Regional Information Report No. 1J10-06

2009 NSEI (Chatham) Sablefish Longline Survey Field Report

by

Michael Vaughn

April 2010

Alaska Department of Fish and Game **Division of Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	E
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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2009 NSEI (CHATHAM) SABLEFISH LONGLINE SURVEY REPORT

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ABSTRACT

This report presents methods and data from the 2009 sablefish (*Anoplopoma fimbria*) longline survey conducted in the Northern Southeast Inside (NSEI) Subdistrict of Southeast Alaska. Catch rates, bycatch data and biological data including sablefish lengths, sex ratios, and ages are presented. Some data from the 2004–2008 annual surveys are also presented. The overall survey catch per unit of effort (CPUE) was 0.32 fish per hook and 2.53 round pounds per hook.

Key words: Sablefish, *Anoplopoma fimbria*, longline survey, Southeast Alaska, Northern Southeast Inside, NSEI, Chatham Strait, CPUE

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) conducts annual longline surveys in the Northern Southeast Inside (NSEI) Subdistrict of Southeast Alaska to assess the condition of sablefish in this area (Figure 1). In 2009, the annual NSEI sablefish survey was conducted from July 28 through August 3 and was the 22nd assessment survey for NSEI. The same 44 stations have been set annually since 1997 (Figure 2).

OBJECTIVES

The primary objectives of the 2009 survey were to,

1. Calculate the catch per unit of effort (CPUE) for sablefish at the 44 stations surveyed annually in the Chatham Strait portion of the NSEI Subdistrict
2. Enumerate, to the lowest possible taxonomic group, all fish captured
3. Collect a representative sample of biological data (n=550) including otoliths (aging structures), length, weight, sex, and stage of gonad maturity from a subsample of sablefish and an additional representative sample (n=550) of sablefish length measurements
4. Collect biological data including length, weight, and sex, from all *Sebastes* rockfishes caught
5. Collect lengths from a subsample of shortspine thornyheads (*Sebastolobus alascanus*)

A secondary objective was to recover tagged sablefish and record recovery information and length of tagged fish.

METHODS

SURVEY AREA

The survey area extended from 57° 56.43’ N latitude, 134° 48.13’ W longitude to 56° 05.24’ N latitude, 134° 30.52’ W longitude and included the 4 statistical areas in Chatham Strait where the major proportion of the commercial fishery occurs: 345731, 345701, 345631, and 345603 (Figure 2). There are 44 stations within the survey area.

The station locations within the survey area were originally randomly selected from areas of potential sablefish habitat greater than 200 fm deep, then fished during subsequent surveys. There have been some station eliminations and modifications over time, with a major standardization of stations occurring in 1997. The 44 stations fished within the survey area in 2009 have all been fished during annual surveys since 1997. Slight modifications to coordinates

have been made as needed if repeated gear problems have occurred at a station. There have been no modifications to station coordinates since the 2005 survey.

VESSELS

ADF&G awards annual 14-day charter agreements to 3 commercial longline vessels to fish 14 or 15 stations each. The survey area is split into 3 distinct sections, allowing all stations to be fished within a single 7-day period. The contract length is longer than the anticipated survey length to allow for delays associated with weather, gear, or other problems.

The 2009 Request for Bids specified a maximum bid of $30,000 for each portion of the survey and stipulated that a vessel could not fish more than one section. Annual contracts were awarded to the 3 vessels with the lowest bids. Vessels were assigned a survey section at the department's discretion.

The *F/V Sherrie Marie* was awarded an annual contract ($29,900) and conducted the longline survey in the southern portion (Trip 1), fishing 14 stations. The *F/V Ida June* was awarded an annual contract ($28,600) and conducted the longline survey in the central portion (Trip 2), fishing 15 stations. The *F/V Seaview* was awarded an annual contract ($29,500) and conducted the longline survey in the northern portion (Trip 3), fishing 15 stations (Figure 2).

Each vessel was required to provide at least 3 experienced crew members in addition to the skipper (Appendix A). The crew operated the vessel and baited, set, retrieved, and repaired all longline gear. Two ADF&G scientific personnel were assigned to each vessel to collect the set, hook accounting, and biological data.

GEAR

In 2000, ADF&G contracted Lummi Fishery Supplies in Seattle to build skates of conventional longline gear. These skates were built to replicate the gear used in National Marine Fisheries Service (NMFS) longline surveys in order to make the ADF&G sablefish catch and effort data from internal state waters comparable with NMFS data from the outside waters of the Gulf of Alaska. To eliminate bias introduced by new gear, all gear was fished prior to its use as survey gear. New gear may not fish as effectively as gear that has previously been baited and deployed in the ocean.

A string of gear consisted of a flag pole, an array of buoys, buoy line of length dependent upon the set depth, a 27 kg (60 lb) longline anchor, 274 m (150 fm) of running line, 25 skates of 45 #13/0 Mustad circle hooks, a second 274 m (150 fm) of running line, a second 27 kg longline anchor, a second buoy line, a second array of buoys and a second flagpole. Beginning in 2000, a 3 kg (7 lb) lead ball was snapped to the end of each skate. Hooks were front threaded to gangions secured to beckets tied into the groundline at 2 m (6.5 ft) intervals. All hooks were secured at 38 cm (15 in) from the groundline, which was the length of a gangion and a becket, when tied together and attached to groundline. Five meters (16 ft) of groundline were left bare at each skate end. Gangions were made of medium lay #60 nylon round braided twine, beckets were of medium lay #72 nylon becket twine, and the groundline was medium lay 1 cm (3/8 in) nylon American Line SSR 100. Each vessel crew attached new hooks on all skates prior to the start of the survey. Bent, straightened, and missing hooks were replaced after each set, as the gear was baited.

BAIT

International Marine Industries, Inc., in Newport, Rhode Island won the bait bid to provide 3,674 kg (8,100 lb) of Argentine illex (shortfin squid, *Illex argentinus*) for the NSEI survey. The winning bid was $1.98/kg ($.90/lb), including shipping costs, for bait shipped to Sitka and $2.12/kg ($.96/lb) for bait shipped to Juneau.

Argentine illex, 100–200 gm in size, was used as bait; the estimated rate of use averaged 6.0 kg (13.2 lb) per 100 hooks. Only the squid body was used as bait; the head and tentacles were discarded. Length of bait pieces was 3.8 to 5.0 cm (1.5–2 in). Bait was thawed within 24 hours of use. This bait protocol replicated that used on the NMFS survey and was consistent with previous ADF&G surveys from 2000 through the present.

SCHEDULE

The survey began on July 28 and concluded on August 3. The survey was scheduled to correspond with the timing of previous surveys, occurring during the favorable tide series (Appendix B) just prior to the start of the commercial fishing season. All vessels delivered their catch from the first half of the survey to the North Pacific Seafoods tender, the *F/V Kamilar*. The *F/V Sherrie Marie* offloaded on July 30 at Port Walter in the evening, the *F/V Ida June* offloaded on July 31 in Baranof Warm Springs Bay in the morning, and the *F/V Seaview* offloaded on the evening of July 31 in Basket Bay. The *F/V Seaview* offloaded their catch from the second half of the survey to the *F/V Ginny C* at Point Thatcher on the evening of August 2. The *F/V Sherrie Marie* and *F/V Ida June* delivered their final catch to North Pacific Seafoods in Sitka in the morning and afternoon of August 3.

SET INFORMATION

Sets were made in the same direction as the tidal current. Haulback direction was dependent on the tide, wind direction, and currents. Sets were allowed to soak for a minimum of 3 and a maximum of 11 hours, which is consistent with NMFS survey protocol (C.R. Lunsford, NMFS, Auke Bay, *personal communication*). If it was necessary to set differently from the standard set coordinates due to circumstances such as tidal currents or weather, the protocol is to set the gear so that it passes through the start latitude and longitude ensuring that the set is as close to the original location points as possible.

Set information collected at each station included the date and time of set and haul, start and end coordinates, the depth of each anchor and skate as they went overboard, haulback order, wind direction and estimated speed, and bottom substrate (Appendix C). Substrate was evaluated based on the skipper's interpretation of sounder information and any substrate that came up on fishing gear. Comments on any problems with the gear or other factors impacting CPUE were noted along with observations regarding the presence of sharks, whales, or any other information of biological interest.

HOOK ACCOUNTING, CATCH, AND CPUE

ADF&G staff classified each hook as it broke the surface of the water. All fish caught were tallied by species. A hook without a fish on it was recorded as, "bare," "bait," or "invalid" (hook bent, broken, missing, or snarled). A whole skate was considered invalid, if more than 25% of the hooks were missing, in a snarl, or stripped.

In surveys prior to 2008, sablefish that were estimated to be less than approximately 45 cm (18 in) in length were recorded as "small" and immediately returned to the water, with the exception of fish collected as biological samples. Current protocol mandates that "small" sablefish are now retained and tallied as regular sablefish. This procedural change was made to avoid impacting the recapture phase of the sablefish stock assessment, due to the reduction in the minimum length tagging standard, which now includes all fish above 32 cm.

Sablefish that broke the surface on a hook but were not landed were recorded as "lost." If a hooked sablefish was visible below the surface of the water but escaped before the hook broke the water surface, the fish was not recorded and the hook status above the surface (bare, bait, or invalid) was recorded. Sablefish that were not marketable were discarded, with the discard reason reported if known. All other fish that broke the surface attached to a hook were identified to the lowest possible taxonomic group. All species other than sablefish and rockfish were immediately released.

The CPUE, in terms of sablefish per hook for an individual station, was calculated using only valid skates. The number of sablefish, including lost and discarded sablefish, was divided by the total number of hooks on valid skates retrieved at that station.

