

Southeast Alaska Coastal Monitoring Project

JC-02-16 August Cruise Report

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Prepared by

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Scientists from the Marine Salmon Investigations Program at Auke Bay Laboratory, NOAA Fisheries, along with a collaborating scientist from the Northwest Fisheries Science Center and a JCFOS student conducted an 8-day cruise aboard the NOAA ship *John N. Cobb* in the marine waters of the northern region of southeastern Alaska 23-30 August 2002. This cruise completes four Southeast Alaska Coastal Monitoring (SECM) Project sampling periods scheduled for 2002. 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 these cruises were to: 1) collect biological data on juvenile Pacific salmon and other pelagic fish species from surface rope trawl samples and 2) monitor physical and biological oceanographic indices seasonally at sampling stations in inside, strait, and offshore habitats 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 August 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 in the Gulf of Alaska. Oceanographic measurements were taken at all stations and trawling occurred at all stations except Auke Bay. Rope trawl

samples were replicated at all previously trawled stations with minimal accompanying oceanographic sampling.

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 upon depth. Surface water samples were taken at each station for later determination of chlorophyll and nutrient content.

Zooplankton was sampled at each station using conical nets hauled vertically and a bongo net system hauled obliquely. At each station, vertical plankton hauls were taken from a depth of 20 m using a 50-cm frame and 243 micron mesh (NORPAC) net. At Auke Bay, and at stations along the Icy Strait and Icy Point transects, vertical hauls were taken 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, and one double oblique bongo haul was taken from 200 m or within 20 m of the bottom using a 60-cm frame with 505 and 333 micron mesh nets. To determine the volume of water sampled a Roshiga flow meter was used inside the vertical net frames and a General Oceanics flow meter was used inside the bongo net frames. 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 haul. During replicate hauls, plankton was sampled with a NORPAC net only.

Trawl Sampling:

A Nordic 264 rope trawl fished, at the surface, directly astern the *John N. Cobb* was used to sample fish. The mouth opening of the trawl was approximately 20 m deep and 26 m wide, spread by a pair of 3 m Lite trawl doors. The trawl was fished fully open with 150 m of main warp out for a duration of 20 minutes 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 nearest mm fork length (FL) with a Limnoterra FMB IV electronic measuring board. The heads

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

of all chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon lacking adipose fins were retained for the possible recovery of coded-wire tags (CWTs). Stomachs from potential predators of juvenile salmon were excised, weighed, and classified by fullness. Stomach contents were removed and identified to a practical level and estimated to the nearest 10% of total volume. The weight of the stomach contents was determined as the weight of the stomach and contents minus the weight of the empty stomach.

Laboratory processing:

Data on settled volumes (SVs, ml) of zooplankton in the 20-m vertical hauls and from decoded CWTs of fish lacking adipose fins are included in this report. Laboratory processing still 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) microscopic analysis zooplankton species composition and abundance estimation from all NORPAC and bongo net samples taken at the Icy Strait stations. These data will be reported in an annual North Pacific Anadromous Fish Commission document.

RESULTS and DISCUSSION

All thirteen stations 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 (4 stations)

Day 2: Icy Strait transect (4 stations)

Day 3: Icy Point transect (4 stations)

Day 4: Icy Point transect (3² stations)

Day 5: Icy Strait transect (4 stations)

Day 6: Upper Chatham Strait transect (4 stations)

Day 7: Icy Strait transect (4 stations) and transit to Juneau NMFS Subport

Day 8: Offload supplies.

A total of 28 CTD casts, 30 NORPAC hauls, 18 bongo hauls, and nine WP-2 hauls were made during the cruise (Table 2). Thirteen water samples were taken at all stations for later analysis of chlorophyll and nutrients.

Surface (2-m) temperatures and salinities ranged from 9.5 to 14.0°C and 17.7 to 31.9 PSU (Table

² Due to inclement weather only oceanographic sampling was completed at Icy Point station IPC.

3). Salinities followed the spatial pattern observed in previous cruises, lowest at the ABM station and increasing toward the Gulf of Alaska. Temperatures were highest at the two stations furthest offshore in the Gulf of Alaska (IPC and IPD), and lowest at the southernmost station in Icy Strait (ISA).

Zooplankton biomass, as determined from the SVs of the NORPAC samples, ranged from <1 to 38 ml, with the highest SVs found at Icy Point and the lowest SVs found at Upper Chatham Strait (Table 3). High SVs of phytoplankton were found at ABM (48, 47, 50 ml), indicating a secondary phytoplankton bloom.

