Summary of the Hecate Strait Synoptic Bottom Trawl Survey, May 19 – June 15, 2017

D. C. Williams, M. K. Nottingham, N. Olsen, and M. R. Wyeth

Science Branch, Pacific Region
Fisheries and Oceans Canada
Pacific Biological Station
Nanaimo, BC
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by

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Fisheries and Oceans Canada
Science Branch, Pacific Region
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ABSTRACT

Williams, D. C., Nottingham, M. K., Olsen, N. and Wyeth, M. R., 2018. Summary of the Hecate Strait synoptic bottom trawl survey, May 19 – June 15, 2017. Can. Manuscr. Rep. Fish. Aquat. Sci. 3149: viii + 55 p.

A bottom trawl survey of Hecate Strait was conducted on the chartered FV Nordic Pearl between May 19 and June 15, 2017. The Hecate Strait synoptic bottom trawl survey was first conducted in 2005, and has been repeated every second year to the present time. This survey is one of a set of long-term and coordinated surveys that together cover the continental shelf and upper slope of most of the British Columbia coast. The objectives of these surveys are to provide fishery-independent abundance indices of all demersal fish species available to bottom trawling and to collect biological samples of selected species.

The survey follows a random depth-stratified design and the sampling units are 2 km by 2 km blocks. One hundred and thirty-eight (71.9%) of the 192 blocks assessed in 2017 were successfully fished. The mean catch per tow was 644 kg with 12-42 species per tow. The average number of species per tow was 23. The most abundant fish species encountered was Arrowtooth Flounder (*Atheresthes stomias*) followed by Spotted Ratfish (*Hydrolagus colliei*), English Sole (*Parophrys vetulus*), Dover Sole (*Microstomus pacificus*) and Sablefish (*Anoplopoma fimbria*). Biological data including individual length, weight, sex, maturity, and ageing structures (for certain species) were collected from 43 different species of fish. Oceanographic data, including water temperature, depth, salinity, and dissolved oxygen were also recorded for most tows.

RÉSUMÉ

Williams, D. C., Nottingham, M. K., Olsen, N. and Wyeth, M. R., 2018. Summary of the Hecate Strait synoptic bottom trawl survey, May 19 – June 15, 2017. Can. Manuscr. Rep. Fish. Aquat. Sci. 3149: viii + 55 p.

Un relevé au chalut de fond dans le détroit d'Hecate a été effectué par le navire de la Garde côtière canadienne *W. E. Ricker* entre le 19 mai et le 15 juin 2017. Le premier relevé synoptique au chalut de fond dans le détroit d'Hecate a été réalisé en 2005, et depuis l'opération est répétée tous les deux ans. Le relevé du détroit d'Hecate fait partie d'un ensemble de relevés à long terme et coordonnés couvrant le plateau continental et le haut du talus continental de la majorité de la côte de la Colombie-Britannique. Ces relevés servent à obtenir des indices d'abondance indépendants de la pêche pour toutes les espèces de poissons démersaux pouvant être pêchées au chalut de fond, ainsi qu'à prélever des échantillons biologiques sur des d'espèces précises.

Ce relevé est réalisé selon un plan d'échantillonnage aléatoire stratifié, et les unités d'échantillonnage sont des blocs de deux kilomètres carrés. Parmi les 192 blocs évalués en 2017, 138 (71.9 %) ont fait l'objet d'une pêche. La moyenne de prises par trait était de 644 kg, avec entre 12 et 42 espèces par trait. Le nombre moyen d'espèces par trait était de 23. Les espèces de poissons capturées le plus fréquemment étaient la plie à grande bouche (*Atheresthes stomias*) suivi de la chimère d'Amérique (*Hydrolagus colliei*), du Carlottin anglais (*Parophrys vetulus*), de la sole de Douvres (*Microstomus pacificus*) et de la morue charbonnière (*Anoplopoma fimbria*). On a recueilli les données biologiques des espèces sélectionnées, notamment la longueur, le poids, le sexe, la maturité et la structure par âge. Les échantillons ont été prélevés sur un total de 43 espèces de poissons différentes. Les données océanographiques, notamment la température de l'eau, la profondeur, la salinité et la teneur en oxygène dissous, ont également été consignées pour la plupart des traits.

INTRODUCTION

In 2003, a report by the Pacific Scientific Advice Review Committee recommended development of fishery-independent relative abundance indices using bottom trawl surveys in British Columbia waters (Sinclair et al. 2003). The report recommended that a pilot survey be conducted in Queen Charlotte Sound (Figure 1). The survey design was synoptic in that it was intended to provide indices for as many species as possible rather than focusing on a limited number of target species.

The first Queen Charlotte Sound (QCS) synoptic bottom trawl survey was successfully completed in the summer of 2003 (Olsen et al. 2007). Following that survey, additional surveys were planned for the west coast of Vancouver Island (WCVI) beginning in 2004, Hecate Strait (HS) beginning in 2005, and the west coast of Haida Gwaii (WCHG) (previously Queen Charlotte Islands) beginning in 2006. These surveys are conducted on a rotating biennial schedule with the QCS and HS surveys conducted in odd-numbered years and the WCVI and WCHG surveys conducted in even-numbered years. These four synoptic bottom trawl surveys provide comprehensive coverage of the continental shelf and upper slope of the British Columbia coast (Figure 1). Surveys are conducted on both chartered commercial fishing vessels as well as Canadian Coast Guard research trawlers.

The first HS synoptic bottom trawl survey was successfully completed in 2005 (Workman et al. 2008) and has been repeated every second year to the present time. This document provides a brief summary of the results and methods from the seventh HS synoptic bottom trawl survey which occurred between May 19 and June 15, 2017. It is not intended as a comprehensive review of the survey, nor does it provide interpretive analysis of the survey results. Previous HS synoptic bottom trawl surveys are summarized in Workman et al. (2008), Olsen et al. (2009a), Olsen et al. (2009b), Nottingham et al. (2017), Williams et al. (2017) and Nottingham et al. (2018).

METHODS

SURVEY DESIGN

The survey area is Hecate Strait, from approximately 52° 40' North latitude to 54° 40' North latitude and westward into Dixon Entrance to approximately 133° 00' West longitude. The southern region of this survey is nearly contiguous with the most northerly extent of the QCS survey (Figure 1).

Depth Strata

All of the synoptic bottom trawl surveys along the British Columbia coast have followed the same random depth-stratified design. Each survey area is divided into 2 km by 2 km blocks and each block is assigned one of four depth strata based on the average bottom depth in the block. The four depth strata vary between areas. The depth strata for the HS synoptic bottom trawl survey are 10-70 m, 70-130 m, 130-220 m, and 220-500 m (Table 1). For each survey in the HS series, blocks are randomly selected within each depth strata.

Block Allocation

Following the methods in Sinclair et al. (2003), commercial fishery catch data were used to model the expected groundfish catches prior to the first survey in each area. The target number of tows in each stratum was based on providing the most precise catch rate indices for as many species as possible. However, in any given year, not all of the randomly selected blocks will be fishable. Further, after the inaugural survey, a block that has been fished in a previous year may be re-selected. The results of previous surveys in each area are used to estimate both the expected proportion of blocks in each stratum that would not result in a useable tow (predicted failure rate) as well as the expected probability of returning to a block that was successfully fished in a previous survey (predicted revisit rate). The predicted failure and revisit rates are combined into a single probability for each survey area and depth stratum. These probabilities are then used to calculate the anticipated number of blocks per stratum required to complete the target number of tows.

When a synoptic bottom trawl survey is conducted on a chartered commercial fishing vessel the contract is structured such that the survey will continue until the entire set of blocks that have been selected are assessed. Assuming that the predicted failure and revisit rates prove to be accurate, at the end of the survey the final distribution of tows in each strata should match the initial target allocation that was modeled based on the commercial fishing data.

Canadian Coast Guard (CCG) research vessel time is allocated amongst various users so each year only a set number of days are available for the synoptic bottom trawl surveys. The operational model that is used for chartered vessels will not work in such a scenario. Instead, we try to fish as many blocks as possible while maintaining the target relative allocation of tows amongst strata. First, the total number of blocks that can be assessed in the number of available fishing days is estimated. Then, using the target relative allocation of tows and the predicted failure and revisit rates, various total "target"

numbers of tows are tested until the total allocated blocks matches the number of blocks that can be assessed in the time available. In 2017, there was no CCG ship available for the HS survey so a charter vessel was used. The schedule was not modified from survey years when a CCG vessel was used.

As indicated above, the start and end dates for trips on CCG ships are determined in advance. However, it may not be possible to fish on some days due to weather, mechanical breakdowns, or unforeseen events such as responding to search and rescue calls. Those days are lost, so if the entire set of selected blocks is started and it is not possible to fish on a number of days, part of the survey area could be missed. To avoid such a situation, the selected blocks are divided into a primary set and a secondary set. The primary set consists of two-thirds of the total blocks and is visited first. The secondary set of blocks is then added once the primary set is nearly complete. The number of blocks in secondary set is based on the number of remaining fishing days.

For the 2017 HS survey, 208 blocks were randomly selected based on 9 blocks a day and 23 days available for fishing (Table 1). The primary set consisted of 139 blocks while the secondary set was anticipated to be 69 blocks.

VESSEL

The survey was conducted aboard the F/V Nordic Pearl, a 35 m commercial stern trawler (Figure 2) contracted to replace the CCG Research vessel W.E. Ricker.

FISHING GEAR

The research trawl was an Atlantic Western IIA box trawl net connected to 963 kg Thyboron Type II heavy duty 107 doors (Figure 3). The net was thoroughly cleaned between tows to prevent cross-contamination of catches. The net was also inspected for damage after every tow. If the net was damaged, it was repaired and restored to its original dimensions prior to resuming fishing. Two nets were rigged at the start of the survey so that if one net was damaged beyond what could be immediately repaired, the second one could be used.

The net included a main body (wing and belly sections), two lengthening pieces, and a codend with liner (Figure 4 and Figure 5). The main body of the net had an 11 mm long-link steel chain frame and was constructed from a mix of double 4.5 mm strand 5 inch web, single 3.5 mm strand 5 inch web, and single 3.5 mm strand 4 ½ inch web (Figure 6). The intermediate sections were constructed from single 4.5 mm strand 4½ inch web (Figure 7). All web in the main body and lengthening pieces was constructed from a compacted strand braided polyethylene (Euroline Premium). The codend was constructed from double 5 mm strand 4 inch regular braided polyethylene web with a ½ inch 210/20 knotless nylon liner (Figure 7).

The Rockhopper footgear included flying wing, mid wing, bunt wing, and bosom sections (Figure 8). The bosom section was built from 16 inch diameter (worn 18 inch) aircraft tires, while the bunt and mid wing sections had 16 inch Rockhopper disks. The flying wings had 5 inch rubber disks with swivel center 16 inch solid bunt bobbins at each end.

The specifications of net and footgear components are shown in Table 2 and dimensions for the assembled trawl pieces are shown in Figure 6 through Figure 8.

SCHEDULE

The survey was split into two sections or "legs" of 14-15 days in duration with six to seven science staff on each leg and one science crew change.

FISHING PROTOCOL

Fishing operations were carried out on the F/V Nordic Pearl following procedures developed for the Canadian Coast Guard ship's 12 hour crew rotation commencing at approximately 0700 hrs and ending at approximately 2000 hrs each day. By following this schedule, survey fishing was limited to daylight hours. Catch processing often continued after fishing operations were completed for the day.

Prior to fishing, the selected blocks were reviewed by the fishing master and chief scientist to determine a candidate set to visit each day. During this review process, one or more blocks might be determined not fishable based on the fishing master's experience and knowledge of the area. In such cases the blocks were marked as "rejected based on prior knowledge". After compiling a list of blocks to be visited, the most efficient route of travel between blocks was planned.

The fishing master was asked to inspect each selected block and find a suitable tow location using the following criteria:

1. All tows should follow a depth contour.
2. If a block was fished in a previous year, then follow the same track so as to minimize the survey footprint.
3. If a block was not fished in a previous year, then make a tow entirely within the block and pass through the center of the block.
4. If it was not possible to make a tow through the center of the block, then make a tow entirely within the block that passes as close to the center as possible.
5. If it was not possible to make a tow entirely within the block, then make a tow such that at least 50 % of the tow is within the block.

The target tow duration was 20 minutes long. The tow start was defined as the time at which the net mensuration data indicated stable bottom contact and the headline collapsed to 3-4 m above the bottom. After 20 minutes had elapsed, net haul back was initiated. Although the target on-bottom time was 20 minutes, tows that were at least 15 minutes in duration were accepted. This pragmatic approach allowed for the retention of many tows that would otherwise have been unusable due to hang-ups or early haul-backs.

Tows were conducted at a target speed of 2.8 to 3.0 nautical miles per hour (5.2 - 5.6 km/hr). When retrieving the net, the fishing master was asked to maintain a water velocity through the net that was consistent with the rest of the tow.

Tows were made in the target depth stratum of the block. If the only possible tow was in a different depth stratum than that assigned to the block, then the tow was conducted, and the block was reassigned to the appropriate depth stratum.

If it was not possible to find a suitable tow location then the block was marked as "rejected based on on-ground inspection" and the vessel moved on to the next selected block.

The result of trawling was either a useable or unusable tow. The most common reasons for deeming a tow unusable were a hang-up of the fishing gear, tear-up of the trawl net, or not achieving the minimum bottom contact time. In the event of an unusable tow, additional attempts to fish the block could be made at either the same location or a different location within the block. Alternatively, the block could be deemed unfishable, in which case it was rejected.

If fishing was attempted in a block, the final status of the block would be recorded as "successfully fished on first attempt", "successfully fished after multiple attempts", or "rejected after last attempt failed". Rejected blocks are removed from the sampling frame for all future surveys to increase the survey efficiency as less time will be spent inspecting blocks that cannot be fished. Some selected blocks were neither successfully fished nor rejected. This result occurred when a temporary obstacle (e.g. trap fishing gear, another vessel, or strong tidal currents) prevents fishing, or when there was insufficient time available to fish a block without spending another day in the area, or if fishing was attempted and although the tow was not successful, the block was not rejected. These blocks were considered unassessed at the end of the survey and have a final status of "block not fished but remains in sampling frame" or "not rejected but last attempt failed".

Fishing Data

The start and end positions, times, and bottom depths, as well as the direction, vessel speed, weather and environmental conditions, and warp length were recorded for every tow. In addition, global positioning system (GPS) data and bottom sounder data were logged continuously for the duration of the survey.

CATCH PROCESSING

At the end of each tow the net was retrieved and the catch dumped into a hopper which emptied into the wetlab below the trawl deck. Catch was sorted in the wetlab by species into separate baskets as it moved along a conveyor system. The catch from all tows, including both useable and unusable tows was recorded. Unusable tows, although not sampled for biological data, were recorded to track catch amounts. Whenever possible, the catch was completely sorted and weighed. However, for large catches in excess of 2,000 kg or for catches with large numbers of small individuals, some method of total catch estimation and sub-sampling for species composition was conducted and the method used was recorded. The specific method of catch estimation and sub-sampling varied based on the total weight and volume of the catch being subsampled as well as the composition of the catch. Large catches were typically visually estimated, although volumetric estimates were sometimes used. In all cases a representative sample of the catch was sorted to determine species composition and to provide individuals for biological sampling.

Baskets of species were weighed to the nearest 0.02 kg using a motion-compensating electronic balance. For small catches the number of individuals was often

recorded in addition to the weight. Weights less than 0.02 kg were recorded as trace amounts. Catch was sorted to the lowest taxonomic group possible. For most fishes this was to the level of species although small and fragile species such as snailfish, lantern fish, or some young-of-the-year rockfish may have only been identified to genus or family. In some cases a few representative individuals may have been frozen for later identification. Invertebrates may have only been identified to phylum or order.

BIOLOGICAL SAMPLING

While the primary purpose of the survey was to generate fishery-independent indices of relative abundance, the secondary goal was to collect biological information to characterize the size, sex, and age-composition of each species caught. Two types of biological samples were conducted: "Length" samples, consisting of individual fish length and sex, and "Age" samples, consisting of length, sex, weight, maturity, and age structure. In an effort to maintain a manageable workload, a minimum catch threshold was established for each species that triggered biological sampling. For rare species or species of special conservation concern the minimum catch could be one fish, whereas for common and abundant species the number might be 25 or 50. The choice of the species from which age samples were collected depended on the weight caught and the "desirability" of the species. The weight of the catch was considered because the intent was to collect age structures from the largest catches of each species in each stratum over the survey. The "desirability" of the species was based on knowledge of conservation concerns and whether or not the species was commercially exploited. Biological samples were typically not collected from unusable tows.

There are some species that are unlikely to ever be assessed using age-structured models. This list includes species such as North Pacific Spiny Dogfish (*Squalus suckleyi*) where the cost of ageing the spines is prohibitive. Other species such as Flathead Sole (*Hippoglossoides elassodon*), Pacific Sanddab (*Citharichthys sordidus*), Greenstriped Rockfish (*Sebastes elongatus*), or Pygmy Rockfish (*Sebastes wilsoni*) are also unlikely candidates for an age-structured assessment as they are not exploited by the commercial fishery. Starting in 2016, a new length-stratified age sample protocol was implemented for these species. The intent of the new protocol was to ensure that the data could be used to construct age-at-maturity or growth curves. There were roughly twenty species identified for the length-stratified ageing protocol and in each survey year three or four species are targeted for data collected using this protocol (Table 3). Given the rotating schedule of the surveys, each species is targeted for one or two years at a time and then will not be targeted for another nine years. The species targeted in the 2017 synoptic bottom trawl surveys were North Pacific Spiny Dogfish (*Squalus suckleyi*), Splitnose Rockfish (*Sebastes diploproa*), Puget Sound Rockfish (*Sebastes emphaeus*) and Sand Sole (*Psettichthys melanostictus*).

Individual fish were measured to fork length, total length, standard length or other length depending on the species. All length measurements were collected to the nearest 0.5 cm using an electronic fish measuring board. Fish were weighed using a motion-compensating electronic balance. Measurements were to the nearest 1, 2, or 5 grams depending on the size of the fish as well as the model and weight range of the scale in use.

There are a variety of hard parts that can be used to determine the age of a fish (Chilton and Beamish 1982). The specific structure that provides the most accurate and efficient estimate of age varies by species but all the structures have the common trait of a series of annular rings that can be counted. Sagittal otoliths (calcareous accretions of the inner ear) were collected from rockfish and flatfish species while fin rays were taken from Walleye Pollock (*Theragra chalcogramma*), Lingcod (*Ophiodon elongates*) and Pacific Cod (*Gadus macrocephalus*). Dorsal spines were collected from North Pacific Spiny Dogfish (*Squalus suckleyi*). All age samples collected on this survey were submitted to the Sclerochronology Lab located at the Pacific Biological Station in Nanaimo, BC for storage and future analysis. In addition to the biological sampling described above, specific data, specimens or tissue samples are routinely collected following requests from other institutions or researchers. In 2017, tissue for DNA analysis was collected from Eulachon (*Thaleichthys pacificus)*, Lingcod (*Ophiodon elongatus),* age-sample Yelloweye (*Sebastes ruberrimus*) and Quillback Rockfish (*Sebastes maliger*) and all Blackspotted (*Sebastes melanostictus*) /Rougheye Rockfish (*Sebastes aleutianus*).

Until the mid-2000s, Rougheye Rockfish (*Sebastes aleutianus*) was considered to be a single, highly variable species with light and dark colour morphs. Genetic and morphological analysis has since confirmed that there are two distinct species (Orr and Hawkins 2008): Rougheye Rockfish (*S. aleutianus*) and Blackspotted Rockfish (*S. melanostictus*). Historical biological and catch information for *S. aleutianus* is now considered to be the aggregate of both species. During the 2008 WCHG survey an attempt was made to differentiate between the two species visually. That preliminary work showed that the two species cannot be reliably distinguished in the field because the morphological characteristics overlap. Further, there is evidence that the two species hybridize (Gharrett et al. 2005). Given that the historical data is recorded as *S. aleutianus* and that attempting to separate the species at the catch level is both time consuming and unreliable, beginning with the 2010 WCHG survey biological samples were collected from every catch that included both a visual assessment of the species (*S. aleutianus* or *S. melanostictus*) as well as a tissue sample for genetic identification of the species. The survey catch data, which continues to be recorded as *S. aleutianus*, can then be partitioned into the two species using either the visual assessment or the results of genetic analyses. We did not attempt to partition the catch data for *S. aleutianus* in this report.

NET-MOUNTED SENSORS AND DATA RECORDERS

The F/V Nordic Pearl was equipped with a Scanmar trawl mensuration system. Sensors attached to the net used acoustic signals to communicate with each other and the vessel and provided real-time net geometry including headline height and depth, as well as doorspread and wingspread which were used to calculate swept area. The Scanmar output was logged continuously during the survey and monitored in real-time during fishing operations.

