Ecosystem-Based Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey off North and West Coast Vancouver Island, British Columbia, October 8 - 23, 2022.

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ECOSYSTEM-BASED JUVENILE PACIFIC SALMON (*ONCORHYNCHUS* SPP.) TRAWL SURVEY OFF NORTH AND WEST COAST VANCOUVER ISLAND, BRITISH COLUMBIA, OCTOBER 8 - 23, 2022

by

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ABSTRACT

Tabata, A.T., Flynn, K.L., Zubkowski, T.B., and King, J.R. 2024. Ecosystem-Based Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey off North and West Coast Vancouver Island, British Columbia, October 8 - 23, 2022. Can. Data Rep. Fish. Aquat. Sci. 1384: vi + 51 p.

Fisheries and Oceans Canada conducted an ecosystem-based trawl survey from October 8-23, 2022 on the *CFV Nordic Pearl*. This study targeted juvenile Pacific Salmon off the North and West Coast of Vancouver Island. There were 35 species sampled in 3,065 kg of catch, with 9.5% juvenile Pacific Salmon caught by weight (291 kg). Jack Mackerel (*Trachurus symmetricus*), the genus *Aequorea*, Lions Mane jellyfish (*Cyanea capillata*) and adult Chum Salmon (*Oncorhynchus keta*) were the most abundant catch by weight. There were 4,088 individual lengths and 2,961 individual weights recorded, including all 5 Pacific Salmon (*Oncorhynchus*) species. Juvenile Pink Salmon were the most abundant juvenile Pacific Salmon species, with catches throughout the study area, followed by juvenile Chinook Salmon, Coho Salmon, Chum Salmon, and Sockeye Salmon. Juvenile Sockeye Salmon had the highest percentage of empty stomachs (14%). Common prey species for juvenile salmon included Pacific Herring, crabs, amphipods and euphausiids. Biological samples for genetic stock composition, otoliths, energy density, gills, and coded wire tags are at the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC). Associated information on the physical oceanography (65 stations) and zooplankton composition (37 stations) was collected and will be analysed at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC).

RÉSUMÉ

Tabata, A.T., Flynn, K.L., Zubkowski, T.B., and King, J.R. 2024. Ecosystem-Based Juvenile Pacific Salmon (*Oncorhynchus* spp.) Trawl Survey off North and West Coast Vancouver Island, British Columbia, October 8 - 23, 2022. Can. Data Rep. Fish. Aquat. Sci. 1384: vi + 51 p.

Pêches et Océans Canada a mené une étude écosystémique au chalutage pélagique du 8 au 23 octobre, 2022 sur le *CFV Nordic Pearl*. Cette étude ciblait les saumons du Pacifique juvéniles de la région du nord et ouest de l'isle de Vancouver. Il y avait 35 espèces échantillonnées dans 3,065 kg de prises, avec 10% de juvénile saumon du Pacifique capturé en poids (291 kg). La carangue symétrique (*Trachurus symmetricus*), le genre *Aequorea*, la méduse à crinière de lion (*Cyanea capillata*) et le saumon kéta adulte étaient les espèces les plus abondantes en poids. On a enregistré 4,088 longueurs individuelles et 2,961 poids individuels, dont les 5 espèces de saumon du Pacifique (*Oncorhynchus* spp.). Le saumon rose juvénile était la espèce de saumon du Pacifique juvénile la plus abondante, avec des captures dans toute la zone d'étude, suivi de le saumon quinnat, le saumon coho, le saumon kéta, et le saumons rouge. Les saumons rouges juvéniles avaient le plus haut pourcentage d'estomac vide (14%). Les espèces de proies communes aux saumons juvéniles comprenaient le hareng du Pacifique, les crabes, les amphipodes et les euphausiacés. Les échantillons biologiques pour la composition des stocks génétique, les otolithes, la densité énergétique, les branchies et les micromarques magnétisées codées se trouvent à la Station biologique du Pacifique de Pêches et Océans Canada (Nanaimo, Colombie-Britannique). Des informations associées sur l'océanographie physique (65 stations) et la composition du zooplancton (37 stations) ont été collectées et seront analysées à l'Institut des sciences de la mer, Pêches et Océans Canada (Sidney, C.-B.).

1 INTRODUCTION

Fisheries and Oceans Canada conducted an ecosystem-based midwater trawl survey, targeting juvenile Pacific Salmon (*Oncorhynchus* spp.) from October 08 to 23, 2022 on the *CFV Nordic Pearl*. The main objectives of this survey were:

1. to determine the abundance, condition, distribution, and genetic stock composition of juvenile Pacific Salmon present off the north and west coast of Vancouver Island in the fall,
2. the associated physical oceanography, and
3. the distribution and biomass of prey species, including zooplankton.

This survey supports research into 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 during the ecosystem-based juvenile Pacific Salmon survey from October 08 to 23, 2022.

2 METHODS

2.1 SURVEY LOCATIONS

Fishing, oceanographic, and zooplankton sampling occurred off the north and west coast of Vancouver Island, including Queen Charlotte Strait, Queen Charlotte Sound, and west coast Vancouver Island (Figure 1).

2.2 FISHING OPERATIONS

The vessel deployed a coastal LFS 7742 trawl net (Appendix A, manufactured by LFS Trawl (LFS Net Systems, Bellingham, USA). This two-bridle mid-water net has a codend liner (12.7 mm stretched) to retain smaller species. The LFS 7742 trawl net was designed to have a net opening of 30 m wide by 15 m high, or an area of 450 m^2 (Figure A.1). The net was towed at 4 to 5 knots (7.4 - 9.3 km/hr) for a target duration of 20 minutes. The start time and location of the tow was recorded when the doors were locked, and the end time and location when the retrieval of the doors was initiated. The target headrope depths were 0 m (surface) and 15 m (depth). Two A-6 floats 86.4 cm x 118.1 cm (34” x 46.5”) were attached to the headrope for surface tows.

The trawl net was fished with Thyborøn Type 15 VF, 4.5 m^2 mid water doors (approximately 798 kg each). Two chain clumps were attached to the footrope with approximately 204 kg (450 lbs) per chain clump. Vessel speed, direction, bottom depth and weather conditions were recorded for each tow (Appendix B). The vessel was equipped with a Marport Trawl System and wireless Marport Trawleye that provided realtime doorspread, headline depth and net opening values

(Marport Americas Inc., Washington, USA). A RBR concerto data logger (RBR Ltd, Ottawa, ON) recording conductivity, temperature, depth, salinity and dissolved oxygen at 1 second intervals (1 Hz), was mounted inside a protective housing and attached to the top of the trawl net along the port rib line of the first belly of the lengthening piece. In addition, RBR duet (RBR Ltd., Ottawa, ON, Canada) temperature and depth sensors were attached to the headrope and footrope to record depth and temperature every 30 seconds to allow plotting of the vertical net depth and opening over time.

2.3 BIOLOGICAL SAMPLES

All salmon species were measured for fork length (mm) and weight (g). 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 < 350 mm. Coho Salmon were considered juveniles < 400 mm. Stomachs were analysed at sea following an established protocol (King, Boldt, and King 2018). For each species in a tow, up to ten specimens were examined for stomach contents, and from these, up to five whole bodies and then five muscle tissues were collected for energy density and stable isotope analyses. Additional collections included: fin clips for genetic stock identification (GSI), salmon gill tissues for for infectious agents and fitness, otoliths, adipose fin status (i.e. clipped vs. non-clipped), and coded wire tags (CWTs).

2.4 OCEANOGRAPHY

A standalone Sea-bird 25 CTD (conductivity-temperature-depth) was used for oceanographic profiles (Sea-bird Electronics Bellevue Washington, USA) at 65 locations (Figure 1, Appendix D). A Niskin bottle at 5 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 was filtered with a 25 mm 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 -20℃. Nutrient and chl a samples were returned for analyses at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC).

2.5 ZOOPLANKTON

At 37 locations (Figure 1, 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 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. The other zooplankton sample was 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.

3 RESULTS

3.1 FISHING OPERATIONS

This survey conducted 65 trawl net tows off the north and west coast of Vancouver Island (Appendix C) with all 65 trawls completed successfully.

Tow speed averaged 8.6 km/hr (4.6 knots), and varied between 6.7 to 11 km/hr (3.6 - 5.9 knots) speed over ground, depending on the wind, tide, and current. Warp length ranged from 188 m to 238 m (Appendix C).

Net mensuration data from the Marport trawl sensors, trawleye and RBR data loggers was collected for mouth opening height, gear depth and doorspread. The doorspread was used to calculate the horizontal net opening width. The difference between the headrope and footrope depth from the RBR duet data loggers was used to calculate the average mouth opening of each tow. Tows with missing menuration data used tow depth-specific averages when required (i.e., an average height and width of 15 m and 48 m for surface tows and 11 m and 50 m for 15 m target depth tows; Table C.1).

3.2 CATCH COMPOSITION

Total catch for the survey from usable tows was 3,065 kg, with 291.2 kg (or 10%) juvenile 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 weight and count, maximum tow catch weight, and mean tow catch weight in usable tows is presented in Table 1. The top three abundant species caught by weight were Jack Mackerel (1,454.45 kg), in 28% of the tows, Water Jellyfish (362.14 kg) in 78% of the tows, and Lions Mane (270.01 kg in 49% of the tows (Table 1). Juvenile Pacific Salmon species caught, in order of abundance by weight, were: Pink Salmon, Chinook Salmon, Coho Salmon, Chum Salmon and Sockeye Salmon. The survey targeted juvenile Pacific Salmon so the catches of adult Pacific Salmon should be interpreted with care.

The location and catch per unit effort (CPUE, kg/kmˆ3) of juvenile salmon is shown in Figure 2. Juvenile Chinook Salmon were caught mostly along the west coast of Vancouver Island, both on the shelf and in the inlets. Juvenile Chum Salmon, Coho Salmon and Pink Salmon were caught throughout the survey area, with the exception of low or zero catches at the northern-most stations around Triangle Island. Juvenile Sockeye Salmon were the least abundant salmon species, localized within the migratory corridor through Queen Charlotte Strait and in Clayquot Sound. The location and catch per unit effort (CPUE, kg/kmˆ3) of other, non-salmonid, frequently caught species is shown in Figure 3. Both Jack Mackeral (*Trachurus symmetricus*) and Pacific Suary (*Cololabis saira*) had larger catches than is typically observered during this survey.

3.3 BIOLOGICAL SAMPLES

Samples were collected for DNA stock composition (958), otoliths (721), energy density (350), stable isotope analysis (426), coded wire tags (26), and gill samples for infectious agents (142). These biological samples were returned to the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC).

3.4 LENGTH AND WEIGHT

Length frequencies and length-weight relationships are presented for Pacific Salmon species in Figures 4 to 8. Double log transformed length-weight regression coefficients were similar in Chinook Salmon, Chum Salmon, Coho Salmon and Pink Salmon. Sockeye Salmon had a slightly smaller coefficient, however the sample size for Sockeye Salmon was small. A larger coefficient typically represents better condition, whereas a smaller coefficient typically represents worse condition. Lengths and weights of 29 species were recorded (Table 2). Within juvenile Pacific salmon, Coho Salmon had the largest maximum length (286 mm) and weight (293 g), whereas Sockeye Salmon had the smallest maximum length (167 mm) and weight (46 g).

3.5 STOMACH CONTENTS

Stomachs of 914 individual fish, from 19 species, were analysed at sea (Table 3). Juvenile Pacific Salmon species had between 2 and 14% empty stomachs, with juvenile Sockeye Salmon having the highest percentage and juvenile Chum Salmon having the lowest percentage (Table 3). The frequency of observation and average volume of identified prey is shown in Table 4. Amphipods were the most frequently observed prey for juvenile Chinook Salmon, however Pacific Herring had the highest average volume. For juvenile Chum Salmon, the most common stomach contents, and the most voluminous were unidentified remains. Since gelatinous prey are digested quickly, it is likely that the unidentified remains in the juvenile Chum Salmon may be ctenophores and jellyfish. More juvenile Coho Salmon stomach contained euphausiids compared to other prey, although similar to juvenile Chinook Salmon, the most voluminous prey was Pacific Herring (Table 4). The most common prey for juvenile Pink Salmon was amphipods, although the most voluminous prey were crabs. Finally, for juvenile Sockeye Salmon the most common prey and the most voluminous prey was amphipods.

3.6 OCEANOGRAPHY

CTD casts and water samples were completed at 65 sites with cast depths ranging from 25 m to 260 m (Appendix D). Samples were collected for nutrients and chlorophyll at approximately 5 m below the surface. Oceanographic data from the CTD casts and nutrient analysis of the water samples will be archived online within the Water Properties Data Inventory under cruise number 2022-011, as well as Canadian Integrated Ocean Observing System or CIOOS.

3.7 ZOOPLANKTON

Vertical bongo tows were conducted at 37 stations to depths ranging from 35 m to 255 m (Appendix D). Formalin-preserved zooplankton samples will be enumerated at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC). Data will be archived in the zooplankton database. Fractionated zooplankton samples are frozen at the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC).