A total of 1,313 fish were collected from 26 rope trawl hauls (Tables 3, 4, and 5). Juvenile salmon were the most frequently occurring taxon, with coho and pink salmon having the highest frequency of occurrence (77 & 69% of hauls). For non-salmonids, crested sculpin (*Blepsias bilobus*), occurred third most frequently (54% of hauls). The most abundant juvenile salmon species caught were pink and chum salmon, with total catches of 878 and 175 (Tables 3 and 5); catches of juvenile coho and sockeye salmon were roughly an order of magnitude lower, whereas catches of juvenile chinook salmon were lowest. The most abundant immature/adult salmon species caught were adult coho and immature chinook, with catches of twelve and six (Tables 3 and 5). Juvenile salmon were caught at all strait stations and primarily at the Icy Point coastal station IPA, within 6.9 km of shore. The largest catches were in Icy Strait.

Only 100 non-salmonids were caught (Tables 4 and 5). The most abundant non-salmonid species caught were crested sculpin and capelin (*Mallotus villosus*), with catches of 40 and 25. These species were only caught at the Upper Chatham and Icy Strait stations.

Two chinook and three coho salmon lacking adipose fins were caught; of these, one chinook and three coho contained CWTs. Origins of these salmon were determined from the CWTs (Table 6). The age 1.1 chinook was released at Auke Bay, AK on 13 June 2001 and caught at Icy Strait on 28 August 2002. Two of the coho, caught at Icy Strait and Icy Point, were age 1.0, whereas the third coho, caught at Icy Point, was age 2.0.

Stomach analysis was done on 27 potential predators of juvenile salmon, including four immature/adult Pacific salmon species and two non-salmonid species (Table 7). The percent frequency of occurrence (FO) of principal prey categories and empty stomachs were reported for each species (Table 7). Some degree of piscivory was exhibited by two salmon species and two non-salmonid species examined: 33% pink, 67% coho, 25% pollock (*Theragra chalcogramma*), and 100% sablefish (*Anoplopoma fimbria*). Piscivory on juvenile pink salmon was exhibited by coho salmon (25%) and sablefish (100%); no other species of juvenile salmon was found in predator stomachs. Other fish prey included Pacific herring (*Clupea pallasii*), walleye pollock, and unidentified fish larvae and remains. Among species that fed principally on invertebrates, chinook and pink salmon and walleye pollock consumed hyperiid amphipods, cephalopods, crab megalope and zoeae, and euphausiids. The %FO of empty stomachs ranged from 0-100%. Among those species where feeding was observed the %FO of empty stomachs was \leq 80%. (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. Flexibility in the sampling schedule, to account for weather, allowed us to meet our scientific objectives.

Table 1.--Localities and coordinates of stations scheduled for oceanographic sampling in the marine waters of the northern region of southeastern Alaska off the NOAA ship *John N. Cobb*, 23-30 August 2002. Distance between refers to adjacent stations in a transect locality.

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.—Number of oceanographic and biological samples collected in the marine waters of the northern region of southeastern Alaska using the NOAA ship *John N. Cobb*, 23-30 August 2002.

Date	Time	Haul#	Station	Plankton net samples				Chlorophyll & nutrients	Rope trawl
				CTD	NORPAC	Bongo	WP-2		
23 August	1013	6069	ABM	1	3	2	1	1	0
23 August	1410	6070	UCD	1	1	0	0	1	1
23 August	1623	6071	UCC	1	1	0	0	1	1
23 August	1812	6072	UCB	1	1	0	0	1	1
23 August	1924	6073	UCA	1	1	0	0	1	1
24 August	0711	6074	ISA	1	1	2	1	1	1
24 August	0845	6075	ISB	1	1	2	1	1	1
24 August	1025	6076	ISC	1	1	2	1	1	1
24 August	1235	6077	ISD	1	1	2	1	1	1
25 August	0743	6078	IPA	1	1	2	1	1	1
25 August	1012	6079	IPB	1	1	2	1	1	1
25 August	1235	6080	IPC	1	1	2	1	1	1
25 August	1520	6081	IPD	1	1	2	1	1	1
26 August	0740	6082	IPA	1	1	0	0	0	1
26 August	0922	6083	IPB	1	1	0	0	0	1
26 August	1109	6084	IPC	1	1	0	0	0	0
27 August	0710	6085	ISA	1	1	0	0	0	1
27 August	0830	6086	ISB	1	1	0	0	0	1
27 August	0946	6087	ISC	1	1	0	0	0	1
27 August	1417	6088	ISD	1	1	0	0	0	1
28 August	0713	6089	ISA	1	1	0	0	0	1
28 August	0827	6090	ISB	1	1	0	0	0	1
28 August	1009	6091	ISC	1	1	0	0	0	1
28 August	1208	6092	ISD	1	1	0	0	0	1
29 August	0735	6093	UCA	1	1	0	0	0	1
29 August	0835	6094	UCB	1	1	0	0	0	1
29 August	0955	6095	UCC	1	1	0	0	0	1
29 August	1155	6096	UCD	1	1	0	0	0	1
Total				28	30	18	9	13	26

Table 3.—Two meter depth temperatures and salinities, 20-m vertical NORPAC plankton settled volumes (SVs), and number of salmon caught in rope trawl hauls from the NOAA ship *John N. Cobb* at stations in marine waters of the northern region of southeastern Alaska, 23-30 August 2002.

