Summary of the Hecate Strait Synoptic Bottom Trawl Survey, May 26 – June 22, 2015

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by

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ABSTRACT

Nottingham, M. K., Williams, D. C., Wyeth, M. R. and Olsen, N., 2018. Summary of the Hecate Strait synoptic bottom trawl survey, May 26 – June 22, 2015. Can. Manuscr. Rep. Fish. Aquat. Sci. 3126: viii + 55 p.

A bottom trawl survey of Hecate Strait was conducted on the Canadian Coast Guard Ship W. E. Ricker between May 26 and June 22, 2015. The Hecate Strait synoptic bottom trawl survey was first conducted in 2005, and has been repeated every second year since. 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 forty-eight (83.1%) of the 178 blocks assessed in 2015 were successfully fished. The mean catch per tow was 418 kg with 13-38 species per tow. The average number of species per tow was 24. The most abundant fish species encountered was Arrowtooth Flounder (*Atheresthes stomias*), followed by Spotted Ratfish (*Hydrolagus colliei*), Dover Sole (*Microstomus pacificus*), Rex Sole (*Glyptocephalus zachirus*) and English Sole (*Parophrys vetulus*). Biological data including individual length, weight, sex, maturity, and ageing structures were collected from selected species. Biological samples were collected from a total of 48 different species of fish. Oceanographic data, including water temperature, depth, salinity, and dissolved oxygen were also recorded for most tows.

RÉSUMÉ

Nottingham, M. K., Williams, D. C., Wyeth, M. R. et Olsen, N., 2018. Relevé synoptique au chalut de fond dans le détroit d'Hecate, du 26 mai 24 - 22 Juin 2015. Rapp. manus. can. sci. halieut. aquat. 3126: 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 26 mai et le 22 juin 2015. 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 178 blocs évalués en 2015, 148 (83.1 %) ont fait l'objet d'une pêche. La moyenne de prises par trait était de 418 kg, avec entre 13 et 38 espèces par trait. Le nombre moyen d'espèces par trait était de 24. Les espèces de poissons capturées le plus fréquemment étaient la plie à grande bouche (*Atheresthes stomias*) suivi de la chimère tachetée (*Hydrolagus colliei*), de la sole de Douvres (*Microstomus pacificus*), de la pile cynoglosse royale (*Glyptocephalus zachirus*) et du Carlottin anglais (*Parophrys vetulus*). 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 48 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, 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 since. This document provides a brief summary of the results and methods from the sixth HS synoptic bottom trawl survey which occurred between May 26 and June 22, 2015. 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 and Williams et al. 2017.

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 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.

As indicated above, the start and end dates for trips on Canadian Coast Guard 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 2015 HS survey, 207 blocks were randomly selected based on 9 blocks a day and 23 days available for fishing (Table 1). The primary set consisted of 138 blocks while the secondary set was anticipated to be 69 blocks.

VESSEL

The survey was conducted aboard the Canadian Coast Guard Ship W.E. Ricker, a 58 m research stern trawler (Figure 2).

FISHING GEAR

The research trawl was an Atlantic Western IIA box trawl net connected to 1,100 kg U.S.A. Jet 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 includes 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 has an 11 mm long-link steel chain frame and is 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 are constructed from single 4.5 mm strand 4½ inch web (Figure 7). All web in the main body and lengthening pieces is constructed from a compacted strand braided polyethylene (Euroline Premium). The codend is 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 includes flying wing, mid wing, bunt wing, and bosom sections (Figure 8). The bosom section is built from 16 inch diameter (worn 18 inch) aircraft tires, while the bunt and mid wing sections have 16 inch Rockhopper disks. The flying wings have 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. The science crew change was on June 8 (Table 3).

FISHING PROTOCOL

Fishing operations were carried out based on the 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 by the fishing master based on his 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 would be 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 had been fished in a previous year, follow the same track so as to minimize the survey footprint.
3. If a block had not been fished in a previous year, make a tow entirely within the block and pass through the center of the block.
4. If it is not possible to make a tow through the center of the block, make a tow entirely within the block that passes as close to the center as possible.
5. If it is not possible to make a tow entirely within the block, make a tow such that at least 50 % of the tow is within the block.

The target tow length 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 19 minutes had elapsed, net haul back was initiated. The extra minute was intended to account for uptake of slack in the main warps. Although the target on-bottom time was 20 minutes, tows that were at least 14 minutes in length were accepted. This was a pragmatic decision that allowed for 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". The vessel would then move 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 either "successfully fished on first attempt", "successfully fished after multiple attempts", or "rejected after last attempt failed". Rejected blocks were removed from the sampling frame for all future surveys. This will increase the efficiency of subsequent surveys, as less time will be spent inspecting blocks that cannot be fished. Some selected blocks may not have been successfully fished but may also not have been rejected. This could occur 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 would be 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. 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, each species had a minimum catch level that had to be exceeded in the tow before biological samples would be collected. For rare species or species of special conservation concern the minimum number could be one fish, whereas for common and abundant species the number might be 25 or 50. The choice of the species to collect age samples from depended on the size of the catch of the species and the "desirability" of the species. The size 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 any conservation concerns and whether or not the species is commercially exploited. Biological samples were typically not collected from unusable tows.

Individual fish were measured to fork length, total length, standard length or other length depending on the species. All length measurements were made using an electronic fish measuring board. Length measurements were collected to the nearest 1 cm for length samples, and 0.5 cm for age samples. 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 of a fish that can be used to determine the age of the 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 2015, a length stratified sample of otoliths were also collected from Pacific Cod (*Gadus macrocephalus*), tissue for DNA analysis was collected from 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* must now be considered to be the aggregate of both species. During the 2008 WCHG survey an attempt was made to differentiate between the two species. 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 confirmation 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 do not attempt to partition the catch data for this report.

NET-MOUNTED SENSORS AND DATA RECORDERS

The W.E. Ricker is equipped with a Notus net mensuration system (previous Hecate Strait survey years used a Simrad ITI system). Sensors attached to the net use acoustic signals to communicate with each other and the vessel and provide real-time net geometry including headline height and depth, as well as doorspread and wingspread which are used to calculate swept area. The Notus 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 trails behind the footrope. The Hobo recorder measures acceleration in three axes which can then be converted into angles. The recorder is mounted in the sled such that the x-axis tilt indicates the angle of the steel sled. When the footgear contacts the bottom, the sled angle is approximately 80 degrees. When the footrope is off the bottom, the sled hangs down and the angle is approximately 40 degrees. These data are 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 2015 HS synoptic bottom trawl survey was divided into two legs of two weeks. From a total of 28 allotted survey days, four days were required for travel and gear loading/unloading at the start, mid-point and end of the survey, one day was required for science crew change, and three days were on shore awaiting vessel crew replacement (Table 3).

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 46 blocks (Table 4).

From the adjusted target of 184 blocks, a total of 178 were assessed during the survey, six blocks were left un-fished due to time constraints, temporary obstacles or weather conditions. Of the 178 blocks that were assessed, 148 were successfully fished, one was rejected based on the fishing master's prior knowledge, 26 were rejected based on on-ground inspections, and three were rejected after one or more failed fishing attempts (Table 4 and Figure 9).

A total of 152 tows, of which 148 were useable, were completed during the 20 days that fishing occurred. Table 5 shows tow results by stratum for this survey. Four tows were not useable due to hang-ups, tear-ups, or insufficient bottom time. The scope (ratio of warp length to bottom depth) used for tows in 2015 is shown in Table 6 and Figure 10. 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 62,474 kg of fish and invertebrates was caught during the 2015 HS survey. The total catch weight for useable tows was typically less than 1,000 kg per tow and averaged 418 kg per tow (Figure 11). The majority of the catch (61, 531 kg, 98.5 %) consisted of 107 different species of fish, including 30 rockfish and 18 flatfish species. The remainder (943 kg) consisted of 138 invertebrate groups. The average number of species identified in useable tows was 24 and ranged from 13 to 38 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 7. Of the fish species caught, Arrowtooth Flounder (*Atheresthes stomias*), was the most dominant by

weight, followed by Spotted Ratfish (*Hydrolagus colliei*), Dover Sole (*Microstomus pacificus*), Rex Sole (*Glyptocephalus zachirus*) and English Sole (*Parophrys vetulus*). 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 25,421 individuals of 48 species of fish. The number of samples and recorded biological attributes per species is shown in Table 8. A summary of the biological data collected for each species is shown in Table 9.

NET-MOUNTED SENSORS AND DATA RECORDERS

Notus net mensuration data and door spread information were collected from 152 tows (Table 10).

Seabird SBE39 (water temperature and depth) were collected from 131 tows and pressure data were collected from 152 tows while Seabird SBE19plus and SBE43 data (conductivity, water temperature, depth and dissolved oxygen) were collected from 147 tows (Table 10 and Figure 13).

BCS data were collected from 152 tows (Table 10). 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 152 tows.

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Table 1. The 2015 HS synoptic bottom trawl survey design showing block allocation per stratum based on the target allocation and the predicted failure and revisit rates (predicted adjustment).

Depth Stratum (m)	Target Allocation	Target Tows	Predicted Adjustment	Total Block Allocation	Primary Set	Secondary Set
10-70	0.38	67	0.22	86	57	29
70-130	0.28	49	0.11	55	37	18
130-220	0.25	44	0.08	48	32	16
220-500	0.09	16	0.11	18	12	6
Total	**1.00**	**176**		**207**	**138**	**69**

Table 2. Atlantic Western IIa box trawl net specifications for the 2015 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. Summary of operations during the 2015 HS synoptic bottom trawl survey.

	Fishing				Tows			
Date	Start	End	Hours	Blocks Assessed	Useable	Not Useable	Total	Notes
05/26/2015	-	-	-	-	-	-	-	load the vessel
05/27/2015	-	-	-	-	-	-	-	travel
05/28/2015	11:16	19:35	8	7	6	0	6	
05/29/2015	7:08	18:27	11	9	9	0	9	
05/30/2015	7:15	18:26	11	10	9	0	9	
05/31/2015	7:30	18:02	11	10	10	0	10	
06/01/2015	7:14	19:23	12	10	10	0	10	
06/02/2015	7:08	18:01	11	11	10	0	10	
06/03/2015	7:16	18:49	11	10	9	1	10	
06/04/2015	7:25	16:58	9	7	7	0	7	
06/05/2015	7:09	19:11	12	9	9	0	9	
06/06/2015	7:04	16:04	9	9	7	0	7	
06/07/2015	7:15	16:04	9	7	5	1	6	
06/08/2015	-	-	-	-	-	-	-	science crew change
06/09/2015	15:54	19:02	4	2	2	0	2	half day travel
06/10/2015	7:08	18:22	11	9	8	0	8	
06/11/2015	7:06	16:45	9	14	8	0	8	
06/12/2015	7:04	16:56	9	8	7	0	7	
06/13/2015	-	-	-	-	-	-	-	awaiting vessel crew change
06/14/2015	-	-	-	-	-	-	-	awaiting vessel crew change
06/15/2015	-	-	-	-	-	-	-	vessel crew change
06/16/2015	7:35	19:11	12	12	10	0	10	
06/17/2015	7:12	19:01	12	9	8	0	8	
06/18/2015	8:57	18:55	10	14	5	0	5	
06/19/2015	7:14	16:42	9	9	4	2	6	
06/20/2015	7:03	15:11	8	8	5	0	5	
06/21/2015	-	-	-	-	-	-	-	travel
06/22/2015	-	-	-	-	-	-	-	half day unload
Total				**228**	**148**	**4**	**152**	
Average Per Day				**10.4**	**7.4**	**0.2**	**7.6**	

Table 4. Block results by stratum for the 2015 HS synoptic bottom trawl survey.

Depth Stratum (m)	Primary Set	Secondary Set	Successful	Rejected Prior	Rejected Inspected	Rejected Failed	Not Assessed	Total
10-70	57	19	47	0	21	2	6	76
70-130	37	12	46	1	1	1	0	49
130-220	32	11	40	0	3	0	0	43
220-500	12	4	15	0	1	0	0	16
Total	**138**	**46**	**148**	**1**	**26**	**3**	**6**	**184**

Table 5. Tow results by stratum for the 2015 HS synoptic bottom trawl survey.

Depth Stratum (m)	Useable	Not Useable
10-70	47	2
70-130	46	1
130-220	40	1
220-500	15	0
Total	**148**	**4**

Table 6. Mean warp length and scope by 50 meter depth interval for the 2015 HS synoptic bottom trawl survey.

Depth (m)	Mean Warp (m)	Mean Scope
0-50	140	4.21
50-100	239	3.07
100-150	340	2.77
150-200	488	2.79
200-250	554	2.52
250-300	629	2.38
300-350	675	2.24

Table 7. Frequency of occurrence, maximum catch weight, mean catch weight per tow, and total survey catch weight of each species captured during the 2015 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*	54	94.84	8.69	460.71
Silvergray Rockfish	*Sebastes brevispinis*	49	79.56	9.03	442.42
Shortspine Thornyhead	*Sebastolobus alascanus*	43	60.92	8.32	357.97
Redbanded Rockfish	*Sebastes babcocki*	39	76.29	12.05	469.98
Quillback Rockfish	*Sebastes maliger*	34	69.78	9.37	318.72
Yellowtail Rockfish	*Sebastes flavidus*	28	224.29	18.66	522.47
Rougheye Rockfish	*Sebastes aleutianus*	21	14.36	2.54	53.34
Canary Rockfish	*Sebastes pinniger*	14	101.79	14.11	197.50
Redstripe Rockfish	*Sebastes proriger*	14	134.56	11.56	161.84
Copper Rockfish	*Sebastes caurinus*	13	29.24	9.27	120.45
Sharpchin Rockfish	*Sebastes zacentrus*	13	4.92	0.74	7.39
Greenstriped Rockfish	*Sebastes elongatus*	8	1.59	0.67	5.37
Darkblotched Rockfish	*Sebastes crameri*	6	2.48	1.29	7.74
Splitnose Rockfish	*Sebastes diploproa*	4	0.32	0.19	0.77
Yellowmouth Rockfish	*Sebastes reedi*	4	2.24	0.88	3.53
Yelloweye Rockfish	*Sebastes ruberrimus*	4	5.32	3.48	13.94
Widow Rockfish	*Sebastes entomelas*	3	63.78	21.98	65.94
Puget Sound Rockfish	*Sebastes emphaeus*	2	8.29	4.20	8.40
Bocaccio	*Sebastes paucispinis*	2	10.64	8.13	16.26
Black Rockfish	*Sebastes melanops*	2	3.11	1.68	3.35
Blackgill Rockfish	*Sebastes melanostomus*	1	1.18	1.18	1.18
Shortraker Rockfish	*Sebastes borealis*	1	31.58	31.58	31.58
Rosethorn Rockfish	*Sebastes helvomaculatus*	1	0.46	0.46	0.46
Harlequin Rockfish	*Sebastes variegatus*	1	0.20	0.20	0.20
Pygmy Rockfish	*Sebastes wilsoni*	1	0.26	0.26	0.26
Flatfishes	**Order Pleuronectiformes**				
Arrowtooth Flounder	*Atheresthes stomias*	126	2521.08	106.77	13346.39
Rex Sole	*Glyptocephalus zachirus*	125	375.84	33.43	4078.33
Dover Sole	*Microstomus pacificus*	118	588.78	49.46	5885.52
Pacific Halibut	*Hippoglossus stenolepis*	113	631.58	32.54	3677.56
English Sole	*Parophrys vetulus*	96	245.24	41.39	3973.83
Flathead Sole	*Hippoglossoides elassodon*	76	328.50	24.04	1802.90
Southern Rock Sole	*Lepidopsetta bilineata*	73	528.69	33.87	2472.18
Petrale Sole	*Eopsetta jordani*	70	27.26	5.29	369.95
Slender Sole	*Lyopsetta exilis*	47	9.05	0.78	36.44
Sand Sole	*Psettichthys melanostictus*	35	127.41	18.69	654.00
Curlfin Sole	*Pleuronichthys decurrens*	30	24.38	2.37	71.21
Butter Sole	*Isopsetta isolepis*	25	45.24	8.13	203.26
Pacific Sanddab	*Citharichthys sordidus*	21	74.85	12.40	260.31
Starry Flounder	*Platichthys stellatus*	8	96.10	17.27	138.16
Lefteye Flounders	Paralichthyidae (Family)	4	0.33	0.14	0.58
Yellowfin Sole	*Limanda aspera*	3	6.66	4.41	13.24
C-O Sole	*Pleuronichthys coenosus*	3	0.36	0.27	0.80
Speckled Sanddab	*Citharichthys stigmaeus*	1	0.16	0.16	0.16
Cod-Like Fishes	**Order Gadiformes**				
Pacific Cod	*Gadus macrocephalus*	110	291.97	12.37	1348.09
Walleye Pollock	*Theragra chalcogramma*	94	431.48	32.19	2929.41
Pacific Tomcod	*Microgadus proximus*	41	63.52	4.49	184.13
Pacific Hake	*Merluccius productus*	5	9.38	2.85	14.23

