

# Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey on the South Coast of British Columbia, July 10 - 20, 2015

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2021

## Canadian Data Report of Fisheries and Aquatic Sciences 1340



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JUVENILE PACIFIC SALMON (*ONCORHYNCHUS* SPP.) TRAWL SURVEY ON THE SOUTH  
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by

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Cat. No. Fs97-13/1340E-PDF ISBN 978-0-660-38740-6 ISSN 1488-5395

Correct citation for this publication:

Anderson, E.D., Tabata, A.M., Zubkowski, T.B., and King, J.R. 2021. Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey on the South Coast of British Columbia, July 10-20, 2015. Can. Data Rep. Fish. Aquat. Sci. 1340: vi + 38 p.

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## ABSTRACT

Anderson, E.D., Tabata, A.M., Zubkowski, T.B., and King, J.R. 2021. Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey on the South Coast of British Columbia, July 10-20, 2015. Can. Data Rep. Fish. Aquat. Sci. 1340: vi + 38 p.

Fisheries and Oceans Canada conducted a trawl survey from July 10-20, 2015 on the *CCGS W.E. Ricker*. This study targeted juvenile Pacific Salmon in southern British Columbia (BC). There were 85,194 individuals caught from 24 species in 54 tows. Pacific Herring was the most abundant species with 92% of the total catch, primarily caught in three tows. All species of Pacific Salmon (*Oncorhynchus* spp.) were caught. Salmon species in decreasing abundance by count were: Pink Salmon (41 juveniles, 1217 adults), Coho Salmon (471 juveniles, 247 adults), Chum Salmon (467 juveniles, 119 adults), Chinook Salmon (90 juveniles, 64 adults), and Sockeye Salmon (45 juveniles, 50 adults). Catch distribution varied based on salmon species and life stage. Biological samples for genetic stock composition (790), otoliths (468), pathogen analyses (239), energy density and stable isotope analyses (2,812), and coded wire tags (95) were returned to the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC). Associated information on the physical oceanography (52 locations) and zooplankton samples (51 locations) were returned to the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC).

## RÉSUMÉ

Anderson, E.D., Tabata, A.M., Zubkowski, T.B., and King, J.R. 2021. Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey on the South Coast of British Columbia, July 10-20, 2015. Can. Data Rep. Fish. Aquat. Sci. 1340: vi + 38 p.

Pêches et Océans Canada a effectué un relevé au chalutage du 10 au 20 juillet 2015 sur le *CCGS W.E. Ricker*. Cette étude ciblait le saumon du Pacifique juvénile dans le sud de la Colombie-Britannique (C.-B.). On a capturé 85 194 individus de 24 espèces dans 54 traits de chalut. Le hareng du Pacifique était l'espèce la plus abondante avec 92% de la prise totale, principalement capturée dans trois traits. Toutes les espèces de saumon du Pacifique (*Oncorhynchus* spp.) ont été capturées. Les espèces de saumon en abondance décroissante par comptage étaient: le saumon rose (41 juvéniles, 1217 adultes), le saumon coho (471 juvéniles, 247 adultes), le saumon kéta (467 juvéniles, 119 adultes), le saumon quinnat (90 juvéniles, 64 adultes) et le saumon rouge (45 juvéniles, 50 adultes). La distribution des prises variait en fonction de l'espèce de saumon et du stade de vie. Les échantillons biologiques pour la composition génétique des stocks (790), les otolithes (468), des analyses de pathogènes (239), des analyses de densité énergétique et d'isotopes stables (2 812), et les micromarques magnétisées codées (95) ont été retournés à la Station biologique du Pacifique, Pêches et Océans Canada (Nanaimo, C.-B.). Les informations associées sur l'océanographie physique (52 sites) et les échantillons de zooplancton (51 sites) ont été retournés à l'Institut des sciences de la mer, Pêches et Océans Canada (Sidney, C.B.).



## 1 INTRODUCTION

Fisheries and Oceans Canada conducted a trawl survey, targeting juvenile Pacific Salmon (*Oncorhynchus* spp.) from July 10-20, 2015 on the *CCGS W.E. Ricker*. The main objectives of this survey were:

1. to determine the abundance, condition, distribution, and genetic stock composition of juvenile Pacific Salmon present off southern British Columbia in the summer,
2. the associated physical oceanography, and
3. the distribution and biomass of zooplankton.

This survey supports research on linkages between oceanographic conditions, fish abundance and community composition, Pacific Salmon ocean ecology and forecasting adult returns. This data report documents the biological, oceanographic, and zooplankton data and samples collected.

## 2 METHODS

### 2.1 SURVEY LOCATIONS

Fishing (Figure 1), oceanographic (Figure 2), and zooplankton (Figure 3) sampling occurred off southern British Columbia, including Johnstone Strait, Queen Charlotte Strait, Queen Charlotte Sound, west coast of Vancouver Island, and Juan de Fuca Strait.

### 2.2 FISHING OPERATIONS

The *CCGS W.E. Ricker* deployed a Cantrawl model 250 midwater trawl net (approximately 90 m long x 30 m wide x 15 m deep; [Cantrawl Nets Ltd.](#), Richmond, Canada; Appendix Table A and Appendix Figure B). This three-bridle midwater net had a codend liner with 12.7 mm mesh (stretched) to retain smaller species. On this survey, the trawl net opening was 14 m high by 36 m wide, or an area of 504 m<sup>2</sup>.

Tow speed averaged 8.9 km/hr, and varied between 5.6 to 15.6 km/hr speed over ground, depending on the wind, tide, and current. The target headrope depths were 0 m, 15 m, and 30 m. Warp length ranged from 150 m to 200 m (Appendix C). Tow duration was 15-30 min, with the time starting when the Jet 5 m<sup>2</sup> trawls doors were locked and the net started fishing.

### 2.3 CATCH PROCESSING

All fish species were sorted to species and counted. Species catch (number of fish) were divided by swept volume to calculate catch per unit effort (CPUE; Figures 4 to 13). The survey targets

juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

## **2.4 BIOLOGICAL SAMPLING**

All salmon species were measured for fork length (mm) and weight (g), sex determined, and presence of lice recorded. Pacific Salmon were divided into juveniles and adults based on their fork lengths to account for different migratory behavior. All Pacific Salmon species, except for Coho Salmon, were considered juveniles < 300 mm. Coho Salmon were considered juveniles < 350 mm. A random sample of whole bodies from each salmon species were frozen for future energy density and stable isotope analyses. Additional collections included: fin clips for genetic stock identification (GSI), additional salmon tissues for molecular identification of pathogens, otoliths, adipose fin status (i.e. clipped vs. non-clipped), and coded wire tags (CWTs).

## **2.5 OCEANOGRAPHY**

A [Sea-bird](#) 911plus CTD (conductivity-temperature-depth) was used for oceanographic profiles (Sea-bird Electronics Bellevue Washington, USA) at 52 locations (Figure 2, Appendix D). A Niskin bottle at 10 m from the surface was used for nutrient and chlorophyll (chl a) collections. Seawater samples for nitrate, phosphate, and silicate were placed in acid-washed glass test tubes and frozen. Seawater for chl a estimation were filtered with GF/F glass fibre filter disks. Filter disks were then placed in polypropylene scintillation vials and frozen. Both the nutrient and chl a samples were frozen and maintained at -18°C. Nutrient and chl a samples were sent for analyses at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC).

## **2.6 ZOOPLANKTON**

At 51 locations (Figure 3, Appendix D), vertical tows to sample zooplankton were conducted to approximately 250 m or within 10 m of the bottom with two 60 cm diameter, 253 micrometer mesh nets mounted in a bongo-drum style frame, one of which was equipped with a flow meter. Zooplankton collected from the flow meter side were preserved in 10% formalin and sent to the zooplankton laboratory at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC) for species enumeration. The other zooplankton sample was sorted into four size fractions by successively sieving through 8.0, 1.7, 1.0, and 0.25 mm screens. Individual size fractions were frozen for future stable isotope, energy density, and proximate analyses.

# **3 RESULTS**

## **3.1 FISHING OPERATIONS**

This survey completed 54 tows (Appendix C), with 88,266 individuals from 27 species sampled.

### 3.2 CATCH COMPOSITION

Total catch for the survey from usable tows was 88,266 pieces, with 2,811 pieces (or 3%) Pacific Salmon. Detailed catch composition for each tow is included in Appendix E. For each species captured during the survey, the number of tows in which the species was present, total catch count, maximum catch count, and mean catch count for usable tows is presented in Table 1. The most abundant species caught by count were Pacific Herring, primarily caught in three tows (78,345 pieces), Jack Mackerel (3,396 pieces), then Pacific Sardine (1,897 pieces; Table 1). All species of Pacific Salmon were caught. The order of abundance by count was: Pink Salmon, Coho Salmon, Chum Salmon, Chinook Salmon, and Sockeye Salmon.

Juvenile Chinook Salmon were caught in the northern tows, both in Queen Charlotte Strait and off northwest Vancouver Island (Figure 4). Adult Chinook Salmon were more abundant in Juan de Fuca Strait and southwest Vancouver Island, although they were present elsewhere (Figure 5). Juvenile Chum Salmon were also found in the northern regions of the survey area (Figure 6). Adult Chum Salmon were found throughout the survey area, except within Queen Charlotte Strait. The largest catches of adult Chum Salmon were in Queen Charlotte Sound and La Perouse Bank (Figure 7). Juvenile Coho Salmon were abundant throughout the survey area, with the exception of southwest Vancouver Island (Figure 8). Adult Coho Salmon were present in small numbers throughout the survey area, however, Juan de Fuca Strait had the largest catches of adult Coho Salmon. Juvenile Pink Salmon were the least abundant salmon species with only 41 juveniles caught, primarily in Queen Charlotte Strait (Figure 8). Conversely, adult Pink Salmon were the most abundant adult salmon caught, except for northwest Vancouver Island. The abundant adult Pink Salmon and few juvenile Pink Salmon is expected given that Pink Salmon have alternating large and small return years. Juvenile Sockeye Salmon were localized within the migratory corridor through Johnstone Strait and Queen Charlotte Sound (Figure 12). Adult Sockeye Salmon were limited to the northwest region off Vancouver Island.

In addition, two Steelhead (Rainbow Trout, *Oncorhynchus mykiss*), were caught off Quatsino Sound and Brooks Peninsula. Both individuals were greater than 600 mm in fork length.

### 3.3 BIOLOGICAL SAMPLES

Samples were collected for GSI (790), otoliths (468), pathogen analyses (239), energy density and stable isotope analyses (2,812). CWTs (95) when present and detected were retained. These biological samples are located at the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC).

### 3.4 LENGTH AND WEIGHT

Length frequencies and length-weight relationships are presented for juvenile Pacific Salmon species in Figures 14 to 18. Double log transformed length-weight regressions coefficients were similar in all five Pacific Salmon species. Lengths and weights of 33 species were recorded, including all five Pacific Salmon species represented (Table 2). Coho Salmon (Juveniles) had the

largest maximum length (342 mm) and weight (458 g), whereas Sockeye Salmon (juveniles) had the smallest maximum length (75 mm) and weight (4 g) of the Pacific Salmon species.