4 DISCUSSION

This ecosystem-based juvenile Pacific Salmon trawl survey collected valuable information on distribution, abundance, condition, and genetic stock composition for juvenile Pacific Salmon off the north and west coast of Vancouver Island. Overall, juvenile Pink Salmon were most abundant, whereas juvenile Sockeye Salmon were least abundant by weight. Distributions ranged from widespread for juvenile Chum Salmon, or localized for juvenile Sockeye Salmon (Queen Charlotte Strait and Clayoquot Sound). Juvenile Sockeye Salmon had the highest percentage of empty stomachs. Amphipods and euphausiids were found in the most number of stomachs, and Pacific Herring and unidentified remains (e.g. jellyfish and squid) were the most voluminous prey in juvenile Pacific Salmon. In addition, 65 physical oceanographic water profiles, and 37 zooplankton samples associated with the survey catches were collected. As it becomes available, the data from laboratory analysis (i.e. GSI, energy density, isotopic analysis, zooplankton composition) will be integrated into the survey data. This data supplements historic juvenile Pacific Salmon surveys, and will be reported in Fisheries and Oceans Canada State of the Pacific Ocean, and is being incorporated into longer term and broader scope research projects.

5 ACKNOWLEDGEMENTS

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6 REFERENCES

7 TABLES

Table 1. All captured species (or taxonomic group), ordered by total catch weight (in grams), showing number of tows in which the species occurred, total catch count, (Count), total catch weight (Weight), maximum catch weight (Max), and mean catch weight (Mean) per tow for usable tows during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022. Blank weights indicate specimens which could not be weighed accurately (either released alive or too small).

Common Name	Scientific Name	Tows	Count	Weight	Max	Mean
Jack Mackerel	*Trachurus symmetricus*	18	1,083	1,454.45	406.47	81
Water Jellyfish	*Aequorea*	51		362.14	36.34	7
Lions Mane	*Cyanea capillata*	32	19	270.01	62.96	8
Chum Salmon (Adults)	*Oncorhynchus keta*	23	66	242.33	76.92	11
Pacific Saury	*Cololabis saira*	5	2,681	228.57	183.68	46
Pink Salmon (Juveniles)	*Oncorhynchus gorbuscha*	28	1,785	133.00	34.02	5
Chinook Salmon (Juveniles)	*Oncorhynchus tshawytscha*	38	801	73.67	6.39	2
Opalescent Inshore Squid	*Doryteuthis opalescens*	32	24,637	66.36	19.55	3
Coho Salmon (Juveniles)	*Oncorhynchus kisutch*	24	206	59.02	18.47	2
Moon Jellyfish	*Aurelia labiata*	24	41	42.36	6.43	2
Coho Salmon (Adults)	*Oncorhynchus kisutch*	8	13	28.75	6.62	4
Chum Salmon (Juveniles)	*Oncorhynchus keta*	22	219	25.19	6.41	1
Chinook Salmon (Adults)	*Oncorhynchus tshawytscha*	10	19	20.11	4.41	2
Chub Mackerel	*Scomber japonicus*	1	14	18.15	18.15	18
Fried Egg Jellyfish	*Phacellophora camtschatica*	12	8	16.41	3.80	1
Lingcod	*Ophiodon elongatus*	1	1	8.25	8.25	8
Ocean Sunfish	*Mola mola*	1	1	4.67	4.67	5
Sea Nettle	*Chrysaora fuscescens*	2	1	3.04	2.68	2
Starry Flounder	*Platichthys stellatus*	1	1	1.79	1.79	2
Smelts	*Osmeridae*	6	1,328	1.50	0.69	0
Sablefish	*Anoplopoma fimbria*	1	5	1.09	1.09	1
Pacific Herring	*Clupea pallasii*	9	33	0.88	0.18	0
Jellyfish	*Scyphozoa*	2		0.88	0.48	0
Ragfish	*Icosteus aenigmaticus*	5	6	0.55	0.35	0
Curlfin Sole	*Pleuronichthys decurrens*	1	1	0.53	0.53	1
Brown Rockfish	*Sebastes auriculatus*	1	1	0.35	0.35	0
Sockeye Salmon (Juveniles)	*Oncorhynchus nerka*	5	7	0.32	0.16	0
Walleye Pollock	*Gadus chalcogrammus*	1	1	0.20	0.20	0
Spotted Ratfish	*Hydrolagus colliei*	1	1	0.19	0.19	0
Pacific Sardine	*Sardinops sagax*	1	2	0.14	0.14	0
Wolf Eel	*Anarrhichthys ocellatus*	2	2	0.04	0.04	0
Pacific Spiny Lumpsucker	*Eumicrotremus orbis*	1	2	0.03	0.03	0
Threespine Stickleback	*Gasterosteus aculeatus*	2	2	0.02	0.02	0
Prowfish	*Zaprora silenus*	1	1	0.01	0.01	0
Tidepool Snailfish	*Liparis florae*	1	1	0.01	0.01	0
Flatfishes	*Pleuronectiformes*	5	6			

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Common Name	Scientific Name	Tows	Count	Weight	Max	Mean
Fish	*Pisces*	4	4			
Kelp Greenling	*Hexagrammos decagrammus*	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 ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022. Tows = number of tows. Type = Type of length measurement (FL = Fork Length, TL = Total Length, SL = Standard Length, ML = Mantle Length, BD = Bell Diameter). Lengths = number of length measurements. Weights = number of weight measurements.

		Length (mm)					**Weight (g)**			
Common Name	Tows	Type	Lengths	Min	Max	Mean	Weights	Min	Max	Mean
Pink Salmon (Juveniles)	28	FL	920	143	250	196	919	29	154	79
Opalescent Inshore Squid	18	ML	831	13	229	37				
Chinook Salmon (Juveniles)	38	FL	800	123	392	190	797	19	724	90
Jack Mackerel	18	FL	492	357	533	477	492	569	1814	1294
Pacific Saury	5	FL	201	217	304	264	201	38	116	80
Chum Salmon (Juveniles)	22	FL	192	168	286	216	192	46	308	113
Coho Salmon (Juveniles)	24	FL	188	224	369	286	188	138	610	293
Smelts	3	FL	148	44	79	59				
Smelts	3	SL	148	44	79	59				
Lions Mane	25	BD	76	148	598	361				
Chum Salmon (Adults)	23	FL	66	578	777	669	66	2322	5714	3645
Moon Jellyfish	19	BD	54	137	324	222				
Pacific Herring	7	SL	31	68	201	113	31	3	83	25
Chinook Salmon (Adults)	10	FL	19	348	625	431	19	530	2948	1049
Chub Mackerel	1	FL	14	293	463	435	14	322	1527	1278
Coho Salmon (Adults)	8	FL	13	384	699	555	13	674	4626	2211
Fried Egg Jellyfish	8	BD	12	75	289	208				
Sockeye Salmon (Juveniles)	5	FL	7	143	185	167	7	28	60	46
Sablefish	1	FL	5	264	281	274	5	167	238	210
Ragfish	3	FL	3	133	321	198	3	28	350	137
Pacific Sardine	1	FL	2	182	192	187	2	56	75	66
Pacific Spiny Lumpsucker	1	TL	2	49	52	50	2	10	16	13
Sea Nettle	2	BD	2	229	299	264				

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Table 2. Lengths and weights for each species (arranged descending by the number of length measurements for each by species) sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022. Tows = number of tows. Type = Type of length measurement (FL = Fork Length, TL = Total Length, SL = Standard Length, ML = Mantle Length, BD = Bell Diameter). Lengths = number of length measurements. Weights = number of weight measurements. *(continued)*

		Length (mm)					**Weight (g)**			
Common Name	Tows	Type	Lengths	Min	Max	Mean	Weights	Min	Max	Mean
Brown Rockfish	1	FL	1	298	298	298	1	352	352	352
C-O Sole	1	TL	1	324	324	324	1	506	506	506
Lingcod	1	FL	1	910	910	910	1	8250	8250	8250
Ocean Sunfish	1	TL	1	382	382	382	1	4670	4670	4670
Prowfish	1	SL	1	82	82	82	1	7	7	7
Spotted Ratfish	1	TL	1	394	394	394	1	190	190	190
Starry Flounder	1	TL	1	519	519	519	1	1791	1791	1791
Tidepool Snailfish	1	TL	1	90	90	90	1	9	9	9
Walleye Pollock	1	FL	1	282	282	282	1	186	186	186
Wolf Eel	1	TL	1	439	439	439	1	36	36	36

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Table 3. Number of tows with stomach samples (Tows), number of stomachs examined (Stomachs), number of empty stomachs (empty), and percentage of empty stomachs for each species (Percent), arranged descending by number of tows, during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022.

Species	Tows	Stomachs	Empty	Percent
Chinook Salmon (Juveniles)	38	253	26	10
Pink Salmon (Juveniles)	28	188	16	9
Coho Salmon (Juveniles)	24	98	5	5
Chum Salmon (Adults)	22	54	41	76
Chum Salmon (Juveniles)	22	89	2	2
Jack Mackerel	18	115	70	61
Chinook Salmon (Adults)	10	19	9	47
Coho Salmon (Adults)	8	13	7	54
Pacific Herring	5	11	6	55
Sockeye Salmon (Juveniles)	5	7	1	14
Pacific Saury	5	41	6	15
Ragfish	3	3	0	0
Spotted Ratfish	1	1	1	100
Walleye Pollock	1	1	0	0
Wolf Eel	1	1	0	0
Prowfish	1	1	1	100
Chub Mackerel	1	10	1	10
Brown Rockfish	1	1	1	100
Sablefish	1	5	1	20
Lingcod	1	1	0	0
Starry Flounder	1	1	1	100
C-O Sole	1	1	0	0

Table 4. Prey items (Prey) identified in the stomach contents of predator species (Species) sampled (alphabetical by Species) during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022. Volume is the mean volume in cm^3; frequency of occurrence (FO) is the proportion of non-empty stomachs containing that prey item.

Species	Prey	Volume	FO
C-O Sole	Copepods	0.50	1.00
Chinook Salmon (Adults)	Pacific Herring	24.67	0.60
Chinook Salmon (Adults)	Euphausiids	16.10	0.10
Chinook Salmon (Adults)	Opalescent Inshore Squid	5.20	0.10
Chinook Salmon (Adults)	Squid	2.30	0.10
Chinook Salmon (Adults)	Unidentified Fishes	2.00	0.30
Chinook Salmon (Juveniles)	Pacific Herring	8.00	0.07
Chinook Salmon (Juveniles)	Whitebait Smelt	2.17	0.11
Chinook Salmon (Juveniles)	Opalescent Inshore Squid	1.76	0.04
Chinook Salmon (Juveniles)	Sauries	0.80	0.00
Chinook Salmon (Juveniles)	Unidentified Fishes	0.74	0.26
Chinook Salmon (Juveniles)	Squid	0.62	0.08
Chinook Salmon (Juveniles)	Cephalopods	0.44	0.03
Chinook Salmon (Juveniles)	Octopus	0.42	0.04
Chinook Salmon (Juveniles)	Amphipods	0.30	0.41
Chinook Salmon (Juveniles)	True Crabs	0.27	0.21
Chinook Salmon (Juveniles)	Euphausiids	0.22	0.17
Chinook Salmon (Juveniles)	Unidentified Remains	0.14	0.10
Chinook Salmon (Juveniles)	Fish Eggs	0.10	0.00
Chinook Salmon (Juveniles)	Invertebrates	0.10	0.01
Chinook Salmon (Juveniles)	Polychaete Worms	0.07	0.01
Chinook Salmon (Juveniles)	Unidentified Algae	0.01	0.00
Chinook Salmon (Juveniles)	Caprella Drepanochir	0.01	0.00
Chub Mackerel	Euphausiids	2.73	0.78
Chub Mackerel	Unidentified Remains	1.73	0.44
Chub Mackerel	Unidentified Plankton	0.40	0.11
Chub Mackerel	Amphipods	0.01	0.11
Chum Salmon (Adults)	Unidentified Remains	4.79	0.92
Chum Salmon (Adults)	Squid	2.60	0.08
Chum Salmon (Adults)	Opalescent Inshore Squid	2.53	0.23
Chum Salmon (Adults)	Comb Jellyfish	0.01	0.15
Chum Salmon (Juveniles)	Unidentified Remains	0.74	0.71
Chum Salmon (Juveniles)	Euphausiids	0.59	0.11
Chum Salmon (Juveniles)	True Crabs	0.45	0.08
Chum Salmon (Juveniles)	Amphipods	0.40	0.15
Chum Salmon (Juveniles)	Comb Jellyfish	0.17	0.14
Chum Salmon (Juveniles)	Stones Or Pebbles	0.12	0.08
Chum Salmon (Juveniles)	Jellyfish	0.01	0.06
Coho Salmon (Adults)	Pink Salmon	48.00	0.17
Coho Salmon (Adults)	Unidentified Remains	2.00	0.17
Coho Salmon (Adults)	True Crabs	0.75	0.33
Coho Salmon (Adults)	Unidentified Fishes	0.30	0.33
Coho Salmon (Adults)	Euphausiids	0.01	0.17
Coho Salmon (Juveniles)	Pacific Herring	7.90	0.09
Coho Salmon (Juveniles)	Opalescent Inshore Squid	3.55	0.05

