

February 23, 2004

**Cruise Report OP-01-03  
Longline Survey of the Gulf of Alaska and Eastern Bering Sea  
May 28-September 1, 2003**

**Prepared by**

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On September 1, 2003, the Alaska Fisheries Science Center (AFSC) completed the twenty-fourth annual longline survey of Alaska sablefish (*Anoplopoma fimbria*) resources of the upper continental slope (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. The NMFS has surveyed the Gulf of Alaska 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 2003.

**OBJECTIVES**

1. Determine the relative abundance and size composition of the commercially important species: sablefish, shortspine thornyhead (*Sebastolobus alascanus*), and rougheye and shortraker rockfish (*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), Greenland turbot (*Reinhardtius hippoglossoides*).
3. Tag and release sablefish, shortspine thornyhead, and Greenland turbot throughout the cruise to determine migration patterns.
4. Implant Greenland turbot and shortspine thorny head with electronic tags that record water temperature, depth, and time.

5. Collect sablefish otoliths to study the age composition of the population.
6. Conduct surface-gillnet sampling to examine distribution and abundance of young-of-the-year sablefish.
7. Test the effect of hook spacing on sablefish catch rates.

### **VESSEL AND GEAR**

Survey operations were conducted using the F/V *Ocean Prowler*, a chartered U.S. longline vessel. The 47 m (155 ft) long 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, two contract biologists, six fishermen and five processors.

Gear configuration was unchanged from that of the 1988-2002 surveys. Units of gear (skates) were 100 m (55 fathoms) long and contained 45 size 13/0 Mustad<sup>1</sup> 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 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 varying lengths by depth of 9.5 mm diameter nylon buoyline, a 92 m (50 fathoms) 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 line, a 27 kg (60 lb) halibut anchor, and 366 m (200 fathoms) of 9.5 mm nylon line. 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*) 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 nautical miles) long and contained 160 skates and 7,200 hooks except in the eastern Bering Sea where 180 skates with 8,100 hooks were 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 except Amatuli Gully station 87, which consists of 160 skates.

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<sup>1</sup> 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 1 at Unalaska. The charter period was divided into seven legs of 18, 14, 15, 2, 10, 11, and 11 days with a one-day port call after the first, third, fourth, and sixth legs. A two-day port call occurred after leg 5. After leg 2, six days were used for port calls and transiting from Kodiak to Ketchikan. During leg 1, most of the stations along the upper continental slope of the eastern Bering Sea were sampled. During leg 2, stations in the Gulf of Alaska were sampled 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 Cordova was sampled, and during leg 6, the area from Cordova 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 length of the 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 an early July rockfish fishery 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 81 days of survey sampling, four days for loading and unloading gear, and 12 days for travel and port calls.

### Hook-Spacing Experiment

A longline hook-spacing experiment was conducted near Yakutat during 25-26 July 2003. 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 among 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 earlier hook spacing experiments conducted in 1986 and 1999-2001, catch rate per hook increased as hook spacing increased to an asymptote at the 4-meter spacing.

Catch per hook for 1-meter spacing, the most common spacing currently in the fishery, was about half that for the 4-meter spacing. These results imply that analysis of fishery catch rates should be standardized by longline set to account for differences in hook spacing.

### Survey Operations

Sixteen stations along the upper continental slope of the eastern Bering Sea and 45 stations along the upper continental slope of the Gulf of Alaska were sampled 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 greater than 1,000 m were sampled (Table 1). In addition, 27 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 hours Alaska Daylight Time. Retrieval began about 0930 hours and was completed by about 1930 hours.

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 fifty-two longline hauls were completed (Table 1). Sablefish was the most frequently caught species, followed by giant grenadiers, Pacific cod, shortspine thornyhead, other species, arrowtooth flounder, and Pacific halibut (Table 2). A total of 86,617 sablefish, with an estimated total round weight of 267,379 kg (589,570 lb), was taken during the survey (Table 3).

