Regional Operational Plan No. ROP.CF.1J.2022.09

Southern Southeast Inside (Clarence Strait) Sablefish Longline Survey

by

Erica Ebert

and

Rhea Ehresmann

September 2022

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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)

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

REGIONAL OPERATIONAL PLAN NO. ROP.CF.1J.2022.09

SOUTHERN SOUTHEAST INSIDE (CLARENCE STRAIT) SABLEFISH LONGLINE SURVEY

by

Erica Ebert and Rhea Ehresmann

Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka

Alaska Department of Fish and Game
Division of Commercial Fisheries
333 Raspberry Road, Anchorage, AK 99518

September 2022

The Regional Operational Plan Series was established in 2012 to archive and provide public access to operational plans for fisheries projects of the Divisions of Commercial Fisheries and Sport Fish, as per joint-divisional Operational Planning Policy. Documents in this series are planning documents that may contain raw data, preliminary data analyses and results, and describe operational aspects of fisheries projects that may not actually be implemented. All documents in this series are subject to a technical review process and receive varying degrees of regional, divisional, and biometric approval, but do not generally receive editorial review. Results from the implementation of the operational plan described in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author if you have any questions regarding the information provided in this plan. Regional Operational Plans are available on the Internet at: http://www.adfg.alaska.gov/sf/publications/

Product names used in this publication are included for completeness and do not constitute product endorsement. The Alaska Department of Fish and Game does not endorse or recommend any specific company or their products.

Erica Ebert and Rhea Ehresmann
Alaska Department of Fish and Game, Division of Commercial Fisheries,
304 Lake St. Ste. 103, Sitka, Alaska 99835

This document should be cited as follows:
Ebert, E., and R. Ehresmann. 2022. Southern Southeast Inside (Clarence Strait) sablefish longline survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.1J.2022.09, Douglas.

Signature Page

Project Title:	*Southern Southeast Inside (Clarence Strait) Sablefish Longline Survey*
Project leader(s):	*Erica T. Ebert*
Division, Region and Area:	*Commercial Fisheries, Region 1, Petersburg*
Project Nomenclature:	*TF–187 TF SE Groundfish*
Period Covered:	*2022*
Field Dates:	*5 May–12 May*
Plan Type:	*Category I*

Approval

Title	Name	Signature	Date
Project leader	Erica T. Ebert		04/08/2022
Research Coordinator	Andrew P. Olson		05/03/2022

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABSTRACT

This regional operational plan details the methodology for the annual Southern Southeast Inside (SSEI) Subdistrict sablefish (*Anoplopoma fimbria)* longline survey. The longline survey's primary objective is to estimate the relative abundance of sablefish through documentation of catch per unit effort (CPUE) at fixed random stations in the SSEI Subdistrict. In addition, department personnel collect fishery independent biological data (age, length, weight, and maturity) of sablefish during the longline survey. The survey results are used in conjunction with fishery CPUE, biological information, and regional trends in sablefish populations to establish the SSEI annual harvest objective (AHO).

Keywords: operational plan, sablefish, Anoplopoma fimbria, black cod, abundance, Southern Southeast Inside Subdistrict, SSEI, stock health, harvest, Clarence Strait, longlines

BACKGROUND

Sablefish (*Anoplopoma fimbria*; also known as black cod) are found in the northeastern Pacific Ocean, ranging from Baja, California to the Aleutian Islands and into the Bering Sea (Mecklenburg et al. 2002). Adult sablefish inhabit the deep waters of the continental shelf, slope, and coastal fjords. Most adults live at depths ranging from 366 m to 914 m (200 to 500 fathoms), but sablefish have been captured at depths over 1,829 m (1,000 fathoms; Allen and Smith 1988). Sablefish are a long-lived species and have been aged to at least 94 years old in Alaska waters (Munk 2001); however, sablefish captured by the commercial fisheries in Southeast Alaska are often not older than 20 years (Mueter 2010).

The sablefish fishery within the Southern Southeast Inside (SSEI) Subdistrict waters (Figure 1) dates to the early 1900s, with the fishery becoming a regular feature in annual reports by 1935, and regulations governing the fishery passing in 1945 (Unpublished 1994 ADF&G memorandum to Commissioner Carl Rosier, Juneau). While the fishery remained small in comparison to the Northern Southeast Inside (NSEI) Subdistrict sablefish fishery, by 1973 it became a developed fishery that was prosecuted utilizing longline and pot gear (Holum and Coonradt 2005). The original SSEI Subdistrict consisted of Clarence Strait, Sumner Strait, Behm Canal, Ernest Sound, the outer coast of Prince of Wales Island, and a portion of southern Frederick Sound. The waters of Dixon Entrance were not formally recognized by the State of Alaska as part of the SSEI Subdistrict until 1983 (Holum and Coonradt 2005). As fleet effort and efficiency increased and the number of fishery days decreased over the next decade, the equal quota share (EQS) management system was implemented in 1997, with 30 longline permits and 5 pot permits authorized to fish SSEI (Holum and Coonradt 2005). Since 2019, the SSEI sablefish fishery has been managed using EQS with a limited entry maximum of 22 permits.

The Alaska Department of Fish and Game (department) began conducting sablefish stock assessment surveys in the SSEI Subdistrict in 1979 (Holum and Coonradt 2005). These surveys did not become standardized until 1988, when their purpose shifted to assess the relative abundance of sablefish over time. Fixed sampling stations were randomly assigned within 3 statistical areas in Clarence Strait (325531, 315502, 315432) where most of the fishing effort was focused, with each statistical area considered a separate stratum (Stahl et al. 2014). Survey stations were added to Dixon Entrance in 1996 as commercial fishery effort shifted over time (Figure 2). In 1997, survey methods were standardized to match the National Marine Fisheries Service (NMFS) sablefish longline survey, which included switching bait from herring to cut squid and modifying survey soak times from 1 hour to a minimum of 3 hours and maximum of 11 hours (Sigler 2000). Furthermore, in 2000 the department began using standardized skates of conventional longline gear built to similar specifications as NMFS longline survey gear (Table 1;

O'Connell et al. 2002). This gear consisted of 2 m (78 in) spacing of hooks attached to the groundline with 38 cm (15 in) gangions with beckets (Carlile et al. 2002).

In 2013, the SSEI survey was redesigned to improve the spatial coverage relative to the fishery as commercial harvest shifted from Clarence Strait to Dixon Entrance (Stahl and Baldwin 2013). Survey stations were proportionally allocated relative to the area of sablefish habitat by strata, with statistical areas included in the redesign that had 3% or more of the commercial fishery harvest on average from 2003 to 2012 (Stahl et al. 2014). The survey redesign also included increasing the minimum distance between stations to 5,400 m based on the average set length of 3,000 m and the distance sablefish can detect bait odor after 1 hour of soaking (1,200 m; Løkkeborg et al. 1995; Sigler 2000). The overall number of survey stations decreased from 37 to 29 stations in 2013, to maintain both the proportional allocation scheme by strata and to accommodate additional survey time needed to survey the more exposed stations in the Dixon Entrance area (Figure 2; Stahl et al. 2014).

OBJECTIVES

1. Collect catch per unit effort (CPUE) data to estimate relative abundance of sablefish in the SSEI Subdistrict.
2. Collect biological data (otoliths, fork length, weight, sex, and maturity) from 550 sablefish during the survey.
3. Measure (fork length) an additional 550 sablefish during the survey.
4. Identify and enumerate, to the lowest possible taxonomic group, all species captured on longline gear during the survey.

METHODS

SURVEY DESIGN

Generally, 29 longline survey stations (Table 2) have been fished in the annual survey since 2013; however, in 2016 and 2017, 28 stations were fished, and in 2019 and 2021, 24 stations were fished due to time constraints with having 1 chartered vessel unable to conduct the survey or a portion of the survey. Typically, 2 vessels are chartered to conduct the annual survey; one is assigned to trip 1, fishing the northern portion (15 stations) of the survey, and the other is assigned to trip 2, fishing the southern portion (14 stations). Timing of the survey is based on the most favorable tide series (i.e., smallest difference between low and high tides) occurring between late April and May. In the event of weather or mechanical delays, the duration of the survey may be extended to a maximum of 14 days.

Each vessel is staffed with 2 scientific department crew members, 1 of whom is assigned as crew leader. Department staff are responsible for data collection and entry, as well as the adherence to survey protocols outlined in this document. The vessel crew consists of a captain (skipper) and 3 experienced crewmen. The skipper is responsible for general navigation, crew supervision, and control of the vessel. The vessel fishing the northern portion of the survey sets gear at 3 stations per day for 5 days, and the vessel fishing the southern portion of the survey sets gear at 3 stations per day for 4 days and has 1 day in which only 2 stations are fished. The skipper on this trip selects the shorter day at their discretion. The department crew leader on each vessel works with the skipper to adjust the number of sets fished per day to accommodate changes in weather, whale

depredation, problems with gear or the vessel, or other issues that arise. If winds exceed 25 knots and/or seas exceed 10 feet, fishing operations may be suspended to provide for the safety of crew and to prevent deterioration of data quality due to loss of fish in rough seas.

One longline set occurs at each station, and each set consists of 25 standardized 100 m (approximately 55-fathom) skates of medium lay 1 cm (3/8 in) American SSR 100 nylon line. A skate consists of 45 Mustad® 39965D #13/0 circle hooks attached approximately 38 cm (15 in) from the groundline with a becket (#72 medium lay twine) and gangion (#60 medium lay round braid twine), and hooks are spaced 2 m (78 in) apart for a total of 1,125 hooks per set. There are 5 m (16 ft) of bare groundline at each skate end, including a spliced 46 cm (18 in) long loop at either end for connecting skates. Skates are weighted with a 3.2 kg (7 lb) cannonball connected by heavy gangion line to a longline snap, which is then attached to the loop at each skate end for a total of 26 weights per set. The end of each set is connected to 366 meters (200 fathoms) of running line, a 27 kg (60 lb) longline anchor, and buoy line with buoys and a "highflyer" flagpole. New hooks are attached to the gear at the start of each survey. Bent or broken hooks are replaced throughout the survey to allow for equal catchability on all hooks. The vessel crew is responsible for overhauling the gear after each set and ensuring the gear remains in good condition throughout the survey.

Each vessel receives 1,043 kg (2,300 lb) of squid for bait. Department staff calculates the rate of bait used at the first 3 stations to ensure enough bait is available to fish all survey stations. The rate of use is approximately 5.7 kg (12.5 lb) per 100 hooks. Bait must be freshly cut squid, thawed no more than 24 hours prior to use. Squid bait is cut into 3.8 cm to 5 cm (1.5 in to 2 in) pieces. The head and the tentacles of the squid are discarded, using only the mantle and viscera of the squid as bait. Staff records details of the vessel, crew, and bait usage on the Vessel Information Form (Appendix A).

Pre-printed Survey Set Forms (Appendix B) for each station are provided and completed with trip number, station number, statistical area, and start and end coordinates for each set. It is at the skipper's discretion which end is set first based on ocean and tide conditions. All attempts are made to set between the 2 locations; however, the current or weather may force a deviation from course to fish the gear appropriately. If it is necessary to set differently, the set should be made as close to the original location points as possible. The start and end positions for each set are the locations where the anchors are deployed overboard. Any problems, unforeseen events, skipper comments, and start and end of the workday should be documented on the Daily Log Form (Appendix C).

Sets soak between 3 to 11 hours, as measured from second anchor overboard to first anchor on board. The length of soak is at the skipper's discretion and depends on weather, killer whale (*Orcinus orca)* or sperm whale (*Physeter macrocephalus)* depredation, presence of hagfish Myxinidae or sand fleas (Lysianassoidea spp.), or other boat traffic in the area. No more than 2 sets should be in the water at any time to reduce loss of fish to sand fleas and hauls should occur as soon as possible after the minimum three-hour soak. A typical pattern of setting gear is to set the first set, wait a short amount of time to minimize soak time on the second set, then set the second set. Next, haul the first set after the three-hour minimum soak. Set the third set, and then haul the second and third sets in sequence. Seabird avoidance devices are required when setting gear in statistical areas 325431 and 325401. This includes trip 1 station 123 and trip 2 stations 124, 125, 126, 127, 128, and 129 located in the Dixon Entrance area (Table 2).

The vessel provides a crewman who operates the roller to haul each set. Prior to hauling gear, a 46 cm (18 in) mark is placed on the railing next to the roller so the operator can measure undersized fish. Sablefish less than the 46 cm (18 in) mark may be gently released at the roller due to low market value and to allow for future spawning potential. All other sablefish, rockfish (*Sebastes sp.)*, and Pacific cod (*Gadus macrocephalus)* are to be retained for sale. Thornyhead rockfish (*Sebastolobus sp.)* that appear healthy are released, while dead or mortally injured thornyhead rockfish are retained for sale. All other catch is carefully released with minimum damage. Fish returned to the water are not to be gaffed or allowed to go through the brushes or a crucifier. Vessels with unfilled Pacific halibut (*Hippoglossus stenolepis)* individual fishing quota (IFQ) on board may retain legal halibut up to their IFQ amount; however, vessels without halibut IFQ must immediately release all Pacific halibut. A reasonable effort should be made to untangle live Pacific sleeper sharks (*Somniosus pacificus)* prior to moving on to other methods of separating the shark from the gear.

