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**Gulf of Alaska Coastal Research (July and August 2001) on Juvenile
Salmon**

by

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Abstract

A research cruise was conducted by scientists from the Auke Bay Laboratory, Ocean Carrying Capacity (OCC) program during July and August 2001 to study the early marine distribution, migration, and growth of juvenile salmon (*Oncorhynchus* spp.) in relation to oceanographic conditions in the coastal waters of the Gulf of Alaska (GOA). Past OCC surveys in this region focused mainly on broadscale surveys of juvenile salmon in the coastal waters of the GOA with little emphasis on associated oceanographic information. These annual summer surveys have documented that juvenile salmon are found on the continental shelf of the GOA and that juvenile salmon may utilize Shelikof Strait (an area associated with the Alaska Coastal Current) as a westward migration corridor rather than the seaward side of Kodiak Island. During 2001, the OCC program collaborated with oceanographers from the Pacific Marine Environmental Laboratory in Seattle, Washington and other GLOBEC investigators in a new interdisciplinary focus on the relationships between biological and physical oceanographic processes and juvenile salmon distribution in the coastal GOA. Our objective is to identify specific processes or factors that may be influencing juvenile salmon spatial distribution, migration, growth, condition, and survival in the GOA and their utilization of Shelikof Strait as a primary migration corridor. This report summarizes the catch data collected during the July and August 2001 juvenile salmon survey.

Introduction

During July and August 2001, scientists from the Auke Bay Laboratory, Ocean Carrying Capacity (OCC) program conducted a survey of juvenile salmon (*Oncorhynchus* spp.) along the coastal waters of the Gulf of Alaska (GOA). The 2001 survey was the fifth in a series of annual assessments (see Carlson et al. 1996-1998; Farley et al. 2000) to document variations in the biological characteristics (e.g. early marine growth, migration, and distribution) of juvenile salmon in the coastal GOA. These annual surveys (see Carlson et al. 2000 for summary) along with previous surveys (Hartt and Dell 1986) have documented that juvenile salmon from the Pacific Northwest, British Columbia, and Alaska migrate in a counter-clockwise direction along the continental shelf of the GOA.

The occurrence of juvenile salmon over the continental shelf of the GOA as opposed to offshore waters is not fully understood. The Alaska Coastal Current (ACC), a vigorous counter-clockwise current around the continental shelf and the main transport of dissolved substances and plankton along the coastal GOA, most likely serves as essential juvenile salmon habitat by providing a nurturing area for juvenile salmon. Availability of forage resources is one of the major factors in selection of habitat by juvenile salmon (Percy 1992), and the possibility of increased productivity in the coastal GOA may explain the fidelity of salmon to that habitat.

Past OCC research cruises focused mainly on broadscale surveys of juvenile salmon in the coastal waters of the GOA with little emphasis on taking associated oceanographic information. During 2001, the OCC program collaborated with oceanographers from the

Pacific Marine Environmental Laboratory in Seattle, Washington and other GLOBEC investigators in a new interdisciplinary focus on the relationships between biological and physical oceanographic processes and juvenile salmon distribution in the coastal GOA. The focus of the OCC juvenile salmon survey was also limited to the GLOBEC Northeast Pacific study region which encompasses the coastal waters of the GOA from Yakutat to the western end of Kodiak Island. Our objective is to identify specific processes or factors that may be influencing juvenile salmon spatial distribution, migration, growth, condition, and survival along the continental shelf of the GOA.

Methods

The OCC/GLOBEC survey along the coastal waters of the Gulf of Alaska was conducted July 12 – August 8, 2001. The survey area included 11 transects beginning with the Icy Point transect near northern Southeast Alaska and ending at Cape Kaguyak at the western end of Kodiak Island (Figure 1). Transects were perpendicular to shore and typically extended from nearshore across the continental shelf to oceanic waters beyond the 200 m shelf break. Sampling stations along each transect were generally spaced 18.5 km apart and each transect included a nearshore station less than 4 km from shore.

The survey was conducted aboard the contracted fishing vessel (F/V) *Great Pacific* (38 meters in length). Fish samples were collected using a midwater rope trawl, that is 198 m long, has hexagonal mesh in wings and body, and a 1.2-cm mesh liner in the codend. The rope trawl was towed between 3.5 to 5 kts, at or near surface, and had a typical spread of 45 m horizontally and 10 m vertically. All tows lasted 30 minutes and covered 2.8 to 4.6 km. Most of the sampling was done during daylight hours; two tows occurred during night as part of a 24-hour repeat sampling of the GAK 3 station (samples taken every 4 hours).

Salmon and other fishes were sorted by species and counted. Standard biological data including fork length, body weight, and sex as well as scale samples (to document age and growth) from the preferred area (Clutter and Whitesel 1956) were taken from subsamples of all salmon species. Subsamples of juvenile pink (*Oncorhynchus gorbuscha*), chum (*O. keta*), and sockeye (*O. nerka*) salmon were frozen whole for laboratory analyses of food habits, otolith hatchery thermal marks (pink and chum salmon), and genetic stock identification (chum salmon). Genetic tissues and otoliths were also saved from immature and maturing chum salmon to determine stock distribution and migration of these salmon. Archival tags measuring temperature and depth were attached to a select number of immature and maturing salmon (those in the best condition having retained most of their scales after being caught) and then the salmon were released. All other fish species were counted; juvenile rockfish (*Sebastes* spp.) and sablefish (*Anoplopoma fimbria*) were frozen whole for laboratory analyses.

Oceanographic data were collected at each trawl station immediately prior to each trawl station. Depth profiles of salinity and temperature from surface to near bottom depths

were collected using a Sea-Bird SBE 19¹ Seacat profiler. Discrete water samples using a Niskin bottle were also collected at each station for salinity and fluorescence calibration with the CTD. Plankton samples were collected using a 1-m² Tucker trawl fitted with a 505-µm mesh net which was towed near the surface (approximately 1 kt) for 5 minutes. Volume of water filtered by the net was estimated by flow meters and the plankton samples were preserved in 5% formalin. Continuous measurements of current, temperature, and salinity were made using an Acoustic Doppler Current Profiler (ADCP) and thermosalinograph.

Results and Discussion

During the survey, 75 trawl stations were completed beginning nearshore at the Icy Point transect and ending at the southwestern end of Kodiak Island along Cape Kaguyak (Figure 1; Tables 1 and 3). Participating scientists are listed in Table 2. A total of 13,332 salmon were captured (Table 4). The largest component of the catch was juvenile salmon including pink (42.2%), chum (11.9%), sockeye (25.3%), coho (*O. kisutch*; 8.3%), and chinook (*O. tshawytscha*; <1%). Immature salmon in our catch included chum (6.8%), sockeye (1%), and chinook (<1%). Maturing salmon in our catch included pink (2.7%), chum (<1%), sockeye (<1%), coho (<1%), and chinook (<1%) salmon. Other species captured during the survey are listed in Table 5.

