Eastern Gulf of Alaska Pacific Salmon Trawl Survey, February 19 - March 21, 2022 onboard the CCGS Sir John Franklin as contribution to the International Year of the Salmon Pan-Pacific Winter High Seas Expedition

Jackie R. King, Cameron Freshwater, Amy M. Tabata, Tyler B. Zubkowski, Chelsea Stanley, Cynthia Wright, Erika D. Anderson and Kelsey L. Flynn

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
V9T 6N7

2022

Canadian Technical Report of Fisheries and Aquatic Sciences 3502

Fisheries and Oceans Canada / Pêches et Océans Canada

Canada

Canadian Technical Report of Fisheries and Aquatic Sciences

Technical reports contain scientific and technical information that contributes to existing knowledge but which is not normally appropriate for primary literature. Technical reports are directed primarily toward a worldwide audience and have an international distribution. No restriction is placed on subject matter and the series reflects the broad interests and policies of Fisheries and Oceans Canada, namely, fisheries and aquatic sciences.

Technical reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in the data base *Aquatic Sciences and Fisheries Abstracts*.

Technical reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page.

Numbers 1-456 in this series were issued as Technical Reports of the Fisheries Research Board of Canada. Numbers 457-714 were issued as Department of the Environment, Fisheries and Marine Service, Research and Development Directorate Technical Reports. Numbers 715-924 were issued as Department of Fisheries and Environment, Fisheries and Marine Service Technical Reports. The current series name was changed with report number 925.

Rapport technique canadien des sciences halieutiques et aquatiques

Les rapports techniques contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui ne sont pas normalement appropriés pour la publication dans un journal scientifique. Les rapports techniques sont destinés essentiellement à un public international et ils sont distribués à cet échelon. II n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques de Pêches et Océans Canada, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports techniques peuvent être cités comme des publications à part entière. Le titre exact figure au-dessus du résumé de chaque rapport. Les rapports techniques sont résumés dans la base de données *Résumés des sciences aquatiques et halieutiques.*

Les rapports techniques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre.

Les numéros 1 à 456 de cette série ont été publiés à titre de Rapports techniques de l'Office des recherches sur les pêcheries du Canada. Les numéros 457 à 714 sont parus à titre de Rapports techniques de la Direction générale de la recherche et du développement, Service des pêches et de la mer, ministère de l'Environnement. Les numéros 715 à 924 ont été publiés à titre de Rapports techniques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 925.

Canadian Technical Report of
Fisheries and Aquatic Sciences 3502

2022

EASTERN GULF OF ALASKA PACIFIC SALMON TRAWL SURVEY, FEBRUARY 19 - MARCH 21, 2022 ONBOARD THE CCGS SIR JOHN FRANKLIN AS CONTRIBUTION TO THE INTERNATIONAL YEAR OF THE SALMON PAN-PACIFIC WINTER HIGH SEAS EXPEDITION

by

Jackie R. King[1], Cameron Freshwater[1], Amy M. Tabata[1], Tyler B. Zubkowski[1], Chelsea Stanley[2], Cynthia Wright[2], Erika D. Anderson[1], and Kelsey L. Flynn[1]

[1]Fisheries and Oceans Canada, Science Branch, Pacific Region, Pacific Biological Station, 3190 Hammond Bay Road, Nanaimo, BC, Canada V9T 6N7
[2]Fisheries and Oceans Canada, Science Branch, Pacific Region, Institute of Ocean Sciences, 9860 West Saanich Road, Sidney, BC, Canada V8L 4B2

Cat. No. Fs97-6/3502E-PDF ISBN 978-0-660-44214-3 ISSN 1488-5379

Correct citation for this publication:

King, J.R., Freshwater, C., Tabata, A.M., Zubkowski, T.B., Stanley, C., Wright, C., Anderson, E.D., and Flynn, K.L. 2022. Eastern Gulf of Alaska Pacific Salmon Trawl Survey, February 19 - March 21, 2022 onboard the CCGS Sir John Franklin as contribution to the International Year of the Salmon Pan-Pacific Winter High Seas Expedition. Can. Tech. Rep. Fish. Aquat. Sci. 3502: vii + 61 p.

CONTENTS

ABSTRACT

King, J.R., Freshwater, C., Tabata, A.M., Zubkowski, T.B., Stanley, C., Wright, C., Anderson, E.D., and Flynn, K.L. 2022. Eastern Gulf of Alaska Pacific Salmon Trawl Survey, February 19 - March 21, 2022 onboard the CCGS Sir John Franklin as contribution to the International Year of the Salmon Pan-Pacific Winter High Seas Expedition. Can. Tech. Rep. Fish. Aquat. Sci. 3502: vii + 61 p.

Fisheries and Oceans Canada conducted an ecosystem-based trawl survey from February 19 to March 21, 2022 on the CCGS Sir John Franklin. This survey targeted Pacific Salmon in the eastern Gulf of Alaska and contributed to the International Year of the Salmon pan-Pacific survey coordinated by the North Pacific Anadromous Fish Commission. There were 31 species sampled in 456 kg of catch, with Pacific Salmon making up 29% of the catch by weight. Overall, the Northern Sea Nettle, Water Jellyfish, and Sockeye Salmon made up the largest biomass within the catch. There were 2478 individual lengths and 1763 individual weights recorded, including 5 Pacific Salmon species (Oncorhynchus spp.). Sockeye Salmon and Chum Salmon were the most abundant Pacific Salmon species, followed by Coho Salmon, Pink Salmon and Chinook Salmon. Stomachs were examined for prey items, with euphausiids, unidentified remains, squid, amphipods and lanternfishes being the most common prey species for salmon. Biological samples including scales, otoliths, muscles, fin clips, gill clips, plasma, liver, gonads, and eyeballs were collected for lab analyses at the Pacific Biological Station, Fisheries and Oceans Canada (Nanaimo, BC), the Alaska Fisheries Science Center, National Marine Fisheries Service (Juneau, AK), the Alaska Department of Fish and Game (Juneau, AK) and the University of British Columbia (Vancouver, BC). Acoustic data were recorded during transit between stations. Associated information on the physical oceanography, macronekton and zooplankton composition was collected from 35 stations for analysis at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC) in collaboration with the University of Victoria (Victoria, BC). ARGO floats were deployed at 6 stations.

RÉSUMÉ

King, J.R., Freshwater, C., Tabata, A.M., Zubkowski, T.B., Stanley, C., Wright, C., Anderson, E.D., and Flynn, K.L. 2022. Eastern Gulf of Alaska Pacific Salmon Trawl Survey, February 19 - March 21, 2022 onboard the CCGS Sir John Franklin as contribution to the International Year of the Salmon Pan-Pacific Winter High Seas Expedition. Can. Tech. Rep. Fish. Aquat. Sci. 3502: vii + 61 p.

Pêches et Océans Canada a mené un relevé écosystémique au chalut du 19 février au 21 mars, 2022 sur le NGCC «Sir John Franklin». Cette étude ciblait les saumons pacifiques du Golfe d'Alaska est, et a contribué à l'étude pan-pacifique de l'Année Internationale des Saumons (AIS), cordonnée par le North Pacific Anadromous Fish Commission (NPAFC). Il y avait 31 espèces échantillonnées dans 456 kg de prise, avec 29% de saumon du Pacifique capturé en poids. Dans l'ensemble la méduse striée du Pacifique (Chrysaora melanaster), la méduse de cristal (Aequorea victoria), et le saumon rouge constituaient la plus grande biomasse. On a enregistré 2478 longueurs individuelles et 1763 poids individuels, dont les 5 espèces de saumon du Pacifique (Onchorhyncus spp.). Le saumon rouge et le saumon kéta étaient les espèces le plus abondantes (par comptage individuel) des espèces de saumon du Pacifique; suivie par le saumon coho, le saumon rose, et le saumon quinnat. Le contenu des estomacs a été examiné pour étudier les articles de proie. Les espèces de proies communes aux saumons comprenaient les restes non identifiés des euphausiacés, les calamars, les amphipodes, et les poissons-lanternes. Les échantillons biologiques prélevés pour être analysés au laboratoire comprenaient des écailles, les otolithes, les muscles, les entailles de nageoires (fin clips), les entailles des branchies, les globes oculaires, les foies, les gonades, et le plasma. Les échantillons seront analysés à la Station Biologique du Pacifique (Pêches et Océans Canada; Nanaimo, C.-B.), Alaska Fisheries Science Center, National Marine Fisheries Service (Juneau, AK), Alaska Department of Fish and Game (Juneau, AK) et L'Université de la Colombie-Britannique (Vancouver, C.-B.). Les données acoustiques ont été recueillies pendant le transport entre les stations d'échantillonnages. Des informations sur l'océanographie physique, et la composition du macronecton et zooplancton) ont été recueillies auprès de 35 stations et seront analysées à l'Institut du Science de la Mer, Pêches et Océans Canada (Sidney, C.-B.) en collaboration avec l'Université de Victoria (Victoria, C.-B.). Les flotteurs ARGO ont été déployés à 6 des stations.

1 INTRODUCTION

Fisheries and Oceans Canada (DFO) conducted an ecosystem-based trawl survey, targeting Pacific Salmon (*Oncorhynchus* spp.) in the eastern North Pacific from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*. This survey collected oceanographic, zooplankton and biological data and samples in contribution to the 2022 International Year of the Salmon (IYS) Pan-Pacific Expedition coordinated by the North Pacific Anadromous Fish Commission (NPAFC, Vancouver, BC). The 2022 IYS Pan-Pacific Expedition was an international collaborative effort between Canada, Japan, the Republic of Korea, the Russian Federation and the United States of America. The 2022 Expedition is the largest ever multinational survey to study Pacific salmon in the North Pacific Ocean during the winter and builds on previous IYS Expeditions into the eastern Gulf of Alaska coordinated by the Pacific Salmon Foundation (Vancouver, BC, Canada) in 2019 and 2020 (Pakhomov et al. 2019; Somov et al. 2020). The 2022 IYS Pan-Pacific Expedition was carried out between January and April of 2022 and involved five research vessels and covered portions of the central and eastern North Pacific Ocean. The Canadian survey adapted DFO coastal juvenile salmon and pelagic sampling protocols (King et al. 2019), as well as DFO Line P oceanographic surveys, to meet overarching IYS survey objectives.

The main objectives of this survey were to:

1. determine the abundance, condition, distribution, and genetic stock composition of Pacific Salmon present in the eastern Gulf of Alaska in February and March,
2. collect the associated physical oceanography, and
3. assess the distribution and biomass of prey species, including zooplankton.

This survey supports research into linkages between oceanographic conditions, fish abundance and community composition, and Pacific Salmon ocean ecology.

2 METHODS

All data collected, including subsequent sample analyses outlined below, will be archived on the IYS Data Portal. Preliminary bridge and trawl data contained in this report are available at Trawl Data from the CCGS Sir John Franklin during the 2022 International Year of the Salmon. Additional archival locations for data are noted below as applicable.

2.1 SURVEY LOCATIONS

The IYS Pan-Pacific Expedition planned to survey the central and eastern portion of the North Pacific, between 135 - 177°W and 44 - 60°N. Fisheries and Oceans Canada was assigned 38 stations in the eastern Gulf of Alaska bounded by 138 - 144°W and 47 - 57°N (Figure 1). Station locations were at the intersection of longitudes and latitudes, and station names are comprised of those coordinates (e.g. the station at the intersection of 138°W and 47°N is called station 138-47).

2.2 OCEANOGRAPHY

A Sea-bird SBE-911plus (Sea-bird Electronics Bellevue Washington, USA) conductivity-temperature-depth profiler (CTD) was used for oceanographic profiles to 300 m depth (or to 2,000 m for Argo float deployment stations, Section 2.8) (Figure 2). The CTD system included 24x10 L Niskin rosette system for the collection of water samples at pre-determined depths. CTD data are processed and archived by the Institute of Ocean Sciences (Fisheries and Oceans Canada, Sidney, BC). The CTD was equipped with transmissometer, fluorometer, pH, salinity and dissolved oxygen sensors. To avoid any chemical contamination from trawl gear and fishing activities, CTD/rosette sampling took place prior to trawl net deployment.

CTD oceanographic data was used to estimate oceanographic conditions (constrained to observed ranges) throughout the survey area using ArcGIS Pro (version 2.8.3). Data were averaged for the upper 10 m of depth. Sea surface temperature (SST, ℃), sea surface salinity (SSS, PSS-78), and sea surface fluorescence (SSF, mg/m3) were all estimated with local polynomial interpolation.

2.2.1 Dissolved oxygen

Water samples for dissolved oxygen content were collected at 5 shallow cast stations (51-138; 51-144; 52-135; 53-141; 53-144) from bottle depths of 5, 25, 50, 75, 100, 150, 200 and 300 m, and were collected at all deep cast stations (bottle depths: 0, 5, 10, 25, 50, 60, 75, 100, 125, 150, 175, 200, 250, 300, 400, 600, 800, 1000, 1250, 1500, 2000 m). Samples were fixed with manganous chloride and alkaline iodide and stored in the dark, at 4℃. Samples were processed at sea using an automated Winkler titration system (Metrohm Dosimat model 876 and a UV light source and detector with a 365 nm filter controlled by LVO2_876 software designed and constructed by Scripps Institution of Oceanography) with modifications based on Carpenter (1965) and adhering to World Ocean Circulation Experiment (WOCE) protocols (Culberson 1991). Data are processed and archived by the Institute of Ocean Sciences (Fisheries and Oceans Canada, Sidney, BC).

2.2.2 Salinity

Water samples for salinity measurements were collected at all deep cast stations from bottle depths of 1000, 1250, 1500 and 2000 m. Sample bottles and nylon inserts were rinsed with sample water 3 times, filled to 90% capacity and stored at room temperature for subsequent analyses (samples sent to the Institute of Ocean Sciences, Fisheries and Oceans Canada, Sidney, BC).

2.2.3 Dissolved nutrients

Water samples for nitrate and nitrite, phosphate and silicate were collected at all shallow cast stations from bottle depths of 5, 25, 50, 75, 100, 125, 150, 200, and 300 m; and at all deep cast stations from bottle depths of 0, 5, 10, 25, 50, 60, 75, 100, 125, 150, 175, 200, 250, 300, 400, 600, 800, 1000, 1250, 1500, 2000 m. Samples were collected in acid rinsed polystyrene and glass (for phosphate) tubes. Tubes and caps were rinsed with sample water 3 times, and filled to within 2 cm of the top. The tubes were frozen at -20℃ and stored in aluminum blocks for subsequent analyses (samples sent to the Institute of Ocean Sciences, Fisheries and Oceans Canada, Sidney, BC).

2.2.4 Ligands

To avoid contamination from vessel gear, when ligands samples were being collected the CTD and rosette casts were completed first at stations. Duplicate water samples to analyse metal-binding compounds (a.k.a. ligands) were collected at all shallow cast stations from bottle depths of 5, 25, 50, 100 and 150 m. Water was filtered directly from the Niskin using a 0.22 µm Millipore Opticap filter (KVGLA4HH3) and collected in 1 L bottles. The filters were flushed with 1 L between casts and 500 ml between Niskin bottles within a cast. Bottles were filled to 90% capacity, and frozen at -20℃ for subsequent analyses (samples sent to A. Ross, Fisheries and Oceans Canada, Sidney, BC).

2.2.5 Environmental DNA (eDNA)

To avoid contamination from vessel gear, when eDNA samples were being collected the CTD and rosette casts were completed first at stations. Water samples were collected for eDNA analyses at all shallow cast stations from bottle depths of 5, 25, 50, and 100 m. A dedicated workstation was sanitized prior to use with 10% diluted bleach to denature DNA, rinsed with water, rinsed with 0.1N sodium thiosulfate to neutralize the bleach, then rinsed again with water. Water samples were filtered directly from the Niskin bottles using an automated filtration system designed by Fisheries and Oceans Canada (K. Miller-Saunders, Nanaimo, BC). Once filtration was completed, the membrane filter capsule was filled with 2 ml of RNAlater, closed at each end with Luer-lok adaptor and parafilm wrapped around caps. Each filter was placed in a Whirl-Pak and stored at 4℃ for subsequent analyses (samples sent to K. Miller-Saunders, Fisheries and Oceans Canada, Sidney, BC). Within 2 hours of filtration, the automated filtration system was flushed with 1 L of 10% diluted bleach, then 1 L of MQ water. The system was recirculated for 5 minutes with 500 mL of 0.1N sodium thiosulfate, and finally flushed with 1 L of Millipore Q (MQ) purified water. Control samples were collected before the first station, and then at regular intervals, using MQ water as the control sample.

2.2.6 High-performance liquid chromatography for phytoplankton pigment analyses (HPLC)

Water samples were collected for two different subsequent analyses for HPLC, used to determine phytoplankton composition from pigment analyses. Samples were collected at all shallow and deep cast stations from bottle depths of 5, 25, and 50 m for the first set of samples (samples sent to A. Peña, Fisheries and Oceans Canada, Sidney, BC) and from 5 m only for the second set of samples (samples sent to M. Costa, University of Victoria, Victoria, BC). Each group of samples were collected from separate Niskin bottles into containers with pre-determined volumes in order to provide enough water for filtration for each protocol. All samples were filtered within 2 hours of collection. Samples collected for A. Peña at the Institute of Ocean Sciences were filtered through a 47 mm GF/F filter using an inverted manifold system with vacuum filtration (not exceeding 5 inHg). Observational data on filtration time and sample colour were collected. Samples were stored at -80℃ in 5 mm cryovials and are to be analyzed at the Institute of Ocean Sciences. Samples collected for M. Costa at the University of Victoria, used a similar inverted system with vacuum filtration but employed 25 mm GF/F filters. Filters were similarly folded into cryovials, stored at -80℃ and returned to the University of Victoria for HPLC analysis.

2.2.7 Chlorophyl a

Water samples for subsequent chlorophyll a analyses were collected from shallow and deep stations from bottle depths of 5, 25, 50, 75, 100 and 150 m. Duplicates from the Niskin bottles were collected in amber calibrated (~330 ml) HDPE bottles. The samples were filtered through 25 mm GF/F under vacuum, not exceeding 5 inHg. Filters were transferred to glass scintillation vials and stored at -80℃ (samples sent to A. Peña, Fisheries and Oceans Canada, Sidney, BC).

2.2.8 Flow Cytometry.

Water samples for subsequent flow cytometry analyses were collected from shallow and deep stations from bottle depth of 5 m. 10-30 ml of seawater was collected directly from the Niskin in a plastic graduated tube. 1.5 ml was transferred to a 3 ml cryovial and 0.75 ul of filtered 10% paraformaldehyde added. Samples then remained in refrigerated conditions (~4℃) for 2 hours and then were frozen at -80℃. (samples were sent to L. Eisner, Alaska Fisheries Science Center, Seattle, WA).

2.2.9 Particulate Organic Matter

Water samples were collected for particulate organic matter (POM) (organic carbon and nitrogen), isotopes (carbon and nitrogen), and fatty acids at both shallow and deep cast stations from duplicate 5 m depth bottles. For organic carbon, nitrogen and isotopes, replicate 2 L samples were collected in cubicontainers, sampled and filtered onto pre-combusted 25 mm GF/F filters and stored at -20℃. For fatty acids, 5-10 L were collected into a cubicontainer and filtered onto a 47 mm pre-combusted GF/F. All containers and sampling equipment was pre-rinsed with sample water and pressures on the vacuum pump did not exceed 12 inHg. Volumes filtered were recorded and filters were inwardly folded and stored in aluminum packets and kept at -20℃ (samples were sent to B. Hunt, University of British Columbia, Vancouver, BC).