### **3.5 OCEANOGRAPHY**

CTD casts were completed at 52 locations with cast depths ranging from 40 m to 252 m (Appendix D). There were 52 locations sampled for nutrient and chl a. Oceanographic data from the CTD casts and nutrient analysis of the water samples were archived online within the [Water Properties Data Inventory](#) under cruise number '201515,' as well as [Canadian Integrated Ocean Observing System](#) or CIOOS.

### **3.6 ZOOPLANKTON**

Vertical bongo tows were conducted at 51 locations to depths ranging from 37 m to 250 m (Appendix D). Formalin-preserved zooplankton samples will be sorted to species and enumerated at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC). Data will be archived in the zooplankton database. Fractionated zooplankton samples were frozen at the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC).

## **4 DISCUSSION**

This juvenile Pacific Salmon trawl survey collected valuable information on distribution, abundance, condition, and genetic stock composition for juvenile Pacific Salmon off southern British Columbia. Overall, juvenile Coho Salmon and juvenile Chum Salmon were most abundant, whereas juvenile Pink Salmon were least abundant. Distributions varied by species and life stage. This survey data supplements historic juvenile Pacific Salmon surveys that have been reported in Fisheries and Oceans Canada [State of the Pacific Ocean](#), and are being incorporated into longer term and broader scope research projects.

## 5 ACKNOWLEDGEMENTS

We would like to acknowledge that scientific research was conducted in the territories of the following First Nations: Ahousaht, Cowichan, Ditidaht, Ehattesaht, Hesquiaht, Hupacasath, Huu-ay-aht, Gwa'Sala-'Nakwaxda'xw, Gwawaenuk, Heitsuk, Homalco, K'ómoks, Kwakiutl, Kwiakah, Maa-nulth, Mamalilikulla-Qwe'Qwa'Sot'Em, Mowachaht/Muchalaht, 'Namgis, Nuchatlaht, Pacheedaht, Quatsino, Scia'new, Te'mexw Treaty Association, Tla'min, Tla-o-qui-aht, Tlatlasikwala, Tlowitsis, Toquaht, Tseshaht, T'Sou-ke, Uchucklesaht, Ucluelet, We Wai Kai, and Wei Wai Kum.

We would like to thank Captain and crew of the *CCGS W.E. Ricker*. Additional acknowledgments to Marc Trudel, who led the high seas salmon program in 2015, and John Morris, who was Chief Scientist on this survey. We appreciate the participation of the following scientific personnel on this survey: Midoli Bresch, Dylan Conover, Brook Davis, Lana Fitzpatrick, Kelsey Flynn, Jim Irvine, Yeongha Jung, Carolyn Knapper, Hugh Maclean, and John Morris.

## 6 FIGURES

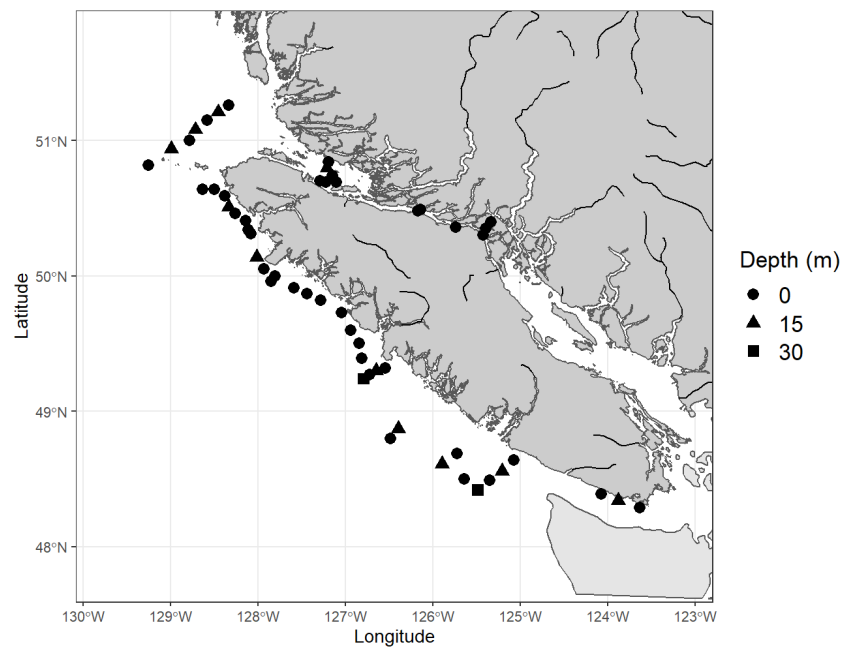


Figure 1. Fishing tow locations during the juvenile Pacific Salmon survey from July 10-20, 2015 on the *CCGS W.E. Ricker*. There were 3 target head rope depths indicated by shape.

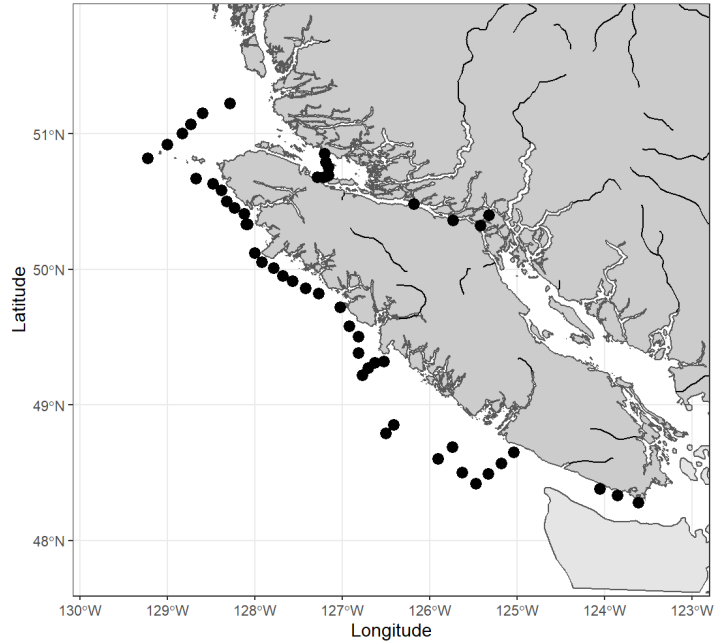


Figure 2. Oceanographic sampling locations during the juvenile Pacific Salmon survey from July 10-20, 2015 on the *CCGS W.E. Ricker*. There were 52 SBE 911plus CTD casts.

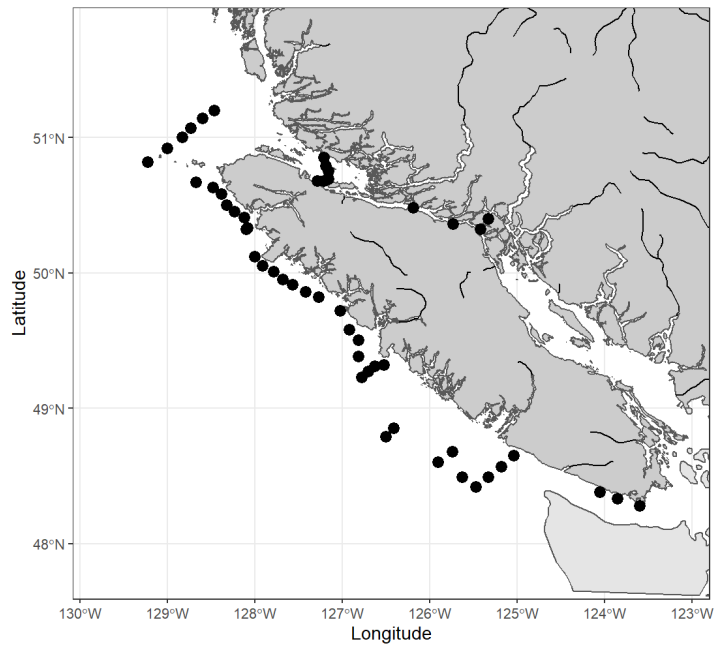


Figure 3. Zooplankton sampling locations during the juvenile Pacific Salmon survey from July 10-20, 2015 on the *CCGS W.E. Ricker*. There were 51 zooplankton vertical tows.

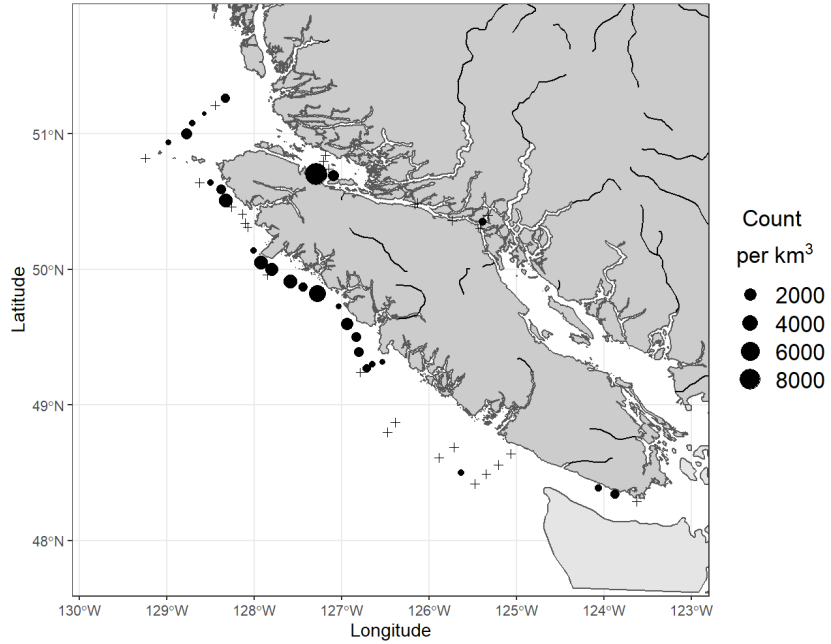


Figure 4. Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

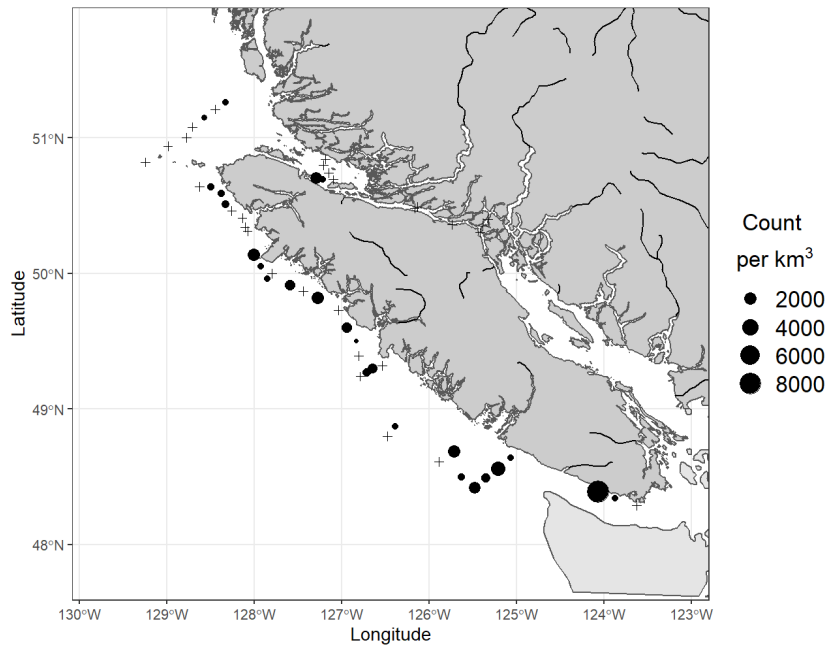


Figure 5. Adult Chinook Salmon (*Oncorhynchus tshawytscha*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). The survey targets juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

