

March 7, 2001

F/V *Ocean Prowler*
Cruise Report OP-99-01
Longline Survey of the Gulf of Alaska and Eastern Bering Sea
May 28-September 5, 1999

Prepared by

Thomas L. Rutecki

On September 5, 1999, the National Marine Fisheries Service, Alaska Fisheries Science Center (AFSC), completed the 21st annual longline survey of sablefish (*Anoplopoma fimbria*) resources of the upper continental slope of Alaska (Figure 1). This survey was designed to continue the time series (1979-94) of the Gulf of Alaska portion of the Japan-U.S. cooperative longline survey that was discontinued after 1994. In the NMFS survey the Gulf of Alaska has been sampled annually since 1987, the eastern Aleutian Islands biennially since 1996, and the eastern Bering Sea biennially since 1997. The Gulf of Alaska and eastern Bering sea were sampled in 1999.

OBJECTIVES

1. Determine the relative abundance and size composition of the commercially important species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), and rougheye 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, shortspine thornyhead, and Greenland turbot 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. Test the effect of hook spacing on sablefish catch per hour.

VESSEL AND GEAR

Survey operations were conducted using the F/V *Ocean Prowler*, a chartered U.S. longline vessel. The 47 m (155 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, three sets of plate freezers, and refrigerated holds. Vessel personnel consisted of a captain, an engineer, a cook, a quality-control technician, six fishermen and five processors.

Gear configuration was unchanged from that of the 1988-98 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 becketts tied into the groundline at 2 m (6.5 ft) intervals. Five meters (16 ft) of groundline were left bare at each end. Gangions were constructed of medium lay #60 thread nylon, becket 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 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 except in the eastern Bering Sea where 180 skates with 8,100 hooks are set. Two eighty-skate groundlines laid end to end were set at each station along the upper continental slope. A single groundline of eighty skates was set at each station in the gullies.

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

OPERATIONS

The charter began on May 28 at Unalaska, Alaska, and ended on September 5 in Unalaska, Alaska. The charter period was divided into seven legs of 19, 24, 17, 4, 14, 12 and 16 days with a one-day port call after the first, third, fourth, and sixth legs. Two-day port calls occurred after legs 2 and 5. During Leg 1, most of the stations along the upper continental slope of the eastern Bering Sea were sampled. During leg 2 the remaining stations in the eastern Bering Sea were sampled as well as the area in the Gulf of Alaska near the western end of Umnak Island and extending eastward to Sand Point. Leg 3 began near Dixon Entrance and continued north and westward to Yakutat. During leg 4 the hook-spacing 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 sampled.

From 1988 to 1990 the survey period was from 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 fishery 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 Fishing Quota (IFQ) system in the sablefish and Pacific halibut longline fisheries. Beginning in 1998 the order in which the stations were sampled was changed to avoid conflicting with a rockfish fishery in 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.

One hundred and six days were used to complete the survey, including 76 days of survey sampling, three days for loading and unloading gear, 22 days for travel and port calls, three days for seamount sampling, and two sampling days for the hook-spacing experiment.

Hook-Spacing Experiment

A longline hook-spacing experiment was conducted near Yakutat from 25-26 July 1999. The purpose of the experiment was to test an assumption on how to interpret longline fishery catch rates. The fishery 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 increasing the hook spacing increased the fishing power of each hook. Most (about 70%) sablefish longline fishermen currently use 1 meter hook spacing, but this spacing differs between vessels and may change with time. In the hook-spacing experiment, circle hooks (size 13/0) baited with squid were used. Four hook spacings were tested, 0.5, 1, 2, and 4 m. Six sets were completed. Each set contained all hook spacings. For both this experiment and an earlier hook spacing experiment conducted in 1986, catch rate per hook increased as hook spacing increased to an asymptote at four meter spacing.

Catch per hook for one-meter spacing, the most common spacing currently in the fishery, was about half that for the four-meter spacing. These results imply that fishery catch rates should be standardized by longline set to account for differences in hook spacing.

Survey Operations

Sixteen stations were sampled along the upper continental slope of the eastern Bering Sea and 45 stations along the upper continental slope of the 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 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.

