Summary of the West Coast Vancouver Island Synoptic Bottom Trawl Survey, May 24 - June 15, 2016

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by

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ABSTRACT

Williams, D.C., Nottingham, M.K., Olsen, N., and Wyeth, M.R. 2018. Summary of the West Coast Vancouver Island synoptic bottom trawl survey, May 24 - June 15, 2016. Can. Manuscr. Rep. Fish. Aquat. Sci. 3137: viii + 54 p.

A bottom trawl survey off the west coast of Vancouver Island was conducted on the Canadian Coast Guard Ship W. E. Ricker between May 24 and June 15, 2016. The West Coast Vancouver Island synoptic bottom trawl survey was first conducted in 2004, and has been repeated every second year since that time. This survey is one of a set of long-term and coordinated surveys that together cover the continental shelf and upper slope of most of the British Columbia coast. The objectives of these surveys are to provide fishery-independent abundance indices of all demersal fish species available to bottom trawling and to collect biological samples of selected species.

The survey follows a random depth-stratified design and the sampling units are 2 km by 2 km blocks. One hundred and forty (79.5 %) of the 176 blocks assessed in 2016 were successfully fished. The mean catch per tow was 852 kg with 14-43 species per tow. The average number of species per tow was 28. The most abundant fish species encountered was Arrowtooth Flounder (*Atheresthes stomias*) followed by Splitnose Rockfish (*Sebastes diploproa*), Pacific Ocean Perch (*Sebastes alutus*), Redstripe Rockfish (*Sebastes proriger*) and Sharpchin Rockfish (*Sebastes zacentrus*). Biological data including individual length, weight, sex, maturity, and ageing structures were collected from 51 different species of fish. Oceanographic data, including water temperature, depth, salinity, and dissolved oxygen were also recorded for most tows.

RÉSUMÉ

Williams, D.C., Nottingham, M.K., Olsen, N., and Wyeth, M.R. 2018. Sommaire du relevé synoptique au chalut de fond de la côte ouest de l'île de Vancouver, du 24 mai et le 15 juin 2016. Can. Manuscr. Rep. Fish. Aquat. Sci. 3137: viii + 54 p.

Un relevé au chalut de fond de la côte ouest de l'île de Vancouver a été effectué par le navire de la Garde Côtière Canadienne *W. E. Ricker* entre le 24 mai et le 15 juin 2016. Le premier relevé synoptique au chalut de fond de la côte ouest de l'île de Vancouver a été réalisé en 2004, puis on a répété l'opération tous les deux ans depuis. Le relevé de la côte ouest de l'île de Vancouver fait partie d'un ensemble de relevés à long terme coordonnés qui couvre le plateau continental et le haut du talus 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 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 176 blocs retenus en 2016, 140 (79.5 %) ont fait l'objet d'une pêche avec succès. La moyenne de prises par trait était de 852 kg, avec entre 14 et 43 espèces capturées par trait. Le nombre moyen d'espèces par trait était de 28. Les espèces de poissons capturées le plus fréquemment étaient la plie à grande bouche (*Atheresthes stomias*), suivi du sébaste à bec-de-lièvre (*Sebastes diploproa*), du sébaste à longue mâchoire (*Sebastes alutus*), du sébaste à raie rouge (*Sebastes proriger*), et du sébaste à menton pointu (*Sebastes zacentrus*). 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 soixante 51 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, as an initial step, 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 synoptic bottom trawl survey (QCS) 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 Queen Charlotte Sound and Hecate Strait surveys conducted in odd-numbered years and the West Coast Vancouver Island and West Coast Haida Gwaii 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 WCVI synoptic bottom trawl survey was successfully completed in 2004 (Workman et al. 2008a) and has been repeated every second year since. This document provides a brief summary of the results and methods from the seventh WCVI synoptic bottom trawl survey which occurred between May 24 and June 15, 2016. It is not intended as a comprehensive review of the survey, nor does it provide interpretive analysis of the survey results. Previous WCVI synoptic bottom trawl surveys are summarized in Workman et al. (2008a), Workman et al. (2008b), Olsen et al. (2009), Wyeth et al. (2016), Williams et al. (2017) and Nottingham et al. (2017).

METHODS

SURVEY DESIGN

The survey area is the west coast of Vancouver Island from approximately 49° 12' to 50° 36' North latitude and approximately 124° 48' to 128° 30' West longitude. The southern boundary is contiguous with the Canada/U.S. boundary (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 WCVI synoptic bottom trawl survey are 50-125 m, 125-200 m, 200-330 m, and 330-500 m (Table 1). For each survey in the WCVI series, blocks are randomly selected within each depth stratum.

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 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 (predicted adjustment). 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. In early years of the survey, both the primary and secondary tows of blocks were created before the start of the survey. The primary set was visited first and then the secondary set would be visited once the primary set was almost completed. The secondary set could be adjusted by randomly either adding or removing blocks, depending on the remaining fishing days. This method invariably created some confusion on board the vessel when the secondary set was adjusted mid-trip. In 2011, the practice was slightly altered. Improvements to the at-sea software facilitated the generation of blocks so at the start of the survey only the primary set of blocks was created. The secondary set of blocks was then added once the primary set was nearly complete. The number of blocks in the secondary set is based on the number of remaining fishing days.

For the 2016 WCVI 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 included a main body (wing and belly sections), two lengthening pieces, and a codend with liner (Figure 4 and Figure 5). The main body of the net had an 11 mm long-link steel chain frame and was constructed from a mix of double 4.5 mm strand 5 inch web, single 3.5 mm strand 5 inch web, and single 3.5 mm strand 4 ½ inch web (Figure 6). The intermediate sections were constructed from single 4.5 mm strand 4½ inch web (Figure 7). All web in the main body and lengthening pieces was constructed from a compacted strand braided polyethylene (Euroline Premium). The codend was constructed from double 5 mm strand 4 inch regular braided polyethylene web with a ½ inch 210/20 knotless nylon liner (Figure 7).

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

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

SCHEDULE

The survey was split into three sections or "legs" of seven to nine days in duration with six or seven science staff on each leg and two science crew changes.

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 20 minutes had elapsed, net haul back was initiated. Although the target on-bottom time was 20 minutes, tows that were at least 15 minutes in 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 2000 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 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 was commercially exploited. Biological samples were typically not collected from unusable tows.

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

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

There are a variety of hard parts of a fish that can be used to determine its age (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 elongatus*) 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 2016, heads were collected from Sablefish (*Anoplopoma fimbria*), otoliths from Lingcod (*Ophiodon elongatus*), genetic tissue from Eulachon (*Thaleichthys pacificus*), Yelloweye (*Sebastes ruberrimus*) and Quillback Rockfish (*Sebastes maliger*), as well as tissue for DNA analysis from 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 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, starting in the fall of 2010, the catch for all surveys was simply recorded as *S. aleutianus*. Then, for every catch, biological samples were collected 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 can then be partitioned into the two species using either the visual assessment or the results of genetic analyses. We did not attempt to partition the catch data for this report.

NET-MOUNTED SENSORS AND DATA RECORDERS

The W.E. Ricker was equipped with a Notus net mensuration system (a Simrad ITI system was used prior to 2013). Sensors attached to the net used acoustic signals to communicate with each other and the vessel and provided real-time net geometry including headline height and depth, as well as doorspread and wingspread which were

used to calculate swept area. The 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) 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. 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 2016 WCVI synoptic bottom trawl survey was divided into three legs of seven to nine days each. From a total of 23 allotted survey days, two half days were required for travel and gear loading/unloading at the start and end of the survey, one full day and one partial day for science crew changes and two half days for vessel crew changes were required (Table 4).

The initial plan was to assess 207 blocks based on 9 blocks per day and 23 fishing days. The total secondary set of 69 blocks was added, although 31 blocks remained unassessed and not visited at the end of the survey (Table 5).

From the target of 207 blocks, 31 blocks were left un-inspected and un-fished due to time constraints at the end of the survey. Of the 176 assessed blocks, 140 were successfully fished, four were rejected based on the fishing master's prior knowledge, 29 were rejected based on on-ground inspections, and three blocks were rejected after one or more failed fishing attempts (Table 5 and Figure 9).

A total of 147 tows, of which 140 were useable, were completed during the 21 days that fishing occurred. Table 6 shows tow results by stratum for this survey. Seven 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 2016 is shown in Table 7 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 125,192 kg of fish and invertebrates was caught during the 2016 WCVI survey. The total catch weight for tows was typically less than 1000 kg per tow and averaged 852 kg per tow (Figure 11). The majority of the catch (124,690 kg, 99.6%) consisted of 109 different species of fish, including 29 rockfish and 14 flatfish species. The remainder (502 kg) consisted of 110 invertebrate groups. The average number of species identified in useable tows was 28 and ranged from 14 to 43 per tow (Figure 12). The frequency of occurrence, maximum catch weight, mean catch weight per tow, and total survey catch weight of each species are shown in Table 8. Of the fish species caught, Arrowtooth Flounder (*Atheresthes stomias*) was the most dominant by weight, followed by Splitnose Rockfish (*Sebastes diploproa*), Pacific Ocean Perch (*Sebastes alutus*), Redstripe Rockfish (*Sebastes proriger*), and Sharpchin Rockfish (*Sebastes zacentrus*). 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 33,948 individuals of 51 species of fish. The number of samples and recorded biological attributes per species is shown in Table 9. A summary of the biological data collected for each species is shown in Table 10.

NET-MOUNTED SENSORS AND DATA RECORDERS

Notus net depth, door spread and headrope to bottom distance information were collected from 108, 146 and from 140 tows respectively (Table 11).

Seabird SBE39 data (water temperature and depth) were collected from 141 tows while Seabird SBE19plus and SBE43 data (conductivity, water temperature, depth and dissolved oxygen) were collected from 135 tows (Table 11 and Figure 14).

Bottom contact sensor (BCS) data were collected from 147 tows (Table 11). An example of data collected by the BCS is shown in Figure 14.

Global positioning system (GPS) data and Simrad bottom sounder data are available for all 147 tows.

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Table 1. The 2016 WCVI synoptic bottom trawl survey design showing block allocation per stratum based on the target allocation and the combined predicted failure and revisit rates (predicted adjustment).

Depth Stratum (m)	Target Allocation	Target Tows	Predicted Adjustment	Total Block Allocation	Primary Set	Secondary Set
50-125	0.37	61	0.27	84	56	28
125-200	0.32	53	0.17	64	43	21
200-330	0.18	30	0.09	33	22	11
330-500	0.13	21	0.19	26	17	9
Total	**1.00**	**165**		**207**	**138**	**69**

Table 2. Atlantic Western IIa box trawl net specifications for the 2016 WCVI synoptic bottom trawl survey.

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

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

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

Table 4. Summary of operations during the 2016 WCVI synoptic bottom trawl survey.

	Fishing				Tows			
Date	Start	End	Hours	Blocks Assessed	Useable	Not Useable	Total	Notes
05/24/2016	-	-	-	-	-	-	-	travel
05/25/2016	15:29	18:14	3	2	2	0	2	
05/26/2016	7:31	19:06	12	10	8	0	8	
05/27/2016	7:16	11:32	4	4	4	0	4	half day unplanned vessel crew change
05/28/2016	8:07	19:23	11	11	9	1	10	
05/29/2016	7:46	18:02	11	11	5	1	6	
05/30/2016	7:15	19:17	12	9	9	0	9	
05/31/2016	7:18	18:13	11	10	8	1	9	
06/01/2016	7:24	12:50	5	6	4	0	4	science crew change
06/02/2016	7:19	17:57	10	8	7	1	8	
06/03/2016	7:10	19:01	12	10	8	0	8	
06/04/2016	8:17	15:30	7	8	5	0	5	half day unplanned vessel crew change
06/05/2016	7:16	18:21	11	9	8	0	8	
06/06/2016	7:16	18:44	11	10	9	0	9	
06/07/2016	7:41	18:16	11	15	8	0	8	
06/08/2016	7:16	19:35	12	13	6	1	7	
06/09/2016	-	-	-	-	-	-	-	science crew change
06/10/2016	7:18	19:01	12	10	7	0	7	
06/11/2016	7:16	17:04	10	9	6	1	7	
06/12/2016	7:20	17:57	10	9	7	0	7	
06/13/2016	7:10	16:18	9	6	6	0	6	
06/14/2016	7:32	18:56	11	9	8	1	9	
06/15/2016	7:41	15:32	8	-	6	0	6	half day travel
Total				**179**	**147**	**6**	**153**	
Average Per Day				**8.9**	**6.6**	**0.4**	**6.9**	

Table 5. Block results by stratum for the 2016 WCVI synoptic bottom trawl survey.

Depth Stratum (m)	Primary Set	Secondary Set	Successful	Rejected Prior	Rejected Inspected	Rejected Failed	Not Rejected Failed	Not Assessed	Total
50-125	56	28	54	2	15	0	0	13	84
125-200	43	21	41	2	8	2	0	11	64
200-330	22	11	26	0	2	1	0	4	33
330-500	17	9	19	2	4	0	0	3	26
Total	**138**	**69**	**140**	**4**	**29**	**3**	**0**	**31**	**207**

Table 6. Tow results by stratum for the 2016 WCVI synoptic bottom trawl survey.

Depth Stratum (m)	Useable	Not Useable
50-125	54	2
125-200	41	3
200-330	26	2
330-500	19	0
Total	**140**	**7**

Table 7. Mean warp length and scope by 50 meter depth interval for the 2016 WCVI synoptic bottom trawl survey.

Depth (m)	Mean Warp (m)	Mean Scope
0-50	175	3.67
50-100	231	3.18
100-150	346	2.78
150-200	471	2.71
200-250	608	2.80
250-300	700	2.64
300-350	828	2.47
350-400	892	2.41
400-450	883	2.10
450-500	1100	2.34

Table 8. Frequency of occurrence, maximum catch weight, mean catch weight per tow, and total survey catch weight of each species captured during the 2016 WCVI 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**				
Greenstriped Rockfish	*Sebastes elongatus*	80	149.07	26.23	2098.02
Yellowtail Rockfish	*Sebastes flavidus*	70	2054.28	86.50	6055.25
Pacific Ocean Perch	*Sebastes alutus*	60	1252.85	178.46	10529.21
Canary Rockfish	*Sebastes pinniger*	60	677.62	59.86	3591.82
Redbanded Rockfish	*Sebastes babcocki*	57	109.89	10.93	612.06
Silvergray Rockfish	*Sebastes brevispinis*	49	181.48	25.53	1251.19
Sharpchin Rockfish	*Sebastes zacentrus*	48	861.49	146.66	6893.09
Redstripe Rockfish	*Sebastes proriger*	47	1627.57	206.46	9703.73
Rosethorn Rockfish	*Sebastes helvomaculatus*	46	35.14	7.95	365.51
Shortspine Thornyhead	*Sebastolobus alascanus*	41	157.46	36.8	1508.69
Rougheye Rockfish	*Sebastes aleutianus*	37	621.18	49.32	1824.89
Darkblotched Rockfish	*Sebastes crameri*	31	89.88	12.62	378.53
Splitnose Rockfish	*Sebastes diploproa*	31	2198.56	396.32	11493.24
Pygmy Rockfish	*Sebastes wilsoni*	27	24.16	3.44	92.86
Rockfishes	*Sebastes (Genus)*	24	1.44	0.52	1.56
Yelloweye Rockfish	*Sebastes ruberrimus*	23	22.10	8.39	192.87
Widow Rockfish	*Sebastes entomelas*	14	19.56	3.18	44.57
Quillback Rockfish	*Sebastes maliger*	9	13.12	6.22	55.96
Bocaccio	*Sebastes paucispinis*	8	17.10	6.16	49.31
Shortbelly Rockfish	*Sebastes jordani*	8	130.7	18.79	150.33
Aurora Rockfish	*Sebastes aurora*	8	35.16	5.18	41.46
Yellowmouth Rockfish	*Sebastes reedi*	8	197.57	40.32	322.55
Stripetail Rockfish	*Sebastes saxicola*	7	2.60	0.96	6.75
Shortraker Rockfish	*Sebastes borealis*	5	32.70	13.13	65.64
Harlequin Rockfish	*Sebastes variegatus*	4	0.38	0.31	0.94
Puget Sound Rockfish	*Sebastes emphaeus*	3	40.54	16.12	48.35
Copper Rockfish	*Sebastes caurinus*	2	6.65	3.69	7.37
Greenspotted Rockfish	*Sebastes chlorostictus*	2	1.59	1.31	2.63
Bank Rockfish	*Sebastes rufus*	1	0.96	0.96	0.96
Flatfishes	**Order Pleuronectiformes**				
Rex Sole	*Glyptocephalus zachirus*	136	189.19	44.22	6014.13
Arrowtooth Flounder	*Atheresthes stomias*	130	2878.13	157.73	20505.27
Dover Sole	*Microstomus pacificus*	127	201.02	32.49	4125.90
Slender Sole	*Lyopsetta exilis*	109	27.86	2.92	315.42
Pacific Halibut	*Hippoglossus stenolepis*	97	172.16	16.50	1600.84
Petrale Sole	*Eopsetta jordani*	93	298.48	15.94	1466.81
English Sole	*Parophrys vetulus*	90	359.10	25.31	2277.53
Flathead Sole	*Hippoglossoides elassodon*	60	217.81	30.78	1846.66
Pacific Sanddab	*Citharichthys sordidus*	52	198.76	21.73	1129.78
Southern Rock Sole	*Lepidopsetta bilineata*	35	105.50	14.84	519.46
Curlfin Sole	*Pleuronichthys decurrens*	18	11.52	2.18	39.28
Butter Sole	*Isopsetta isolepis*	5	0.29	0.15	0.75
Sand Sole	*Psettichthys melanostictus*	4	14.19	4.61	18.43
Starry Flounder	*Platichthys stellatus*	1	2.81	2.81	2.81
Cod-Like Fishes	**Order Gadiformes**				
Pacific Cod	*Gadus macrocephalus*	101	285.04	28.91	2920.19
Pacific Hake	*Merluccius productus*	86	505.04	41.84	3514.33