The CPUE in terms of round pounds per hook for an individual station was calculated by multiplying the fish per hook CPUE for the station by the average weight of the fish sampled at that station. The overall fish per hook CPUE for the survey was calculated by dividing the total number of sablefish by the total number of hooks retrieved on valid skates only. The overall round pounds per hook CPUE was calculated by multiplying the overall fish per hook CPUE for the survey by the overall average weight of sablefish sampled during the survey.

BIOLOGICAL SAMPLING

The first sablefish from each set and every 20^{th} sablefish thereafter from the first 20 skates of each set were set aside for biological sampling. Length and weight were measured, sex and maturity were assessed, and otoliths were removed from each biological sample. Additional length measurements were collected from every 21^{st} sablefish from the first 20 skates of each set. This is a change of protocol from the previous survey in which every 10^{th} and 11^{th} sablefish from the first 13 skates of each set were sampled for biological data. This change provided for a more representative sample collection, as it included specimens from a greater portion of each set. Lengths were measured to the nearest cm from the tip of the snout to the fork of the tail using a measuring board. Weights were measured to the nearest 0.1 kg using a Salter heavy-duty hanging scale. If seas were too rough to obtain repeatable weights during a haul, fish were not weighed. Sablefish sex and maturity were assessed from visual observation of the gonads. Fish were classified into 6 maturity categories: immature, maturing juvenile, mature/developing, spawning, spent/post spawning, and resting (Appendix F). After sampling, fish were cleaned and dressed to industry standards by ADF&G staff.

Otoliths were cleaned on board the vessels using warm water with highly diluted detergent, hand-dried, and stored dry in plastic multi-cell trays. They were aged at the ADF&G Division of Commercial Fisheries Mark, Tag, and Age Laboratory in Juneau using the break-and-burn technique.

Sebastes rockfish lengths and weights were recorded using the same methods and equipment used for sablefish. Gender was determined by examination of the urogenital papillae. All

Sebastes rockfish were retained on the vessel. The length of every shortspine thornyhead (*Sebastolobus alascanus*) caught on the first 11 skates of each set was measured. The thornyhead sampling rate was reduced from 12 to 11 skates in 2009, because sample goals have been exceeded in recent surveys. Shortspine thornyheads were released immediately after measurement.

TAGGED SABLEFISH

All tagged sablefish encountered during the survey were retained. Tags were collected and the associated recovery information was recorded for each fish. Recovery information included tag number, length, date recovered, vessel name, set number, location, and depth.

BID TO PURCHASE ADF&G FISH

The department solicited bids from area processors to purchase the fish caught during the survey. The 2009 bids were based upon the catch delivered during the 2008 survey. North Pacific Seafoods in Sitka submitted the winning bid (Appendix D).

RESULTS

SET INFORMATION

All 44 stations were surveyed (Appendix E). A total of 25 skates with approximately 1,125 hooks were set at each station and a total of 1,100 skates were deployed during the survey. Twenty-eight skates from 18 different sets were classified as invalid and not included in the calculation of CPUE. Gear snarls accounted for 17 of the invalid skates. The longline gear parted on subset 25 at station 1 but all gear was recovered by hauling from the opposite end. The set drifted approximately one mile at the north end of station 15. Standard protocol of 150 fathom running line was used on all vessels except for the *F/V Sherrie Marie*, which deployed 200 fathoms of running line on one end of each set and 100 fathoms on the other end. No other on-board alterations were made to the set plan.

Pacific sleeper sharks (*Somniosus pacificus*) or evidence of shark presence was observed at 26 of the 44 stations.

CATCH AND CPUE

The CPUE in terms of fish per hook ranged from 0.14 at station 33, Distant Point, to 0.46 at station 52, mid Point Alexander (Table 1). The overall CPUE was 0.32 sablefish per hook. The CPUE in terms of round pounds per hook ranged from 0.89 lb/hook (0.4 kg/hook) at station 33 to 5.01 lbs/hook (2.27 kg/hook) at station 52, and the survey average was 2.53 lbs/hook (1.15 kg/hook).

The 2009 survey CPUE (0.32 fish per hook and 2.53 lbs per hook) was comparable to the 2008 survey CPUE of 0.33 fish per hook and 2.57 pounds per hook (Table 2). The 2005 survey had the highest CPUE of the past 5 annual surveys at 2.85 lbs/hook and 2007 had the lowest at 2.39 lbs/hook.

A total of 15,431 sablefish were caught during the survey, on both valid and invalid skates, and 14,946 were retained. Valid skates accounted for 15,195 sablefish caught with 14,723 retained (Table 3). Of the non-retained sablefish caught on valid skates, 389 were lost at the roller, 51 were discarded due to shark damage, 26 were discarded due to sand flea damage, and 6 were

discarded due to other damage. Sablefish depredation by sharks was most common in the central portion of the survey area, and least common in the southern portion.

BYCATCH

A total of 3,836 fish and 25 other animals were caught as bycatch (Table 4). Valid skates accounted for 3,782 fish and 24 of the other animals. Bycatch species composition varied between stations. Shortspine thornyhead (*Sebastolobus alascanus*) was the most frequently encountered bycatch species, comprising 44% of the total bycatch count. Skates (*Raja* spp. and *Bathyraja* spp.) were the next most abundant bycatch, comprising 35%. Pacific halibut (*Hippoglossus stenolepis*), Arrowtooth flounder (*Atheresthes stomias*), and Dover sole (*Microstomus pacificus*) made up 6%, 5%, and 4% of the bycatch, respectively. The remaining bycatch, in descending order of abundance, were: shortraker rockfish (*Sebastes borealis*), rougheye rockfish (*Sebastes aleutianus*), Pacific sleeper shark, Pacific cod (*Gadus macrocephalus*), brown king crab (*Lithodes acquispina*), redbanded rockfish (*Sebastes babcocki*), grenadier (Family Macrouridae), walleye pollock (*Theragra chalcogramma*), and chum salmon (*Oncorhyncus keta*). These species combined accounted for 4% of the bycatch.

BIOLOGICAL DATA

Sablefish

Length and weight were measured, sex and maturity were assessed, and otoliths were taken from 620 sablefish. An additional 598 sablefish were measured for length only, for a total of 1,218 length measurements. Lengths ranged from 46 cm (18 in) to 101 cm (40 in). The mean length of fish sampled in 2009 was 69 cm (27 in) (Figure 3).

The mean length of fish sampled in 2008 was 68 cm (27 in), the 2007 mean was 67 cm (26 in), the 2006 mean was 68 cm (27 in), and the 2005 mean was 67 cm (26 in) (Figures 4 and 5). The average length of sablefish sampled during the 2009 survey continues the trend of overall increase in average length on NSEI longline surveys since 2007.

The sex ratio of the sampled sablefish was 59% female. Females were larger than males with a mean fork length of 71 cm (28 in) and mode of 70 cm (28 in), compared to the male mean fork length of 65 cm (26 in) and mode of 63 cm (25 in) (Figure 6). Females were also distributed over a wider range of lengths than males, and all of the largest individuals were female.

The mean weight of all the sablefish sampled was 3.6 kg (7.9 lbs; Table 1). Females averaged 4.0 kg (8.9 lbs), and males averaged 3.0 kg (6.6 lbs). Age estimates were completed for 619 sablefish. The ages ranged from 2 to 69 years, with an average age of 15 years (Figure 7). The median age was 11 years, and the mode was 10 years.

Visual inspection of the gonads indicated approximately 12% of males and 8% of females sampled had not previously spawned (Table 5). The majority of the fish sampled in 2009, 88% of the males and 92% of the females, had previously spawned or were going to spawn in the upcoming season (Appendix F).

Rockfish

A total of 12 redbanded rockfish (*Sebastes babcocki*), 45 rougheye rockfish (*S. aleutianus*), and 56 shortraker rockfish (*S. borealis*) were measured. The average fork lengths were 49 cm, 45 cm, and 65 cm (17, 18, and 26 in), respectively. Weight data was collected for all Sebastes rockfish

as well, but 2 of the shortraker rockfish were heavier than the upper limit of the 10 kg scale. Average weights of the redbanded and rougheye rockfish were 2.3 and 1.7 kg (5.1 and 3.7 lbs).

Lengths were taken from 717 shortspine thornyheads. Fork lengths ranged from 19 cm to 67 cm (7 to 26 in) with a mean length of 40 cm (16 in).

TAGGED SABLEFISH

A total of 112 sablefish with ADF&G tags were caught during the survey. Tags were recovered from fish released in years 1997 through 2009. The majority of the recoveries were from fish tagged in 2009 (34) and 2008 (32; Figure 8). The ADF&G tag recovery rate for the survey was 7.5 tags per thousand fish. Four of the recovered tags had been applied by other agencies.

FISH TICKET AND LANDING DATA

A total of 111,610 round pounds of sablefish and 816 round pounds of rockfish were landed for a value of $369,743. Thirty-one percent of the sablefish catch by weight came from statistical area 345631, 27% from 345701, 24% from 345731, and 19% from 345603. Thirty-six percent of the final dressed (eastern cut) product weight was made up of fish graded in the 4-5 pound size category, 29% was 5-7 pounds, 20% was 3-4 pounds, 12% was over 7 pounds, and 3% was less than 3 pounds. One percent of the overall sablefish catch had sand flea or other physical damage and was graded separately into the lower value #2 category.