DATA COLLECTION

Hook Accounting

One department staff member records detailed set information during deployment and retrieval (haulback) of each set on the Survey Set Form (Appendix B) and on the tablet using the At-Sea Electronic Sampling (ACES) application (Appendix D). These forms capture the weather condition while setting, time of deployment and retrieval for anchors and buoys, and depths of each anchor and skate (Appendices E and F). The staff member who completes these forms while setting and hauling gear is also responsible for the hook accounting component of that set. This staff member must position themself in a location where they have an unrestricted view of the intersection of the longline gear and the ocean surface to begin tallying the hooks of the set using the ACES hook accounting application (Appendix G). The staff member keeps a set of paper Hook Accounting Forms (Appendix H) nearby in a clipboard in case the tablet fails, or if weather (rain) does not allow for using the tablet for hook accounting. It is the responsibility of the person conducting the hook accounting to identify and enumerate, to the lowest possible taxonomic group, all species captured on longline gear during the survey. The other ADF&G staff, who is collecting biological samples on deck, should document any irregularities or issues that the other staff person encounters on all-weather paper. This procedure allows the hauling of gear to remain uninterrupted throughout the set.

The roller should be operated at a speed and in a manner to allow accurate tallies. Staff should request that the gear be slowed or stopped if additional time is needed to document the disposition of hooks. Hooks are assigned a code based on their status as the hook breaks the surface of the water. See Appendix I for hook categories and disposition combinations utilized during the SSEI longline survey. If a fish becomes separated from the hook below the water surface, the hook is tallied as either a bare or baited hook. A hook returning with 2 fish attached as the hook breaks the surface is considered a “re-bite” and only the original fish is counted in the hook count tally, while the second fish is noted by species in the skate comment section as a “re-bite.” Thornyhead rockfish are released on the SSEI survey if alive and healthy; however, if a thornyhead cannot be released alive and is retained onboard, there is not an option in the ACES application to document that disposition. Instead, staff should select discard thornyhead and flag the note box on the ACES hook accounting screen, noting the number of thornyhead rockfish retained on that skate. While

finalizing sets at the end of the day, staff must change those discard thornyhead tallies with flagged notes to retained thornyhead rockfish tallies.

As hooks are being tallied, every 10th sablefish is set aside for biological sampling. The sample rate calls for the collection of the first sablefish of the set and every 10th sablefish thereafter for the first 20 skates of each set. This systematic sampling design helps reduce bias regarding which fish are sampled. The sample rate can be adjusted depending on the harvest of the first 2 days of the survey to ensure that the goal of 550 samples is reached. Staff conducting hook accounting alerts the crew member at the roller which specimens should be set aside. If a 10th fish is missed as a sample, the next sablefish is set aside for sampling, and so on. The ACES application emits an audible tone that notifies staff when a sample should be collected based on the number of sablefish tallied. There is also a visual display that provides a countdown to the next sample (Appendix G). In determining the 10th fish to be sampled, only "retained" sablefish and "discard small" sablefish are counted; lost sablefish or those discarded due to fleas, sharks, or other types of damage are not considered, as the fish condition would most likely make the fish unsuitable for sampling**.** Additional sablefish are collected and measured only for length data. The next sablefish following each regular biological specimen (second sablefish of the set and every 11th sablefish thereafter) is collected and segregated in a separate tub as a "length only" sample. The ACES application emits a different tone to indicate a sablefish is a length sample. This sablefish is also counted as the first fish in the tally toward the next biological sample.

Gear snarls can occur when setting the gear. When a multiple hook snarl is present during haulback, the gear is slowed or stopped. If a snarl involves more than 2 hooks, the snarl check box at the bottom of the ACES hook accounting form is marked (Appendix G). The vessel crewman operating the roller counts the total hooks involved in the snarl as they haul the gear across the roller for staff to record. Staff do not need to differentiate between bare and baited hooks in a snarl; all snarled hooks without fish are considered invalid. All fish present in a snarl are identified to the species level and enumerated appropriately for that skate. The number of invalid hooks is then determined by subtracting the number of fish in the snarl from the total hooks counted in the snarl. Hooks are also assigned the condition "invalid" if they are broken, hooked in the line, hooked to another hook, or missing (a broken gangion). If a skate has 12 or more invalid hooks, that entire skate is considered invalid. A skate may also be considered invalid if whale depredation is evidenced on a given skate or skates. Staff adjusts the status of a skate as invalid when finalizing skates by selecting "Not Valid" under the condition code drop down menu in ACES or by circling "N" under valid on the Hook Accounting form (Appendix H). The invalid skate is noted on the set's comments and any sablefish from an invalid skate are not included in the calculation of that station's CPUE.

If a skate breaks off or the gear is otherwise parted, the number of the skate that parted, as well as the time the end of the skate is retrieved on board, is recorded in the comments on the Survey Set Form (Appendix B). After resuming the haul on the opposite end of the set, staff shall advance the set number in ACES using the forward button to the next sequential skate and start tallying. Staff should continue collecting sablefish biological samples until a total of 20 skates have been sampled and the remaining 5 skates of gear are tallied. Once skate 25 is completed, the ACES screen is paged back to the parted skate to tally any remaining hooks for that subset. The "Date and Time of Second Anchor On board" is recorded on the Survey Set Form (Appendix B) as the time that the second end of the parted gear (end of the final skate hauled) is brought on board. Following the completion of the haul, staff renumbers the skates to keep the hook tallies consistent with the

sequence of the original set order. The first skate to the parted skate retain their original skate numbers; the remaining skates are renumbered in reverse order with skate 25 assigned to the skate after which the gear parted and the vessel began hauling the other end of the set.

If more than 25 skates are mistakenly set for a station, the extra skate(s) should be tallied separately as additional skate(s) and are not combined with the hook tally for skate 25. Additional skates in a set are noted in the set's comments and are included in the CPUE calculations on the Vessel Summary Form (Appendix J) for that station.

Should the vessel experience whale depredation with whales actively feeding off the gear, the vessel should cease setting additional gear in the area on that day, as the whales are likely to stay with the vessel until it leaves the area. The presence of orca or sperm whales are documented by selecting the whale box at the bottom of the ACES hook accounting screen for each skate in which whales are present (Appendix G). Any sablefish that appear to be whale-damaged (e.g., sablefish lips or head appears on the hook but no body) are recorded as "Disc. Other" in ACES and then corrected to the appropriate discard status during set data finalization, see below. Gear that is already set will need to be hauled prior to the expiration of the 11-hour soaking period, but the vessel should attempt to discourage additional depredation by traveling away from the set, in hopes that the whale(s) will move on. If that set is depredated, the vessel needs to consider other options prior to proceeding with additional fishing and options to discourage additional interactions should be discussed by the department crew leader, skipper, and/or project leader. It is believed that sperm whales cue on bubbles caused by cavitation from engine cycling. Techniques that may confuse whales and decrease depredation include reducing engine cycling, setting decoy buoys at least a mile away from set locations, avoiding lingering in the station area after a set is made, and traveling near shore and in shallower water. If feasible, staff should collect photos of the fluke (sperm whale) and left side of dorsal fin (orca) for identification by cetacean researchers.

Once a set's gear is hauled, each set is finalized in the ACES program directly on the tablet used to do the hook accounting. This involves verifying that hook counts are correct for each skate in the set, adding any missing data or comments, changing skate status to invalid when appropriate, correcting errors (misidentification of a species) that were made, editing "Disc. Other" and "unknown" species or codes to the proper selection, and addressing any additional set notes made by the other staff member. For example, sablefish marked as "Disc. Other" due to whale depredation must be changed to "Not marketable due to orca or sperm whale depredation" and noted in the skate comments field along with changing the skate status to invalid due to whale depredation. Skate comments should include any information describing why the skate was not fishing properly: line parting, hang-ups, snarls, the presence of whales, and shark or whale depredation. After reviewing each skate, staff types "verified" along with their initials and the date in the comment section of each skate to confirm data verification. After all skates have been verified, staff must review and verify that ACES has the correct set information (e.g., date and times of setting and hauling, and location of the set), and then should also add their initials and date with "verified" in the set comments. Comments affecting CPUE should be listed first when reporting set information in the set comments, such as too many or too few skates per set and number of invalid skates within the set. Once all 25 skates of a set are verified and set data and comments are verified, the set can be marked as finalized in ACES.

Biological Sampling

While one scientific staff member is hook accounting, the other is collecting biological samples. Sablefish biological samples consist of fork length (nearest whole centimeter), weight (nearest 0.1 kg), sex, and maturity and are recorded using the Groundfish At-Sea Survey Sampling application on the tablet (Appendix K); however, the biological sampler should also bring 2 Sablefish Biological Data Collection Forms on deck with them (Appendix L) in the event that the tablet fails. Specimen numbers are assigned sequentially to each sablefish sample with the first sablefish sampled on each set assigned as "specimen 1."

After taking a fork length measurement, sablefish are weighed using a Marel® electronic motion compensation scale. The scale is calibrated at the start of each set and as sea conditions change. If the Marel® scale cannot be properly calibrated due to rough weather or other issues, a hanging scale may be used. When using the hanging scale, weight readings should be taken a second time to reduce misreading due to wave and wind action. Weight collection is skipped if the ocean conditions are not conducive to accurate and repeatable readings with either scale. Some sablefish may ingest water as they are hauled to the surface as evidenced by their swollen appearance. Samplers must purge the water from the fish stomachs prior to recording weight.

Following the collection of length and weight data, staff remove the specimen's otoliths. The otoliths are accessed by making a horizontal cut across the top of the head, about a centimeter deep. The 2 otoliths are in opposing grooves within the cartilage and forward of the brain. The otoliths are removed with forceps and are stored temporarily on deck in pill boxes. The pill boxes are numbered from 1 through 100 and are reused for otoliths from 101 through 200 and so forth. Otolith numbers are assigned consecutively to sablefish with biological data beginning with the first sample collected (otolith 1) and ending with the last sample taken on the final set of the survey. Otolith numbers do not match specimen numbers, which restart numbering with 1 at the start of every set. To assign a specimen an otolith number in the Groundfish At-Sea Survey Sampling application (Appendix K), staff clicks on the "oto" button. Any notes for a sample's otolith condition are made by clicking "Notes" in the Groundfish At-Sea Survey Sampling application and selecting the corresponding condition from the "notes/otolith comments" pop-up menu or by writing in the comments box (Appendix K). Length only sablefish samples are not included in the otolith number sequence. The sampler should continually verify that the otolith number on the sampling form and tablet application matches the cell's lid number on the pill box to avoid errors in sequencing.

Otoliths are cleaned daily to avoid compromising otolith storage capacity on deck and to reduce the chance of sample loss due to accidental spillage. Otoliths should be cleaned at the end of the day inside the vessel cabin by immersing individual pairs in a small bowl of water to remove any remaining blood or tissue and gently dabbing them using a paper towel. No more than one pair of otoliths should be cleaned or removed from their pill box cell at a time to avoid accidental mixing. Staff should ensure notes recorded for otoliths on paper and in the sampling application (e.g., no otoliths, 1 otolith lost, etc.) match the number and condition of otoliths they are cleaning before placing them in the long-term storage 24-cell trays, which are labeled with trip information and specimen numbers (Appendix M). If no otoliths were collected for a specimen, the corresponding cell is left empty and uncapped. Any otolith sequence issues or abnormalities with the otoliths while collecting, cleaning, or storing the otoliths must be fully documented on the sampling application. Any questionable otoliths are noted and addressed in port with the Age Determination Unit (ADU).

After otoliths are extracted, sex and maturity data are collected by examining the specimen's gonads macroscopically. Sablefish are cut and dressed (eastern cut) to industry standards (Figure 3) to view the gonads. Male specimens are recorded with sex code "01" and females with code "02." A code of "00" is assigned to those specimens where the sex is not observed, and code "99" to those that are indiscernible. Maturity is coded according to 1 of 2 stages, immature "01" or mature "07" (Figures 4 and 5). Sablefish with undeveloped gonads that have not previously spawned are assigned as immature. Fish with gonads that are developed and have spawned or are prepared to spawn are recorded as mature. Questionable gonads should be saved to review with the other staff member after the set's haulback and hook accounting is complete. After sex and maturity data are recorded for a fish, the fish is cleaned with a scraper, rinsed with a deck hose, and then iced in a fish hold separate from round fish.

