

Southeast Alaska Coastal Monitoring Project

JC-02-13 July Cruise Report

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Prepared by

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Scientists from the Marine Salmon Investigations Program at Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA Fisheries, and JCSFO students conducted a 9-day cruise aboard the NOAA ship *John N. Cobb* in the marine waters of the northern region of southeastern Alaska 23-31 July 2002. This cruise took place in the third of four sampling periods scheduled for 2002, and was part of the Southeast Alaska Coastal Monitoring (SECM) Project. The SECM project was initiated in 1997 to study the habitat use and early marine ecology of juvenile Pacific salmon (*Oncorhynchus* spp) in inshore, strait, and coastal habitats along a primary seaward migration corridor used by juvenile salmon. These habitats span 250 km from near Juneau westward through Icy Strait to 64 km offshore in the Gulf of Alaska. Objectives for the monitoring cruises were to: 1) collect biological data on juvenile Pacific salmon and other pelagic fish species from surface rope trawl samples; 2) monitor physical and biological oceanographic indices seasonally at sampling stations in inside, strait, and offshore habitats of juvenile salmon; and 3) conduct process studies focusing on bioenergetics of juvenile salmon.

Sampling in 2002 marks the sixth year of the SECM long-term study on how the intra- and inter-annual variability of physical and biological oceanographic indices relate to the distribution, abundance, growth, and survival of salmon and other fish populations at the same localities. The information collected will also provide insight into potential effects of climate change on stock-specific growth and recruitment of salmonids, and the utilization of marine habitat by key fish species.

METHODS

Thirteen stations were scheduled for sampling during the July 2002 cruise (Table 1, Figure 1). Stations were located in Auke Bay and along three transects with four stations each in Upper Chatham Strait, Icy Strait, and off Icy Point. Oceanographic measurements were taken at all stations and trawling occurred at all stations except Auke Bay. Rope trawl samples were replicated in strait habitats without taking the full suite of oceanographic samples.

Oceanographic sampling:

The physical and biological environment was monitored at each station and throughout the cruise. To examine horizontal water structure, temperature and salinity readings were continuously logged at one-minute intervals from 2-m depth using a SeaBird SBE-21¹ thermosalinograph. To examine vertical water structure, a Seabird SBE-19 conductivity-temperature-depth (CTD) profiler was deployed at each station to 200 m or within 10 m of the bottom, dependent on depth. Surface water samples were taken at each station for later determination of chlorophyll and nutrient content.

Zooplankton was sampled at each station with conical nets hauled vertically and a bongo net system towed obliquely. At each station, vertical plankton hauls were retrieved from a depth of 20 m using a 50-cm frame and 243 micron mesh (Norpac) net. At Auke Bay, and in the Icy Strait and Icy Point transects, vertical hauls were retrieved from a depth of 200 m or within 20 m of the bottom using a 57-cm frame and 202 micron mesh (WP-2) net. A Roshiga flow meter was used inside the vertical net frames to determine the amount of water volume sampled. Also at each station, one double oblique bongo tow was done to 200 m or within 20 m of the bottom using a 60-cm frame with 505 and 333 micron mesh nets. General Oceanics flow meters were placed inside each of the bongo nets to determine the amount of water volume sampled. A Bendix/Marine Advisors Model T-1 Bathykymograph time depth recorder was used with the bongo nets to validate the maximum deployment depth of each tow. During replicate tows, only the Norpac sample was collected; however, at the ISC Icy Strait station, a second double oblique bongo tow was done to 20 meters (28 meter wire out at 45 degrees) to compare zooplankton from the zone inhabited by juvenile salmon caught in two diel periods (0400 and 1600).

Trawl Sampling:

Sampling for fish was accomplished with Nordic 264 rope trawl fished directly astern the *John N. Cobb* at the surface. The mouth opening of the trawl was approximately 20 m deep and 26 m wide, spread by a pair of 3.0 m Lite trawl doors. The trawl was fished fully open with 150 m of main warp out for a duration of 20 min at a speed of about 1.0-1.5 m/sec (2-3 knots). To fish the headrope of the trawl at the surface, a cluster of three meshed A-4 Polyform buoys was tethered to each wing tip of the headrope and one A-3 Polyform float was clipped onto the center of the headrope. Mesh sizes ranged from 162.6 cm in the throat of the trawl near the jib lines to 8.9 cm in the cod end. A 6.1 m long, 0.8 cm knotless liner was sewn into the codend. Along the jib lines on the top panel of the trawl, between the head rope and the first 162.6 cm mesh, a small mesh panel of 10.2 cm mesh was incorporated to minimize the loss of fish aft of the headrope.