The highest total sablefish catch was observed at station 87 in the central Gulf of Alaska (Table 2). Station 86 in the central Gulf of Alaska had the largest average length sablefish (Table 3).

A total of 4,055 sablefish, 535 shortspine thornyhead, and 128 Greenland turbot were tagged and released during the survey. Electronic tags were implanted in 45 Greenland turbot and 55 shortspine thornyhead. Length-weight data and otoliths were collected from 2,045 sablefish. Twenty-six gillnet sets were completed. A total of 21 young-of-the-year sablefish were caught during gillnet the survey.

Killer whales preying on sablefish and Greenland turbot during retrieval were observed at eastern Bering Sea stations 4, 6, 10, 20, 23, and 32.

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

## SCIENTIFIC PERSONNEL

- Leg I (May 28 - June 18)  
 Larry Haaga, Field Party Chief, RACE  
 Jim Salzman, Contract Biologist  
 Ken Orwig, Contract Biologist
- Leg II (June 18- July 3)  
 Nancy Maloney, Field Party Chief, ABL  
 Jim Salzman, Contract Biologist  
 Ken Orwig, Contract Biologist
- Leg III (July 8 - July 24)  
 Lee Hulbert, Field Party Chief, ABL  
 Jim Salzman, Contract Biologist  
 Ken Orwig, Contract Biologist
- Leg IV (July 24 - July 27)  
 Dave Clausen, Field Party Chief, ABL

Mitch Lorenz, Biologist, ABL  
Jim Salzman, Contract Biologist  
Ken Orwig, Contract Biologist

Leg V (July 27 - August 11)  
John Karinen, Field Party Chief, ABL  
Dean Courtney, Biologist, ABL  
Jim Salzman, Contract Biologist  
Ken Orwig, Contract Biologist

Leg VI (August 8- August 20)  
Chris Lunsford, Field Party Chief, ABL  
Jim Salzman, Contract Biologist  
Ken Orwig, Contract Biologist\_\_\_\_\_

Leg VII (August 20 - September 1)  
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

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Table 1.--Haul number (set), preassigned station number, and starting and ending positions and depths for the 2003 NMFS longline survey of the Eastern Bering Sea and Gulf of Alaska, May 28- September 1.

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	5846.6	17734.47	5848.9	17742.33	176	312
2	1	5849.1	17743.10	5851.2	17749.91	436	580
3	2	5837.2	17638.53	5835.5	17646.76	150	344
4	2	5835.4	17647.30	5833.7	17655.30	390	756
5	4	5829.8	17540.00	5829.2	17548.19	215	433
6	4	5829.0	17548.60	5830.1	17556.65	427	728
7	6	5819.8	17418.62	5824.0	17422.07	166	440
8	6	5824.1	17422.67	5825.0	17431.31	383	536
9	8	5737.5	17409.87	5742.0	17414.36	153	431
10	8	5742.5	17414.56	5747.0	17418.39	382	500
11	10	5649.5	17322.75	5653.9	17324.79	232	482
12	10	5654.2	17324.88	5658.3	17328.24	510	654
13	12	5637.6	17221.03	5634.7	17225.64	187	583
14	12	5634.4	17226.43	5630.1	17230.22	598	723
15	13	5627.6	17136.34	5627.5	17144.27	379	554
16	13	5627.7	17144.99	5630.4	17152.11	190	432
17	15	5609.5	17040.09	5607.5	17046.61	140	375
18	15	5607.4	17047.14	5609.4	17054.47	519	697
19	17	5602.2	16937.22	5559.3	16943.09	197	560
20	17	5559.2	16943.82	5558.9	16952.64	502	451
21	18	5614.6	16910.32	5611.1	16916.38	170	638
22	18	5610.7	16917.02	5607.6	16923.18	671	719
23	20	5648.4	16848.10	5550.9	16855.49	218	545
24	20	5551.0	16855.89	5554.9	16900.65	512	747
25	22	5527.5	16759.78	5525.7	16807.34	153	245
26	22	5526.6	16807.70	5523.7	16814.91	259	486
27	32	5346.2	16719.95	5342.8	16722.21	128	506
28	32	5343.1	16722.51	5343.0	16728.96	470	602
29	33	5336.6	16818.45	5336.6	16810.99	122	756
30	33	5336.7	16810.46	5337.5	16803.24	444	711
31	34	5320.9	16859.63	5318.1	16854.82	636	797
32	34	5318.2	16853.90	5318.3	16847.25	600	729
Gulf of Alaska							
33	63	5257.8	16808.21	5245.5	16813.07	112	367
34	63	5254.3	16813.09	5250.8	16814.10	137	734
35	62	5239.4	16859.61	5236.7	16905.57	154	622
36	62	5236.8	16905.90	5233.4	16910.22	443	730
37	64	5311.5	16651.20	5307.1	16653.49	216	318
38	64	5306.8	16653.67	5302.9	16656.94	328	1027
39	65	5334.9	16541.05	5330.9	16542.98	123	297
40	65	5330.7	16542.78	5327.6	16546.31	348	498

