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THE JOINT USA-CANADA ECHO INTEGRATION-TRAWL SURVEY FROM JUNE 24 TO SEPTEMBER 8, 2003: A REPORT ON THE CATCH AND BIOLOGICAL DATA COLLECTED FOR PACIFIC SALMON OFF SOUTHEAST ALASKA

by

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ABSTRACT

Morris, J. F. T., Welch, D. W., P. M. Winchell, M. E. Thiess, M. Trudel, T. B. Zubkowski, and H. R. MacLean. 2004. The joint USA-Canada echo integration-trawl survey, June 24 to September 8, 2003: a report on the catch and biological data collected for Pacific salmon off Southeast Alaska. Can. Data Rep. Fish. Aquat. Sci. 1151: 43 p.

Scientists from the USA and the Stock Assessment Division of Fisheries and Oceans Canada conducted the Joint USA-Canada Echo Integration -Trawl survey that took place on the *CCGS W.E. Ricker* from June 24 to September 8, 2003. The primary purpose of the survey was to assess the distribution of Pacific hake (*Merluccius productus*) off Southeast Alaska, British Columbia, and the USA coast down to Monterey Bay, California. On this survey, the Highseas Salmon Program was allocated the day of August 27 for dedicated fishing for juvenile salmon and oceanographic sampling along a cross-shelf transect off Southeast Alaska near Forrester Island (54.8 ^{o}N). Fish, oceanographic, or zooplankton sampling at nine stations was completed.

The Highseas Salmon Program of Fisheries and Oceans Canada has conducted annual Pacific salmon surveys in the Gulf of Alaska since 1995. The main objectives of these surveys were to collect information on (1) the distribution and ecology of Pacific salmon (*Oncorhynchus spp.*) during their ocean phase, (2) the ambient oceanographic conditions, and (3) the distribution and biomass of zooplankton.

A total of 375 Pacific salmon were caught along the Forrester Island transect. Of these, 167 were juvenile pink salmon (*O. gorbuscha*), 35 were juvenile chum salmon (*O. keta*), 25 were juvenile sockeye salmon (*O. nerka*), 103 were juvenile coho salmon (*O. kisutch*), and 34 were juvenile chinook salmon (*O. tshawytscha*) in their first summer in the ocean.

Almost all the juvenile pink, chum, sockeye, coho, chinook were caught at the three stations that were closest to the shore.

Juvenile pink, chum, sockeye, coho, and chinook averaged 179, 188, 174, 276 252 mm in fork length, respectively.

Ten age 1.0 juvenile chinook were recovered with either or both CWT's or PIT tags. All were Columbia River – Snake River chinook that had been released in the spring of 2003.

Three age 1.0 juvenile coho were recovered with CWT's. Two had been released into the Lewis River within the lower Columbia River production area, and one had been released into Fork Creek within the Willipa River production area on the coast of Washington State.

RESUME

Morris, J. F. T., Welch, D. W., P. M. Winchell, M. E. Thiess, M. Trudel, T. B. Zubkowski, and H. R. MacLean. 2004. The joint USA-Canada echo integration-trawl survey, June 24 to September 8, 2003: a report on the catch and biological data collected for Pacific salmon off Southeast Alaska. Can. Data Rep. Fish. Aquat. Sci. 1151: 43 p.

Des scientifiques des États-Unis et de la Division de l'Évaluation des stocks de Pêches et Océans Canada ont conduit une étude Canado-Américaine Écho Intégration – Chalut qui a eu lieu du 24 juin au 8 septembre 2003 à bord du *CCGS W.E. Ricker*. L'objectif principal de cette étude était de déterminer la distribution des merlus du Pacifique (*Merluccius productus*) dans le sud-est de l'Alaska, en Colombie-Britannique, et le long de la côte américaine jusqu'à la baie Monterey en Californie. Durant cette étude, le Programme des Saumons en Haute Mer de Pêches et Océans Canada a eu du temps le 27 août 2003 qui a été dédié pour pêcher des saumons juvéniles et pour déterminer les conditions océanographiques le long d'un transect situés dans le sud-est de l'Alaska près de l'Île de Forrester (54.8 ^{o} N). Neufs stations d'échantillonnage de poissons, de zooplanctons ou de conditions océanographiques ont été complétées.

Le programme des Saumons en Haute Mer a réalisé des études sur le saumon du Pacifique dans le Golfe de l'Alaska depuis 1995. Les objectifs de ces études étaient de (1) évaluer la distribution et l'écologie des saumons du Pacifique (*Oncorhynchus* spp.) juvéniles durant leur première année en mer, (2) décrire les conditions océanographiques ambiantes, et (3) quantifier la biomasse de zooplancton, une proie importante des saumons du Pacifique dans l'océan.

Un total de 375 saumons du Pacifique ont été capturés le long du transect de l'Île de Forrester. De ce nombre, 167 étaient des saumons juvéniles roses (*O. gotbuscha*), 35 étaient des saumons juvéniles kétas (*O. keta*), 25 étaient des saumons juvéniles rouges (*O. nerka*), 103 étaient des saumons juvéniles cohos (*O. kisutch*), et 34 étaient des saumons quinnats (*O. tshawytscha*) juvéniles durant leur première année en mer.

Presque tous les saumons juvéniles roses, kétas, rouges, cohos et quinnats ont été capturés aux trois stations les plus rapprochées du rivage.

Les saumons juvéniles roses, kétas, rouges, cohos et quinnats avaient une longueur à la fourche moyenne respectivement de 179, 188, 174, 276 et 252 mm.

Dix quinnats juvéniles d'âge 1.0 marqués à l'aide d'un CWT ou d'un PIT (passive integrated transponder) ont été capturés. Tous étaient des quinnats qui avaient été relâchés dans le système des fleuves Columbia et Snake au printemps 2003.

Trois cohos juvéniles d'âge 1.0 marqués à l'aide d'un CWT ont été capturés. Deux avaient été relâchés dans la rivière Lewis dans la zone de production de l'aval du

fleuve Columbia et un qui avait été relâché dans le ruisseau Fork situé dans la aire de production de la rivière Willipa sur la côte de l’état du Washington.

INTRODUCTION

The Highseas Salmon Program of Fisheries and Oceans Canada has conducted annual Pacific salmon surveys in the Gulf of Alaska since 1995 [2-20]. The main objectives of these surveys were to collect information on (1) the distribution and ecology of Pacific salmon (*Oncorhynchus spp.*) during their ocean phase, (2) the ambient oceanographic conditions, and (3) the distribution and biomass of zooplankton.

The Highseas Salmon Program was allocated the day of August 27 on the Joint USA-Canada Echo Integration -Trawl survey that took place on board the *CCGS W.E. Ricker* from June 24 to September 8, 2003 [1]. Scientists from the USA and the Stock Assessment Division of Fisheries and Oceans Canada directed the survey. The primary purpose of this survey was to assess, by both trawl fishing and hydroacoustic techniques, the distribution of Pacific hake (*Merluccius productus*) off Southeast Alaska, British Columbia, and the USA coast down to Monterey Bay, California. On this survey, the Highseas Salmon Program fished for juvenile salmon along a cross-shelf transect off Southeast Alaska near Forrester Island (54.8 ^{o} N). This report documents the catch and biological data for Pacific salmon that was collected, and provides a notification for the oceanographic work conducted along this transect.

MATERIALS AND METHODS

General Survey Information

Figures 1, 2, and 3 show, respectively, the 5 fishing, 9 oceanographic, and 8 zooplankton stations along the Forrester Island transect completed by the *CCGS W.E. Ricker* on August 27, 2003.

Fishing Gear and Fishing Operations

The survey was conducted on the *CCGS W.E. Ricker*, a stern trawler 58 m in length which is powered by a 2,500 H.P. model AH 40 Akasaka diesel engine.

The *CCGS W.E. Ricker* towed a mid-water trawl, originally manufactured by Cantrawl Nets Ltd., Richmond, BC, and later modified to a model 240 trawl by the fishing crew. The trawl has a heavy-duty front end of hexagonal web made from 3/8 in. (9.5 mm) and 5/16 in. (7.9 mm) Tenex rope, and a tapered body made-up of 64 in. (163 cm), 32 in. (81.3 cm), 16 in. (40.6 cm), 8 in. (20.3 cm) and 4 in. (10.2 cm) polypropylene sections, an intermediate section of 3 in. (7.6 cm) polypropylene, and a codend of 1.5 in. (3.8 cm) knotted nylon lined with 0.25 in. mesh (64 mm). The trawl has three 40 m bridles of 5/8 in. (1.6 cm) wire rope per side that are attached with a single hook-up to 5 m Jet doors. Typically, 100-150 m of 1.25 in. (3.2 cm) warp was paid out to tow the trawl at the surface.

The *CCGS W.E. Ricker* was able to tow the trawl at the surface at 5 knots (2.6 m s^{-1}) in good sea conditions, and this typically achieved a mouth opening of approximately 28 m wide by 16 m deep as measured acoustically by a Simrad trawl eye mounted on the headrope.

Oceanographic Sampling

At oceanographic stations, the scientific crew (1) conducted CTD (conductivity-temperature-depth) casts, and (2) collected surface seawater samples with a Niskin bottle for nitrate, phosphate, silicate, and salinity. No chlorophyll *a* samples were collected on this survey due to mal-functioning equipment.

Nitrate, phosphate, and silicate samples were collected in acid-washed glass test tubes, and the glass fiber disks were folded and placed in polypropylene scintillation vials. All these samples were stored frozen.

CTD casts were conducted to 250 m or within 5 m of the bottom with a Seabird SBE 911+ probe. Several calibration samples from selected CTD casts were collected over the course of the survey with Niskin bottles at depths where the salinities were stable.

Zooplankton Sampling

Vertical bongo tows to approximately 150 m or within 10 m of the bottom were conducted with two 57 cm diameter, 253 µm Nitex nets. One of the nets was equipped with a flowmeter.

Zooplankton collected from the net with the flowmeter were preserved in 10% formalin and sent to the zooplankton laboratory at the Institute of Ocean Sciences, Fisheries and Oceans Canada (Sidney, BC) for species classification and enumeration. Zooplankton taken from the net without flowmeter were sorted into four size fractions by successively sieving through 8.0, 1.7, 1.0, and 0.25 mm screens. Each size fraction was weighed wet, dried at 60°C for 48 hours, re-weighed, and stored in plastic bags for future stable isotope, bomb calorimetry, and proximate analyses.

RESULTS

Salmon Catch Data

Table 1 reports information on trawl tows and a summary of Pacific salmon catches for this survey. Tow information includes: station ID, transect name, sampling region, date and time, start latitude (°N) and longitude (°W), heading (°T; degrees true), and bottom depth (m). Station ID numbers, for example, “HS200316-109-1” consist of the Pacific Biological Station cruise designation “HS200316”, where HS stands for the Highseas Salmon Program, the year is 2003, and the cruise number is 16; where the assigned transect number on the Joint USA-Canada Echo Integration-Trawl survey is

"109"; and where the tow number on this transect is "1". The station ID number serves as the primary key in the Highseas Salmon database.

For each tow, catch totals are provided for all chinook salmon (*O. tshawytscha*) ("CK") that includes all ages and size classes, and separately for juveniles and adults of chum salmon (*O. keta*) ("CM"), coho salmon (*O. kisutch*) ("CO"), pink salmon (*O. gorbuscha*) ("PK"), and sockeye salmon (*O. nerka*) ("SE"). In this report, "juveniles" are defined as fish in their first summer in the ocean (age X.0+), while "adults" include all older age groups (age X.1+ or older). Age separation was determined based on examination of size distributions (fork length) which showed non-overlapping size modes for chum, coho, pink, and sockeye salmon. Chinook salmon were not divided into juveniles and adults based on size since there is considerable overlap among size modes that represent the multiple age groups.

Biological Data

Table 2 reports the detailed biological data collected from each Pacific salmon caught during the survey. Individual salmon were assigned a Fish Number which consists of the Station ID number, the species code, and the consecutive sample number within each tow-species group. For example, "HS200316-109-1-124-001" refers to the Station ID number, species code "124" for chinook salmon, and the sample number "001". We used the following species codes from the Salmon Stock Assessment (SSA) database administered by Fisheries and Oceans, Canada: 108, pink salmon; 112, chum salmon; 115, coho salmon; 118, sockeye salmon; and 124, chinook salmon.

Biological data collected for each salmon includes (when available): species common name, fork length (mm), whole body weight (g wet), sex, stomach content weight (g wet), % water (based on the ratio of dry to wet whole body weight), coded wire tag number (CWT; if present), pit tag number (if present), and observed fin clip (if present).

Catch Distributions

Juvenile pink, chum, and sockeye were caught within the range of 26 to 125, 6 to 25 fish per tow, and 1 to 25 fish per tow, respectively, on the first two fishing stations that were closet to the shore along the Forrester Island transect off Southeast Alaska (Figures 4, 6, and 8).

Juvenile coho were caught on all five stations on the shelf within the range of 26 to 125 fish per tow on the first three stations closet to the shore, and at 1 fish per tow at the two stations further offshore on the shelf (Figure 10).

Juvenile chinook from 200 to 299 mm in fork length were caught on the first three stations closet to the beach within the range of 6 to 25 fish per tow (Figure 14).

One adult pink was caught on the first station closest to the beach (Figure 5).

Adult coho were caught on the first four stations within the range of 1 to 5 fish per tow (Figure 11).

No adult chum, adult sockeye, juvenile chinook under 200 mm in forklength, or chinook 300 mm or greater in fork length were caught (Figures 7, 9, 12, 13, 15, 16, 17, and 18).

Size of Juvenile Salmon

Figure 20 shows the length frequencies for each species of salmon caught on the cruise. Juvenile pink, chum, sockeye, coho, and chinook averaged 179, 188, 174, 276 252 mm in fork length, with standard deviations of 17.4, 23.9, 9.2, 19.3, and 14.6 mm, and standard errors of 1.3, 4.0, 1.8, 1.9, and 2.5 mm, respectively.

CWT and PIT Tag Recoveries

Table 5 reports the details on the coded wire tag (CWT) salmon caught on the survey. Reported information includes the coded wire tag number, the assigned Fish Number, species common name, the date and region of recovery, the fork length (mm) at capture, the release area, the name of the agency and hatchery that released the tagged fish, the brood year, and dates of first and second hatchery releases.

Table 6 reports the details on the PIT tag chinook salmon caught on the survey. Reported information includes the PIT tag number, the CWT number if present, the assigned Fish Number, the date and region of recovery, the fork length (mm) at capture, the release site, the upstream distance in km from the mouth of the Columbia River, the smolt release date, and down stream interrogations.

Ten juvenile chinook were recovered with CWT's or PIT tags on the Forrester Island transect off Southeast Alaska on August 27, 2003. Six were tagged with CWT's only, three were tagged with PIT tags only, and one was tagged with both a CWT and a PIT tag. All were age 1.0 juvenile chinook that had been released as smolts into the Columbia River – Snake River basin in the spring of 2003. At capture, they averaged 252 mm in fork length ranged from 238 to 270 mm.