After each haul, the fish caught were anaesthetized with tricaine methanesulfonate, identified, enumerated, measured, and stomachs sampled (if appropriate). Fish were measured to the

¹Reference to trade names does not imply endorsement by the NOAA Fisheries.

nearest mm fork length (FL) with a Limnotera FMB IV electronic measuring board. The heads of all chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon lacking adipose fins were retained for the possible recovery of a coded-wire tag (CWT). Stomachs from potential predators of juvenile salmon were excised, weighed, and classified by fullness. The weight of the stomach contents was determined as the difference between the weight of the stomach and contents minus the weight of the empty stomach. Stomach contents were removed and prey were generally identified to the family level and estimated to the nearest 10% of total volume.

Laboratory processing:

Data on settled volumes (SVs) of zooplankton in the 20-m vertical hauls and from decoded CWTs of fish lacking adipose fins are included in this report. Laboratory processing in progress includes 1) measurement of weight and condition of juvenile salmon; 2) determination of energetic content from frozen samples of juvenile pink, chum, and coho salmon; 3) examination for otolith thermal marks in frozen samples of juvenile chum, sockeye, coho, and chinook salmon; 4) scale samples of each species of juvenile salmon; 5) measurement of plankton displacement volumes of all Bongo net samples; and 6) zooplankton species composition and abundance from all Norpac hauls and from Bongo net samples taken in Icy Strait stations.

RESULTS and DISCUSSION

All thirteen stations scheduled for sampling in the northern region of southeastern Alaska were sampled (Table 1). Standard oceanographic sampling and surface trawling were conducted according to the following schedule:

Day 1: Auke Bay (1 station) and Upper Chatham Strait transect (3 stations); Day 2: Icy Strait transect (4 stations); Day 3: Upper Chatham Strait transect (1 station); Day 4: Icy Strait transect (5 stations); Day 5: Upper Chatham Strait transect (4 stations); Day 6: Icy Strait transect (3 stations); Day 7: Icy Point transect (4 stations); Day 8: Icy Point transect (4 stations); and Day 9: transit to Juneau NMFS subport.

Oceanographic sampling was accomplished at each station. However, the oceanographic winch did occasionally malfunction during some Bongo net retrievals. A total of 29 CTD casts, 31 Norpac tows, 26 bongo tows, and 9 WP-2 tows were made during the cruise (Table 2). Water samples were also taken at all stations for later analysis of chlorophyll and nutrients. In addition, shallow bongo samples were taken at the ISC station in the Icy Strait transect at 0400 and 1600.

Surface (2-m) temperatures and salinities ranged from 8.5 to 14.0°C and from 17.4 to 32.0 PSU (Table 3). Salinity followed the typical spatial pattern, lowest at the ABM station and increasing toward the Gulf of Alaska. Temperatures were highest at the two stations (IPC and IPD) furthest offshore in the Gulf of Alaska.

Zooplankton biomass, as determined from the SVs of the 20-m vertical tow samples, ranged from <1 to 22 ml (Table 3). Little measurable phytoplankton was present at only a couple stations, indicating low primary production at this time. Zooplankton SVs were consistently high

at the furthest offshore station (IPD) in the Gulf of Alaska.

A total of 4,028 fish was collected from 28 rope trawl hauls (Tables 3, 4, and 5). Juvenile salmon were the most frequently occurring taxon, with coho, pink, and chum salmon having the highest frequency of occurrence (75-86% of hauls). For non-salmonids, crested sculpin (*Blepsias bilobus*), occurred third most frequently (64% of hauls), but only were found in the strait habitats. Among the juvenile salmon species, chum and pink salmon were most abundant, with total catches of 1,748 and 1,691 (Tables 3 and 5); catches of juvenile coho and sockeye salmon were roughly an order of magnitude lower, while catches of juvenile chinook salmon were lowest. The 14 adult pink and 9 immature chinook salmon caught were the most abundant of large salmon (Tables 3 and 5). Juvenile salmon were caught at all strait stations and primarily at the three coastal stations inside the shelf break, within 40 km of shore.

