



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE
AUKE BAY LABORATORY
11305 Glacier Hwy, Juneau, AK 99801-8626
(907) 789-6000

24 hour RAPICOM (907) 789-6094
March 11, 1992

CRUISE RESULTS

North Pacific Cooperative Fisheries of Japan Vessel
Anyo Maru No. 22
Cruise No. 91-01

Japan/U.S. cooperative longline survey for sablefish
and Pacific cod in the Aleutian region,
eastern Bering Sea, and Gulf of Alaska, 1991.

Prepared by David M. Clausen

INTRODUCTION

Since 1978, Japan and the United States have conducted an annual, cooperative longline survey in the northeastern Pacific Ocean along Alaska's continental slope. Formerly (1978-88), the Japanese government's Fishery Agency of Japan was the Japanese agency responsible for the survey. Since 1989, however, the survey has been conducted by a private Japanese organization, the North Pacific Cooperative Fisheries of Japan, in cooperation with the Alaska Fisheries Science Center (AFSC) of the U.S. National Marine Fisheries Service. The 1991 survey was conducted between April and September using the Anyo Maru No. 22, a commercial Japanese longline vessel provided by the North Pacific Cooperative Fisheries of Japan. As in previous years, the survey was directed primarily at sablefish (Anoplopoma fimbria) and Pacific cod (Gadus macrocephalus) between depths of 100 m and 1,000 m. Areas surveyed included the western Aleutians, eastern Aleutians, Regions I, II, III, IV, and V of the eastern Bering Sea, and the following International North Pacific Fisheries Commission (INPFC) statistical areas in the Gulf of Alaska: Shumagin, Chirikof, Kodiak, Yakutat, and Southeastern (Fig. 1). These surveys now provide 13 consecutive years (1979-91) of standardized data for the Gulf of Alaska and Aleutian region, and 10 years (1982-91) of standardized data for the eastern Bering Sea. (The first year of the survey, 1978, was experimental and could not be used for population assessment purposes.)



OBJECTIVES

1. Monitor annual changes in the relative abundance and size composition of sablefish and Pacific cod along the continental slope of Alaska.
2. Monitor annual changes in stock condition of other major fish species caught in the survey, including Pacific halibut (Hippoglossus stenolepis), arrowtooth flounder (Atheresthes stomias), Greenland turbot (Reinhardtius hippoglossoides), rockfish (Sebastes spp.), thornyheads (Sebastolobus spp.), and grenadiers (Macrouridae).
3. Tag and release sablefish throughout the cruise to determine migration patterns.
4. Collect sablefish otoliths to study age composition of the stocks.

ITINERARY

<u>Date</u>	<u>Activity</u>
28 April	Departed Shioyama, Japan.
29 April-4 May	In transit to western Aleutian Islands.
5 May-4 June	Fished 30 stations in the Aleutian Islands and eastern Bering Sea.
5-6 June	In port, Dutch Harbor AK, to restock vessel.
7 June-6 July	Fished 30 stations in the eastern Bering Sea.
7-8 July	In port, Dutch Harbor, to exchange scientific personnel and restock vessel.
9 July- 11 August	Fished 34 stations in the eastern Bering Sea and western Gulf of Alaska.
12-13 August	In port, Seward AK, to exchange scientific personnel and restock vessel.
14 August- 4 September	Fished 22 stations in the eastern Gulf of Alaska.
5-6 September	In transit to Seattle, WA.
7 September	Arrived Seattle; end cruise.

METHODS

The methods used in 1991 were similar to those used in previous years. The Anyo Maru No. 22, a 57.7 m (189 ft) longline vessel, carried a crew of 23 Japanese nationals. One station was occupied each day. At each station, one longline 16 km (8.6 nm) long was set and retrieved. The longline consisted of 160 hachis (Japanese term for "skates" or lengths of longline), each 100 m (328 ft) long, tied together. Halibut anchors and surface buoys were attached at the beginning and end of the longline and one-third and two-thirds of the way along the line. A 3-kg (7 lb) rock anchored each hachi. Each hachi had 45 "J" style hooks spaced at 2 m intervals along the line. Thus, 7,200 hooks were fished each day at a station. The hooks were baited with squid and were attached to the line by 1.2 m (47 in) gangions.

Previously (1982-1989), 108 stations were usually fished in the survey. Positions of each station were replicated as much as possible from year to year. In 1990, the number of planned stations was increased to 117, as nine additional stations were added in the northern part of the eastern Bering Sea (area Bering V in Figure 1). These same 117 stations were planned for repetition in the 1991 survey.