The gillnet was set about midnight and retrieved before the longline gear was set at 0630. All fish caught in the gillnet were counted and measured for length. Juvenile sablefish and salmon were frozen for additional studies back at the laboratory.

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 fifty-two longline hauls (sets) were completed (Table 1). Sablefish was the most frequently caught species, followed by giant grenadiers, Pacific cod, arrowtooth flounder, and Pacific halibut (Table 2). A total of 88,949 sablefish, with an estimated total round weight of 298,146 kg (657,412 lb), was taken during the survey (Table 3).

The highest total sablefish catch was observed at station 105 in southern southeast Alaska (table 2). The largest average length sablefish were caught at station 98 in northern southeast Alaska (Table 3).

Approximately 4,633 sablefish, 603 shortspine thornyhead, and 188 Greenland turbot were tagged and released during the survey. Length weight data and otoliths were collected from 2,451 sablefish. Thirty-six gillnet sets were completed. A total of 28 young-of-the-year and 12 age 1 sablefish were caught during the survey.

Killer whales preying on sablefish and Greenland Turbot coming up on the gear were observed at eastern Bering Sea stations 12, 13, 17, 22, 32, 33, and 34.

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

SCIENTIFIC PERSONNEL

- Leg I (May 28 - June 15)
 Larry Haaga, Field Party Chief, RACE
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg II (June 15- July 8)
 Nancy Maloney, Field Party Chief, ABL
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg III (July 8 - July 24)
 Thomas Rutecki, Field Party Chief, ABL
 Jim Salzman, Contract Biologist
 Ken Orwig, Contract Biologist
- Leg IV (July 24 - July 27)
 Michael Sigler, Field Party Chief, ABL

Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

Leg V (July 27 - August 9)
John Karinen, Field Party Chief, ABL
Phil Rigby, Supervisory Fisheries Biologist, ABL
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

Leg VI (August 10- August 21)
Michael Sigler, Field Party Chief, ABL
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

Leg VII (August 21 - September 5)
Larry Haaga, Field Party Chief, RACE
Jim Salzman, Contract Biologist
Ken Orwig, Contract Biologist

ABL - Auke Bay Laboratory
RACE - Resource Assessment and Conservation Engineering Division

For further information contact either

Dr. Michael Dahlberg, Director, Auke Bay Laboratory, National Marine Fisheries Service, 11305
Glacier Highway, Juneau, AK 99801-8626 Telephone (907) 789-6000

or

Dr. Gary Stauffer, Director, Resource Assessment and Conservation Engineering Division,
National Marine Fisheries Service, 7600 Sand Point Way NE., Building 4, BIN C15700, Seattle,
WA 98115-0070 -- Telephone (206) 526-4170.

Table 1.--Haul number (set), preassigned station number, and starting and ending positions and depths for the 1999 NMFS longline survey of the eastern Bering Sea and Gulf of Alaska, May 28 - September 5.