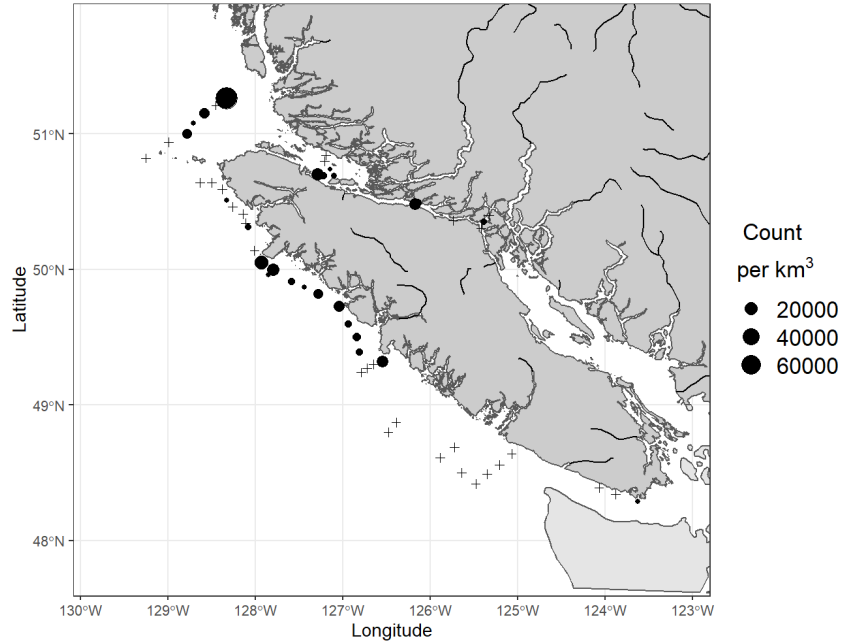


Figure 6. Juvenile Chum Salmon (*Oncorhynchus keta*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

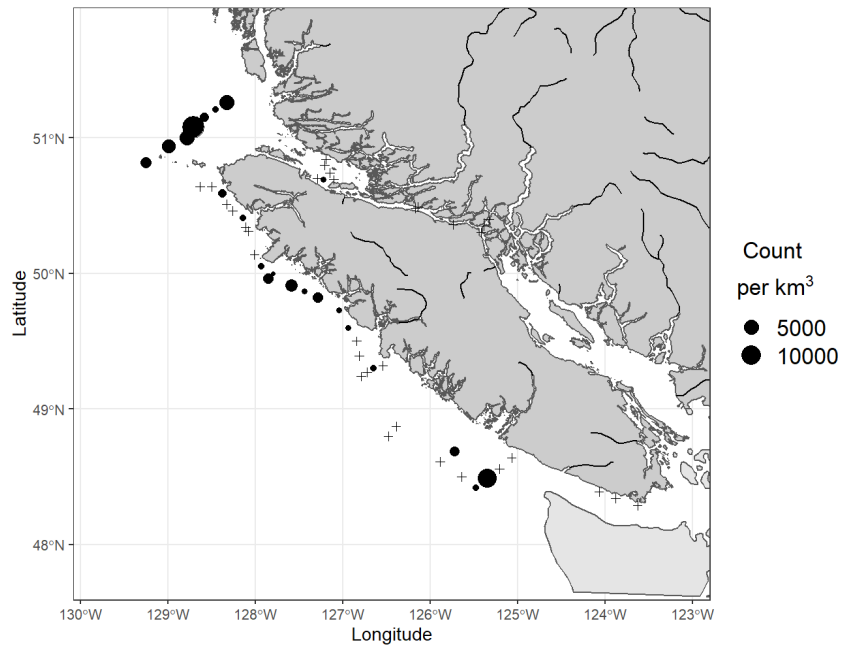


Figure 7. Adult Chum Salmon (*Oncorhynchus keta*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). The survey targets juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.



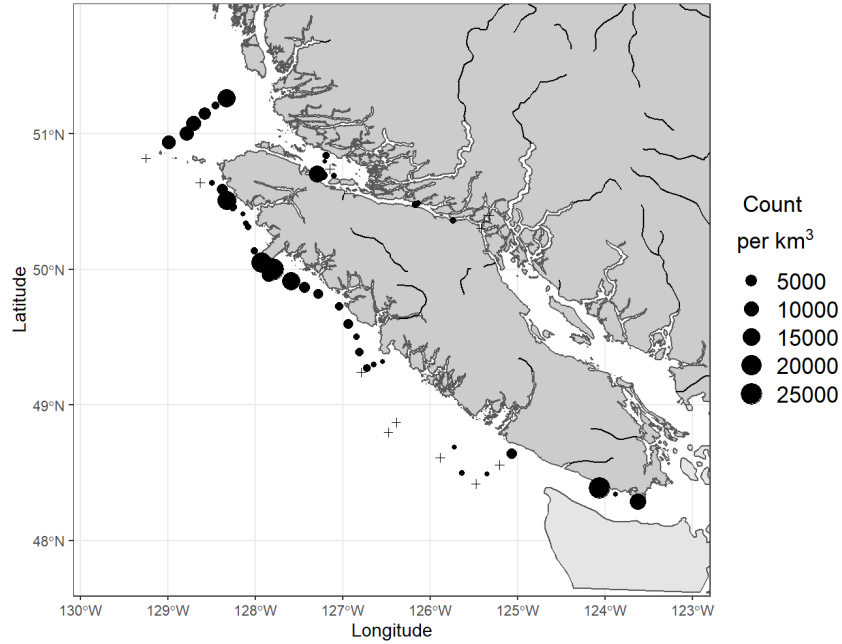


Figure 8. Juvenile Coho Salmon (*Oncorhynchus kitsutch*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

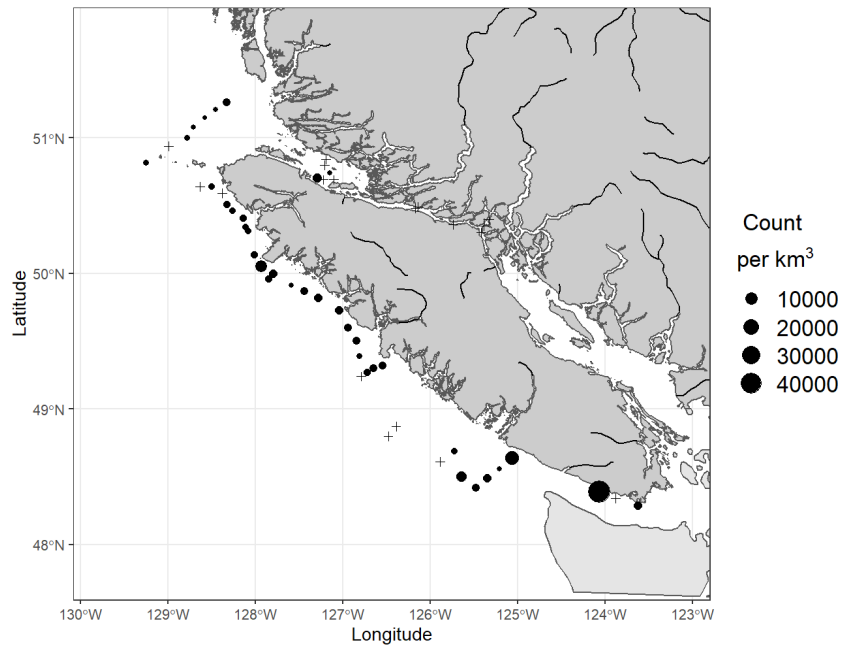


Figure 9. Adult Coho Salmon (*Oncorhynchus kitsutch*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). The survey targets juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

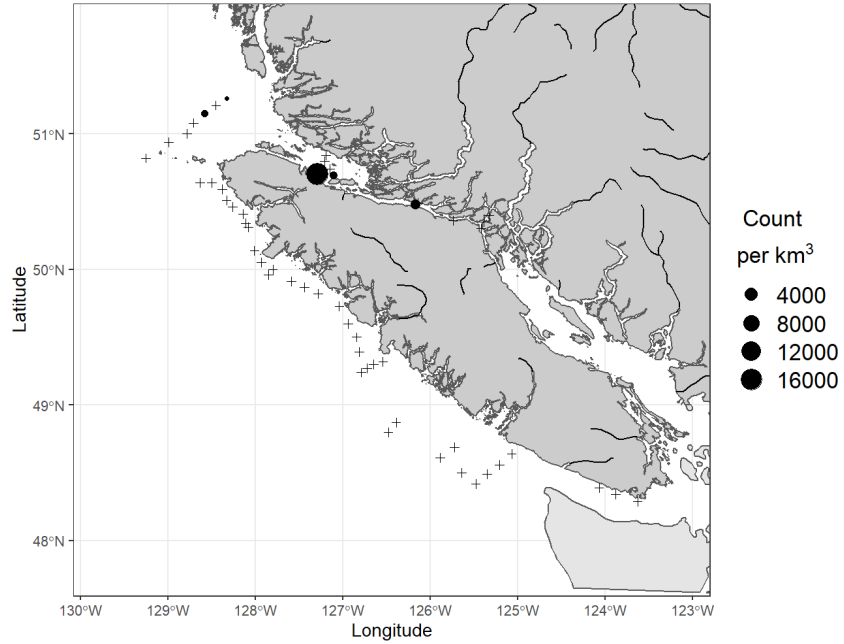


Figure 10. Juvenile Pink Salmon (*Oncorhynchus gorbusha*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