Three juvenile coho were recovered with CWT's. All were age 1.0. Two had been released in the spring of 2003 into the Lewis River within the lower Columbia River production area, and one had been released in the spring of 2003 in Fork Creek within the Willipa River production area on the coast of Washington State. At capture, these coho ranged from 262 to 275 mm in fork length.

Oceanographic Data

Table 3 reports the physical oceanographic data collected during the survey, including the station ID number, transect, region, the date and time in UTC, the latitude (^{o}N) and longitude (^{o}W), sea surface temperature (SST; ^{o}C), and salinity (SSS; ppt) taken from the CTD files, sea surface salinities (ppt) determined from the sample bottles that were used to calibrate the CTD probe, nitrate, silicate and phosphate concentrations (μmol L^{-1}), and chlorophyll *a* (μg L^{-1}).

The CTD files are catalogued on the website of the Canadian Department of Fisheries and Oceans, Ocean Science and Productivity division (OSAP) at:

http://www-sci.pac.dfo-mpo.gc.ca/osap/data/default_e.htm

Contact Joe Linguanti at linguantij@pac.dfo-mpo.gc.ca for permission to access these data.

Zooplankton Data

Table 4 reports the zooplankton data by station collected by the Bongo tows, including the station ID number, transect, region, latitude (^{o}N) and longitude (^{o}W), bottom depth (m), the date and time, target depth (m), tow duration, wire angle (degrees), and volume of ocean water sampled in cubic meters that is calculated from the flow meter readings. Also shown are the dry weights (g) of zooplankton which were standardised to 1,000 cubic meters sampled for the 8.0, 1.7, 1.0, and 0.25 mm size factions as well as for the total sample.

The zooplankton sampling details, and any associated species identifcation and enumeration analyses are archived in the Fisheries and Oceans Canada, Pacific Region Zooplankton database at:

http://www-sci.pac.dfo-mpo.gc.ca/osap/projects/plankton/zooplanktondatabase_e.htm

Contact Steve Romaine at romaines@pac.dfo-mpo.gc.ca for permission to access these data.

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Table 1. Tow positions and catch summaries of Pacific salmon for the *CCGS W.E. RICKER* survey , 27/08/2003.

Station ID	Station Name	Region	Date	Time	Latitude (°N)	Longitude (°W)	Heading (°T)	SOG (kts)	Bottom Depth (m)	CK all	CM Juv	CM ad.	CO Juv	CO Ad.	PK Juv	PK Ad.	SE Juv	SE Ad.
HS200316-109-1	FORRESTER IS	SEA	27-Aug-03	08:15	54.787	133.077	264	5.28	194	7	22	0	25	1	121	1	22	0
HS200316-109-2	FORRESTER IS	SEA	27-Aug-03	11:31	54.776	133.179	254	4.46	208	21	13	0	42	1	46	0	3	0
HS200316-109-3	FORRESTER IS	SEA	27-Aug-03	13:30	54.753	133.325	261	5.1	139	6	0	0	34	4	0	0	0	0
HS200316-109-4	FORRESTER IS	SEA	27-Aug-03	15:19	54.744	133.466	223	6.22	146	0	0	0	1	4	0	0	0	0
HS200316-109-8	FORRESTER IS	SEA	27-Aug-03	18:56	54.703	133.927	254	5.41	218	0	0	0	1	0	0	0	0	0
									Totals	34	35	0	103	10	167	1	25	0
														Overall total			375	

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-124-001	CHINOOK	249	192	F	2.45			AD
HS200316-109-1-124-002	CHINOOK	278	287	U	3		T?0606?	
HS200316-109-1-124-003	CHINOOK	250	216	M	1.82			AD
HS200316-109-1-124-004	CHINOOK	246	215	M	3.31			
HS200316-109-1-124-005	CHINOOK	283	296	F	1.36			AD
HS200316-109-1-124-006	CHINOOK	251	205	M	2.26			AD
HS200316-109-1-124-007	CHINOOK	262		U	1.9			
HS200316-109-2-124-001	CHINOOK	245	182	U	1.31	1.0	T093660	AD
HS200316-109-2-124-002	CHINOOK	244	212	M	3.29			AD
HS200316-109-2-124-003	CHINOOK	242	179	F	2.25			AD
HS200316-109-2-124-004	CHINOOK	238	165	U	0.35	1.0	T631448	
HS200316-109-2-124-005	CHINOOK	258	218	M	3.77			AD
HS200316-109-2-124-006	CHINOOK	241	184	M	1.53			AD
HS200316-109-2-124-007	CHINOOK	244	200	U	1.18			AD
HS200316-109-2-124-008	CHINOOK	246	193	F	1.56			AD
HS200316-109-2-124-009	CHINOOK	254	204	U	2.57	1.0	T054033	AD
HS200316-109-2-124-010	CHINOOK	246	197	U	08 7	1.0	T054448	AD
HS200316-109-2-124-011	CHINOOK	245	196	M	4.05			AD
HS200316-109-2-124-012	CHINOOK	234	159	F	2.87			AD
HS200316-109-2-124-013	CHINOOK	234	163	M	0.88			
HS200316-109-2-124-014	CHINOOK	252	203	F	1.35			
HS200316-109-2-124-015	CHINOOK	264	239	U	0.39	1.0	T093530	AD
HS200316-109-2-124-016	CHINOOK	239	176	M	0.51			
HS200316-109-2-124-017	CHINOOK	256	211	F	1.81			AD
HS200316-109-2-124-018	CHINOOK	237	169	F	1.73			
HS200316-109-2-124-019	CHINOOK	230	155	M	1.87			
HS200316-109-2-124-020	CHINOOK	245	197	F	1.25			AD
HS200316-109-2-124-021	CHINOOK	231	158	M	1.03			AD
HS200316-109-3-124-001	CHINOOK	261	220	U	1.93	1.0	T108773	AD
HS200316-109-3-124-002	CHINOOK	265	250	U	0.67			
HS200316-109-3-124-003	CHINOOK	267	258	U	5.14		T093555	
HS200316-109-3-124-004	CHINOOK	270	254	U	4.24	1.0	T093642	AD
HS200316-109-3-124-005	CHINOOK	290	298	U	0.55			AD
HS200316-109-3-124-006	CHINOOK	260	216	U	1.09			AD
HS200316-109-1-112-001	CHUM	181	60					
HS200316-109-1-112-002	CHUM	186	66					
HS200316-109-1-112-003	CHUM	220	98					
HS200316-109-1-112-004	CHUM	156	36					
HS200316-109-1-112-005	CHUM	220	80					

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-112-006	CHUM	193	66					
HS200316-109-1-112-007	CHUM	175	56					
HS200316-109-1-112-008	CHUM	158	42					
HS200316-109-1-112-009	CHUM	270	82					
HS200316-109-1-112-010	CHUM	193	76					
HS200316-109-1-112-011	CHUM	182	62					
HS200316-109-1-112-012	CHUM	250	88					
HS200316-109-1-112-013	CHUM	190	74					
HS200316-109-1-112-014	CHUM	182	64					
HS200316-109-1-112-015	CHUM	200	82					
HS200316-109-1-112-016	CHUM	154						
HS200316-109-1-112-017	CHUM	183						
HS200316-109-1-112-018	CHUM	175						
HS200316-109-1-112-019	CHUM	206						
HS200316-109-1-112-020	CHUM	188						
HS200316-109-1-112-021	CHUM	187						
HS200316-109-1-112-022	CHUM	196						
HS200316-109-2-112-001	CHUM	177	60					
HS200316-109-2-112-002	CHUM	186	60					
HS200316-109-2-112-003	CHUM	158	42					
HS200316-109-2-112-004	CHUM	169	46					
HS200316-109-2-112-005	CHUM	185	63					
HS200316-109-2-112-006	CHUM	179	58					
HS200316-109-2-112-007	CHUM	184	61					
HS200316-109-2-112-008	CHUM	178	59					
HS200316-109-2-112-009	CHUM	184	60					
HS200316-109-2-112-010	CHUM	183	58					
HS200316-109-2-112-011	CHUM	187	66					
HS200316-109-2-112-012	CHUM	165	49					
HS200316-109-2-112-013	CHUM	211	91					
HS200316-109-1-115-001	COHO	258	204	M	6.36			AD
HS200316-109-1-115-002	COHO	292	294	M	2.67			
HS200316-109-1-115-003	COHO	262	232	F	4.07			
HS200316-109-1-115-004	COHO	287	318	PM	9.5			
HS200316-109-1-115-005	COHO	244	184	M	6.99			
HS200316-109-1-115-006	COHO	262	224	M	1.02	1.0	T631533	AD
HS200316-109-1-115-007	COHO	275	276	F	4.59			
HS200316-109-1-115-008	COHO	264	222	PM	2.51			
HS200316-109-1-115-009	COHO	255	206	M	2.37			

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-115-010	COHO	260	218	F	12.46			
HS200316-109-1-115-011	COHO	260	218	F	4.73			
HS200316-109-1-115-012	COHO	307	350	M	10.42			
HS200316-109-1-115-013	COHO	267	246	M	10.92	1.0	T631191	
HS200316-109-1-115-014	COHO	284	302	M	13.42			
HS200316-109-1-115-015	COHO	238	166	F	3.26			
HS200316-109-1-115-016	COHO	255	196	M	4.67			
HS200316-109-1-115-017	COHO	270	240	M	3.82			
HS200316-109-1-115-018	COHO	264	238	F	2.9			
HS200316-109-1-115-019	COHO	270	240	M	3.72			
HS200316-109-1-115-020	COHO	246	186	M	6.95			
HS200316-109-1-115-021	COHO	257	226	M	8.36			
HS200316-109-1-115-022	COHO	265	220	M	2.16			
HS200316-109-1-115-023	COHO	260	216	M	5.32			
HS200316-109-1-115-024	COHO	275	262	M	3.73			
HS200316-109-1-115-025	COHO	266	232	F	6.51			
HS200316-109-1-115-026	COHO		2300	M				
HS200316-109-2-115-001	COHO	260	231	F	3.41			
HS200316-109-2-115-002	COHO	295	319	F	0.66			
HS200316-109-2-115-003	COHO	292	310	M	6.04			AD
HS200316-109-2-115-004	COHO	266	232	M	3.49			
HS200316-109-2-115-005	COHO	265	247	F	1.52			
HS200316-109-2-115-006	COHO	271	242	F	3.52			AD
HS200316-109-2-115-007	COHO	262	218	M	2.37			
HS200316-109-2-115-008	COHO	296	343	M	7.48			
HS200316-109-2-115-009	COHO	272	266	F	3.96			
HS200316-109-2-115-010	COHO	243	196	M	1.49			
HS200316-109-2-115-011	COHO	274	292	M	85.4			AD
HS200316-109-2-115-012	COHO	303	340	M	1.28			AD
HS200316-109-2-115-013	COHO	276	244	M	3.66			
HS200316-109-2-115-014	COHO	239	173	F	3.86			
HS200316-109-2-115-015	COHO	259	219	F	2.51			
HS200316-109-2-115-016	COHO	275	269	M	2.9			
HS200316-109-2-115-017	COHO	264	226	M	2.34			AD
HS200316-109-2-115-018	COHO	274	261	M	5.35			
HS200316-109-2-115-019	COHO	287	290	M	7.02			
HS200316-109-2-115-020	COHO	289	321	F	2.2			
HS200316-109-2-115-021	COHO	280	282	F	5.61			
HS200316-109-2-115-022	COHO	275	269	F	1.19			

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-2-115-023	COHO	232	159	M	3.24			
HS200316-109-2-115-024	COHO	324	428	PM	2.86			
HS200316-109-2-115-025	COHO	260	239	F	1.2			
HS200316-109-2-115-026	COHO	291	304	F	7.91			AD
HS200316-109-2-115-027	COHO	281	227	M	3.76			
HS200316-109-2-115-028	COHO	251	215	M	3.55			
HS200316-109-2-115-029	COHO	271	257	F	0.97		T050969	
HS200316-109-2-115-030	COHO	283	297	M	6.03			
HS200316-109-2-115-031	COHO	682	4500	M				
HS200316-109-2-115-032	COHO	255						
HS200316-109-2-115-033	COHO	265						
HS200316-109-2-115-034	COHO	265						
HS200316-109-2-115-035	COHO	265						
HS200316-109-2-115-036	COHO	265						
HS200316-109-2-115-037	COHO	275						
HS200316-109-2-115-038	COHO	275						
HS200316-109-2-115-039	COHO	275						
HS200316-109-2-115-040	COHO	275						
HS200316-109-2-115-041	COHO	285						
HS200316-109-2-115-042	COHO	295						
HS200316-109-2-115-043	COHO	315						
HS200316-109-3-115-001	COHO	290	310	M	12.67			AD
HS200316-109-3-115-002	COHO	256	210	F	9.1			
HS200316-109-3-115-003	COHO	283	276	F	10.69			
HS200316-109-3-115-004	COHO	275	256	F	3.78			
HS200316-109-3-115-005	COHO	305	346	M	10.23			AD
HS200316-109-3-115-006	COHO	293	294	M	14.07			AD
HS200316-109-3-115-007	COHO	270	244	F	10.46			
HS200316-109-3-115-008	COHO	275	254	F	7.66	1.0	T631367	AD
HS200316-109-3-115-009	COHO	262	236	M	1.37			AD
HS200316-109-3-115-010	COHO	308	392	F	9.26			AD
HS200316-109-3-115-011	COHO	307	330	F	3.24			AD
HS200316-109-3-115-012	COHO	314	372	F	14.24			
HS200316-109-3-115-013	COHO	296	318	M	2.95			
HS200316-109-3-115-014	COHO	296	326	F	7			AD
HS200316-109-3-115-015	COHO	292	324	M	11.23			
HS200316-109-3-115-016	COHO	260	234	F	14.74			AD
HS200316-109-3-115-017	COHO	284	282	M	11.85			
HS200316-109-3-115-018	COHO	287	312	F	1.66			