Salmon distribution within our survey varied by life history stage. Juvenile salmon were distributed along the continental shelf from nearshore locations to the 200 m shelf break from the Icy Point to Seward Line transects (Figures 2a-d). Juvenile salmon were located closer to shore along transects west of the Seward Line. Catch per unit effort (CPUE; number of salmon caught within a 30 minute time period) of juvenile salmon was largest near the 200 m contour along the Icy Point and Ocean Cape transects and along transects within Shelikof Strait (Figures 2a-d; Table 4). Immature chum salmon were found along all transects sampled except Cape Kekurnoi with the largest CPUE generally occurring at offshore locations beyond the 200 m contour (Figure 3a). Immature sockeye salmon were mainly found along transects west of Cape Cleare with the largest catches occurring along the Cape Kaguyak transect (Figure 3b). Mature pink salmon were found along all transects sampled, with the largest CPUE occurring at the shelf station on the Cape Chiniak transect. Maturing chum, sockeye, and coho salmon were only sporadically captured throughout the survey area (Figure 4a-d).

Body size of juvenile salmon varied depending on location (Table 6). Juvenile salmon tended to be smallest along transects nearest exit corridors where juvenile salmon enter the Gulf of Alaska from inside waters of Southeast Alaska (e.g. Icy Point) and Prince William Sound (e.g. Cape Cleare). Within Shelikof Strait, juvenile salmon were smaller along the Cape Nukshak transect than the Cape Kekurnoi transect.

¹ Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

Acknowledgments

We wish to thank the Alaska Boat Company, particularly Captains C. Bronson (Leg 1) and C. Bolton (Leg 2) and the crew of the F/V *Great Pacific*, for their fine efforts and technical assistance in all aspects of our field surveys.

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Table 1. Cruise itinerary for the July 12 – August 8, 2001 juvenile salmon survey in the coastal waters of the Gulf of Alaska.

Date	Location/Activity
Leg 1	
12-July	Depart Seattle, enroute Juneau
13-July	Enroute Juneau
14-July	Enroute Juneau
15-July	Arrive Juneau
16-July	Load scientists; enroute Icy Point
17-July	Begin sampling Icy Point; enroute Ocean Cape
18-July	Begin sampling Ocean Cape
19-July	Continue sampling Ocean Cape; enroute Cape Yakataga
20-July	Engine trouble; enroute Yakutat
21-July	Yakutat; enroute Cape Yakataga
22-July	Begin sampling Cape Yakataga; enroute Cape St. Elias
23-July	Begin sampling Cape St. Elias; enroute Cape Cleare
24-July	Begin sampling Cape Cleare; enroute GAK line
25-July	Begin sampling GAK line
26-July	Continue sampling GAK line
27-July	24hr repeated sampling at GAK 3; enroute Seward
28-July	Arrive Seward; offload Leg 1 scientists; load Leg 2 scientists and gear
Leg 2	
28-July	Depart Seward; enroute Gore Point
29-July	Begin sampling Gore Point
30-July	Continue sampling Gore Point
31-July	Continue sampling Gore Point; enroute Cape Chiniak
1-August	Begin sampling Cape Chiniak
2-August	Continue sampling Cape Chiniak; enroute Cape Nukshak
3-August	Begin sampling Cape Nukshak; enroute Cape Kekurnoi; begin sampling
4-August	Continue sampling Cape Kekurnoi; enroute Cape Kaguyak; begin sampling
5-August	Continue sampling Cape Kaguyak
6-August	Continue sampling Cape Kaguyak; enroute Dutch Harbor
7-August	Enroute Dutch Harbor
8-August	Arrive Dutch Harbor; offload scientists and gear; end cruise

Table 2. Participating scientists for the July 12 – August 8, 2001 juvenile salmon survey in the coastal waters of the Gulf of Alaska.

Scientist	Agency
Leg 1	
Edward V. Farley, Jr. (Chief Scientist)	Auke Bay Laboratory, AFSC, NMFS
Edward D. Cokelet	PMEL, NMFS
Ellen C. Martinson	Auke Bay Laboratory, AFSC, NMFS
Noele Weemes	Auke Bay Laboratory, AFSC, NMFS
Jamal H. Moss	University of Washington
Leg 2	
Bruce L. Wing (Chief Scientist)	Auke Bay Laboratory, AFSC, NMFS
Christine M. Kondzela	Auke Bay Laboratory, AFSC, NMFS
James M. Murphy	Auke Bay Laboratory, AFSC, NMFS
Mary Auburn-Cook	Invert Inc., Susquehanna, PA
Corey Fitch	College of Wooster

Table 3. Haul information for the July 17 - August 6, 2001 OCC/GLOBEC juvenile salmon survey in the coastal waters of the Gulf of Alaska.