Only 113 non-salmonids were caught in the trawl (Tables 4 and 5). By species, the largest catches were 62 crested sculpin (*Blepsias bilobus*) and 33 squid (Gonatidae); the crested sculpin occurred only in straits and the squid only in the Gulf of Alaska.

Origins were determined from salmon lacking the adipose fin that contained CWTs. Of the 18 salmon lacking the adipose fin, two of the three chinook and 13 of the 16 coho contained CWTs (Table 6). All four fish lacking the adipose fin and did not contain CWTs were captured in the Gulf of Alaska. In contrast, all of the 13 fish lacking the adipose fin recovered in the Strait habitat contained CWTs. All but one of CWTs were from juveniles; the one older fish was an age 0.1 (one-ocean, ocean-type) chinook salmon from British Columbia and was recovered in the Strait habitat. The chinook and coho juveniles recovered in the Gulf of Alaska originated from the Columbia River Basin, whereas, all the CWT juvenile coho salmon recovered in the Strait habitat were from southeastern Alaska.

Stomach analysis was done on 34 potential predators of juvenile salmon while onboard the vessel, including five immature/adult Pacific salmon species and two non-salmonid species (Table 7). The percent frequency of occurrence of principal prey categories and the incidence of empty stomachs were reported for each species (Table 7). Some degree of piscivory was exhibited by 3 salmon species examined: 6 of 9 chinook, 2 of 3 coho, and 3 of 14 pink. No piscivory on juvenile salmon was observed. Other fish prey included Pacific herring (*Clupea pallasii*), walleye pollock (*Theragra chalcogramma*), and unidentified fish larvae and remains. The main invertebrate prey consumed were: hyperiid amphipods, crab megalope and zoeae, euphausiids, and jellies (spiny dogfish only). The rate of empty stomachs ranged from 0-100%. When more than one predator per species was examined, the rate of empty stomachs was \leq 33%. (Table 7).

ACKNOWLEDGMENTS

We acknowledge and compliment the command and crew of the NOAA ship *John N. Cobb* for their cooperation and performance during the cruise. Minor modifications in the sampling schedule to account for weather allowed us to achieve our scientific objectives.

Table 1.--Localities and coordinates of stations scheduled for oceanographic sampling in the marine waters of the northern region of southeastem Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002. Distance between stations within a transect is indicated in the “between km” column.

Locality	Station	Latitude North	Longitude West	Distance		Depth m
				offshore km	between km	
Auke Bay	ABM	58° 22.00'	134° 40.00'	1.5	—	60
Upper Chatham Strait	UCA	58° 04.57'	135° 00.08'	3.2	—	400
	UCB	58° 06.22'	135° 00.91'	6.4	3.2	100
	UCC	58° 07.95'	135° 01.69'	6.4	3.2	100
	UCD	58° 09.64'	135° 02.52'	3.2	3.2	200
Icy Strait	ISA	58° 13.25'	135° 31.76'	3.2	—	128
	ISB	58° 14.22'	135° 29.26'	6.4	3.2	200
	ISC	58° 15.28'	135° 26.65'	6.4	3.2	200
	ISD	58° 16.38'	135° 23.98'	3.2	3.2	234
Icy Point	IPA	58° 20.12'	137°07.16'	6.9	—	160
	IPB	58° 12.71'	137°16.96'	23.4	16.8	130
	IPC	58° 05.28'	137°26.75'	40.2	16.8	150
	IPD	57° 53.50'	137°42.60'	65.0	24.8	1,300

Table 2.--Oceanographic and biological samples collected in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002.

