

January 25, 1999

**F/V Alaskan Leader
Cruise Report AL-98-01
Longline Survey of the Gulf of Alaska and Eastern Aleutians
June 1-September 5, 1998**

Prepared by

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On September 5, 1998, the National Marine Fisheries Service, Alaska Fisheries Science Center (AFSC), completed the twelfth annual longline survey of sablefish (*Anoplopoma fimbria*) resources in the Gulf of Alaska and the eastern Aleutian Islands. The survey area extended from Amchitka pass eastward to Dixon Entrance (Figure 1). This survey was designed to continue the time series (1979-94) of the Japan-U.S. cooperative longline survey that was discontinued after 1994. Beginning in 1996, the eastern Aleutian Islands and eastern Bering Sea has been surveyed on alternating years along with the Gulf of Alaska. For example, during 1999 the eastern Bering Sea and the Gulf of Alaska will be surveyed.

OBJECTIVES

1. Determine the relative abundance and size composition of the commercially important species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), and roughey and shortraker rockfishes (*Sebastes aleutianus* and *S. borealis*).
2. Determine the relative abundance and size composition of other groundfish species caught during the survey: Pacific cod (*Gadus macrocephalus*), arrowtooth flounder (*Atheresthes stomias*), grenadiers (Macrouridae), and the relative abundance of Pacific halibut (*Hippoglossus stenolepis*).

3. Tag and release sablefish, Greenland turbot, and shortspine thornyheads throughout the cruise to determine migration patterns.
4. Collect sablefish otoliths to study the age composition of the population.
5. Conduct gillnet sampling to examine distribution and abundance of young-of-the-year sablefish.
6. Implant sablefish with electronic tags that record water temperature, depth, and time.
7. Test the ability of sablefish to locate baited hooks when there are gaps between the hooks.

VESSEL AND GEAR

Survey operations were conducted using the F/V *Alaskan Leader*, a chartered U.S. longline vessel. The 46 m (150 ft) vessel carried standard longline hauling gear and was equipped with radios, radars, GPS receivers, LORAN receivers, video and paper track plotters, a processing line, four sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, an engineer, a first mate, a cook, a quality-control technician, three fishermen, three processors, and four baiters.

Gear configuration was unchanged from that of the 1988-97 surveys. Units of gear (skates) were 100 m (55 fm) long and contained 45 size 13/0 Mustad¹ circle hooks. Hooks were attached to 38 cm (15 in) gangions that were secured to beackets tied into the groundline at 2 m (6.5 ft) intervals. Five meters (16 ft) of groundline were left bare at each skate end. Gangions were constructed of medium lay #60 thread nylon, beacket material was medium lay #72 thread nylon, and groundline was medium lay 9.5 mm (3/8 in) diameter nylon.

A set of gear consisted of a flag and buoy array at each end followed sequentially by a 9.5 mm diameter nylon buoyline, a 92 m (50 fm) section of 9.5 mm polypropylene floating line, a 16 kg (35 lb) piece of chain (to dampen the effect of wave surge on the

¹ Citation of the above brand name does not constitute U.S. government endorsement.

buoyline), 92 m of 9.5 mm nylon, a 27 kg (60 lb) halibut anchor, and 366 m (200 fm) of 9.5 mm nylon. The groundline was weighted with 3.2 kg (7 lb) lead balls at the end of each skate. Hooks were hand baited with chopped squid (*Illex* spp.) at a rate of about 5.7 kg (12.5 lb) per 100 hooks. Squid heads and tentacles were not used for bait.

Total groundline set each day was 16 km (8.6 nmi) long and contained 160 skates and 7,200 hooks. Two eighty-skate groundlines were set end to end at each station along the upper continental slope. A single groundline of eighty skates was set at each station in the gullies.

OPERATIONS

The charter began on June 1 at Unalaska, Alaska, and ended on September 5 at Dutch Harbor, Alaska. The charter period was divided into seven legs of 18, 14, 15, 15, 14, 12, and 16 days with a one-day port call after the first, third, fourth and sixth legs. A two-day port call occurred after leg 5. During Leg 1, the survey sampled from Amchitka Pass to the western end of Umnak Island. The second leg began near the western end of Umnak Island and continued eastward to Sand Point. Leg 3 began near Dixon Entrance and continued north and westward to Yakutat. During Leg 4, the hook-cluster experiment was conducted in the Yakutat vicinity. During Leg 5, the area between Yakutat and Seward was sampled, and during leg 6, the area from Seward to Kodiak was sampled. During leg 7, the area from Kodiak to Sandpoint was surveyed.