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longitude (dddmm.m)	Start depth (m)	End depth (m)
Eastern Bering Sea							
1	1	5846.7	17734.9	5849.2	17742.7	153	329
2	1	5849.4	17743.1	5851.4	17750.7	405	590
3	2	5837.0	17636.8	5836.1	17647.8	150	232
4	2	5836.2	17648.2	5833.7	17656.0	248	824
5	4	5825.0	17530.7	5825.0	17539.0	211	480
6	4	5825.1	17540.2	5827.9	17546.8	570	693
7	6	5820.1	17419.1	5824.1	17422.4	170	451
8	6	5824.1	17423.0	5825.1	17432.0	547	403
9	8	5737.9	17410.0	5741.8	17414.3	149	420
10	8	5742.3	17414.5	5746.7	17418.0	472	582
11	10	5649.9	17322.8	5653.9	17324.6	212	536
12	10	5654.3	17325.0	5658.7	17327.8	522	580
13	12	5637.7	17221.5	5634.9	17226.9	174	511
14	12	5634.5	17227.3	5630.1	17229.8	524	712
15	13	5628.0	17127.7	5627.6	17136.6	208	410
16	13	5627.5	17137.4	5627.2	17145.1	370	636
17	15	5609.6	17040.3	5607.7	17046.8	136	409
18	15	5607.4	17046.8	5609.3	17052.6	482	548
19	17	5602.1	16937.5	5600.0	16945.7	194	259
20	17	5600.0	16945.9	5558.8	16954.5	276	430
21	18	5614.3	16910.5	5610.9	16916.8	178	634
22	18	5610.8	16917.3	5607.7	16922.2	659	713
23	20	5548.8	16848.5	5551.2	16856.0	196	463
24	20	5551.5	16857.0	5555.5	16900.4	538	736
25	22	5527.4	16800.4	5525.6	16808.0	157	265
26	22	5525.5	16808.2	5523.9	16814.8	267	480
27	32	5346.3	16719.8	5342.7	16722.8	176	496
28	32	5342.9	16724.2	5342.5	16728.1	513	417
29	33	5336.9	16817.1	5337.0	16810.0	638	801
30	33	5337.0	16807.2	5337.5	16759.3	761	684
31	34	5321.4	16857.6	5319.7	16853.4	811	630
32	34	5319.6	16850.4	5320.3	16845.2	733	804
Gulf of Alaska							
33	62	5239.3	16859.9	5236.8	16905.6	169	535
34	62	5236.6	16906.9	5233.5	16910.9	475	521
35	63	5257.7	16808.5	5254.2	16813.0	119	404
36	63	5254.0	16813.0	5250.5	16815.3	273	786
37	64	5311.2	16651.6	5306.9	16654.6	219	321
38	64	5306.6	16654.7	5303.1	16659.2	325	729
39	65	5334.9	16541.3	5331.0	16544.2	120	257
40	65	5330.8	16544.8	5326.8	16547.8	269	421

Haul no.	Station no.	Start latitude (ddmm.m)	End longitude (dddmm.m)	End latitude (ddmm.m)	End longitude (dddmm.m)	Start depth (m)	End depth (m)
41	66	5344.0	16428.4	5340.8	16434.5	135	297
42	66	5340.6	16435.0	5337.8	16440.9	328	615
43	67	5358.0	16316.2	5354.4	16321.1	116	352
44	67	5354.1	16321.8	5351.1	16327.9	278	697
45	68	5407.7	16138.7	5405.2	16143.7	135	400
46	68	5405.3	16144.5	5404.0	16150.2	301	664
47	69	5418.6	16103.8	5415.5	16108.7	185	402
48	69	5415.8	16109.2	5413.2	16115.4	421	709
49	70	5421.5	16014.3	5417.6	16017.9	142	345
50	70	5417.1	16018.2	5412.8	16020.5	369	714
51	71	5430.3	15915.9	5426.3	15920.0	142	273
52	71	5426.1	15920.2	5422.3	15924.9	283	890
53	148	5438.8	13250.0	5436.5	13255.3	145	378
54	149	5435.8	13301.8	5435.7	13308.0	402	408
55	108	5427.9	13355.0	5429.3	13401.0	261	526
56	108	5430.0	13400.9	5433.6	13403.5	449	597
57	107	5438.8	13250.2	5457.8	13421.1	214	615
58	107	5458.3	13421.6	5501.1	13427.4	436	883
59	106	5520.9	13444.2	5523.5	13449.9	359	648
60	106	5524.3	13451.1	5523.7	13457.9	530	852
61	105	5533.4	13458.0	5534.0	13503.0	245	571
62	105	5535.1	13503.7	5537.8	13508.0	520	538
63	144	5555.8	13454.0	5559.7	13454.6	190	321
64	145	5602.9	13455.1	5605.0	13500.0	350	361
65	104	5558.0	13526.7	5601.3	13531.3	378	638
66	104	5601.8	13532.3	5604.1	13537.5	517	871
67	103	5622.9	13521.1	5622.8	13529.0	153	189
68	103	5623.0	13529.6	5621.8	13537.3	190	234
69	102	5650.8	13559.4	5653.0	13604.8	210	615
70	102	5653.8	13605.8	5657.4	13606.7	658	795
71	101	5711.1	13614.0	5712.0	13619.7	217	673
72	101	5712.6	13620.4	5715.4	13622.9	697	820
73	100	5731.1	13632.4	5736.4	13636.9	215	941
74	100	5736.3	13639.9	5739.0	13645.0	735	923
75	142	5754.8	13700.9	5755.2	13708.6	393	443
76	143	5757.9	13704.7	5758.0	13712.8	231	420
77	99	5752.4	13722.5	5753.0	13728.5	189	718
78	99	5752.9	13729.6	5752.8	13735.4	693	905
79	98	5808.3	13843.6	5828.9	13851.7	241	826
80	98	5808.8	13852.8	5810.6	13859.4	561	1,028
81	97	5828.0	13928.1	5727.3	13936.0	193	560
82	97	5827.3	13937.2	5824.7	13942.7	497	1,188
83	96	5841.1	14038.1	5841.0	14046.5	225	660