Date	Time	Haul#	Station	CTD	Plankton net samples			Chlorophyll & nutrients	Rope trawl
					Norpac	Bongo	WP-2		
23 July	1045	6039	ABM	1	3	2	1	1	0
23 July	1430	6040	UCA	1	1	2	0	1	1
23 July	1630	6041	UCB	1	1	2	0	1	1
23 July	1712	6042	UCC	1	1	2	0	1	1
24 July	0735	6043	ISA	1	1	2	0	1	1
24 July	0930	6044	ISB	1	1	2	0	1	1
24 July	1220	6045	ISC	1	1	2	0	1	1
24 July	1442	6046	ISD	1	1	2	0	1	1
25 July	1055	6047	UCD	1	1	2	0	0	1
26 July	0354	6048	ISC	1	1	2 ^{shallow 20 m}	0	0	1
26 July	1012	6049	ISA	1	1	0	0	0	1
26 July	1149	6050	ISB	1	1	0	0	0	1
26 July	1536	6051	ISC	1	1	2 ^{shallow 20 m}	0	0	1
26 July	1325	6052	ISD	1	1	0	0	0	1
27 July	0728	6053	UCA	1	1	0	0	0	1
27 July	0841	6054	UCB	1	1	0	0	0	1
27 July	1325	6055	UCC	1	1	0	0	0	1
27 July	0955	6056	UCD	1	1	0	0	0	1
28 July	0735	6057	ISA	1	1	0	0	0	1
28 July	0854	6058	ISB	1	1	0	0	0	1
28 July	1000	6059	ISC	1	1	0	0	0	1
29 July	0846	6060	IPA	1	1	2	1	1	1
29 July	1125	6061	IPB	1	1	2	1	1	1
29 July	1525	6062	IPC	1	1	2	1	1	1
29 July	1830	6063	IPD	1	1	2	1	1	1
30 July	0730	6064	IPA	1	1	0	0	0	1
30 July	0840	6065	IPB	1	1	0	0	0	1
30 July	1120	6066	IPC	1	1	0	0	0	1
30 July	1433	6067	IPD	1	1	0	0	0	1
Total				29	31	26	9	13	28

Table 3.--Two meter depth temperatures and salinities, settled volumes of plankton from 20-m vertical Norpac hauls, and catches of salmon with a rope trawl at stations sampled from the NOAA ship *John N. Cobb* in marine waters of the northern region of southeastern Alaska, 23-31 July 2002. All hauls except 6048 were made during daylight hours.

Date	Haul#	Station	Temp. (°C)	Salinity (PSU)	Settled plankton (ml)			Juvenile salmon					Immature		Adult		
					Zoop-	Phyto-	Total	Pink	Chum	Sockeye	Coho	Chinook	Chinook	Pk	Co	Chu	So
23 July	6039	ABM	13.0	17.4	9.0	3.0	12.0	—	—	—	—	—	—	—	—	—	—
23 July	6040	UCA	11.1	28.3	2.0	0.0	2.0	7	16	6	36	0	1	2	0	0	0
23 July	6041	UCB	11.7	28.0	1.0	0.0	1.0	4	27	5	4	1	0	0	0	0	0
23 July	6042	UCC	12.8	26.5	2.0	0.0	2.0	65	153	5	1	0	1	1	0	0	0
24 July	6043	ISA	10.6	28.0	4.0	0.0	4.0	10	105	4	34	0	0	1	0	0	0
24 July	6044	ISB	11.9	26.5	8.0	0.0	8.0	198	174	6	3	0	0	0	0	0	0
24 July	6045	ISC	12.2	25.6	5.0	0.0	5.0	84	163	2	11	0	0	0	1	0	0
24 July	6046	ISD	13.0	23.7	4.0	0.0	4.0	351	252	9	30	0	0	0	0	0	0
25 July	6047	UCD	11.7	25.4	1.0	0.0	1.0	51	33	24	18	0	0	1	0	0	0
26 July	6048	ISC	12.7	23.8	8.0	0.0	8.0	11	30	2	8	0	1	0	1	0	0
26 July	6049	ISA	10.5	27.3	7.5	0.0	7.5	30	16	0	1	0	0	0	0	0	0
26 July	6050	ISB	10.7	27.3	11.0	0.0	11.0	31	43	4	8	0	2	2	0	0	0
26 July	6051	ISC	12.7	24.0	3.5	0.0	3.5	449	459	18	5	0	0	0	0	0	0
26 July	6052	ISD	11.9	25.4	3.5	0.0	3.5	7	28	2	12	1	1	0	1	0	0
27 July	6053	UCA	10.8	27.8	3.0	0.0	3.0	0	0	0	8	0	0	0	0	0	0
27 July	6054	UCB	10.5	27.7	2.5	0.0	2.5	3	0	0	7	0	1	1	0	0	0
27 July	6055	UCC	11.4	27.3	1.5	0.0	1.5	4	30	8	27	0	1	0	0	0	0
27 July	6056	UCD	10.9	27.7	1.0	0.0	1.0	147	110	44	20	1	0	0	0	1	1
28 July	6057	ISA	8.5	30.0	4.0	0.0	4.0	0	0	0	2	0	0	1	0	0	0
28 July	6058	ISB	8.5	29.9	3.5	0.0	3.5	0	0	0	6	0	0	0	0	0	0
28 July	6059	ISC	10.4	28.5	19.0	0.0	19.0	0	0	0	19	0	0	1	0	0	0
29 July	6060	IPA	10.0	31.3	3.5	0.0	3.5	1	4	6	1	1	1	0	0	0	0
29 July	6061	IPB	12.5	31.7	6.5	0.0	6.5	149	34	10	1	1	0	2	0	0	0
29 July	6062	IPC	13.9	31.9	18.0	4.0	22.0	1	1	0	0	0	0	0	0	0	0
29 July	6063	IPD	14.0	31.9	22.0	0.0	22.0	0	0	0	0	0	0	1	0	0	0
30 July	6064	IPA	10.5	30.3	3.0	0.0	3.0	4	15	0	0	2	0	0	0	0	0
30 July	6065	IPB	12.0	31.1	4.0	0.0	4.0	43	31	11	11	0	0	0	0	0	0
30 July	6066	IPC	13.3	32.0	4.0	0.0	4.0	41	24	1	0	0	0	0	0	0	0
30 July	6067	IPD	13.6	31.9	11.0	0.0	11.0	0	0	0	1	0	0	1	0	0	0
Total catch			—	—	—	—	—	1,691	1,748	167	274	7	9	14	3	1	1