A Mac Marine Industries Bottom Contact Sensor (BCS) was attached to the footrope to record contact with the sea floor. The BCS consists of a pressure housing with an Onset Hobo data recorder in a stainless steel sled that trailed behind the footrope. The Hobo recorder measured acceleration in three axes which was then converted into

angles. The recorder was mounted in the sled such that the x-axis tilt indicated the angle of the steel sled. When the footgear contacted the bottom, the sled angle was approximately 80 degrees. When the footrope was off the bottom, the sled hung down and the angle was approximately 40 degrees. These data were used to determine the exact times in each tow that the trawl net first and last contacted the sea floor, thus providing an accurate measure of total bottom contact time.

A Seabird SBE39 temperature and pressure recorder (TDR) was attached to the starboard wing of the trawl. A Seabird SBE19plus recorder (CTD) equipped with a SBE43 dissolved oxygen sensor was attached to the center of the headline. The SBE19plus recorded conductivity, temperature and pressure data with derived values for salinity (Seabird, 1989) and depth (Seabird 2002). The SBE43 recorded oxygen voltage output data with calculated values for dissolved oxygen (ml/l) using temperature, pressure, and salinity data (Seabird 2012). The SBE39 was activated prior to the first tow of the day and turned off after the last tow of the day, while the SBE19plus and SBE43 were turned on and off manually before and after each tow. All data recorders were downloaded at the end of each day.

DATA RECORDING

All the fishing, catch, and biological data were recorded directly into a Microsoft SQL Server database through a Microsoft Access interface. Details of the electronic data acquisition system used for this survey can be found in Olsen (2010).

All the data from the survey are archived in an Oracle relational database called "GFBio", the Groundfish Biological Samples database maintained by the Groundfish Data Unit (Fisheries and Oceans Canada, Science Branch, Pacific Region) located at the Pacific Biological Station in Nanaimo, BC.

RESULTS

FISHING

The 2017 HS synoptic bottom trawl survey was divided into two legs each two weeks in duration. From a total of 28 allotted survey days, six days were required for travel and gear loading/unloading at the start, middle and end of the survey, one day was required for science crew change, one day was lost due to poor weather conditions and one and a half days were required for maintenance (Table 4).

The initial plan was to assess 207 blocks based on 9 blocks per day and 23 fishing days. However, after completing the primary set of blocks it was clear that there was insufficient time remaining to complete the anticipated secondary set of 69 blocks. Therefore, the secondary set that was actually added consisted of 53 blocks (Table 5).

From the adjusted target of 192 blocks, all were assessed during the survey. Of the 192 blocks that were assessed, 138 were successfully fished, four were rejected based on the fishing master's prior knowledge, 42 were rejected based on on-ground inspections, and eight were rejected after one or more failed fishing attempts (Table 5 and Figure 9).

A total of 152 tows, of which 138 were useable, were completed during the 18.5 days that fishing occurred. Fourteen tows were not useable due to hang-ups, tear-ups, or insufficient bottom time. Table 6 shows tow results by stratum for this survey. The initial scope (ratio of warp length to bottom depth) used for tows in 2017 is shown in Table 7 and Figure 10. The F/V Nordic Pearl has an autotrawl system that adjusts the warp length to maintain net shape, so the recorded value is the initial length when fishing began. Complete information for each tow including date, duration, location, average depth, average speed, warp, total catch weight and usability is presented in Appendix A.

CATCH

A total of 81,392 kg of fish and invertebrates were caught during the 2017 HS survey. The total catch weight for useable tows was typically less than 700 kg per tow and averaged 644 kg per tow (Figure 11). The majority of the catch (79,733 kg, 97.9%) consisted of 96 different species of fish, including 26 rockfish and 17 flatfish species. The remainder (1,659 kg) consisted of 139 invertebrate groups. The average number of species identified in useable tows was 23 and ranged from 12 to 42 species per tow (Figure 12). The frequency of occurrence, maximum catch weight, mean catch weight per tow, and total survey catch weight of each species are shown in Table 8. Of the fish species caught, Arrowtooth Flounder (*Atheresthes stomias*) was the most dominant by weight, followed by Spotted Ratfish (*Hydrolagus colliei*), English Sole (*Parophrys vetulus*), Dover Sole (*Microstomus pacificus*) and Sablefish (*Anoplopoma fimbria*). Catch weights by tow for the 50 most commonly encountered species in this survey are included in Appendix B.

BIOLOGICAL SAMPLES AND SPECIMENS

Biological samples were collected from a total of 19,907 individuals of 43 species of fish. The number of samples and recorded biological attributes per species is shown in Table 9. A summary of the biological data collected for each species is shown in Table 10.

NET-MOUNTED SENSORS AND DATA RECORDERS

Scanmar net mensuration data was collected for 148 tows and door spread information was collected from 150 tows. Net depth was collected from 152 tows. (Table 11).

Seabird SBE39 (water temperature, and depth) were collected from 152 tows while Seabird SBE19plus and SBE43 data (conductivity, water temperature, depth and dissolved oxygen) were collected from 139 tows (Table 11 and Figure 13).

BCS data were collected from 152 tows (Table 11). An example of data collected by the BCS is shown in Figure 14.

Global positioning system (GPS) data and bottom sounder data are available for all 192 tows.

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Table 1. The 2017 HS synoptic bottom trawl survey design showing block allocation per stratum based on the target allocation and the predicted failure and revisit rates.

Depth Stratum (m)	Target Allocation	Target Tows	Predicted Adjustment	Total Block Allocation	Primary Set	Secondary Set	Revised Seconday Set
10-70	0.42	67	0.22	81	58	29	23
70-130	0.26	49	0.10	51	37	18	14
130-220	0.23	44	0.09	44	32	16	12
220-500	0.09	16	0.09	16	12	6	4
Total	**1.00**	**176**		**192**	**139**	**69**	**53**

Table 2. Atlantic Western IIa box trawl net specifications for the 2017 HS synoptic bottom trawl survey.

Component	Dimension
Wings, square, and bottom belly netting	combination of 5 inch double strand 4.5mm Euroline Premium and 5 inch single strand 3.5 mm Euroline Premium
Belly netting	4 ½ inch single strand 3.5mm Euroline Premium
Lengthening piece netting	4 ½ inch single strand 4.5 mm Euroline Premium
Codend netting	4 inch double 5 mm orange braided polyethylene
Codend liner	½ inch 210/20 knotless nylon
Floats	8 inch diameter center hole rated to 2000 m
Net frame chain	11 mm long link (64 mm inner length) grade 80 steel chain
Net frame rope	1 inch 3-strand twisted Polysteel
Net frame rope to chain lashing	3/8 inch 3-strand twisted Esterpro
Riblines	1 ¼ inch 3-strand twisted Polysteel
Footgear bosom	16 inch diameter tires (worn 18 inch aircraft tires)
Rubber spacers	4 inch, 5 inch, and 6 inch diameter disks cut from tires
Footgear wing center chain	16 mm mid link (65 mm inner length) grade 80 steel chain
Footgear wing top chain	11 mm long link (64 mm inner length) grade 80 steel chain
Rockhopper disk	16 inch diameter
Solid rubber bunt bobbin with steel tube center	16 inch diameter by 10 inch
Steel toggles	5 inch diameter by 3 inch long with 13 inches of chain (from center of toggle)

Table 3. Length-stratified species age sample schedule by year for all Pacific synoptic bottom trawl surveys.

Species	Scientific Name	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Butter Sole	*Isopsetta isolepis*						x				
Curlfin Sole	*Pleuronichthys decurrens*			x	x						
Darkblotched Rockfish	*Sebastes crameri*							x	x		
Flathead Sole	*Hippoglossoides elassodon*					x	x				
Giant Grenadier	*Albatrossia pectoralis*	x									
Greenstriped Rockfish	*Sebastes elongatus*			x	x						
Harlequin Rockfish	*Sebastes variegatus*					x	x				
North Pacific Spiny Dogfish	*Squalus suckleyi*	x	x								
Pacific Flatnose	*Antimora microlepis*			x							
Pacific Grenadier	*Coryphaenoides acrolepis*					x					
Pacific Sanddab	*Citharichthys sordidus*									x	x
Pacific Tomcod	*Microgadus proximus*			x	x						
Popeye Grenadier	*Coryphaenoides cinereus*							x			
Puget Sound Rockfish	*Sebastes emphaeus*	x	x								
Pygmy Rockfish	*Sebastes wilsoni*					x	x				
Rosethorn Rockfish	*Sebastes helvomaculatus*							x	x		
Sand Sole	*Psettichthys melanostictus*		x								
Sharpchin Rockfish	*Sebastes zacentrus*									x	x
Shortbelly Rockfish	*Sebastes jordani*			x	x						
Slender Sole	*Lyopsetta exilis*							x	x		
Splitnose Rockfish	*Sebastes diploproa*	x	x								
Stripetail Rockfish	*Sebastes saxicola*									x	x

Table 4. Summary of operations during the 2017 HS synoptic bottom trawl survey.

	Fishing				Tows			
Date	Start	End	Hours	Blocks Assessed	Useable	Not Useable	Total	Notes
05/19/2017	-	-	-	-	-	-	-	set-up and load
05/20/2017	-	-	-	-	-	-	-	travel and get fuel
05/21/2017	07:35	18:36	11	7	6	2	8	
05/22/2017	07:11	19:48	12	12	12	0	12	
05/23/2017	07:19	18:45	11	13	9	0	9	
05/24/2017	-	-	-	-	-	-	-	weather day
05/25/2017	07:06	10:34	3	2	2	1	3	tow for repairs
05/26/2017	-	-	-	-	-	-	-	repairs
05/27/2017	06:44	19:08	13	13	10	1	11	
05/28/2017	07:38	18:30	11	11	7	2	9	
05/29/2017	06:54	18:43	12	14	7	0	7	
05/30/2017	06:38	21:15	15	13	10	1	11	
05/31/2017	-	-	-	-	-	-	-	travel
06/01/2017	-	-	-	-	-	-	-	science crew change
06/02/2017	11:14	20:12	9	8	8	0	8	
06/03/2017	08:58	15:06	7	10	4	2	6	
06/04/2017	07:09	19:45	12	13	11	1	12	
06/05/2017	07:15	13:04	6	7	6	0	6	
06/06/2017	06:49	18:42	12	12	11	0	11	
06/07/2017	06:43	19:10	13	11	5	2	7	
06/08/2017	07:10	18:13	11	11	7	1	8	
06/09/2017	06:49	11:55	5	4	4	0	4	
06/10/2017	06:59	17:20	11	13	7	0	7	
06/11/2017	07:06	16:02	9	10	8	1	9	
06/12/2017	08:11	13:23	5	8	4	0	4	
06/13/2017	-	-	-	-	-	-	-	travel
06/14/2017	-	-	-	-	-	-	-	travel
06/15/2017	-	-	-	-	-	-	-	unload
Total				**192**	**138**	**14**	**152**	
Average Per Day				**10.1**	**7.3**	**0.7**	**8.0**	

Table 5. Block results by stratum for the 2017 HS synoptic bottom trawl survey.

Depth Stratum (m)	Primary Set	Secondary Set	Successful	Rejected Prior	Rejected Inspected	Rejected Failed	Not Assessed	Total
10-70	58	23	47	3	27	4	0	81
70-130	37	14	44	1	5	1	0	51
130-220	32	12	38	0	5	1	0	44
220-500	12	4	9	0	5	2	0	16
Total	**139**	**53**	**138**	**4**	**42**	**8**	**0**	**192**

Table 6. Tow results by stratum for the 2017 HS synoptic bottom trawl survey.

Depth Stratum (m)	Useable	Not Useable
10-70	47	8
70-130	44	1
130-220	38	1
220-500	9	4
Total	**138**	**14**

Table 7. Initial warp length and scope by 50 meter depth interval for the 2017 HS synoptic bottom trawl survey

Depth (m)	Mean Warp (m)	Mean Scope
0-50	174	5.00
50-100	242	3.23
100-150	339	2.78
150-200	489	2.80
200-250	568	2.59
250-300	711	2.72
300-350	856	2.52

Table 8. Frequency of occurrence, maximum catch weight, mean catch weight per tow, and total survey catch weight of each species captured during the 2017 HS synoptic bottom trawl survey. Trace amounts (<0.02 kg) are entered as -.

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Rockfishes	**Family Scorpaenidae**				
Pacific Ocean Perch	*Sebastes alutus*	49	853.80	27.53	1321.30
Quillback Rockfish	*Sebastes maliger*	49	43.34	7.14	342.75
Silvergray Rockfish	*Sebastes brevispinis*	41	30.38	6.08	249.41
Redbanded Rockfish	*Sebastes babcocki*	39	80.12	12.82	499.84
Shortspine Thornyhead	*Sebastolobus alascanus*	39	77.62	8.75	341.26
Yellowtail Rockfish	*Sebastes flavidus*	23	689.82	45.04	1035.92
Canary Rockfish	*Sebastes pinniger*	18	67.68	7.52	120.36
Rougheye/Blackspotted Rockfish Complex	*Sebastes aleutianus/melanostictus* complex	17	9.64	2.09	35.58
Redstripe Rockfish	*Sebastes proriger*	16	49.12	10.26	164.12
Copper Rockfish	*Sebastes caurinus*	15	81.90	10.38	155.70
Greenstriped Rockfish	*Sebastes elongatus*	13	5.84	1.45	18.84
Sharpchin Rockfish	*Sebastes zacentrus*	12	190.50	16.13	193.58
Bocaccio	*Sebastes paucispinis*	10	10.04	1.43	14.34
Yelloweye Rockfish	*Sebastes ruberrimus*	7	8.78	6.40	44.79
Pygmy Rockfish	*Sebastes wilsoni*	6	0.93	0.48	2.89
Rockfishes	*Sebastes* (Genus)	6	0.87	0.52	1.03
Harlequin Rockfish	*Sebastes variegatus*	4	1.74	0.83	3.33
Rosethorn Rockfish	*Sebastes helvomaculatus*	4	1.34	0.67	2.67
Yellowmouth Rockfish	*Sebastes reedi*	2	17.38	9.15	18.30
Widow Rockfish	*Sebastes entomelas*	2	0.31	0.27	0.53
Splitnose Rockfish	*Sebastes diploproa*	2	0.31	0.20	0.39
Black Rockfish	*Sebastes melanops*	1	1.44	1.44	1.44
Greenspotted Rockfish	*Sebastes chlorostictus*	1	1.11	1.11	1.11
Darkblotched Rockfish	*Sebastes crameri*	1	0.22	0.22	0.22
Stripetail Rockfish	*Sebastes saxicola*	1	0.22	0.22	0.22
Puget Sound Rockfish	*Sebastes emphaeus*	1	0.13	0.13	0.13
Flatfishes	**Order Pleuronectiformes**				
Arrowtooth Flounder	*Atheresthes stomias*	109	2701.31	167.75	18116.71
Rex Sole	*Glyptocephalus zachirus*	108	1095.63	29.91	3229.99
English Sole	*Parophrys vetulus*	101	5582.75	121.70	12169.72
Dover Sole	*Microstomus pacificus*	96	757.31	55.08	5177.38
Pacific Halibut	*Hippoglossus stenolepis*	84	431.34	29.31	2462.23
Southern Rock Sole	*Lepidopsetta bilineata*	78	145.53	19.96	1557.16
Petrale Sole	*Eopsetta jordani*	69	29.15	5.36	369.58
Flathead Sole	*Hippoglossoides elassodon*	60	261.02	16.17	970.09
Pacific Sanddab	*Citharichthys sordidus*	50	51.16	4.19	192.53
Slender Sole	*Lyopsetta exilis*	40	5.41	0.64	24.48
Sand Sole	*Psettichthys melanostictus*	35	73.18	10.03	351.20
Butter Sole	*Isopsetta isolepis*	32	50.62	8.65	276.70
Curlfin Sole	*Pleuronichthys decurrens*	28	12.39	3.34	93.44
Starry Flounder	*Platichthys stellatus*	15	95.44	26.04	390.61
C-o Sole	*Pleuronichthys coenosus*	4	0.46	0.31	1.22
Yellowfin Sole	*Limanda aspera*	2	0.80	0.50	1.00
Speckled Sanddab	*Citharichthys stigmaeus*	2	0.10	0.08	0.16
Cod-Like Fishes	**Order Gadiformes**				
Pacific Cod	*Gadus macrocephalus*	111	1012.90	22.80	2530.95
Walleye Pollock	*Gadus chalcogrammus*	87	558.51	26.22	2280.97
Pacific Tomcod	*Microgadus proximus*	44	78.62	4.51	194.10

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Pacific Hake	*Merluccius productus*	28	95.96	18.14	489.89
Cartilaginous Fish	**Class Chondrichthyes**				
Spotted Ratfish	*Hydrolagus colliei*	142	2013.43	116.32	16516.95
North Pacific Spiny Dogfish	*Squalus suckleyi*	106	55.32	9.54	1011.54
Big Skate	*Beringraja binoculata*	52	334.69	25.74	1415.70
Longnose Skate	*Raja rhina*	34	123.16	15.57	529.31
Sandpaper Skate	*Bathyraja interrupta*	13	7.37	2.73	35.51
Greenlings	**Family Hexagrammidae**				
Lingcod	*Ophiodon elongatus*	69	28.93	3.85	265.32
Kelp Greenling	*Hexagrammos decagrammus*	15	12.20	2.28	34.21
Whitespotted Greenling	*Hexagrammos stelleri*	1	0.28	0.28	0.28
Sculpins	**Family Cottidae**				
Roughback Sculpin	*Chitonotus pugetensis*	27	0.16	0.08	1.34
Buffalo Sculpin	*Enophrys bison*	14	2.36	0.58	5.77
Pacific Staghorn Sculpin	*Leptocottus armatus*	11	0.84	0.39	3.91
Red Irish Lord	*Hemilepidotus hemilepidotus*	9	2.68	1.17	10.57
Roughspine Sculpin	*Triglops macellus*	7	0.18	0.18	0.18
Bigmouth Sculpin	*Hemitripterus bolini*	6	14.40	8.90	53.40
Threadfin Sculpin	*Icelinus filamentosus*	6	0.30	0.19	0.96
Darkfin Sculpin	*Malacocottus zonurus*	5	0.46	0.20	0.79
Slim Sculpin	*Radulinus asprellus*	5	-	-	-
Cabezon	*Scorpaenichthys marmoratus*	2	6.60	3.77	7.54
Sailfin Sculpin	*Nautichthys oculofasciatus*	2	0.31	0.31	0.31
Spotfin Sculpin	*Icelinus tenuis*	2	-	-	-
Blackfin Sculpin	*Malacocottus kincaidi*	1	0.64	0.64	0.64
Brown Irish Lord	*Hemilepidotus spinosus*	1	-	-	-
Eelpouts	**Family Zoarcidae**				
Blackbelly Eelpout	*Lycodes pacificus*	12	1.22	0.33	1.65
Shortfin Eelpout	*Lycodes brevipes*	10	0.11	0.10	0.19
Black Eelpout	*Lycodes diapterus*	7	0.84	0.34	1.34
Wattled Eelpout	*Lycodes palearis*	6	0.96	0.41	2.46
Bigfin Eelpout	*Lycodes cortezianus*	5	1.14	0.52	2.59
Pallid Eelpout	*Lycodapus mandibularis*	2	-	-	-
Poachers	**Family Agonidae**				
Sturgeon Poacher	*Podothecus accipenserinus*	21	0.40	0.12	2.26
Northern Spearnose Poacher	*Agonopsis vulsa*	9	0.06	0.03	0.08
Bigeye Poacher	*Bathyagonus pentacanthus*	6	-	-	-
Smootheye Poacher	*Xeneretmus leiops*	3	-	-	-
Lanternfishes	**Family Myctophidae**				
Lanternfishes	Myctophidae (Family)	1	-	-	-
Northern Lampfish	*Stenobrachius leucopsarus*	1	-	-	-
Other Fish					
Sablefish	*Anoplopoma fimbria*	82	1393.54	50.13	4110.32
Eulachon	*Thaleichthys pacificus*	57	32.70	3.90	191.28
Pacific Herring	*Clupea pallasii*	55	4.02	0.70	35.61
Pacific Sand Lance	*Ammodytes personatus*	26	3.27	0.60	10.20
Shiner Perch	*Cymatogaster aggregata*	24	0.60	0.21	4.21
Snake Prickleback	*Lumpenus sagitta*	16	0.41	0.11	0.97
Chinook Salmon	*Oncorhynchus tshawytscha*	9	8.76	2.54	22.86
Blue-eyed Searcher	*Bathymaster signatus*	4	0.05	0.05	0.05
Northern Ronquil	*Ronquilus jordani*	3	-	-	-
Prowfish	*Zaprora silenus*	2	0.76	0.73	1.46
Black Hagfish	*Eptatretus deani*	2	0.56	0.35	0.70
Pacific Lamprey	*Entosphenus tridentatus*	1	0.10	0.10	0.10