2.3 ZOOPLANKTON

Vertical tows to sample zooplankton were conducted to 300 m with two 60 cm diameter, 253 µm mesh nets mounted in a bongo-drum style frame, one of which was equipped with a flow meter. A RBR duet depth sensor (RBR Ltd., Ottawa, ON, Canada) was attached to the bongo frame. Zooplankton collected from the net with the flow meter were preserved in 10% formalin for species enumeration (samples sent to A. Sastri, Fisheries and Oceans Canada, Sidney, BC). The other net sample was sorted into five size fractions by stack sieving through 4, 2, 1, 0.5 and 0.25 mm screens. Individual size fractions from half of the stations were frozen in plastic bags and stored at -80℃ and will be analyzed for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC). Samples collected at the other half of the stations were frozen at -20℃ for energy density analyses (samples sent to T. Miller, Alaska Fisheries Science Center, Juneau, AK).

2.4 TUCKER TRAWL

A Tucker trawl (1 m^2 mouth opening when towed at 45°; 1 mm mesh size) equipped with a double-release mechanism (Ocean Test Equipment) was towed obliquely at approximately 1.5 knots. The wire angle and length of wire were used to estimate approximate net depth during deployment. A RBR duet depth sensor was attached to the trawl frame to provide net depths post-deployment based on 10 second horizontal towing prior to triggering the double-release mechanism. Target sampling depths included 0 – 400 m; 400 – 275 m; 275 – 0 m. Nekton collected from each net were preserved in 10% formalin for species enumeration (samples sent to J. Dower, University of Victoria, Victoria, BC).

2.5 FISHING OPERATIONS

The vessel deployed an LFS 1142 trawl net (Appendix A, manufactured by LFS Trawl (LFS Net Systems, Bellingham, USA)). This two-bridle mid-water net has a fine-mesh codend liner (11 mm stretched) to retain smaller species. The net was designed to have a net opening of 46 m wide by 30 m high, or an area of 1380 m^2 (Figure A.1).

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 each approximately 340 kg (750 lbs). The vessel was equipped with a SCANMAR Trawl System and wireless SS4 Catch Sensor that provided real time door spread, headline depth and net opening values (SCANMAR, Åsgårdstrand, Norway). In addition, RBR duet temperature and depth sensors were attached to the headrope and footrope to record depth and temperature every 30 seconds. The vertical net opening was plotted over time to show the net opening and mean net opening was calculated.

The target headrope depth was 0 m (surface). Two A-6 floats 86.4 cm x 118.1 cm (34" x 46.5") were attached to the headrope. Warp length was 200 m (Appendix B). Target tow duration and speed was 60 minutes at 5 knots (9.3 km/hr) once the trawls doors were locked and the net was fishing.

2.6 CATCH ENUMERATION

During net retrieval vessel crew inspected net mesh for large specimens, particularly Pacific Salmon, for removal; the net end was shaken while suspended to ensure the catch accumulated in the codend. The catch was deposited into baskets to be sorted and processed in the lab. All catch was sorted and enumerated by species (or lowest taxonomic grouping), with species total catch weight (kg) and count recorded. Once all salmon were removed, large catches were randomly subsampled prior to sorting. Subsample composition with associated weights and counts were used to estimate total weight and count for species within the subsample. For fragmented cnidarian species catch was weighed with counts for whole specimens (if present) and fragmented pieces were weighed to provide overall total catch weight, but total counts were not estimated. The total catch (or the subsample) of each species (or taxonomic group), was weighed to the nearest 0.1 kg using a large capacity, motion-compensating electronic balance (Marel Model M1100/M2000, 60 kg capacity). Catches of a species or taxonomic group which totaled less than 0.1 kg, were recorded as “trace” instead of a weight.

2.7 BIOLOGICAL SAMPLES

2.7.1 Pacific Salmon Specimens

All Pacific Salmon specimens were measured for fork length (mm) and weight (g). Specimens were weighed (nearest g) using a benchtop motion-compensating electronic scale (Marel Model M1100, 3 kg capacity). The sex and maturity were determined and recorded. Adipose fin status (i.e. clipped vs. non-clipped) was recorded. Salmon were inspected for presence of coded wire tags using a handheld detector, and if present the snout portion with the tag was removed and frozen at -20℃ for subsequent extraction and determination of hatchery origin by Fisheries and Oceans Canada (Nanaimo, BC). Otoliths and 5 scales were collected for potential ageing and microchemistry analyses (samples archived by J. King, Fisheries and Oceans, Nanaimo, BC). Since trawl caught salmon are often missing most scales, if scales were not present in the preferred area of sampling (i.e. posterior to the dorsal fin from just above the lateral line) then scales were selected from under the pectoral fin first and then from any location possible if those were not available. Two replicates of caudal fin tissue were collected and stapled to separate sheets of Whatman paper to dry for genetic stock identification (replicate 1 samples sent to T. Beacham, Fisheries and Oceans Canada, Nanaimo, BC; replicate 2 samples sent to C. Habicht, Alaska Department of Fish and Game, Juneau, AK). Heads were frozen at -20℃ for lab analyses of eyeballs for stable isotopes, and operculum clips and vertebrae for hormone levels (samples sent to D. Oxman, Alaska Department of Fish and Game, Juneau, AK). The visceral organs and gonads were examined for the presence of visceral adhesion (surrounded by a thick connective tissue sheath) caused by the parasitic nematode, *Philonema oncorhynchi*. Gonads were removed and frozen at -20℃ for lab analyses for insulin-like growth factor 1 (IGF-1), energy density analyses and an intercalibration study (samples sent to T. Miller, Alaska Fisheries Science Center, Juneau, AK). Livers were removed and frozen at -20℃ for stable isotope analyses, energy density analyses, and tissue content (lipid, protein, carbohydrate) analyses (samples sent to T. Miller, Alaska Fisheries Science Center, Juneau, AK). Muscle tissue with skin anterior to the dorsal fin was removed and frozen at -80℃ for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC). Muscle tissue with skin posterior to the dorsal fin was removed and frozen at -20°C for energy density analyses (samples sent to J. King, Fisheries and Oceans Canada, Nanaimo, BC).

Length and weight observations were both log-transformed for use in linear regression analyses where a slope coefficient >3 indicates positive allometric growth, and a slope coefficient <3 indicates negative allometric growth (Froese 2006). These data were also used to calculate Fulton's K condition factor ($K=(100 \times W_{grams})/(L_{cm})^3$) where K>1 indicates a specimen in good condition and K<1 indicates a specimen in poor condition (Froese 2006).

2.7.1.1 Blood plasma samples

Blood samples were collected within the first 30 minutes of enumerating the catch for insulin growth factor (IGF-1) and insulin-like growth binding protein (IGFBP) analyses. Between 0.2 and 0.5 ml of blood was collected from the ventral vein in the caudal peduncle using a 1.5 inch, 1 cc syringes (18 gauge) prepped with sodium heparin. The blood was placed in 0.5 ml microtubes and centrifuged at 5000 rpm (~3000 x g) for 5 min. The plasma was transferred to labelled 0.5 ml plasma tubes and frozen at -20°C (samples sent to B. Beckman, Northwest Fisheries Science Center, Seattle, WA).

2.7.1.2 Gill samples

Samples of gill filaments were aseptically collected within the first 30 minutes of enumerating the catch for subsequent lab analyses for pathogen presence and genetic screening to access fish health and condition (samples sent to K. Miller-Saunders, Fisheries and Oceans Canada, Nanaimo, BC). Gill filaments were removed from the second gill arch and were placed in a 2 ml centrifuge tube filled with RNAlater solution. The filaments were incubated in RNAlater in a 4°C fridge for ~12 hours and subsequently frozen at -20°C.

2.7.1.3 External injuries

Prior to dissection, both sides of the specimen's body were examined for external marks: 1) wounds (fresh injuries) and scars (healed wounds), 2) sea lice (either present or abrasions caused by them above the anal fin or behind dorsal fin), 3) signs of illness (metacecaria, i.e. raised black spots or fin rot), or 4) deformities (e.g., deformed fins or gill cover). If present, the type of mark and location, approximate size, potential predators if applicable, or number of sea lice or metacecaria were recorded and two photos were taken, one with entire fish and one with a close-up of the mark (data and photos sent to C. Neville, Fisheries and Oceans Canada, Nanaimo, BC).

2.7.1.4 Stomach samples

Stomachs were analysed at sea following the established protocol of King, Boldt, and King (2018). The stomach was removed from the anterior end of the oesophagus to the pyloric sphincter. The bolus from the pyloric and cardiac parts of the stomach were removed to a petri dish and prey sorted to lowest taxonomic level possible with using naked eye or hand lens. The volume of each prey taxonomic group was measured to nearest 0.1 cm^3 using a volumetric measuring board and the digested state was estimated (fresh, partially, fully). Empty stomachs were also recorded. All stomach contents were then frozen at -20°C for potential further lab analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC).

2.7.2 Other Specimens

For other species, a random selection of specimens were processed, up to a maximum of 100 individuals per tow. Specimens were measured for length (mm) and weight (g). The bell diameters of intact jellyfish specimens were recorded, and up to 5 intact specimens were frozen at -80℃ for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC). The mantle length of squid specimens were recorded, and a maximum of 10 specimens per species were frozen at -20℃ whole for lab analyses of stomach contents and for energy density estimation (samples sent to J. King Fisheries and Oceans Canada, Nanaimo, BC). If available an additional 5 squid specimens were frozen at -80℃ whole for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC). For finfish, if specimens were large enough, a maximum of 10 specimens per species were examined for stomach contents onboard as per protocol used for salmon specimens (King et al. 2018) and whole bodies (stomachs included, but prey excluded) were frozen at -20℃ whole for energy density estimation (samples sent to J. King, Fisheries and Oceans Canada, Nanaimo, BC). If finfish specimens were too small for at sea stomach content analyses, a maximum of 10 specimens per species were frozen at -20℃ whole for lab analyses of stomach contents and for energy density estimation (samples sent to J. King Fisheries and Oceans Canada, Nanaimo, BC). If available an additional 5 finfish specimens were frozen at -80℃ whole for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC). A random sample of euphausiids, when present, were frozen at -80℃ for stable isotope and fatty acid analyses (samples sent to B. Hunt, University of British Columbia, Vancouver, BC).

2.7.3 Specimens for Microplastics

If available, 5 specimens of *Tarletonbeania crenularis*, *Onychoteuthis borealjaponicus* or *Gonatopsis borealis* were individually wrapped in foil (pre-wiped with 70% ethanol) and frozen at -20℃ for subsequent analyses of gill rakers and stomachs for microplastics (samples sent to S. Brander, Oregon State University, Corvallis, OR). Control standards were collected consisting of air control filters inside a petri dish. The filter and petri dish units were prepared in the lab, and sealed in foil until use on board. Once unwrapped, the filter paper was moistened with reverse osmosis-purified water, and the filter and petri dish were set near the sample while it was being collected. Once sampling was completed, the dish was closed and the unit was rewrapped in the foil.

2.8 ARGO FLOAT DEPLOYMENT

Six Argo floats were deployed. Argo is an international program that uses a fleet of robotic instruments that drift with the ocean currents and move up and down between the surface and a mid-water level collecting and storing water profile data. Data collected by the floats will be processed and stored by, and are available from, the Argo program. These data will not be archived through the IYS Data Mobilization data portal.

2.9 ACOUSTIC DATA

Acoustic data were recorded at all times using a SIMRAD EK80 echo sounder (Kongsberg Maritime CM Canada Lid, Vancouver, Canada). operating at 18, 38, 70, 120, 200, 333 kHz. Data are processed and archived by Fisheries and Oceans Canada (S. Gauthier, Institute of Ocean Sciences, Sidney, BC).

2.10 MACROPLASTIC OBSERVATIONS

During daytime transit, a GoPro video camera was attached to the starboard railing, 12 m above the water, to opportunistically provide 2 second time lapse video of the surface waters. The camera was obliquely oriented in order to capture the horizon (to estimate pitch), but also avoid the vessel wake. The video was archived (H. Wolter, The Ocean Cleanup Organization, Rotterdam, The Netherlands) and will be analysed by AI software to estimate macroplastic occurrence in the open ocean.

3 RESULTS

3.1 OCEANOGRAPHY

CTD casts and water samples were completed using a rosette at 35 sites with cast depths ranging from 300 m to 2000 m (Figure 2 and Appendix C). Preliminary sea surface temperature, salinity and fluorescence data are presented in Figure 3. Observed SST ranged from 4.19 – 8.84 ℃, and modeled SST varied from warmest in the southern and eastern portions to coldest in the most north-western portion of the survey area (Figure 7.3). Observed SSS showed low variability, ranging from 32.18 – 32.64 (PSS-78) indicating euhaline conditions throughout the survey area. Modeled SSS estimates denote two areas of slightly higher salinity: the south-western portion and the north-western portion of the survey area (Figure 3). SSF ranged from 0.125-0.504 mg/m^3, and modeled data suggest higher productivity in the south-western survey area (Figure 3).

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 2022-002, as well as Canadian Integrated Ocean Observing System.

3.2 ZOOPLANKTON

Vertical bongo tows were conducted at 35 stations (Figure 2 and Appendix C). Enumeration data will be archived in the Institute of Ocean Sciences (Sidney, BC) Zooplankton Database.

3.3 TUCKER TRAWL

A Tucker trawl was deployed at 34 stations to a maximum target depth of 400 m (Figure 1, Appendix D). The first five stations used target depths of 0-400 m; 400-100 m and 100-0 m but based on results and acoustic observations, the final protocol for target depths 0-400 m; 400-275 m and 275 – 0 m was selected and used for remaining stations. The double release-mechanism failed on four events, all resulting in the second net failing to close (and therefore fishing from bottom depth to surface) and the third net failing to open (Appendix D).

3.4 FISHING OPERATIONS

This survey conducted 34 usable trawl net tows; 33 in the Gulf of Alaska and 1 additional tow on the continental slope off Queen Charlotte Sound (Figure 1, Appendix B). The mean opening of the LFS 1142 was 21 m high by 54 m wide and the warp length was consistently 200 m. Mean vessel speed during fishing was 9 kilometers per hour (4.9 knots). All trawl bridge log data can be found in Appendix B.

3.5 CATCH COMPOSITION AND DISTRIBUTION

For each species captured during the survey, the number of tows in which the species was present, total catch weight, maximum catch weight, and mean catch weight for usable tows is presented in Table 1. Detailed catch composition for each tow is included in Appendix F. Total catch for the survey was 456 kg, with 130 kg (29%) Pacific Salmon. Five species of Pacific Salmon were caught, Sockeye Salmon, Chum Salmon, Coho Salmon, Pink Salmon, Chinook Salmon (in order of abundance by weight). The most abundant species caught by weight were Northern Sea Nettle (78 kg), caught in 53% of the tows, Water Jellyfish (63 kg), caught in 74% of the tows, and Sockeye Salmon (58 kg) caught in 62% of the tows.

Sockeye Salmon and Chum Salmon were caught throughout the survey area (Figure 4), and did not appear to be wholly constrained by temperature in their distribution. However, the larger catches of Sockeye Salmon occurred between temperatures of 4.8-7.1℃; larger catches of Chum Salmon occurred within temperatures of 7.1-8.2℃. Neither species' distribution was limited to the southern, more productive waters. Coho Salmon, Pink Salmon and Chinook Salmon were not captured in waters <6.6℃; and were mainly encountered in the southern, more productive, portion of the survey area.

Northern Lampfish were encountered in warmer, more productive waters in the survey area and Blue Lanternfish were only caught in the central-eastern portion (Figure 5). Myctophids migrate diurnally and are only available to midwater trawl gear at night. As a result, daytime tows cannot be used to estimate spatial distributions.

The large jellyfish, Fried Egg Jellyfish and Northern Sea Nettle, were mainly captured in northern, cooler and less productive, waters (Figure 6). Smallfin Gonate Squid were primarily encountered in warmer, more productive waters with the exception of two small catches at northern stations. Boreopacific Gonate Squid and Boreal Clubhook Squid were captured sporadically throughout the survey area, in a range of ocean conditions (Figure 7). The five catches of Threespine Stickleback were in the northern, westernmost portion of the survey area in cooler, less productive waters (Figure 8). These catches were all within one of the higher SSS areas, and were not associated with a freshwater lens. While Threespine Sticklebacks are typically associated with coastal waters throughout the north Pacific, their occurrence in distant, offshore waters is not rare (Quinn and Light, 1988). It is unclear if occurrences of Threespine Sticklebacks in offshore waters are strays or are part of a regular migratory pattern (Bell and Foster, 1994).

3.6 BIOLOGICAL SAMPLES

Samples were collected from each Pacific Salmon (n=221) for DNA stock composition, scales, otoliths, muscles for energy density and stable isotope analysis, gonads, and liver. Coded wire tags (n=1), gill samples for infectious agents (n=198), and blood for growth hormones (n=191) were also collected.

Whole bodies were collected for stomach content analyses along with energy density estimates or for stable isotope analyses of Blue Lanternfish (n=25 and 20), California Headlightfish (n=5 and 5), Daggertooth (n=3 and 0), Northern Lampfish (n=34 and 25), Threespine Sticklebacks (n=55 and 20), Boreal Clubhook Squid (n=9 and 5), Boreopacific Gonate Squid (n=24 and 10) and Smallfin Gonate Squid (n=23 and 13). Intact bodies were collected for stable isotope analyses of *Calycopsis* spp. (n=1), *Aequorea* spp. (n=14), *Chrysaora Melanaster* (n=40), Moon Jellyfish (n=14), Fried Egg Jellyfish (n=28) and of ctenophores (n=24) including *Hormiphora cucumis* (n=2). Whole bodies were collected for microplastic analyses of gills and stomachs for Blue Lanternfish (n=12), Boreal Clubhook Squid (n=9) and Boreopacific Gonate Squid (n=5).

3.7 LENGTH AND WEIGHT

Lengths and weights of 26 species were recorded (Table 2). Length frequencies and length-weight relationships are presented for Pacific Salmon species in Figures 9 to 13. Within Pacific Salmon, Chinook Salmon had the largest mean length (480 mm) and weight (1282 g), whereas Pink Salmon had the smallest mean length (285 mm) and weight (221 g).

Slope coefficients from log transformed length and weight regressions were similar in Sockeye and Chum Salmon and both close to 3 (Figures 9 and 10), indicating isometric growth; however Sockeye Salmon had >80% individuals with a K condition factor >1, indicating most specimens were in good condition, while Chum Salmon only had 60% of individuals with a K condition factor >1. Coho Salmon and Pink Salmon length-weight regressions had slope coefficients larger than 3 (Figures 11 and 12), indicating positive-allometric growth, however a large proportion (85%) of Pink Salmon specimens had K condition factors <1 indicating poor condition. Over 80% of the Coho Salmon specimens had a K condition factor >1. Chinook Salmon length-weight regression had a slope coefficient below the expected range (2.5-3.5; Froese (2006)), but caution should be used for interpretation since only four fish were captured, all of which had a K condition factor >1 (Figure 13).

Most California Headlightfish ranged in length from 48-62 mm, and a single specimen measured at 76 mm (Figure 14). The length frequency of Northern Lampfish was bimodal (Figure 14), perhaps due to the presence of two cohorts; the first mode from 31-60 mm, corresponding to 2 year olds; the second mode from 60-90 mm corresponding to 3-4 year olds (Smoker and Pearcy, 1970). Blue Lanternfish ranged in length from 25 – 75 mm, with a mean of 51 mm (Figure 14).