From 1988 to 1990 the survey period was June 26 to September 12. The survey periods in 1991 through 1994 were 2-1/2 weeks later than in 1988 through 1990. The 1991-1994 surveys were delayed to avoid the commercial fishing period that started 45 days later than in 1988 through 1990. Starting in 1995 the survey period was moved back to near the 1988-1990 time periods because of the extensive increase in the commercial fishing season resulting from the implementation of the Individual Fishery Quota (IFQ) system in the sablefish and Pacific halibut longline fishery. Beginning in 1998 the order in which the stations sampled was changed to avoid conflicting with a rockfish fishery during early July in the central Gulf of Alaska. Instead of continuing to sample in an easterly direction from Sand Point to Dixon Entrance the survey vessel transited to Dixon Entrance during early July and resumed sampling in a westerly direction going from Dixon Entrance to Sand Point.

Ninety-seven days were used to complete the survey, including 74 days of survey sampling, three days for loading and unloading gear, 15 days for travel and port calls, and five days for the hook-cluster experiment.

Hook-Cluster Experiment

A hook-cluster experiment was conducted near Yakutat from July 21-27. The purpose of the experiment was to test an assumption on how to interpret the longline survey results. The survey catch per skate is assumed to be an index of relative abundance; for example, a 10% difference in catch rate reflects a 10% difference in relative abundance. This assumption would be wrong if bait location by sablefish is more difficult after several baits are taken; then the relationship between catch rate and relative abundance would be nonlinear and the gear would be said to "saturate". Results from hook-timer experiments show that the probability that a sablefish locates a bait does not change, at least as long as half the baits remain available.

The purpose of the hook-cluster experiment was to test the ability of sablefish to locate baited hooks when there are gaps between clusters of hooks. The gaps are equivalent to line intervals unavailable to capture of fish. Sablefish must locate the clusters of available baits between the gaps. Varying the length of the gaps provides information on the search area of sablefish and their ability to locate available baits. Although the gap varies, the total number of hooks per skate is standardized to eliminate increasing attraction area with more hooks. Gaps from 4 to 42 m were tested. If sablefish catch rate is the same for all gaps, this implies that sablefish are efficient bait predators and that saturation does not occur, at least when baits are spaced less than 42 m apart .

Survey Operations

Fourteen and forty-five stations respectively, were sampled along the upper continental slopes of the Eastern Aleutians and Gulf of Alaska at a rate of one station per day (Figure 1). Surveyed depths ranged from approximately 200 to 1,000 m, although at some stations, depths less than 150 m or more than 1,000 m were sampled (Table 1). Twenty-seven stations were sampled in gullies at the rate of one to two stations per day. The sampled gullies were Shelikof Trough, Amatuli Gully, W-grounds, Yakutat Valley, Spencer Gully, Ommaney Trench, and Dixon Entrance. One station (42) was sampled on the continental shelf rather than the continental slope off Baranof Island. The gear was set from shallow to deep and was retrieved in the same order, except on occasions when groundlines parted or sea conditions dictated that it be pulled from the opposite direction. Setting began about

0630 h Alaska Daylight Time. Retrieval began about 0930 h and was completed by about 1930 h.

Data Collection

Catch data were recorded on a hand-held electronic data logger. During gear retrieval a scientist recorded the species of each hooked fish, the condition of each unoccupied hook (absent, broken, or tangled), and whether bait remained on the hook. Time of day was recorded constantly from an internal clock and depth was entered when the first and last skates came aboard, at the beginning of each fifth skate, and when crossing into a new depth interval (0-100 m, 101-200 m, 201-300 m, 301-400 m, 401-600 m, 601-800 m, 801-1,000 m and 1,001-1,200 m).