Common Name	Scientific Name	Number of Tows	Catch Weight (kg) Max	Mean	Total
Northern Smoothtongue	*Leuroglossus schmidti*	1	-	-	-
White Barracudina	*Arctozenus risso*	1	-	-	-
Snailfishes	*Liparidae (Family)*	1	-	-	-
Crabs and Shrimp	**Class Malacostraca**				
Sidestripe Shrimp	*Pandalopsis dispar*	41	0.78	0.34	6.76
Pink Shrimp (smooth)	*Pandalus jordani*	30	1.80	0.84	16.75
Dungeness Crab	*Metacarcinus magister*	23	46.14	4.72	108.61
Prawn	*Pandalus platyceros*	13	0.74	0.31	2.46
Furrowed Rock Crab	*Cancer branneri*	12	0.19	0.14	0.29
Crangons	*Crangon* (Genus)	11	-	-	-
Graceful Decorator Crab	*Oregonia gracilis*	9	0.21	0.16	0.31
Red Rock Crab	*Cancer productus*	8	1.89	0.85	3.39
Spike Shrimp (horned Shrimp)	*Paracrangon echinata*	8	0.01	0.01	0.01
Right-handed Hermits	Paguridae (Family)	8	-	-	-
Pink Shrimp	*Pandalus borealis*	7	2.16	1.65	4.95
-	*Argis* (Genus)	7	-	-	-
Cancer Crabs	Cancridae (Family)	7	-	-	-
Isopods	Isopoda (Order)	6	-	-	-
Decorator Crabs	*Oregonia* (Genus)	4	0.19	0.19	0.19
Yellowleg Shrimp	*Pandalus tridens*	4	0.13	0.13	0.13
Coonstripe Shrimp	*Pandalus danae*	4	-	-	-
Redclaw Crab	*Chorilia longipes*	3	-	-	-
Nelson's Argid	*Argis levior*	3	-	-	-
-	*Pagurus brandti*	2	1.38	1.38	1.38
Glass Shrimp	*Pasiphaea pacifica*	2	-	-	-
-	Crangonidae (Family)	2	-	-	-
Spider Crabs	Majidae (Family)	2	-	-	-
Inshore Tanner Crab	*Chionoecetes bairdi*	1	0.21	0.21	0.21
Pacific Lyre Crab	*Hyas lyratus*	1	-	-	-
Squat Lobster	*Munida quadrispina*	1	-	-	-
Left-handed Hermits	Diogenidae (Family)	1	-	-	-
Graceful Kelp Crab	*Pugettia gracilis*	1	-	-	-
Sharp-nosed Crab	*Scyra acutifrons*	1	-	-	-
Rock Crabs	*Cancer* (Genus)	1	-	-	-
Common Argid	*Argis alaskensis*	1	-	-	-
Northern Crangon	*Crangon alaskensis*	1	-	-	-
Common Two-spined Crangon	*Neocrangon communis*	1	-	-	-
-	*Eualus* (Genus)	1	-	-	-
Sea Stars	**Class Asteroidea**				
Pink Short-spined Star	*Pisaster brevispinus*	24	89.80	6.84	164.22
Mud Star	*Ctenodiscus crispatus*	20	4.26	1.29	18.05
-	*Cheiraster dawsoni*	16	1.12	0.33	2.32
Sand Star	*Luidia foliolata*	15	0.94	0.54	2.15
Vermillion Starfish	*Mediaster aequalis*	10	0.02	0.02	0.02
Spiny Red Sea Star	*Hippasteria spinosa*	9	0.48	0.23	1.58
Fish-eating Star	*Stylasterias forreri*	9	0.57	0.18	1.08
-	*Dipsacaster* (Genus)	8	1.01	0.52	1.57
Rose Starfish	*Crossaster papposus*	8	0.04	0.04	0.04
Cushion Star	*Pteraster tesselatus*	8	-	-	-
-	*Henricia* (Genus)	7	0.08	0.08	0.08
Long-armed Sea Star	*Orthasterias koehleri*	6	0.24	0.13	0.40
Sunflower Starfish	*Pycnopodia helianthoides*	3	1.26	1.17	2.34
Starfish	Asteroidea (Class)	3	0.58	0.58	0.58
-	*Solaster* (Genus)	2	0.94	0.94	0.94

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
-	Pterasteridae (Family)	2	0.01	0.01	0.01
-	*Cheiraster* (Genus)	2	-	-	-
Leather Star	*Dermasterias imbricata*	1	1.77	1.77	1.77
-	*Poraniopsis inflatus inflatus*	1	0.12	0.12	0.12
-	*Dipsacaster borealis*	1	0.10	0.10	0.10
-	*Pseudarchaster* (Genus)	1	-	-	-
-	Goniasteridae (Family)	1	-	-	-
-	*Pseudarchaster alascensis*	1	-	-	-
Blood Star	*Henricia leviuscula*	1	-	-	-
-	Solasteridae (Family)	1	-	-	-
Striped Sun Starfish	*Solaster stimpsoni*	1	-	-	-
Cookie Star	*Ceramaster patagonicus*	1	-	-	-
-	*Henricia aspera*	1	-	-	-
Blood Star	*Henricia spiculifera*	1	-	-	-
Brittle Stars	**Class Ophiuroidea**				
-	*Ophiura sarsi*	10	-	-	-
-	*Amphiophiura ponderosa*	9	0.82	0.33	1.33
Basket Star	*Gorgonocephalus eucnemis*	6	0.38	0.21	1.03
-	Ophiactidae (Family)	2	-	-	-
-	Ophiuridae (Family)	1	-	-	-
Sea Cucumbers	**Class Holothuroidea**				
Giant Red Sea Cucumber	*Parastichopus californicus*	18	4.66	1.22	20.70
Whitespotted Sea Cucumber	*Apostichopus leukothele*	6	1.45	0.49	2.91
Soft Sea Cucumber	*Pseudostichopus mollis*	5	2.36	1.24	6.18
Sea Cucumbers	Holothuroidea (Class)	3	0.26	0.26	0.26
Sweet Potato Sea Cucumber	*Molpadia intermedia*	2	0.44	0.44	0.44
Peppered Sea Cucumber	*Cucumaria piperata*	2	-	-	-
-	*Cucumaria* (Genus)	1	-	-	-
-	Cucumariidae (Family)	1	-	-	-
Octopuses and Squid	**Class Cephalopoda**				
Opalescent Inshore Squid	*Doryteuthis opalescens*	37	1.39	0.26	5.47
Schoolmaster Gonate Squid	*Berryteuthis magister*	15	16.30	2.97	44.60
Pacific Bobtail Squid	*Rossia pacifica*	7	-	-	-
Giant Pacific Octopus	*Enteroctopus dofleini*	3	4.76	3.31	9.94
Smoothskin Octopus	*Benthoctopus leioderma*	1	0.10	0.10	0.10
Octopus	*Octopus* (Genus)	1	-	-	-
Sea Urchins	**Super Order Echinacea**				
Fragile Urchin	*Allocentrotus fragilis*	41	3.78	0.95	36.08
Pallid Urchin	*Strongylocentrotus pallidus*	16	0.42	0.22	2.01
Red Urchin	*Strongylocentrotus franciscanus*	6	0.85	0.42	1.69
Green Urchin	*Strongylocentrotus droebachiensis*	4	1.63	0.60	1.81
Sea Urchins	Echinacea (Super Order)	1	1.40	1.40	1.40
Jellyfish	**Phylum Cnidaria**				
Lions Mane	*Cyanea capillata*	55	3.22	0.56	21.99
Jellyfish	Scyphozoa (Class)	22	1.81	1.05	2.11
Fried Egg Jellyfish, Egg Yolk Jelly	*Phacellophora camtschatica*	1	2.12	2.12	2.12
-	*Chrysaora melanaster*	1	1.53	1.53	1.53
Anenomes and Corals	**Class Anthozoa**				
Anemone	Actiniaria (Order)	20	32.32	3.91	62.51
-	*Metridium* (Genus)	19	33.06	6.20	111.68
Sea Pen	*Ptilosarcus gurneyi*	19	15.24	2.24	33.54
Sea Whip	*Balticina septentrionalis*	13	0.94	0.53	1.06
-	*Primnoa* (Genus)	4	200.00	44.05	220.26

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Sea Pens	Pennatulacea (Order)	4	1.40	0.89	3.54
-	*Metridium farcimen*	3	38.08	14.30	42.89
Bubble Gum Coral	*Paragorgia arborea*	1	5.24	5.24	5.24
-	*Peachia* (Genus)	1	-	-	-
Snails and Slugs	**Class Gastropoda**				
Oregontriton	*Fusitriton oregonensis*	26	0.95	0.40	4.37
California Armina	*Armina californica*	9	0.28	0.19	0.76
Gastropods	Gastropoda (Class)	5	0.40	0.40	0.40
Seaslugs	Nudibranchia (Order)	3	-	-	-
-	*Doris* (Genus)	2	-	-	-
Sea-clown Triopha	*Triopha catalinae*	1	-	-	-
Adams Spiny Margarite	*Cidarina cidaris*	1	-	-	-
Limpets	Lottiidae (Family)	1	-	-	-
Other Invertebrate Species					
Larvaceans (pelagic Tunicates)	Appendicularia (Class)	39	52.97	3.24	84.16
Sponges	Porifera (Phylum)	17	9.18	2.61	18.27
Spiny Scallop	*Chlamys hastata*	16	5.44	1.29	14.19
Salps	Thaliacea (Class)	12	1.50	0.49	1.95
Heart Urchin	*Brisaster latifrons*	12	13.93	2.27	20.44
Pink Scallop, (aka Reddish Scallop)	*Chlamys rubida*	10	6.68	1.73	12.14
Bath Sponges	Demospongiae (Class)	7	0.80	0.37	1.49
Giant Barnacle	*Balanus nubilis*	7	3.68	1.44	8.62
Glass Sponges	Hexactinellida (Class)	5	2.98	1.72	6.87
Sea Mouse	*Aphrodita* (Genus)	5	0.07	0.07	0.07
Peanutworms	Sipuncula (Phylum)	4	-	-	-
Lampshells	Brachiopoda (Phylum)	4	-	-	-
Pacific Sand Dollar	*Dendraster excentricus*	3	299.68	159.05	477.15
-	Tunicata (Sub Phylum)	3	1.79	0.99	1.97
Barnacles	Cirripedia (Infraclass)	2	3.33	3.25	6.51
Salp	*Cyclosalpa affinis*	2	0.16	0.16	0.16
Molluscs	Mollusca (Phylum)	2	-	-	-
-	Carditidae (Family)	1	0.22	0.22	0.22
-	Cryptosyringida (Super Class)	1	0.10	0.10	0.10
-	*Styela* (Genus)	1	0.04	0.04	0.04
Green False-jingle	*Pododesmus macrochisma*	1	0.02	0.02	0.02
White-line Chiton	*Tonicella insignis*	1	-	-	-
Hydroid	Hydrozoa (Class)	1	-	-	-
-	Bryozoa (Phylum)	1	-	-	-
-	Articulata (Sub Class)	1	-	-	-
-	Antedonidae (Family)	1	-	-	-
Bivalve Molluscs	Bivalvia (Class)	1	-	-	-
Giant Rock-scallop (aka Purplehinged Rockscallop)	*Crassadoma gigantea*	1	-	-	-
Salps	Salpida (Order)	1	-	-	-
-	*Chelyosoma productum*	1	-	-	-
-	*Bugula* (Genus)	1	-	-	-

Table 9. Species sampled during the 2017 HS synoptic bottom trawl survey. The number of samples and number of recorded biological attributes are shown for each species.

Species Name		Number of Samples	Number of Recorded Biological Attributes				
Common	**Scientific**		**Length**	**Weight**	**Sex**	**Maturity**	**Age**
Arrowtooth Flounder	*Atheresthes stomias*	68	1847	1397	1847	513	514
Big Skate	*Beringraja binoculata*	52	211	59	209	0	0
Bocaccio	*Sebastes paucispinis*	9	48	48	48	48	48
Butter Sole	*Isopsetta isolepis*	16	316	109	316	0	0
Canary Rockfish	*Sebastes pinniger*	5	70	70	70	50	50
Copper Rockfish	*Sebastes caurinus*	5	62	55	62	55	54
Curlfin Sole	*Pleuronichthys decurrens*	12	158	76	158	0	0
Dover Sole	*Microstomus pacificus*	45	1210	863	1210	665	665
English Sole	*Parophrys vetulus*	66	1876	1597	1876	1005	905
Eulachon	*Thaleichthys pacificus*	32	984	0	0	0	0
Flathead Sole	*Hippoglossoides elassodon*	14	367	245	367	0	0
Greenstriped Rockfish	*Sebastes elongatus*	3	38	38	38	0	0
Kelp Greenling	*Hexagrammos decagrammus*	3	60	28	60	0	0
Lingcod	*Ophiodon elongatus*	41	310	258	302	222	222
Longnose Skate	*Raja rhina*	32	90	0	90	0	0
North Pacific Spiny Dogfish	*Squalus suckleyi*	66	383	311	383	311	275
Pacific Cod	*Gadus macrocephalus*	62	821	716	821	602	602
Pacific Hake	*Merluccius productus*	12	267	180	267	83	83
Pacific Halibut	*Hippoglossus stenolepis*	84	516	25	5	0	0
Pacific Ocean Perch	*Sebastes alutus*	19	435	349	435	222	224
Pacific Sanddab	*Citharichthys sordidus*	23	585	254	585	0	0
Pacific Tomcod	*Microgadus proximus*	11	332	128	332	0	0
Petrale Sole	*Eopsetta jordani*	27	305	288	305	212	212
Pygmy Rockfish	*Sebastes wilsoni*	3	25	16	25	0	0
Quillback Rockfish	*Sebastes maliger*	19	339	307	339	250	250
Redbanded Rockfish	*Sebastes babcocki*	16	206	206	206	206	205
Redstripe Rockfish	*Sebastes proriger*	4	95	95	95	59	59
Rex Sole	*Glyptocephalus zachirus*	61	1556	1048	1555	402	402
Rougheye/Blackspotted Rockfish Complex	*Sebastes aleutianus/melanostictus* complex	16	49	49	49	49	49
Sablefish	*Anoplopoma fimbria*	47	821	641	821	379	377
Sand Sole	*Psettichthys melanostictus*	20	372	343	372	324	295
Sandpaper Skate	*Bathyraja interrupta*	13	26	0	26	0	0
Sharpchin Rockfish	*Sebastes zacentrus*	2	57	17	56	0	0
Shortspine Thornyhead	*Sebastolobus alascanus*	16	390	262	390	0	130
Silvergray Rockfish	*Sebastes brevispinis*	12	115	87	115	0	0
Slender Sole	*Lyopsetta exilis*	6	115	15	115	0	0
Southern Rock Sole	*Lepidopsetta bilineata*	46	1170	973	1170	838	838
Spotted Ratfish	*Hydrolagus colliei*	61	2092	0	2092	0	0
Starry Flounder	*Platichthys stellatus*	15	118	118	118	117	0
Walleye Pollock	*Gadus chalcogrammus*	40	899	475	899	172	172
Yelloweye Rockfish	*Sebastes ruberrimus*	7	12	12	12	12	12
Yellowmouth Rockfish	*Sebastes reedi*	1	35	0	35	0	0
Yellowtail Rockfish	*Sebastes flavidus*	8	124	110	124	51	51
	Total	**1120**	**19907**	**11868**	**18400**	**6847**	**6694**

Table 10. Summary of biological data collected during the 2017 HS synoptic bottom trawl survey. For each species the number of samples and specimens, the minimum, maximum, and mean length, the minimum, maximum, and mean weight, and proportion of females is shown. Weights less than 0.1 kg are entered as <0.1 and no data collected is entered as -.

		Number of		Length	Length (cm)			Weight (kg)			Female
Common Name	**Scientific Name**	**Samples**	**Specimens**	**Type**	**Min.**	**Max.**	**Mean**	**Min.**	**Max.**	**Mean**	**Proportion**
Arrowtooth Flounder	*Atheresthes stomias*	68	1847	Fork	12	72	42	<0.1	3.1	0.8	0.61
Big Skate	*Beringraja binoculata*	52	211	Total	19	180	82	0.4	19.9	2.4	0.51
Bocaccio	*Sebastes paucispinis*	9	48	Fork	21	37	25	0.1	0.5	0.2	0.6
Butter Sole	*Isopsetta isolepis*	16	316	Total	17	41	29	0.1	0.5	0.2	0.62
Canary Rockfish	*Sebastes pinniger*	5	70	Fork	15	52	31	<0.1	2.3	0.7	0.49
Copper Rockfish	*Sebastes caurinus*	5	62	Fork	28	47	36	0.3	2.1	1	0.45
Curlfin Sole	*Pleuronichthys decurrens*	12	158	Total	18	43	29	0.1	1.4	0.5	0.39
Dover Sole	*Microstomus pacificus*	45	1210	Total	14	62	37	0.1	2.4	0.5	0.58
English Sole	*Parophrys vetulus*	66	1876	Total	12	49	30	<0.1	1.3	0.3	0.57
Eulachon	*Thaleichthys pacificus*	32	984	Standard	7	21	15	-	-	-	-
Flathead Sole	*Hippoglossoides elassodon*	14	367	Total	16	41	31	<0.1	0.7	0.3	0.53
Greenstriped Rockfish	*Sebastes elongatus*	3	38	Fork	18	37	27	0.1	0.8	0.3	0.5
Kelp Greenling	*Hexagrammos decagrammus*	3	60	Fork	19	39	31	0.1	0.8	0.4	0.67
Lingcod	*Ophiodon elongatus*	41	310	Fork	23	115	34	0.1	9.7	0.4	0.58
Longnose Skate	*Raja rhina*	32	90	Total	38	169	90	-	-	-	0.57
North Pacific Spiny Dogfish	*Squalus suckleyi*	66	383	Total	25	109	71	0.1	8.2	1.8	0.55
Pacific Cod	*Gadus macrocephalus*	62	821	Fork	20	84	45	0.1	7.8	1.4	0.48
Pacific Hake	*Merluccius productus*	12	267	Fork	18	68	51	0.1	2.2	1	0.82
Pacific Halibut	*Hippoglossus stenolepis*	84	516	Fork	37	141	71	1.6	4.8	2.9	0.6
Pacific Ocean Perch	*Sebastes alutus*	19	435	Fork	10	48	30	<0.1	1.7	0.4	0.44
Pacific Sanddab	*Citharichthys sordidus*	23	585	Total	9	35	20	<0.1	0.5	0.1	0.56
Pacific Tomcod	*Microgadus proximus*	11	332	Fork	13	30	21	<0.1	0.2	0.1	0.52
Petrale Sole	*Eopsetta jordani*	27	305	Total	15	60	39	<0.1	2.5	0.8	0.56
Pygmy Rockfish	*Sebastes wilsoni*	3	25	Fork	12	23	19	<0.1	0.2	0.1	0.92
Quillback Rockfish	*Sebastes maliger*	19	339	Fork	12	45	31	<0.1	1.9	0.7	0.52
Redbanded Rockfish	*Sebastes babcocki*	16	206	Fork	21	61	44	0.1	4.4	1.6	0.35
Redstripe Rockfish	*Sebastes proriger*	4	95	Fork	21	40	28	0.1	1	0.3	0.48
Rex Sole	*Glyptocephalus zachirus*	61	1556	Total	11	53	31	<0.1	1.2	0.2	0.59
Rougheye/Blackspotted Rockfish Complex	*Sebastes aleutianus/melanostictus* complex	16	49	Fork	17	51	31	0.1	2.3	0.6	0.49

Common Name	Scientific Name	Number of Samples	Number of Specimens	Length Type	Length (cm) Min.	Length (cm) Max.	Length (cm) Mean	Weight (kg) Min.	Weight (kg) Max.	Weight (kg) Mean	Female Proportion
Sablefish	*Anoplopoma fimbria*	47	821	Fork	27	77	39	0.2	4.4	0.7	0.49
Sand Sole	*Psettichthys melanostictus*	20	372	Total	14	47	34	<0.1	1.4	0.5	0.75
Sandpaper Skate	*Bathyraja interrupta*	13	26	Total	49	90	61	-	-	-	0.46
Sharpchin Rockfish	*Sebastes zacentrus*	2	57	Fork	9	32	23	<0.1	0.2	0.1	0.40
Shortspine Thornyhead	*Sebastolobus alascanus*	16	390	Total	9	55	28	<0.1	2.5	0.4	0.43
Silvergray Rockfish	*Sebastes brevispinis*	12	115	Fork	23	64	47	0.2	3.6	1.5	0.28
Slender Sole	*Lyopsetta exilis*	6	115	Total	13	32	24	<0.1	0.1	0	0.62
Southern Rock Sole	*Lepidopsetta bilineata*	46	1170	Total	12	48	29	<0.1	1.6	0.4	0.68
Spotted Ratfish	*Hydrolagus colliei*	61	2092	2nd Dorsal	8	52	32	-	-	-	0.44
Starry Flounder	*Platichthys stellatus*	15	118	Total	47	74	61	1.3	5.5	3.3	0.98
Walleye Pollock	*Gadus chalcogrammus*	40	899	Fork	13	71	37	<0.1	2.2	0.7	0.59
Yelloweye Rockfish	*Sebastes ruberrimus*	7	12	Fork	29	67	54	0.4	6	3.7	0.58
Yellowmouth Rockfish	*Sebastes reedi*	1	35	Fork	30	40	32	-	-	-	0.34
Yellowtail Rockfish	*Sebastes flavidus*	8	124	Fork	17	55	40	0.1	3.1	1.1	0.36

Table 11. Summary of data from net-mounted recorders during the 2017 HS synoptic bottom trawl survey, showing the number of tows and total number of records. A total of 152 survey tows were conducted, of which 138 were useable.