Intact jellyfish bell diameter (mm) frequency plots are presented in Figure 15. The most samples, i.e. intact jellyfish, were collected for the two large species: Northern Sea Nettle and Fried Egg Jellyfish (Table 1). Bell diameters of Northern Sea Nettle ranged from 41 – 492 mm, with a mean of 152 mm. Fried Egg Jellyfish ranged in size from 73 – 443 mm, with a mean of 207 mm (Figure 15).

Cephalopod mantle length (mm) frequency plots are presented in Figure 16. The majority of Smallfin Gonate Squid were between 50 – 60 mm in mantle length. Boreopacific Gonate Squid ranged in size from 25 – 121 mm mantle length, however two tows with small specimens account for the size mode 25-50 mm (Figure 16). Boreal Clubhook Squid ranged in size from 116 – 235 mm in mantle length, with the majority of specimens < 150 mm in size (Figure 16).

The majority of Threespine Stickleback were 70 – 90 mm in length, with a few specimens as small as 56 mm and a few as large as 94 mm (Figure 17). It is interesting to note that almost all Threespine Stickleback specimens were larger than the usual size of 73 mm expected for specimens in Alaskan coastal waters (Mecklenburg et al., 2002)

3.8 STOMACH CONTENTS

Stomachs of 220 individual salmon, from 5 species, were analysed at sea (Tables 3 and 4). The stomach of the only specimen of Black Rockfish was empty (Table 3). Coho Salmon had the highest percentage (31%) of stomachs that were empty, while Pink and Chinook Salmon specimens all had stomachs containing prey items (Table 3).

Sockeye Salmon stomachs most frequently contained euphausiids but the most volumous prey item was squid (Table 4, Figure 18). For Chum Salmon most prey items were unidentifiable, and since gelatinous prey are digested quickly, it is likely that these unidentified remains were ctenophores and jellyfish. For prey that could be identified in Chum Salmon stomachs, the most common prey item was euphausiids, and the most voluminous was lanternfishes (Table 4). Coho Salmon had the most stomachs that contained squid and amphipods, and unidentified fish were the most voluminous prey item for Coho Salmon. The most common and the most voluminous prey for Chinook Salmon was squid, (Table 4). The most common prey for Pink Salmon was euphausiids, although the most voluminous prey was unidentified zooplankton (Table 4).

Selected smaller fish (eg. myctophids and Threespine Sticklebacks) and squid samples were frozen at sea and stomach contents will be analyzed in the lab (samples sent to J. King, Fisheries and Oceans, Nanaimo, BC).

3.9 ARGO FLOAT DEPLOYMENT

Argo floats were deployed at 6 stations (Figure 2 and Appendix E).

4 DISCUSSION

This ecosystem-based trawl survey collected valuable information on distribution, abundance, condition, and genetic stock composition of Pacific Salmon in the eastern Gulf of Alaska during winter, a period hypothesized to be an important determinant of salmon year class strength. Data on oceanographic conditions and community composition will supplement the Pacific Salmon biological data to provide insight into how climate, and associated oceanographic variability influences the whole pelagic ecosystem in the open ocean, as well as the abundance, distribution, growth, and condition of Pacific Salmon. We caught 221 salmon, representing Sockeye, Chum, Pink, Coho, and Chinook Salmon (in order of descending abundance). There was evidence of spatial preferences in species distribution: Sockeye were found in larger numbers in the north, while Coho, Chum, and Pink Salmon generally dominated in the southern parts of survey area. There was spatial variability in oceanographic conditions, with warmer sea surface temperatures in the southern and eastern portions and colder temperatures in the most north-western portion of the survey area; modeled sea surface salinity estimates denote two areas of slightly higher salinity in the south-western portion and the north-western portion of the survey area; and sea surface fluorescence suggest higher productivity in the south-western survey area. Prey consumed varied across salmon species: euphausiids and squid were important in Sockeye Salmon diet; euphausiids and lanternfishes important in Chum Salmon diet; euphausiids and zooplankton were important in Pink Salmon diets; squid and amphipods important in Coho Salmon diet; and squid important in Chinook Salmon diet. 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.

5 REFERENCES

Carpenter, James H. 1965. "The accuracy of the Winkler method for dissolved oxygen analysis. Limnology and Oceanography." *Limnology and Oceanography* 10 (1): 135–40.

Culberson, C. H. 1991. "Dissolved oxygen." In *WHP Operations and Methods.*

Froese, Rainer. 2006. "Cube law, condition factor and weight-length relationships: History, meta-analysis and recommendations." *Journal of Applied Ichthyology* 22 (4): 241–53.

King, J, J L Boldt, H Dennis-Bohm, T Zubkowski, E Anderson, L Florstrand, and S Tucker. 2019. "Integrated Pelagic Ecosystem Surveys on the Vancouver Island Continental Shelf, July 7 - August 2, 2017 and July 5 - July 29, 2018." *Can. Tech. Rep. Fish. Aquat. Sci* 3318: xi + 115\simp.

King, J R, J L. Boldt, and S A 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: 62.

Pakhomov, Evgeny A, Christoph Deeg, Svetlana Esenkulova, Gerard Foley, P V Hunt, Arkadii Ivanov, Hae Kun Jung, et al. 2019. "Summary of preliminary findings of the International Gulf of Alaska Expedition onboard the R/V Professor Kaganovskiy during February 16–March 18, 2019." *NPAFC Documents* 1930: 25. https://npafc.org.

Somov, Alexei, Christoph M. Deeg, Tristan Blaine, Svetlana Esenkulova, Sabrina Garcia, Igor V. Grigorov, Albina Kanzeparova, et al. 2020. "Preliminary Findings of the Second Salmon Gulf of Alaska Expedition Onboard the R / V Pacific Legacy March 11 – April 7 , 2020 as Part of the International Year of the Salmon." *NPAFC Documents* 1930: 49. https://npafc.org.

6 ACKNOWLEDGEMENTS

We would like to thank Captain Zbigniew (Zibby) Chmara, and the crew of the *CCGS Sir John Franklin*. We appreciate the expertise of the science staff who participated in the survey, including Hilari Dennis-Bohm, Nicolas Enns, Rick Ferguson, Daniel Williams, and Yeongha (Johan) Yung. Thank you to Colin Bailey and James Mortimor for their reviews of this report. This survey was part of the North Pacific Anadromous Fish Commission International Year of the Salmon 2022 Pan-Pacific Winter Expedition. We would like to acknowledge and thank the NPAFC IYS team and all the international collaborators that assisted in the planning and execution of this multinational expedition.

7 FIGURES

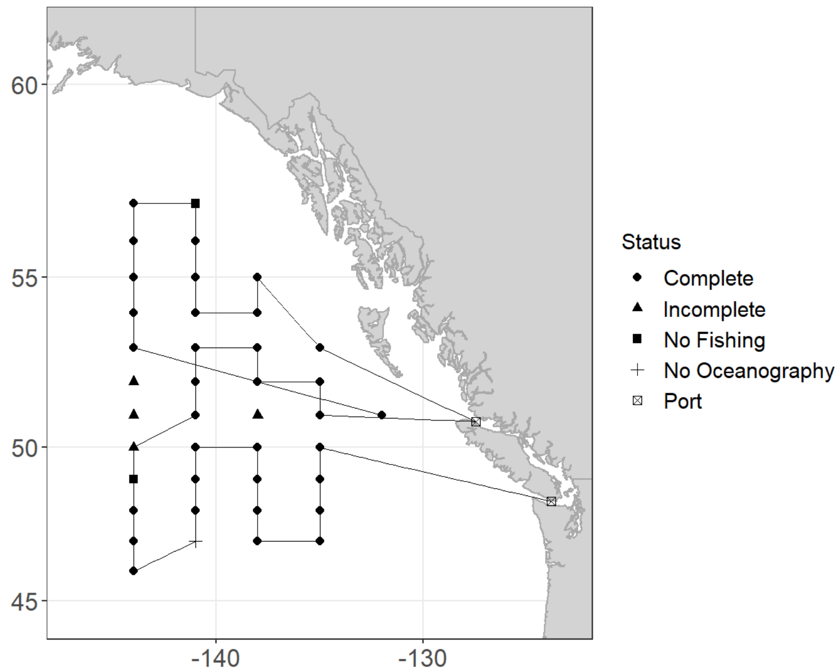

Figure 1. Planned and accomplished station locations and survey trackline from the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*.

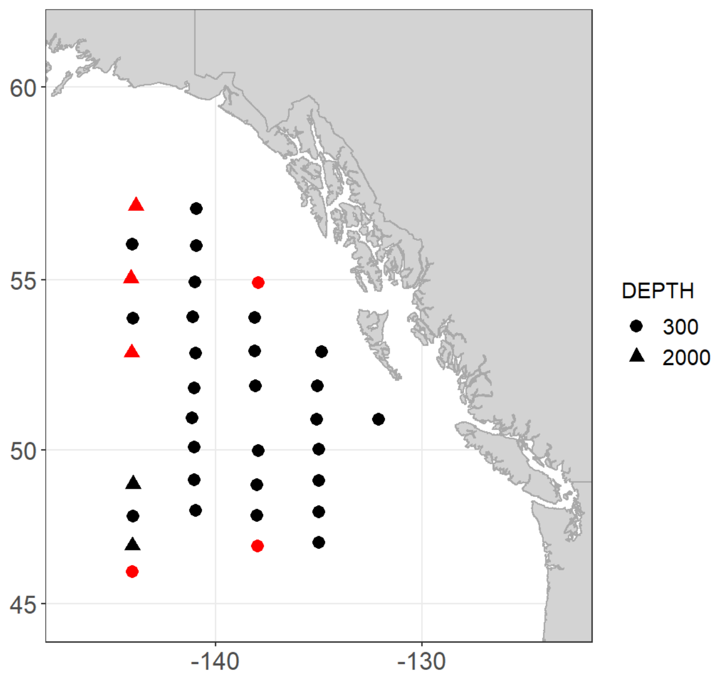

Figure 2. Oceanographic sampling during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*. Maximum CTD and rosette depth is indicated by the shape. ARGO float deployment stations are indicated in red.

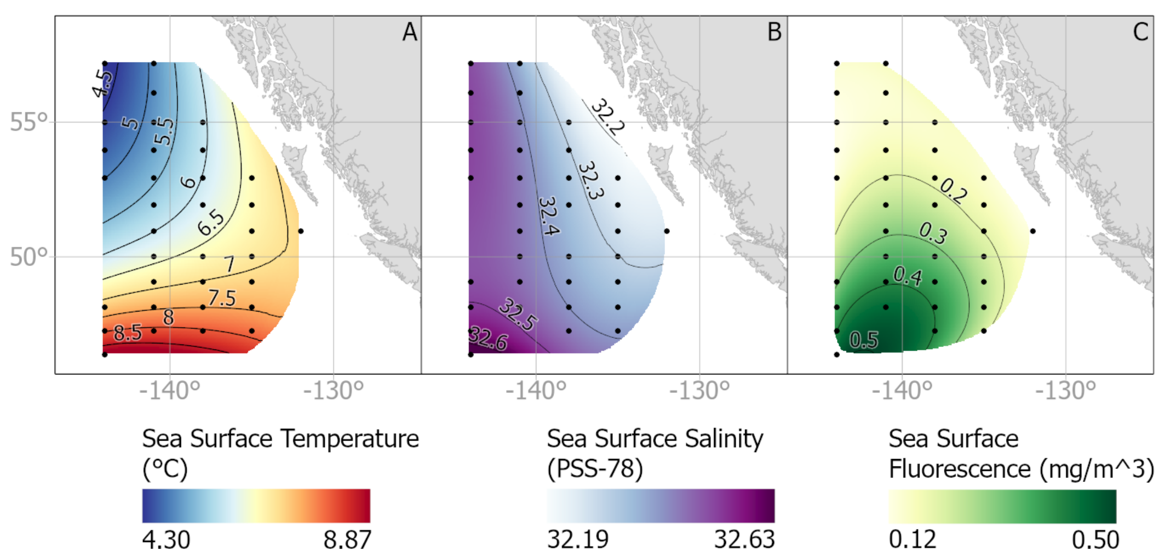

Figure 3. Modelled oceanographic conditions for the survey area based on observed Sea-Bird SBE 911plus CTD data: (A) Sea surface temperature (℃), (B) Sea surface salinity (PSS-78) and (C) Sea surface fluorescence (mg/m^3) were all averaged for the first 10 meters of depth and then continuous surfaces were estimated with local polynomial interpolation.

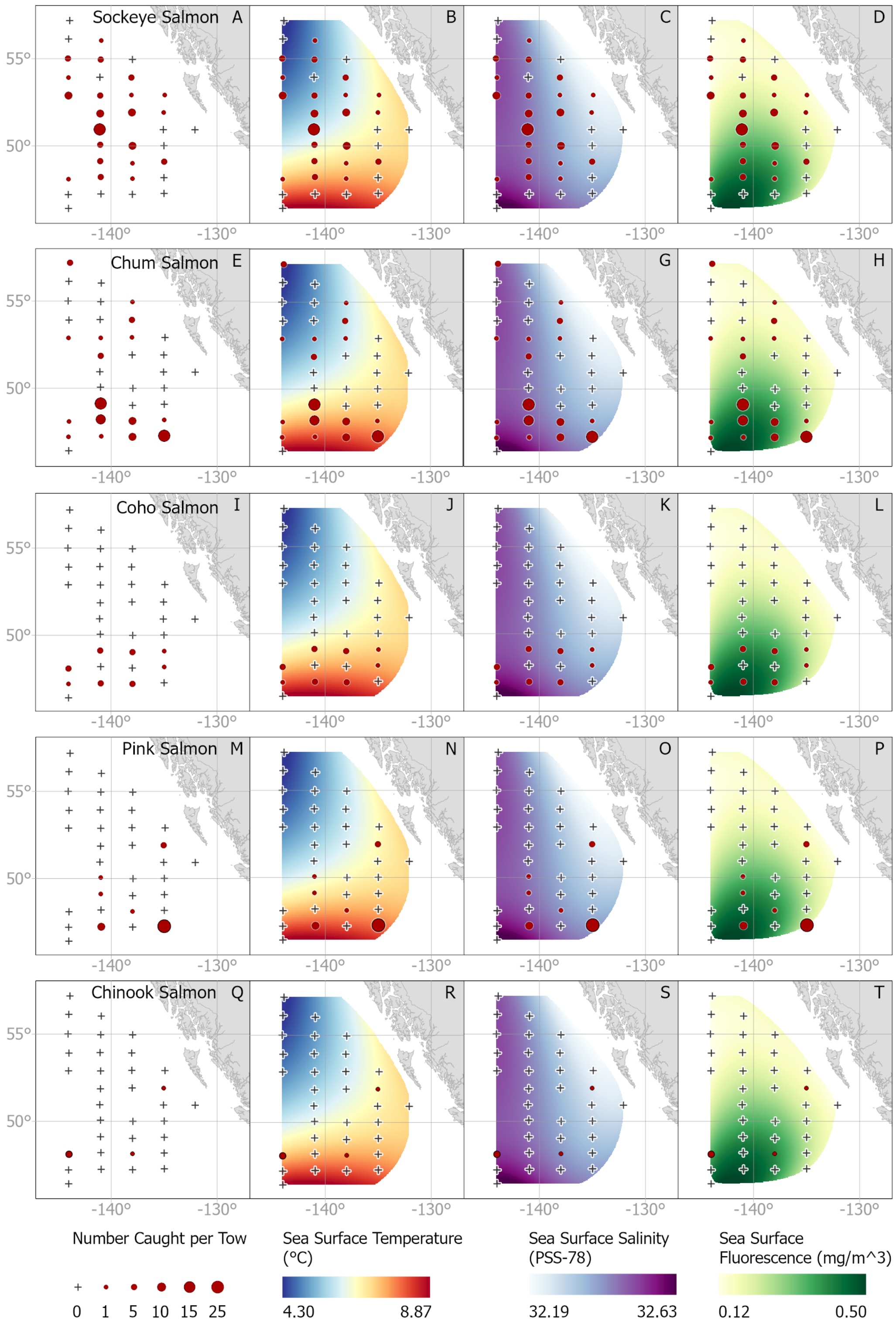

Figure 4. (A-D) Sockeye Salmon (*Oncorhynchus nerka*), (E-H) Chum Salmon (*Oncorhynchus keta*), (I-L) Coho Salmon (*Oncorhynchus kitsutch*), (M-P) Pink Salmon (*Oncorhynchus gorbusha*), and (Q-T) Chinook Salmon (*Oncorhynchus tschawytscha*) catch for each tow. Circles are proportional to catch abundance, and zero catches are shown with a cross (+). Catch is overlaid on different oceanographic conditions, modelled using local polynominal interpolation from observed values at station locations. (B, F, J, N, R) Shows catch overlaid on modelled sea surface temperature (℃). (C,G,K,O,S) Shows catch overlaid on modelled sea surface salinity. (D,H,L,P,T) Shows catch overlaid on modelled sea surface fluorescence (mg/m^3).

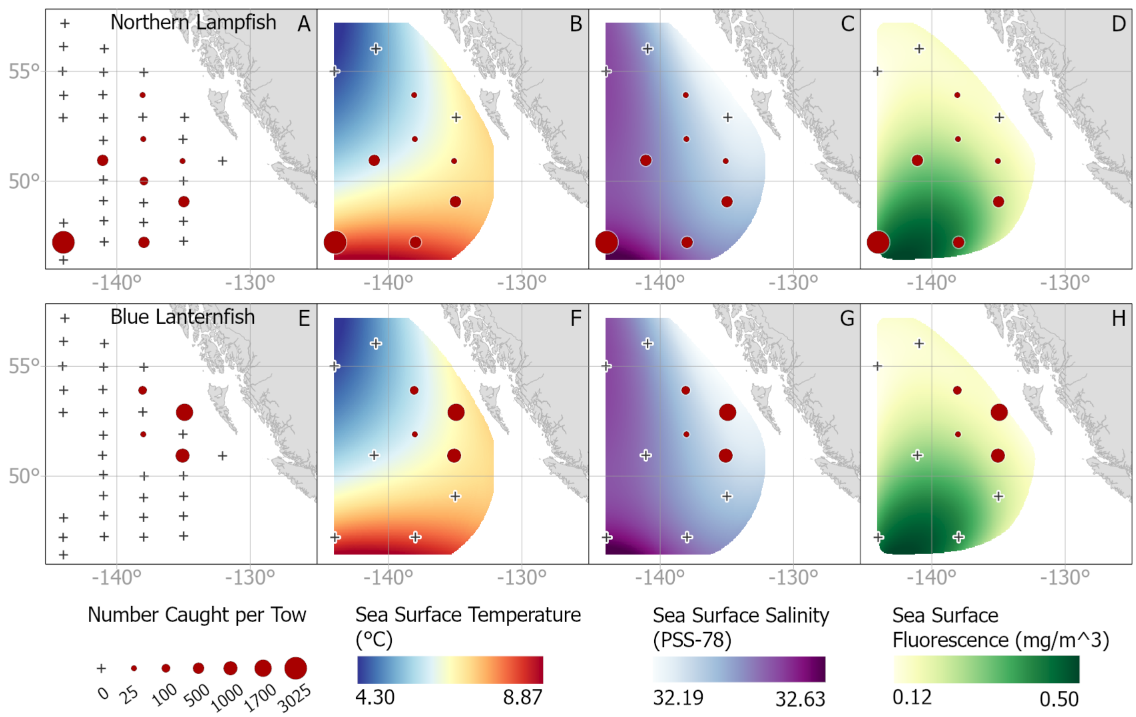

Figure 5. (A-D) Northern lampfish (*Stenobrachius leucopsarus*) and (E-H) blue lanternfish (*Tarletonbeania crenularis*) catch for each tow. Circles are proportional to weight of catch in kilograms, and zero catches are shown with a cross (+). Catch is overlaid on different oceanographic conditions, modelled using local polynominal interpolation from observed values at station locations. (B, F) Shows catch overlaid on modelled sea surface temperature (℃). (C,G) Shows catch overlaid on modelled sea surface salinity. (D,H) Shows catch overlaid on modelled sea surface fluorescence (mg/m^3).