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Species	Prey	Volume	FO
Coho Salmon (Juveniles)	Unidentified Fishes	1.58	0.32
Coho Salmon (Juveniles)	True Crabs	1.38	0.32
Coho Salmon (Juveniles)	Squid	1.30	0.01
Coho Salmon (Juveniles)	Euphausiids	0.70	0.41
Coho Salmon (Juveniles)	Unidentified Remains	0.26	0.05
Coho Salmon (Juveniles)	Amphipods	0.12	0.26
Coho Salmon (Juveniles)	Caprellidea	0.10	0.01
Coho Salmon (Juveniles)	Pteropods	0.01	0.01
Coho Salmon (Juveniles)	Rockfishes	0.01	0.01
Jack Mackerel	Sauries	23.10	0.04
Jack Mackerel	Pacific Herring	18.20	0.07
Jack Mackerel	Opalescent Inshore Squid	7.30	0.16
Jack Mackerel	Whitebait Smelt	6.30	0.02
Jack Mackerel	Euphausiids	4.80	0.22
Jack Mackerel	Jellyfish	4.75	0.04
Jack Mackerel	Pandalid Shrimp	3.90	0.02
Jack Mackerel	Unidentified Remains	2.51	0.36
Jack Mackerel	Amphipods	0.79	0.22
Jack Mackerel	Octopus	0.65	0.04
Jack Mackerel	Unidentified Fishes	0.54	0.18
Jack Mackerel	Squid	0.01	0.02
Lingcod	Unidentified Remains	200.00	1.00
Pacific Herring	Whitebait Smelt	0.70	0.20
Pacific Herring	Unidentified Fishes	0.40	0.20
Pacific Herring	Unidentified Remains	0.30	0.40
Pacific Herring	Euphausiids	0.20	0.20
Pacific Herring	Unidentified Plankton	0.01	0.20
Pacific Saury	Unidentified Remains	1.69	0.94
Pacific Saury	Amphipods	0.01	0.11
Pacific Saury	Euphausiids	0.01	0.03
Pink Salmon (Juveniles)	True Crabs	1.07	0.47
Pink Salmon (Juveniles)	Arrow Worms	1.00	0.01
Pink Salmon (Juveniles)	Euphausiids	0.46	0.31
Pink Salmon (Juveniles)	Unidentified Remains	0.35	0.12
Pink Salmon (Juveniles)	Amphipods	0.25	0.68
Pink Salmon (Juveniles)	Pteropods	0.22	0.07
Pink Salmon (Juveniles)	Comb Jellyfish	0.11	0.01
Pink Salmon (Juveniles)	Unidentified Fishes	0.04	0.04
Pink Salmon (Juveniles)	Fish Eggs	0.01	0.01
Pink Salmon (Juveniles)	Polychaete Worms	0.01	0.03
Pink Salmon (Juveniles)	Cephalopods	0.01	0.01
Pink Salmon (Juveniles)	Octopus	0.01	0.01
Pink Salmon (Juveniles)	Unidentified Plankton	0.01	0.01
Pink Salmon (Juveniles)	Caprellidea	0.01	0.01
Ragfish	Comb Jellyfish	1.50	0.33
Ragfish	Unidentified Remains	0.50	0.33
Ragfish	Amphipods	0.15	0.67
Sablefish	Unidentified Remains	4.10	0.50
Sablefish	True Crabs	2.55	0.50

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Species	Prey	Volume	FO
Sablefish	Opalescent Inshore Squid	2.00	0.25
Sablefish	Jellyfish	1.20	0.25
Sablefish	Unidentified Fishes	0.60	0.25
Sockeye Salmon (Juveniles)	Amphipods	0.68	0.67
Sockeye Salmon (Juveniles)	Euphausiids	0.65	0.33
Sockeye Salmon (Juveniles)	Stones Or Pebbles	0.20	0.17
Sockeye Salmon (Juveniles)	True Crabs	0.10	0.17
Sockeye Salmon (Juveniles)	Unidentified Remains	0.01	0.17
Walleye Pollock	Unidentified Fishes	1.40	1.00
Wolf Eel	Unidentified Fishes	0.50	1.00
Wolf Eel	Amphipods	0.10	1.00

8 FIGURES

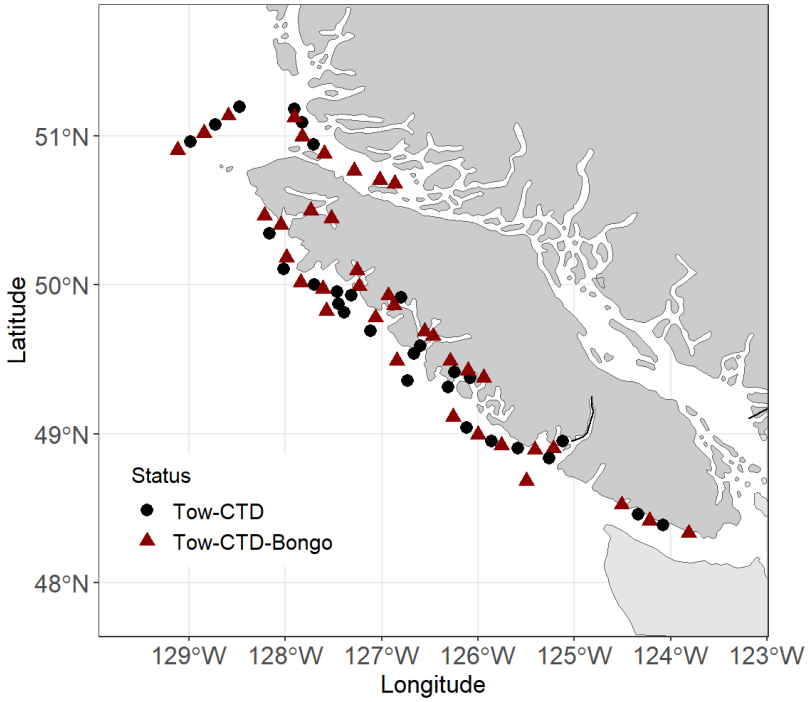

Figure 1. Location of survey events (fishing tows, CTD casts and zooplankton bongo casts) during the ecosystem-based juvenile Pacific Salmon survey from October 08 to 23, 2022 on the *CFV Nordic Pearl*.

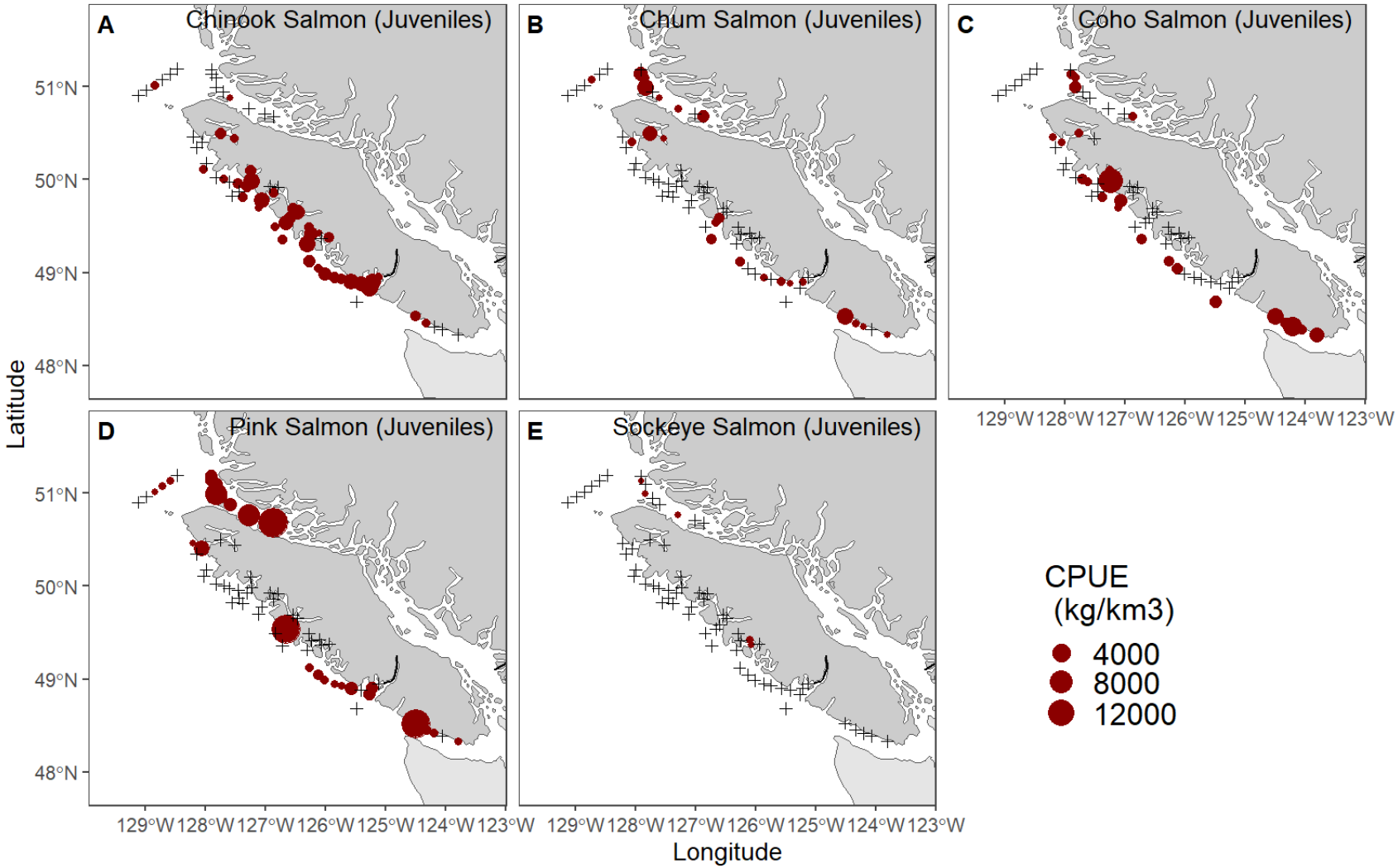

Figure 2. Juvenile Pacific Salmon (*Oncorhynchus spp.*) catch per unit effort (CPUE; kg/km^3) for each tow. (A) Chinook Salmon (*Oncorhynchus tshawytscha)*), (B) Chum Salmon (*Oncorhynchus keta*), (C) Coho Salmon (*Oncorhynchus kisutch*), (D) Pink Salmon (*Oncorhynchus gorbusha*) and (E) Sockeye Salmon (*Oncorhynchus nerka*). Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

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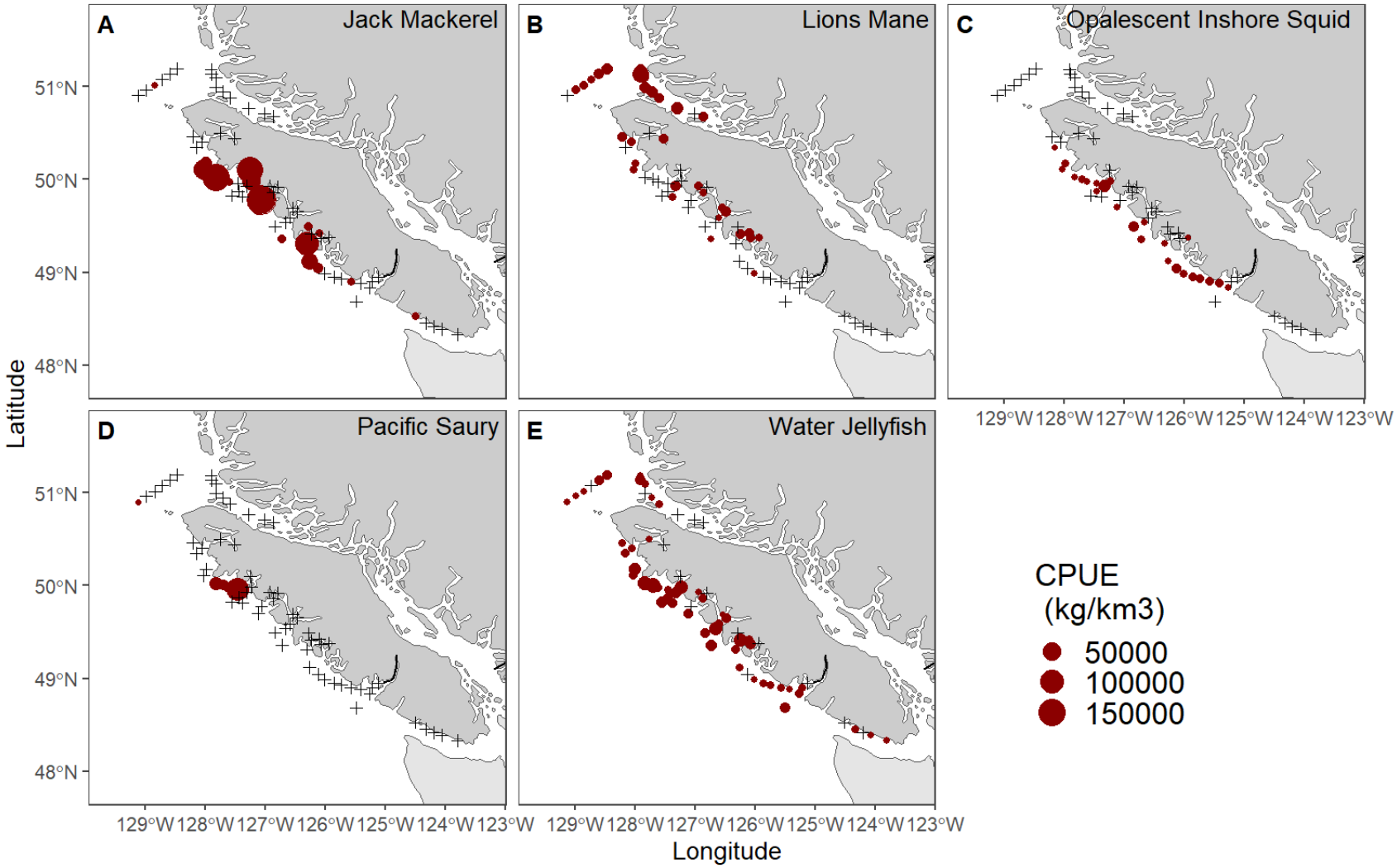

Figure 3. Catch per unit effort (CPUE; kg/km^3) for commonly caught species by tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+).