Table 1.—continued

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)
41	66	5344.2	16428.04	5341.1	16433.41	134	272
42	66	5340.9	16433.77	5337.8	16439.01	301	577
43	68	5408.0	16138.26	5405.3	16143.50	122	319
44	68	5405.4	16144.03	5403.6	16150.51	290	725
45	67	5358.1	16315.84	5354.4	16319.39	119	453
46	67	5354.4	16319.98	5351.7	16326.27	373	611
47	69	5418.9	16103.59	5415.9	16108.98	179	370
48	69	5415.8	16109.63	5412.5	16113.78	391	804
49	70	5424.7	15952.74	5421.0	15955.92	152	248
50	70	5420.6	15956.12	5417.6	16001.40	283	612
51	71	5430.0	15914.95	5426.5	15917.81	147	284
52	71	5426.5	15918.40	5422.7	15922.54	281	761
53	72	5438.0	15834.15	5434.1	15838.45	131	365
54	72	5433.9	15838.73	5429.8	15842.60	383	830
55	73	5451.1	15744.21	5447.4	15748.48	184	379
56	73	5447.3	15748.89	5443.2	15751.71	381	716
57	74	5514.3	15640.37	5510.4	15644.30	207	334
58	74	5510.0	15644.69	5505.5	15645.10	332	776
59	75	5538.4	15551.04	5534.0	15551.72	155	210
60	75	5533.7	15551.68	5529.2	15549.62	212	214
61	148	5438.9	13250.30	5436.4	13255.14	148	376
62	149	5435.9	13301.50	5435.8	13308.25	405	409
63	108	5427.6	13355.09	5429.3	13400.90	392	571
64	108	5429.5	13401.20	5432.9	13403.55	520	608
65	107	5453.9	13417.21	5457.7	13421.22	225	546
66	107	5457.8	13421.96	5500.9	13427.20	469	831
67	106	5520.7	13402.02	5523.4	13449.85	356	579
68	106	5523.7	13450.02	5523.2	13457.14	487	809
69	105	5533.4	13457.99	5534.3	13502.96	245	545
70	105	5534.9	135403.10	5537.3	13507.71	477	600
71	144	5555.8	13454.02	5600.0	13454.80	207	361
72	145	5602.0	13455.71	5605.3	13501.16	370	351
73	104	5558.9	13526.21	5601.5	13532.28	370	650
74	104	5601.6	13532.56	5604.7	13537.97	668	913
75	103	5622.9	13520.88	5622.8	13528.87	154	187
76	103	5623.0	13529.28	5622.1	13536.91	190	251
77	102	5651.1	13659.78	5654.1	13605.66	252	700
78	102	5654.3	13605.99	5658.4	13607.15	647	727
79	101	5711.3	13614.14	5712.7	13620.72	245	679
80	101	5712.9	13620.94	5716.9	13623.52	836	1,059
81	100	5737.1	13632.48	5736.9	13639.53	236	692
82	100	5737.0	13639.88	5739.6	13645.54	701	622
83	142	5754.9	13700.71	5755.2	13708.60	444	395