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Codfishes	Gadidae (Family)	1	-	-	-
Cartilaginous Fish	**Class Chondrichthyes**				
Spotted Ratfish	*Hydrolagus colliei*	139	1057.06	80.39	11173.81
North Pacific Spiny Dogfish	*Squalus suckleyi*	81	532.07	16.28	1318.44
Big Skate	*Raja binoculata*	35	73.46	13.28	464.75
Longnose Skate	*Raja rhina*	29	46.06	9.22	267.37
Sandpaper Skate	*Bathyraja interrupta*	19	2.78	1.31	24.81
Aleutian Skate	*Bathyraja aleutica*	4	11.20	7.79	31.15
Tope Shark	*Galeorhinus galeus*	2	-	-	-
Greenlings	**Family Hexagrammidae**				
Lingcod	*Ophiodon elongatus*	24	35.50	6.59	158.06
Kelp Greenling	*Hexagrammos decagrammus*	16	8.18	2.23	35.61
Sculpins	**Family Cottidae**				
Roughback Sculpin	*Chitonotus pugetensis*	23	0.87	0.23	2.78
Slim Sculpin	*Radulinus asprellus*	17	-	-	-
Buffalo Sculpin	*Enophrys bison*	16	3.25	0.88	12.29
Darkfin Sculpin	*Malacocottus zonurus*	13	1.79	0.63	3.16
Red Irish Lord	*Hemilepidotus hemilepidotus*	8	3.79	1.29	10.33
Bigmouth Sculpin	*Hemitripterus bolini*	7	7.65	3.52	24.63
Threadfin Sculpin	*Icelinus filamentosus*	6	1.27	0.59	1.78
Tadpole Sculpin	*Psychrolutes paradoxus*	5	-	-	-
Roughspine Sculpin	*Triglops macellus*	4	0.95	0.52	1.03
Great Sculpin	*Myoxocephalus polyacanthocephalus*	4	1.64	1.26	3.78
Spotfin Sculpin	*Icelinus tenuis*	2	-	-	-
Pacific Staghorn Sculpin	*Leptocottus armatus*	2	1.83	1.07	2.14
Spinyhead Sculpin	*Dasycottus setiger*	1	-	-	-
Grunt Sculpin	*Rhamphocottus richardsonii*	1	-	-	-
Dusky Sculpin	*Icelinus burchami*	1	-	-	-
Ribbed Sculpin	*Triglops pingelii*	1	-	-	-
Eelpouts	**Family Zoarcidae**				
Blackbelly Eelpout	*Lycodes pacificus*	19	1.68	0.29	4.67
Shortfin Eelpout	*Lycodes brevipes*	12	0.30	0.14	0.42
Wattled Eelpout	*Lycodes palearis*	10	5.56	2.15	17.17
Black Eelpout	*Lycodes diapterus*	9	0.47	0.19	0.95
Bigfin Eelpout	*Lycodes cortezianus*	6	4.16	1.29	6.44
Eelpouts	Zoarcidae (Family)	1	-	-	-
Poachers	**Family Agonidae**				
Sturgeon Poacher	*Podothecus accipenserinus*	42	1.24	0.33	10.61
Bigeye Poacher	*Bathyagonus pentacanthus*	9	-	-	-
Poachers	Agonidae (Family)	6	0.08	0.08	0.08
Northern Spearnose Poacher	*Agonopsis vulsa*	2	-	-	-
Lanternfishes	**Family Myctophidae**				
Lanternfishes	Myctophidae (Family)	4	-	-	-
Lanternfish	*Tarletonbeania* (Genus)	1	-	-	-
Northern Lampfish	*Stenobrachius leucopsarus*	1	-	-	-
Other Fish					
Sablefish	*Anoplopoma fimbria*	93	774.66	21.09	1961.45
Pacific Herring	*Clupea pallasii*	71	94.74	5.16	361.35
Eulachon	*Thaleichthys pacificus*	69	155.94	10.82	649.31
Snake Prickleback	*Lumpenus sagitta*	41	0.32	0.14	1.22
Pacific Sand Lance	*Ammodytes hexapterus*	30	103.03	10.16	243.82
Shiner Perch	*Cymatogaster aggregata*	13	1.63	0.35	2.81
Whitebarred Prickleback	*Poroclinus rothrocki*	6	-	-	-
Northern Ronquil	*Ronquilus jordani*	3	0.02	0.02	0.03

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Northern Smoothtongue	*Leuroglossus schmidti*	3	0.30	0.30	0.30
Pacific Viperfish	*Chauliodus macouni*	3	-	-	-
-	Psychrolutinae (Sub Family)	2	-	-	-
Smooth Alligatorfish	*Anoplagonus inermis*	2	-	-	-
Bobtail Eels	Cyematidae (Family)	1	-	-	-
Slender Barracudina	*Lestidiops ringens*	1	-	-	-
Black Hagfish	*Eptatretus deani*	1	1.26	1.26	1.26
Pacific Lamprey	*Entosphenus tridentatus*	1	-	-	-
American Shad	*Alosa sapidissima*	1	0.66	0.66	0.66
Decorated Warbonnet	*Chirolophis decoratus*	1	-	-	-
Wolf Eel	*Anarrhichthys ocellatus*	1	-	-	-
Pacific Sandfish	*Trichodon trichodon*	1	0.08	0.08	0.08
Blue-eyed Searcher	*Bathymaster signatus*	1	0.04	0.04	0.04
Chinook Salmon	*Oncorhynchus tshawytscha*	1	0.34	0.34	0.34
Crabs and Shrimp	**Class Malacostraca**				
Crangons	*Crangon* (Genus)	74	0.14	0.09	0.27
Sidestripe Shrimp	*Pandalopsis dispar*	51	3.36	0.80	38.39
Pink Shrimp (smooth)	*Pandalus jordani*	50	8.19	1.75	62.98
Isopods	Isopoda (Order)	17	-	-	-
Prawn	*Pandalus platyceros*	14	0.66	0.35	3.11
Spike Shrimp (Horned Shrimp)	*Paracrangon echinata*	11	0.03	0.03	0.03
Redclaw Crab	*Chorilia longipes*	10	-	-	-
Dungeness Crab	*Metacarcinus magister*	9	3.57	1.65	13.18
Right-handed Hermits	Paguridae (Family)	9	0.36	0.23	0.46
-	*Argis* (Genus)	8	-	-	-
Furrowed Rock Crab	*Cancer branneri*	8	-	-	-
Graceful Decorator Crab	*Oregonia gracilis*	8	0.16	0.09	0.17
Glass Shrimp	*Pasiphaea pacifica*	7	-	-	-
Pink Shrimp	*Pandalus borealis*	6	4.38	2.05	10.24
Yellowleg Shrimp	*Pandalus tridens*	5	0.30	0.30	0.30
-	*Eualus* (Genus)	5	-	-	-
Cancer Crabs	Cancridae (Family)	5	0.25	0.24	0.47
Sharp-nosed Crab	*Scyra acutifrons*	4	-	-	-
Squat Lobster	*Munida quadrispina*	2	-	-	-
Pygmy Rock Crab	*Cancer oregonensis*	2	-	-	-
Red Rock Crab	*Cancer productus*	2	0.08	0.08	0.08
Spider Crabs	Majidae (Family)	2	-	-	-
Coonstripe Shrimp	*Pandalus danae*	2	0.02	0.02	0.02
Euphausiids	Euphausiacea (Order)	2	-	-	-
-	*Euphausia* (Genus)	1	4.87	4.87	4.87
Decapods	Decapoda (Order)	1	-	-	-
Pandalid Shrimp	*Pandalus* (Genus)	1	-	-	-
-	Paguroidea (Super Family)	1	-	-	-
-	*Spirontocaris* (Genus)	1	-	-	-
-	Pagurinae (Sub Family)	1	0.10	0.10	0.10
Brown Box Crab	*Lopholithodes foraminatus*	1	0.58	0.58	0.58
Flatspine Triangle Crab	*Phyllolithodes papillosus*	1	-	-	-
Decorator Crabs	*Oregonia* (Genus)	1	-	-	-
Porcelain Crabs	Porcellanidae (Family)	1	-	-	-
Pubescent Porcelain Crab	*Pachycheles pubescens*	1	-	-	-
Rock Crabs	*Cancer* (Genus)	1	-	-	-
Sea Stars	**Class Asteroidea**				
Mud Star	*Ctenodiscus crispatus*	25	6.86	2.37	52.06
Sand Star	*Luidia foliolata*	23	1.04	0.40	4.02

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Pink Short-spined Star	*Pisaster brevispinus*	21	24.80	1.98	41.61
Cushion Star	*Pteraster tesselatus*	13	0.48	0.24	1.22
-	*Cheiraster dawsoni*	10	0.33	0.19	0.75
Rose Starfish	*Crossaster papposus*	9	0.08	0.08	0.08
Starfish	Asteroidea (Class)	8	-	-	-
Spiny Red Sea Star	*Hippasteria spinosa*	7	0.48	0.21	0.84
Vermillion Starfish	*Mediaster aequalis*	6	0.02	0.02	0.02
-	*Henricia* (Genus)	6	0.20	0.13	0.26
Cookie Star	*Ceramaster patagonicus*	5	0.10	0.07	0.14
Fish-eating Star	*Stylasterias forreri*	5	0.29	0.21	0.41
Long-armed Sea Star	*Orthasterias koehleri*	5	0.68	0.26	1.02
-	*Mediaster* (Genus)	4	0.06	0.06	0.06
-	*Solaster* (Genus)	4	0.24	0.24	0.24
Sunflower Starfish	*Pycnopodia helianthoides*	3	2.28	1.45	4.36
-	Goniasteridae (Family)	3	1.00	1.00	1.00
Leather Star	*Dermasterias imbricata*	3	0.86	0.68	1.36
-	Echinasteridae (Family)	3	-	-	-
-	*Dipsacaster* (Genus)	3	0.74	0.74	0.74
-	*Hippasteria* (Genus)	2	0.42	0.37	0.73
-	Solasteridae (Family)	1	0.10	0.10	0.10
-	Pterasteridae (Family)	1	0.07	0.07	0.07
Winged Sea Star	*Pteraster militaris*	1	-	-	-
Brittle Stars	**Class Ophiuroidea**				
-	*Ophiura* (Genus)	11	0.12	0.12	0.12
-	Ophiuroidea (Class)	10	-	-	-
Basket Star	*Gorgonocephalus eucnemis*	9	0.30	0.20	1.20
-	*Ophiacantha* (Genus)	4	-	-	-
-	*Amphiophiura ponderosa*	1	0.03	0.03	0.03
Sea Cucumbers	**Class Holothuroidea**				
Giant Red Sea Cucumber	*Parastichopus californicus*	17	8.94	2.48	37.19
Sea Cucumbers	Holothuroidea (Class)	10	-	-	-
Whitespotted Sea Cucumber	*Parastichopus leukothele*	5	0.78	0.39	1.95
Sweet Potato Sea Cucumber	*Molpadia intermedia*	5	-	-	-
Soft Sea Cucumber	*Pseudostichopus mollis*	4	0.68	0.47	1.40
Octopuses and Squid	**Class Cephalopoda**				
Pacific Bobtail Squid	*Rossia pacifica*	34	0.05	0.04	0.12
Opalescent Inshore Squid	*Doryteuthis opalescens*	24	51.06	4.39	57.01
Schoolmaster Gonate Squid	*Berryteuthis magister*	17	12.48	3.59	43.11
Smoothskin Octopus	*Benthoctopus leioderma*	5	0.09	0.06	0.11
Giant Pacific Octopus	*Enteroctopus dofleini*	3	7.66	7.15	14.30
Sea Urchins	**Super Order Echinacea**				
Fragile Urchin	*Allocentrotus fragilis*	52	5.81	1.72	80.85
Pallid Urchin	*Strongylocentrotus pallidus*	14	2.68	0.46	4.13
Red Urchin	*Strongylocentrotus franciscanus*	2	1.15	1.15	1.15
Purple Sea Urchins	*Strongylocentrotus purpuratus*	1	0.15	0.15	0.15
-	Strongylocentrotidae (Family)	1	-	-	-
Jellyfish	**Phylum Cnidaria**				
Jellyfish	Scyphozoa (Class)	74	10.90	0.78	32.03
Lions Mane	*Cyanea capillata*	60	10.17	1.04	47.83
-	*Periphylla periphylla*	17	0.05	0.03	0.10
Moon Jelly	*Aurelia aurita*	13	10.40	3.10	37.18
Fried Egg Jellyfish, Egg Yolk Jelly	*Phacellophora camtschatica*	3	2.40	1.43	2.86
-	*Periphylla* (Genus)	2	-	-	-

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Anemones and Corals	**Class Anthozoa**				
Anemone	Actiniaria (Order)	33	8.73	1.84	42.35
-	*Metridium* (Genus)	12	27.19	7.73	85.01
Sea Pen	*Ptilosarcus gurneyi*	9	1.01	0.46	4.14
Sea Whip	*Balticina septentrionalis*	8	0.22	0.12	0.48
-	*Primnoa* (Genus)	8	12.56	4.01	28.09
Sea Pens	Pennatulacea (Order)	1	3.61	3.61	3.61
-	*Gersemia* (Genus)	1	0.03	0.03	0.03
Snails and Slugs	**Class Gastropoda**				
Oregontriton	*Fusitriton oregonensis*	27	2.14	0.39	6.25
California Armina	*Armina californica*	27	1.84	0.64	8.26
Gastropods	Gastropoda (Class)	9	0.16	0.13	0.39
-	Opisthobranchia (Sub Class)	4	-	-	-
Rosy Tritonia	*Tritonia diomedea*	3	0.03	0.03	0.03
Seaslugs	Nudibranchia (Order)	2	0.07	0.07	0.07
Foliate Thornmouth	*Ceratostoma foliatum*	1	-	-	-
-	*Neptunea* (Genus)	1	-	-	-
Other Invertebrate Species					
Sponges	Porifera (Phylum)	35	10.55	2.46	66.46
Heart Urchin	*Brisaster latifrons*	18	4.76	0.84	12.67
Pink Scallop, (aka Reddish Scallop)	*Chlamys rubida*	15	11.99	3.15	12.61
-	Tunicata (Sub Phylum)	11	0.36	0.18	1.24
Sea Mouse	*Aphrodita* (Genus)	10	0.02	0.02	0.02
Giant Barnacle	*Balanus nubilis*	9	16.06	5.71	39.94
Lampshells	Brachiopoda (Phylum)	8	-	-	-
Spiny Scallop	*Chlamys hastata*	7	0.47	0.34	0.67
Molluscs	Mollusca (Phylum)	7	-	-	-
-	*Suberites* (Genus)	7	2.40	1.13	5.67
Bivalve Molluscs	Bivalvia (Class)	5	-	-	-
-	*Yoldia* (Genus)	5	-	-	-
Heart Urchins	Atelostomata (Super Order)	5	5.64	2.04	10.19
Peanutworms	Sipuncula (Phylum)	4	-	-	-
-	Ctenophora (Phylum)	4	-	-	-
-	Bryozoa (Phylum)	3	-	-	-
Scallop	Pectinidae (Family)	2	0.06	0.06	0.06
Polychaete Worms	Polychaeta (Class)	2	-	-	-
Ascidians and Tunicates	Ascidiacea (Class)	2	2.60	2.60	2.60
Tube Worms	Sedentaria (Sub Class)	2	19.78	19.78	19.78
Chitons	Polyplacophora (Class)	1	-	-	-
-	Neoloricata (Sub Class)	1	-	-	-
-	Platyhelminthes (Phylum)	1	0.08	0.08	0.08
Sea Lilies and Feather Stars	Crinoidea (Class)	1	-	-	-
-	Antedonidae (Family)	1	-	-	-
Starfishes	Stelleroidea (Class)	1	-	-	-
-	Echiura (Phylum)	1	-	-	-
Glass Sponges	Hexactinellida (Class)	1	0.04	0.04	0.04
Bath Sponges	Demospongiae (Class)	1	0.13	0.13	0.13
Barnacles	Cirripedia (Infraclass)	1	0.68	0.68	0.68
Acorn Barnacle	*Balanus glandula*	1	0.78	0.78	0.78
-	Crambeidae (Family)	1	-	-	-
-	*Aaptos* (Genus)	1	-	-	-
-	*Crassadoma* (Genus)	1	-	-	-
-	*Spinosphaera* (Genus)	1	-	-	-
Salps	Thaliacea (Class)	1	0.19	0.19	0.19

Table 8. Species sampled during the 2015 HS synoptic bottom trawl survey. The number of samples and number of recorded biological attributes are shown for each species.

Common Name	Scientific Name	Number of Samples	Number of Recorded Biological Attributes				
			Length	Weight	Sex	Maturity	Age
Aleutian Skate	*Bathyraja aleutica*	4	4	0	4	0	0
Arrowtooth Flounder	*Atheresthes stomias*	105	3019	852	3019	853	853
Big Skate	*Raja binoculata*	35	69	0	69	0	0
Bocaccio	*Sebastes paucispinis*	2	3	3	3	3	3
Butter Sole	*Isopsetta isolepis*	15	366	188	366	188	188
Canary Rockfish	*Sebastes pinniger*	5	62	54	62	54	54
Copper Rockfish	*Sebastes caurinus*	8	123	109	123	109	109
Curlfin Sole	*Pleuronichthys decurrens*	12	93	49	63	49	49
Dover Sole	*Microstomus pacificus*	70	1868	1115	1867	1068	1068
English Sole	*Parophrys vetulus*	70	2215	1160	2214	1158	1156
Eulachon	*Thaleichthys pacificus*	37	1272	0	0	0	0
Flathead Sole	*Hippoglossoides elassodon*	44	1283	233	1247	233	233
Kelp Greenling	*Hexagrammos decagrammus*	4	60	0	60	0	0
Lingcod	*Ophiodon elongatus*	14	36	14	37	14	14
Longnose Skate	*Raja rhina*	29	59	0	59	0	0
North Pacific Spiny Dogfish	*Squalus suckleyi*	20	292	79	292	79	79
Pacific Cod	*Gadus macrocephalus*	63	903	660	776	660	834
Pacific Halibut	*Hippoglossus stenolepis*	111	686	0	207	0	0
Pacific Herring	*Clupea pallasii*	1	50	0	0	0	0
Pacific Ocean Perch	*Sebastes alutus*	16	364	269	364	269	269
Pacific Sanddab	*Citharichthys sordidus*	9	236	0	236	0	0
Pacific Tomcod	*Microgadus proximus*	11	404	0	404	0	0
Petrale Sole	*Eopsetta jordani*	35	364	296	364	296	255
Puget Sound Rockfish	*Sebastes emphaeus*	1	28	28	28	28	28
Pygmy Rockfish	*Sebastes wilsoni*	1	7	0	7	0	0
Quillback Rockfish	*Sebastes maliger*	19	321	261	322	261	261
Redbanded Rockfish	*Sebastes babcocki*	21	208	208	208	208	208
Redstripe Rockfish	*Sebastes proriger*	4	84	24	84	24	24
Rex Sole	*Glyptocephalus zachirus*	88	2715	321	2710	321	321
Rougheye Rockfish	*Sebastes aleutianus*	21	63	63	63	63	63
Sablefish	*Anoplopoma fimbria*	53	695	213	695	186	186
Sand Sole	*Psettichthys melanostictus*	22	603	0	603	0	0
Sandpaper Skate	*Bathyraja interrupta*	18	21	0	21	0	0
Sharpchin Rockfish	*Sebastes zacentrus*	1	43	0	43	0	0
Shortraker Rockfish	*Sebastes borealis*	1	2	2	2	2	2
Shortspine Thornyhead	*Sebastolobus alascanus*	22	509	85	509	0	85
Silvergray Rockfish	*Sebastes brevispinis*	19	223	56	223	56	56
Slender Sole	*Lyopsetta exilis*	6	101	0	101	0	0
Southern Rock Sole	*Lepidopsetta bilineata*	49	1550	875	1550	874	874
Spotted Ratfish	*Hydrolagus colliei*	77	3040	0	3040	0	0
Starry Flounder	*Platichthys stellatus*	7	37	30	37	0	0
Tope Shark	*Galeorhinus galeus*	2	27	0	9	0	0
Walleye Pollock	*Theragra chalcogramma*	40	1061	242	1061	242	240
Widow Rockfish	*Sebastes entomelas*	2	34	28	34	28	28
Yelloweye Rockfish	*Sebastes ruberrimus*	4	4	4	4	4	4
Yellowfin Sole	*Limanda aspera*	1	25	0	25	0	0
Yellowmouth Rockfish	*Sebastes reedi*	1	5	0	5	0	0
Yellowtail Rockfish	*Sebastes flavidus*	10	184	82	184	82	82
Total		**1210**	**25421**	**7603**	**23404**	**7412**	**7626**

