Summary of the 2022 British Columbia Sablefish (*Anoplopoma fimbria*) trap survey, October 3–November 19, 2022

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SUMMARY OF THE 2022 BRITISH COLUMBIA SABLEFISH (*ANOPLOPOMA FIMBRIA*) TRAP SURVEY, OCTOBER 3–NOVEMBER 19, 2022

by

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ABSTRACT

Hardy, S.M., Lacko, L.C. and Holt, K.R. 2024. Summary of the 2022 British Columbia Sablefish (*Anoplopoma fimbria*) trap survey, October 3–November 19, 2022. Can. Tech. Rep. Fish. Aquat. Sci. 3625: vii + 55 p.

The 2022 British Columbia Sablefish trap survey methodologies and findings are detailed in this technical report. This coastal survey was comprised of stratified random survey sets (StRS) in five depth-stratified areas and standardized sets in a mainland inlet locality. Six sets were specifically allocated for benthic contact research, equipped with three deep-water autonomous cameras mounted on a 60-trap string. Biological sampling was carried out for Sablefish and incidentally captured Shortraker Rockfish, Yelloweye Rockfish, and Rougheye/Blackspotted Rockfish. Sablefish were randomly sampled from every third trap on all sets. The tag and release study conducted annually since 1991 was continued in 2022.

In 2022, a total of 45,500 Sablefish were captured on StRS sets. Out of these fish, 4,299 were selected for biological sampling, while 8,698 were tagged and released. Weather conditions limited the survey to 86 of the 91 planned StRS blocks and 5 of the 20 mainland inlet sites. To assess trends over time, survey catch per unit effort (CPUE) and biological data are compared to previous years. The Sablefish stratified random survey (StRS) biomass index in 2022 increased by 10% compared to 2021, marking the second-highest index value since the survey's inception in 2003.

RÉSUMÉ

Hardy, S.M., Lacko, L.C. and Holt, K.R. 2024. Summary of the 2022 British Columbia Sablefish (*Anoplopoma fimbria*) trap survey, October 3–November 19, 2022. Can. Tech. Rep. Fish. Aquat. Sci. 3625: vii + 55 p.

Les méthodologies et les résultats du relevé au casier de la morue charbonnière de la Colombie-Britannique en 2022 sont détaillés dans ce rapport technique. Ce relevé côtier comprenait des traits ayant fait l'objet d'un échantillonnage aléatoire stratifié qui ont été effectués dans cinq zones stratifiées en fonction de la profondeur et des traits habituels réalisés dans un emplacement des bras de mer continentaux. Six traits ont été précisément consacrés à la recherche de fond benthique, menée au moyen de trois caméras autonomes en eau profonde montées sur une ligne de 60 pièges. On a effectué un échantillonnage biologique pour la morue charbonnière et les espèces capturées accidentellement, soit le sébaste boréal, le sébaste aux yeux jaunes, le sébaste à œil épineux et le sébaste à taches noires. On a échantillonné les morues charbonnières capturées de façon aléatoire à partir du troisième casier de chaque trait. L'étude de marquage et de remise à l'eau menée annuellement depuis 1991 s'est poursuivie en 2022.

En 2022, un total de 45 500 morues charbonnières ont été capturées au moyen de traits ayant fait l'objet d'un échantillonnage aléatoire stratifié. Parmi celles-ci, 4 299 poissons ont été utilisées pour le prélèvement d'échantillons biologiques, tandis que 8 698 ont été marquées et remises à l'eau. En raison des conditions météorologiques, 86 des 91 blocs d'échantillonnage aléatoire stratifié et 5 des 20 bras de mer continentaux ont fait l'objet d'un échantillonnage. Pour évaluer les tendances au fil du temps, les captures par unité d'effort (CPUE) et les données biologiques sont comparées à celles des années précédentes. L'indice de la biomasse du relevé aléatoire stratifié de la morue charbonnière a augmenté de 10 % en 2022 par rapport à 2021, ce qui représente la deuxième valeur d'indice la plus élevée depuis le début du relevé en 2003.

1 Introduction

Fishery-independent Sablefish surveys, using longline trap gear, have been conducted along the B.C. continental shelf by Fisheries and Oceans Canada (DFO) in collaboration with the Canadian Sablefish Association (CSA) since 1988. Survey practices have evolved over the years. The current method of using stratified random survey (StRS) sets within five spatial areas has been in place since 2003, and standardized fishing sets at mainland inlet locations have been employed since 1994.

The stratified random survey (StRS) has been utilized for a range of objectives, including collecting catch and effort data, gathering biological samples, capturing oceanographic measurements, recording video imagery of gear benthic contact (2013–2017, 2021 and 2022), and acquiring tag release and recapture data. These datasets serve as a fishery-independent source for assessing the biological status of the Sablefish stock and evaluating the effectiveness of coastal management tools, as discussed in Johnson et al. (In prep.).

Benthic contact data, including videos, are being used for a project led by the Canadian Sablefish Association and funded by the British Columbia Salmon Restoration and Innovation Fund (BCSRIF) aimed at developing evaluation methods for benthic-contact fisheries with assessments of sensitive habitats.

2 Methods

2.1 SURVEY DESIGN

The 2022 Sablefish survey design followed pre-existing survey protocols, combining a Randomized Survey component with an Inlet Survey component. Furthermore, additional survey sets were designated for a benthic contact video component. The methods for these elements are outlined in Sections 2.1.1, 2.1.2, and 2.1.3, respectively.

2.1.1 STRATIFIED RANDOM SAMPLING SURVEY COMPONENT

Since 2003, the StRS survey area has been divided into five spatial strata (S_1 to S_5) and three depth strata (RD_1 to RD_3). Each of these 15 strata are divided into two by two kilometer grid cells, known as ‘fishing blocks’, from which specific locations are randomly selected for a survey in a given year. The target number of blocks and allocation for all strata combined for the 2022 survey was 91 (Table 1). Historical information and rationale on the previous year’s block target numbers can be found in the technical report by Lacko et al. (2023).

2.1.2 INLET SURVEY COMPONENT

Under the inlet survey design, five sets were allocated to five specific polygons in each of the following four areas: Portland Inlet, Gil Island, Finlayson Channel, and Dean/Burke Channel (Figure 1). In 2022, only Finlayson Channel Inlet locality was fished due to time restraints arising from poor weather conditions.

2.1.3 BENTHIC CONTACT VIDEO COMPONENT (TRAPCAM)

Video research was conducted during Sablefish surveys from 2013 to 2017. During these years, cameras were placed on 25-trap strings used for StRS survey sets. In 2021 and 2022, the benthic contact research study was expanded to also include up to 15 experimental camera sets with 60-trap strings, with five sets in each of the three depth strata. The objectives of the benthic contact video component were as follows:

1. To validate estimates of gear movement using the algorithm developed from 25-trap strings of Sablefish gear;
2. To estimate benthic contact and gear movement from 60-trap strings in B.C. coastal fishing grounds by collecting movement data near the ends and middle of the string.

To support the first research objective, data were collected by deploying trap cameras on selected sets from the StRS design component. The target was to have a total of 25 StRS sets with cameras, with five sets in each of the five spatial strata (Table 2). While there were no specific requirements for deploying the camera package on particular StRS sets, efforts were made to coincide with days when 60-trap experimental gear movement sets were conducted, as described below, deploying cameras within the same depth range. On days without experimental gear movement sets, attempts were made to distribute the cameras across different depth strata.

Data to support the second research objective were acquired through the deployment of dedicated sets designed to replicate commercial fishing arrangements, each comprised of 60 traps on a single string. The locations for these sets were selected by the Fishing Master and scheduled on days that would not interfere with StRS survey operations during trap deployment and retrieval. A key requirement was that experimental sets be positioned at a minimum distance of one nautical mile from any survey blocks not yet subjected to fishing and not intended for abundance indexing purposes.

No species captured in the benthic contact research sets underwent sampling, except in cases involving Sablefish tag recoveries, which were retained for biological sampling.

2.2 GHNMCA AND HAIDA HERITAGE SITE

The Archipelago Management Board (AMB) of the Gwaii Haanas National Marine Conservation Area Reserve (GHNMCA) granted approval for the Sablefish survey to operate within the multi-use protection zones of the reserve from 2021 to 2023. The Gwaii Haanas Gina 'Waadluxan KilGuhlGa Land-Sea-People Management Plan is located at https://parks.canada.ca/pn-np/bc/gwaiihaanas/info/consultations/gestion-management-2018. If any of the randomly selected survey blocks landed within strict protection zones during the selection process, they were replaced with alternate blocks outside the strict zone. In 2022, three blocks fell within the strict protection zone in the original allocation.

2.3 VESSEL

The 2022 survey of 91 fishing sets and six benthic contact research sets were chartered aboard the fishing vessel (F/V) *Pacific Viking* (Figure 2), skippered by Albert (Deacon) Melnychuk between October 3–November 19, 2022 (Appendix A). Further information about the vessel can be found at http://marinetraffic.com.

2.4 FISHING GEAR

The longline trap gear for StRS and inlet sets consisted of a groundline resting on the ocean floor with 25 baited traps attached to beckets at 150 foot intervals along its length and 90 pound anchors at each end. A flagpole was required for at least one end of the set to improve visibility for retrieval. The traps were steel frame with a benthic hoop diameter of 54 inches and covered with an North American #84 black braided nylon web of 2.75 inch mesh. Figures of the gear are found in the 2021 survey report (Lacko et al. 2023).

The tunnels were made of green braided, knotless, 1.25 inch mesh. The traps did not include escape rings, however, a 'rot panel' of # 21 cotton was added above the middle ring. Standard bait bags (6 by 12 inches) made of 1/8 inch web with a nylon drawstring and #7 stainless trolling snaps were included with the traps. The traps and bait bags were purchased by the Canadian Sablefish Association.

At the beginning of each survey leg, the Chief Scientist works with the vessel crew and science staff to ensure the squid bait is cut into 2 lb (0.91 kg) blocks and the hake blocks are broken into 10 lb (4.54 kg) sections. The weights are confirmed with using the haul card scale.

2.5 FISHING OPERATIONS

In the course of routine survey fishing operations, fishing gear was deployed on alternate days. Before gear deployment, the Fishing Master conducted an inspection of the block to assess its fishability and ensure it fell within the targeted depth range. The objective was to maximize the presence of gear within the boundaries of the block. In cases where the block was deemed unfishable, a neighboring block was selected as a replacement, with preference given to blocks to the east or west of the original block. If such blocks did not meet the criteria, alternatives to the north or south were considered. If none of these nearby blocks met the required conditions, an alternate block within the same area and depth stratum was randomly chosen.

Two science staff members were responsible for recording information related to gear deployment. One science member was situated in the wheelhouse and entered data into the Electronic Data Acquisition System (EDAS) GFBioField Bridge Log form, as referenced in (Olsen 2010). This Bridge Log form comprised nine distinct sections (Header, Fishing, Spatial, Gear Specs, Depths, Environment, Comment, Usability, Finish), in which crucial survey set details were documented.

EDAS collected National Marine Electronics Association (NMEA)-formatted data from the global positioning system (GPS) and depth sounder, which were subsequently reviewed within the NMEA attributes plot series section available on the Bridge Log form. For more information regarding the electronic input of the EDAS GFBioField forms mentioned in this document, please refer to the GFBio Field User Guide 2022, which can be obtained upon request.

A fishing set paper log was completed on the back deck by the science staff member with the best view of the crew setting the traps along the stern rail. This log included details such as the deployment time, the identification of the first and last buoys, the times when the first and last traps were deployed, a count of beckets and traps, and information about the data recorders deployed (including which trap they were placed in and their unique identifying numbers). An example of a set log can be found in the 2021 survey report by (Lacko et al. 2023). Additionally, the science staff member on the back deck ensured that each deployed trap was correctly baited and undamaged.

2.5.1 Stratified Random Survey Component (StRS)

Sets in StRS blocks had a targeted soak time of 24 hours +/- 2 hours. Fishing sets were designated useable if hauled between 22 and 26 hours. Traps were baited with 4.5 kg of loose offshore Pacific Hake (*Merluccius productus*) and 0.9 kg of bagged squid.

2.5.2 Inlet Component

Fishing sets in inlet localities had a targeted soak time of 18 hours +/- 2 hours. These sets were designated useable if hauled between 16 and 20 hours, compatible with the historic inlet survey protocols. As with previous surveys, traps were baited with 0.9 kg of bagged squid.

2.5.3 Benthic Contact Video Component

2.5.3.1 25-Trap Strings

For the subset of StRS sets selected for gear movement research, TRAPCAM and associated equipment (Section 2.10.1) were placed in an open, unbaited trap positioned in the middle (trap 13) of a 25-trap string of gear. On these sets, the total number of traps is increased to 26 so that the remaining 25 traps were fished as part of the StRS design.

2.5.3.2 60-Trap Strings (Experimental gear movement)

These sets were intended to replicate commercial fishing practices, and as such, closed traps were baited at the discretion of the Fishing Master as per commercial fishing practices. Soak time was also at the discretion of the Fishing Master, with gear deployed and retrieved at times convenient to other operations. Trap cameras were deployed in open, unbaited traps located at positions 5, 35, and 55 on the 60-trap string.

2.6 CATCH PROCESSING

The Skipper modified haulback speed as needed, to allow the science crew to accurately record catch as each trap came on board. Two science staff were positioned on deck at the haul card station; one recorded the catch and the other managed the movement of baskets.

First, the catch recorder entered set details into the EDAS GFBioField Bridge Log, including the buoy number and retrieval time of the first buoy picked up. The first and last trap retrieval times, along with the trap number containing the data recorder, were automatically populated from the GFBioField Trap Catch Form. The haul start and end times were also automatically populated from the GFBioField Trap Catch Form when the first and last trap times were recorded.

As the groundline was hauled, each becket and trap was entered in the EDAS GFBioField Trap Catch form which is accessed via the EDAS GFBioField Haul Card form. Crew members alerted the recorder about any damage or irregularity to a trap, which was then recorded in the EDAS GFBioField Trap Usability form.

For each trap, the crew sorted catch by species, and counted the catch into baskets. Catch counts for each basket of fish were recorded, and weighed to the nearest 0.2 kg on a motion compensating scale. Each basket was given a basket use code of D, A, T, SD and/or F. Code D designated fish species as discards or commercial catch; code A allocated fish to age samples; code T allocated Sablefish to be tagged and released; code SD identified sublegal Sablefish discards; and code F represented fish frames with amphipod or hagfish damage.

2.6.1 Sablefish Allocation Details

Prior to 2018, Sablefish were tagged from 1/3 of the traps on StRS sets and 1/2 of the traps on the inlet sets. Due to high catch numbers, the survey protocol was revised in 2018 to designate up to 125 Sablefish to be tagged from 1/3 of the traps on all sets. The established protocol was continued in 2022. When catches were high, traps targeted for tagging were spread throughout the string to avoid tagging the first 125 fish.

Traps were selected for biological sampling with the goal of selecting 50 to 60 fish per set. If CPUE was high, the new survey protocol of 2018 required that a minimum of two traps be used for samples. If the two traps contained more than 60 Sablefish total, then 50-60 specimens were randomly selected from the sample. If catch rates were low, a sufficient number of traps not designated for tagging, were kept for sampling, to ensure that the biosample contained 50-60 pieces.

The remaining traps were allocated to the discard category and sorted by size into either legal discards or sublegal discards. The sublegal discards code was added during the 2017 survey to account for the large numbers of juvenile Sablefish that were encountered, and to facilitate their quick return to the ocean. Legal discards of Sablefish were kept by the vessel and processed as commercial catch.

For the Amphipod damaged fish, the frames were put in a separate basket and both a weight and a count were recorded.

2.7 BIOLOGICAL SAMPLING (LWSMO)

Biological samples were collected from Sablefish and incidentally captured Shortraker Rockfish, Yelloweye Rockfish, and Rougheye/Blackspotted Rockfish on the EDAS GFBioField Fish Recording form. Measurements were electronically recorded for fork length (L), body weight (W), sex (S) and maturity level (M). Sagittal otoliths (O) were collected and stored for potential ageing by the Sclerochronology Laboratory located at the Pacific Biological Station in Nanaimo, B.C. In 2022, Shortraker Rockfish, Yelloweye Rockfish, and Rougheye/Blackspotted Rockfish were sampled for LWSMO (up to 25 pieces/set). Tissue samples (fin clips in vials containing 95% ethanol) for DNA extraction were collected from Yelloweye Rockfish and Rougheye/Blackspotted Rockfish.

On Groundfish surveys, fin clips are routinely collected from the Rougheye/Blackspotted Rockfish complex for later species confirmation using genetic methods. Since this complex of two distinct species (Orr and Wildes 2008) have similar appearances with slight variations in colour markings and dorsal fin rays, the sampler visually identifed each specimen as either a Rougheye, a Blackspotted or a hybrid species.

All rockfish and legal-sized Sablefish (fork length > 55 cm) that were sacrificed for biological samples were dressed, frozen, and landed as commercial catch.

2.8 SABLEFISH TAGGING

Fish destined to be tagged were transferred from the sorting area to a tagging tank. A vessel crew member was positioned to retrieve Sablefish from the tank and provide assistance with fish handling. A science member stood at the sample station and tagged fish with a Mark II Long Tagging gun loaded with Floy FD-94 T-bar anchor tags. The tag was inserted on the left side of the fish, 1 cm below and 2-3 cm behind the anterior insertion of the first dorsal fin. Fork length measurements (mm to the nearest ½ cm) taken on the Scantrol measuring board were electronically transferred to the EDAS GFBioField Fish Recording form (Olsen 2010). Before release, any sampling errors, injuries or damage to the fish were documented on the Fish Recording form by a second science member who was stationed at the sample computer. Tag checks were performed systematically to ensure tag numbers on the data form matched those on the fish specimen.

Water temperature in the tagging tank was measured at one minute intervals by a standard oceanographic temperature-depth recorder (TDR), which was installed in the tank during the haul.

2.9 SABLEFISH TAG RECOVERY

Any previously tagged fish brought aboard were handled in one of two ways. First, Sablefish with Canadian tags were re-released after affixing a new tag, and documenting any wounds from the old tag. Second, Sablefish with foreign agency tags or those that had sustained multiple injuries were retained for biological sampling. For these specimens, the tag and otoliths were stored in a bar-coded vial, which was later scanned into the EDAS GFBioField Tag Recovery Entry form by DFO staff (Olsen 2010). The department subsequently returns any foreign tags to their country of origin.

2.10 CAMERA AND OCEANOGRAPHIC SENSOR DATA COLLECTION

2.10.1 25-TRAP STRINGS (26-TRAPS WITH TRAPCAM)

For StRS sets used in gear movement research, an open, unbaited trap equipped with a deep-water autonomous camera (TRAPCAM), a standard oceanographic temperature-depth recorder (TDR), and an Actigraph xGT3X-BT accelerometer (AXL) was added to the middle of a 25-trap string of gear.

The TRAPCAM system comprised a pressure housing with high-intensity LEDs for illumination and a GoPro camera for capturing image data. Both components were controlled by a microcontroller, which also featured an onboard accelerometer and depth recorder. The camera unit was programmed with a time delay option (for 24 hour soaks, a 21.5 hour start time delay was used) and a trigger depth of 46 meters, and once those parameters were met it would record video only when triggered by movement. It was securely placed in a bracket and mounted inside the top of the trap, with the camera lens facing out of the tunnel. After the data were downloaded, video footage was synchronized with the accelerometer measurements using specialized software developed by Nuytco Research Ltd. for this purpose.

The TDRs were housed in a PVC enclosure and attached to the inside of the trap using carabiners. They were programmed to record temperature and depth (pressure) at 3-second intervals when deployed with a camera or accelerometer, and at 60-second intervals when deployed alone.

Accelerometers were programmed to record movement at 100 Hz and were housed in a pressure enclosure, which was then secured to a bracket. This bracket was subsequently bolted to the top of the trap frame. An additional accelerometer was affixed to the rail next to the trap hauler to provide information about vessel movement during hauling.

A specific number of sets were designated for camera trap deployments in each of the fifteen StRS area-depth strata (Table 2). Data from the TDR loggers were processed after completing the set using tools available on the GFBioField Upload Sensor Data form to prepare it for uploading to the Pacific Biological Station Groundfish database (GFBio).

2.10.2 60-TRAP STRINGS (EXPERIMENTAL GEAR MOVEMENT)

To quantify the movement of trap gear on the seafloor, which is a common occurrence in the commercial Sablefish fishery in B.C., a total of six 60-trap strings were deployed. On each string, three traps were fitted with electronic gear strategically positioned at the beginning, middle, and end of the gear string (Table 3). The traps equipped with electronic equipment were sealed with a full cape and tunnel and were devoid of any bait. The details of the digital instrumentation included:

- A deep-water autonomous camera (TRAPCAM) that captures motion-activated and fixed-interval high definition video;
- A standard oceanographic temperature-depth recorder (TDR) that records in-situ depth and temperature data;
- A tri-axial accelerometer (AXL) that tracks quasi-continuous 3-axis motion and orientation of a trap.

Just like the 25-trap strings, an AXL was attached to the rail beside the trap hauler to collect information about vessel movement during hauling.