All tagged sablefish encountered on the survey are retained and the tag number, biological data, and set number are recorded on the Deck Tag Recovery Form (Appendix N). If a tagged fish was designated as a biological sample, the individual is treated like a random biological sample and the otoliths are included in the survey's otolith series. The tag number is also noted in the comments section of the sampling application or the paper sample form for that specimen. Tags are removed from the fish and secured in a safe place (e.g., small sealable plastic bag or in an unused cell of the otolith pill box) on deck until the set is completed. Tags and associated information are then transferred to the Survey Tag Recovery Form (Appendix O) inside the vessel cabin in between sets or at the end of the day. If tags from other agencies are recovered (NMFS, DEPARTMENT Homer, Fisheries and Oceans Canada Pacific Biological Station, or Japan), biological data (length, weight, sex, maturity, and otoliths) are collected from the tagged fish and mailed with the tag to the respective agency upon return to port. These otoliths are stored separately and not included in the survey's otolith number sequence, unless they were collected as part of the systematic sampling.

At the end of each day, the Vessel Summary Form (Appendix J) is filled out for the stations fished that day. The form captures the CPUE and the average sablefish weight for each station. A cumulative estimate of the catch weight is calculated to give the processor an estimate of landing size on offload days. The CPUE and average weights can also be compared by station for the previous 3 surveys to estimate relative catches and to facilitate adjusting biological sample rates if needed (Table 3).

VESSEL SAFETY

The safety of department staff is of utmost importance and department staff can terminate a survey at any time if they feel that the vessel is unsafe or that the skipper is making poor decisions that jeopardize the safety of crew and/or the integrity of the survey. If there is a situation on the vessel in which survey crew are in danger, the Garmin inReach® satellite communication device is utilized to contact the appropriate safety contacts for the current year's survey. If the situation warrants immediate response, staff should contact the United States Coast Guard (USCG) directly. If staff are unsure whether a situation constitutes a safety concern, they should: 1) address the concern with the skipper, 2) contact the land-based safety contact and Groundfish Project Leader, and 3) document the circumstances as the situation allows, utilizing photos or videos if necessary.

Each survey binder has a Vessel Safety Checklist Form (Appendix P) that must be completed with the skipper prior to the vessel leaving the dock along with a Vessel Diagram Form (Appendix Q). The crew leader ensures that department staff have a safety orientation with the skipper that covers

location and operation of the life raft, fire extinguishers, and other safety equipment. The Vessel Diagram Form illustrates locations of the necessary safety equipment and allows staff to orient themselves with the working space on deck. Staff are told where to report in an emergency and the best location to store their survival suits. Survey staff must wear a personal flotation device (PFD) while on deck. A personal locator beacon (PLB) is assigned to each department staff on each vessel and are stored in an accessible location of their choice. Staff and PLB assignments are documented and sent to the appropriate shoreside safety contacts in the event that one is activated. The PLBs are manually activated and send a signal to the USCG once activated.

Each survey vessel's crew leader must notify a designated land contact between 8:00 AM and 3:00 PM of the vessel's status each day of the survey via an inReach device. If a vessel has not contacted the land contact by 3:00 PM each day, the USCG will be notified of the situation at 907-463-2990. Additionally, each crew leader is responsible for conducting a daily check-in with the survey coordinator every morning via inReach® devices or via text message on their phones. Daily check-ins should include staff members' safety and wellbeing report and provide the opportunity to relay additional information or to ask questions. Department staff may communicate daily check-ins by whatever means they choose; however, staff are not authorized to use the vessel's radios or phones unless given direct permission by the skipper.

SCHEDULE AND DELIVERABLES

The SSEI longline survey coordinator will begin planning the annual longline survey in March, including ensuring two chartered vessels are contracted, opening a fish buy bid to local processors, organizing gear, and training department staff using the protocols outlined in this document. Charted vessel skippers and department staff assigned to the longline survey are provided with survey gear and materials prior to the survey departure. The survey is then conducted in late April or early May.

RESPONSIBILITIES

Erica Ebert, Fishery Biologist I, Survey Coordinator and Crew Leader. Oversight of all aspects of the project, including operational planning, equipment inventory, ADF&G survey staff training, participation in survey, and data review.

Rhea Ehresmann, Fishery Biologist III, Groundfish Project Leader. Assists in oversight of all aspects of the project and utilizes survey results for the stock assessment the following year.

Madison Bargas, Fishery Biologist I, Crew Leader. Responsible for collecting data during the survey as outlined in this document and assisting ADF&G crew as needed while conducting the survey.

Maureen Blair, Fish and Wildlife Technician IV, Crew. Responsible for collecting data during the survey as outlined in this document.

Jill Walker, Fishery Biologist II, Crew. Responsible for collecting data during the survey as outlined in this document.

REFERENCES CITED

Allen, M. J., and G. B. Smith. 1988. Atlas and zoogeography of common fishes in the Bering Sea and northeastern Pacific. NOAA Technical Report NMFS 66.

Carlile, D. W., B. Richardson, M. Cartwright, and V. M. O'Connell. 2002. Southeast Alaska sablefish stock assessment activities 1988-2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J02-02, Juneau.

Holum, D. D., and E. E. Coonradt. 2005. The Southeast Alaska Southern Southeast inside sablefish fishery information report with outlook to the 2005 fishery. Alaska Department of Fish and Game, Fishery Management Report No. 05-26, Anchorage.

Løkkeborg, S., B. L. Olla, W. H. Pearson, and M. W. Davis. 1995. Behavioral responses of sablefish, Anoplopoma fimbria, to bait odour. Journal of Fish Biology 46(1):142–155.

Mecklenburg, C. W., T. A. Mecklenburg, and L. K. Thorsteinson. 2002. Fishes of Alaska. American Fisheries Society, Bethesda, Maryland.

Mueter, F. 2010. Evaluation of stock assessment and modeling options to assess sablefish population levels and status in the Northern Southeast Inside (NSEI) management area. Alaska Department of Fish and Game, Special Publication No. 10-01, Anchorage.

Munk, K. M. 2001. Maximum ages of groundfish in waters off Alaska and British Columbia and considerations of age determination. Alaska Fishery Research Bulletin 8(1):12–21.

O'Connell, V., E. E. Coonradt, B. Richardson, M. Vaughn, D. Holum, C. Brylinsky, and K. Carroll. 2002. 1999–2001 Report to the Board of Fisheries, Region 1 groundfish fisheries, Region 1: Southeast Alaska-Yakutat. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J02-46, Juneau.

Sigler, M. F. 2000. Abundance estimation and capture of sablefish (Anoplopoma fimbria) by longline gear. Canadian Journal of Fisheries and Aquatic Sciences 57(6):1270–1283.

Stahl, J. P., and A. Baldwin. 2013. 2012 NSEI (Northern Southeast Inside Subdistrict) sablefish mark-tag survey. Alaska Department of Fish and Game, Fishery Data Series No. 13-29, Anchorage.

Stahl, J. P., K. Carroll, and K. Green. 2014. Southern Southeast Inside commercial sablefish fishery and survey activities in Southeast Alaska, 2013. Alaska Department of Fish and Game. Fishery Management Report No. 14-39, Anchorage.

TABLES

Table 1.–Gear history of the Southern Southeast Inside (SSEI) Subdistrict longline survey from 1988 to 2022. Gear was standardized in 2000, and no survey was conducted in 2005.

Year	ADF&G number	Vessel name	Gear type	Skate length (m)	Hook size	Hook spacing (m)	Tied gangion length (cm)	Bait	Skates per set	Hooks per skate	Soak time (hrs)
1988	41440	*Isis*	Snap	300	13 C	3	25	Herring	10	100	1
1989	41440	*Isis*	Snap	300	13 C	3	25	Herring	5	100	1
1990	99999	*Isis*	Snap	300	13 C	3	25	Herring	5	100	1
1991	99999	*Isis*	Snap	300	13 C	3	25	Herring	5	100	1
1992	41440	*Isis*	Snap	300	13 C	3	25	Herring	5	100	1
1993	99999	*Isis*	Snap	300	13 C	3	25	Herring	5	100	1
1994	99941	*Medeia*	Snap	300	13 C	3	25	Herring	5	100	1
1995	99941	*Medeia*	Snap	300	13 C	3	25	Herring	5	100	1
1996	99941	*Medeia*	Snap	300	13 C	3	25	Herring	5	100	1
1997	44450	*Cherokee*	Conv.	182.9	13 C	1.8	36	Cut Squid	15	100	3 to 11
	45211	*Providence*	Conv.	182.9	13 C	1.6	23	Cut Squid	15	100	3 to 11
1998	41043	*Jennifer Lee*	Conv.	164.6	13 C	1.6	28	Cut Squid	11	100	3 to 11
	45211	*Providence*	Conv.	182.9	13 C	1.6	23	Cut Squid	11	100	3 to 11
1999	41043	*Jennifer Lee*	Conv.	164.6	13 C	1.6	28	Cut Squid	11	100	3 to 11
	45211	*Providence*	Conv.	168.3	13 C	1.6	23	Cut Squid	11	100	3 to 11
2000	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2001	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2002	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2003	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2004	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11

-continued-

Table 1.–Page 2 of 3.

Year	ADF&G number	Vessel name	Gear type	Skate length (m)	Hook size	Hook spacing (m)	Tied gangion length (cm)	Bait	Skates per set	Hooks per skate	Soak time (hrs)
2006	41043	*Jennifer Lee*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2007	33468	*Masonic*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2008	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2009	33468	*Masonic*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2010	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2011	33468	*Masonic*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2012	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2013	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2014	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2015	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2016	52119	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	41022	*Viking Maid*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2017	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	33468	*Masonic*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11

-continued-

Table 1.–Page 3 of 3.

Year	ADF&G number	Vessel name	Gear type	Skate length (m)	Hook size	Hook spacing (m)	Tied gangion length (cm)	Bait	Skates per set	Hooks per skate	Soak time (hrs)
2018	33468	*Masonic*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2019	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2020	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	59664	*Sisu*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2021	45211	*Providence*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
	33133	*Predator*	Conv.	100	13 C	2	38	Cut Squid	25	45	3 to 11
2022	41022	*Viking Maid*	Conv.	100	13C	2	38	Cut Squid	25	45	3 to 11
	45211	*Providence*	Conv.	100	13C	2	38	Cut Squid	25	45	3 to 11

Table 2.–Southern Southeast Inside (SSEI) Subdistrict survey master station list.

Station	Trip	Statistical area	Start Lat.	Start Long.	End Lat.	End Long.	Start Depth (m)	End Depth (m)	Area description
101	1	325533	55 48.71	132 28.76	55 50.11	132 29.83	291	276	Little Ratz Harbor
102	1	325533	55 48.06	132 24.93	55 46.95	132 23.96	326	330	Narrow Point
103	1	325531	55 40.87	132 18.48	55 42.30	132 19.65	320	326	Tolstoi Point
44	1	325531	55 34.10	132 13.52	55 35.40	132 15.03	300	268	Ship Island
37	1	315502	55 28.42	131 58.99	55 29.19	132 01.50	243	241	Caamano Island
31	1	315502	55 18.43	131 58.61	55 19.87	132 00.08	236	233	Skin Island
107	1	315502	55 10.53	131 54.26	55 12.13	131 54.48	232	235	Wedge Island
20	1	315502	55 01.87	131 43.66	55 00.39	131 43.16	217	217	Dall Head
109	1	315502	55 05.22	131 45.91	55 06.42	131 47.66	277	260	Canoe Cove
118	1	315431	54 39.76	131 47.72	54 38.31	131 47.78	193	189	West Devil Rock
119	1	315431	54 36.82	131 57.01	54 35.23	131 57.03	195	184	Cape Chacon
120	1	315431	54 32.73	131 51.19	54 34.39	131 51.83	184	185	Celestial Reef
121	1	315431	54 32.85	131 44.06	54 31.47	131 44.07	193	192	Celestial Reef
122	1	315431	54 33.78	131 40.11	54 35.42	131 40.01	210	182	West Devil Rock
123	1	325401	54 26.81	132 0.86	54 26.83	132 03.57	163	186	Celestial Reef
110	2	315432	54 59.73	131 50.31	54 58.19	131 50.36	233	222	Percy Island
111	2	315432	54 57.15	131 55.09	54 58.64	131 55.00	240	237	Ingraham Bay
18	2	315432	54 54.37	131 48.20	54 55.52	131 48.17	226	225	Hidden Bay
113	2	315432	54 50.62	131 40.06	54 49.15	131 41.14	227	195	West Rock
12	2	315432	54 48.75	131 53.00	54 50.30	131 52.81	216	223	Island Point
115	2	315432	54 46.54	131 54.61	54 44.93	131 54.60	227	228	McLean Arm

-continued-

Table 2.–Page 2 of 2.