Table 9. Summary of biological data collected during the 2015 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**
Aleutian Skate	*Bathyraja aleutica*	4	4	Total	89	130	112	-	-	-	0.75
Arrowtooth Flounder	*Atheresthes stomias*	105	3019	Total	11	78	37	<0.1	2.8	0.7	0.59
Big Skate	*Raja binoculata*	35	69	Total	19	175	87	-	-	-	0.48
Bocaccio	*Sebastes paucispinis*	2	3	Fork	70	73	71	5.3	5.5	5.3	-
Butter Sole	*Isopsetta isolepis*	15	366	Total	15	36	26	<0.1	0.5	0.2	0.59
Canary Rockfish	*Sebastes pinniger*	5	62	Fork	14	57	39	<0.1	2.2	1.0	0.61
Copper Rockfish	*Sebastes caurinus*	8	123	Fork	17	46	34	0.1	1.8	0.8	0.50
Curlfin Sole	*Pleuronichthys decurrens*	12	93	Total	15	41	31	0.2	1.2	0.6	0.44
Dover Sole	*Microstomus pacificus*	70	1868	Total	19	59	36	0.1	2.0	0.5	0.50
English Sole	*Parophrys vetulus*	70	2215	Total	7	48	29	<0.1	0.9	0.3	0.56
Eulachon	*Thaleichthys pacificus*	37	1272	Standard	4	21	13	-	-	-	-
Flathead Sole	*Hippoglossoides elassodon*	44	1283	Total	7	43	29	<0.1	0.6	0.3	0.53
Kelp Greenling	*Hexagrammos decagrammus*	4	60	Fork	17	45	31	-	-	-	0.62
Lingcod	*Ophiodon elongatus*	14	36	Fork	29	119	64	0.2	17.5	3.5	0.53
Longnose Skate	*Raja rhina*	29	59	Total	35	135	86	-	-	-	0.42
North Pacific Spiny Dogfish	*Squalus suckleyi*	20	292	Total	49	111	72	0.5	2.6	1.4	0.62
Pacific Cod	*Gadus macrocephalus*	63	903	Fork	4	89	37	<0.1	7.2	1.1	0.52
Pacific Halibut	*Hippoglossus stenolepis*	111	686	Fork	20	196	72	-	-	-	0.48
Pacific Herring	*Clupea pallasii*	1	50	Standard	9	20	13	-	-	-	-
Pacific Ocean Perch	*Sebastes alutus*	16	364	Fork	12	51	33	0.1	1.9	0.6	0.37
Pacific Sanddab	*Citharichthys sordidus*	9	236	Total	12	37	27	-	-	-	0.50
Pacific Tomcod	*Microgadus proximus*	11	404	Fork	10	30	20	-	-	-	0.50
Petrale Sole	*Eopsetta jordani*	35	364	Total	28	60	41	0.3	2.6	0.8	0.60
Puget Sound Rockfish	*Sebastes emphaeus*	1	28	Fork	11	18	14	<0.1	0.1	<0.1	0.61
Pygmy Rockfish	*Sebastes wilsoni*	1	7	Fork	10	21	14	-	-	-	0.43
Quillback Rockfish	*Sebastes maliger*	19	322	Fork	13	46	30	<0.1	2.0	0.6	0.52
Redbanded Rockfish	*Sebastes babcocki*	21	208	Fork	23	58	44	0.2	3.6	1.6	0.38
Redstripe Rockfish	*Sebastes proriger*	4	84	Fork	11	34	20	<0.1	0.3	0.1	0.28
Rex Sole	*Glyptocephalus zachirus*	88	2715	Total	6	55	31	<0.1	0.5	0.2	0.62

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
Rougheye Rockfish	*Sebastes aleutianus*	21	63	Fork	10	57	34	<0.1	3.1	0.8	0.44
Sablefish	*Anoplopoma fimbria*	53	695	Fork	27	89	41	0.2	7.9	1.1	0.50
Sand Sole	*Psettichthys melanostictus*	22	603	Total	11	47	28	-	-	-	0.52
Sandpaper Skate	*Bathyraja interrupta*	18	21	Total	21	70	54	-	-	-	0.33
Sharpchin Rockfish	*Sebastes zacentrus*	1	43	Fork	15	27	21	-	-	-	0.63
Shortraker Rockfish	*Sebastes borealis*	1	2	Fork	89	97	93	13.5	18.1	15.8	0.50
Shortspine Thornyhead	*Sebastolobus alascanus*	22	509	Total	14	53	28	0.0	2.0	0.4	0.49
Silvergray Rockfish	*Sebastes brevispinis*	19	223	Fork	12	62	47	<0.1	2.8	1.2	0.29
Slender Sole	*Lyopsetta exilis*	6	101	Total	16	33	26	-	-	-	0.72
Southern Rock Sole	*Lepidopsetta bilineata*	49	1550	Total	7	50	25	<0.1	1.8	0.2	0.60
Spotted Ratfish	*Hydrolagus colliei*	77	3040	2nd Dorsal	9	52	32	-	-	-	0.49
Starry Flounder	*Platichthys stellatus*	7	37	Total	45	65	58	1.8	4.3	2.9	0.95
Tope Shark	*Galeorhinus galeus*	2	9	Fork	168	181	174	-	-	-	-
Walleye Pollock	*Theragra chalcogramma*	40	1061	Fork	3	105	30	0.1	2.1	0.6	0.54
Widow Rockfish	*Sebastes entomelas*	2	34	Fork	16	23	21	<0.1	0.2	0.1	0.41
Yelloweye Rockfish	*Sebastes ruberrimus*	4	4	Fork	40	63	54	1.2	5.2	3.3	0.75
Yellowfin Sole	*Limanda aspera*	1	25	Total	15	27	21	-	-	-	0.80
Yellowmouth Rockfish	*Sebastes reedi*	1	5	Fork	28	36	31	-	-	-	0.20
Yellowtail Rockfish	*Sebastes flavidus*	10	184	Fork	16	55	33	0.1	2.6	0.6	0.32

Table 10. Summary of data from net-mounted recorders during the 2015 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 148 were useable.

Data Recorder	Attribute	Number of	
		Tows	Records
Hobo Pendant Acceleration Data Logger	Bottom contact sensor tilt angle	152	34130
Notus Trawl Mensuration System	Net depth (m)	145	25348
	Doorspread (m)	152	27222
	Headline height above bottom (m)	152	27258
Seabird Sbe19plus Seacat Profiler	Conductivity of sea water (S/m)/ salinity (PSU)	147	27606
	Pressure (db)/ depth (m)	147	27606
	Water temperature (^{o}C)	147	27606
Seabird SBE43	Oxygen voltage (V)/ Dissolved oxygen (ml/L)	147	27606
Seabird SBE39 Temperature And Pressure Recorder	Water temperature (^{o}C)	131	30345
	Pressure (db)/ depth (m)	152	174070

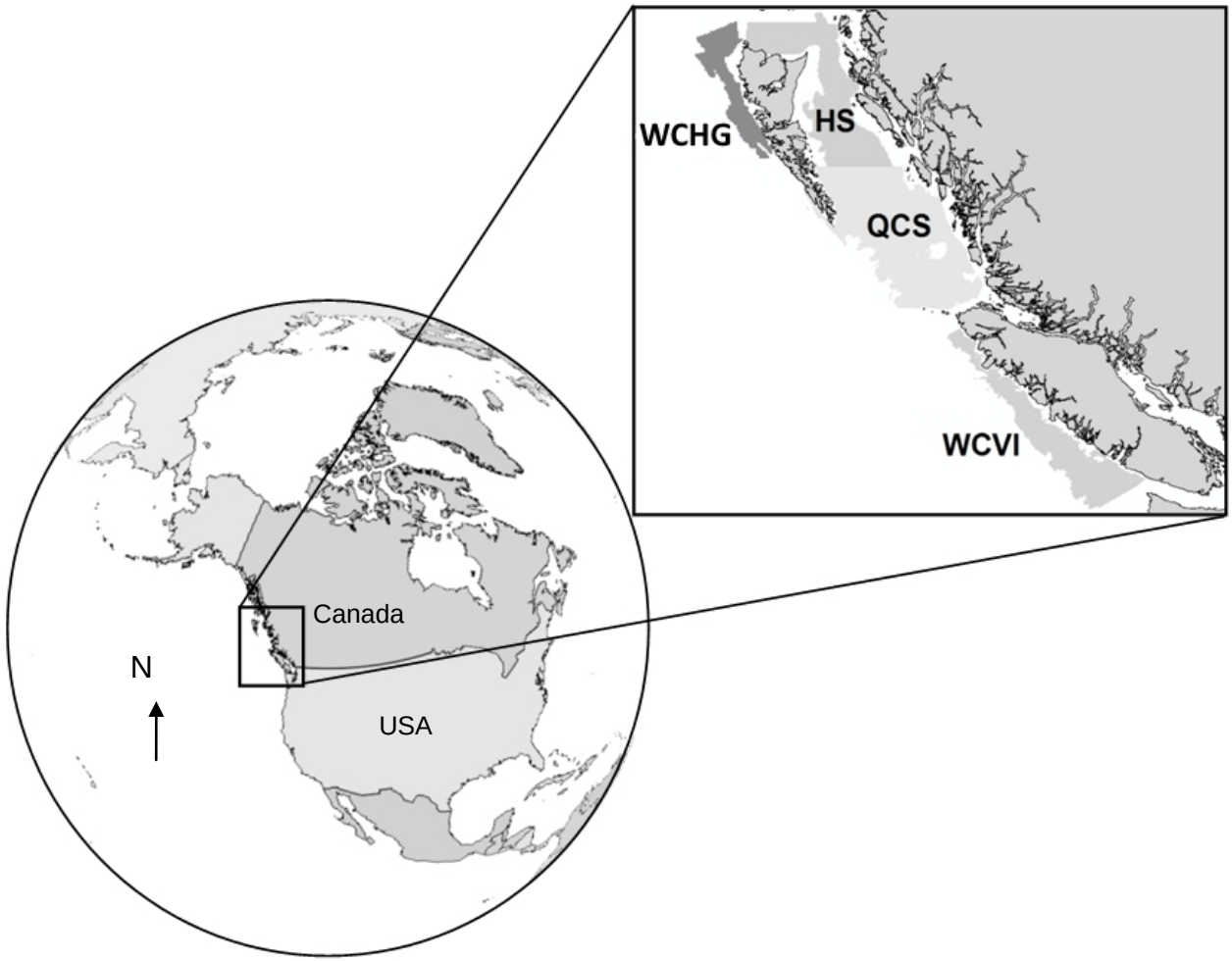

Figure 1. Locations of the current synoptic bottom trawl surveys on the coast of British Columbia, Canada. WCHG = West Coast Haida Gwaii; HS = Hecate Strait; QCS = Queen Charlotte Sound; WCVI = West Coast Vancouver Island.

Figure 2. The Canadian Coast Guard Ship W.E. Ricker used for the 2015 HS synoptic bottom trawl survey.

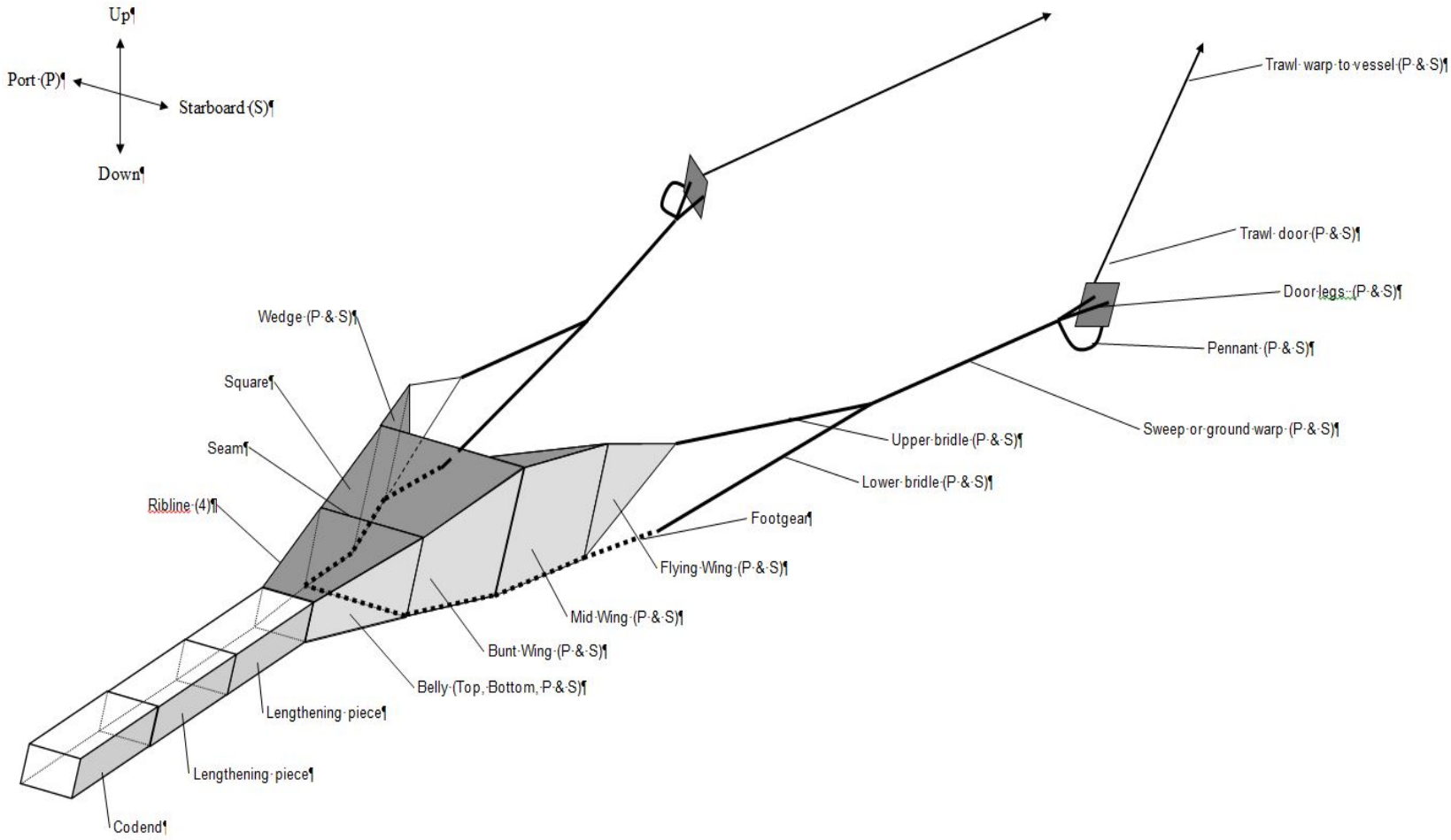

Figure 3. Overview diagram of the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey.

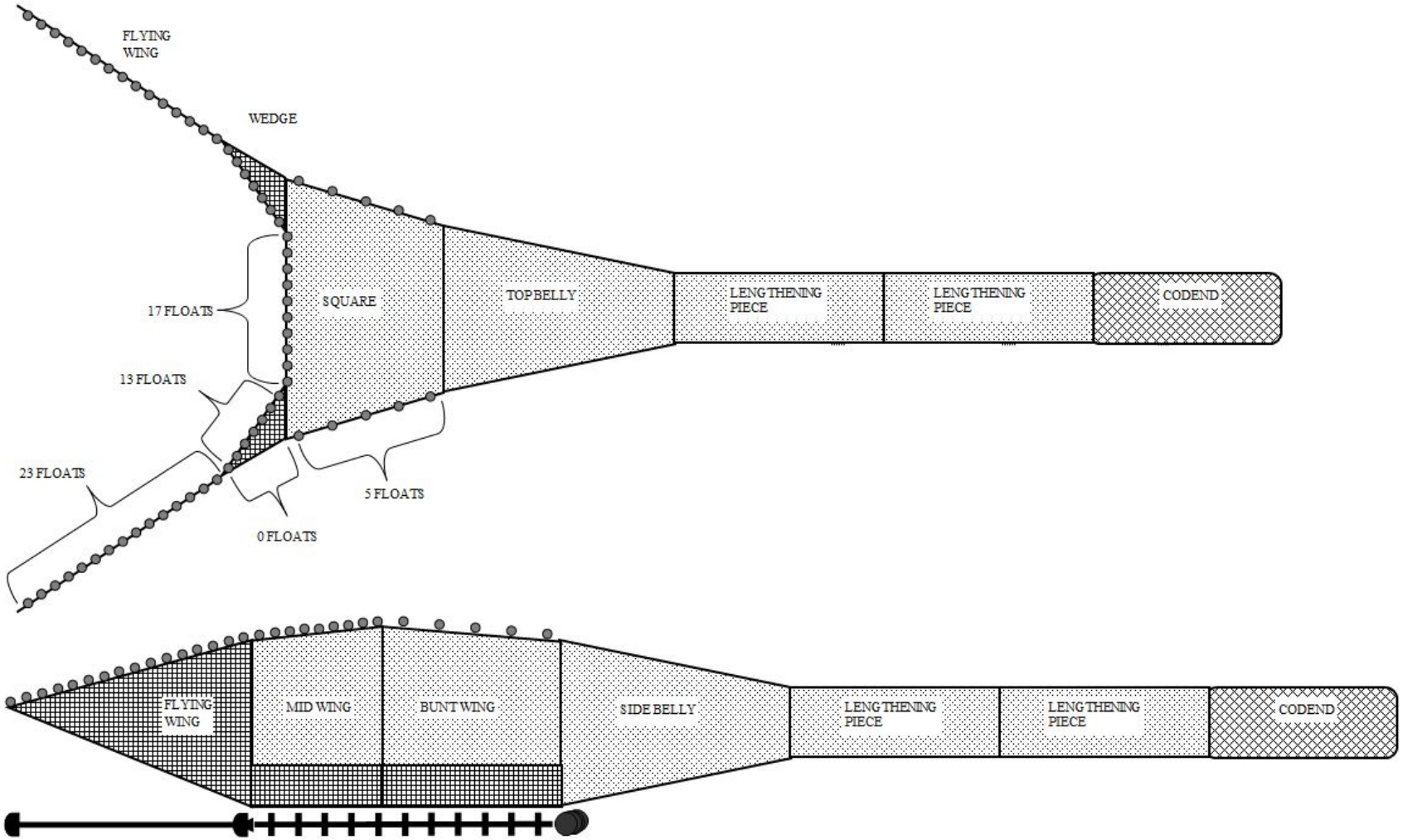

Figure 4. Top and side view of the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey.