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Walleye Pollock	*Gadus chalcogrammus*	56	70.74	5.03	276.48
Pacific Tomcod	*Microgadus proximus*	11	10.47	2.62	26.24
Giant Grenadier	*Albatrossia pectoralis*	1	1.82	1.82	1.82
Threadfin Grenadier	*Coryphaenoides filifer*	1	0.94	0.94	0.94
Cartilaginous Fish	**Class Chondrichthyes**				
Spotted Ratfish	*Hydrolagus colliei*	134	854.16	20.47	2742.74
North Pacific Spiny Dogfish	*Squalus suckleyi*	107	885.50	55.09	5894.12
Longnose Skate	*Raja rhina*	62	37.28	10.35	641.50
Sandpaper Skate	*Bathyraja interrupta*	21	2.48	1.29	27.11
Big Skate	*Beringraja binoculata*	19	50.44	15.96	303.32
Brown Cat Shark	*Apristurus brunneus*	7	12.98	2.90	20.31
Alaska Skate	*Bathyraja parmifera*	1	0.56	0.56	0.56
Greenlings	**Family Hexagrammidae**				
Lingcod	*Ophiodon elongatus*	83	286.36	21.25	1763.69
Kelp Greenling	*Hexagrammos decagrammus*	12	6.68	2.50	30.04
Sculpins	**Family Cottidae**				
Threadfin Sculpin	*Icelinus filamentosus*	47	10.96	1.17	48.15
Slim Sculpin	*Radulinus asprellus*	38	0.16	0.11	0.34
Roughspine Sculpin	*Triglops macellus*	6	0.16	0.11	0.21
Darkfin Sculpin	*Malacocottus zonurus*	6	0.92	0.52	1.03
Blackfin Sculpin	*Malacocottus kincaidi*	2	0.62	0.62	0.62
Northern Sculpin	*Icelinus borealis*	2	-	-	-
Brown Irish Lord	*Hemilepidotus spinosus*	1	0.29	0.29	0.29
Darter Sculpin	*Radulinus boleoides*	1	-	-	-
Tadpole Sculpin	*Psychrolutes paradoxus*	1	-	-	-
Soft Sculpin	*Psychrolutes sigalutes*	1	-	-	-
Eelpouts	**Family Zoarcidae**				
Blackbelly Eelpout	*Lycodes pacificus*	56	20.00	2.48	111.61
Bigfin Eelpout	*Lycodes cortezianus*	27	5.22	1.99	49.81
Black Eelpout	*Lycodes diapterus*	18	3.28	0.94	10.39
Pallid Eelpout	*Lycodapus mandibularis*	2	-	-	-
Eelpout	*Lycenchelys* (Genus)	1	0.58	0.58	0.58
Poachers	**Family Agonidae**				
Smootheye Poacher	*Xeneretmus leiops*	15	0.33	0.14	0.81
Bigeye Poacher	*Bathyagonus pentacanthus*	12	0.20	0.13	0.52
Blackfin Poacher	*Bathyagonus nigripinnis*	7	-	-	-
Poachers	Agonidae (Family)	4	-	-	-
Sturgeon Poacher	*Podothecus accipenserinus*	2	0.58	0.36	0.72
Northern Spearnose Poacher	*Agonopsis vulsa*	2	0.16	0.16	0.16
Pygmy Poacher	*Odontopyxis trispinosa*	2	-	-	-
Lanternfishes	**Family Myctophidae**				
Lanternfishes	Myctophidae (Family)	2	-	-	-
Lanternfish	*Tarletonbeania* (Genus)	2	-	-	-
Garnet Lanternfish	*Stenobrachius nannochir*	2	-	-	-
Pinpoint Lampfish	*Nannobrachium regale*	1	0.13	0.13	0.13
California Headlightfish	*Diaphus theta*	1	-	-	-
Other Fish					
Sablefish	*Anoplopoma fimbria*	106	921.78	83.26	8825.27
Eulachon	*Thaleichthys pacificus*	48	15.84	1.89	87.05
Pacific Herring	*Clupea pallasii*	38	0.96	0.30	11.14
American Shad	*Alosa sapidissima*	28	7.46	1.62	45.45
Northern Ronquil	*Ronquilus jordani*	24	0.54	0.19	3.21
Chinook Salmon	*Oncorhynchus tshawytscha*	12	7.73	2.81	33.75
Pacific Lamprey	*Entosphenus tridentatus*	12	0.22	0.07	0.46

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Shiner Perch	*Cymatogaster aggregata*	8	0.26	0.16	0.81
Whitebarred Prickleback	*Poroclinus rothrocki*	5	-	-	-
Black Hagfish	*Eptatretus deani*	3	0.41	0.28	0.85
Jack Mackerel	*Trachurus symmetricus*	2	0.27	0.20	0.40
Snailfishes	Liparidae (Family)	2	0.14	0.14	0.14
Pacific Sand Lance	*Ammodytes personatus*	2	-	-	-
Pacific Viperfish	*Chauliodus macouni*	2	-	-	-
Shining Tubeshoulder	*Sagamichthys abei*	2	-	-	-
Green Sturgeon	*Acipenser medirostris*	1	18.79	18.79	18.79
Wolf Eel	*Anarrhichthys ocellatus*	1	4.23	4.23	4.23
Pile Perch	*Rhacochilus vacca*	1	3.80	3.80	3.80
Mackerels And Tunas	Scombridae (Family)	1	0.36	0.36	0.36
Snake Prickleback	*Lumpenus sagitta*	1	0.15	0.15	0.15
Pacific Pompano	*Peprilus simillimus*	1	0.06	0.06	0.06
Pink Snailfish	*Paraliparis rosaceus*	1	-	-	-
Showy Snailfish	*Liparis pulchellus*	1	-	-	-
Tubeshoulders	Platytroctidae (Family)	1	-	-	-
Crabs and Shrimp	**Class Malacostraca**				
Pink Shrimp (smooth)	*Pandalus jordani*	52	104.03	6.8	170.01
Prawn	*Pandalus platyceros*	34	2.00	0.61	17.67
Crangons	*Crangon* (Genus)	33	-	-	-
Sidestripe Shrimp	*Pandalopsis dispar*	19	0.25	0.19	0.95
Brown Box Crab	*Lopholithodes foraminatus*	13	2.34	1.11	12.17
Pink Shrimp	*Pandalus borealis*	13	3.28	0.94	4.71
Spike Shrimp (horned Shrimp)	*Paracrangon echinata*	13	-	-	-
Isopods	Isopoda (Order)	11	-	-	-
Dungeness Crab	*Metacarcinus magister*	7	7.71	1.97	11.80
Decorator Crabs	*Oregonia* (Genus)	6	-	-	-
Graceful Decorator Crab	*Oregonia gracilis*	4	-	-	-
Right-handed Hermits	Paguridae (Family)	4	-	-	-
Glass Shrimp	*Pasiphaea pacifica*	4	-	-	-
-	*Argis* (Genus)	4	-	-	-
Cancer Crabs	Cancridae (Family)	3	-	-	-
Nelson's Argid	*Argis levior*	2	-	-	-
Large Eyed Eualid	*Eualus macropthalmus*	2	-	-	-
Tanner Crabs	*Chionoecetes* (Genus)	1	-	-	-
Inshore Tanner Crab	*Chionoecetes bairdi*	1	-	-	-
Graceful Crab	*Cancer gracilis*	1	-	-	-
Left-handed Hermits	Diogenidae (Family)	1	-	-	-
-	Paguroidea (Super Family)	1	-	-	-
Common Two-spined Crangon	*Neocrangon communis*	1	-	-	-
Shrimp	Dendrobranchiata (Sub Order)	1	-	-	-
Sea Stars	**Class Asteroidea**				
Sand Star	*Luidia foliolata*	25	0.60	0.27	1.61
Fish-eating Star	*Stylasterias forreri*	19	2.25	0.47	4.27
Mud Star	*Ctenodiscus crispatus*	18	0.58	0.25	0.74
Vermillion Starfish	*Mediaster aequalis*	15	0.24	0.13	0.66
Spiny Red Sea Star	*Hippasteria spinosa*	14	4.89	0.93	7.43
Cushion Star	*Pteraster tesselatus*	14	0.30	0.30	0.30
Rose Starfish	*Crossaster papposus*	12	-	-	-
-	*Henricia* (Genus)	9	-	-	-
-	*Poraniopsis inflatus inflatus*	8	0.94	0.38	1.53
Morning Sun Starfish	*Solaster dawsoni*	4	0.80	0.50	1.00
Long-armed Sea Star	*Orthasterias koehleri*	4	0.16	0.16	0.16

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Sunflower Starfish	*Pycnopodia helianthoides*	3	1.20	1.20	1.20
-	Solasteridae (Family)	3	-	-	-
Starfish	Asteroidea (Class)	3	-	-	-
-	Goniasteridae (Family)	2	-	-	-
Striped Sun Starfish	*Solaster stimpsoni*	1	0.21	0.21	0.21
-	*Pteraster* (Genus)	1	0.20	0.20	0.20
-	*Cheiraster* (Genus)	1	-	-	-
-	*Hippasteria* (Genus)	1	-	-	-
-	*Gephyreaster swifti*	1	-	-	-
-	Poraniidae (Family)	1	-	-	-
-	*Solaster* (Genus)	1	-	-	-
-	*Diplopteraster multipes*	1	-	-	-
Winged Sea Star	*Pteraster militaris*	1	-	-	-
-	*Pycnopodia* (Genus)	1	-	-	-
Brittle Stars	**Class Ophiuroidea**				
-	*Ophiura* (Genus)	33	0.56	0.26	2.10
Basket Star	*Gorgonocephalus eucnemis*	17	0.66	0.25	2.24
-	*Ophiura sarsi*	6	-	-	-
Sea Cucumbers	**Class Holothuroidea**				
Whitespotted Sea Cucumber	*Parastichopus leukothele*	49	2.86	0.59	20.76
Giant Red Sea Cucumber	*Parastichopus californicus*	12	3.22	1.43	14.26
Sea Cucumbers	Holothuroidea (Class)	10	3.42	2.04	4.08
Soft Sea Cucumber	*Pseudostichopus mollis*	8	0.70	0.24	1.68
Peppered Sea Cucumber	*Cucumaria piperata*	6	-	-	-
Armoured Sea Cucumber	*Psolus chitinoides*	2	-	-	-
-	*Pentamera* (Genus)	1	-	-	-
Papillose Sea Cucumber	*Synallactes challengeri*	1	-	-	-
Octopuses and Squid	**Class Cephalopoda**				
Pacific Bobtail Squid	*Rossia pacifica*	33	0.06	0.04	0.13
Opalescent Inshore Squid	*Doryteuthis opalescens*	18	4.55	0.60	6.58
Schoolmaster Gonate Squid	*Berryteuthis magister*	16	6.35	1.93	30.88
Octopus	*Octopus* (Genus)	2	2.30	2.30	2.30
Smoothskin Octopus	*Benthoctopus leioderma*	2	-	-	-
Robust Clubhook Squid	*Moroteuthis robusta*	1	15.74	15.74	15.74
Giant Pacific Octopus	*Enteroctopus dofleini*	1	6.85	6.85	6.85
Sea Urchins	**Super Order Echinacea**				
Fragile Urchin	*Allocentrotus fragilis*	84	5.67	1.00	54.78
Pallid Urchin	*Strongylocentrotus pallidus*	11	0.88	0.38	1.89
Jellyfish	**Phylum Cnidaria**				
Jellyfish	Scyphozoa (Class)	26	1.38	0.59	4.70
Lions Mane	*Cyanea capillata*	15	2.00	0.59	7.63
Sea Nettle	*Chrysaora quinquecirrha*	6	2.83	1.22	6.08
-	*Chrysaora* (Genus)	1	3.40	3.40	3.40
Anenomes and Corals	**Class Anthozoa**				
Anemone	Actiniaria (Order)	39	6.48	2.21	50.78
Sea Whip	*Balticina septentrionalis*	35	1.58	0.25	2.78
Sea Pen	*Ptilosarcus gurneyi*	3	-	-	-
-	*Metridium* (Genus)	2	4.13	3.15	6.29
Snails and Slugs	**Class Gastropoda**				
Oregontriton	*Fusitriton oregonensis*	18	0.44	0.19	1.52
Seaslugs	Nudibranchia (Order)	13	0.09	0.07	0.14
Whelks	Buccinidae (Family)	11	0.11	0.11	0.11
California Armina	*Armina californica*	9	0.14	0.08	0.15
Rosy Tritonia	*Tritonia diomedea*	6	0.24	0.23	0.46

Common Name	Scientific Name	Number of Tows	Catch Weight (kg)		
			Max	Mean	Total
Gastropods	Gastropoda (Class)	5	-	-	-
-	*Carinaria cristata*	2	-	-	-
Lewis Moonsnail	*Euspira lewisii*	1	0.52	0.52	0.52
-	*Tritonia* (Genus)	1	-	-	-
-	Tritoniidae (Family)	1	-	-	-
Topshells	Trochidae (Family)	1	-	-	-
Other Invertebrate Species					
Sponges	Porifera (Phylum)	18	8.32	2.1	25.26
Heart Urchin	*Brisaster latifrons*	15	0.73	0.40	2.41
Water Jellyfish	*Aequorea victoria*	14	0.81	0.45	1.36
Sea Mouse	*Aphrodita* (Genus)	9	0.36	0.22	0.44
-	Ctenophora (Phylum)	7	-	-	-
Spiny Scallop	*Chlamys hastata*	6	0.05	0.05	0.05
Lampshells	Brachiopoda (Phylum)	6	-	-	-
Salps	Thaliacea (Class)	6	-	-	-
Pink Scallop, (aka Reddish Scallop)	*Chlamys rubida*	5	0.14	0.14	0.14
Molluscs	Mollusca (Phylum)	4	-	-	-
Peanutworms	Sipuncula (Phylum)	3	-	-	-
-	Antedonidae (Family)	2	-	-	-
-	*Suberites* (Genus)	2	-	-	-
-	Tunicata (Sub Phylum)	2	-	-	-
Polychaete Worms	Polychaeta (Class)	1	-	-	-
Tube Worms	Sedentaria (Sub Class)	1	-	-	-
-	*Suberites domuncula latus*	1	-	-	-
-	Opheliidae (Family)	1	-	-	-
Proboscis Worm	Nemertea (Phylum)	1	-	-	-
-	*Thetys* (Genus)	1	-	-	-
-	Echiura (Phylum)	1	-	-	-

Table 9. Species sampled during the 2016 WCVI synoptic bottom trawl survey. The number of samples and recorded biological attributes are shown for each species.

		Number of	Number of Recorded Biological Attributes				
Common Name	**Scientific Name**	**Samples**	**Length**	**Weight**	**Sex**	**Maturity**	**Age**
Alaska Skate	*Bathyraja parmifera*	1	1	0	1	0	0
Arrowtooth Flounder	*Atheresthes stomias*	97	2491	411	2491	411	411
Aurora Rockfish	*Sebastes aurora*	1	29	0	29	0	0
Big Skate	*Beringraja binoculata*	19	32	0	32	0	0
Bocaccio	*Sebastes paucispinis*	8	17	17	17	17	17
Brown Cat Shark	*Apristurus brunneus*	5	41	0	41	0	0
Canary Rockfish	*Sebastes pinniger*	30	531	427	531	422	422
Curlfin Sole	*Pleuronichthys decurrens*	8	84	0	69	0	0
Darkblotched Rockfish	*Sebastes crameri*	12	256	0	256	0	0
Dover Sole	*Microstomus pacificus*	89	2451	852	2451	854	852
English Sole	*Parophrys vetulus*	55	1574	663	1573	662	663
Eulachon	*Thaleichthys pacificus*	37	1246	0	0	0	0
Flathead Sole	*Hippoglossoides elassodon*	41	1146	0	1146	0	0
Green Sturgeon	*Acipenser medirostris*	1	1	0	0	0	0
Greenstriped Rockfish	*Sebastes elongatus*	42	1280	0	1280	0	0
Kelp Greenling	*Hexagrammos decagrammus*	3	39	0	39	0	0
Lingcod	*Ophiodon elongatus*	50	355	299	343	296	323
Longnose Skate	*Raja rhina*	61	159	0	157	0	0
North Pacific Spiny Dogfish	*Squalus suckleyi*	57	1006	310	1006	310	266
Pacific Cod	*Gadus macrocephalus*	62	971	839	971	837	839
Pacific Hake	*Merluccius productus*	51	1174	141	1175	141	141
Pacific Halibut	*Hippoglossus stenolepis*	92	314	0	168	0	0
Pacific Ocean Perch	*Sebastes alutus*	44	1236	846	1236	846	846
Pacific Sanddab	*Citharichthys sordidus*	37	1336	0	1336	0	0
Pacific Tomcod	*Microgadus proximus*	4	176	0	176	0	0
Petrale Sole	*Eopsetta jordani*	48	747	618	747	618	615
Puget Sound Rockfish	*Sebastes emphaeus*	2	50	50	50	50	50
Pygmy Rockfish	*Sebastes wilsoni*	13	327	0	327	0	0
Quillback Rockfish	*Sebastes maliger*	8	46	46	46	46	46
Redbanded Rockfish	*Sebastes babcocki*	37	484	484	484	484	484
Redstripe Rockfish	*Sebastes proriger*	28	765	373	765	393	393
Rex Sole	*Glyptocephalus zachirus*	118	3698	291	3699	291	231
Rosethorn Rockfish	*Sebastes helvomaculatus*	29	661	0	658	0	0
Rougheye Rockfish	*Sebastes aleutianus*	34	379	379	379	379	379
Sablefish	*Anoplopoma fimbria*	91	1705	432	1705	432	2
Sandpaper Skate	*Bathyraja interrupta*	21	27	0	27	0	0
Sharpchin Rockfish	*Sebastes zacentrus*	37	1058	0	1057	0	0
Shortbelly Rockfish	*Sebastes jordani*	3	75	0	75	0	0
Shortraker Rockfish	Sebastes borealis	5	11	11	11	11	11
Shortspine Thornyhead	*Sebastolobus alascanus*	35	1061	129	1050	0	102
Silvergray Rockfish	*Sebastes brevispinis*	16	302	137	302	137	137
Slender Sole	*Lyopsetta exilis*	58	1444	0	1444	0	0
Southern Rock Sole	*Lepidopsetta bilineata*	21	528	271	528	271	271
Splitnose Rockfish	*Sebastes diploproa*	23	598	394	598	394	301
Spotted Ratfish	*Hydrolagus colliei*	23	792	0	792	0	0
Stripetail Rockfish	*Sebastes saxicola*	2	27	0	27	0	0
Walleye Pollock	*Gadus chalcogrammus*	20	459	26	459	26	26
Wolf Eel	*Anarrhichthys ocellatus*	1	1	0	0	0	0
Yelloweye Rockfish	*Sebastes ruberrimus*	22	63	63	63	63	63
Yellowmouth Rockfish	*Sebastes reedi*	2	20	0	20	0	0
Yellowtail Rockfish	*Sebastes flavidus*	37	674	251	674	218	218
	Total	**1641**	**33948**	**8760**	**32511**	**8609**	**8109**