Date	Transect Name	Station ID	Lat °N	Lon °W	Course (degrees)	Start Time	Speed (knots)	Net Opening			SST (°C)
								Vert. (m)	Hori. (m)	Warp (m)	
7/17	Icy Point	IP2	58.12	137.12	270	16:10	5.0	9	44	384	13.0
7/17	Icy Point	IP4	58.54	137.30	270	20:18	4.6	9	46	384	13.1
7/18	Ocean Cape	OC10	57.60	140.29	90	8:03	4.8	9	46	384	12.5
7/18	Ocean Cape	OC9	58.09	140.20	355	11:22	4.6	9	44	384	13.7
7/18	Ocean Cape	OC8	58.19	140.15	0	14:17	4.4	9	44	384	13.7
7/18	Ocean Cape	OC6	58.39	140.10	0	18:16	4.6	9	44	384	13.8
7/19	Ocean Cape	OC5	58.52	140.07	5	7:24	5.1	9	46	384	13.1
7/19	Ocean Cape	OC4	59.02	140.03	10	10:26	4.8	9	46	384	13.7
7/19	Ocean Cape	OC3	59.12	139.60	10	13:10	4.9	9	46	384	12.3
7/19	Ocean Cape	OC2	59.22	139.55	10	16:10	4.7	9	46	384	13.0
7/19	Ocean Cape	OC1	59.31	139.53	195	18:31	4.3	9	46	384	13.0
7/22	Cape Yakataga	IB1	60.02	142.33	180	6:45	4.6	9	46	384	12.2
7/22	Cape Yakataga	IB2	59.56	142.30	195	9:27	4.8	9	46	384	12.3
7/22	Cape Yakataga	IB3	59.46	142.33	190	12:40	4.7	9	46	384	12.6
7/22	Cape Yakataga	IB5	59.31	142.36	185	15:50	4.9	9	46	384	11.9
7/22	Cape Yakataga	IB6	59.19	142.39	185	19:08	5.2	9	46	384	12.8
7/23	Cape St. Elias	CSE5	59.08	144.36	0	6:55	4.9	9	46	384	13.1
7/23	Cape St. Elias	CSE4	59.19	144.36	5	9:48	4.8	9	46	384	14.4
7/23	Cape St. Elias	CSE3	59.30	144.38	0	12:51	4.7	9	46	384	14.2
7/23	Cape St. Elias	CSE2	59.36	144.36	0	15:52	4.6	9	46	384	12.8
7/23	Cape St. Elias	CSE1	59.47	144.40	252	19:03	6.0	11	44	320	14.0
7/24	Cape Cleare	CC1	59.45	147.49	180	7:19	4.4	9	46	384	12.8
7/24	Cape Cleare	CC3	59.35	147.39	145	10:07	4.6	9	46	384	13.8
7/24	Cape Cleare	CC5	59.23	147.23	145	13:35	4.7	9	46	384	15.1
7/24	Cape Cleare	CC6	59.15	147.11	145	16:25	4.8	9	46	384	15.0
7/24	Cape Cleare	CC7	59.05	146.58	145	20:17	4.7	9	46	384	14.2
7/25	Seward Line	GAK12	58.13	147.55	325	6:50	4.9	9	46	384	13.3
7/25	Seward Line	GAK11	58.43	148.03	325	9:45	4.8	9	46	384	13.4
7/25	Seward Line	GAK10	58.31	148.11	325	12:35	4.5	9	46	384	14.6
7/25	Seward Line	GAK9	58.39	148.21	325	15:46	5.0	9	46	402	12.6
7/25	Seward Line	GAK8	58.47	148.28	325	18:38	4.8	9	46	384	13.4
7/26	Seward Line	GAK7	58.57	148.37	330	6:43	4.6	9	46	384	13.2
7/26	Seward Line	GAK6	59.05	148.43	330	9:30	4.7	9	46	421	13.5
7/26	Seward Line	GAK5	59.14	148.52	330	12:22	4.6	9	46	421	13.8
7/26	Seward Line	GAK4	59.25	149.01	330	15:38	5.0	9	46	402	15.2
7/26	Seward Line	GAK3	59.32	149.11	330	18:40	4.7	9	46	366	15.7
7/26	Seward Line	GAK3	59.32	149.10	330	22:30	4.7	9	46	384	14.0
7/27	Seward Line	GAK3	59.32	149.10	330	2:36	4.3	9	46	384	14.5
7/27	Seward Line	GAK3	59.33	149.11	330	6:41	4.7	9	46	384	13.0

Table 3 (con't). Haul information for the July 17 - August 6, 2001 OCC/GLOBEC juvenile salmon survey in the coastal waters of the Gulf of Alaska.

Date	Transect Name	Station ID	Lat °N	Lon °W	Course (degrees)	Start Time	Speed (knots)	Net Opening			SST (°C)
								Vert. (m)	Hori. (m)	Warp (m)	
7/27	Seward Line	GAK3	59.32	149.10	330	10:29	4.7	9	46	402	13.7
7/27	Seward Line	GAK3	59.32	149.10	340	14:30	4.3	9	46	430	14.8
7/27	Seward Line	GAK2	59.40	149.19	330	17:31	4.1	9	46	402	14.2
7/27	Seward Line	GAK1	59.50	149.28	330	20:33	5.0	9	46	421	15.0
7/29	Gore Point	GP1	59.09	150.56	145	8:30	4.1	11	48	369	12.3
7/29	Gore Point	GP3	58.54	150.45	155	12:29	4.5	9	46	366	12.2
7/29	Gore Point	GP4	58.45	150.39	155	15:30	4.5	11	46	384	13.3
7/29	Gore Point	GP5	58.36	150.31	140	18:22	4.5	11	46	384	11.6
7/30	Gore Point	GP6	58.26	150.23	165	7:45	4.1	13	42	384	9.5
7/30	Gore Point	GP7	58.17	150.17	155	10:26	3.5	11	48	411	10.7
7/30	Gore Point	GP8	58.08	150.09	160	13:40	4.2	9	46	402	11.4
7/30	Gore Point	GP9	57.58	150.02	160	16:32	4.5	11	46	384	9.2
7/30	Gore Point	GP10	57.51	149.56	150	19:15	4.5	11	46	384	10.4
7/31	Gore Point	GP11	57.39	149.49	166	7:15	4.8	11	44	366	11.6
7/31	Gore Point	GP12	57.30	149.42	150	9:57	4.1	11	46	421	11.8
7/31	Gore Point	GP13	57.21	149.35	154	12:52	3.5	9	46	402	12.1
7/31	Gore Point	GP14	57.12	149.27	155	16:15	3.5	11	46	421	13.9
8/1	Cape Chiniak	CCH7	56.16	150.52	340	7:02	4.2	11	46	375	9.2
8/1	Cape Chiniak	CCH6	56.29	151.03	335	10:19	4.7	13	46	384	10.7
8/1	Cape Chiniak	CCH5	56.42	151.17	345	13:40	4.6	13	46	384	12.7
8/1	Cape Chiniak	CCH4	56.55	151.29	340	16:54	4.3	13	46	402	12.5
8/2	Cape Chiniak	CCH3	57.08	151.43	345	6:47	4.0	13	46	421	12.6
8/2	Cape Chiniak	CCH2	57.22	151.56	349	10:07	4.5	13	46	402	11.0
8/2	Cape Chiniak	CCH1	57.24	152.07	154	13:00	4.2	11	37	395	11.4
8/3	Cape Nukshak	CN1	58.02	153.26	320	6:48	4.4	11	46	402	10.4
8/3	Cape Nukshak	CN2	58.11	153.41	324	10:36	3.9	9	44	421	10.9
8/3	Cape Nukshak	CN3	58.22	153.56	145	16:23	5.0	13	46	413	11.9
8/4	Cape Kekurnoi	CK1	57.42	155.17	138	7:02	4.5	13	42	426	10.4
8/4	Cape Kekurnoi	CK2	57.35	155.04	130	10:25	4.2	11	46	413	13.6
8/4	Cape Kekurnoi	CK3	57.25	154.45	135	15:40	4.5	11	44	402	11.4
8/5	Cape Kaguyak	CKAG1	56.40	153.54	155	6:39	4.5	11	46	384	11.5
8/5	Cape Kaguyak	CKAG2	56.29	153.43	148	9:29	4.8	13	44	373	12.8
8/5	Cape Kaguyak	CKAG3	56.16	153.31	150	12:36	3.5	11	46	373	12.9
8/5	Cape Kaguyak	CKAG4	56.08	153.22	150	15:25	3.7	11	46	402	13.6
8/5	Cape Kaguyak	CKAG5	55.55	153.09	145	19:00	4.7	11	46	421	14.5
8/6	Cape Kaguyak	CKAG6	55.42	152.55	145	7:20	4.6	11	46	402	14.0

Table 4. Catch per unit effort (CPUE) of juvenile (J), immature (I), and adult (A) salmon by species and station by the F/V *Great Pacific* in the Gulf of Alaska, July 17 - August 6, 2001. Dash (-) indicates no salmon caught.