Table 1.—continued

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	143	5757.9	13704.52	5758.0	13712.39	292	419
85	99	5752.6	13722.68	5753.0	13729.83	227	704
86	99	5753.1	13730.19	5752.9	13736.79	594	767
87	98	5808.4	13849.98	5809.4	13851.98	309	598
88	98	5809.6	13852.23	5810.7	13859.50	902	1,051
89	97	5828.0	13928.05	5827.4	13936.04	197	511
90	97	5827.4	13936.39	5824.9	13941.63	538	752
91	96	5841.1	14037.95	5841.0	14046.10	231	675
92	96	5841.1	14046.10	5843.2	14052.89	533	622
93	138	5924.9	14056.20	5925.6	14104.63	226	294
94	139	5924.8	14110.03	5921.4	14114.85	322	323
95	95	5903.0	14120.23	5902.9	14128.49	291	498
96	95	5902.9	14129.29	5902.9	14137.63	540	853
97	94	5923.2	14209.90	5925.1	14217.17	235	427
98	94	5925.4	14217.41	5928.3	14223.05	445	850
99	93	5933.0	14233.92	5935.2	14240.78	125	586
100	93	5934.4	14241.03	5934.4	14247.75	579	652
101	137	5940.3	14323.01	5943.1	14329.91	292	310
102	136	5944.7	14335.26	5946.2	14343.28	157	295
103	92	5933.2	14339.04	5933.5	14348.33	182	673
104	92	5933.6	14349.18	5935.1	14357.08	671	740
105	91	5931.2	14442.79	5928.9	14450.00	181	505
106	91	5928.8	14450.41	5926.7	14457.07	504	818
107	90	5930.0	14532.55	5931.1	14540.54	159	588
108	90	5931.4	14541.50	5930.6	14549.26	544	618
109	89	5915.7	14651.54	5913.0	14658.53	198	604
110	89	5913.0	14658.87	5910.0	14704.55	579	822
111	134	5927.2	14657.71	5927.2	14702.63	206	211
112	135	5930.9	14709.28	5930.9	14709.13	208	218
113	88	5912.7	14731.58	5908.5	14731.61	196	452
114	88	5908.3	14731.82	5904.1	14731.76	488	790
115	87	5907.5	14838.89	5902.9	14838.81	157	209
116	87	5902.8	14839.03	5858.3	14838.90	219	243
117	132	5904.9	14924.25	5902.3	14930.99	182	230
118	133	5857.0	14930.35	5855.3	14937.56	242	238
119	130	5843.7	14911.75	5846.0	14905.09	175	216
120	131	5848.0	14902.89	5850.2	14856.36	238	254
121	86	5841.3	14820.38	5837.4	14819.97	279	433
122	86	5833.3	14820.04	5833.2	14819.94	444	905
123	85	5817.5	14837.04	5813.7	14839.67	242	501
124	85	5813.3	14839.81	5809.1	14841.91	533	806
125	84	5758.3	14909.99	5755.0	14914.91	171	477
126	84	5754.9	14915.09	5751.5	14919.31	487	836