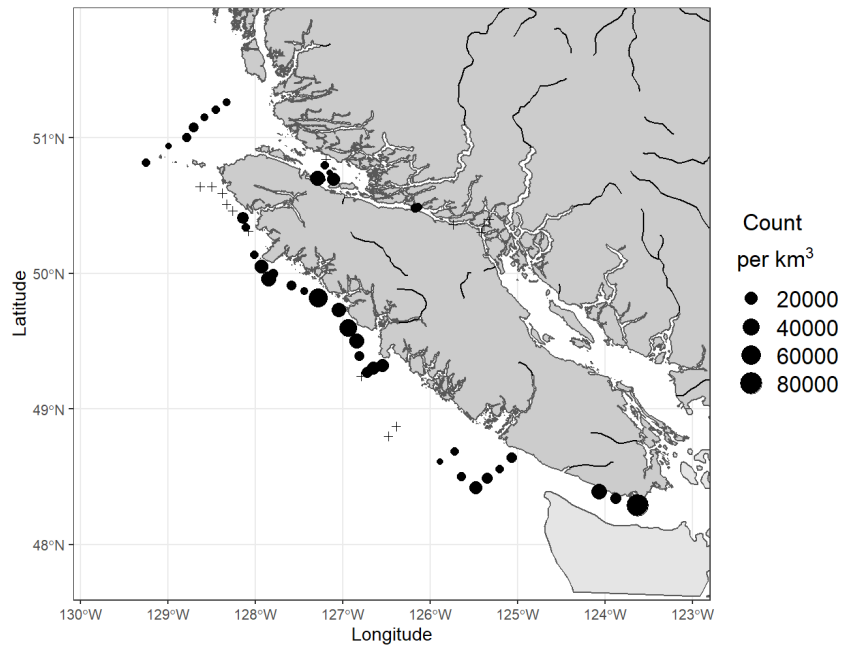


Figure 11. Adult Pink Salmon (*Oncorhynchus gorbusha*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). The survey targets juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

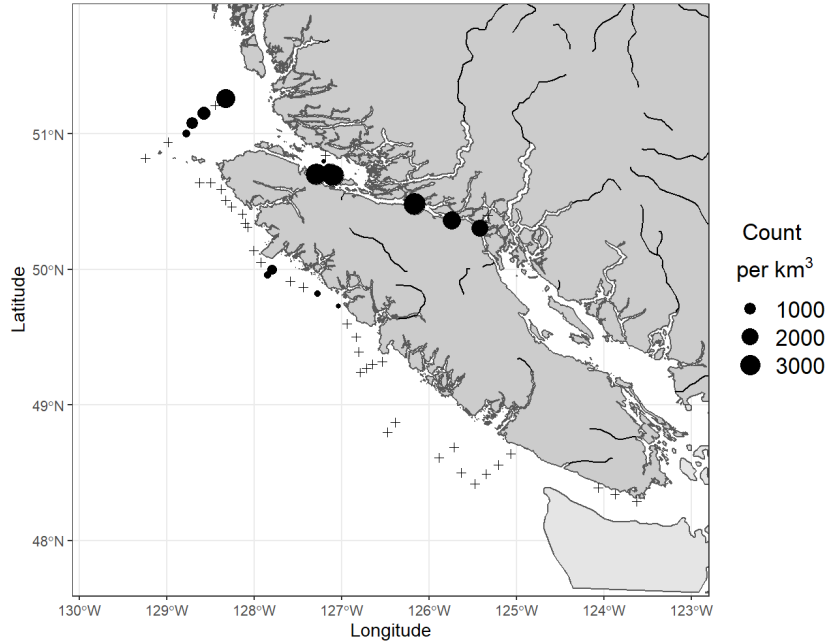


Figure 12. Juvenile Sockeye Salmon (*Oncorhynchus nerka*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

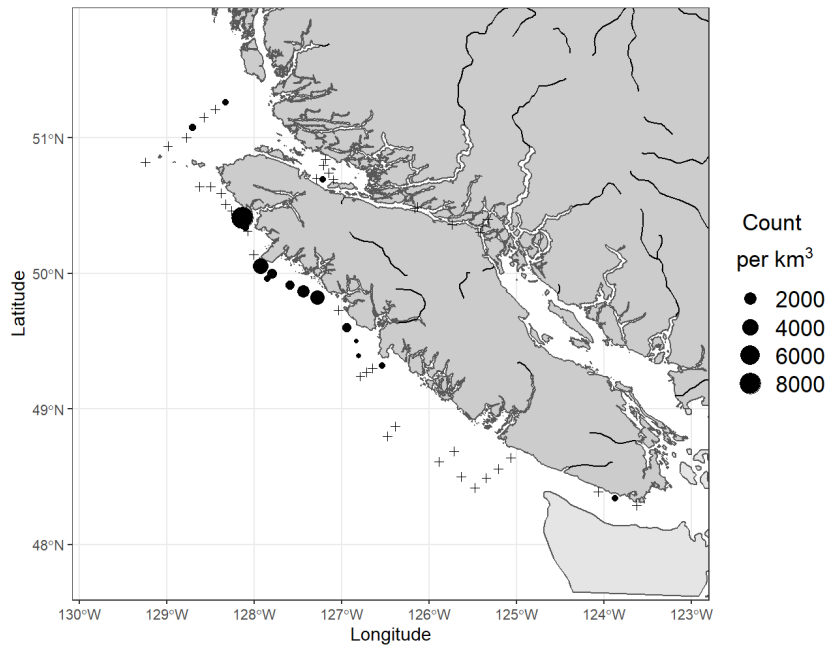


Figure 13. Adult Sockeye Salmon (*Oncorhynchus nerka*) catch per km<sup>3</sup> for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). The survey targets juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

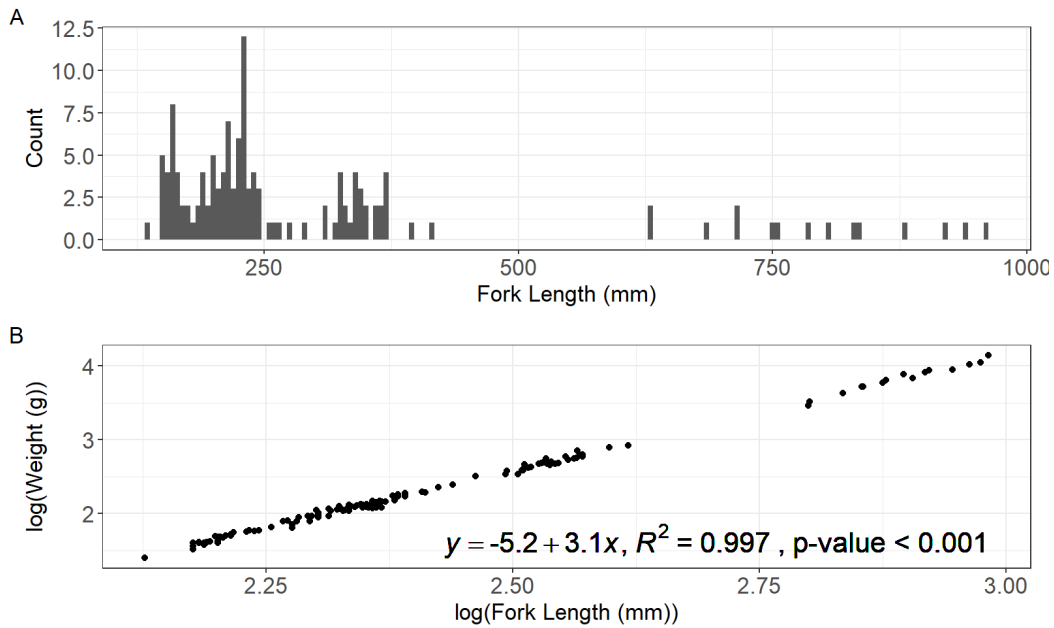


Figure 14. Chinook Salmon (*Oncorhynchus tshawytscha*) length frequency plot as sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

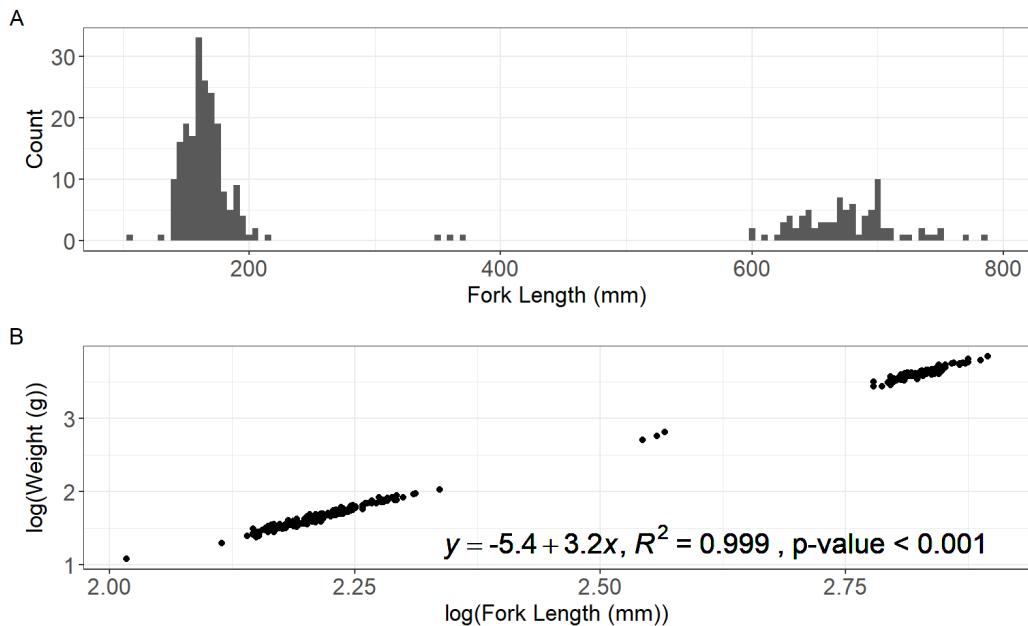


Figure 15. Chum Salmon (*Oncorhynchus keta*) length frequency plot as sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

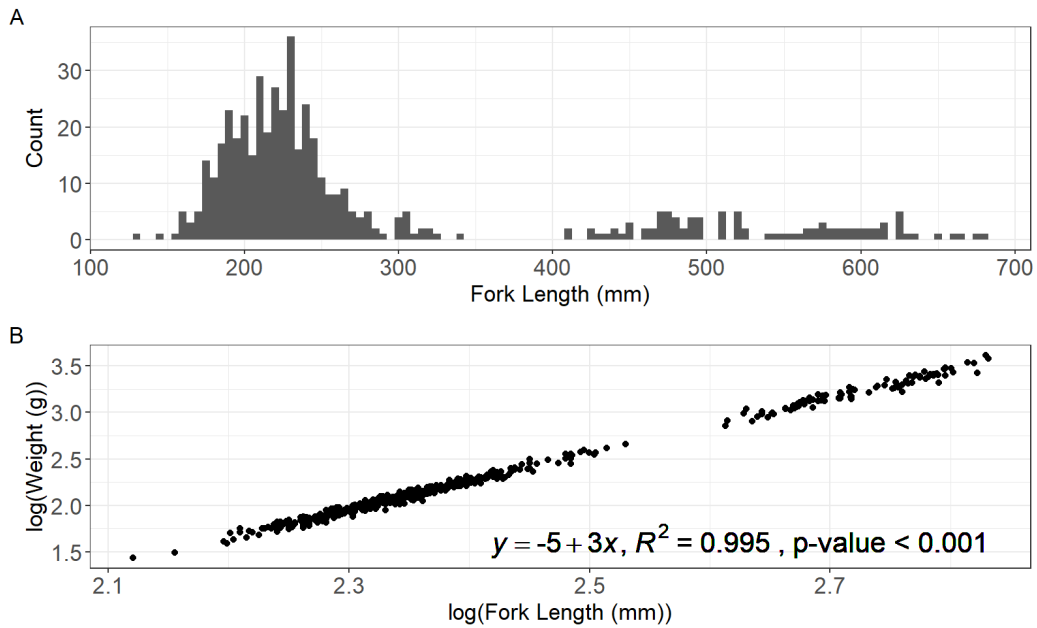


Figure 16. Coho Salmon (*Oncorhynchus kisutch*) length frequency plot as sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