Data Recorder	Attribute	Number of	
		Tows	Records
Hobo Pendant Acceleration Data Logger	Bottom contact sensor tilt angle	152	2397535
Scanmar Trawl Mensuration System	Net depth (m)	152	
	Doorspread (m)	150	
	Headline height above bottom (m)	148	
Seabird Sbe19plus Seacat Profiler	Conductivity of sea water (S/m)/ salinity (PSU)	139	220466
	Pressure (db)/ depth (m)	139	220466
	Water temperature (^{o}C)	139	220466
Seabird SBE43	Oxygen voltage (V)/ Dissolved oxygen (ml/L)	139	220466
Seabird SBE39 Temperature And Pressure Recorder	Water temperature (^{o}C)	152	537430
	Pressure (db)/ depth (m)	152	537430

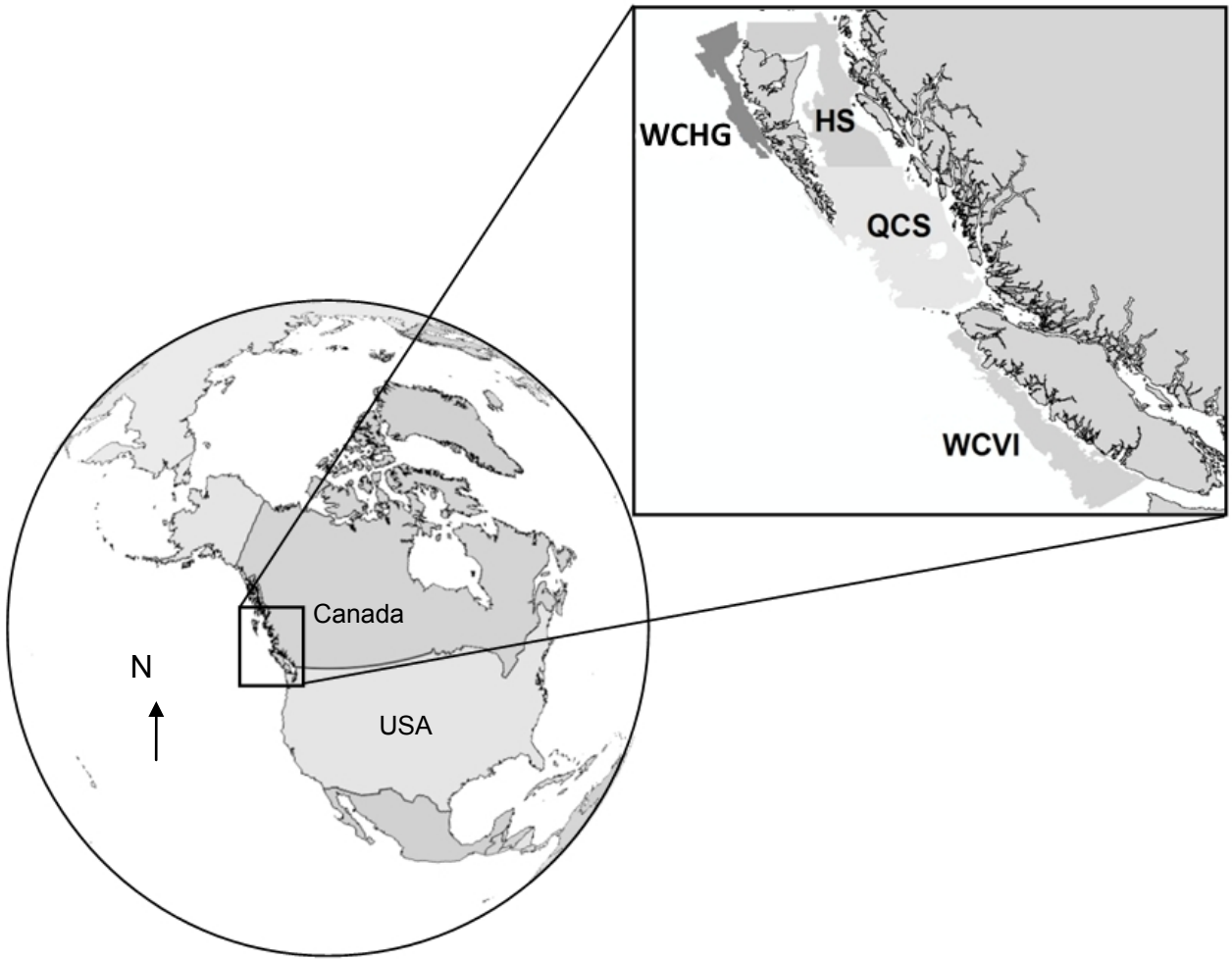

Figure 1. Locations of the current synoptic bottom trawl surveys on the coast of British Columbia, Canada. WCHG = West Coast Haida Gwaii; HS = Hecate Strait; QCS = Queen Charlotte Sound; WCVI = West Coast Vancouver Island.

Figure 2. The FV Nordic Pearl used for the 2017 HS synoptic bottom trawl survey (photo Schon Acheson).

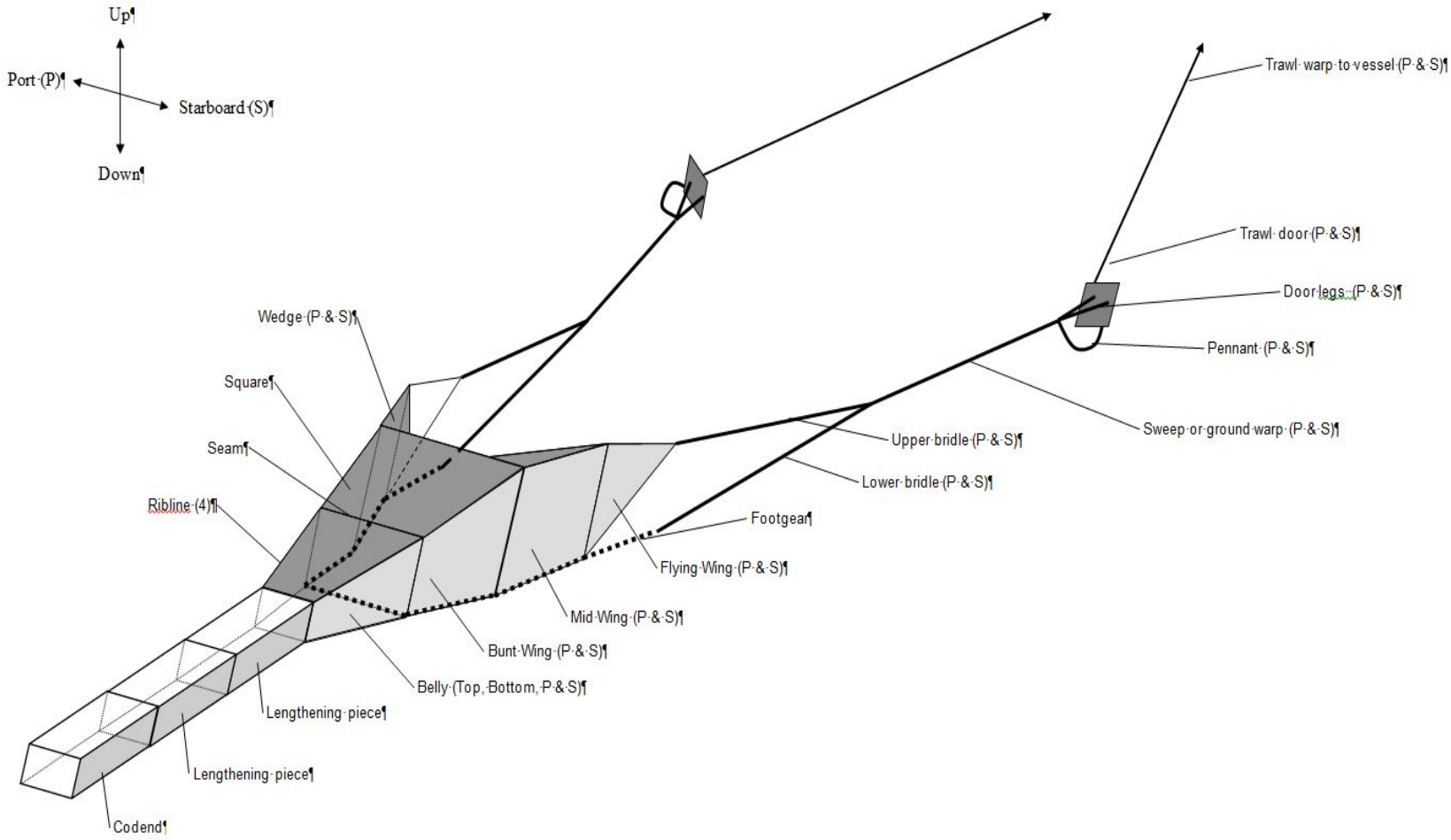

Figure 3. Overview diagram of the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey.

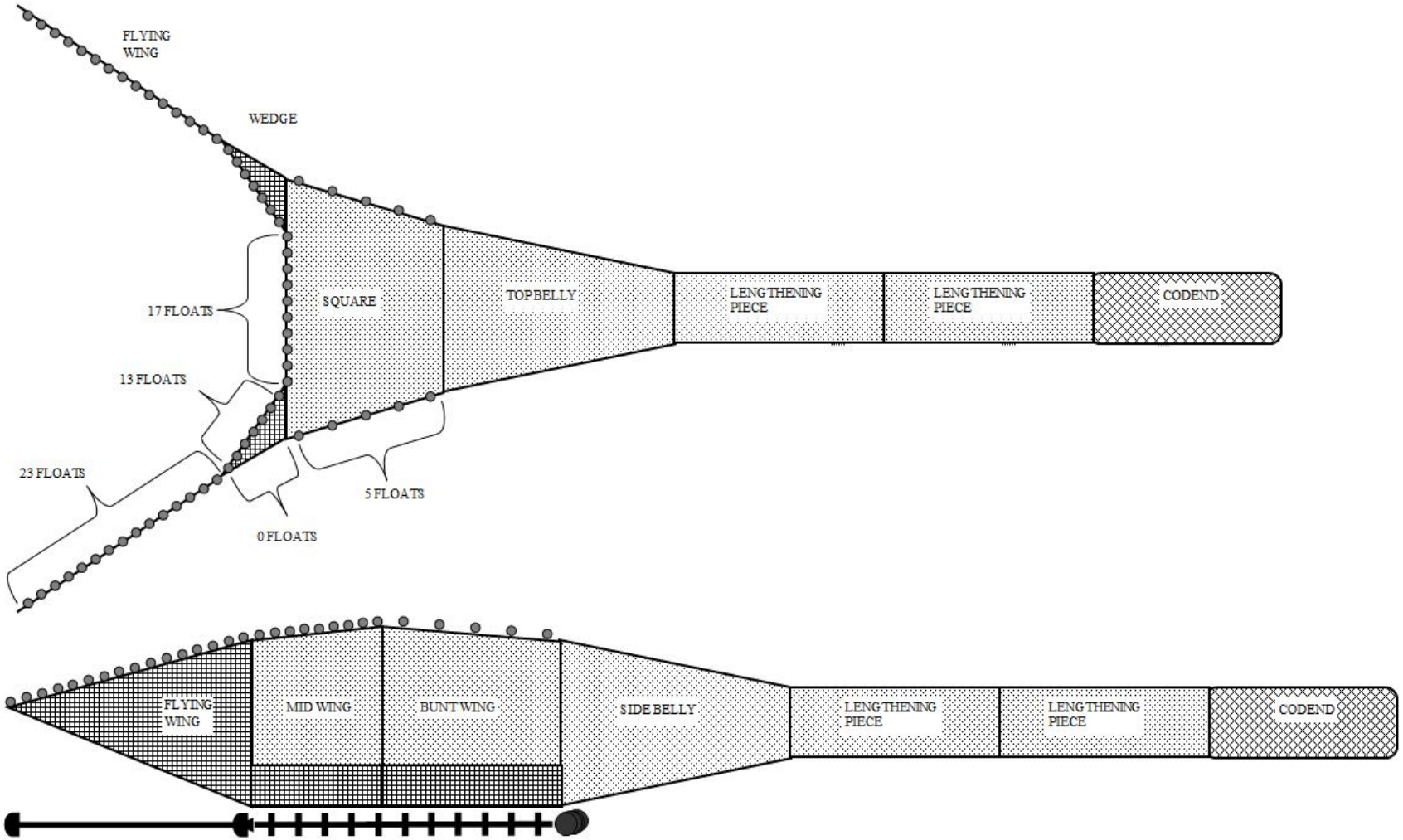

Figure 4. Top and side view of the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey.

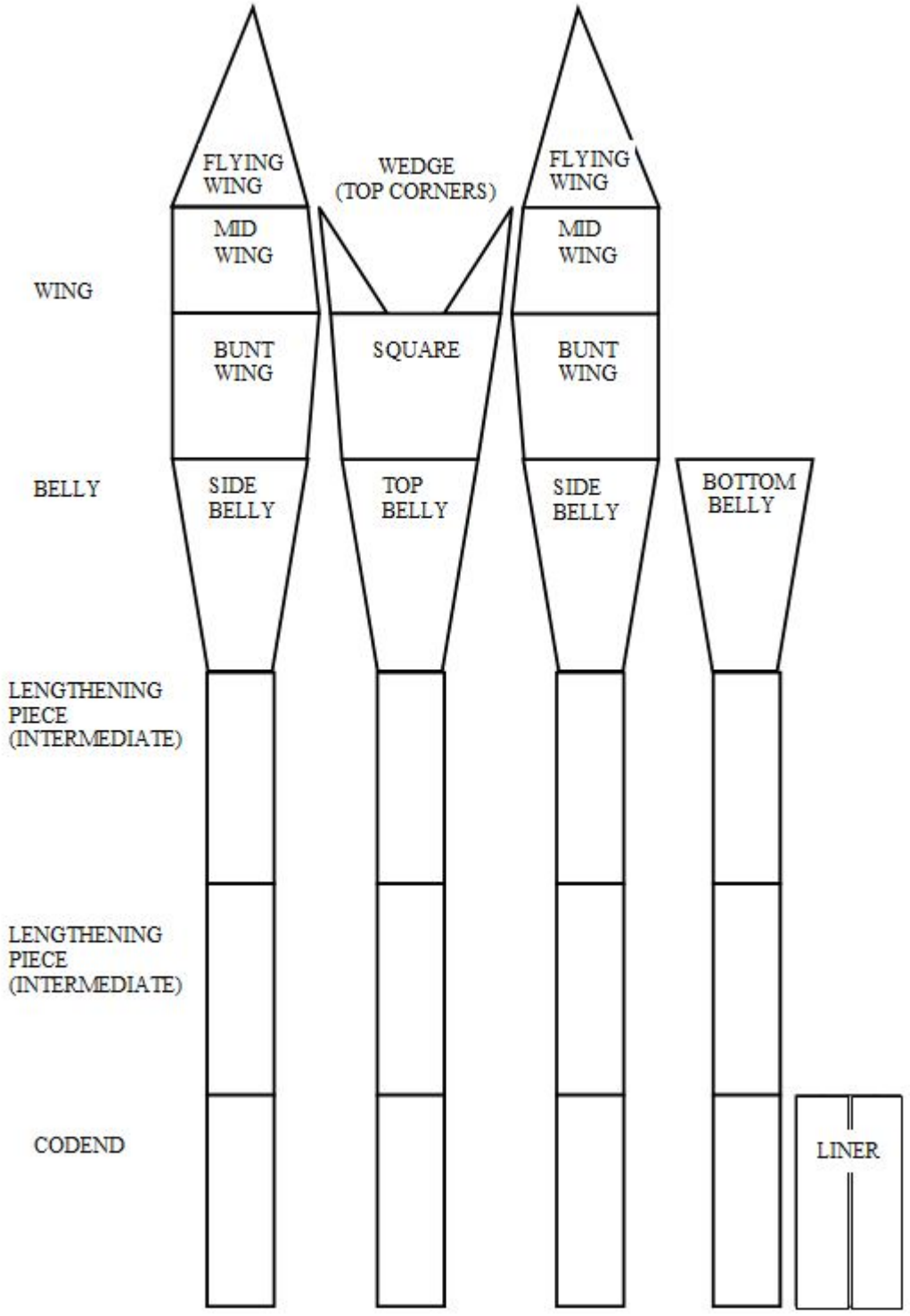

Figure 5. Diagram of the net panels with section names for the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey.

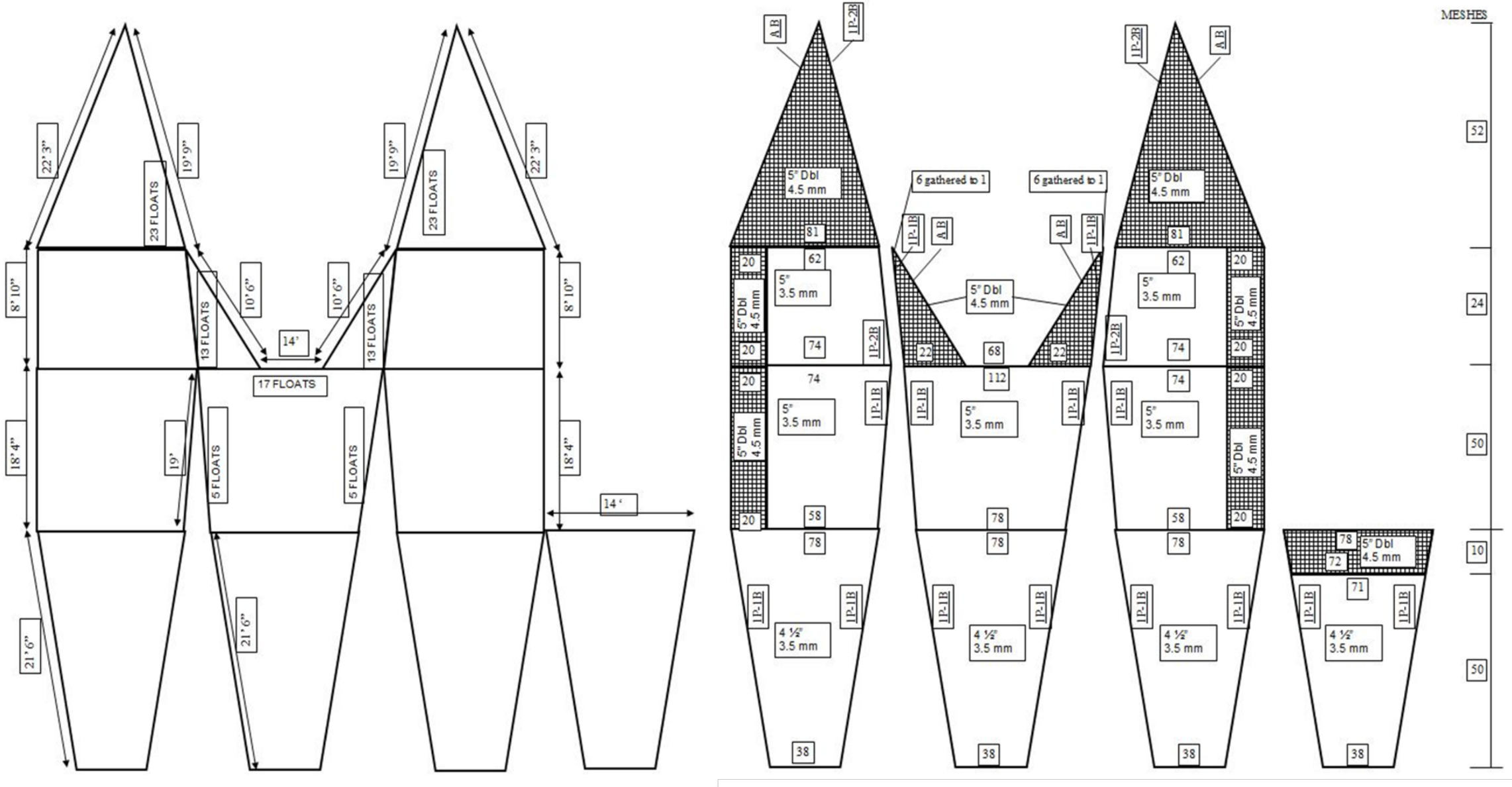

Figure 6. Details of the wing and belly sections of the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey. Dimensions and the float arrangement are shown on the left while netting details, mesh counts, and mesh cuts are shown on the right side of the diagram.