Date	Station ID	Pink		Chum			Sockeye			Coho		Chinook		
		J	A	J	I	A	J	I	A	J	A	J	I	A
7/17	IP2	60	-	90	-	1	2	1	2	5	1	1	-	-
7/17	IP4	550	8	250	3	-	300	-	1	7	-	-	-	-
7/18	OC10	-	-	-	-	-	-	-	1	-	-	-	-	-
7/18	OC9	-	7	-	11	-	-	-	-	-	-	-	-	-
7/18	OC8	-	1	-	1	-	-	-	-	-	-	-	-	-
7/18	OC6	-	4	-	10	-	9	-	1	10	-	-	-	-
7/19	OC5	500	12	460	2	1	75	-	1	30	-	1	-	-
7/19	OC4	8	10	10	-	4	14	-	2	125	1	3	-	-
7/19	OC3	1	10	17	-	-	1	-	3	60	-	-	-	-
7/19	OC2	15	7	12	1	5	1	-	-	21	-	-	-	1
7/19	OC1	-	-	-	-	-	-	-	-	1	2	1	-	-
7/22	IB1	5	4	5	8	1	-	-	1	16	3	1	2	1
7/22	IB2	7	2	9	2	1	3	-	-	22	-	2	-	-
7/22	IB3	70	4	21	-	1	6	-	1	55	1	2	-	-
7/22	IB5	67	3	6	-	-	5	-	-	12	3	-	-	-
7/22	IB6	17	4	-	10	1	62	-	1	38	2	-	-	-
7/23	CSE5	-	-	-	4	-	-	3	-	-	1	-	-	-
7/23	CSE4	-	-	-	1	-	-	3	-	1	-	-	-	-
7/23	CSE3	6	2	17	22	1	7	-	-	38	3	-	-	-
7/23	CSE2	-	5	6	22	-	90	-	-	38	-	-	6	-
7/23	CSE1	2	1	1	-	-	-	-	-	7	6	-	4	-
7/24	CC1	5	11	6	6	-	9	-	-	48	2	-	1	-
7/24	CC3	16	6	48	13	-	17	-	-	17	-	-	1	-
7/24	CC5	42	-	8	5	-	6	-	1	17	3	4	-	-
7/24	CC6	11	-	1	16	-	19	-	-	60	-	1	-	-
7/24	CC7	1	-	-	144	-	6	-	-	11	3	-	-	-
7/25	GAK12	-	17	-	53	2	-	-	-	1	-	-	-	-
7/25	GAK11	-	7	-	29	3	-	1	2	1	-	-	-	-
7/25	GAK10	51	4	9	7	-	5	-	-	9	-	-	-	-
7/25	GAK9	135	7	-	-	-	7	1	-	6	1	-	-	-
7/25	GAK8	26	4	5	11	-	1	1	-	27	-	-	-	-
7/26	GAK7	5	16	-	59	4	14	-	-	34	2	-	-	-
7/26	GAK6	25	1	3	11	-	5	1	-	5	1	-	1	-
7/26	GAK5	34	6	1	1	-	21	-	-	29	3	-	-	-
7/26	GAK4	4	5	-	1	-	16	-	-	34	2	-	-	-
7/26	GAK3	15	16	24	58	-	9	-	-	20	1	-	-	-
7/26	GAK3	4	3	1	11	-	2	-	-	13	2	-	-	-
7/27	GAK3	-	3	-	8	-	-	-	-	-	1	-	-	-
7/27	GAK3	36	3	7	1	-	8	-	-	14	1	-	-	-

Table 4. (Con't) Catch per unit effort (CPUE) of juvenile (J), immature (I), and adult (A) salmon by species and station by the F/V *Great Pacific* in the Gulf of Alaska, July 17 - August 6, 2001. Dash (-) indicates no salmon caught.

Date	Station ID	Pink		Chum			Sockeye			Coho		Chinook		
		J	A	J	I	A	J	I	A	J	A	J	I	A
7/27	GAK3	1	10	1	7	-	3	-	-	5	-	-	-	-
7/27	GAK3	27	9	5	13	1	7	-	-	10	3	-	-	-
7/27	GAK2	50	6	30	62	2	8	-	-	3	-	2	-	-
7/27	GAK1	19	-	43	-	-	1	-	-	9	-	-	-	-
7/29	GP1	-	-	-	9	-	9	7	-	13	-	-	1	-
7/29	GP3	42	-	37	3	-	58	-	-	16	-	-	2	-
7/29	GP4	179	-	25	7	-	14	-	-	2	1	-	3	-
7/29	GP5	171	-	12	-	-	24	1	-	26	1	-	3	-
7/30	GP6	-	1	-	4	-	-	-	-	1	8	-	-	-
7/30	GP7	-	20	-	1	-	-	-	-	-	8	-	-	-
7/30	GP8	-	3	-	-	-	-	1	-	1	-	-	1	-
7/30	GP9	-	-	-	11	-	7	-	-	-	-	-	1	-
7/30	GP10	30	4	-	8	-	-	6	-	-	2	-	2	-
7/31	GP11	-	5	-	19	-	-	2	-	-	1	-	-	1
7/31	GP12	-	3	-	30	-	-	7	1	-	-	-	-	-
7/31	GP13	-	-	-	15	-	-	1	-	-	-	-	-	-
7/31	GP14	-	1	-	19	1	-	5	-	-	-	-	-	-
8/1	CCH7	-	-	-	-	-	-	-	-	-	-	-	-	-
8/1	CCH6	-	2	-	1	-	-	-	-	-	-	-	-	-
8/1	CCH5	-	1	-	8	-	1	5	-	-	1	-	1	-
8/1	CCH4	-	9	-	29	1	-	2	2	2	-	-	-	-
8/2	CCH3	-	1	-	-	1	-	1	-	-	-	-	-	-
8/2	CCH2	1	18	1	-	4	-	-	-	-	4	-	-	-
8/2	CCH1	-	3	-	-	-	-	3	-	2	-	-	2	-
8/3	CN1	386	2	46	-	-	119	-	-	12	2	-	1	-
8/3	CN2	2200	-	212	1	-	1790	-	-	1	3	-	-	-
8/3	CN3	213	4	65	-	-	434	-	-	76	2	-	4	-
8/4	CK1	106	11	34	-	1	66	2	2	38	2	-	6	-
8/4	CK2	450	11	46	-	1	112	-	-	-	1	-	-	-
8/4	CK3	30	21	8	-	-	1	-	3	40	3	-	1	-
8/5	CKAG1	4	9	3	1	-	1	6	-	11	14	-	-	-
8/5	CKAG2	-	6	-	4	2	-	20	-	2	5	-	1	-
8/5	CKAG3	-	5	-	-	-	-	15	2	-	-	-	-	-
8/5	CKAG4	-	6	-	9	-	-	3	-	-	1	-	1	-
8/5	CKAG5	-	1	-	112	-	-	22	1	-	-	-	-	-
8/6	CKAG6	-	-	-	2	-	-	12	-	-	-	-	-	-