Station	Trip	Statistical area	Start Lat.	Start Long.	End Lat.	End Long.	Start Depth (m)	End Depth (m)	Area description
116	2	315432	54 42.83	131 50.46	54 44.29	131 50.43	207	202	Cape Chacon
117	2	315432	54 41.04	131 41.73	54 42.55	131 41.64	239	229	West Devil Rock
124	2	325431	54 30.51	132 12.54	54 30.53	132 15.40	195	185	Point Nunez
125	2	325431	54 32.13	132 21.20	54 32.14	132 18.83	188	196	Point Marsh
126	2	325401	54 27.32	132 18.97	54 27.29	132 16.30	198	196	Surf Point
127	2	325401	54 27.42	132 26.45	54 27.40	132 23.73	196	197	Point Marsh
128	2	325431	54 30.66	132 35.40	54 30.69	132 38.19	205	206	Cape Muzon
129	2	325401	54 26.28	132 36.65	54 26.30	132 39.09	186	195	Cape Muzon

Table 3.–Station catch per unit effort (CPUE; sablefish per hook) and average sablefish weight (kg) from the 2019 to 2021 Southern Southeast Inside (SSEI) Subdistrict longline surveys with average for all 3 years.

Trip	Station number	2019		2020		2021		Average	
		Sablefish per hook	Average weight (kg)	Sablefish per hook	Average weight (kg)	Sablefish per hook	Average weight (kg)	Sablefish per hook	Average weight (kg)
1	20	0.21	1.54	0.14	1.64	0.19	1.56	0.18	1.58
1	31	NA	NA	0.10	1.44	0.05	2.10	0.05	1.77
1	37	NA	NA	0.23	2.15	0.19	2.22	0.14	2.19
1	44	NA	NA	0.27	1.57	0.45	2.19	0.24	1.88
1	101	0.17	1.45	0.22	1.81	0.29	1.79	0.23	1.68
1	102	0.16	2.68	0.24	2.61	0.27	2.05	0.22	2.45
1	103	0.20	2.00	0.22	2.07	0.24	1.94	0.22	2.00
1	107	0.35	2.09	0.28	2.10	0.32	2.24	0.32	2.15
1	109	0.24	2.22	0.28	1.89	0.33	2.06	0.28	2.06
1	118	0.22	1.63	0.45	1.91	0.52	1.80	0.40	1.78
1	119	0.26	2.22	0.34	2.25	0.38	2.36	0.33	2.28
1	120	0.23	2.00	0.38	1.68	0.47	1.68	0.36	1.79
1	121	0.13	1.00	0.19	1.42	0.22	1.40	0.18	1.27
1	122	0.13	1.86	0.34	2.17	0.52	1.73	0.33	1.92
1	123	NA	NA	0.38	1.58	0.42	1.40	0.27	1.49
2	12	0.25	1.54	0.31	1.51	NA	NA	0.28	1.52
2	18	0.13	1.00	0.16	1.51	NA	NA	0.15	1.25
2	110	0.15	1.68	0.20	1.84	0.14	1.83	0.16	1.78
2	111	0.17	1.68	0.12	2.14	0.12	1.85	0.14	1.89
2	113	NA	NA	0.39	1.46	0.42	1.54	0.27	1.50
2	115	0.12	2.00	0.18	1.66	NA	NA	0.15	1.83
2	116	0.13	1.18	0.47	1.34	0.22	1.38	0.27	1.30
2	117	0.18	1.77	0.41	1.62	NA	NA	0.30	1.70
2	124	0.24	1.86	0.34	2.18	0.44	1.86	0.34	1.97
2	125	0.26	2.31	0.30	1.98	0.46	1.95	0.34	2.08
2	126	0.24	1.72	0.47	1.68	NA	NA	0.36	1.70
2	127	0.24	1.68	0.59	1.66	0.46	2.01	0.43	1.78
2	128	0.19	2.81	0.27	2.10	0.33	2.38	0.26	2.43
2	129	0.25	1.54	0.38	1.69	0.37	2.00	0.33	1.74
Average		0.20	1.81	0.30	1.82	0.33	1.89	0.26	1.82

FIGURES

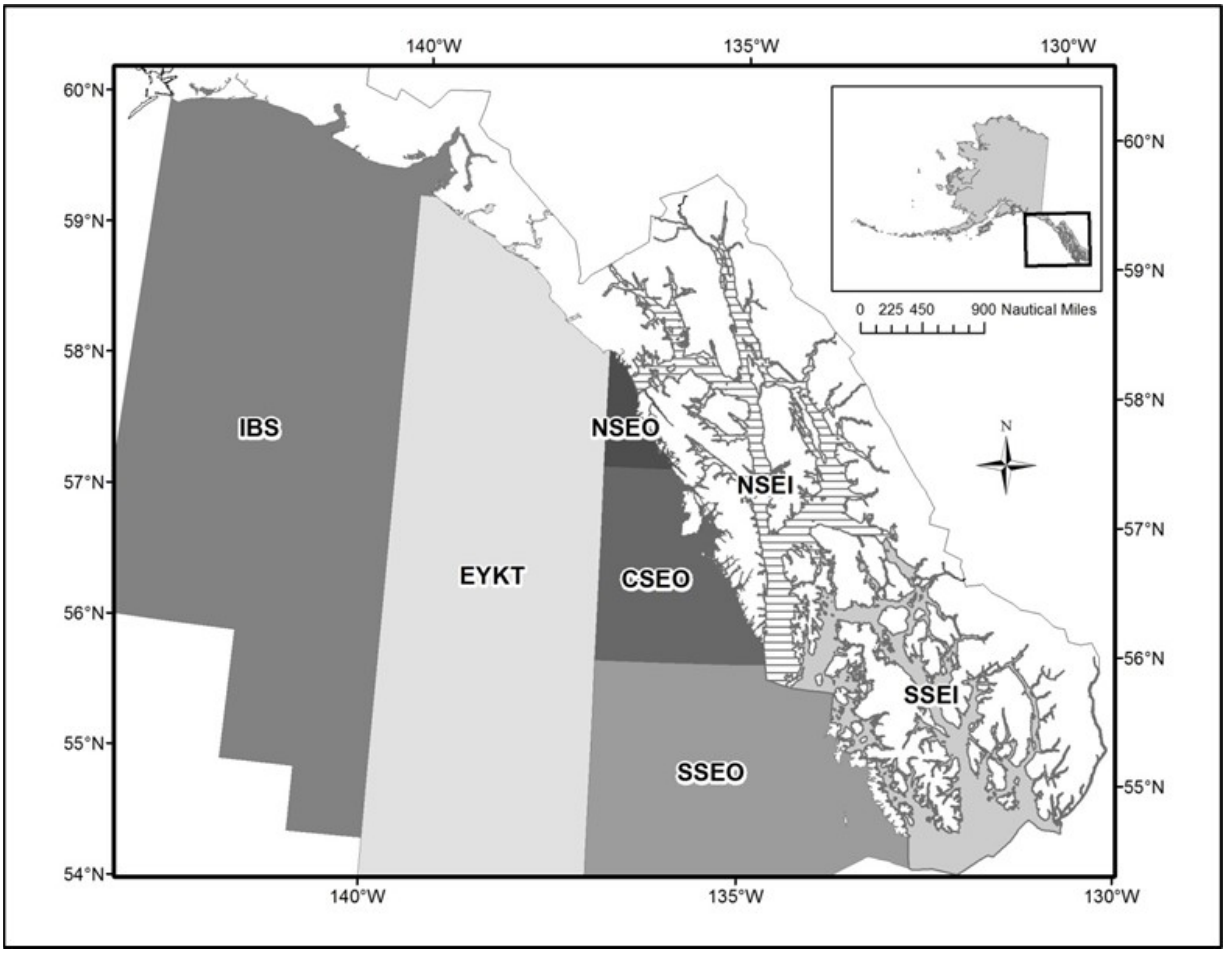


Figure 1.–Southeast District groundfish management area boundaries in Southeast Alaska waters excluding lingcod and black rockfish: Icy Bay Subdistrict (IBS), East Yakutat (EYKT) Section, Northern Southeast Outside (NSEO) Section, Central Southeast Outside (CSEO) Section, Southern Southeast Outside (SSEO) Section, Northern Southeast Inside (NSEI) Subdistrict and Southern Southeast Inside (SSEI) Subdistrict.

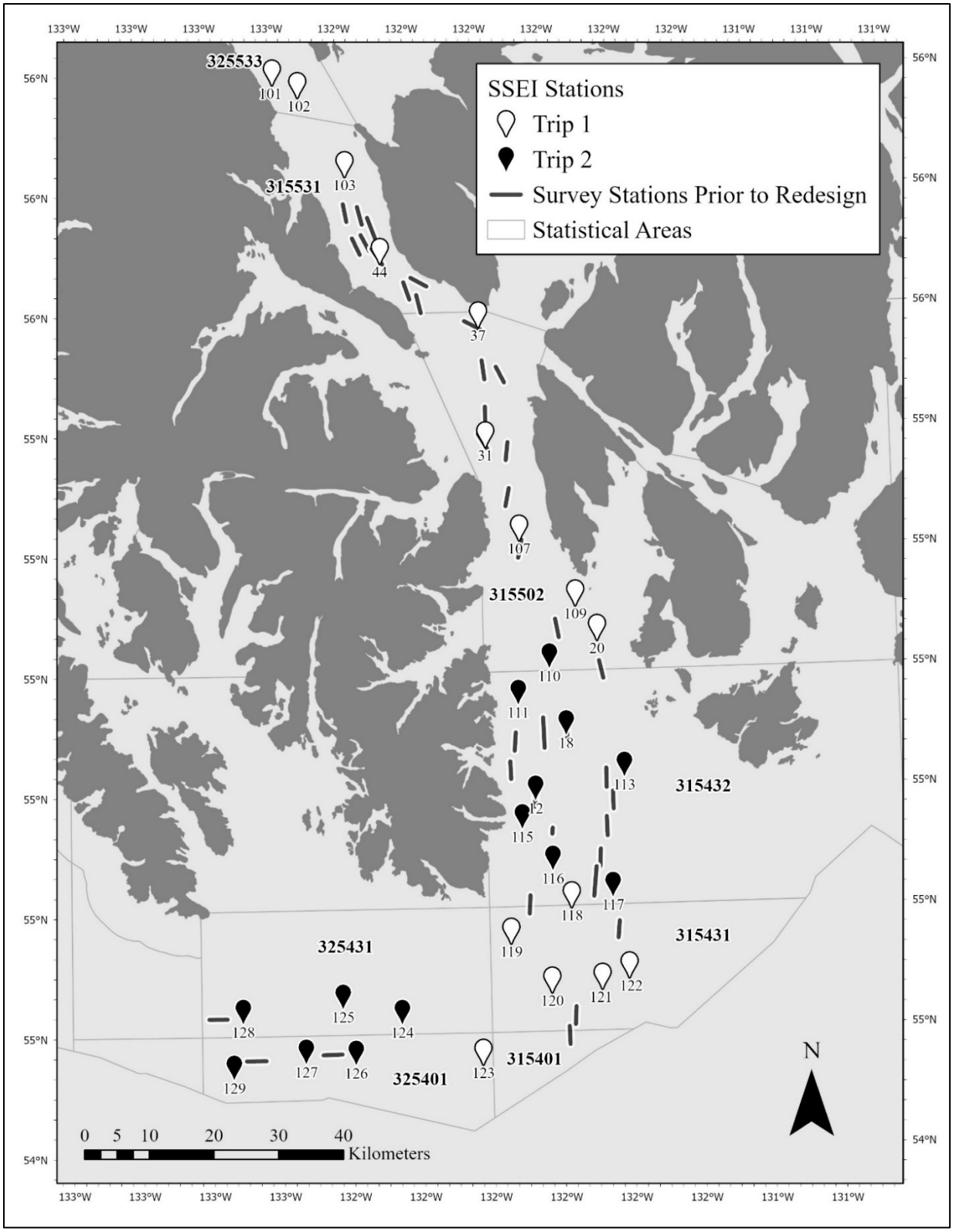


Figure 2.–Southern Southeast Inside (SSEI) survey station locations before and after 2013 survey redesign.

Figure 3.–Eastern cut sablefish.