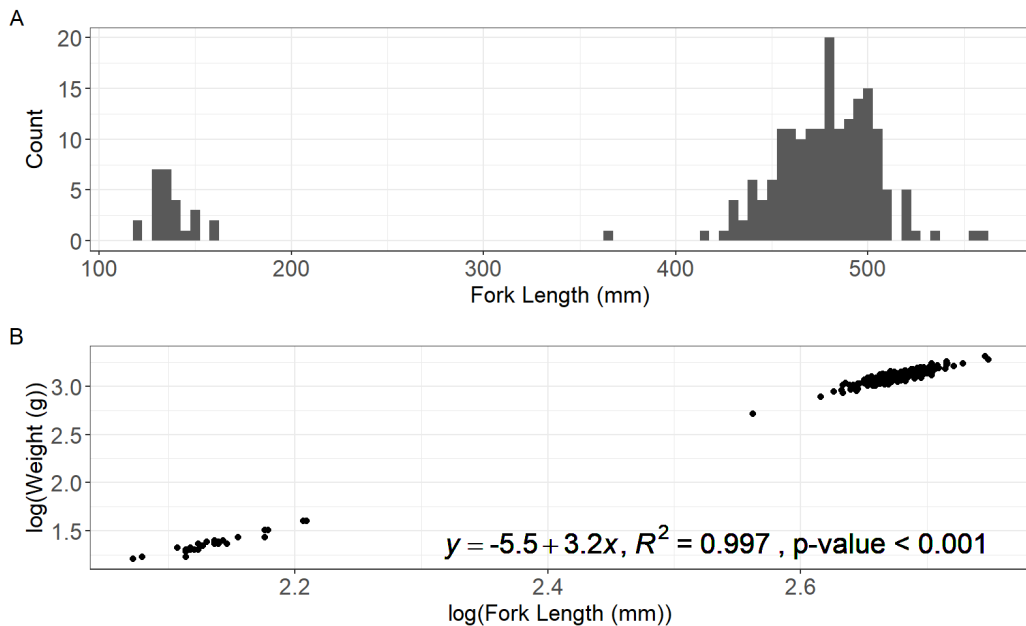


Figure 17. Pink Salmon (*Oncorhynchus gorbusha*) length frequency plot as sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

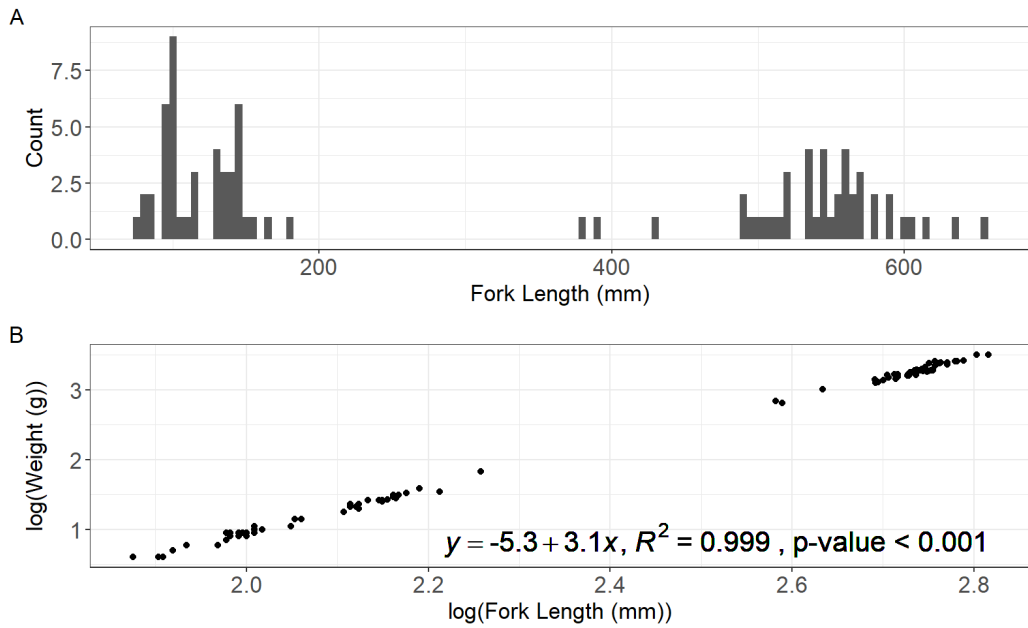


Figure 18. Sockeye Salmon (*Oncorhynchus nerka*) length frequency plot as sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

## 7 TABLES

Table 1. All captured species (or taxonomic group), ordered by total catch (in pieces), showing number of tows in which the species occurred, total catch count, maximum catch count, and mean catch count per tow for usable tows during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015.

<b>Common Name</b>	<b>Scientific Name</b>	<b>Tows</b>	<b>Total</b>	<b>Max</b>	<b>Mean</b>
Pacific Herring	<i>Clupea pallasii</i>	3	78345	45880	26115
Jack Mackerel	<i>Trachurus symmetricus</i>	3	3396	3390	1132
Pacific Sardine	<i>Sardinops sagax</i>	1	1897	1897	1897
Northern Anchovy	<i>Engraulis mordax</i>	2	1294	1277	647
Pink Salmon (Adults)	<i>Oncorhynchus gorbuscha</i>	40	1217	164	30
Coho Salmon (Juveniles)	<i>Oncorhynchus kisutch</i>	42	471	71	11
Chum Salmon (Juveniles)	<i>Oncorhynchus keta</i>	25	467	177	19
Coho Salmon (Adults)	<i>Oncorhynchus kisutch</i>	36	247	80	7
Opalescent Inshore Squid	<i>Doryteuthis opalescens</i>	6	225	99	38
Chub Mackerel	<i>Scomber japonicus</i>	1	120	120	120
Chum Salmon (Adults)	<i>Oncorhynchus keta</i>	22	119	28	5
Chinook Salmon (Juveniles)	<i>Oncorhynchus tshawytscha</i>	28	90	16	3
Chinook Salmon (Adults)	<i>Oncorhynchus tshawytscha</i>	25	64	14	3
Walleye Pollock	<i>Gadus chalcogrammus</i>	5	63	34	13
Sockeye Salmon (Adults)	<i>Oncorhynchus nerka</i>	16	50	17	3
Sockeye Salmon (Juveniles)	<i>Oncorhynchus nerka</i>	16	45	7	3
Pink Salmon (Juveniles)	<i>Oncorhynchus gorbuscha</i>	6	41	30	7
Black Rockfish	<i>Sebastes melanops</i>	11	33	7	3
North Pacific Spiny Dogfish	<i>Squalus suckleyi</i>	6	26	20	4
Wolf Eel	<i>Anarrhichthys ocellatus</i>	12	24	6	2
Pacific Cod	<i>Gadus macrocephalus</i>	3	15	10	5
Tope Shark	<i>Galeorhinus galeus</i>	3	4	2	1
Medusafish	<i>Icichthys lockingtoni</i>	1	2	2	2
Pricklebacks	Stichaeidae	1	2	2	2
Yellowtail Rockfish	<i>Sebastes flavidus</i>	1	2	2	2
Bay Pipefish	<i>Syngnathus leptorhynchus</i>	1	1	1	1
Blue Shark	<i>Prionace glauca</i>	1	1	1	1
Eulachon	<i>Thaleichthys pacificus</i>	1	1	1	1
Pacific Spiny Lumpsucker	<i>Eumicrotremus orbis</i>	1	1	1	1
Prowfish	<i>Zaprora silenus</i>	1	1	1	1
Quillfish	<i>Ptilichthys goodei</i>	1	1	1	1
Smelts	Osmeridae	1	1	1	1

Table 2. Lengths and weights for each species (arranged descending by the number of length measurements for each by species) sampled during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015. (Tows = number of tows, Measured = number of length measurements, Weighed = number of weight measurements).

Species	Tows	Length (mm)			Weight (g)				
		Measured	Min	Max	Mean	Weighed	Min	Max	Mean
Pink Salmon (Adults)	40	1216	320	579	468	176	520	2060	1303
Coho Salmon (Juveniles)	44	493	132	342	223	399	27	458	133
Chum Salmon (Juveniles)	24	466	104	244	162	199	12	106	47
Coho Salmon (Adults)	32	227	351	678	502	95	721	4142	1798
Chum Salmon (Adults)	21	118	328	785	600	90	506	7150	4186
Opalescent Inshore Squid	4	112	20	105	56				
Pacific Herring	3	105	132	290	178				
Chinook Salmon (Juveniles)	27	89	134	298	205	91	25	324	107
Chinook Salmon (Adults)	25	64	311	960	493	45	340	13930	2757
Pacific Sardine	1	61	163	261	197				
Walleye Pollock	3	59	37	81	58				
Jack Mackerel	3	56	215	550	264				
Northern Anchovy	2	53	138	171	156				
Sockeye Salmon (Adults)	16	50	382	654	545	43	650	3210	1891
Sockeye Salmon (Juveniles)	16	45	75	181	118	45	4	68	18
Pink Salmon (Juveniles)	7	42	110	291	138	26	16	40	24
Black Rockfish	11	33	212	540	398				
North Pacific Spiny Dogfish	6	26	510	1180	835				
Wolf Eel	12	24	265	559	477				
Pacific Cod	3	15	54	75	65				
Chub Mackerel	1	5	237	289	259				
Tope Shark	3	4	1485	1820	1639				
Medusafish	1	2	95	110	102				
Pricklebacks	1	2	72	75	74				
Rainbow Trout (Steelhead)	2	2	610	662	636	1	3248	3248	3248



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Species	Tows	Length (mm)			Weight (g)			
		Measured	Min	Max	Mean	Min	Max	Mean
Yellowtail Rockfish	1	2	347	360	354			
Bay Pipefish	1	1	82	82	82			
Blue Shark	1	1	1065	1065	1065			
Eulachon	1	1	182	182	182			
Pacific Spiny Lumpsucker	1	1	20	20	20			
Prowfish	1	1	91	91	91			
Quillfish	1	1	140	140	140			
Smelts	1	1	40	40	40			

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## APPENDIX A CANTRAWL 250 NET SPECIFICATIONS

Table A.1. Net specifications for the CanTrawl 250 net used during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015.