Table 5. Catch per unit effort (CPUE) of marine fishes by species and station by the F/V *Great Pacific* in the Gulf of Alaska, July 17 - August 6, 2001. Dash (-) indicates no marine fish caught. Life history stages include juvenile (J), young of the year (YOY), and adult (A).

Date	Station ID	Pollock		Herr-	Cape-	Sand-	Wolf-	Pom-	Prow-	Sable-	J.Rock-	Dog-	Sand-	Squid	Salmon	
		J	YOY	A	ing	lin	lance	eel	fret	fish	fish	fish	fish	fish	fish	shark
7/17	IP2	-	-	-	-	-	-	1	-	-	-	-	5	-	-	-
7/17	IP4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/18	OC10	-	-	-	-	-	-	-	6	-	-	2	-	-	6	-
7/18	OC9	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-
7/18	OC8	20	-	-	-	-	-	-	2	-	-	1	-	-	20	-
7/18	OC6	1	-	-	-	-	-	-	-	7	-	-	2	-	1	-
7/19	OC5	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-
7/19	OC4	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
7/19	OC3	-	-	-	-	-	-	-	-	-	3	-	6	-	-	-
7/19	OC2	-	-	-	-	-	-	-	-	-	12	-	3	-	-	-
7/19	OC1	-	-	-	1	-	4	1	-	-	-	-	-	-	-	-
7/22	IB1	1	-	-	53	24	1	-	-	1	-	-	2	3	-	-
7/22	IB2	2	-	-	-	-	5	-	-	-	-	-	2	-	-	-
7/22	IB3	-	-	-	-	-	-	-	-	-	1	-	7	-	-	-
7/22	IB5	5	-	-	-	-	-	-	-	-	1	-	-	-	5	-
7/22	IB6	-	-	-	-	-	-	2	-	-	-	-	12	-	-	-
7/23	CSE5	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-
7/23	CSE4	2	-	-	-	-	-	-	23	1	-	-	-	-	-	-
7/23	CSE3	-	-	-	-	-	-	-	19	1	1	-	-	-	-	-
7/23	CSE2	-	-	-	-	-	-	-	7	-	-	-	1	-	-	1
7/23	CSE1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
7/24	CC1	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
7/24	CC3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
7/24	CC5	-	-	1	-	-	-	-	-	-	-	-	21	-	-	-
7/24	CC6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/24	CC7	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
7/25	GAK12	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
7/25	GAK11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/25	GAK10	1	-	-	-	-	-	-	-	-	-	1	-	-	500	-
7/25	GAK9	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
7/25	GAK8	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-
7/26	GAK7	-	-	-	-	-	-	-	-	-	-	-	73	-	-	-
7/26	GAK6	-	-	-	-	-	-	-	-	1	1	-	6	-	-	-
7/26	GAK5	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-
7/26	GAK4	-	-	-	-	-	-	-	-	-	1	-	70	-	-	-
7/26	GAK3	-	-	-	-	-	-	-	-	-	21	-	70	-	-	-
7/26	GAK3	-	-	-	-	-	-	-	-	1	3	-	21	-	-	-
7/27	GAK3	-	500	-	3700	-	-	-	-	-	8	-	23	-	-	-
7/27	GAK3	-	-	-	-	-	-	-	-	-	7	-	4	-	-	-

Table 5. (Con't) Catch per unit effort (CPUE) of marine fishes by species and station by the F/V *Great Pacific* in the Gulf of Alaska, July 17 - August 6, 2001. Dash (-) indicates no marine fish caught. Life history stages include juvenile (J), young of the year (YOY), and adult (A).

Date	Station ID	Pollock			Herr- ing	Cape- lin	Sand- lance	Wolf- eel	Pom- fret	Prow- fish	Sable- fish	J.Rock- fish	Dog- fish	Sand- fish	Squid	Salmon shark
		J	YOY	A												
7/27	GAK3	-	-	-	-	-	-	-	-	-	11	-	3	-	-	-
7/27	GAK3	-	-	-	-	-	-	-	-	-	-	-	36	-	-	-
7/27	GAK2	-	-	2	6	-	-	-	-	-	-	-	1	-	-	-
7/27	GAK1	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-
7/29	GP1	5	-	-	-	5	-	-	2	-	-	-	-	-	-	-
7/29	GP3	1	-	-	1	-	-	-	19	-	-	-	-	-	-	-
7/29	GP4	-	-	-	-	-	-	-	1	-	-	-	63	-	-	-
7/29	GP5	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-
7/30	GP6	-	-	3	2000	-	-	-	1	-	-	-	-	-	500	-
7/30	GP7	-	-	-	-	-	19	-	1	-	-	-	-	-	-	-
7/30	GP8	4	-	-	-	-	-	-	2	-	-	-	-	-	2	-
7/30	GP9	3	-	-	-	-	-	-	2	-	-	-	6	-	-	-
7/30	GP10	-	-	-	-	-	1	-	2	-	-	-	63	-	-	-
7/31	GP11	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-
7/31	GP12	-	-	-	-	-	-	-	4	2	33	1	-	-	-	-
7/31	GP13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/31	GP14	3	-	-	-	-	-	-	1	-	-	-	-	-	-	-
8/1	CCH7	-	-	-	-	-	-	-	-	-	-	9	-	-	50	-
8/1	CCH6	-	-	-	-	-	-	-	1	-	750	-	-	-	-	-
8/1	CCH5	-	-	-	-	-	-	-	-	-	160	-	-	-	-	-
8/1	CCH4	1	-	-	-	-	-	1	3	4	-	1	-	-	-	-
8/2	CCH3	16	-	-	-	-	-	-	-	3	-	-	-	-	-	-
8/2	CCH2	100	-	-	-	-	3	-	-	1	-	-	-	-	-	-
8/2	CCH1	-	-	-	-	-	12	-	-	-	-	-	-	5	-	-
8/3	CN1	3	1000	-	1	3000	1	-	-	2	-	-	-	2	-	-
8/3	CN2	-	-	1	-	-	100	-	-	2	-	-	-	-	-	-
8/3	CN3	100	-	1	1	60	5	-	-	2	-	-	-	3	-	-
8/4	CK1	1	100	1	3	50	75	-	-	2	-	-	-	1	-	1
8/4	CK2	-	2	3	1	-	-	-	-	-	-	-	-	16	-	-
8/4	CK3	-	50	1	-	-	-	-	-	4	-	-	-	6	-	-
8/5	CKAG1	-	-	1	-	500	1500	-	-	-	-	-	-	7500	-	-
8/5	CKAG2	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-
8/5	CKAG3	-	-	-	-	-	-	-	-	3	-	-	-	6	-	-
8/5	CKAG4	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
8/5	CKAG5	-	-	-	-	-	-	-	-	2	-	60	-	-	-	-
8/6	CKAG6	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-