Table 10. Summary of biological data collected during the 2016 WCVI 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**
Alaska Skate	*Bathyraja parmifera*	1	1	Total	42	42	42	-	-	-	1.00
Arrowtooth Flounder	*Atheresthes stomias*	97	2491	Fork	12	74	45	0.1	2.3	1.0	0.59
Aurora Rockfish	*Sebastes aurora*	1	29	Fork	15	41	32	-	-	-	0.41
Big Skate	*Beringraja binoculata*	19	32	Total	12	183	92	-	-	-	0.53
Bocaccio	*Sebastes paucispinis*	8	17	Fork	27	74	58	0.2	5.1	2.9	0.35
Brown Cat Shark	*Apristurus brunneus*	5	41	Total	36	60	44	-	-	-	0.49
Canary Rockfish	*Sebastes pinniger*	30	531	Fork	14	61	44	<0.1	3.4	1.5	0.47
Curlfin Sole	*Pleuronichthys decurrens*	8	84	Total	15	41	28	-	-	-	0.46
Darkblotched Rockfish	*Sebastes crameri*	12	256	Fork	16	53	35	-	-	-	0.43
Dover Sole	*Microstomus pacificus*	89	2451	Total	15	88	34	<0.1	2.5	0.5	0.40
English Sole	*Parophrys vetulus*	55	1574	Total	13	46	31	<0.1	1.0	0.3	0.77
Eulachon	*Thaleichthys pacificus*	37	1246	Standard	8	22	14	-	-	-	-
Flathead Sole	*Hippoglossoides elassodon*	41	1146	Total	8	41	29	-	-	-	0.62
Green Sturgeon	*Acipenser medirostris*	1	1	Total	160	160	160	-	-	-	-
Greenstriped Rockfish	*Sebastes elongatus*	42	1280	Fork	12	40	27	-	-	-	0.53
Kelp Greenling	*Hexagrammos decagrammus*	3	39	Fork	22	41	31	-	-	-	0.51
Lingcod	*Ophiodon elongatus*	50	355	Fork	35	104	68	0.3	13.7	3.2	0.59
Longnose Skate	*Raja rhina*	61	159	Total	5	143	78	-	-	-	0.50
North Pacific Spiny Dogfish	*Squalus suckleyi*	57	1006	Total	38	116	71	0.2	7.1	1.8	0.46
Pacific Cod	*Gadus macrocephalus*	62	971	Fork	26	83	53	0.3	5.6	1.8	0.55
Pacific Hake	*Merluccius productus*	51	1174	Fork	15	73	47	0.4	1.8	0.8	0.68
Pacific Halibut	*Hippoglossus stenolepis*	92	314	Fork	8	135	73	-	-	-	0.39
Pacific Ocean Perch	*Sebastes alutus*	44	1236	Fork	14	51	33	0.1	1.7	0.7	0.49
Pacific Sanddab	*Citharichthys sordidus*	37	1336	Total	6	34	22	-	-	-	0.52
Pacific Tomcod	*Microgadus proximus*	4	176	Fork	13	101	18	-	-	-	0.50
Petrale Sole	*Eopsetta jordani*	48	747	Total	21	57	40	0.1	2.3	0.9	0.64
Puget Sound Rockfish	*Sebastes emphaeus*	2	50	Fork	12	19	15	<0.1	0.1	<0.1	0.74
Pygmy Rockfish	*Sebastes wilsoni*	13	327	Fork	10	25	17	-	-	-	0.67
Quillback Rockfish	*Sebastes maliger*	8	46	Fork	16	44	37	0.1	1.9	1.2	0.41
Redbanded Rockfish	*Sebastes babcocki*	37	484	Fork	8	57	34	<0.1	3.5	0.8	0.47
Redstripe Rockfish	*Sebastes proriger*	28	765	Fork	15	42	29	<0.1	1.1	0.4	0.55

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
Rex Sole	*Glyptocephalus zachirus*	118	3698	Total	4	50	30	<0.1	0.5	0.2	0.49
Rosethorn Rockfish	*Sebastes helvomaculatus*	29	661	Fork	11	34	23	-	-	-	0.53
Rougheye Rockfish	*Sebastes aleutianus*	34	379	Fork	14	59	45	<0.1	3.3	1.6	0.45
Sablefish	*Anoplopoma fimbria*	91	1705	Fork	32	87	50	0.3	8.1	1.9	0.45
Sandpaper Skate	*Bathyraja interrupta*	21	27	Total	25	75	53	-	-	-	0.33
Sharpchin Rockfish	*Sebastes zacentrus*	37	1058	Fork	11	39	25	-	-	-	0.54
Shortbelly Rockfish	*Sebastes jordani*	3	75	Fork	14	29	20	-	-	-	0.49
Shortraker Rockfish	*Sebastes borealis*	5	11	Fork	54	94	69	2.6	12.8	5.9	0.55
Shortspine Thornyhead	*Sebastolobus alascanus*	35	1061	Total	6	50	23	<0.1	0.7	0.2	0.45
Silvergray Rockfish	*Sebastes brevispinis*	16	302	Fork	37	63	49	0.9	3.9	1.6	0.30
Slender Sole	*Lyopsetta exilis*	58	1444	Total	8	33	23	-	-	-	0.56
Southern Rock Sole	*Lepidopsetta bilineata*	21	528	Total	11	44	29	<0.1	1.4	0.3	0.68
Splitnose Rockfish	*Sebastes diploproa*	23	598	Fork	8	41	23	<0.1	1.1	0.3	0.43
Spotted Ratfish	*Hydrolagus colliei*	23	792	2nd Dorsal	10	51	32	-	-	-	0.52
Stripetail Rockfish	*Sebastes saxicola*	2	27	Fork	16	29	22	-	-	-	0.48
Walleye Pollock	*Gadus chalcogrammus*	20	459	Fork	15	55	25	0.1	0.5	0.3	0.50
Wolf Eel	*Anarrhichthys ocellatus*	1	1	Total	147	147	147	-	-	-	-
Yelloweye Rockfish	*Sebastes ruberrimus*	22	63	Fork	13	68	51	<0.1	6.7	3.0	0.62
Yellowmouth Rockfish	*Sebastes reedi*	2	20	Fork	36	50	44	-	-	-	0.45
Yellowtail Rockfish	*Sebastes flavidus*	37	674	Fork	10	57	42	0.2	2.9	1.3	0.45

Table 11. Summary of data from net-mounted recorders during the 2016 WCVI synoptic bottom trawl survey, showing the number of tows and total number of records. A total of 147 survey tows were conducted, of which 140 were useable.

		Number of	
Data Recorder	**Attribute**	**Tows**	**Records**
Hobo Pendant Acceleration Data Logger	Trawl Net Angle	147	63942
Notus Net Sensors	Net Depth	108	17126
	Trawl Net Doorspread	146	26279
	Trawl Net Headrope To Bottom Distance	140	23737
Seabird Sbe19plus Seacat Profiler S/N 5130	Conductivity of sea water (S/m)	135	27529
	Depth (m)	135	27529
	Oxygen voltage (V)	135	27529
	Salinity (PSU)	135	27529
	Pressure (db)	135	27529
	Water temperature (^{o}C)	135	27529
Seabird SBE43	Dissolved oxygen (ml/L)	135	27529
Seabird SBE39 Temperature And Pressure Recorder	Water temperature (^{o}C)	141	61450
	Depth (m)	141	61450
Simrad Es70 Depth Sounder	Depth (m)	147	177156

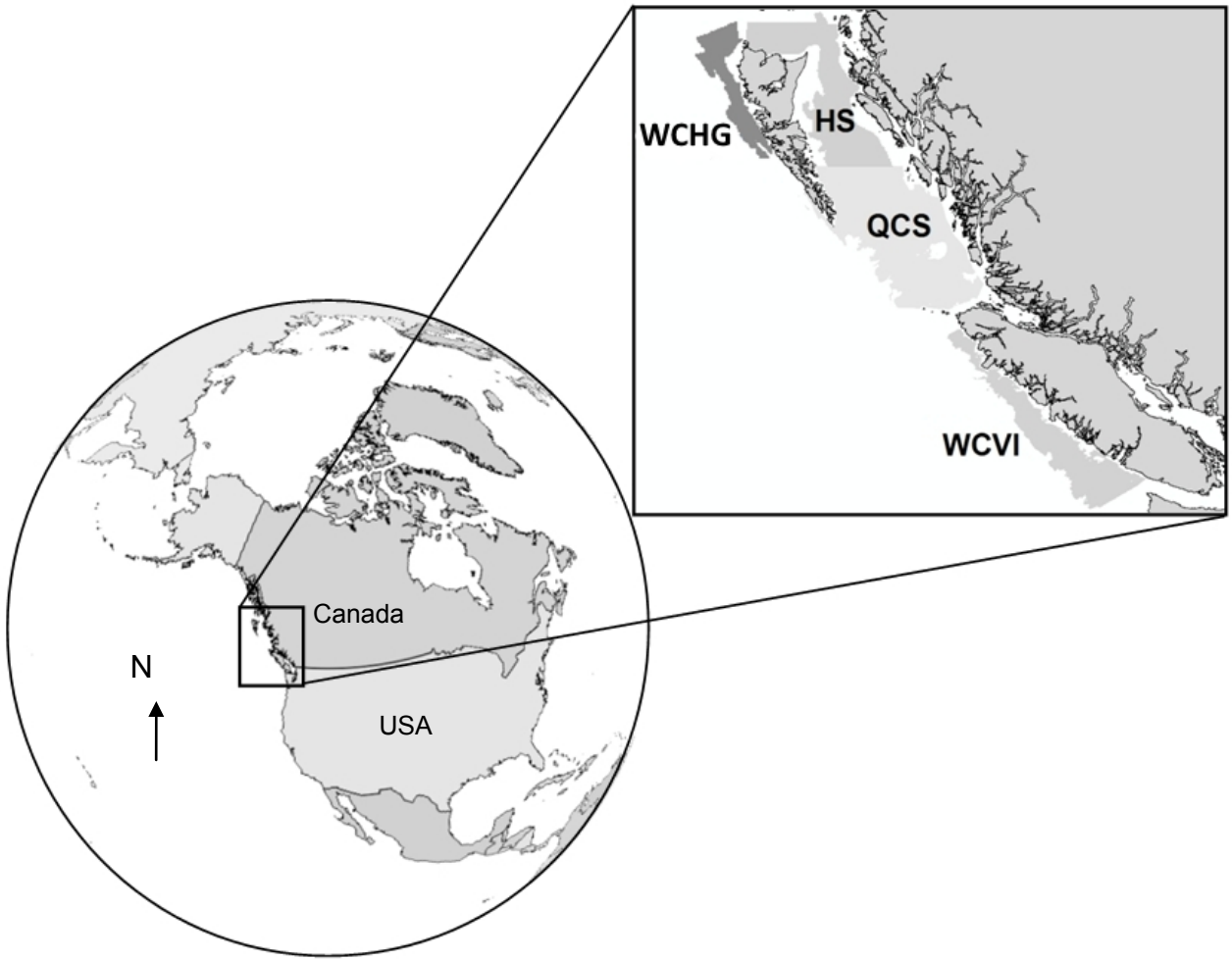

Figure 1. Locations of the current synoptic bottom trawl surveys on the coast of British Columbia, Canada. WCHG = West Coast Haida Gwaii; HS = Hecate Strait; QCS = Queen Charlotte Sound; WCVI = West Coast Vancouver Island.

Figure 2. The Canadian Coast Guard Ship W.E. Ricker used for the 2016 WCVI synoptic bottom trawl survey.

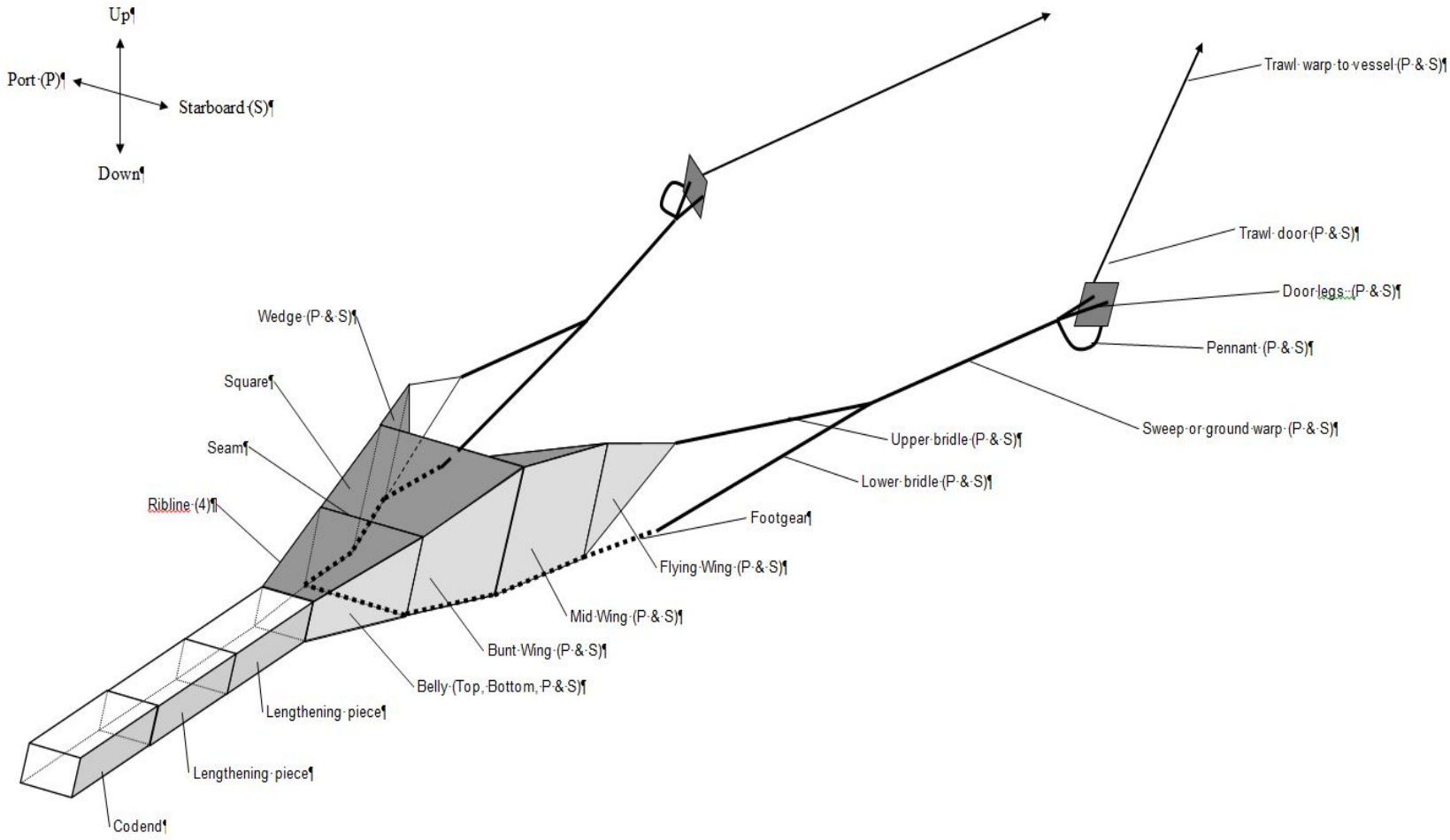

Figure 3. Overview diagram of the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey.

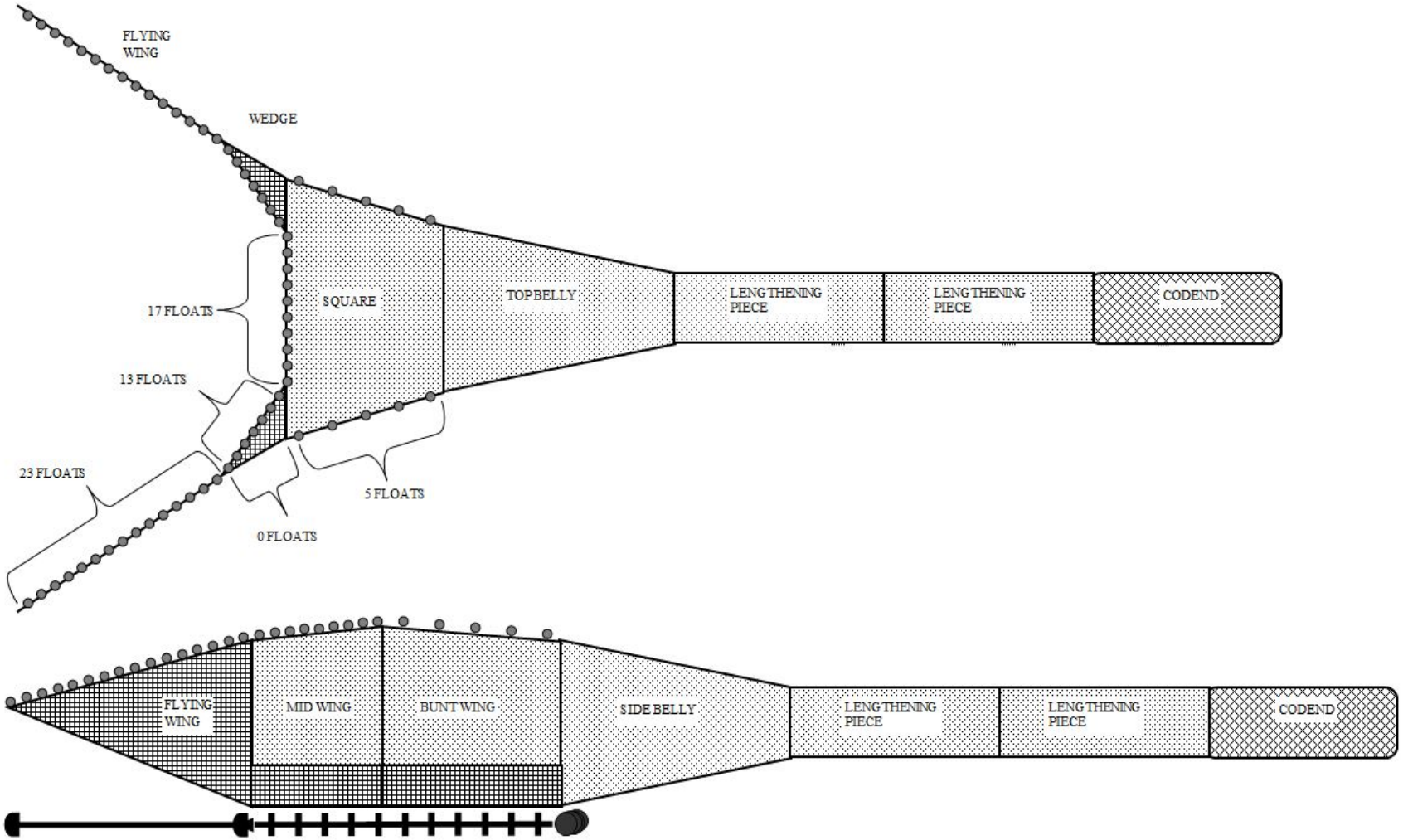

Figure 4. Top and side view of the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey.