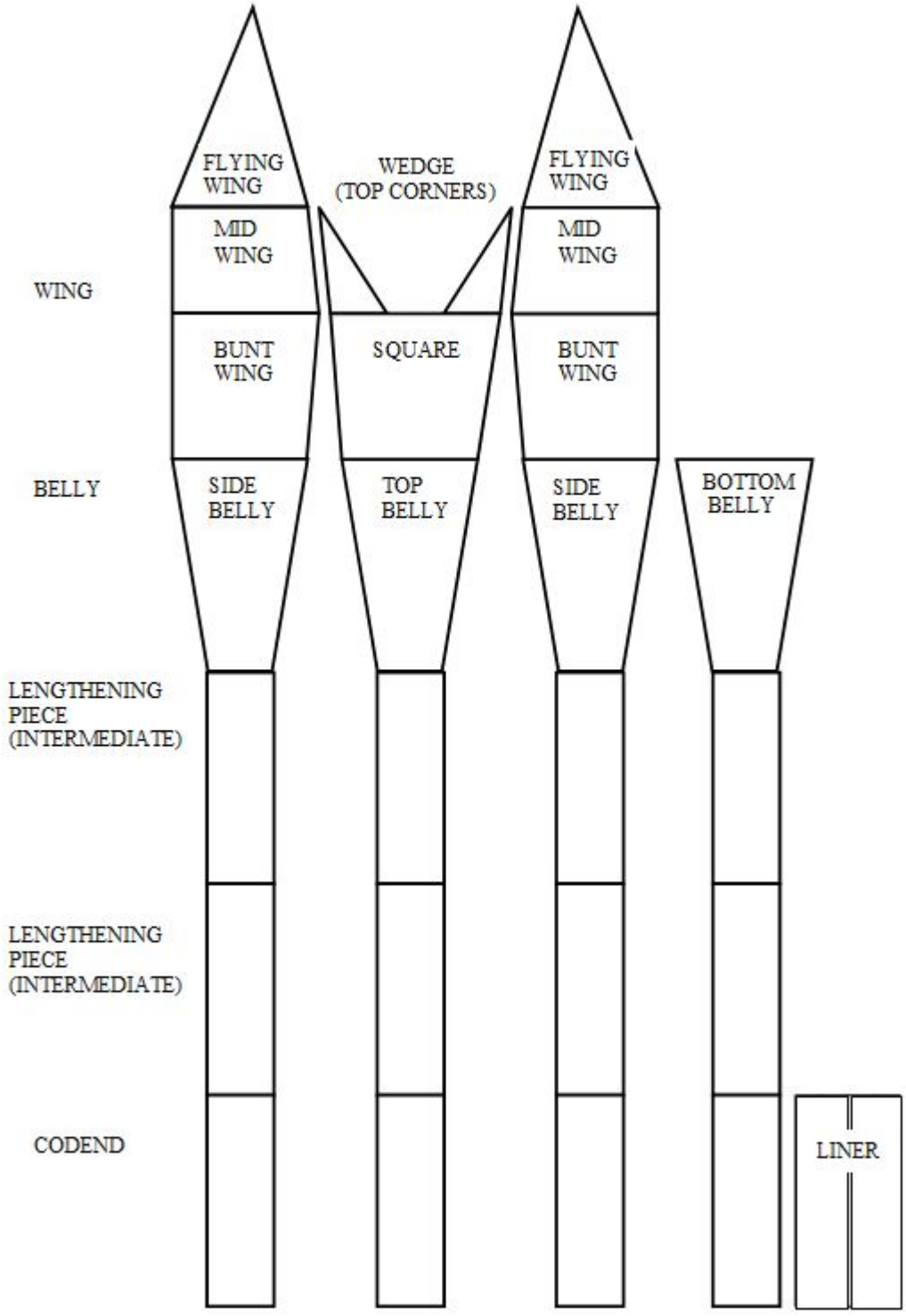

Figure 5. Diagram of the net panels with section names for the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey.

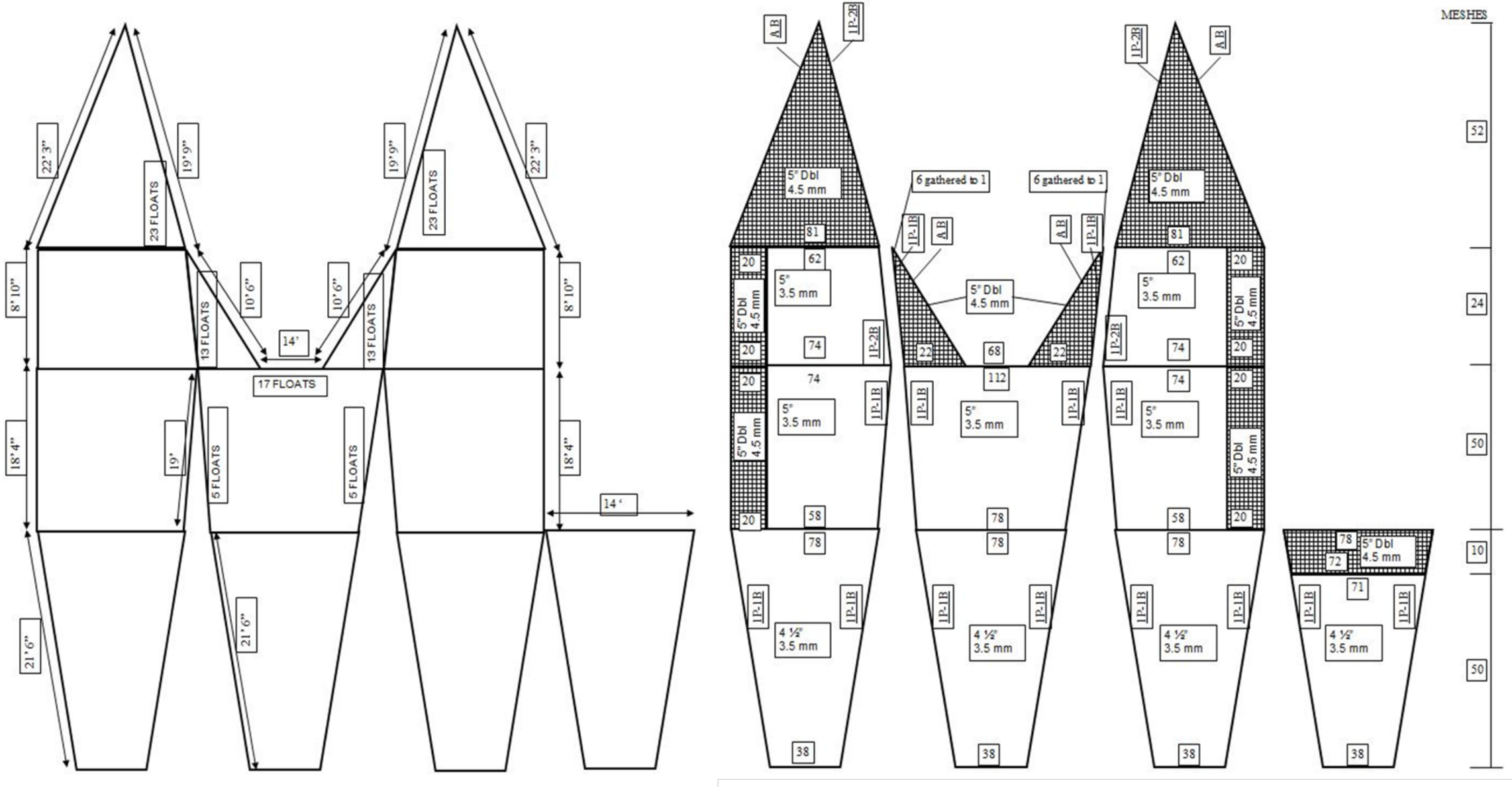

Figure 6. Details of the wing and belly sections of the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey. Dimensions and the float arrangement are shown on the left while netting details, mesh counts, and mesh cuts are shown on the right side of the diagram.

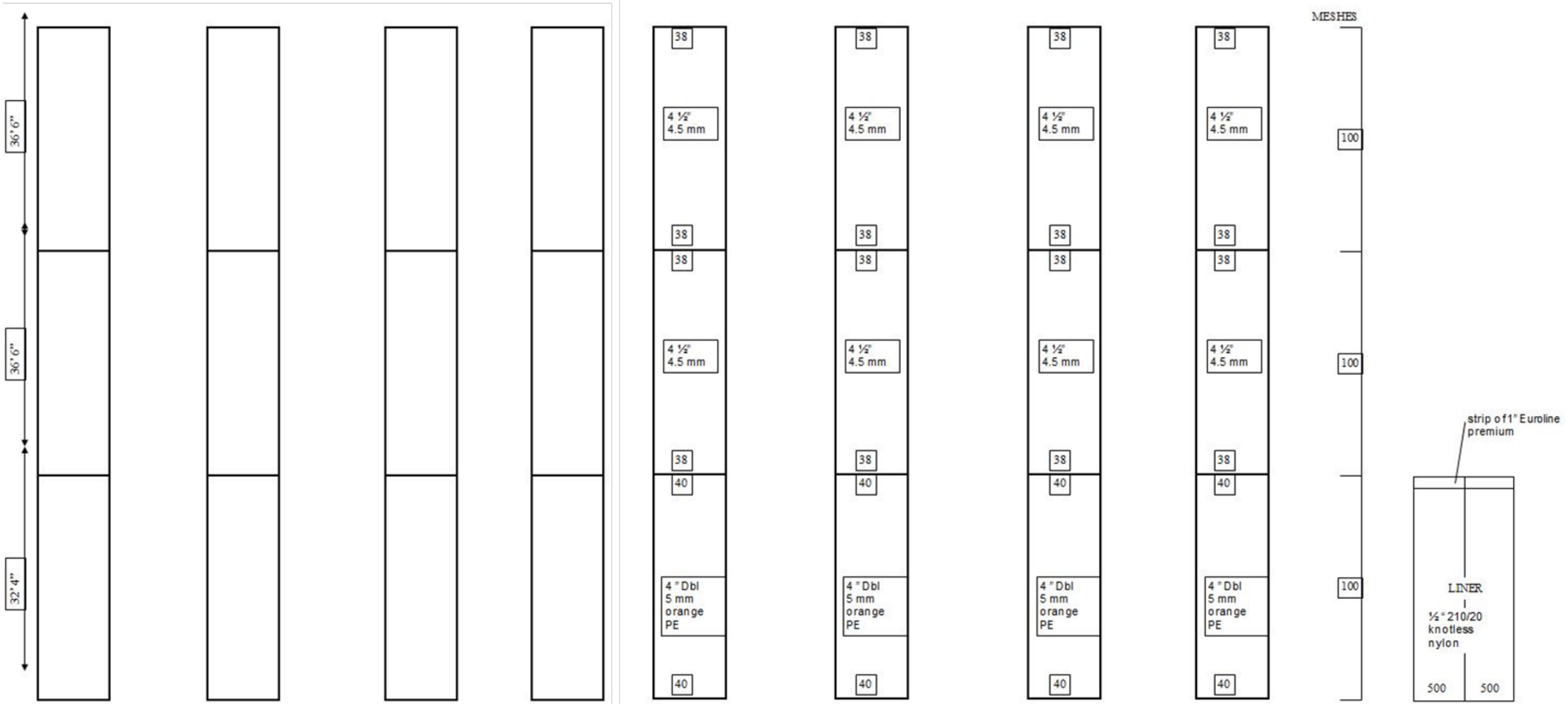

Figure 7. Details of the lengthening (intermediate) pieces and codend sections of the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey. Dimensions are shown on the left while netting details, mesh counts, and mesh cuts including the codend liner are shown on the right side of the diagram.

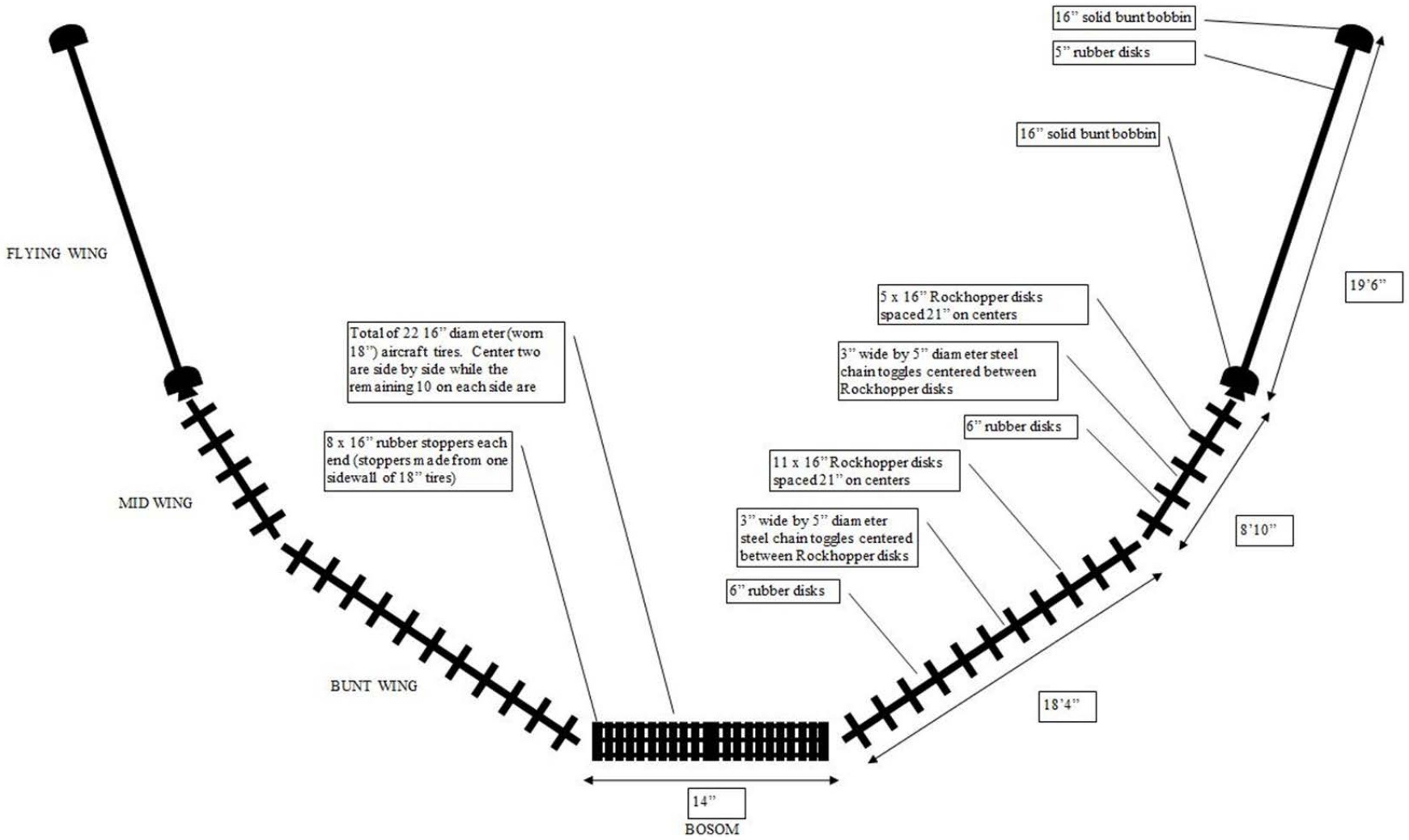

Figure 8. Details of the Rockhopper foot gear for the Atlantic Western IIa box trawl used on the 2015 HS synoptic bottom trawl survey.