Table 6. Number sampled (*n*), average (Ave) and standard deviation (Stdv) of length (mm) and weight (g) by transect of juvenile pink, chum, sockeye and coho salmon captured by the F/V *Great Pacific* in the Gulf of Alaska, July 17 - August 6, 2001.

Transect	Pink					Chum					Sockeye					Coho				
	<i>n</i>	Length		Weight		<i>n</i>	Length		Weight		<i>n</i>	Length		Weight		<i>n</i>	Length		Weight	
		Ave	Stdv	Ave	Stdv		Ave	Stdv	Ave	Stdv		Ave	Stdv	Ave	Stdv		Ave	Stdv		
Icy Point	60	120.6	9.2	18.4	5.4	60	121.4	11.3	16.7	6.3	12	145.0	10.8	35.5	7.6	12	238.7	37.8	171.9	83.3
Ocean Cape	54	118.1	12.9	16.2	6.0	69	127.5	17.7	20.4	13.7	31	180.5	25.1	65.5	27.6	55	197.3	40.2	104.5	65.2
Cape Yakataga	89	123.5	14.9	19.4	7.4	41	128.8	15.3	22.5	9.2	24	161.6	38.4	53.8	29.7	62	218.2	36.4	135.0	69.1
Cape St. Elias	8	135.1	5.4	23.3	5.7	24	141.2	12.0	27.9	8.5	17	191.8	26.8	79.2	23.9	31	204.3	46.8	120.2	102.9
Cape Cleare	63	117.9	12.6	14.8	5.3	45	130.3	15.6	22.5	10.0	40	183.6	40.2	72.3	38.6	50	215.9	31.8	128.3	61.5
Seward Line	277	124.5	12.1	18.3	6.0	134	131.7	10.8	23.0	5.9	84	178.7	38.3	67.9	38.3	124	230.3	30.1	154.4	68.6
Gore Point	126	132.4	15.1	21.3	7.9	77	135.6	12.2	24.1	7.6	47	182.4	23.0	66.7	23.5	37	256.9	29.5	213.2	70.7
Cape Chiniak	1	143.0		27.0		1	146.0		32.0		2	208.0	18.4	95.5	24.7	6	271.8	30.2	264.0	91.8
Cape Nukshak	91	121.3	14.1	16.6	6.1	90	118.8	15.8	17.6	7.8	30	120.1	15.7	18.9	9.0	21	229.6	30.3	157.2	85.1
Cape Kekurnoi	90	138.1	15.2	25.0	9.4	68	143.3	18.7	30.5	12.1	21	156.0	19.8	39.5	16.8	29	245.9	15.2	182.5	34.1
Cape Kaguyak	4	159.0	12.4	37.3	8.7	3	182.7	11.2	58.3	9.5	1	165.0		52.0		12	272.9	32.4	258.8	91.9