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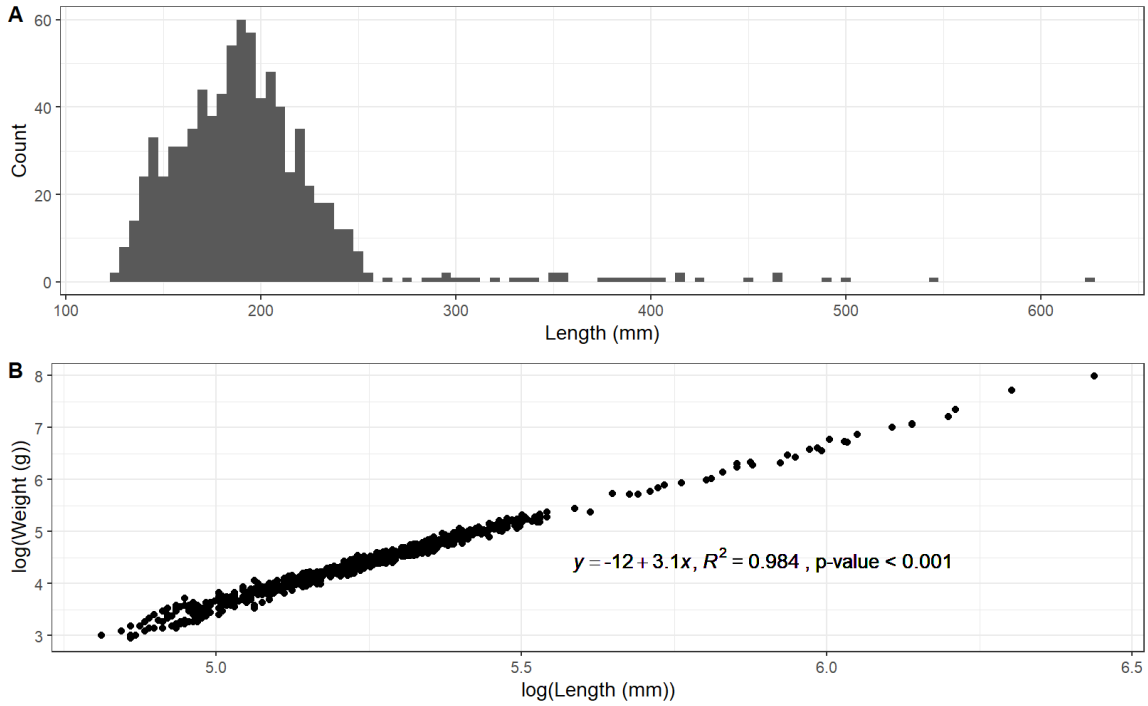

Figure 4. Chinook Salmon (*Oncorhynchus tshawytscha)*) length frequency plot as sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

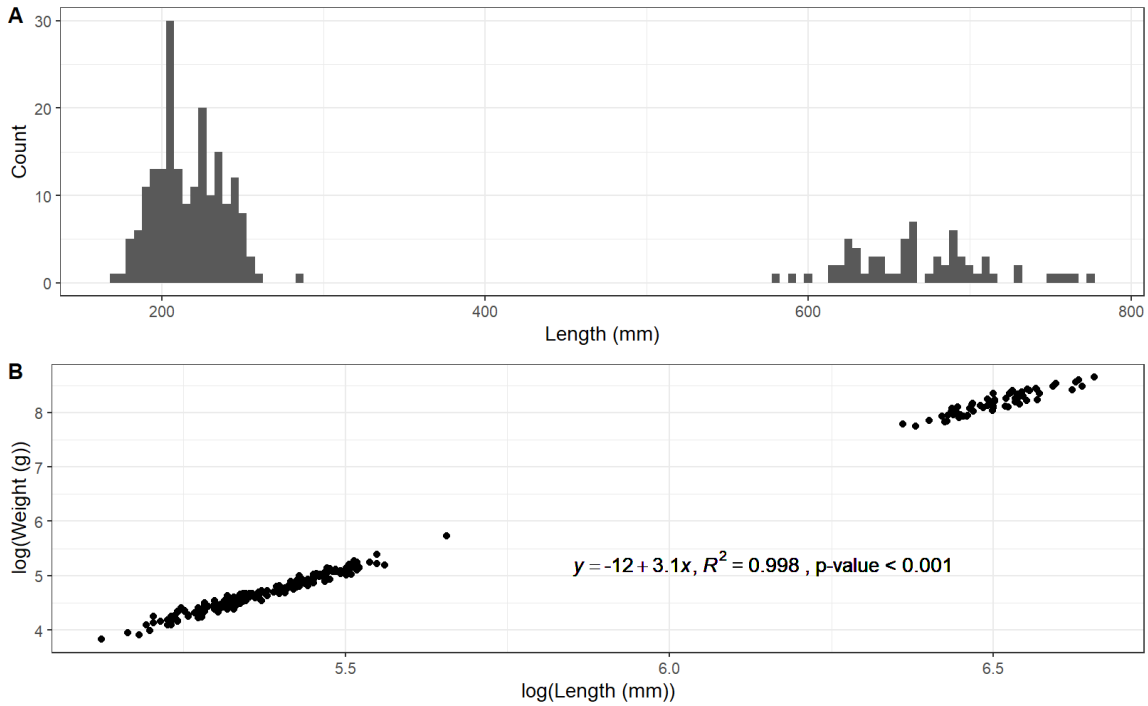

Figure 5. Chum Salmon (*Oncorhynchus keta*) length frequency plot as sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

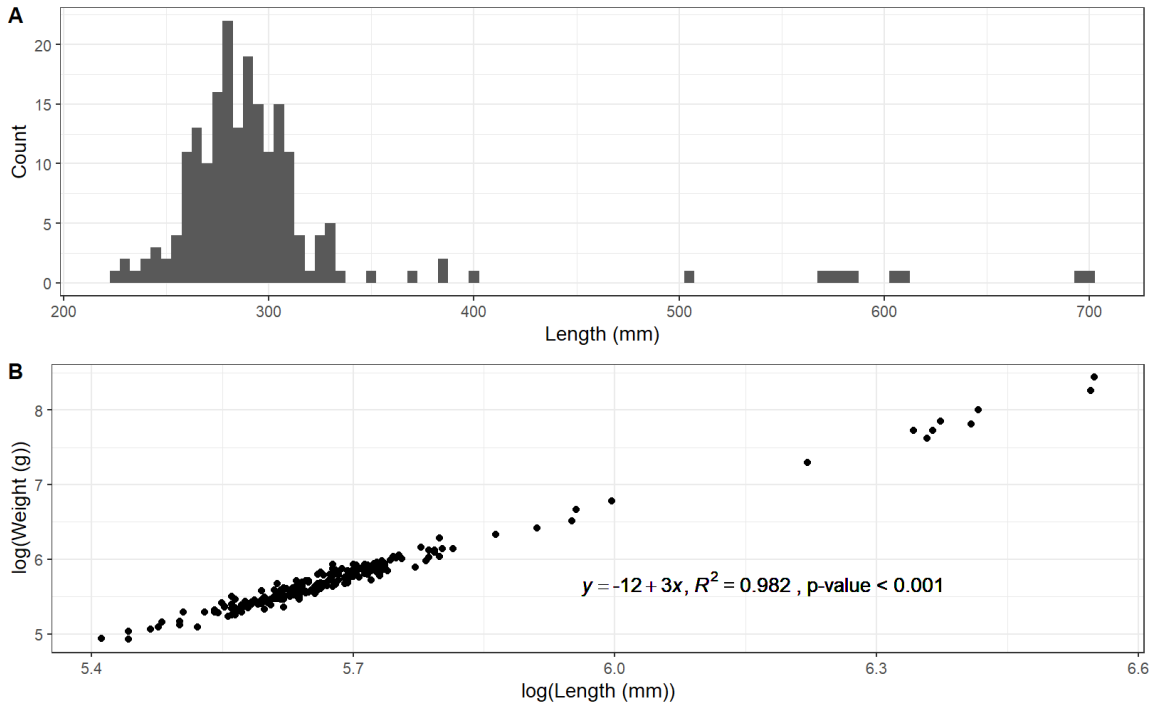

Figure 6. Coho Salmon (*Oncorhynchus kisutch*) length frequency plot as sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

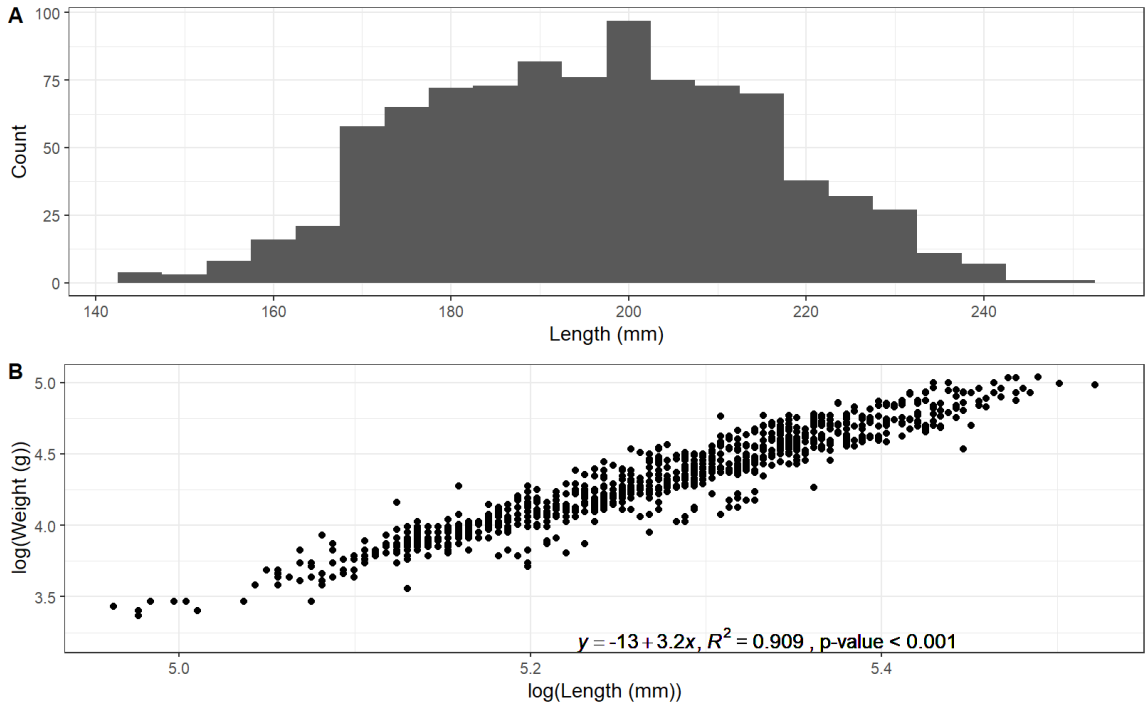

Figure 7. Pink Salmon (*Oncorhynchus gorbusha*) length frequency plot as sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

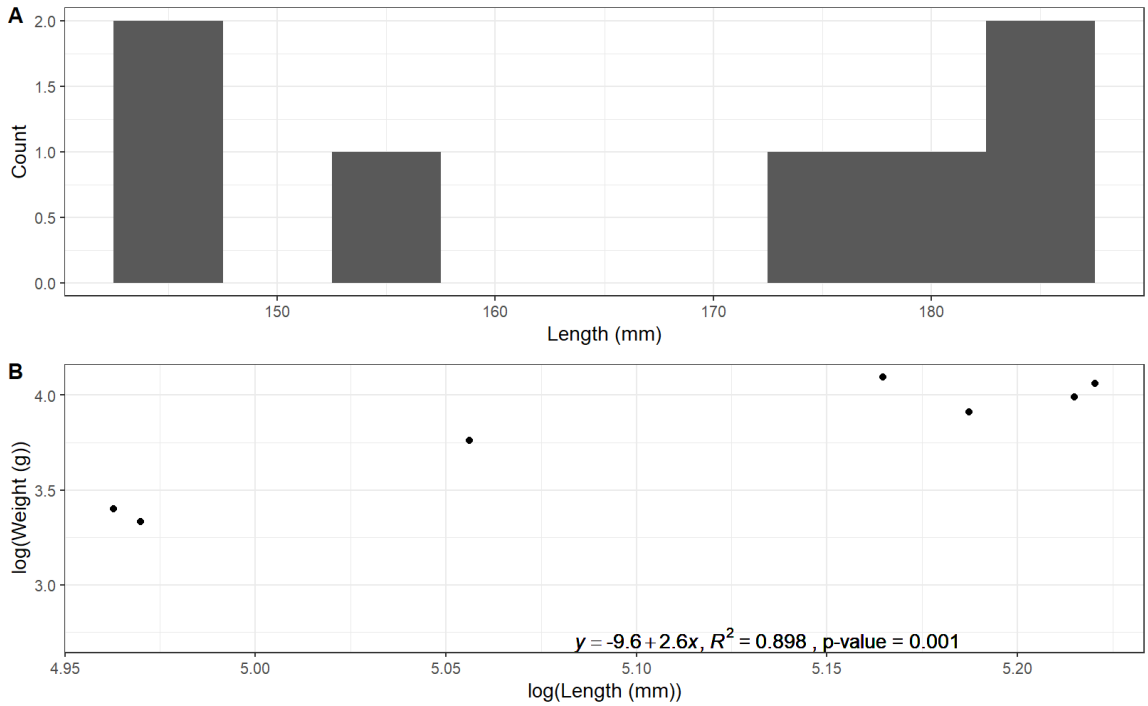

Figure 8. Sockeye Salmon (*Oncorhynchus nerka*) length frequency plot as sampled during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022 (A). Double log-transformed length-weight regression with outliers removed, using a Bonferroni outlier test (B).