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-1093-115-019	COHO	285	312	M	11.73			
HS200316-1093-115-020	COHO	263	232	M	11.82			
HS200316-1093-115-021	COHO	274	244	F	6.27			
HS200316-1093-115-022	COHO	256	206	M	6.11			
HS200316-1093-115-023	COHO	316	380	PM	0.08			
HS200316-1093-115-024	COHO	311	384	F	9.28			AD
HS200316-1093-115-025	COHO	273	257	F	8.56			
HS200316-1093-115-026	COHO	292	330	M	8.83			
HS200316-1093-115-027	COHO	281	297	F	10.77			
HS200316-1093-115-028	COHO	283	302	F	11.98			
HS200316-1093-115-029	COHO	258	220	M	7.02			
HS200316-1093-115-030	COHO	256	210	M	10.18			
HS200316-1093-115-031	COHO	686	5030	F				
HS200316-1093-115-032	COHO	683	4308	M				
HS200316-1093-115-033	COHO	695	4846	M				
HS200316-1093-115-034	COHO	662	4044	M				
HS200316-1093-115-035	COHO	278	267					
HS200316-1093-115-036	COHO	312	283					
HS200316-1093-115-037	COHO	294	296					
HS200316-1093-115-038	COHO	291	304					
HS200316-1094-115-001	COHO	305	332	M	3.58			
HS200316-1094-115-002	COHO	661	3670	F				
HS200316-1094-115-003	COHO	682	4082	F				
HS200316-1094-115-004	COHO	672	3956	M				
HS200316-1094-115-005	COHO	697	5060	M				
HS200316-1098-115-001	COHO	318	436	PM	11.7			
HS200316-1091-108-001	PINK	220	90					
HS200316-1091-108-002	PINK	160	46					
HS200316-1091-108-003	PINK	157	36					
HS200316-1091-108-004	PINK	205	82					
HS200316-1091-108-005	PINK	157	36					
HS200316-1091-108-006	PINK	208	92					
HS200316-1091-108-007	PINK	177	60					
HS200316-1091-108-008	PINK	168	48					
HS200316-1091-108-009	PINK	185	66					
HS200316-1091-108-010	PINK	165	48					
HS200316-1091-108-011	PINK	175	54					
HS200316-1091-108-012	PINK	203	126					
HS200316-1091-108-013	PINK	155	38					

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-108-014	PINK	163	48					
HS200316-109-1-108-015	PINK	152	32					
HS200316-109-1-108-016	PINK		1820					
HS200316-109-1-108-017	PINK	135						
HS200316-109-1-108-018	PINK	145						
HS200316-109-1-108-019	PINK	145						
HS200316-109-1-108-020	PINK	145						
HS200316-109-1-108-021	PINK	145						
HS200316-109-1-108-022	PINK	145						
HS200316-109-1-108-023	PINK	155						
HS200316-109-1-108-024	PINK	155						
HS200316-109-1-108-025	PINK	155						
HS200316-109-1-108-026	PINK	155						
HS200316-109-1-108-027	PINK	155						
HS200316-109-1-108-028	PINK	155						
HS200316-109-1-108-029	PINK	155						
HS200316-109-1-108-030	PINK	155						
HS200316-109-1-108-031	PINK	155						
HS200316-109-1-108-032	PINK	155						
HS200316-109-1-108-033	PINK	155						
HS200316-109-1-108-034	PINK	165						
HS200316-109-1-108-035	PINK	165						
HS200316-109-1-108-036	PINK	165						
HS200316-109-1-108-037	PINK	165						
HS200316-109-1-108-038	PINK	165						
HS200316-109-1-108-039	PINK	165						
HS200316-109-1-108-040	PINK	165						
HS200316-109-1-108-041	PINK	165						
HS200316-109-1-108-042	PINK	165						
HS200316-109-1-108-043	PINK	165						
HS200316-109-1-108-044	PINK	165						
HS200316-109-1-108-045	PINK	165						
HS200316-109-1-108-046	PINK	165						
HS200316-109-1-108-047	PINK	165						
HS200316-109-1-108-048	PINK	165						
HS200316-109-1-108-049	PINK	165						
HS200316-109-1-108-050	PINK	165						
HS200316-109-1-108-051	PINK	165						
HS200316-109-1-108-052	PINK	165						

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-108-053	PINK	165						
HS200316-109-1-108-054	PINK	165						
HS200316-109-1-108-055	PINK	165						
HS200316-109-1-108-056	PINK	165						
HS200316-109-1-108-057	PINK	165						
HS200316-109-1-108-058	PINK	165						
HS200316-109-1-108-059	PINK	165						
HS200316-109-1-108-060	PINK	165						
HS200316-109-1-108-061	PINK	175						
HS200316-109-1-108-062	PINK	175						
HS200316-109-1-108-063	PINK	175						
HS200316-109-1-108-064	PINK	175						
HS200316-109-1-108-065	PINK	175						
HS200316-109-1-108-066	PINK	175						
HS200316-109-1-108-067	PINK	175						
HS200316-109-1-108-068	PINK	175						
HS200316-109-1-108-069	PINK	175						
HS200316-109-1-108-070	PINK	175						
HS200316-109-1-108-071	PINK	175						
HS200316-109-1-108-072	PINK	175						
HS200316-109-1-108-073	PINK	175						
HS200316-109-1-108-074	PINK	175						
HS200316-109-1-108-075	PINK	175						
HS200316-109-1-108-076	PINK	175						
HS200316-109-1-108-077	PINK	175						
HS200316-109-1-108-078	PINK	175						
HS200316-109-1-108-079	PINK	175						
HS200316-109-1-108-080	PINK	175						
HS200316-109-1-108-081	PINK	175						
HS200316-109-1-108-082	PINK	175						
HS200316-109-1-108-083	PINK	185						
HS200316-109-1-108-084	PINK	185						
HS200316-109-1-108-085	PINK	185						
HS200316-109-1-108-086	PINK	185						
HS200316-109-1-108-087	PINK	185						
HS200316-109-1-108-088	PINK	185						
HS200316-109-1-108-089	PINK	185						
HS200316-109-1-108-090	PINK	185						
HS200316-109-1-108-091	PINK	185						

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-108-092	PINK	185						
HS200316-109-1-108-093	PINK	185						
HS200316-109-1-108-094	PINK	185						
HS200316-109-1-108-095	PINK	185						
HS200316-109-1-108-096	PINK	185						
HS200316-109-1-108-097	PINK	185						
HS200316-109-1-108-098	PINK	185						
HS200316-109-1-108-099	PINK	195						
HS200316-109-1-108-100	PINK	195						
HS200316-109-1-108-101	PINK	195						
HS200316-109-1-108-102	PINK	195						
HS200316-109-1-108-103	PINK	195						
HS200316-109-1-108-104	PINK	195						
HS200316-109-1-108-105	PINK	195						
HS200316-109-1-108-106	PINK	195						
HS200316-109-1-108-107	PINK	195						
HS200316-109-1-108-108	PINK	195						
HS200316-109-1-108-109	PINK	205						
HS200316-109-1-108-110	PINK	205						
HS200316-109-1-108-111	PINK	205						
HS200316-109-1-108-112	PINK	205						
HS200316-109-1-108-113	PINK	205						
HS200316-109-1-108-114	PINK	205						
HS200316-109-1-108-115	PINK	205						
HS200316-109-1-108-116	PINK	205						
HS200316-109-1-108-117	PINK	205						
HS200316-109-1-108-118	PINK	205						
HS200316-109-1-108-119	PINK	205						
HS200316-109-1-108-120	PINK	215						
HS200316-109-1-108-121	PINK	215						
HS200316-109-1-108-122	PINK	225						
HS200316-109-2-108-001	PINK	198	77					
HS200316-109-2-108-002	PINK	187	68					
HS200316-109-2-108-003	PINK	178	55					
HS200316-109-2-108-004	PINK	176	53					
HS200316-109-2-108-005	PINK	179	56					
HS200316-109-2-108-006	PINK	181	57					
HS200316-109-2-108-007	PINK	189	70					
HS200316-109-2-108-008	PINK	176	67					

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-2-108-009	PINK	191	69					
HS200316-109-2-108-010	PINK	194	73					
HS200316-109-2-108-011	PINK	199	82					
HS200316-109-2-108-012	PINK	175	56					
HS200316-109-2-108-013	PINK	180	59					
HS200316-109-2-108-014	PINK	170	47					
HS200316-109-2-108-015	PINK	184	61					
HS200316-109-2-108-016	PINK	155						
HS200316-109-2-108-017	PINK	175						
HS200316-109-2-108-018	PINK	175						
HS200316-109-2-108-019	PINK	175						
HS200316-109-2-108-020	PINK	175						
HS200316-109-2-108-021	PINK	175						
HS200316-109-2-108-022	PINK	175						
HS200316-109-2-108-023	PINK	185						
HS200316-109-2-108-024	PINK	185						
HS200316-109-2-108-025	PINK	185						
HS200316-109-2-108-026	PINK	185						
HS200316-109-2-108-027	PINK	185						
HS200316-109-2-108-028	PINK	185						
HS200316-109-2-108-029	PINK	185						
HS200316-109-2-108-030	PINK	185						
HS200316-109-2-108-031	PINK	185						
HS200316-109-2-108-032	PINK	185						
HS200316-109-2-108-033	PINK	185						
HS200316-109-2-108-034	PINK	185						
HS200316-109-2-108-035	PINK	195						
HS200316-109-2-108-036	PINK	195						
HS200316-109-2-108-037	PINK	195						
HS200316-109-2-108-038	PINK	195						
HS200316-109-2-108-039	PINK	195						
HS200316-109-2-108-040	PINK	195						
HS200316-109-2-108-041	PINK	195						
HS200316-109-2-108-042	PINK	195						
HS200316-109-2-108-043	PINK	195						
HS200316-109-2-108-044	PINK	205						
HS200316-109-2-108-045	PINK	215						
HS200316-109-2-108-046	PINK	215						
HS200316-109-1-118-001	SOCKEYE	175	60	F	1.19			

Table 2. Biological data collected for each salmon caught on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

Fish Number	Species	Fork Length	Whole Body Weight (g wet)	Sex	Stomach Content Weight (g wet)	CWT age	CWT	Fin Clip
HS200316-109-1-118-002	SOCKEYE	174	53	M	1.33			
HS200316-109-1-118-003	SOCKEYE	173	43	M	1.04			
HS200316-109-1-118-004	SOCKEYE	163	44	M	1.35			
HS200316-109-1-118-005	SOCKEYE	160	40	F	1.22			
HS200316-109-1-118-006	SOCKEYE	164	45	M	1.17			
HS200316-109-1-118-007	SOCKEYE	180	53	M	0.91			
HS200316-109-1-118-008	SOCKEYE	185	68	M	2.68			
HS200316-109-1-118-009	SOCKEYE	170	51	F	0.91			
HS200316-109-1-118-010	SOCKEYE	167	45	M	0.33			
HS200316-109-1-118-011	SOCKEYE	179	60	F	0.91			
HS200316-109-1-118-012	SOCKEYE	166	49	M	1.6			
HS200316-109-1-118-013	SOCKEYE	169	55	M	1.52			
HS200316-109-1-118-014	SOCKEYE	180	61	F	1			
HS200316-109-1-118-015	SOCKEYE	167	48	F	0.8			
HS200316-109-1-118-016	SOCKEYE	175	56	M	0.68			
HS200316-109-1-118-017	SOCKEYE	158	37	F	1.03			
HS200316-109-1-118-018	SOCKEYE	178	56	M	1.19			
HS200316-109-1-118-019	SOCKEYE	173	51	M	1.81			
HS200316-109-1-118-020	SOCKEYE	171	54	U	1.64			
HS200316-109-1-118-021	SOCKEYE	167	51	M	0.95			
HS200316-109-1-118-022	SOCKEYE	182	61	M	1.79			
HS200316-109-2-118-001	SOCKEYE	198	88	M	0.33			
HS200316-109-2-118-002	SOCKEYE	176	60	M	0.11			
HS200316-109-2-118-003	SOCKEYE	189	69	F	0.74			

Table 3. Physical oceanographic data collected on the *CCGS W.E. RICKER* survey, 27/08/2003.

Station ID	Station Name	Region	Date UTC	Time UTC	Latitude (°N)	Longitude (°W)	Bottom Depth (m)	SST (°C)	SSS (ppt)	NO3 umoles/L	Si umoles/	PO4 umoles/L	Chl A ug/L
HS200316-109-1	FORRESTER IS	SEA	27-Aug-03	13:46	54.794	133.081	192			8.6	23.4	0.99	
HS200316-109-2	FORRESTER IS	SEA	27-Aug-03	17:37	54.776	133.185	198			7.5	22.9	0.93	
HS200316-109-3	FORRESTER IS	SEA	27-Aug-03	19:41	54.761	133.318	128			5.2	20.2	0.8	
HS200316-109-4	FORRESTER IS	SEA	27-Aug-03	21:35	54.752	133.448	145			5	15	0.81	
HS200316-109-6	FORRESTER IS	SEA	27-Aug-03	23:53	54.726	133.711	218			1.4	12.9	0.57	
HS200316-109-7	FORRESTER IS	SEA	28-Aug-03	01:05	54.716	133.842	226			0	12.3	0.47	
HS200316-109-9	FORRESTER IS	SEA	28-Aug-03	03:11	54.693	134.101	222			0	10.3	0.5	
HS200316-109-10	FORRESTER IS	SEA	28-Aug-03	04:54	54.667	134.359	2145			0	10.4	0.45	
HS200316-109-11	FORRESTER IS	SEA	28-Aug-03	06:49	54.641	134.625	2368						

Table 4. Zooplankton data from bongo tows collected on the *CCGS W.E. RICKER* survey , 27/08/2003.

Station ID	Station Name	Region	Latitude (°N)	Longitude (°W)	Date	Time	Target Depth (m)	Tow Duration	Wire Angle (°)	Volume Sieved (cu m)	Plankton Weights by Size Faction (g dry / 1000 cu m)				
											8.0mm	1.7mm	1.0mm	0.25mm	Total
HS200316-109-1	FORRESTER IS	SEA	54.787	133.055	27-Aug-03	07:31	100	00:06		43	0.47	0	0.71	8.47	9.64
HS200316-109-2	FORRESTER IS	SEA	54.777	133.179	27-Aug-03	10:54	150	00:11		45	0	0.22	2.22	6.66	9.1
HS200316-109-3	FORRESTER IS	SEA	54.759	133.311	27-Aug-03	13:00	90	00:07		39	0	0	0	5.84	5.84
HS200316-109-4	FORRESTER IS	SEA	54.754	133.451	27-Aug-03	14:52	125	00:08		38	0.26	1.3	3.12	22.37	27.05
HS200316-109-6	FORRESTER IS	SEA	54.723	133.706	27-Aug-03	17:14	150	00:11		55	0	3.28	4.37	20.77	28.42
HS200316-109-7	FORRESTER IS	SEA	54.717	133.848	27-Aug-03	18:22	150	00:11		49	0	5.33	3.49	20.09	28.91
HS200316-109-9	FORRESTER IS	SEA	54.695	134.100	27-Aug-03	20:29	150	00:13		54	0	3.14	4.25	7.21	14.61
HS200316-109-10	FORRESTER IS	SEA	54.666	134.360	27-Aug-03	22:15	150	00:10		52	0.58	6.97	0.58	14.33	22.46

Table 5. Coded Wire Tag (CWT) data collected on the CCGS W.E. RICKER survey to the Gulf of Alaska, 27/08/2003.