The vessel generally attempted to fish depths between 100 m and 1,000 m (55-548 fm) at each station. These depths correspond to the bathymetric distribution of most commercial-sized sablefish in Alaskan waters. However, because of bottom irregularities and the varied angle of the continental slope, it was often impossible to fish the complete depth range at all stations. The longline was usually set starting in shallow water, and then laid seaward across the isobaths of the continental slope into deeper water. The gear was then retrieved in the same direction, i.e., shallow to deep. At a few stations, however, the longline had to be set and retrieved in an opposite direction (deep to shallow) because of strong currents or winds. Additionally, at some stations, where Pacific cod was the primary species of interest and the angle of the continental slope was gradual, the entire longline was set at depths less than 400 m. Most of these shallow stations were in the eastern Bering Sea.

At each station, the soak time (time between set and retrieval) of an individual hachi depended upon the hachi's location in the longline. Setting the gear usually began in the morning (~0745 hours) and finished within 1 h. The vessel then returned to the starting position, waited until the first hachi had been in the water for ~3 h, and began hauling the gear. Retrieval of the entire longline usually lasted 5-6 h. Thus, soak time varied from 3 h at the beginning of the longline to 7 or 8 h at the end.

The catch was tallied by species and hachi number as the longline was brought aboard. Also, the depth at which the fish were caught was estimated by measuring the depth of water under the vessel every fifth hachi.

The catch was then separated into individual species for further sampling. Pacific halibut were landed without a gaff, measured for length, and immediately released. Other species were retained and weighed. Commonly caught fish were individually measured to determine length frequencies. These included sablefish, Pacific cod, arrowtooth flounder, Greenland turbot, rougheye rockfish (Sebastes aleutianus), shortraker rockfish (S. borealis), shortspine thornyhead (Sebastolobus alascanus), giant grenadier (Albatrossia pectoralis), and other grenadiers (Coryphaenoides spp.). Sablefish and Pacific cod were separated by sex and depth stratum before they were measured.

At most stations, a subsample of sablefish was held in live tanks, and then tagged and released. Only robust, uninjured fish, usually <70 cm in fork length, were selected for tagging. The tags used were plastic Floy anchor tags, as in previous years. The AFSC Resource Assessment and Conservation Engineering Division (RACE) supplied the tags in the Aleutian region, eastern Bering Sea, and western half of the Gulf of Alaska (labeled "U.S. National Marine Fisheries Reward, Seattle, Washington U.S.A."). The AFSC Auke Bay Laboratory (ABL) supplied the tags in the eastern half of the Gulf of Alaska (labeled "U.S. National Marine Fisheries Reward, Auke Bay, Alaska USA").

Sablefish otoliths were collected throughout the cruise for the AFSC. Generally, two otoliths were collected per fish. In the Aleutian Islands, otoliths were taken from five fish per centimeter length per sex; in the eastern Bering Sea, a similar collection was made. In the Gulf of Alaska, the otolith collection scheme was somewhat different: otoliths were taken from three fish per centimeter length per sex in each of 3 depth strata (101-200 m, 201-400 m, and 401-1,000 m) in 3 areas (Shumagin, Kodiak, and Southeastern), resulting in a total of nine separate otolith collections for this region.

After completion of sampling, grenadiers were discarded because they were not marketable, and the rest of the catch was processed and frozen for later sale in Japan as food. Sale of the fish helped to defray the Japanese fishing cooperative's cost of conducting the survey.

Scientists from the AFSC will analyze the sablefish data collected during the survey by calculating the sablefish catch

¹Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

per hachi. Catch per hachi, a measure of relative abundance, is calculated by dividing the number of fish caught by the number of hachis fished. This calculation is done for each area and by 100 m increments from 100 m to 1,000 m.

RESULTS

A total of 116 stations was sampled by the Anyo Maru No. 22 during the 1991 cruise (Fig. 1). This was one less than the planned number of 117; one station (#30) was cancelled due to stormy weather conditions. Station locations were generally within 1 nm of their standard positions, with two major exceptions: 1) The positions of six of the nine new stations in the northern Bering Sea (first fished in 1990) were relocated as much as 29 nm. These relocations were necessary to extend the survey coverage all the way to the new U.S.-Russia boundary line in this region. 2) Twelve stations in the Shumagin and Chirikof areas (stations 63-74) were moved as much as 2 to 10 nm from their standard positions. The reason for the relocation of these stations is unknown at this time, but may be related to conflicts with U.S. trawlers operating in the vicinity. The exact positions and starting and ending depths for all the stations fished in 1991 are listed in Table 1.