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TABLES

Table 1.–Hook condition, sablefish average weights and CPUE (valid skates only), by station, for the 2009 sablefish longline survey

Station	Total Hooks	Bare Hooks	Baited Hooks	Invalid Hooks	Number of Sablefish	Fish / Hook	Avg. Weight (kg)	Kg / Hook	Avg. Weight (lbs)	Lbs / Hook
1	1,027	362	214	26	331	0.32	3.7	1.20	8.2	2.65
3	1,110	358	222	7	465	0.42	4.7	1.95	10.3	4.31
4	1,067	304	278	43	397	0.37	3.3	1.22	7.2	2.69
5	1,057	345	197	9	421	0.40	3.4	1.35	7.5	2.97
6	1,070	269	240	27	432	0.40	3.8	1.52	8.3	3.35
7	1,027	238	354	19	367	0.36	3.7	1.30	8.0	2.88
8	1,110	297	250	17	485	0.44	3.7	1.62	8.2	3.58
9	1,061	279	338	28	363	0.34	4.0	1.38	8.9	3.04
10	1,122	204	448	24	318	0.28	3.4	0.98	7.6	2.15
13	1,121	256	455	40	301	0.27	3.3	0.90	7.4	1.98
15	1,099	83	689	4	261	0.24	3.1	0.73	6.8	1.62
16	1,117	266	254	23	474	0.42	3.9	1.66	8.6	3.65
18	1,049	251	353	42	309	0.29	4.2	1.23	9.2	2.72
19	1,114	240	353	22	391	0.35	4.0	1.39	8.8	3.07
21	1,084	241	327	32	398	0.37	3.0	1.08	6.5	2.39
22	1,068	151	499	45	236	0.22	2.5	0.55	5.5	1.22
23	1,038	196	403	75	291	0.28	3.5	0.99	7.8	2.19
24	1,126	226	284	38	367	0.33	3.9	1.27	8.6	2.80
25	1,050	150	433	25	321	0.31	3.0	0.91	6.5	2.00
27	1,103	100	576	7	374	0.34	4.1	1.40	9.1	3.09
28	1,114	134	571	12	330	0.30	3.9	1.14	8.5	2.52
29	1,016	150	392	46	338	0.33	3.8	1.26	8.4	2.79
30	1,020	132	514	47	261	0.26	4.3	1.11	9.5	2.44
32	944	119	519	31	195	0.21	3.7	0.76	8.1	1.68
33	1,127	63	804	22	161	0.14	2.8	0.40	6.2	0.89
35	1,025	98	623	51	224	0.22	3.7	0.80	8.1	1.76
37	1,123	111	621	50	278	0.25	3.3	0.81	7.3	1.80
39	1,104	125	536	68	303	0.27	4.0	1.09	8.7	2.40
41	1,129	129	530	33	396	0.35	3.6	1.28	8.0	2.81
42	1,027	112	487	37	318	0.31	3.1	0.97	6.9	2.13
43	1,123	159	550	42	284	0.25	3.9	0.98	8.6	2.17
44	1,094	39	780	31	197	0.18	3.2	0.57	7.0	1.26
45	1,079	107	628	40	254	0.24	3.1	0.73	6.9	1.62
46	1,107	108	544	44	360	0.33	3.3	1.08	7.3	2.39
47	1,078	119	519	39	322	0.30	3.4	1.01	7.4	2.22
49	1,077	167	451	14	349	0.32	2.9	0.93	6.3	2.05
51	1,125	252	375	31	397	0.35	4.6	1.62	10.1	3.56
52	1,115	231	307	12	510	0.46	5.0	2.27	10.9	5.01
53	1,113	298	295	26	466	0.42	2.9	1.21	6.4	2.68
54	1,114	311	143	64	311	0.28	3.2	0.89	7.0	1.95
55	1,121	342	182	42	436	0.39	2.4	0.94	5.3	2.07
56	1,113	188	448	46	287	0.26	3.3	0.86	7.3	1.89
57	1,070	229	289	19	433	0.40	3.9	1.59	8.7	3.50
58	1,108	281	161	31	483	0.44	3.8	1.64	8.3	3.62
Sum	47,686	8,820	18,436	1,429	15,195	0.32	3.6	1.15	8.0	2.54

Table 2.–Sablefish per hook and round pounds per hook CPUE, for the NSEI sablefish longline surveys, 2005–2009

	2009		2008		2007		2006		2005	
Station	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**
1	0.32	2.65	0.39	3.06	0.22	1.68	0.37	2.59	0.54	5.16
3	0.42	4.31	0.25	1.91	0.30	2.78	0.23	1.93	0.33	2.22
4	0.37	2.69	0.27	2.53	0.34	1.98	0.40	3.18	0.42	2.78
5	0.40	2.97	0.29	2.86	0.36	2.76	0.37	2.57	0.36	2.70
6	0.40	3.35	0.45	3.52	0.40	3.47	0.43	3.77	0.41	3.43
7	0.36	2.88	0.21	1.85	0.32	2.93	0.33	3.00	0.39	3.35
8	0.44	3.58	0.25	2.34	0.28	2.17	0.34	2.49	0.33	2.36
9	0.34	3.04	0.48	4.38	0.39	3.15	0.30	2.31	0.34	2.66
10	0.28	2.15	0.45	3.47	0.42	3.24	0.40	3.54	0.42	3.00
13	0.27	1.98	0.34	2.39	0.31	2.12	0.22	1.77	0.28	2.03
15	0.24	1.62	0.48	3.74	0.43	3.36	0.40	2.54	0.40	2.58
16	0.42	3.65	0.38	2.87	0.44	3.24	0.33	2.53	0.36	2.76
18	0.29	2.72	0.37	3.07	0.28	2.10	0.36	2.84	0.34	2.83
19	0.35	3.07	0.28	2.53	0.30	2.56	0.32	2.49	0.32	2.57
21	0.37	2.39	0.43	2.73	0.35	2.74	0.37	2.63	0.40	2.96
22	0.22	1.22	0.20	1.21	0.21	1.49	0.27	1.86	0.19	1.16
23	0.28	2.19	0.18	1.65	0.19	1.99	0.20	1.84	0.23	1.89
24	0.33	2.80	0.30	2.47	0.18	1.11	0.29	1.92	0.33	2.56
25	0.31	2.00	0.34	2.60	0.28	1.88	0.34	2.50	0.32	2.51
27	0.34	3.09	0.30	2.94	0.30	2.35	0.31	2.54	0.28	2.01
28	0.30	2.52	0.21	1.94	0.19	1.44	0.24	1.75	0.22	1.83
29	0.33	2.79	0.29	2.21	0.25	1.88	0.34	2.80	0.25	1.61

-continued-

Table 2.–Continued (page 2 of 2)

	2009		2008		2007		2006		2005	
Station	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**	**Fish/hook**	**lbs/hook**
30	0.26	2.44	0.34	2.58	0.39	3.74	0.24	1.41	0.32	3.23
32	0.21	1.68	0.24	1.67	0.38	2.94	0.24	1.86	0.35	3.17
33	0.14	0.89	0.18	1.34	0.28	1.28	0.13	0.89	0.20	1.32
35	0.22	1.76	0.22	1.56	0.30	1.98	0.20	1.46	0.26	1.97
37	0.25	1.80	0.14	0.94	0.22	1.57	0.18	1.42	0.25	2.06
39	0.27	2.40	0.24	1.85	0.44	2.87	0.25	2.14	0.43	3.51
41	0.35	2.81	0.28	2.35	0.35	2.51	0.35	3.35	0.45	3.21
42	0.31	2.13	0.20	1.50	0.31	1.98	0.23	1.80	0.37	2.90
43	0.25	2.17	0.45	3.95	0.33	2.56	0.26	2.30	0.51	3.99
44	0.18	1.26	0.22	1.18	0.31	1.54	0.22	1.76	0.48	3.49
45	0.24	1.62	0.34	2.59	0.20	1.32	0.24	2.46	0.47	3.19
46	0.33	2.39	0.37	2.59	0.37	2.24	0.25	1.83	0.41	2.72
47	0.30	2.22	0.47	3.42	0.42	2.58	0.25	1.96	0.60	4.77
49	0.32	2.05	0.48	3.17	0.45	2.70	0.30	2.25	0.61	3.76
51	0.35	3.56	0.50	3.89	0.41	—	0.35	2.85	0.41	3.24
52	0.46	5.01	0.53	4.32	0.50	4.48	0.51	3.85	0.38	3.53
53	0.42	2.68	0.32	2.00	0.29	1.91	0.41	3.23	0.42	2.28
54	0.28	1.95	0.17	1.39	0.25	1.65	0.32	2.55	0.40	2.87
55	0.39	2.07	0.51	3.75	0.45	2.92	0.38	2.17	0.50	3.40
56	0.26	1.89	0.38	2.87	0.30	1.70	0.31	2.32	0.43	3.09
57	0.40	3.50	0.38	3.60	0.39	3.74	0.42	3.33	0.42	4.07
58	0.44	3.62	0.32	2.55	0.29	—	0.40	3.49	0.40	3.21
Overall	0.32	2.54	0.33	2.57	0.33	2.39	0.31	2.41	0.37	2.85

Note: Sperm whales were present in 2008 in the southern survey section during haulback at stations 1, 3, 4, 5, 6, 7, 8, 53, and 55. The amount of predation was not quantified. However evidence of predation was observed at several of these stations.

Table 3.–Sablefish retention and discard status in numbers of fish (valid skates only), during the 2009 NSEI sablefish longline survey.