Length frequency data were collected with a bar code based measuring board and a bar code reader/data storage device. Length was measured by depth interval for sablefish, Pacific cod, grenadiers, arrowtooth flounder, rockfish, and thornyheads. Lengths of sablefish and Pacific cod also were recorded by sex. Pacific halibut were counted and released at the rail without measuring. Catch and length frequency data were transferred to a computer and electronic backup media twice a day.

As in the previous surveys, the charter vessel was allowed to retain most of the catch once the scientific data were recorded.

RESULTS

One hundred and forty-eight longline hauls (sets) were completed (Table 1). Sablefish was the most frequently caught species, followed by giant grenadiers, Pacific cod, other species, arrowtooth flounder, roughey and shortraker rockfish, Pacific halibut, and shortspine thornyhead (Table 2). A total of 82,911 sablefish, with an estimated total round weight of 289,344 kg (638,004 lb), was taken during the survey (Table 3).

The highest total sablefish catch was observed at station 100, off northern southeast Alaska (Table 2). The largest average length sablefish were caught at stations 98 and 99 off of northern southeast Alaska (Table 3).

Approximately, 3,281 sablefish, 524 shortspine thornyhead, and 66 Greenland turbot were tagged and released during the survey. Electronic tags were implanted in 195 sablefish. Length-weight data and otoliths were collected from approximately 2,450 sablefish.

Forty-two gillnet sets were completed. A total of approximately 954 young-of-the-year sablefish were caught.

As they did during the 1996 longline survey, killer whales preyed upon the catch at Aleutian Islands station 37. During this survey (1998) the whales took nearly all sablefish and Greenland turbot from 60 skates.

More detailed results and comparisons to previous surveys will be reported in a subsequent technical document.

Fifteen sets were completed in the hook-cluster experiment. Each set contained all gap sizes. The sablefish catch rates were similar for all gaps except the widest, which was slightly less, implying that the probability that a sablefish locates a bait does not change until few baits are available. More detailed results will be available in a technical report.

SCIENTIFIC PERSONNEL

- Leg I (June 1 - June 18)
 Larry Haaga, Field Party Chief, RACE
 Chris Lunsford, Fishery Research Biologist, ABL
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg II (June 18 - June 29)
 Nancy Maloney, Field Party Chief, ABL
 Heather MacConnell, Program Analyst, ABL
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg III (July 5 - July 21)
 Thomas Rutecki, Field Party Chief, ABL
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg IV (July 21 - July 27)
 Mike Sigler, Field Party Chief, ABL
 Meg Cartwright, Fishery Biologist ADF&G
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg V (July 27 - August 9)

Nancy Maloney, Field Party Chief, ABL
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

Leg VI (August 10 - August 21)
Larry Haaga, Field Party Chief, RACE
Tom Pearson, Fishery Biologist, AKRO
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

Leg VII (August 21 - September 5)
Linc Freese, Field Party Chief, ABL
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

ABL - Auke Bay Laboratory
RACE - Resource Assessment and Conservation Engineering Division
ADF&G - Alaska Department of Fish and Game
AKRO - Alaska Regional Office

For further information contact either

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Table 1.--Haul number (set), preassigned station number, and starting and ending positions and depths for the 1998 NMFS longline survey of the Eastern Aleutian Islands and Gulf of Alaska, June 1 - September 5.