<b>Part</b>	<b>Size</b>	<b>Material</b>
<b>Rigging</b>		
Doors	2 m <sup>2</sup>	Jet
Door Legs	12.2 m (6.67 fm)	1 inch Spectra rope
Bridles	45.72 m (25 fm)	5/8 Wire Rope
<b>Net Frame</b>		
Head Line	76.2 m (41.7 fm)	1 1/8 inch Tenex
<b>Foot Rope</b>		
Foot Rope	76.2 (41.7 fm)	1/2 chain
<b>Web</b>		
Mesh incl. Codend	3.8 cm (1.5 inch)	Knotted nylon
Codend Liner	12.7 mm (0.5 inch)	210/20 knotless liner

## APPENDIX B CANTRAWL 250 NET DIAGRAM

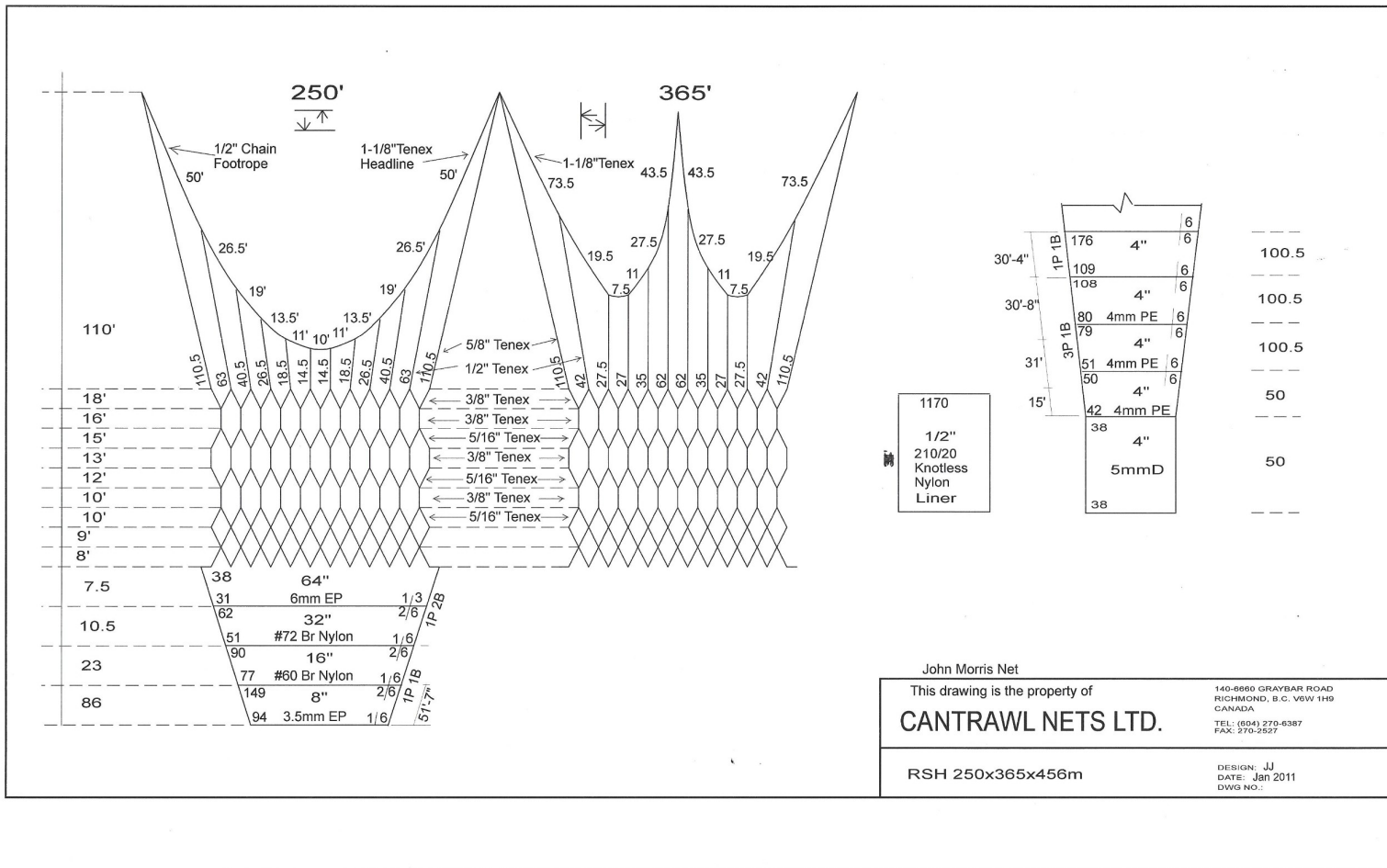


Figure B.1. Net diagram for CanTrawl 250 trawl net used during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015.

## APPENDIX C TRAWL BRIDGE LOG DATA

Table C.1. Bridge log information for trawl tows during the juvenile Pacific Salmon survey aboard the *CCGS W.E. Ricker*, July 10-20, 2015.

<b>Tow Number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Event Number	217	220	223	226	229	232
Date	2015-07-10	2015-07-10	2015-07-10	2015-07-11	2015-07-11	2015-07-11
Station ID	JF01	JF02	JF03	VI01	VI02	VI03
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	13:24	15:20	16:59	07:00	08:40	10:26
Duration (min)	30	30	19	30	30	30
Start Latitude	48° 17' 24" N	48° 20' 24" N	48° 23' 24" N	48° 38' 24" N	48° 33' 36" N	48° 29' 24" N
Start Longitude	123° 37' 48" W	123° 52' 48" W	124° 4' 12" W	125° 4' 12" W	125° 12' 36" W	125° 20' 60" W
End Latitude	48° 17' 60" N	48° 21' 0" N	48° 23' 60" N	48° 36' 36" N	48° 32' 24" N	48° 27' 36" N
End Longitude	123° 41' 24" W	123° 55' 48" W	124° 7' 12" W	125° 7' 12" W	125° 15' 36" W	125° 24' 0" W
Direction of Tow (deg)	279	283	289	232	238	235
Vessel Speed (km/h)	8.1	8.8	10.5	9.3	9.6	9.1
Distance Towed (km)	4.06	4.41	3.37	4.67	4.80	4.57
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	175	150	175	175	175
Target Headrope Depth (m)	0	15	0	0	15	0
Start Bottom Depth (m)	132	135	79	71	104	153
End Bottom Depth (m)	163	133	91	101	115	159
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
Event Number	235	238	241	244	247	250
Date	2015-07-11	2015-07-11	2015-07-11	2015-07-11	2015-07-12	2015-07-12
Station ID	VI04	VI05	VI06	VI07	VI08	VI09
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	12:10	14:11	16:40	18:28	06:53	08:39
Duration (min)	30	30	30	30	30	30
Start Latitude	48° 25' 12" N	48° 30' 0" N	48° 36' 36" N	48° 41' 24" N	48° 47' 60" N	48° 52' 12" N
Start Longitude	125° 28' 48" W	125° 38' 24" W	125° 53' 24" W	125° 43' 12" W	126° 28' 48" W	126° 23' 24" W
End Latitude	48° 26' 24" N	48° 30' 36" N	48° 36' 36" N	48° 43' 12" N	48° 49' 48" N	48° 53' 60" N
End Longitude	125° 31' 12" W	125° 41' 24" W	125° 57' 0" W	125° 40' 48" W	126° 26' 24" W	126° 21' 36" W
Direction of Tow (deg)	298	293	263	47	44	36
Vessel Speed (km/h)	7.2	7.9	8.6	8.4	9.5	8.2
Distance Towed (km)	3.59	3.93	4.30	4.22	4.76	4.11
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	200	175	150	150	175	175
Target Headrope Depth (m)	30	0	15	0	0	15
Start Bottom Depth (m)	136	105	90	150	230	171
End Bottom Depth (m)	133	91	75	169	185	157
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>
Event Number	256	259	262	265	268	271
Date	2015-07-14	2015-07-14	2015-07-14	2015-07-14	2015-07-14	2015-07-14
Station ID	EP01	EP02	EP03	EP04	VI10	VI11
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	06:44	08:06	09:25	10:44	12:39	14:14
Duration (min)	30	30	30	30	30	30
Start Latitude	49° 19' 12" N	49° 17' 60" N	49° 16' 12" N	49° 14' 24" N	49° 23' 24" N	49° 30' 0" N
Start Longitude	126° 32' 24" W	126° 39' 0" W	126° 43' 12" W	126° 47' 24" W	126° 48' 36" W	126° 50' 24" W
End Latitude	49° 18' 36" N	49° 16' 12" N	49° 13' 48" N	49° 16' 12" N	49° 26' 24" N	49° 31' 48" N
End Longitude	126° 35' 60" W	126° 41' 24" W	126° 45' 36" W	126° 48' 36" W	126° 47' 60" W	126° 54' 36" W
Direction of Tow (deg)	266	228	223	335	9	295
Vessel Speed (km/h)	9.0	8.0	10.0	9.0	10.6	11.0
Distance Towed (km)	4.50	4.00	5.02	4.52	5.30	5.50
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	175	175	200	175	150
Target Headrope Depth (m)	0	15	0	30	0	0
Start Bottom Depth (m)	68	106	123	133	104	113
End Bottom Depth (m)	87	117	129	135	81	95
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>
Event Number	274	277	280	283	286	289
Date	2015-07-14	2015-07-14	2015-07-15	2015-07-15	2015-07-15	2015-07-15
Station ID	VI12	VI13	VI14	VI15	VI16	VI17
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	15:43	17:52	06:35	08:08	09:39	11:14
Duration (min)	30	30	30	30	30	30
Start Latitude	49° 36' 0" N	49° 43' 48" N	49° 49' 12" N	49° 52' 12" N	49° 54' 36" N	49° 57' 36" N
Start Longitude	126° 56' 24" W	127° 2' 24" W	127° 16' 48" W	127° 26' 24" W	127° 35' 24" W	127° 50' 60" W
End Latitude	49° 37' 48" N	49° 44' 24" N	49° 49' 48" N	49° 53' 60" N	49° 55' 12" N	49° 59' 24" N
End Longitude	126° 59' 24" W	127° 5' 24" W	127° 20' 24" W	127° 29' 24" W	127° 39' 0" W	127° 51' 36" W
Direction of Tow (deg)	317	296	285	306	280	349
Vessel Speed (km/h)	9.7	9.3	8.5	8.8	9.0	8.3
Distance Towed (km)	4.87	4.63	4.24	4.41	4.50	4.15
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	150	150	150	150	150
Target Headrope Depth (m)	0	0	0	0	0	0
Start Bottom Depth (m)	58	62	66	70	63	112
End Bottom Depth (m)	75	69	74	75	103	102
Usable	Y	Y	Y	Y	Y	Y