Table 1.—continued

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	128	5800.8	14950.49	5759.1	14957.62	226	264
128	129	5805.0	14954.20	5803.9	15002.28	294	298
129	83	5737.8	14955.01	5733.6	14957.18	406	503
130	83	5733.4	14957.26	5729.2	14958.94	574	900
131	82	5724.1	15035.54	5719.9	15035.54	210	482
132	82	5719.4	15036.19	5715.2	15035.57	520	706
133	81	5707.0	15113.26	5703.0	15116.76	252	529
134	81	5702.8	15117.39	5658.6	15117.05	575	853
135	80	5629.0	15212.88	5625.4	15217.93	156	340
136	80	5625.3	15218.04	5621.0	15221.12	414	536
137	79	5618.2	15304.66	5615.6	15311.39	236	593
138	79	5615.5	15312.00	5612.6	15317.93	606	696
139	78	5558.6	15401.53	5554.3	15401.56	284	561
140	78	5554.2	15401.81	5551.0	15404.42	586	861
141	77	5602.5	15433.99	5558.5	15434.30	236	509
142	77	5558.3	15434.39	5554.4	15434.49	540	870
143	76	5546.0	15508.31	5541.7	15510.78	157	314
144	76	5541.5	15510.97	5537.9	15515.18	347	609
145	126	5720.8	15502.66	5720.9	15510.65	237	240
146	127	5719.6	15522.76	5720.9	15514.59	245	258
147	124	5659.3	15503.77	5659.9	15511.23	169	229
148	125	5700.1	15518.25	5702.6	15524.29	254	264
149	122	5611.1	15557.80	5610.9	15605.19	196	237
150	123	5613.9	15607.85	5615.2	15614.83	264	247
151	120	5547.3	15604.68	5545.7	15612.07	204	238
152	121	5545.0	15612.07	5543.8	15619.91	242	249

Table 2. --Catch by station in number by species for the 2003 NMFS longline survey of the Eastern Bering Sea and the Gulf of Alaska, May 28 - September 1. SF = sablefish, PC = Pacific cod, GR = giant grenadiers, PH = Pacific halibut, ATF = arrowtooth flounder, GT = Greenland Turbot, RF = rougheye and shotraker rockfish, ST = thomyheads, Sk = skate, OS = otherspecies

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
Bering Sea										
1	303	448	762	102	338	411	20	15	346	44
2	162	295	713	67	252	297	12	13	171	409
6	0	350	0	64	40	1	0	0	60	26
8	327	488	1,126	206	210	154	105	34	161	48
12	152	468	1,260	347	371	176	21	45	243	39
13	132	627	1,304	175	332	90	68	19	298	211
15	300	1,248	1,204	115	187	124	194	317	83	75
17	649	1,220	944	103	351	125	320	20	123	48
18	455	609	71	54	405	193	25	4	270	28
22	119	1,796	34	79	365	248	15	6	378	1,117
33	529	542	250	264	280	266	198	134	34	42
34	452	0	45	16	263	474	1	39	255	25
Gulf Of Alaska										
64	902	0	1,993	85	185	0	606	84	41	10
65	976	618	911	159	297	0	38	229	66	23
67	1,545	413	1,222	162	166	0	346	151	33	69
68	1,265	959	541	298	291	0	410	178	69	91
69	1,631	228	1,556	261	192	0	70	187	15	64
70	1,902	921	896	415	233	0	33	67	53	190
71	1,964	321	1,804	151	158	0	60	280	7	35
72	2,289	363	1,755	177	75	0	78	152	8	15
73	1,509	177	2,142	33	210	0	95	161	24	18
74	2,594	12	1,712	54	55	0	30	309	21	36
75	1,528	1,215	0	911	582	0	6	0	108	90
76	942	65	1,208	261	164	0	39	220	161	352
77	1,554	0	1,916	1	33	0	40	407	21	89
78	1,230	0	1,437	14	14	0	83	359	6	756
79	2,631	0	1,479	53	38	0	25	88	4	13
80	384	33	1,388	244	70	0	230	131	2	98
81	1,570	1	1,344	29	71	0	79	252	2	390
82	1,787	5	1,543	102	65	0	50	143	2	187
83	791	0	2,185	1	1	0	0	162	3	234
84	1,147	37	681	78	16	0	11	341	11	164
85	1,922	0	656	24	10	0	5	177	12	85
86	1,619	0	453	52	12	0	38	292	7	64
87	3,298	43	0	176	107	0	0	42	80	36
88	1,555	100	1,076	243	48	0	105	211	43	72
89	1,337	12	908	10	22	0	28	414	11	178
90	1,243	8	588	117	2	0	78	278	19	235
91	1,639	10	328	49	26	0	41	353	25	438
92	1,341	1	680	17	9	0	32	175	5	97
93	1,546	0	276	166	10	0	32	924	15	56
94	1,189	0	160	40	56	0	115	282	24	67
95	1,600	0	418	184	61	0	443	198	79	70

