7.5	-	-	-	-	-	-	-
19	57°57'	149°00'	0.0	-	-	-	-	-	-	-	-
20	58°11'	148°45'	15.5	15.5	-	-	-	-	-	-	-
21	58°01'	148°55'	5.2	4.8	-	0.4	-	-	-	-	-
22	58°02'	148°45'	7.2	6.8	0.2	0.2	-	-	-	-	-
23	58°11'	148°39'	12.7	12.3	0.2	0.2	-	-	-	-	-
24	58°30'	148°26'	9.5	8.7	0.4	0.4	-	-	-	-	-
25	58°03'	149°30'	13.5	11.5	0.8	1.0	0.2	-	-	-	-
26	58°47'	148°07'	15.7	15.1	0.4	0.2	-	-	-	2	35.5
27	58°21'	148°28'	20.9	19.5	0.6	0.8	-	-	-	-	-
28	58°48'	148°03'	12.5	11.5	0.4	0.6	-	-	-	-	-
29	59°05'	147°53'	26.2	25.2	1.0	-	-	-	-	-	-
30	59°00'	147°50'	21.1	20.7	0.2	0.2	-	-	-	-	-
31	58°59'	147°29'	26.2	25.2	0.6	0.4	-	-	-	-	-
Total			417.5	402.9	6.8	7.6	0.2	0	0	4	121.2
Aug. 1	59°10'	147°41'	17.7	16.7	0.6	0.4	-	-	-	-	-
2	59°08'	147°43'	20.5	20.1	-	0.4	-	-	-	-	-
3	59°11'	147°21'	16.2	16.2	-	-	-	-	-	-	-
4	59°10'	147°14'	8.7	8.7	-	-	-	-	-	-	-
5	59°04'	147°35'	18.4	18.2	-	0.2	-	-	-	-	-
6	59°11'	147°22'	16.8	16.8	-	-	-	-	-	-	-
7	59°11'	147°05'	14.0	13.8	-	0.2	-	-	-	-	-
8	58°50'	147°51'	12.3	12.1	-	0.2	-	-	-	-	-
9	59°12'	146°57'	11.5	11.5	-	-	-	-	-	-	-
10	59°05'	147°41'	12.2	11.8	-	0.4	-	-	-	3	30.4
11	59°11'	147°02'	8.3	7.9	-	0.4	-	-	-	-	-
12	59°15'	146°30'	9.6	9.1	-	0.5	-	-	-	-	-
13	59°18'	146°14'	18.3	17.8	-	0.5	-	-	-	-	-
14	59°17'	146°02'	7.3	6.5	0.2	0.6	-	-	-	2	33.2
15	59°18'	146°19'	10.0	9.2	-	0.8	-	-	-	-	-
16	59°29'	145°44'	18.6	18.6	-	-	-	-	-	-	-
17	59°27'	145°28'	17.8	17.6	-	0.2	-	-	-	-	-
18	59°30'	145°20'	16.2	16.2	-	-	-	-	-	-	-
19	59°29'	145°30'	15.5	15.3	-	0.2	-	-	-	-	-
20	59°25'	145°25'	19.6	19.6	-	-	-	-	-	-	-
21	59°26'	145°23'	13.5	12.9	-	0.6	-	-	-	-	-
22	59°24'	145°30'	18.8	18.0	-	0.8	-	-	-	-	-
23	59°25'	145°22'	18.4	17.6	-	0.8	-	-	-	-	-
24	59°26'	145°21'	11.9	10.9	0.4	0.6	-	-	-	-	-
25	59°25'	145°23'	10.1	10.1	-	-	-	-	-	-	-
26	59°27'	145°24'	6.7	6.5	-	0.2	-	-	-	-	-

(Table continued on next page.)

Table 2 - Daily Landings of the Seiju Maru No. 3 Fleet, April 24-September 20, 1963 (Contd.)