Table 4.--Catches of fish other than salmon with a rope trawl at stations sampled in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002. All hauls except 6048 were made during daylight hours.

Date	Haul#	Station	Crested sculpin	Squid	Walleye pollock	Pacific spiny lump sucker	Salmon shark	Wolf-eel	Spiny dogfish
23 July	6039	ABM	—	—	—	—	—	—	—
23 July	6040	UCA	2	0	1	0	0	0	0
23 July	6041	UCB	1	0	1	0	0	0	0
23 July	6042	UCC	2	0	0	0	0	0	0
24 July	6043	ISA	12	0	0	2	0	0	0
24 July	6044	ISB	0	0	0	0	0	0	0
24 July	6045	ISC	5	0	0	0	0	0	0
24 July	6046	ISD	2	0	0	0	0	0	0
25 July	6047	UCD	2	0	0	0	0	0	0
26 July	6048	ISC	2	0	0	0	0	0	0
26 July	6049	ISA	0	0	0	1	0	0	0
26 July	6050	ISB	1	0	0	0	0	0	0
26 July	6051	ISC	2	0	1	1	0	1	0
26 July	6052	ISD	3	0	0	0	0	1	0
27 July	6053	UCA	5	0	0	0	0	0	0
27 July	6054	UCB	2	0	1	0	0	0	0
27 July	6055	UCC	8	0	0	0	0	0	0
27 July	6056	UCD	2	0	0	0	0	0	0
28 July	6057	ISA	5	0	0	0	1	0	0
28 July	6058	ISB	3	0	1	2	0	0	0
28 July	6059	ISC	3	0	0	0	1	0	0
29 July	6060	IPA	0	0	0	0	0	0	0
29 July	6061	IPB	0	0	1	0	0	0	0
29 July	6062	IPC	0	8	0	0	0	0	1
29 July	6063	IPD	0	25	0	0	0	0	0
30 July	6064	IPA	0	0	1	0	0	0	0
30 July	6065	IPB	0	0	0	0	0	0	0
30 July	6066	IPC	0	0	0	0	0	0	0
30 July	6067	IPD	0	0	0	0	0	0	0
Total			62	33	7	6	2	2	1

Table 5.--Length, frequency of occurrence, and life history stage of fish captured in 28 rope trawl hauls in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002.