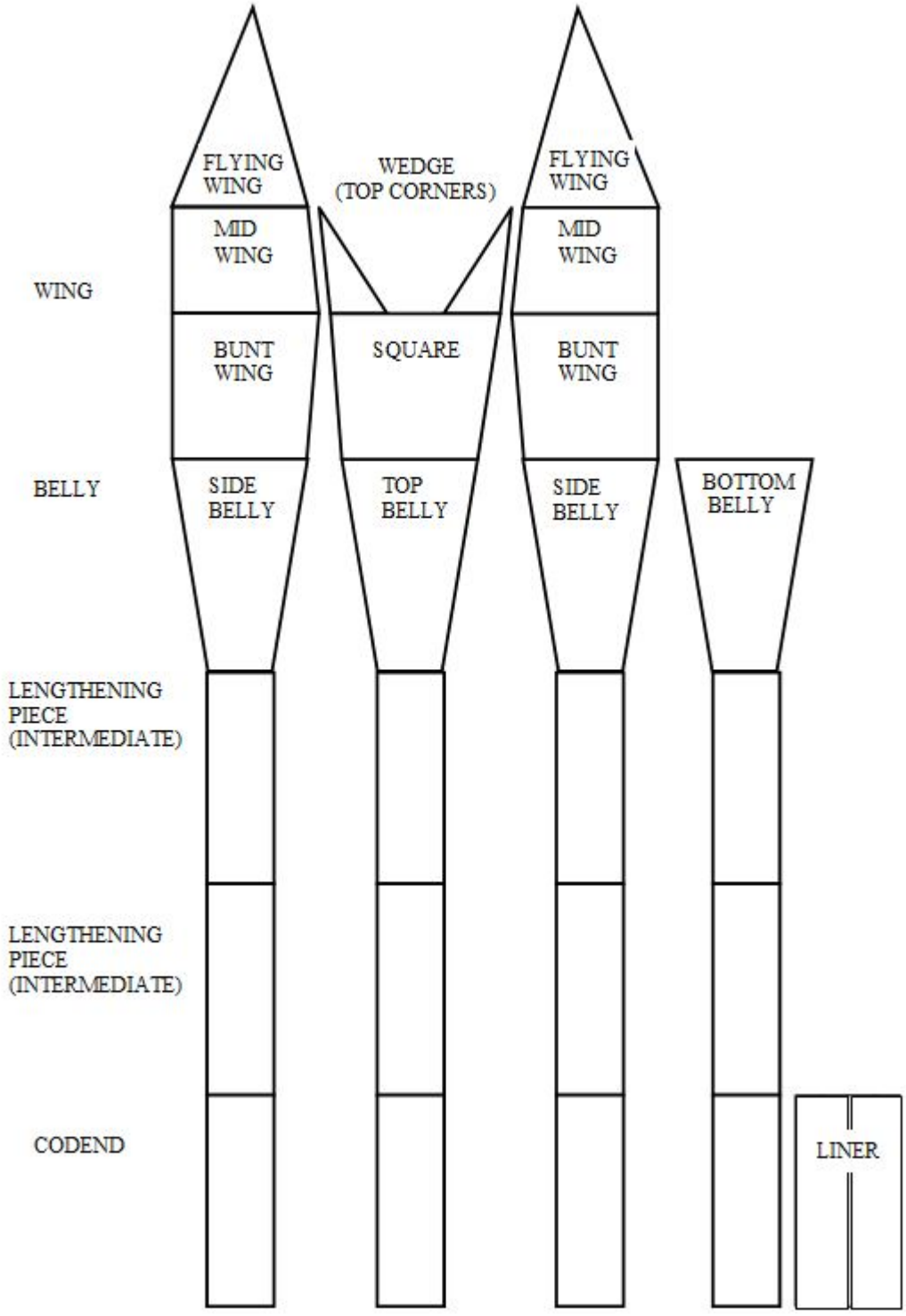

Figure 5. Diagram of the net panels with section names for the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey.

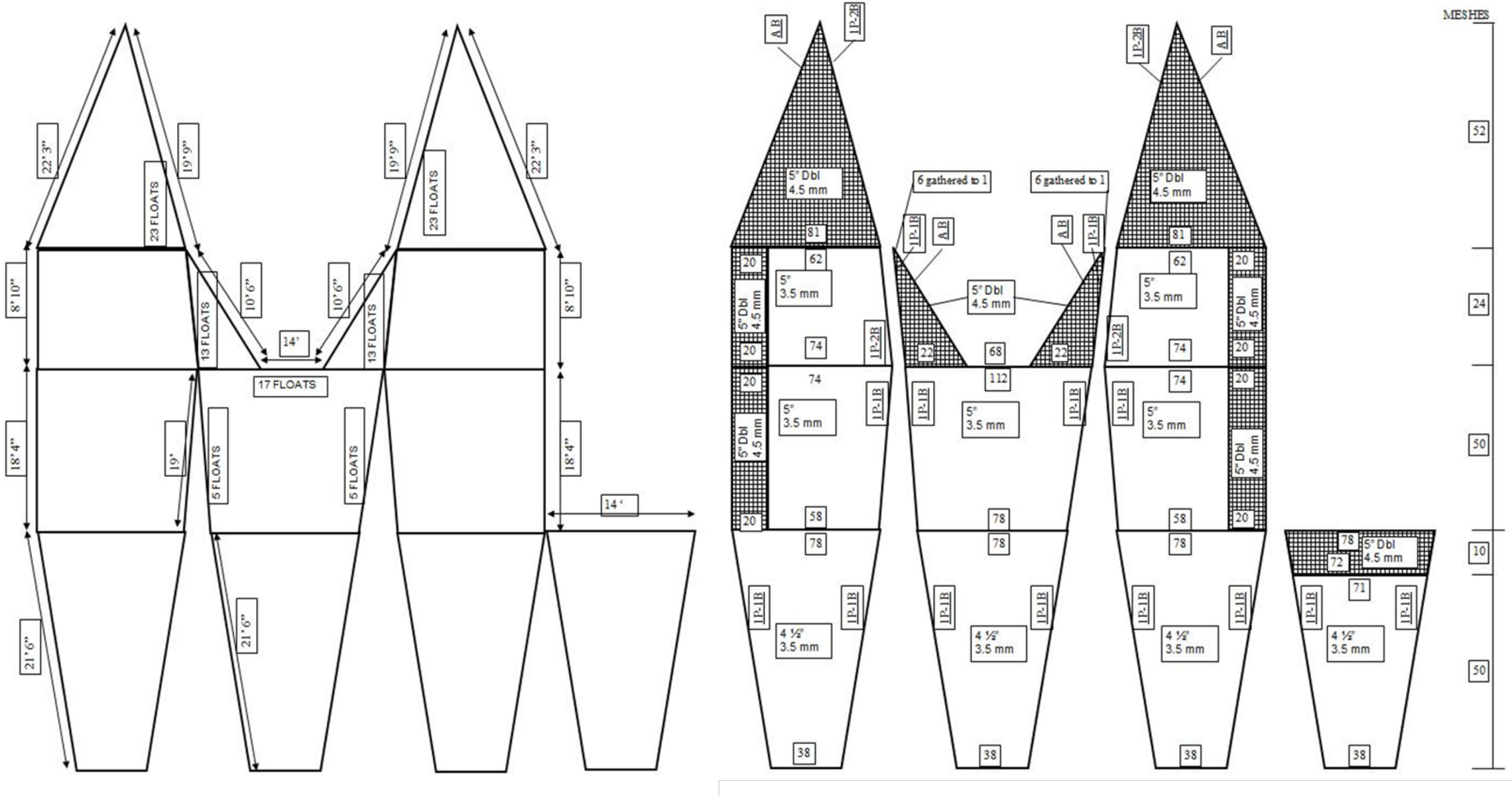

Figure 6. Details of the wing and belly sections of the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey. Dimensions and the float arrangement are shown on the left while netting details, mesh counts, and mesh cuts are shown on the right side of the diagram.

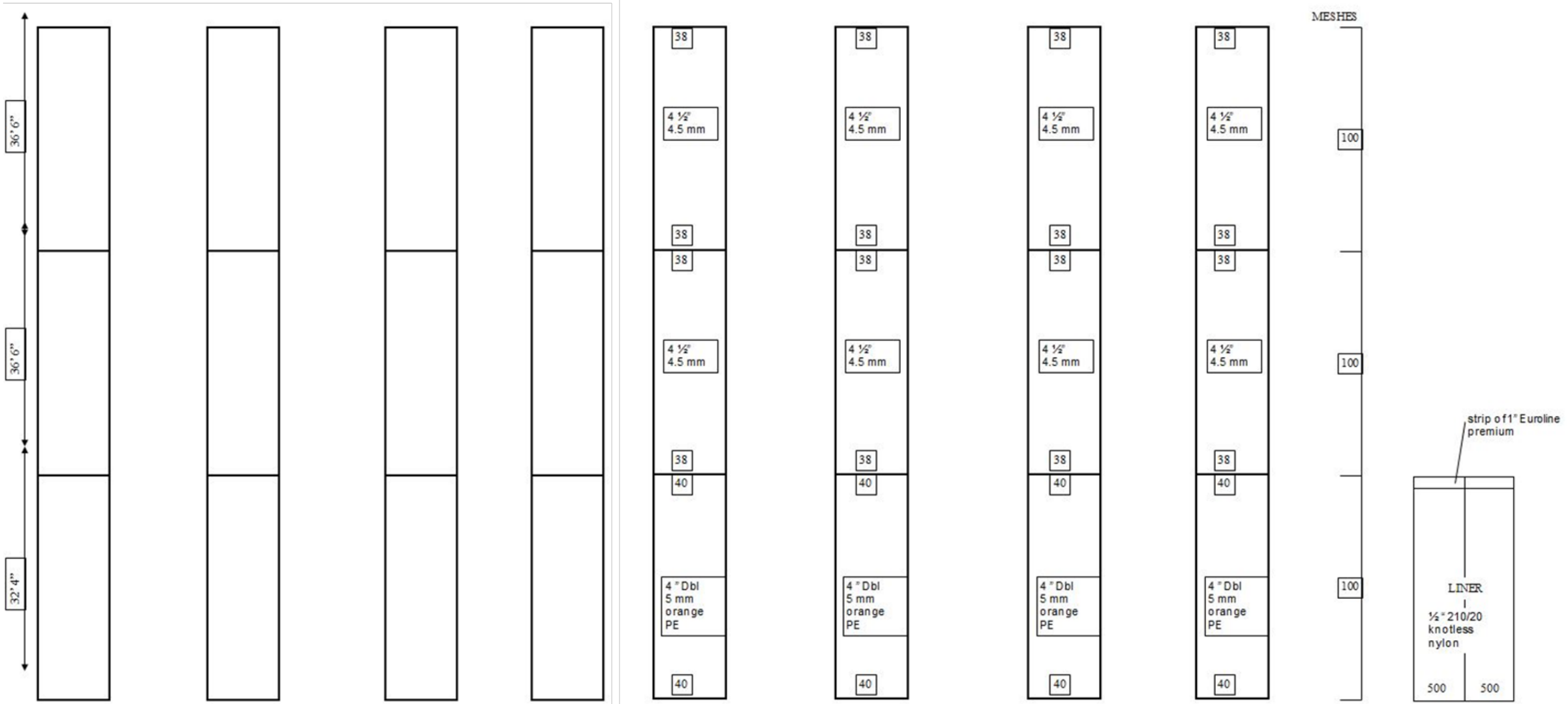

Figure 7. Details of the lengthening (intermediate) pieces and codend sections of the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey. Dimensions are shown on the left while netting details, mesh counts, and mesh cuts including the codend liner are shown on the right side of the diagram.

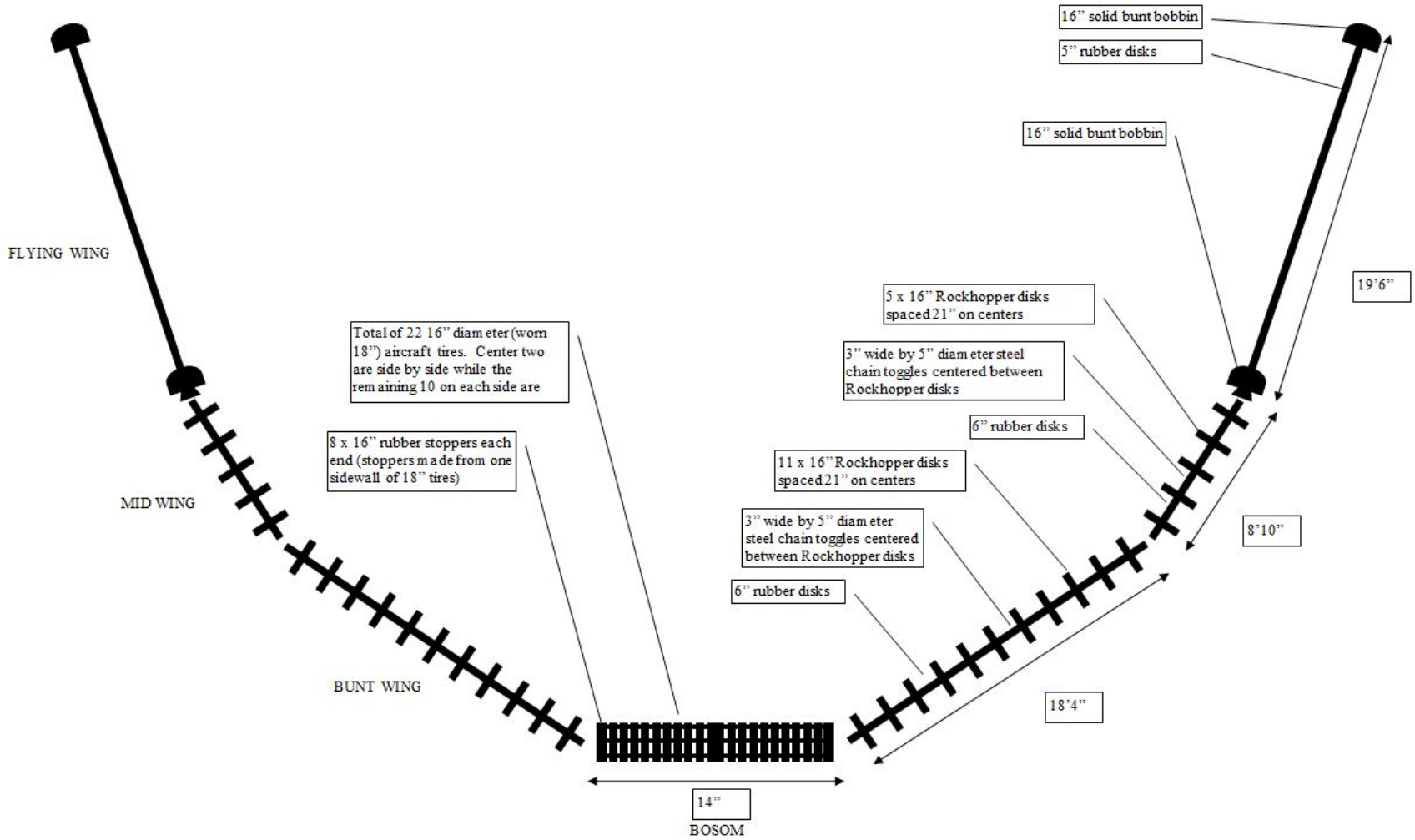

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Figure 8. Details of the Rockhopper foot gear for the Atlantic Western IIa box trawl used on the 2016 WCVI synoptic bottom trawl survey.

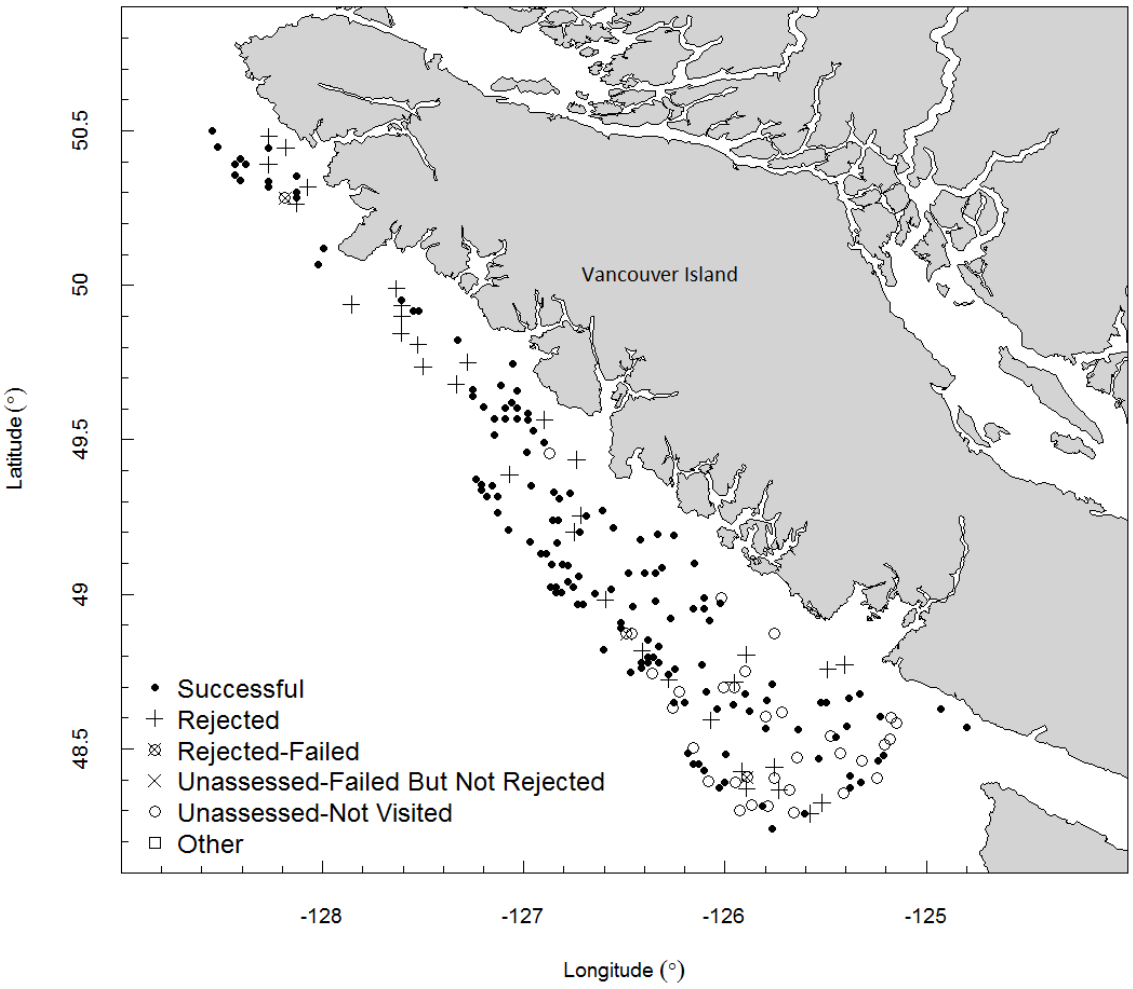

Figure 9. Final status of the 2016 WCVI synoptic bottom trawl survey showing 140 blocks that were fished successfully, 33 that were rejected prior to fishing or after inspection, three blocks that were abandoned after one or more failed fishing attempts and 31 blocks that were unassessed.