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longitude (dddmm.m)	Start depth (m)	End depth (m)
84	96	5841.5	14047.0	5843.6	14053.8	578	821
85	138	5925.0	14056.1	5925.6	14104.7	198	293
86	139	5924.9	14110.1	5921.4	14114.9	318	323
87	95	5903.0	14120.3	5902.9	14128.4	291	500
88	95	5903.1	14129.7	5903.1	14138.0	532	844
89	94	5923.3	14210.3	5925.4	14217.6	244	452
90	94	5926.1	14218.2	5928.1	14224.5	422	963
91	137	5940.3	14323.1	5942.8	14328.9	292	309
92	136	5944.6	14335.4	5945.9	14343.0	293	185
93	93	5932.8	14234.2	5934.8	14240.1	127	617
94	93	5934.8	14239.6	5935.7	14245.9	579	619
95	92	5933.4	14339.8	5933.7	14348.2	171	802
96	92	5933.9	14350.4	5935.3	14358.7	644	530
97	91	5931.2	14442.9	5929.0	14450.7	182	486
98	91	5928.7	14451.5	5928.7	14451.7	494	907
99	90	5930.0	14531.8	5931.0	14540.1	158	750
100	90	5930.9	14540.6	5931.4	14548.1	601	741
101	89	5915.5	14651.7	5913.0	14658.2	190	600
102	89	5912.9	14659.5	5909.8	14704.5	557	940
103	134	5937.0	14657.9	5933.6	14702.5	207	214
104	135	5930.9	14709.2	5927.0	14708.8	208	217
105	88	5909.3	14736.1	5905.4	14736.4	252	497
106	88	5904.8	14736.7	5901.0	14737.3	528	834
107	132	5704.8	14923.6	5902.5	14930.2	176	223
108	133	5856.9	14930.3	5855.3	14936.7	239	242
109	87	5907.5	14839.0	5903.1	14838.8	1,552	200
110	87	5902.8	14838.6	5958.3	14838.5	215	243
111	130	5843.4	14911.3	5846.1	14904.7	173	213
112	131	5848.2	14902.5	5850.3	14855.9	230	252
113	86	5841.2	14820.1	5837.3	14820.1	268	439
114	86	5836.7	14820.1	5832.6	14819.1	480	957
115	85	5817.7	14836.9	5813.6	14839.4	235	496
116	85	5812.9	14839.8	5808.6	14841.6	544	835
117	84	5758.3	14909.9	5755.1	14914.8	170	475
118	84	5754.6	14959.0	5751.4	14919.3	496	909
119	128	5759.7	14950.5	5759.0	14957.8	226	264
120	129	5804.8	14954.7	5804.0	15002.1	293	323
121	83	5337.9	14955.2	5733.5	14956.5	396	561
122	83	5732.8	14957.9	5728.8	14959.7	585	914
123	82	5725.1	15031.8	5720.8	15030.5	202	480
124	82	5720.2	15030.8	5716.0	15033.8	517	782
125	81	5707.0	15113.5	5703.1	15116.8	250	515
126	81	5702.3	15117.7	5657.9	15117.7	596	860