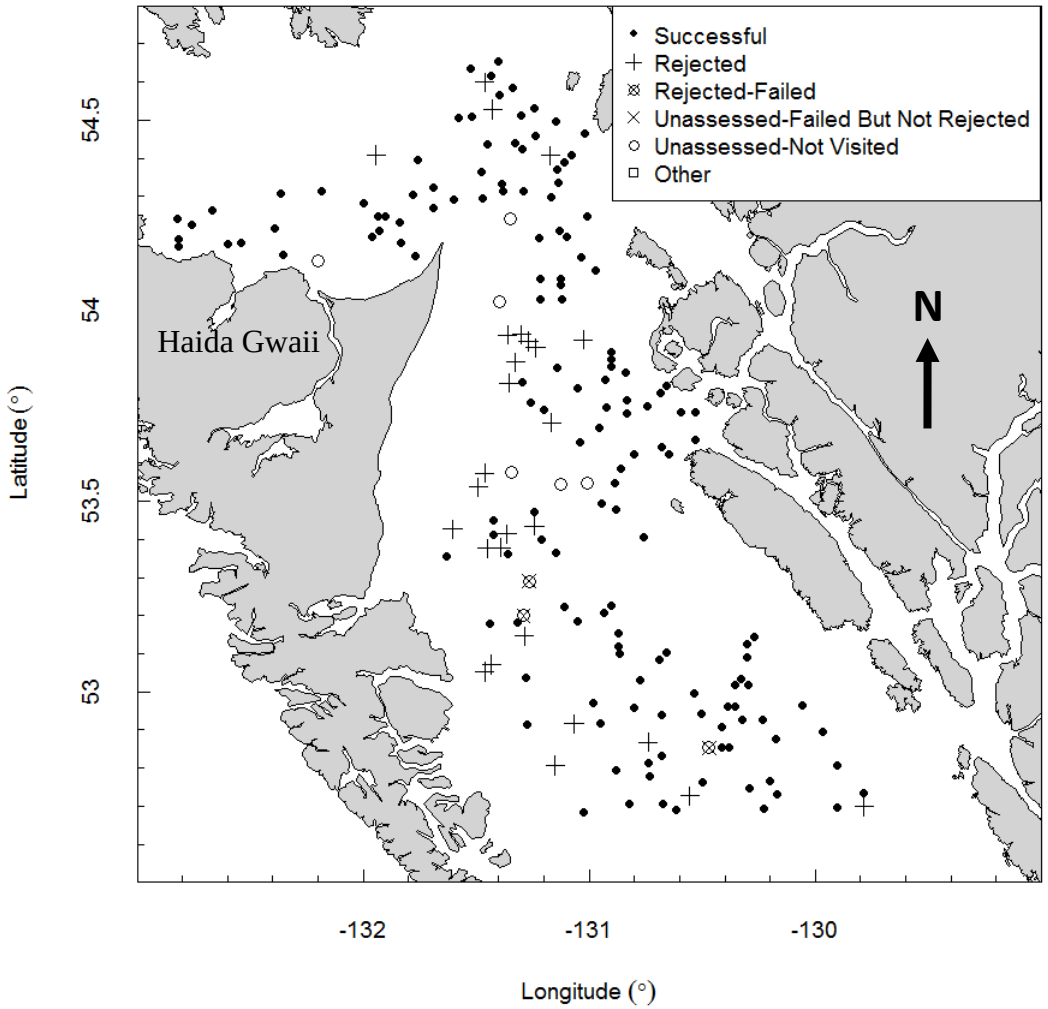

Figure 9. Final status of the 2015 HS synoptic bottom trawl survey showing 148 blocks that were fished successfully, 27 blocks rejected prior to fishing or after inspection, three blocks rejected after multiple failed fishing attempts, and six blocks that were unassessed.

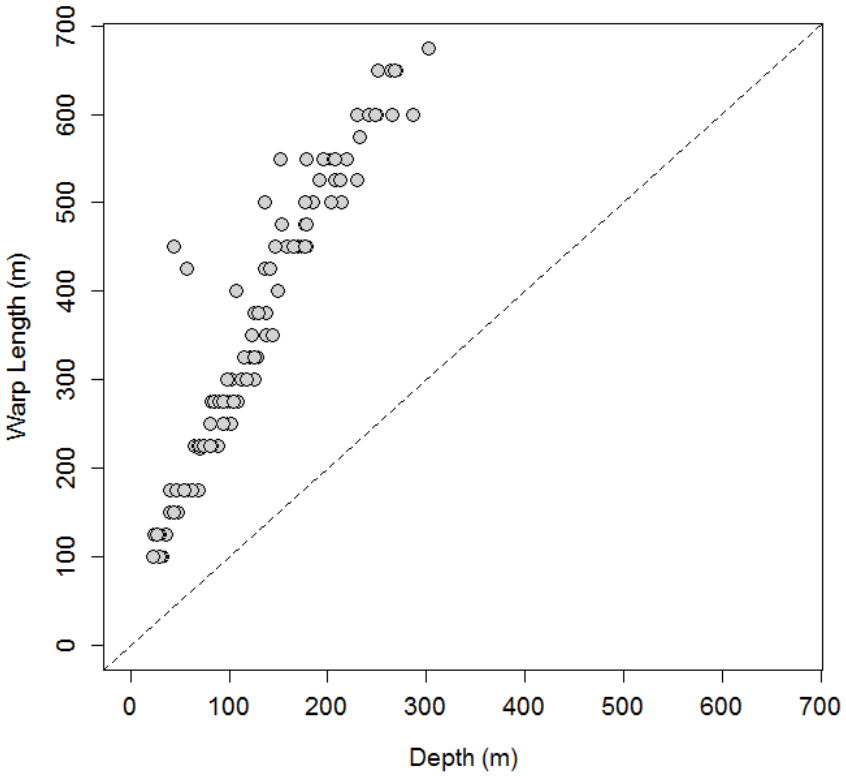

Figure 10. Warp length versus starting depth for each tow during the 2015 HS synoptic bottom trawl survey.

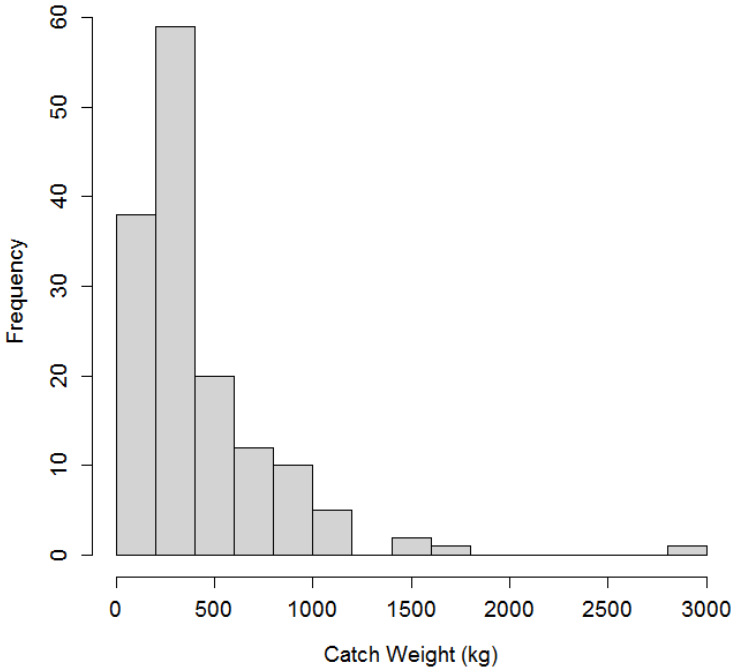

Figure 11. Histogram of catch weight in useable tows during the 2015 HS synoptic bottom trawl survey.

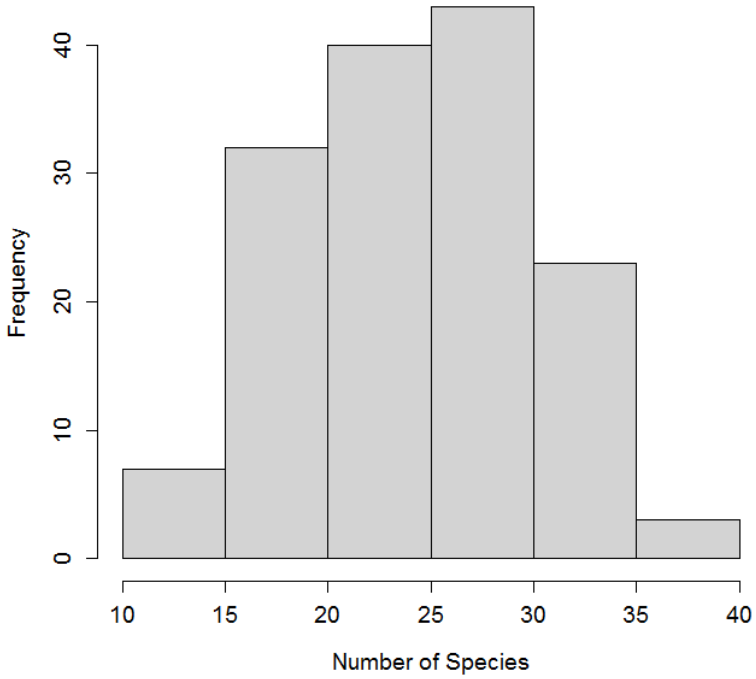

Figure 12. Histogram of number of species caught in useable tows during the 2015 HS synoptic bottom trawl survey.

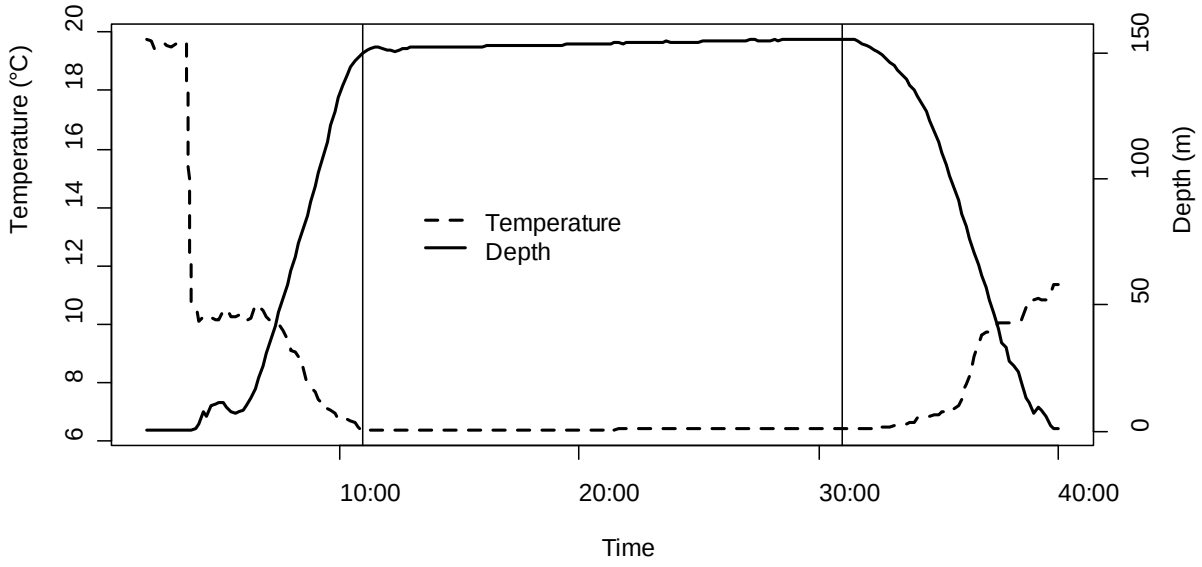

Figure 13. Example of a Seabird 39 temperature and pressure profile collected during a synoptic bottom trawl survey. The vertical lines indicate the start and end of net contact with the sea floor.

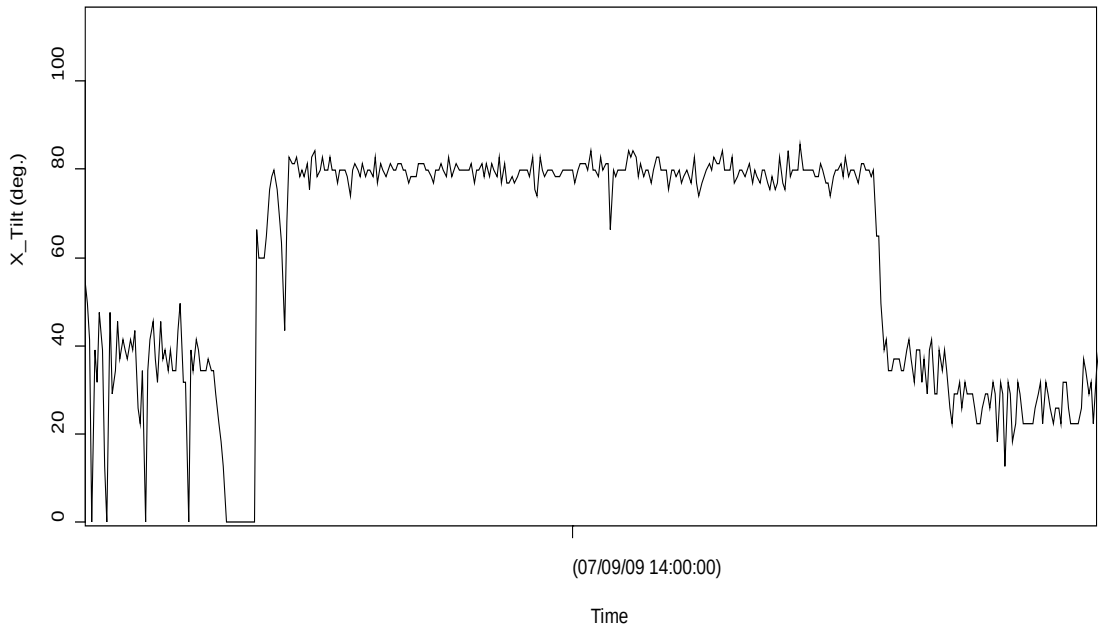

Figure 14. Example of a Mac Marine Industries bottom contact sensor profile collected during a synoptic bottom trawl survey. The raised segment in the middle of the profile at approximately 80° indicates where the net made contact with the sea floor.

APPENDIX A: HS 2015 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-28	11:11	52.7312	129.7805	213.3	21	5.5	525	339.6	Yes
2	May-28	13:07	52.8016	129.9164	267.4	20	5.5	650	296.7	Yes
3	May-28	15:02	52.8909	129.9611	241.3	20	5.1	600	135.1	Yes
4	May-28	16:24	52.8791	130.1674	244.3	20	5.4	600	70.5	Yes
5	May-28	17:57	52.9375	130.2211	230.3	19	5.7	600	135.8	Yes
6	May-28	19:12	52.9314	130.3277	204.8	21	5.5	550	231.9	Yes
7	May-29	7:03	53.1288	130.3061	207	21	5.4	550	307.9	Yes
8	May-29	8:05	53.0922	130.3037	206.2	21	5.4	550	253.1	Yes
9	May-29	9:45	53.0422	130.3144	206.5	21	5.4	550	177.0	Yes
10	May-29	11:02	52.9561	130.3479	195.4	21	5.3	550	164.0	Yes
11	May-29	12:30	52.9729	130.3851	177.1	21	5.8	500	142.0	Yes
12	May-29	13:38	52.9157	130.4048	136.4	23	5.4	500	401.7	Yes
13	May-29	15:11	52.9521	130.5004	116.2	20	5.6	325	157.4	Yes
14	May-29	16:28	53.0005	130.5289	98.9	20	5.3	275	98.6	Yes
15	May-29	18:01	53.0989	130.6513	142.1	23	5.5	425	645.1	Yes
16	May-30	7:12	53.0209	130.7606	103.3	20	5.5	275	671.1	Yes
17	May-30	8:34	53.1081	130.8765	96.2	20	5.3	275	207.6	Yes
18	May-30	9:29	53.1443	130.8815	99.9	21	5.4	275	400.9	Yes
19	May-30	10:39	53.2319	130.9137	102.4	20	5.3	275	181.0	Yes
20	May-30	12:11	53.1932	131.0626	45.2	22	5.4	175	130.6	Yes
21	May-30	13:20	53.2258	131.1215	39.9	22	5.7	175	93.9	Yes
22	May-30	15:11	53.3704	131.1573	40.8	21	5.6	175	368.8	Yes
23	May-30	16:15	53.4058	131.1946	30.4	22	5.6	125	184.0	Yes
24	May-30	18:05	53.4784	131.2308	28.7	23	5.3	125	418.0	Yes
25	May-31	7:25	53.3951	130.7474	153.5	19	5.4	475	384.9	Yes
26	May-31	8:52	53.4823	130.8744	96.2	20	5.8	275	188.2	Yes
27	May-31	10:03	53.4892	130.9537	80.7	21	5.5	225	353.1	Yes
28	May-31	10:57	53.5452	130.8927	71.5	21	5.5	225	216.5	Yes
29	May-31	12:17	53.5782	130.8681	65.1	22	5.5	225	323.6	Yes
30	May-31	13:12	53.6157	130.7956	73	21	5.4	225	504.4	Yes
31	May-31	14:10	53.6354	130.6906	101.9	20	5.7	275	306.7	Yes
32	May-31	15:03	53.6165	130.6603	69.4	21	5.4	225	200.6	Yes
33	May-31	16:16	53.6568	130.5317	40.0	22	5.7	175	266.8	Yes
34	May-31	17:39	53.7294	130.5420	69.8	21	5.6	225	305.3	Yes
35	Jun-01	7:12	53.8114	130.6705	62.8	19	5.7	175	253.8	Yes
36	Jun-01	8:28	53.7502	130.7456	137.3	21	5.4	375	2852.4	Yes
37	Jun-01	9:42	53.7362	130.8385	69.3	20	5.7	175	314.2	Yes
38	Jun-01	11:04	53.6952	130.9614	46.0	21	5.4	175	223.4	Yes
39	Jun-01	12:39	53.7511	130.9351	60.1	20	5.7	175	556.9	Yes
40	Jun-01	14:21	53.7931	131.0559	57.9	21	5.6	175	242.4	Yes
41	Jun-01	15:38	53.8125	130.9277	85.1	22	5.4	275	944.3	Yes
42	Jun-01	16:45	53.8635	130.8973	88.1	21	5.4	225	1044.0	Yes
43	Jun-01	18:10	53.8707	130.8983	89.5	21	5.3	275	386.8	Yes
44	Jun-01	19:01	53.8853	130.8937	81.9	21	5.6	225	576.8	Yes
45	Jun-02	7:07	54.0274	131.1224	31.6	22	5.3	125	192.5	Yes
46	Jun-02	8:05	54.0595	131.1297	35.5	21		125	371.6	Yes
47	Jun-02	9:01	54.0924	131.1346	29.2	23	5.6	125	455.1	Yes
48	Jun-02	10:10	54.0960	130.9746	79.0	20	5.5	225	226.0	Yes
49	Jun-02	11:07	54.1325	131.0400	107.0	23	5.2	400	684.3	Yes
50	Jun-02	12:35	54.1850	131.1062	28.1	23	5.5	125	228.2	Yes
51	Jun-02	13:27	54.2127	131.1304	26.3	24	5.4	125	870.9	Yes