2.11 F/V PACIFIC VIKING 2022 GFSURVEYS NETWORK CONFIGURATION

In 2022, the EDAS was integrated into the F/V *Pacific Viking* network. The configuration details of the GFSurveys network, including devices and connection types, can be found in Appendix B. This network incorporates a variety of hardware components, encompassing rugged laptops, motion-compensated marine scales, electronic fish measuring boards, headphones, webcams, barcode scanners, printers, network devices, and backup devices. The software is primarily built around the GFBioField SQL Server database, with a Microsoft Access front-end. Hardware components are linked through a local area network facilitated by a router, utilizing either a hardwired ethernet connection or wireless connectivity. The electronics set up on the bridge in 2022 included a network switch connected to:

- The Chief Scientist's laptop, utilized for recording bridge log data through the GFBioField Microsoft Access front end;
- An internet protocol (IP) camera power injector, linked via an ethernet cable to the IP camera positioned on a post above the haul card station. The IP camera was employed to capture photographs of each basket weighed at the haul card station;
- The GFSERVER laptop, utilized for storing the GFBioField SQL Server database and logging NMEA data streams from the vessel's GPS and depth sounder;
- A SQLBACKUP USB RAID, connected to the GFServer laptop, handled database backups. A long ethernet cable extended from the network switch on the bridge to the wireless router in the dry lab, establishing the GFSurveys local area network (LAN). Three devices in the dry lab were linked via ethernet cable to the router:

1. The GFFCBACKUP RAID, housing a duplicate of the GFSurveys network folder and serving as a backup repository.
2. The Sensors Toughbook, used for downloading and processing data from the sensors deployed on the survey.
3. The barcode label printer, utilized for printing otolith tray and sample labels through the GFBioField frontend.

A Toughbook dedicated to scale logging was positioned within a deck shed and wirelessly linked to the GFSurveys LAN. This Toughbook was specifically configured to record data output from the marine platform scales stationed at the haul card and biosample stations, directing the information to a database. The scales were physically connected to the logging Toughbook through serial cables. Given the laptop's sole serial port, a USB-serial adaptor facilitated the second connection.

At the biosample station on the deck, another Toughbook, enclosed in a protective shroud, established a wireless connection to the GFSurveys LAN. GFBioField was configured so that the biosample station Toughbook could access and record the biosample scale data remotely, from the scale weights logged by the Toughbook in the deck shed. The biosample station Toughbook was additionally linked to a fish measuring board, a barcode scanner for various sample labels, and a Bluetooth headset, providing the sampler with audio feedback from GFBioField.

At the haul card station on the deck, another Toughbook, housed in a protective shroud, was wirelessly connected to the GFSurveys LAN. GFBioField was configured to allow the haul card Toughbook to record haul card station scale weights remotely from the deck shed Toughbook as well.

Uninterruptible Power Sources (UPS) were utilized to ensure continuous power supply to essential EDAS components, encompassing the network switch and the SQL Backup RAID (located in the bridge); and the router and GFFCBackup device (housed in the dry lab).

2.12 ELECTRONIC MONITORING (EM) VIDEO DATA COLLECTION

The survey vessel's electronic monitoring (EM) system was custom-designed and installed by Archipelago Marine Research, Inc. (AMR) in Victoria, B.C., with the objective of collecting fishing activity data. The EM system recorded video and logged vessel sensor data during the survey trip. The EM video data from activities at the rail, the hopper, and the scale from two cameras were reviewed by a pair of science staff with the AMR software FishVue Interpret Lite.

During this review, one science member would watch the video and verbally identify each trap, specify the species found in the baskets, and designate the station where each basket was allocated (Aging, Tagging, or Discard). A second member of the science team would confirm that the trap and basket records in the GFBioField Trap Catch datasheet align with the video. An electronic 'check box' was employed for each basket record to monitor which baskets had been reviewed and confirmed as accurate.

3 Results and Discussion

3.1 FISHING

The 2022 Sablefish trap survey spanned 48 days and commenced in Nanaimo, B.C. on October 3 (Figure 3). This shift in timing was an attempt to circumvent inclement weather conditions. Crew changes took place on October 20 in Port Hardy and on November 3 in Skidegate Narrows. The survey concluded on November 19, with a total loss of 9 weather days.

In total, 97 sets were completed (Appendix C): 86 StRS sets (Figure 4), six 60-trap experimental sets for gear movement research (Figure 4) and five standardized sets at the Finlayson Channel Inlet locality (Figure 5). Out of the initial 91 blocks designated for the StRS portion of the survey, five blocks were not fished due to adverse weather conditions and timing issues (Figure 6).

3.2 CATCH PER UNIT EFFORT (CPUE)

Catch per unit effort (CPUE) statistics for 2022 are presented in relation to the available time series for each of the survey components used to index abundance: (i) StRS (2003–2022) and (ii) inlet indexing sites (1991–2022).

3.2.1 StRS Set CPUE

Catch rates (catch per unit effort) as indexed by kilograms of Sablefish per trap (Figure 7) and number of fish per trap (Figure 8) were generally higher in the middle depth strata (RD_2) over the survey time series (2003–2022), although there have been some recent years in which CPUE in shallow depth strata of the southern regions have been equal or higher than those in the corresponding mid-depth strata. In 2022, the kg/trap and #fish/trap in the middle depth strata (RD_2) were lower than the peak reached in 2019 in areas S_2, S_3, S_4 and S_5. In area S_1 (South West Coast Vancouver Island), the 2022 kg/trap and #fish/trap in the middle depth strata (RD_2) were lower than the peaks reached in 2020 and 2021.

The mean weight of captured Sablefish in 2022 was similar or slightly higher compared to 2021 in the deep (RD_3) and middle depth (RD_2) waters of areas S_2, S_3, S_4 and S_5. In the shallow (RD_1) waters, the mean weight in 2022 was slightly higher in areas S_2 and S_4 (Figure 9).

The stratified mean survey abundance in 2022 is up 10% from 2021, which is the second highest index value since 2003. (Figure 10).

3.2.2 Inlet CPUE

CPUE in the mainland inlets has shown variations over the years (1995–2022), with peak CPUE occurring approximately every 5–8 years (Figure 11). Specifically, at Dean/Burke Channel and Gil Island mainland inlet locations, the highest average CPUE values were observed in 1999, 2004, 2011, and 2019. For Finlayson Channel Inlet locality, the peak average CPUE years were 1999, 2005, 2011, and 2018. In the case of Portland Inlet, the peak average CPUE years were 1999, 2003, 2011, and 2019. Notably, there were no inlet surveys conducted in 2020. In 2021, only Dean/Burke Channel on the mainland was surveyed, and in 2022, only Finlayson Channel Inlet locality was surveyed.

CPUE index at Finlayson Channel Inlet locality in 2022 was 42.7 kg/trap, which was 17% lower than the time series high of 51.4 kg/trap in 2018 and the sixth highest CPUE observed at that location since the start of the series.

3.3 CATCH COMPOSITION

A total of forty-nine species were represented in the 2022 catch from StRS sets (Table 4). These groups included ten roundfish species, twelve rockfish species, three flatfish species and twenty-three invertebrate species. The most common species by weight, following Sablefish, were Lingcod (*Ophiodon elongatus*), Spiny Dogfish (*Squalus acanthias*), Pacific Halibut (*Hippoglossus stenolepis*) and Rougheye/Blackspotted Rockfish complex (*Sebastes aleutianus*).

A total of three species were represented in the catches from Finlayson Channel Inlet locality in 2022 (Table 5). These groups included one roundfish species, one flatfish species and one invertebrate species. The most common species by weight, following Sablefish, were Pacific Halibut (*Hippoglossus stenolepis*).

3.4 SABLEFISH SAMPLING

A detailed breakdown of the fate of the Sablefish catch in each trap for the 2022 survey is listed in Appendix D. Over all sets, 348 traps with Sablefish were sampled and 502 traps with Sablefish were tagged.

During the 2022 StRS survey component, a total of 45,500 Sablefish were caught. Of that total, 8,795 were tagged and released and 4,406 were retained for biological sampling. Of the tagged fish, 97 were previously tagged fish that were re-released with a new tag. There were 3 previously tagged fish retained for sampling (Appendix E).

Out of the 2,263 Sablefish captured during the 2022 inlet sets, 595 were tagged and released, 256 were used for biological sampling and 5 were previously tagged fish re-released with a new tag (Appendix E).

The six dedicated 60-trap gear movement sets that deployed cameras captured 7,666 Sablefish. Sublegal Sablefish and other species were returned to the water, except for those fish permitted for retention under the Section 52 scientific licence. There were 17 previously tagged fish retained for sampling (Appendix E).

Overall, the StRS sets had a higher proportion of females than males over the spatial strata S_1, S_2, S_3 and S_4. More females than males were caught in the shallow depth stratum (RD_1) within all spatial strata (S_1 - S_5) (Table 6). In the mid depth stratum (RD_2), there were more males than females in S_1, S_2, S_3 and S_5. The deepest depth stratum (RD_3) saw more females in spatial strata S_1 and S_2. Equal numbers were found in S_4 in the mid depth (RD_2) and deep stratum (RD_3) (Table 6).

3.5 SABLEFISH FORK LENGTH

Differences in length distributions between female and male Sablefish are exhibited in the data collected from the StRS portion of the 2003–2022 surveys. Over these 20 years, the mean fork length ($\bar{x}$) was 64.8 cm for females and 58.1 cm for males (Figure 12, plot A).

In 2022, the StRS average mean fork length for the 2,278 females was 62.3 cm and the average mean fork length for the 2,013 males was 56.3 cm. The average length increased in 2022, up from a time series low in 2021 (Figure 12, plot B).

Differences in length distributions between female and male Sablefish are exhibited in the data collected from the Inlet portion of the 1994–2022 surveys. Over these 29 years, the mean fork length ($\bar{x}$) was 60.4 cm for females and 55.1 cm for males (Figure 13, plot A).

In 2022, at Finlayson Channel inlet locality, the average mean fork length for the 185 females was 61 cm and the average mean fork length for the 71 males was 54 cm (Figure 13, plot B).

On average, female Sablefish from StRS sets reach a far greater size (Figure 14, plot A) compared to males (Figure 14, plot B).

3.6 SABLEFISH MATURITY

Sablefish maturity stages were macroscopically identified and coded based on the gonadal structure, colour and developmental characteristics (Appendix F). The relative frequency of the maturity stages each year for the random (StRS) survey shows a slight increase in skipped spawning in 2022, where skipped spawners are those that have spawned before, but are not spawning this year (Figure 15). This trend in 2022 is evident from the slightly higher proportion of sampled fish in ‘resting’ stage.

3.7 SABLEFISH SUBLEGAL ENCOUNTERS

The proportion of sublegal (<=55 cm fork length) Sablefish encountered in the sampled fish in each survey stratum has fluctuated in recent years (Figure 16). In general, the proportion of sublegal fish tends to be higher in mid-depth strata than in shallow or deep strata. In 2017 and 2018, several strata had over 50% of fish caught be of sublegal size (the mid-depth of the two most northern spatial strata, S4 and S5). In 2019, the proportion of sublegal fish increased sharply in all strata, with each of the 5 spatial strata having over 50% of fish caught at mid-depths be of sublegal size. The proportion of sublegal fish continued to be higher in 2020 and 2021, but has started to decline again in all strata in 2022. Only a single stratum in 2022 has over 50% of sampled fish measured as sublegal (the mid-depth stratum of the most southern stratum, S1).

3.8 RECOVERED TAGGED SABLEFISH

Of the 426 Canadian tagged fish that were recovered on the survey, over half (264 of 426, or 62%) had travelled no more than 50 kilometers from the release site. More than half of the recoveries (287 of 426, or 67%) were recaptured within 5 years at liberty (Table 7).

3.9 OTHER FISH SAMPLING

Length, sex, maturity, otoliths and DNA samples were collected from a subsample of the catch of Rougheye/Blackspotted Rockfish. Of the 134 specimens sampled, the science samplers visually identified 19 specimens as Rougheye, 114 specimens as Blackspotted and 1 specimen as a hybrid species (Appendix G).

Length, sex, maturity and otoliths were collected for Shortraker Rockfish, and Length, sex, maturity, otoliths and DNA were collected for Yelloweye Rockfish (Appendix H).

3.10 SABLEFISH AGES

The highest proportions of females' ages in StRS sets from 2003 to 2010 were 3, 4, 5, 6, 7, 8, 9, and 10 years of age, respectively. Another cohort emerged from 2011 to 2015, with ages 3, 4, 5, 6, and 7. In 2016, 2017, and 2018, the highest proportion of female Sablefish were 3, 4, and 5 years old. Finally, from 2019 to 2022, the dominant age group consisted of 3, 4, 5 and 6-year-old female Sablefish, respectively (Figure 17, plot A).

The highest proportions of males' ages in StRS sets from 2003 to 2011 were 3, 5, 5, 6, 8, 8, 8, 10, and 12 years of age, respectively. Another cohort began dominating the StRS catch starting in 2012, initially as 4-year-olds in 2012, followed by 5-year-olds in 2013, 7-year-olds in 2014, 7-year-olds in 2015, and 8-year-olds in 2016. In 2019, 2020, 2021 and 2022, the age distribution consisted of 3, 4, 5 and 6-year-old males, respectively (Figure 17, plot B), mirroring the pattern observed for females.

3.11 OCEANOGRAPHIC TEMPERATURES AND DEPTHS

Depth and temperature data were extracted from approximately one hour after deployment and one hour before retrieval to capture temperatures while the trap was positioned on the seafloor bottom. Consistent with previous years, the survey data for the year 2022 revealed a trend of decreasing temperature with depth across 1-degree latitude intervals from southwest Vancouver Island to northwest Haida Gwaii (Figure 18).

SBE 39 temperature (pressure) recorders have been deployed on survey fishing sets since 2006. In the shallow waters, the lowest average bottom temperature of 4.1 °C was recorded in 2016 (latitude zone 52°–53°); the highest average bottom temperature was 7.4 °C in 2016 (50°–51°). In the mid-depth waters, the lowest average bottom temperature was 2.9 °C in 2019 (52°–53°); the highest average bottom temperature was 6.4 °C in 2013 (50°–51°). In the deepest waters, the lowest average bottom temperature was 2.2 °C in 2016 (54°–55°) and the highest average bottom temperature was 4.1°C in 2016 (48°–49°) (Figure 19).

3.12 ACKNOWLEDGEMENTS

We would like to express our gratitude for the review of this document, which was provided by Lindsay Dealy and Josef Vavra. We also would like to thank Kathryn Temple for the technical expertise for the vessel network configuration. The B.C. Sablefish trap survey represents the culmination of collaborative efforts involving numerous individuals. Since 1994, the Canadian Sablefish Association has been instrumental in coordinating and supporting this survey.

The scientific team responsible for conducting the 2022 Sablefish research charter comprised Ian Hamilton, Thomas Giguere, Leila Kadivar, Josef Vavra of Archipelago Marine Research Ltd (AMR); Schon Acheson, Aislyn Adams, Travis Bell, Kristina Castle, Kathryn Temple and Malcolm Wyeth of Fisheries and Oceans, Canada. We extend our special thanks to the Vessel Master and crew of the F/V *Pacific Viking*, whose hard work played a pivotal role in the success of the survey in 2022. The crew members in 2022 included Deacon Melnychuk (Skipper), Darkat Forsyth, Kevin Groulx, Dave Holomego, Braxton Tanaka, and Nick Gallant.

4 Figures

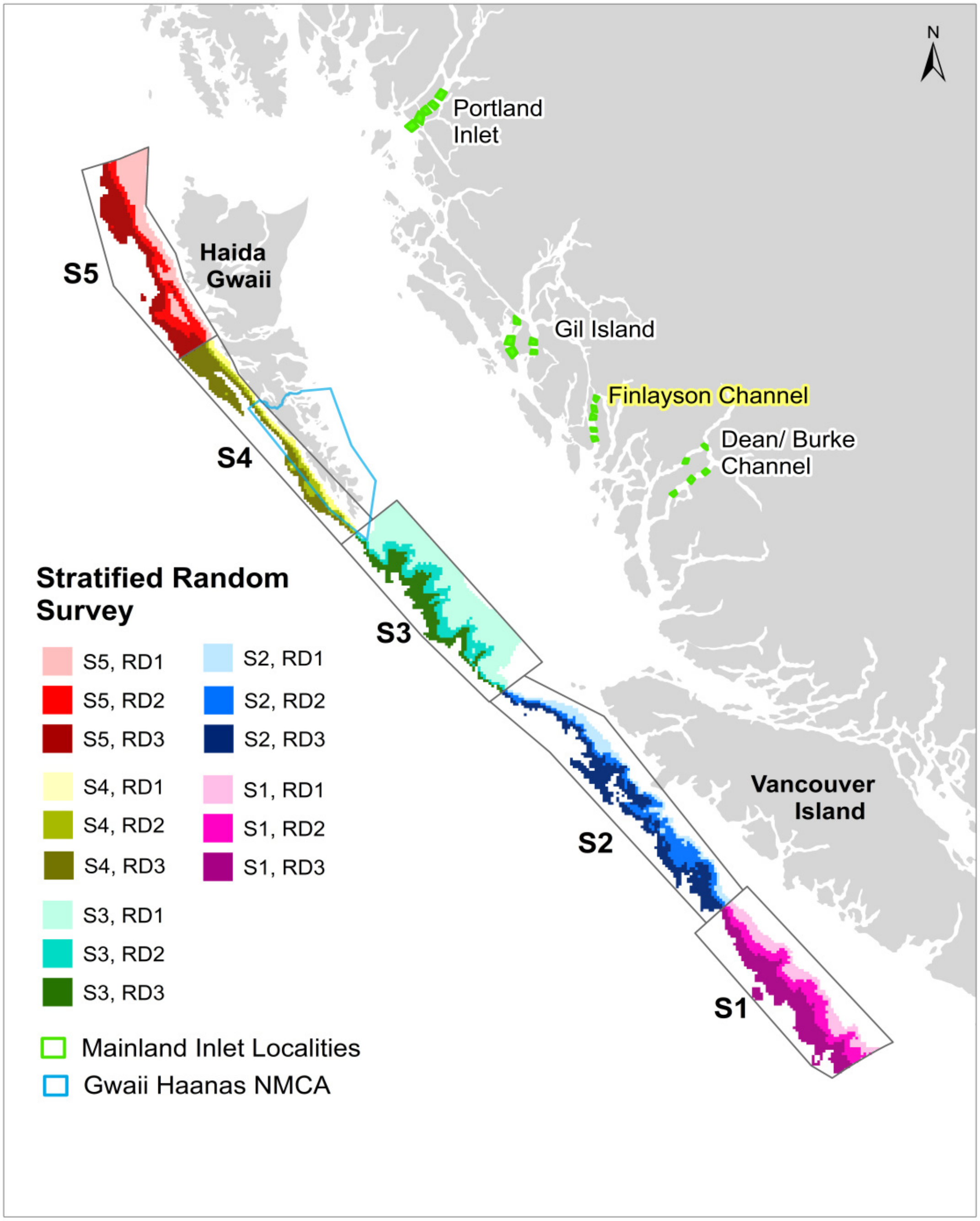


Figure 1. B.C. Sablefish trap survey design for 2003–2022, including locations of the Randomized component and Inlets survey component. Randomized Survey depth strata (RD_1–RD_3) are colour-coded and nested within each of the five spatial strata (S_1–S_5). Inlets Survey set locations are indicated by green polygons. In 2022, of the four inlet locations, only Finlayson Channel Inlet locality (highlighted) was surveyed.

Figure 2. Image of the F/V *Pacific Viking* used for the 2022 B.C. Sablefish trap survey. Photo credit: Schon Hardy.

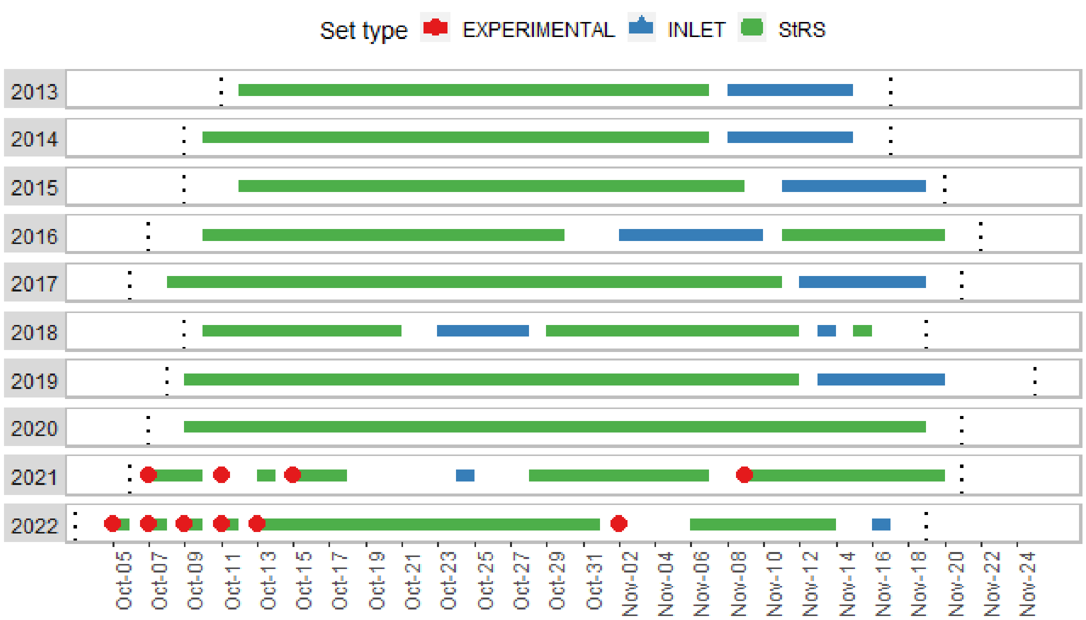


Figure 3. Timeline of survey dates by set type (experimental, StRS, and Inlet) over the past 10 years, with the dashed black lines indicating the start and end dates of each trip.