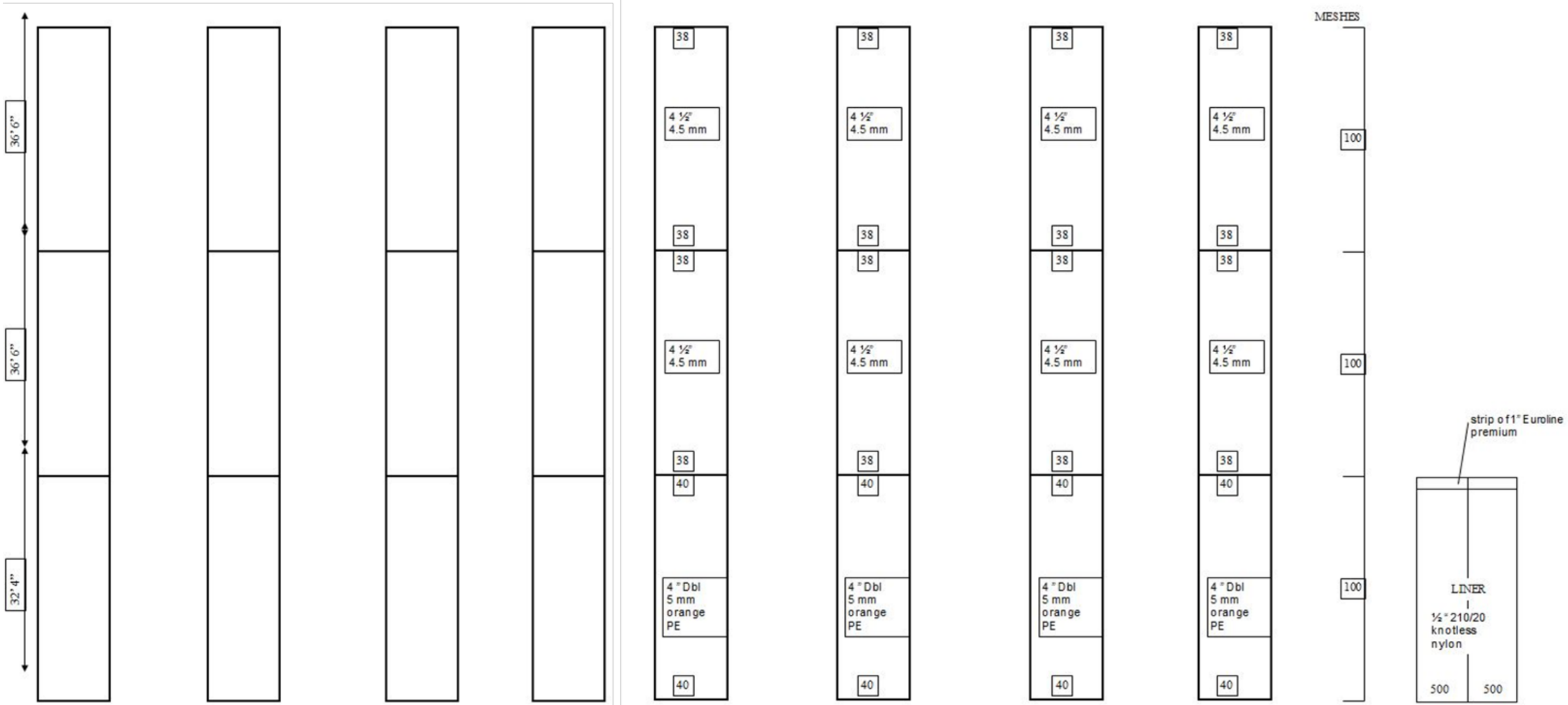

Figure 7. Details of the lengthening (intermediate) pieces and codend sections of the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey. Dimensions are shown on the left while netting details, mesh counts, and mesh cuts including the codend liner are shown on the right side of the diagram.

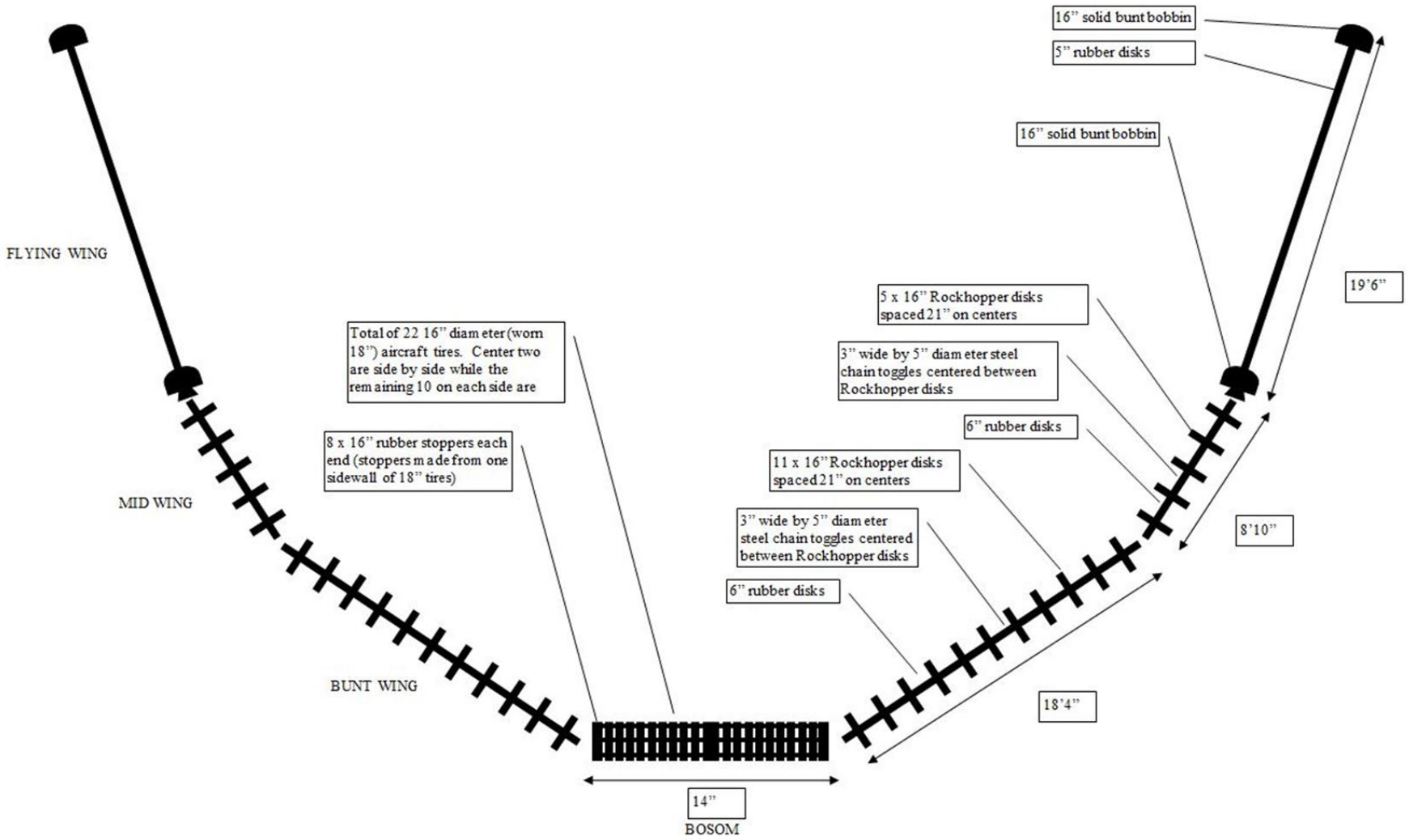

Figure 8. Details of the Rockhopper foot gear for the Atlantic Western IIa box trawl used on the 2017 HS synoptic bottom trawl survey.

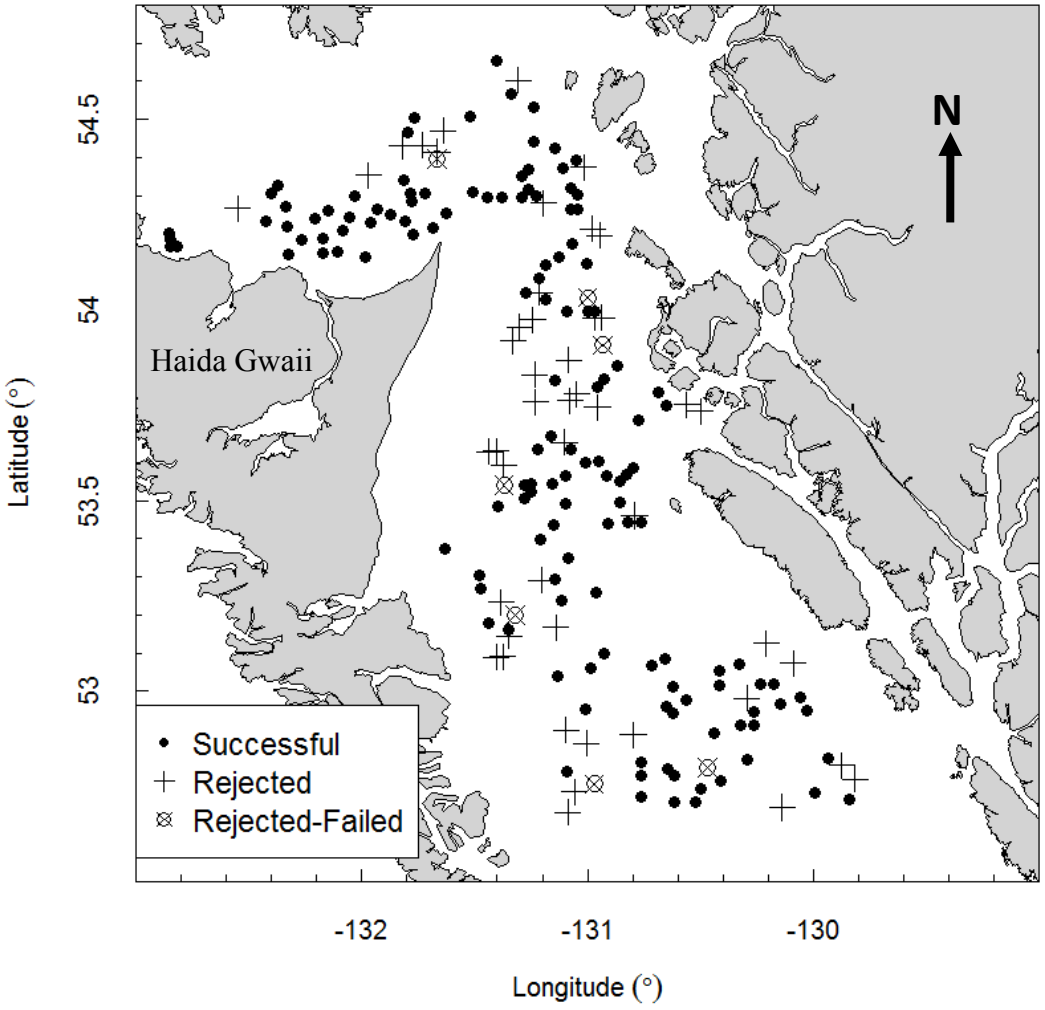

Figure 9. Final status of the 2017 HS synoptic bottom trawl survey showing 138 blocks that were fished successfully, 46 blocks rejected prior to fishing or after inspection, and eight blocks rejected after multiple failed fishing attempts.

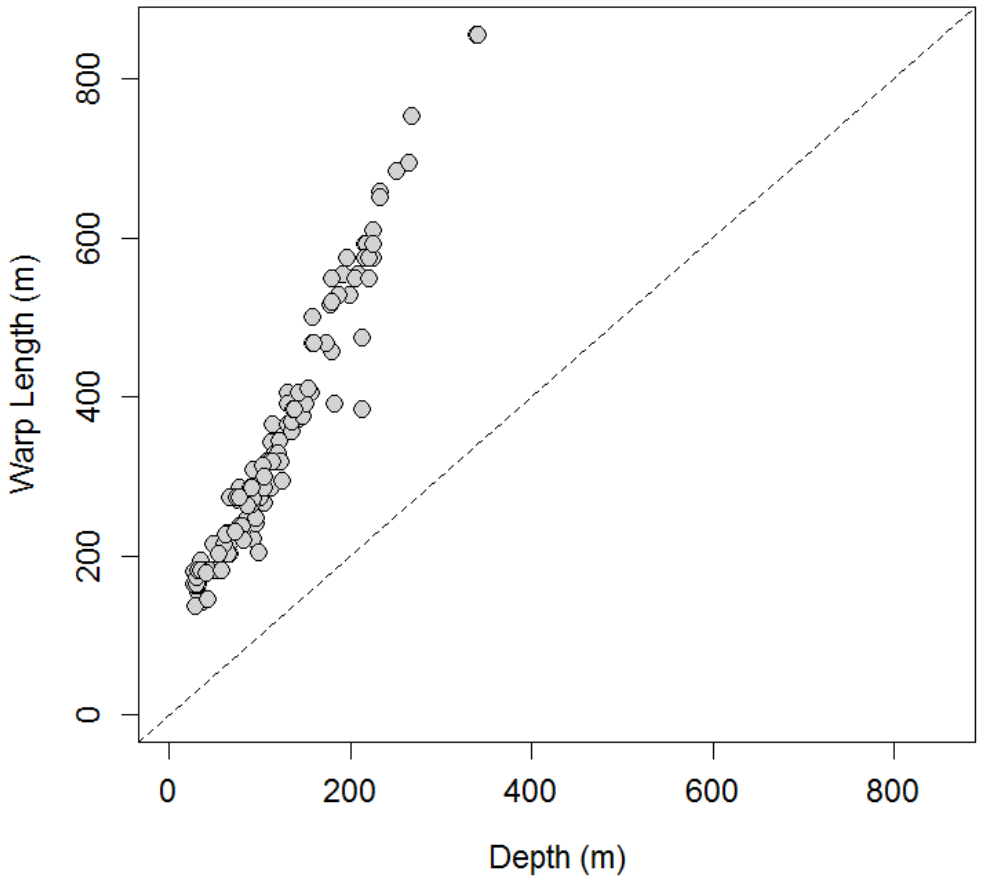

Figure 10. Starting warp length versus starting depth for each tow during the 2017 HS synoptic bottom trawl survey.

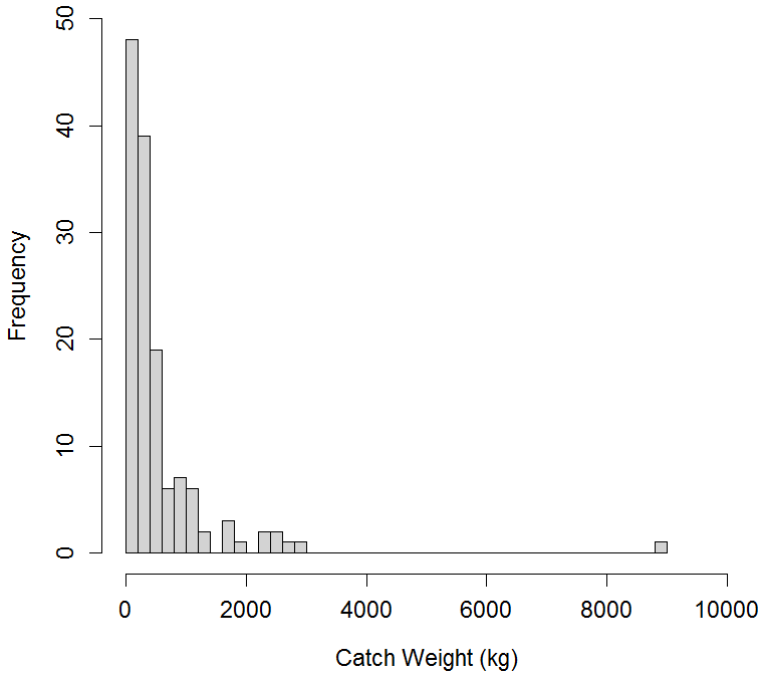

Figure 11. Histogram of catch weight in useable tows during the 2017 HS synoptic bottom trawl survey.

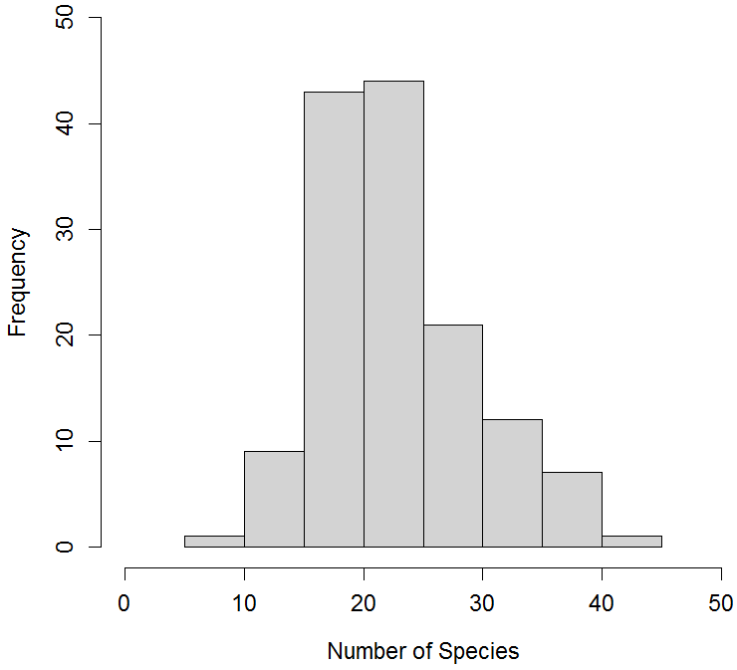

Figure 12. Histogram of number of species caught in useable tows during the 2017 HS synoptic bottom trawl survey.

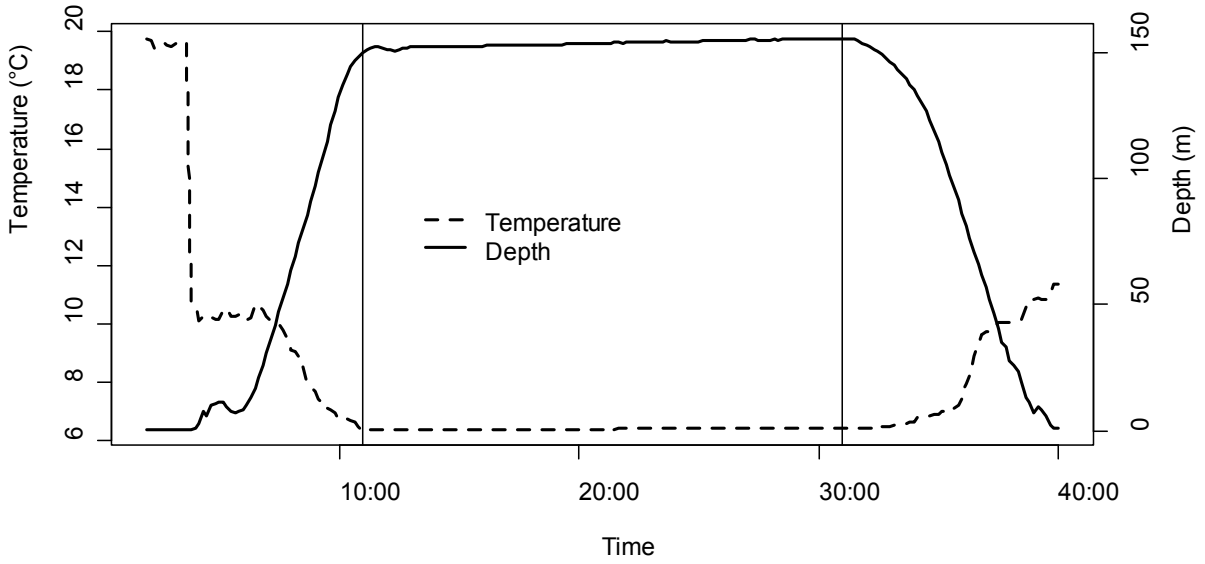

Figure 13. Example of a Seabird 39 temperature and pressure profile collected during a synoptic bottom trawl survey. The vertical lines indicate the start and end of net contact with the sea floor.