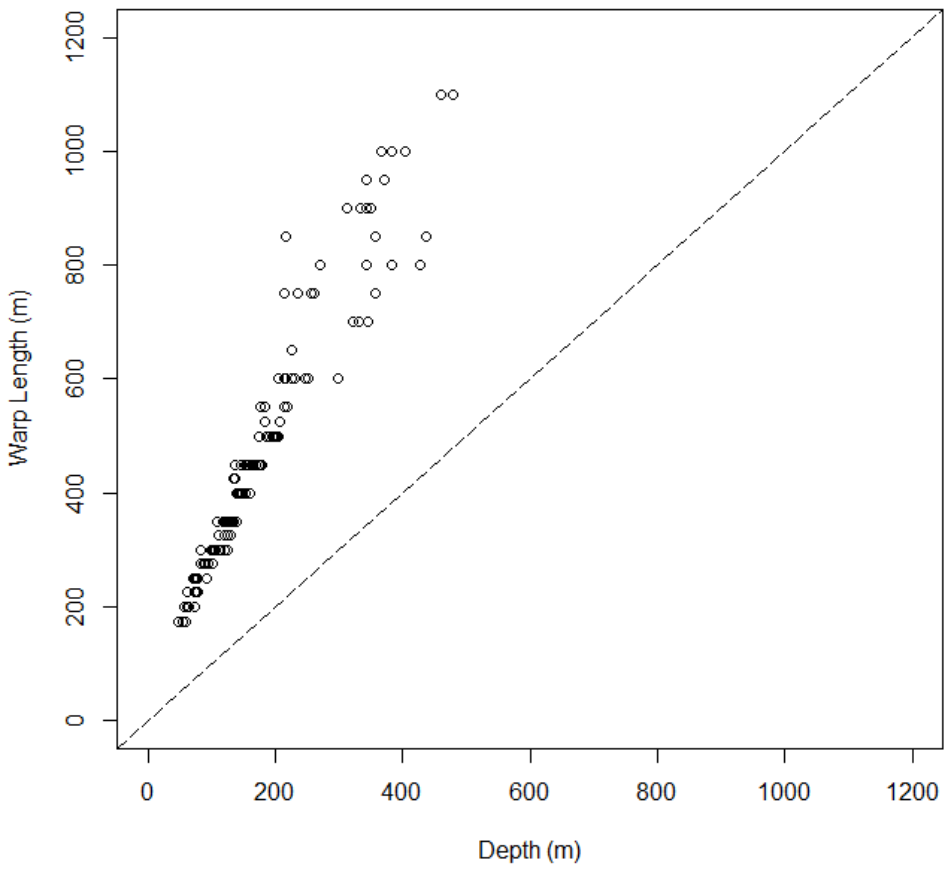

Figure 10. Warp length versus median depth for each tow during the 2016 WCVI synoptic bottom trawl survey.

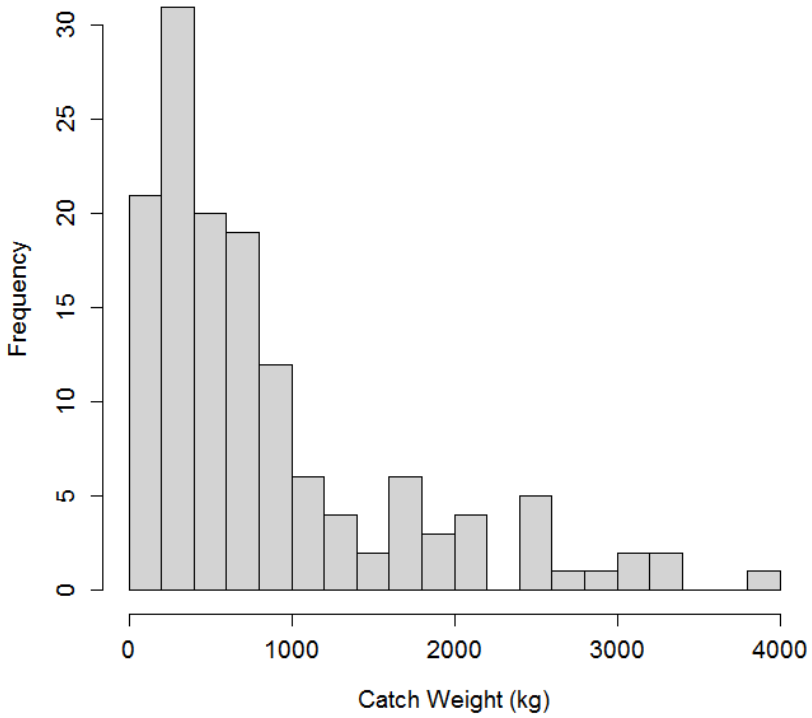

Figure 11. Histogram of catch weight per useable tow during the 2016 WCVI synoptic bottom trawl survey.

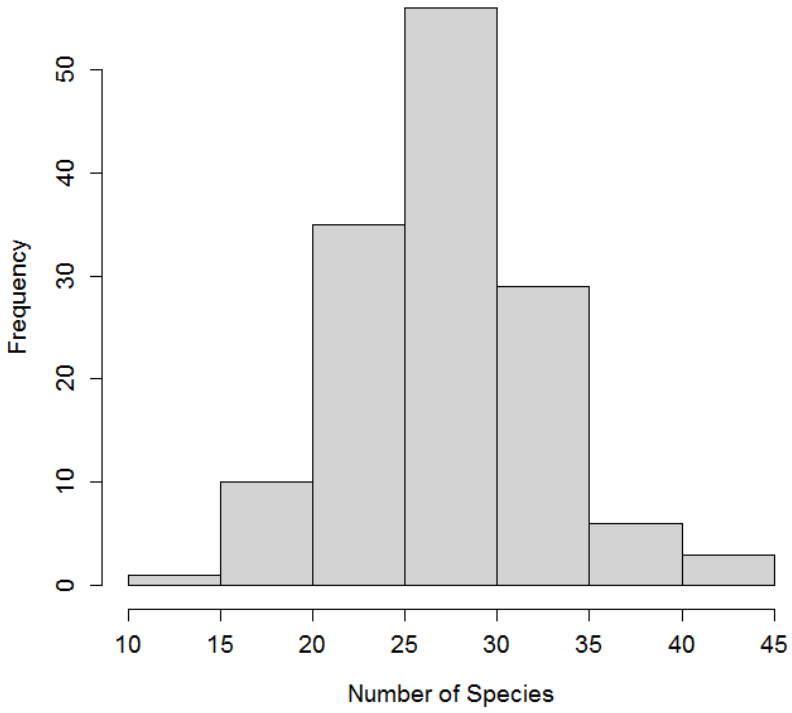

Figure 12. Histogram of number of species caught per useable tow during the 2016 WCVI synoptic bottom trawl survey.

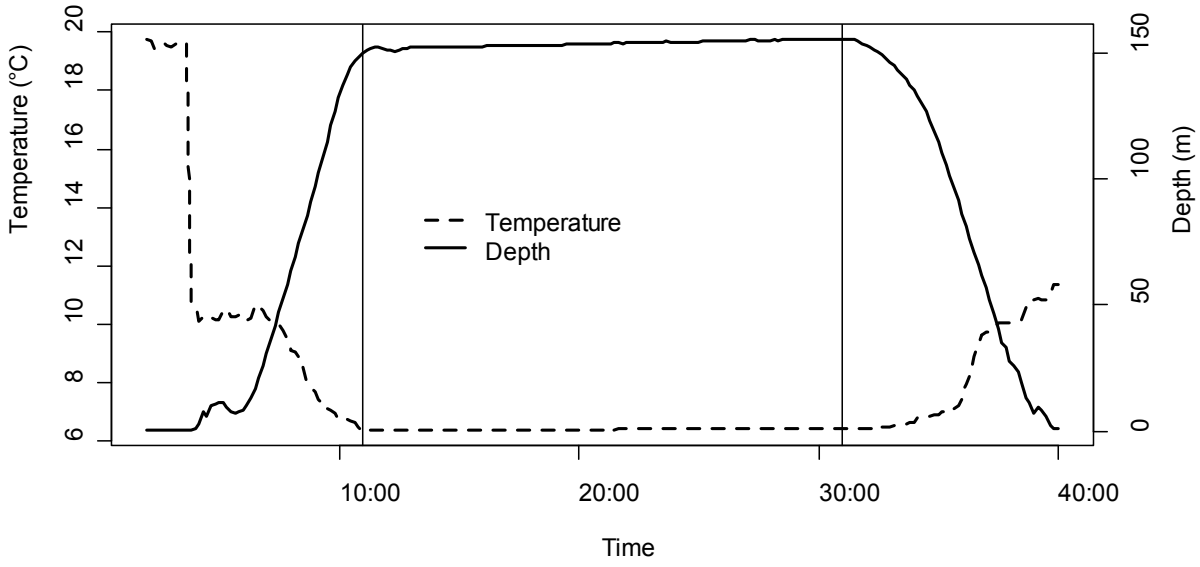

Figure 13. Example of a Seabird 39 temperature and pressure profile collected during a synoptic bottom trawl survey. The vertical lines indicate the start and end of net contact with the sea floor.

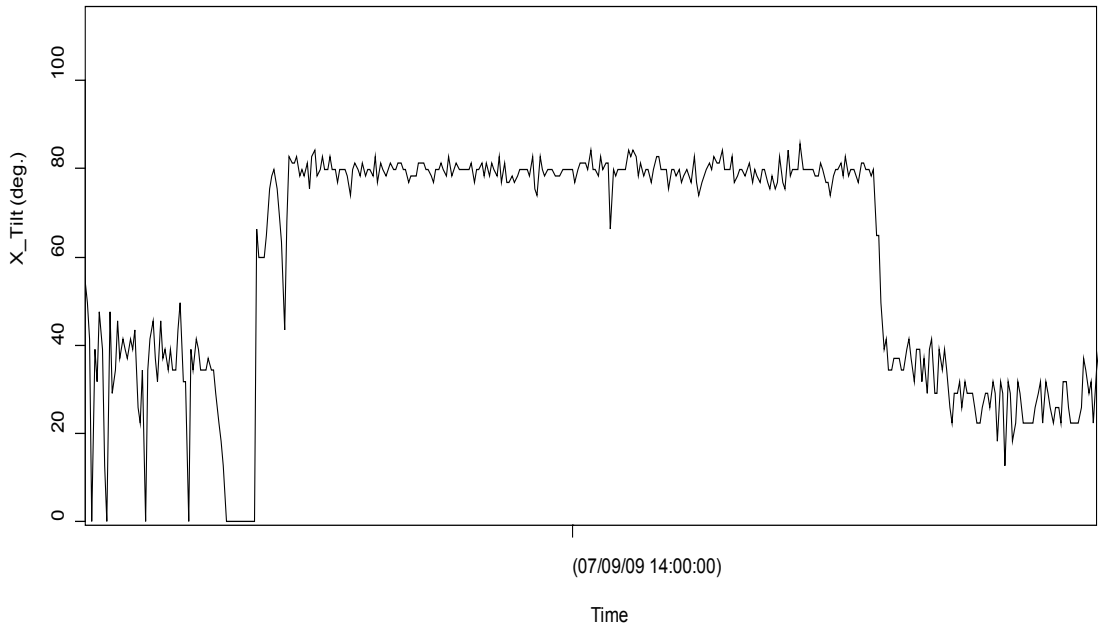

Figure 14. Example of a bottom contact sensor profile collected during a synoptic bottom trawl survey. The raised segment in the middle of the profile at approximately 80° indicates where the net made contact with the sea floor.

APPENDIX A: WCVI 2016 SURVEY BRIDGE LOG

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable
1	May-25	15:25	48.5710	124.7910	83.9	22	5.7	275	121.1	Yes
2	May-25	17:51	48.6408	124.9156	54.0	21	6.0	175	930.5	Yes
3	May-26	7:26	48.3144	125.8046	175.8	22	6.1	450	2193.1	Yes
4	May-26	8:48	48.2482	125.7717	333.6	29	5.5	900	690.2	Yes
5	May-26	10:39	48.2960	125.5934	133.6	22	5.8	425	1455.5	Yes
6	May-26	13:58	48.3807	125.3797	127.8	20	6.0	350	1094.1	Yes
7	May-26	15:13	48.4064	125.3887	169.9	23	5.3	450	393.7	Yes
8	May-26	16:09	48.3953	125.3314	117.4	22	5.3	350	675.1	Yes
9	May-26	17:39	48.4628	125.2508	154.6	23	5.5	450	344.0	Yes
10	May-26	18:42	48.4797	125.2230	147.8	22	6.2	400	414.1	Yes
11	May-27	7:13	48.4626	125.5459	93.2	21	5.6	250	1627.0	Yes
12	May-27	8:32	48.5432	125.4692	126.0	23	5.7	350	456.1	Yes
13	May-27	9:38	48.5640	125.3844	137.8	23	5.4	450	814.4	Yes
14	May-27	11:08	48.6098	125.2310	103.6	21	5.1	300	622.5	Yes
15	May-28	8:04	48.6807	125.3142	70.6	23	5.6	250	119.7	Yes
16	May-28	8:56	48.6669	125.3744	63.9	21	5.7	200	333.0	Yes
17	May-28	9:54	48.6531	125.4840	61.0	22	5.4	200	1333.3	Yes
18	May-28	10:43	48.6490	125.5119	61.2	9	4.0	200	39.6	No
19	May-28	11:29	48.6436	125.5132	63.9	21	5.6	200	3530.5	Yes
20	May-28	12:39	48.5646	125.6264	62.9	22	5.6	200	159.5	Yes
21	May-28	13:49	48.5650	125.7919	74.5	21	6.2	250	83.5	Yes
22	May-28	15:45	48.4872	126.0013	146.9	22	5.6	400	240.8	Yes
23	May-28	17:56	48.3997	125.9952	214.6	24	5.2	750	1365.0	Yes
24	May-28	18:57	48.3775	126.0324	404.8	20	5.8	1000	351.7	Yes
25	May-29	7:42	48.4104	125.8908	160.7	23	5.4	400	0.0	No
26	May-29	10:53	48.4266	126.0982	226.0	24	5.6	650	2156.5	Yes
27	May-29	12:14	48.4549	126.1396	255.4	25	5.3	750	1742.5	Yes
28	May-29	13:23	48.4547	126.1596	342.1	26	5.9	900	3124.3	Yes
29	May-29	15:00	48.4918	126.1839	312.7	26	5.2	900	3222.1	Yes
30	May-29	17:38	48.6365	126.0453	117.9	22	5.8	350	168.2	Yes
31	May-30	7:10	48.6543	126.2051	199.4	22	5.7	500	1741.2	Yes
32	May-30	9:03	48.6560	126.2576	349.4	22	6.1	900	1029.7	Yes
33	May-30	10:48	48.7476	126.2768	183.3	23	5.9	525	2598.4	Yes
34	May-30	12:22	48.7609	126.2480	162.1	23	5.8	450	1561.7	Yes
35	May-30	13:29	48.7775	126.3290	216.6	28	5.6	850	2790.0	Yes
36	May-30	15:29	48.6915	126.0928	121.4	21	5.7	350	240.0	Yes
37	May-30	16:32	48.6552	125.9665	99.3	22	5.8	300	211.9	Yes
38	May-30	17:43	48.6338	125.8735	77.8	21	5.9	250	74.2	Yes
39	May-30	19:00	48.6855	125.8975	72.2	17	5.4	225	68.2	Yes
40	May-31	7:06	48.7529	126.4634	461.1	27	6.8	1100	264.6	Yes
41	May-31	8:28	48.7695	126.4174	342.5	25	6.1	950	716.2	Yes
42	May-31	9:49	48.8033	126.3638	183.8	24	6.3	550	1931.8	Yes
43	May-31	11:11	48.7859	126.4131	260.1	20	5.5	750	2516.6	Yes
44	May-31	12:55	48.8191	126.5931	382.3	28	5.6	1000	539.7	Yes
45	May-31	14:17	48.8863	126.5100	176.9	25	5.5	550	1115.6	Yes
46	May-31	15:13	48.9035	126.5164	174.3	23	5.6	500	1350.4	Yes
47	May-31	16:21	48.9510	126.4448	153.7	16	5.7	400	1074.8	No
48	May-31	17:48	48.9556	126.4622	157.2	23	5.5	450	551.5	Yes
49	Jun-01	7:19	48.8389	126.3308	164.9	23	5.7	450	664.7	Yes
50	Jun-01	9:25	48.7814	126.1196	113.3	22	5.5	300	359.8	Yes
51	Jun-01	11:26	48.6673	125.7992	61.6	22	5.5	200	78.4	Yes
52	Jun-01	12:26	48.7125	125.7750	152.9	22	5.6	450	656.3	Yes
53	Jun-02	7:15	49.0260	126.5832	153.3	24	5.5	450	1333.6	Yes

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable
54	Jun-02	8:56	48.9693	126.6995	370.4	24	6.1	950	634.1	Yes
55	Jun-02	10:05	49.0185	126.7489	224.9	22	6.0	600	1004.2	Yes
56	Jun-02	11:01	49.0354	126.7769	212.9	24	6.2	600	923.7	Yes
57	Jun-02	12:21	49.0059	126.8409	479.4	26	5.4	1100	283.4	Yes
58	Jun-02	13:35	49.0232	126.8330	356.2	25	5.3	850	850.4	Yes
59	Jun-02	15:20	49.1017	126.8765	229.6	10	5.6	600	838.3	No
60	Jun-02	17:31	49.0916	126.8533	215.8	24	5.8	600	2019.8	Yes
61	Jun-03	7:06	49.0511	126.7198	170.0	23	5.6	450	748.7	Yes
62	Jun-03	8:01	49.0936	126.7720	162.9	23	6.0	450	768.9	Yes
63	Jun-03	9:07	49.1253	126.8821	204.1	25	5.7	600	1731.0	Yes
64	Jun-03	10:20	49.1770	126.8287	146.5	23	5.8	450	390.4	Yes
65	Jun-03	13:03	49.2394	126.8198	137.2	22	6.1	425	305.2	Yes
66	Jun-03	14:48	49.2111	127.0694	367.1	27	5.6	1000	900.2	Yes
67	Jun-03	16:39	49.3136	127.1760	269.6	26	5.6	800	3002.2	Yes
68	Jun-03	18:33	49.3511	127.2103	236.2	25	5.9	750	440.5	Yes
69	Jun-04	8:15	48.9254	126.0866	73.1	22	5.6	250	114.6	Yes
70	Jun-04	9:21	48.9484	126.1523	83.5	23	5.5	300	364.0	Yes
71	Jun-04	10:46	48.9661	126.3347	131.9	21	6.0	350	392.3	Yes
72	Jun-04	12:25	49.0596	126.3354	109.1	22	5.5	350	161.4	Yes
73	Jun-04	15:08	48.9807	126.0880	62.1	23	5.3	225	115.6	Yes
74	Jun-05	7:14	49.0944	126.1671	55.4	22	5.6	175	120.3	Yes
75	Jun-05	8:47	49.1949	126.2618	46.8	22	5.4	175	125.6	Yes
76	Jun-05	11:42	49.2651	126.6008	102.3	21	5.5	275	304.5	Yes
77	Jun-05	13:07	49.3320	126.7776	111.7	21	5.7	300	245.9	Yes
78	Jun-05	14:03	49.3062	126.8199	125.1	22	5.7	325	974.3	Yes
79	Jun-05	15:01	49.3250	126.8456	129.4	21	5.7	325	612.6	Yes
80	Jun-05	15:59	49.3424	126.9523	147.0	20	5.3	400	497.2	Yes
81	Jun-05	17:56	49.3552	127.1694	184.7	22	5.3	500	1121.8	Yes
82	Jun-06	7:08	49.3679	127.2437	343.1	23	5.3	800	711.3	Yes
83	Jun-06	9:29	49.5071	127.1373	139.2	23	5.3	400	921.1	Yes
84	Jun-06	11:00	49.5616	127.1421	130.9	21	5.4	350	557.5	Yes
85	Jun-06	12:16	49.5601	127.0924	120.6	22	5.6	325	393.8	Yes
86	Jun-06	13:31	49.5954	127.0813	113.5	21	5.5	300	800.7	Yes
87	Jun-06	14:39	49.6129	127.0532	105.3	21	5.5	300	711.2	Yes
88	Jun-06	15:43	49.5984	127.0274	103.0	23	5.6	300	513.3	Yes
89	Jun-06	16:52	49.5638	127.0330	110.5	22	5.6	325	895.1	Yes
90	Jun-06	18:20	49.5241	126.9514	102.2	22	5.4	300	363.1	Yes
91	Jun-07	7:38	49.5637	126.9724	93.7	21	5.3	275	835.7	Yes
92	Jun-07	8:41	49.5774	126.9773	87.7	22	5.3	275	317.5	Yes
93	Jun-07	10:01	49.6630	127.0444	76.5	22	5.5	250	263.8	Yes
94	Jun-07	10:59	49.6673	127.1025	100.5	21	5.4	275	624.5	Yes
95	Jun-07	12:15	49.5981	127.1900	132.5	21	5.4	350	711.5	Yes
96	Jun-07	13:08	49.6349	127.2446	134.3	21	5.4	350	2864.9	Yes
97	Jun-07	15:22	49.6548	127.2445	130.6	21	5.6	350	3338.0	Yes
98	Jun-07	17:53	49.7418	127.0488	56.0	22	5.4	200	213.6	Yes
99	Jun-08	7:12	49.8258	127.3362	77.5	23	5.4	225	56.6	Yes
100	Jun-08	10:53	49.9157	127.5426	58.5	21	5.2	175	33.8	Yes
101	Jun-08	12:05	49.9224	127.5156	63.1	13	5.1	200	25.6	No
102	Jun-08	12:48	49.9245	127.5185	63.3	21	5.5	200	27.5	Yes
103	Jun-08	14:06	49.9595	127.5982	75.7	16	5.2	225	28.5	Yes
104	Jun-08	17:48	50.0741	128.0117	199.8	17	5.3	500	487.8	Yes
105	Jun-08	19:13	50.1250	128.0073	110.2	21	5.2	300	212.9	Yes
106	Jun-10	7:12	50.3239	128.2887	204.0	21	5.3	500	3201.1	Yes
107	Jun-10	8:58	50.3451	128.4145	321.8	18	5.3	700	855.8	Yes