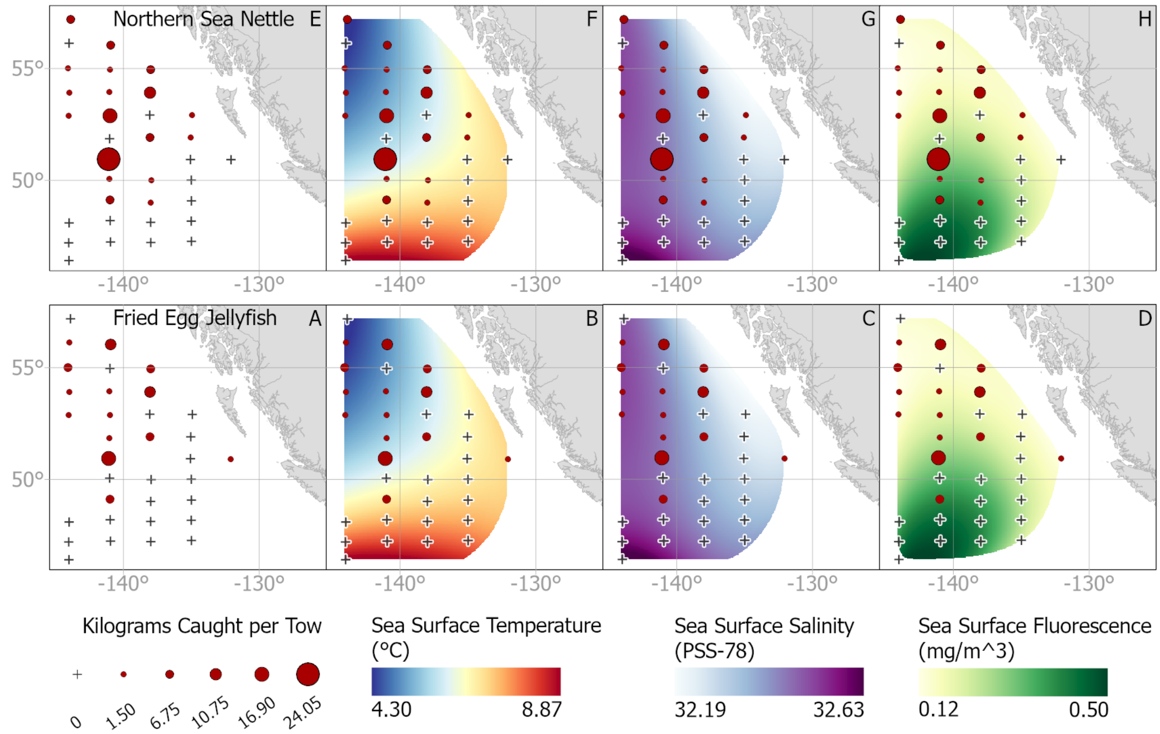

Figure 6. (A-D) Fried egg jellyfish (*Phacellophora camtschatica*) and northern sea nettle (E-H) (*Chrysaora melanaster*) catch for each tow. Circles are proportional to weight of catch in kilograms, and zero catches are shown with a cross (+). Catch is overlaid on different oceanographic conditions, modelled using local polynominal interpolation from observed values at station locations. (B, F) Shows catch overlaid on modelled sea surface temperature (℃). (C,G) Shows catch overlaid on modelled sea surface salinity. (D,H) Shows catch overlaid on modelled sea surface fluorescence (mg/m^3).

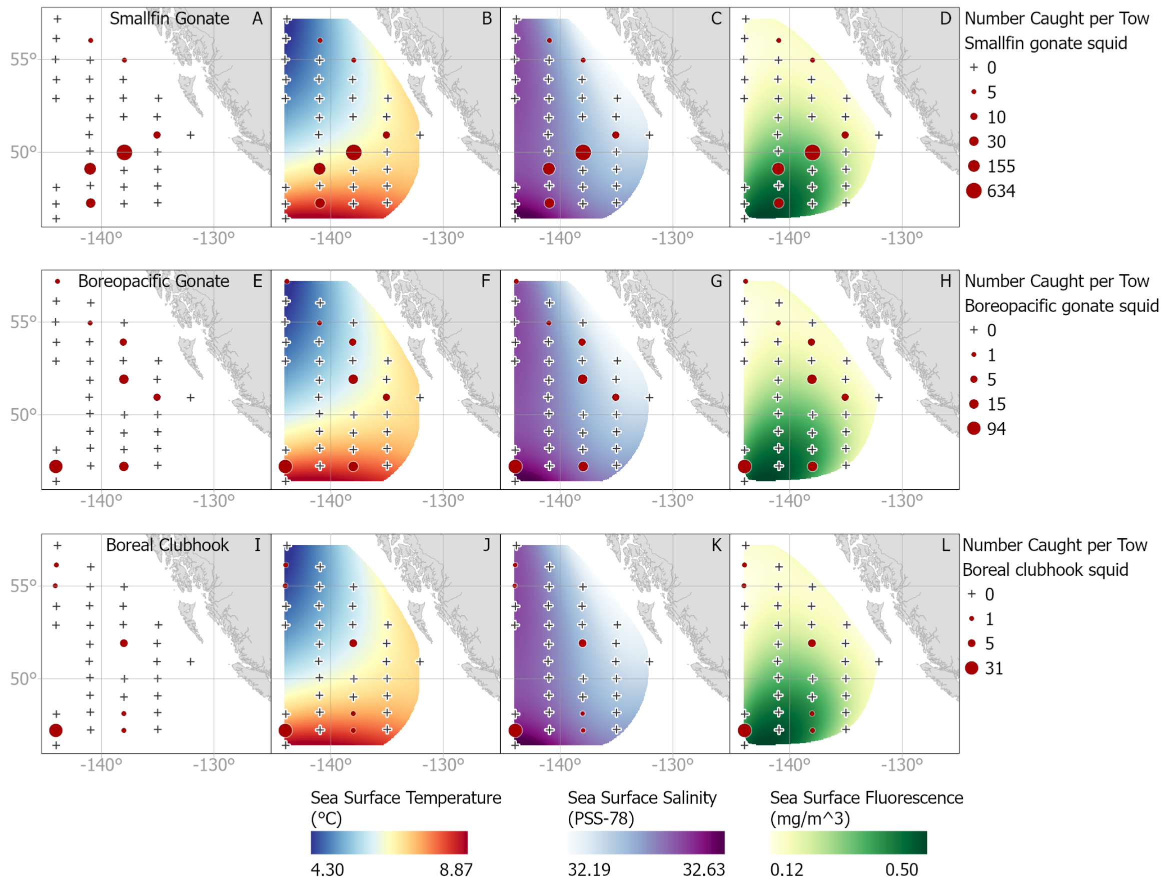

Figure 7. (A-D) Smallfin gonate squid (*Berryteuthis anonychus*), (E-H) boreopacific gonate squid (*Gonatopsis borealis*), and (I-L) boreal clubhook squid (*Onychoteuthis borealijaponicus*) catch for each tow. Circles are proportional to weight of catch in kilograms, and zero catches are shown with a cross (+). Catch is overlaid on different oceanographic conditions, modelled using local polynominal interpolation from observed values at station locations. (B, F, J) Shows catch overlaid on modelled sea surface temperature (℃). (C,G,K) Shows catch overlaid on modelled sea surface salinity. (D,H,L) Shows catch overlaid on modelled sea surface fluorescence (mg/m^3).

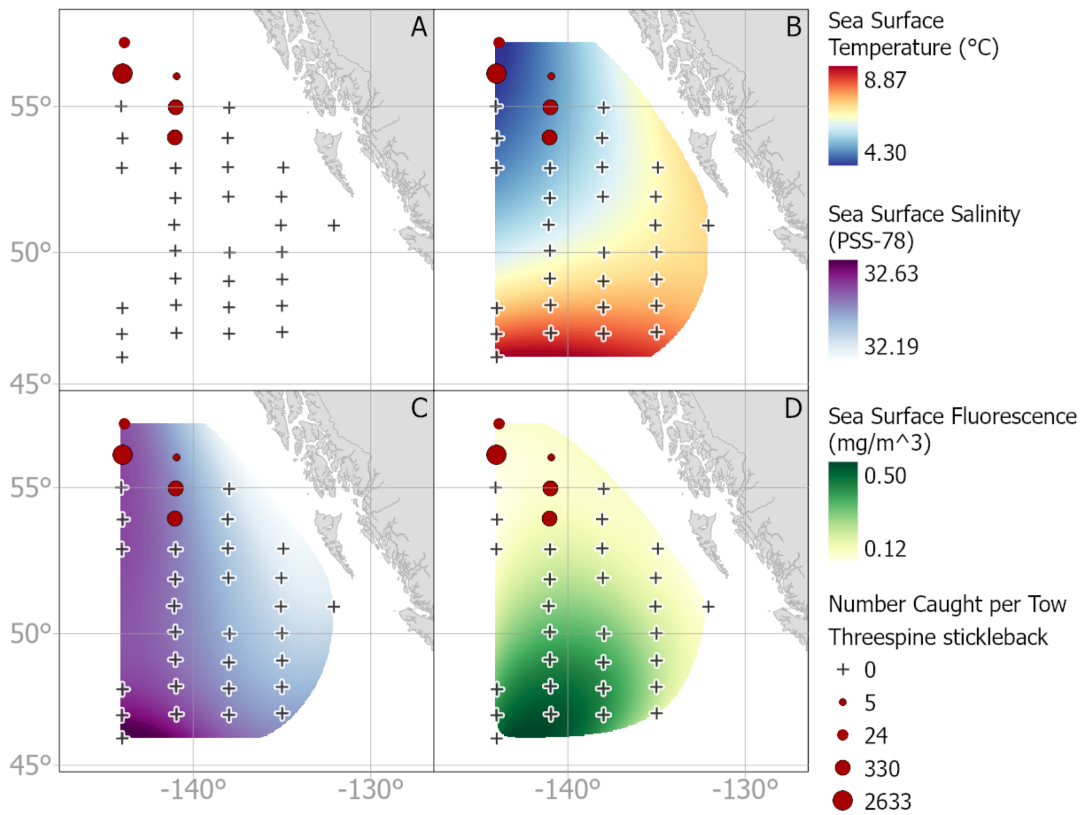

Figure 8. Threespine stickleback (*Gasterosteus aculeatus*) catch for each tow. Circles are proportional to weight of catch in kilograms, and zero catches are shown with a cross (+). Catch is overlaid on different oceanographic conditions, modelled using local polynominal interpolation from observed values at station locations. (B) Shows catch overlaid on modelled sea surface temperature (℃). (C) Shows catch overlaid on modelled sea surface salinity. (D) Shows catch overlaid on modelled sea surface fluorescence (mg/m^3).

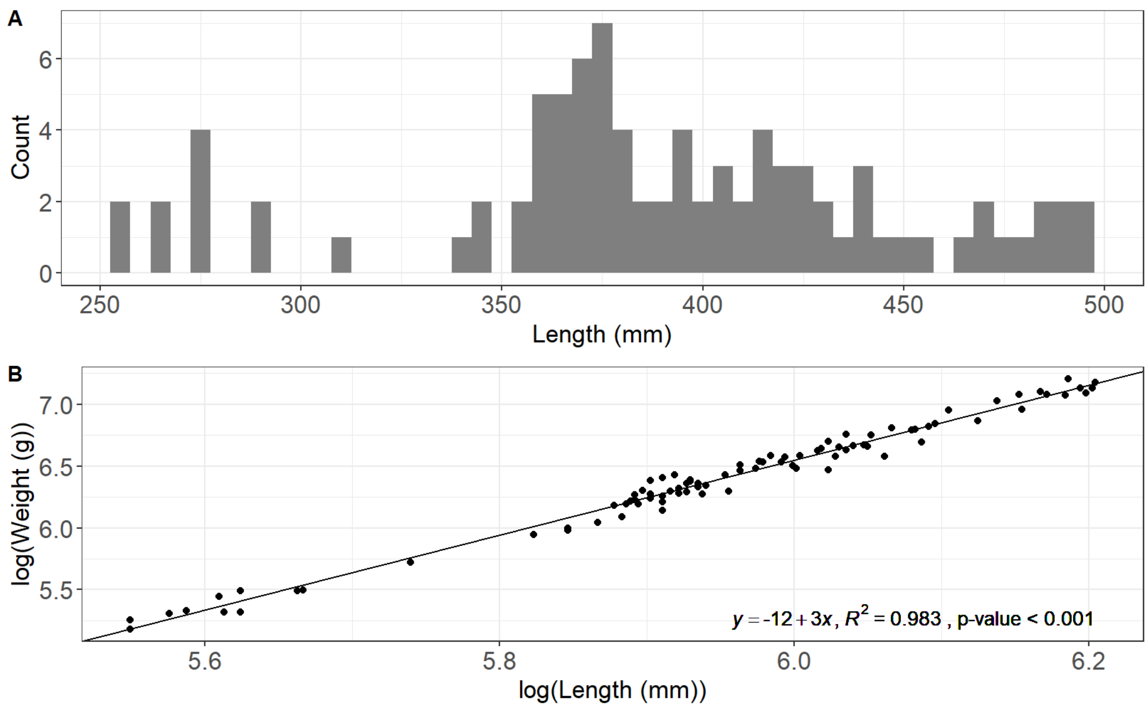

Figure 9. Sockeye Salmon (*Oncorhynchus nerka*) length frequency plot as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022 (A). Double log-transformed length-weight regression (B).

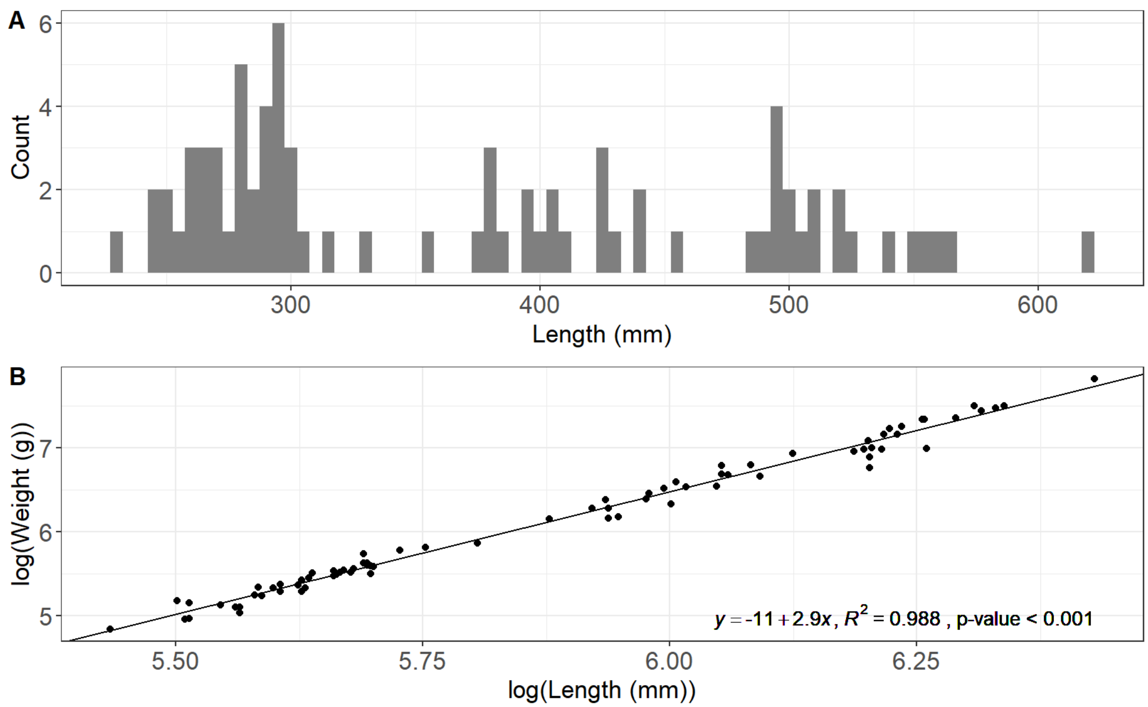

Figure 10. Chum Salmon (*Oncorhynchus keta*) length frequency plot as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022 (A). Double log-transformed length-weight regression (B).

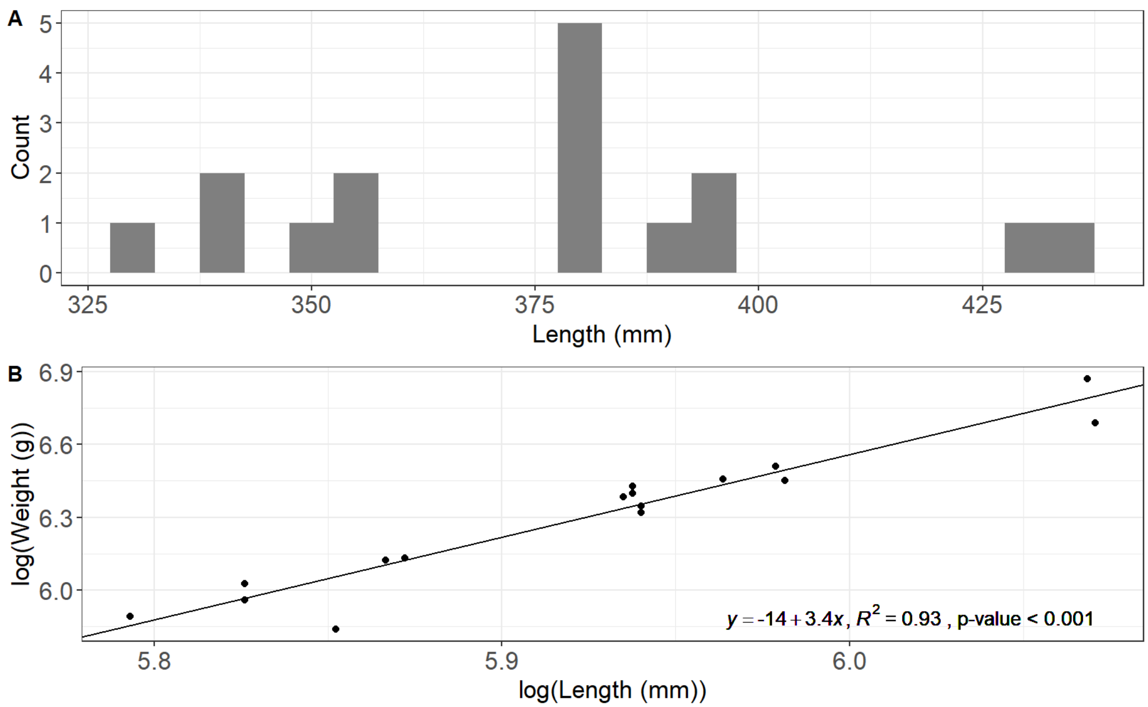

Figure 11. Coho Salmon (*Oncorhynchus kisutch*) length frequency plot as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022 (A). Double log-transformed length-weight regression (B).