<b>Tow Number</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>
Event Number	292	295	298	301	304	307
Date	2015-07-15	2015-07-15	2015-07-15	2015-07-16	2015-07-16	2015-07-16
Station ID	VI18	VI19	VI20	VI21	VI22	VI23
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	12:49	14:25	15:57	06:37	08:25	09:55
Duration (min)	30	30	30	30	30	30
Start Latitude	50°0' 0" N	50°2' 60" N	50°8' 24" N	50°18' 36" N	50°20' 24" N	50°24' 36" N
Start Longitude	127°47' 60" W	127°55' 48" W	128°0' 36" W	128°4' 48" W	128°6' 36" W	128°8' 24" W
End Latitude	50°1' 48" N	50°4' 48" N	50°10' 12" N	50°15' 36" N	50°22' 12" N	50°25' 12" N
End Longitude	127°50' 24" W	127°58' 12" W	128°1' 12" W	128°4' 12" W	128°7' 48" W	128°11' 24" W
Direction of Tow (deg)	321	310	354	174	337	287
Vessel Speed (km/h)	10.9	8.3	7.8	10.3	7.7	8.2
Distance Towed (km)	5.44	4.13	3.91	5.13	3.85	4.09
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	175	200	175	175	150
Target Headrope Depth (m)	0	0	15	0	0	0
Start Bottom Depth (m)	122	159	102	95	110	87
End Bottom Depth (m)	119	133	97	112	109	116
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>
Event Number	310	313	316	319	322	325
Date	2015-07-16	2015-07-16	2015-07-16	2015-07-16	2015-07-16	2015-07-17
Station ID	VI24	VI25	VI26	VI27	VI28	T07
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	11:40	13:12	14:45	16:16	17:35	06:40
Duration (min)	30	30	30	30	30	30
Start Latitude	50° 27' 36" N	50° 30' 36" N	50° 35' 24" N	50° 38' 24" N	50° 38' 24" N	50° 49' 12" N
Start Longitude	128° 15' 36" W	128° 19' 48" W	128° 22' 48" W	128° 30' 0" W	128° 37' 48" W	129° 15' 0" W
End Latitude	50° 27' 36" N	50° 31' 48" N	50° 36' 36" N	50° 38' 60" N	50° 40' 12" N	50° 50' 24" N
End Longitude	128° 18' 36" W	128° 20' 60" W	128° 25' 12" W	128° 32' 24" W	128° 39' 36" W	129° 19' 12" W
Direction of Tow (deg)	273	334	318	302	320	297
Vessel Speed (km/h)	7.4	6.9	7.4	7.6	8.1	10.6
Distance Towed (km)	3.69	3.44	3.72	3.82	4.06	5.30
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	175	200	150	150	150	150
Target Headrope Depth (m)	0	15	0	0	0	0
Start Bottom Depth (m)	124	126	90	125	178	119
End Bottom Depth (m)	156	128	84	138	167	148
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>41</b>	<b>42</b>
Event Number	328	331	334	337	340	343
Date	2015-07-17	2015-07-17	2015-07-17	2015-07-17	2015-07-17	2015-07-17
Station ID	T06	T05	T04	T03	T02	T01
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	09:28	11:03	12:35	14:16	15:55	17:33
Duration (min)	30	30	30	30	30	30
Start Latitude	50°56' 24" N	51°0' 0" N	51°4' 48" N	51°8' 60" N	51°12' 36" N	51°15' 36" N
Start Longitude	128°59' 24" W	128°46' 48" W	128°42' 36" W	128°34' 48" W	128°26' 60" W	128°19' 48" W
End Latitude	50°57' 36" N	51°1' 48" N	51°6' 0" N	51°10' 48" N	51°12' 36" N	51°13' 48" N
End Longitude	128°56' 24" W	128°45' 36" W	128°39' 36" W	128°31' 12" W	128°23' 24" W	128°17' 24" W
Direction of Tow (deg)	49	24	54	52	81	139
Vessel Speed (km/h)	9.2	7.3	8.0	10.2	8.2	8.9
Distance Towed (km)	4.61	3.67	4.02	5.11	4.09	4.43
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	175	150	175	150	175	150
Target Headrope Depth (m)	15	0	15	0	15	0
Start Bottom Depth (m)	64	62	66	160	194	83
End Bottom Depth (m)	74	65	93	198	166	71
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>43</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>
Event Number	346	349	352	355	358	361
Date	2015-07-18	2015-07-18	2015-07-18	2015-07-18	2015-07-18	2015-07-18
Station ID	QCST01	QCST02	QCST03	QCST04	QCST05	QCST06
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	06:40	08:15	10:20	11:25	13:28	14:55
Duration (min)	30	30	30	30	30	30
Start Latitude	50° 50' 24" N	50° 47' 60" N	50° 44' 24" N	50° 41' 24" N	50° 41' 24" N	50° 42' 0" N
Start Longitude	127° 11' 24" W	127° 12' 36" W	127° 9' 0" W	127° 5' 60" W	127° 13' 12" W	127° 17' 24" W
End Latitude	50° 49' 48" N	50° 47' 60" N	50° 43' 48" N	50° 41' 24" N	50° 43' 12" N	50° 43' 12" N
End Longitude	127° 8' 24" W	127° 16' 48" W	127° 5' 24" W	127° 9' 0" W	127° 15' 36" W	127° 19' 12" W
Direction of Tow (deg)	116	281	115	273	322	325
Vessel Speed (km/h)	8.7	9.4	9.3	7.8	9.3	7.1
Distance Towed (km)	4.37	4.72	4.67	3.89	4.67	3.54
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	175	175	150	150	150
Target Headrope Depth (m)	0	15	0	0	0	0
Start Bottom Depth (m)	132	150	172	151	106	80
End Bottom Depth (m)	151	147	172	89	231	182
Usable	Y	Y	Y	Y	Y	Y

<b>Tow Number</b>	<b>49</b>	<b>50</b>	<b>51</b>	<b>52</b>	<b>53</b>	<b>54</b>
Event Number	364	365	368	369	372	375
Date	2015-07-19	2015-07-19	2015-07-19	2015-07-19	2015-07-19	2015-07-19
Station ID	JS01	JS02	JS03	JS04	JS05	JS06
Net	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl	CanTrawl
Start Time (PDT)	06:45	07:25	11:12	13:19	14:41	16:15
Duration (min)	15	15	15	15	15	30
Start Latitude	50°28' 48" N	50°29' 24" N	50°21' 36" N	50°21' 0" N	50°23' 60" N	50°17' 60" N
Start Longitude	126°10' 12" W	126°8' 24" W	125°44' 24" W	125°23' 24" W	125°19' 48" W	125°25' 12" W
End Latitude	50°28' 12" N	50°28' 12" N	50°21' 36" N	50°21' 36" N	50°22' 48" N	50°16' 48" N
End Longitude	126°9' 0" W	126°10' 12" W	125°42' 0" W	125°21' 36" W	125°20' 24" W	125°24' 36" W
Direction of Tow (deg)	108	215	87	55	204	161
Vessel Speed (km/h)	8.7	15.6	9.9	10.7	9.2	5.6
Distance Towed (km)	2.17	3.89	2.48	2.69	2.30	2.82
Net Opening Width (m)	36	36	36	36	36	36
Net Opening Height (m)	14	14	14	14	14	14
Warp Length (m)	150	150	150	150	150	150
Target Headrope Depth (m)	0	0	0	0	0	0
Start Bottom Depth (m)	318	250	200	288	258	235
End Bottom Depth (m)	310	323	222	211	232	203
Usable	Y	Y	Y	Y	Y	Y

## APPENDIX D CTD CASTS AND ZOOPLANKTON TOWS

Table D.1. CTD casts and vertical bongo tow times and depths during the juvenile Pacific Salmon survey from July 10-20, 2015 on the *CCGS W.E. Ricker*.

Date	Station	Latitude	Longitude	CTD			BONGO		
				Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)
2015-07-10	JF01	48° 16' 48" N	123° 36' 36" W	10:58	177	160	12:13	183	150
2015-07-10	JF02	48° 19' 48" N	123° 50' 60" W	13:47	134	125	15:02	141	130
2015-07-10	JF03	48° 22' 48" N	124° 2' 60" W	15:34	55	45	16:42	54	44
2015-07-11	VI01	48° 38' 60" N	125° 2' 24" W	05:32	52	40	06:43	57	47
2015-07-11	VI02	48° 34' 12" N	125° 10' 48" W	07:08	100	90	08:21	106	96
2015-07-11	VI03	48° 29' 24" N	125° 19' 48" W	08:50	149	140	10:05	149	140
2015-07-11	VI04	48° 25' 12" N	125° 28' 12" W	10:39	130	120	11:52	135	125
2015-07-11	VI05	48° 30' 0" N	125° 37' 48" W	12:40	102	95	13:52	106	95
2015-07-11	VI06	48° 36' 0" N	125° 54' 0" W	15:12	93	80	16:23	94	84
2015-07-15	VI18	50° 0' 36" N	127° 46' 48" W	11:21	113	100	12:33	117	107
2015-07-11	VI07	48° 41' 24" N	125° 44' 24" W	16:56	144	130	18:10	144	134
2015-07-12	VI08	48° 47' 24" N	126° 30' 0" W	05:06		252	06:30	266	250
2015-07-12	VI09	48° 51' 0" N	126° 24' 36" W	06:52	177	165	08:16	177	150
2015-07-14	EP01	49° 19' 12" N	126° 31' 12" W	05:14	57	50	06:24	58	50
2015-07-14	EP02	49° 18' 36" N	126° 37' 48" W	06:36	98	90	07:48	100	90
2015-07-14	EP03	49° 16' 12" N	126° 42' 0" W	07:53	120	110	09:06	110	100
2015-07-14	EP04	49° 13' 12" N	126° 46' 12" W	09:12	130	120	10:25	133	123
2015-07-14	VI10	49° 22' 48" N	126° 48' 36" W	11:09	113	100	12:21	113	103
2015-07-14	VI11	49° 30' 0" N	126° 48' 36" W	12:47	64	55	13:56	65	55
2015-07-14	VI12	49° 34' 48" N	126° 55' 12" W	14:21	66	55	15:30	68	58
2015-07-14	VI13	49° 43' 12" N	127° 1' 12" W	16:26	57	45	17:35	58	48
2015-07-15	VI14	49° 49' 12" N	127° 16' 12" W	05:09	49	40	06:18	47	37
2015-07-15	VI15	49° 51' 36" N	127° 25' 12" W	06:41	69	60	07:52	58	48
2015-07-15	VI16	49° 54' 36" N	127° 34' 12" W	08:08	74	65	09:23	63	53
2015-07-15	VI17	49° 57' 0" N	127° 40' 48" W	09:43	116	105	10:57	116	105
2015-07-15	VI19	50° 2' 60" N	127° 55' 12" W	12:51	166	155	14:06	170	160
2015-07-15	VI20	50° 7' 12" N	128° 0' 0" W	14:26	119	110	15:40	120	110
2015-07-16	VI21	50° 19' 48" N	128° 4' 48" W	05:06	88	85	06:19	89	80