Tow	Date	Time	Latitude	Longitude	Depth (m)	Duration (min)	Speed (km/h)	Warp (m)	Catch (kg)	Usable
108	Jun-10	10:17	50.3658	128.4450	332.0	19	5.7	700	793.4	Yes
109	Jun-10	13:25	50.5058	128.5483	197.0	20	5.7	500	2152.6	Yes
110	Jun-10	14:31	50.4573	128.5259	219.5	21	5.7	550	393.9	Yes
111	Jun-10	16:39	50.4361	128.2616	142.2	22	5.5	400	427.5	Yes
112	Jun-10	18:36	50.3308	128.2620	195.0	22	5.4	500	1895.6	Yes
113	Jun-11	7:13	50.3579	128.1377	113.2	21	5.6	300	199.4	Yes
114	Jun-11	8:48	50.3086	128.1355	141.5	22	5.4	400	337.7	Yes
115	Jun-11	10:01	50.2889	128.1216	139.2	20	5.5	350	545.0	Yes
116	Jun-11	12:04	50.2906	128.1908	174.6	15	4.9	450	1112.6	No
117	Jun-11	14:11	50.3977	128.3934	202.2	20	5.4	500	433.3	Yes
118	Jun-11	15:29	50.4149	128.4164	201.2	21	5.4	500	435.4	Yes
119	Jun-11	16:38	50.3960	128.4406	214.6	21	5.5	550	2526.0	Yes
120	Jun-12	7:17	49.4866	126.8935	98.3	21	5.5	300	415.3	Yes
121	Jun-12	8:22	49.4645	126.9946	120.2	20	5.4	300	368.1	Yes
122	Jun-12	10:14	49.3417	127.2180	356.3	16	5.7	750	1724.2	Yes
123	Jun-12	11:59	49.3091	127.1182	185.7	15	5.4	500	475.8	Yes
124	Jun-12	13:22	49.2718	127.1346	344.5	16	5.6	700	777.5	Yes
125	Jun-12	15:22	49.1761	126.9626	246.2	21	5.6	600	2533.8	Yes
126	Jun-12	17:33	49.2463	126.8641	143.9	22	5.5	400	414.5	Yes
127	Jun-13	7:07	49.2613	126.6885	113.8	22	5.4	300	256.4	Yes
128	Jun-13	8:18	49.1936	126.7108	121.5	21	5.6	350	509.8	Yes
129	Jun-13	10:01	49.1215	126.9065	250.9	21	5.5	600	1788.1	Yes
130	Jun-13	11:46	49.0873	126.7953	179.7	23	5.4	450	2466.6	Yes
131	Jun-13	14:24	49.2092	126.5462	105.5	22	5.4	300	663.3	Yes
132	Jun-13	15:54	49.1716	126.4141	90.0	22	5.4	275	313.6	Yes
133	Jun-14	7:30	49.1981	126.3300	60.5	22	5.7	200	209.8	Yes
134	Jun-14	8:54	49.0782	126.3062	90.6	22	5.5	275	349.2	Yes
135	Jun-14	10:11	49.0631	126.3943	123.8	20	5.5	300	413.3	Yes
136	Jun-14	11:07	49.0694	126.4675	131.0	21	5.4	350	750.2	Yes
137	Jun-14	12:40	49.0062	126.6624	190.9	23	5.4	500	667.1	Yes
138	Jun-14	14:43	49.0284	126.8733	427.0	14	5.4	800	277.1	Yes
139	Jun-14	15:45	49.0112	126.8207	383.5	19	5.3	800	1151.2	Yes
140	Jun-14	16:52	48.9685	126.7462	437.2	16	5.4	850	161.4	Yes
141	Jun-14	18:40	48.8768	126.4921	175.0	15	5.4	450	2805.5	No
142	Jun-15	7:35	48.7762	126.3776	298.9	19	5.4	600	494.3	Yes
143	Jun-15	8:42	48.7962	126.3725	208.0	22	5.5	525	876.1	Yes
144	Jun-15	10:06	48.8452	126.3710	173.5	22	5.4	450	366.4	Yes
145	Jun-15	11:52	48.9213	126.2843	126.5	22	5.4	350	412.8	Yes
146	Jun-15	13:35	48.9634	126.1175	72.3	21	5.6	200	119.0	Yes
147	Jun-15	15:09	48.9668	126.0076	48.5	22	5.7	175	27.0	Yes

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

Common Name	Scientific Name	Total Weight (Kg)	1	2	3	4	5
Arrowtooth Flounder	*Atheresthes stomias*	20505.3	0.9		322.0	93.2	25.1
Aurora Rockfish	*Sebastes aurora*	41.5				2.3	
Big Skate	*Beringraja binoculata*	303.3	4.3				
Bigfin Eelpout	*Lycodes cortezianus*	49.8				3.3	
Blackbelly Eelpout	*Lycodes pacificus*	111.6					
Bocaccio	*Sebastes paucispinis*	49.3			3.7		
Brown Cat Shark	*Apristurus brunneus*	20.3				1.6	
Canary Rockfish	*Sebastes pinniger*	3591.8	20.5		76.0		16.5
Curlfin Sole	*Pleuronichthys decurrens*	39.3	0.9	0.5			
Darkblotched Rockfish	*Sebastes crameri*	378.5					
Dover Sole	*Microstomus pacificus*	4125.9			7.9	101.4	1.2
English Sole	*Parophrys vetulus*	2277.5	28.1	0.7	2.6		55.4
Eulachon	*Thaleichthys pacificus*	87.1	0.7				
Flathead Sole	*Hippoglossoides elassodon*	1846.7	0.3				
Greenstriped Rockfish	*Sebastes elongatus*	2098.0			138.7		14.2
Kelp Greenling	*Hexagrammos decagrammus*	30.0	0.3				
Lingcod	*Ophiodon elongatus*	1763.7	1.3		2.3		36.1
Longnose Skate	*Raja rhina*	641.5				17.3	
North Pacific Spiny Dogfish	*Squalus suckleyi*	5894.1	2.8	0.5	542.8	2.4	539.4
Pacific Cod	*Gadus macrocephalus*	2920.2		2.9	20.3		261.6
Pacific Hake	*Merluccius productus*	3514.3				22.7	
Pacific Halibut	*Hippoglossus stenolepis*	1600.8		50.5	34.8	31.2	9.9
Pacific Ocean Perch	*Sebastes alutus*	10529.2			29.0	62.6	
Pacific Sanddab	*Citharichthys sordidus*	1129.8	6.2	1.4	0.3		
Pacific Tomcod	*Microgadus proximus*	26.2	0.2				
Petrale Sole	*Eopsetta jordani*	1466.8	4.5	0.1			298.5
Puget Sound Rockfish	*Sebastes emphaeus*	48.4					
Pygmy Rockfish	*Sebastes wilsoni*	92.9			0.2		1.9
Quillback Rockfish	*Sebastes maliger*	56.0	10.0				
Redbanded Rockfish	*Sebastes babcocki*	612.1				13.7	
Redstripe Rockfish	*Sebastes proriger*	9703.7	0.4		597.0		15.9
Rex Sole	*Glyptocephalus zachirus*	6014.1	3.3		1.6	17.1	1.4
Rosethorn Rockfish	*Sebastes helvomaculatus*	365.5			35.1	3.4	12.3
Rougheye Rockfish	*Sebastes aleutianus*	1824.9				1.9	
Sablefish	*Anoplopoma fimbria*	8825.3			192.6	155.3	13.0
Sandpaper Skate	*Bathyraja interrupta*	27.1				1.9	
Sharpchin Rockfish	*Sebastes zacentrus*	6893.1			18.2		9.6
Shortraker Rockfish	*Sebastes borealis*	65.6					
Shortspine Thornyhead	*Sebastolobus alascanus*	1508.7				79.7	1.0
Silvergray Rockfish	*Sebastes brevispinis*	1251.2			2.2		
Slender Sole	*Lyopsetta exilis*	315.4				4.9	1.0
Southern Rock Sole	*Lepidopsetta bilineata*	519.5	3.9	17.1			
Splitnose Rockfish	*Sebastes diploproa*	11493.2				52.6	
Spotted Ratfish	*Hydrolagus colliei*	2742.7	24.2	854.2	20.5	4.1	19.0
Threadfin Sculpin	*Icelinus filamentosus*	48.2					
Walleye Pollock	*Gadus chalcogrammus*	276.5	0.2				
Widow Rockfish	*Sebastes entomelas*	44.6			2.6		2.4
Yelloweye Rockfish	*Sebastes ruberrimus*	192.9			16.7		16.1
Yellowmouth Rockfish	*Sebastes reedi*	322.6					
Yellowtail Rockfish	*Sebastes flavidus*	6055.3			125.1	1.9	101.4
Other		850.5	8.2	2.5	0.7	15.4	2.5
Total			**121.1**	**930.5**	**2193.1**	**690.2**	**1455.5**

Common Name	6	7	8	9	10	11	12	13	14	15	16
Arrowtooth Flounder	105.2	79.6	183.3	95.0	93.5	93.1	53.6	167.8	5.9		
Aurora Rockfish											
Big Skate					2.2	11.9					
Bigfin Eelpout											
Blackbelly Eelpout	0.2	0.5		2.1	3.4		0.5	0.4	0.4		
Bocaccio	17.1										
Brown Cat Shark											
Canary Rockfish	103.0	2.6							19.9		0.7
Curlfin Sole							0.6				0.5
Darkblotched Rockfish											
Dover Sole	15.4	102.0	32.8	42.1	61.3	27.2	114.8	158.0	2.6		
English Sole	15.5		57.3	3.4	0.6	359.1	2.5	10.8	16.5	0.6	
Eulachon		0.6		-	0.1	0.2	15.8	0.7	0.8		
Flathead Sole	1.7	26.9	3.6	17.7	19.4	1.3	43.1	17.3	164.5		
Greenstriped Rockfish	38.2		9.8	0.7		34.2	4.1	1.2		0.1	
Kelp Greenling											6.7
Lingcod	4.8							0.5			3.3
Longnose Skate		17.8	2.5	37.3	15.6		7.3	8.4			
North Pacific Spiny Dogfish	35.4	35.8	80.3	55.7	97.1	6.5	1.4	2.0	2.8		0.5
Pacific Cod	7.9		124.6	2.5	5.9	26.7		8.6	159.8	0.9	1.6
Pacific Hake		2.3		3.1	1.7		26.5	35.7	2.1		
Pacific Halibut			20.1			65.9	9.6	12.2	4.8		
Pacific Ocean Perch			22.2	0.3				114.9			
Pacific Sanddab						25.1		0.4		3.9	2.3
Pacific Tomcod											
Petrale Sole	2.0	11.7	5.9	0.5	3.0	210.1	8.6	16.6	4.9		0.4
Puget Sound Rockfish											
Pygmy Rockfish	9.9							0.2			
Quillback Rockfish									1.6		10.1
Redbanded Rockfish		0.4						0.9			
Redstripe Rockfish	65.6		2.9	1.1				0.4			180.9
Rex Sole	25.9	85.8	29.2	56.5	89.6	42.4	58.4	101.3	8.0		
Rosethorn Rockfish	0.4										
Rougheye Rockfish		0.5	0.9					0.2			
Sablefish	19.2	6.4	23.7	7.7		592.3	14.4	30.9	1.8		
Sandpaper Skate		0.9	1.3		1.2			1.4	1.1		
Sharpchin Rockfish	207.9		0.2								
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish	0.8								1.3		
Slender Sole	0.7	3.6	1.4	5.8	4.4	2.9	1.1	4.1	1.6		
Southern Rock Sole						3.5		0.2		54.8	28.8
Splitnose Rockfish				-	-			0.4			
Spotted Ratfish		7.9	47.1	11.1	8.3	115.4	56.2	98.5	22.8	56.3	85.9
Threadfin Sculpin	0.2		9.6	0.4				2.7	2.3	0.1	
Walleye Pollock	6.3				2.9		9.4	4.3	70.7		
Widow Rockfish	4.4										0.9
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish	397.2	3.4	7.5		1.8		17.8	6.8	123.9		
Other	9.3	5.1	9.2	1.2	2.1	9.2	10.5	6.5	2.2	3.0	10.5
Total	**1094.1**	**393.7**	**675.1**	**344.0**	**414.1**	**1627.0**	**456.1**	**814.4**	**622.5**	**119.7**	**333.0**

Common Name	17	18	19	20	21	22	23	24	25	26	27
Arrowtooth Flounder			-	1.7		8.6	68.6	27.5		60.0	43.1
Aurora Rockfish								0.7			
Big Skate					13.2						
Bigfin Eelpout								2.1			0.6
Blackbelly Eelpout											
Bocaccio											
Brown Cat Shark											
Canary Rockfish	0.4	2.4	9.5		0.8	63.0	20.7				2.0
Curlfin Sole				0.6	2.1						
Darkblotched Rockfish											0.8
Dover Sole					0.5	15.5	30.2	34.6		20.6	18.0
English Sole	0.3			8.3	6.5	3.1					0.8
Eulachon					-						
Flathead Sole						0.3					
Greenstriped Rockfish						12.8	38.3	0.3		80.8	4.7
Kelp Greenling	4.8	3.8	6.5		1.3						
Lingcod	2.6	0.6	6.5		1.5	2.0	1.2			1.9	9.0
Longnose Skate								1.5		5.5	36.8
North Pacific Spiny Dogfish						18.4	64.0	3.1		47.2	52.3
Pacific Cod	1.1			2.9	0.3	6.4	15.3			28.3	16.6
Pacific Hake							1.5	12.0			
Pacific Halibut	18.2		46.4	17.5	6.0		4.6			21.4	39.5
Pacific Ocean Perch							257.8	9.8		1252.9	1217.8
Pacific Sanddab	2.0	1.2	0.5	7.1	3.1						
Pacific Tomcod											
Petrale Sole		0.9		1.2		1.7	3.8				
Puget Sound Rockfish	7.8		40.5								
Pygmy Rockfish	0.9		3.1			0.3					
Quillback Rockfish	13.1		9.6		6.1						
Redbanded Rockfish							11.5	2.3		1.9	2.5
Redstripe Rockfish	1170.2	13.0	1627.6	1.2							
Rex Sole				0.6	1.2	58.7	64.8	9.1		23.5	12.3
Rosethorn Rockfish						0.1	14.0			0.9	1.9
Rougheye Rockfish								20.3			
Sablefish							94.4	188.1		346.9	168.7
Sandpaper Skate						0.1					
Sharpchin Rockfish						0.7	501.6			169.7	34.5
Shortraker Rockfish											
Shortspine Thornyhead							51.0	30.4		0.2	26.1
Silvergray Rockfish						2.7	4.7			2.7	1.4
Slender Sole						4.2	4.3	1.6		1.6	3.1
Southern Rock Sole	4.1	5.3	2.9	105.5	20.3	0.3					
Splitnose Rockfish							57.5			20.9	26.4
Spotted Ratfish	99.0	9.4	58.8	12.8	17.4	1.2	39.6			38.5	20.5
Threadfin Sculpin						0.2	0.1			0.8	
Walleye Pollock											
Widow Rockfish	0.4		4.1							1.4	
Yelloweye Rockfish						3.8					
Yellowmouth Rockfish											
Yellowtail Rockfish						34.7	13.5			29.0	1.9
Other	8.3	3.1	138.7	0.3	3.2	1.8	2.1	8.4		-	1.2
Total	**1333.3**	**39.6**	**1954.8**	**159.5**	**83.5**	**240.8**	**1365.0**	**351.7**		**2156.5**	**1742.5**