Tow	Date	Start Time	Start Latitude	Start Longitude	Average Depth (m)	Bottom Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Useable
52	Jun-02	15:10	54.2416	131.0195	105.0	20	5.6	275	665.4	Yes
53	Jun-02	16:16	54.2991	131.1555	56.3	22	5.6	175	273.1	Yes
54	Jun-02	17:39	54.3322	131.1298	70.4	21	5.7	222	1756.9	Yes
55	Jun-03	7:14	54.3788	131.1509	76.7	20	5.5	225	1160.2	Yes
56	Jun-03	8:16	54.3897	131.1165	82.5	21	5.8	275	1029.4	Yes
57	Jun-03	9:24	54.4692	131.0258	104.4	21	5.3	275	549.3	Yes
58	Jun-03	10:28	54.4932	131.1384	136.5	21	5.6	425	779.9	Yes
59	Jun-03	12:11	54.4694	131.2430	127.9	21	5.7	325	1412.2	Yes
60	Jun-03	13:33	54.5190	131.3150	125.2	21	5.6	375	834.1	Yes
61	Jun-03	14:30	54.5226	131.2259	170.6	8	5.7	425	525.7	No
62	Jun-03	15:10	54.5364	131.2499	137.1	21	5.6	375	1060.8	Yes
63	Jun-03	16:34	54.5878	131.3446	122.2	20	5.6	325	770.3	Yes
64	Jun-03	18:25	54.6267	131.5163	178.1	22	5.6	475	354.8	Yes
65	Jun-04	7:20	54.3061	132.3660	212.9	20	5.6	525	313.8	Yes
66	Jun-04	9:01	54.2559	132.6872	207.7	17	5.4	525	194.7	Yes
67	Jun-04	10:41	54.2164	132.7634	191.5	23	5.6	525	492.3	Yes
68	Jun-04	12:53	54.2385	132.8319	301.7	22	5.5	675	731.2	Yes
69	Jun-04	14:08	54.1912	132.8324	115.2	20	5.4	325	347.4	Yes
70	Jun-04	15:04	54.1712	132.8256	56.6	20	5.5	425	306.0	Yes
71	Jun-04	16:36	54.1734	132.5926	90.5	21	5.7	275	848.3	Yes
72	Jun-05	7:06	54.1759	132.5391	94.2	20	5.8	275	946.8	Yes
73	Jun-05	8:39	54.1519	132.3458	92.2	20	5.6	275	682.4	Yes
74	Jun-05	9:49	54.2199	132.4101	129.6	21	5.7	375	854.7	Yes
75	Jun-05	11:52	54.3158	132.1978	231.8	21	5.4	575	218.7	Yes
76	Jun-05	13:56	54.2764	132.0003	177.2	20	5.8	475	305.2	Yes
77	Jun-05	15:17	54.2120	131.9181	126.2	19	5.5	325	433.6	Yes
78	Jun-05	16:28	54.1877	131.9459	108.9	19	5.6	275	430.1	Yes
79	Jun-05	17:53	54.1759	131.8483	74.3	20	5.4	225	553.9	Yes
80	Jun-05	18:50	54.1502	131.7592	24.4	22	5.4	125	277.9	Yes
81	Jun-06	7:02	53.0234	131.2714	27.1	23	5.6	125	63.6	Yes
82	Jun-06	8:15	52.9179	131.2723	83.2	19	5.8	225	340.9	Yes
83	Jun-06	10:40	52.9818	130.9720	27.8	22	5.6	125	72.9	Yes
84	Jun-06	12:05	52.9114	130.9603	25.7	23	5.7	125	153.1	Yes
85	Jun-06	13:13	52.9542	130.8127	53.7	21	5.8	175	78.2	Yes
86	Jun-06	14:43	52.8240	130.7323	80.7	20	5.4	225	53.2	Yes
87	Jun-06	15:43	52.7997	130.8785	54.6	21	5.7	175	233.5	Yes
88	Jun-07	7:13	52.6865	131.0306	57.9	20	5.7	175	362.5	Yes
89	Jun-07	8:25	52.6986	130.8122	95.1	20	5.8	275	54.8	Yes
90	Jun-07	9:33	52.7776	130.7291	91.9	22	5.5	275	76.7	Yes
91	Jun-07	10:46	52.8389	130.6870	83.2	20	5.7	225	61.0	Yes
92	Jun-07	12:21	52.8479	130.4719	124.2	20	5.7	275	43.1	No
93	Jun-07	15:40	52.7524	130.2958	230.1	22	5.7	525	53.7	Yes
94	Jun-09	15:47	52.6925	129.9003	264.1	21	5.7	650	62.7	Yes
95	Jun-09	18:36	52.7001	130.2192	250.9	22	5.5	650	100.7	Yes
96	Jun-10	7:03	52.7246	130.1632	250.2	21	5.6	600	54.9	Yes
97	Jun-10	8:09	52.7704	130.1989	248.2	21	5.8	600	87.5	Yes
98	Jun-10	10:00	52.8592	130.3726	174.1	20	5.7	450	315.1	Yes
99	Jun-10	10:59	52.8604	130.4215	136.9	20	5.7	350	282.3	Yes
100	Jun-10	13:22	52.7591	130.5062	143.6	22	5.4	350	431.3	Yes
101	Jun-10	14:39	52.6956	130.6128	138.1	20	5.7	350	373.9	Yes
102	Jun-10	15:47	52.7109	130.6738	126.0	19	5.7	300	247.4	Yes
103	Jun-10	18:00	52.9502	130.6717	60.9	21	5.7	175	283.8	Yes
104	Jun-11	7:03	53.7290	130.6033	81.4	20	5.7	250	232.6	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-11	8:34	53.7792	130.6625	117.5	19	5.7	300	230.4	Yes
106	Jun-11	10:06	53.8430	130.8415	97.3	20	5.5	300	750.8	Yes
107	Jun-11	11:00	53.7727	130.8374	111.9	20	5.6	300	816.1	Yes
108	Jun-11	12:40	53.6485	131.0455	48.2	20	5.5	150	350.2	Yes
109	Jun-11	14:24	53.7351	131.1866	41.9	21	5.8	150	402.5	Yes
110	Jun-11	15:17	53.7647	131.2662	42.9	20	5.9	150	437.0	Yes
111	Jun-11	16:23	53.8164	131.2833	39.8	21	5.8	150	330.0	Yes
112	Jun-12	7:00	54.6544	131.3847	177.9	19	5.5	450	303.5	Yes
113	Jun-12	8:09	54.6168	131.4166	146.2	21	5.7	450	335.0	Yes
114	Jun-12	10:16	54.5014	131.5647	269.9	21	5.7	650	521.0	Yes
115	Jun-12	12:05	54.5028	131.5269	219.1	21	5.7	550	476.7	Yes
116	Jun-12	14:36	54.3679	131.4648	213.9	19	5.7	500	292.0	Yes
117	Jun-12	15:36	54.3300	131.3963	158.3	21	5.5	450	549.0	Yes
118	Jun-12	16:33	54.3128	131.3899	123.4	21	5.8	350	1550.4	Yes
119	Jun-16	7:30	54.3967	131.7473	265.0	18	5.7	600	115.4	Yes
120	Jun-16	9:04	54.3286	131.6783	170.0	20	5.5	450	119.5	Yes
121	Jun-16	10:09	54.3041	131.7876	185.0	21	6.1	500	178.8	Yes
122	Jun-16	11:54	54.2457	131.9382	178.0	21	5.7	550	323.8	Yes
123	Jun-16	12:54	54.2450	131.9129	177.0	18	5.9	450	214.6	Yes
124	Jun-16	13:53	54.2348	131.8450	165.0	20	5.5	450	138.0	Yes
125	Jun-16	14:52	54.2672	131.6945	149.0	20	5.8	400	574.2	Yes
126	Jun-16	16:01	54.2924	131.6103	152.0	25	5.7	550	388.0	Yes
127	Jun-16	17:36	54.2867	131.4865	99.0	19	5.5	300	878.0	Yes
128	Jun-16	18:49	54.3178	131.2997	102.0	20	5.5	300	1113.5	Yes
129	Jun-17	7:08	54.4280	131.2861	44.4	19	5.8	450	820.8	Yes
130	Jun-17	8:04	54.4491	131.3347	175.4	20	5.7	450	722.58	Yes
131	Jun-17	9:09	54.4324	131.4416	286.9	16	5.6	600	376.95	Yes
132	Jun-17	11:53	54.556	131.3807	114.8	19	5.6	300	616.63	Yes
133	Jun-17	13:53	54.4166	131.0879	122.9	20	5.8	350	754.65	Yes
134	Jun-17	15:38	54.2012	131.2111	22.5	20	5.9	100	345	Yes
135	Jun-17	17:33	54.0801	131.2085	29.2	21	5.7	100	860.88	Yes
136	Jun-17	18:40	54.0234	131.2085	31.2	20	5.5	100	184.31	Yes
137	Jun-18	8:55	53.8446	131.1389	43.5	21	5.7	150	570.08	Yes
138	Jun-18	13:47	53.3588	131.6424	28.3	20	5.6	100	87.29	Yes
139	Jun-18	15:55	53.4091	131.4153	23.5	22	5.5	100	215.3	Yes
140	Jun-18	17:34	53.4591	131.4138	27.9	22	5.8	100	192.66	Yes
141	Jun-18	18:35	53.3673	131.3472	31.5	21	5.8	100	206.8	Yes
142	Jun-19	7:13	53.2924	131.2631	26.1	13	5.7	100	92.69	No
143	Jun-19	8:08	53.205	131.2826	30.0	2	8.4	100	26.32	No
144	Jun-19	9:20	53.1756	131.3182	25.9	22	5.6	100	348.21	Yes
145	Jun-19	10:45	53.1751	131.4329	23.2	23	5.5	100	50.28	Yes
146	Jun-19	15:09	53.2124	130.9299	94.2	19	5.6	250	236.41	Yes
147	Jun-19	16:20	53.1098	130.8725	101.6	19	5.7	250	396.24	Yes
148	Jun-20	7:00	53.0874	130.6928	97.8	20	5.7	250	318.08	Yes
149	Jun-20	9:41	53.1495	130.2832	203.6	21	5.6	500	255.67	Yes
150	Jun-20	11:49	53.0248	130.3526	195.0	21	5.3	550	87.19	Yes
151	Jun-20	12:49	53.0256	130.3052	207.9	21	5.6	550	119.81	Yes
152	Jun-20	14:46	52.9744	130.0582	241.6	21	5.8	600	323.02	Yes

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

Common Name	Scientific Name	Total Weight (Kg)	1	2	3	4	5
Aleutian Skate	*Bathyraja aleutica*	31.2					
Arrowtooth Flounder	*Atheresthes stomias*	13346.4	247.0	152.7	33.8	14.9	33.7
Big Skate	*Raja binoculata*	464.8	3.7				
Bigmouth Sculpin	*Hemitripterus bolini*	24.6					
Bocaccio	*Sebastes paucispinis*	16.3					
Buffalo Sculpin	*Enophrys bison*	12.3					
Butter Sole	*Isopsetta isolepis*	203.3					
Canary Rockfish	*Sebastes pinniger*	197.5		1.5			
Copper Rockfish	*Sebastes caurinus*	120.5					
Curlfin Sole	*Pleuronichthys decurrens*	71.2					
Dover Sole	*Microstomus pacificus*	5885.5	4.0	47.3	12.2	2.8	5.7
English Sole	*Parophrys vetulus*	3973.8					
Eulachon	*Thaleichthys pacificus*	649.3	0.1	31.6	30.2	-	29.7
Flathead Sole	*Hippoglossoides elassodon*	1802.9	0.6	0.2	0.3	1.3	1.4
Kelp Greenling	*Hexagrammos decagrammus*	35.6					
Lingcod	*Ophiodon elongatus*	158.1					
Longnose Skate	*Raja rhina*	267.4	7.9				
North Pacific Spiny Dogfish	*Squalus suckleyi*	1318.4	13.6	2.1	12.6	1.8	3.7
Pacific Cod	*Gadus macrocephalus*	1348.1	2.0	1.5			
Pacific Hake	*Merluccius productus*	14.2					
Pacific Halibut	*Hippoglossus stenolepis*	3677.6		15.7			18.3
Pacific Ocean Perch	*Sebastes alutus*	460.7	4.3	1.6	1.7		2.0
Pacific Sand Lance	*Ammodytes hexapterus*	243.8					
Pacific Sanddab	*Citharichthys sordidus*	260.3					
Pacific Tomcod	*Microgadus proximus*	184.1					
Petrale Sole	*Eopsetta jordani*	370.0			1.4		0.9
Puget Sound Rockfish	*Sebastes emphaeus*	8.4					
Quillback Rockfish	*Sebastes maliger*	318.7					
Red Irish Lord	*Hemilepidotus hemilepidotus*	10.3					
Redbanded Rockfish	*Sebastes babcocki*	470.0	7.9	10.9	7.4	10.1	7.3
Redstripe Rockfish	*Sebastes proriger*	161.8					
Rex Sole	*Glyptocephalus zachirus*	4078.3	3.5	3.8	1.9	0.7	1.5
Rougheye Rockfish	*Sebastes aleutianus*	53.3		3.0	3.2	5.6	0.6
Sablefish	*Anoplopoma fimbria*	1961.5	10.5	12.1	4.3	3.8	3.7
Sand Sole	*Psettichthys melanostictus*	654.0					
Sandpaper Skate	*Bathyraja interrupta*	24.8		0.6			
Shortraker Rockfish	*Sebastes borealis*	31.6					
Shortspine Thornyhead	*Sebastolobus alascanus*	358.0	9.1	5.7	5.2	4.3	2.5
Silvergray Rockfish	*Sebastes brevispinis*	442.4	4.2		3.6		1.2
Slender Sole	*Lyopsetta exilis*	36.4	0.2		1.0	1.4	2.6
Southern Rock Sole	*Lepidopsetta bilineata*	2472.2					
Spotted Ratfish	*Hydrolagus colliei*	11173.8		0.4	0.8	1.7	1.1
Starry Flounder	*Platichthys stellatus*	138.2					
Sturgeon Poacher	*Podothecus accipenserinus*	10.6					
Walleye Pollock	*Theragra chalcogramma*	2929.4	9.1		3.4	5.1	8.0
Wattled Eelpout	*Lycodes palearis*	17.2					-
Widow Rockfish	*Sebastes entomelas*	65.9					
Yelloweye Rockfish	*Sebastes ruberrimus*	13.9					
Yellowfin Sole	*Limanda aspera*	13.2					
Yellowtail Rockfish	*Sebastes flavidus*	522.5			3.0		
Other		1369.6	12.0	6.0	9.3	17.1	12.2
Total		**62473.9**	**339.6**	**296.7**	**135.1**	**70.5**	**135.8**

Common Name	6	7	8	9	10	11	12	13	14	15	16
Aleutian Skate											
Arrowtooth Flounder	71.1	98.4	62.4	82.9	58.3	25.7	162.4	29.9	7.7	104.5	6.4
Big Skate		9.0			6.3						5.2
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin											
Butter Sole											
Canary Rockfish							1.9	11.4	5.4		
Copper Rockfish											
Curlfin Sole											
Dover Sole	28.1	43.2	36.4	14.6	27.6	11.0	2.1	1.8	0.2	64.9	6.2
English Sole							23.3	17.6	30.8	9.1	51.7
Eulachon	78.1	87.8	68.1	23.8	5.8	9.9	0.3	-		4.7	
Flathead Sole	2	7.2	3.7	0.5	7.9	9.2	25.4	29.3	0.2	31.4	12.6
Kelp Greenling											
Lingcod								1.2			
Longnose Skate	11.7	2.3	13.8	5.1	11.8	5.7					
North Pacific Spiny Dogfish	9.1	6.7		4.9	18.0	42.7	23.3	11.3	4.6	10.5	532.1
Pacific Cod					0.6	1.3	4.1	3.0	9.0	2.6	4.0
Pacific Hake											
Pacific Halibut			5.2				2.6	4.6	4.1	12.8	
Pacific Ocean Perch	0.69	1.1	1.8	2.3	0.7	0.9	0.1				
Pacific Sand Lance											
Pacific Sanddab											
Pacific Tomcod									0.1		
Petrale Sole		2.2	2.1				7.2	1.0	15.0	13.7	3.0
Puget Sound Rockfish											
Quillback Rockfish								1.1			2.6
Red Irish Lord											
Redbanded Rockfish	8.6	27.4	34.5	18.8	5.3	8.7					
Redstripe Rockfish							1.3				
Rex Sole	1.0	4.0	2.0	0.4	1.9	3.2	126.6	35.0	16.5	375.8	29.4
Rougheye Rockfish		0.3	0.3		0.3						
Sablefish	2.77	5.3	0.9	3.7	3.1	2.9	1.0	0.6	1.2	3.2	1.2
Sand Sole											
Sandpaper Skate			1.3		1.4						
Shortraker Rockfish											
Shortspine Thornyhead	1.19	0.9	4.3	2.2	0.9						
Silvergray Rockfish		3.5		2.1	2.0	4.9	4.6	2.7			
Slender Sole	0.2	0.3	0.2	0.4		0.6	0.5	0.2		0.2	0.2
Southern Rock Sole									1.2		
Spotted Ratfish	4.32	2.1	6.6	3.9		0.9	7.9	1.9	2.1	0.7	6.6
Starry Flounder											
Sturgeon Poacher											
Walleye Pollock	1.4	1.9	3.8				0.7	2.1			7.2
Wattled Eelpout	0.6		0.2								
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish						2.3				8.1	
Other	10.95	4.4	5.3	11.4	12.3	12.1	6.2	2.8	0.6	2.7	3.0
Total	**231. 9**	**307.9**	**253.1**	**177.0**	**164.0**	**142.0**	**401.7**	**157.4**	**98.6**	**645.1**	**671.1**