During the entire cruise, 18,474 hachis or 1,847 km (997 nm) of longline gear were set. A total of 259,280 fish was caught on the 831,330 hooks set; thus, 31.2% of the hooks caught and retained fish.

Sablefish and Pacific cod made up most of the catch (Table 2). Sablefish comprised 28.7% (74,451 fish) of the catch in numbers, and Pacific cod, 27.0% (69,903 fish). Sablefish were most abundant in the Gulf of Alaska, and Pacific cod were most abundant in the eastern Bering Sea. Catch rates and average weights of sablefish and Pacific cod for each station are listed in Table 3. The highest catch rate for sablefish was at station 102 (41.3 fish/100 hooks), and for Pacific cod was at station 46 (38.5 fish/100 hooks). Compared to the 1990 cooperative survey, catches of sablefish declined substantially in the Aleutians and eastern Bering Sea; in particular, sablefish catches in the eastern Bering Sea decreased >50%. Total sablefish catch in the Gulf of Alaska in the 1991 survey was similar to that in 1990, although on an area basis, catches declined somewhat in the western Gulf and increased in the eastern Gulf. The survey catches of Pacific cod were similar in the Aleutians between 1990 and 1991, but declined by 23% in the eastern Bering Sea.

Among the other species caught in the survey, giant grenadier was most abundant, followed by arrowtooth flounder, rockfish, and skates (Table 2). Catches of giant grenadier were highest in the Aleutians and western Gulf of Alaska. Most of the rockfish catch was rougheye or shortraker rockfish in the Aleutians and Gulf of

Alaska. Shortraker rockfish were most abundant in the Yakutat area, whereas roughey rockfish showed an atypical distribution: the highest catches of this latter species were in the West Aleutian and in the Southeastern areas, the two geographic extremes of the survey.

In past years of the survey, killer whales often greatly interfered with the longline operations at stations in the eastern Bering Sea by stripping hooked fish off the line. In the 1991 survey, killer whales were observed in the vicinity at several stations in the eastern Bering Sea and east Aleutians (stations 22, 25, 27, 31, and 37), but they appeared to strip only a very small number of fish from the line. Hence, the effect of killer whales on catches and catch rates in the 1991 cooperative survey was judged to be negligible.

A total of 4,301 sablefish was tagged and released in the 1991 survey, 5.8% of all sablefish caught (Table 2). Most of the fish were tagged in the Gulf of Alaska. Since 1978, the cooperative longline survey has tagged and released a cumulative total of 157,153 sablefish in the survey area.

Otoliths were collected for the United States from 2,428 sablefish: 612 in the Aleutian region and eastern Bering Sea, and 1,816 in the Gulf of Alaska.

More complete analyses of the survey results for sablefish, including length compositions and estimates of relative population numbers and weights, will be completed for the Gulf of Alaska by the AFSC Auke Bay Laboratory, and for the Aleutian region and eastern Bering Sea by the AFSC Resource Ecology and Fisheries Management Division (REFM). The 1991 results for the Gulf of Alaska will also be compared with results from another, concurrent longline survey in the Gulf (the 1991 domestic longline survey) by the AFSC RACE Division. Detailed results from all these analyses will be available from the AFSC at a later date.

SCIENTIFIC PERSONNEL

28 April-7 September

Kiyoshi Fujii, North Pacific Cooperative Fisheries of Japan,
Tokyo, Japan.

28 April-7 July

Darlene Everhart, AFSC/RACE Division, Seattle.

8 July-12 August

Greg Olewiler, AFSC/RACE Division, Seattle.

13 August-7 September

Ted Jackson, AFSC/ABL, Auke Bay, Alaska.

For more information on Anyo Maru No. 22 Cruise 91-01,
please contact either

Dr. George Snyder, Director
Auke Bay Laboratory
National Marine Fisheries Service
Alaska Fisheries Science Center
11305 Glacier Hwy.
Juneau, AK 99801-8626
phone (907) 789-6000

or

Dr. Gary Stauffer, Director
Resource Assessment and Conservation Engineering Division
National Marine Fisheries Service
Alaska Fisheries Science Center
7600 Sand Point Way NE
BIN C15700, Building 4
Seattle, Wa. 98115
phone (206) 526-4170

Table 1.--Position and depth of each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1991.