	Discarded due to damage by					
Station	**Sand fleas**	**Sleeper Sharks**	**Other injuries**	**Lost at Roller**	**Retained**	**Total**
1	—	—	—	11	320	331
3	—	—	—	25	440	465
4	—	—	—	12	385	397
5	—	—	—	9	412	421
6	—	—	—	24	408	432
7	—	2	—	10	355	367
8	—	—	—	17	468	485
9	1	1	—	14	347	363
10	—	—	—	10	308	318
13	—	—	—	4	297	301
15	—	—	—	5	256	261
16	—	2	—	17	455	474
18	—	—	1	6	302	309
19	—	2	—	8	381	391
21	1	2	1	14	380	398
22	12	6	1	5	212	236
23	1	4	—	8	278	291
24	6	4	—	13	344	367
25	—	—	1	10	310	321
27	—	1	—	12	361	374
28	—	—	—	7	323	330
29	—	2	—	8	328	338
30	1	—	—	11	249	261
32	—	1	—	5	189	195
33	—	—	—	2	159	161
35	—	—	—	6	218	224
37	—	1	—	1	276	278
39	—	4	1	9	289	303
41	—	3	—	7	386	396
42	4	—	—	3	311	318
43	—	3	—	1	280	284
44	—	—	—	—	197	197
45	—	—	—	4	250	254
46	—	1	—	4	355	360
47	—	1	1	3	317	322
49	—	3	—	5	341	349
51	—	3	—	7	387	397
52	—	1	—	18	491	510
53	—	—	—	15	451	466
54	—	1	—	6	304	311
55	—	—	—	—	436	436
56	—	1	—	6	280	287
57	—	1	—	11	421	433
58	—	1	—	16	466	483
Total	26	51	—	389	14,723	15,195

Table 4.–Overall catch numbers by species (valid and invalid skates) in the 2009 NSEI sablefish longline survey

Station	Sablefish	Shortspine Thornyhead	Unidentified Skate	Arrowtooth Flounder	Pacific Halibut	Longnose Skate	Dover Sole	Rougheye Rockfish	Shortraker Rockfish	Pacific Sleeper Shark	Unidentified Coral	Redbanded Rockfish	Brown King Crab	Other
1	347	51	18	6	15	3	2	0	1	0	0	0	0	1
3	465	28	19	3	3	2	1	0	2	0	0	0	0	0
4	408	24	11	3	4	1	2	0	0	0	0	0	0	0
5	437	44	24	2	3	1	11	0	0	0	0	0	0	0
6	437	34	31	4	10	10	13	1	0	0	0	0	0	0
7	373	25	12	2	7	0	0	9	1	1	0	0	0	0
8	485	19	29	2	3	0	8	0	0	0	0	0	0	0
9	372	32	15	0	3	1	2	0	1	0	0	0	0	0
10	318	79	37	1	2	1	7	0	0	0	1	0	0	0
13	301	31	8	4	5	0	0	13	3	0	2	0	2	1
15	261	25	33	0	1	1	2	0	0	0	0	0	0	0
16	474	68	11	8	2	1	7	0	1	1	0	0	1	0
18	317	42	24	1	7	2	14	0	0	0	6	0	1	0
19	391	67	22	2	3	1	13	0	0	0	0	0	0	0
21	398	53	23	1	4	1	2	0	0	0	2	0	0	0
22	244	66	52	4	0	16	0	0	0	4	0	0	0	0
23	313	65	7	4	0	0	0	0	0	3	0	0	1	0
24	367	61	71	8	32	4	5	8	6	4	0	5	0	7
25	326	50	41	1	22	6	4	1	0	0	1	0	0	0
27	374	21	12	2	4	0	7	0	0	0	0	0	0	0
28	330	44	6	1	5	0	4	0	7	0	0	0	0	0
29	357	52	28	1	2	3	5	0	0	1	0	0	0	0
30	276	39	7	0	3	2	17	0	3	0	0	0	0	0
32	231	56	10	4	2	0	15	0	0	0	0	0	0	0
33	161	25	37	1	0	14	0	0	0	0	0	0	0	0
35	232	19	11	0	2	1	0	0	0	0	1	0	0	0
37	278	22	31	1	2	1	4	0	0	2	0	0	0	0
39	303	14	29	3	5	8	7	1	1	2	2	0	0	0
41	396	17	19	1	3	0	0	0	0	1	0	0	0	0
42	351	13	46	1	2	9	2	0	0	1	0	0	0	0
43	284	3	60	5	5	11	2	0	0	2	0	0	0	0
44	197	7	32	0	1	6	0	0	0	1	0	0	0	0
45	261	11	30	4	1	3	0	0	1	0	0	0	0	0
46	360	5	27	1	6	6	0	0	2	1	3	0	0	0
47	322	4	47	5	10	3	2	3	2	1	1	0	1	0
49	358	9	73	5	2	7	0	0	0	4	0	0	0	0
51	397	1	36	3	12	6	6	3	1	2	0	0	0	0
52	510	34	10	3	3	0	0	1	4	0	0	0	0	0
53	466	14	7	5	1	1	0	0	0	0	0	0	0	0
54	311	149	52	44	13	17	2	0	7	1	0	0	0	0
55	436	39	10	26	13	29	1	1	0	0	0	0	0	0
56	287	58	39	28	11	5	2	0	1	0	0	0	0	0
57	436	61	18	4	1	1	3	0	9	1	0	0	0	2
58	483	118	6	1	14	0	1	3	7	1	0	0	0	1
Sum	15,431	1,699	1,171	205	249	184	173	44	60	34	19	5	6	12

Table 5.–Sablefish maturity stages from observation of gonad gross morphology, found in samples taken during the 2009 NSEI sablefish longline survey

Maturity Stage	Number of Males	Number of Females	Total
Immature	10	7	17
Maturing Juvenile	20	24	44
Mature/developing	85	164	249
Spawning	0	2	2
Spent/post spawning	37	13	50
Resting	102	156	258
Total	254	366	620

FIGURES

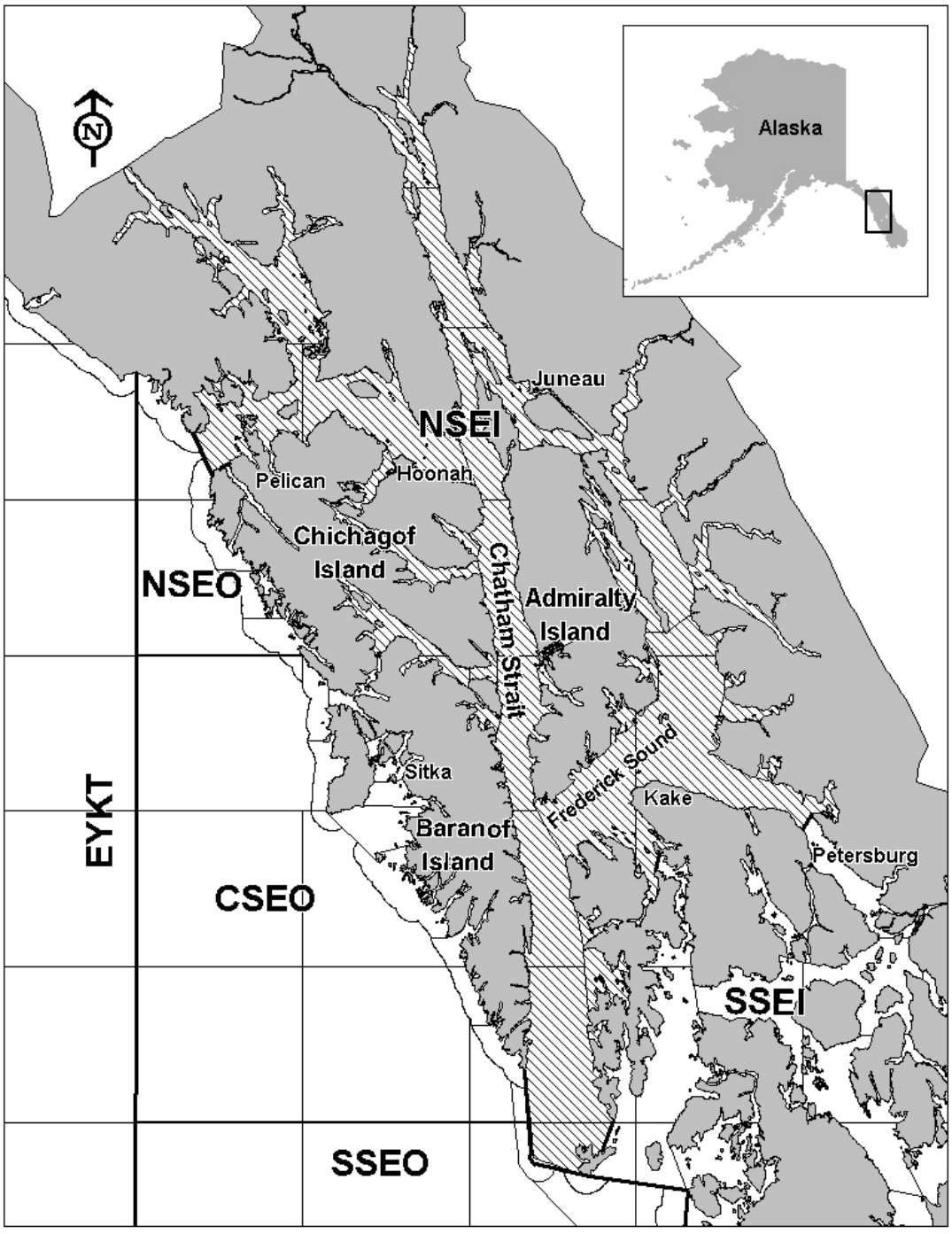

Figure 1.–The marine waters included in the Northern Southeast Alaska Inside (NSEI) Subdistrict. Adjacent Groundfish Management areas include East Yakutat (EYKT), Northern Southeast Outside (NSEO), Central Southeast Outside (CSEO), Southern Southeast Outside (SSEO), and Southern Southeast Inside (SSEI).