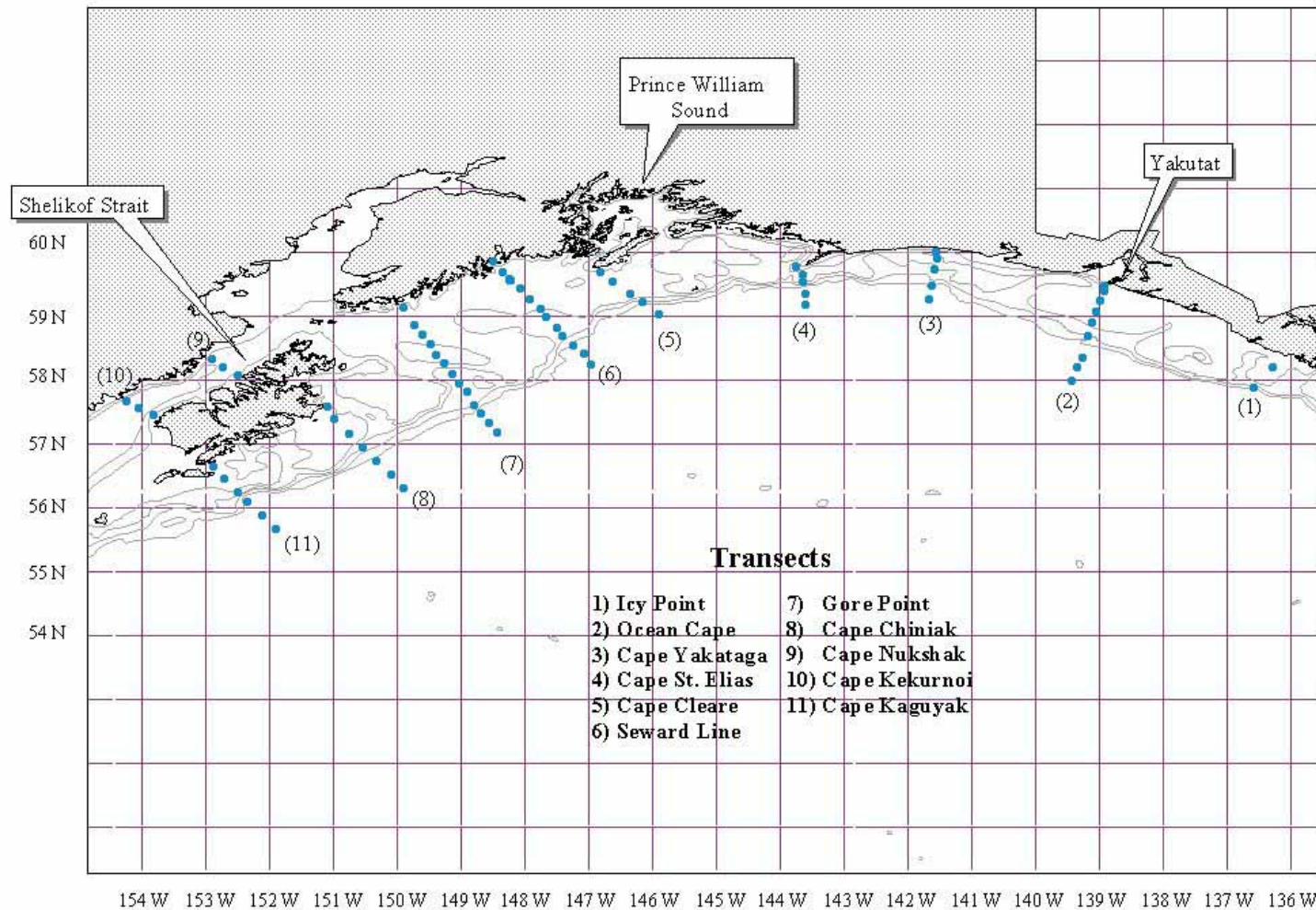


Figure 1. Transects and stations sampled by the NMFS, OCC/GLOBEC program in the Gulf of Alaska July 17 - August 6, 2001.

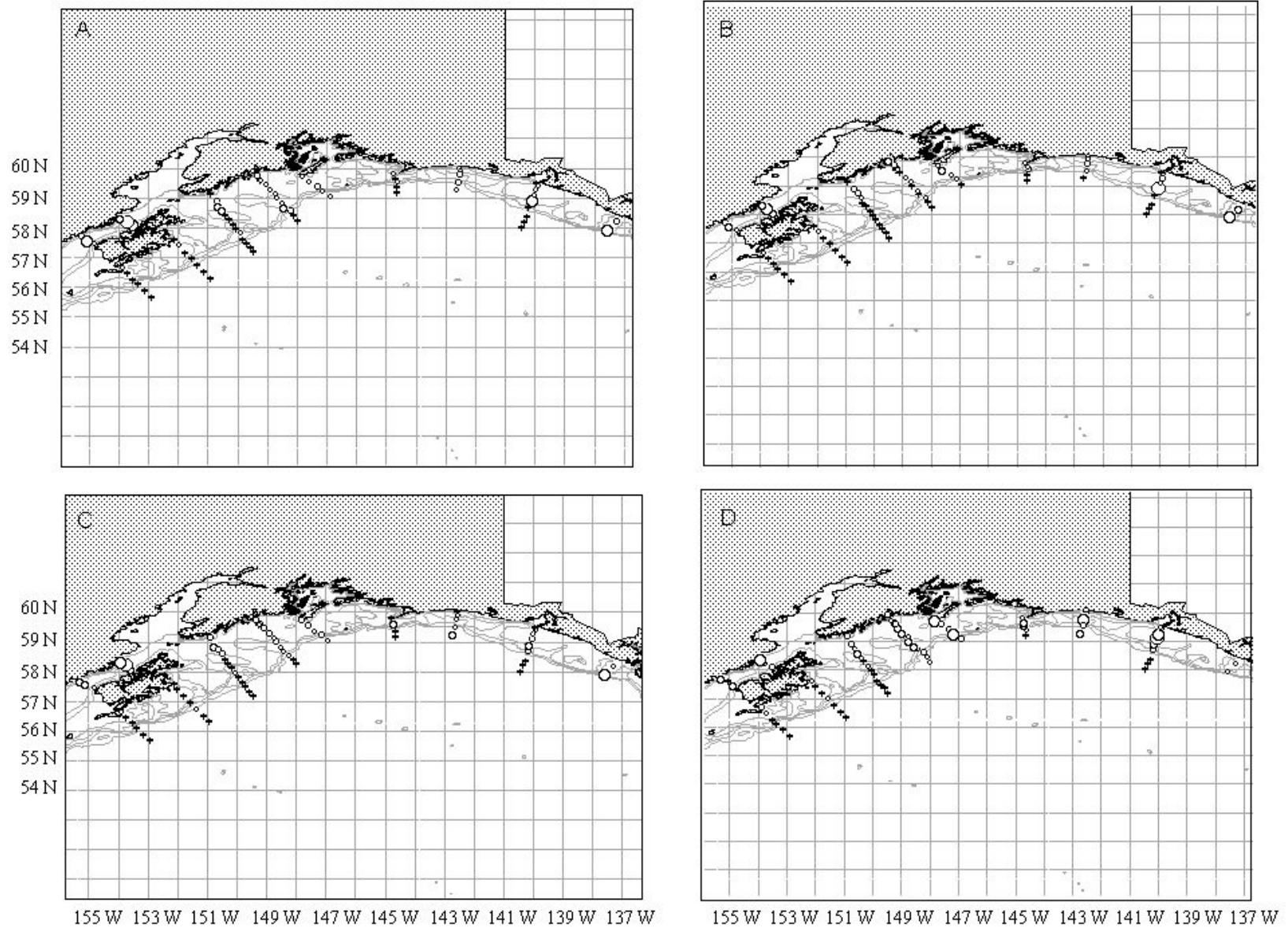


Figure 2. Distribution (shown by graduated symbol of catch per unit effort (CPUE)- see Table 4) of juvenile pink (A), chum (B), sockeye (C), and coho (D) salmon during the July-August 2001 OCC/GLOBEC Gulf of Alaska survey. (+ indicates location sampled, but no juvenile salmon of a particular species were caught)