Common name	Species	n ³	Fork length (mm)			Frequency of occurrence	Life ² history stage
			min	max	\bar{x}		
Chum salmon	<i>Oncorhynchus keta</i>	1,748	88	196	124.1	75%	J
Pink salmon	<i>O. gorbuscha</i>	1,691	79	200	114.8	79%	J
Coho salmon	<i>O. kisutch</i>	274	160	299	211.9	86%	J
Sockeye salmon	<i>O. nerka</i>	177	79	189	148.8	64%	J
Chinook salmon	<i>O. tshawytscha</i>	7	208	310	247.1	21%	J
Chinook salmon	<i>O. tshawytscha</i>	9	344	650	454.2	29%	I
Pink salmon	<i>O. gorbuscha</i>	14	418	542	492.8	39%	A
Coho salmon	<i>O. kisutch</i>	3	616	688	649.7	11%	A
Chum salmon	<i>O. keta</i>	1	625	625	625.0	4%	A
Sockeye salmon	<i>O. nerka</i>	1	335	335	335.0	4%	A ⁴
Total salmonids captured and measured ³		3,915	—	—	—	—	—
Crested sculpin	<i>Blepsias bilobus</i>	62	64	129	95.6	64%	I-A
Squid	Gonatidae	33	16	51	26.9	14%	I
Walleye pollock	<i>Theragra chalcogramma</i>	7	37	605	365.1	25%	J-A
P. Spiny lump sucker	<i>Eumicrotremus orbis</i>	6	50	70	58.8	7%	I
Wolf- Eel	<i>Anarrhichthys ocellatus</i>	2	71	430	250.5	7%	A
Salmon shark	<i>Lamna ditropis</i>	2	1910	2000	1955.0	7%	A
Spiny dogfish	<i>Squalus acanthias</i>	1	770	770	770.0	4%	A
Total non-salmonids captured		113	—	—	—	—	—
Total fish and squid captured		4,028	—	—	—	—	—

²J = juvenile or post larvae in first year at sea (i.e., age -.0), I = immature age -.1 or older in pre-spawn condition, and A = mature adult or near age of maturity

³Some species were subsampled for length data; actual numbers of the following species of juvenile salmon were measured: 1,341 chum, salmon, 1,581 pink, and 272 coho

⁴Maturing male

Table 6.--Release and recovery information on salmon lacking the adipose fin or coded-wire tagged that were captured in the in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002.

Species	Release information					Recovery information							Marine			
	Coded-wire tag code	Brood year	Agency ⁵	Locality	Date	Size		Locality (station code)	Date	Size		Age ⁶	Days since release	Distance traveled	km	km/d
						mm	g			mm	g			km	km/d	
Chinook	18:31/31	2000	CDFO	Wannock R., B. C.	06/28/01	—	3.5	Chatham St. (UCC) Haul#6042 Fish# 227	07/23/02	344	560.0	0.1	390	700	1.8	
Chinook	63:06/92	2000	WDFW	Lewis River, WA	03/20/2002	—	53.7	Icy Point (IPA) Haul# 6064 Fish# 1	07/30/02	310	381.3	1.0	132	1,600	12.1	
Chinook	No tag	—	—	—	—	—	—	Icy Point (IPA) Haul# 6060 Fish# 1	07/29/02	215	132.1	—	—	—	—	
Coho	04:04/76	99-00	ADFG	Berners River, AK	5/14-6/6/02	105	—	Chatham St. (UCA) Haul# 6040 Fish# 1	07/23/02	217	121.6	~1.0	~63	40	~0.6	
Coho	04:05/52	2000	ADFG	Chilkat River, AK	05/19/02	86	6.4	Chatham St. (UCA) Haul# 6040 Fish# 2	07/23/02	201	89.1	—	—	—	—	
Coho	04:48/33	2000	NSRA	Kasnyku Bay, AK	06/01/02	—	20.5	Chatham St. (UCC) Haul# 6042 Fish# 1	07/23/02	203	105.0	—	—	—	—	
Coho	04:05/77	2000	DIPAC	Sheep Creek, AK	05/21/02	—	12.3	Icy Strait (ISA) Haul# 6043 Fish# 32	07/24/02	212	107.2	1.0	64	70	1.1	
Coho	04:05/73	2000	DIPAC	Sheep Creek, AK	05/21/02	—	12.3	Icy Strait (ISA) Haul# 6043 Fish# 33	07/24/02	177	61.7	1.0	64	70	1.1	
Coho	04:04/76	99-00	ADFG	Berners River, AK	5/14-6/6/02	105	—	Icy Strait (ISA) Haul# 6043 Fish# 34	07/24/02	204	95.9	~1.0	~62	70	~1.1	
Coho	04:32/08	99-00	ADFG	Berners River, AK	06/6-13/02	105	—	Icy Strait (ISD) Haul# 6046 Fish# 1	07/24/02	207	102.9	~1.0	~44	80	~1.8	
Coho	04:48/32	2000	NSRA	Kasnyku Bay, AK	06/05/02	—	22.1	Icy Strait (ISD) Haul# 6046 Fish# 2	07/24/02	219	124.0	~1.0	49	130	2.7	