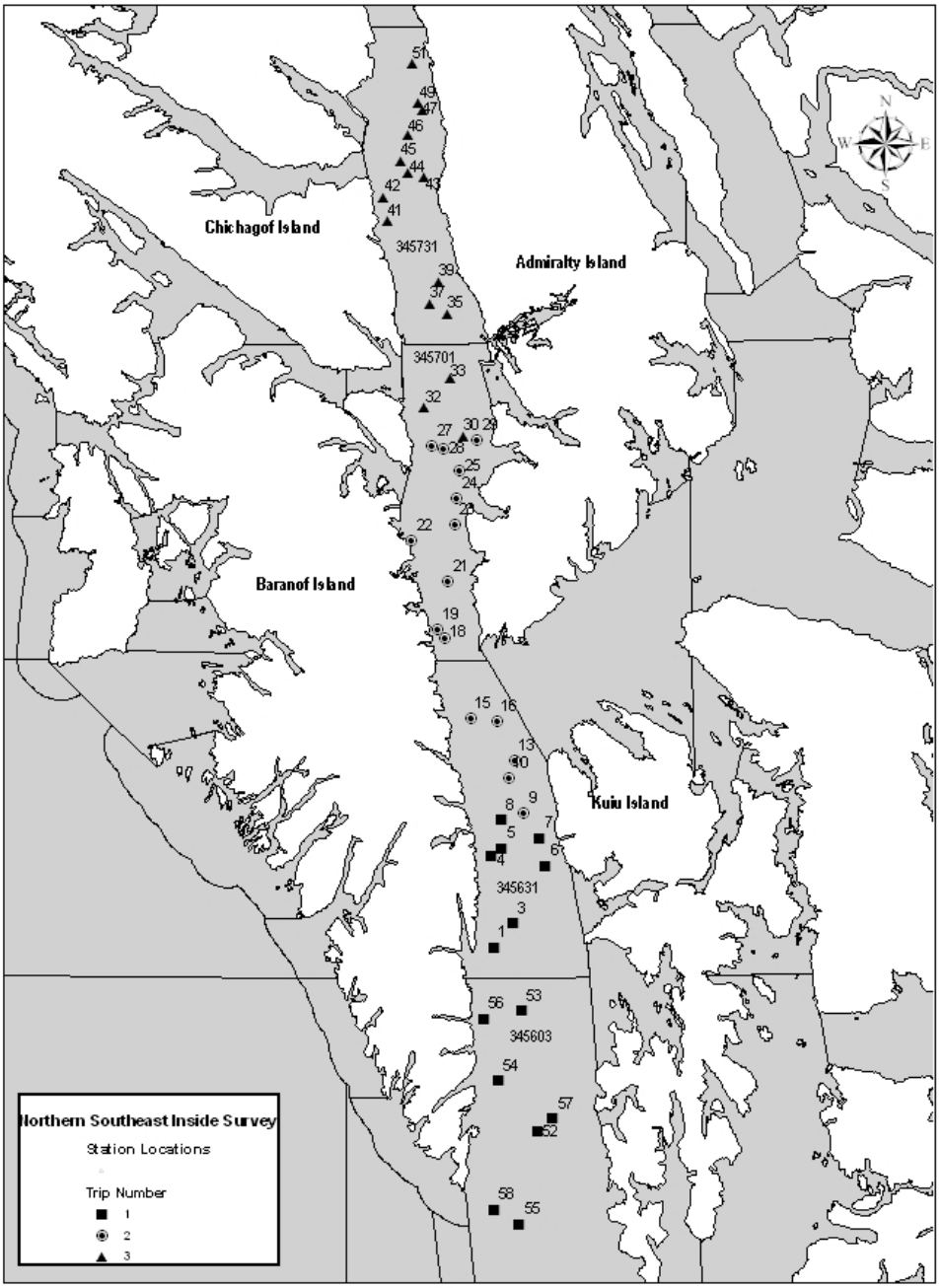

Figure 2.–Survey station locations, statistical areas, and trip station assignments for the 2009 NSEI longline survey

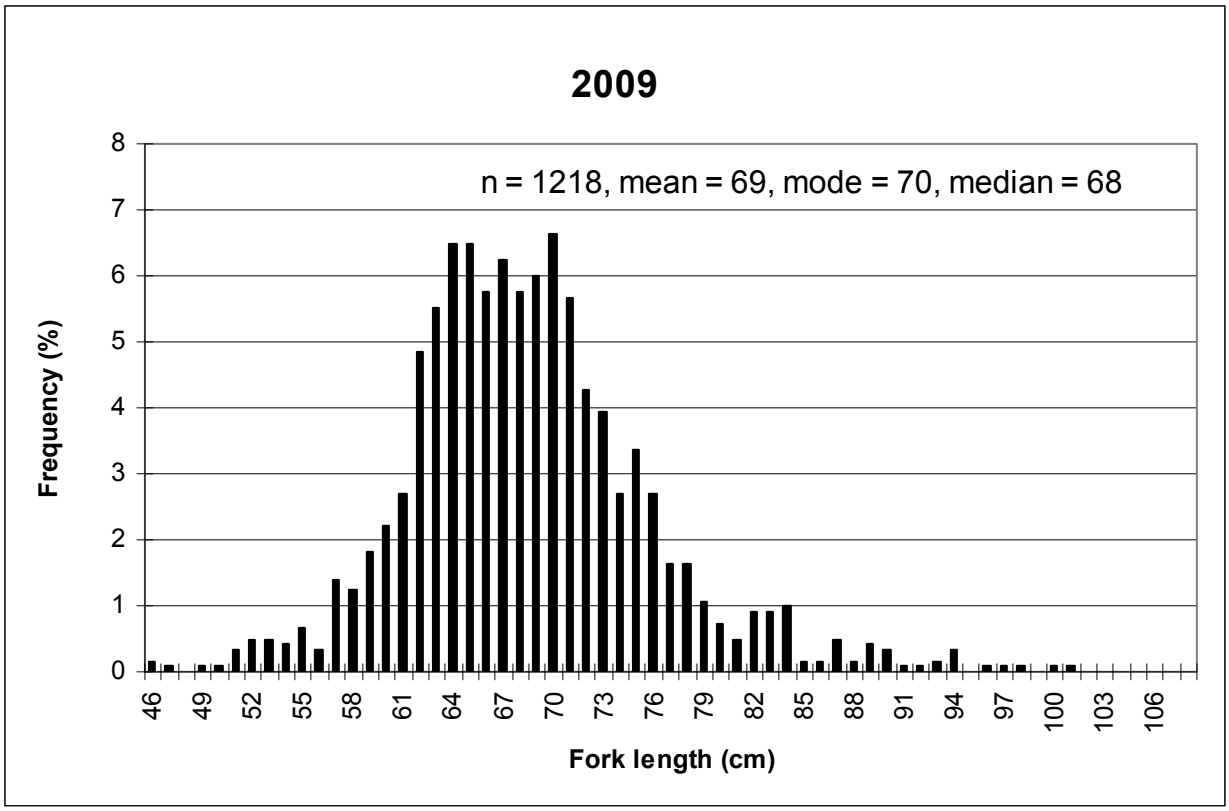

Figure 3.–Sablefish length frequency distribution, from the 2009 NSEI sablefish longline survey