CWT	Fish Number	Species	Recovery Date	Recovery Region	Recovery Fork Length (mm)	Release Area	Release Agency	Hatchery	Brood Year	Date of First Release	Date of Last Release	Age
T054033	HS200316109-2-124-009	CHINOOK	27-Aug-03	SEA	254	CECR	FWS	CARSON NFH	2001	16-Apr-03	16-Apr-03	1.0
T054448	HS200316109-2-124-010	CHINOOK	27-Aug-03	SEA	246	CECR	FWS	WARM SPRINGS NFH	2001	16-Apr-03	16-Apr-03	1.0
T093530	HS200316109-2-124-015	CHINOOK	27-Aug-03	SEA	264	LOCR	ODFW	WILLAMETTE	2001		25-Feb-03	1.0
T093642	HS200316109-3-124-004	CHINOOK	27-Aug-03	SEA	270	SNAK	ODFW	IRRIGON	2001	01-Apr-03	15-Apr-03	1.0
T093660	HS200316109-2-124-001	CHINOOK	27-Aug-03	SEA	245	SNAK	ODFW	IRRIGON	2001	01-Apr-03	15-Apr-03	1.0
T108773	HS200316109-3-124-001	CHINOOK	27-Aug-03	SEA	261	SNAK	IDFG	RAPID R	2001	17-Mar-03	25-Apr-03	1.0
T631448	HS200316109-2-124-004	CHINOOK	27-Aug-03	SEA	238	UPCR	WDFW	CHIWAWA	2001	21-Apr-03	30-Apr-03	1.0
T631191	HS200316109-1-115-013	COHO	27-Aug-03	SEA	267	LOCR	WDFW	LEWIS R	2001	07-May-03	10-May-03	1.0
T631367	HS200316109-3-115-008	COHO	27-Aug-03	SEA	275	LOCR	WDFW	LEWIS R	2001	07-May-03	10-May-03	1.0
T631533	HS200316109-1-115-006	COHO	27-Aug-03	SEA	262	WILP	WDFW	FORKS CR	2001	01-Apr-03	09-Apr-03	1.0

RELEASE AGENCIES:

FWS	U.S. Fisheries and Wildlife Service
IDGF	Idaho Department of Fish and Game
ODFW	Oregon Department of Fish and Wildlife
WDFW	Washington Department of Fish and Wlidlife

RELEASE AREAS

CECR	Central Columbia River
LOCR	Lower Columbia River
WILP	Willipa River, Washington
SNAK	Snake River

Table 6. Pit tag data collected for chinook salmon caught on the *CCGS W.E. RICKER* survey , 27/08/2003.

PIT	CWT	Fish Number	Recovery Date	Recovery Region	Recovery Fork Length (mm)	Release Site	Columbia R, basin km upstream	Release Date	Interrogation sites	
3D9.1BF185B897		HS200316-109-3-124-006	27-AUG-2003	SEA	260	LEAV	800	21-APR-2003 12:00:00		
3D9.1BF171D7B8		HS200316-109-2-124-006	27-AUG-2003	SEA	241	RAPH	978	17-MAR-2003 08:00:00	RPJ	GRJ
3D9.1BF1856548		HS200316-109-2-124-002	27-AUG-2003	SEA	244	LEAV	800	21-APR-2003 12:00:00	MCJ	
3D9.1BF16F22EE	T093660	HS200316-109-2-124-001	27-AUG-2003	SEA	245	IMNAHW	904	01-APR-2003 10:00:00	GOJ	

RRELEASE SITES

LEAV – LEAVENWORTH NATIONAL FISH HATCHERY
RAPH – RAPID RIVER HATCHERY
IMNAHW – IMNAHA RIVER WIER

INTERROGATION SITES

RPJ – RAPID RIVER JUVENILE TRAP
GRJ – LOWER GRANITE DAM
MCJ – MCNARY DAM
GOJ – LITTLE GOOSE DAM

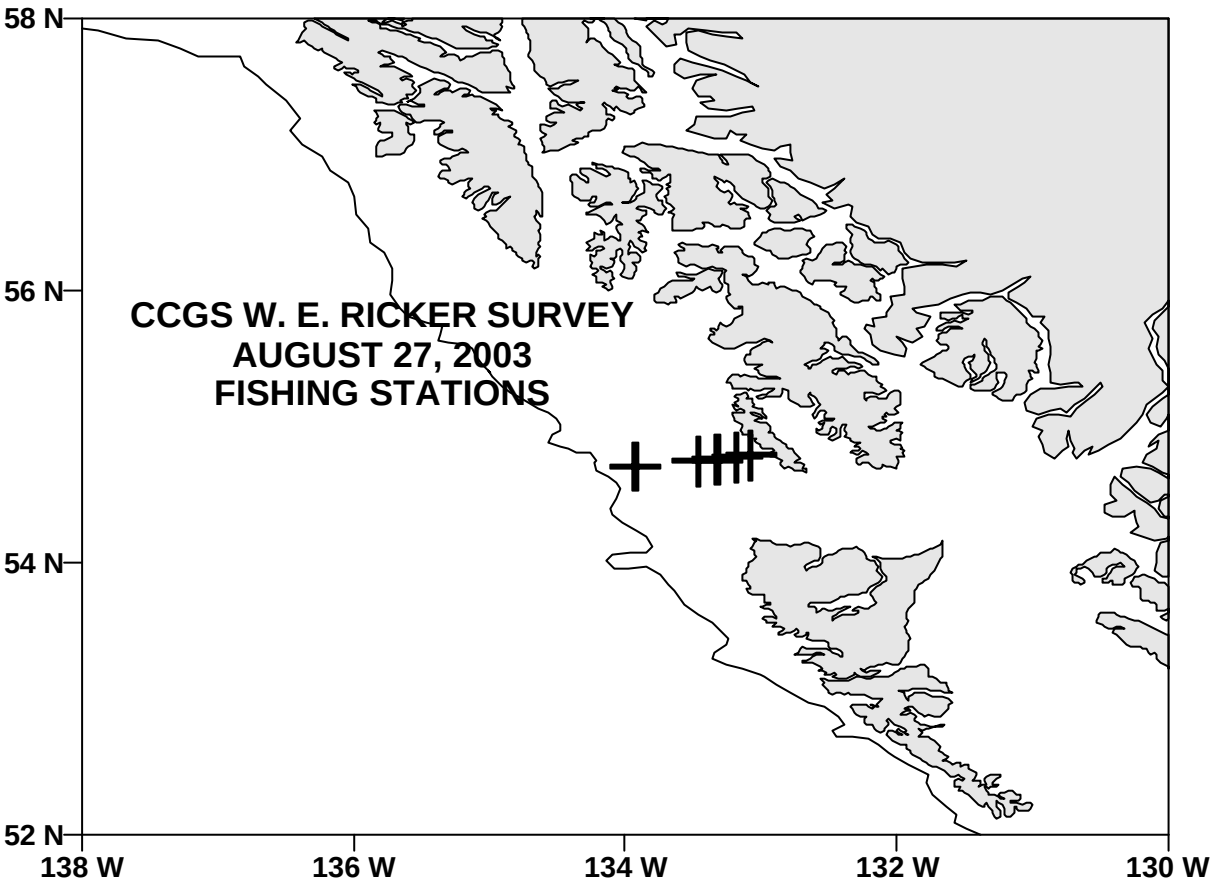

Figure 1. Fishing stations on the *CCGS W. E. Ricker* survey, August 27, 2003.

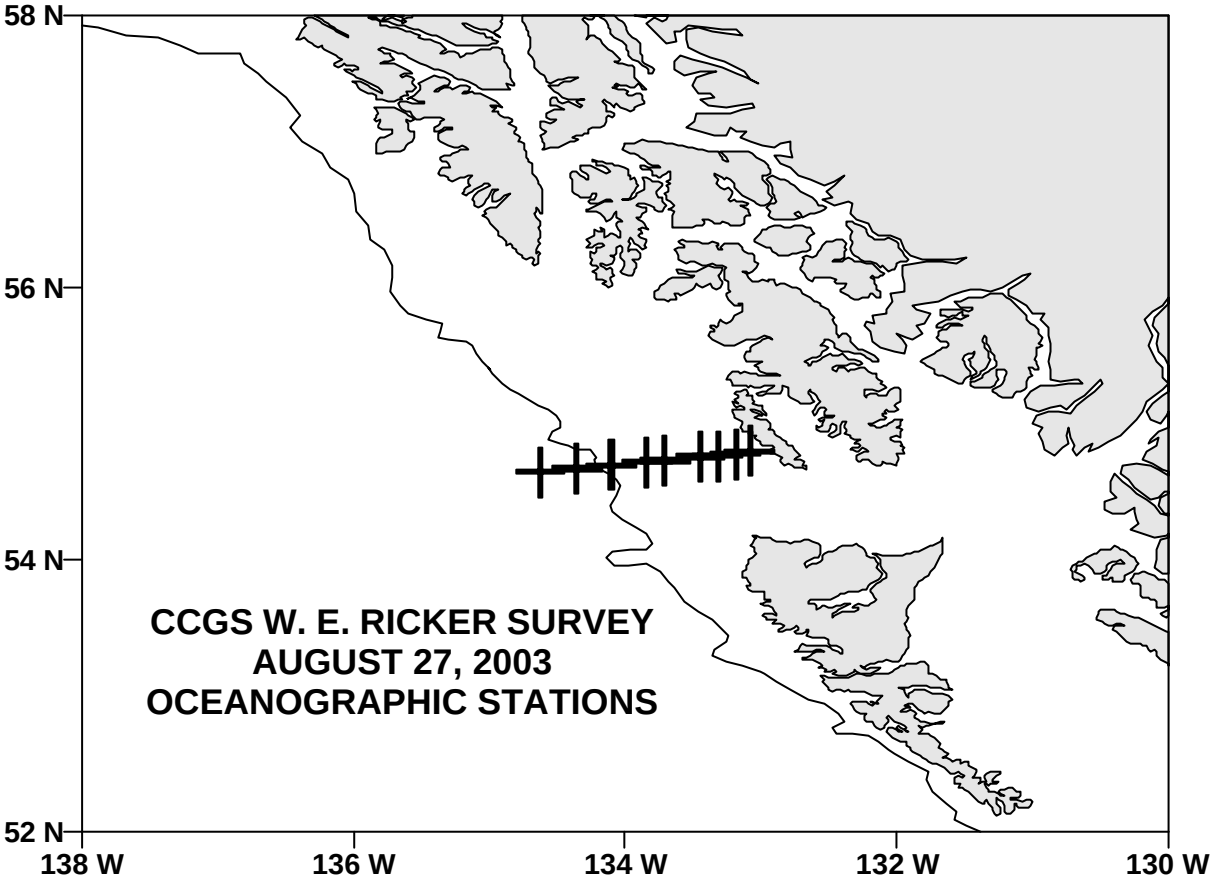

Figure 2. Oceanographic stations on the *CCGS W. E. Ricker* survey, August 27, 2003.

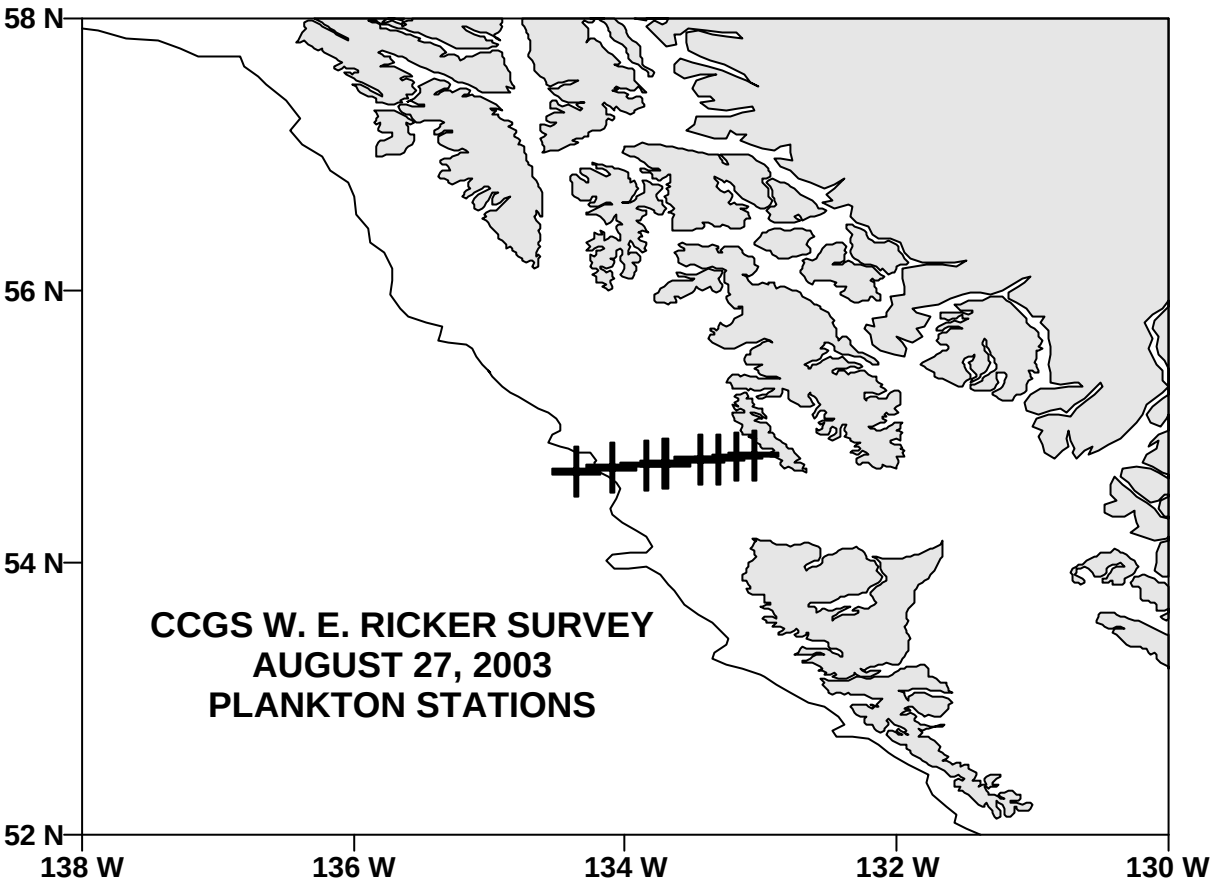

Figure 3. Plankton stations on the *CCGS W. E. Ricker* survey, August 27, 2003.