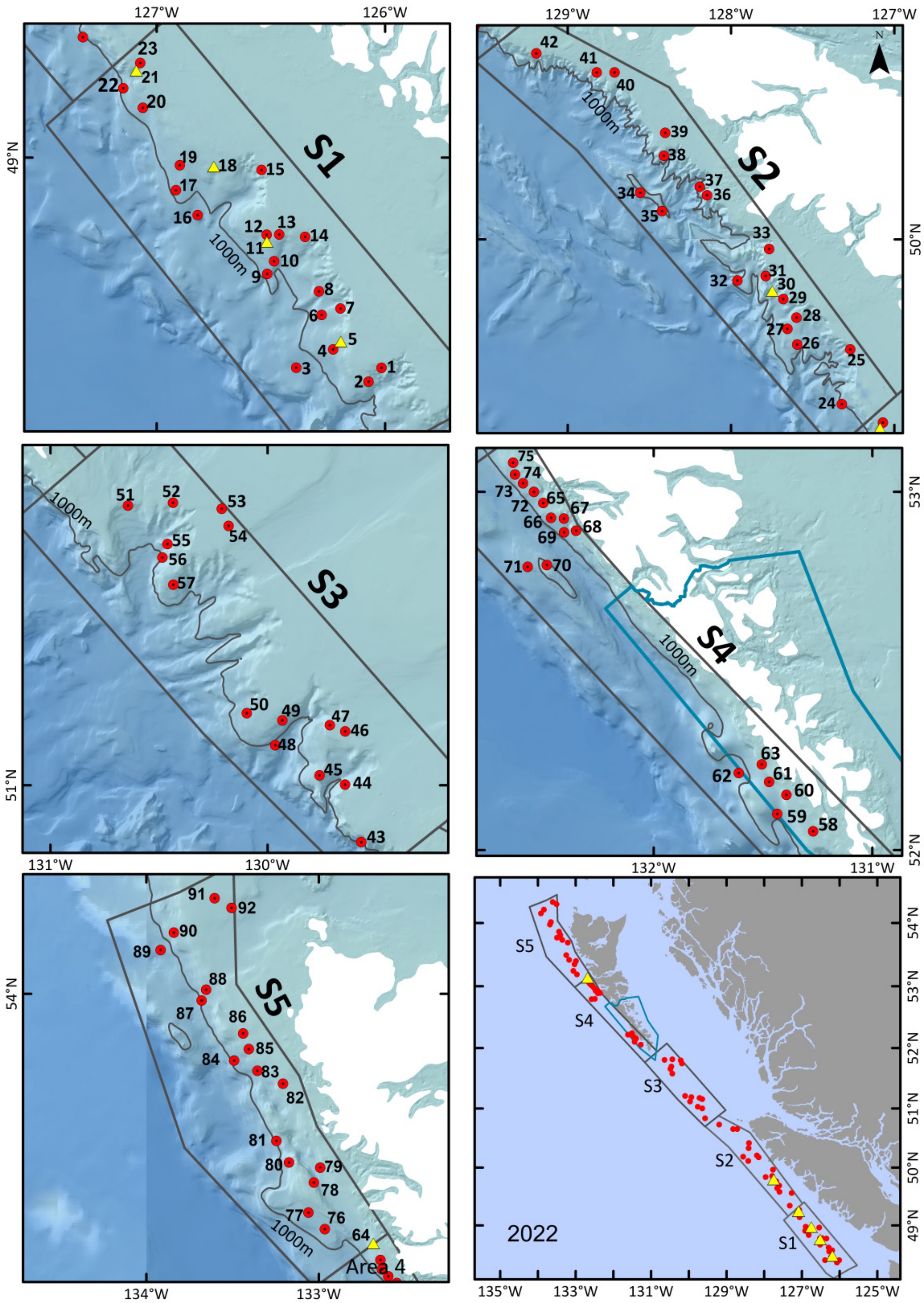


Figure 4. Start locations of survey sets (red markers) conducted in 2022 for the stratified random survey areas S_1 through S_5. Yellow triangle symbols represent the six movement/deep-water autonomous camera sets.

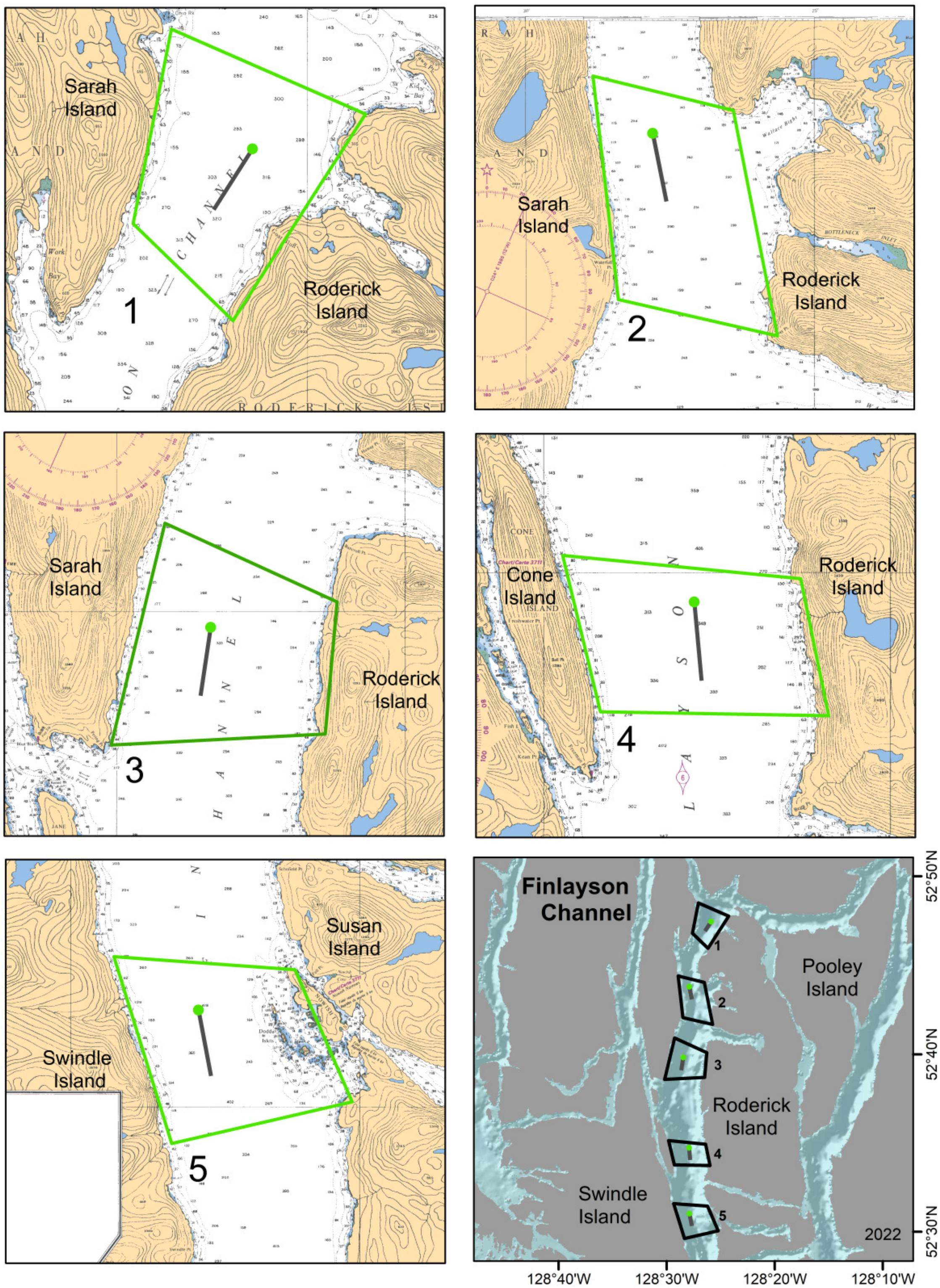


Figure 5. Location of the 2022 standardized sets within the Finlayson Channel mainland inlet locality. The green dots represent the start deployment position of the set.

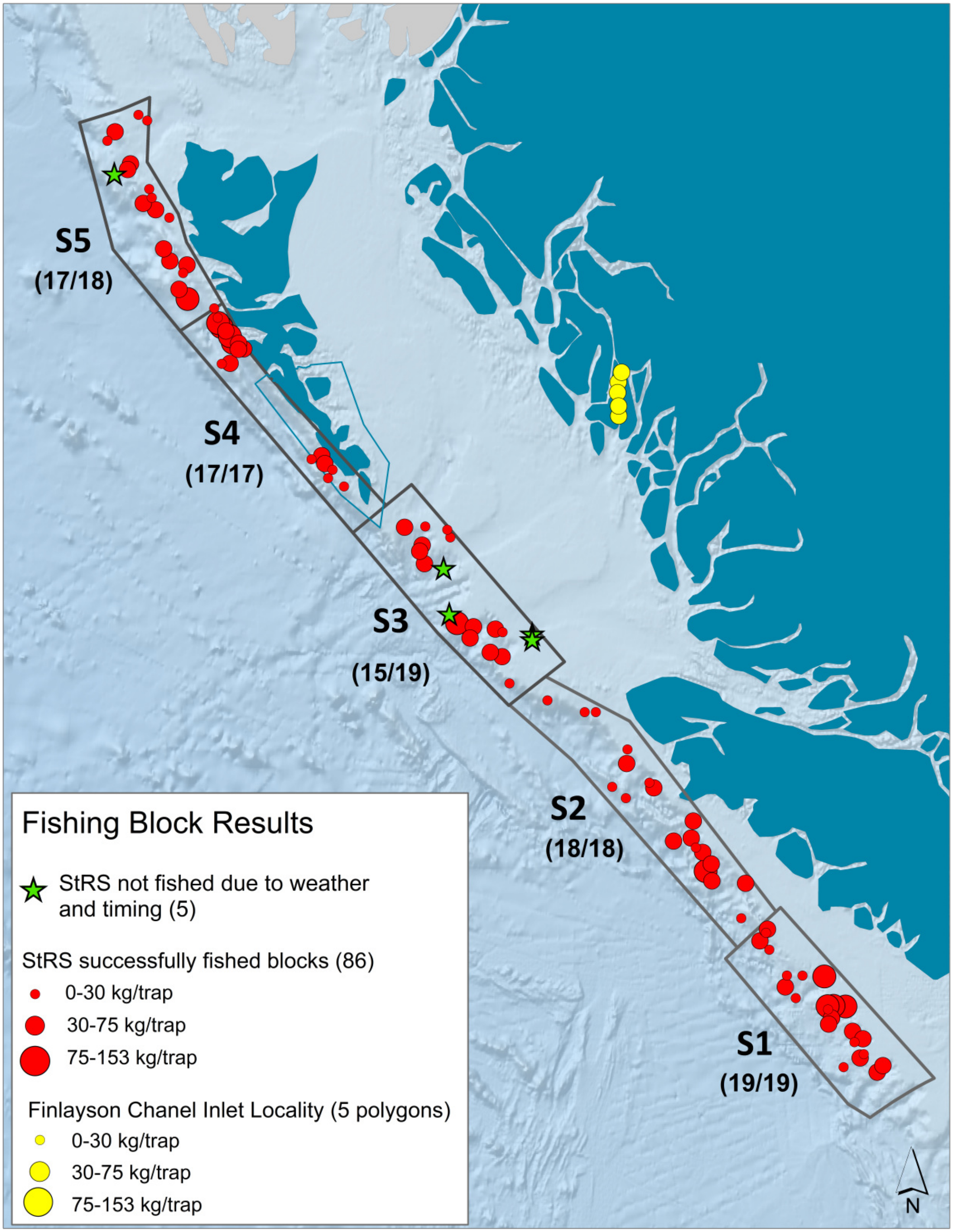


Figure 6. Map of allocated vs completed survey blocks for the 2022 survey sets. The star symbols depict rationale for dropped survey blocks. Finlayson Channel mainland inlet locality was the only inlet fished in 2022. Cpue values (in kg/trap) are displayed for each set location.

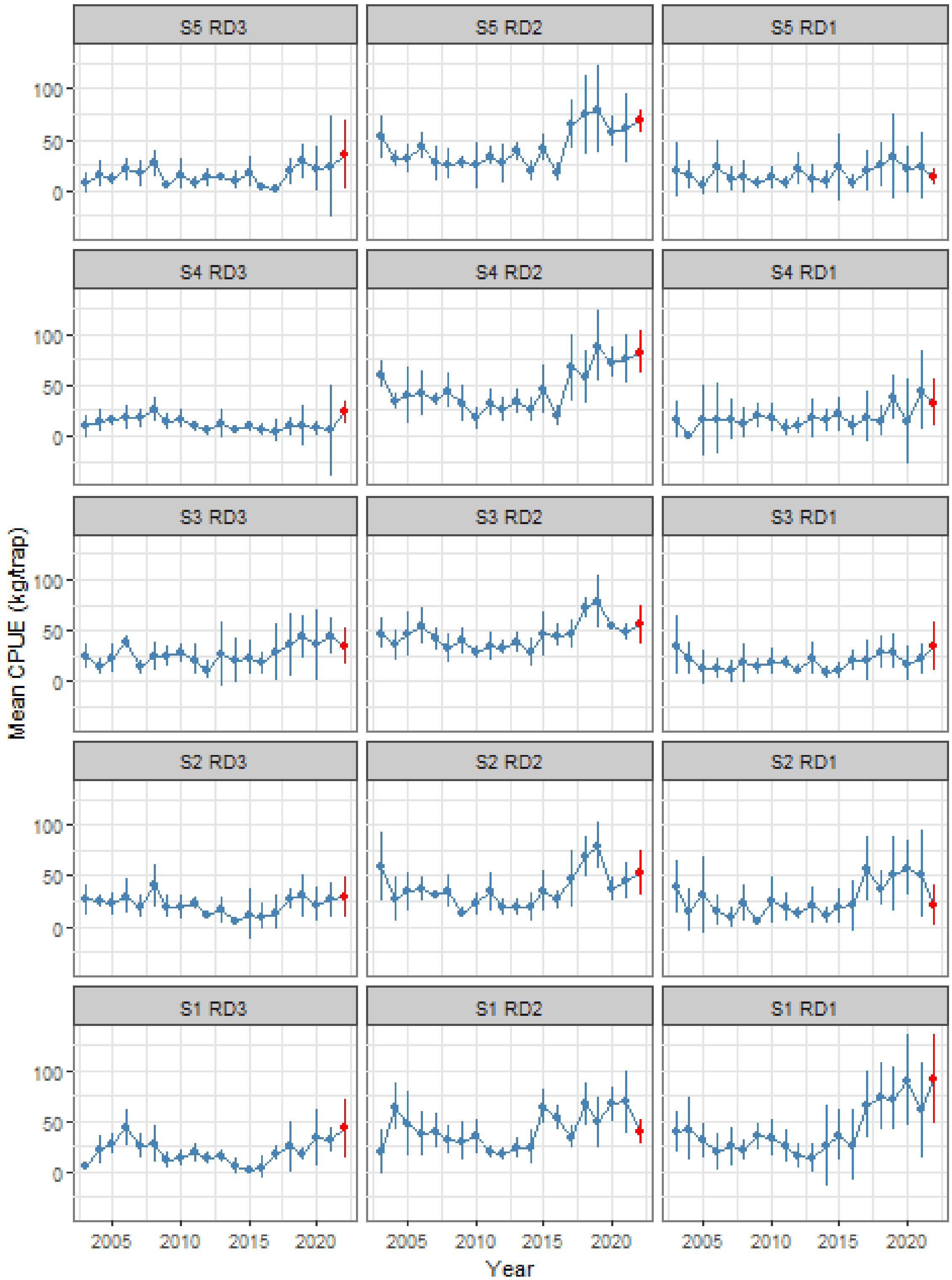


Figure 7. Average Sablefish catch per unit effort (CPUE; mean +/- 95% CIs) by survey strata since 2003. Panels run deep to shallow (left to right) and north to south (top to bottom).

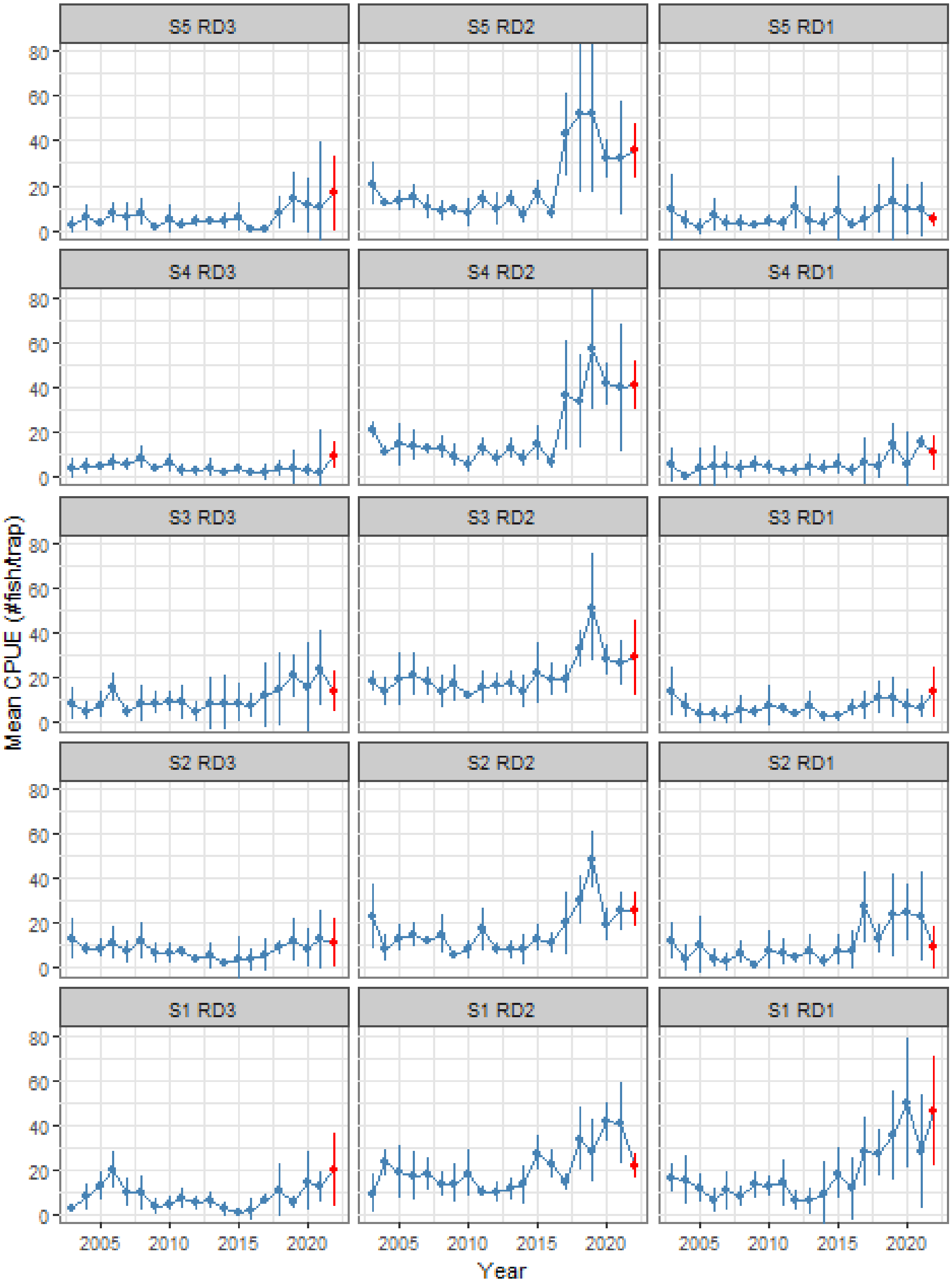


Figure 8. Average number of Sablefish per trap (mean +/- 95% CIs) by StRS survey strata over time. Panels run deep to shallow (left to right) and north to south (top to bottom).