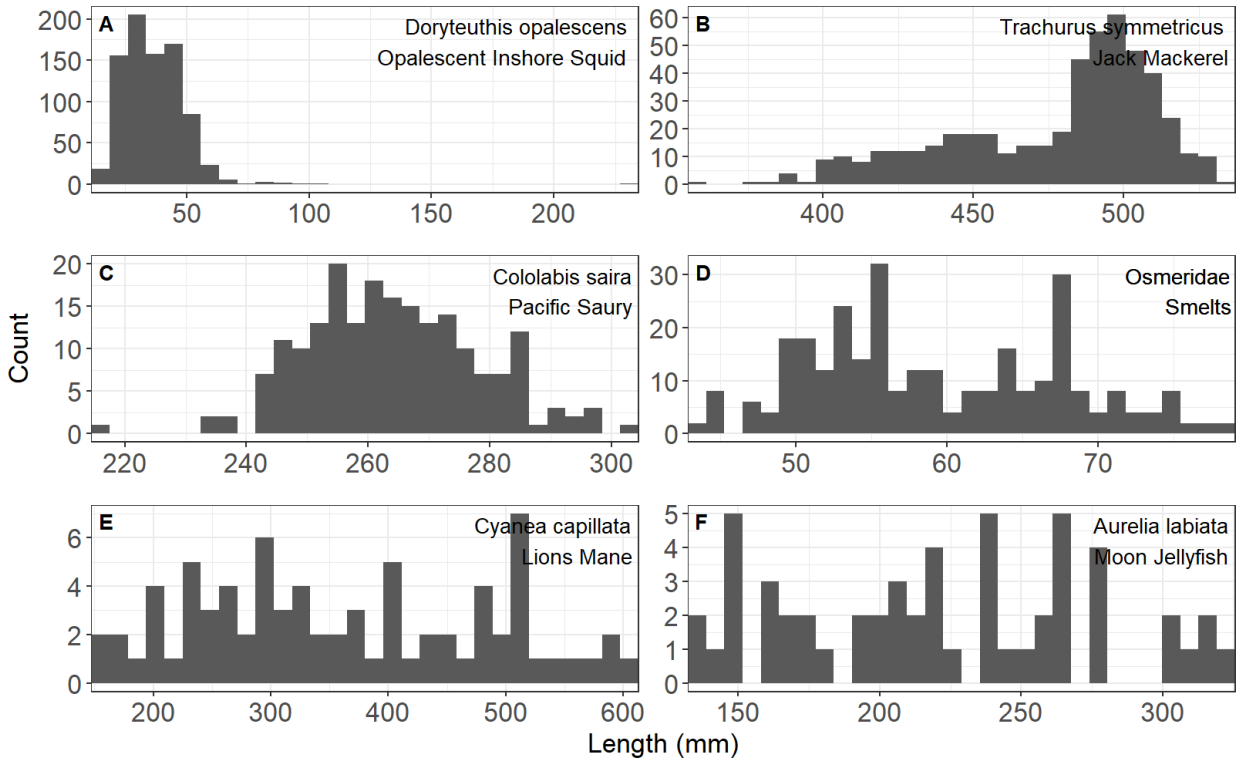

Figure 9. Length (mm) frequency plots for common species sampled (n>50 samples) during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022. (A) Opalescent Inshore Squid (*Doryteuthis opalescens*), length = Mantle Length, (B) Jack Mackerel (*Trachurus symmetricus*), length = Fork Length, (C) Pacific Saury (*Cololabis saira*), length = Fork Length, (D) Smelts (*Osmeridae*), length = Fork Length, (E) Smelts (*Osmeridae*), length = Standard Length, (F) Lions Mane (*Cyanea capillata*), length = Bell Diameter, (G) Moon Jellyfish (*Aurelia labiata*), length = Bell Diameter.

APPENDIX A NET SPECIFICATIONS

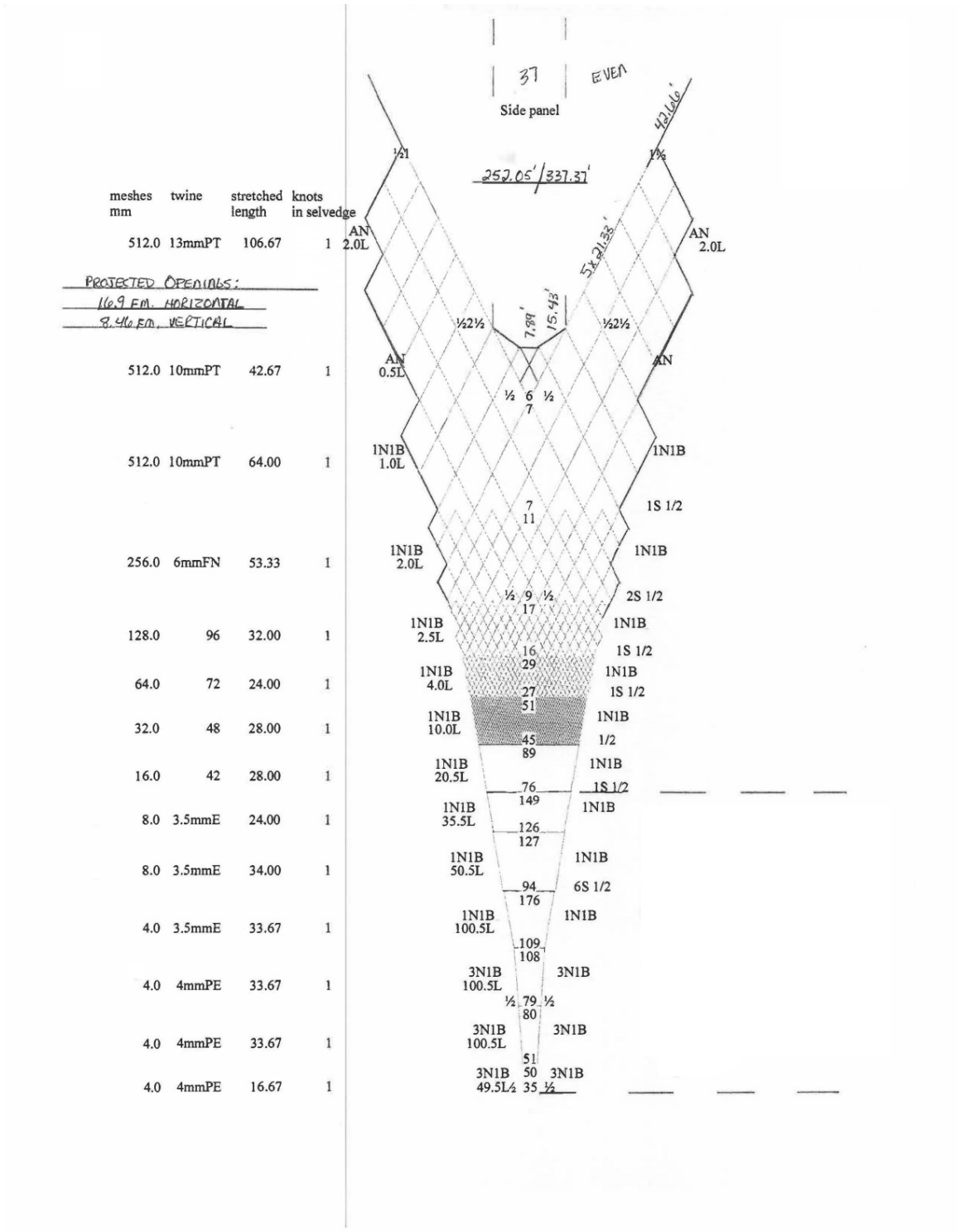

Figure A.1. Net specifications (side view) for the LFS 7742 trawl net used during the ecosystem-based juvenile Pacific Salmon survey from October 08 to 23, 2022 on the *CFV Nordic Pearl*.

APPENDIX B The Beaufort Scale

Table B.1. The Beaufort Scale used to describe weather conditions.

Force	Description	Wind Speed (knots)	Sea State
0	Calm	<1	Sea like mirror
1	Light Air	1-3	Ripples; no foam crests
2	Light Breeze	4-6	Small wavelets
3	Gentle Breeze	7-10	Crests breaking
4	Moderate Breeze	11-16	Whitecaps
5	Fresh Breeze	17-21	Moderate waves - spray
6	Strong Breeze	22-27	Large waves
7	Moderate Gale	28-33	Sea heaps up
8	Fresh Gale	34-40	Moderately high waves
9	Strong Gale	41-47	High waves; spray
10	Whole Gale	48-55	Overhanging crests; sea white
11	Storm	56-63	Exceptionally high waves
12	Hurricane	64-118	Sea white

APPENDIX C TRAWL BRIDGE LOG DATA

Table C.1. Bridge log information for trawl tows during the ecosystem-based juvenile Pacific Salmon survey aboard the *CFV Nordic Pearl*, October 08 to 23, 2022.

Station Name	QCST01	QCST02	QCST04	QCST05	QCST06	QCST07
Tow	1	2	3	4	5	6
Event Number	3	6	9	12	14	17
Date (Pacific)	2022-10-09	2022-10-09	2022-10-09	2022-10-10	2022-10-10	2022-10-10
Start Time (Pacific)	07:53	10:26	12:58	07:41	09:23	11:04
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	21	21	16	21	20	19
Start Latitude	50° 40’ 30" N	50° 42’ 28" N	50° 46’ 00" N	50° 52’ 39" N	50° 56’ 44" N	50° 59’ 44" N
Start Longitude	126° 52’ 10" W	127° 00’ 49" W	127° 17’ 10" W	127° 35’ 40" W	127° 42’ 42" W	127° 49’ 51" W
End Latitude	50° 41’ 11" N	50° 42’ 54" N	50° 46’ 17" N	50° 54’ 00" N	50° 57’ 31" N	51° 00’ 42" N
End Longitude	126° 54’ 12" W	127° 02’ 42" W	127° 18’ 55" W	127° 37’ 55" W	127° 44’ 47" W	127° 51’ 13" W
Direction of Tow (deg)	296	288	283	313	300	318
Vessel Speed (km/h)	7.8	7.0	8.0	10.6	8.4	7.5
Distance Towed (km)	2.70	2.35	2.12	3.64	2.83	2.40
Net Opening Width (m)	49	50	49	48	51	39
Net Opening Height (m)	16	11	15	15	12	16
Warp Length (m)	196	229	207	198	223	198
Target Headrope Depth (m)	0	15	0	0	15	0
Median Headrope Depth (m)	6	14	5	4	13	8
Start Bottom Depth (m)	183	183	219	353	298	148
End Bottom Depth (m)	193	163	212	416	291	141
Usable	Y	Y	Y	Y	Y	Y