Table 6.-- (cont.)

Species	Coded-wire tag code	Brood year	Release information				Recovery information						Marine distance traveled		
			Agency ⁵	Locality	Date	Size mm g	Locality (station code)	Date	Size mm g	Age ⁶	Days since release	km	km/d		
Coho	04:48/33	2000	NSRA	Kasnyku Bay, AK	06/01/02	—	20.5	Chatham St. (UCC) Haul# 6055 Fish# 1	07/23/02	227	140.9	1.0	52	100	1.9
Coho	04:48/33	2000	NSRA	Kasnyku Bay, AK	06/01/02	—	20.5	Icy Strait (ISC) Haul# 6045 Fish# 1	07/24/02	236	154.8	1.0	53	130	2.5
Coho	04:04/76	99-00	ADFG	Berners River, AK	5/14-6/6/02	105	—	Icy Strait (ISC) Haul# 6051 Fish# 5	07/26/02	245	172.9	~1.0	66	80	1.2
Coho	04:48/51	2000	NSRA	Kasnyku Bay, AK	06/05/02	—	22.4	Icy Strait (ISD) Haul# 6052 Fish# 1	07/26/02	187	70.4	1.0	51	130	2.5
Coho	No tag	—	—	—	—	—	—	Icy Point (IPB) Haul# 6065 Fish# 1	07/30/02	264	222.6	—	—	—	—
Coho	63:10/90	2000	WDFW	Toutle River, WA	??/??/02	—	—	Icy Point (IPB) Haul# 6065 Fish# 2	07/30/02	237	149.7	1.0	??	1,600	??
Coho	No tag	—	—	—	—	—	—	Icy Point (IPB) Haul# 6065 Fish# 3	07/30/02	275	257.0	—	—	—	—
Coho	No tag	—	—	—	—	—	—	Icy Point (IPB) Haul# 6065 Fish# 4	07/30/02	225	138.2	—	—	—	—

⁵ADFG=Alaska Department of Fish and Game, CDFO=Canadian Department of Fisheries and Oceans, DIPAC=Douglas Island Pink and Chum Corporation, and NSRA=Northern Southeast Regional Aquaculture Association, and WDFW=Washington Department of Fish and Wildlife.

⁶European age notation, with the numeral before the decimal denoting the number of freshwater winters and the numeral following the decimal denoting marine winters.

Table 7.--Percent frequency of occurrence of prey categories in stomachs of predators examined during sampling in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002. The number of stomachs examined is shown in parentheses for each species.

Prey category	Pacific salmon (immature/adult)					Non-salmonids	
	Chinook (9)	Chum (1)	Coho (3)	Pink (14)	Sockeye (1)	Spiny dogfish (1)	Walleye pollock (5)
				<u>Invertebrate prey</u>			
Amphipods, Hyperiid	12.5	0.0	0.0	50.0	0.0	0.0	40.0
Crab megalops	12.5	0.0	0.0	21.4	0.0	0.0	40.0
Crab zoeae	12.5	0.0	0.0	71.4	0.0	0.0	60.0
Euphausiids	37.5	0.0	0.0	28.6	0.0	0.0	20.0
Jellies	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Other	12.5	0.0	0.0	0.0	0.0	0.0	0.0
				<u>Fish prey</u>			
Herring	12.5	0.0	0.0	0.0	0.0	0.0	0.0
Walleye Pollock	12.5	0.0	33.3	0.0	0.0	0.0	0.0
Unidentified larvae	12.5	0.0	0.0	14.3	0.0	0.0	0.0
Unknown remains	37.5	0.0	33.3	7.1	0.0	0.0	0.0
Empty stomachs	12.5	100.0	33.3	14.3	100.0	0.0	20.0