Station number	Position at start of longline		Position at end of longline		Depth	
					start (m)	end (m)
Eastern Bering Sea						
1	58°46.8'	177°33.2'W	58°48.5'	177°47.9'W	175	860
2	58°36.9'	176°39.2'W	58°34.2'	176°53.2'W	155	650
3	58°41.3'	176°00.8'W	58°35.6'	176°11.8'W	140	194
4	58°30.0'	175°39.9'W	58°29.0'	175°54.6'W	205	810
5	58°38.0'	174°21.7'W	58°31.8'	174°31.8'W	156	223
6	58°20.0'	174°19.8'W	58°22.5'	174°26.0'W	185	780
7	57°52.7'	173°53.0'W	58°00.6'	173°50.8'W	155	129
8	57°38.2'	174°10.4'W	57°45.0'	174°17.6'W	153	750
9	57°05.0'	173°27.1'W	57°08.0'	173°14.5'W	245	130
10	56°49.0'	173°20.3'W	56°56.2'	173°26.0'W	165	645
11	56°40.6'	172°11.1'W	56°37.8'	172°24.3'W	132	213
12	56°37.5'	172°21.0'W	56°30.9'	172°28.2'W	200	785
13	56°28.8'	171°26.0'W	56°25.7'	171°38.2'W	170	710
14	56°23.0'	171°16.4'W	56°15.9'	171°10.5'W	145	150
15	56°09.3'	170°39.0'W	56°08.7'	170°52.5'W	156	1100
16	56°08.2'	169°58.2'W	56°00.9'	169°53.6'W	123	150
17	56°02.7'	169°37.3'W	55°58.9'	169°50.8'W	190	910
18	56°16.7'	169°23.7'W	56°24.5'	169°23.7'W	250	120
19	56°01.8'	168°09.5'W	56°04.0'	168°23.8'W	150	233
20	55°50.0'	168°49.8'W	55°50.0'	169°02.0'W	160	960
21	55°33.0'	168°26.8'W	55°37.8'	168°15.6'W	253	139
22	55°26.3'	168°02.4'W	55°22.3'	168°15.7'W	182	930
23	55°04.0'	167°00.0'W	54°59.2'	167°09.9'W	153	188
24	54°55.5'	167°10.0'W	54°48.1'	167°16.2'W	232	433
25	54°50.3'	167°18.3'W	54°46.8'	167°27.8'W	430	553
26	54°28.5'	167°05.7'W	54°20.8'	167°11.4'W	501	900
27	54°40.0'	166°25.0'W	54°33.0'	166°31.0'W	328	440
28	54°47.3'	166°15.0'W	54°41.0'	166°23.2'W	199	310
29	54°55.0'	166°07.9'W	54°48.8'	166°12.8'W	142	174
30	(not fished)					
31	54°06.7'	166°22.0'W	54°13.7'	166°23.0'W	98	880
32	53°47.0'	167°19.6'W	53°44.0'	167°27.5'W	119	570
33	53°34.5'	168°16.7'W	53°38.1'	168°04.0'W	125	880
34	53°16.5'	168°49.7'W	53°22.7'	168°58.5'W	368	850
109	60°48.0'	178°20.0'W	60°41.5'	178°31.0'W	172	181
110	60°07.0'	178°51.8'W	60°05.2'	179°07.4'W	218	512
111	60°29.7'	179°06.7'W	60°23.6'	179°17.6'W	456	688
112	60°25.0'	178°20.0'W	60°22.0'	178°36.0'W	174	264
113	59°46.6'	178°42.6'W	59°51.3'	178°30.4'W	385	147
114	59°34.0'	177°36.4'W	59°35.7'	177°21.6'W	200	160
115	59°28.8'	178°19.2'W	59°33.9'	178°07.2'W	294	191
116	59°15.4'	177°31.9'W	59°20.6'	177°20.3'W	196	165
117	59°13.3'	178°06.0'W	59°19.8'	178°16.6'W	171	740

Table 1.--(continued).