Date	Mothership Noon Position		Catch (Metric Tons)					Halibut[1]			
								Under 66 cm.		Over 66 cm.	
	Lat. N.	Long. W.	Catch	Sablefish	Arrowtooth Flounder	Blackthroat Rockfish	Pacific Ocean Perch	Number	Avg. Wt. (Kg.)	Number	Avg. Wt. (Kg.)
Aug. 27	59°15'	146°46'	11.9	11.7	0.2	-	-	-	-	-	-
28	59°11'	147°10'	16.4	16.0	0.2	0.2	-	-	-	-	-
29	59°00'	147°40'	18.1	18.1	-	-	-	-	-	-	-
30	59°01'	147°45'	11.0	11.0	-	-	-	-	-	-	-
31	58°59'	148°20'	10.3	10.3	-	-	-	-	-	1	4.5
Total			436.6	426.8	1.6	8.2	0.0	0	0	6	162.1
Sept. 1	58°44'	148°19'	14.2	14.2	-	-	-	-	-	-	-
2	58°40'	148°35'	12.6	12.6	-	-	-	-	-	1	39.3
3	58°40'	148°09'	5.4	5.4	-	-	-	-	-	-	-
4	58°30'	148°23'	20.1	19.1	0.2	0.8	-	-	-	-	-
5	58°30'	148°25'	14.3	14.3	-	-	-	-	-	-	-
6	58°14'	148°30'	2.2	2.2	-	-	-	-	-	-	-
7	58°15'	148°27'	2.1	1.9	0.2	-	-	-	-	-	-
8	58°10'	148°29'	15.9	15.5	0.4	-	-	-	-	-	-
9	58°03'	148°50'	10.7	10.7	-	-	-	-	-	-	-
10	57°48'	149°34'	5.6	5.0	-	0.6	-	-	-	-	-
11	57°48'	149°20'	11.5	11.5	-	-	-	-	-	-	-
12	57°49'	149°32'	13.8	13.4	0.4	-	-	-	-	-	-
13	57°41'	149°45'	8.0	7.8	0.2	-	-	-	-	-	-
14	57°41'	149°28'	4.7	4.5	0.2	-	-	-	-	-	-
15	57°40'	148°51'	6.5	5.7	0.8	-	-	-	-	-	-
16	56°16'	152°43'	1.1	1.1	-	-	-	-	-	-	-
17	55°50'	154°10'	1.7	1.7	-	-	-	-	-	-	-
18	55°54'	153°53'	6.8	6.8	-	-	-	-	-	-	-
19	55°52'	154°01'	7.8	7.8	-	-	-	-	-	-	-
20	55°50'	154°10'	6.4	6.4	-	-	-	-	-	-	-
Total			171.4	167.6	2.4	1.4	0.0	0	0	1	39.3
Grand Total			1,561.0	1,504.6	22.2	33.1	1.1	58	107.5	28	434.5

1/Halibut catches were classified according to length (under or over 66 cm. or 26 inches) at the request of the International Pacific Halibut Commission.

2. The total catch landed by a catcher boat was estimated visually by noting the number and fullness of fish-cargo nets transferred to the factoryship. A full net weighed about 1 metric ton.

3. The fish-processing officer aboard the factoryship made the final and most accurate estimate. He periodically sampled the catch by species for round and dressed weight to estimate the percentage discard (waste) per fish. He then was able to use the careful tally that was made of the number of pans of fish by weight and species going into the freezing room to estimate total round weight. His final figures were used as a check against the other two estimates.

DAILY LANDINGS: The daily landings in metric tons are given by species, and include the numbers and average weights of halibut (table 2). The reported total catch was 1,561 metric tons for April 24-September 20, 1963. Of that total, 542 kg. (1,000 kg. = 1 metric ton) or 0.03 percent of the total catch was halibut; except for the catch on May 4, halibut catches were less than 1 percent by weight of the daily landings. Sablefish contributed 1,504.6 metric tons or 96.4 percent of the total catch. Blackthroat rockfish, arrowtooth flounder, and Pacific ocean perch followed in that order of importance.