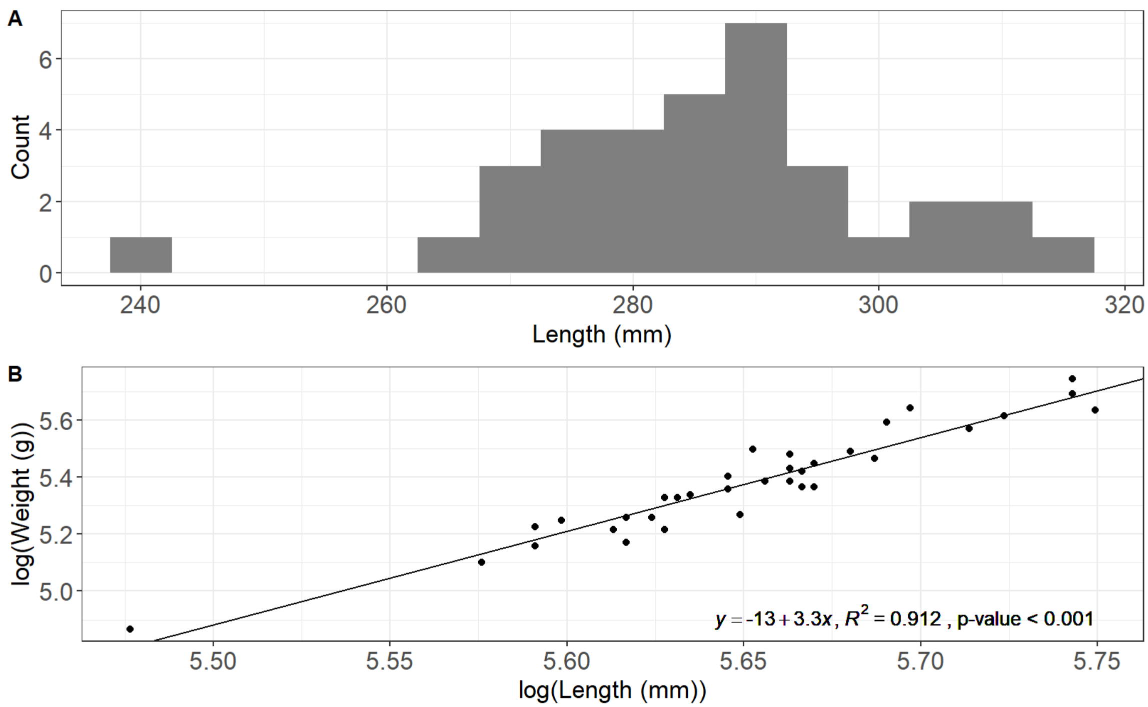

Figure 12. Pink Salmon (*Oncorhynchus gorbusha*) length frequency plot as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022 (A). Double log-transformed length-weight regression (B).

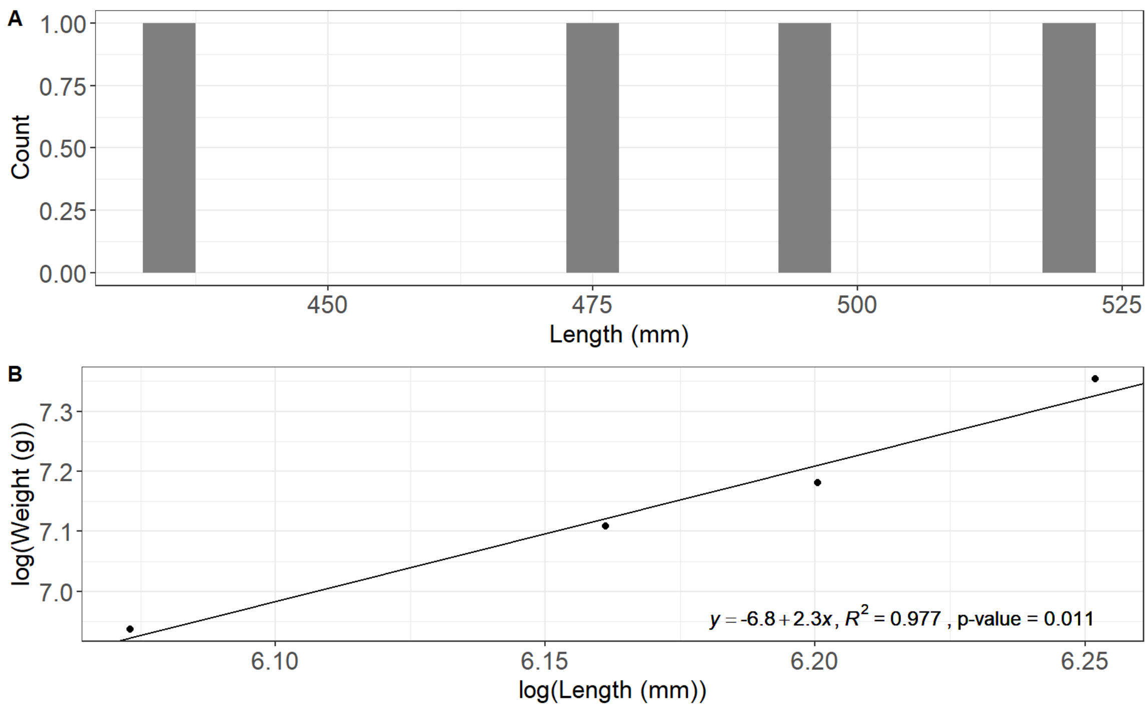

Figure 13. Chinook Salmon (*Oncorhynchus tshawytscha)*) length frequency plot as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022 (A). Double log-transformed length-weight regression (B).

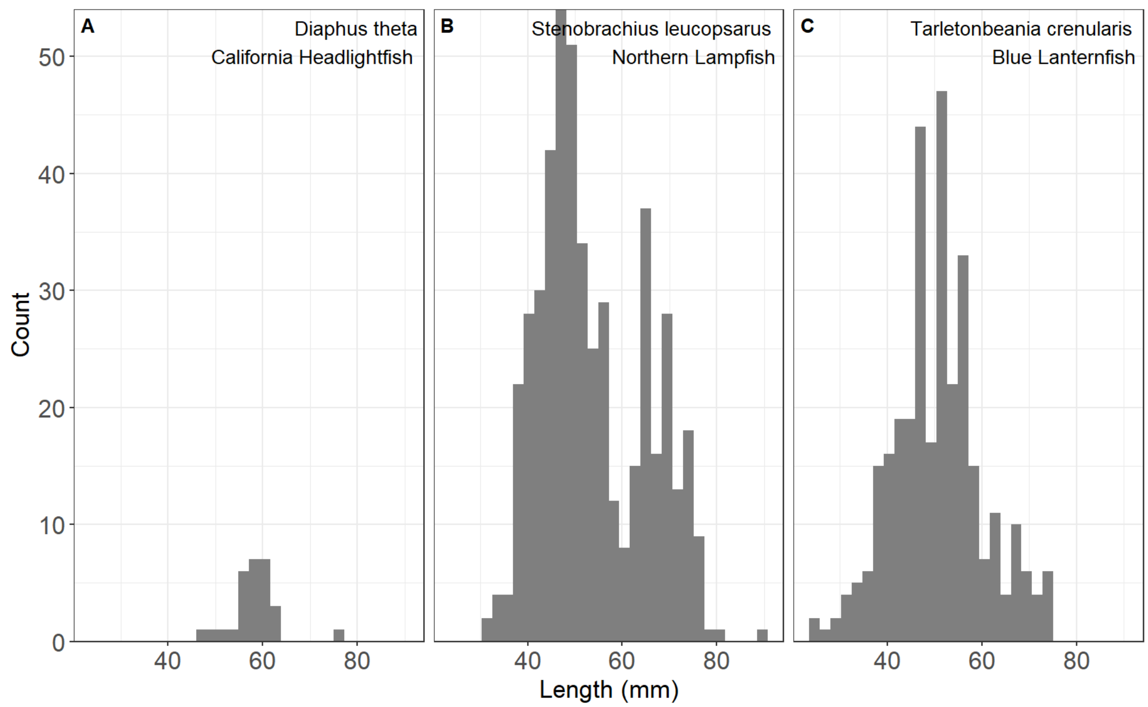

Figure 14. Myctophid length (mm) frequency plots as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

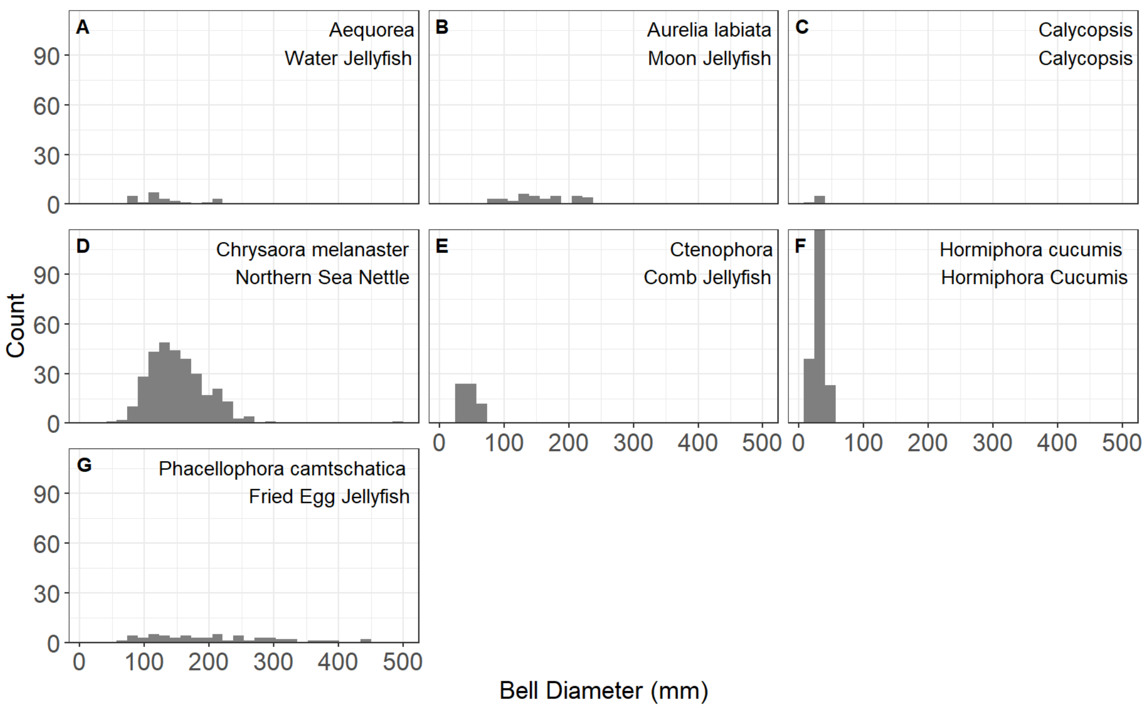

Figure 15. Jellyfish bell diameter (mm) frequency plots as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

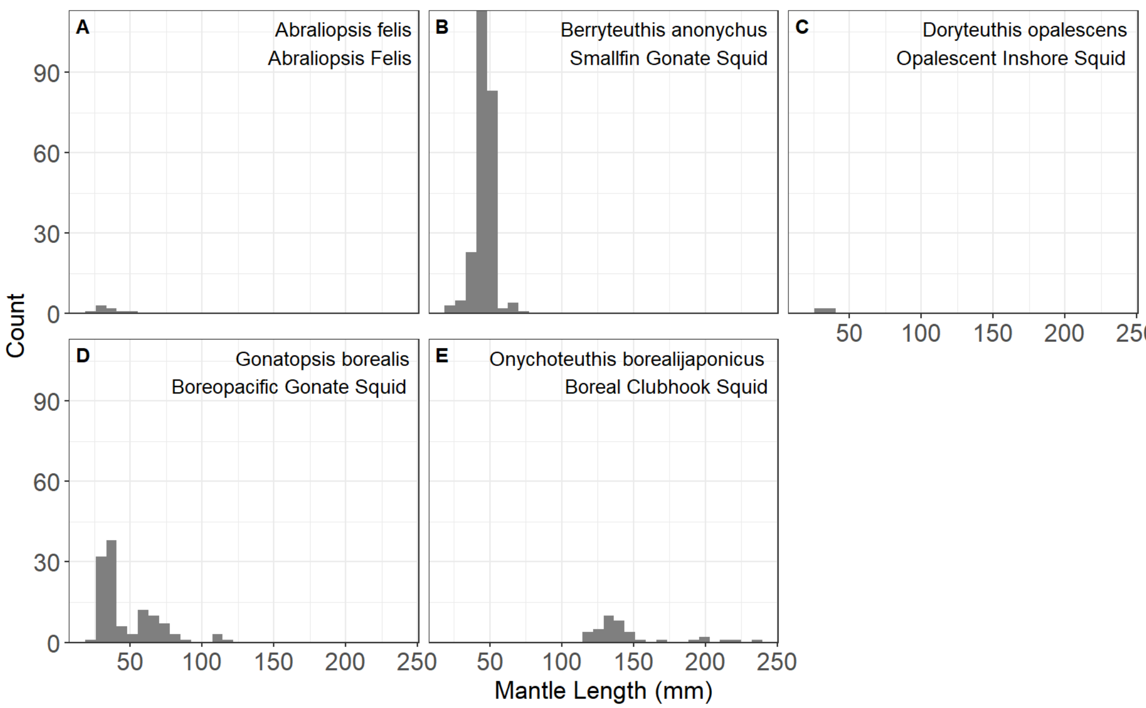

Figure 16. Cephalopod mantle length (mm) frequency plots as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

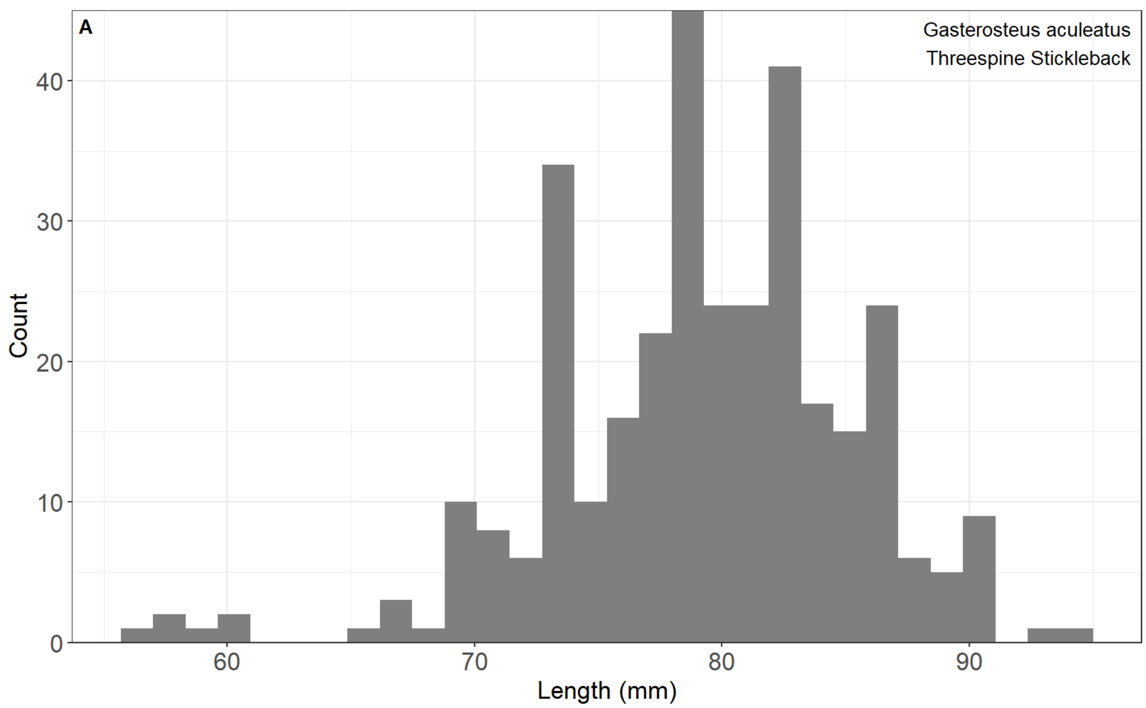

Figure 17. Threespine Stickleback length (mm) frequency plots as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

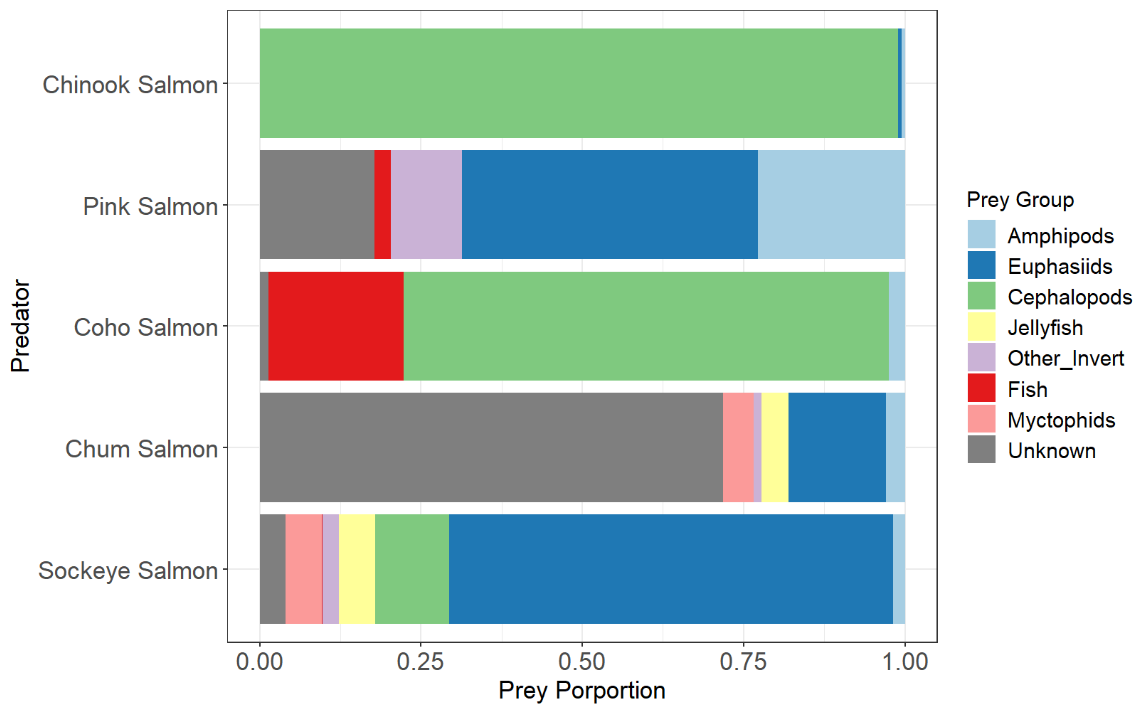

Figure 18. Volume of prey items as a proportion of total volume of prey consumed by salmon species as sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

8 TABLES

Table 1. All captured species (or taxonomic group), ordered by total catch weight, showing number of tows in which the species occurred, total catch count of whole specimens (when applicable), total catch weight, maximum catch weight, and mean catch weight per tow for usable tows during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022. Jellyfish weights include all identifiable pieces, but only those with intact bells are were included in the counts. Euphausiacea were not counted due to small size. Blank weights indicate specimens which could not be weighed accurately.