Haul no.	Station no.	Start latitude (ddmm.m)	Start longitude (dddmm.m)	End latitude (ddmm.m)	End longitude (dddmm.m)	Start depth (m)	End depth (m)
127	79	5618.1	15304.6	5615.6	15311.2	252	594
128	79	5615.4	15312.4	5612.5	15317.8	592	834
129	80	5620.0	15226.7	5623.7	15232.0	182	503
130	80	5624.1	15232.7	5621.6	15238.4	469	803
131	78	5558.5	15401.2	5554.5	15401.0	275	566
132	78	5554.0	15400.6	5550.8	15403.6	578	904
133	77	5502.5	15433.9	5558.3	15434.2	235	531
134	77	5557.7	15434.3	5553.8	15434.8	583	880
135	76	5546.1	15508.3	5541.9	15510.9	157	307
136	76	5541.3	15511.0	5537.7	15515.4	357	729
137	75	5538.5	15551.1	5534.0	15551.9	147	211
138	75	5533.7	15551.7	5529.3	15549.8	212	225
139	122	5611.0	15557.7	5611.1	15604.7	194	236
140	123	5613.9	15607.8	5615.0	15614.4	247	264
141	126	5720.9	15510.5	5720.6	15502.6	241	241
142	127	5720.9	15514.8	5619.5	15522.6	246	257
143	124	5659.1	15504.0	5659.9	15511.8	172	235
144	125	5700.0	15518.1	5702.4	15524.2	253	265
145	120	5547.1	15604.6	5545.7	15611.5	203	237
146	121	5544.7	15611.9	5543.7	15619.5	243	251
147	74	5514.2	15640.5	5510.5	15644.2	179	329
148	74	5510.1	15645.0	5506.5	15645.2	290	808
149	73	5450.8	15744.5	5447.2	15748.9	180	387
150	73	5446.4	15749.6	5442.4	15753.3	416	508
151	72	5438.1	15834.5	5434.0	15837.0	123	411
152	72	5433.7	15839.9	5429.7	15843.5	327	825

Table 2. --Catch in number by species for the 1999 NMFS longline survey of the Eastern Bering Sea and the Gulf of Alaska, May 28 - September 5. SF = sablefish, PC = Pacific cod, GR = giant grenadiers, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland Turbot, RF = rougheye and shortraker rockfish, ST = thornyheads, SK = skate, OS = otherspecies.

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
Eastern Bering Sea										
1	41	1,608	690	575	168	166	18	2	473	372
2	60	1,607	1,096	111	309	416	6	7	486	296
4	45	349	1,543	90	325	485	0	1	123	53
6	22	1,317	381	1,326	392	162	20	0	322	199
8	54	384	886	474	225	424	55	41	172	30
10	139	260	1,872	353	307	182	28	26	106	39
12	17	372	1,572	37	43	54	10	16	122	224
13	11	219	1,266	90	130	19	39	21	25	269
15	88	476	1,343	329	200	95	28	26	88	84
17	12	545	316	65	258	44	202	18	150	155
18	565	280	762	103	569	668	9	15	130	36
20	585	772	187	191	544	579	112	15	153	81
22	1	1,305	7	18	73	18	10	1	96	694
32	594	284	40	206	483	17	69	104	19	187
33	681	343	45	588	387	403	356	83	52	149
34	269	0	13	3	125	156	0	37	257	125
Gulf of Alaska										
62	864	72	1,655	225	184	2	556	141	9	32
63	295	713	655	673	325	0	252	110	49	41
64	2,240	14	1,335	107	156	2	226	125	6	32
65	987	845	723	652	510	0	42	119	46	30
66	879	389	1,634	322	250	2	135	74	45	30
67	434	949	1,027	711	137	0	132	39	42	105
68	1,143	576	849	676	423	0	367	306	33	47
69	2,034	261	1,421	149	399	0	16	143	9	12
70	1,536	766	1,016	236	449	0	17	134	22	42
71	1,180	913	1,529	123	314	0	128	77	37	31
72	1,395	379	1,793	286	251	0	41	146	17	40
73	1,092	107	1,236	210	589	0	45	175	16	71
74	1,623	83	1,148	353	433	1	31	310	11	93
75	1,034	506	0	1,239	1,351	0	2	0	97	53
76	2,016	142	695	228	435	0	61	145	61	388
77	1,623	5	1,835	81	435	0	56	283	12	65
78	1,194	1	1,666	102	226	0	212	308	12	392
79	1,660	1	1,213	82	472	0	42	230	4	54
80	1,009	65	1,025	310	142	0	261	451	21	110
81	1,701	0	1,384	35	295	0	11	137	5	426
82	1,298	105	1,804	234	377	0	54	220	3	124
83	1,016	0	2,169	1	22	1	13	82	1	372
84	1,685	362	805	198	333	0	46	202	28	164
85	1,082	182	1,121	63	391	0	157	302	23	62
86	1,242	96	980	74	150	0	303	323	23	287
87	2,089	94	0	89	110	0	10	94	68	64
88	1,338	189	1,130	21	241	0	340	209	18	163
89	1,023	61	879	51	163	0	47	244	16	493
90	968	75	703	45	45	0	210	264	25	67
91	1,026	45	782	17	50	0	302	258	20	226