Date	Haul#	Station	Temp. (°C)	Salinity (PSU)	Plankton SVs (ml)			Juvenile salmon					Immature	Adult			
					Zoop-	Phyto-	Total	Pink	Chum	Sockeye	Coho	Chinook	Chinook	Pink	Coho	Chum	
23 August	6069	ABM	10.4	17.7	10.0	48.0	58.0	—	—	—	—	—	—	—	—	—	—
23 August	6070	UCD	11.4	28.1	0.5	47.0	62.0	1	0	0	5	0	1	0	1	0	0
23 August	6071	UCC	9.9	29.7	0.3	50.0	70.0	3	0	1	1	0	0	0	0	0	0
23 August	6072	UCB	10.3	29.5	0.3	0.0	0.5	0	0	0	1	0	1	0	0	0	0
23 August	6073	UCA	10.0	29.7	0.4	0.0	0.3	0	0	0	3	0	0	0	0	0	0
24 August	6074	ISA	9.5	29.4	2.0	0.0	0.3	0	0	0	1	0	0	1	0	0	0
24 August	6075	ISB	10.5	28.8	2.5	0.0	0.4	7	0	1	10	2	0	0	1	0	0
24 August	6076	ISC	10.7	28.5	0.8	0.0	2.0	46	7	1	3	0	0	0	0	0	0
24 August	6077	ISD	10.7	28.8	1.0	0.0	2.5	2	2	0	4	0	0	0	0	0	0
25 August	6078	IPA	13.5	31.5	17.0	0.0	0.8	40	3	1	1	0	0	0	0	2	0
25 August	6079	IPB	13.0	31.7	13.0	0.0	1.0	0	0	0	2	0	0	0	0	0	0
25 August	6080	IPC	13.8	31.7	7.0	0.0	17.0	0	0	0	3	0	0	0	0	0	0
25 August	6081	IPD	13.8	31.5	38.0	0.0	38.0	0	0	0	0	0	0	0	0	0	0
26 August	6082	IPA	13.5	31.7	11.0	0.0	11.0	22	6	4	3	0	0	0	0	0	0
26 August	6083	IPB	13.2	31.4	7.0	0.0	7.0	0	0	0	1	0	0	0	0	0	0
26 August	6084	IPC	14.0	31.9	3.5	0.0	3.5	—	—	—	—	—	—	—	—	—	—
27 August	6085	ISA	9.8	28.6	6.5	0.0	6.5	10	4	0	0	0	0	0	1	0	0
27 August	6086	ISB	11.9	21.1	5.0	0.0	5.0	10	3	4	0	0	0	0	0	0	1
27 August	6087	ISC	11.3	20.7	8.0	0.0	8.0	383	94	35	8	0	1	0	2	0	0
27 August	6088	ISD	11.4	21.1	8.5	0.0	8.5	61	5	3	2	1	0	1	0	0	0
28 August	6089	ISA	10.1	25.1	5.0	0.0	5.0	3	0	2	1	0	1	0	0	0	0
28 August	6090	ISB	11.2	20.7	6.0	0.0	6.0	19	2	2	4	1	0	1	2	0	0
28 August	6091	ISC	11.3	20.8	6.0	0.0	6.0	27	12	14	4	1	0	0	1	0	0
28 August	6092	ISD	11.5	20.1	6.0	0.0	6.0	231	36	5	2	0	1	0	0	0	0
29 August	6093	UCA	10.9	25.4	0.5	0.0	0.5	0	0	0	0	0	0	0	1	0	0
29 August	6094	UCB	10.1	28.9	0.4	0.0	0.4	4	0	0	1	0	0	0	0	0	0
29 August	6095	UCC	10.4	28.3	0.4	0.0	0.4	4	0	0	0	1	0	0	1	0	0
29 August	6096	UCD	10.8	27.0	0.5	0.0	0.5	5	1	0	0	0	0	0	0	0	0
Total Catch			—	—	—	—	—	878	175	73	60	6	5	3	12	1	—

Table 4.—Number of non-salmonids caught in rope trawl hauls from the NOAA ship *John N. Cobb* at stations in marine waters of the northern region of southeastern Alaska, 23-30 August 2002.