Station Name	QCSD01	QCSD03	QCSD02	T02	T03	T04
Tow	7	8	9	10	11	12
Event Number	19	22	24	26	29	31
Date (Pacific)	2022-10-10	2022-10-10	2022-10-10	2022-10-11	2022-10-11	2022-10-11
Start Time (Pacific)	13:28	14:57	16:48	07:10	09:16	11:07
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	21	20	20	21	19
Start Latitude	51° 05’ 37" N	51° 07’ 49" N	51° 11’ 01" N	51° 11’ 22" N	51° 07’ 59" N	51° 04’ 21" N
Start Longitude	127° 49’ 52" W	127° 54’ 13" W	127° 54’ 29" W	128° 28’ 24" W	128° 35’ 30" W	128° 43’ 32" W
End Latitude	51° 06’ 52" N	51° 09’ 19" N	51° 12’ 32" N	51° 09’ 43" N	51° 06’ 59" N	51° 03’ 25" N
End Longitude	127° 50’ 54" W	127° 54’ 15" W	127° 54’ 24" W	128° 29’ 07" W	128° 37’ 34" W	128° 45’ 09" W
Direction of Tow (deg)	332	359	1	195	232	227
Vessel Speed (km/h)	7.8	8.2	8.4	9.5	9.1	7.8
Distance Towed (km)	2.61	2.76	2.82	3.19	3.05	2.58
Net Opening Width (m)	51	47	45	49	47	46
Net Opening Height (m)	11	14	11	12	15	15
Warp Length (m)	198	199	221	227	194	188
Target Headrope Depth (m)	15	0	15	15	0	0
Median Headrope Depth (m)	13	4	15	12	5	5
Start Bottom Depth (m)	107	120	126	196	136	61
End Bottom Depth (m)	112	121	131	187	118	60
Usable	Y	Y	Y	Y	Y	Y

Station Name	T05	T06	T07	QS03	QS02	QS01
Tow	13	14	15	16	17	18
Event Number	34	36	39	42	45	48
Date (Pacific)	2022-10-11	2022-10-11	2022-10-11	2022-10-12	2022-10-12	2022-10-12
Start Time (Pacific)	12:51	14:24	15:58	07:25	09:29	12:07
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	20	20	21	20	21
Start Latitude	51° 00’ 51" N	50° 57’ 31" N	50° 54’ 03" N	50° 26’ 16" N	50° 29’ 47" N	50° 24’ 13" N
Start Longitude	128° 50’ 33" W	128° 59’ 03" W	129° 07’ 29" W	127° 31’ 06" W	127° 45’ 35" W	128° 03’ 23" W
End Latitude	50° 59’ 29" N	50° 56’ 19" N	50° 52’ 15" N	50° 27’ 41" N	50° 28’ 57" N	50° 25’ 09" N
End Longitude	128° 51’ 46" W	129° 00’ 58" W	129° 08’ 49" W	127° 32’ 12" W	127° 47’ 45" W	128° 05’ 22" W
Direction of Tow (deg)	209	226	205	333	238	305
Vessel Speed (km/h)	8.7	9.3	11.0	8.8	8.9	8.7
Distance Towed (km)	2.91	3.15	3.68	2.94	2.99	2.91
Net Opening Width (m)	40	43	46	50	49	50
Net Opening Height (m)	17	16	15	11	14	10
Warp Length (m)	194	196	205	234	194	232
Target Headrope Depth (m)	15	15	0	15	0	15
Median Headrope Depth (m)	15	15	6	12	5	12
Start Bottom Depth (m)	60	70	60	182	120	75
End Bottom Depth (m)	67	69	61	186	104	65
Usable	Y	Y	Y	Y	Y	Y

Station Name	VI05	BB01	BB03	BB04	VI06	VI07
Tow	19	20	21	22	23	24
Event Number	51	53	56	58	61	63
Date (Pacific)	2022-10-12	2022-10-12	2022-10-13	2022-10-13	2022-10-13	2022-10-13
Start Time (Pacific)	13:50	15:27	07:19	08:50	11:20	13:04
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	21	20	20	20	20
Start Latitude	50° 27’ 39" N	50° 20’ 40" N	50° 10’ 27" N	50° 06’ 25" N	50° 01’ 04" N	50° 00’ 18" N
Start Longitude	128° 12’ 32" W	128° 09’ 23" W	127° 59’ 33" W	128° 01’ 40" W	127° 49’ 40" W	127° 42’ 03" W
End Latitude	50° 25’ 55" N	50° 19’ 27" N	50° 08’ 53" N	50° 07’ 41" N	50° 00’ 32" N	49° 59’ 38" N
End Longitude	128° 11’ 34" W	128° 07’ 44" W	128° 00’ 08" W	128° 02’ 47" W	127° 47’ 58" W	127° 40’ 18" W
Direction of Tow (deg)	160	138	193	330	115	119
Vessel Speed (km/h)	10.2	8.9	8.8	8.1	6.7	7.2
Distance Towed (km)	3.43	2.98	2.99	2.70	2.27	2.42
Net Opening Width (m)	48	52	51	48	47	50
Net Opening Height (m)	15	11	13	11	16	11
Warp Length (m)	198	225	196	234	198	232
Target Headrope Depth (m)	0	15	0	15	0	15
Median Headrope Depth (m)	5	13	5	13	5	13
Start Bottom Depth (m)	91	138	82	207	257	96
End Bottom Depth (m)	106	127	90	535	171	90
Usable	Y	Y	Y	Y	Y	Y

Station Name	VI08	VI09	KS01	KS02	KS03	KS04
Tow	25	26	27	28	29	30
Event Number	66	68	71	74	76	78
Date (Pacific)	2022-10-13	2022-10-13	2022-10-14	2022-10-14	2022-10-14	2022-10-14
Start Time (Pacific)	14:40	16:24	07:21	09:20	11:28	12:55
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	21	21	20	20	20
Start Latitude	49° 58’ 31" N	49° 57’ 18" N	50° 05’ 43" N	49° 59’ 12" N	49° 55’ 37" N	49° 52’ 27" N
Start Longitude	127° 36’ 49" W	127° 27’ 21" W	127° 15’ 05" W	127° 14’ 02" W	127° 19’ 10" W	127° 27’ 08" W
End Latitude	49° 57’ 16" N	49° 57’ 16" N	50° 04’ 13" N	49° 58’ 08" N	49° 54’ 23" N	49° 51’ 41" N
End Longitude	127° 35’ 49" W	127° 25’ 13" W	127° 15’ 09" W	127° 15’ 58" W	127° 20’ 11" W	127° 29’ 24" W
Direction of Tow (deg)	151	90	180	228	207	241
Vessel Speed (km/h)	7.7	7.6	8.2	9.0	7.7	9.1
Distance Towed (km)	2.60	2.57	2.79	3.04	2.59	3.06
Net Opening Width (m)	44	48	52	48	53	48
Net Opening Height (m)	15	16	11	14	11	14
Warp Length (m)	192	196	232	201	234	196
Target Headrope Depth (m)	0	0	15	0	15	0
Median Headrope Depth (m)	6	5	12	5	12	5
Start Bottom Depth (m)	79	54	110	145	60	70
End Bottom Depth (m)	81	61	208	156	60	78
Usable	Y	Y	Y	Y	Y	Y

Station Name	KS05	VI10	VI11	EI04	EI03	EI02
Tow	31	32	33	34	35	36
Event Number	81	83	85	88	91	94
Date (Pacific)	2022-10-14	2022-10-14	2022-10-15	2022-10-15	2022-10-15	2022-10-15
Start Time (Pacific)	14:28	16:01	07:06	08:54	11:52	13:44
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	20	20	20	20	21
Start Latitude	49° 49’ 36" N	49° 49’ 01" N	49° 41’ 46" N	49° 46’ 46" N	49° 55’ 49" N	49° 51’ 51" N
Start Longitude	127° 33’ 29" W	127° 22’ 45" W	127° 07’ 05" W	127° 04’ 09" W	126° 55’ 46" W	126° 51’ 59" W
End Latitude	49° 49’ 27" N	49° 48’ 42" N	49° 43’ 21" N	49° 47’ 55" N	49° 54’ 21" N	49° 52’ 33" N
End Longitude	127° 31’ 07" W	127° 20’ 33" W	127° 06’ 27" W	127° 06’ 08" W	126° 55’ 42" W	126° 49’ 55" W
Direction of Tow (deg)	95	101	13	310	177	61
Vessel Speed (km/h)	8.5	8.0	9.0	9.5	8.1	8.3
Distance Towed (km)	2.85	2.70	3.03	3.18	2.71	2.79
Net Opening Width (m)	55	51	47	47	52	51
Net Opening Height (m)	11	15	17	15	11	15
Warp Length (m)	231	194	194	196	232	210
Target Headrope Depth (m)	15	0	0	0	15	0
Median Headrope Depth (m)	13	5	5	5	13	5
Start Bottom Depth (m)	83	78	97	45	201	228
End Bottom Depth (m)	78	78	81	42	280	141
Usable	Y	Y	Y	Y	Y	Y

Station Name	EI01	NS01	NS02	NS04	NS05	NS06
Tow	37	38	39	40	41	42
Event Number	96	99	102	104	106	109
Date (Pacific)	2022-10-15	2022-10-16	2022-10-16	2022-10-16	2022-10-16	2022-10-16
Start Time (Pacific)	15:18	07:28	09:03	10:33	11:55	13:54
Net		LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)		20	20	20	20	20
Start Latitude	49° 55’ 18" N	49° 41’ 24" N	49° 39’ 10" N	49° 35’ 19" N	49° 32’ 19" N	49° 29’ 40" N
Start Longitude	126° 47’ 55" W	126° 32’ 47" W	126° 28’ 25" W	126° 35’ 56" W	126° 39’ 41" W	126° 50’ 23" W
End Latitude	49° 53’ 52" N	49° 41’ 46" N	49° 37’ 59" N	49° 33’ 59" N	49° 31’ 06" N	49° 28’ 29" N
End Longitude	126° 47’ 16" W	126° 30’ 34" W	126° 29’ 59" W	126° 36’ 55" W	126° 40’ 56" W	126° 49’ 32" W
Direction of Tow (deg)	162	74	219	203	212	153
Vessel Speed (km/h)	8.2	8.3	8.8	8.2	8.0	7.2
Distance Towed (km)	2.76	2.76	2.90	2.76	2.70	2.42
Net Opening Width (m)		51	48	51	50	58
Net Opening Height (m)		11	15	11	10	7
Warp Length (m)		232	201	231	196	229
Target Headrope Depth (m)	15	15	0	15	0	15
Median Headrope Depth (m)		15	5	13	7	15
Start Bottom Depth (m)	223	172	244	100	51	72
End Bottom Depth (m)	218	248	186	82	47	73
Usable	Y	Y	Y	Y	Y	Y

Station Name	VI14	CS09	CS08	CS06	CS05	CS04
Tow	43	44	45	46	47	48
Event Number	111	113	116	118	121	123
Date (Pacific)	2022-10-16	2022-10-17	2022-10-17	2022-10-17	2022-10-18	2022-10-18
Start Time (Pacific)	15:50	12:40	14:18	16:21	07:14	08:51
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	21	20	20	20	20	20
Start Latitude	49° 21’ 23" N	49° 02’ 48" N	49° 07’ 02" N	49° 18’ 50" N	49° 29’ 09" N	49° 24’ 35" N
Start Longitude	126° 43’ 39" W	126° 07’ 37" W	126° 15’ 58" W	126° 19’ 04" W	126° 17’ 03" W	126° 14’ 30" W
End Latitude	49° 20’ 34" N	49° 03’ 40" N	49° 08’ 03" N	49° 18’ 54" N	49° 27’ 43" N	49° 23’ 01" N
End Longitude	126° 41’ 33" W	126° 09’ 46" W	126° 17’ 45" W	126° 21’ 32" W	126° 16’ 23" W	126° 14’ 32" W
Direction of Tow (deg)	119	299	309	270	161	178
Vessel Speed (km/h)	8.5	9.1	8.6	8.9	8.2	8.6
Distance Towed (km)	2.94	3.06	2.87	2.98	2.75	2.89
Net Opening Width (m)	45	49	54	44	46	48
Net Opening Height (m)	14	14	11	14	11	15
Warp Length (m)	199	205	238	198	236	196
Target Headrope Depth (m)	0	0	15	0	15	0
Median Headrope Depth (m)	8	4	11	4	14	4
Start Bottom Depth (m)	92	59	70	37	110	62
End Bottom Depth (m)	91	64	72	41	123	63
Usable	Y	Y	Y	Y	Y	Y

Station Name	CS03	CS02	CS01	CS10	VI15	VI16
Tow	49	50	51	52	53	54
Event Number	126	128	131	134	136	139
Date (Pacific)	2022-10-18	2022-10-18	2022-10-18	2022-10-19	2022-10-19	2022-10-19
Start Time (Pacific)	11:02	12:58	15:46	07:55	09:33	11:12
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	20	20	20	20	20
Start Latitude	49° 25’ 39" N	49° 22’ 11" N	49° 22’ 25" N	48° 59’ 09" N	48° 57’ 05" N	48° 55’ 40" N
Start Longitude	126° 06’ 10" W	126° 04’ 24" W	125° 56’ 34" W	126° 00’ 59" W	125° 51’ 20" W	125° 44’ 33" W
End Latitude	49° 25’ 39" N	49° 20’ 35" N	49° 20’ 57" N	48° 58’ 15" N	48° 56’ 30" N	48° 55’ 31" N
End Longitude	126° 03’ 52" W	126° 03’ 58" W	125° 57’ 13" W	125° 59’ 08" W	125° 48’ 53" W	125° 42’ 01" W
Direction of Tow (deg)	88	168	194	124	108	93
Vessel Speed (km/h)	8.3	8.9	8.4	8.4	9.5	9.3
Distance Towed (km)	2.79	3.01	2.83	2.82	3.19	3.11
Net Opening Width (m)	50	50	50	48	48	51
Net Opening Height (m)	11	13	11	16	16	11
Warp Length (m)	194	212	234	196	196	238
Target Headrope Depth (m)	15	0	15	0	0	15
Median Headrope Depth (m)	13	6	12	5	5	13
Start Bottom Depth (m)	159	110	138	53	43	98
End Bottom Depth (m)	138	100	138	49	49	98
Usable	Y	Y	Y	Y	Y	Y