Table 3- -continued

Station	SF	PC	GR	PH	ATF	GT	RF	ST	SK	OS
96	1,343	0	439	128	45	0	151	104	43	61
97	866	1	370	22	35	0	71	203	17	79
98	684	0	957	7	14	0	586	52	5	91
99	648	0	311	5	19	0	167	127	5	199
100	1,997	4	435	1	15	0	78	153	5	66
101	1,549	0	459	18	63	0	217	140	6	385
102	1,727	0	337	16	89	0	163	100	18	44
103	172	213	0	452	162	0	0	8	71	659
104	1,712	0	393	7	25	0	253	234	10	641
105	1,924	77	219	102	71	1	144	145	59	130
106	1,902	0	139	3	31	0	427	139	11	61
107	1,041	8	125	10	14	0	357	92	11	113
108	576	0	124	14	28	0	1,109	145	27	163
120	412	523	0	272	105	0	0	0	42	34
121	803	53	0	255	84	0	0	2	166	27
122	791	445	0	72	119	0	0	0	119	13
123	565	407	0	114	95	0	0	0	187	20
124	583	219	0	65	297	0	4	0	186	42
125	312	630	0	214	159	0	1	0	279	28
126	359	253	0	86	176	0	0	0	238	23
127	694	373	0	129	130	0	0	0	255	24
128	1,328	123	0	189	62	0	1	7	11	6
129	947	0	0	95	69	0	1	42	40	6
130	581	3	0	13	16	0	1	60	36	4
131	1,214	6	0	31	17	0	2	46	44	11
132	1,175	48	0	59	36	0	1	9	130	15
133	1,466	5	0	15	26	0	7	55	59	20
134	194	1	0	46	243	0	72	40	70	204
135	272	0	0	20	36	0	106	25	51	247
136	278	0	0	74	9	0	2	68	124	113
137	202	0	0	10	6	0	1	133	35	15
138	321	0	0	75	40	0	41	78	35	102
139	617	0	0	17	15	0	19	38	78	207
142	809	0	93	4	13	0	2	155	7	6
143	1,183	0	5	36	32	0	12	59	21	9
144	332	39	0	159	279	0	181	164	88	79
145	1,609	0	3	6	169	0	19	142	20	50
148	542	254	0	88	43	0	22	115	222	371
149	877	0	0	39	23	0	53	248	241	58
Total	86,617	17,318	45,378	9,127	9,583	2,560	8,496	11,021	6,471	10,860

Table 3.- Mean length, round weight, mean dressed weight, number and estimated total round weight of sablefish by station, for the 2003 NMFS longline survey of the Eastern Bering Sea and the Gulf of Alaska May28 - September 1.

Station Number	Mean length (cm)	Mean round weight (kg) <sup>2</sup>	Mean dressed weight (lb) <sup>3</sup>	Number of sablefish	Estimated total round weight (kg) <sup>4</sup>
Bering Sea					
1	66.34	3.13	4.35	303	948.61
2	65.36	3.07	4.26	162	497.03
8	69.57	3.69	5.13	327	1,207.72
12	66.05	3.15	4.37	152	478.52
13	69.86	3.81	5.30	132	503.54
15	69.11	3.61	5.01	300	1,082.42
17	66.66	3.18	4.42	649	2,066.71
18	65.10	2.94	4.09	455	1,339.83
22	60.69	2.36	3.28	119	281.38
33	67.48	3.44	4.78	529	1,819.00
34	66.58	3.20	4.44	452	1,444.28
Gulf of Alaska					
64	60.52	2.35	3.26	902	2,116.61
65	61.78	2.49	3.46	976	2,430.92
67	63.55	2.83	3.92	1,545	4,365.60
68	67.86	3.45	4.79	1,265	4,364.09
69	61.61	2.60	3.60	1,631	4,233.00
70	63.08	2.74	3.80	1,902	5,206.78
71	63.20	2.75	3.83	1,964	5,409.42
72	67.83	3.43	4.76	2,289	7,844.00
73	66.39	3.20	4.45	1,509	4,835.53
74	67.59	3.39	4.70	2,594	8,785.19
75	57.72	2.00	2.78	1,528	3,062.73
76	66.91	3.29	4.57	942	3,100.35
77	68.29	3.51	4.88	1,554	5,460.64
78	68.64	3.56	4.95	1,230	4,380.22
79	65.96	3.10	4.30	2,631	8,148.92
80	65.73	3.12	4.33	384	1,197.39
81	67.47	3.39	4.71	1,570	5,320.08
82	63.02	2.69	3.73	1,787	4,799.08