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.mm)	End latitude (ddmm.m)	End longitude (dddmm.mm)	Start depth (m)	End depth (m)
Eastern Aleutians							
1	35	5306.7	17006.19	5303.8	17011.95	174	180
2	35	5303.9	17012.17	5306.0	17017.87	211	674
3	37	5216.7	17329.60	5221.0	17329.80	156	612
4	37	5221.1	17330.08	5224.7	17330.28	624	771
5	38	5215.0	17450.50	5218.7	17446.39	174	400
6	38	5219.2	17445.79	5220.5	17440.55	430	822
7	39	5208.1	17536.22	5209.4	17541.86	116	708
8	39	5209.6	17542.34	5210.2	17548.58	480	760
9	40	5158.3	17626.73	5201.7	17625.61	109	501
10	40	5201.8	17624.39	5203.5	17620.00	400	703
11	54	5145.9	17809.94	5144.5	17815.33	91	458
12	54	5144.1	17816.35	5144.1	17822.44	441	665
13	42	5142.7	17853.74	5138.8	17842.27	515	741
14	42	5146.6	17857.98	5143.2	17853.33	165	481
15	53	5124.1	17837.16	5121.2	17832.87	156	505
16	53	5121.2	17832.41	5122.1	17826.45	489	874
17	55	5135.3	17737.36	5132.6	17742.91	198	467
18	55	5132.5	17743.09	5131.4	17748.55	400	860
19	57	5143.9	17559.76	5138.4	17600.96	186	398
20	57	5138.7	17601.23	5134.6	17602.21	435	861
21	58	5150.8	17508.12	5146.5	17508.02	179	365
22	58	5146.2	17507.36	5141.7	17509.18	384	1250
23	59	5152.9	17420.25	5149.6	17424.18	124	401
24	59	5149.1	17424.63	5147.1	17430.92	340	840
25	60	5155.1	17329.91	5152.6	17335.29	116	244
26	60	5152.3	17335.95	5152.0	17342.71	236	568
27	61	5226.4	17017.67	5224.2	17022.96	234	400
28	61	5224.1	17023.53	5220.6	17027.06	540	932
Gulf of Alaska							
29	65	5335.0	16540.92	5330.8	16542.92	120	312
30	65	5330.5	16542.82	5322.0	16545.56	358	780
31	64	5312.0	16651.15	5307.7	16653.43	197	305
32	64	5307.3	16653.95	5303.0	16656.43	310	869
33	62	5239.8	16859.08	5237.1	16904.43	134	427
34	62	5237.3	16905.51	5234.0	16910.03	320	886
35	63	5258.0	16808.07	5255.0	16812.95	108	319
36	63	5254.6	16813.08	5250.7	16814.11	160	780
37	66	5344.3	16427.80	5340.9	16432.54	133	296
38	66	5340.7	16433.52	5337.8	16438.86	301	617

39	67	5358.4	16315.78	5354.3	16319.40	111	470
40	67	5354.4	16319.62	5352.1	16326.71	331	667

Table 1. -- continued

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.mm)	End latitude (ddmm.m)	End longitude (dddmm.mm)	Start depth (m)	End depth (m)
41	68	5407.9	16137.74	5405.3	16143.15	120	340
42	68	5405.6	16144.14	5403.9	16149.83	200	834
43	69	5419.2	16103.04	5416.0	16108.21	145	358
44	69	5415.8	16109.36	5412.4	16113.76	387	867
45	70	5422.2	16014.15	5418.3	16017.34	142	283
46	70	5417.9	16018.16	5413.6	16019.49	313	622
47	71	5430.3	15915.65	5426.3	15919.13	148	277
48	71	5426.2	15919.69	5422.7	15922.43	287	764
49	149	5435.7	13309.17	5435.9	13301.97	389	412
50	148	5438.9	13249.92	5436.0	13255.67	132	382
51	108	5427.7	13355.38	5429.3	13401.24	245	707
52	108	5429.9	13400.93	5433.5	13403.84	422	838
53	107	5454.1	13416.98	5457.5	13421.03	219	545
54	107	5457.9	13421.31	5500.0	13426.15	383	898
55	106	5520.9	13444.35	5523.6	13450.09	306	550
56	106	5524.0	13450.44	5523.3	13457.91	522	858
57	105	5533.6	13458.02	5534.1	13502.34	219	554
58	105	5535.0	13503.02	5537.7	13508.09	458	913
59	144	5555.9	13454.31	5600.0	13455.52	196	363
60	145	5601.9	13455.54	5605.3	13501.30	346	369
61	104	5559.0	13526.79	5601.3	13532.07	364	671
62	104	5602.1	13532.32	5604.8	13537.45	583	867
63	103	5623.0	13521.16	5623.0	13529.24	155	189
64	103	5623.1	13529.52	5622.2	13536.88	189	248
65	102	5651.1	13559.88	5653.8	13605.80	219	806
66	102	5654.3	13606.00	5658.0	13607.56	677	900
67	101	5711.3	13614.38	5712.7	13621.04	229	764
68	101	5713.2	13621.22	5716.7	13623.79	816	1064
69	100	5737.3	13632.55	5737.2	13639.00	220	730
70	100	5737.9	13640.40	5736.7	13646.11	600	930
71	142	5755.0	13700.10	5755.0	13708.35	400	445
72	143	5757.9	13704.54	5757.9	13712.81	235	422
73	99	5752.5	13722.63	5753.0	13730.39	190	658
74	99	5753.2	13731.31	5753.1	13737.98	645	945
75	98	5808.5	13844.66	5809.6	13852.17	287	860
76	98	5809.9	13852.63	5810.8	13859.64	544	1009
77	97	5828.5	13927.83	5827.6	13936.16	190	480
78	97	5827.8	13937.45	5827.7	13936.99	494	1009