Common Name	17	18	19	20	21	22	23	24	25	26	27
Aleutian Skate											
Arrowtooth Flounder	11.9	32.0	34.1					0.3	321.9	80.3	40.2
Big Skate				6.3			12.2	7.5			
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin				-				2.3			
Butter Sole			1.6							2.5	
Canary Rockfish											
Copper Rockfish				0.4	4.5			29.2			
Curlfin Sole					2.0			1.9			0.7
Dover Sole	2.1	1.1	9.56						12.1	10.4	61.7
English Sole	109.0	4.84	35.5	0.2	0.4	0.3	1.1		0.6	2.6	5.9
Eulachon									1.1		-
Flathead Sole	4.6	5.36	14.3						0.6	10.4	28.7
Kelp Greenling					5.2	1.0		0.5			
Lingcod		13.04									
Longnose Skate											
North Pacific Spiny Dogfish	9.6	10.3	0.24	23.2	14.9		2.4	1.2	3.9		
Pacific Cod	7.5	292.0	12.8	0.3		1.5	0.4	1.2	4.2	12.1	22.0
Pacific Hake											
Pacific Halibut	9.2	2.02	12.3	11.7	10.7		22.5	23.0		0.7	27.5
Pacific Ocean Perch											
Pacific Sand Lance				3.7	1.8	17.5	1.0	0.2			
Pacific Sanddab											
Pacific Tomcod	2.9		2.52				0.3				0.3
Petrale Sole	27.3	6.46	14.32							2.7	9.7
Puget Sound Rockfish											
Quillback Rockfish		2.2		0.3	12.5	2.2					2.1
Red Irish Lord								3.8			
Redbanded Rockfish											
Redstripe Rockfish											
Rex Sole	17.7	0.82	42.7	-					9.9	28.3	15.7
Rougheye Rockfish											
Sablefish	0.6	1.1							1.8	11.1	3.6
Sand Sole				0.2	5.4	34.8	3.6	0.7			
Sandpaper Skate											
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish											1.3
Slender Sole											0.1
Southern Rock Sole	0.4		0.5	15.5	27.8	271.0	50.9	56.0			10.3
Spotted Ratfish	0.8	16.8		66.9	1.4	37.4	80.0	276.6	7.0	3.7	98.7
Starry Flounder						2.0					
Sturgeon Poacher					0.5	0.4	0.5	0.1			0.3
Walleye Pollock	0.3	12.5							2.7	18.5	11.5
Wattled Eelpout											
Widow Rockfish									1.2		
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish											
Other	3.5	0.48	0.5	2.0	6.8	0.7	9.1	13.5	7.9	5.0	13.0
Total	**207.6**	**400.9**	**181.0**	**130.6**	**93.9**	**368.8**	**184.0**	**418.0**	**374.9**	**188.2**	**353.1**

Common Name	28	29	30	31	32	33	34	35	36	37	38
Aleutian Skate											
Arrowtooth Flounder	43.3	60.1	40.2	118.6	33.2	1.6	21.6	36.1	2521.1	58.3	
Big Skate		3.2									17.5
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin				-							
Butter Sole	15.0	45.2	3.7							0.3	
Canary Rockfish		0.6	1.26						1.2		
Copper Rockfish		4.8				3.8					0.7
Curlfin Sole	0.4	1.2				0.5		1.5			1.9
Dover Sole	9.9	1.4	5.8	3.6	4.2	0.1	2.5	4.8	104.3	1.7	
English Sole	43.3	41.3	21.8	41.5	39.21	26.5	53.0	63.6		18.5	12.7
Eulachon	-	-					0.1		0.5		
Flathead Sole	3.2	5.9	92.6	39.5	3.2		9.2	2.1	45.3	131.1	
Kelp Greenling		0.6				1.8	2.4	1.0			1.1
Lingcod					2.57	1.3		1.0			
Longnose Skate											
North Pacific Spiny Dogfish				9.1		16.8	17.2				
Pacific Cod	5.4	5.0		4.9	12.8	3.0	15.4	0.7	4.2	4.8	19.5
Pacific Hake											
Pacific Halibut	10.6	4.1	1.08		11.39	17.1	15.6	43.2	12.4	4.1	18.6
Pacific Ocean Perch											
Pacific Sand Lance	-										0.7
Pacific Sanddab						6.3	5.1	28.9			
Pacific Tomcod	0.8	0.7	1.28	0.2			25.9	18.2		1.2	1.3
Petrale Sole	6.7	7.9		0.4	2.57	4.6	2.2	1.4	5.4	1.6	
Puget Sound Rockfish											
Quillback Rockfish		2.2			2.17	7.8	2.1	8.2	1.4		
Red Irish Lord											0.2
Redbanded Rockfish											
Redstripe Rockfish					0.1			1.3			
Rex Sole	24.3	12.9	33.9	64.7	2.79		4.6	16.4	61.7	31.1	
Rougheye Rockfish											
Sablefish	13.1	17.2	4.26	0.9	6.07		2.4	12.9	36.3	2.8	
Sand Sole											1.6
Sandpaper Skate											
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish				0.9				1.7			
Slender Sole				2.8				0.2	2.1	0.3	
Southern Rock Sole	14.9	21.4	0.4	0.4	24.4	72.0	5.9	5.5		0.6	30.7
Spotted Ratfish	16.1	52.3	8.3	5.0	42.9	86.3	89.7	2.3	6.3	8.0	102.8
Starry Flounder											
Sturgeon Poacher	-	-			0.1	-	0.2	0.1			0.2
Walleye Pollock	3.0	19.0	284.2	7.9	7.1		12.2	0.3	1.6	48.8	
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish								1.3			
Yellowfin Sole											
Yellowtail Rockfish			1	5.5					48.5	1.0	
Other	6.4	16.6	4.6	0.8	5.8	17.2	18.1	1.1	-	-	13.9
Total	**216.5**	**323.6**	**504.4**	**306.7**	**200.6**	**266.8**	**305.3**	**253.8**	**2852.4**	**314.2**	**223.4**

Common Name	39	40	41	42	43	44	45	46	47	48	49
Aleutian Skate											
Arrowtooth Flounder	44.4	4.4	293.0	68.78	62.2	115.5	1.6	0.3	0.3	62.4	129.4
Big Skate								0.4			
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin								0.2			
Butter Sole	35.8	3.7		19.1	6.4	7.7		2.9	0.9		
Canary Rockfish											
Copper Rockfish								1.5			
Curlfin Sole	1.9						0.66	1.2			
Dover Sole	1.1	0.6	12.6	4.2	4.2	4.9		0.3		2.3	53.4
English Sole	126.6	33.5	30.7	9.8	4.8	33.0	27.0	97.0	190.0	31.7	15.2
Eulachon			0.2		-					0.5	1.2
Flathead Sole	8.0		328.5	68.5	55.6	145.1				1.8	0.8
Kelp Greenling						0.5		8.2			
Lingcod								1.2			
Longnose Skate		0.7									
North Pacific Spiny Dogfish	0.8				0.6	2.9					3.1
Pacific Cod			26.5	10.5		17.0	13.5	1.0	5.1	8.1	5.9
Pacific Hake											
Pacific Halibut	17.9	33.5	5.4	4.1		32.0	55.9	41.3	83.2	24.7	72.7
Pacific Ocean Perch											
Pacific Sand Lance	0.1										
Pacific Sanddab	74.9	63.1		1.0	0.9	2.4			0.1		
Pacific Tomcod	63.5	4.6	18.0	0.8	0.2	0.4	0.7	7.4	3.2	0.3	
Petrale Sole	12.5	12.7	25.7								
Puget Sound Rockfish											
Quillback Rockfish						4.0		37.9	0.8		13.9
Red Irish Lord											
Redbanded Rockfish											
Redstripe Rockfish											
Rex Sole	10.9	8.5	136.3	66.7	78.8	70.1		0.2	-	11.6	89.8
Rougheye Rockfish											
Sablefish	4.2	0.3	9.8	774.7	168.6	128.2	1	3.1	2.2	8.9	3.5
Sand Sole	21.3	6.0					18.4	25.5	38.0		
Sandpaper Skate											
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish											3.5
Slender Sole			0.4	0.3	0.1						0.5
Southern Rock Sole	113.3	17.4	0.2	3.0	2.4	5.1	46.3	21.8	72.7	10.5	
Spotted Ratfish	15.0	44.3	8.2	2.4	0.3	0.3	4.2	5.2	29.9	36.1	159.8
Starry Flounder											
Sturgeon Poacher	0.9	-		0.4		0.1	0.4	0.3	0.5	-	
Walleye Pollock	0.1		47.2	9.7	1.8	5.7	0.2		0.1	22.9	119.0
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish								94.3			
Other	3.7	9.1	1.5	0.2	-	2.0	22.6	20.6	24.4	4.2	12.6
Total	**556.9**	**242.4**	**944.3**	**1044.0**	**386.8**	**576.8**	**192.5**	**371.6**	**451.5**	**226.0**	**684.3**

Common Name	50	51	52	53	54	55	56	57	58	59	60
Aleutian Skate											7.4
Arrowtooth Flounder			73.7	44.4	294.5	91.2	309.3	106.3	181.1	403.1	131.0
Big Skate		1.4		14.1	8.9				21.9	43.4	
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin											
Butter Sole	0.5			2.0	14.9						
Canary Rockfish											
Copper Rockfish											
Curlfin Sole											
Dover Sole	0.2		59.0		6.6	129.1	8.3	68.0	270.4	527.7	392.6
English Sole	1.6	27.9	14.1	10.3	145.4	49.9	245.2	30.8	4.4	129.6	4.6
Eulachon	-		0.4			0.3		0.2	0.5	0.2	0.4
Flathead Sole			7.5		5.9	2.4	0.4	16.4	13.7	5.7	27.1
Kelp Greenling											
Lingcod							10.4				
Longnose Skate							3.6		2.3	46.1	5.1
North Pacific Spiny Dogfish				5.3		4.2	1.1		5.5	2.3	1.9
Pacific Cod	9.4	20.3	9.0	64.9	27.2	10.0	4.0	2.6	7	18.6	19.8
Pacific Hake											
Pacific Halibut	65.9	40.5	73.8	93.8	34.9	3.8	90.7	22.8	20.1	68.2	26.4
Pacific Ocean Perch								0.5	0.3	0.4	0.1
Pacific Sand Lance	-	-									
Pacific Sanddab											
Pacific Tomcod	1.5		0.3			0.5					
Petrale Sole					1.1	0.8		0.7			
Puget Sound Rockfish											
Quillback Rockfish			69.8	2.9	1.8		23.6				
Red Irish Lord											
Redbanded Rockfish											
Redstripe Rockfish						0.3					
Rex Sole	0.7		10.6	0.1	44.0	70.8	5.0	52.6	54.9	32.1	56.6
Rougheye Rockfish											
Sablefish	39.9	16.0	4.6		16.4	4.4	1.3	99.9	3.2	1.7	0.9
Sand Sole	5.8	1.1									
Sandpaper Skate									1.82	1.9	1.2
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish							1.9	2.3			
Slender Sole								0.2			
Southern Rock Sole	12.3	17.0	0.1	1.2	0.6	0.3					
Spotted Ratfish	64.5	724.8	328.4	34.0	1057.1	758.1	299.2	131.8	172.1	124.0	151.9
Starry Flounder	4.2	13.9			96.1	2.2					
Sturgeon Poacher	-										
Walleye Pollock			10.8		0.22	6.7	20.5	14.1	6.8	2.0	2.7
Wattled Eelpout									4.9	1.6	2.3
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish											
Other	21.6	8.0	3.4	0.2	1.1	25.2	4.8	0.2	9	3.7	2.0
Total	**228.2**	**870.9**	**665.4**	**273.1**	**1756.9**	**1160.2**	**1029.4**	**549.3**	**779.9**	**1412.2**	**834.1**

Common Name	61	62	63	64	65	66	67	68	69	70	71
Aleutian Skate								8.7			
Arrowtooth Flounder	18.4	122.0	140.2	58.1	14.8	68.8	89.7	200.7	88.6	86.5	541.2
Big Skate											
Bigmouth Sculpin				2.2		3.7	2.4				
Bocaccio											
Buffalo Sculpin											
Butter Sole											
Canary Rockfish						2.9			2.1		
Copper Rockfish											
Curlfin Sole										2.2	
Dover Sole	178.7	588.8	258.2	135.6	2.2	25.3	4.1	66.2	4.1	0.3	0.34
English Sole		0.8				1.4			8.1	33.0	5.0
Eulachon	0.1	0.5	0.4	0.1	0.1						0.1
Flathead Sole	1.4	25.3	81.9								
Kelp Greenling											
Lingcod					1.9		6.1			4.8	
Longnose Skate			18.6	8.5			3.2	33.9			
North Pacific Spiny Dogfish	3.9		4.4						5.5		2.26
Pacific Cod	4.5	5.6	9.7	2.1	15.7		19.6		10.0		86.7
Pacific Hake											
Pacific Halibut	34.2	5.3	10.4	7.6	151.6	10.1	13.1	177.4	5.5	8.9	9.6
Pacific Ocean Perch				3.3	11.3	27.7	77.3	12.4	-	-	
Pacific Sand Lance											
Pacific Sanddab											
Pacific Tomcod	0.2										
Petrale Sole		1.6				1.6		1.4	1.7	12.8	4.5
Puget Sound Rockfish											
Quillback Rockfish										2.1	
Red Irish Lord											
Redbanded Rockfish	3.4				8.1	9.8	10.3	15.8			
Redstripe Rockfish										0.3	
Rex Sole	65.9	47.5	33.2	66.8	4.8	8.2	0.9	16.6	28.7	10.4	0.3
Rougheye Rockfish				1.6	0.5		3.0	1.1			
Sablefish		1.5	2.7	1.4		11.1		112.2			
Sand Sole											
Sandpaper Skate		2.8						0.9			
Shortraker Rockfish								31.6			
Shortspine Thornyhead				12.1	21.1	1.9	9.5	23.5	0.2		
Silvergray Rockfish					1.0	2.3	10.8	2.1	4.7		1.5
Slender Sole		0.6	0.5	0.5							
Southern Rock Sole										1.0	1.3
Spotted Ratfish	208.1	244.4	202.1	47.2	73.5		45.3	9.4	35.6	115.8	194.6
Starry Flounder											
Sturgeon Poacher											
Walleye Pollock	5.3	1.1			1.3		193.5	2.1	152.8	3.6	0.7
Wattled Eelpout		5.6	1.9	0.1							
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish					2.3	15.9	1.4				
Other	1.5	7.5	6.1	7.8	3.4	3.9	2.0	15.1	-	24.5	0.34
Total	**525.7**	**1060.8**	**770.3**	**354.8**	**313.8**	**194.7**	**492.3**	**731.2**	**347.4**	**306.0**	**848.3**

Common Name	72	73	74	75	76	77	78	79	80	81	82
Aleutian Skate											
Arrowtooth Flounder	325.2	176.2	151.1	15.4	12.8	81.9	157.9	233.3			0.1
Big Skate										1.7	1.0
Bigmouth Sculpin											
Bocaccio	5.6						10.6				
Buffalo Sculpin										3.3	0.9
Butter Sole	0.5								0.6		
Canary Rockfish											
Copper Rockfish										21.6	5.2
Curlfin Sole									1.7		3.4
Dover Sole	2.1	2.9	9.8	29.6	2.9	13.8	27.78	11.1			0.9
English Sole	25.6	3.9	16.3			0.2	2.4	77.4	0.7		178.5
Eulachon				-							
Flathead Sole			0.6				0.5				
Kelp Greenling										0.3	
Lingcod	5.5	6.0			35.5		6.0				6.2
Longnose Skate											
North Pacific Spiny Dogfish		15.2				2.7	3.9	1.6			2.4
Pacific Cod	55.4	3.3	9.6	2.1	21.2	7.0	5.4	17.9	4.8		1.2
Pacific Hake											
Pacific Halibut	70.6	7.4	8.1		9.7	3.1	16.0	19.0	15.6		
Pacific Ocean Perch			0.3	14.3	27.1	3.6	0.5				
Pacific Sand Lance										5.0	0.2
Pacific Sanddab									0.5		55.8
Pacific Tomcod											2.1
Petrale Sole	7.5	0.7	1.5	2.7		5.4	7.4	8.9	2.9		2.3
Puget Sound Rockfish											
Quillback Rockfish											
Red Irish Lord										3.0	
Redbanded Rockfish				12.5	13.0						
Redstripe Rockfish					0.2			0.3			
Rex Sole	5.9	1.6	29.8	15.1	10.0	32.5	28.0	8.7			1.7
Rougheye Rockfish				0.6							
Sablefish				21.7				5.7			2.9
Sand Sole										2.0	53.4
Sandpaper Skate				1.4							
Shortraker Rockfish											
Shortspine Thornyhead				23.2	26.9	1.0					
Silvergray Rockfish	5.4		14.3	9.2	79.6	15.2	34.2	4.0			
Slender Sole											
Southern Rock Sole							0.7		3.4	9.8	2.8
Spotted Ratfish	117.2	31.9	194.3	49.7	51.8	29.9	45.9	49.5	99.1	11.8	12.8
Starry Flounder											
Sturgeon Poacher								-	-		1.2
Walleye Pollock	318.5	431.5	381.9	1.6	4.5	8.6	70.4	114.2			5.3
Wattled Eelpout								-			
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											0.1
Yellowtail Rockfish			36.5			224.3	10.2				
Other	1.7	1.6	0.4	19.5	9.9	4.3	2.1	2.2	148.6	5.1	0.7
Total	**946.8**	**682.4**	**854.7**	**218.7**	**305.2**	**433.6**	**430.1**	**553.9**	**277.9**	**63.6**	**340.9**