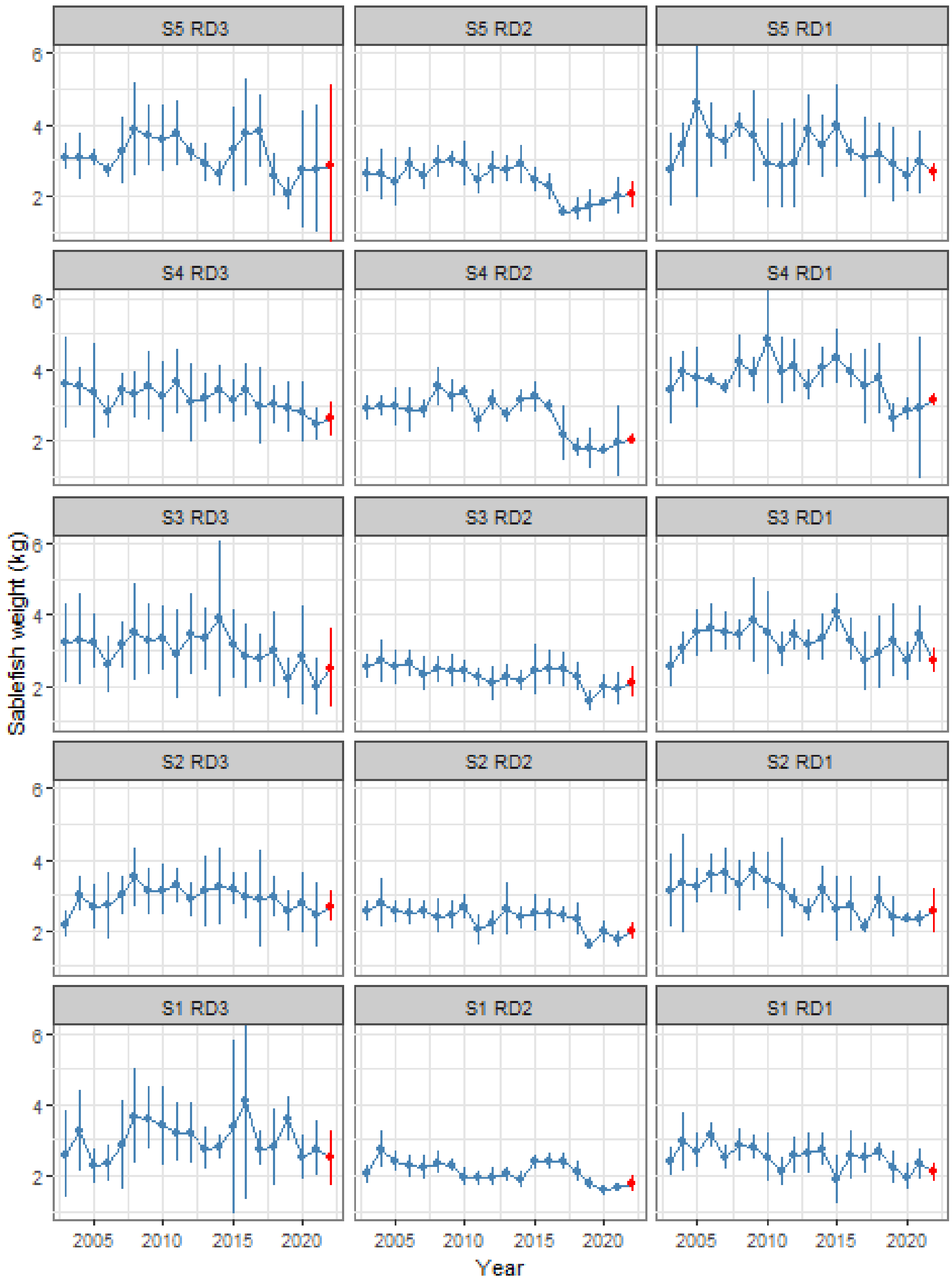


Figure 9. Average weight of Sablefish (mean +/- 95% CIs) by survey strata over time. Panels run deep to shallow (left to right) and north to south (top to bottom).

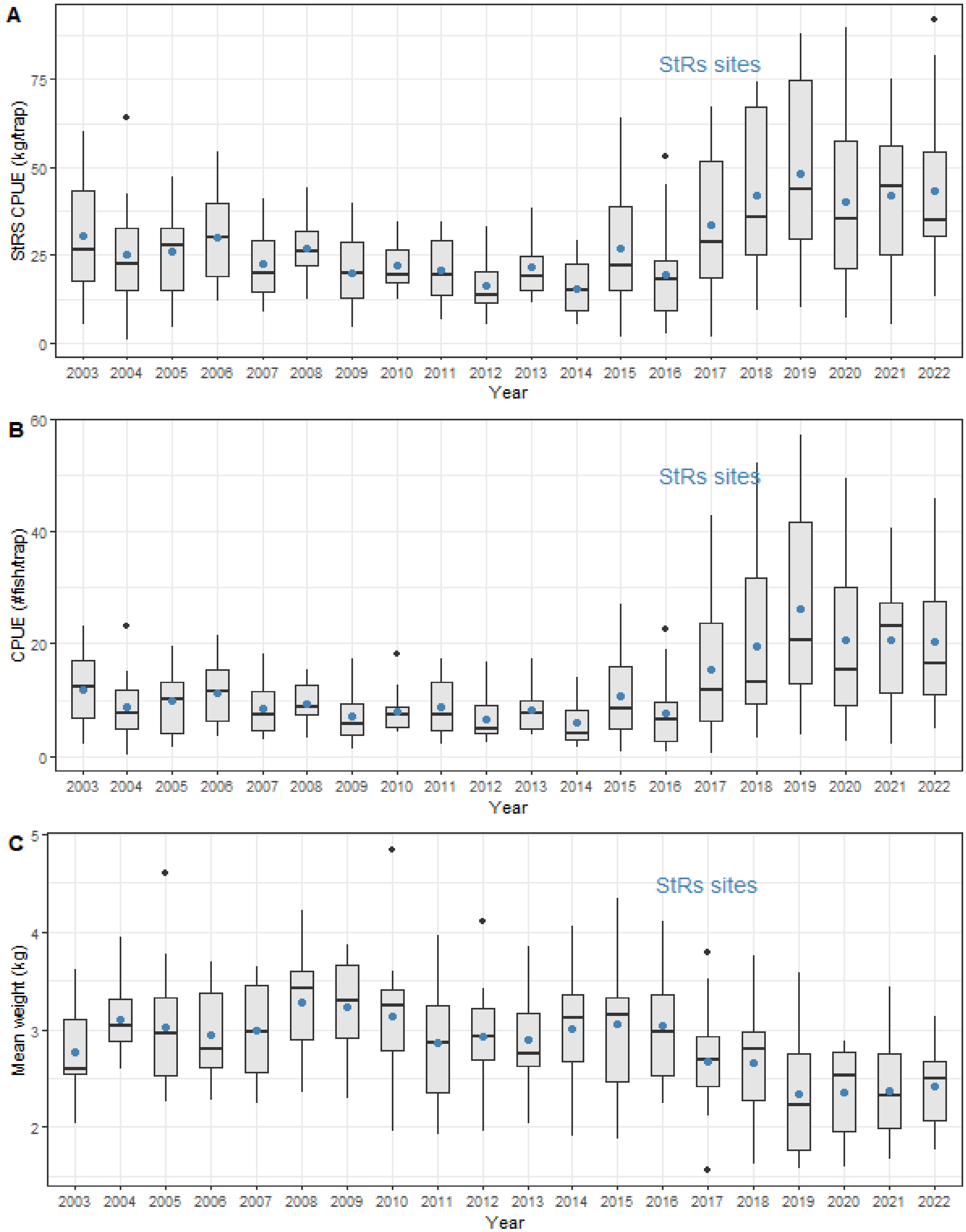


Figure 10. (A) Annual mean weight of Sablefish per trap (kg/trap); (B) annual mean number of Sablefish per trap (#fish/trap); (C) annual mean weight of Sablefish (kg) by StRS survey over time. Horizontal line is median and blue dots are arithmetic mean.

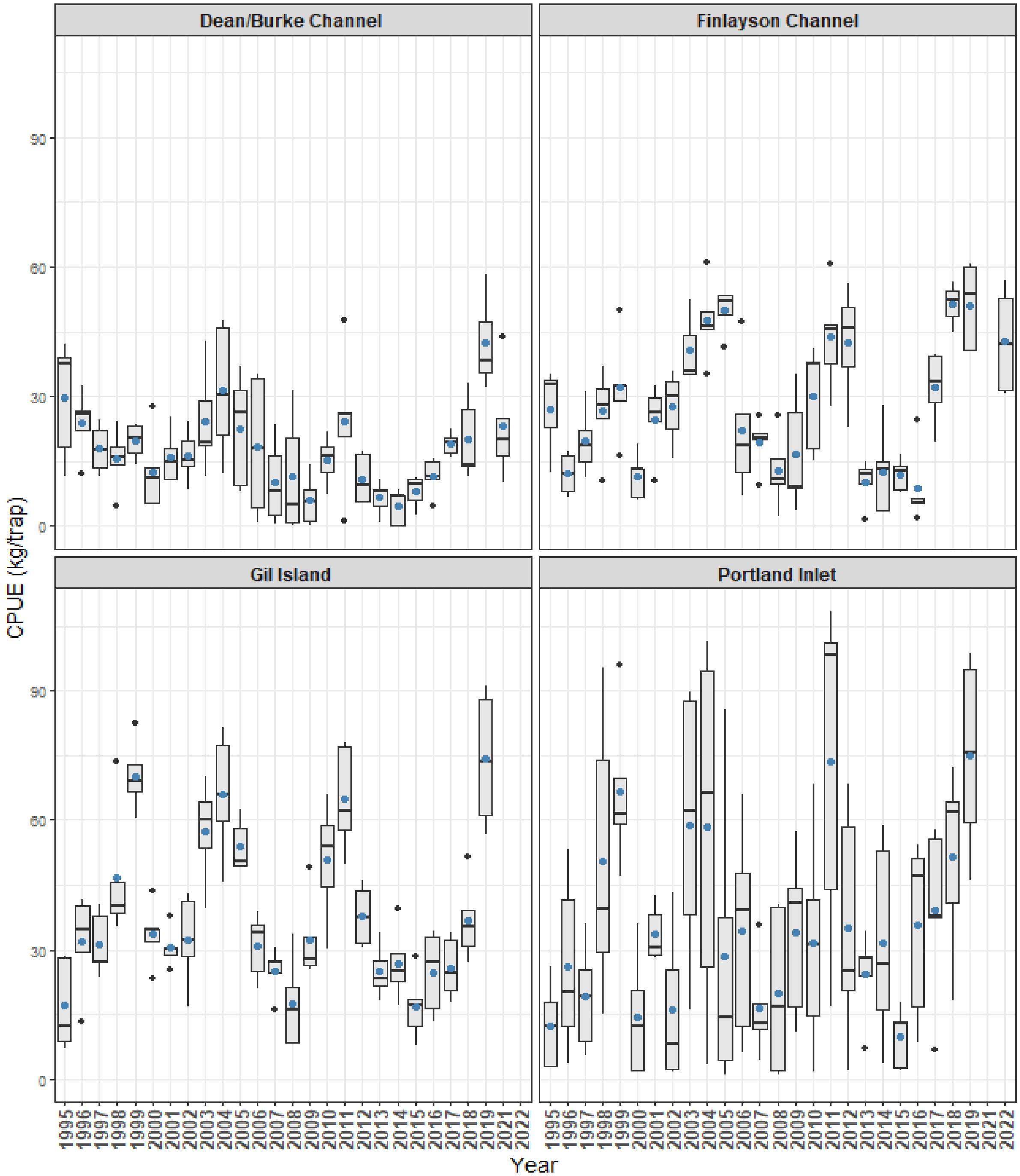
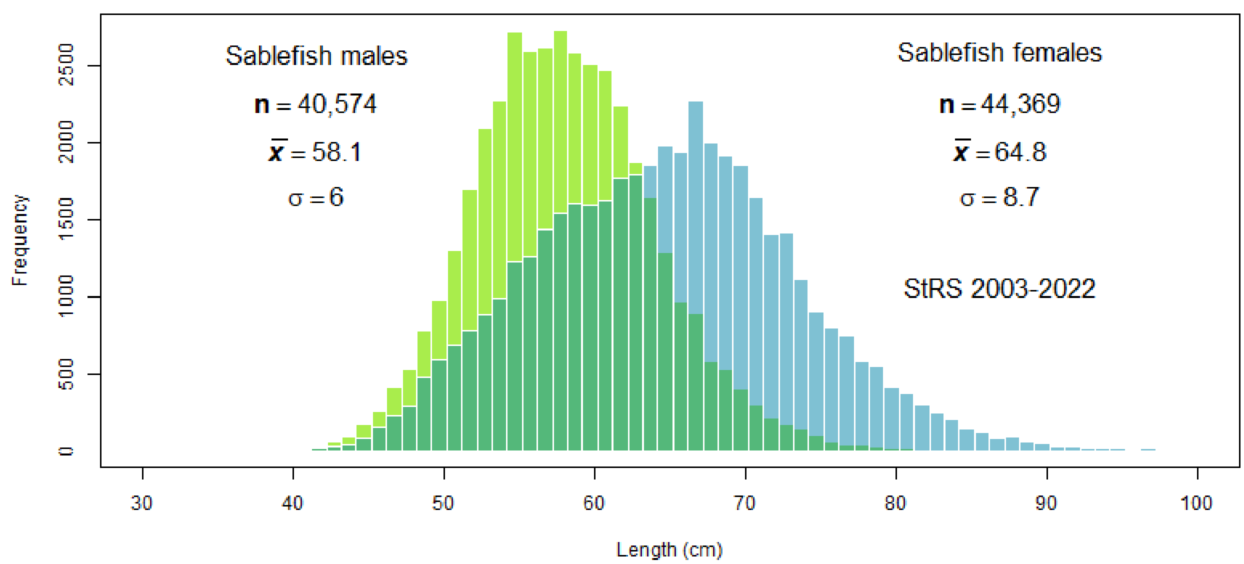


Figure 11. Annual distributions of catch statistics over the four mainland inlet indexing sets between 1994 and 2022 with CPUE in units of weight of Sablefish per trap (kg/trap). Horizontal line is median, grey shading shows the 25th and 75% percentiles, and blue dots show arithmetic means. No inlets were surveyed in 2020. Dean/Burke Channel Inlet locality was the only inlet surveyed in 2021; Finlayson Channel Inlet locality was the only inlet surveyed in 2022.

A



B

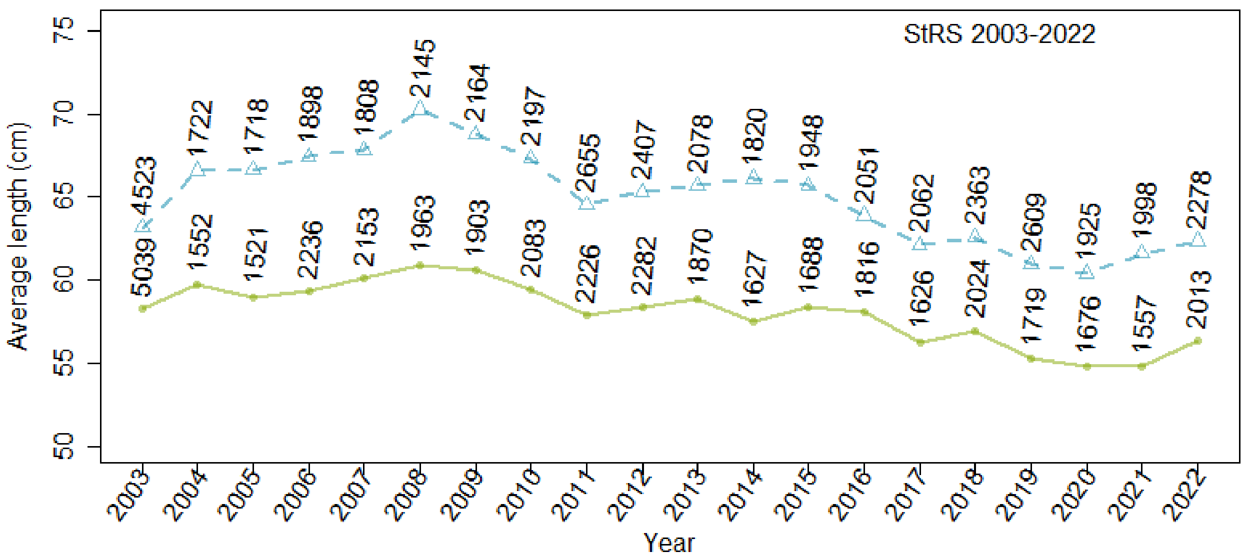


Figure 12. Length frequencies for female (blue) and male Sablefish (green) up to 2022 for all StRS sets. Specimen number (n), mean ($\overline{x}$) and standard deviation (σ) are displayed (A). Average length of male and female Sablefish by year. Counts by sex are labelled (B).

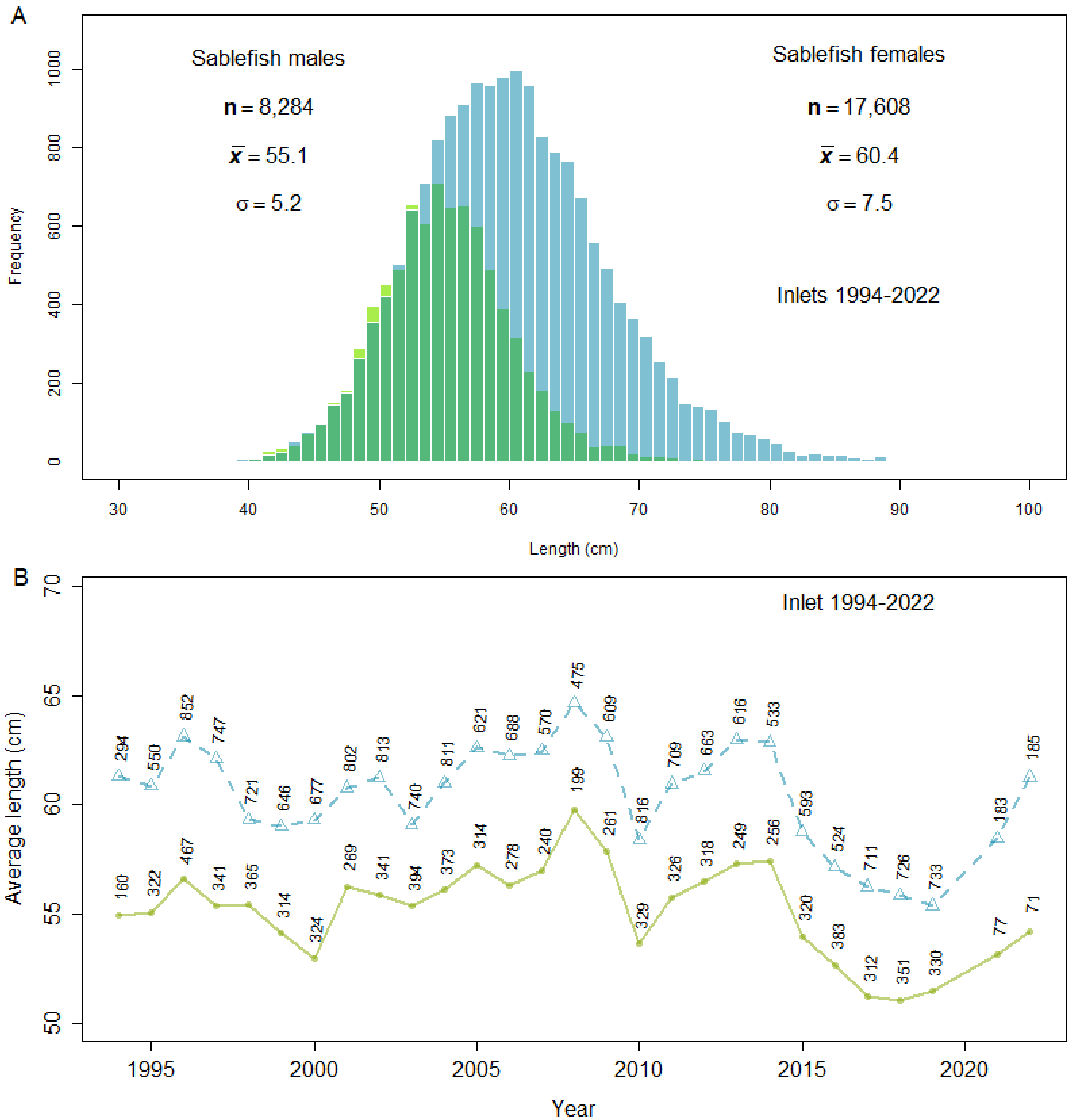


Figure 13. Length frequencies for female (blue) and male Sablefish (green) up to 2022 for all Inlet sets. Specimen number (n), mean ($\overline{x}$) and standard deviation (σ) are displayed (A). Average length of male and female Sablefish by year. Counts by sex are labelled (B). Data for all years includes all inlets, with the exception of no inlets surveyed in 2020; only the Dean/Burke Channel Inlet locality was surveyed in 2021, and only the Finlayson Channel Inlet locality was surveyed in 2022.

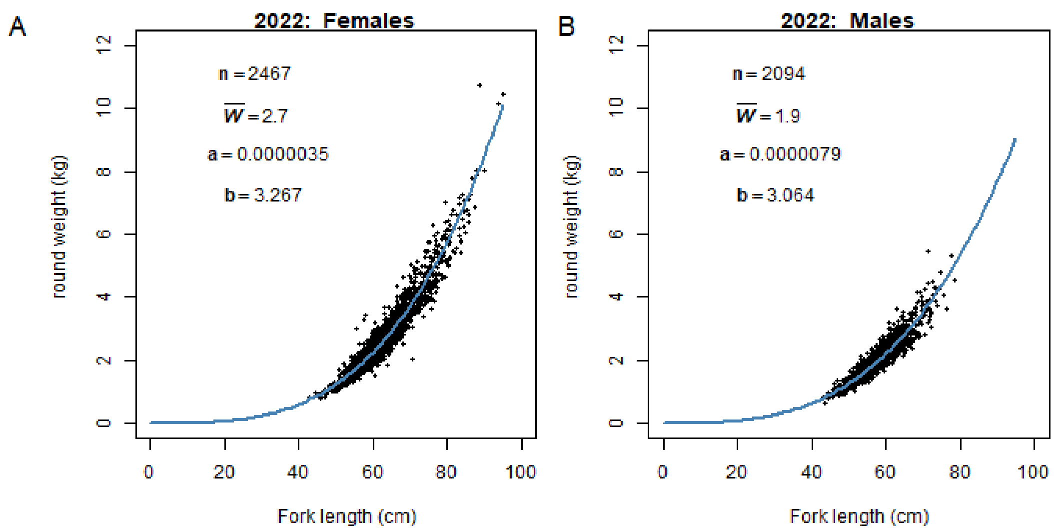


Figure 14. Sablefish fork length (centimeters) vs weight (kiograms) for females (A) and males (B) sampled during the 2022 survey.