79	138	5925.1	14056.31	5925.5	14104.61	206	293
80	139	5924.8	14109.79	5921.3	14114.95	317	324
81	96	5841.2	14038.49	5841.1	14046.96	229	742
82	96	5841.4	14047.79	5843.7	14054.20	625	954
83	94	5923.1	14209.24	5924.9	14216.65	229	480

Table 1. -- continued

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.mm)	End latitude (ddmm.m)	End longitude (dddmm.mm)	Start depth (m)	End depth (m)
84	94	5925.6	14217.30	5927.9	14222.58	425	874
85	95	5902.9	14121.06	5902.8	14129.03	303	525
86	95	5902.9	14130.36	5902.6	14139.01	593	919
87	93	5933.1	14233.94	5934.9	14240.18	131	588
88	93	5935.4	14241.49	5934.2	14247.50	588	660
89	137	5940.2	14323.19	5942.5	14329.75	293	310
90	136	5944.7	14335.96	5946.4	14343.76	155	293
91	92	5933.3	14339.49	5933.7	14348.60	171	677
92	92	5934.0	14349.25	5935.0	14356.93	551	920
93	91	5931.2	14442.83	5928.8	14450.47	183	516
94	91	5928.6	14451.98	5926.7	14459.10	487	900
95	90	5930.5	14532.55	5931.2	14540.82	154	850
96	90	5931.2	14542.30	5931.2	14550.50	316	670
97	89	5915.9	14651.20	5913.4	14657.27	190	564
98	89	5913.3	14658.21	5910.3	14703.77	561	900
99	134	5937.0	14658.06	5933.4	14703.20	208	211
100	135	5931.0	14709.14	5926.6	14708.82	209	217
101	87	5902.5	14838.62	5907.2	14838.56	159	222
102	87	5857.7	14839.40	5902.2	14838.93	229	255
103	88	5909.1	14736.73	5904.8	14738.15	238	445
104	88	5904.4	14739.47	5900.5	14739.03	409	858
105	132	5905.0	14923.66	5902.5	14930.36	175	225
106	133	5857.0	14930.31	5855.3	14937.16	236	241
107	128	5800.0	14950.51	5758.9	14957.76	223	262
108	129	5803.8	15002.58	5805.0	14955.85	295	303
109	131	5850.9	14855.53	5848.2	14802.21	233	253
110	130	5846.4	14904.68	5843.9	14911.83	180	220
111	86	5841.3	14820.43	5836.7	14819.56	280	516
112	86	5836.4	14819.91	5832.1	14819.77	519	1000
113	85	5817.6	14836.68	5813.2	14838.37	242	519
114	85	5812.7	14838.96	5808.8	14841.79	554	832
115	84	5758.6	14909.57	5755.1	14914.82	167	477
116	84	5754.7	14916.45	5750.8	14920.25	493	906
117	83	5737.8	14955.44	5733.5	14957.50	380	561
118	83	5732.6	14958.31	5728.3	15000.46	593	942

119	82	5723.8	15034.33	5719.6	15035.83	222	500
120	82	5718.8	15036.38	5714.4	15035.95	548	761
121	81	5707.2	15113.34	5703.1	15116.24	232	529
122	81	5702.6	15117.08	5658.6	15116.99	567	832
123	80	5629.1	15212.81	5625.5	15217.58	134	448
124	80	5625.5	15218.11	5621.3	15221.02	461	642
125	79	5618.2	15304.66	5615.9	15310.68	229	503
126	79	5616.0	15311.42	5613.1	15316.98	467	764