				Catch Weight (kg)		
Scientific **Name**	**Common Name**	**Tows**	**Count**	**Total**	**Max**	**Mean**
Chrysaora melanaster	Northern Sea Nettle	18	311	78.33	24.05	4
Aequorea	Water Jellyfish	25	11	63.30	8.41	3
Oncorhynchus nerka	Sockeye Salmon	21	88	58.43	16.24	3
Phacellophora camtschatica	Fried Egg Jellyfish	14	58	51.20	16.90	4
Oncorhynchus keta	Chum Salmon	16	79	49.95	20.15	3
Euphausiacea	Euphausiids	10		42.72	11.57	4
Scyphozoa	Jellyfish	10		34.68	20.31	3
Gasterosteus aculeatus	Threespine Stickleback	5	3298	15.09	12.11	3
Aurelia labiata	Moon Jellyfish	12	36	12.01	7.45	1
Stenobrachius leucopsarus	Northern Lampfish	8	4104	9.45	7.26	1
Oncorhynchus kisutch	Coho Salmon	8	16	9.12	2.47	1
Oncorhynchus gorbuscha	Pink Salmon	6	34	7.69	3.96	1
Oncorhynchus tshawytscha	Chinook Salmon	3	4	5.14	2.61	2
Berryteuthis anonychus	Smallfin Gonate Squid	6	830	4.14	3.30	1
Tarletonbeania crenularis	Blue Lanternfish	4	2785	3.66	2.10	1
Onychoteuthis borealijaponicus	Boreal Clubhook Squid	6	39	3.50	2.30	1
Ctenophora	Comb Jellyfish	10	74	2.23	1.82	0
Sebastes melanops	Black Rockfish	1	1	1.48	1.48	1
Gonatopsis borealis	Boreopacific Gonate Squid	7	120	1.13	0.60	0
Hormiphora cucumis	Hormiphora Cucumis	6	216	0.91	0.35	0
Myctophidae	Lanternfishes	2	20	0.89	0.83	0
Icosteus aenigmaticus	Ragfish	1	1	0.28	0.28	0
Lipolagus ochotensis	Popeye Blacksmelt	1	26	0.16	0.16	0
Anotopteridae	Daggertooths	3	3	0.09	0.04	0
Diaphus theta	California Headlightfish	1	28	0.07	0.07	0
Doryteuthis opalescens	Opalescent Inshore Squid	1	20	0.05	0.05	0
Calycopsis	Calycopsis	3	6	0.01	0.01	0
Teuthida	Squid	1		0.01	0.01	0
Abraliopsis felis	Abraliopsis Felis	2	8			
Bathymasteridae	Ronquils	2	7			
Amphipoda	Amphipods	1	4			

Table 2. Lengths and weights for each species (arranged descending by the number of length measurements for each by species) sampled during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022. (Tows = number of tows, N = number of measurements).

			Length (mm)				Weight (g)			
Scientific Name	**Common Name**	**Tows**	**N**	**Min**	**Max**	**Mean**	**N**	**Min**	**Max**	**Mean**
Stenobrachius leucopsarus	Northern Lampfish	8	484	31	90	54	484	1	8	2
Gasterosteus aculeatus	Threespine Stickleback	5	329	56	94	79	329	2	7	5
Tarletonbeania crenularis	Blue Lanternfish	4	315	25	75	51	312	1	4	1
Chrysaora melanaster	Northern Sea Nettle	18	306	41	492	152				
Berryteuthis anonychus	Smallfin Gonate Squid	6	234	21	77	46	205	1	22	5
Hormiphora cucumis	Hormiphora Cucumis	6	179	17	55	31				
Gonatopsis borealis	Boreopacific Gonate Squid	7	117	25	121	47	114	2	74	9
Oncorhynchus nerka	Sockeye Salmon	21	88	257	495	388	88	178	1346	665
Oncorhynchus keta	Chum Salmon	16	78	229	620	372	78	127	2484	638
Ctenophora	Comb Jellyfish	9	60	26	73	46	1	6	6	6
Phacellophora camtschatica	Fried Egg Jellyfish	11	56	73	443	207				
Onychoteuthis borealijaponicus	Boreal Clubhook Squid	6	39	116	235	147	38	50	258	85
Aurelia labiata	Moon Jellyfish	10	36	74	227	156				
Oncorhynchus gorbuscha	Pink Salmon	6	34	239	314	285	34	130	312	221
Diaphus theta	California Headlightfish	1	28	48	76	58	28	2	4	2
Aequorea	Water Jellyfish	4	23	76	216	128				
Lipolagus ochotensis	Popeye Blacksmelt	1	22	62	122	92	22	1	16	6
Oncorhynchus kisutch	Coho Salmon	8	16	328	433	375	16	344	962	567
Abraliopsis felis	Abraliopsis Felis	2	8	25	53	35				
Bathymasteridae	Ronquils	2	7	36	43	39				
Calycopsis	Calycopsis	3	6	24	32	28	1	6	6	6
Oncorhynchus tshawytscha	Chinook Salmon	3	4	434	519	480	4	1030	1562	1282
Doryteuthis opalescens	Opalescent Inshore Squid	1	4	26	40	33	4	1	2	2
Anotopteridae	Daggertooths	3	3	150	340	271	3	4	24	15
Sebastes melanops	Black Rockfish	1	1	454	454	454	1	1616	1616	1616
Icosteus aenigmaticus	Ragfish	1	1	251	251	251	1	243	243	243

Table 3. Number of tows with stomach samples (Tows), number of stomachs examined (Stomachs), and number of empty stomachs (Empty) for each species, arranged descending by number of tows, during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

Scientific Name	**Common Name**	**Tows**	**Stomachs**	**Empty**
Oncorhynchus nerka	Sockeye Salmon	21	88	19
Oncorhynchus keta	Chum Salmon	16	78	6
Oncorhynchus kisutch	Coho Salmon	8	16	5
Oncorhynchus gorbuscha	Pink Salmon	6	34	0
Oncorhynchus tshawytscha	Chinook Salmon	3	4	0
Sebastes melanops	Black Rockfish	1	1	1

Table 4. Prey items (Prey) identified in the stomach contents of predator species (Species) sampled (alphabetical by Species) during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022. Volume is mean volume in cm^3; frequency of occurrence (FO) is the proportion of non-empty stomachs that contained that prey item.

Species	Prey	Volume	FO
Chinook Salmon	Squid	11.40	0.75
Chinook Salmon	Cephalopods	3.10	0.25
Chinook Salmon	Amphipods	0.20	0.25
Chinook Salmon	Euphausiids	0.20	0.25
Chum Salmon	Lanternfishes	11.50	0.01
Chum Salmon	Comb Jellyfish	4.00	0.01
Chum Salmon	Unidentified Remains	3.04	0.81
Chum Salmon	Invertebrates	3.00	0.01
Chum Salmon	Unidentified Plankton	3.00	0.01
Chum Salmon	Euphausiids	2.06	0.25
Chum Salmon	Coelenterates	1.80	0.04
Chum Salmon	Jellyfish	1.00	0.01
Chum Salmon	Amphipods	0.79	0.12
Chum Salmon	Squid		0.01
Coho Salmon	Unidentified Fishes	6.35	0.18
Coho Salmon	Squid	5.07	0.82
Coho Salmon	Unidentified Remains	0.40	0.18
Coho Salmon	Amphipods	0.38	0.36
Coho Salmon	Pteropods	0.01	0.09
Coho Salmon	Euphausiids	0.01	0.09
Pink Salmon	Unidentified Plankton	2.03	0.18
Pink Salmon	Amphipods	1.95	0.24
Pink Salmon	Euphausiids	1.37	0.68
Pink Salmon	Arrow Worms	0.80	0.18
Pink Salmon	Unidentified Fishes	0.50	0.03
Pink Salmon	Pteropods	0.47	0.18
Pink Salmon	Fish Eggs	0.11	0.32
Sockeye Salmon	Squid	8.10	0.06
Sockeye Salmon	Smallfin Gonate Squid	7.00	0.01
Sockeye Salmon	Euphausiids	5.12	0.67
Sockeye Salmon	Lanternfishes	4.75	0.06
Sockeye Salmon	Jellyfish	2.47	0.10
Sockeye Salmon	Comb Jellyfish	2.00	0.01
Sockeye Salmon	Pteropods	1.45	0.09
Sockeye Salmon	Unidentified Remains	1.07	0.19
Sockeye Salmon	Amphipods	0.62	0.14
Sockeye Salmon	Unidentified Fishes	0.30	0.01
Sockeye Salmon	Decapods	0.20	0.01

APPENDIX A NET SPECIFICATIONS

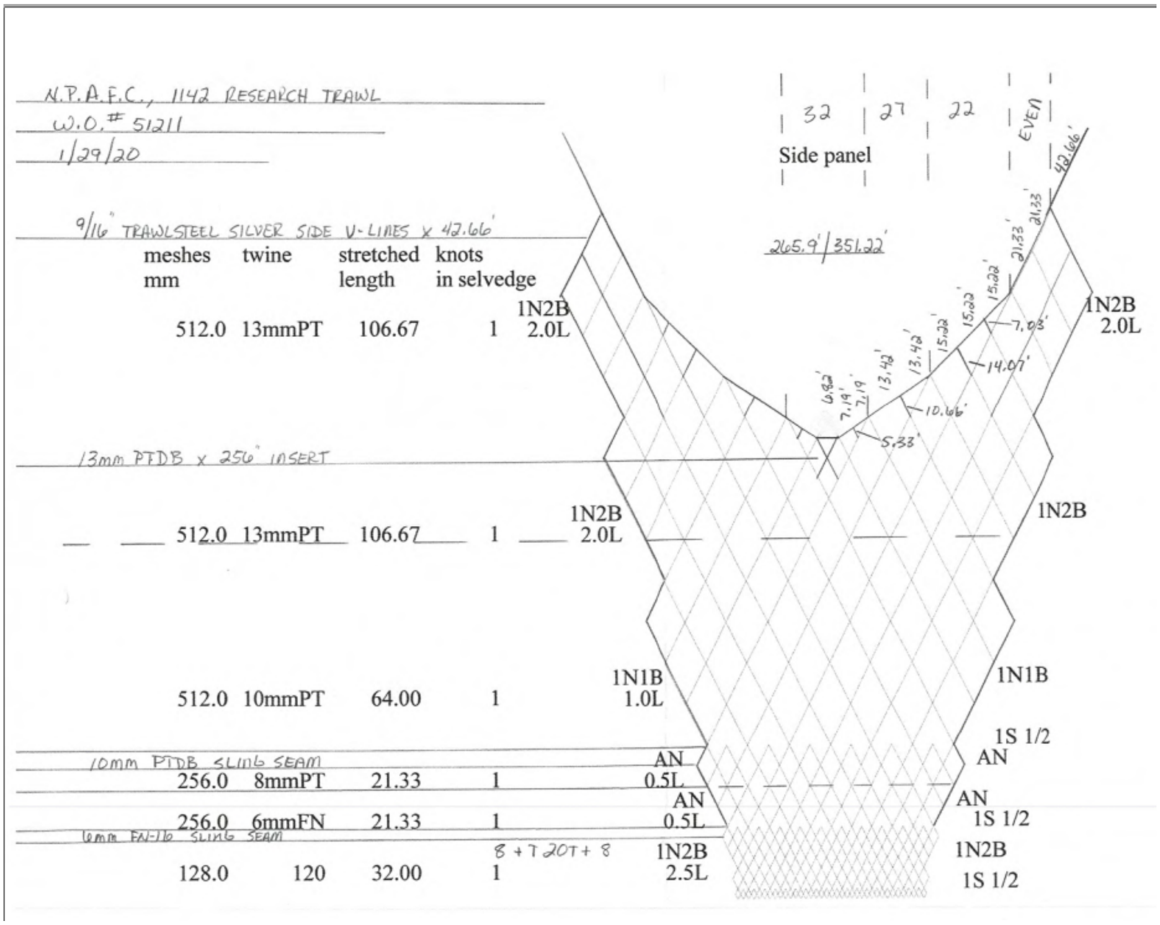

Figure A.1. Net specifications (side view) for the LFS 1142 offshore trawl net used during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*.

APPENDIX B TRAWL BRIDGE LOG DATA

Table B.1. Bridge log data for trawl tows during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition aboard the *CCGS Sir John Franklin*, February 19 to March 21, 2022.

Station ID	**50-135**	**49-135**	**48-135**	**47-135**	**47-138**	**48-138**
Event Number	9	13	17	21	25	29
Date (Pacific)	2022-02-22	2022-02-22	2022-02-23	2022-02-23	2022-02-24	2022-02-24
Date (UTC)	2022-02-22	2022-02-23	2022-02-23	2022-02-23	2022-02-24	2022-02-24
Start Time (Pacific)	12:42	21:02	07:20	15:31	07:00	15:24
Start Time (UTC)	20:42	05:02	15:20	23:31	15:00	23:24
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60	60	61
Start Latitude	50° 00' 46" N	49° 01' 09" N	48° 02' 05" N	47° 01' 54" N	46° 58' 18" N	47° 58' 31" N
Start Longitude	135° 00' 01" W	134° 59' 32" W	135° 00' 08" W	134° 59' 24" W	137° 59' 02" W	137° 59' 32" W
End Latitude	49° 56' 00" N	48° 56' 02" N	47° 57' 03" N	46° 57' 01" N	47° 02' 56" N	48° 03' 42" N
End Longitude	135° 00' 45" W	134° 59' 01" W	134° 59' 35" W	135° 00' 02" W	138° 00' 53" W	137° 59' 42" W
Direction of Tow (deg)	190	181	180	189	351	005
Vessel Speed (km/h)	8.9	9.4	9.3	9.1	8.9	9.4
Distance Towed (km)	8.87	9.48	9.35	9.09	8.89	9.62
Net Opening Width (m)	54.0	53.6	54.6	55.0	54.1	53.1
Net Opening Height (m)	21	16	20	20	21	21
Warp Length (m)	200	200	200	200	200	200
Target Headrope Depth (m)	0	0	0	0	0	0
Median Headrope Depth (m)	2	10	4	4	4	3
Start Bottom Depth (m)	3503	3511	2893	3149	3580	3284
End Bottom Depth (m)	3601	3858	3187	3645	3791	3912
Usable	Y	Y	Y	Y	Y	Y

Station ID	49-138	50-138	50-141	49-141	48-141	47-141
Event Number	33	37	41	45	49	50
Date (Pacific)	2022-02-26	2022-02-26	2022-02-27	2022-02-27	2022-02-28	2022-02-28
Date (UTC)	2022-02-26	2022-02-27	2022-02-27	2022-02-28	2022-02-28	2022-03-01
Start Time (Pacific)	09:27	18:39	10:11	18:41	09:25	18:00
Start Time (UTC)	17:27	02:39	18:11	02:41	17:25	02:00
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60	60	60
Start Latitude	48° 57' 05" N	49° 59' 49" N	50° 03' 57" N	49° 03' 08" N	48° 03' 37" N	46° 59' 51" N
Start Longitude	137° 59' 28" W	137° 57' 12" W	141° 00' 33" W	141° 00' 19" W	140° 58' 26" W	140° 56' 52" W
End Latitude	49° 02' 42" N	49° 59' 49" N	49° 59' 25" N	48° 58' 12" N	47° 59' 09" N	46° 59' 32" N
End Longitude	137° 59' 50" W	138° 04' 52" W	140° 59' 52" W	140° 58' 38" W	140° 59' 21" W	141° 04' 06" W
Direction of Tow (deg)	004	277	184	176	197	275
Vessel Speed (km/h)	9.3	9.1	8.3	9.4	8.3	9.3
Distance Towed (km)	10.43	9.15	8.45	9.38	8.36	9.19
Net Opening Width (m)	52.4	49.9	54.1	53.5	54.5	51.5
Net Opening Height (m)	22	20	19	21	19	20
Warp Length (m)	200	200	200	200	200	200
Target Headrope Depth (m)	0	0	0	0	0	0
Median Headrope Depth (m)	2	4	3	3	3	3
Start Bottom Depth (m)	3979	3932	3483	3832	4494	4341
End Bottom Depth (m)	3964	3272	3677	3757	4192	4802
Usable	Y	Y	Y	Y	Y	Y

Station ID	46-144	47-144	48-144	51-141	52-141	53-141
Event Number	54	59	63	69	73	77
Date (Pacific)	2022-03-01	2022-03-01	2022-03-02	2022-03-03	2022-03-04	2022-03-04
Date (UTC)	2022-03-01	2022-03-02	2022-03-02	2022-03-04	2022-03-04	2022-03-05
Start Time (Pacific)	10:04	21:47	09:31	22:04	09:23	18:28
Start Time (UTC)	18:04	05:47	17:31	06:04	17:23	02:28
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60	60	60
Start Latitude	46° 03' 29" N	46° 57' 28" N	47° 56' 48" N	50° 59' 26" N	51° 55' 43" N	52° 57' 19" N
Start Longitude	144° 00' 28" W	144° 01' 27" W	143° 59' 44" W	141° 04' 31" W	141° 00' 45" W	140° 59' 49" W
End Latitude	45° 58' 48" N	47° 01' 57" N	48° 01' 35" N	51° 00' 26" N	52° 00' 25" N	53° 01' 16" N
End Longitude	144° 00' 44" W	143° 58' 55" W	144° 01' 11" W	140° 56' 51" W	141° 00' 36" W	141° 03' 20" W
Direction of Tow (deg)	193	032	360	088	011	341
Vessel Speed (km/h)	8.7	8.9	9.1	9.1	8.7	8.3
Distance Towed (km)	8.68	8.92	9.04	9.17	8.71	8.33
Net Opening Width (m)	52.6	53.6	53.9	52.7	54.9	57.6
Net Opening Height (m)	24	20	21	23	20	18
Warp Length (m)	200	200	200	200	200	200
Target Headrope Depth (m)	0	0	0	0	0	0
Median Headrope Depth (m)	3	4	3	3	4	5
Start Bottom Depth (m)	4119	4739	4173	4129	4170	4111
End Bottom Depth (m)	4407	4129	4895	4162	4112	4331
Usable	Y	Y	Y	Y	Y	Y

Station ID	**53-138**	**52-138**	**52-135**	**51-135**	**53-135**	**55-138**
Event Number	81	85	89	93	97	101
Date (Pacific)	2022-03-05	2022-03-05	2022-03-06	2022-03-06	2022-03-10	2022-03-10
Date (UTC)	2022-03-05	2022-03-06	2022-03-06	2022-03-07	2022-03-10	2022-03-11
Start Time (Pacific)	09:17	19:28	09:02	19:28	00:27	17:13
Start Time (UTC)	17:17	03:28	17:02	03:28	08:27	01:13
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60	60	60
Start Latitude	52° 59' 21" N	51° 58' 41" N	51° 58' 35" N	50° 58' 30" N	52° 58' 43" N	54° 57' 34" N
Start Longitude	138° 03' 10" W	138° 01' 17" W	135° 02' 26" W	135° 03' 41" W	134° 55' 28" W	137° 58' 32" W
End Latitude	53° 02' 13" N	52° 02' 08" N	52° 02' 02" N	51° 01' 46" N	53° 00' 40" N	55° 01' 13" N
End Longitude	137° 55' 49" W	137° 56' 37" W	134° 56' 36" W	134° 58' 11" W	135° 02' 22" W	138° 03' 30" W
Direction of Tow (deg)	064	047	051	051	300	329
Vessel Speed (km/h)	9.8	8.3	9.3	8.7	8.5	8.5
Distance Towed (km)	9.80	8.35	9.24	8.82	8.52	8.58
Net Opening Width (m)	55.0	52.4	54.6	54.9	52.2	54.9
Net Opening Height (m)	21	22	21	20	20	23
Warp Length (m)	200	200	200	200	200	200
Target Headrope Depth (m)	0	0	0	0	0	0
Median Headrope Depth (m)	4	4	4	4	4	3
Start Bottom Depth (m)	4277	4433	4688	4318	2824	2941
End Bottom Depth (m)	4120	4036	4241	4516	2916	3012
Usable	Y	Y	Y	Y	Y	Y