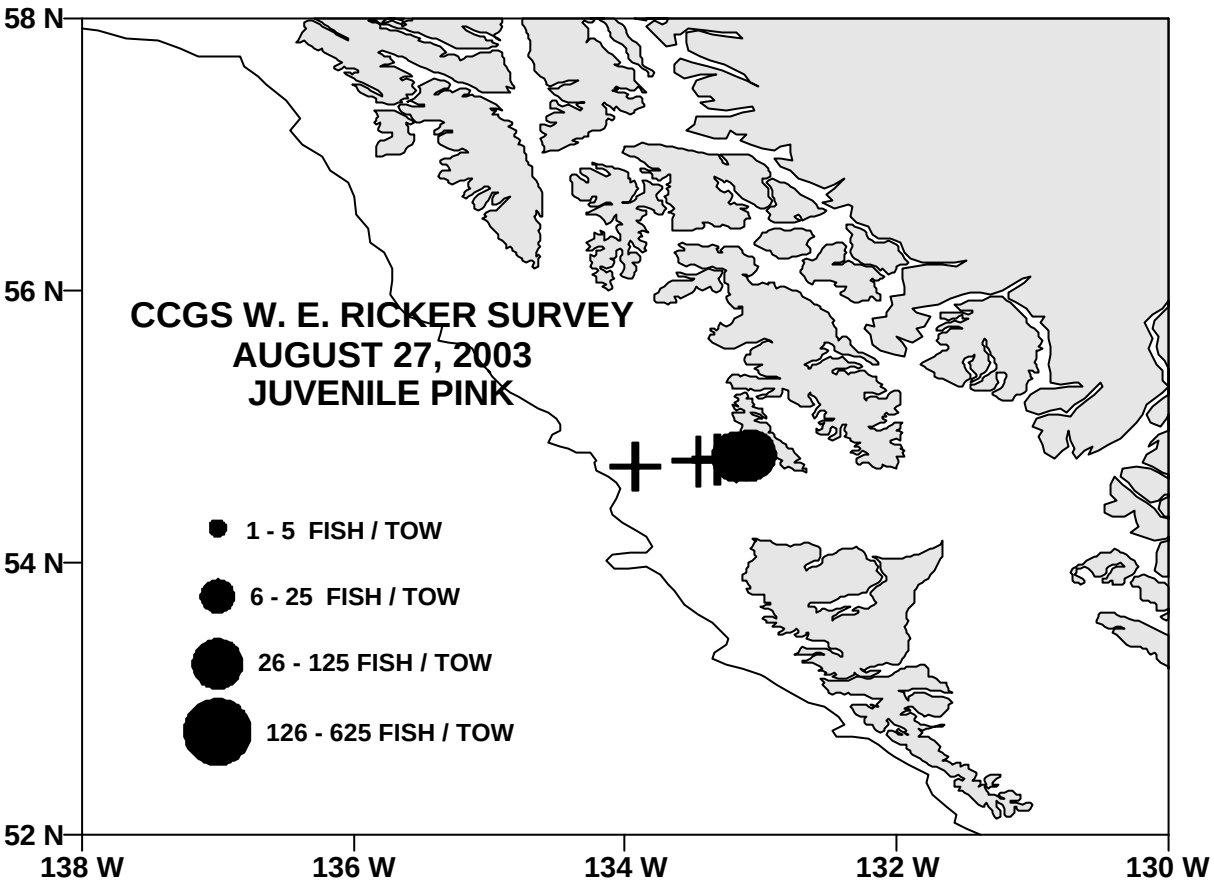

Figure 4. Distribution of juvenile (age 0.0) pink salmon catches. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

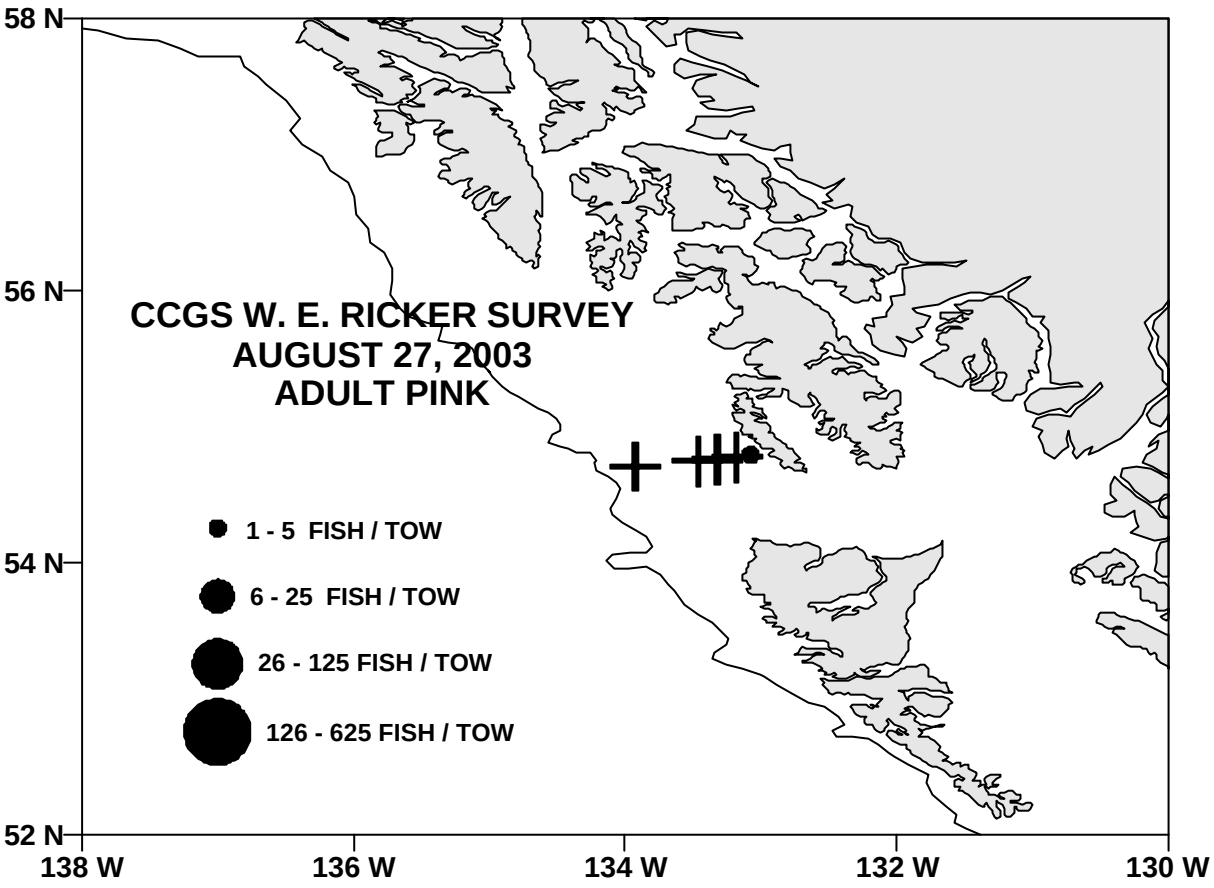

Figure 5. Distribution of adult (age 0.1) pink salmon catches. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

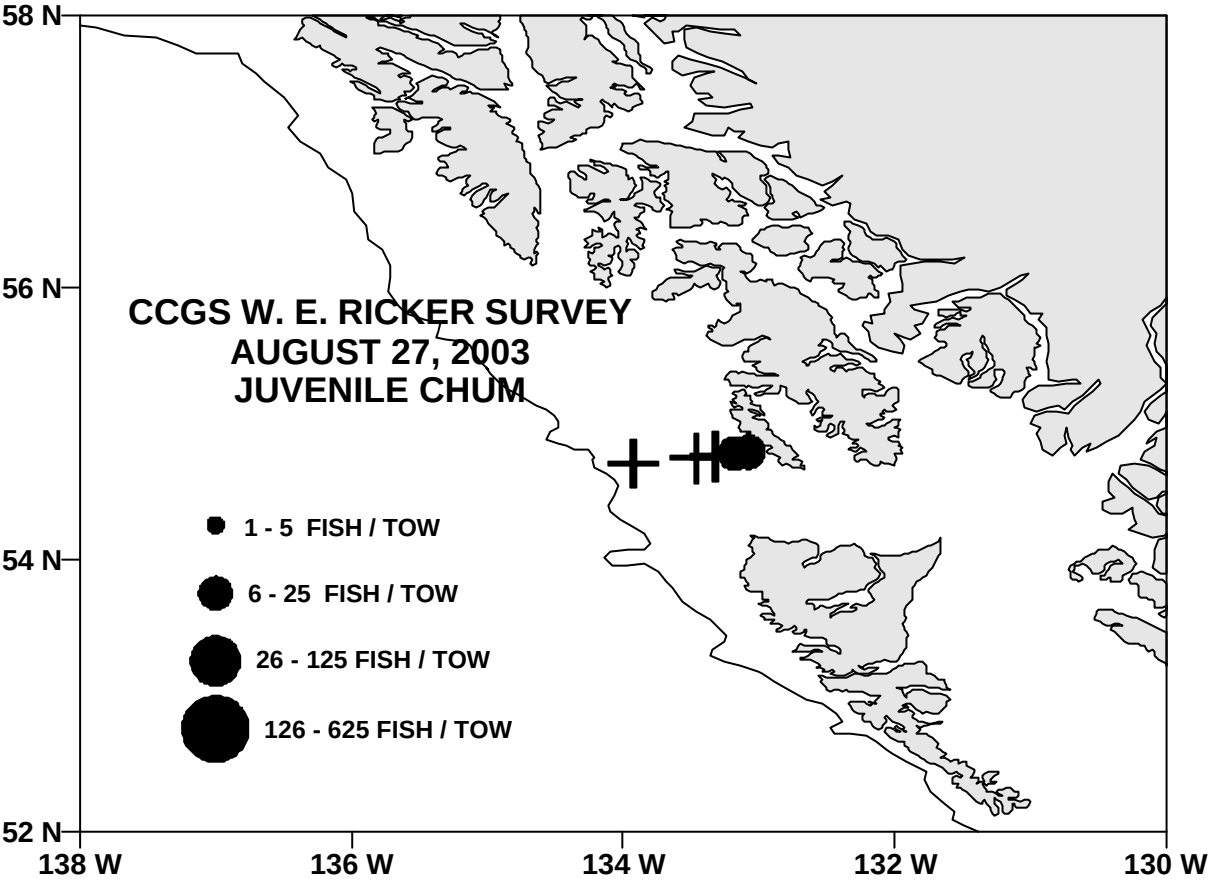

Figure 6. Distribution of juvenile (age 0.0) chum salmon catches. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+)

.

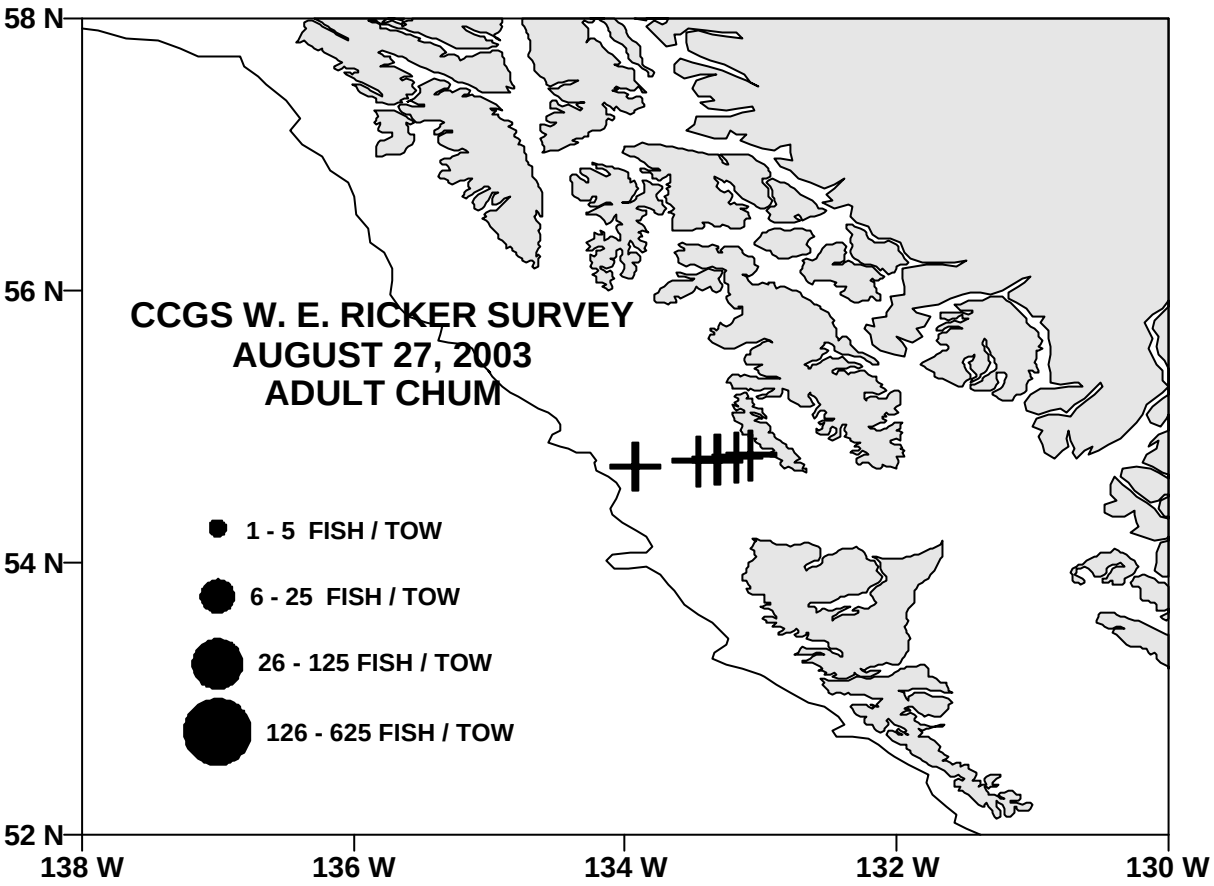

Figure 7. Distribution of adult chum salmon catches. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