Station Name	VI17	BS04	BS05	BS01	BS02	BS03
Tow	55	56	57	58	59	60
Event Number	141	144	147	149	152	154
Date (Pacific)	2022-10-19	2022-10-19	2022-10-20	2022-10-20	2022-10-20	2022-10-20
Start Time (Pacific)	12:41	15:02	07:28	09:59	11:21	13:07
Net	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742	LFS 7742
Duration (min)	20	20	20	20	21	21
Start Latitude	48° 54’ 08" N	48° 41’ 12" N	48° 52’ 57" N	48° 56’ 55" N	48° 53’ 55" N	48° 49’ 56" N
Start Longitude	125° 34’ 20" W	125° 29’ 37" W	125° 25’ 08" W	125° 07’ 19" W	125° 13’ 00" W	125° 15’ 39" W
End Latitude	48° 52’ 50" N	48° 40’ 22" N	48° 54’ 14" N	48° 55’ 46" N	48° 52’ 25" N	48° 48’ 25" N
End Longitude	125° 32’ 36" W	125° 31’ 51" W	125° 23’ 48" W	125° 08’ 52" W	125° 13’ 48" W	125° 15’ 22" W
Direction of Tow (deg)	136	238	31	219	196	170
Vessel Speed (km/h)	9.6	9.5	8.6	8.5	8.6	8.4
Distance Towed (km)	3.22	3.16	2.89	2.86	2.94	2.82
Net Opening Width (m)	49	50	50	54	48	53
Net Opening Height (m)	15	10	14	11	14	10
Warp Length (m)	196	234	196	238	198	234
Target Headrope Depth (m)	0	15	0	15	0	15
Median Headrope Depth (m)	5	14	4	13	6	15
Start Bottom Depth (m)	96	101	56	93	104	110
End Bottom Depth (m)	98	167	53	91	90	58
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 ecosystem-based juvenile Pacific Salmon survey from October 08 to 23, 2022 on the *CFV Nordic Pearl*.

				CTD			BONGO		
Date	Station	Latitude	Longitude	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)
2022-10-09	QCST01	50° 40' 53" N	126° 52' 05" W	07:28	187	139	07:48	186	175
2022-10-09	QCST02	50° 42' 10" N	127° 01' 29" W	10:03	150	140	10:20	170	160
2022-10-09	QCST04	50° 46' 05" N	127° 16' 58" W	12:35	172	160	12:51	211	160
2022-10-10	QCST05	50° 52' 51" N	127° 35' 25" W	07:05	329	250	07:24	374	250
2022-10-10	QCST06	50° 56' 32" N	127° 42' 05" W	09:13	294	250			
2022-10-10	QCST07	50° 59' 54" N	127° 49' 31" W	10:48	148	140	11:00	149	135
2022-10-10	QCSD01	51° 05' 24" N	127° 49' 27" W	13:23	104	90			
2022-10-10	QCSD03	51° 07' 24" N	127° 54' 12" W	14:45	122	110	14:54	121	110
2022-10-10	QCSD02	51° 10' 51" N	127° 54' 00" W	16:43	126	115			
2022-10-11	T02	51° 11' 59" N	128° 28' 18" W	07:03	193	185			
2022-10-11	T03	51° 08' 20" N	128° 35' 21" W	08:54	141	130	09:12	139	130
2022-10-11	T04	51° 04' 44" N	128° 43' 32" W	11:03	61	50			
2022-10-11	T05	51° 01' 17" N	128° 51' 13" W	12:36	62	50	12:44	61	50
2022-10-11	T06	50° 57' 51" N	128° 59' 08" W	14:20	71	60			
2022-10-11	T07	50° 54' 33" N	129° 07' 02" W	15:46	64	55	15:56	63	55
2022-10-12	QS03	50° 27' 06" N	127° 31' 38" W	07:05	190	185	07:20	189	180
2022-10-12	QS02	50° 29' 54" N	127° 43' 31" W	09:16	117	110	09:26	117	110
2022-10-12	QS01	50° 24' 13" N	128° 02' 44" W	11:49	79	70	12:00	82	90
2022-10-12	VI05	50° 28' 03" N	128° 13' 18" W	13:36	82	70	13:47	86	75
2022-10-12	BB01	50° 20' 52" N	128° 10' 21" W	15:19	149	140			
2022-10-13	BB03	50° 11' 15" N	127° 59' 14" W	07:06	55	50	07:17	64	50
2022-10-13	BB04	50° 06' 17" N	128° 00' 48" W	08:41	198	165			
2022-10-13	VI06	50° 01' 04" N	127° 50' 24" W	10:56	354	250	11:14	298	250
2022-10-13	VI07	50° 00' 16" N	127° 42' 11" W	13:01	97	90			
2022-10-13	VI08	49° 58' 31" N	127° 36' 24" W	14:27	77	70	14:38	77	70

				CTD			BONGO		
Date	Station	Latitude	Longitude	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)
2022-10-13	VI09	49° 57’ 32" N	127° 28’ 02" W	16:20	47	40			
2022-10-14	KS01	50° 05’ 59" N	127° 15’ 15" W	07:03	131	120	07:18	125	115
2022-10-14	KS02	49° 59’ 34" N	127° 13’ 34" W	09:01	169	160	09:15	161	150
2022-10-14	KS03	49° 55’ 51" N	127° 19’ 00" W	11:22	64	50			
2022-10-14	KS04	49° 52’ 35" N	127° 26’ 35" W	12:49	68	60			
2022-10-14	KS05	49° 49’ 32" N	127° 34’ 46" W	14:14	91	85	14:26	88	75
2022-10-14	VI10	49° 48’ 54" N	127° 23’ 28" W	15:57	82	75			
2022-10-15	VI11	49° 41’ 18" N	127° 06’ 40" W	07:02	98	90			
2022-10-15	EI04	49° 46’ 52" N	127° 03’ 59" W	08:43	43	45	08:51	43	35
2022-10-15	EI03	49° 55’ 42" N	126° 55’ 41" W	11:31	240	225	11:47	240	230
2022-10-15	EI02	49° 51’ 45" N	126° 52’ 22" W	13:22	227	220	13:38	227	220
2022-10-15	EI01	49° 54’ 28" N	126° 47’ 31" W	15:04	219	210			
2022-10-16	NS01	49° 41’ 16" N	126° 33’ 09" W	07:02	267	260	07:22	266	255
2022-10-16	NS02	49° 39’ 30" N	126° 27’ 54" W	08:46	187	175	09:00	192	180
2022-10-16	NS04	49° 35’ 46" N	126° 35’ 26" W	10:26	108	95			
2022-10-16	NS05	49° 32’ 24" N	126° 39’ 50" W	11:52	49	50			
2022-10-16	NS06	49° 29’ 22" N	126° 50’ 22" W	13:43	74	65	13:52	73	65
2022-10-16	VI14	49° 21’ 20" N	126° 44’ 06" W	15:45	94	85			
2022-10-17	CS09	49° 02’ 35" N	126° 06’ 39" W	12:36	59	50			
2022-10-17	CS08	49° 06’ 49" N	126° 14’ 56" W	14:03	68	50	14:14	67	60
2022-10-17	CS06	49° 18’ 51" N	126° 18’ 20" W	16:19	35	25			
2022-10-18	CS05	49° 29’ 32" N	126° 17’ 19" W	06:58	105	100	07:11	104	95
2022-10-18	CS04	49° 25’ 10" N	126° 14’ 41" W	08:44	66	60			
2022-10-18	CS03	49° 25’ 28" N	126° 06’ 14" W	10:46	157	145	10:58	160	150
2022-10-18	CS02	49° 23’ 06" N	126° 05’ 13" W	12:53	68	60			

Date	Station	Latitude	Longitude	CTD			BONGO		
				Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)	Start Time (PDT)	Bottom Depth (m)	Gear Depth (m)
2022-10-18	CS01	49° 22' 38" N	125° 56' 31" W	15:31	137	130	15:43	136	125
2022-10-19	CS10	49° 00' 01" N	125° 59' 38" W	07:07	45	35	07:17	48	40
2022-10-19	VI15	48° 57' 09" N	125° 52' 11" W	09:31	44	35			
2022-10-19	VI16	48° 55' 24" N	125° 45' 37" W	10:59	100	90	11:08	98	90
2022-10-19	VI17	48° 54' 28" N	125° 35' 30" W	12:37	95	85			
2022-10-19	BS04	48° 41' 11" N	125° 29' 49" W	14:51	96	85	15:00	96	85
2022-10-20	BS05	48° 53' 52" N	125° 24' 14" W	07:17	56	50	07:26	56	45
2022-10-20	BS01	48° 57' 16" N	125° 07' 11" W	09:51	93	85			
2022-10-20	BS02	48° 54' 15" N	125° 12' 59" W	11:09	100	90	11:18	100	90
2022-10-20	BS03	48° 50' 19" N	125° 15' 51" W	13:03	101	95			
2022-10-21	JDF02	48° 31' 26" N	124° 30' 50" W	07:07	93	90	07:28	84	75
2022-10-21	JDF03	48° 27' 43" N	124° 20' 48" W	09:42	114	105			
2022-10-21	JDF04	48° 25' 13" N	124° 13' 36" W	11:09	117	105	11:17	117	110
2022-10-21	JDF05	48° 23' 19" N	124° 05' 10" W	12:42	109	100			
2022-10-21	JDF01	48° 20' 09" N	123° 49' 08" W	14:26	142	135	14:37	143	130

APPENDIX E CATCH DATA

Table E.1. Weight (kg) and counts of species (or taxa) per station during the ecosystem-based juvenile Pacific Salmon survey from October 08 to 23, 2022 on the *CFV Nordic Pearl*. Jellyfish weights include all identified pieces but only counted if bells were intact. Euphausiacea were not counted. Counts with blank weights indicate catches too big or small to be weighed accurately.

Station Name	QCST01		QCST02		QCST04		QCST05		QCST06	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)					1.58	2				
Chinook Salmon (Juveniles)							0.13	1		
Chum Salmon (Adults)					76.92	20				
Chum Salmon (Juveniles)	2.13	25			0.16	2	0.08	1		
Coho Salmon (Adults)										
Coho Salmon (Juveniles)	0.52	2								
Pink Salmon (Juveniles)	32.95	580	0.76	10	10.74	172	3.83	55	0.23	3
Sockeye Salmon (Juveniles)					0.04	1				
Brown Rockfish										
Chub Mackerel										
Curlfin Sole										
Fish										
Flatfishes										
Fried Egg Jellyfish									0.87	2
Jack Mackerel										
Jellyfish										
Kelp Greenling										
Lingcod										
Lions Mane	6.69	1			20.72		12.08		16.70	
Moon Jellyfish							3.38	5	2.05	
Ocean Sunfish										
Opalescent Inshore Squid										
Pacific Herring										
Pacific Sardine										
Pacific Saury										
Pacific Spiny Lumpsucker										
Prowfish										
Ragfish										
Sablefish										
Sea Nettle										
Smelts										
Spotted Ratfish										
Starry Flounder										
Threespine Stickleback										
Tidepool Snailfish										
Walleye Pollock										
Water Jellyfish							1.61		0.12	
Wolf Eel										
TOTAL	**42.29**	**608**	**0.76**	**10**	**110.16**	**197**	**21.11**	**62**	**19.97**	**5**

Station Name	QCST07		QCSD01		QCSD03		QCSD02		T02		T03		T04	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)														
Chinook Salmon (Juveniles)														
Chum Salmon (Adults)														
Chum Salmon (Juveniles)	4.23	34	0.11	1	3.31	19							0.25	2
Coho Salmon (Adults)	2.31	1												
Coho Salmon (Juveniles)	1.70	6	0.26	1	0.74	3								
Pink Salmon (Juveniles)	10.22	136	2.04	29	1.70	24	1.35	20			0.17	2	0.18	2
Sockeye Salmon (Juveniles)	0.03	1			0.03	1								
Brown Rockfish														
Chub Mackerel														
Curlfin Sole														
Fish						1								
Flatfishes														
Fried Egg Jellyfish			0.15								0.65	1		
Jack Mackerel														
Jellyfish	0.40												0.48	
Kelp Greenling						1								
Lingcod														
Lions Mane	12.95		0.97	2	62.96		13.53		17.06		12.63		2.26	1
Moon Jellyfish					5.48		0.20	1	2.89	2				
Ocean Sunfish													4.67	1
Opalescent Inshore Squid								1						
Pacific Herring													0.14	4
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish						2			0.35	1				
Sablefish														
Sea Nettle														
Smelts														
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish			1.61		9.98		0.49		8.29		7.35			
Wolf Eel														
TOTAL	**31.84**	**178**	**5.14**	**33**	**84.20**	**51**	**15.57**	**22**	**28.59**	**3**	**20.80**	**3**	**7.98**	**10**