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
92	711	2	135	0	52	0	50	126	3	21
93	1,720	8	317	132	35	0	22	604	30	54
94	1,241	8	293	29	280	0	519	316	38	237
95	1,767	0	524	27	42	0	497	382	41	126
96	1,766	0	592	44	139	0	415	251	42	48
97	1,096	1	400	11	147	0	365	200	10	204
98	955	0	703	2	11	0	621	52	3	144
99	1,757	3	323	12	77	0	210	268	11	109
100	1,983	2	651	0	14	0	91	276	5	71
101	1,366	10	777	2	79	0	110	307	8	54
102	1,231	15	463	4	51	0	85	288	12	100
103	913	504	0	271	361	0	1	30	26	632
104	1,778	0	429	7	21	0	249	443	13	301
105	2,566	79	471	65	41	0	177	266	44	105
106	2,455	1	311	5	27	0	869	209	14	79
107	1,391	27	260	18	68	0	899	131	20	168
108	1,009	22	189	28	65	0	1,455	205	33	166
120	551	372	0	248	714	0	1	0	268	25
121	774	65	0	193	374	0	0	0	240	7
122	952	202	0	146	275	0	1	1	89	29
123	1,681	27	0	74	204	0	0	0	80	5
124	880	326	0	183	605	0	2	0	103	26
125	750	485	0	306	334	0	0	0	146	61
126	794	308	0	222	482	0	0	0	176	53
127	927	331	0	287	223	0	2	0	158	25
128	984	226	0	192	280	0	0	5	10	8
129	716	0	0	484	517	0	0	25	8	8
130	196	1	0	5	26	0	1	41	30	13
131	1,052	9	0	37	207	0	6	67	68	23
132	1,422	8	0	34	11	0	1	14	136	32
133	786	1	0	11	35	0	46	11	114	11
134	54	0	0	0	8	0	4	28	49	99
135	573	1	0	11	11	0	49	20	75	18
136	295	1	0	50	59	0	14	55	50	24
137	323	0	0	9	42	0	3	57	12	4
138	545	1	0	50	122	0	29	112	27	42
139	1,302	0	0	22	59	0	27	32	98	5
142	1,010	0	287	4	71	0	43	246	27	21
143	1,338	0	18	26	241	0	14	149	27	47
144	599	126	0	47	175	0	127	177	35	128
145	1,093	0	2	10	89	0	76	189	26	198
148	467	193	0	87	79	0	16	153	108	592
149	1,290	1	0	53	75	0	15	189	89	87
Total	88,949	21,483	53,376	15,600	21,024	3,896	12,189	11,989	6,155	11,319

Table 3.- Mean length, round weight, mean dressed weight, number and estimated total round weight of sablefish by station, for the 1999 NMFS longline survey of the Eastern Bering Sea and the Gulf of Alaska, May 28 - 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
1	62.2	2.6	3.6	41	108
2	65.8	3.2	4.4	60	191
4	64.2	2.9	4.1	45	132
6	65.4	3.1	4.3	22	68
8	64.7	3.0	4.2	54	163
10	62.8	2.7	3.8	139	377
12	54.9	1.7	2.3	17	29
13	53.7	1.9	2.7	11	21
15	70.4	3.9	5.4	88	345
17	60.5	2.5	3.5	12	30
18	65.2	3.1	4.2	565	1,726
20	62.9	2.7	3.7	585	1,562
22	0.0	0.0	0.0	1	*
32	56.6	1.9	2.6	594	1,119
33	61.0	2.5	3.5	681	1,692
34	60.8	2.4	3.3	269	647
Gulf of Alaska					
62	65.6	3.1	4.4	864	2,708
63	61.0	2.5	3.4	295	727
64	56.3	1.8	2.6	2,240	4,131
65	58.2	2.1	2.9	987	2,024
66	58.8	2.2	3.1	879	1,951
67	63.2	2.9	4.0	434	1,237
68	68.8	3.7	5.1	1,143	4,176
69	61.3	2.6	3.7	2,034	5,354
70	63.1	2.8	3.9	1,536	4,343
71	61.5	2.6	3.6	1,180	3,054
72	68.6	3.6	5.0	1,395	5,011
73	67.4	3.4	4.7	1,092	3,724