Station number	Position at start of longline		Position at end of longline		Depth	
					start (m)	end (m)
Aleutian Region						
35	53°01.8'	170°09.9'W	53°06.3'	170°17.4'W	180	740
36	52°49.0'	171°16.0'W	52°47.0'	171°03.0'W	140	675
37	52°16.6'	173°30.5'W	52°24.4'	173°30.5'W	180	779
38	52°14.4'	174°50.0'W	52°20.4'	174°43.0'W	170	1000
39	52°07.9'	175°37.8'W	52°10.5'	175°49.0'W	120	1070
40	51°58.3'	176°26.5'W	52°03.7'	176°17.6'W	110	840
41	51°54.5'	177°33.0'W	51°55.0'	177°36.3'W	490	1200
42	51°45.7'	178°57.8'W	51°39.0'	178°49.0'W	238	715
43	52°03.3'	178°17.0'E	52°08.0'	178°23.0'E	132	900
44	52°15.5'	176°00.6'E	52°18.6'	176°12.6'E	102	520
45	52°40.4'	174°26.8'E	52°45.3'	174°17.8'E	101	1100
46	53°04.3'	172°51.2'E	53°07.7'	172°40.7'E	100	620
47	52°32.3'	173°02.7'E	52°32.7'	172°50.2'E	118	840
48	52°19.6'	174°14.5'E	52°14.0'	174°04.8'E	116	760
49	51°42.6'	175°49.4'E	51°36.7'	175°42.6'E	106	780
50	51°45.9'	177°00.3'E	51°41.0'	177°09.4'E	120	950
51	51°43.7'	178°07.4'E	51°35.8'	178°07.4'E	137	535
52	51°17.6'	179°04.4'E	51°11.3'	179°01.5'E	110	920
53	51°23.4'	178°35.0'W	51°28.6'	178°26.9'W	110	920
54	51°45.1'	178°11.0'W	51°44.5'	178°22.0'W	101	920
55	51°35.4'	177°38.3'W	51°30.9'	177°49.4'W	135	880
56	51°32.6'	176°46.7'W	51°25.6'	176°50.7'W	182	815
57	51°44.0'	175°59.0'W	51°36.0'	176°01.5'W	182	692
58	51°52.2'	175°07.7'W	51°44.5'	175°07.7'W	160	480
59	51°53.0'	174°19.4'W	51°47.0'	174°27.0'W	120	990
60	51°55.0'	173°30.4'W	51°51.0'	173°40.8'W	130	800
61	52°26.4'	170°15.4'W	52°20.5'	170°23.7'W	216	680
Gulf of Alaska						
62	52°35.3'	169°31.3'W	52°27.6'	169°31.6'W	135	537
63	52°59.0'	168°03.0'W	52°53.0'	168°12.0'W	119	930
64	53°05.5'	166°43.1'W	53°12.8'	166°46.1'W	870	232
65	53°35.9'	165°35.0'W	53°29.4'	165°41.7'W	128	920
66	53°44.6'	164°16.7'W	53°39.1'	164°26.7'W	307	930
67	53°55.2'	163°20.3'W	53°49.7'	163°28.7'W	165	820
68	54°04.5'	161°57.8'W	54°01.7'	162°09.7'W	145	820
69	54°19.1'	161°06.2'W	54°12.3'	161°14.5'W	136	850
70	54°22.7'	160°08.1'W	54°14.6'	160°13.0'W	142	675
71	54°29.8'	159°15.3'W	54°32.3'	159°21.3'W	148	780
72	54°40.3'	158°26.7'W	54°32.8'	158°33.6'W	191	840
73	54°52.6'	157°37.2'W	54°45.9'	157°44.9'W	151	775
74	55°13.6'	156°34.4'W	55°05.8'	156°37.0'W	205	830
75	55°30.2'	155°47.6'W	55°36.9'	155°51.3'W	220	187
76	55°44.8'	155°08.0'W	55°37.0'	155°11.0'W	164	650

Table 1.--(continued).

Station number	Position at start of longline		Position at end of longline		Depth	
					start (m)	end (m)
77	55°59.6'	154°37.2'W	55°52.3'	154°45.4'W	350	900
78	55°59.1'	154°00.9'W	55°50.7'	154°03.4'W	197	800
79	56°17.1'	153°00.2'W	56°12.4'	153°12.7'W	128	900
80	56°32.6'	152°03.0'W	56°25.6'	152°09.7'W	146	820
81	57°07.0'	151°15.0'W	56°59.0'	151°20.2'W	195	845
82	57°25.0'	150°34.9'W	57°16.6'	150°31.4'W	165	775
83	57°38.5'	149°52.6'W	57°30.3'	149°53.3'W	356	765
84	57°58.8'	149°08.7'W	57°50.5'	149°13.0'W	153	870
85	58°17.8'	148°38.0'W	58°09.0'	148°39.2'W	170	920
86	58°40.8'	148°18.2'W	58°33.2'	148°19.6'W	284	900
87	59°08.4'	148°39.0'W	59°00.3'	148°39.0'W	146	242
88	59°02.3'	147°53.5'W	58°54.6'	147°57.0'W	150	835
89	59°17.0'	146°49.8'W	59°10.3'	146°58.4'W	198	910
90	59°29.0'	145°27.0'W	59°27.6'	145°34.6'W	170	850
91	59°31.7'	144°41.4'W	59°26.4'	144°52.7'W	186	900
92	59°34.4'	143°36.6'W	59°27.3'	143°41.6'W	150	930
93	59°35.8'	142°31.2'W	59°29.1'	142°38.0'W	179	980
94	59°24.0'	142°10.0'W	59°26.7'	142°21.4'W	220	890
95	59°02.8'	141°20.0'W	59°01.6'	141°34.8'W	285	800
96	58°42.6'	140°53.0'W	58°41.3'	140°39.0'W	900	244
97	58°28.5'	139°27.0'W	58°25.8'	139°40.0'W	188	820
98	58°08.5'	138°43.0'W	58°10.4'	138°55.3'W	181	900
99	57°52.0'	137°22.1'W	57°53.0'	137°36.0'W	186	970
100	57°31.3'	136°30.3'W	57°36.7'	136°37.2'W	188	930
101	57°11.2'	136°15.0'W	57°14.7'	136°25.0'W	238	930
102	56°50.4'	136°00.0'W	56°56.7'	136°07.0'W	260	900
103	56°24.1'	135°23.7'W	56°21.3'	135°38.2'W	160	310
104	55°58.0'	135°24.7'W	56°02.0'	135°34.3'W	230	875
105	55°32.5'	134°58.6'W	55°37.4'	135°09.8'W	230	1000
106	55°20.4'	134°43.4'W	55°23.0'	134°56.0'W	265	810
107	54°52.8'	134°17.5'W	54°58.6'	134°25.5'W	238	900
108	54°28.0'	133°55.4'W	54°32.2'	134°04.4'W	247	950