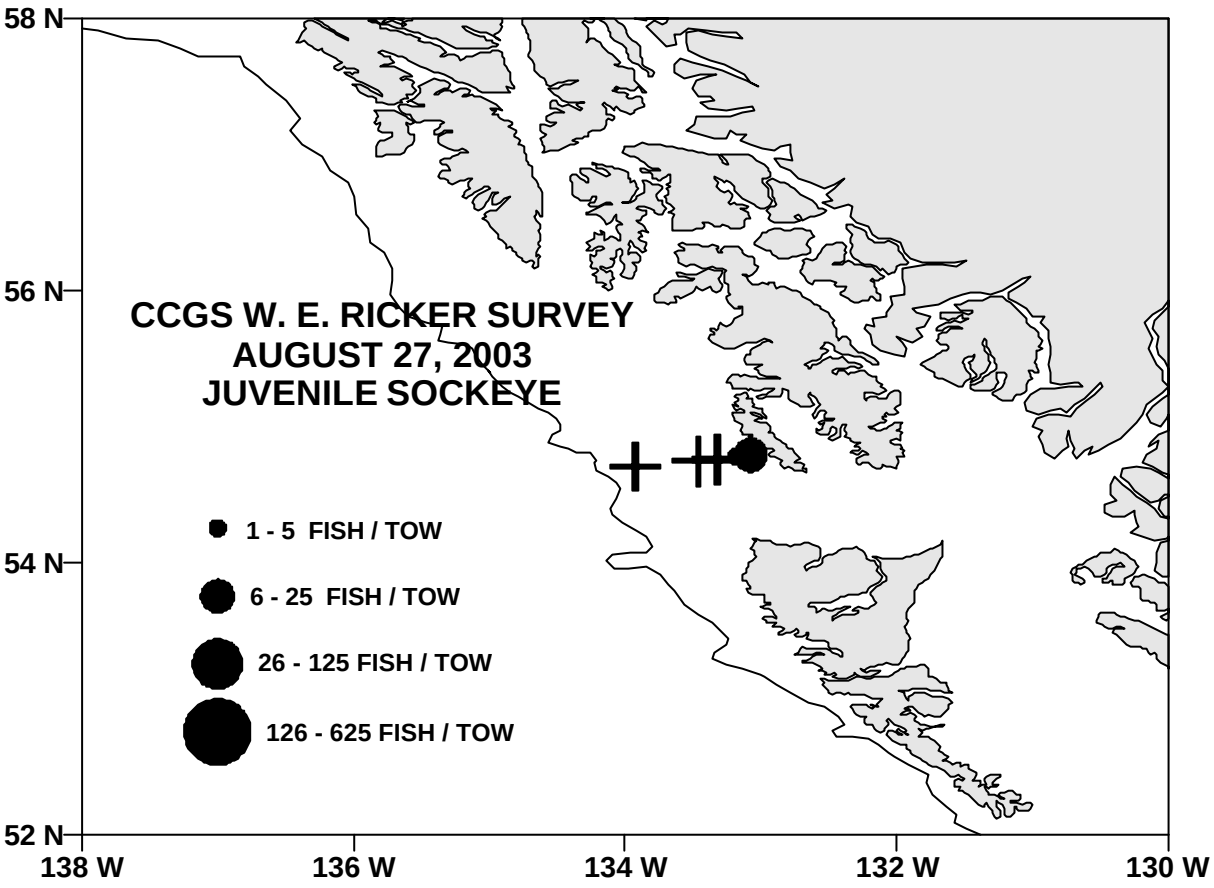

Figure 8. Distribution of juvenile (age X.0) sockeye salmon catches. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

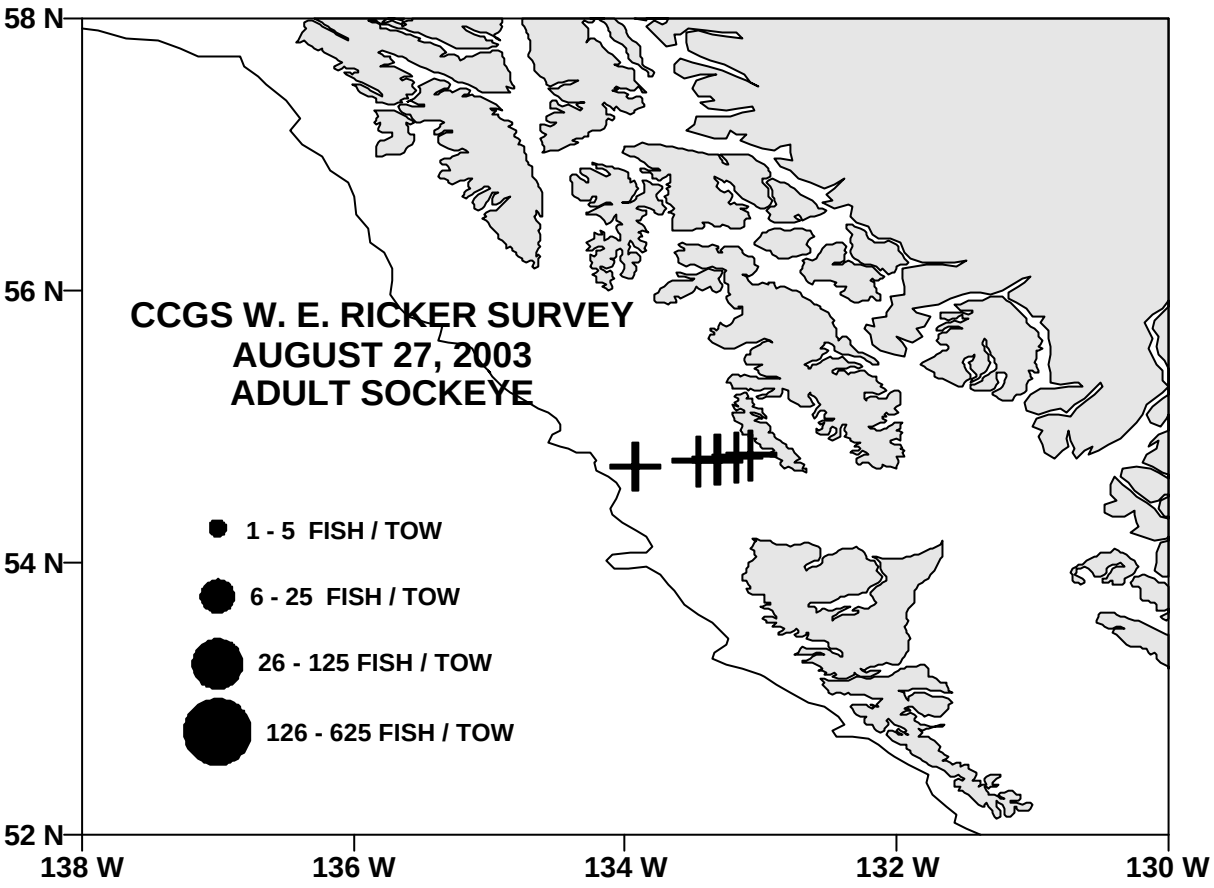

Figure 9. Distribution of adult sockeye salmon catches. Symbol size (?) is proportional to catch per tow, zero catches are shown by a (+).

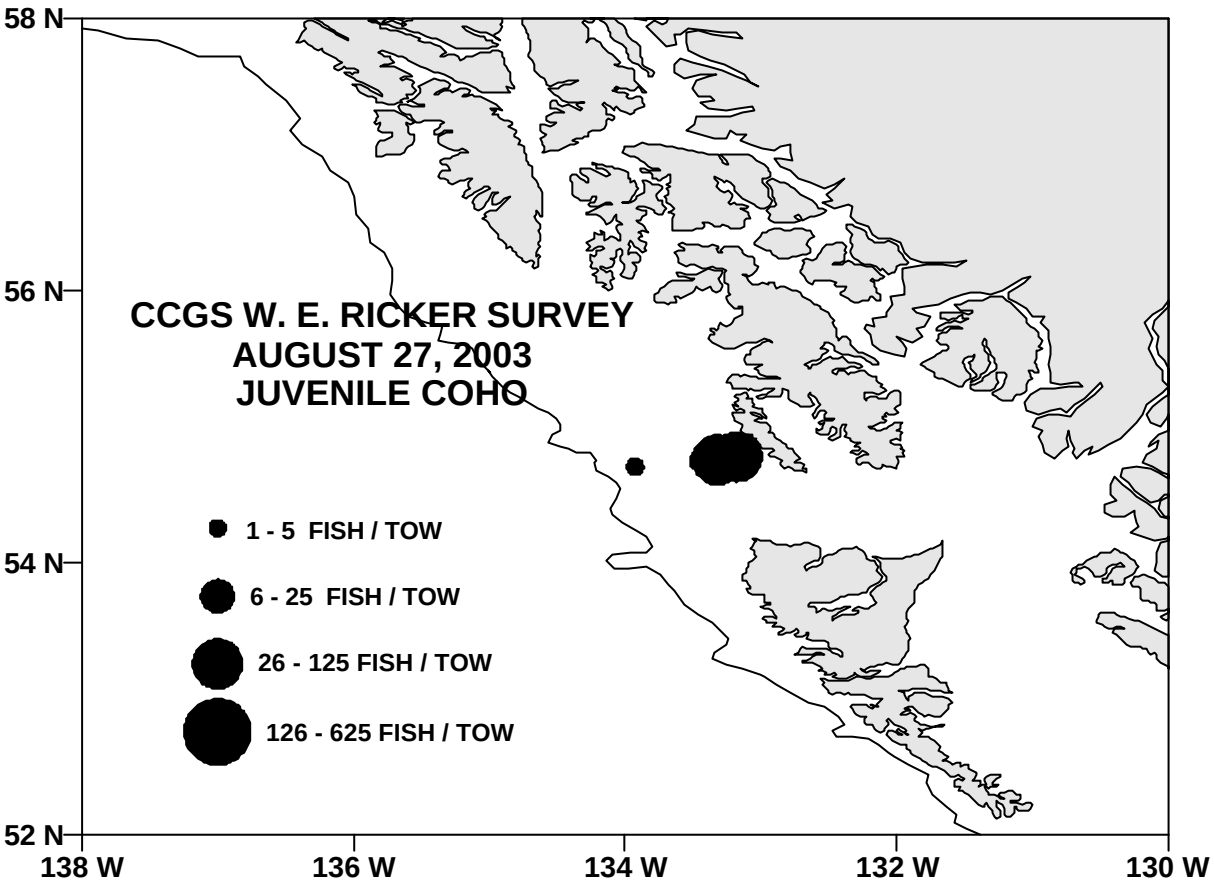

Figure 10. Distribution of juvenile (age X.0) coho salmon catches. Symbol size (?) is proportional to catch per tow, zero catches are shown by a (+).

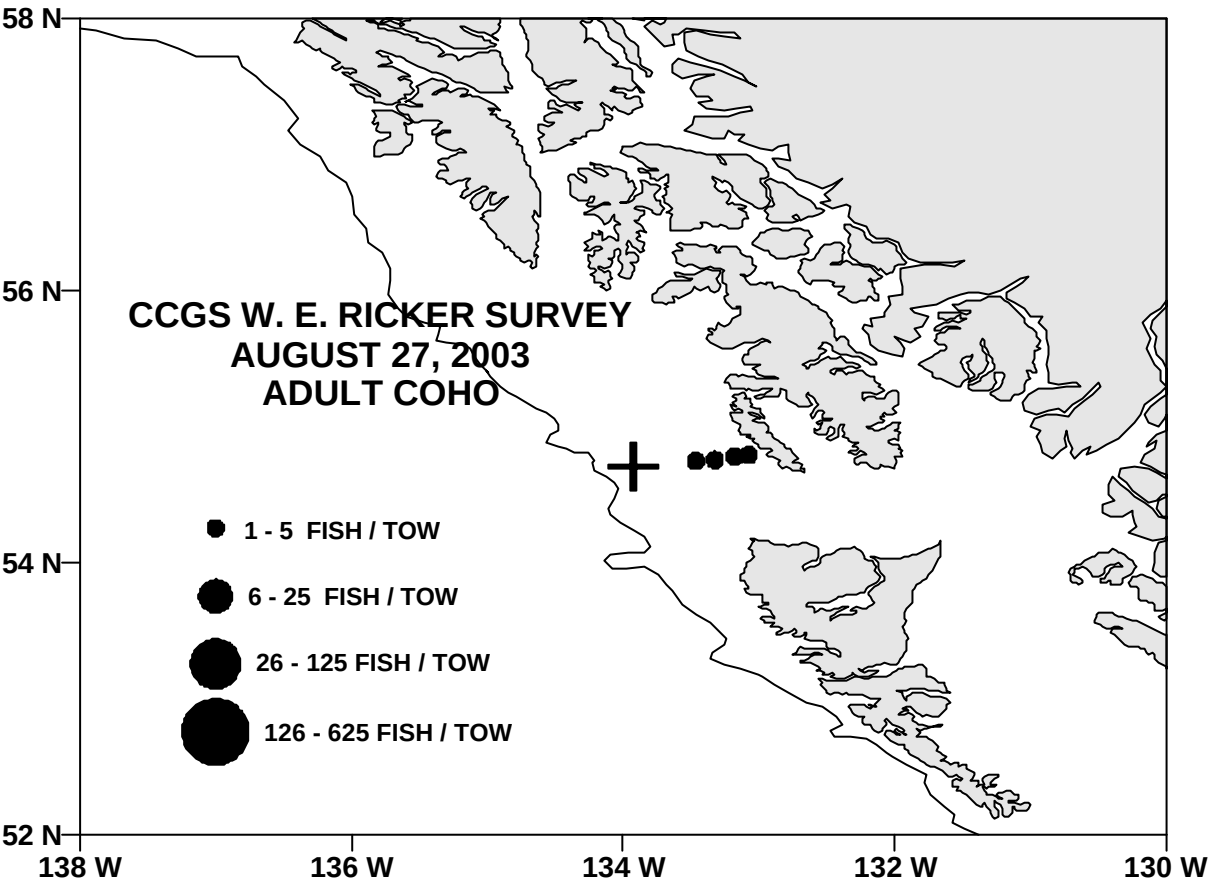

Figure 11. Distribution of adult (age X.1) coho salmon catches. Symbol size (?) is proportional to catch per tow, zero catches are shown by a (+).