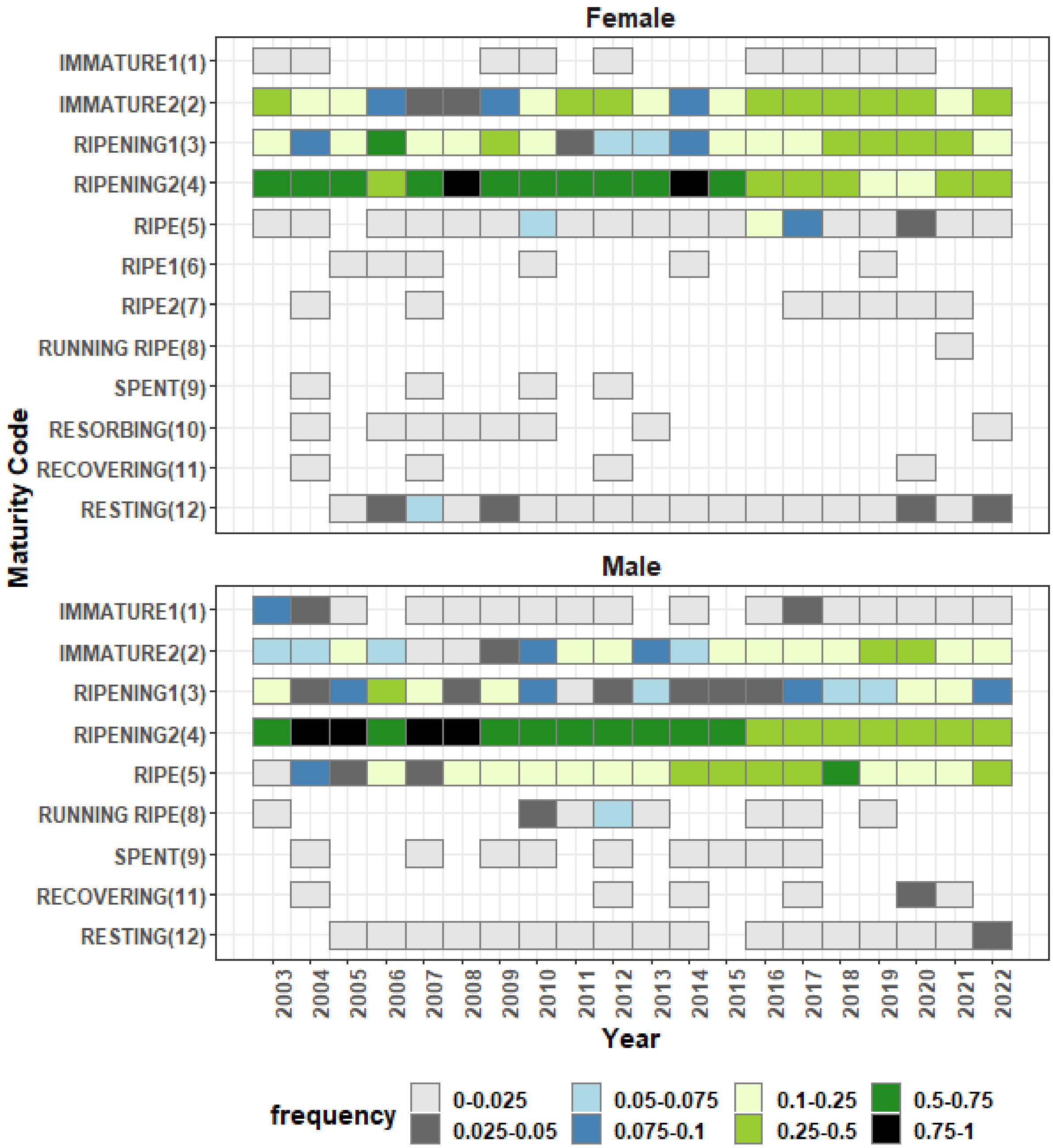


Figure 15. Relative frequency of maturity stages by survey year for female and male Sablefish caught on StRS sets. Maturity codes at stage 3 through to stage 12 are considered a mature fish.

Figure 16. The percentage of sublegal Sablefish (<55 cm fork length) sampled by spatial (S_1–S_5) and depth strata (S=shallow, RD_1; M=mid, RD_2; D=deep, RD_3) over time. Sublegal specimen counts above 50% sampled shown in blue.

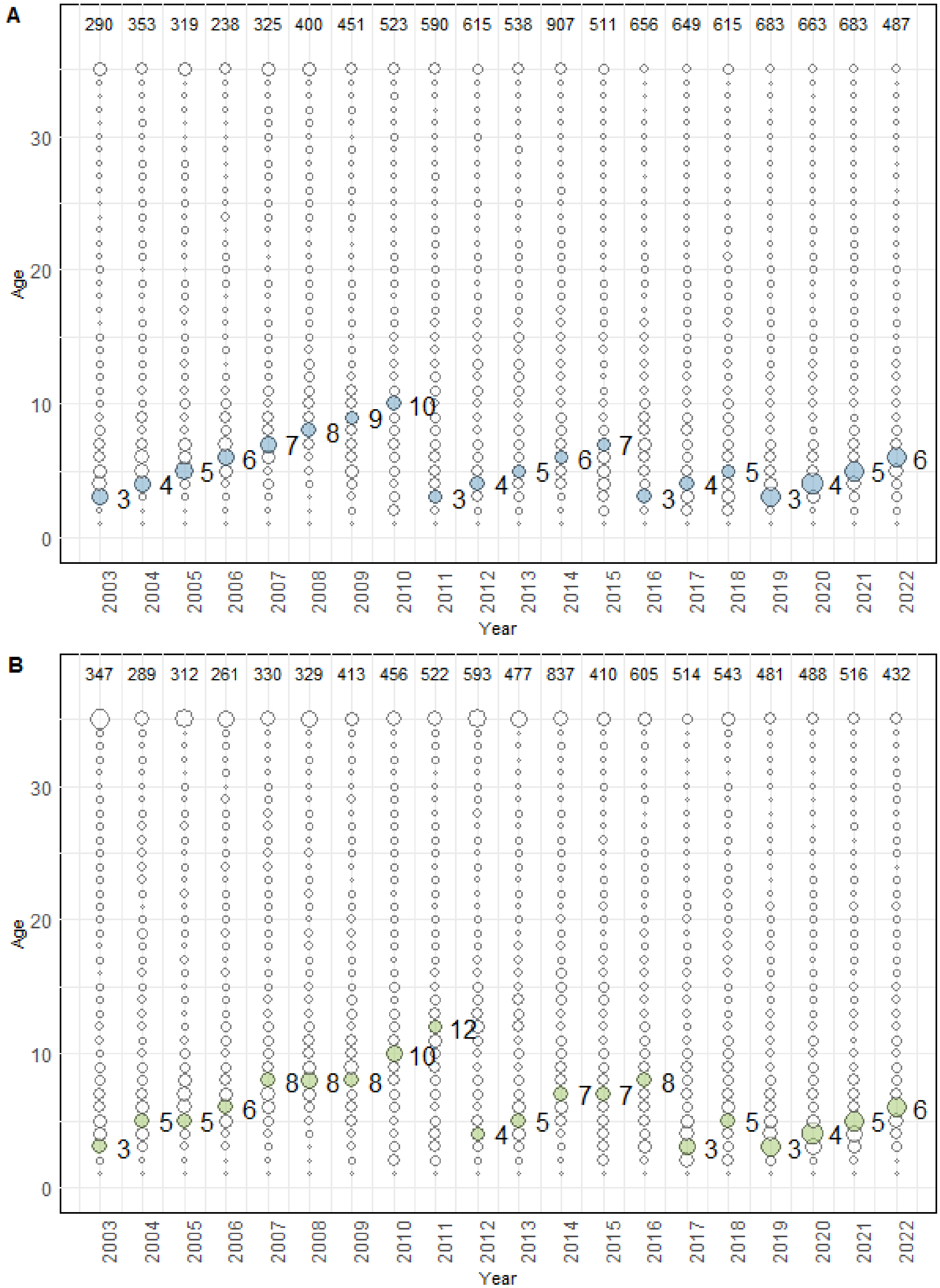


Figure 17. Bubble plot for female (A) and male (B) Sablefish ages by survey year from StRS sets that have been aged. The sizes of the circles are proportional to the number of fish with given ages. Fish age 35 and older are included in one bubble. The total number of fish aged are listed across the top of each panel. The ages with the highest ratios are posted to the right of each bubble.

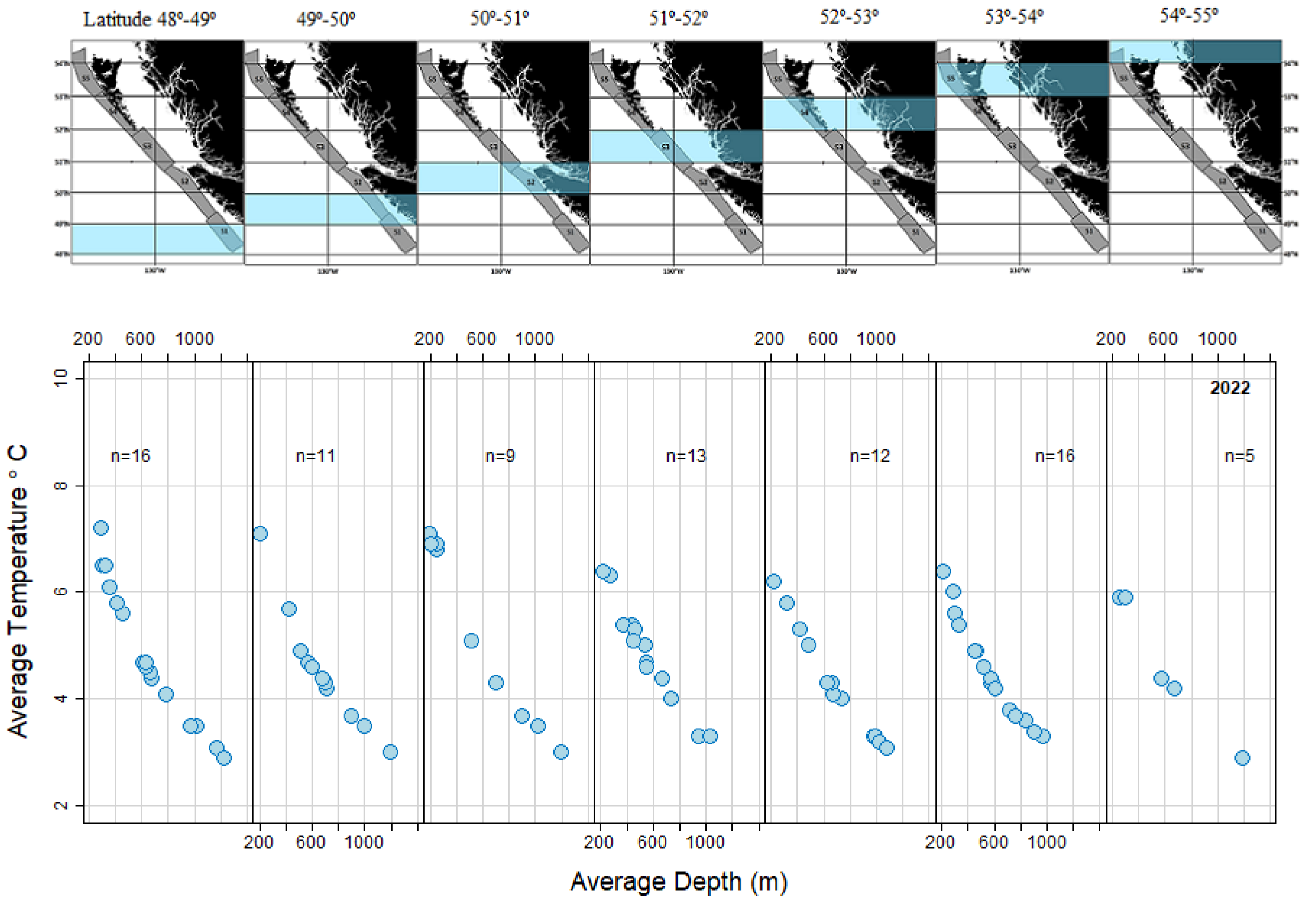


Figure 18. Coplot of average depth (m) versus average temperature (°C) for a given 1-degree latitude range (blue bands) for 2022 while the gear on/near bottom. The number of fishing sets deployed with a TDR logger are represented by n.

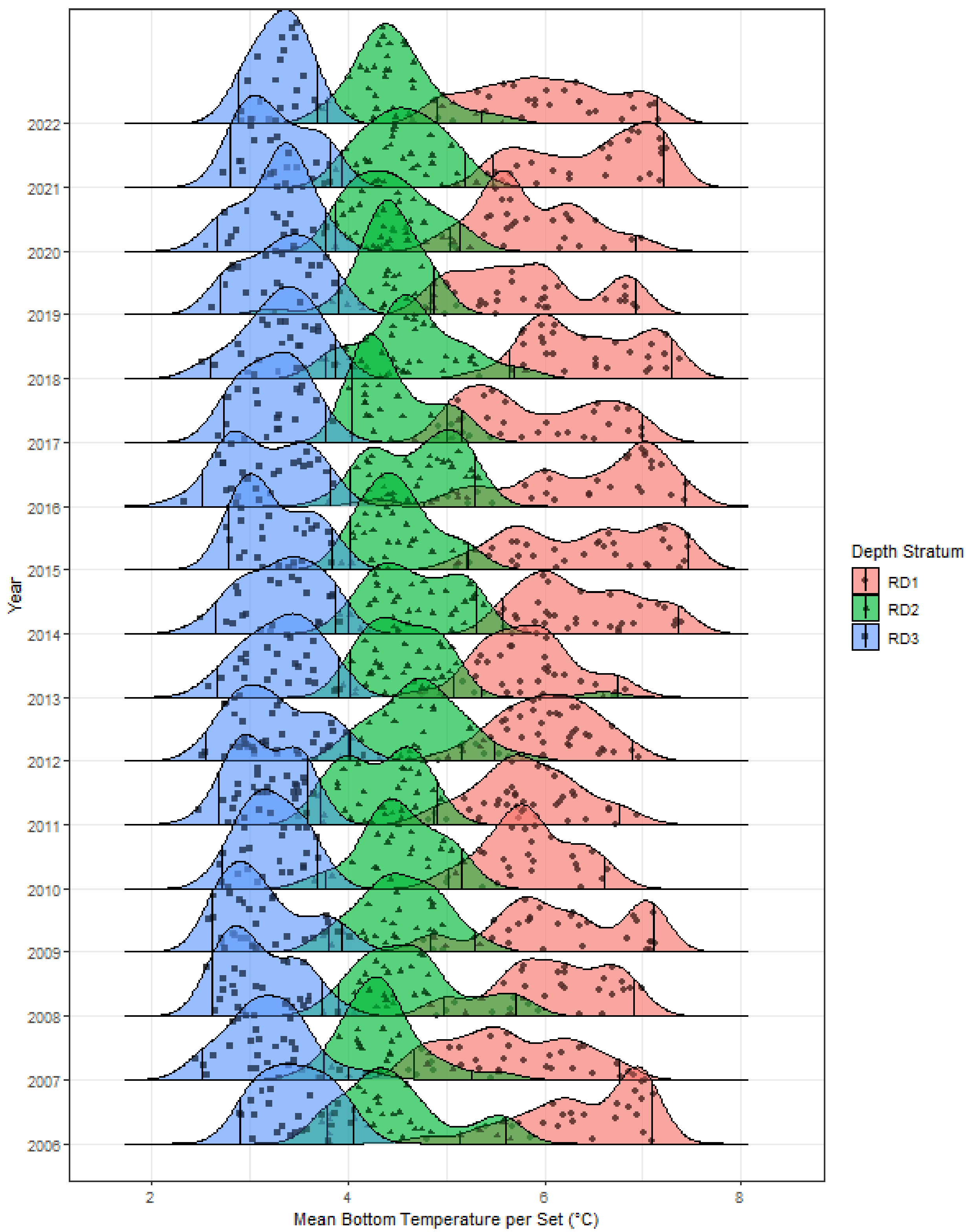


Figure 19. Vertical density ridgeplots of mean bottom temperatures per year as reported by set from the TDR loggers on traps at three depth intervals, RD_1 = shallow (100-450 m), RD_2 = mid (450-850 m), RD_3 = deep (850-1400 m). Lines indicate the 2.5% and 97.5% tails.

5 Tables

Table 1. Spatial and depth stratum block allocation and completed block counts (blue) for the 2022 B.C. Sablefish trap survey.

Spatial Strata	Depth Strata							
	RD_1: 100 – 250 fa	RD_1 2022	RD_2: 250 – 450 fa	RD_2 2022	RD_3: 450 – 750 fa	RD_3 2022	Total	Total 2022
S_1 (South West Coast Vancouver Island or SWCVI)	6	6	8	8	5	5	19	19
S_2 (North West Coast Vancouver Island or NWCVI)	6	6	7	7	5	5	18	18
S_3 (Queen Charlotte Sound or QCS)	8	6	6	6	5	3	19	15
S_4 (South West Coast Haida Gwaii or SWCHG)	6	6	6	6	5	5	17	17
S_5 (North West Coast Haida Gwaii or NWCHG)	6	6	7	7	5	4	18	17
Total	**32**	**30**	**34**	**34**	**25**	**22**	**91**	**86**

Table 2. Target number of 25-trap survey sets with a camera trap and completed counts (blue) for the 2022 B.C. Sablefish trap survey.

Strata	Sets in Depth Strata							
	RD_1	RD_1 2022	RD_2	RD_2 2022	RD_3	RD_3 2022	Total	Total 2022
S_1 (SWCVI)	2	2	2	2	1	0	5	4
S_2 (NWCVI)	2	0	2	2	1	1	5	3
S_3 (QCS)	2	0	2	1	1	1	5	2
S_4 (SWCHG)	2	1	2	0	1	1	5	2
S_5 (NWCHG)	2	2	2	3	1	1	5	6
Total	**10**	**5**	**10**	**8**	**5**	**4**	**25**	**17**

Table 3. Details of completed 60-trap benthic contact video sets. Temperature depth recorder (TDR), Actigraph accelerometer (AXL), and camera (CAM) are marked with an ‘x’.

Spatial Strata	Set	Becket id	Trap id	TDR	AXL	CAM
S_1 (SWCVI)	5	4	4	x	x	x
		30	30	x	x	x
		54	54	x	x	x
S_1 (SWCVI)	11	3	3	x	x	x
		30	30	x	x	x
		54	54	x	x	x
S_1 (SWCVI)	18	5	5	x	x	x
		30	30	x	x	x
		54	54	x	x	x
S_1 (SWCVI)	21	5	5	x	x	x
		30	30	x	x	x
		54	54	x	x	x
S_2 (NWCVI)	30	5	5	x	x	x
		30	30	x	x	x
		54	54	x	x	x
S_5 (NWCHG)	64	5	5	x	x	x
		30	30	x	x	x
		54	54	x	x	x

Table 4. Summary of species captured during the 2022 StRS survey component. Species without a count or weight indicates trace weight only.