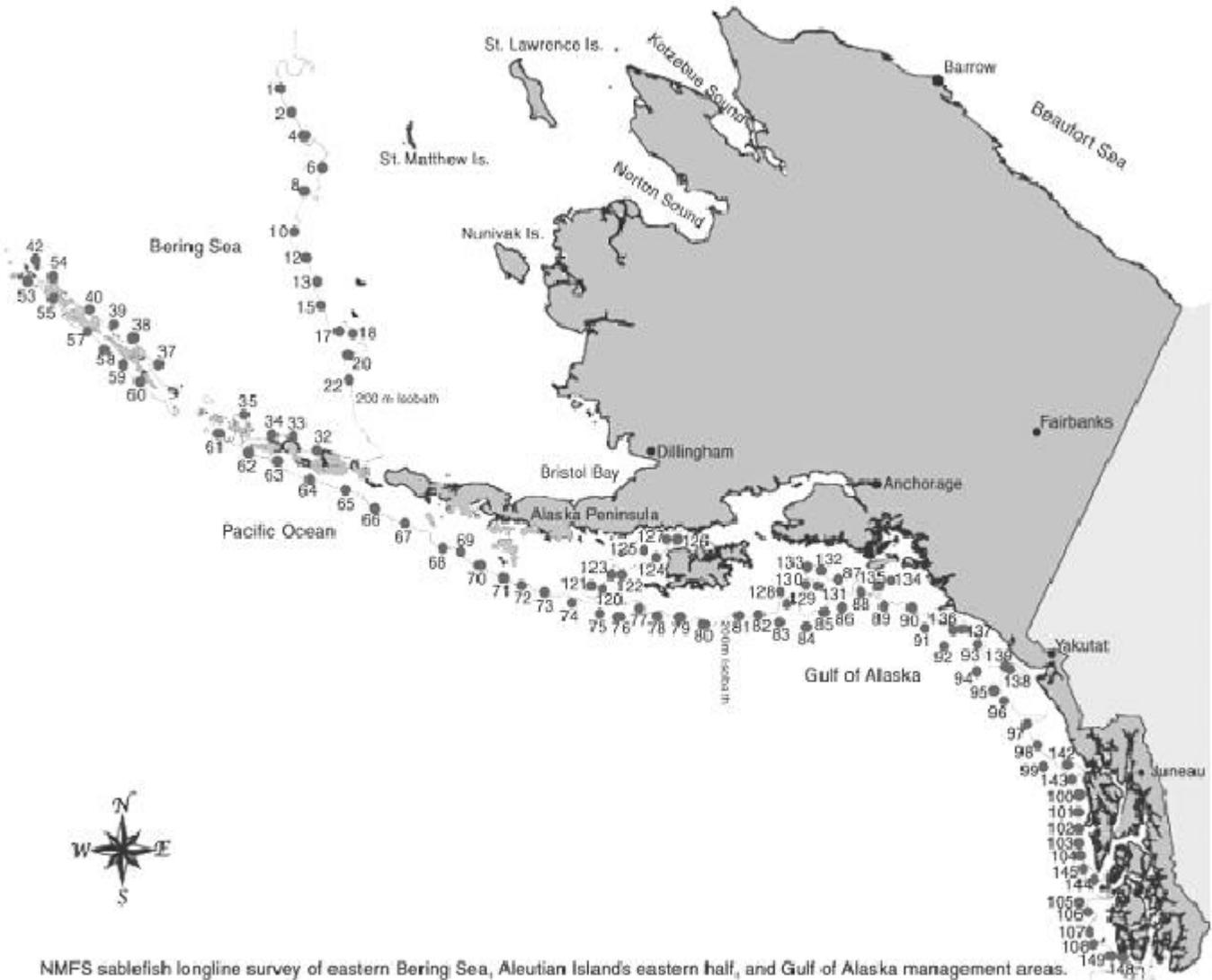
<sup>2</sup> Mean weight was estimated by applying a length-weight relationship to the length frequency distribution from each station.