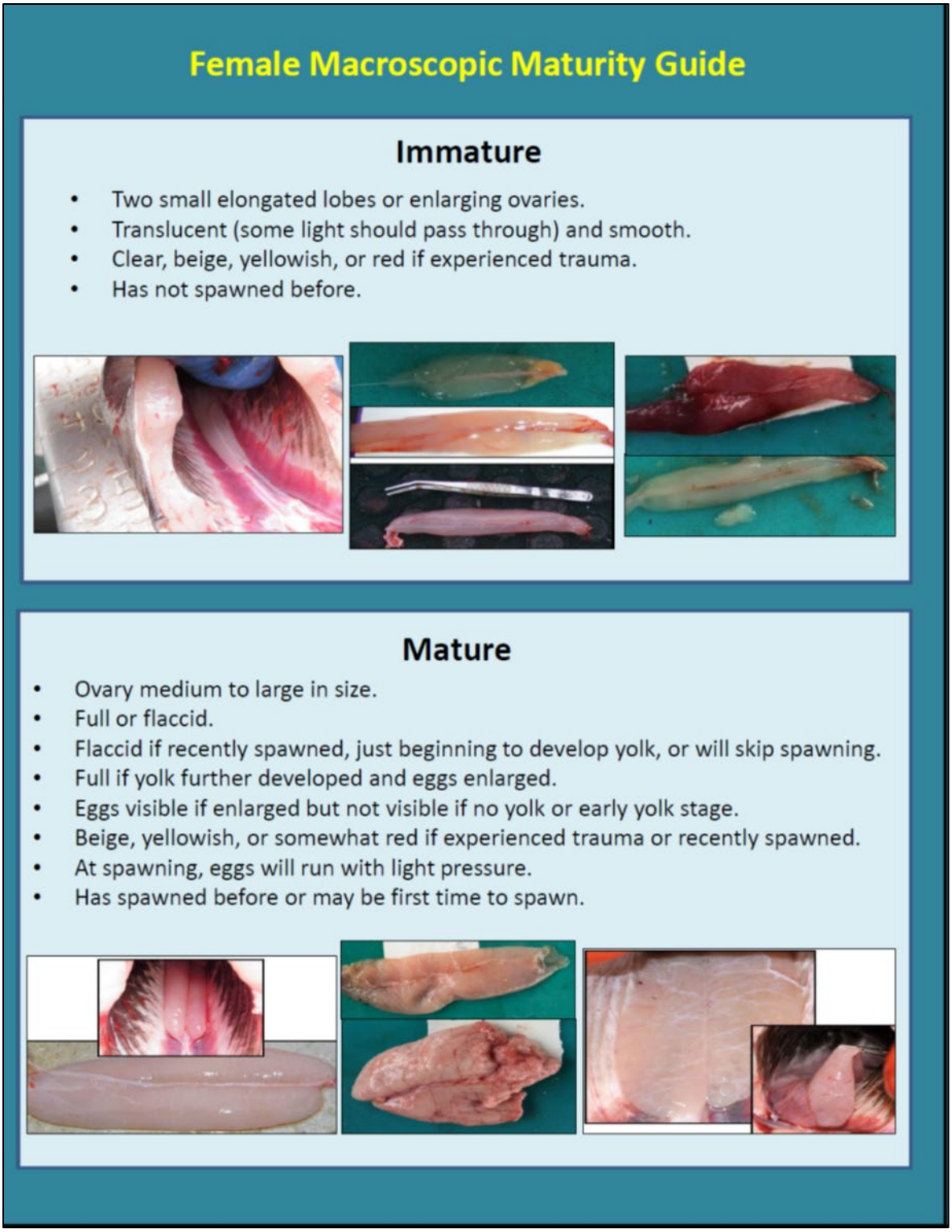


Figure 4.–Female sablefish macroscopic maturity guide.

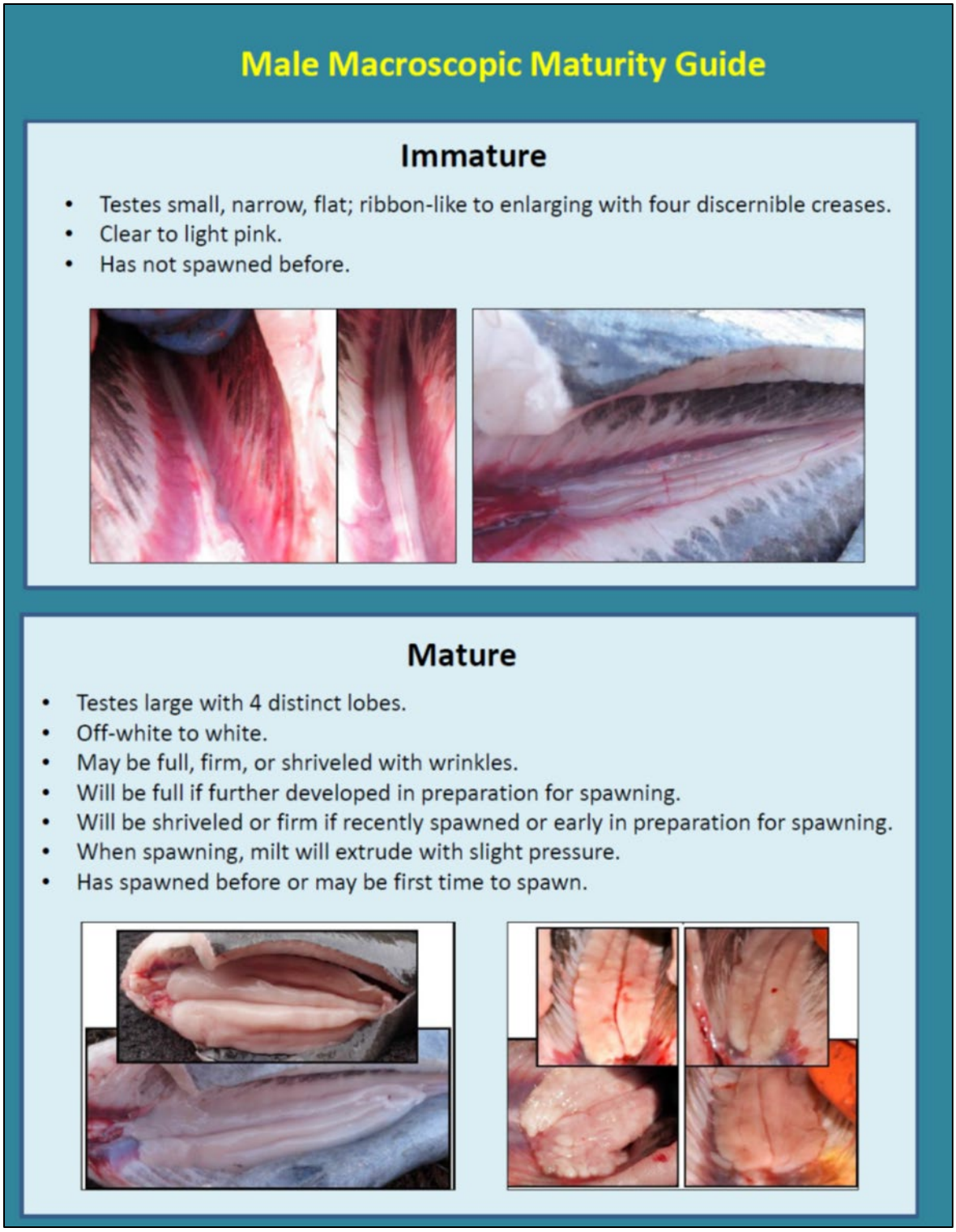


Figure 5.–Male sablefish macroscopic maturity guide.

APPENDICES

Appendix A.–Vessel information form.

VESSEL INFORMATION FORM

Year: _____ Survey: _____ Trip #: _____

Vessel:_____ Departure Port, Date and Time: _____

Return to port Date and Time: _____

Vessel hold type: ICE SLUSH RSW

ADF&G crew: _____

Skipper and crew: _____ _____

_____ _____

_____ _____

Amount of bait taken: _____ bags @ _____ lbs/bag= _____lbs

Number of sets: _____

Amount of bait left over: _____ bags @ _____ lbs/bag= _____lbs

Processor/tender name: _____

Location, date, and time of 1st delivery: _____

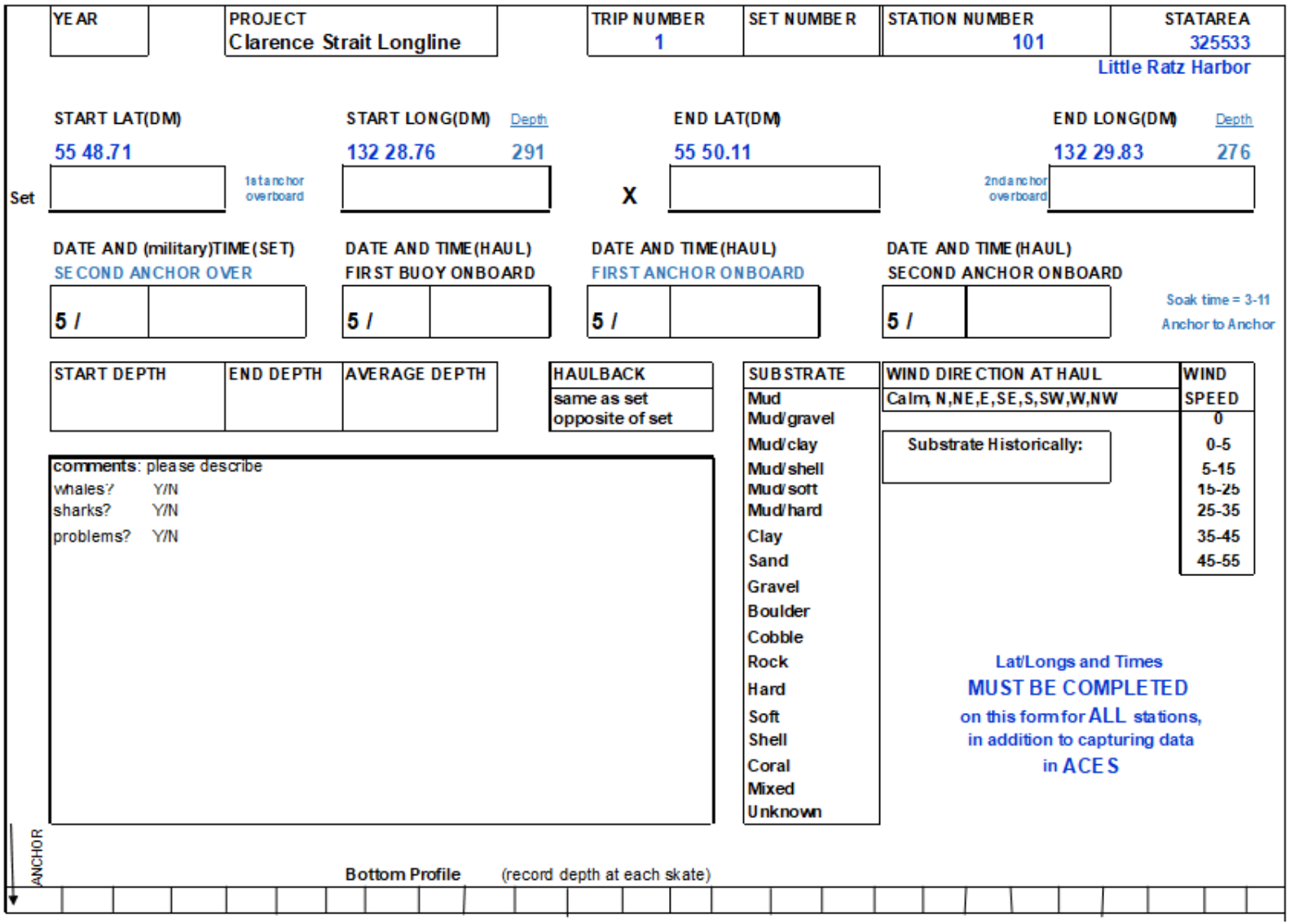
Est. time to unload: _____

Location, date, and time of 2nd delivery: _____

Est. time to unload: _____

Comments:

Appendix B.–Survey set form.



YEAR	PROJECT	TRIP NUMBER	SET NUMBER	STATION NUMBER	STATAREA
	Clarence Strait Longline	1		101	325533

Little Ratz Harbor

	START LAT(DM)	START LONG(DM)	Depth		END LAT(DM)	END LONG(DM)	Depth
	55 48.71	132 28.76	291		55 50.11	132 29.83	276
Set	1st anchor overboard			X		2nd anchor overboard	

DATE AND (military)TIME(SET) SECOND ANCHOR OVER	DATE AND TIME(HAUL) FIRST BUOY ONBOARD	DATE AND TIME(HAUL) FIRST ANCHOR ONBOARD	DATE AND TIME(HAUL) SECOND ANCHOR ONBOARD
5 /	5 /	5 /	5 /

Soak time = 3-11
Anchor to Anchor

START DEPTH	END DEPTH	AVERAGE DEPTH

HAULBACK
same as set
opposite of set

comments: please describe
whales? Y/N
sharks? Y/N
problems? Y/N

SUBSTRATE
Mud
Mud/gravel
Mud/clay
Mud/shell
Mud/soft
Mud/hard
Clay
Sand
Gravel
Boulder
Cobble
Rock
Hard
Soft
Shell
Coral
Mixed
Unknown

WIND DIRECTION AT HAUL
Calm, N,NE,E,SE,S,SW,W,NW

Substrate Historically:

WIND SPEED
0
0-5
5-15
15-25
25-35
35-45
45-55

Lat/Longs and Times
MUST BE COMPLETED
on this form for ALL stations,
in addition to capturing data
in ACES

ANCHOR

Bottom Profile (record depth at each skate)

Appendix C.–Daily log form.