Common Name	28	29	30	31	32	33	34	35	36	37	38
Arrowtooth Flounder	168.5	67.7	15.0	358.6	87.6	976.1	212.5	1585.0	17.6	7.92	0.11
Aurora Rockfish	0.1				35.2						
Big Skate						43.3		20.1			
Bigfin Eelpout	3.9	4.0			0.2			0.9			
Blackbelly Eelpout									0.7		
Bocaccio											
Brown Cat Shark											
Canary Rockfish			5.5	46.7		16.4	1.3				
Curlfin Sole											0.8
Darkblotched Rockfish	89.9	41.6	0.1		19.5	47.5	19.9	0.8			
Dover Sole	27.0	15.9	4.7	24.6	92.1	44.3	80.7	45.2	18.3	2.3	
English Sole	1.4	6.0	12.5	3.1		1.7	4.8		44.9	94.8	6.9
Eulachon											
Flathead Sole			0.74			1.9	32.4		3.4	2.9	0.6
Greenstriped Rockfish			21.3	38.5		74.8	23.3	35.5			0.1
Kelp Greenling											0.9
Lingcod		16.9	6.7	41.6		5.2	3.4	6.1			
Longnose Skate	1.2			7.9	25.8	9.9	24.2		7.1		
North Pacific Spiny Dogfish	24.2	5.1	9.4	92.0	2.5	885.5	849.0	101.3	15.0	10.8	
Pacific Cod	1.5		1.3	18.6		9.0	60.3	24.3	11.4		0.4
Pacific Hake	42.7	13.0	8.1		12.2			0.7	8.9	16.1	
Pacific Halibut		6.8	8.7				9.1	35.9			
Pacific Ocean Perch	671.2	533.5		47.1	294.8	14.5	8.6	192.0			
Pacific Sanddab			1.3						1.1	18.3	3.3
Pacific Tomcod											
Petrale Sole			3.4	3.7		1.5	26.9	1.0	1.0	1.4	12.4
Puget Sound Rockfish											
Pygmy Rockfish			2.7								
Quillback Rockfish											
Redbanded Rockfish	17.4	13.5		10.3	5.7			4.8			
Redstripe Rockfish			4.0	17.1		260.8	14.6	0.7			
Rex Sole	29.2	35.3	35.8	42.4	15.6	91.5	109.5	64.8	60.1	44.1	3.5
Rosethorn Rockfish	7.0	16.2	0.6	17.5	2.2	0.2		6.8			
Rougheye Rockfish	9.7	7.4			127.3			0.4			
Sablefish	54.4	57.1	2.4	38.4	174.7	89.8	50.3	169.9	6.1	3.9	
Sandpaper Skate							0.8				
Sharpchin Rockfish			0.5	839.8		5.7		12.8			
Shortraker Rockfish											
Shortspine Thornyhead	154.1	157.5		8.5	127.9	0.7		60.8			
Silvergray Rockfish				15.4		2.6		3.5			
Slender Sole	0.8	0.5	1.2	1.4		3.7	8.2	1.7	4.5	0.4	
Southern Rock Sole			0.5								31.5
Splitnose Rockfish	1816.9	2198.6		40.2	0.5			392.8			
Spotted Ratfish	3.0	4.9	1.8	10.4	2.7	4.4	6.1	16.0	5.6	3.5	12.7
Threadfin Sculpin			1.0	0.4				0.2	0.3	0.2	0.4
Walleye Pollock				1.1					0.6		
Widow Rockfish			0.4								
Yelloweye Rockfish			6.0	5.5				4.4			
Yellowmouth Rockfish											
Yellowtail Rockfish			11.6	4.6		2.9	11.1		23.4	2.3	
Other	0.3	20.7	1.0	6.0	3.4	4.4	4.7	1.7	9.9	3.1	0.5
Total	**3124.3**	**3222.1**	**168.2**	**1741.2**	**1029.7**	**2598.4**	**1561.7**	**2790.0**	**240.0**	**211.9**	**74.2**

Common Name	39	40	41	42	43	44	45	46	47	48	49
Arrowtooth Flounder		43.6	314.5	549.7	40.4	44.2	203.4	178.2	376.3	165.2	190.4
Aurora Rockfish		1.4				0.3					
Big Skate				21.6				14.1			
Bigfin Eelpout			5.2		2.0	0.4					
Blackbelly Eelpout											0.3
Bocaccio											
Brown Cat Shark		1.8									
Canary Rockfish				12.2	1.6		8.5	60.6	3.6		
Curlfin Sole	4.6										
Darkblotched Rockfish					43.1						1.05
Dover Sole		57.2	46.4	10.1	12.1	24.8	18.0	12.9	55.8	43.0	87.6
English Sole	1.3							0.4	7.2	2.9	0.4
Eulachon											2.9
Flathead Sole											61.0
Greenstriped Rockfish				113.3	1.6		49.4	25.0	40.4	42.9	2.9
Kelp Greenling											
Lingcod	3.0			4.2			5.1		23.1	50.6	2.7
Longnose Skate		4.1		1.1		1.0			3.9	0.8	8.2
North Pacific Spiny Dogfish				208.2	1.9		19.9	44.1	8.0	7.3	31.9
Pacific Cod				103.4	2.4		8.3	7.4	19.2	1.2	2.8
Pacific Hake		30.7	36.9		5.8	24.78			30.6		3.0
Pacific Halibut	6.7			45.9			18.8	9.8	3.4	10.5	
Pacific Ocean Perch			1.0	13.7	123.4	113.5	3.6	6.1	2.9		8.1
Pacific Sanddab	5.9										
Pacific Tomcod											
Petrale Sole	19.1			5.8	1.6		1.4	2.1	22.6	3.1	1.4
Puget Sound Rockfish											
Pygmy Rockfish				0.1			0.2	1.1	8.9	2.5	
Quillback Rockfish											
Redbanded Rockfish			10.8	4.5	8.8	1.3	0.1		0.5	0.1	
Redstripe Rockfish				21.7			365.2	13.9	8.9	0.2	
Rex Sole	3.0	2.8	28.3	29.8	9.3	2.7	9.2	10.7	55.3	61.2	181.2
Rosethorn Rockfish				1.2	5.9		6.2	3.0	5.4	9.5	
Rougheye Rockfish		2.1	81.1	7.0	1.0	196.1	3.7				
Sablefish		77.8	115.3	750.2	35.1	76.3	170.0	72.8	1.1	8.7	44.8
Sandpaper Skate		1.4	2.5								
Sharpchin Rockfish				12.5	28.0		1.3	25.4	39.0	5.3	
Shortraker Rockfish		2.8									
Shortspine Thornyhead		33.0	70.3		42.51	51.4					
Silvergray Rockfish				1.1			15.2	25.4	3.1		
Slender Sole			0.3	0.3	0.72	0.12	0.3	0.5	3.4	2.1	7.8
Southern Rock Sole	15.8										
Splitnose Rockfish					2140						1.0
Spotted Ratfish	7.6		1.9	4.5	7.58	1.9	20.0	18.2	0.9	5.5	3.3
Threadfin Sculpin				1.3			2.2	1.2	-	3.3	
Walleye Pollock									0.5		6.4
Widow Rockfish							5.2				
Yelloweye Rockfish									4.6	22.1	
Yellowmouth Rockfish											
Yellowtail Rockfish				1.4			178.3	807.8	341.4	99.1	11.4
Other	1.3	5.9	1.7	6.9	1.48	0.96	2.1	9.6	4.9	4.5	4.4
Total	**68.2**	**264.6**	**716.2**	**1931.8**	**2516.6**	**539.7**	**1115.6**	**1350.4**	**1074.8**	**551.5**	**664.7**

Common Name	50	51	52	53	54	55	56	57	58	59	60
Arrowtooth Flounder	26.1		11.9	303.9	108.5	18.1	24.5	0.8	123.1	38.9	73.4
Aurora Rockfish								0.6			
Big Skate			20.2								
Bigfin Eelpout					2.7	3.6	0.3		1.8	-	3.6
Blackbelly Eelpout	1.6	-									
Bocaccio											
Brown Cat Shark								13.0	1.6		
Canary Rockfish		0.1		36.7			5.8				
Curlfin Sole		1.7									
Darkblotched Rockfish						1.4			1.2		
Dover Sole	9.2		64.8	34.3	100.0	36.8	17.9	70.1	186.8	13.4	41.4
English Sole	56.0	1.1	108.1	5.7	4.9						
Eulachon	0.2		2.0								
Flathead Sole	5.2		28.2								
Greenstriped Rockfish				149.1		29.0	36.5			2.6	68.4
Kelp Greenling		2.0									
Lingcod		0.6	4.0	11.7							
Longnose Skate	7.0		23.8	10.8	7.1		4.5	3.6	12.2		
North Pacific Spiny Dogfish	6.0	7.1		56.9		4.4	28.3			16.7	11.9
Pacific Cod	34.0	0.8	1.1	92.1		44.7	22.8				28.1
Pacific Hake	90.8		2.1	1.2	6.5	0.6	0.7	11.5	10.4	8.1	13.5
Pacific Halibut		5.2	44.9	18.2	8.9	9.4	15.2		19.3		
Pacific Ocean Perch		-			26.2	368.0	113.2		110.2	220.3	612.7
Pacific Sanddab	32.4	5.1	0.1								
Pacific Tomcod											
Petrale Sole	3.6	8.7	6.1	6.4		1.5					
Puget Sound Rockfish											
Pygmy Rockfish				24.2							
Quillback Rockfish											
Redbanded Rockfish	-			4.3	10.6	28.9	17.8		6.6	109.9	19.9
Redstripe Rockfish				178.2							
Rex Sole	70.2	0.1	97.9	54.3	69.1	134.8	36.8	0.6	129.1	12.4	47.1
Rosethorn Rockfish				14.3		0.8	2.1			2.0	13.8
Rougheye Rockfish					198.6	8.3		3.0	31.0	8.9	
Sablefish	1.2			129.9	86.3	18.9	102.0	124.2	173.4	28.1	95.2
Sandpaper Skate	1.1					0.2	0.9		2.3		
Sharpchin Rockfish				72.7		232.1	439.5			107.8	861.5
Shortraker Rockfish								6.5	4.0		
Shortspine Thornyhead					3.0	1.9	0.7	34.5	32.7		7.6
Silvergray Rockfish				11.1		5.2	15.9			68.4	76.3
Slender Sole	2.6		1.4	2.2		1.1	0.2		0.6		0.1
Southern Rock Sole		33.6									
Splitnose Rockfish						45.9	25.2				2.6
Spotted Ratfish	5.0	7.1	223.6	5.0		3.9	5.7	0.4	1.2	3.3	18.8
Threadfin Sculpin	0.2			11.0	0.1	0.7					-
Walleye Pollock	1.6		11.1	2.3			1.0				
Widow Rockfish											
Yelloweye Rockfish				13.7							
Yellowmouth Rockfish							2.4			197.6	22.3
Yellowtail Rockfish	1.7			77.3			1.7				
Other	4.2	5.3	5.2	6.3	1.7	4.1	2.3	14.6	2.9		1.5
Total	**359.8**	**78.4**	**656.3**	**1333.6**	**634.1**	**1004.2**	**923.7**	**283.4**	**850.4**	**838.3**	**2019.8**

Common Name	61	62	63	64	65	66	67	68	69	70	71
Arrowtooth Flounder	183.7	121.2	148.3	53.0	92.8	120.7	28.1	22.7	0.5	14.0	60.1
Aurora Rockfish											
Big Skate											
Bigfin Eelpout		0.2				0.6	2.1				
Blackbelly Eelpout		-	-	1.6	1.4	-				0.1	9.1
Bocaccio		0.5									
Brown Cat Shark						0.2					
Canary Rockfish	10.6	4.7	10.9	1.1	4.4						
Curlfin Sole									1.6		
Darkblotched Rockfish						45.5	2.7				0.2
Dover Sole	26.9	17.2	17.5	6.0	11.6	146.3	29.0	42.5	0.6	5.2	47.8
English Sole	42.1	25.0		19.1	25.5		2.1		13.9	32.5	1.3
Eulachon				-	0.5						1.4
Flathead Sole				4.0	32.1						90.2
Greenstriped Rockfish	79.4	75.2	128.9	19.4	2.6			21.8			
Kelp Greenling											
Lingcod		4.1	1.4	5.4			8.7	22.6		9.5	25.7
Longnose Skate			15.9	1.1	0.5	5.9	2.7	15.7			4.8
North Pacific Spiny Dogfish	61.4	43.2	27.1	14.3	10.9	1.9	5.4	36.1			1.5
Pacific Cod	3.5	12.7	30.4	33.1	17.2		3.2	15.4	0.4		4.5
Pacific Hake	3.1	1.9	-	15.9	5.6	59.7	8.7	0.7			33.0
Pacific Halibut	4.4	4.5	17.2	4.6		11.7	20.3	6.3	10.9	3.2	4.5
Pacific Ocean Perch	3.3		338.7			66.5	622.6	40.1			
Pacific Sanddab									19.7	198.8	
Pacific Tomcod											
Petrale Sole	4.6	6.5	-	18.4	17.7					38.0	3.4
Puget Sound Rockfish											
Pygmy Rockfish	5.9	0.6		0.1							
Quillback Rockfish											
Redbanded Rockfish	1.1		14.6			6.2	39.1	14.0			
Redstripe Rockfish	70.5	155.0	17.1	15.6							
Rex Sole	87.8	100.1	79.9	109.3	46.5	78.5	52.2	9.5	33.2	37.5	70.3
Rosethorn Rockfish	6.1	5.9	2.0					0.6			
Rougheye Rockfish						79.0	5.8				0.8
Sablefish	77.2	5.5	294.5	0.5		193.5	21.0	21.3	0.7		
Sandpaper Skate						1.2	1.2				
Sharpchin Rockfish	38.0	128.1	388.3	4.5				28.0			
Shortraker Rockfish						32.7					
Shortspine Thornyhead						43.6	68.8	10.7			
Silvergray Rockfish	5.1	26.4	71.5	1.8			8.7	9.9			
Slender Sole	1.5	3.4		8.6	27.9	0.3	1.1	0.7		0.2	14.5
Southern Rock Sole									15.4		
Splitnose Rockfish			112.8				2061.0	2.8			0.1
Spotted Ratfish	3.3	2.2	5.0	6.7	3.7	4.0	0.5	115.4	10.7	5.6	7.6
Threadfin Sculpin	-	1.2		1.3	0.4			-			0.3
Walleye Pollock			0.5		-		7.1	0.8	0.5	0.2	8.4
Widow Rockfish											
Yelloweye Rockfish	1.2	11.9	3.1							7.6	
Yellowmouth Rockfish											
Yellowtail Rockfish	24.7	5.5	5.4	43.28	1.2			1.0			1.9
Other	3.3	5.8		1.8	2.7	2.0		1.7	6.7	19.5	1.6
Total	**748.7**	**768.9**	**1731.0**	**390.4**	**305.2**	**900.2**	**3002.2**	**440.5**	**114.6**	**364.0**	**392.3**

Common Name	72	73	74	75	76	77	78	79	80	81	82
Arrowtooth Flounder	25.7	1.3	0.5		17.9	30.4	138.2	224.8	66.9	4.7	177.3
Aurora Rockfish											
Big Skate											
Bigfin Eelpout											
Blackbelly Eelpout	10.5	0.1			20.0	4.0	1.8	4.1	1.1		
Bocaccio				0.2							
Brown Cat Shark											
Canary Rockfish				36.7		2.9				677.6	
Curlfin Sole		2.2	11.5	4.5							
Darkblotched Rockfish	0.3							0.4	2.9		7.8
Dover Sole	7.4	0.2	0.3		3.8	4.4	13.1	9.2	29.1		90.0
English Sole	10.3	35.5	18.2	12.3	26.6	13.6	10.1	3.0	3.7		
Eulachon	1.6				6.1	1.0	1.2	0.5	0.8		
Flathead Sole	16.3				6.9	13.9	97.8	84.0	217.8		
Greenstriped Rockfish	0.2					0.4			0.2	60.4	
Kelp Greenling				1.4							
Lingcod			10.2		21.2	19.6	20.9	3.5			
Longnose Skate	2.8		2.9						15.0		
North Pacific Spiny Dogfish						12.6	103.9	76.0	39.3	51.8	
Pacific Cod	2.3	2.4			19.8	22.5	104.7	46.2	6.3	24.8	
Pacific Hake	14.2	3.1			7.5	57.1	427.2	27.0			11.6
Pacific Halibut		4.9	9.4		5.5	7.2	3.1	11.9		5.5	5.7
Pacific Ocean Perch										1.9	21.7
Pacific Sanddab	27.5	20.8	14.3	14.6	117.2	7.2					
Pacific Tomcod		1.4	5.0	10.5	1.5						
Petrale Sole	1.5	8.9	1.6	1.8	3.7	7.1	7.6	3.7	0.7		
Puget Sound Rockfish											
Pygmy Rockfish											
Quillback Rockfish				2.9							
Redbanded Rockfish									0.3		23.6
Redstripe Rockfish											
Rex Sole	14.4	27.1	12.5	4.7	18.3	18.4	17.9	35.9	79.1	68.8	9.3
Rosethorn Rockfish										7.4	
Rougheye Rockfish									0.2	0.2	206.4
Sablefish	1.1				20.9	7.2	6.8	19.9	8.2	2.4	136.7
Sandpaper Skate										2.3	0.8
Sharpchin Rockfish								0.3		17.8	
Shortraker Rockfish											
Shortspine Thornyhead											15.5
Silvergray Rockfish										181.5	
Slender Sole	6.0	0.2			1.7	2.7	7.7	17.0	6.7	1.4	0.4
Southern Rock Sole	0.4	6.4	21.4	7.9							
Splitnose Rockfish											1.3
Spotted Ratfish	9.0			0.7	3.0	11.6	10.0	6.3		3.1	2.0
Threadfin Sculpin		0.1				0.1				1.2	
Walleye Pollock	5.9				1.3	1.1	1.2	11.9	0.4		
Widow Rockfish				0.3							
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish				6.5				22.2	15.4	5.5	
Other	4.2	1.0	12.8	20.6	1.8	1.1	1.0	4.8	3.0	3.8	1.3
Total	**161.4**	**115.6**	**120.3**	**125.6**	**304.5**	**245.9**	**974.3**	**612.6**	**497.2**	**1121.8**	**711.3**