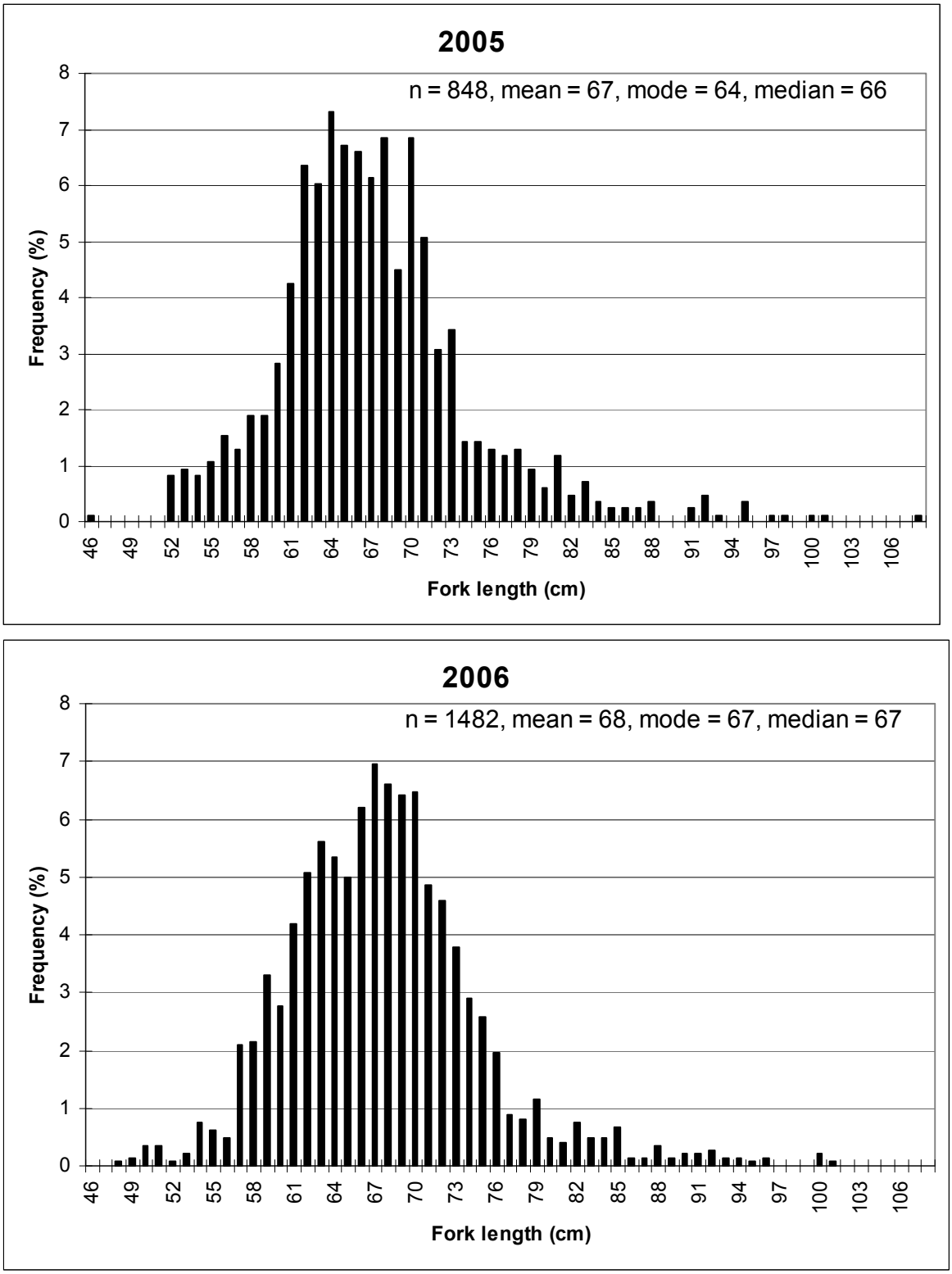

Figure 4.–Sablefish length frequency distributions from the 2005 and 2006 NSEI sablefish longline surveys

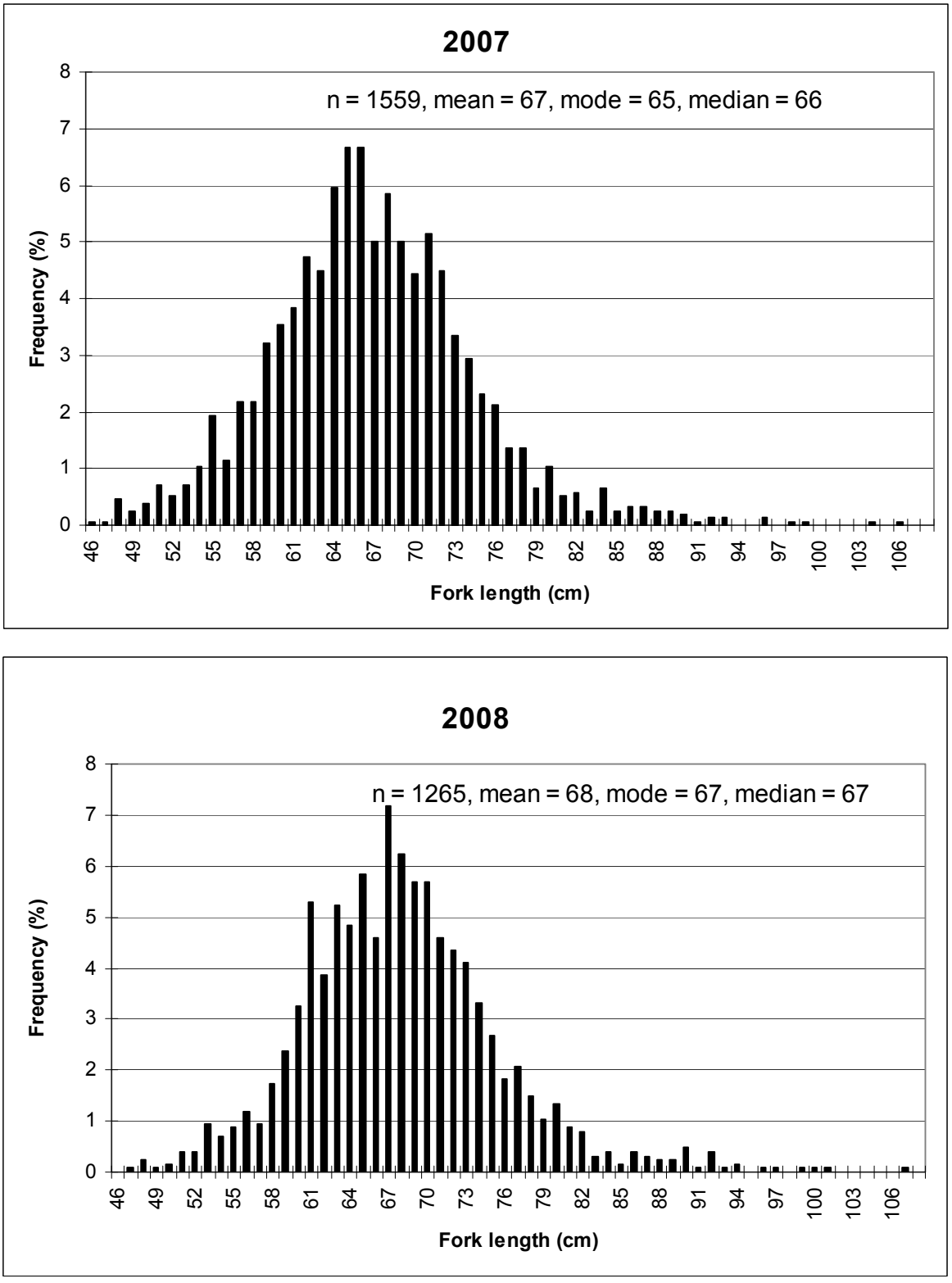

Figure 5.–Sablefish length frequency distributions from the 2007 and 2008 NSEI sablefish longline surveys

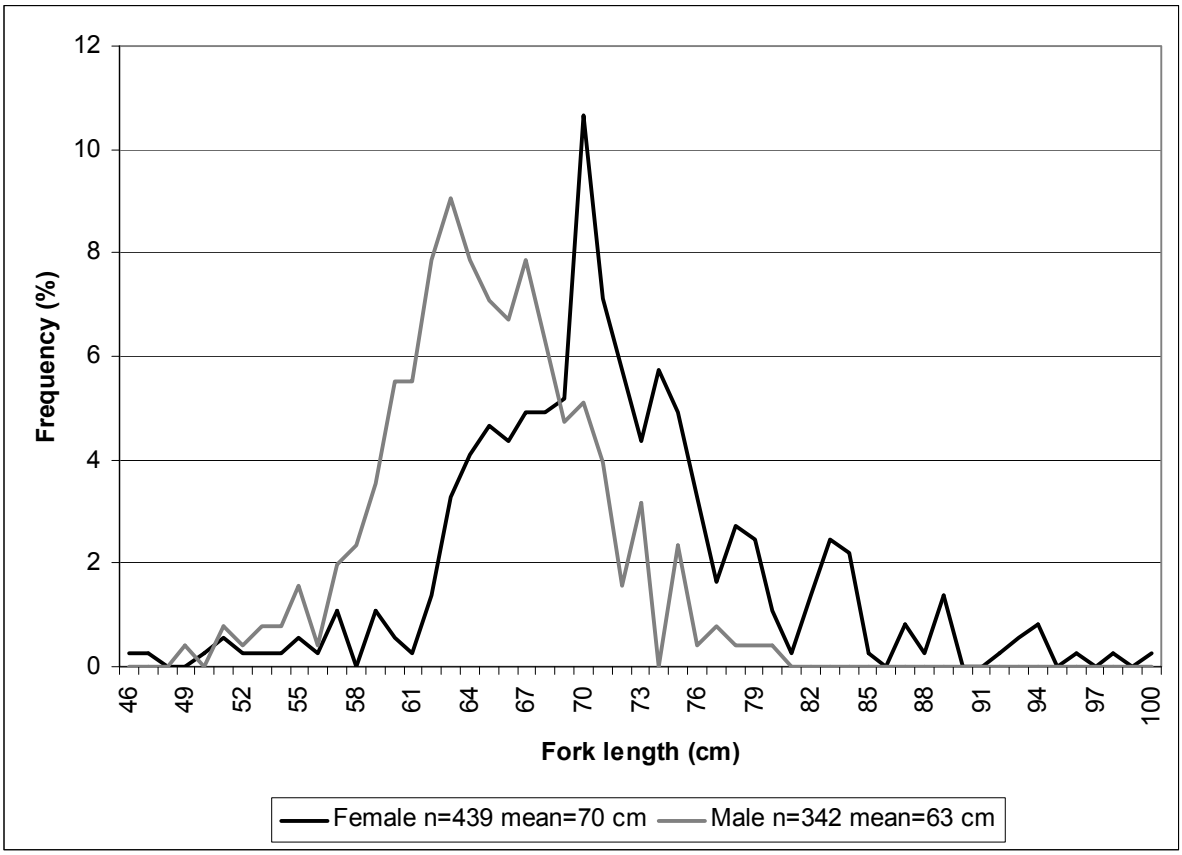

Figure 6.–Sablefish length frequency distribution by sex, from the 2009 NSEI sablefish longline survey