Category	Common Name	Scientific Name	Count	Weight(kg)
Roundfish Species	Sablefish	ANOPLOPOMA FIMBRIA		95,661
	Lingcod	OPHIODON ELONGATUS		1,242
	North Pacific Spiny Dogfish	SQUALUS ACANTHIAS		1,214
	Pacific Grenadier	CORYPHAENOIDES ACROLEPIS		220
	Pectoral Rattail	ALBATROSSIA PECTORALIS		179
	Pacific Sleeper Shark	SOMNIOSUS PACIFICUS		7
	Pacific Cod	GADUS MACROCEPHALUS		5
	Brown Cat Shark	APRISTURUS BRUNNEUS		1
	Darkfin Sculpin	MALACOCOTTUS ZONURUS	1	
	Threadfin Sculpin	ICELINUS FILAMENTOSUS	1	
Rockfish Species	Rougheye/Blackspotted Rockfish Complex	SEBASTES ALEUTIANUS		390
	Redbanded Rockfish	SEBASTES BABCOCKI		228
	Yelloweye Rockfish	SEBASTES RUBERRIMUS		209
	Shortraker Rockfish	SEBASTES BOREALIS		158
	Shortspine Thornyhead	SEBASTOLOBUS ALASCANUS		81
	Yellowmouth Rockfish	SEBASTES REEDI		10
	Canary Rockfish	SEBASTES PINNIGER		7
	Rosethorn Rockfish	SEBASTES HELVOMACULATUS		6
	Bocaccio	SEBASTES PAUCISPINIS		5
	Longspine Thornyhead	SEBASTOLOBUS ALTIVELIS		1
		SEBASTES		1
	Aurora Rockfish	SEBASTES AURORA		1
Flatfish Species	Pacific Halibut	HIPPOGLOSSUS STENOLEPIS		859
	Arrowtooth Flounder	ATHERESTHES STOMIAS		165
	Dover Sole	MICROSTOMUS PACIFICUS		8
Invertebrate Species	Grooved Tanner Crab	CHIONOECETES TANNERI		165
		ALLOCENTROTUS FRAGILIS		51
	Oregontriton	FUSITRITON OREGONENSIS		21
	Brown Box Crab	LOPHOLITHODES FORAMINATUS		19
	Red Queen Crab	LITHODES COUESI		10
	Giant Pacific Octopus	ENTEROCTOPUS DOFLEINI		9
		NEPTUNEA		4
		PARALOMIS MULTISPINA		1
	Inshore Tanner Crab	CHIONOECETES BAIRDI		1
	Prawn	PANDALUS PLATYCEROS	3	
	Morning Sun Starfish	SOLASTER DAWSONI	2	
	Sea Mouse	APHRODITA	1	
	Vermillion Starfish	MEDIASTER AEQUALIS	1	
	Whitespotted Sea Cucumber	PARASTICHOPUS LEUKOTHELE	1	
	Fish-Eating Star	STYLASTERIAS FORRERI	1	
	Heart Urchins	ATELOSTOMATA	1	
	Gastropods	GASTROPODA		
		AMPHIOPHIURA PONDEROSA		
		CROSSASTER		
	Sponges	PORIFERA		
	Mud Star	CTENODISCUS CRISPATUS		
	Ophiuroidea	OPHIUROIDEA		
	Rose Starfish	CROSSASTER PAPPOSUS		

Table 5. Summary of species captured during the 2022 survey standardized sets conducted at Finlayson Channel Inlet locality. Species without a count or weight indicates trace weight only.

Category	Common Name	Scientific Name	Count	Weight(kg)
Roundfish Species	Sablefish	ANOPLOPOMA FIMBRIA		5256
Flatfish Species	Pacific Halibut	HIPPOGLOSSUS STENOLEPIS		15
Invertebrate Species	Mud Star	CTENODISCUS CRISPATUS	17	

Table 6. Summary of Sablefish sex ratios and mean fork length measurements collected during the 2022 stratified random sets by spatial and depth stratum.

Strata		Proportion			Mean Fork Length (mm)		
Spatial	Depth	M:F	Males	Females	Males	Females	Tagged
S_1	RD_1		0.33	0.67	557	597	579
	RD_2		0.65	0.35	540	578	548
	RD_3		0.35	0.65	559	633	592
			0.44	**0.56**	**552**	**603**	**573**
S_2	RD_1		0.32	0.68	598	632	601
	RD_2		0.64	0.36	543	594	561
	RD_3		0.36	0.64	569	651	610
			0.44	**0.56**	**570**	**626**	**591**
S_3	RD_1		0.28	0.72	594	638	604
	RD_2		0.61	0.39	565	611	573
	RD_3		0.53	0.47	590	654	608
			0.47	**0.53**	**583**	**634**	**595**
S_4	RD_1		0.26	0.74	610	663	636
	RD_2		0.50	0.50	559	583	564
	RD_3		0.50	0.50	592	659	611
			0.42	**0.58**	**587**	**635**	**604**
S_5	RD_1		0.28	0.72	581	633	605
	RD_2		0.63	0.37	546	590	563
	RD_3		0.66	0.34	551	625	590
			0.52	**0.48**	**559**	**616**	**586**

Table 7. Canadian tag recovery counts from all sets during the 2022 survey, by distance from release site and years at liberty. Distances were determined using the great circle distance between the release location and recovery location.

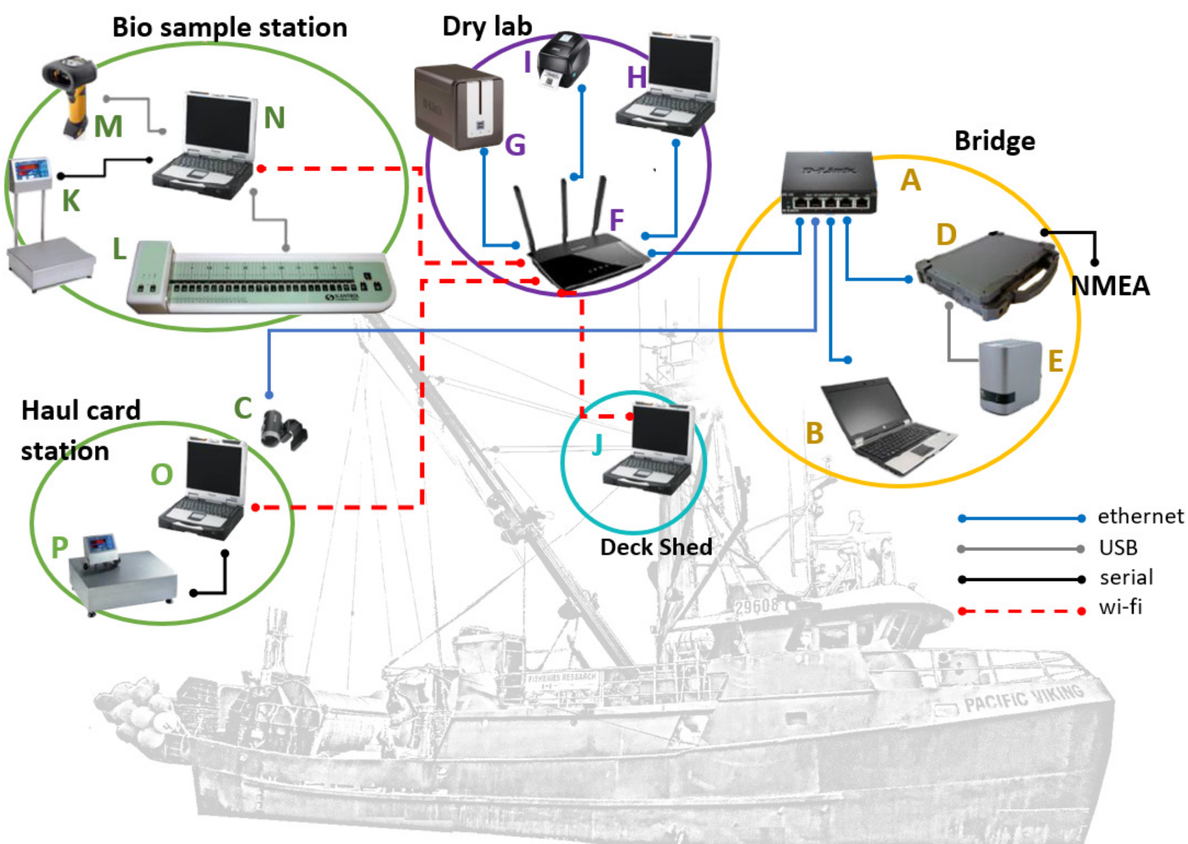
	Distance (km) from Release Location							
Years at Liberty	**<10**	**11-50**	**51-100**	**101-250**	**251-500**	**501-1000**	**1000+**	**Recovery count**
1	38	23	8	8	1	0	0	78
2-5	83	41	13	38	28	2	4	209
6-10	21	13	3	16	8	3	1	65
11+	24	21	8	12	6	1	2	74
Total Counts	166	98	32	74	43	6	7	426

APPENDIX A LIST OF SABLEFISH RESEARCH AND ASSESSMENT SURVEYS.

Year	Dates	Vessel	Captain	Set Count	GFBIO Trip id
1988	Oct 28 - Nov 24	VICIOUS FISHER	VANCE FLETCHER	16	43990
1989	Oct 19 - Nov 18	LA PORSCHE	SIGURD BRYNJOLFSON	29	43910
1990	Nov 8 - Nov 18	VIKING STAR	DOUG FARRINGTON	24	43750
1991	Oct 9 - Oct 29	W. E. RICKER	ALAN FARRINGTON	32	43673
1992	Oct 13 - Nov 4	W. E. RICKER	RON ROBERTS	38	43670
1993	Oct 19 - Nov 11	W. E. RICKER	ALAN FARRINGTON	42	43650
1994	Oct 13 - Oct 31	LA PORSCHE	RICHARD BEAUVAIS	39	43630
1994	Oct 18 - Nov 13	WESTERN VIKING	RICK JONES	27	43390
1995	Oct 8 - Oct 20	OCEAN PEARL	ROBERT FRAUMENI	29	43270
1995	Oct 11 - Oct 28	VICTOR F	MICHAEL DERRY	34	43330
1995	Oct 1 - Oct 31	VIKING SUNRISE	JASON OLSEN	40	43350
1996	Sep 26 - Oct 10	OCEAN PEARL	MICHAEL DERRY	32	43039
1996	Sep 30 - Oct 22	VIKING STAR	OTTO ELVAN	49	43210
1996	May 10 - May 30	VIKING SUNRISE	ALBERT (DEACON) MELNYCHUK	42	43024
1997	Sep 26 - Oct 21	OCEAN PEARL	MICHAEL DERRY	74	42699
1997	May 20 - Jun 10	VIKING SUNRISE	ALBERT (DEACON) MELNYCHUK	42	42760
1998	Sep 22 - Oct 17	OCEAN PEARL	MICHAEL DERRY	89	41122
1999	Sep 29 - Oct 30	OCEAN PEARL	MICHAEL DERRY	109	40589
2000	Oct 8 - Nov 14	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	131	40517
2001	Oct 6 - Nov 6	OCEAN PEARL	MICHAEL DERRY	134	43233
2002	Oct 4 - Nov 7	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	125	48120
2002	Oct 5 - Nov 13	VIKING SUNRISE	JASON OLSEN	90	48110
2003	Oct 15 - Nov 13	OCEAN PEARL	MICHAEL DERRY	94	52100
2003	Oct 7 - Nov 10	VIKING STAR	JIM FARRINGTON	84	52120
2004	Oct 5 - Nov 15	MILBANKE SOUND	DON QUAST	95	58145
2004	Oct 5 - Nov 3	OCEAN MARAUDER	ALBERT (DEACON) MELNYCHUK	84	57360
2005	Oct 4 - Nov 2	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	84	60529
2005	Oct 7 - Nov 17	VIKING SUNRISE	RORY JOHNSON	88	60503
2006	Oct 1 - Nov 1	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	98	62966
2006	Oct 2 - Nov 15	SENA II	TIM JOYS	98	62666
2007	Oct 7 - Nov 12	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	99	65106
2007	Oct 8 - Nov 12	VIKING TIDE	JASON OLSEN	91	65107
2008	Sep 29 - Nov 16	OCEAN PEARL	ROBERT FRAUMENI	157	67007
2009	Oct 8 - Nov 25	OCEAN PEARL	ROBERT FRAUMENI	155	69067
2010	Oct 9 - Nov 30	OCEAN PEARL	ROBERT FRAUMENI	153	70787
2011	Oct 9 - Nov 21	OCEAN PEARL	DARCY NICHOLS	132	72067
2012	Oct 9 - Nov 17	OCEAN PEARL	DARCY NICHOLS	135	73190
2013	Oct 11 - Nov 17	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	111	74872
2014	Oct 9 - Nov 17	OCEAN PEARL	DARCY NICHOLS	111	76150
2015	Oct 9 - Nov 20	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	111	77830
2016	Oct 7 - Nov 22	OCEAN PEARL	DARCY NICHOLS	111	80471
2017	Oct 6 - Nov 21	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	109	82790
2018	Oct 9 - Nov 19	OCEAN PEARL	DARCY NICHOLS	111	84250
2019	Oct 8 - Nov 25	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	109	85230
2020	Oct 7 - Nov 21	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	87	85690
2021	Oct 6 - Nov 21	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	81	86130
2022	Oct 3 - Nov 19	PACIFIC VIKING	ALBERT (DEACON) MELNYCHUK	97	86530

APPENDIX B F/V PACIFIC VIKING 2022 GFSURVEYS NETWORK CONFIGURATION

The GFSurveys network consisted of a network switch (A) connected via ethernet cable on the bridge to the chief scientist laptop (B), and the GFSERVER database server (D). GFSERVER (D) was connected to a SQLBACKUP USB RAID (E), and configured to log NMEA feeds from the vessel GPS and depth sounder. An IP camera power source was connected to the network switch (A), and a sturdy ethernet cable was routed to the IP camera (C) mounted above the haul card station. A long ethernet cable connected the bridge network switch (A) to the router (F) in the dry lab. The dry lab router (F) was connected to the GFFCBACKUP RAID (G), the sensor toughbook (H), and the barcode label printer (I). A scale logging Toughbook (J) was set up in the deck shed, and was wirelessly connected to the router (F). The scale logging Toughbook (J) was configured to log output from the haul card scale (P) and biosample platform marine scale (K). On deck at the biosample station, a Toughbook (N) was wirelessly connected to the router (F). The Toughbook (N) was configured to access the biosample scale (K) data remotely, and was also connected to a fish measuring board (L), and a barcode scanner (M). On deck at the haul card station, a toughbook (O) was wirelessly connected to the router (F) and was configured to access haul card scale (P) data. UPS units were used to ensure uninterrupted power supply (not shown below) to the core EDAS components (A, E, F, and G). The connection types are colour-coded and presented in the legend.



APPENDIX C SURVEY SET DETAILS 2022.

Details of sets completed during the 2022 survey program. Sets are listed by stratum/inlet name, set type (Exper=experimental), depth stratum, start date, end time of gear deployment, and duration in minutes. The depth strata for type 3 tagging sets include RD_1 (100-250 fathoms), RD_2 (250-450 fathoms), and RD_3 (450-750 fathoms). The position data includes the major area and start and end latitude and longitude in degrees decimal minutes. The bottom depths (in meters) of the fishing set are shown with the mean bottom depth calculated from recordings at one minute intervals between the start and end of the set. The number of traps fished for each set excludes open traps, while holed or fouled traps have been included. Sets that successfully deployed a Seabird SBE temperature and pressure recorder (TDR), an accelerometer (AXL) or a camera (CAM) are indicated with an ‘x’.

Set	Spatial Stratum	Type	Depth Stratum	Date	Time	Duration (minutes)	Area	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)	Mean Depth (m)	Traps Fished	TDR	AXL	CAM
1	S1	StRS	RD1	Oct 5	08:06	1326	3C	48° 3.4'N	126° 0.9'W	48° 3.3'N	126° 1.8'W	302	281	300	25	x		
2	S1	StRS	RD2	Oct 5	09:26	1366	3C	48° 1'N	126° 4.4'W	48° 0.8'N	126° 5.3'W	496	471	472	25	x		
3	S1	StRS	RD3	Oct 5	11:54	1393	3C	48° 3.4'N	126° 23.3'W	48° 3.4'N	126° 24.3'W	1230	1277	1254	25	x		
4	S1	StRS	RD2	Oct 5	13:54	1535	3C	48° 6.6'N	126° 13.7'W	48° 6.5'N	126° 14.6'W	656	695	676	25	x		
5		Exper		Oct 5	15:08	1327	3C	48° 8'N	126° 11.6'W	48° 8.1'N	126° 13.9'W	466	603	529	58	x	x	x
6	S1	StRS	RD2	Oct 5	16:36	1485	3C	48° 2.7'N	126° 16.7'W	48° 2.6'N	126° 17.7'W	665	687	676	25	x	x	x
7	S1	StRS	RD2	Oct 5	18:00	1487	3C	48° 3.8'N	126° 11.7'W	48° 3.5'N	126° 12.7'W	479	639	567	25	x		
8	S1	StRS	RD2	Oct 7	08:07	1323	3C	48° 6.8'N	126° 17.4'W	48° 6.2'N	126° 17.9'W	565	700	617	25	x		
9	S1	StRS	RD3	Oct 7	10:23	1345	3C	48° 9.8'N	126° 30.9'W	48° 9.7'N	126° 31.8'W	1012	1035	1025	25	x		
10	S1	StRS	RD2	Oct 7	11:50	1349	3C	48° 2'N	126° 29.2'W	48° 1.7'N	126° 30.1'W	661	669	648	25	x		
11		Exper		Oct 7	13:39	1343	3C	48° 5.4'N	126° 31'W	48° 4.7'N	126° 32.9'W	415	562	479	58	x	x	x
12	S1	StRS	RD1	Oct 7	15:04	1464	3C	48° 6.6'N	126° 31.1'W	48° 6.5'N	126° 32'W	336	378	355	25	x	x	x
13	S1	StRS	RD1	Oct 7	16:22	1556	3C	48° 6.7'N	126° 27.8'W	48° 6.4'N	126° 28.7'W	294	315	305	25	x		
14	S1	StRS	RD1	Oct 7	17:53	1578	3C	48° 6.3'N	126° 21'W	48° 6.2'N	126° 22.1'W	306	333	325	25	x		
15	S1	StRS	RD1	Oct 9	08:04	1328	3C	48° 7.9'N	126° 32.4'W	48° 7.4'N	126° 33.2'W	272	414	366	25	x		
16	S1	StRS	RD3	Oct 9	10:35	1381	3C	48° 0'N	126° 49.2'W	48° 0'N	126° 50.3'W	1209	1214	1198	25	x		
17	S1	StRS	RD3	Oct 9	13:06	1355	3C	48° 4.4'N	126° 54.9'W	48° 4.3'N	126° 55.9'W	965	1011	990	25	x		
18		Exper		Oct 9	14:55	1379	3C	48° 8.4'N	126° 45'W	48° 8.3'N	126° 47.4'W	409	530	461	58	x	x	x
19	S1	StRS	RD2	Oct 9	16:01	1518	3C	48° 8.7'N	126° 53.9'W	48° 8.6'N	126° 55.1'W	775	821	798	25	x	x	x
20	S1	StRS	RD2	Oct 11	08:02	1329	3D	49° 0.6'N	127° 3.6'W	49° 0.5'N	127° 4.6'W	677	747	708	25	x		
21		Exper		Oct 11	09:31	1620	3D	49° 5'N	127° 5.3'W	49° 5'N	127° 7.6'W	380	538	464	58	x	x	x
22	S1	StRS	RD3	Oct 11	10:47	1289	3D	49° 2'N	127° 8.8'W	49° 1.9'N	127° 9.8'W	967	1081	1025	25	x		
23	S1	StRS	RD1	Oct 11	12:08	1318	3D	49° 6.3'N	127° 4.3'W	49° 6.3'N	127° 5.4'W	197	213	205	25	x	x	x
24	S2	StRS	RD3	Oct 11	14:16	1567	3D	49° 0.7'N	127° 19.3'W	49° 0.7'N	127° 20.3'W	1074	1199	1191	25	x		
25	S2	StRS	RD1	Oct 11	16:51	1572	3D	49° 3.8'N	127° 16.3'W	49° 4'N	127° 17.4'W	313	461	401	25	x		
26	S2	StRS	RD2	Oct 11	19:15	1595	3D	49° 5'N	127° 35.7'W	49° 4.2'N	127° 36'W	539	762	670	25	x		
27	S2	StRS	RD2	Oct 13	08:01	1331	3D	49° 8.8'N	127° 39.3'W	49° 8.7'N	127° 40.4'W	524	580	529	25	x		
28	S2	StRS	RD2	Oct 13	09:24	1387	3D	49° 1.4'N	127° 36'W	49° 1.4'N	127° 37.1'W	551	605	577	25	x		
29	S2	StRS	RD2	Oct 13	10:37	1421	3D	49° 5.9'N	127° 40.8'W	49° 5.8'N	127° 42'W	586	711	672	25	x		
30		Exper		Oct 13	12:29	1414	3D	49° 7.8'N	127° 44.9'W	49° 7.6'N	127° 47.2'W	433	557	532	58	x	x	x
31	S2	StRS	RD2	Oct 13	14:05	1469	3D	49° 1.3'N	127° 47.3'W	49° 1.1'N	127° 48.3'W	570	615	570	25	x	x	x
32	S2	StRS	RD3	Oct 13	15:34	1505	3D	49° 0.3'N	127° 57.7'W	49° 0.2'N	127° 58.8'W	856	896	882	25	x		
33	S2	StRS	RD1	Oct 13	18:20	1488	3D	49° 7.7'N	127° 46'W	49° 7.7'N	127° 47.3'W	258	395	375	25	x		
34	S2	StRS	RD3	Oct 15	07:13	1302	3D	50° 1.1'N	128° 33.4'W	50° 1.1'N	128° 34.5'W	980	1180	1063	25	x		
35	S2	StRS	RD3	Oct 15	09:14	1309	3D	50° 0.7'N	128° 25.4'W	50° 0.7'N	128° 26.5'W	1087	1225	1186	25	x		
36	S2	StRS	RD2	Oct 15	11:44	1302	3D	50° 0.5'N	128° 8.8'W	50° 0.5'N	128° 9.9'W	519	650	580	25	x		
37	S2	StRS	RD3	Oct 15	13:14	1312	3D	50° 2.5'N	128° 11.5'W	50° 2.4'N	128° 12.7'W	958	1264	1086	25	x	x	x
38	S2	StRS	RD2	Oct 15	15:29	1322	3D	50° 9.7'N	128° 24.7'W	50° 9'N	128° 24.6'W	653	740	668	25	x	x	x
39	S2	StRS	RD1	Oct 15	16:58	1353	3D	50° 5.1'N	128° 24.2'W	50° 5.2'N	128° 25.3'W	201	205	203	25	x		
40	S2	StRS	RD1	Oct 18	08:05	1325	5A	50° 9.3'N	128° 42.8'W	50° 9.4'N	128° 43.9'W	195	200	199	25	x		
41	S2	StRS	RD1	Oct 18	09:10	1356	5A	50° 9.3'N	128° 49.4'W	50° 9.4'N	128° 50.6'W	221	231	236	25	x		
42	S2	StRS	RD1	Oct 18	11:54	1362	5A	50° 3.7'N	129° 11.5'W	50° 3.2'N	129° 12.1'W	235	292	258	25	x		

continued.