Station ID	**54-138**	**54-141**	**55-141**	**56-141**	**57-144**	**56-144**
Event Number	106	110	114	118	125	127
Date (Pacific)	2022-03-11	2022-03-11	2022-03-12	2022-03-12	2022-03-14	2022-03-14
Date (UTC)	2022-03-11	2022-03-12	2022-03-12	2022-03-13	2022-03-14	2022-03-15
Start Time (Pacific)	03:24	16:50	09:10	19:58	12:12	19:09
Start Time (UTC)	11:24	00:50	17:10	03:58	19:12	02:09
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60	60	60
Start Latitude	53° 57’ 55" N	53° 59’ 09" N	54° 57’ 54" N	55° 57’ 48" N	57° 00’ 38" N	56° 03’ 12" N
Start Longitude	138° 03’ 39" W	141° 02’ 44" W	140° 59’ 21" W	140° 56’ 21" W	143° 53’ 32" W	143° 59’ 52" W
End Latitude	54° 01’ 16" N	54° 02’ 17" N	55° 03’ 38" N	56° 01’ 33" N	57° 00’ 16" N	55° 58’ 22" N
End Longitude	137° 57’ 33" W	140° 56’ 17" W	140° 59’ 20" W	141° 01’ 23" W	144° 02’ 44" W	144° 00’ 03" W
Direction of Tow (deg)	054	060	010	333	279	194
Vessel Speed (km/h)	9.1	9.1	9.6	8.7	9.4	9.1
Distance Towed (km)	9.12	9.12	10.64	8.70	9.34	8.97
Net Opening Width (m)	53.3	54.0	53.8	54.5	56.6	56.0
Net Opening Height (m)	22	22	22	23	22	19
Warp Length (m)	200	200	200	200	200	200
Target Headrope Depth (m)	0	0	0	0	0	0
Median Headrope Depth (m)	4	4	4	3	4	5
Start Bottom Depth (m)	3428	3593	3638	3700	3728	3951
End Bottom Depth (m)	3291	3686	3498	3495	3577	3973
Usable	Y	Y	Y	Y	Y	Y

Station ID	55-144	54-144	53-144	51-132
Event Number	134	139	143	148
Date (Pacific)	2022-03-15	2022-03-15	2022-03-16	2022-03-19
Date (UTC)	2022-03-15	2022-03-16	2022-03-16	2022-03-19
Start Time (Pacific)	07:28	17:13	09:31	10:36
Start Time (UTC)	14:28	00:13	16:31	17:36
Net	LFS 1142	LFS 1142	LFS 1142	LFS 1142
Duration (min)	60	60	60	60
Start Latitude	55° 00' 18" N	53° 57' 31" N	52° 57' 48" N	50° 57' 59" N
Start Longitude	144° 04' 12" W	143° 59' 18" W	144° 01' 36" W	132° 04' 32" W
End Latitude	54° 57' 40" N	54° 02' 17" N	53° 02' 44" N	51° 00' 58" N
End Longitude	143° 57' 36" W	144° 01' 00" W	143° 58' 45" W	131° 58' 34" W
Direction of Tow (deg)	137	000	031	054
Vessel Speed (km/h)	8.5	9.1	9.6	8.9
Distance Towed (km)	8.57	9.03	9.67	8.91
Net Opening Width (m)	55.7	54.0	54.9	52.6
Net Opening Height (m)	21	21	23	21
Warp Length (m)	200	200	200	200
Target Headrope Depth (m)	0	0	0	0
Median Headrope Depth (m)	4	3	4	4
Start Bottom Depth (m)	3282	3660	3231	2810
End Bottom Depth (m)	4190	3466	3190	2615
Usable	Y	Y	Y	Y

APPENDIX C CTD CAST AND ZOOPLANKTON TOW BRIDGE LOG DATA

Table C.1. CTD casts and vertical bongo tow times and depths during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*.

						CTD			BONGO		
Station	**Date (Pacific)**	**Date (UTC)**	**Latitude**	**Longitude**	**Bottom Depth (m)**	**Start Time (Pacific)**	**Start Time (UTC)**	**Gear Depth (m)**	**Start Time (Pacific)**	**Start Time (UTC)**	**Gear Depth (m)**
50-135	2022-02-22	2022-02-22	50° 01' 24" N	135° 00' 01" W	3480	11:08	19:08	300	10:50	18:50	300
49-135	2022-02-22	2022-02-23	49° 02' 52" N	134° 59' 52" W	2524	20:07	04:07	300	19:11	03:11	300
48-135	2022-02-23	2022-02-23	48° 02' 44" N	135° 00' 14" W	3381	06:05	14:05	300	05:51	13:51	300
47-135	2022-02-23	2022-02-23	47° 03' 18" N	134° 59' 27" W	3060	14:39	22:39	300	13:53	21:53	300
47-138	2022-02-24	2022-02-24	46° 56' 08" N	137° 58' 21" W	3601	05:46	13:46	300	05:26	13:26	300
48-138	2022-02-24	2022-02-24	47° 56' 13" N	137° 59' 34" W	3456	14:26	22:26	300	14:09	22:09	300
49-138	2022-02-26	2022-02-26	48° 55' 26" N	137° 59' 44" W	3044	08:27	16:27	300	07:19	15:19	300
50-138	2022-02-26	2022-02-27	49° 59' 35" N	137° 55' 58" W	3527	17:44	01:44	300	16:33	00:33	300
50-141	2022-02-27	2022-02-27	50° 05' 23" N	141° 00' 52" W	3560	09:15	17:15	300	08:57	16:57	300
49-141	2022-02-27	2022-02-28	49° 04' 42" N	141° 00' 58" W	3478	17:52	01:52	300	16:50	00:50	300
48-141	2022-02-28	2022-02-28	48° 05' 31" N	140° 57' 56" W	4789	08:25	16:25	300	08:08	16:08	300
46-144	2022-03-01	2022-03-01	46° 05' 20" N	144° 00' 39" W	4167	09:13	17:13	300	07:58	15:58	300
47-144	2022-03-01	2022-03-02	46° 56' 34" N	144° 01' 23" W	4211	19:26	03:26	2000	18:59	02:59	300
48-144	2022-03-02	2022-03-02	47° 54' 32" N	143° 59' 19" W	4116	08:28	16:28	300	07:20	15:20	300
49-144	2022-03-02	2022-03-03	48° 55' 54" N	143° 59' 21" W	4000	16:29	00:29	2000	16:14	00:14	300
51-141	2022-03-03	2022-03-04	50° 59' 05" N	141° 07' 50" W	4290	21:12	05:12	300	20:58	04:58	300
52-141	2022-03-04	2022-03-04	51° 53' 34" N	141° 00' 39" W	4254	08:28	16:28	300	07:14	15:14	300
53-141	2022-03-04	2022-03-05	52° 55' 29" N	140° 58' 19" W	4845	17:30	01:30	300	17:15	01:15	300
53-138	2022-03-05	2022-03-05	52° 59' 04" N	138° 06' 25" W	4390	08:14	16:14	300	07:06	15:06	300
52-138	2022-03-05	2022-03-06	51° 57' 14" N	138° 03' 09" W	4310	18:40	02:40	300	18:26	02:26	300

Station	Date (Pacific)	Date (UTC)	Latitude	Longitude	Bottom Depth (m)	CTD			BONGO		
						Start Time (Pacific)	Start Time (UTC)	Gear Depth (m)	Start Time (Local)	Start Time (UTC)	Gear Depth (m)
52-135	2022-03-06	2022-03-06	51° 57' 16" N	135° 04' 46" W	4396	08:12	16:12	300	07:07	15:07	300
51-135	2022-03-06	2022-03-07	50° 57' 18" N	135° 05' 47" W	4264	18:39	02:39	300	18:23	02:23	300
53-135	2022-03-09	2022-03-10	52° 57' 56" N	134° 52' 37" W	2783	23:32	07:32	300	22:35	06:35	300
55-138	2022-03-10	2022-03-11	54° 55' 47" N	137° 56' 15" W	3387	16:17	00:17	300	16:01	00:01	300
54-138	2022-03-11	2022-03-11	53° 56' 45" N	138° 06' 05" W	3237	02:30	10:30	300	01:21	09:21	300
54-141	2022-03-11	2022-03-12	53° 58' 03" N	141° 04' 45" W	3717	16:04	00:04	300	15:49	23:49	300
55-141	2022-03-12	2022-03-12	54° 56' 23" N	140° 59' 48" W	3628	08:20	16:20	300	07:11	15:11	300
56-141	2022-03-12	2022-03-13	55° 56' 28" N	140° 54' 52" W	3438	19:10	03:10	300	18:29	02:29	300
57-141	2022-03-13	2022-03-13	56° 56' 09" N	140° 55' 51" W	3487	06:59	13:59	300	05:18	12:18	300
57-144	2022-03-14	2022-03-14	57° 00' 30" N	143° 50' 16" W	3780	10:17	17:17	2000	09:08	16:08	300
56-144	2022-03-14	2022-03-15	55° 58' 30" N	144° 00' 53" W	3238	21:42	04:42	300	21:28	04:28	300
55-144	2022-03-15	2022-03-15	55° 02' 37" N	144° 04' 35" W	3488	04:52	11:52	2000	03:35	10:35	300
54-144	2022-03-15	2022-03-15	53° 55' 50" N	143° 59' 10" W	3529	16:26	23:26	300	16:13	23:13	300
53-144	2022-03-16	2022-03-16	52° 55' 55" N	144° 02' 26" W	3599	07:34	14:34	2000	06:10	13:10	300
51-132	2022-03-19	2022-03-19	50° 57' 01" N	132° 06' 41" W	2822	09:50	16:50	300	08:25	15:25	300

APPENDIX D TUCKER TRAWL BRIDGE LOG DATA

Table D.1. Tucker trawl bridge log data for the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*. Target Start and Target End represent depths in metres (m) and the vessel speed is in kilometres per hour(km/hr). MR = Messenger Released: Y = Messenger and net successfully deployed; N = Messenger failed and net failed to open or close.When the messenger failed to open or close nets, the second net fished from the bottom depth to the surface.

Station	Event	Date (Pacific)	Date (UTC)	Net	MR	Net Time (Pacific)	Net Time (UTC)	Target Start	Target End	Latitude	Longitude	Vessel Speed
50-135	6	2022-02-22	2022-02-22	1		10:07	18:07	0	400	50.020	-134.991	0.8
50-135	6	2022-02-22	2022-02-22	2	Y	10:17	18:17	400	100	50.022	-134.993	0.8
50-135	6	2022-02-22	2022-02-22	3	N	10:25	18:25	100	0	50.024	-134.994	0.8
49-135	11	2022-02-22	2022-02-23	1		19:30	03:30	0	400	49.044	-135.001	0.8
49-135	11	2022-02-22	2022-02-23	2	Y	19:47	03:47	400	100	49.047	-135.998	0.8
49-135	11	2022-02-22	2022-02-23	3	Y	19:52	03:52	100	0	49.048	-135.997	0.8
48-135	14	2022-02-23	2022-02-23	1		05:05	13:05	0	400	48.040	-134.997	0.8
48-135	14	2022-02-23	2022-02-16	2	Y	05:21	13:21	400	100	48.043	-134.998	0.8
48-135	14	2022-02-23	2022-02-23	3	Y	05:28	13:28	100	0	48.045	-134.999	0.8
47-135	19	2022-02-23	2022-02-23	1		14:19	22:19	0	400	47.055	-134.994	0.9
47-135	19	2022-02-23	2022-02-23	2	Y	14:06	22:06	0	400	47.057	-134.998	0.9
47-135	19	2022-02-23	2022-02-23	3	Y	14:19	22:19	400	100	47.055	-134.994	0.9
47-135	19	2022-02-23	2022-02-23	4		14:28	22:28	100	0	47.054	-134.991	0.9
47-138	22	2022-02-24	2022-02-24	1		04:11	12:11	0	400	46.941	-137.958	0.9
47-138	22	2022-02-24	2022-02-24	2	Y	04:30	12:30	400	100	46.938	-137.987	0.9
47-138	22	2022-02-24	2022-02-17	3	Y	05:04	13:04	100	0	46.933	-137.977	0.9
50-138	35	2022-02-26	2022-02-27	1		18:50	02:50	0	400	49.998	-137.903	1.6
50-138	35	2022-02-26	2022-02-27	2	Y	17:05	01:05	400	275	49.997	-137.915	1.6
50-138	35	2022-02-26	2022-02-27	3	Y	17:17	01:17	275	0	49.996	-137.924	1.6
50-141	38	2022-02-27	2022-02-27	1		07:42	15:42	0	400	50.066	-141.003	1.5
50-141	38	2022-02-27	2022-02-27	2	Y	08:09	16:09	400	275	50.079	-141.009	1.5
50-141	38	2022-02-27	2022-02-27	3	Y	08:20	16:20	275	0	50.082	-141.010	1.5
49-141	43	2022-02-27	2022-02-28	1		17:03	01:03	0	400	49.068	-141.001	1.3
49-141	43	2022-02-27	2022-02-28	2	Y	17:17	01:17	400	275	49.071	-141.005	1.3
49-141	43	2022-02-27	2022-02-28	3	Y	17:28	01:28	275	0	49.074	-141.010	1.3

Station	Event	Date (Pacific)	Date (UTC)	Net	MR	Net Time (Pacific)	Net Time (UTC)	Target Start	Target End	Latitude	Longitude	Vessel Speed
48-138	46	2022-02-28	2022-02-28	1		07:04	15:04	0	400	48.075	-140.998	2.0
48-138	46	2022-02-28	2022-02-28	2	Y	07:22	15:22	400	275	48.078	-140.987	2.0
48-138	46	2022-02-28	2022-02-28	3	Y	07:33	15:33	275	0	48.083	-140.978	2.0
46-144	52	2022-03-01	2022-03-01	1		08:11	16:11	0	400	46.072	-144.001	1.5
46-144	52	2022-03-01	1899-12-30	2	Y	08:35	16:35	400	275	46.081	-144.006	1.5
46-144	52	2022-03-01	2022-03-01	3	Y	08:45	16:45	275	0	46.085	-144.008	1.5
47-144	56	2022-03-01	2022-03-02	1		18:02	02:02	0	400	46.934	-144.003	1.4
47-144	56	2022-03-01	2022-03-02	2	Y	18:17	02:17	400	275	46.939	-144.007	1.4
47-144	56	2022-03-01	2022-03-02	3	Y	18:25	02:25	275	400	46.941	-144.012	1.4
48-144	61	2022-03-02	2022-03-02	1		07:33	15:33	0	400	47.926	-143.999	1.4
48-144	61	2022-03-02	2022-03-02	2	Y	07:54	15:54	400	0	47.933	-143.996	1.4
48-144	61	2022-03-02	2022-03-02	3	N	08:05	16:05	275	0	47.914	-143.993	1.4
51-141	66	2022-03-03	2022-03-04	1		20:05	04:05	0	400	50.991	-141.108	1.4
51-141	66	2022-03-03	2022-03-04	2	Y	20:16	04:16	400	275	50.989	-141.115	1.4
51-141	66	2022-03-03	2022-03-04	3	Y	20:28	04:28	275	0	50.988	-141.122	1.4
52-141	71	2022-03-04	2022-03-04	1		07:25	15:25	0	400	51.920	-140.999	2.0
52-141	71	2022-03-04	2022-03-04	2	Y	07:50	15:50	400	275	51.907	-141.006	2.0
52-141	71	2022-03-04	2022-03-04	3	Y	08:02	16:02	275	0	51.900	-141.007	2.0
53-141	74	2022-03-04	2022-03-04	1		13:57	21:57	0	400	52.934	-140.995	1.4
53-141	74	2022-03-04	2022-03-05	2	Y	16:09	00:09	400	275	52.930	-140.991	1.4
53-141	74	2022-03-04	2022-03-05	3	Y	16:20	00:20	275	0	52.927	-140.990	1.4
53-138	79	2022-03-05	2022-03-05	1		07:19	15:19	0	400	52.998	-138.103	1.1
53-138	79	2022-03-05	2022-03-05	2	Y	07:39	15:39	400	0	52.993	-138.107	1.1

Station	Event	Date (Pacific)	Date (UTC)	Net	MR	Net Time (Pacific)	Net Time (UTC)	Target Start	Target End	Latitude	Longitude	Vessel Speed
53-138	79	2022-03-05	2022-03-05	3	N	07:51	15:51			52.990	-138.108	1.1
52-138	82	2022-03-05	2022-03-06	1		17:32	01:32	0	400	51.972	-138.043	1.7
52-138	82	2022-03-05	2022-03-06	2	Y	17:43	01:43	400	0	51.968	-138.047	1.7
52-138	82	2022-03-05	2022-03-06	3	N	17:54	01:54			51.963	-138.051	1.7
52-135	87	2022-03-06	2022-03-06	1		07:31	15:31	0	400	51.968	-135.064	1.3
52-135	87	2022-03-06	2022-03-06	2	Y	07:39	15:39	400	275	51.963	-135.071	1.3
52-135	87	2022-03-06	2022-03-06	3	Y	07:51	15:51	275	0	51.969	-135.075	1.3
51-135	90	2022-03-06	2022-03-07	1		17:39	01:39	0	400	50.974	-135.083	1.7
51-135	90	2022-03-06	2022-03-07	2	Y	17:43	01:43	400	275	50.968	-135.088	1.7
51-135	90	2022-03-06	2022-03-08	3	Y	17:55	01:55	275	0	50.964	-135.092	1.7
53-135	95	2022-03-09	2022-03-10	1		22:47	06:47	0	0	52.973	-134.901	1.5
53-135	95	2022-03-09	2022-03-10	2	Y	23:03	07:03	0	400	52.970	-134.892	1.5
53-135	95	2022-03-09	2022-03-10	3	Y	23:10	07:10	400	0			1.5
55-138	98	2022-03-10	2022-03-10	1		00:00	08:00	0	400	54.946	-137.950	1.7
55-138	98	2022-03-10	2022-03-10	2	Y	15:08	23:08	0	400	54.946	-137.950	1.7
55-138	98	2022-03-10	2022-03-10	3		15:21	23:21	400	275	54.940	-137.944	1.7
55-138	98	2022-03-10	2022-03-10	4		15:32	23:32	275	0	54.935	-137.942	1.7
54-138	104	2022-03-11	2022-03-11	1		01:33	09:33	0	400	53.961	-138.089	1.3
54-138	104	2022-03-11	2022-03-11	2	Y	01:52	09:52	400	275	53.956	-138.093	1.3
54-138	104	2022-03-11	2022-03-11	3	Y	02:03	10:03	275	0	53.952	-138.098	1.3
54-141	107	2022-03-11	2022-03-11	1		14:57	22:57	0	400	53.984	-141.060	1.5
54-141	107	2022-03-11	2022-03-11	2	Y	15:10	23:10	400	275	53.980	-141.065	1.5
54-141	107	2022-03-11	2022-03-11	3	Y	15:21	23:21	275	0	53.977	-141.070	1.5