Table 1. -- continued

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.mm)	End latitude (ddmm.m)	End longitude (dddmm.mm)	Start depth (m)	End depth (m)
127	78	5554.0	15402.34	5558.6	15402.01	267	593
128	78	5549.9	15404.86	5553.5	15402.81	635	938
129	77	5602.3	15433.98	5558.1	15434.05	248	551
130	77	5557.6	15434.71	5553.5	15434.75	600	887
131	76	5546.0	15508.01	5541.9	15510.27	158	319
132	76	5541.6	15510.72	5538.5	15513.96	335	574
133	75	5538.6	15550.88	5534.1	15551.77	135	209
134	75	5534.0	15551.98	5529.9	15549.96	213	229
135	122	5611.1	15558.34	5610.9	15605.77	209	238
136	123	5613.9	15608.07	5615.1	15615.32	248	264
137	126	5720.8	15502.84	5720.8	15511.00	236	243
138	127	5720.9	15515.28	5719.6	15522.84	245	256
139	124	5700.0	15511.91	5659.6	15504.27	173	233
140	125	5703.0	15524.98	5700.2	15518.70	253	264
141	120	5545.0	15611.90	5547.3	15604.85	207	242
142	121	5544.8	15612.92	5543.5	15621.19	244	263
143	74	5514.3	15640.75	5510.3	15644.60	163	325
144	74	5510.0	15645.18	5505.6	15646.25	294	750
145	73	5447.1	15749.00	5450.5	15745.25	201	398
146	73	5446.6	15749.87	5442.2	15753.46	398	505
147	72	5437.8	15834.93	5433.8	15839.32	127	353
148	72	5433.4	15839.96	5429.7	15843.32	353	848

Table 2. --Catch in number by species for the 1998 NMFS longline survey of the Eastern Aleutians Sea and the Gulf of Alaska, June 1-September 5, 1998. SF = sablefish, PC = Pacific cod, GR = giant grenadiers, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland Turbot, RF = roughey and shortraker rockfish, ST = thornyheads, SK = skate, OS = other species.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
Eastern Aleutians										
35	90	1,880	455	490	272	47	136	13	457	137
37	157	0	177	0	24	42	0	20	61	42
38	576	323	261	130	306	460	67	230	24	28
39	880	415	951	146	120	220	81	163	91	73
40	825	478	683	60	149	246	113	183	28	83
42	194	825	918	188	47	16	57	23	270	98
53	715	230	1,359	85	66	86	127	154	78	121
54	292	1,606	1,854	866	151	27	169	52	91	928
55	256	703	1,953	199	217	27	192	96	95	114
57	421	338	1,909	161	85	31	65	44	220	45
58	270	334	1,484	207	115	18	254	97	128	238
59	387	679	1,205	361	221	6	478	118	63	200
60	177	1,549	388	366	32	1	865	52	29	144
61	453	2	971	169	19	29	36	188	382	164
Gulf of Alaska										
62	855	357	2,638	141	132	4	362	182	26	30
63	544	624	1,064	342	629	0	469	153	44	26
64	1,928	106	637	205	474	2	344	80	30	11
65	683	911	1,914	230	211	0	17	45	36	8
66	1,650	630	1,709	263	309	2	22	109	38	17
67	569	1,025	1,395	405	583	2	165	96	58	32
68	878	1,108	568	574	701	0	442	163	51	35
69	971	274	2,581	150	580	1	15	121	10	16
70	865	994	1,720	324	367	1	25	83	45	15
71	1,774	838	1,395	268	340	1	68	147	25	27
72	1,240	335	1,111	286	62	0	40	257	16	58
73	400	88	1,665	156	242	0	150	280	6	126
74	1,137	160	407	156	216	0	68	170	11	145
75	787	950	0	1,372	925	0	2	0	51	47
76	1,147	241	1,029	282	331	0	68	147	118	180
77	1,581	20	1,222	100	205	1	30	254	8	104
78	922	3	1,087	224	255	0	101	170	4	521
79	1,872	0	1,696	44	98	0	44	257	5	20
80	1,418	44	792	96	218	0	301	280	9	76
81	1,575	6	1,538	48	64	0	19	135	2	280
82	1,237	106	396	119	355	0	35	251	3	44
83	915	0	869	1	9	0	2	281	1	247
84	1,614	337	920	124	100	0	76	181	10	307
85	1,497	113	601	50	223	0	88	273	9	68
86	1,224	78	449	136	102	0	363	318	25	447
87	2,045	194	0	174	545	0	1	77	146	162