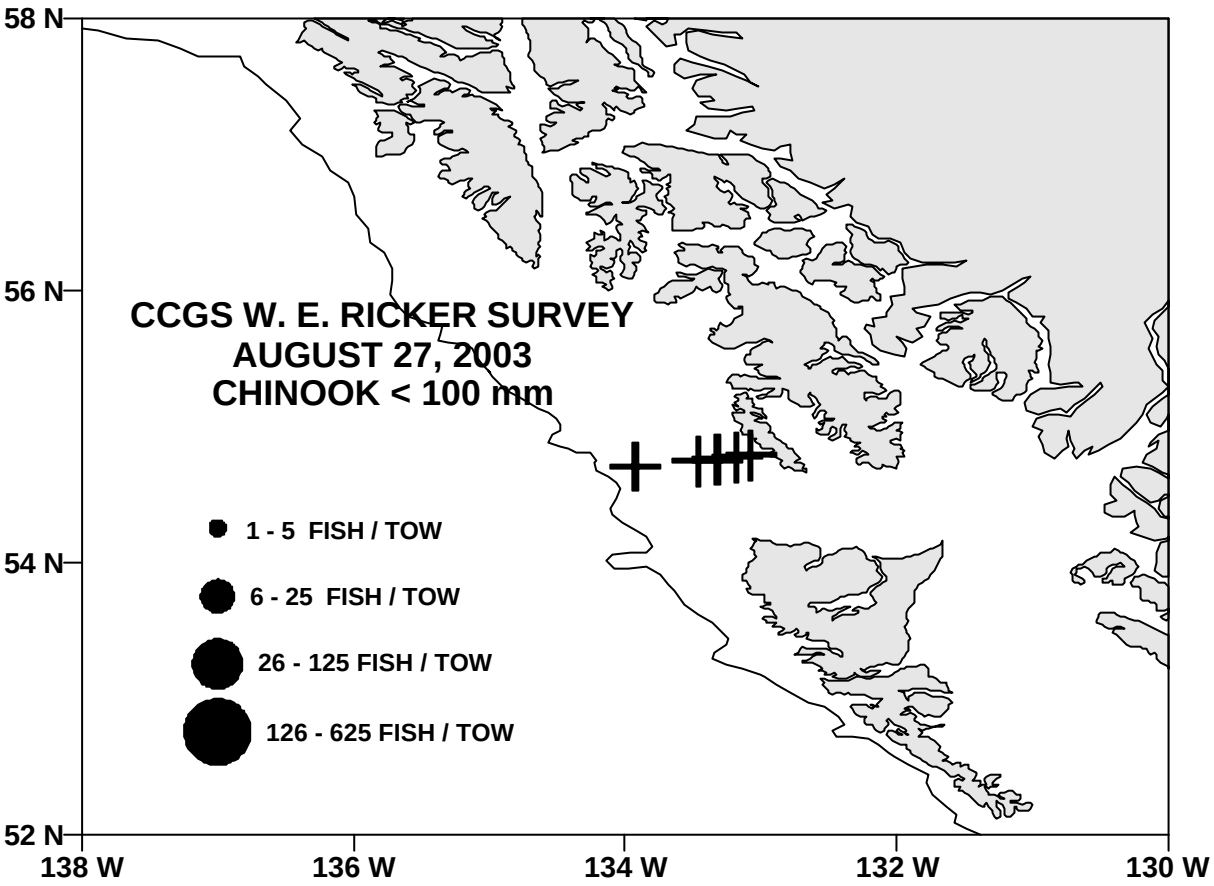

Figure 12. Distribution of catches of chinook salmon less than 100mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

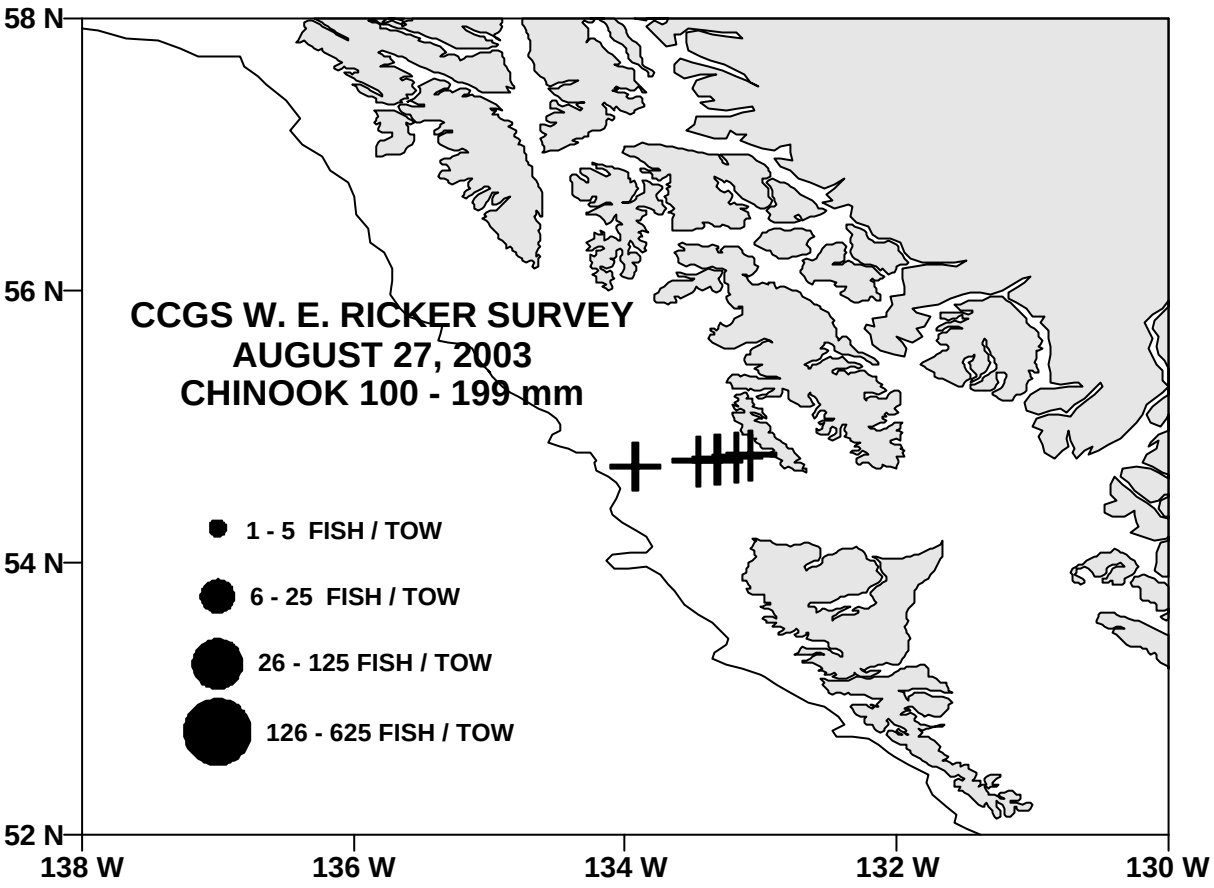

Figure 13. Distribution of catches of chinook salmon from 100 to 199mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

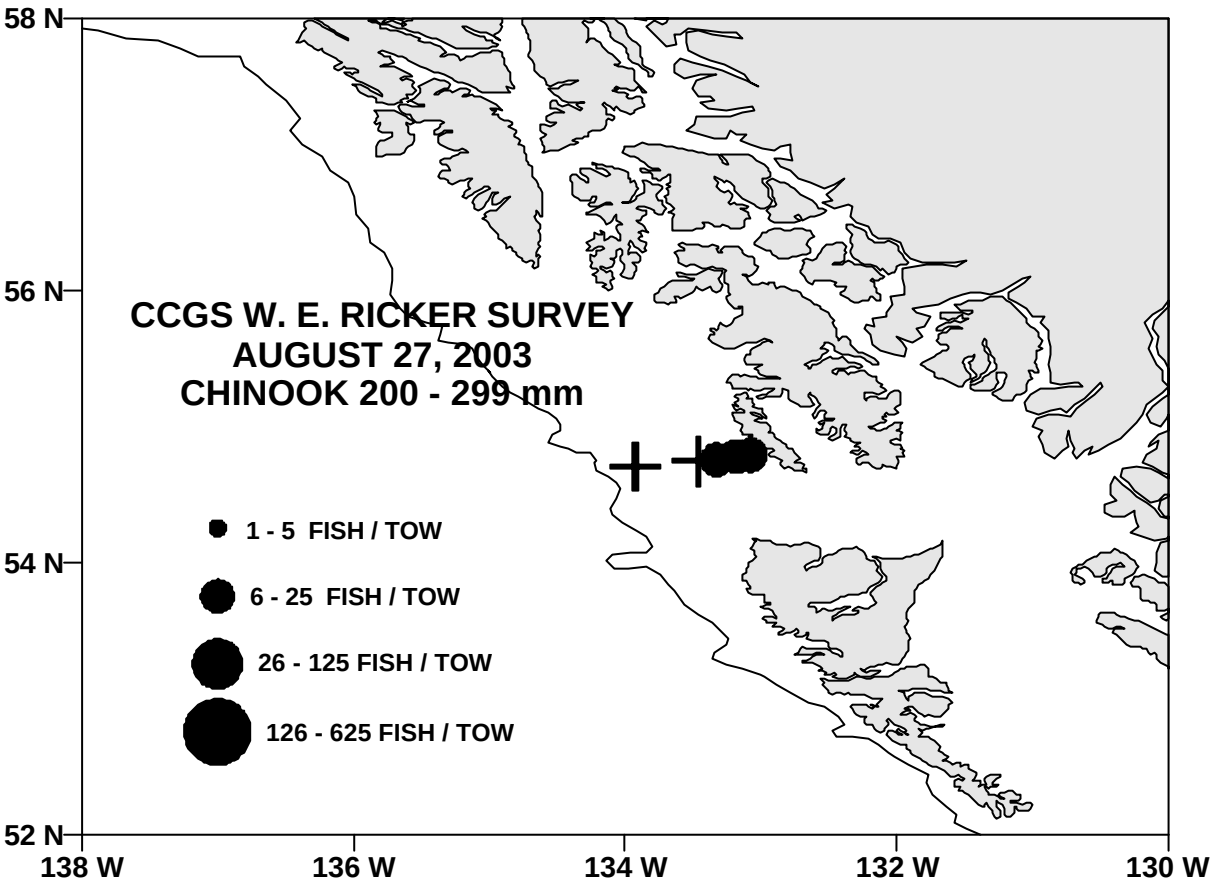

Figure 14. Distribution of catches of chinook salmon from 200 to 299mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

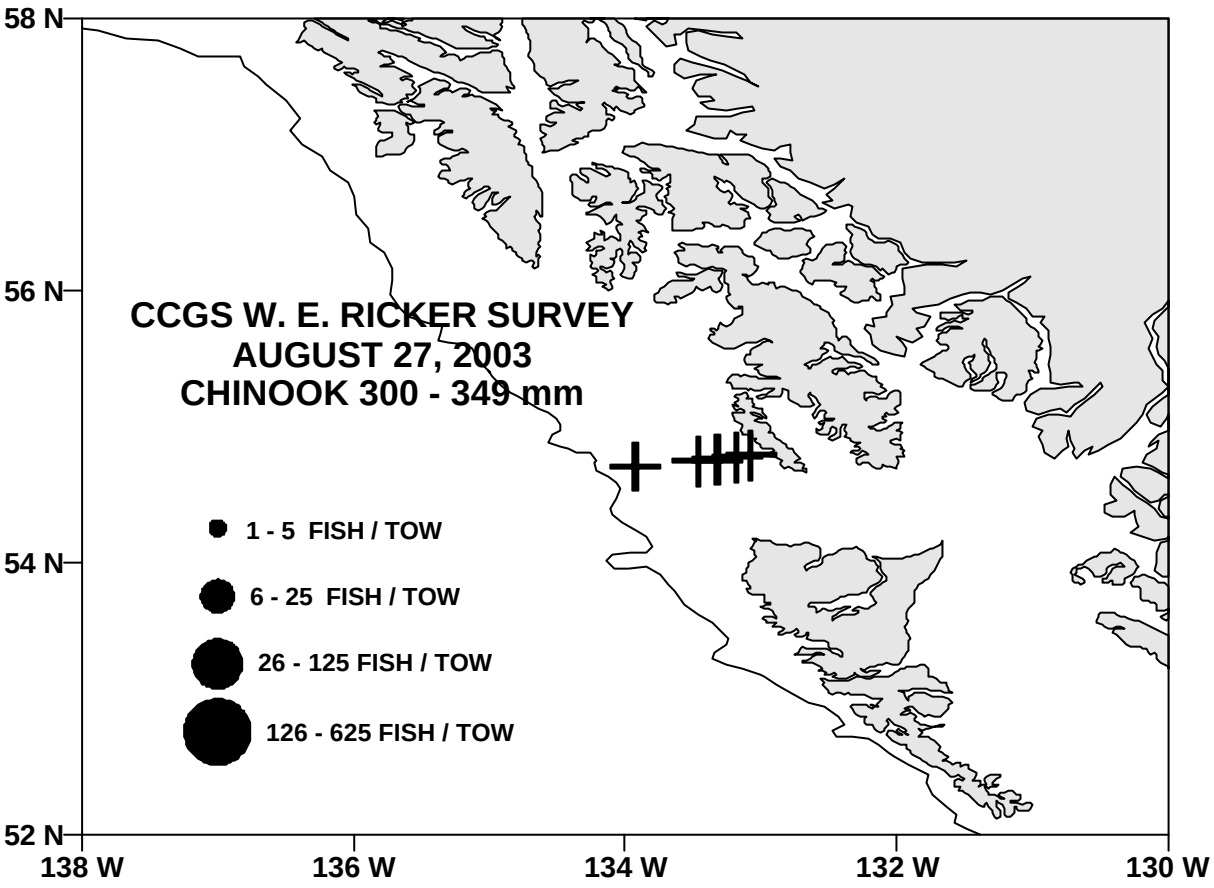

Figure 15. Distribution of catches of chinook salmon from 300 to 349 mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

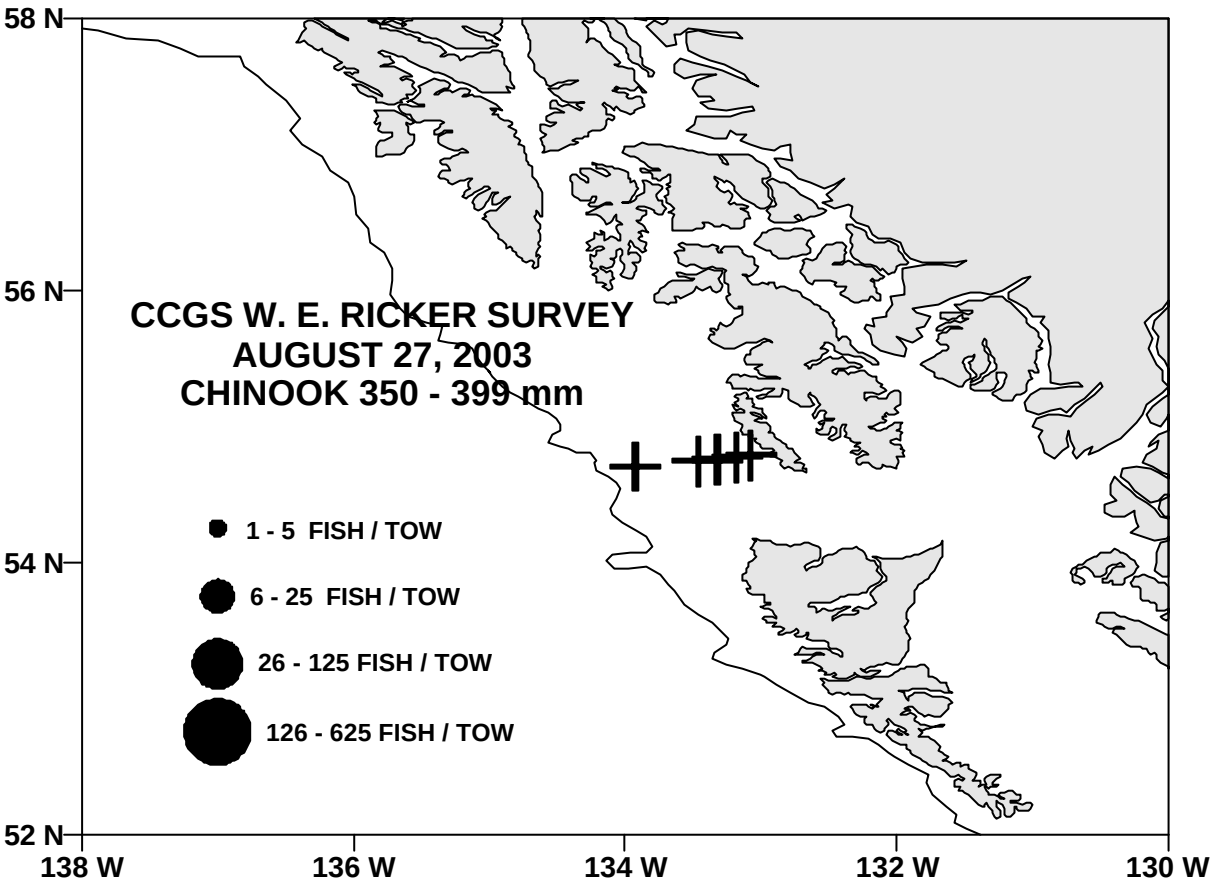

Figure 16. Distribution of catches of chinook salmon from 350 to 399mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