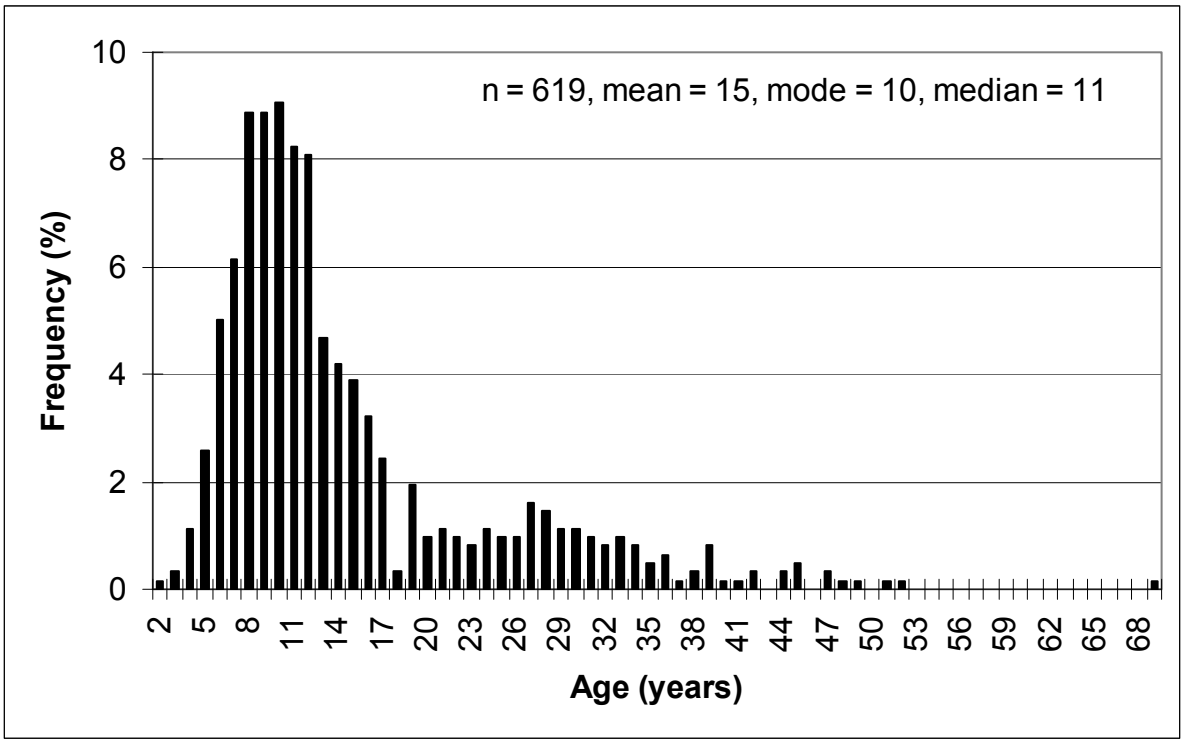

Figure 7.–Sablefish age frequency distribution for the 2009 NSEI sablefish longline survey

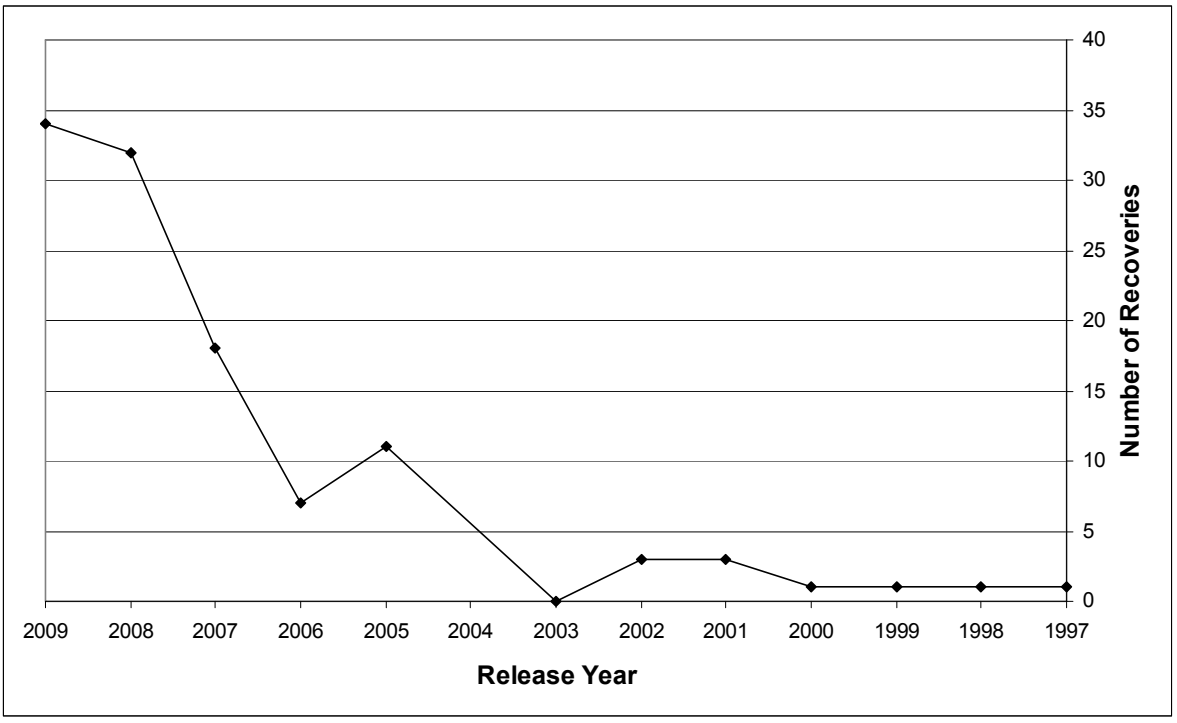

Figure 8.–Number of sablefish tags recovered in the 2009 NSEI sablefish longline survey, stratified by release year

APPENDICES

Appendix A.–Vessels, vessel crew, and scientific survey staff participating in the 2009 NSEI sablefish longline survey

Trip No.	Vessel	Crewmembers	Affiliation
Trip 1	Sherrie Marie	Norm Pillen	Skipper
		Glen Bircher	Crew
		Tom Corso	Crew
		Jessie Pavlik	Crew
		Leanne Pillen	Crew
		Mike Vaughn	Survey Project Leader, ADF&G
		Craig Monaco	ADF&G
Trip 2	Ida June	Greg Beam	Skipper
		Arc Beam	Crew
		Ameriah Beam	Crew
		Kevin Beam	Crew
		Kamala Carroll	Vessel lead, ADF&G
		Allison Sayer	ADF&G
Trip 3	Seaview	John Etheridge	Skipper
		Clayton Etheridge	Crew
		Glen Galloway	Crew
		Wayne Bigness	Crew
		Becky Knight	Vessel lead, ADF&G
		James Shewmake	ADF&G

Appendix B.–Tide table for Baranof Warm Springs, Chatham Strait, July 25–August 7, 2009

	High Tides				Low Tides			
Date	**Time**	**Ft.**	**Time**	**Ft.**	**Time**	**Ft.**	**Time**	**Ft.**
07/25	3:48 AM	15.3	4:29 PM	15.0	10:05 AM	-3.0	10:34 PM	-0.3
07/26	4:36 AM	13.9	5:09 PM	14.6	10:47 AM	-1.3	11:24 PM	0.3
07/27	5:26 AM	12.1	5:52 PM	13.8	11:31 AM	0.6	—	—
07/28	6:23 AM	10.3	6:39 PM	12.9	12:19 PM	2.7	12:18 AM	1.1
07/29	7:33 AM	8.9	7:34 PM	12.0	1:15 PM	4.5	1:19 AM	1.9
07/30	9:04 AM	8.1	8:40 PM	11.4	2:27 PM	5.9	2:31 AM	2.5
07/31	10:35 AM	8.3	9:50 PM	11.3	3:49 PM	6.4	3:48 AM	2.5
08/01	11:44 AM	9.0	10:52 PM	11.6	5:01 PM	6.0	4:57 AM	2.0
08/02	12:33 PM	9.8	11:45 PM	12.2	5:56 PM	5.3	5:52 AM	1.3
08/03	1:10 PM	10.6	—	—	6:39 PM	4.4	6:34 AM	0.4
08/04	1:42 PM	11.4	12:29 AM	12.9	7:17 PM	3.5	7:10 AM	-0.3
08/05	2:11 PM	12.0	1:08 AM	13.4	7:52 PM	2.7	7:42 AM	-0.9
08/06	2:38 PM	12.5	1:44 AM	13.8	8:24 PM	2.1	8:12 AM	-1.3
08/07	3:04 PM	12.9	2:17 AM	13.9	8:56 PM	1.6	8:40 AM	-1.3

Appendix C.–Set dates, times, soak and haul durations, haul order, and depths, for the 2009 NSEI sablefish longline survey