Common Name	83	84	85	86	87	88	89	90	91	92	93
Arrowtooth Flounder	510.8	232.1	121.1	108.8	26.6	34.4	153.7	14.9	18.6	46.4	13.0
Aurora Rockfish											
Big Skate					16.9	6.1		12.3			50.4
Bigfin Eelpout											
Blackbelly Eelpout	0.7	0.1	0.2	1.0	1.4	0.4		0.6	0.7	0.4	0.1
Bocaccio											
Brown Cat Shark											
Canary Rockfish		8.1	4.5								
Curlfin Sole											
Darkblotched Rockfish											
Dover Sole	27.8	14.0	5.3	18.0	11.4	12.8	18.3	11.1	11.2	7.6	2.4
English Sole	5.4	12.6	11.0	31.7	32.7	34.0	30.2	30.7	26.2	71.2	93.8
Eulachon			0.6	1.9	0.7	0.8	1.9	0.6	1.1	1.3	-
Flathead Sole	6.4	16.6	17.8	42.0	28.7	21.3	30.6	30.6	20.4	0.8	
Greenstriped Rockfish			0.2	0.6		0.1	0.1		0.1	0.2	0.3
Kelp Greenling											
Lingcod	5.6	10.5	15.7	37.3	24.8	34.8	13.0	12.5	48.2	26.9	7.4
Longnose Skate		0.5			8.6		13.2	8.1			
North Pacific Spiny Dogfish	169.4	140.2	69.8	54.2	5.1	6.0	29.3	10.1			12.1
Pacific Cod	16.1	12.0	38.4	95.0	40.5		285.0		3.2	0.4	
Pacific Hake			1.4	287.2	352.4	210.1	20.6	35.7	505.0	7.0	
Pacific Halibut	3.4	11.9	3.2	16.7	38.8	40.7	13.9	6.0	15.0	8.1	3.8
Pacific Ocean Perch									0.1		
Pacific Sanddab				0.4	5.4	13.0	0.1	26.3	48.2	32.4	14.4
Pacific Tomcod										0.4	
Petrale Sole	2.8	24.0	5.0	36.2	39.4	30.5	45.3	10.5	18.6	17.5	8.8
Puget Sound Rockfish											
Pygmy Rockfish											
Quillback Rockfish											
Redbanded Rockfish											
Redstripe Rockfish				0.2							
Rex Sole	39.3	22.5	15.1	17.0	37.9	34.0	24.2	61.6	95.0	84.6	31.2
Rosethorn Rockfish											
Rougheye Rockfish											
Sablefish		28.7	3.8	25.1	12.2	15.6	42.0	45.3	3.4		
Sandpaper Skate											
Sharpchin Rockfish											
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish		2.2	2.6								
Slender Sole	2.2	1.2	1.0	0.9	1.4	0.8	1.2	2.4	0.8	0.5	0.3
Southern Rock Sole										3.0	2.2
Splitnose Rockfish											
Spotted Ratfish	0.7	2.9	4.0	8.0	9.2	11.4	9.0	10.9	4.9	2.8	6.2
Threadfin Sculpin									0.2		
Walleye Pollock		0.4	0.3	0.4	2.0	1.5		2.8	1.3	2.9	9.8
Widow Rockfish											
Yelloweye Rockfish											
Yellowmouth Rockfish											
Yellowtail Rockfish	123.3	13.4	68.7	14.0	12.2	1.8	137.9	26.5	7.7	0.3	
Other	7.2	3.6	3.9	4.1	3.0	3.4	25.7	3.7	5.6	2.8	7.9
Total	**921.1**	**557.5**	**393.8**	**800.7**	**711.2**	**513.3**	**895.1**	**363.1**	**835.7**	**317.5**	**263.8**

Common Name	94	95	96	97	98	99	100	101	102	103	104
Arrowtooth Flounder	13.8	336.7	80.3	2878.1							10.7
Aurora Rockfish											
Big Skate					20.8						
Bigfin Eelpout											
Blackbelly Eelpout	1.5	-									
Bocaccio			5.7								
Brown Cat Shark											
Canary Rockfish		26.7	112.4	2.6				0.4			5.9
Curlfin Sole						0.5					
Darkblotched Rockfish											
Dover Sole	5.5	14.5	12.2	201.0	-						54.2
English Sole	21.0	14.3	13.2	85.9	80.9	1.4					
Eulachon	0.5	0.1				0.1					
Flathead Sole	66.4	6.9		6.6							
Greenstriped Rockfish	0.2	0.3	21.8	0.9					0.2	0.1	14.9
Kelp Greenling								1.8	0.4		
Lingcod	13.5	4.7	50.8	30.7	7.6		2.7		2.9		
Longnose Skate				11.0							29.3
North Pacific Spiny Dogfish	7.6	236.2	178.0	24.9	5.4			4.3	4.5		15.6
Pacific Cod	70.9	7.4	12.9	22.1	0.9	0.8					38.9
Pacific Hake	58.0										8.9
Pacific Halibut	172.2		20.2	15.9		4.3	15.4	3.1			
Pacific Ocean Perch		0.1									66.6
Pacific Sanddab	31.6				54.7	3.4		0.2	0.6	0.8	
Pacific Tomcod					3.2						
Petrale Sole	98.1	24.8	2.5	114.5	8.7	0.1			1.8		1.0
Puget Sound Rockfish								-			
Pygmy Rockfish			4.1								
Quillback Rockfish						1.4		1.2			
Redbanded Rockfish											21.6
Redstripe Rockfish			212.7			0.4		0.3	0.2		12.2
Rex Sole	42.1	28.8	42.9	189.2	11.6	0.4					92.9
Rosethorn Rockfish											0.5
Rougheye Rockfish											
Sablefish	2.7	3.7	0.6	221.8							
Sandpaper Skate											
Sharpchin Rockfish			4.7								50.9
Shortraker Rockfish											
Shortspine Thornyhead											
Silvergray Rockfish			24.4								28.8
Slender Sole	1.0	2.1	0.8	0.7			0.1				2.6
Southern Rock Sole					3.7	24.8	4.3	5.4	8.8	13.8	0.4
Splitnose Rockfish											
Spotted Ratfish	6.5	3.4	1.5	8.2		16.2	10.2	3.6	3.9	13.3	3.2
Threadfin Sculpin					-						0.2
Walleye Pollock	9.4					1.4					1.4
Widow Rockfish											
Yelloweye Rockfish			8.2								18.3
Yellowmouth Rockfish											
Yellowtail Rockfish	1.7		2054.3								1.8
Other	0.3	0.9	0.6	24.0	16.3	1.5	1.1	5.4	4.3	0.5	6.8
Total	**624.5**	**711.5**	**2864.9**	**3338.0**	**213.6**	**56.6**	**33.8**	**25.6**	**27.5**	**28.5**	**487.8**

Common Name	105	106	107	108	109	110	111	112	113	114	115
Arrowtooth Flounder	9.9	1317.8	100.3	13.8	21.3	71.8	110.0	1245.5	0.5	59.2	48.7
Aurora Rockfish											
Big Skate											
Bigfin Eelpout			0.7								
Blackbelly Eelpout							-			-	
Bocaccio					10.0						
Brown Cat Shark											
Canary Rockfish		336.4			580.8	19.8	17.3	195.8		16.1	148.5
Curlfin Sole	0.1										
Darkblotched Rockfish	-		7.9	30.6				0.8			
Dover Sole	1.7	6.9	16.6	46.1	6.4	2.6	14.4	126.6	0.5	8.5	0.3
English Sole	5.5						54.6		2.3	3.8	2.0
Eulachon	0.2						15.1			4.3	0.6
Flathead Sole							12.0			3.2	0.4
Greenstriped Rockfish	0.2	17.0			61.6	20.6	3.3	45.9			
Kelp Greenling											
Lingcod	100.7	19.1			7.1		6.7	9.5	29.1	133.6	286.4
Longnose Skate		23.0		0.7		6.8					
North Pacific Spiny Dogfish		28.4	4.4	1.6		3.0	7.3	21.0		16.8	11.2
Pacific Cod		17.1	5.7		52.0	26.0	59.0	7.1		4.1	
Pacific Hake		-	28.6	11.0	8.9	31.7	44.6	1.4		0.2	
Pacific Halibut		14.5	7.3		17.2	13.1	10.3	7.7	51.9	3.1	7.8
Pacific Ocean Perch		2.4	203.1	396.1		6.4		0.5			
Pacific Sanddab									3.6		0.2
Pacific Tomcod											
Petrale Sole	14.9						4.6		11.6	5.0	2.7
Puget Sound Rockfish											
Pygmy Rockfish					0.4						
Quillback Rockfish											
Redbanded Rockfish		52.7	5.9	19.6	7.1	1.6		2.4			
Redstripe Rockfish		160.6			698.3	45.9	1.9	91.1			
Rex Sole	10.8	73.1	4.4	3.4	21.8	12.9	46.6	76.4	28.1	47.1	29.8
Rosethorn Rockfish		1.6	0.3		26.1	8.1		14.4			
Rougheye Rockfish			24.9	21.8							
Sablefish		224.0	318.1	38.1	22.2	5.4		8.9			
Sandpaper Skate				1.1			2.4			1.1	
Sharpchin Rockfish	-	821.7			304.3	21.3		9.4			
Shortraker Rockfish											
Shortspine Thornyhead			88.5	92.1		19.0					
Silvergray Rockfish	1.6	68.5	1.1		176.6	34.3	2.5			4.8	2.4
Slender Sole	0.8	-				0.3	2.7	13.7	0.1	1.2	0.8
Southern Rock Sole									38.4		
Splitnose Rockfish			11.1	109.5	2.2	11.6					
Spotted Ratfish	6.6	3.3	8.9	2.5	2.2	25.1	5.4	5.6	33.2	9.7	3.1
Threadfin Sculpin					-						
Walleye Pollock	59.4	-					0.3			0.2	
Widow Rockfish											
Yelloweye Rockfish		4.2	2.5		11.6			6.0			
Yellowmouth Rockfish		1.9	8.5		73.8	3.8					
Yellowtail Rockfish		6.7			40.7		1.6	2.7			
Other	0.7		7.0	5.5		3.0	4.7	3.4	-	15.7	0.3
Total	**212.9**	**3201.1**	**855.8**	**793.4**	**2152.6**	**393.9**	**427.5**	**1895.6**	**199.4**	**337.7**	**545.0**

Common Name	116	117	118	119	120	121	122	123	124	125	126
Arrowtooth Flounder	55.9	99.3	93.2	82.1	20.0	84.1	502.8	46.9	258.3	206.9	92.3
Aurora Rockfish											
Big Skate					9.6						
Bigfin Eelpout									0.6	-	
Blackbelly Eelpout			0.1		2.2	5.2					1.2
Bocaccio	9.8										
Brown Cat Shark							1.0				
Canary Rockfish	509.6	27.9	38.1	23.1				5.3			
Curlfin Sole											
Darkblotched Rockfish					0.3					3.9	
Dover Sole	2.5	18.7	29.4	9.6	8.3	19.9	85.9	12.1	86.9	33.4	15.9
English Sole					40.5	28.9					5.1
Eulachon						1.1					2.0
Flathead Sole					11.0	33.7				2.8	31.5
Greenstriped Rockfish	2.3	24.7	14.8	106.2	0.2			18.1			3.1
Kelp Greenling											
Lingcod	26.0		5.1	10.7	21.2	15.5		15.8			4.1
Longnose Skate			14.8	29.9	4.8		19.9		7.6		13.7
North Pacific Spiny Dogfish	2.2	15.4	3.9	6.1	8.8	2.1	32.0	66.2	16.4	2.7	32.2
Pacific Cod		5.3	4.7	38.5	2.0	36.7		14.2		8.8	11.2
Pacific Hake		0.8			2.6	56.5	5.5		4.6	3.6	
Pacific Halibut	4.6	38.4	12.6	45.4	3.6	3.8	11.7	10.1		4.5	
Pacific Ocean Perch		3.8	0.3	1130.8			61.7		17.3	432.5	
Pacific Sanddab					79.6						
Pacific Tomcod					0.3						
Petrale Sole	1.4				9.4	8.4		0.7			5.1
Puget Sound Rockfish											
Pygmy Rockfish	0.3	0.1	0.2					11.0			
Quillback Rockfish											
Redbanded Rockfish	6.7	1.8	17.0	3.1			8.9	12.8	6.3	7.9	
Redstripe Rockfish	144.2	51.4	10.3	307.6				5.4			
Rex Sole	3.3	27.7	47.3	116.0	59.6	40.7	6.3	31.2	5.6	121.2	135.9
Rosethorn Rockfish	2.1	13.7	23.9	25.7				13.7			
Rougheye Rockfish							28.4	1.8	56.0	1.8	
Sablefish		27.8	5.8	18.3	7.7	3.8	921.8	13.2	304.8	162.3	0.9
Sandpaper Skate											
Sharpchin Rockfish	217.5	57.2	76.4	403.1				174.0			
Shortraker Rockfish							19.6				
Shortspine Thornyhead		6.3	2.5	5.2			16.8		11.1	5.7	
Silvergray Rockfish	105.5	5.7	12.1	137.5		10.3		13.3		1.7	
Slender Sole	0.3	0.2	0.3		0.8	11.3		0.4		0.4	17.8
Southern Rock Sole					0.5						
Splitnose Rockfish				1.6						1530.9	
Spotted Ratfish	8.3	1.3	3.5	5.1	10.9	4.7	1.0	0.6	1.8	0.7	2.1
Threadfin Sculpin											
Walleye Pollock					6.3	0.9				2.1	
Widow Rockfish								1.3			
Yelloweye Rockfish	10.3		11.3					3.7			
Yellowmouth Rockfish				12.2							
Yellowtail Rockfish		1.1		8.3	0.5						37.9
Other	-	4.9	7.8	1.1	104.6	0.4	1.0	4.3	-		2.4
Total	**1112.6**	**433.3**	**435.4**	**2527.0**	**415.3**	**368.1**	**1724.2**	**475.8**	**777.5**	**2533.8**	**414.5**

Common Name	127	128	129	130	131	132	133	134	135	136	137
Arrowtooth Flounder	33.6	44.6	429.6	128.0	26.3	66.5	3.7	46.6	68.0	120.6	303.1
Aurora Rockfish											
Big Skate						3.6	27.8				
Bigfin Eelpout			4.4								
Blackbelly Eelpout	0.2	1.0	-	-	16.5	0.5	-	0.8	2.7	0.4	
Bocaccio				2.2							
Brown Cat Shark											
Canary Rockfish		2.6		3.9		0.2				1.9	
Curlfin Sole							4.8				
Darkblotched Rockfish			1.0		0.2				0.3		
Dover Sole	9.7	8.3	29.6	16.3	8.5	1.8	1.5	0.3	40.5	24.9	31.9
English Sole	45.8	39.9			7.7	84.8	31.6	67.3			2.8
Eulachon	3.7	1.2			3.3	0.3		1.9	1.3	0.2	
Flathead Sole	36.4	21.1			8.6	7.6		6.5	166.7	40.9	
Greenstriped Rockfish	-	0.4	1.0	79.7				0.1		24.7	29.5
Kelp Greenling											
Lingcod		5.3		4.4	2.6	11.2	27.9			243.3	5.4
Longnose Skate		6.6							10.7	10.9	7.5
North Pacific Spiny Dogfish	15.2	23.1	10.7	13.5	2.9			7.5	6.2	2.0	9.1
Pacific Cod	57.7	183.5		10.5	23.5			15.7	53.8	19.7	13.2
Pacific Hake		106.1	11.0	1.7	460.0	0.8		25.8	2.0	1.0	
Pacific Halibut	3.2	3.5		8.4			9.1	9.2	21.2		50.9
Pacific Ocean Perch			231.8								15.7
Pacific Sanddab		0.4			47.0	61.3	7.4	114.2			
Pacific Tomcod						0.4	3.3				
Petrale Sole		5.9			1.5	28.4	5.4	25.9	1.8	2.1	1.0
Puget Sound Rockfish											
Pygmy Rockfish				7.4						1.6	4.2
Quillback Rockfish											
Redbanded Rockfish			6.2	2.0						0.7	0.3
Redstripe Rockfish	0.8			1559.4							0.8
Rex Sole	34.3	32.2	65.1	91.6	34.7	39.8	56.1	21.1	22.8	57.8	85.8
Rosethorn Rockfish				16.5							1.1
Rougheye Rockfish											
Sablefish	4.3	3.5	163.2	197.5	14.8	2.1		1.5	2.5	1.0	46.4
Sandpaper Skate											
Sharpchin Rockfish				285.9	0.1					0.9	21.4
Shortraker Rockfish											
Shortspine Thornyhead			10.8								
Silvergray Rockfish				9.3							24.9
Slender Sole	3.0	3.5	1.0	0.9	1.0	1.5	0.2	3.4	5.3	9.8	1.3
Southern Rock Sole							25.8				
Splitnose Rockfish			819.6								
Spotted Ratfish	7.3	6.7	2.0		3.5	0.8	3.8		5.0	48.5	7.0
Threadfin Sculpin	0.3			2.5	-	-		-		0.3	0.3
Walleye Pollock	0.3	1.3	1.0		0.5	0.9		0.7	0.6		
Widow Rockfish				1.1							
Yelloweye Rockfish											1.3
Yellowmouth Rockfish											
Yellowtail Rockfish	0.6	7.2		9.5					1.3	136.1	1.6
Other	-	1.8	-	14.4	0.3	1.5	1.4	0.7	0.7	0.8	0.6
Total	**256.4**	**509.8**	**1788.1**	**2466.6**	**663.3**	**313.6**	**209.8**	**349.2**	**413.3**	**750.2**	**667.1**

Common Name	138	139	140	141	142	143	144	145	146	147
Arrowtooth Flounder	37.3	145.8	20.1	94.0	193.6	114.2	39.8	54.4	2.6	
Aurora Rockfish	0.8									
Big Skate									1.1	3.9
Bigfin Eelpout		1.9	0.8		2.2	1.7				
Blackbelly Eelpout							0.4	9.8	-	
Bocaccio										
Brown Cat Shark			1.1							
Canary Rockfish				216.3		1.9			0.2	
Curlfin Sole									0.9	0.9
Darkblotched Rockfish		1.1				2.4	3.5			
Dover Sole	37.6	77.3	60.1	14.5	39.8	45.7	38.1	66.7	0.6	
English Sole				0.5	0.7				22.1	4.4
Eulachon							4.0	1.4		
Flathead Sole					4.7		54.4	114.6		0.2
Greenstriped Rockfish				25.2		51.4	6.8	0.3		
Kelp Greenling									0.2	
Lingcod								4.7	7.7	
Longnose Skate			2.1		10.3	16.0		4.0		
North Pacific Spiny Dogfish				2.1	2.0		6.9	15.3		
Pacific Cod				6.2		22.9	2.4	32.0	3.5	
Pacific Hake	12.0	23.0	13.7		3.3		1.8	2.9		
Pacific Halibut						6.0		8.0	9.4	1.7
Pacific Ocean Perch	1.0	77.0	2.7		46.0	247.4	39.1			
Pacific Sanddab									32.2	11.8
Pacific Tomcod										-
Petrale Sole						1.1			6.0	
Puget Sound Rockfish										
Pygmy Rockfish				0.6						
Quillback Rockfish										
Redbanded Rockfish		5.3			3.0	10.6	0.8			
Redstripe Rockfish				1580.5						
Rex Sole	2.4	19.7	3.8	14.4	30.2	81.5	121.6	77.9	22.9	0.2
Rosethorn Rockfish				12.8		0.5				
Rougheye Rockfish	49.7	621.2	8.9	4.9	3.9					
Sablefish	99.9	154.6	36.5	28.9	66.9	50.5	26.2	5.5		
Sandpaper Skate										
Sharpchin Rockfish				10.6		202.7				
Shortraker Rockfish										
Shortspine Thornyhead	22.8	20.5	7.8		79.2	6.3				
Silvergray Rockfish	7.4			9.9						
Slender Sole				0.1	0.6	2.0	7.1	8.9	0.2	
Southern Rock Sole									5.6	3.0
Splitnose Rockfish					6.1	0.8				
Spotted Ratfish	3.1	1.3	0.8	0.1		6.8	1.6	1.7	2.1	
Threadfin Sculpin		0.6				0.4				
Walleye Pollock							5.9	3.6	1.7	
Widow Rockfish				19.6						
Yelloweye Rockfish				6.2						
Yellowmouth Rockfish										
Yellowtail Rockfish				758.2		2.2	2.0			
Other	3.0	1.8	2.8		1.7	1.2	4.0	1.1	-	0.9
Total	**277.1**	**1151.2**	**161.4**	**2805.5**	**494.3**	**876.1**	**366.4**	**412.8**	**119.0**	**27.0**