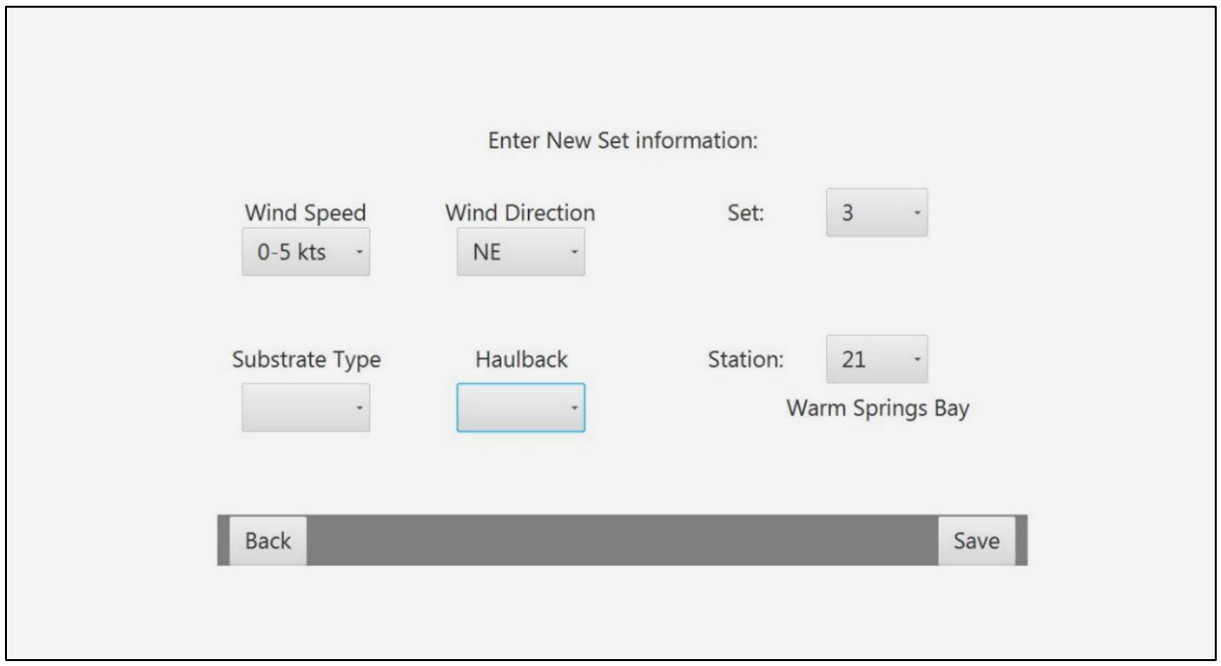
Vessel Information Form- Daily Log

Document pertinent information including problems encountered, factors on CPUE, events, skipper comments, ideas for the future, etc

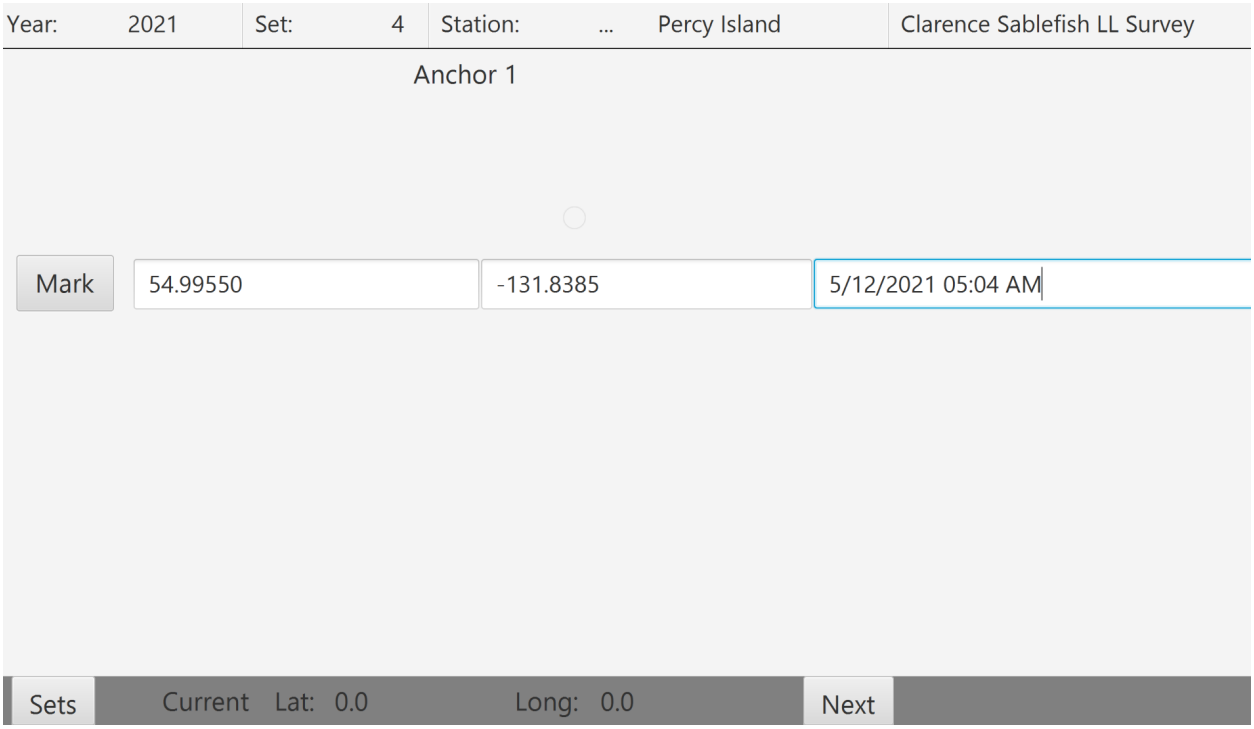
Year: _____ **Survey:** _____ **Trip #:** _____

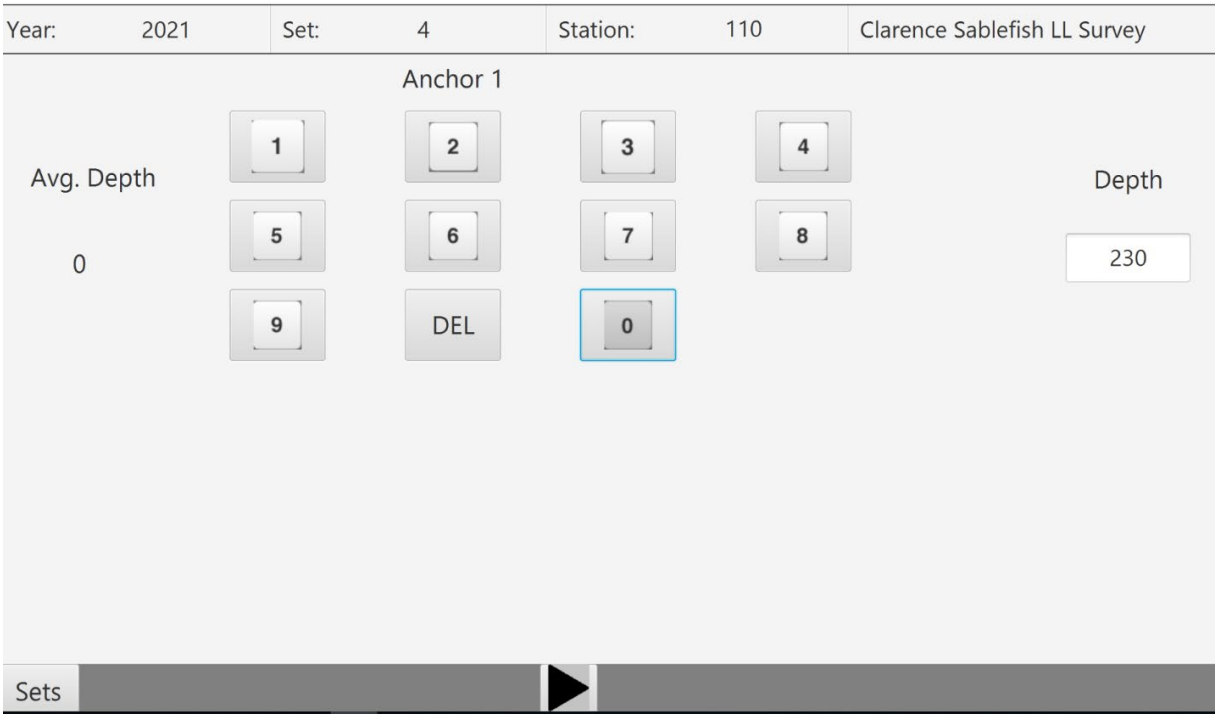
Appendix D.–At-Sea Electronic Sampling (ACES) main application screen.

Appendix E.–At-Sea Electronic Sampling (ACES) set information screen.

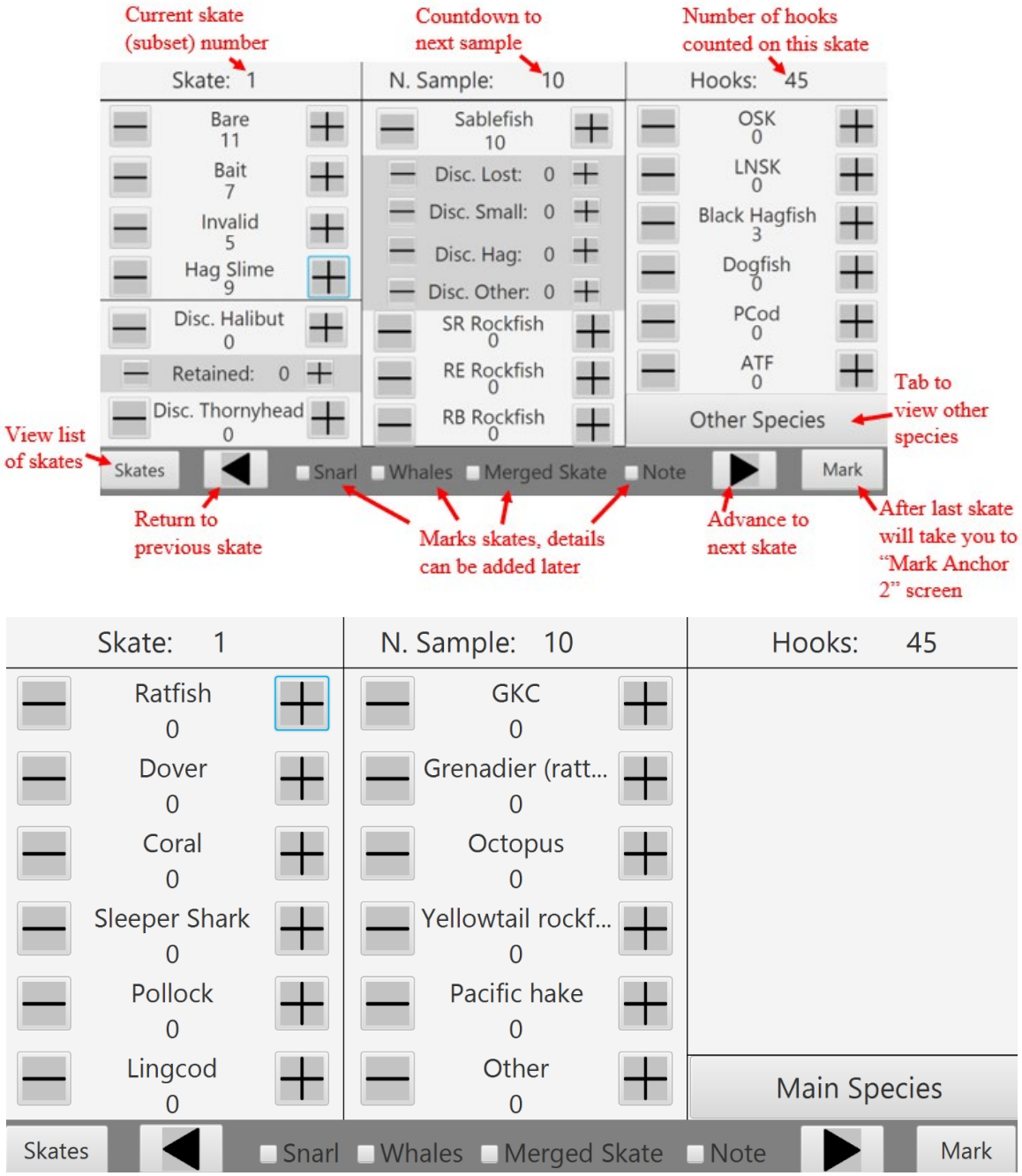


Appendix F.–At-Sea Electronic Sampling (ACES) coordinate and time screen, and ACES depth screen for the first anchor.