Set	Spatial Stratum	Type	Depth Stratum	Date	Time	Duration (minutes)	Area	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)	Mean Depth (m)	Traps Fished	TDR	AXL	CAM
43	S3	StRS	RD3	Oct 18	14:55	1357	5A	50° 0.1’N	129° 34.1’W	50° 9.6’N	129° 33.5’W	838	1136	988	25	x	x	x
44	S3	StRS	RD2	Oct 18	17:06	1367	5A	51° 0.1’N	129° 38.6’W	51° 0.2’N	129° 39.7’W	465	545	514	25	x	x	x
45	S3	StRS	RD2	Oct 18	18:20	1393	5A	51° 0.7’N	129° 45.6’W	51° 0.2’N	129° 46.3’W	459	445	459	25	x		
46	S3	StRS	RD1	Oct 22	00:21	1244	5A	51° 0.4’N	129° 38.5’W	51° 0.4’N	129° 39.9’W	270	273	271	25	x		
47	S3	StRS	RD1	Oct 22	01:25	1280	5A	51° 0.5’N	129° 42.8’W	51° 0.4’N	129° 43.8’W	423	383	427	25	x		
48	S3	StRS	RD3	Oct 22	03:30	1311	5A	51° 0’N	129° 57.9’W	51° 0’N	129° 58.9’W	1023	985	1019	25	x		
49	S3	StRS	RD2	Oct 22	04:57	1335	5A	51° 1.3’N	129° 55.9’W	51° 1.3’N	129° 56.9’W	548	513	532	25	x		
50	S3	StRS	RD2	Oct 22	06:19	1373	5A	51° 2.5’N	130° 5.8’W	51° 2.4’N	130° 6.8’W	727	783	751	25	x		
51	S3	StRS	RD1	Oct 24	16:53	1210	5B	51° 8.4’N	130° 38.6’W	51° 8.2’N	130° 39.8’W	408	422	415	25	x		
52	S3	StRS	RD1	Oct 24	18:42	1224	5B	51° 8.9’N	130° 26.1’W	51° 8.9’N	130° 27.2’W	336	340	346	25	x		
53	S3	StRS	RD1	Oct 24	20:47	1221	5B	51° 7.8’N	130° 12.7’W	51° 7.8’N	130° 13.7’W	213	212	210	25	x		
54	S3	StRS	RD1	Oct 24	22:10	1254	5B	51° 4.9’N	130° 10.8’W	51° 4.8’N	130° 11.6’W	219	221	218	25	x		
55	S3	StRS	RD2	Oct 25	00:33	1276	5B	51° 1.8’N	130° 27.7’W	51° 1.8’N	130° 28.7’W	541	719	602	25	x		
56	S3	StRS	RD3	Oct 25	01:46	1307	5B	51° 9.4’N	130° 29.1’W	51° 9.6’N	130° 30.1’W	889	1082	972	25	x		
57	S3	StRS	RD2	Oct 25	03:35	1305	5B	51° 4.8’N	130° 26.1’W	51° 4.7’N	130° 27.2’W	612	574	565	25	x		
58	S4	StRS	RD1	Oct 31	08:03	1325	5E	52° 0.2’N	131° 16.3’W	52° 0.2’N	131° 17.2’W	212	218	219	24	x		
59	S4	StRS	RD3	Oct 31	10:00	1341	5E	52° 0.1’N	131° 26.1’W	52° 0.1’N	131° 27.1’W	1016	1095	1049	25	x		
60	S4	StRS	RD1	Oct 31	11:42	1340	5E	52° 0.3’N	131° 23.6’W	52° 0.4’N	131° 24.6’W	217	520	366	25	x		
61	S4	StRS	RD2	Oct 31	12:52	1392	5E	52° 1.5’N	131° 28.3’W	52° 1.5’N	131° 29.3’W	735	804	759	25	x		
62	S4	StRS	RD3	Oct 31	14:39	1407	5E	52° 3’N	131° 36.7’W	52° 3’N	131° 37.6’W	953	1052	1017	25	x		
63	S4	StRS	RD2	Oct 31	16:08	1418	5E	52° 4.5’N	131° 30.4’W	52° 4.5’N	131° 31.4’W	587	759	668	25	x		
64		Exper		Nov 2	06:18	273	5E	53° 0.3’N	132° 41’W	53° 0.3’N	132° 43.7’W	424	596	495	58	x	x	x
65	S4	StRS	RD2	Nov 6	06:01	1327	5E	52° 8.2’N	132° 30.3’W	52° 8.2’N	132° 31.4’W	590	653	632	25	x		
66	S4	StRS	RD2	Nov 6	07:27	1361	5E	52° 5.7’N	132° 28.2’W	52° 5.8’N	132° 29.3’W	516	736	618	25	x		
67	S4	StRS	RD1	Nov 6	08:44	1402	5E	52° 5.6’N	132° 24.7’W	52° 5.5’N	132° 25.8’W	407	402	438	25	x		
68	S4	StRS	RD1	Nov 6	10:01	1431	5E	52° 3.6’N	132° 21.3’W	52° 3.6’N	132° 22.6’W	428	453	446	25	x		
69	S4	StRS	RD3	Nov 6	11:20	1480	5E	52° 3.3’N	132° 24.6’W	52° 3.3’N	132° 25.8’W	825	977	982	25	x		
70	S4	StRS	RD3	Nov 6	12:57	1505	5E	52° 7.9’N	132° 29.3’W	52° 7.8’N	132° 30.7’W	921	989	965	25	x	x	x
71	S4	StRS	RD3	Nov 6	14:24	1520	5E	52° 7.6’N	132° 34.6’W	52° 7.6’N	132° 35.9’W	1147	1190	1151	25			
72	S4	StRS	RD1	Nov 8	06:01	1333	5E	53° 0’N	132° 32.9’W	52° 9.8’N	132° 33.9’W	413	515	455	25	x		
73	S4	StRS	RD2	Nov 8	07:22	1366	5E	53° 0.4’N	132° 35.9’W	53° 0.6’N	132° 37.1’W	514	671	603	25	x		
74	S4	StRS	RD2	Nov 8	08:41	1418	5E	53° 0.9’N	132° 38.1’W	53° 0’N	132° 39.3’W	497	719	585	25	x		
75	S4	StRS	RD1	Nov 8	09:55	1472	5E	53° 0.8’N	132° 38.6’W	53° 0.7’N	132° 40’W	215	402	288	24	x	x	x
76	S5	StRS	RD2	Nov 8	12:23	1470	5E	53° 1.3’N	132° 57.9’W	53° 1’N	132° 59.1’W	771	782	774	25	x	x	x
77	S5	StRS	RD2	Nov 8	13:47	1500	5E	53° 4.8’N	133° 3.6’W	53° 4.5’N	133° 4.8’W	711	731	721	25	x		
78	S5	StRS	RD1	Nov 8	15:30	1510	5E	53° 1’N	133° 1.7’W	53° 0.4’N	133° 1.1’W	415	404	442	25	x		
79	S5	StRS	RD2	Nov 11	06:04	1324	5E	53° 4.1’N	132° 59.5’W	53° 4.1’N	133° 0.7’W	556	618	591	25	x		
80	S5	StRS	RD2	Nov 11	07:28	1362	5E	53° 5.2’N	133° 10.4’W	53° 5.2’N	133° 11.4’W	526	676	598	25	x		
81	S5	StRS	RD3	Nov 11	08:57	1379	5E	53° 9.7’N	133° 14.8’W	53° 9.5’N	133° 15.9’W	815	995	933	25	x		
82	S5	StRS	RD1	Nov 11	11:23	1376	5E	53° 1.5’N	133° 12.5’W	53° 1.4’N	133° 13.9’W	207	225	216	25	x	x	x
83	S5	StRS	RD2	Nov 11	12:33	1407	5E	53° 4.2’N	133° 21.3’W	53° 4.2’N	133° 22.9’W	541	643	590	25	x	x	x
84	S5	StRS	RD3	Nov 11	13:56	1440	5E	53° 6.3’N	133° 29.5’W	53° 6.2’N	133° 30.7’W	821	897	856	25	x	x	x

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continued.

Set	Spatial Stratum	Type	Depth Stratum	Date	Time	Duration (minutes)	Area	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth (m)	End Depth (m)	Mean Depth (m)	Traps Fished	TDR	AXL	CAM
85	S5	StRS	RD1	Nov 11	15:29	1437	5E	53° 8.6'N	133° 24.3'W	53° 8.6'N	133° 25.6'W	319	359	336	25	x		
86	S5	StRS	RD1	Nov 11	16:45	1450	5E	53° 1.8'N	133° 26.3'W	53° 1.7'N	133° 27.8'W	237	319	282	25	x		
87	S5	StRS	RD3	Nov 13	07:40	1331	5E	53° 8.6'N	133° 40.8'W	53° 8.6'N	133° 42'W	895	1065	968	25	x		
88	S5	StRS	RD2	Nov 13	08:57	1341	5E	54° 0.8'N	133° 39.2'W	54° 0.8'N	133° 40.3'W	649	719	683	25	x		
89	S5	StRS	RD3	Nov 13	11:22	1370	5E	54° 0'N	133° 55'W	54° 0.9'N	133° 56.1'W	1226	1218	1236	25	x		
90	S5	StRS	RD2	Nov 13	12:53	1366	5E	54° 2.5'N	133° 50.4'W	54° 2.5'N	133° 51.6'W	512	630	564	25	x	x	x
91	S5	StRS	RD1	Nov 13	15:06	1408	5E	54° 9.5'N	133° 36.3'W	54° 9.5'N	133° 37.5'W	259	260	259	25	x	x	x
92	S5	StRS	RD1	Nov 13	16:20	1428	5E	54° 7.5'N	133° 30.4'W	54° 7.5'N	133° 31.6'W	302	292	296	25	x		
93	Finlayson	Inlet		Nov 16	11:56	981	5C	52° 7.5'N	128° 25.9'W	52° 6.9'N	128° 26.5'W	564	591	577	25	x		
94	Finlayson	Inlet		Nov 16	12:57	1018	5C	52° 3.8'N	128° 27.9'W	52° 3.1'N	128° 27.7'W	600	595	598	25	x		
95	Finlayson	Inlet		Nov 16	13:51	1066	5C	52° 9.8'N	128° 28.5'W	52° 9.1'N	128° 28.6'W	564	581	585	25	x		
96	Finlayson	Inlet		Nov 16	15:06	1091	5C	52° 4.7'N	128° 27.9'W	52° 4'N	128° 27.8'W	681	648	657	25	x		
97	Finlayson	Inlet		Nov 16	15:50	1145	5C	52° 1'N	128° 27.9'W	52° 0.3'N	128° 27.7'W	774	808	800	25	x		

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APPENDIX D SUMMARY OF BASKET USE BY TRAP 2022.

Summary of the basket use by trap number for StRS and inlet sets during the 2022 Sablefish survey. The fate of the Sablefish catch for each set and trap is indicated using the following abbreviations: D = Discarded after weighing (processed as commercial catch), A = Sampled for Length, Sex, Maturity, Weight and Otoliths (LSMWO), T = Tagged and released, SD = Sublegal discarded, F= Frames with amphipod or hagfish damage, NULL = No Sablefish catch/or trap missing. Standardized sets at mainland inlet localities are highlighted with green. StRS sets highlighted with purple had a camera deployed on that string of gear.

Set	Trap																										Total			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	A	D	T	-
1	T	D,SD		T	A	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D	T	A		T	D,SD	D,SD	T		4	1	9	2
2	D	A	T	D,SD	D,SD	T		A	T	D	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD		3	2	8	1
3	A		A	D,SD		D,SD		T	D,SD		T	D,SD	A	T	D,SD	A	T			T	A	A	T	A	A		8	0	6	6
4	T	D,SD	A	T	D,SD	D,SD	T		A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD		D,SD	D,SD	D,SD	D,SD	D,SD		2	0	6	2
6	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A		D,SD	A	T	D,F	A	T	D,SD	A	T	D,SD	T	D,SD	5	1	7	0
7	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,F	T	D,SD	A,F	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,F		3	2	7	0
9	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	T,SD	D,SD		3	0	8	0
10	T	D,SD	A	D,SD	D,SD	D,SD	T	T,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	T,SD	D,SD		2	0	3	0
12	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	T,SD	D,SD		D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	2	0	2	0
13	T	D,SD	A	T	D,SD	A	D,F	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	1	2	0
14	D,SD	D,SD	T	D,SD	A	D,SD	D,F	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	A	D,F	D,SD	D,SD	D,SD	D,SD		D,SD	D,SD		2	2	2	1
15	D,F	T,F	D,SD	A,F	T,F	D,F	D,F	T,F	D,SD	D,SD	T,F	D,SD	D,SD	D,SD	D,SD	A,F	D,F	D,SD	D,SD	D,F	D,SD	D,SD	D,SD	D,SD	D,F		2	6	4	0
17	A	A	T	T,SD	D,F	T	D,SD	T,SD	T	T,SD	D,SD	D,SD	D,SD	D,SD	T	T,SD	T	D,SD	T,SD	D,SD	T,SD	D,SD	T,SD	D,SD	T,SD		2	1	5	0
19	T	D,SD	A	T	D,SD	A	T,F	D,SD	D,SD	T		D,SD	T,F		A,F	D,SD	T,SD	A	D,SD		D,SD	D,SD	T,SD		D,SD	D,SD	4	0	5	3
20	D,SD	T	T	D,SD		T		D,SD	T	D,SD	A	T	D,SD		T	D,SD	D,SD	T		D,SD	T		D,SD	T			1	0	9	6
22	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	T	T,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,F	T,SD		2	1	4	0
23	D,F	T,SD		D,SD	T	T	D,SD	D,SD	T		D	D,SD					A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		1	2	4	6
24	A	T	T	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D	A	T	D	A	T	A	A	T	D,SD	A		8	2	9	0
25	T,F	D	A	T	D,SD	D,SD	T	D,SD	D,F	D,SD	T,F	A,F	T	D,SD	D,SD	D,SD	T,F	D,SD	T,F	D,F	D,SD	D,SD	D,SD	D,SD	D,F		2	4	7	0
26	D,SD	A	T		T,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD		3	0	6	1
27	D,SD	T	D,SD	A	T	D,SD	T,SD	D,SD	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	T,SD	D,SD	D,SD		2	0	4	0
28	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	T,SD	D,SD		2	0	5	0
29	D,SD	A,F	T	D,SD	D,SD	T	D,SD	D,SD	T	T,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	0	5	0
31	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T		A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	3	0	6	0
33	A	T,F	D,F	A	T,F	D,F	D,F	T	D,SD	A,F	T,F	D,F	T,F	T,F	D,F	D,F	T,F	D,F	D,F	T	D,F	D,SD	T	D,F			3	10	9	1
34	T	D,SD	A	T	A	D,SD	T	D,SD	A			A	T	A	D,SD	T	D,SD	A	T	A	A	T	A	A	T		10	0	8	2
35	D,SD	A	T	D,SD	A		D	A	T	A	A	T	D,SD	A	T	A	D,SD	T	D	D,SD	T	D	D,SD	T	D,SD		7	3	7	1
36	A	T	D,SD		T	D,SD	A		D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	A	T,F	D,SD	D,SD		4	0	7	2
37	T	D,SD	A	T	D,SD		T	D,SD	A	T	D,SD	A	T		A	T	D	A	T	D,SD	A	T	D,SD	A	T	D,SD	7	1	9	1
38	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD		T,F	D,SD	A	D,SD	D,SD	D,SD	D,F	D,SD	D,SD	D,SD	D,SD	D,SD	3	1	5	0
39			A	D,SD	T			T,F			A	T			A		A	A		A					A		7	0	3	14
40	D				A			A	A	T		A	T	A		T				A	A	T			T		7	1	5	12
41			T			T		A		D,SD	T	A		A				T				A					4	0	4	16
42		T		A	T	A	A,F		A	A	T			T	A	A		A	D	T		D					8	2	5	10
43			A	T	A	A	T	D,SD	A	T	D,SD	A	T		D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	5	0	8	2
44	D,SD	D,SD	T	D,SD	A	T	D,SD	T,SD	T		D,SD	T	D,SD	D,SD	D,SD	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	A	D	3	1	5	0
45	A	T	D	D,SD	T	D,SD	D,SD	A		T,SD	T	D,SD	T	T	D,SD		T	A	D,SD	T	A	T	D,SD	T	D,SD		4	1	9	2
46	T	D,SD	A	T	D,F	A	D,SD	D,SD	A	T		D,SD	T		A	T	D,SD	A	T	T,SD	A	T	D,SD	D,SD	T		6	1	8	2
47	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD		4	0	7	0
48	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	T,SD	T	D,SD	A	D,SD	D	D,SD		4	1	7	0
49	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	T	T	D	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		1	1	7	0
50	D,SD	A	T	D,SD	D	D,F	D,SD	D,SD	T	D,SD	D,SD	T,SD	T,SD	D,SD	T,SD	D,SD	T,SD	D,SD	D,SD	A	T,SD	D,SD	D,SD	D,SD	T,SD		2	2	2	0
51	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	0	4	0
52	T	D,SD	A	T	D,SD	A	T	D	D	T	D,SD	D,SD	T	D,SD	D,SD	T	T,SD	A	T	D,SD	A	T	D,SD	T	T		4	2	10	0
53	D	A	T		A		A		T	A	A	T		A	T	A	A		A	A	T		D	T	D,SD		10	2	6	6
54	A	T	D,SD	A	T		A	T	D	A	T	D,SD	A	T	D,SD	A	T		A	T	D,SD	A	T	D			8	2	8	3

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continued.

Set	Trap 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total A	D	T	-
55	T	D,SD	A	T		D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	0	5	1
56	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD		4	0	8	0
57	A	T	D,SD	D,SD	D,SD	D,SD	T,SD	T	D,SD	D,SD	D,SD	D,SD	T	T	D,SD	T,SD	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	T,SD		2	0	6	0
58					A	A			A		A	A	T						T					A			6	0	2	17
59	D	A	T	D,SD	A	T	D,SD	A	T	D	A	T	D,SD		T	A	A	T	A	A	T	D,SD	A		D		9	3	7	2
60	A	T	D	D,SD	T	D	A	T	D		T	D	D	T				A									3	5	5	11
61	T	D,SD	A	T	D	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD	T	D,F	D,SD	D,SD	D,F	D,F	D,SD		2	4	5	0
62			T	A	A	T	D	A		D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D		5	2	7	3
63	A,F	T	D,SD	D,SD	T	D,SD	A,F	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		3	0	4	0
65	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,F		2	1	4	0
66	A	T	D,SD	D,SD	D,SD	D,SD	T,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	0	3	0
67	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	T,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D	D,SD		5	1	7	0
68		A	T	D,SD	D,SD	T	D,SD	D,SD	T	T	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD		2	0	8	1
70	T	D,SD	A	T	D,SD	D	T	D,SD	T,SD	T	D,SD	D,SD	D,SD		A	D,SD			T	T,SD	A	T	D,SD		D,SD	D,SD	3	1	6	3
71	D	A	T	A	A	T	A	A	T	A		T		A	T	A	A	T	A	A	T	A	A	T			13	1	8	3
72	A	T	D,SD	D,SD	T	D	D	T	D	T,SD	T	D,SD	A	T	D	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D		4	5	8	0
73	T	D,SD	A	T	D,SD	T,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		1	1	3	0
74	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D,SD	T,SD	D,SD	D,SD	D,SD	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD		2	0	3	0
75	A	T	D	A	T		D,SD	T	D,SD	A	T	D,SD							A	T				A			5	1	5	11
76	T	D,SD	D,SD	T,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	T		A	D,SD	D,SD	D,SD	D,SD	D,SD		D,SD	D,SD	D,SD	D,SD	D,SD	2	0	2	1
77	D,SD	A	T	T,SD	T,SD	D,SD	D,SD	D,SD	T,SD	T,SD	D,SD	D,SD	T,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	T,SD	T,SD	D,SD		2	0	3	0
78	A	T	A	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T		A	T	D		T	D,SD		T	A	D,SD		7	1	8	3
79	D,SD	T	A	T	D,SD	D,SD	T	D,SD	D,SD		D,SD	A	T	D,SD	D,SD	T	D,SD	A	T		T,SD	D,SD		D,SD	D,SD		3	0	6	3
80	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD		3	0	5	0
81	T	T	D,SD	A	T	D,SD	A	T	D,SD	T		D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD		T	D,SD	D,SD		3	0	9	2
82						A					A																2	0	0	23
83	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD		D,SD	D,SD	A	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	2	0	4	0
84	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	A		D,SD	D,SD	T	D,SD	D,SD	T	D,SD	T,SD	T	T,SD	D,SD	D,SD	2	0	6	0
85			A		A		T	A	A		A	A	T	A	D,SD		T	D,SD		T	T				T		7	0	6	10
86	A	D,SD	T	D,SD		T			T	A		T		A		A	A	T			A	A	A	A	A		10	0	5	8
87	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	D,SD	D,SD	D,SD		4	0	6	0
88	T	D,SD	A	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD		2	0	5	0
89	D	A	T			T				A		T			T			T			T						2	1	6	16
90	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	D,SD	T	D,SD		D,SD	D,SD	A	T	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	D,SD	2	0	4	0
91	D	A		T	D,SD	A		D,SD		T			T			T					A			A	T	A	5	1	5	12
92	T	A	T		A	T	T,SD	A		A	A			A		A	D,SD	T	D,SD				A	T			8	0	5	9
93	A	T	D,SD	A	T	D,SD	D,SD	T		A	T	D,SD	A	T	D,SD	D,SD		D,SD	D,SD		T			D	D,SD		4	1	6	5
94	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	D,SD	D,SD	D,SD	D,SD		5	0	7	0
95	D,SD	T	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD	D,SD	D,SD	A	T	D,SD	D,SD	T	T,SD	D,SD	T	D,SD	D,SD	T	D,SD		2	0	8	0
96	A	T	A	D,SD	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	D,SD		7	0	8	0
97	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	T	D,SD	A	T	D,SD	A	T	D,SD	A	T	D,SD	D,SD	D,SD		6	0	8	0

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APPENDIX E SUMMARY OF SABLEFISH BIOLOGICAL DATA 2022.