Station Name	T05		T06		T07		QS03		QS02		QS01		VI05	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)														
Chinook Salmon (Juveniles)	0.31	1					0.39	9	1.44	41				
Chum Salmon (Adults)														
Chum Salmon (Juveniles)							0.09	1	4.43	52	0.23	3		
Coho Salmon (Adults)									1.88	1				
Coho Salmon (Juveniles)									0.39	1	0.17	1	0.28	2
Pink Salmon (Juveniles)	0.08	1									3.50	48	0.09	1
Sockeye Salmon (Juveniles)														
Brown Rockfish														
Chub Mackerel														
Curlfin Sole	0.53	1												
Fish														
Flatfishes												1		
Fried Egg Jellyfish	0.89	2	0.56	1										
Jack Mackerel	0.65	1												
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane	4.68	2	6.15	3			7.51				2.76	3	12.16	
Moon Jellyfish					0.52	1	0.62	1	0.74	1	1.59	3	0.50	1
Ocean Sunfish														
Opalescent Inshore Squid								1		1				9
Pacific Herring														
Pacific Sardine														
Pacific Saury					0.05	1								
Pacific Spiny Lumpsucker			0.03	2										
Prowfish			0.01	1										
Ragfish														
Sablefish														
Sea Nettle														
Smelts														
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish	0.25		0.59		0.65				0.81		1.44		2.54	
Wolf Eel														
TOTAL	**7.39**	**8**	**7.34**	**7**	**1.22**	**2**	**8.61**	**12**	**9.69**	**97**	**9.69**	**59**	**15.57**	**13**

Station Name	BB01		BB03		BB04		VI06		VI07		VI08		VI09	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)														
Chinook Salmon (Juveniles)					0.25	2			0.34	2			1.06	6
Chum Salmon (Adults)			4.25	1	14.52	4			4.73	1	4.46	1		
Chum Salmon (Juveniles)														
Coho Salmon (Adults)														
Coho Salmon (Juveniles)									0.60	2	0.36	1		
Pink Salmon (Juveniles)														
Sockeye Salmon (Juveniles)														
Brown Rockfish					0.35	1								
Chub Mackerel														
Curlfin Sole														
Fish														
Flatfishes		1												
Fried Egg Jellyfish							3.72							
Jack Mackerel			25.63	18	88.62	68	247.40	217	1.80	2	1.48	1		
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane			1.22		1.62									
Moon Jellyfish	2.03	2	5.47	7	0.81	2	6.36							
Ocean Sunfish														
Opalescent Inshore Squid	0.01	24	1.34	698	0.58	233	0.09	36	1.10	250	0.57	94	0.26	59
Pacific Herring							0.06	1	0.14	2			0.18	19
Pacific Sardine													0.14	2
Pacific Saury							25.40	357	9.73	135	9.71	115	183.68	2,073
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish														
Sablefish														
Sea Nettle											2.68		0.36	1
Smelts														
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish	3.26		23.72		4.09		32.95		35.66		3.44		2.08	
Wolf Eel													0.04	1
TOTAL	**5.30**	**27**	**61.63**	**724**	**110.84**	**310**	**315.98**	**611**	**54.10**	**394**	**22.70**	**212**	**187.80**	**2,161**

Station Name	KS01		KS02		KS03		KS04		KS05		VI10		VI11	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)			4.41	4										
Chinook Salmon (Juveniles)	1.24	11	5.98	44	1.05	7					0.72	1	0.19	2
Chum Salmon (Adults)	6.16	2	6.84	2							4.30	1	6.45	2
Chum Salmon (Juveniles)														
Coho Salmon (Adults)			5.36	4										
Coho Salmon (Juveniles)	0.24	1	18.47	52	0.66	2					0.62	2	0.28	1
Pink Salmon (Juveniles)														
Sockeye Salmon (Juveniles)														
Brown Rockfish														
Chub Mackerel	18.15	14												
Curlfin Sole														
Fish														
Flatfishes								3						
Fried Egg Jellyfish			1.02	1			1.44		2.67					
Jack Mackerel	228.97	153	96.57	66									67.11	56
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane					7.96						1.81	1		
Moon Jellyfish			0.35								0.34		0.10	1
Ocean Sunfish														
Opalescent Inshore Squid			1.76	607	19.55	4,508	0.19	91					0.29	112
Pacific Herring							0.06	1						
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish														
Sablefish			1.09	5										
Sea Nettle														
Smelts														
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish			29.24		12.25		7.46		12.90		8.55		9.65	
Wolf Eel								1						
TOTAL	**254.76**	**181**	**171.09**	**785**	**41.47**	**4,517**	**9.15**	**96**	**15.57**	**0**	**16.34**	**5**	**84.07**	**174**

Station Name	EI04		EI03		EI02		EI01		NS01		NS02		NS04	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)														
Chinook Salmon (Juveniles)	6.10	54			0.77	9	1.47	23	1.31	22	4.11	71	1.79	23
Chum Salmon (Adults)			2.57	1	12.15	3							2.81	1
Chum Salmon (Juveniles)													0.74	5
Coho Salmon (Adults)											3.85	1		
Coho Salmon (Juveniles)	2.74	8												
Pink Salmon (Juveniles)													0.23	2
Sockeye Salmon (Juveniles)														
Brown Rockfish														
Chub Mackerel														
Curlfin Sole														
Fish		1												
Flatfishes														
Fried Egg Jellyfish														
Jack Mackerel	406.47	282												
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane			4.25		2.29		3.76		2.94	1	11.09		0.39	
Moon Jellyfish											1.37	4	0.26	1
Ocean Sunfish														
Opalescent Inshore Squid												1		1
Pacific Herring														
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish					0.14	1			0.03	1				
Sablefish														
Sea Nettle														
Smelts														
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish			0.11		3.20		1.26		0.04		6.84		3.98	
Wolf Eel														
TOTAL	**415.31**	**345**	**6.93**	**1**	**18.55**	**13**	**6.49**	**23**	**4.32**	**24**	**27.26**	**77**	**10.20**	**33**

Station Name	NS05		NS06		VI14		CS09		CS08		CS06		CS05	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)					3.83	4			0.54	1				
Chinook Salmon (Juveniles)	2.81	31	0.17	1	0.55	2	0.48	3	1.78	9	5.60	38	0.37	4
Chum Salmon (Adults)			4.29	1					3.42	1			20.32	6
Chum Salmon (Juveniles)	0.28	2			0.82	5			0.56	4				
Coho Salmon (Adults)													5.47	2
Coho Salmon (Juveniles)					1.08	3	1.53	6	0.86	3				
Pink Salmon (Juveniles)	20.08	193					0.93	9	0.38	3				
Sockeye Salmon (Juveniles)														
Brown Rockfish														
Chub Mackerel														
Curlfin Sole														
Fish				1								1		
Flatfishes														
Fried Egg Jellyfish									0.12	1	0.52		3.80	
Jack Mackerel					3.03	3	13.16	11	64.26	53	199.05	145	2.91	2
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane					0.43	2								
Moon Jellyfish			0.13						0.22	1				
Ocean Sunfish														
Opalescent Inshore Squid	0.62	365	6.83	2,822	2.48	2,215	7.98	3,563	0.66	347	0.75	217		
Pacific Herring														
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish														
Sablefish														
Sea Nettle														
Smelts														
Spotted Ratfish														
Starry Flounder											1.79	1		
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish	20.38		3.95		17.95				1.08		4.31			
Wolf Eel														
TOTAL	**44.17**	**591**	**15.37**	**2,825**	**30.17**	**2,234**	**24.08**	**3,592**	**73.88**	**423**	**212.02**	**402**	**32.87**	**14**

Station Name	CS04		CS03		CS02		CS01		CS10		VI15		VI16	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)									3.14	1			0.83	1
Chinook Salmon (Juveniles)	3.29	36	0.07	1			0.69	9	2.78	20	1.62	9	0.89	6
Chum Salmon (Adults)	14.43	4	11.62	3					14.94	4	2.42	1		
Chum Salmon (Juveniles)											0.15	1		
Coho Salmon (Adults)														
Coho Salmon (Juveniles)														
Pink Salmon (Juveniles)									0.33	4	0.21	4	0.12	2
Sockeye Salmon (Juveniles)			0.16	3	0.06	1								
Brown Rockfish														
Chub Mackerel														
Curlfin Sole														
Fish														
Flatfishes														
Fried Egg Jellyfish														
Jack Mackerel			1.50	1										
Jellyfish														
Kelp Greenling														
Lingcod									8.25	1				
Lions Mane	8.31		6.56		4.12	3	1.16		0.29					
Moon Jellyfish	0.40	1												
Ocean Sunfish														
Opalescent Inshore Squid						3	0.02	11	3.10	1,615	5.19	1,450	4.24	1,710
Pacific Herring									0.04	1				
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish			0.03	1										
Sablefish														
Sea Nettle														
Smelts										1	0.42	280	0.07	37
Spotted Ratfish														
Starry Flounder														
Threespine Stickleback														
Tidepool Snailfish														
Walleye Pollock														
Water Jellyfish	36.34		1.46		12.71				1.04		3.52		0.98	
Wolf Eel														
TOTAL	**62.77**	**41**	**21.40**	**9**	**16.89**	**7**	**1.87**	**20**	**33.91**	**1,647**	**13.53**	**1,745**	**7.13**	**1,756**

Station Name	VI17		BS04		BS05		BS01		BS02		BS03		JDF02	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)	1.54	1									0.55	1	3.12	3
Chinook Salmon (Juveniles)	6.24	82			4.16	56	0.36	6	6.39	99	5.38	56	1.01	2
Chum Salmon (Adults)	5.82	2					2.73	1					10.76	3
Chum Salmon (Juveniles)	0.56	5			0.06	1			0.20	3			6.41	50
Coho Salmon (Adults)													0.67	1
Coho Salmon (Juveniles)			1.69	5									7.16	33
Pink Salmon (Juveniles)	3.46	43							2.40	42	1.57	17	34.02	367
Sockeye Salmon (Juveniles)														
Brown Rockfish														
Chub Mackerel														
Curlfin Sole														
Fish														
Flatfishes						1								
Fried Egg Jellyfish														
Jack Mackerel	3.06	2											2.78	2
Jellyfish														
Kelp Greenling														
Lingcod														
Lions Mane														
Moon Jellyfish	0.12										6.43	7		
Ocean Sunfish														
Opalescent Inshore Squid	3.96	2,604			4.15	673					0.64	313		
Pacific Herring	0.14	3			0.08	1							0.04	1
Pacific Sardine														
Pacific Saury														
Pacific Spiny Lumpsucker														
Prowfish														
Ragfish														
Sablefish														
Sea Nettle														
Smelts	0.69	768			0.19	181					0.13	61		
Spotted Ratfish											0.19	1		
Starry Flounder														
Threespine Stickleback										1			0.02	1
Tidepool Snailfish					0.01	1								
Walleye Pollock											0.20	1		
Water Jellyfish	1.50		12.06		0.76				2.54		3.44			
Wolf Eel														
TOTAL	**27.09**	**3,510**	**13.75**	**5**	**9.41**	**914**	**3.09**	**7**	**11.53**	**145**	**18.53**	**457**	**65.99**	**463**

Station Name	JDF03		JDF04		JDF05		JDF01	
Common Name	Weight	Count	Weight	Count	Weight	Count	Weight	Count
Chinook Salmon (Adults)					0.57	1		
Chinook Salmon (Juveniles)	0.38	2						
Chum Salmon (Adults)							5.42	1
Chum Salmon (Juveniles)	0.16	1	0.11	1			0.12	1
Coho Salmon (Adults)	2.59	1					6.62	2
Coho Salmon (Juveniles)	1.43	5	12.22	47	0.69	3	4.33	16
Pink Salmon (Juveniles)	0.67	8	0.54	6			0.22	2
Sockeye Salmon (Juveniles)								
Brown Rockfish								
Chub Mackerel								
Curlfin Sole								
Fish								
Flatfishes								
Fried Egg Jellyfish								
Jack Mackerel								
Jellyfish								
Kelp Greenling								
Lingcod								
Lions Mane								
Moon Jellyfish								
Ocean Sunfish								
Opalescent Inshore Squid						3		
Pacific Herring								
Pacific Sardine								
Pacific Saury								
Pacific Spiny Lumpsucker								
Prowfish								
Ragfish								
Sablefish								
Sea Nettle								
Smelts								
Spotted Ratfish								
Starry Flounder								
Threespine Stickleback								
Tidepool Snailfish								
Walleye Pollock								
Water Jellyfish	1.14				0.39		0.18	
Wolf Eel								
TOTAL	**6.37**	**17**	**12.87**	**54**	**1.65**	**7**	**16.89**	**22**

King, J., J. L. Boldt, and S. King. 2018. “Proceedings of the Pacific Region Workshop on Stomach Content Analyses, February 27-March 1 2018, Nanaimo, British Columbia.” *Can. Tech. Rep. Fish. Aquat. Sci.*, no. 3274: v + 55 p.