Common Name	83	84	85	86	87	88	89	90	91	92	93
Aleutian Skate											
Arrowtooth Flounder				0.2			1.1	0.52	-	5.5	14.1
Big Skate	6.1		3.1		13.4						
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin		0.7									
Butter Sole											
Canary Rockfish					101.8	0.2					
Copper Rockfish		25.8			14.4						
Curlfin Sole	2.0	0.5	2.2	0.5	3.5				0.5		
Dover Sole									0.1		2.7
English Sole	0.1		1.0	6.8			16.3	21.6	6.4	0.7	
Eulachon											
Flathead Sole											
Kelp Greenling		0.1			3.7	1.3					
Lingcod					1.1	4.0				2.6	
Longnose Skate											
North Pacific Spiny Dogfish		4.56				2.1	9.0	4.0	13.4	4.9	2.4
Pacific Cod		0		5.1		0.4	0.2	0.8			
Pacific Hake											
Pacific Halibut		47.6		3.1	18.5	70.1	4.1	4.2	22.0		
Pacific Ocean Perch											4.1
Pacific Sand Lance	7.9	0.8			1.2	0.4					
Pacific Sanddab			1.0	0.8			0.8	13.2			
Pacific Tomcod				0.2				-			
Petrale Sole			1.2	0.2			1.7	4.7	3.5	1.4	1.3
Puget Sound Rockfish						8.3	0.1				
Quillback Rockfish		1.5			17.8	12.9		0.86		3.2	
Red Irish Lord											
Redbanded Rockfish											4.7
Redstripe Rockfish						134.6	2.1	2.3		10.9	
Rex Sole				1.9	-		2.1	1.2	1.6	1.5	0.2
Rougheye Rockfish											0.7
Sablefish											
Sand Sole	5.4	0.5	0.5		0.4						
Sandpaper Skate											1.1
Shortraker Rockfish											
Shortspine Thornyhead											0.9
Silvergray Rockfish								-		3.7	3.6
Slender Sole											0.1
Southern Rock Sole	48.7	28.0	40.0	5.6	8.1	1.0	8.2	8.22	0.7	0.6	
Spotted Ratfish		24.7		15.5	9.8	49.8	6.6	11.7	11.6	1.3	1.9
Starry Flounder											
Sturgeon Poacher	0.2		-	-			0.4	0.12			
Walleye Pollock	-	0								0.2	
Wattled Eelpout											
Widow Rockfish					1.0	63.8					
Yelloweye Rockfish										3.0	
Yellowfin Sole											
Yellowtail Rockfish		0.02			31.4	3.7					
Other	2.5	18.3	29.1	13.3	7.6	10.1	2.1	3.16	1.3	3.7	16.0
Total	**72.9**	**153.1**	**78.2**	**53.2**	**233.5**	**362.5**	**54.8**	**76.72**	**61.0**	**43.1**	**53.7**

Common Name	94	95	96	97	98	99	100	101	102	103	104
Aleutian Skate											
Arrowtooth Flounder	25.7	24.2	15.5	33.42	29.4	102.9	47.2	10.3	9.05		59.5
Big Skate											
Bigmouth Sculpin		5.2									
Bocaccio											
Buffalo Sculpin											
Butter Sole											
Canary Rockfish								62.7	2.72		
Copper Rockfish											
Curlfin Sole								0.4			
Dover Sole	5.6	4.1	8.5	5.04	12.1	1.1	24.0	6.1	2.43		45.0
English Sole						39.3	113.1	54.4	105.5	0.5	27.5
Eulachon	8.6	0.5	0.3	12.22	0.2	-		0.3			0.1
Flathead Sole					17.0	1.2	42.1	29.1	2.7		9.2
Kelp Greenling											
Lingcod								8.2			0.9
Longnose Skate											
North Pacific Spiny Dogfish		2.7		2.1	1.6	3.1		2.8	0.1		
Pacific Cod						15.5	69.5	0.7	1.6		5.5
Pacific Hake	1.8			1.6							
Pacific Halibut							1.3	3.9	11.3	2.9	2.4
Pacific Ocean Perch			0.5	1.6	94.8	25.9	2.2				0.2
Pacific Sand Lance										93.7	4.7
Pacific Sanddab											
Pacific Tomcod											0.6
Petrale Sole		0.7			0.4	7.1	3.1	3.8		3.3	0.7
Puget Sound Rockfish											
Quillback Rockfish											0.4
Red Irish Lord											
Redbanded Rockfish	2.7	5.7	4.2	5.3	2.8						
Redstripe Rockfish					7.5			0.5			0.1
Rex Sole	0.6	0.6	1.1	1.1	107.9	44.4	107.6	142.3	99.5		33.7
Rougheye Rockfish					0.7						
Sablefish	3.3	3.5	3.6	3.1	7.9	6.8	0.5	0.5			8.5
Sand Sole											
Sandpaper Skate	1.2			1.26							
Shortraker Rockfish											
Shortspine Thornyhead	1.8	2.2	0.5	2.9							
Silvergray Rockfish	3.3	37.1	5.9		6.9	11.5		26.7	2.0		0.7
Slender Sole	0.5	0.5	1.5	0.07	1.0	0.1	0.6	0.8	0.18		0.2
Southern Rock Sole						0.7				135.3	
Spotted Ratfish		5.4	2.2	2.4	3.0	13.1	10.8	5.8	7.6	47.2	6.6
Starry Flounder											
Sturgeon Poacher											0.1
Walleye Pollock					7.5	1.1	0.7	1.6	0.58		5.6
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish					4.3			5.3			
Yellowfin Sole											
Yellowtail Rockfish								2.9	0.77		1.9
Other	7.8	8.5	11.3	15.32	9.8	8.7	8.4	4.8	1.5	0.9	18.6
Total	**62.7**	**100.7**	**54.9**	**87.49**	**315.1**	**282.3**	**431.3**	**373.9**	**247.4**	**283.8**	**232.6**

Common Name	105	106	107	108	109	110	111	112	113	114	115
Aleutian Skate									11.2		
Arrowtooth Flounder	95.4	416.5	253.5	12.4	0.4	1.6	0.4	20.6	69.3	165.7	171.2
Big Skate					12.4		8.1	20.0			
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin						1.52	0.1				
Butter Sole						0.22	15.6				
Canary Rockfish											
Copper Rockfish											
Curlfin Sole				24.4	3.4		0.1				
Dover Sole	36.8	2.8	144.7	0.2	0.4	0.4	3.3	124.6	110.1	128.9	129.2
English Sole	4.5	4.6		1.8	216.8	151.7	70.6				
Eulachon	13.5	0.2	12.1					3.2	10.2	0.5	
Flathead Sole	14.4	148.6	138.1	6.7		0			3.5	1.2	
Kelp Greenling				0.9							
Lingcod											
Longnose Skate								3.0	0.4	9.42	6.7
North Pacific Spiny Dogfish		0.5									
Pacific Cod		3.3	0.7	2.4		1.11	0.3	1.2	3.2		4.2
Pacific Hake											
Pacific Halibut	10.1	24.2	6.4	72.0	54.6	22.1	4.7	13.5	21.4	10.3	
Pacific Ocean Perch	0.1							0.6	0.3		1.6
Pacific Sand Lance											
Pacific Sanddab		0.5			0.2	0.27					
Pacific Tomcod		1.8	0.3		1.0	13.6	2.9				
Petrale Sole	0.4	3.6	14.7								
Puget Sound Rockfish											
Quillback Rockfish	0.4										
Red Irish Lord											
Redbanded Rockfish											1.6
Redstripe Rockfish											
Rex Sole	35.6	71.3	170.0	2.5		5.83	1.8	17.8	4.3	49.6	38.1
Rougheye Rockfish										5.3	5.7
Sablefish	3.6	9.6	1.7			0.33	1.9	1.1	1.3	22. 8	23.6
Sand Sole				0.4	45.0	94.85	37.3				
Sandpaper Skate										0.53	
Shortraker Rockfish											
Shortspine Thornyhead								5.3	4.5	14.4	28.5
Silvergray Rockfish									1.5		
Slender Sole	0.6	0.6	9.1						1.0		
Southern Rock Sole	0.2			20.4	24.7	7.7	98.6			0.35	
Spotted Ratfish	2.8	2.2	9.9	184.0	39.1	113.8	64.1	80.2	80.2	96.0	53.8
Starry Flounder											
Sturgeon Poacher				0.1	0.4	0.5	0.6				
Walleye Pollock	7.0	60.3	49.7				-	4.6			
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole						6.5	6.7				
Yellowtail Rockfish	1.1		2.6	1.8							
Other	3.7	0.3	2.6	20.1	4.1	15.0	13.1	7.7	12.5	16.11	12.5
Total	**230.4**	**750.8**	**816.1**	**350.2**	**402.5**	**437.0**	**330.0**	**303.5**	**335.0**	**521.0**	**476.7**

Common Name	116	117	118	119	120	121	122	123	124	125	126
Aleutian Skate	3.8										
Arrowtooth Flounder	85.5	74.2	27.7	13.4	27.8	30.5	27.1	19.3	21.3	279.3	163.7
Big Skate											
Bigmouth Sculpin	1.8										
Bocaccio											
Buffalo Sculpin											
Butter Sole											
Canary Rockfish											
Copper Rockfish											
Curlfin Sole											
Dover Sole	66.1	240.5	266.4	21.5	3.4	15.0	14.6	15.5	10.4	10.2	13.6
English Sole		40.8	27.8								
Eulachon	4.4	0.5		1.9	0.1						
Flathead Sole							0.9	0.5	0.5		0.4
Kelp Greenling											
Lingcod											
Longnose Skate		7.2									
North Pacific Spiny Dogfish			17.8				1.7				
Pacific Cod		2.7	24.8				45.6	19.1	18.7	12.2	2.4
Pacific Hake				1.4							
Pacific Halibut	22.3	17.1	64.9	8.7	10.4		11.0		3.5	3.0	5.1
Pacific Ocean Perch		1.5	1.1		31.6	60.5	21.7	4.6	4.1	1.3	0.3
Pacific Sand Lance			-								
Pacific Sanddab											
Pacific Tomcod											
Petrale Sole			0.9								
Puget Sound Rockfish											
Quillback Rockfish											
Red Irish Lord											
Redbanded Rockfish	10.9	5.7	8.2				76.3	68.8	6.3	2.9	
Redstripe Rockfish											
Rex Sole	30.1	24.5	209.2	3.8	11.2	23.9	45.3	36.0	28.2	33.0	45.0
Rougheye Rockfish	1.3										
Sablefish	11.1		2.4	14.5	1.2						
Sand Sole											
Sandpaper Skate	0.7	1.9	1.7								0.3
Shortraker Rockfish											
Shortspine Thornyhead	21.6	2.1		7.5	1.9	8.3	0.6	0.7			
Silvergray Rockfish					9.8	9.3	29.3	21.1	13.4	4.8	17.6
Slender Sole							1.0		0.3		
Southern Rock Sole											
Spotted Ratfish	31.8	100.3	836.8	34.1	18.5	23.7	36.4	23.6	15.5	39.7	101.6
Starry Flounder											
Sturgeon Poacher											
Walleye Pollock		4.0	50.2	4.5	1.8	3.1	7.0	2.7	8.1	186.6	35.7
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish			6.6								
Other	0.7	26.0	3.9	4.1	1.9	4.4	5.3	2.8	7.9	1.2	1.52
Total	**292.0**	**549.0**	**1550.4**	**115.4**	**119.5**	**178.8**	**323.8**	**214.6**	**138.0**	**574.2**	**387.0**

Common Name	127	128	129	130	131	132	133	134	135	136	137
Aleutian Skate											
Arrowtooth Flounder	76.9	251.9	127.7	76.1	46.6	164.8	242.3				5.5
Big Skate		73.5	50.0	72.9				2.2	17.2		1.7
Bigmouth Sculpin					7.7						
Bocaccio											
Buffalo Sculpin								-			
Butter Sole									18.2		0.4
Canary Rockfish			1.7								
Copper Rockfish											2.4
Curlfin Sole									0.1	0.42	10.2
Dover Sole	41.7	23.9	260.7	218.2	25.3	187.7	122.4				3.1
English Sole	130.1	26.5				36.9	0.5		127.0	2.12	177.2
Eulachon			1.4	0.1		0.1	27.0		-		
Flathead Sole						20.4	1.5				
Kelp Greenling											7.1
Lingcod											4.1
Longnose Skate			13.2	13.5		1.9	5.0				
North Pacific Spiny Dogfish		3.8			1.4	2.1	1.5			3.5	1.8
Pacific Cod	12.4	28.9	3.7		3.4	8.5	3.4	0.4	0.4	1.72	17.2
Pacific Hake											
Pacific Halibut	3.5	631.6	25.7	11.5	32.7	27.1	15.8	234.8	104.7	62.3	33.4
Pacific Ocean Perch	0.4		2.3	1.3		0.1	0.4				
Pacific Sand Lance								-	-		
Pacific Sanddab									0.1	0.1	4.5
Pacific Tomcod	0.4								0.8		0.6
Petrale Sole	9.8	1.9				1.2	1.6				1.3
Puget Sound Rockfish											
Quillback Rockfish							2.0				10.6
Red Irish Lord											0.1
Redbanded Rockfish			9.6	14.0	2.5						
Redstripe Rockfish											
Rex Sole	199.1	16.5	24.0	50.7	12.7	19.5	20.8				1.1
Rougheye Rockfish					14.4	1.3					
Sablefish			8.8	5.8	133.2	3.1	1.8		4.4		2.2
Sand Sole								0.8	12.5	12.7	4.6
Sandpaper Skate			1.8								
Shortraker Rockfish											
Shortspine Thornyhead			0.3	22.9	60.9	3.2					
Silvergray Rockfish	8.6										
Slender Sole											
Southern Rock Sole								16.4	528.7	56.9	51.7
Spotted Ratfish	387.9	50.4	288.2	232.1	15.5	128.3	284.6	60.1	24.7	35.0	195.4
Starry Flounder		3.9						3.9	11.9		
Sturgeon Poacher									0.2	0.73	
Walleye Pollock	6.9	0.4	0.6	1.5	3.1		16.1	-			
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish						7.8	3.9				
Other	0.5	0.5	1.2	2.0	17.6	2.8	3.9	26.3	10.0	8.98	34.0
Total	**878.0**	**1113.5**	**820.8**	**722.6**	**377.0**	**616.6**	**754.7**	**345.0**	**860.9**	**184.3**	**570.1**

Common Name	138	139	140	141	142	143	144	145	146	147	148
Aleutian Skate											
Arrowtooth Flounder									15.0	15.4	35.5
Big Skate	0.9	1.8	7.3	5.9			2.1	2.7			
Bigmouth Sculpin											
Bocaccio											
Buffalo Sculpin		0.7	-		2.5	0.1	-	-			
Butter Sole	1.6		1.8						2.4		
Canary Rockfish											
Copper Rockfish					6.2						
Curlfin Sole			0.1		1.3		0.3				
Dover Sole									1.2	5.0	
English Sole	6.3	1.9	8.7	13.7	0.2				143.1	114.7	3.0
Eulachon	-	-	-						0.1		
Flathead Sole									7.9	22.0	
Kelp Greenling											
Lingcod									4.9	7.8	21.8
Longnose Skate											15.4
North Pacific Spiny Dogfish	39.6	18.7		30.0	1.6	9.1	29.8	14.5	6.8	77.2	47.1
Pacific Cod		0.1	0.1		0.3		-	2.0	0.8	1.0	1.9
Pacific Hake											
Pacific Halibut		13.7	42.7	29.4	6.9						9.3
Pacific Ocean Perch											
Pacific Sand Lance	0	0.3	-0	-	0.5	0.1	103.0	1.0		-	
Pacific Sanddab											
Pacific Tomcod									1.8	0.6	
Petrale Sole									10.1	8.0	27.1
Puget Sound Rockfish											
Quillback Rockfish					1.6					63.4	0.6
Red Irish Lord		0.4	1.1		0.9	0.8					
Redbanded Rockfish											
Redstripe Rockfish											
Rex Sole									26.7	71.8	0.6
Rougheye Rockfish											
Sablefish											29.2
Sand Sole	14.1	25.7	29.6	21.4	1.7	1.0	127.4	0.3			
Sandpaper Skate											
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish											
Slender Sole											
Southern Rock Sole	17.8	128.3	68.9	99.0	34.9	0.9	63.3	14.2	0.4		1.3
Spotted Ratfish		9.0	2.2		31.9	5.9		1.7		3.8	108.9
Starry Flounder											
Sturgeon Poacher	0.22	0.2	0.4	0.2	0.2		0.1				
Walleye Pollock									0.8	0.7	12.0
Wattled Eelpout											
Widow Rockfish											
Yelloweye Rockfish											
Yellowfin Sole											
Yellowtail Rockfish											
Other	6.69	14.5	29.9	7.3	2.1	8.5	22.2	13.8	14.5	4.8	4.5
Total	**87.29**	**215.3**	**192.7**	**206.8**	**92.7**	**26.3**	**348.2**	**50.3**	**236.4**	**396.2**	**318.1**

Common Name	149	150	151	152
Aleutian Skate				
Arrowtooth Flounder	141.5	22.9	37.8	84.8
Big Skate				
Bigmouth Sculpin	1.66			
Bocaccio				
Buffalo Sculpin				
Butter Sole				
Canary Rockfish				
Copper Rockfish				
Curlfin Sole				
Dover Sole	7.3	28.5	29.9	1.5
English Sole				
Eulachon	10.3	3.45	4.9	155.9
Flathead Sole	2.11	2.48	1.9	2.2
Kelp Greenling				
Lingcod				
Longnose Skate	6.3	0.7	4.3	
North Pacific Spiny Dogfish	37.2	4.5	20.0	20.3
Pacific Cod	0.8			
Pacific Hake			-	9.4
Pacific Halibut				
Pacific Ocean Perch		0.1	1.3	
Pacific Sand Lance				
Pacific Sanddab				
Pacific Tomcod				
Petrale Sole				
Puget Sound Rockfish				
Quillback Rockfish				
Red Irish Lord				
Redbanded Rockfish	3.2	2.4	5.2	7.4
Redstripe Rockfish				
Rex Sole	0.8	3.8	1.9	2.8
Rougheye Rockfish	2.2			1.7
Sablefish	0.4	2.1	1.1	10.2
Sand Sole				
Sandpaper Skate		1.21		
Shortraker Rockfish				
Shortspine Thornyhead	0. 8	0.3	1.9	8.6
Silvergray Rockfish	0.9			
Slender Sole	0.3	0.28	0.1	1.0
Southern Rock Sole				
Spotted Ratfish	10.7			1.1
Starry Flounder				
Sturgeon Poacher				
Walleye Pollock	1.8			3.2
Wattled Eelpout				
Widow Rockfish				
Yelloweye Rockfish				
Yellowfin Sole				
Yellowtail Rockfish	1.8	1.78		
Other	25.7	12. 8	9.5	13.2
Total	**255. 7**	**87.2**	**119.8**	**323.0**