CATCH BY STATISTICAL AREA: A summary of bottom-gill net catches by statistical areas (including the total catch, catch by major species, and catch per tan) is given in table 3. Twenty-seven statistical areas were fished between 145° W. and 168° W. longitude, in which a total of 1,070 strings of gear or 39,265 tans of gill net were set. Halibut were taken in 12 of the 27 statistical areas. The largest number of halibut, 56 fish, was taken in area 62540 and the largest weight of halibut, 178 kg., was taken in area 49583. The greatest amount of effort

Table 3 - Summary of Catches by Statistical Areas (Total Catch, Catch by Major Species, and Catch Per Tan)

Statistical Area	Total Tans Set	All Species		Sablefish		Arrowtooth Flounder		Blackthroat Rockfish[1/]		Pacific Ocean Perch		Halibut			
												Catch			
		Total Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Total Wt.	Wt. Per Tan	Fish	Fish Per Tan
	No.	(Kilograms)										Kg.	Kg.	No.	No.
46590	2,400	110,200	45.92	106,800	44.50	400	0.17	3,000	1.25	-	-	-	-	-	-
46593	1,101	54,800	49.77	54,400	49.41	-	-	400	0.36	-	-	-	-	-	-
47590	1,787	68,991	38.61	65,700	36.77	200	0.11	3,000	1.68	-	-	91	.05	3	.00
48583	698	31,000	44.41	30,500	43.70	200	0.29	300	0.43	-	-	-	-	-	-
48590	4,563	245,205	53.74	241,500	52.93	2,000	0.44	1,700	0.37	-	-	5	.00	1	.00
48593	38	300	7.89	300	7.89	-	-	-	-	-	-	-	-	-	-
49573	2,963	126,350	42.64	122,300	41.28	1,800	0.61	2,000	0.67	200	0.07	50	.02	2	.00
49580	7,301	301,246	41.26	291,100	39.87	4,100	0.56	6,000	0.82	-	-	46	.01	2	.00
49583	3,058	130,478	42.67	126,900	41.50	1,100	0.36	2,300	0.75	-	-	178	.06	5	.00
50573	6,817	282,406	41.43	276,800	40.60	4,100	0.60	1,500	0.22	-	-	6	.00	1	.00
50590	40	3,600	90.00	3,600	90.00	-	-	-	-	-	-	-	-	-	-
52560	145	1,076	7.42	700	4.83	-	-	376	2.59	-	-	-	-	-	-
53560	2,756	75,163	27.27	60,665	22.01	3,684	1.34	10,796	3.92	2	0.00	16	.01	9	.00
54553	160	5,804	36.28	5,700	35.62	100	0.62	-	-	-	-	4	.02	1	.01
54560	1,176	33,502	28.49	31,400	26.70	1,000	0.85	1,100	0.94	-	-	2	.00	1	.00
55553	1,417	44,246	31.22	42,804	30.21	1,236	0.87	202	0.14	4	0.00	-	-	-	-
55560	35	4,400	125.71	4,400	125.71	-	-	-	-	-	-	-	-	-	-
59543	120	976	8.13	678	5.65	30	0.25	68	0.57	200	1.67	-	-	-	-
61540	330	4,068	12.33	3,660	11.09	400	1.21	8	0.02	-	-	-	-	-	-
62533	120	560	4.67	560	4.67	-	-	-	-	-	-	-	-	-	-
62540	1,160	16,726	14.42	15,409	13.28	863	0.74	295	0.25	23	0.02	136	.12	56	.05
62543	160	758	4.74	654	4.09	100	0.62	-	-	4	0.02	-	-	-	-
63533	55	857	15.58	821	14.93	23	0.42	10	0.18	-	-	3	.05	2	.04
63540	715	12,088	16.91	10,515	14.71	429	0.60	257	0.36	882	1.23	5	.01	3	.00
66530	90	626	6.96	200	2.22	208	2.31	100	1.11	118	1.31	-	-	-	-
67530	20	15	0.75	-	-	6	0.30	-	-	9	0.45	-	-	-	-
68530	40	55	1.38	3	0.08	6	0.15	-	-	46	1.15	-	-	-	-

1/Incidental catches of Sebastolobus sp. included.

and highest catch per tan were in statistical areas between 145° W. and 150° W. longitude. Sablefish dominated the catch in all but three areas.