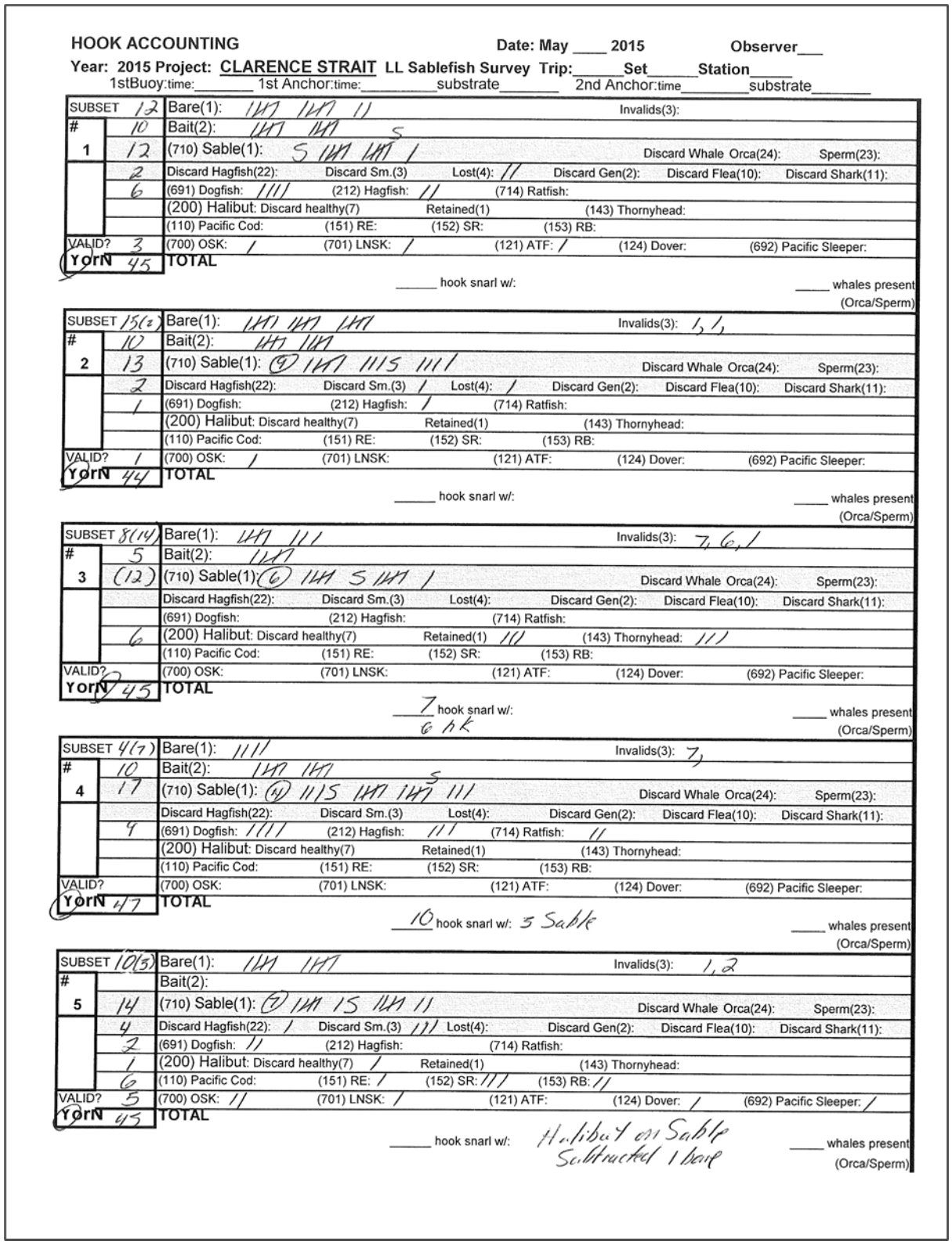




Appendix G.–At-Sea Electronic Sampling (ACES) hook accounting and species screens.



Appendix H.–Hook accounting paper form example.



HOOK ACCOUNTING Date: May ____ 2015 Observer___

Year: 2015 Project: CLARENCE STRAIT LL Sablefish Survey Trip:_____Set_____Station_____

1stBuoy:time:_____ 1st Anchor:time:_____substrate_____ 2nd Anchor:time_____substrate_____

SUBSET 12	Bare(1): 1111 1111 11						Invalids(3):		
# 10	Bait(2): 1111 1111 5								
1 12	(710) Sable(1): 5 1111 1111 1						Discard Whale Orca(24):		Sperm(23):
2	Discard Hagfish(22):	Discard Sm.(3)	Lost(4): 11	Discard Gen(2):	Discard Flea(10):	Discard Shark(11):			
6	(691) Dogfish: 1111	(212) Hagfish: 11	(714) Ratfish:						
	(200) Halibut: Discard healthy(7)	Retained(1)	(143) Thornyhead:						
	(110) Pacific Cod:	(151) RE:	(152) SR:	(153) RB:					
VALID? 3	(700) OSK: 1	(701) LNSK: 1	(121) ATF: 1	(124) Dover:	(692) Pacific Sleeper:				
Y or N 45	TOTAL								

_____ hook snarl w/: _____ whales present (Orca/Sperm)

SUBSET 15(2)	Bare(1): 1111 1111 1111						Invalids(3): 1, 1,		
# 10	Bait(2): 1111 1111								
2 13	(710) Sable(1): (9) 1111 1115 1111						Discard Whale Orca(24):		Sperm(23):
2	Discard Hagfish(22):	Discard Sm.(3) 1	Lost(4): 1	Discard Gen(2):	Discard Flea(10):	Discard Shark(11):			
1	(691) Dogfish:	(212) Hagfish: 1	(714) Ratfish:						
	(200) Halibut: Discard healthy(7)	Retained(1)	(143) Thornyhead:						
	(110) Pacific Cod:	(151) RE:	(152) SR:	(153) RB:					
VALID? 1	(700) OSK: 1	(701) LNSK:	(121) ATF:	(124) Dover:	(692) Pacific Sleeper:				
Y or N 44	TOTAL								

_____ hook snarl w/: _____ whales present (Orca/Sperm)

SUBSET 8(14)	Bare(1): 1111 111						Invalids(3): 7, 6, 1		
# 5	Bait(2): 1111								
3 (12)	(710) Sable(1): (6) 1111 5 1111 1						Discard Whale Orca(24):		Sperm(23):
	Discard Hagfish(22):	Discard Sm.(3)	Lost(4):	Discard Gen(2):	Discard Flea(10):	Discard Shark(11):			
	(691) Dogfish:	(212) Hagfish:	(714) Ratfish:						
6	(200) Halibut: Discard healthy(7)	Retained(1) 11	(143) Thornyhead: 111						
	(110) Pacific Cod:	(151) RE:	(152) SR:	(153) RB:					
VALID? 9	(700) OSK:	(701) LNSK:	(121) ATF:	(124) Dover:	(692) Pacific Sleeper:				
Y or N 45	TOTAL								

7 hook snarl w: 6 hk _____ whales present (Orca/Sperm)

SUBSET 4(7)	Bare(1): 1111						Invalids(3): 7,		
# 10	Bait(2): 1111 1111 5								
4 17	(710) Sable(1): (4) 1115 1111 1111 111						Discard Whale Orca(24):		Sperm(23):
	Discard Hagfish(22):	Discard Sm.(3)	Lost(4):	Discard Gen(2):	Discard Flea(10):	Discard Shark(11):			
9	(691) Dogfish: 1111	(212) Hagfish: 111	(714) Ratfish: 11						
	(200) Halibut: Discard healthy(7)	Retained(1)	(143) Thornyhead:						
	(110) Pacific Cod:	(151) RE:	(152) SR:	(153) RB:					
VALID?	(700) OSK:	(701) LNSK:	(121) ATF:	(124) Dover:	(692) Pacific Sleeper:				
Y or N 47	TOTAL								

10 hook snarl w: 3 Sable _____ whales present (Orca/Sperm)

SUBSET 10(5)	Bare(1): 1111 1111						Invalids(3): 1, 2		
#	Bait(2):								
5 14	(710) Sable(1): (7) 1111 15 1111 11						Discard Whale Orca(24):		Sperm(23):
4	Discard Hagfish(22): 1	Discard Sm.(3) 111	Lost(4):	Discard Gen(2):	Discard Flea(10):	Discard Shark(11):			
2	(691) Dogfish: 11	(212) Hagfish:	(714) Ratfish:						
1	(200) Halibut: Discard healthy(7) 1	Retained(1)	(143) Thornyhead:						
6	(110) Pacific Cod:	(151) RE: 1	(152) SR: 111	(153) RB: 11					
VALID? 5	(700) OSK: 11	(701) LNSK: 1	(121) ATF:	(124) Dover: 1	(692) Pacific Sleeper: 1				
Y or N 45	TOTAL								

_____ hook snarl w: Halibut on Sable Subtracted 1 bait _____ whales present (Orca/Sperm)

Appendix I.–Hook conditions and dispositions assigned as the hook breaks the water surface.

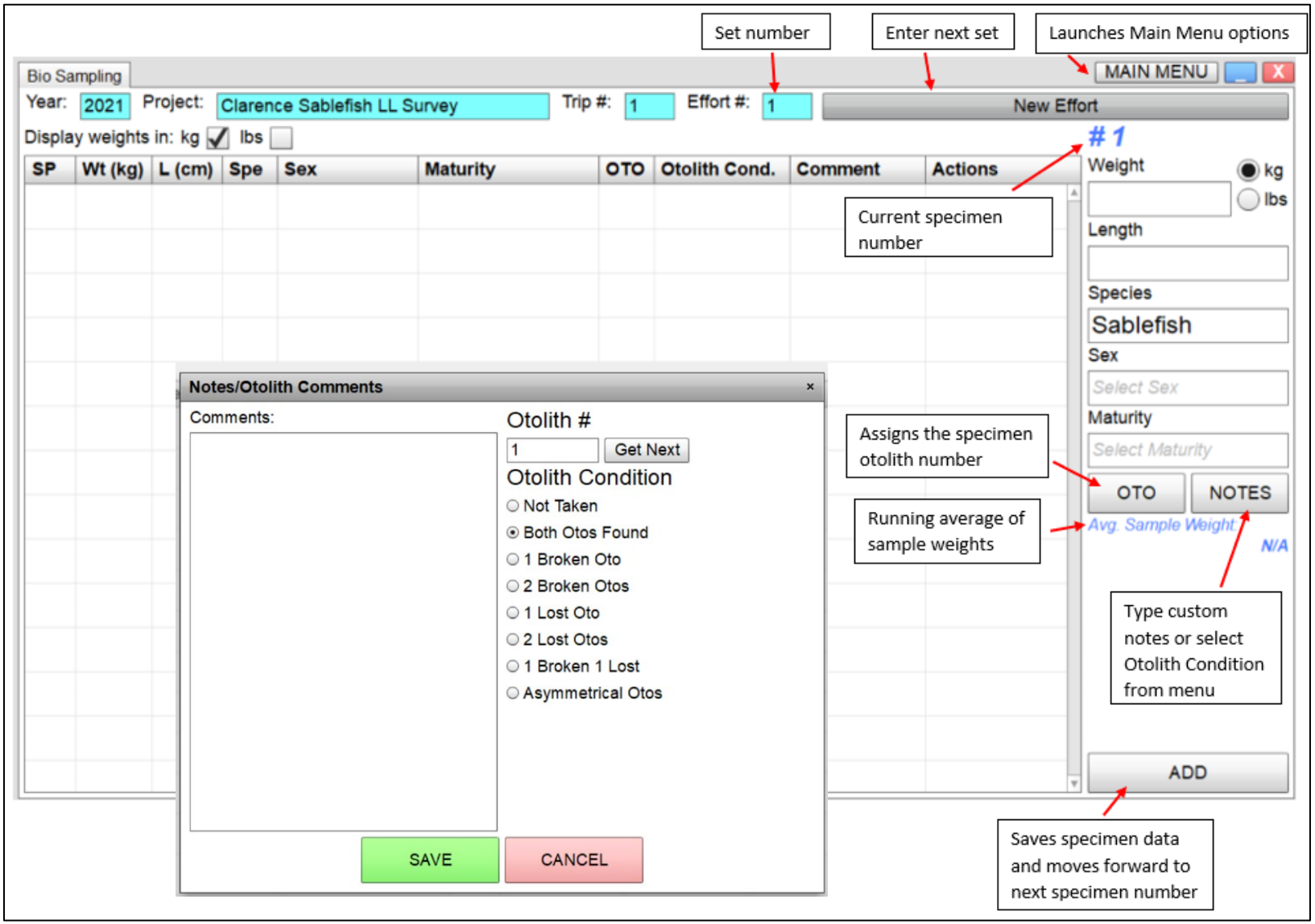
HOOK CONDITION	DESCRIPTION
Bare	a clean bare hook that appears to be in good condition
Bait	bait is attached to a hook
Invalid	hook that is bent or hooked to another hook, or within a snarl of other hooks, or is missing as the gangion breaks the surface; hook with kelp, rock, stick, shell, old longline gear, or other debris
Hag slime	hook with any sign of hagfish slime
Halibut	hook with a halibut attached
Discard	hook with a halibut discarded
Retained	hook with a halibut retained
Discard thornyhead	hook with a thornyhead discarded
Sablefish	hook with a sablefish attached and fish is landed on deck and retained
Discard Lost	hook with a sablefish and fish escapes before being landed on deck
Discard Small	hook with a sablefish attached less than 45 cm (18 in); gently discarded at sea
Discard Hagfish	hook with a sablefish attached but too damaged to be marketable; discarded at sea
Discard Other	hook with a sablefish attached but not marketable (e.g., fish wrapped or cut in half by groundline, damaged by fleas, whales, or another scenario that made the fish unmarketable); discarded at sea Note: during data verification, edit to the appropriate discard status
Shortraker (SR)	hook with a shortraker rockfish
Rougheye (RE)	hook with a rougheye rockfish
Redbanded (RB)	hook with a redbanded rockfish
Longnose skate (LNSK)	hook with a longnose skate
Other skate (OSK)	hook with a different skate species (not longnose)
Black hagfish	hook with a black hagfish
Dogfish	hook with a dogfish
Pacific cod (Pcod)	hook with a Pacific cod
Arrowtooth flounder (ATF)	hook with an arrowtooth flounder
Other species	hook with a species on the Other Species tab in ACES
Ratfish	hook with a ratfish
Dover	hook with a dover
Coral	a hook returning with a coral attached Note: during data finalization, edit to appropriate coral: red tree or general coral
Sleeper shark	hook with a Pacific sleeper shark
Pollock	hook with a pollock
Lingcod	hook with a lingcod
Golden king crab	hook with a golden king crab
Grenadier	hook with a grenadier
Octopus	hook with an octopus
Yellowtail	hook with a yellowtail
Pacific hake	hook with a pacific hake
Other fish/crab	hook with any other species of fish or crab

Appendix J.–Vessel summary form.