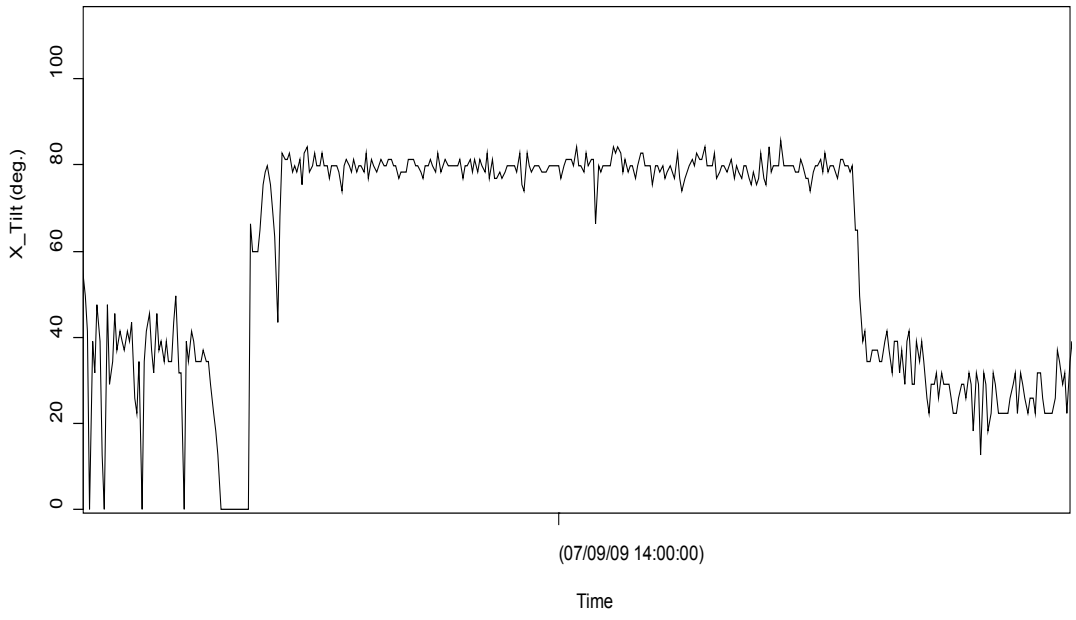

Figure 14. Example of a Mac Marine Industries bottom contact sensor profile collected during a synoptic bottom trawl survey. The raised segment in the middle of the profile at approximately 80° indicates where the net made contact with the sea floor.

APPENDIX A: HS 2017 SURVEY BRIDGE LOG

Tow	Date	Start Time	Start Latitude	Start Longitude	Average Depth (m)	Bottom Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Useable
1	May-21	07:30	52.7235	129.8498	212.3	21	5.4	476	521.7	Yes
2	May-21	09:21	52.7319	129.9931	264.5	22	5.7	695	169.2	Yes
3	May-21	11:21	52.8308	129.9489	268.3	23	5.7	750	2962.5	No
4	May-21	12:44	52.8168	129.9462	268	23	5.3	754	2338.7	Yes
5	May-21	14:15	52.9460	130.0318	264	5	5.9	732	123.2	No
6	May-21	15:25	52.9515	130.0344	251	22	5.4	684	382.9	Yes
7	May-21	16:47	52.9936	130.0645	232.9	22	6.0	651	249.3	Yes
8	May-21	18:09	52.9584	130.1548	232.1	21	6.1	658	235.6	Yes
9	May-22	07:08	54.1307	131.9639	42.2	22	5.5	146	60.4	Yes
10	May-22	08:11	54.1990	132.0647	103.5	22	5.6	315	72.3	Yes
11	May-22	09:22	54.2524	132.0604	159.2	23	5.5	468	315.9	Yes
12	May-22	10:30	54.2336	131.9449	157.0	22	5.6	501	962.5	Yes
13	May-22	11:20	54.2593	131.9428	215.0	22	6.0	593	252.9	Yes
14	May-22	12:34	54.2521	131.8871	195.7	21	5.3	574	245.7	Yes
15	May-22	13:33	54.2277	131.8222	157.4	23	5.6	468	473.8	Yes
16	May-22	14:28	54.2799	131.7754	177.8	22	6.2	516	355.5	Yes
17	May-22	15:24	54.3032	131.7951	191.1	21	5.9	554	968.5	Yes
18	May-22	16:45	54.3426	131.8231	207.4	22	6.0	554	458.1	Yes
19	May-22	17:57	54.3136	131.7145	179.8	23	5.5	549	129.9	Yes
20	May-22	19:24	54.2011	131.7628	89.4	22	5.6	285	400.8	Yes
21	May-23	07:16	54.3029	131.3052	76.5	22	6.7	285	1127.1	Yes
22	May-23	08:17	54.3001	131.2042	66.7	24	5.4	274	554.0	Yes
23	May-23	09:17	54.3071	131.2670	88.1	21	5.9	274	898.8	Yes
24	May-23	11:03	54.4277	131.1562	130.4	22	6.2	406	2302.8	Yes
25	May-23	12:12	54.3774	131.0994	114.3	22	5.4	366	2557.3	Yes
26	May-23	13:38	54.3274	131.0902	111.5	22	5.8	344	2706.0	Yes
27	May-23	15:52	54.1486	131.1255	35.1	22	6.1	183	233.7	Yes
28	May-23	16:45	54.1142	131.1688	36.2	23	6.1	183	417.5	Yes
29	May-23	18:23	54.0335	131.1685	43.3	21	6.5	183	489.8	Yes
30	May-25	07:05	53.3585	131.6270	27.4	23	6.5	181	32.2	Yes
31	May-25	09:03	53.4964	131.2901	32.2	23	5.6	183	152.3	Yes
32	May-25	10:12	53.5114	131.2635	31.2	22	6.0	165	0.0	No
33	May-27	06:43	53.5179	131.2530	31.7	22	5.9	165	160.7	Yes
34	May-27	07:28	53.5335	131.2623	29.5	21	5.9	165	298.1	Yes
35	May-27	08:20	53.5330	131.2783	27.3	21	6.0	165	429.2	Yes
36	May-27	09:28	53.5299	131.3715	25.5	10	6.4	165	39.2	No
37	May-27	12:03	53.6392	131.2360	29.2	21	5.6	165	98.5	Yes
38	May-27	12:54	53.6676	131.1740	51.0	21	5.5	183	491.5	Yes
39	May-27	14:13	53.6450	131.0653	74.0	21	5.9	274	247.3	Yes
40	May-27	15:26	53.6066	130.9504	63.3	21	5.8	229	112.6	Yes
41	May-27	16:34	53.5710	131.0976	48.7	21	5.8	216	299.0	Yes
42	May-27	17:45	53.4854	131.0809	52.1	21	5.5	216	340.6	Yes
43	May-27	18:46	53.4282	131.1431	42.6	21	5.6	183	155.1	Yes
44	May-28	07:34	53.7406	130.6457	118.3	22	5.6	318	513.4	Yes
45	May-28	08:27	53.7816	130.6768	119.0	21	5.3	329	211.9	Yes
46	May-28	09:55	53.8605	130.8840	90.9	21	5.8	285	1116.6	Yes
47	May-28	11:34	53.9133	130.9476	76.4	3	5.5	285	58.8	No
48	May-28	12:53	53.9920	131.0031	59.7	21	6.0	216	118.9	Yes
49	May-28	14:03	53.9971	130.9654	80.7	3	5.9	220	0.0	No
50	May-28	14:27	54.0081	130.9642	80.3	20	5.4	238	244.2	Yes
51	May-28	15:49	53.9984	131.0834	77.7	21	5.5	238	827.4	Yes

Tow	Date	Start Time	Start Latitude	Start Longitude	Average Depth (m)	Bottom Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Useable
52	May-28	18:06	53.8236	130.9252	89.9	21	5.6	285	1043.4	Yes
53	May-29	06:50	53.7049	130.7659	121.1	21	5.7	346	527.8	Yes
54	May-29	08:48	53.8002	130.9549	64.3	21	5.4	203	307.2	Yes
55	May-29	11:20	53.8228	131.1505	48.7	21	5.6	183	379.3	Yes
56	May-29	14:24	54.0425	131.2878	31.3	23	5.4	183	124.4	Yes
57	May-29	16:09	54.1141	131.0124	101.4	21	6.0	293	308.8	Yes
58	May-29	17:31	54.2596	131.0430	124.1	21	5.9	294	1382.3	Yes
59	May-29	18:22	54.2937	131.0486	112	17	5.5	285	1907.7	Yes
60	May-30	06:34	53.2680	130.9583	94.8	21	6.0	241	131.7	Yes
61	May-30	08:04	53.0960	130.9372	70.1	20	6.0	220	151.1	Yes
62	May-30	08:57	53.0679	130.9724	55.4	21	5.6	203	152.5	Yes
63	May-30	10:21	53.0499	131.1296	36.9	21	5.9	183	154.7	Yes
64	May-30	11:40	52.9610	131.0027	36.4	22	5.9	183	111.9	Yes
65	May-30	13:45	52.7680	130.9668	44.0	12	5.8	183	32.0	No
66	May-30	15:34	52.7180	130.7681	103.9	21	5.7	267	103.9	Yes
67	May-30	16:44	52.8081	130.7672	81.5	21	5.8	220	170.8	Yes
68	May-30	18:30	52.9329	130.6294	91.9	21	5.7	221	141.0	Yes
69	May-30	19:32	52.9520	130.6400	81.4	21	5.9	234	369.8	Yes
70	May-30	20:48	52.9722	130.5557	97.6	22	5.7	205	138.4	Yes
71	Jun-02	11:07	52.9132	130.2564	225.2	22	5.8	574	214.3	Yes
72	Jun-02	12:20	52.9044	130.3219	205	21	5.7	549	100.8	Yes
73	Jun-02	13:19	52.9409	130.2653	220.5	22	5.6	574	1683.6	Yes
74	Jun-02	14:27	53.0095	130.2347	219.5	21	6.0	549	248.9	Yes
75	Jun-02	15:55	53.0457	130.4047	186.7	24	5.8	529	180.8	Yes
76	Jun-02	17:43	53.0090	130.6119	102.2	21	6.0	271	312.8	Yes
77	Jun-02	18:42	53.0926	130.6495	119.8	20	5.8	329	522.6	Yes
78	Jun-02	19:46	53.0775	130.7243	119.0	22	5.9	329	167.3	Yes
79	Jun-03	08:55	53.1746	131.3421	35.0	7	6.4	183	4.9	No
80	Jun-03	09:23	53.1762	131.3420	35.9	21	5.8	143	48.3	Yes
81	Jun-03	10:24	53.2104	131.3179	40.7	16	5.4	163	31.3	No
82	Jun-03	11:29	53.1944	131.4329	31.8	22	6.1	155	20.8	Yes
83	Jun-03	13:24	53.2780	131.4748	28.9	23	5.8	137	72.0	Yes
84	Jun-03	14:45	53.2931	131.4667	28.4	22	5.9	163	45.5	Yes
85	Jun-04	07:07	54.1723	132.8048	57.8	21	5.8	183	78.1	Yes
86	Jun-04	07:54	54.1736	132.8568	54.8	3	7.8	227	0.0	No
87	Jun-04	08:21	54.1737	132.8345	61.9	22	5.7	227	106.0	Yes
88	Jun-04	09:03	54.1873	132.8551	91.0	19	6.1	285	323.3	Yes
89	Jun-04	10:03	54.2040	132.8589	137.0	21	5.6	384	1332.8	Yes
90	Jun-04	12:43	54.3041	132.3766	212.7	21	6.0	384	184.3	Yes
91	Jun-04	13:37	54.3193	132.3804	217.5	22	5.3	593	196.8	Yes
92	Jun-04	14:48	54.2767	132.3526	198.1	21	5.8	529	122.9	Yes
93	Jun-04	16:05	54.2370	132.4359	142.5	21	5.7	406	282.4	Yes
94	Jun-04	17:09	54.2241	132.3452	138.5	21	5.8	384	832.0	Yes
95	Jun-04	18:07	54.1916	132.2773	113.3	22	6.0	318	804.7	Yes
96	Jun-04	19:21	54.1487	132.3358	92.0	21	6.1	273	179.3	Yes
97	Jun-05	07:12	54.1469	132.0943	39.8	21	5.4	179	124.9	Yes
98	Jun-05	08:19	54.1461	132.1899	53.9	21	5.8	203	278.4	Yes
99	Jun-05	09:18	54.1853	132.1819	86.7	21	5.7	263	142.6	Yes
100	Jun-05	10:26	54.2423	132.2177	152.9	21	5.6	412	426.8	Yes
101	Jun-05	11:23	54.2663	132.1596	178.5	21	5.9	457	376.2	Yes
102	Jun-05	12:37	54.3003	132.0155	221.6	24	5.6	594	247.4	Yes
103	Jun-06	06:47	54.2116	131.7065	77.0	20	5.8	274	931.9	Yes
104	Jun-06	07:34	54.2473	131.6400	105.0	21	5.8	300	602.9	Yes

Tow	Date	Start Time	Start Latitude	Start Longitude	Average Depth (m)	Bottom Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Useable
105	Jun-06	08:35	54.3128	131.5193	156.0	22	6.1	406	700.0	Yes
106	Jun-06	09:37	54.2910	131.4559	93.0	21	5.9	309	1002.1	Yes
107	Jun-06	10:20	54.2974	131.3926	75.3	22	5.6	271	1076.0	Yes
108	Jun-06	11:10	54.3393	131.3052	138.6	22	5.6	384	1744.8	Yes
109	Jun-06	12:55	54.3618	131.2617	107.6	22	5.8	318	2506.5	Yes
110	Jun-06	14:37	54.4480	131.2524	141.7	21	5.8	395	1689.2	Yes
111	Jun-06	15:42	54.5202	131.2509	130.1	21	5.9	391	635.9	Yes
112	Jun-06	16:45	54.5694	131.3525	115.0	21	5.7	327	721.5	Yes
113	Jun-06	18:16	54.6566	131.4146	182.4	21	5.9	391	415.9	Yes
114	Jun-07	06:37	54.4989	131.5237	215.4	21	5.3	574	389.9	Yes
115	Jun-07	08:47	54.5038	131.7712	340.5	24	5.5	856	350.0	Yes
116	Jun-07	10:09	54.4694	131.7833	339.1	21	5.4	856	333.5	Yes
117	Jun-07	11:54	54.4378	131.7226	297.7	21	5.2	750	433.8	No
118	Jun-07	13:31	54.3932	131.6786	259.4	16	5.6	686	0.0	No
119	Jun-07	16:56	54.4028	131.0589	95.0	21	5.6	285	737.2	Yes
120	Jun-07	18:46	54.2773	131.0749	72.2	21	5.6	230	9000.0	Yes
121	Jun-08	07:06	54.1874	131.0569	105.1	21	6.0	285	2865.1	Yes
122	Jun-08	08:48	54.0981	131.2082	34.3	22	6.0	183	598.6	Yes
123	Jun-08	10:27	54.0424	131.0068	77.9	6	4.9	256	123.4	No
124	Jun-08	14:07	53.6115	131.0057	52.5	21	5.7	183	339.6	Yes
125	Jun-08	15:33	53.5628	130.9283	66.7	21	5.8	-	176.6	Yes
126	Jun-08	16:24	53.5465	130.8686	84.4	21	5.4	274	184.9	Yes
127	Jun-08	17:05	53.5574	130.8384	84.2	21	5.3	247	159.5	Yes
128	Jun-08	17:49	53.5799	130.7937	94.9	21	5.5	249	289.7	Yes
129	Jun-09	06:46	53.4844	130.8724	100.0	21	5.9	274	193.9	Yes
130	Jun-09	08:33	53.5522	131.1456	66.6	21	5.7	203	620.5	Yes
131	Jun-09	09:56	53.4056	131.1965	35.1	22	5.9	194	189.3	Yes
132	Jun-09	11:33	53.4752	131.3866	31.4	22	5.9	163	99.6	Yes
133	Jun-10	06:53	53.4290	130.7710	179.6	22	5.3	519	470.6	Yes
134	Jun-10	07:49	53.4520	130.8136	135.6	21	5.9	369	502.3	Yes
135	Jun-10	08:59	53.4341	130.9118	110.1	22	5.4	318	390.9	Yes
136	Jun-10	10:38	53.3584	131.0820	51.0	20	5.7	183	264.8	Yes
137	Jun-10	11:42	53.2809	131.1332	40.7	21	5.7	183	78.9	Yes
138	Jun-10	12:59	53.2513	131.1078	46	21	5.5	183	234.6	Yes
139	Jun-10	16:58	52.8051	131.0853	30.4	22	6	174	184.1	Yes
140	Jun-11	07:03	52.7669	130.7751	90.1	22	5.7	265	57.7	Yes
141	Jun-11	08:07	52.8023	130.6408	112.0	20	6	-	99.4	Yes
142	Jun-11	08:58	52.7852	130.6161	122.7	21	5.7	318	64.6	Yes
143	Jun-11	09:51	52.7090	130.6090	135.2	19	5.4	357	390.0	Yes
144	Jun-11	10:56	52.7022	130.5238	142.7	22	5.5	373	1096.7	Yes
146	Jun-11	12:00	52.7481	130.5059	146.6	22	5.8	377	142.9	Yes
147	Jun-11	13:00	52.7573	130.4066	149.7	23	5.6	391	218.4	Yes
148	Jun-11	14:03	52.7939	130.4741	137.6	22	5.4	384	22.2	No
149	Jun-11	15:36	52.8212	130.2881	224.9	21	5.9	593	468.7	Yes
150	Jun-12	08:05	53.0754	130.3326	203.3	21	5.6	-	308.9	Yes
151	Jun-12	09:32	53.0156	130.1724	224.3	22	5.5	609	516.6	Yes
152	Jun-12	11:26	53.0235	130.4221	173.5	21	5.7	468	283.0	Yes
153	Jun-12	12:58	52.8880	130.4380	130.4	21	5.4	366	228.2	Yes

APPENDIX B: CATCH BY TOW (KG) <0.1 KG ENTERED AS –

Common Name	Scientific Name	Total Weight (Kg)	1	2	3	4	5
Arrowtooth Flounder	*Atheresthes stomias*	18116.7	11.7	73.3	2701.3	1913.3	73.7
Big Skate	*Beringraja binoculata*	1415.7				32.2	
Bigmouth Sculpin	*Hemitripterus bolini*	53.4					
Bocaccio	*Sebastes paucispinis*	14.3					
Buffalo Sculpin	*Enophrys bison*	5.8					
Butter Sole	*Isopsetta isolepis*	276.7					
Cabezon	*Scorpaenichthys marmoratus*	7.5					
Canary Rockfish	*Sebastes pinniger*	120.4					
Copper Rockfish	*Sebastes caurinus*	155.7					
Curlfin Sole	*Pleuronichthys decurrens*	93.4					
Dover Sole	*Microstomus pacificus*	5177.4	0.9	22.5	113.1	192.9	12.1
English Sole	*Parophrys vetulus*	12169.7					
Eulachon	*Thaleichthys pacificus*	191.3		1.3		-	2.0
Flathead Sole	*Hippoglossoides elassodon*	970.1		7.5	0.5	2.2	0.4
Greenstriped Rockfish	*Sebastes elongatus*	18.8	1.0				
Harlequin Rockfish	*Sebastes variegatus*	3.3					
Kelp Greenling	*Hexagrammos decagrammus*	34.2					
Lingcod	*Ophiodon elongatus*	265.3			9.5	7.6	4.1
Longnose Skate	*Raja rhina*	529.3			17.6	57.3	4.5
North Pacific Spiny Dogfish	*Squalus suckleyi*	1011.5	1.1	4.9	10.3	5.1	
Pacific Cod	*Gadus macrocephalus*	2531.0					
Pacific Hake	*Merluccius productus*	489.9	2.0	5.6	2.9	11.6	11.0
Pacific Halibut	*Hippoglossus stenolepis*	2462.2				13.9	
Pacific Ocean Perch	*Sebastes alutus*	1321.3	147.1	4.6	0.4		
Pacific Sand Lance	*Ammodytes personatus*	10.2					
Pacific Sanddab	*Citharichthys sordidus*	192.5					
Pacific Staghorn Sculpin	*Leptocottus armatus*	3.9					
Pacific Tomcod	*Microgadus proximus*	194.1					
Petrale Sole	*Eopsetta jordani*	369.6	1.8		4.8	1.2	2.4
Quillback Rockfish	*Sebastes maliger*	342.8					
Red Irish Lord	*Hemilepidotus hemilepidotus*	10.6					
Redbanded Rockfish	*Sebastes babcocki*	499.8	20.2	27.1	23.3	4.9	4.7
Redstripe Rockfish	*Sebastes proriger*	164.1	2.6				
Rex Sole	*Glyptocephalus zachirus*	3230.0	3.7	2.0	9.9	9.8	0.3
Rougheye Rockfish	*S. aleutianus/melanostictus*	35.6		0.4	5.3	2.5	
Sablefish	*Anoplopoma fimbria*	4110.3		5.0	29.9	51.4	3.1
Sand Sole	*Psettichthys melanostictus*	351.2					
Sandpaper Skate	*Bathyraja interrupta*	35.5		2.2		3.5	
Sharpchin Rockfish	*Sebastes zacentrus*	193.6	190.5				
Shiner Perch	*Cymatogaster aggregata*	4.2					
Shortspine Thornyhead	*Sebastolobus alascanus*	341.3	12.1	5.2	2.3	1.8	0.5
Silvergray Rockfish	*Sebastes brevispinis*	249.4	29.5			1.9	
Slender Sole	*Lyopsetta exilis*	24.5		1.8	0.7	0.4	0.1
Southern Rock Sole	*Lepidopsetta bilineata*	1557.2					
Spotted Ratfish	*Hydrolagus colliei*	16517.0	0.3		12.1	18.7	1.7
Starry Flounder	*Platichthys stellatus*	390.6					
Walleye Pollock	*Gadus chalcogrammus*	2281.0	55.6	2.2	3.7	3.7	0.7
Yelloweye Rockfish	*Sebastes ruberrimus*	44.8	6.1				
Yellowmouth Rockfish	*Sebastes reedi*	18.3	17.4				
Yellowtail Rockfish	*Sebastes flavidus*	1035.9					
Other		1748.8	18.1	3.7	15.0	2.9	2.0
Total		**81391.7**	**521.7**	**169.2**	**2962.5**	**2338.7**	**123.2**