CATCH BY DEPTH: Records of catches by 100-meter (328-foot) depth intervals (table 4) include the catch per tan of all species combined and of important individual species. Most fishing was between 600 and 800 meters (1,969 and 2,625 feet). Similarly, the greater portion of the total catch (over 66 percent) was taken in that depth interval. The catches per tan were high between 500 and 900 meters (1,804 and 2,953 feet). Halibut were distributed between 200 and 800 meters (656 and 2,625 feet) but were most common between 400 and 500 meters (1,312 and 1,804 feet). Sablefish were caught between 200 and 1,000 meters (656 and 3,281 feet) and catch per tan was highest between 500 and 900 meters (1,312 and 2,953 feet). Arrowtooth flounder and Pacific ocean perch both were abundant between 200 and 500 meters (656 and 1,804 feet), and catches of blackthroat rockfish were best between 300 and 600 meter (984 and 1,969 feet).

Table 4 - Summary of Catches by 100-Meter Depth Intervals (Total Catch, Catch by Major Species, and Catch Per Tan)

Depth (Meters)	Total Tans Set	All Species		Sablefish		Arrowtooth Flounder		Blackthroat Rockfish[1/]		Pacific Ocean Perch		Halibut			
												Catch			
		Total Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Catch	Catch Per Tan	Total Wt.	Wt. Per Tan	Fish	Fish Per Tan
	No.	(Kilograms)										Kg.	Kg.	No.	No.
101- 200	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
201- 300	100	2,173	21.73	1,609	16.09	416	4.16	20	.20	60	.60	68	.68	2	.02
301- 400	1,181	37,068	31.39	29,285	24.80	2,240	1.90	4,492	3.80	977	.83	74	.06	4	.00
401- 500	3,043	97,041	31.89	83,148	27.32	4,008	1.32	9,183	3.02	447	.15	255	.08	61	.02
501- 600	5,481	221,596	40.43	208,760	38.09	4,392	.80	8,444	1.54	-	-	-	-	-	-
601- 700	12,594	518,135	41.14	507,197	40.27	5,804	.40	5,804	.46	4	0	65	.00	3	.00
701- 800	12,721	510,190	40.11	500,770	39.37	4,145	.33	5,269	.41	-	-	6	.00	2	.00
801- 900	3,495	139,619	39.95	139,000	39.77	419	.12	200	.06	-	-	-	-	-	-
900-1,000	70	1,900	27.14	1,900	27.14	-	-	-	-	-	-	-	-	-	-
No depth data	545	27,774	50.96	26,400	48.44	1,300	2.38	-	-	-	-	74	.14	14	.03

1/Incidental catches of Sebastolobus sp. included.

INCIDENTAL CATCH: The following species were taken incidentally in the bottom gill nets:

Painted greenling	Oxylebius pictus
Spiny dogfish	Squalus acanthias
Dover sole	Microstomus pacificus
Pacific cod	Gadus macrocephalus
Prowfish	Zaprora silenus
Flag rockfish	Sebastodes rubrivinctus
Shortspine channel rockfish	Sebastolobus alascanus
Longspine channel rockfish	Sebastolobus altivilus
Salmon shark	Lamna ditropis
Pacific sleeper shark	Somniosus pacificus
Skate	Family Radjidae
Walleye pollock	Theragra chalcogrammus
Grenadiers	Family Macruridae
Tanner crab	Chionoecetes sp.
_____	Anotopterus pharae

BIOLOGICAL OBSERVATIONS: Biological data were collected on halibut, sablefish, blackthroat rockfish, and arrowtooth flounder. "Complete" biological records included length, weight, sex, maturity, and stomach contents. In addition, otolith samples, for age determination, were collected from halibut; scale samples were also collected from sablefish in May through July.

Biological data on halibut were transmitted to the International Pacific Halibut Commission.

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