88	929	205	477	10	137	1	225	214	9	350
89	864	144	634	70	278	0	48	321	50	125
90	325	44	816	82	55	1	370	95	34	285

Table 2.-continued.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
91	1,456	64	675	87	128	1	221	225	25	145
92	852	20	604	11	90	0	97	167	2	24
93	2,033	11	189	190	48	0	27	440	26	24
94	1,221	4	238	86	265	1	392	150	15	123
95	1,953	0	398	28	100	0	385	233	30	226
96	1,395	0	691	52	166	0	395	55	61	85
97	1,285	46	531	52	101	0	782	159	43	101
98	967	0	697	4	40	0	672	35	7	29
99	1,453	0	285	9	54	0	233	78	17	175
100	2,355	1	216	0	70	0	198	239	9	51
101	1,763	32	392	4	123	0	218	212	4	187
102	1,460	33	371	11	126	0	328	186	6	142
103	72	113	0	170	19	0	0	8	11	2,386
104	2,257	0	663	8	32	0	336	271	12	183
105	1,599	54	265	45	32	0	133	254	33	303
106	1,645	2	212	4	42	0	529	189	15	131
107	1,654	39	293	20	32	0	841	192	38	267
108	1,613	18	234	15	87	0	671	171	26	123
120	245	251	0	353	267	0	0	1	101	34
121	576	140	0	203	257	0	0	0	143	14
122	355	482	0	102	209	0	0	0	77	34
123	320	119	0	41	347	0	0	0	79	35
124	79	267	0	115	202	0	0	0	78	34
125	152	288	0	137	87	0	0	0	40	17
126	109	493	0	124	82	0	0	0	46	32
127	341	928	0	173	174	0	0	2	96	78
128	607	606	0	73	314	0	1	12	15	53
129	1,368	8	0	576	458	0	0	18	46	14
130	1,243	20	0	23	65	0	0	28	50	145
131	1,050	85	0	29	252	0	9	84	64	84
132	767	147	0	83	181	0	1	16	141	190
133	1,203	7	0	71	204	0	10	25	79	52
134	90	1	0	1	26	0	1	11	95	848
135	355	2	0	10	49	0	56	5	64	931
136	257	6	0	39	47	0	1	34	67	718
137	711	0	0	35	22	0	6	15	40	231
138	526	0	0	54	141	0	70	53	26	109
139	1,224	0	0	30	181	0	39	48	59	81
142	917	0	43	4	34	0	25	255	16	11
143	1,097	0	16	21	50	0	60	91	10	54
144	459	39	0	20	179	0	59	116	33	572
145	724	0	1	41	78	0	21	156	35	223

148	779	113	0	39	42	0	11	204	210	628
149	1,185	2	0	27	26	0	43	297	230	74
Total	82,911	23,738	52,912	13,080	16,099	1,274	13,471	11,308	5,217	16,225

Table 3. - Mean length, mean round weight, mean dressed weight, number and estimated total round weight of sablefish by station, for the 1998 NMFS longline survey of the Eastern Aleutians and Gulf of Alaska, June 1-September 5.