Table 2.--Numbers of fish caught and sablefish tagged, by area¹, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1991.

Species	Western Aleutians	Eastern Aleutians	Bering I	Bering II	Bering III	Bering IV	Bering V	Shumagin	Chirikof	Kodiak	Yakutat	South-eastern	Total
Sablefish	674	3,791	965	624	873	891	103	7,028	6,992	15,802	17,081	19,627	74,451
Pacific cod	13,581	11,787	2,124	9,674	6,093	5,357	12,979	3,961	2,068	876	854	549	69,903
Pacific halibut	630	871	279	821	1,022	180	589	533	275	133	90	154	5,577
Arrowtooth flounder	548	549	488	4,817	3,238	1,416	707	1,609	2,201	1,292	342	295	17,502
Greenland turbot	287	683	737	1,275	1,040	763	551	3	1	0	1	0	5,341
Shortraker rockfish	239	793	50	26	45	28	5	365	57	191	910	308	3,017
Rougheye rockfish	2,521	986	206	13	16	5	1	520	268	233	307	1,408	6,484
Other rockfish ²	447	20	25	2	2	0	0	8	16	15	154	285	974
Thornyheads	901	641	232	23	36	5	9	1,191	923	1,146	769	512	6,388
Giant grenadier	4,728	7,590	126	582	1,412	2,072	2,218	7,576	5,508	4,717	2,214	385	39,128
Skates	1,015	1,150	138	1,530	612	834	2,965	140	102	160	195	101	8,942
Other	<u>2,552</u>	<u>2,533</u>	<u>878</u>	<u>3,623</u>	<u>1,433</u>	<u>1,236</u>	<u>6,620</u>	<u>339</u>	<u>180</u>	<u>1,008</u>	<u>878</u>	<u>293</u>	<u>21,573</u>
All species combined	28,123	31,394	6,248	23,010	15,822	12,787	26,747	23,273	18,591	25,573	23,795	23,917	259,280
No. of sablefish tagged	80	267	31	19	25	48	4	301	214	736	835	1,741	4,301
No. of stations	10	17	4	14	9	6	9	10	7	10	11	9	116

¹For location of areas, see Figure 1.²Includes all species of Sebastes rockfish except shortraker and rougheye rockfish; does not include thornyheads (Sebastes spp.).

Table 3.--Catch rates and average weights of sablefish and Pacific cod at each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1991.

Station no.	<u>Sablefish</u>		<u>Pacific cod</u>	
	No. caught/ 100 hooks	average round weight (lb)	No. caught/ 100 hooks	average round weight (lb)
Bering IV				
1	2.71	8.8	10.06	10.4
2	1.08	7.0	9.46	9.4
3	0.00	-	18.00	12.4
4	7.38	8.3	8.00	6.9
5	0.00	-	24.90	10.6
6	1.21	8.6	3.99	8.1
Bering III				
7	0.00	-	18.21	11.8
8	0.75	8.7	7.76	11.2
9	0.00	-	12.40	11.4
10	2.32	8.5	5.32	8.6
11	0.03	2.9	16.71	11.6
12	0.92	7.8	2.13	8.6
13	4.89	8.4	5.72	9.2
14	0.00	-	11.93	8.6
15	3.22	9.1	4.44	11.3
Bering I				
16	0.00	-	20.63	7.8
17	1.17	8.5	8.81	10.8
18	0.44	3.7	12.68	10.8
19	0.00	-	21.96	8.3
20	1.68	7.5	12.39	10.6
21	0.00	-	23.90	9.6
22	0.21	7.9	9.88	8.6
23	0.00	-	4.53	10.3
24	0.42	5.9	4.07	7.0
25	1.02	5.4	0.00	-
26	3.33	6.9	0.00	-
27	0.61	4.9	0.01	6.0
28	0.00	-	4.08	7.0
29	0.00	-	11.43	8.6
Bering I				
30		(not fished)		
31	0.08	5.3	6.90	13.9
32	0.06	7.3	8.50	7.1
33	3.71	7.4	13.90	7.8
34	9.56	7.1	0.19	8.3