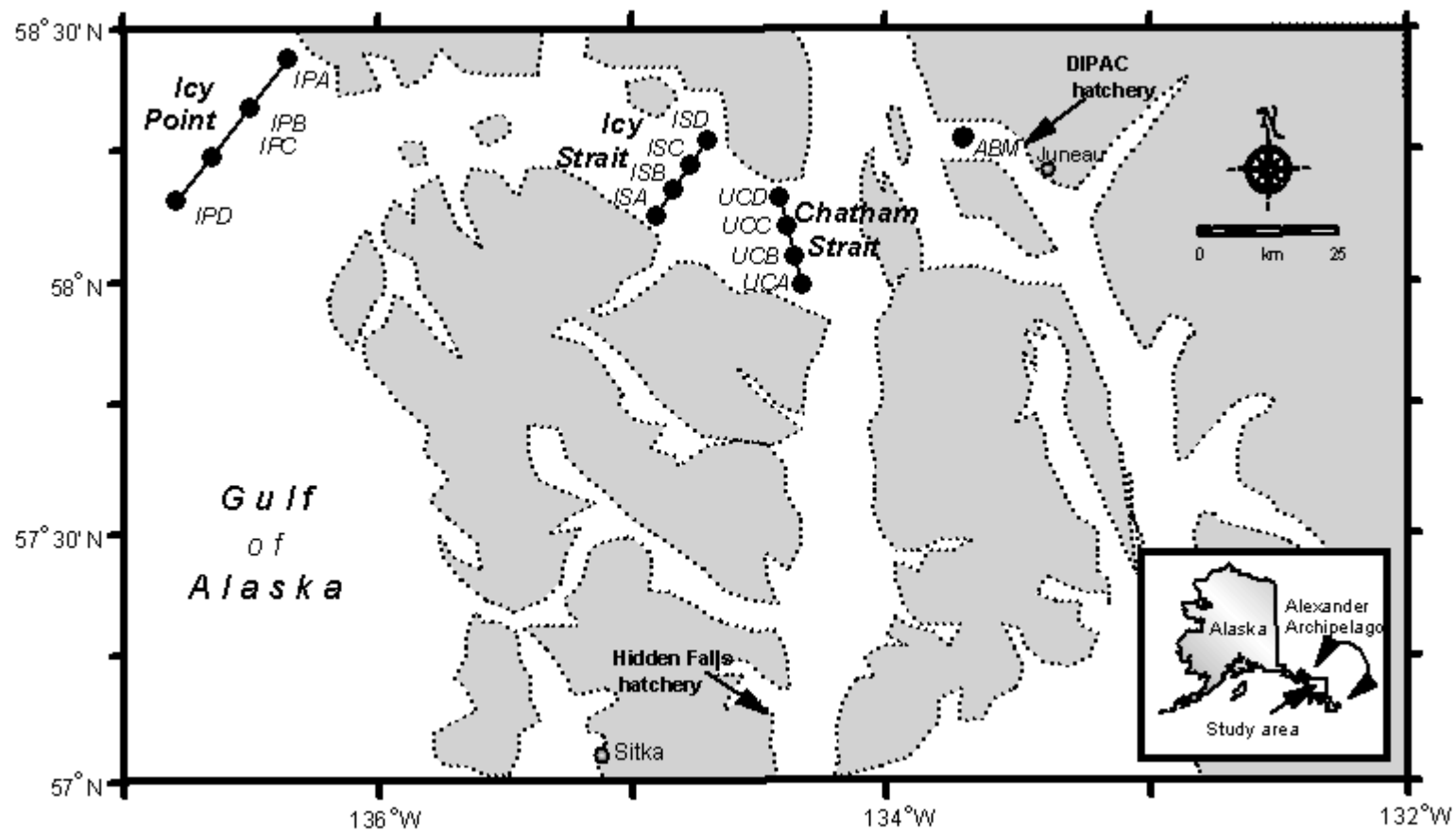


Figure 1.--Thirteen stations sampled in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-31 July 2002.