Common Name	6	7	8	9	10	11	12	13	14	15	16
Arrowtooth Flounder	181.2	132.3	86.1		8.9	24.1	72.6	51.5	60.4	231.4	147.5
Big Skate				18.9	1.9						
Bigmouth Sculpin	3.8						6.9				
Bocaccio										0.4	
Buffalo Sculpin											
Butter Sole					1.4						
Cabezon											
Canary Rockfish						2.0	0.8				
Copper Rockfish											
Curlfin Sole											
Dover Sole	45.9	20.2	14.3			5.0	19.2	30.5	3.2	53.3	8.4
English Sole				1.8	5.6	24.5	1.2				
Eulachon	11.3	25.1	13.3					4.6	7.2		3.6
Flathead Sole	3.8	2.7	4.7				0.6			2.7	
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling											
Lingcod						3.1					
Longnose Skate	11.9	0.8									
North Pacific Spiny Dogfish	7.7		3.2			35.7	5.5	5.2	9.0	5.7	11.1
Pacific Cod			6.5		18.6	16.2	4.8	6.8	22.3	6.7	14.5
Pacific Hake	35.5	28.9	22.6								
Pacific Halibut			3.6	10.0	4.9	4.4	5.9				13.8
Pacific Ocean Perch	0.2	0.4	9.5			0.7	4.9	15.4	3.7	0.7	108.1
Pacific Sand Lance											
Pacific Sanddab				0.4							
Pacific Staghorn Sculpin											
Pacific Tomcod					0.2	-					
Petrale Sole	1.4		0.9	2.1	2.1	3.0	0.9				
Quillback Rockfish											
Red Irish Lord											
Redbanded Rockfish	15.8	5.3	24.7					19.7	80.1	15.8	1.9
Redstripe Rockfish											
Rex Sole	3.8	1.6	3.5		0.4	29.8	36.5	32.3	17.6	82.3	13.1
Rougheye/Blackspotted Rockfish Complex											
Sablefish	9.6	7.0	7.6							0.5	1.0
Sand Sole				1.1							
Sandpaper Skate								0.6		1.3	
Sharpchin Rockfish											
Shiner Perch											
Shortspine Thornyhead	5.7	1.9	10.0					7.1	3.2		0.5
Silvergray Rockfish	4.4		4.2			7.0	3.9	2.2	1.1	0.8	
Slender Sole	2.3	3.0	1.5								
Southern Rock Sole				12.2							
Spotted Ratfish	8.0	3.4	6.3	13.7	21.0	93.0	71.7	53.3	25.7	52.5	24.3
Starry Flounder											
Walleye Pollock	5.8	8.3	3.8		0.1	50.9	36.9	9.4	9.7	17.1	6.5
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish			2.4			14.8	689.8	8.6		1.7	
Other	24.8	8.4	7.0	0.1	7.2	2.0	0.4	5.8	2.3	0.9	1.3
Total	**382.9**	**249.3**	**235.6**	**60.4**	**72.3**	**315.9**	**962.5**	**252.9**	**245.7**	**473.8**	**355.5**

Common Name	17	18	19	20	21	22	23	24	25	26	27
Arrowtooth Flounder	55.9	180.3	32.2	156.8	103.6	11.8	242.8	161.3	117.9	222.1	
Big Skate					46.2		9.0	1.6	10.9	72.3	11.8
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin											
Butter Sole					25.4	37.7	16.1				
Cabezon											
Canary Rockfish											
Copper Rockfish											
Curlfin Sole											
Dover Sole	13.2	10.7		12.4	1.4	0.5	1.4	757.3	91.5	275.1	1.7
English Sole				19.0	366.6	392.8	375.0	27.4	191.6	238.4	8.3
Eulachon	2.7	1.3	4.6	0.1						0.8	
Flathead Sole					1.0					3.8	
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling											0.5
Lingcod				1.4			13.4				0.2
Longnose Skate	4.5	123.2	14.0							9.4	
North Pacific Spiny Dogfish	9.4		15.8	27.0	5.8		5.1	9.7		1.9	
Pacific Cod	6.0		4.8	38.0	78.3	28.8	48.1	4.2	38.9	25.9	3.3
Pacific Hake											
Pacific Halibut		58.8	11.0	20.5	431.3	59.0	116.1	25.1	8.6	62.7	25.8
Pacific Ocean Perch	853.8	33.7	4.9					0.4	0.3		
Pacific Sand Lance											
Pacific Sanddab							0.5				0.3
Pacific Staghorn Sculpin					0.2						
Pacific Tomcod					0.1	2.5	0.3				0.1
Petrale Sole				4.9	1.3		0.8				
Quillback Rockfish				0.2						0.3	
Red Irish Lord											0.7
Redbanded Rockfish	0.8	5.6	2.5								
Redstripe Rockfish											
Rex Sole	9.3	17.4	14.3	13.3	14.7	1.8	25.3	13.8	17.9	24.0	
Rougheye/Blackspotted Rockfish Complex											
Sablefish				8.3	4.2	1.3	0.4	1.0	5.1	1.7	
Sand Sole											6.2
Sandpaper Skate											
Sharpchin Rockfish											
Shiner Perch											
Shortspine Thornyhead	1.3	5.1	1.0		0.6						
Silvergray Rockfish		4.6	6.6								
Slender Sole			0.3								
Southern Rock Sole					23.1	7.3	1.9				51.1
Spotted Ratfish	6.8	13.5	11.9	89.5	8.1	10.4	4.6	1243.4	1987.0	1709.7	38.1
Starry Flounder					6.4		6.1				73.4
Walleye Pollock	3.9	2.5	4.2	6.5			31.9	51.5	85.9	56.0	
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish								2.3			
Other	0.9	1.2	1.9	3.0	8.8	0.5	-	3.8	1.8	2.3	12.7
Total	**968.5**	**458.1**	**129.9**	**400.8**	**1127.1**	**554.4**	**898.8**	**2302.8**	**2557.3**	**2706.3**	**234.3**

Common Name	28	29	30	31	32	33	34	35	36	37	38
Arrowtooth Flounder											
Big Skate	18.0	4.8	2.16	3.9					9.5	0.3	14.8
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin			-				-		0.4		
Butter Sole	16.7	6.8	0.52	1.0							0.5
Cabezon											
Canary Rockfish											
Copper Rockfish											
Curlfin Sole		0.2									5.1
Dover Sole		-									
English Sole	135.8	364.9		11.0		0.5			0.4	0.8	64.5
Eulachon											
Flathead Sole											
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling									0.7	0.1	
Lingcod		0.3				1.5	0.5			0.2	1.4
Longnose Skate											
North Pacific Spiny Dogfish				4.7		2.8		4.3	3.4		9.5
Pacific Cod	1.0					0.3	1.3	0.5		2.4	2.2
Pacific Hake											
Pacific Halibut	33.8	35.4				10.9	4.9	23.1		6.3	34.4
Pacific Ocean Perch											
Pacific Sand Lance			0.21	-		0.7	0.3	0.2	-		
Pacific Sanddab	-	0.9		0.1				0.1		-	2.6
Pacific Staghorn Sculpin				0.3							
Pacific Tomcod	0.8	2.9									0.1
Petrale Sole											
Quillback Rockfish	0.2										
Red Irish Lord	1.7								0.6		
Redbanded Rockfish											
Redstripe Rockfish											
Rex Sole		0.2									
Rougheye/Blackspotted Rockfish Complex											
Sablefish		1.3									
Sand Sole	6.0	29.8	5.9	9.1		8.8	0.8	0.8		8.4	2.3
Sandpaper Skate											
Sharpchin Rockfish											
Shiner Perch	0.4		0.44	0.3		0.4	-	0.1	0.2	0.2	0.3
Shortspine Thornyhead											
Silvergray Rockfish											
Slender Sole											
Southern Rock Sole	79.8	28.8	22.51	40.6		41.4	32.4	23.6	6.4	34.7	42.6
Spotted Ratfish	17.9	4.5		71.8		73.6	27.2	3.9	1.8	2.0	299.9
Starry Flounder	95.4			6.2		3.0	41.5	62.8		39.0	2.8
Walleye Pollock				0.2							
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish											
Other	10.5	13.2	0.95	3.0		16.9	189.2	309.9	15.9	4.1	8.5
Total	**418.1**	**494.0**	**32.7**	**152.3**		**160.7**	**298.1**	**429.2**	**39.2**	**98.5**	**491.5**

Common Name	39	40	41	42	43	44	45	46	47	48	49
Arrowtooth Flounder	-					33.3	18.9	205.67			
Big Skate		0.7									
Bigmouth Sculpin											
Bocaccio	0.2								0.4	0.2	
Buffalo Sculpin											
Butter Sole	1.0							5.8			
Cabezon											
Canary Rockfish											
Copper Rockfish	0.1	0.3	0.5		4.4					0.4	
Curlfin Sole	9.6	2.1	1.6	1.1							
Dover Sole	0.2					75.5	29.8	2.5			
English Sole	66.5	4.0		1.3	1.3	41.5	24.9	55.0	1.9	0.4	
Eulachon						1.4	10.7	-			
Flathead Sole						35.5	8.9	261.0	9.5		
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling	1.9	2.1							1.3	6.0	
Lingcod	5.8	13.3	1.4	0.5	15.3					12.3	
Longnose Skate											
North Pacific Spiny Dogfish	11.4	6.9			4.0	6.3	8.3	8.2			
Pacific Cod	2.3	5.4	1.1	0.5	0.7	1.1	1.6	15.2		3.1	
Pacific Hake						0.2					
Pacific Halibut	7.5		5.1	27.1				4.0		4.2	
Pacific Ocean Perch											
Pacific Sand Lance					0.5	0.1		-			
Pacific Sanddab	1.5	0.7			-			2.7	0.8	0.1	
Pacific Staghorn Sculpin											
Pacific Tomcod		0.1				2.7	6.3	1.1			
Petrale Sole	1.4	1.4				2.3					
Quillback Rockfish	10.3	1.1	0.5		0.7		11.8		4.0	21.7	
Red Irish Lord										0.2	
Redbanded Rockfish							0.6				
Redstripe Rockfish									34.3	10.4	
Rex Sole	0.3	0.5				22.0	36.0	86.1			
Rougheye/Blackspotted Rockfish Complex											
Sablefish	0.3					265.2	40.6	437.3	5.6	7.7	
Sand Sole					7.3						
Sandpaper Skate											
Sharpchin Rockfish						0.1	0.1				
Shiner Perch	0.1	0.1								-	
Shortspine Thornyhead											
Silvergray Rockfish						1.0					
Slender Sole						1.3	0.3	0.3			
Southern Rock Sole	19.0	7.9	20.4	8.1	78.4		0.1		0.3	10.8	
Spotted Ratfish	71.9	48.3	262.2	295.2	40.1	0.9	1.5	5.0		29.7	
Starry Flounder											
Walleye Pollock						22.6	10.8	26.5			
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish										0.5	
Other	36.3	17.7	6.2	6.9	2.4	0.6	0.9	0.2	0.7	11.3	
Total	**247.3**	**112.6**	**299.0**	**340.6**	**155.1**	**513.4**	**211.9**	**1116.6**	**58.8**	**118.9**	

Common Name	50	51	52	53	54	55	56	57	58	59	60
Arrowtooth Flounder	4.7	41.3	51.8	88.4	7.8			76.3	270.9	296.6	7.1
Big Skate		52.0			2.7	1.0	2.3	1.7	3.8	51.0	
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin											
Butter Sole	0.3	3.3	0.5		50.6	1.4	0.7				
Cabezon											
Canary Rockfish											
Copper Rockfish						0.9					
Curlfin Sole					1.3	0.6					
Dover Sole		5.9	9.0	34.4	0.5			9.0	293.9	264.9	0.4
English Sole	72.2	281.6	84.7	51.5	41.1	55.4	5.4	4.2	53.4	299.2	49.6
Eulachon			-	0.7		-	-	6.0	2.1		1.0
Flathead Sole		2.5	116.2	56.6	4.8			2.6	0.7		5.1
Greenstriped Rockfish								1.3			
Harlequin Rockfish											
Kelp Greenling						6.4					
Lingcod	2.0					7.5	0.3		28.9	11.4	1.3
Longnose Skate			14.2							1.8	
North Pacific Spiny Dogfish	2.7	12.6	0.4	0.1		23.4	7.2	1.5	0.8	2.5	8.0
Pacific Cod	8.7	17.4	69.5	19.3	3.6	2.0	0.2	6.2	6.9	20.6	5.6
Pacific Hake											
Pacific Halibut	7.9	9.7	34.4		13.3	5.9	53.4		202.1	48.1	2.8
Pacific Ocean Perch											
Pacific Sand Lance											
Pacific Sanddab	8.2	1.1	0.3		51.2	5.2	0.5				0.2
Pacific Staghorn Sculpin		0.8	0.3								0.2
Pacific Tomcod	0.6	78.6	5.9	0.1	21.1	0.4	0.1	0.3		0.6	0.9
Petrale Sole	0.9	16.0	17.8	14.8	7.1	1.0					13.3
Quillback Rockfish	0.1					2.4		35.2	2.0	24.5	1.1
Red Irish Lord											
Redbanded Rockfish											
Redstripe Rockfish											
Rex Sole	1.8	98.5	121.4	44.0	14.2	0.9		15.3	127.9	18.5	5.3
Rougheye/Blackspotted Rockfish Complex											
Sablefish	88.9	99.5	470.8	8.1	1.0			11.9	1.3	5.0	4.3
Sand Sole	1.5	12.3	0.3		73.2	1.9	4.2	0.6			
Sandpaper Skate											
Sharpchin Rockfish										0.1	
Shiner Perch	0.1	-					0.2				
Shortspine Thornyhead											
Silvergray Rockfish								1.0			
Slender Sole		-	0.9	5.4							
Southern Rock Sole	21.4	0.6		0.4	8.1	53.2	19.1	1.9	1.1		5.4
Spotted Ratfish	9.4	11.2	2.1	9.4	1.8	200.0	26.7	54.2	364.7	853.7	11.8
Starry Flounder							2.4				
Walleye Pollock	4.1	33.9	42.8	194.3	2.3			73.6	9.0	4.4	2.6
Yelloweye Rockfish								4.9			
Yellowmouth Rockfish											
Yellowtail Rockfish											
Other	8.9	48.5	0.1	0.2	1.8	9.9	1.8	1.2	13.7	4.8	5.7
Total	**244.2**	**827.4**	**1043.4**	**527.8**	**307.2**	**379.3**	**124.4**	**308.8**	**1383.3**	**1907.7**	**131.7**

Common Name	61	62	63	64	65	66	67	68	69	70	71
Arrowtooth Flounder	2.7					2.1	0.3	7.6	2.7	7.9	83.4
Big Skate		14.7	16.5	5.0		12.6	43.2	4.5	23.2		
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin			0.5	-							
Butter Sole	0.3	0.2					0.3	1.4	1.3		
Cabezon											
Canary Rockfish											
Copper Rockfish		0.2		38.9	2.1	1.9					
Curlfin Sole	3.7	5.8	3.2	5.6		1.5	3.0	2.3	1.5		
Dover Sole		-				0.2	0.2	0.2			13.3
English Sole	62.5	58.1	13.1	2.1		9.1	25.3	68.5	59.5	24.2	
Eulachon											1.4
Flathead Sole	0.5									9.1	
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling											
Lingcod		2.1	2.6	1.6	0.4	1.4	0.4	0.3	0.3		
Longnose Skate								1.5			2.5
North Pacific Spiny Dogfish	13.5	17.2	1.3	10.1		6.1	2.9	15.8	4.1	37.7	31.1
Pacific Cod		2.6	25.9	0.6	4.5	0.9	1.4	0.5	2.0	1.6	
Pacific Hake											43.0
Pacific Halibut	5.4					31.3	4.5	4.2		6.3	
Pacific Ocean Perch											2.4
Pacific Sand Lance			-	0.2	0.9	0.1	-				
Pacific Sanddab	16.5	25.3	1.2			3.1	10.5	0.7	2.2		
Pacific Staghorn Sculpin			0.8	-				0.1			
Pacific Tomcod	16.3	3.0					0.3	2.8	2.1		
Petrale Sole	16.8	7.0	1.2			6.6	8.5	2.3	2.5	12.9	
Quillback Rockfish				1.1	0.5	7.6	1.5				
Red Irish Lord				0.7							
Redbanded Rockfish											7.7
Redstripe Rockfish						1.1	0.3				
Rex Sole	5.3					2.0	4.5	11.3	1.7	17.9	0.4
Rougheye/Blackspotted Rockfish Complex											1.7
Sablefish	1.8	1.7						0.5	187.7	13.1	5.9
Sand Sole			14.8	12.8							
Sandpaper Skate											1.5
Sharpchin Rockfish						0.6					
Shiner Perch		0.1	0.2	0.2	-						
Shortspine Thornyhead											2.1
Silvergray Rockfish						0.3					
Slender Sole						-					0.2
Southern Rock Sole	1.4	3.0	71.0	32.7	9.8	9.7	44.7	9.7	38.5	4.2	
Spotted Ratfish	4.1	10.0	1.7		13.9	2.1	17.3	6.8	40.4	2.9	11.0
Starry Flounder											
Walleye Pollock		-		0.1		0.2		0.1		0.5	
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish											
Other	0.4	1.8	0.5	0.2	-	3.6	1.9	0.2	0.3	0.4	6.6
Total	**151.1**	**152.9**	**154.7**	**111.9**	**32.0**	**103.9**	**170.8**	**141.0**	**369.8**	**138.4**	**214.3**

Common Name	72	73	74	75	76	77	78	79	80	81	82
Arrowtooth Flounder	34.0	169.8	73.4	37.8	61.5	170.0	71.0				
Big Skate											
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin								-	0.2		0.6
Butter Sole											
Cabezon										0.9	
Canary Rockfish						0.5				-	
Copper Rockfish									7.2	6.5	1.4
Curlfin Sole											
Dover Sole	19.7	33.3	39.2	16.8	0.2	3.3	1.3				
English Sole					65.4	100.8	38.8			-	
Eulachon	1.8	0.3	2.6	2.1	-						
Flathead Sole	0.7	0.6	1.8		13.2	1.4	0.6				
Greenstriped Rockfish						0.8					
Harlequin Rockfish											
Kelp Greenling										0.1	
Lingcod					0.3	0.9				1.3	
Longnose Skate			4.9								
North Pacific Spiny Dogfish	12.8	31.5	25.8	12.4	3.9	1.6	7.7		2.7	10.0	
Pacific Cod					90.9	66.7	3.4			0.3	1.1
Pacific Hake	17.5	11.4	43.7	96.0	5.4						
Pacific Halibut					29.4						
Pacific Ocean Perch		5.2	1.3	-		0.9	0.4				
Pacific Sand Lance									0.3	0.1	
Pacific Sanddab											
Pacific Staghorn Sculpin											
Pacific Tomcod							0.2			0.1	
Petrale Sole	0.7			0.7		11.6	13.1				
Quillback Rockfish						1.6				-	0.7
Red Irish Lord										1.3	
Redbanded Rockfish	4.4	18.4	19.4	3.7							
Redstripe Rockfish											
Rex Sole	0.3	2.7	0.7	0.7	3.6	8.2	23.6				
Rougheye/Blackspotted Rockfish Complex		0.6	0.8	0.1							
Sablefish		1393.5	8.0		3.2	103.9	3.2				
Sand Sole									0.1	0.6	
Sandpaper Skate		1.1		1.2							
Sharpchin Rockfish						0.1					
Shiner Perch								-			
Shortspine Thornyhead	0.3	1.4	1.1								
Silvergray Rockfish		1.4	2.1		2.7						
Slender Sole	0.1	0.5	0.2	0.1			0.1				
Southern Rock Sole					1.1			4.1	31.6	1.6	4.7
Spotted Ratfish	5.9	7.9	15.0	4.8	28.9	37.7	2.4	0.6	6.0	2.3	11.6
Starry Flounder											
Walleye Pollock			4.0	0.2	0.8	9.4	0.7				
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish				1.5	1.7						
Other	2.7	3.9	4.9	2.9	0.5	3.3	0.6	0.2	0.1	6.3	0.6
Total	**100.8**	**1683.6**	**248.9**	**180.8**	**312.8**	**522.6**	**167.3**	**4.9**	**48.3**	**31.3**	**20.8**