Table 3.--(continued).

Station no.	<u>Sablefish</u>		<u>Pacific cod</u>	
	No. caught/ 100 hooks	average round weight (lb)	No. caught/ 100 hooks	average round weight (lb)
Bering V				
109	0.00	-	30.79	8.2
110	0.15	6.8	19.28	9.4
111	0.06	6.8	0.00	-
112	0.00	-	24.51	10.8
113	0.00	-	27.99	11.2
114	0.00	-	18.65	10.9
115	0.00	-	21.53	9.7
116	0.00	-	22.50	11.7
117	1.22	8.1	15.01	10.4
Eastern Aleutians				
35	2.40	8.8	11.85	8.9
36	0.36	8.5	6.41	11.4
37	1.29	5.3	4.76	9.4
38	3.10	8.6	7.53	8.3
39	8.94	7.8	4.10	6.4
40	4.88	8.3	14.28	6.1
41	2.11	8.0	1.22	7.8
42	1.61	7.5	10.36	6.2
Western Aleutians				
43	0.65	7.2	2.69	12.5
44	0.11	9.5	22.76	13.0
45	0.63	9.7	30.44	12.7
46	1.22	10.1	38.49	13.0
47	0.26	8.6	31.82	10.1
48	1.08	9.2	17.79	8.7
49	0.63	9.8	4.07	20.0
50	3.57	9.8	9.01	11.4
51	0.18	9.0	12.79	11.1
52	1.03	10.1	18.75	11.0
Eastern Aleutians				
53	2.60	7.9	13.18	6.9
54	2.63	8.4	13.00	7.0
55	1.97	7.8	17.36	5.3
56	4.19	6.9	8.26	5.6
57	5.32	5.6	9.74	7.6
58	1.25	6.4	10.96	7.9
59	1.89	8.4	18.65	9.2
60	3.07	8.6	13.07	8.9
61	5.32	7.3	1.58	7.8

Table 3.--(continued).

Station no.	<u>Sablefish</u>		<u>Pacific cod</u>	
	No. caught/ 100 hooks	average round weight (lb)	No. caught/ 100 hooks	average round weight (lb)
Shumagin				
62	4.13	8.5	3.08	8.9
63	4.35	9.7	12.78	9.1
64	10.07	5.4	0.00	-
65	8.90	7.7	4.43	7.7
66	12.39	7.5	0.00	-
67	12.28	8.9	1.51	6.4
68	8.35	8.7	9.47	6.2
69	8.82	7.0	7.19	5.3
70	16.88	7.1	6.64	7.5
71	11.46	8.2	9.90	5.9
Chirikof				
72	17.06	8.5	4.21	5.4
73	9.57	7.7	12.35	5.7
74	17.28	8.2	0.99	6.0
75	11.76	6.7	5.29	7.1
76	12.82	7.7	3.21	6.1
77	19.50	7.8	0.00	-
78	9.13	7.4	2.68	5.5
Kodiak				
79	32.25	8.4	0.31	9.4
80	24.26	7.4	1.22	6.2
81	20.85	7.2	0.50	6.0
82	24.39	6.7	0.96	6.4
83	18.60	7.6	0.00	-
84	20.51	7.4	1.85	6.2
85	15.92	7.3	1.97	5.8
86	13.75	7.3	0.00	-
87	30.51	7.0	3.28	5.0
88	18.43	7.8	2.08	6.8

Table 3.--(continued).