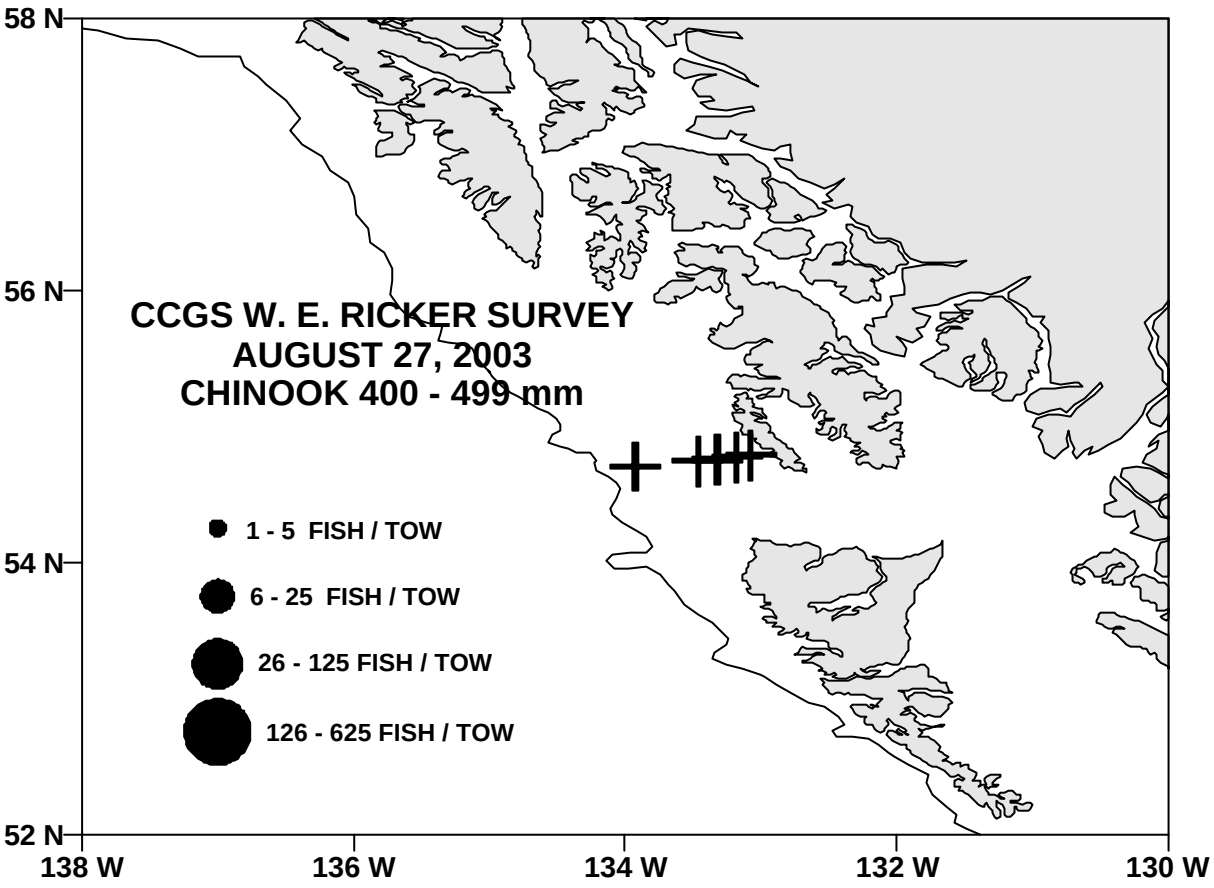

Figure 17. Distribution of catches of chinook salmon from 400 to 499mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

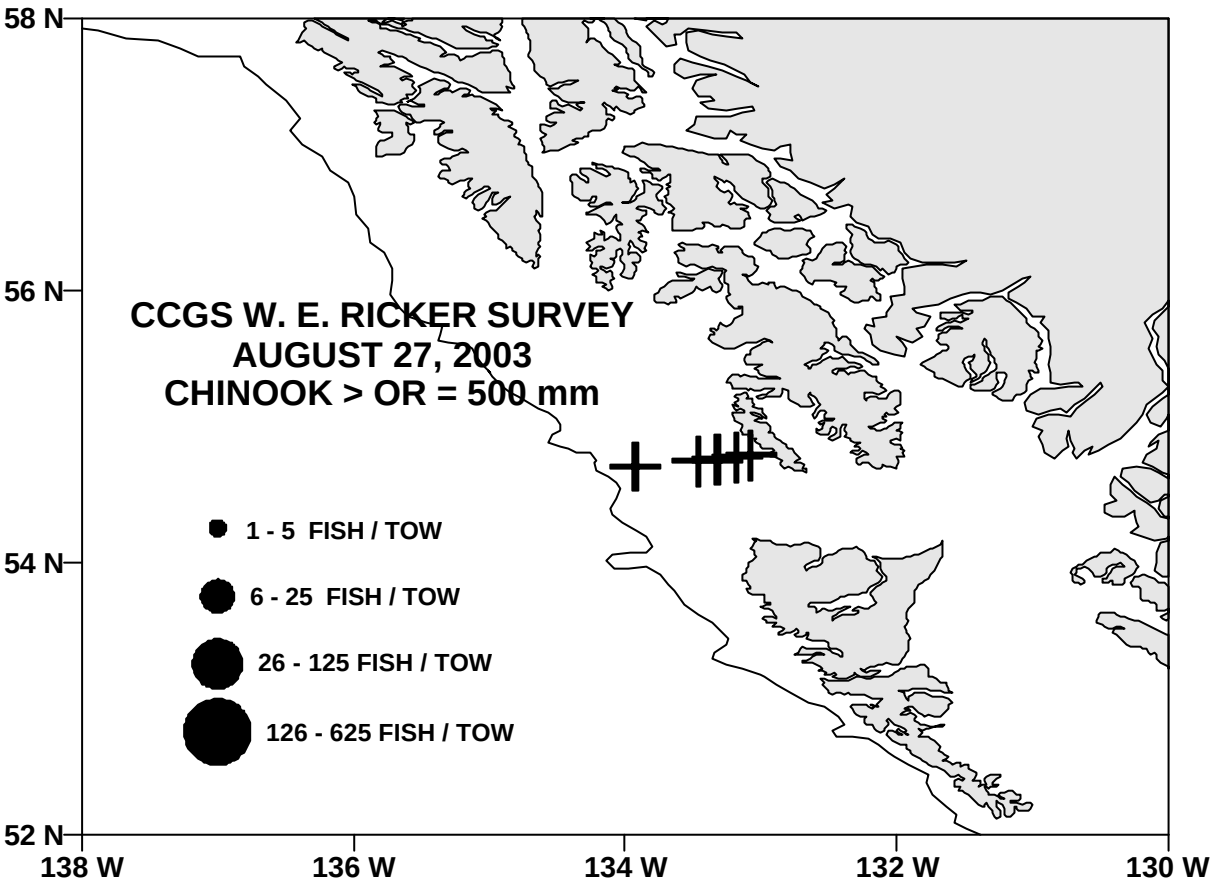

Figure 18. Distribution of of chinook salmon greater than or equal to 500mm. Symbol size (?) is proportional to catch per tow; zero catches are shown by a (+).

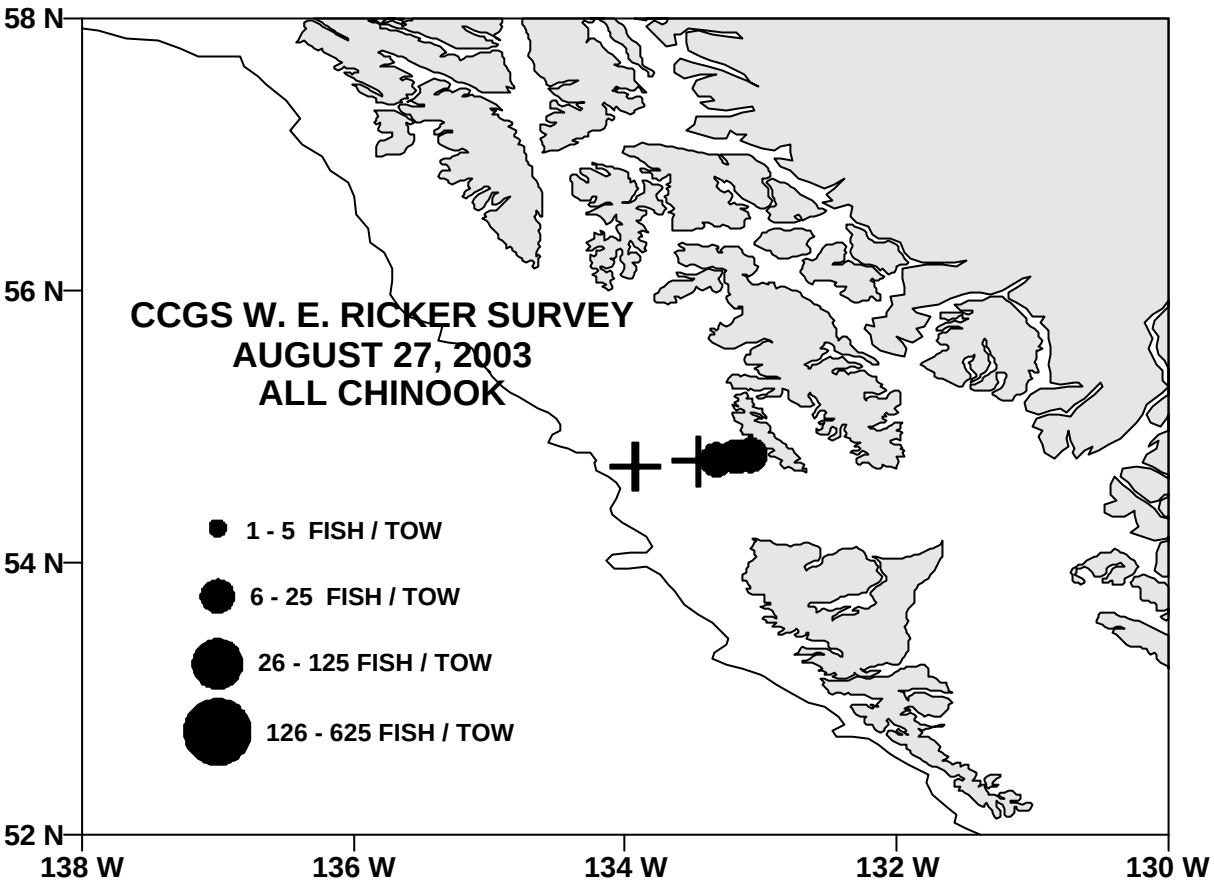

Figure 19. Distribution of catches of chinook from all size classes. Symbol size (?) is proportional to catch per tow, zero catches are shown by a (+).

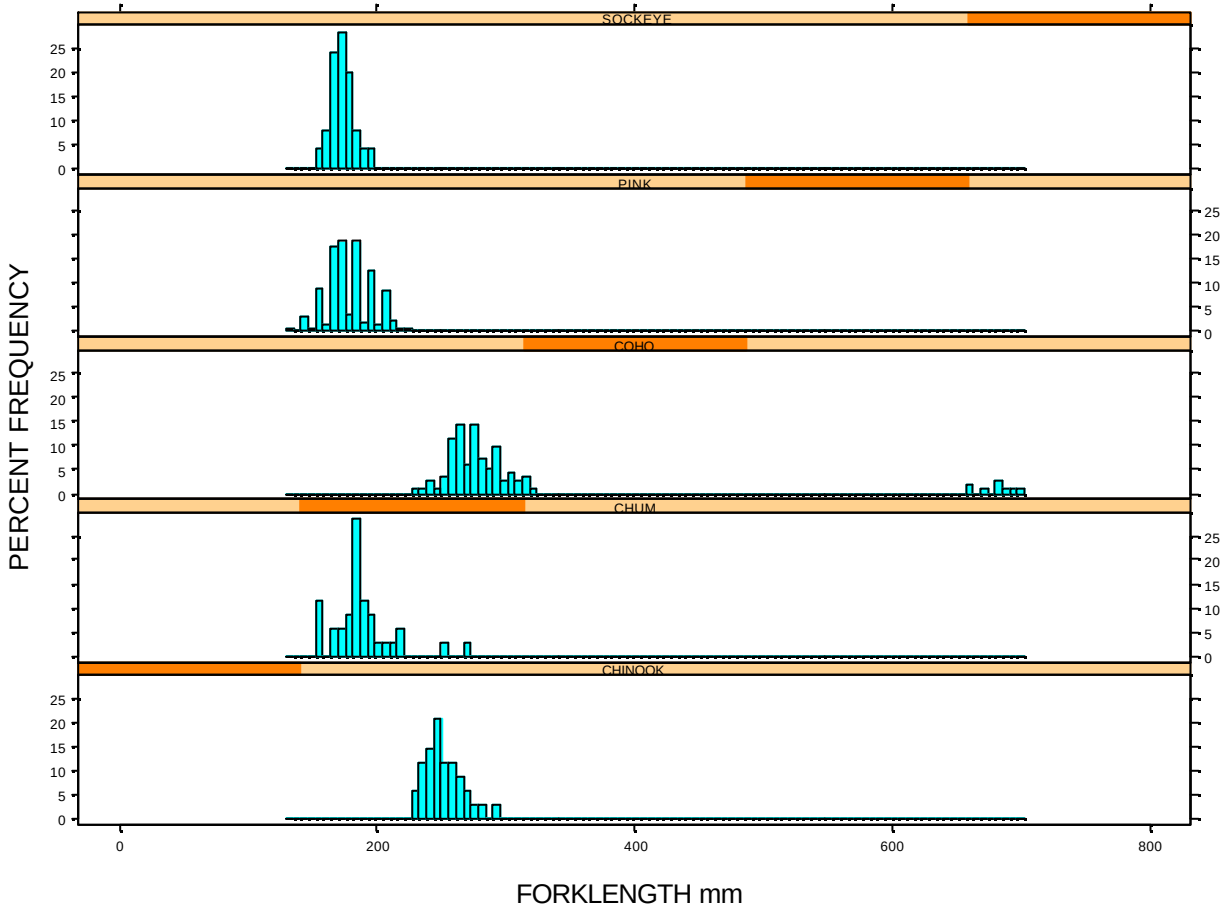

Figure 20. Size distribution (fork length; mm) of Pacific salmon caught on the CCGS W. E. Ricker survey to the Gulf of Alaska on August 27, 2003.