Common Name	83	84	85	86	87	88	89	90	91	92	93
Arrowtooth Flounder			1.2		4.4	11.4	1122.1	30.6	27.7	7.2	79.1
Big Skate			5.8					29.5			
Bigmouth Sculpin									10.6	6.7	11.0
Bocaccio											
Buffalo Sculpin	2.4	0.6			0.4	0.3					
Butter Sole											
Cabezon											
Canary Rockfish			1.1		-	67.7	6.6	4.6		2.6	
Copper Rockfish											
Curlfin Sole			0.2		1.1						
Dover Sole							4.8	0.6	0.2		0.3
English Sole	0.1		5.8		9.8	2.2	34.8				
Eulachon								0.8	1.2	0.1	
Flathead Sole											
Greenstriped Rockfish								0.2	0.1	0.6	5.8
Harlequin Rockfish											
Kelp Greenling		1.4	0.3		0.2						
Lingcod		0.6	1.2		4.7	16.4	5.7				2.8
Longnose Skate								5.6	22.6		
North Pacific Spiny Dogfish	8.2	1.9							4.5		1.6
Pacific Cod	3.2	1.0			6.8	0.5	8.7	11.7	19.5	6.1	8.9
Pacific Hake									2.0		
Pacific Halibut	38.4	22.5	7.0		21.6	42.9				3.7	44.9
Pacific Ocean Perch								11.7	23.5	5.4	10.3
Pacific Sand Lance	3.3	1.0	-		-						
Pacific Sanddab		-	8.0		2.5	2.8	0.4				
Pacific Staghorn Sculpin											
Pacific Tomcod											
Petrale Sole					3.4	12.9	3.2				1.3
Quillback Rockfish			2.1		0.1	8.6	3.2	2.1		1.5	7.1
Red Irish Lord	1.4	2.7									
Redbanded Rockfish								15.3	20.4	47.6	6.7
Redstripe Rockfish			0.3		0.1	0.5					
Rex Sole						0.2	22.8	2.5	3.0	0.5	1.6
Rougheye/Blackspotted Rockfish Complex									2.9		
Sablefish	0.3										
Sand Sole		0.5									
Sandpaper Skate											
Sharpchin Rockfish									0.1	0.1	
Shiner Perch		0.1									
Shortspine Thornyhead								35.6	35.2	20.4	0.3
Silvergray Rockfish						9.3	2.1	8.4	0.8	5.8	16.6
Slender Sole											
Southern Rock Sole	12.4	4.4	0.3		1.9						
Spotted Ratfish	0.5	1.0	16.0		40.8	104.4	107.9	19.4	17.5	8.8	76.1
Starry Flounder											
Walleye Pollock							5.0	3.4	0.2	3.1	0.2
Yelloweye Rockfish											6.1
Yellowmouth Rockfish											
Yellowtail Rockfish			2.4		0.2	2.1			2.8		
Other	2.0	7.8	26.3		8.2	41.3	5.4	2.1	2.1	2.8	1.5
Total	**72.0**	**45.5**	**78.1**		**106.0**	**323.3**	**1332.8**	**184.3**	**196.8**	**122.9**	**282.4**

Common Name	94	95	96	97	98	99	100	101	102	103	104
Arrowtooth Flounder	544.6	260.5	53.9	4.2		1.7	138.6	118.0	59.0	282.5	109.2
Big Skate				9.5	73.4	46.6					0.6
Bigmouth Sculpin									14.4		
Bocaccio											
Buffalo Sculpin											
Butter Sole						1.3	0.7				
Cabezon											
Canary Rockfish							3.8	5.1			
Copper Rockfish											
Curlfin Sole											
Dover Sole	10.0	6.8	0.1				6.8	6.0	7.5	13.2	18.8
English Sole	63.6	250.4	5.5		3.2		10.5	0.9		302.3	95.5
Eulachon									13.4	-	
Flathead Sole											
Greenstriped Rockfish		0.3									
Harlequin Rockfish											
Kelp Greenling											
Lingcod	4.0						4.7	10.0	5.3	2.9	
Longnose Skate			16.7								
North Pacific Spiny Dogfish	8.3	4.0	8.9	12.1	4.4		7.4	7.9	5.6	3.7	5.3
Pacific Cod	6.0	8.0	19.2	7.5	92.9	2.1	29.3	39.2	2.1	10.5	6.9
Pacific Hake											
Pacific Halibut		36.9	34.5	1.6	3.0			20.5		40.2	
Pacific Ocean Perch	0.7	0.1					1.0	8.0	19.6	3.2	1.5
Pacific Sand Lance				0.2	-	-					
Pacific Sanddab		7.4	5.0	1.0	0.1				-		
Pacific Staghorn Sculpin											
Pacific Tomcod		1.3	0.4							1.3	0.2
Petrale Sole	6.2	29.2	2.9	1.1	1.3	2.9	8.0	1.6		2.7	5.2
Quillback Rockfish		1.4									
Red Irish Lord											
Redbanded Rockfish								9.4	22.8	3.6	
Redstripe Rockfish											
Rex Sole	37.6	25.5	1.0		0.1		49.9	4.3	11.3	13.0	30.1
Rougheye/Blackspotted Rockfish Complex									1.4		
Sablefish	0.9	3.9					0.4			7.0	0.4
Sand Sole		1.0		17.3	9.5	0.7					
Sandpaper Skate											
Sharpchin Rockfish											
Shiner Perch											
Shortspine Thornyhead								1.2	20.6	0.3	
Silvergray Rockfish	11.1	10.4					16.1	12.6	3.1		
Slender Sole											
Southern Rock Sole			0.1	14.0	11.7	1.7					1.1
Spotted Ratfish	135.4	154.3	29.9	51.8	78.4	84.1	58.0	95.6	32.3	228.1	319.4
Starry Flounder				3.8							
Walleye Pollock	2.0	3.2	0.3				56.0	11.9	19.1	0.5	5.5
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish							34.9	21.2	4.6		
Other	1.6	0.2	1.1	0.9	0.2	1.7	0.7	2.8	5.3	16.9	3.3
Total	**832.0**	**804.7**	**179.3**	**124.9**	**278.4**	**142.6**	**426.8**	**376.2**	**247.4**	**931.9**	**602.9**

Common Name	105	106	107	108	109	110	111	112	113	114	115
Arrowtooth Flounder	344.0	208.4	231.5	1154.1	1452.0	320.4	105.0	237.4	91.9	68.5	5.8
Big Skate			4.6	15.8		150.0	56.9	56.8			
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin											
Butter Sole			17.6								
Cabezon											
Canary Rockfish				2.7	6.1						
Copper Rockfish											
Curlfin Sole											
Dover Sole	109.7	5.8	0.3	235.8	38.6	755.1	193.7	80.1	140.2	49.7	228.1
English Sole	3.6	144.8	493.4	12.6	65.4	43.7	3.9	3.9	0.6		
Eulachon				0.2		0.7	2.4	1.1	17.5	32.7	1.6
Flathead Sole	0.4		0.8	0.3		0.7	6.1	42.1	8.0		
Greenstriped Rockfish											
Harlequin Rockfish											
Kelp Greenling											
Lingcod		0.3									
Longnose Skate		4.1		9.7		65.7	10.8	21.6	8.3	51.1	0.4
North Pacific Spiny Dogfish	8.4	33.0	10.8	27.6	7.0	9.5	6.3	5.0	2.0	5.1	
Pacific Cod	11.8	19.0	108.6	9.5	17.5	4.7	14.5	5.6	2.8		
Pacific Hake						0.4					1.8
Pacific Halibut	13.0	13.3	25.9	27.5	23.7	28.3	15.5	24.7	37.6		7.1
Pacific Ocean Perch	24.9	4.9		1.0						0.7	0.6
Pacific Sand Lance											
Pacific Sanddab											
Pacific Staghorn Sculpin					0.6						
Pacific Tomcod			0.7					0.3			
Petrale Sole			0.9		5.6			0.9			
Quillback Rockfish											
Red Irish Lord											
Redbanded Rockfish	1.9	1.8									
Redstripe Rockfish											
Rex Sole	43.7	37.2	4.3	58.0	49.9	54.1	31.9	11.0	11.2	21.3	18.7
Rougheye/Blackspotted Rockfish Complex										0.7	1.3
Sablefish	0.6	1.5	8.7	1.3			15.5	23.2	4.3	4.4	45.4
Sand Sole											
Sandpaper Skate				7.4			3.4		3.8		
Sharpchin Rockfish											
Shiner Perch											
Shortspine Thornyhead	0.4			0.1					4.2	25.5	17.8
Silvergray Rockfish	1.7	1.9							3.4	1.3	
Slender Sole						0.4			0.2		
Southern Rock Sole			10.9		1.0						
Spotted Ratfish	123.7	379.2	146.4	169.3	71.4	247.8	157.6	177.1	68.1	112.3	11.0
Starry Flounder			2.1								
Walleye Pollock	7.5	144.2	5.4	10.8	762.9	6.6	12.4	27.2	6.8	1.9	
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish	2.3	1.8			3.4						
Other	2.6	0.8	3.1	1.2	1.6	1.2	0.1	3.6	5.2	14.7	10.6
Total	**700.0**	**1002.1**	**1076.0**	**1744.8**	**2506.5**	**1689.2**	**635.9**	**721.5**	**415.9**	**389.9**	**350.0**

Common Name	116	117	118	119	120	121	122	123	124	125	126
Arrowtooth Flounder	16.8	14.1		81.2	368.5	343.2	1.5	1.3			10.8
Big Skate					334.7	1.4	3.5				
Bigmouth Sculpin											
Bocaccio					0.3			0.1			0.5
Buffalo Sculpin											
Butter Sole							30.1	4.2			
Cabezon											
Canary Rockfish											
Copper Rockfish											
Curlfin Sole									12.4	6.5	0.3
Dover Sole	155.6	29.7		31.4		127.0		0.3		0.3	10.7
English Sole				4.7	5582.8	142.7	271.6	5.8	0.3	15.3	51.6
Eulachon	1.5	0.4		0.3	5.3	3.0					0.1
Flathead Sole				2.5	8.1	1.8					38.4
Greenstriped Rockfish				3.2				0.4			
Harlequin Rockfish								1.7			
Kelp Greenling								1.1			
Lingcod				1.6	0.4		0.7	1.8	5.1	1.2	0.6
Longnose Skate	9.2	3.0									
North Pacific Spiny Dogfish	1.0	1.9		4.2		15.3					
Pacific Cod				6.0	9.8	31.1	1.4	0.7	60.1	4.1	1.3
Pacific Hake	6.4			1.9							
Pacific Halibut				24.6	75.7	45.2	89.4		24.0	10.5	
Pacific Ocean Perch	1.0			2.0							
Pacific Sand Lance											
Pacific Sanddab				0.1			0.4			1.4	2.9
Pacific Staghorn Sculpin							0.3				
Pacific Tomcod					2.9		8.3				0.6
Petrale Sole					28.1					4.6	2.4
Quillback Rockfish				22.6	2.6			23.8	1.5		2.5
Red Irish Lord											
Redbanded Rockfish		0.5		4.6							
Redstripe Rockfish								49.1	2.0		
Rex Sole	19.8	5.8		1.3	1095.6	55.8				0.5	28.1
Rougheye/Blackspotted Rockfish Complex	2.7	9.6		2.6							
Sablefish	48.9	48.3		13.0	8.9	1.6		5.2	1.4	8.2	8.0
Sand Sole							25.2	7.1			
Sandpaper Skate	3.4			2.7							
Sharpchin Rockfish											
Shiner Perch							0.6	-			
Shortspine Thornyhead	29.3	77.6		3.7	0.8						
Silvergray Rockfish				1.1	0.8			0.4			
Slender Sole									-		
Southern Rock Sole				0.8	18.0		98.7	2.8	20.4	16.4	10.7
Spotted Ratfish	17.6	23.6		438.5	1313.7	2013.4	26.5	7.8	204.5	101.8	10.9
Starry Flounder					26.4		19.3				
Walleye Pollock	2.3	3.5		77.7	9.2	42.8		1.1			
Yelloweye Rockfish								4.6			
Yellowmouth Rockfish											
Yellowtail Rockfish											
Other	17.9	215.6		4.8	107.4	40.6	21.7	3.9	8.0	5.7	4.5
Total	**333.5**	**433.8**		**737.2**	**9000.0**	**2865.1**	**599.4**	**123.4**	**339.6**	**176.6**	**184.9**

Common Name	127	128	129	130	131	132	133	134	135	136	137
Arrowtooth Flounder	8.5	48.0	29.3	3.2	0.3		165.4	108.1	68.1	3.9	
Big Skate				80.9	8.5	11.8	3.1				8.76
Bigmouth Sculpin											
Bocaccio	10.0			0.2							
Buffalo Sculpin						-					
Butter Sole	0.8	9.6	18.2	21.1	0.2						
Cabezon											
Canary Rockfish										7.8	0.22
Copper Rockfish										9.1	
Curlfin Sole	0.6			9.8	7.9					3.0	0.84
Dover Sole	1.2	7.7	9.5	2.5			83.6	95.1	35.3		
English Sole	28.7	67.4	31.5	267.4	6.2	4.0	3.3	44.8	42.7	1.0	0.24
Eulachon	0.1	0.2	0.3				0.2	0.1	0.2		
Flathead Sole	20.6	17.1	33.5	5.0			0.3	10.3	141.1	7.9	
Greenstriped Rockfish											
Harlequin Rockfish	0.3										
Kelp Greenling										12.2	0.12
Lingcod	1.8		0.4	1.1	4.2	0.8	15.7			9.2	0.73
Longnose Skate							2.9				
North Pacific Spiny Dogfish			0.1		10.3	12.0	4.1		7.4	6.2	18.9
Pacific Cod	34.3	7.7	15.4	0.7	3.8		11.8	11.9	6.2		
Pacific Hake							40.1	72.6	12.2		
Pacific Halibut	1.9		1.7	25.9					6.4	15.1	6.48
Pacific Ocean Perch	0.1						0.3	0.1			
Pacific Sand Lance						-					
Pacific Sanddab	0.2			16.5	0.2	0.2					4.73
Pacific Staghorn Sculpin				0.4							
Pacific Tomcod	1.1	15.9	6.3	4.1							0.14
Petrale Sole	1.5	4.0	9.7					1.9	6.9	1.8	
Quillback Rockfish	20.0	1.0	0.3	0.9	0.5					41.5	
Red Irish Lord											
Redbanded Rockfish							3.6	10.0			
Redstripe Rockfish	4.3										
Rex Sole	5.0	61.5	20.6	6.0			95.5	29.3	53.8	0.8	
Rougheye/Blackspotted Rockfish Complex											
Sablefish	1.4	38.4	4.7		1.5		5.3	2.5	0.6		
Sand Sole				26.8	18.7	19.0					6.5
Sandpaper Skate											
Sharpchin Rockfish											
Shiner Perch				-							
Shortspine Thornyhead											
Silvergray Rockfish											
Slender Sole		0.2				-	0.2	0.3	0.7	0.3	
Southern Rock Sole	2.7	0.9	0.1	73.2	73.0	29.1	1.5			1.8	17.06
Spotted Ratfish	1.8	5.6	7.5	70.2	51.2	17.8	6.6	12.2	4.4	99.6	5.04
Starry Flounder											
Walleye Pollock	-	0.4	1.4				24.0	99.1	3.3		
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish	1.9										
Other	10.6	4.1	3.6	6.9	3.4	4.8	3.0	4.1	1.7	43.7	9.14
Total	**159.5**	**289.7**	**193.9**	**623.1**	**189.8**	**99.6**	**470.6**	**502.3**	**390.9**	**264.8**	**78.9**

Common Name	138	139	140	141	142	143	144	146	147	148	149
Arrowtooth Flounder			0.1			1.4	28.8	6.3	15.8	5.7	42.2
Big Skate	17.9	2.7									
Bigmouth Sculpin											
Bocaccio						2.0					
Buffalo Sculpin		0.6									
Butter Sole											
Cabezon		6.6									
Canary Rockfish									1.3		
Copper Rockfish		81.9									
Curlfin Sole	2.0		0.8								
Dover Sole				0.6	0.8	0.5		3.7	0.2		9.9
English Sole	0.2		4.8	21.4	22.5	6.2		13.6	14.5		
Eulachon											
Flathead Sole				0.6	4.4	7.0	1.7	19.6	6.9		2.7
Greenstriped Rockfish							3.9		1.1		
Harlequin Rockfish						0.9				0.4	
Kelp Greenling											
Lingcod		0.7	0.6		0.3		1.0	0.2	1.6		
Longnose Skate									8.1		4.3
North Pacific Spiny Dogfish	6.2	2.4	19.1	55.3	14.2	18.8		6.7	10.4		7.0
Pacific Cod	1.0		1.0				1012.9	25.3	9.6	9.7	
Pacific Hake	0.8							-			
Pacific Halibut	47.8		4.1					2.1	7.9		
Pacific Ocean Perch								0.1	0.5		
Pacific Sand Lance	1.8	0.3									
Pacific Sanddab	0.2		1.7								
Pacific Staghorn Sculpin											
Pacific Tomcod											
Petrale Sole			2.8	2.1	5.5	0.5	0.8	6.0	6.4		
Quillback Rockfish	0.2	8.9				14.0	0.6	1.1		2.2	
Red Irish Lord		1.4									
Redbanded Rockfish											15.9
Redstripe Rockfish						42.8	1.3			2.8	1.0
Rex Sole			1.9	15.1	13.4	14.4	2.7	36.2	20.6		0.3
Rougheye/Blackspotted Rockfish Complex											1.5
Sablefish				0.3			2.4	0.4	7.0		371.7
Sand Sole	10.3										
Sandpaper Skate											
Sharpchin Rockfish						1.3	0.2			0.1	
Shiner Perch											
Shortspine Thornyhead											0.8
Silvergray Rockfish						30.4	18.0		8.3		2.4
Slender Sole			-	0.1		0.1		0.4	0.4		0.4
Southern Rock Sole	145.5	0.6	12.0	0.1							
Spotted Ratfish		76.4	4.5	1.8	0.8	3.9	9.1	3.8	29.4		1.9
Starry Flounder											
Walleye Pollock				1.5	2.1			5.7	8.6		1.5
Yelloweye Rockfish						8.3	6.0				
Yellowmouth Rockfish										0.9	
Yellowtail Rockfish						230.6	2.5				
Other	0.7	1.5	4.4	0.5	0.3	6.9	4.7	11.8	59.9	0.5	5.0
Total	**234.6**	**184.1**	**57.7**	**99.4**	**64.6**	**390.0**	**1096.7**	**142.9**	**218.4**	**22.2**	**468.7**

Common Name	150	151	152	153
Arrowtooth Flounder	239.5	322.5	190.2	35.9
Big Skate				
Bigmouth Sculpin				
Bocaccio				
Buffalo Sculpin				
Butter Sole				
Cabezon				
Canary Rockfish				7.5
Copper Rockfish				
Curlfin Sole				
Dover Sole	34.0	36.8	28.3	0.3
English Sole				5.2
Eulachon		0.1	-	-
Flathead Sole	0.3	1.4	15.9	3.3
Greenstriped Rockfish				0.2
Harlequin Rockfish				
Kelp Greenling				
Lingcod				2.2
Longnose Skate	2.7	7.6	3.5	3.3
North Pacific Spiny Dogfish		0.1	0.3	34.8
Pacific Cod		1.3		6.1
Pacific Hake	11.0	1.6	1.9	
Pacific Halibut				8.3
Pacific Ocean Perch		0.3	0.3	0.7
Pacific Sand Lance				
Pacific Sanddab				
Pacific Staghorn Sculpin				
Pacific Tomcod				
Petrale Sole				8.0
Quillback Rockfish				43.3
Red Irish Lord				
Redbanded Rockfish	4.5	18.6	1.3	4.7
Redstripe Rockfish				11.1
Rex Sole	-	1.6	15.2	10.7
Rougheye/Blackspotted Rockfish Complex	0.9	0.5		
Sablefish	1.1	102.1	1.6	
Sand Sole				
Sandpaper Skate		3.5		
Sharpchin Rockfish				0.4
Shiner Perch				
Shortspine Thornyhead	0.4	3.3	0.3	
Silvergray Rockfish	4.1			5.1
Slender Sole	0.1	0.4	0.4	0.5
Southern Rock Sole				
Spotted Ratfish	7.3	7.5	19.8	22.9
Starry Flounder				
Walleye Pollock		1.0		
Yelloweye Rockfish				8.8
Yellowmouth Rockfish				
Yellowtail Rockfish				2.1
Other	3.0	6.4	4.0	2.8
Total	**308.9**	**516.6**	**283.0**	**228.2**