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

<sup>4</sup> 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.

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
83	69.10	3.65	5.07	791	2,886.20
84	66.16	3.27	4.55	1,147	3,754.16
85	67.62	3.42	4.75	1,922	6,572.68
86	70.10	3.88	5.39	1,619	6,285.98
87	61.37	2.50	3.47	3,298	8,234.02
88	69.34	3.74	5.19	1,555	5,810.34
89	67.92	3.49	4.84	1,337	4,661.67
90	66.27	3.21	4.46	1,243	3,992.96
91	67.18	3.38	4.70	1,639	5,544.45
92	67.47	3.44	4.78	1,341	4,614.16
93	68.60	3.66	5.08	1,546	5,652.56
94	63.05	2.77	3.84	1,189	3,290.62
95	67.15	3.35	4.65	1,600	5,357.29
96	66.61	3.29	4.57	1,343	4,422.50
97	64.47	2.96	4.12	866	2,567.15
98	67.44	3.43	4.76	684	2,343.69
99	65.45	3.07	4.26	648	1,989.26
100	69.57	3.80	5.28	1,997	7,591.50
101	67.66	3.51	4.88	1,549	5,439.18
102	68.19	3.62	5.03	1,727	6,260.25
103	55.81	1.92	2.67	172	330.24
104	66.91	3.35	4.65	1,712	5,731.90
105	65.87	3.19	4.44	1,924	6,146.32
106	65.57	3.12	4.34	1,902	5,937.89
107	66.04	3.23	4.49	1,041	3,367.31
108	62.02	2.63	3.65	576	1,514.48
120	63.78	2.79	3.88	412	1,151.17
121	66.25	3.14	4.36	803	2,520.63
122	64.79	2.90	4.03	791	2,294.10
123	65.86	3.07	4.26	565	1,734.53
124	61.66	2.48	3.45	583	1,447.63
125	63.51	2.73	3.80	312	852.90
126	61.21	2.41	3.35	359	866.31
127	63.00	2.66	3.70	694	1,847.63
128	64.86	2.93	4.07	1,328	3,894.91
129	68.30	3.53	4.90	947	3,339.76
130	61.93	2.60	3.61	581	1,509.67
131	65.52	3.12	4.33	1,214	3,787.49
132	39.94	1.77	2.45	1,175	2,075.75
133	59.20	2.20	3.06	1,466	3,230.09
134	58.15	2.14	2.97	194	414.70
135	56.61	1.99	2.77	272	542.55
136	58.05	2.31	3.20	278	641.42
137	59.31	2.23	3.10	202	450.51

Station Number	Mean length (cm)	Mean round weight (kg)	Mean dressed weight (lb)	Number of sablefish	Estimated total round weight (kg)
138	62.44	2.86	3.97	321	917.68
139	65.26	3.07	4.26	617	1,894.50
142	64.51	2.92	4.05	809	2,358.38
143	63.24	2.75	3.81	1,183	3,249.27
144	64.80	2.99	4.16	332	993.23
145	64.87	3.03	4.21	1,609	4,880.33
148	62.76	2.67	3.71	542	1,447.87
149	59.95	2.29	3.18	877	2,007.66
Total				86,617	267,379.02



NMFS sablefish longline survey of eastern Bering Sea, Aleutian Islands eastern half, and Gulf of Alaska management areas.