Year____ Vessel_____ Trip ___ Clarence Longline Survey - Vessel Summary Form

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Date	Sta #	Set	Smalls, Lost & discards. & (discard only)	Invalid sablefish (from invalid skates only)	Total sablefish for cpue (includes smalls, lost and discards but not invalids)	Total hooks for cpue: use 45 hooks X number of valid skates (1125 hks if all subsets valid)	CPUE fish/hook (F/G)	CPUE fish/hook **last year**	Number of sablefish on board (includes invalids but not small, lost or discards) (F-D)+E	Avg kg	Avg rnd lbs (K*2.2)	Avg rnd lbs **last year**	Total rnd lbs for set (J*L)	Cumulative rnd lbs on board	Rnd lbs discarded ((D)*L)	Stat area
			( )													
			( )													
			( )													
			( )													
			( )													
			( )													
			( )													
			( )													
	Date of Landing				Landed weight				Statarea %							

Appendix K.–Annotated main screen for Groundfish at-sea survey sampling application and notes/otolith comments pop-up menu.



Appendix L.–Sablefish biological data collection form.

BIOLOGICAL DATA COLLECTION FORM

SABLEFISH SAMPLING Date: May ______ 2014 Set_____ Station______

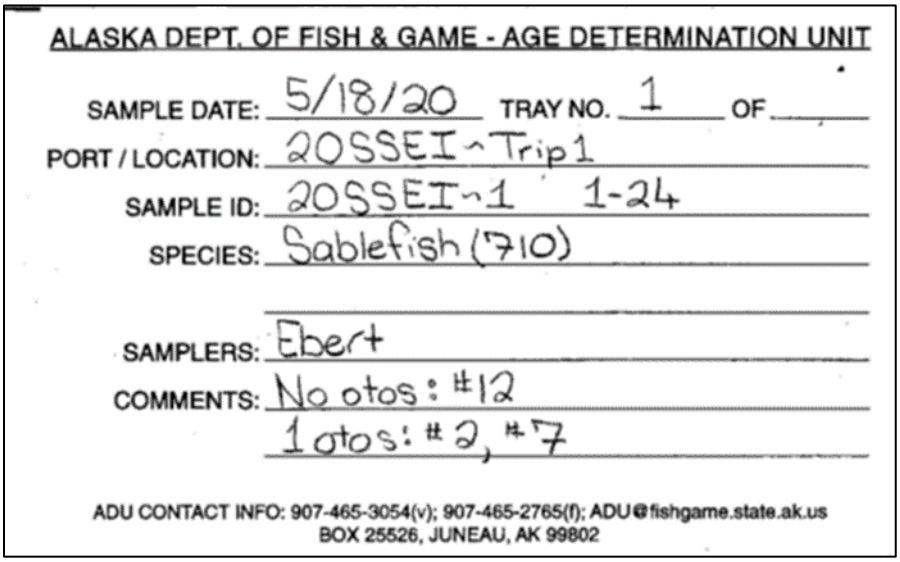
YEAR: 2014 PROJECT: Clarence Strait Sablefish Survey TRIP NO.:_____

Sablefish are to be recorded on one series of pages, all rockfish will be together on a seperate series.
Sablefish Oto # begins with 1 and continues sequentially for the entire trip.
Enter Oto number in Alex comment column as "oto001;" format
** Each **set** starts with Alex (specimen) # 1 and is numbered consecutively including all species for that set.

Alex #	Species	nearest 10 mm LENGTH-MM	tenths WT-KGS	SEX	MAT	Oto #	AGE	RI	COMMENTS	Alex #	sable lengths
	710		.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								
			.								

Sampler________________ Recorder______________

Appendix M.–Example of 24-cell sablefish otolith tray label (front and back) and information written on front of completed 24-cell sablefish otolith tray.


ALASKA DEPT. OF FISH & GAME - AGE DETERMINATION UNIT

SAMPLE DATE: 5/18/20 TRAY NO. 1 OF ____

PORT / LOCATION: 20SSEI ~ Trip 1

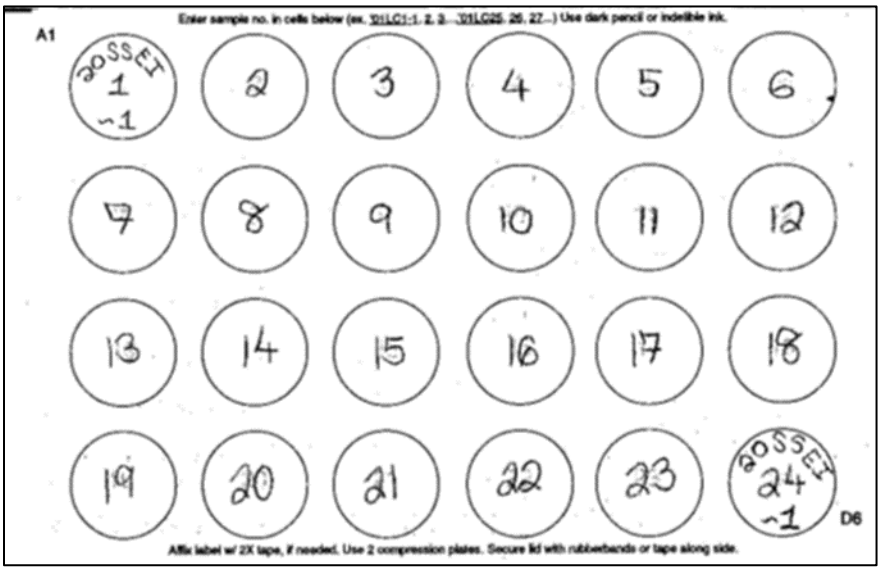
SAMPLE ID: 20SSEI ~ 1 1-24

SPECIES: Sablefish (710)

SAMPLERS: Ebert

COMMENTS: No otos: #12
1 otos: #2, #7

ADU CONTACT INFO: 907-465-3054(v); 907-465-2765(f); ADU@fishgame.state.ak.us
BOX 25526, JUNEAU, AK 99802



SSEI TRIP # _____

Specimen otolith # range (1-24)_____

Case #1 of____

(fill in end of survey when total known)

Appendix N.–Deck tag recovery form.

Deck Tag Recovery Form - SSEI Longline Survey

YEAR:_____ **TRIP:_____**

Tag #	Set #	Length-cm	Weight-kg	Sex	Maturity	Agency

Appendix O.–Survey tag recovery form.

ADFG Survey Tag Recovery Form

for use only for tags with logbook trip number and set number

F/V :_____ **Logbook(Trip) #**_____ **Date of Landing:** _____**yr**____

Species_____ **Set Number** _____ **Port of landing**_____

Attach tags here
(so tag numbers are visible)

Tag Number_____ **Size**_____**cm rnd**
Tag Number_____ **Size**_____**cm rnd**
Tag Number_____ **Size**_____**cm rnd**
Tag Number_____ **Size**_____**cm rnd**
Tag Number_____ **Size**_____**cm rnd**

measured by staff_____

Data entered (date)_____ **Recovery Info: survey** **Tag turned in by: survey**

Sampler_____
Please put your name in here if you are the one filling in this form

Return to: ADFG; 304 Lake St., Room 103; Sitka AK 99835
revised 05/04/05

Appendix P.–Vessel safety checklist form.

Vessel Safety Checklist

(Must be completed and signed **prior** to departure. Statements in **RED** are no-go items. If these cannot be answered with a "Yes" or fixed prior to start of survey the vessel may not depart!)

Prior to the departure of the _____ (YYYY) SSEI/NSEI longline survey (Circle One) the ADF&G science crew (_____ and _____) met with _____ (vessel captain) to discuss vessel safety procedures and equipment. This meeting took place onboard the FV _____ at _____, _____ (Time and Date). During this meeting we saw and discussed:

1) The USCG Commercial Fishing Safety Decal (typically located on window of wheelhouse). We verified that this sticker is valid through the end of this survey **(Yes) (No)**

2) The life raft is located in a float-free location. The life raft has sufficient capacity for everyone who will be on board during this survey **(Yes) (No)**

3) The Hydrostatic Release on the life raft is correctly set up (see diagram on back) and the hydrostatic release expiration date is valid through survey **(Yes) (No)**

4) The EPIRB on this vessel was located and is:
   Located in a float-free location **(Yes) (No)**

   Hydrostatic release expiration date is valid through survey **(Yes) (No)**

   Battery and NOAA Registration sticker are valid through survey **(Yes) (No)**

5) There are sufficient immersion suits onboard for all crew. Both members of the science crew have their own and know where these will be stowed **(Yes) (No)**

6) During this safety check we have:

- ❑ Seen the location of radios and discussed emergency call procedures (these are posted)
- ❑ Discussed emergency alarms and procedures (duties, muster station, etc.)
- ❑ Seen the location of fire extinguishers, especially those near high-risk areas
- ❑ Know the location of primary and secondary first aid kits
- ❑ Seen station bill and have discussed our duties, if any, during the listed emergencies
- ❑ Seen location of vessel flares and have discussed which types are available

7) We have also discussed:

- ❑ The expected workflow and safe areas for us to be on deck
- ❑ Our mandatory daily check-in procedures with home port
- ❑ Verified, if needed, any allergies, potential medical conditions or dietary requirements of science crew
- ❑ Where our sampling gear, including raingear, should be stowed to be both accessible to us but not infringing upon crew space
- ❑ Where we can safely plug in and charge our electronics, both during the day and overnight

As the science crew onboard this vessel for the _____ (YYYY) SSEI/NSEI longline survey (Circle One) we certify that we participated in the above safety check in person and that the above checked statements are true to the best of our knowledge (sign and date).

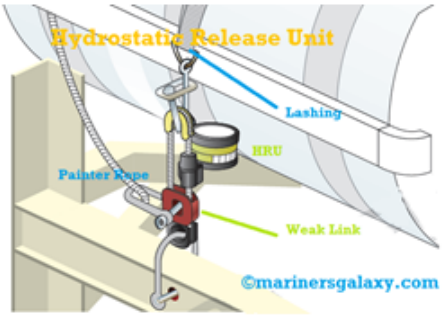
_____ (Lead) _____ (Crew)

-continued-

Commercial Fishing Vessel Safety Examination – Sticker typically located on window of wheelhouse. Verify that expiration date is after survey dates.

EPIRB – Needs to be located in a float-free location. Check registration, expiration dates on hydrostatic release, and battery. Verify that expiration dates are after survey dates.

Examples of life rafts – need to be in float-free locations. Check capacity (large enough for all personnel onboard). Check expiration dates – verify that these are after survey dates.



Setup of hydrostatic release for life raft. Verify that this is correctly assembled. Verify that expiration dates are after survey dates.

Fire extinguishers – there need to be fire extinguishers in all hazard areas on board. This includes the galley, entry to engine room, outside crew quarters, and wheelhouse.

Example of Station Bill – This should include crew duties during major emergencies; Abandon ship, Fire, Man Overboard

Appendix Q.–Vessel diagram form.

Vessel Diagram

At beginning of survey please make a sketch of working area of boat. Try to include locations for setting and hauling, area where hook accounting and biological sampling staff will typically stand, identify crew work areas, roller, block, direction of line, checker bins, and identify hazard areas.

Vessel Name: _____

Scientific Staff:_____ (Lead)

Scientific Staff:_____ (Crew)