Date	Station	Latitude	Longitude	CTD			BONGO		
				Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)
2015-07-16	VI22	50° 19' 48" N	128° 5' 60" W	06:53	101	90	08:07	104	94
2015-07-16	VI23	50° 24' 36" N	128° 7' 12" W	08:25	80	70	09:37	80	70
2015-07-16	VI24	50° 27' 0" N	128° 13' 48" W	09:56	118	110	11:10	119	110
2015-07-16	VI25	50° 30' 0" N	128° 19' 12" W	11:44	122	110	12:55	123	113
2015-07-16	VI26	50° 34' 48" N	128° 22' 48" W	13:19	89	80	14:29	90	80
2015-07-16	VI27	50° 37' 48" N	128° 28' 48" W	14:47	120	110	15:58	123	113
2015-07-16	VI28	50° 40' 12" N	128° 40' 12" W	17:25	166	150	18:40	168	150
2015-07-17	T07	50° 49' 12" N	129° 13' 12" W	05:03	102	90	06:16	106	95
2015-07-17	T06	50° 55' 12" N	129° 0' 0" W	08:00	62	55	09:10	62	52
2015-07-17	T05	51° 0' 0" N	128° 49' 48" W	09:37	65	55	10:47	65	55
2015-07-17	T04	51° 4' 12" N	128° 43' 48" W	11:02	66	56	12:18	65	55
2015-07-17	T03	51° 8' 60" N	128° 35' 60" W	12:43	143	135	13:56	143	133
2015-07-17	T02	51° 12' 0" N	120° 27' 36" W	14:20	198	190	15:36	198	150
2015-07-17	T01	51° 13' 12" N	128° 16' 48" W	17:25	85	75			
2015-07-18	QCST01	50° 51' 0" N	127° 12' 0" W	05:08	131	120	06:22	131	121
2015-07-18	QCST02	50° 47' 24" N	127° 11' 24" W	06:43	156	145	07:58	155	145
2015-07-18	QCST03	50° 45' 0" N	127° 9' 36" W	08:45	183	175	10:01	188	150
2015-07-18	QCST04	50° 41' 24" N	127° 9' 36" W	11:13	65	55	12:23	71	61
2015-07-18	QCST05	50° 40' 48" N	127° 12' 36" W	12:02	85	75	13:11	97	87
2015-07-18	QCST06	50° 40' 48" N	127° 16' 48" W	13:31	58	50	14:38	58	48
2015-07-19	JS01	50° 28' 48" N	126° 10' 48" W	05:05	323	250	06:26	325	150
2015-07-19	JS03	50° 21' 36" N	125° 43' 48" W	09:26	194	150	10:52	198	150
2015-07-19	JS05	50° 23' 60" N	125° 19' 12" W	13:04	261	250	14:21	263	150
2015-07-19	JS06	50° 19' 12" N	125° 25' 12" W	14:40	274	250	15:58	270	150



## APPENDIX E CATCH DATA

Table E.1. Catch (in pieces) of species (or taxonomic groups where species identification could not be made with certainty) captured during the juvenile Pacific Salmon survey from July 10-20, 2015 on the *CCGS W.E. Ricker*.

<b>Tow</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
Event Number	217	220	223	226	229	232	235	238	241	244	247
Bay Pipefish											
Black Rockfish											
Blue Shark											
Chinook Salmon (Adults)		1	14	1	7	2	3	1		4	
Chinook Salmon (Juveniles)		2	1					1			
Chub Mackerel											120
Chum Salmon (Adults)						22	1			3	
Chum Salmon (Juveniles)	1										
Coho Salmon (Adults)	5		80	32	1	7	4	12		2	
Coho Salmon (Juveniles)	25	1	42	8		1		1		1	
Eulachon											
Jack Mackerel						5	1				3390
Medusafish											
North Pacific Spiny Dogfish					20	1	1	2	1		
Northern Anchovy								17			1277
Opalescent Inshore Squid											
Pacific Cod											
Pacific Herring			45880								
Pacific Sardine											1897
Pacific Spiny Lumpsucker											
Pink Salmon (Adults)	164	24	58	20	10	26	33	12	3	9	
Pink Salmon (Juveniles)											
Pricklebacks											
Prowfish											
Quillfish											
Smelts											
Sockeye Salmon (Adults)		1									
Sockeye Salmon (Juveniles)											
Tope Shark						1		1			
Walleye Pollock											
Wolf Eel			1								
Yellowtail Rockfish											
<b>TOTAL</b>	<b>195</b>	<b>29</b>	<b>46076</b>	<b>61</b>	<b>38</b>	<b>65</b>	<b>43</b>	<b>47</b>	<b>4</b>	<b>19</b>	<b>6684</b>

<b>Tow</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>
Event Number	250	256	259	262	268	271	274	277	280	283	286
Bay Pipefish											
Black Rockfish		5			2	1	3	1	2		1
Blue Shark									1		
Chinook Salmon (Adults)	1		2	2		1	3		4		3
Chinook Salmon (Juveniles)		1	1	2	3	3	5	1	10	2	6
Chub Mackerel											
Chum Salmon (Adults)			1				1	1	4	1	7
Chum Salmon (Juveniles)		30			5	12	5	26	14	1	4
Coho Salmon (Adults)		5	4	3	2	5	5	6	6	5	1
Coho Salmon (Juveniles)		1	1	3	4	2	7	4	6	9	37
Eulachon											
Jack Mackerel											
Medusafish											
North Pacific Spiny Dogfish		1									
Northern Anchovy											
Opalescent Inshore Squid						3	99	28			
Pacific Cod											
Pacific Herring											
Pacific Sardine											
Pacific Spiny Lumpsucker											
Pink Salmon (Adults)		41	39	30	18	75	108	60	114	8	17
Pink Salmon (Juveniles)											
Pricklebacks											
Prowfish											
Quillfish											
Smelts		1									
Sockeye Salmon (Adults)		1			1	1	2		6	4	2
Sockeye Salmon (Juveniles)								1	1		
Tope Shark									2		
Walleye Pollock											
Wolf Eel		6		1	1	3		4	1	1	
Yellowtail Rockfish											
<b>TOTAL</b>	<b>1</b>	<b>92</b>	<b>48</b>	<b>41</b>	<b>36</b>	<b>106</b>	<b>238</b>	<b>132</b>	<b>171</b>	<b>31</b>	<b>78</b>

<b>Tow</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>	<b>32</b>	<b>33</b>
Event Number	289	292	295	298	301	304	307	310	313	316	319
Bay Pipefish											
Black Rockfish	2	7	4	5							
Blue Shark											
Chinook Salmon (Adults)	1		1	4					1	1	1
Chinook Salmon (Juveniles)		7	6	1					5	2	1
Chub Mackerel											
Chum Salmon (Adults)	4	1	1				1			2	
Chum Salmon (Juveniles)	1	46	43		4				1		
Coho Salmon (Adults)	3	7	18	3	2	2	3	2	2		2
Coho Salmon (Juveniles)	15	71	42	2	2	1	1	3	30	8	1
Eulachon									1		
Jack Mackerel											
Medusafish			2								
North Pacific Spiny Dogfish											
Northern Anchovy											
Opalescent Inshore Squid											
Pacific Cod											
Pacific Herring				32460							
Pacific Sardine											
Pacific Spiny Lumpsucker											
Pink Salmon (Adults)	57	18	47	9		8	28				
Pink Salmon (Juveniles)											
Pricklebacks											
Prowfish											
Quillfish											
Smelts											
Sockeye Salmon (Adults)	1	3	7			1	17				
Sockeye Salmon (Juveniles)	1	2									
Tope Shark											
Walleye Pollock											
Wolf Eel		3							1		
Yellowtail Rockfish			2								
<b>TOTAL</b>	<b>85</b>	<b>165</b>	<b>173</b>	<b>32484</b>	<b>8</b>	<b>12</b>	<b>50</b>	<b>5</b>	<b>41</b>	<b>13</b>	<b>5</b>

<b>Tow</b>	<b>34</b>	<b>35</b>	<b>36</b>	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b>	<b>41</b>	<b>42</b>	<b>43</b>	<b>44</b>
Event Number	325	328	331	334	337	340	343	346	349	352	355
Bay Pipefish											
Black Rockfish											
Blue Shark											
Chinook Salmon (Adults)					1		1				
Chinook Salmon (Juveniles)		1	3	1	1		2				3
Chub Mackerel											
Chum Salmon (Adults)	6	9	9	28	3	1	12				
Chum Salmon (Juveniles)			12	1	23		177			1	2
Coho Salmon (Adults)	2		1	1	1	1	4			1	
Coho Salmon (Juveniles)		17	16	20	14	3	37	2	1		1
Eulachon											
Jack Mackerel											
Medusafish											
North Pacific Spiny Dogfish											
Northern Anchovy											
Opalescent Inshore Squid			12								53
Pacific Cod			10		2	3					
Pacific Herring			5								
Pacific Sardine											
Pacific Spiny Lumpsucker											
Pink Salmon (Adults)	13	3	10	15	9	9	8		9	4	35
Pink Salmon (Juveniles)					2		1				2
Pricklebacks						2					
Prowfish			1								
Quillfish											
Smelts											
Sockeye Salmon (Adults)				1			1				
Sockeye Salmon (Juveniles)			1	2	3		6		1	2	7
Tope Shark											
Walleye Pollock		1	34		9	16	3				
Wolf Eel	1							1			
Yellowtail Rockfish											
<b>TOTAL</b>	<b>22</b>	<b>31</b>	<b>114</b>	<b>69</b>	<b>68</b>	<b>35</b>	<b>252</b>	<b>3</b>	<b>11</b>	<b>8</b>	<b>103</b>

<b>Tow</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b>	<b>51</b>	<b>52</b>
Event Number	358	361	364	365	368	369	372	375
Bay Pipefish							1	
Black Rockfish								
Blue Shark								
Chinook Salmon (Adults)	1	3						
Chinook Salmon (Juveniles)	2	16				1		
Chub Mackerel								
Chum Salmon (Adults)	1							
Chum Salmon (Juveniles)	5	30	15	6		2		
Coho Salmon (Adults)		7						
Coho Salmon (Juveniles)	5	23	1	1	1			
Eulachon								
Jack Mackerel								
Medusafish								
North Pacific Spiny Dogfish								
Northern Anchovy								
Opalescent Inshore Squid		30						
Pacific Cod								
Pacific Herring								
Pacific Sardine								
Pacific Spiny Lumpsucker					1			
Pink Salmon (Adults)	1	51	6	8				
Pink Salmon (Juveniles)	4	30	2					
Pricklebacks								
Prowfish								
Quillfish	1							
Smelts								
Sockeye Salmon (Adults)	1							
Sockeye Salmon (Juveniles)		6	4	2	3			3
Tope Shark								
Walleye Pollock								
Wolf Eel								
Yellowtail Rockfish								
<b>TOTAL</b>	<b>21</b>	<b>196</b>	<b>28</b>	<b>17</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>3</b>