Station	Event	Date (Pacific)	Date (UTC)	Net	MR	Net Time (Pacific)	Net Time (UTC)	Target Start	Target End	Latitude	Longitude	Vessel Speed
55-141	112	2022-03-12	2022-03-12	1		07:25	15:25	0	400	54.952	-141.012	1.1
55-141	112	2022-03-12	2022-03-12	2	Y	07:45	15:45	400	275	54.948	-141.006	1.1
55-141	112	2022-03-12	2022-03-12	3	Y	07:57	15:57	275	0	54.944	-141.002	1.1
56-141	115	2022-03-12	2022-03-13	1		17:35	01:35	0	400	55.948	-140.943	1.6
56-141	115	2022-03-12	2022-03-13	2	Y	17:49	01:49	400	275	55.945	-140.935	1.6
56-141	115	2022-03-12	2022-03-13	3	Y	18:01	02:01	275	0	55.941	-140.928	1.6
57-141	120	2022-03-13	2022-03-13	1		05:31	12:31	0	400	56.935	-140.974	1.6
57-141	120	2022-03-13	2022-03-13	2	Y	05:57	12:57	400	275	56.933	-140.955	1.6
57-141	120	2022-03-13	2022-03-13	3	Y	06:11	13:11	275	0	56.931	-140.944	1.6
57-144	123	2022-03-14	2022-03-14	1		09:21	16:21	0	400	57.005	-143.877	1.6
57-144	123	2022-03-14	2022-03-14	2	Y	09:43	16:43	400	275	57.007	-143.863	1.6
57-144	123	2022-03-14	2022-03-14	3	Y	09:55	16:55	275	0	57.007	-143.851	1.6
56-144	128	2022-03-14	2022-03-15	1		20:34	03:34	0	400	55.959	-143.997	1.5
56-144	128	2022-03-14	2022-03-15	2	Y	20:47	03:47	400	275	55.964	-144.001	1.5
56-144	128	2022-03-14	2022-03-15	3	Y	21:00	04:00	275	9	55.969	-144.005	1.5
55-144	132	2022-03-15	2022-03-15	1		03:46	10:46	0	400	55.043	-144.040	1.6
55-144	132	2022-03-15	2022-03-15	2	Y	04:07	11:07	400	275	55.044	-144.054	1.6
55-144	132	2022-03-15	2022-03-15	3	Y	04:18	11:18	275	0	55.044	-144.062	1.6
54-144	136	2022-03-15	2022-03-15	1		15:17	22:17	0	400	53.944	-144.004	1.7
54-144	136	2022-03-15	2022-03-15	2	Y	15:33	22:33	400	275	53.938	-143.998	1.7
54-144	136	2022-03-15	2022-03-15	3	Y	15:45	22:45	275	0	53.933	-143.994	1.7
53-144	141	2022-03-16	2022-03-16	1		06:35	13:35	0	400	52.950	-144.020	1.5
53-144	141	2022-03-16	2022-03-16	2	Y	06:58	13:58	400	275	52.942	-144.031	1.5
53-144	141	2022-03-16	2022-03-16	3	Y	07:11	14:11	275	0	52.938	-144.035	1.5
51-132	146	2022-03-19	2022-03-19	1		08:37	15:37	0	400	50.962	-132.093	1.4
51-132	146	2022-03-19	2022-03-19	2	Y	09:00	16:00	400	275	50.956	-132.101	1.4
51-132	146	2022-03-19	2022-03-19	3	Y	09:12	16:12	275	0	50.953	-132.108	1.4

APPENDIX E ARGO FLOAT BRIDGE LOG DATA

Table E.1. Argo float deployment times and locations during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*.

Station	Event	Date (Pacific)	Date (UTC)	Time (Pacific)	Time (UTC)	Latitude	Longitude	Serial Number
47-138	26	2022-02-24	2022-02-24	08:53	16:53	47° 04’ 25" N	138° 01’ 10" W	AI2632-21CA024
46-144	55	2022-03-01	2022-03-01	11:53	19:53	45° 57’ 58" N	144° 01’ 46" W	AI2632-21CA025
55-138	102	2022-03-10	2022-03-11	19:01	03:01	55° 01’ 51" N	138° 04’ 41" W	AI2632 21CA027
57-144	126	2022-03-14	2022-03-14	13:40	20:40	57° 00’ 13" N	144° 04’ 48" W	AI2632-21CA029
55-144	135	2022-03-15	2022-03-15	09:14	16:14	54° 56’ 48" N	143° 56’ 26" W	AI2632-21CA028
53-144	144	2022-03-16	2022-03-16	10:58	17:58	53° 04’ 05" N	143° 57’ 19" W	AI2632-21CA026

APPENDIX F CATCH DATA

Table F.1. Weight (kg) and counts per station of caught species (or taxa) during the Eastern Gulf of Alaska Pacific Salmon Trawl Survey for the NPAFC International Year of the Salmon Pan-Pacific Winter High Seas Expedition from February 19 to March 21, 2022 on the *CCGS Sir John Franklin*. Jellyfish weights include all identified pieces but only counted if bells were intact. Euphausiacea were not counted due to small size. Counts with blank weights indicate catches too small to be weighed accurately.

	STATION	50-135		49-135		48-135		47-135		47-138	
Scientific Name	**Common Name**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon							3.96	18		
Oncorhynchus keta	Chum Salmon					0.17	1	6.81	17	4.96	6
Oncorhynchus kisutch	Coho Salmon			0.62	1	0.42	1			2.47	4
Oncorhynchus nerka	Sockeye Salmon			0.99	2						
Oncorhynchus tshawytscha	Chinook Salmon										
Diaphus theta	California Headlightfish										
Stenobrachius leucopsarus	Northern Lampfish			0.57	350					0.37	185
Tarletonbeania crenularis	Blue Lanternfish										
Gasterosteus aculeatus	Threespine Stickleback										
Anotopteridae	Daggertooths										
Bathymasteridae	Ronquils										
Icosteus aenigmaticus	Ragfish										
Lipolagus ochotensis	Popeye Blacksmelt										
Sebastes melanops	Black Rockfish										
Aequorea	Water Jellyfish	0.04				0.22					
Aurelia labiata	Moon Jellyfish							0.32		0.50	
Calycopsis	Calycopsis										
Chrysaora melanaster	Northern Sea Nettle										
Ctenophora	Comb Jellyfish										
Hormiphora cucumis	Hormiphora Cucumis	0.12	39	0.27	50	0.35	99	0.04	16		
Phacellophora camtschatica	Fried Egg Jellyfish										
Scyphozoa	Jellyfish										
Abraliopsis felis	Abraliopsis Felis				3						5
Berryteuthis anonychus	Smallfin Gonate Squid										
Doryteuthis opalescens	Opalescent Inshore Squid										
Gonatopsis borealis	Boreopacific Gonate Squid									0.05	11
Onychoteuthis borealijaponicus	Boreal Clubhook Squid									0.11	1
Amphipoda	Amphipods										
Euphausiacea	Euphausiids			5.73						0.80	
TOTAL		**0.16**	**39**	**8.18**	**406**	**1.16**	**101**	**11.13**	**51**	**9.26**	**212**

	STATION	48-138		49-138		50-138		50-141		49-141	
Scientific Name	**Common Name**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon	0.21	1					0.26	1	0.26	1
Oncorhynchus keta	Chum Salmon	2.14	7							20.15	23
Oncorhynchus kisutch	Coho Salmon			0.94	2					0.77	2
Oncorhynchus nerka	Sockeye Salmon	0.69	1	0.85	1	4.53	7	2.69	5	2.84	5
Oncorhynchus tshawytscha	Chinook Salmon	1.55	1								
Diaphus theta	California Headlightfish										
Stenobrachius leucopsarus	Northern Lampfish					0.13	92				
Tarletonbeania crenularis	Blue Lanternfish										
Gasterosteus aculeatus	Threespine Stickleback										
Anotopteridae	Daggertooths										
Bathymasteridae	Ronquils										
Icosteus aenigmaticus	Ragfish										
Lipolagus ochotensis	Popeye Blacksmelt										
Sebastes melanops	Black Rockfish					1.48	1				
Aequorea	Water Jellyfish							0.21	4	2.47	
Aurelia labiata	Moon Jellyfish									7.45	14
Calycopsis	Calycopsis										
Chrysaora melanaster	Northern Sea Nettle			0.15	1	0.15	2	0.25	3	6.02	49
Ctenophora	Comb Jellyfish										
Hormiphora cucumis	Hormiphora Cucumis					0.13	11		1		
Phacellophora camtschatica	Fried Egg Jellyfish									4.05	3
Scyphozoa	Jellyfish	2.43		2.03		0.79		2.70		20.31	
Abraliopsis felis	Abraliopsis Felis										
Berryteuthis anonychus	Smallfin Gonate Squid					3.30	634			0.60	153
Doryteuthis opalescens	Opalescent Inshore Squid										
Gonatopsis borealis	Boreopacific Gonate Squid										
Onychoteuthis borealijaponicus	Boreal Clubhook Squid	0.06	1								
Amphipoda	Amphipods										
Euphausiacea	Euphausiids										
TOTAL		**7.08**	**11**	**3.97**	**4**	**10.51**	**747**	**6.11**	**14**	**64.92**	**250**

	STATION	48-141		47-141		46-144		47-144		48-144	
Scientific Name	**Common Name**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon			1.95	9						
Oncorhynchus keta	Chum Salmon	3.32	11	0.13	1			0.99	1	0.28	1
Oncorhynchus kisutch	Coho Salmon			1.88	3			0.40	1	1.62	2
Oncorhynchus nerka	Sockeye Salmon	0.93	2							0.60	1
Oncorhynchus tshawytscha	Chinook Salmon									2.61	2
Diaphus theta	California Headlightfish										
Stenobrachius leucopsarus	Northern Lampfish							7.26	3025		
Tarletonbeania crenularis	Blue Lanternfish										
Gasterosteus aculeatus	Threespine Stickleback										
Anotopteridae	Daggertooths										
Bathymasteridae	Ronquils										
Icosteus aenigmaticus	Ragfish										
Lipolagus ochotensis	Popeye Blacksmelt							0.16	26		
Sebastes melanops	Black Rockfish										
Aequorea	Water Jellyfish	1.10		0.46				0.40			
Aurelia labiata	Moon Jellyfish									0.53	4
Calycopsis	Calycopsis										
Chrysaora melanaster	Northern Sea Nettle										
Ctenophora	Comb Jellyfish	0.04	4	0.06	6	0.07	13	1.82	15		
Hormiphora cucumis	Hormiphora Cucumis										
Phacellophora camtschatica	Fried Egg Jellyfish										
Scyphozoa	Jellyfish					0.02				5.06	
Abraliopsis felis	Abraliopsis Felis										
Berryteuthis anonychus	Smallfin Gonate Squid			0.08	26						
Doryteuthis opalescens	Opalescent Inshore Squid										
Gonatopsis borealis	Boreopacific Gonate Squid							0.60	94		
Onychoteuthis borealijaponicus	Boreal Clubhook Squid							2.30	31		
Amphipoda	Amphipods										
Euphausiacea	Euphausiids							11.57			
TOTAL		**5.39**	**17**	**4.56**	**45**	**0.09**	**13**	**25.50**	**3193**	**10.70**	**10**

	STATION	51-141		52-141		53-141		53-138		52-138	
Scientific Name	**Common Name**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon										
Oncorhynchus keta	Chum Salmon			1.67	3	0.86	1	1.08	1		
Oncorhynchus kisutch	Coho Salmon										
Oncorhynchus nerka	Sockeye Salmon	16.24	25	3.11	7	2.76	3	0.86	1	4.82	6
Oncorhynchus tshawytscha	Chinook Salmon										
Diaphus theta	California Headlightfish										
Stenobrachius leucopsarus	Northern Lampfish	1.07	423							0.01	4
Tarletonbeania crenularis	Blue Lanternfish									0.05	24
Gasterosteus aculeatus	Threespine Stickleback										
Anotopteridae	Daggertooths										
Bathymasteridae	Ronquils										
Icosteus aenigmaticus	Ragfish									0.28	1
Lipolagus ochotensis	Popeye Blacksmelt										
Sebastes melanops	Black Rockfish										
Aequorea	Water Jellyfish	3.19		4.42		5.75		2.29		0.73	
Aurelia labiata	Moon Jellyfish					0.89	3				
Calycopsis	Calycopsis										
Chrysaora melanaster	Northern Sea Nettle	24.05	44			16.68	94			6.70	17
Ctenophora	Comb Jellyfish										
Hormiphora cucumis	Hormiphora Cucumis										
Phacellophora camtschatica	Fried Egg Jellyfish	16.90	16	0.27	2	0.96	5			2.93	2
Scyphozoa	Jellyfish	1.07									
Abraliopsis felis	Abraliopsis Felis										
Berryteuthis anonychus	Smallfin Gonate Squid										
Doryteuthis opalescens	Opalescent Inshore Squid										
Gonatopsis borealis	Boreopacific Gonate Squid									0.09	6
Onychoteuthis borealijaponicus	Boreal Clubhook Squid									0.83	4
Amphipoda	Amphipods										
Euphausiacea	Euphausiids	2.15								5.25	
TOTAL		**64.67**	**508**	**9.47**	**12**	**27.90**	**106**	**4.23**	**2**	**21.69**	**64**

	STATION	52-135		51-135		53-135		55-138		54-138	
Scientific Name	**Common Name**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon	1.05	4								
Oncorhynchus keta	Chum Salmon							0.17	1	2.85	2
Oncorhynchus kisutch	Coho Salmon										
Oncorhynchus nerka	Sockeye Salmon	0.66	1			1.35	1			2.61	3
Oncorhynchus tshawytscha	Chinook Salmon	0.98	1								
Diaphus theta	California Headlightfish									0.07	28
Stenobrachius leucopsarus	Northern Lampfish			0.03	24					0.01	1
Tarletonbeania crenularis	Blue Lanternfish			1.40	1000	2.10	1665			0.11	96
Gasterosteus aculeatus	Threespine Stickleback										
Anotopteridae	Daggertooths									0.04	1
Bathymasteridae	Ronquils										
Icosteus aenigmaticus	Ragfish										
Lipolagus ochotensis	Popeye Blacksmelt										
Sebastes melanops	Black Rockfish										
Aequorea	Water Jellyfish	2.38		4.17		8.34		2.67	7	3.99	
Aurelia labiata	Moon Jellyfish							0.56	2	0.59	2
Calycopsis	Calycopsis										
Chrysaora melanaster	Northern Sea Nettle	0.29	2			0.65	5	1.82	12	10.75	27
Ctenophora	Comb Jellyfish					0.05	10	0.01	6	0.08	4
Hormiphora cucumis	Hormiphora Cucumis										
Phacellophora camtschatica	Fried Egg Jellyfish							2.25	2	6.79	4
Scyphozoa	Jellyfish										
Abraliopsis felis	Abraliopsis Felis										
Berryteuthis anonychus	Smallfin Gonate Squid			0.16	10				2		
Doryteuthis opalescens	Opalescent Inshore Squid					0.05	20				
Gonatopsis borealis	Boreopacific Gonate Squid			0.07	4					0.19	3
Onychoteuthis borealijaponicus	Boreal Clubhook Squid										
Amphipoda	Amphipods										
Euphausiacea	Euphausiids			4.89		7.79				2.49	
TOTAL		**5.36**	**8**	**10.72**	**1038**	**20.33**	**1701**	**7.48**	**32**	**30.57**	**171**

Scientific Name	STATION Common Name	54-141 Weight	 Count	55-141 Weight	 Count	56-141 Weight	 Count	57-144 Weight	 Count	56-144 Weight	 Count
Oncorhynchus gorbuscha	Pink Salmon										
Oncorhynchus keta	Chum Salmon							3.32	2		
Oncorhynchus kisutch	Coho Salmon										
Oncorhynchus nerka	Sockeye Salmon			1.67	2	0.75	1				
Oncorhynchus tshawytscha	Chinook Salmon										
Diaphus theta	California Headlightfish										
Stenobrachius leucopsarus	Northern Lampfish										
Tarletonbeania crenularis	Blue Lanternfish										
Gasterosteus aculeatus	Threespine Stickleback	1.51	330	1.35	306	0.02	5	0.10	24	12.11	2633
Anotopteridae	Daggertooths	0.01	1								
Bathymasteridae	Ronquils				6						1
Icosteus aenigmaticus	Ragfish										
Lipolagus ochotensis	Popeye Blacksmelt										
Sebastes melanops	Black Rockfish										
Aequorea	Water Jellyfish	0.38		1.24		1.99		0.67			
Aurelia labiata	Moon Jellyfish			0.22	2			0.09	1		
Calycopsis	Calycopsis				3		1			0.01	2
Chrysaora melanaster	Northern Sea Nettle	0.38	7	0.21	4	1.56	5	5.71	24		
Ctenophora	Comb Jellyfish				1	0.02	2				
Hormiphora cucumis	Hormiphora Cucumis										
Phacellophora camtschatica	Fried Egg Jellyfish	0.08	1			8.30	12			0.26	
Scyphozoa	Jellyfish			0.16				0.11			
Abraliopsis felis	Abraliopsis Felis										
Berryteuthis anonychus	Smallfin Gonate Squid						5				
Doryteuthis opalescens	Opalescent Inshore Squid										
Gonatopsis borealis	Boreopacific Gonate Squid			0.05	1			0.08	1		
Onychoteuthis borealijaponicus	Boreal Clubhook Squid									0.09	1
Amphipoda	Amphipods										
Euphausiacea	Euphausiids					2.00					
TOTAL		**2.36**	**339**	**4.90**	**325**	**14.64**	**31**	**10.08**	**52**	**12.47**	**2637**

	STATION	55-144		54-144		53-144		51-132	
Scientific Name	**CommonName**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**	**Weight**	**Count**
Oncorhynchus gorbuscha	Pink Salmon								
Oncorhynchus keta	Chum Salmon					1.05	1		
Oncorhynchus kisutch	Coho Salmon								
Oncorhynchus nerka	Sockeye Salmon	4.74	5	1.26	1	3.48	8		
Oncorhynchus tshawytscha	Chinook Salmon								
Diaphus theta	California Headlightfish								
Stenobrachius leucopsarus	Northern Lampfish								
Tarletonbeania crenularis	Blue Lanternfish								
Gasterosteus aculeatus	Threespine Stickleback								
Anotopteridae	Daggertooths			0.04	1				
Bathymasteridae	Ronquils								
Icosteus aenigmaticus	Ragfish								
Lipolagus ochotensis	Popeye Blacksmelt								
Sebastes melanops	Black Rockfish								
Aequorea	Water Jellyfish	2.98		4.35		8.41		0.45	
Aurelia labiata	Moon Jellyfish			0.59	4	0.23	3	0.04	1
Calycopsis	Calycopsis								
Chrysaora melanaster	Northern Sea Nettle	1.12	2	1.00	3	0.84	10		
Ctenophora	Comb Jellyfish							0.08	13
Hormiphora cucumis	Hormiphora Cucumis								
Phacellophora camtschatica	Fried Egg Jellyfish	6.22	9	1.00		0.98	2	0.21	
Scyphozoa	Jellyfish								
Abraliopsis felis	Abraliopsis Felis								
Berryteuthis anonychus	Smallfin Gonate Squid								
Doryteuthis opalescens	Opalescent Inshore Squid								
Gonatopsis borealis	Boreopacific Gonate Squid								
Onychoteuthis borealijaponicus	Boreal Clubhook Squid	0.11	1						
Amphipoda	Amphipods				4				
Euphausiacea	Euphausiids	0.05							
TOTAL		**15.22**	**17**	**8.24**	**13**	**14.99**	**24**	**0.78**	**14**