Station no.	<u>Sablefish</u>		<u>Pacific cod</u>	
	No. caught/ 100 hooks	average round weight (lb)	No. caught/ 100 hooks	average round weight (lb)
Yakutat				
89	24.47	8.4	1.04	6.5
90	17.69	7.9	0.42	6.0
91	23.39	7.4	1.64	7.2
92	14.86	7.5	6.13	5.0
93	30.94	8.1	1.10	6.6
94	31.33	7.9	0.50	6.0
95	26.10	7.3	0.00	-
96	13.81	8.0	0.00	-
97	23.32	7.5	0.81	12.4
98	14.96	7.5	0.15	6.8
99	16.36	8.9	0.08	6.2
Southeastern				
100	38.83	7.9	0.14	6.7
101	37.17	7.6	0.28	5.6
102	41.28	8.5	0.03	5.3
103	9.86	7.0	5.74	5.6
104	28.13	7.0	0.46	5.6
105	35.39	7.6	0.04	6.0
106	40.61	6.9	0.07	6.4
107	27.33	7.6	0.06	7.3
108	14.00	7.1	0.82	6.1

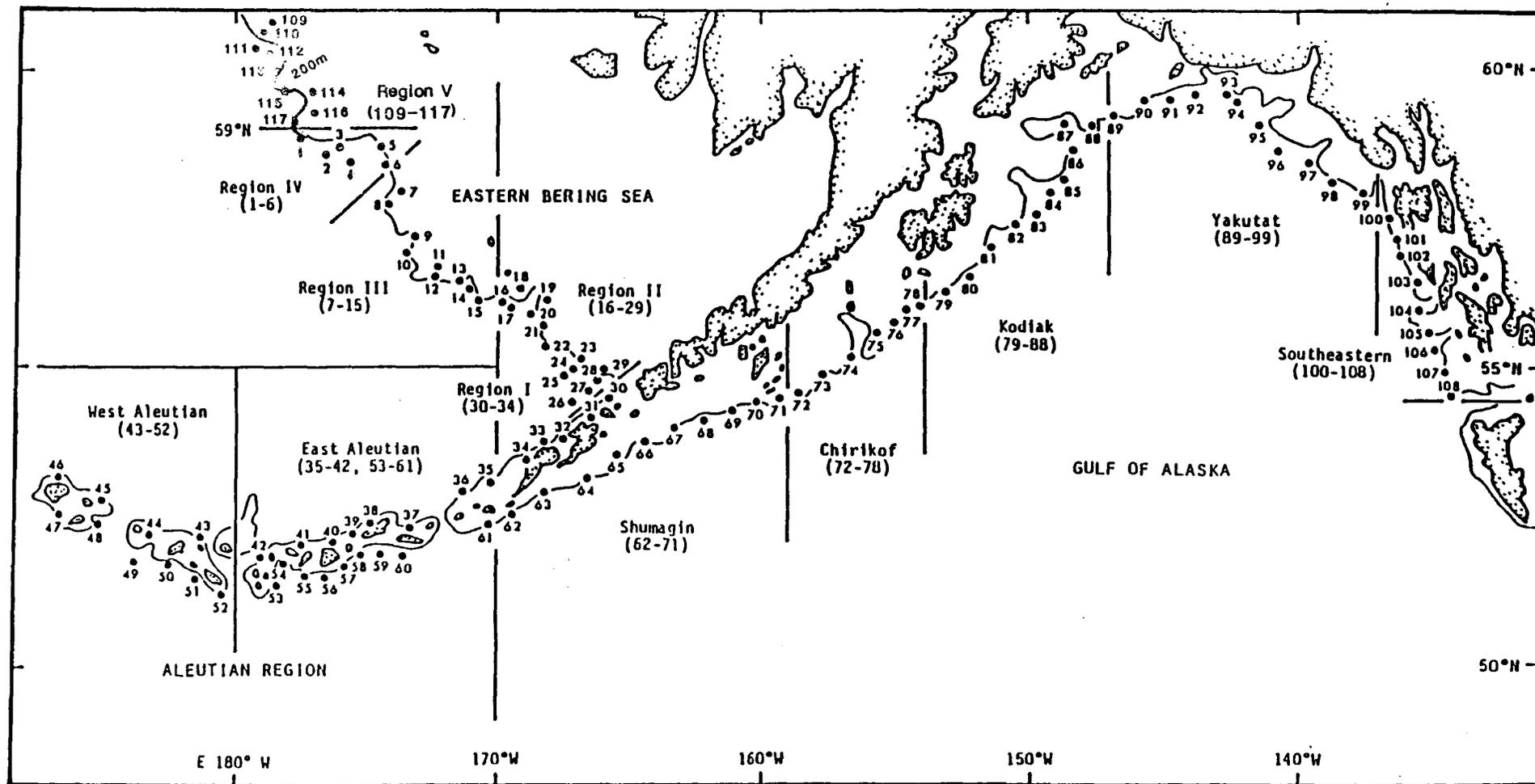


Figure 1.--Location of stations, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1991. Station 30 was not fished.