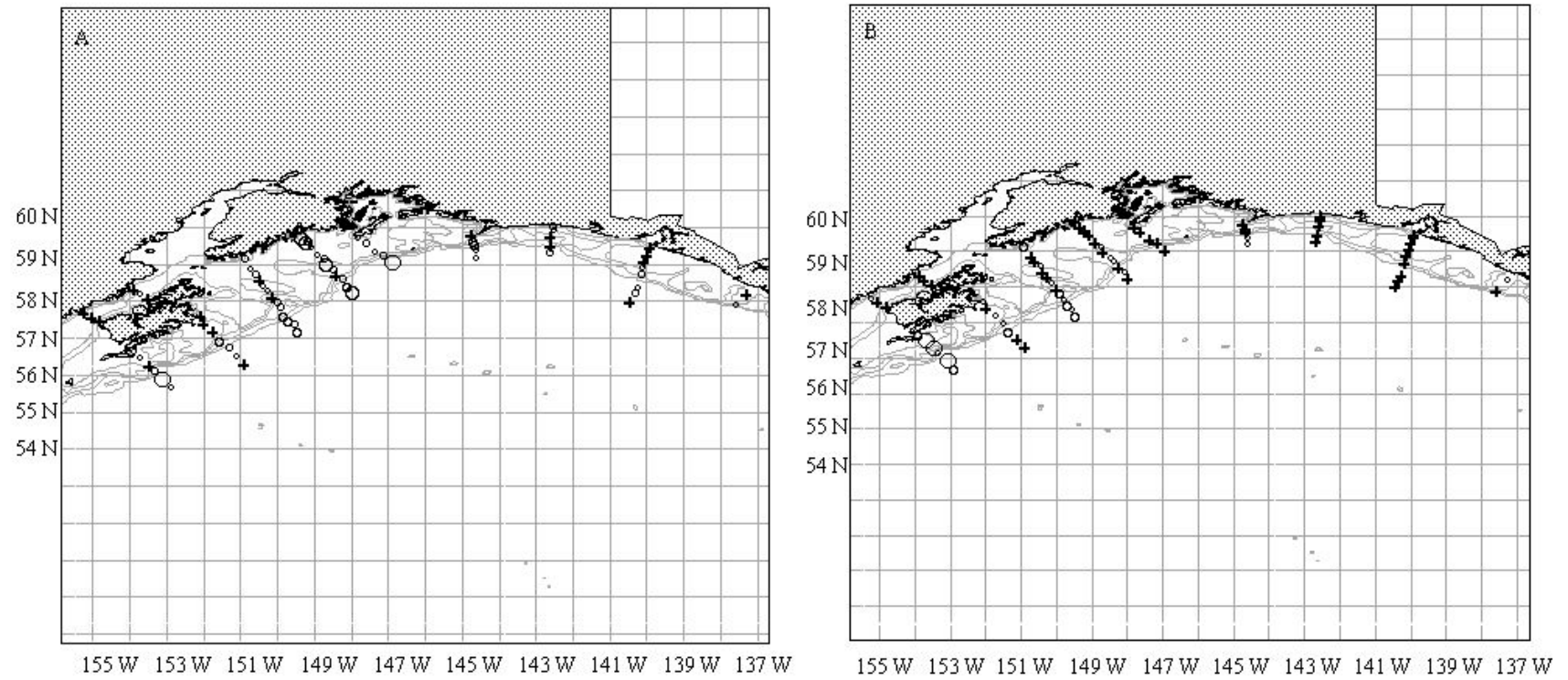


Figure 3. Distribution (shown by graduated symbol of catch per unit effort (CPUE) - see Table 4) of immature chum (A) and sockeye (B) salmon during the July-August 2001 OCC/GLOBEC Gulf of Alaska survey. (+ indicates location sampled, but no immature salmon of a particular species were caught.)

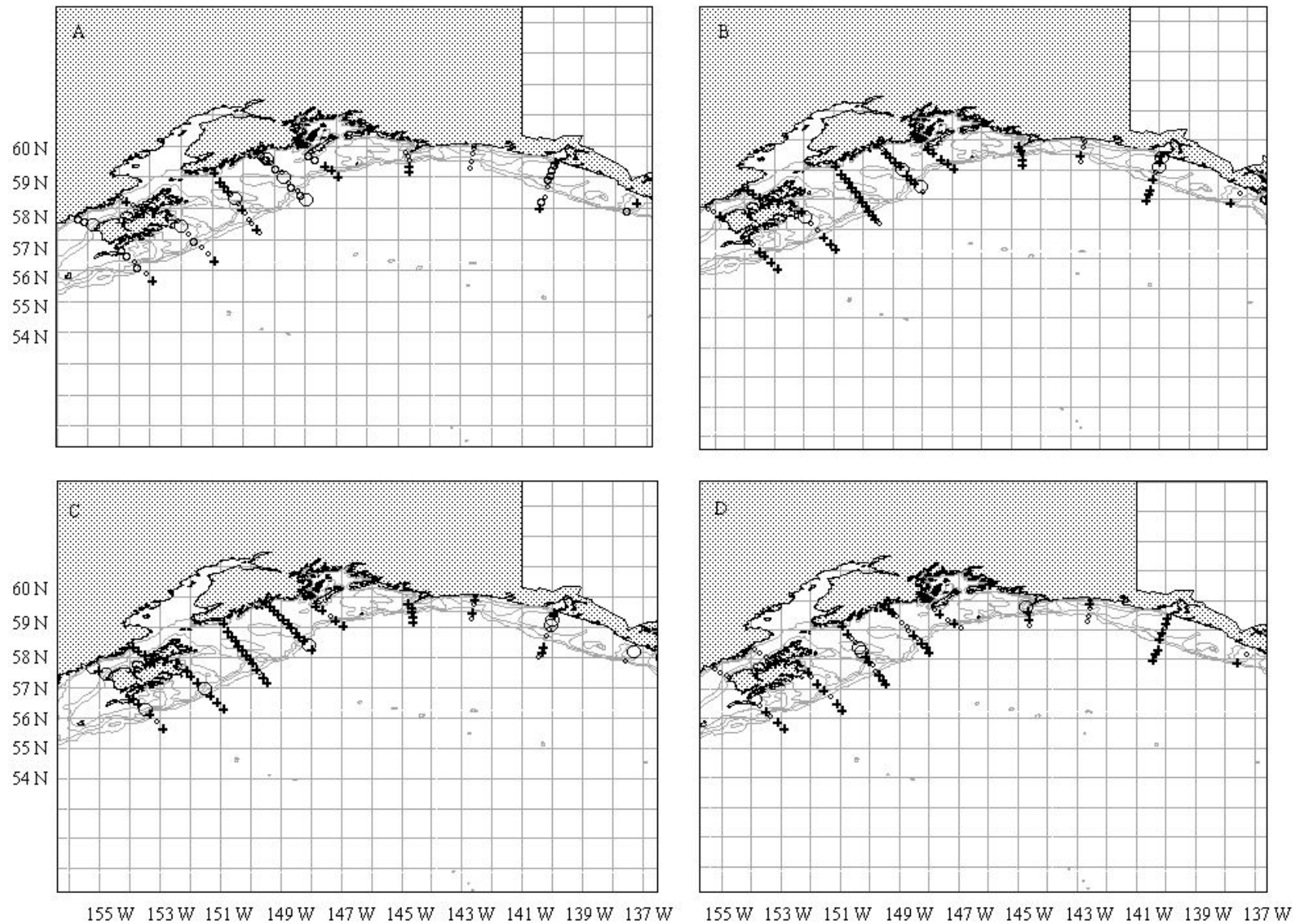


Figure 4. Distribution (shown by graduated symbol of catch per unit effort (CPUE)- see Table 4) of adult pink (A), chum (B), sockeye (C), and coho (D) salmon during the July-August 2001 OCC/GLOBEC Gulf of Alaska survey. (+ indicates location sampled, but no adult salmon of a particular species were caught)