* No weight estimate because of killer whale predation.

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.

Table 3-continued

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
74	69.1	3.7	5.1	1,623	5,933
75	61.1	2.5	3.5	1,034	2,578
76	66.5	3.2	4.5	2,016	6,470
77	69.2	3.7	5.1	1,623	5,944
78	70.9	4.0	5.5	1,194	4,727
79	70.5	3.9	5.4	1,660	6,409
80	70.8	3.9	5.5	1,009	3,976
81	69.7	3.8	5.2	1,701	6,406
82	67.7	3.4	4.8	1,298	4,451
83	69.5	3.8	5.2	1,016	3,824
84	70.2	3.9	5.4	1,685	6,497
85	68.3	3.5	4.9	1,082	3,788
86	72.3	4.3	6.0	1,242	5,326
87	64.6	3.1	4.3	2,089	6,393
88	71.5	4.1	5.7	1,338	5,490
89	71.6	4.1	5.7	1,023	4,224
90	71.0	4.1	5.6	968	3,925
91	69.6	3.8	5.3	1,026	3,877
92	68.9	3.7	5.1	711	2,593
93	73.8	4.6	6.4	1,720	7,883
94	69.6	3.9	5.4	1,241	4,791
95	71.9	4.2	5.9	1,767	7,439
96	73.7	4.6	6.3	1,766	8,046
97	73.0	4.4	6.2	1,096	4,850
98	76.1	5.1	7.1	955	4,863
99	74.3	4.7	6.6	1,757	8,330
100	70.9	4.2	5.9	1,983	8,380
101	71.0	4.0	5.6	1,366	5,490
102	68.8	3.6	5.0	1,231	4,438
103	55.5	1.9	2.7	913	1,766
104	69.6	3.8	5.3	1,778	6,781
105	70.0	3.9	5.4	2,566	9,949
106	68.6	3.6	5.0	2,455	8,895
107	69.1	3.7	5.2	1,391	5,157
108	66.9	3.3	4.6	1,009	3,372
120	60.7	2.4	3.4	551	1,331
121	64.0	2.9	4.0	774	2,250
122	59.4	2.3	3.1	952	2,148
123	55.8	1.8	2.6	1,681	3,088
124	60.5	2.4	3.3	880	2,111
125	57.8	2.1	2.9	750	1,552

Table 3. continued.

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
126	56.8	1.9	2.7	794	1,540
127	61.8	2.6	3.6	927	2,380
128	64.4	2.9	4.0	984	2,827
129	71.9	4.1	5.8	716	2,963
130	68.1	3.5	4.9	196	687
131	70.4	4.0	5.5	1,052	4,184
132	59.3	2.4	3.4	1,422	3,436
133	62.7	2.8	3.9	786	2,191
134	52.4	1.7	2.3	54	91
135	52.4	1.6	2.2	573	904
136	59.7	2.5	3.5	295	733
137	63.0	2.8	3.9	323	897
138	59.8	2.5	3.5	545	1,355
139	64.0	2.8	3.9	1,302	3,680
142	68.7	3.6	5.0	1,010	3,628
143	65.3	3.1	4.3	1,338	4,113
144	66.9	3.5	4.9	599	2,099
145	66.8	3.4	4.7	1,093	3,670
148	62.6	2.8	3.8	467	1,286
149	60.9	2.4	3.3	1,290	3,094
Total				88,949	298,146