				Time (hr:min)				Depth (fm)		
Trip	Effort	Station	Date	Set Time	Soak duration	Haul duration	Haul order	Start	End	Avg.
1	1	55	07/29	6:45	3:33	1:30	Opposite	283	292	287
1	2	58	07/29	7:23	5:44	1:38	Opposite	286	306	294
1	3	52	07/29	16:41	3:47	1:32	Opposite	394	390	392
1	4	57	07/30	6:22	3:55	1:40	Opposite	370	389	379
1	5	54	07/30	7:27	8:01	1:50	Opposite	356	301	352
1	6	56	07/30	14:30	5:01	1:32	Opposite	312	308	305
1	7	53	07/31	9:50	3:32	1:32	Same	381	388	385
1	8	1	07/31	11:37	6:14	2:48	Same	267	284	286
1	9	3	07/31	17:02	5:03	1:32	Same	356	358	357
1	10	4	08/01	8:44	4:05	1:19	Same	374	367	371
1	11	5	08/01	9:31	5:52	1:27	Same	382	373	378
1	12	8	08/01	12:09	6:00	1:27	Same	396	394	398
1	13	7	08/02	7:39	3:33	1:32	Same	274	244	264
1	14	6	08/02	10:10	3:27	1:23	Same	299	278	299
2	1	27	07/29	8:38	3:42	1:25	Same	373	403	387
2	2	29	07/29	10:40	4:42	1:31	Same	285	279	292
2	3	28	07/29	14:32	3:40	1:20	Same	350	248	282
2	4	25	07/30	7:27	3:35	1:24	Same	279	272	276
2	5	23	07/30	8:24	5:37	1:27	Same	335	408	391
2	6	22	07/30	9:09	7:31	1:50	Opposite	326	321	319
2	7	24	07/30	13:24	6:20	1:31	Opposite	236	295	230
2	8	21	07/31	7:40	7:32	1:19	Same	339	355	347
2	9	19	07/31	13:40	4:04	1:19	Opposite	359	341	347
2	10	18	08/01	7:57	3:42	1:16	Same	348	333	341
2	11	16	08/01	9:13	5:27	1:16	Same	354	369	361
2	12	15	08/01	13:57	3:24	1:03	Same	360	366	364
2	13	13	08/02	6:19	3:56	1:12	Same	204	233	216
2	14	9	08/02	6:53	5:56	1:24	Same	358	352	356
2	15	10	08/02	12:07	4:04	1:07	Same	367	385	382
3	1	51	07/29	5:29	3:29	1:12	Same	237	295	282
3	2	47	07/29	7:42	3:49	1:25	Same	261	233	251
3	3	49	07/29	11:01	3:30	1:28	Same	267	271	268
3	4	46	07/30	5:31	3:30	1:12	Same	238	261	253
3	5	45	07/30	7:55	3:43	1:15	Same	290	280	285
3	6	44	07/30	10:56	3:18	1:17	Same	272	272	272
3	7	43	07/31	5:12	3:33	1:17	Same	257	286	279
3	8	42	07/31	7:34	4:29	1:19	Same	287	311	292
3	9	41	07/31	11:15	3:20	1:15	Same	307	252	284
3	10	39	08/01	6:08	3:22	1:16	Same	237	236	214
3	11	37	08/01	8:22	3:58	1:21	Same	309	330	315
3	12	35	08/01	11:34	3:29	1:21	Same	240	326	270
3	13	33	08/02	5:38	4:06	1:17	Same	301	284	292
3	14	30	08/02	8:22	4:28	1:19	Same	336	326	292
3	15	32	08/02	11:56	3:39	1:18	Same	371	354	347

Note: Set time began when the second anchor went overboard. Soak duration is time elapsed between the set time and time the first anchor came aboard. Haul duration is time elapsed between hauling aboard the first and second anchors.

Appendix D.–Winning fish buyer bid from North Pacific Seafoods of Sitka, for the 2009 NSEI sablefish longline survey.

Species	Cut	Size	Dressed lbs.	Price per lb ($)	Extended price ($)
Sablefish	Eastern cut	1-2	500	4.21	2,105.00
Sablefish	Eastern cut	2-3	3,018	4.35	13,128.30
Sablefish	Eastern cut	3-4	15,761	4.75	74,864.75
Sablefish	Eastern cut	4-5	21,844	4.95	108,325.80
Sablefish	Eastern cut	5-7	23,010	5.35	123,103.50
Sablefish	Eastern cut	7 up	9,915	5.45	54,036.75
Sablefish-#2	Eastern cut	1-2	21	3.80	79.80
Sablefish-#2	Eastern cut	2-3	113	3.95	446.35
Sablefish-#2	Eastern cut	3-4	21	4.35	91.35
Sablefish-#2	Eastern cut	4-5	247	4.55	1,123.85
Sablefish-#2	Eastern cut	5-7	791	4.95	3,915.45
Sablefish-#2	Eastern cut	7 up	1,114	5.00	5,570.00
Rougheye	Round	—	256	0.25	64.00
Shortraker	Round	—	513	0.25	128.25
Redbanded	Round	—	35	0.25	8.75
Thornyhead	Eastern cut	—	5	1.00	5.00
Thornyhead	Round	—	5	1.00	5.00
Pacific Cod	Round	—	5	0.05	0.25
Total					387,002.15

Appendix E.–Set location information for the 2009 NSEI sablefish longline survey

		Start Position				End Position			
Station	Area description	Lat. deg.	Lat. min.	Long. deg.	Long. min.	Lat. deg.	Lat. min.	Long. deg.	Long. min.
1	Patterson Point	56	32.00	134	34.65	56	31.46	134	34.68
3	N Patterson Point	56	35.43	134	31.31	56	33.77	134	31.14
4	Mount Ada	56	41.66	134	34.91	56	40.14	134	34.85
5	S Gut Bay	56	42.45	134	33.24	56	40.94	134	33.15
6	S Washington Bay	56	40.74	134	25.80	56	39.31	134	25.72
7	Washington Bay	56	43.29	134	26.56	56	41.80	134	26.15
8	Gut Bay	56	45.11	134	33.24	56	43.61	134	33.21
9	N Washington Bay	56	45.52	134	29.19	56	43.73	134	28.35
10	Hoggat Bay	56	48.71	134	31.79	56	47.05	134	31.82
13	Kingsmill Point	56	50.49	134	30.77	56	48.78	134	30.78
15	N Red Bluff Bay	56	54.32	134	38.37	56	52.49	134	38.41
16	Yasha Island	56	54.18	134	33.74	56	52.47	134	33.75
18	Cascade Bay	57	2.00	134	42.67	57	0.24	134	42.59
19	N Cascade Bay	57	2.88	134	43.93	57	1.05	134	43.98
21	Warm Springs Bay	57	7.49	134	42.06	57	5.71	134	42.05
22	White Cliff	57	10.08	134	47.40	57	11.46	134	48.41
23	N Wilson Cove	57	12.89	134	40.46	57	11.44	134	41.37
24	Point Caution	57	15.37	134	40.51	57	13.76	134	40.85
25	Woody Point	57	17.93	134	39.98	57	16.48	134	40.01
27	Point Lull	57	20.24	134	44.75	57	18.63	134	44.79
28	Point Lull Middle	57	20.00	134	42.73	57	18.24	134	42.67
29	Chaik Bay	57	20.83	134	36.96	57	19.16	134	37.02
30	Village Point	57	21.35	134	39.23	57	19.87	134	39.30
32	S Point Thatcher	57	24.00	134	46.00	57	22.50	134	45.99
33	Distant Point Middle	57	26.91	134	41.51	57	25.32	134	41.59
35	N Danger Point	57	32.95	134	42.08	57	31.46	134	42.05
37	White Rock Middle	57	33.91	134	45.13	57	32.36	134	45.11
39	Parker Point	57	36.00	134	43.67	57	34.75	134	42.26
41	Basket Bay	57	41.67	134	52.70	57	41.40	134	50.01
42	S S Passage Point	57	43.93	134	53.07	57	42.47	134	52.89
43	S Fishery Creek	57	45.81	134	45.93	57	44.30	134	45.79
44	S Passage Point Middle	57	46.30	134	48.77	57	44.82	134	48.72
45	S Passage Point	57	47.35	134	50.19	57	45.93	134	50.12
46	Fishery Point	57	49.77	134	48.85	57	48.28	134	48.57
47	N Fishery Point	57	52.03	134	45.20	57	50.56	134	45.87
49	Far N Fishery Point	57	52.78	134	46.89	57	51.30	134	47.23
51	Point Hepburn	57	56.43	134	48.13	57	55.14	134	47.80
52	Port Alexander Middle	56	14.04	134	27.42	56	15.54	134	27.37
53	Port Herbert Middle	56	27.14	134	29.98	56	25.56	134	29.79
54	Port Alexander	56	18.45	134	35.05	56	19.80	134	34.26
55	Point Howard Middle	56	5.24	134	30.52	56	6.78	134	30.51
56	Port Herbert	56	26.25	134	36.39	56	24.75	134	36.10
57	Port Malmsbury	56	15.12	134	24.83	56	16.55	134	24.74
58	Cape Ommaney	56	6.43	134	34.92	56	7.94	134	34.81

Appendix F.–Sablefish spawning maturity stages and criteria used by the Alaska Department of Fish and Game.

Maturity Stage	Description of Males at Stage	Description of Females at Stage
Immature	Testes very narrow, parallel, flat and ribbon-like, almost clear in color. Longitudinal creases are easily discernable.	Ovaries appear as 2 narrow (slender) ovoids. May be veined. It may be easiest to determine immature from maturing juvenile ovaries while ovaries are intact in fish.
Maturing juvenile	Testes enlarging, not ribbon-like, with 4 discernable creases running full length. Light pink in color. Has not spawned before.	Ovaries enlarging, translucent and pinkish to clear: eggs not yet discernable. Has not spawned before. Will spawn in the coming year. More veined. Cloudy, but not necessarily throughout.
Mature/developing	Testes large and white, each with 4 distinct lobes. No milt present.	Ovaries large and becoming white to yellowish white with developing eggs discernable and firmly attached.
Spawning	Testes very large and white, extruding milt freely under slight pressure or when cut.	Ovaries very large with large translucent eggs loose within ovary or extruding from the oviduct.
Spent/post spawning	Testes large, shriveled, often with wrinkles, and bloodshot. No milt present.	Ovaries shriveled and opaque, soft and flaccid, often reddish in color.
Resting	Testes large and firm, light brown to off-white in color. No milt present. Has spawned previously. May have wrinkles.	Ovaries large, firm and opaque, not shriveled. No eggs discernable. Has spawned previously. Noticeable follicle structure.