Station Number	Mean length (cm)	Mean round weight (kg) ²	Mean dressed weight (lb) ³	Number of sablefish	Estimated total round weight (kg) ⁴
Eastern Aleutians					
38	65.6	3.1	4.3	576	1,791
39	64.8	3.0	4.2	880	2,640
40	67.2	3.4	4.7	825	2,795
42	67.4	3.4	4.8	194	664
53	61.9	2.6	3.6	715	1,864
54	68.6	3.7	5.2	292	1,085
55	64.3	3.0	4.2	256	766
57	61.9	2.6	3.6	421	1,086
58	63.0	2.7	3.8	270	784
59	66.2	3.3	4.5	387	1,261
60	72.0	4.2	5.9	177	750
61	65.3	3.1	4.3	453	1,392
Gulf of Alaska					
62	68.2	3.5	4.9	855	3,021
63	66.7	3.3	4.5	544	1,779
64	59.1	2.2	3.0	1,928	4,192
65	64.2	3.0	4.1	683	2,018
66	60.6	2.5	3.5	1,650	4,131
67	64.7	3.0	4.2	569	1,706
68	68.8	3.7	5.1	878	3,215
69	60.6	2.6	3.7	971	2,559
70	66.5	3.3	4.6	865	2,870
71	66.0	3.2	4.4	1,774	5,668
72	69.1	3.7	5.1	1,240	4,532
73	68.9	3.6	5.1	400	1,457
74	70.0	3.8	5.3	1,137	4,352
75	66.5	3.2	4.5	787	2,538
76	67.9	3.4	4.8	1,147	3,925
77	70.4	3.9	5.4	1,581	6,109
78	71.2	4.0	5.6	922	3,705

² Mean weight was estimated by applying a length-weight relationship to the length frequency distribution from each station.

³ Mean dressed weight was estimated using a recovery rate of 0.6 of round weight in pounds.

⁴ Estimated total round weight is the product of mean round weight and the number of hooked sablefish that came to the surface, including a small percentage that was lost during landing.

80	71.1	4.0	5.6	1,418	5,728
81	69.4	3.7	5.2	1,575	5,868
82	67.9	3.5	4.8	1,237	4,263

Table 3.- continued.

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
83	67.9	3.5	4.8	915	3,169
84	45.5	2.4	3.3	1,614	3,866
85	69.3	3.7	5.1	1,497	5,538
86	70.7	4.0	5.5	1,224	4,872
87	61.9	2.7	3.7	2,045	5,465
88	66.4	3.2	4.5	929	2,974
89	69.5	3.8	5.2	864	3,244
90	63.2	2.8	3.9	325	918
91	71.2	4.1	5.7	1,456	5,952
92	68.0	3.5	4.9	852	3,006
93	71.8	4.2	5.8	2,033	8,533
94	68.0	3.5	4.9	1,221	4,272
95	71.1	4.0	5.6	1,953	7,886
96	73.4	4.5	6.2	1,395	6,235
97	71.1	4.0	5.6	1,285	5,187
98	74.0	4.6	6.4	967	4,481
99	74.0	4.6	6.4	1,453	6,692
100	72.5	4.3	5.9	2,355	10,072
101	71.2	4.1	5.6	1,763	7,146
102	72.2	4.3	5.9	1,460	6,245
103	52.9	1.6	2.2	72	115
104	70.2	3.9	5.4	2,257	8,802
105	70.3	3.9	5.4	1,599	6,242
106	68.7	3.6	5.0	1,645	5,945
107	71.1	4.0	5.6	1,654	6,688
108	69.4	3.7	5.2	1,613	6,022
120	64.4	2.9	4.1	245	717
121	66.4	3.2	4.5	576	1,846
122	59.9	2.3	3.2	355	825
123	60.1	2.4	3.3	320	752
124	63.6	2.9	4.1	79	231
125	59.8	2.3	3.2	152	350
126	61.5	2.5	3.5	109	273
127	63.1	2.7	3.8	341	920
128	63.9	2.8	3.9	607	1,718
129	71.5	4.1	5.7	1,368	5,583
130	66.4	3.2	4.4	1,243	3,971
131	72.2	4.2	5.9	1,050	4,451

132	63.3	2.8	3.9	767	2,174
133	65.1	3.0	4.2	1,203	3,613
134	64.6	3.0	4.2	90	274
135	62.9	2.9	4.0	355	1,015
136	51.7	2.2	3.0	257	552
137	63.8	2.9	4.0	711	2,037

Table 3.- continued.

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
138	54.3	1.8	2.5	526	952
139	65.6	3.1	4.3	1,224	3,814
142	67.2	3.3	4.6	917	3,062
143	68.3	3.5	4.9	1,097	3,872
144	65.8	3.1	4.4	459	1,440
145	62.8	2.7	3.8	724	1,960
148	63.6	2.9	4.0	779	2,222
149	62.8	2.7	3.7	1,185	3,167
Total				82,911	290,004