Summary of biological data collected for Sablefish includes information about the set, catch weight in kilograms, and the number of fish. Sablefish counts by trap are depicted with sparklines, predominantly originating from the end location in 2022 (green sparklines), with exceptions for sets 95, 96, and 97 (blue sparklines) which were picked up from the start location. Tagged fish counts are documented in terms of the number of fish recovered and re-released, fish sampled, and fish tagged and released. Tagged fish fork lengths are presented both in terms of counts of the number of tagged fish measured for fork length and mean values (mm). Specimen counts are categorized by sample type, with corresponding mean fork lengths tabulated. Standardized sets at mainland inlet locations are highlighted in green, while StRS sets have no background color. Sets marked with purple had cameras deployed on that string of gear. The six sets highlighted in blue correspond to the 60 trap sets that were deployed to assess gear benthic contact.

Set	Total Catch			Tagged Fish Counts				Tagged Fork Length(mm)		Specimen Count						Mean Fork Length(mm)		
	kg	Count	Count by Trap	Recover-Rerelease	Tag Sample	Re-leased	No Tag	Count	Mean	Fork Length	Sex	Maturity	Otoliths	Weight	Count	Proportion Males	Males	Females
1	724	290		0	0	109	1	109	609	48	48	48	48	48	49	0.35	575	617
2	915	434		0	0	153	0	152	577	52	51	51	52	52	52	0.45	563	597
3	484	176		0	0	52	0	52	625	52	52	52	52	52	52	0.21	627	632
4	930	543		0	0	125	0	125	546	52	52	52	52	52	52	0.71	549	553
5		996		0	2	0	0	2	550	2	2	2	2	2	2	1	575	0
6	699	428		0	0	131	0	131	536	51	50	50	51	50	51	0.8	532	574
7	1105	520		0	0	121	0	121	582	51	51	51	51	51	51	0.65	588	593
8	1608	818		1	0	124	0	125	568	52	52	52	52	52	52	0.71	556	563
9	1170	503		1	0	123	0	124	600	56	56	56	55	56	56	0.32	576	641
10	1249	741		4	0	119	0	123	537	57	56	56	57	57	57	0.68	514	552
11		1780		0	1	0	0	1	565	1	1	1	1	1	1	1	565	0
12	2296	1154		0	0	121	0	121	565	55	53	53	54	55	55	0.38	559	602
13	2644	1390		0	0	130	0	130	567	53	53	53	53	53	53	0.28	540	587
14	2673	1384		0	0	153	1	153	561	53	53	53	53	53	54	0.47	549	589
15	3817	1957		0	0	118	73	118	583	50	50	50	50	50	123	0.34	551	589
16	470	136		1	0	46	0	47	667	50	50	50	50	50	50	0.06	653	663
17	1598	789		9	0	144	0	153	563	54	54	54	54	54	54	0.5	528	596
18		1225		0	4	0	0	4	530	3	4	4	3	3	4	0.5	545	585
19	684	471		2	0	126	0	127	513	50	50	50	50	50	50	0.56	511	598
20	548	362		2	0	111	0	113	525	50	50	50	50	50	50	0.66	512	575
21		1605		0	8	0	0	8	584	7	8	8	6	8	8	0.75	607	633
22	1630	828		5	0	118	2	123	577	51	51	51	51	51	53	0.65	546	602
23	1612	687		2	0	144	0	146	606	54	54	54	54	54	54	0.15	593	601

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continued.

Set	Total Catch			Tagged Fish Counts				Tagged Fork Length(mm)		Specimen Count						Mean Fork Length(mm)		
	kg	Count	Count by Trap	Recover-Rerelease	Tag Sample	Re-leased	No Tag	Count	Mean	Fork Length	Sex	Maturity	Otoliths	Weight	Count	Proportion Males	Males	Females
24	618	214		1	0	65	0	66	650	48	48	48	48	48	48	0.29	582	652
25	1226	535		0	0	121	2	121	596	56	56	56	56	56	58	0.34	574	601
26	914	536		1	0	153	0	154	530	51	51	51	51	51	51	0.82	534	565
27	2535	1024		3	0	157	0	160	586	54	54	54	54	54	54	0.44	565	644
28	1260	663		2	0	131	0	133	557	54	54	54	54	54	54	0.61	518	583
29	1352	719		2	0	129	0	131	567	54	54	54	54	54	54	0.67	553	584
30		1307		0	2	0	0	2	594	2	2	2	2	2	2	0.5	580	620
31	1029	509		0	0	125	0	125	560	53	53	53	53	53	53	0.58	549	593
32	1395	665		4	0	146	0	150	568	54	54	54	54	54	54	0.65	543	627
33	968	512		2	0	106	9	108	584	52	52	52	52	52	61	0.23	577	620
34	352	126		0	0	56	0	56	636	47	47	47	47	47	47	0.36	581	657
35	585	206		0	0	47	0	47	618	54	54	54	54	54	54	0.26	593	637
36	814	387		0	0	108	6	108	577	56	56	56	56	56	62	0.55	554	584
37	620	219		0	0	69	0	69	637	55	55	55	55	55	55	0.25	586	673
38	1360	766		0	0	153	0	152	554	59	59	59	59	59	59	0.76	541	564
39	168	58		0	0	10	1	10	679	43	43	43	43	43	44	0.21	574	643
40	61	30		1	0	13	0	14	563	15	15	15	15	15	15	0.47	554	640
41	352	132		0	0	45	0	45	620	45	45	45	45	45	45	0.29	583	638
42	333	95		0	0	15	3	15	680	48	48	48	48	48	51	0.46	665	673
43	649	260		0	0	90	0	89	612	56	56	55	56	56	56	0.34	618	649
44	1190	517		1	1	116	1	118	586	53	53	53	53	53	54	0.55	583	618
45	732	298		3	0	93	0	96	609	72	72	72	72	72	72	0.54	583	612
46	729	262		1	0	102	1	103	619	52	52	52	51	52	53	0.19	591	650

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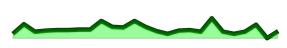
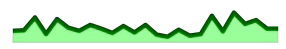
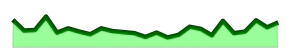
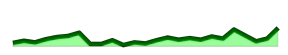
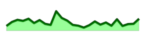
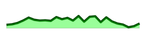
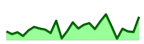
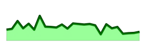
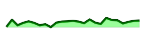
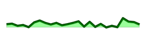
continued.

Set	Total Catch			Tagged Fish Counts				Tagged Fork Length(mm)		Specimen Count						Mean Fork Length(mm)		
	kg	Count	Count by Trap	Recover-Rerelease	Tag Sample	Re-leased	No Tag	Count	Mean	Fork Length	Sex	Maturity	Otoliths	Weight	Count	Proportion Males	Males	Females
47	1091	412		0	0	135	0	135	606	51	51	51	51	51	51	0.25	619	615
48	908	442		2	0	122	0	123	570	53	53	53	53	53	53	0.66	564	618
49	1558	697		2	0	134	0	135	589	51	51	51	51	51	51	0.61	573	617
50	2093	1445		9	0	118	0	127	514	49	49	49	49	49	49	0.71	518	574
51	1851	848		0	0	128	0	128	584	52	51	51	52	52	52	0.67	591	650
52	635	253		3	0	76	0	79	601	53	53	53	53	53	53	0.38	582	601
53	248	84		0	0	14	0	14	608	51	51	51	51	51	51	0.14	614	659
54	475	154		0	0	53	0	51	635	53	53	53	53	53	53	0.06	578	648
55	1259	530		0	0	129	0	129	586	53	53	53	53	53	53	0.49	591	628
56	1025	361		0	0	119	0	119	646	52	52	52	52	52	52	0.6	604	696
57	1471	789		4	0	131	0	135	567	52	52	52	52	52	52	0.81	555	590
58	116	37		0	0	6	0	6	604	31	31	31	31	31	31	0.1	565	647
59	465	177		0	0	58	0	58	643	51	51	51	51	51	51	0.55	608	661
60	332	105		0	0	34	0	34	631	32	32	32	32	32	32	0.16	611	654
61	1352	650		0	0	126	1	125	570	52	52	52	48	52	53	0.5	554	571
62	523	184		0	0	32	0	32	649	52	52	52	52	52	52	0.44	600	693
63	1507	691		0	0	133	1	133	576	64	64	64	64	64	65	0.3	566	593
64		753		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	2054	1111		0	0	143	0	143	547	56	56	56	56	56	56	0.45	553	574
66	2481	1260		1	0	157	0	158	556	56	56	56	56	56	56	0.61	549	565
67	1304	406		1	0	123	1	124	635	58	58	58	58	58	59	0.21	620	681
68	1397	482		0	0	123	0	122	621	51	51	51	51	51	51	0.27	592	659
69	794	326		0	0	89	0	89	619	51	51	51	51	51	51	0.49	592	631

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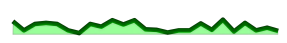
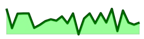
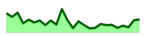
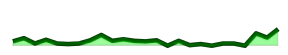
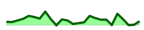
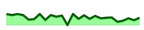
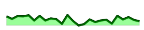
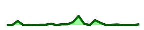
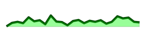
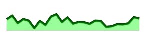
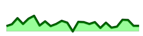
continued.

Set	Total Catch			Tagged Fish Counts				Tagged Fork Length(mm)		Specimen Count						Mean Fork Length(mm)		
	kg	Count	Count by Trap	Recover-Rerelease	Tag Sample	Re-leased	No Tag	Count	Mean	Fork Length	Sex	Maturity	Otoliths	Weight	Count	Proportion Males	Males	Females
70	828	401		5	0	127	0	132	576	50	50	50	50	50	50	0.66	551	610
71	277	90		0	0	42	0	42	632	44	44	44	44	44	44	0.34	643	682
72	1218	367		1	1	122	0	123	655	53	53	53	53	53	53	0.45	613	674
73	2474	1154		1	1	123	2	124	567	52	51	51	52	52	54	0.65	564	582
74	2371	1128		1	0	178	0	178	572	51	51	51	51	51	51	0.57	575	610
75	365	120		1	0	30	0	31	642	49	49	49	49	49	49	0.27	626	660
76	2218	1498		1	0	173	0	174	522	52	52	52	52	52	52	0.71	506	564
77	1681	975		9	0	134	0	143	544	49	49	49	49	49	49	0.88	524	566
78	543	216		0	0	79	0	79	601	51	51	51	51	51	51	0.39	599	629
79	1289	485		1	0	122	0	123	607	53	53	53	49	53	53	0.49	595	598
80	1539	721		1	0	129	0	130	579	51	51	51	51	51	51	0.63	564	607
81	1044	497		1	0	143	0	144	579	47	47	47	47	47	47	0.62	559	609
82	5	2		0	0	0	0	0	0	2	2	2	2	2	2	0	0	620
83	1779	811		0	0	121	0	121	571	53	53	53	53	53	53	0.62	567	582
84	1209	596		3	0	121	0	124	580	52	52	52	52	52	52	0.65	540	581
85	275	111		0	0	33	1	32	600	55	55	55	55	55	56	0.35	564	619
86	304	119		0	0	47	1	47	602	40	40	40	40	40	41	0.45	578	620
87	1142	532		0	0	123	0	123	598	50	50	50	50	50	50	0.78	556	647
88	1562	852		0	0	141	0	141	561	55	55	55	55	55	55	0.71	538	588
89	95	19		0	0	13	0	13	731	5	5	5	5	5	5	0	0	793
90	1704	783		0	0	147	0	147	580	48	48	48	48	48	48	0.38	569	597
91	216	76		0	0	32	0	32	629	33	33	33	33	33	33	0	0	635

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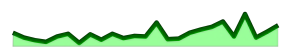
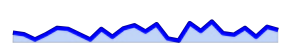
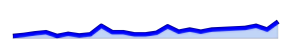
continued.

Set		Total Catch		Tagged Fish Counts				Tagged Fork Length(mm)		Specimen Count						Mean Fork Length(mm)		
	kg	Count	Count by Trap	Recover-Rerelease	Tag Sample	Re-leased	No Tag	Count	Mean	Fork Length	Sex	Maturity	Otoliths	Weight	Count	Proportion Males	Males	Females
92	491	159		2	0	17	0	19	613	58	58	58	57	58	58	0.17	585	652
93	783	363		0	0	98	0	98	594	52	52	52	52	52	52	0.19	546	595
94	1382	610		1	0	136	0	137	595	50	50	50	50	50	50	0.22	542	600
95	1274	523		2	0	132	0	133	597	50	50	50	50	50	50	0.2	562	616
96	775	350		1	0	101	0	101	600	51	51	51	51	51	51	0.41	537	593
97	1041	417		1	0	123	0	124	615	53	53	53	49	53	53	0.36	535	664
Experimental		7,666		0	17	0	0	17		15	17	17	14	16	17			
StRS+Inlet		47,763		102	3	9,288	107	9,377		4,555	4,548	4,547	4,539	4,554	4,662			
Total		**55,429**		**102**	**20**	**9,288**	**107**	**9,394**		**4,570**	**4,565**	**4,564**	**4,553**	**4,570**	**4,679**			

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APPENDIX F TABLE OF SABLEFISH MATURITY CONVENTION CODES.

Maturity convention codes and gonad descriptions for male and female Sablefish.

Maturity code	Sex	Maturity Name	Maturity Description
1	Female	IMMATURE 1	Thin string-like =1.5mm thick mid-section, translucent-white colour
2		IMMATURE 2	Thicked >5mm, does not extend length of body cavity, some folds sausage-like, translucent-white colour
3		RIPENING 1	Eggs present, white opaque colour, encased in translucent sock, <25cavity
4		RIPENING 2	Eggs larger =1mm diameter, white in colour, blood vessels present on surface, >25body cavity
5		RIPE	Eggs at least 1mm diameter, white in colour, gonad full size, >50cavity
6		RIPE1	Gonad full size, >50cavity but at least 25have become translucent
7		RIPE2	Gonad full size, >50cavity but at least 50have become translucent
8		RUNNING RIPE	Stream of translucent eggs released when slight-moderate pressure is applied to external posterior region of body cavity
9		SPENT	Gonad is red-purple in colour, residual eggs may be present, outer wall of gonad flaccid
10		RESORBING	Eggs present but did not function normally (not normal)
11		RECOVERING	Still some red purple colour, not flaccid, whitish sheen to exterior surface
12		RESTING	Smooth elongated and round in shape, brown purple pulp interior, exterior surface has whitish sheen
1	Male	IMMATURE 1	Very thin string-like >1mm thick, translucent white colour
2		IMMATURE 2	Thin string-like 3mm thick, extends length of body cavity, white-translucent colour
3		RIPENING 1	Thick >10mmm, visible folds, white smooth texture, =20body cavity
4		RIPENING 2	Thick >10mmm, visible folds, white smooth texture with blood vessels present on surface, >30body cavity
5		RIPE	Thick >10mmm, visible folds, white smooth texture wiith blood vessels present on surface, folds delicate, some sperm may flow, >40cavity
8		RUNNING RIPE	Lobes fully developed, sperm is released when slight pressure is applied to external posterior region of body cavity
9		SPENT	Lobes or folds are bloodshot, some sperm may be present when moderate pressure is applied to external posterior region of body cavity
11		RECOVERING	Lobes flat, brown in colour, bloodshot appearance on edges and ends of lobes
12		RESTING	Firm, light brown colour, wrinkles on surface

APPENDIX G SUMMARY OF BIOLOGICAL DATA FOR THE ROUGHEYE/BLACKSPOTTED ROCKFISH COMPLEX.

Biological data collected for Rougheye/Blackspotted Rockfish complex. Each set is listed with counts of specimens sampled, calculations of mean fork lengths and the number of species visually identified as either a RE = Rougheye Rockfish, BS = Blackspotted Rockfish or a hybrid. All were captured on StRS sets.

	Specimen Count							Mean Fork Length(mm)				Sampler Visual id		
Set	**Fork Length**	**Weight**	**Sex**	**Maturity**	**Otolith**	**DNA**	**Total Count**	**Proportion Males**	**Males**	**Females**	**No sex**	**RE**	**BS**	**Hybrid**
2	1	1	1	1	1	1	2	0	0	495	0	1	0	0
12	7	7	7	7	7	7	7	0.57	528	505	0	7	0	0
27	1	1	1	1	1	1	1	0	0	470	0	1	0	0
45	13	13	13	13	13	13	13	0.85	528	533	0	1	12	0
47	6	6	6	6	6	6	6	0.17	590	439	0	3	3	0
51	1	1	1	1	1	1	1	0	0	430	0	0	1	0
52	17	17	17	17	17	17	17	0.41	464	410	0	4	13	0
60	7	7	7	7	7	7	7	0.71	460	495	0	0	6	1
67	9	9	9	9	9	9	9	0.56	472	504	0	1	8	0
68	7	7	7	7	7	7	7	0.71	474	318	0	0	7	0
72	24	24	24	24	24	24	24	0.71	471	468	0	0	24	0
78	25	25	25	25	25	22	124	0.72	468	484	0	1	24	0
79	2	2	2	2	2	2	2	0.5	500	430	0	0	2	0
80	5	5	5	5	5	5	5	0.6	478	495	0	0	5	0
85	8	8	8	8	8	8	8	0.5	513	473	0	0	8	0
90	1	1	1	1	1	1	1	1	450	0	0	0	1	0
	134	134	134	134	134	131	234					19	114	1

APPENDIX H SUMMARY OF BIOLOGICAL DATA FOR OTHER ROCKFISH SPECIES.

Biological data collected for other rockfish species. Each set is listed with counts of specimens sampled and calculations of mean fork lengths. All were captured on StRS sets.

		Specimen Count								Mean Fork Length(mm)		
Species Name	**Set**	**Fork Length**	**Weight**	**Sex**	**Maturity**	**Otoliths**	**DNA**	**Total**	**Prop Males**	**Males**	**Females**	**No sex**
SHORTRAKER ROCKFISH	27	2	2	2	2	2	0	2	0.50	710	710	0
	36	1	1	1	1	1	0	1	1.00	595	0	0
	44	7	7	7	7	7	0	7	0.71	652	560	0
	45	6	6	6	6	6	0	6	0.33	558	614	0
	47	1	1	1	1	1	0	1	1.00	595	0	0
	49	1	1	1	1	1	0	1	1.00	745	0	0
	55	2	2	2	2	2	0	2	0.50	645	765	0
	60	2	2	2	2	2	0	2	1.00	693	0	0
	63	1	1	1	1	1	0	1	0.00	0	545	0
	67	2	2	2	2	2	0	2	1.00	560	0	0
	68	4	4	4	4	4	0	4	0.75	647	555	0
	72	4	4	4	4	4	0	4	1.00	663	0	0
	74	1	1	1	1	1	0	1	0.00	0	550	0
	79	1	1	1	1	1	0	1	0.00	0	665	0
	80	1	1	1	1	1	0	1	0.00	0	520	0
	90	2	2	2	2	2	0	2	0.00	0	653	0
YELLOWEYE ROCKFISH	23	1	1	1	1	1	1	1	1.00	555	0	0
	40	2	2	2	2	2	2	2	0.50	370	580	0
	42	5	5	5	5	5	5	5	0.60	603	550	0
	53	15	15	15	15	15	13	15	0.33	602	494	0
	54	8	8	8	8	8	8	8	0.50	573	493	0
	58	17	17	17	17	17	17	17	0.76	536	485	0
	60	9	9	9	9	9	9	9	0.44	648	594	0
	75	2	2	2	2	2	2	2	1.00	613	0	0
	82	4	4	4	4	4	4	4	0.75	623	615	0

6 References

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