Date	Haul#	Station	Crested sculpin	Capelin	Squid	Walleye pollock	Pacific spiny lump sucker	Black rockfish	Sablefish	Smooth lump sucker	Salmon shark
23 August	6069	ABM	—	—	—	—	—	—	—	—	—
23 August	6070	UCD	0	0	0	0	0	0	0	0	0
23 August	6071	UCC	4	0	1	0	0	0	0	0	0
23 August	6072	UCB	2	0	0	0	0	0	0	0	0
23 August	6073	UCA	5	0	0	1	0	0	0	0	0
24 August	6074	ISA	3	0	0	2	1	0	0	0	0
24 August	6075	ISB	4	0	0	1	0	0	0	0	0
24 August	6076	ISC	3	0	0	0	0	0	0	0	0
24 August	6077	ISD	3	0	0	0	0	0	0	0	0
25 August	6078	IPA	0	0	0	0	0	0	2	0	0
25 August	6079	IPB	0	0	0	0	0	0	0	0	0
25 August	6080	IPC	0	0	19	0	0	0	0	0	1
25 August	6081	IPD	0	0	0	0	0	3	0	0	0
26 August	6082	IPA	0	0	0	0	0	0	0	0	0
26 August	6083	IPB	0	0	1	0	0	0	0	0	0
26 August	6084	IPC	—	—	—	—	—	—	—	—	—
27 August	6085	ISA	0	25	0	0	1	0	0	1	0
27 August	6086	ISB	0	0	0	0	1	0	0	0	0
27 August	6087	ISC	4	0	0	0	0	0	0	0	0
27 August	6088	ISD	1	0	0	0	0	0	0	0	0
28 August	6089	ISA	2	0	0	0	0	0	0	0	0
28 August	6090	ISB	2	0	0	0	0	0	0	0	0
28 August	6091	ISC	0	0	0	0	0	0	0	0	0
28 August	6092	ISD	4	0	0	0	0	0	0	0	0
29 August	6093	UCA	1	0	0	0	0	0	0	0	0
29 August	6094	UCB	0	0	0	0	0	0	0	0	0
29 August	6095	UCC	0	0	0	0	0	0	0	0	0
29 August	6096	UCD	2	0	0	0	0	0	0	0	0
Total			40	25	21	4	3	3	2	1	1

Table 5.—Length, percent frequency of occurrence (FO), and life history stage of fish caught in 26 rope trawl hauls from the NOAA ship *John N. Cobb* in the marine waters of the northern region of southeastern Alaska, 23-30 August 2002.

Common name	Species	n	Fork length (mm)			%FO	Life ³ history stage
			min	max	x		
Pink salmon	<i>Oncorhynchus gorbuscha</i>	878	103	211	142.6	69	J
Chum salmon	<i>O. keta</i>	175	88	227	144.7	46	J
Sockeye salmon	<i>O. nerka</i>	73	90	201	139.1	46	J
Coho salmon	<i>O. kisutch</i>	60	167	307	235.1	77	J
Chinook salmon	<i>O. tshawytscha</i>	6	151	282	235.0	19	J
Chinook salmon	<i>O. tshawytscha</i>	6	392	530	448.4	19	I
Coho salmon	<i>O. kisutch</i>	12	385	717	608.8	12	A
Pink salmon	<i>O. gorbuscha</i>	3	405	495	450.0	35	A
Chum salmon	<i>O. keta</i>	1	658	658	658.0	4	A
Total salmonids captured and measured		1,213	—	—	—	—	—
Crested sculpin	<i>Blepsias bilobus</i>	40	71	159	127.6	54	I-A
Capelin	<i>Mallotus villosus</i>	25	31	59	45.6	4	L
Squid	Gonatidae	21	19	35	26.5	12	I
Walleye pollock	<i>Theragra chalcogramma</i>	4	280	530	385.0	12	J-A
P.S. lump sucker	<i>Eumicrotremus orbis</i>	3	61	80	68.7	12	I
Black rockfish	<i>Sebastes melanops</i>	3	50	51	50.7	4	J
Sablefish	<i>Anoplopoma fimbria</i>	2	338	394	366.0	4	A
Sm. lump sucker	<i>Aptocyclus ventricosus</i>	1	211	211	211.0	4	A
Salmon shark	<i>Lamna ditropis</i>	1	1774	1774	1774.0	4	A
Total non-salmonids captured		100	—	—	—	—	—
Total fish and squid captured		1,313	—	—	—	—	—

³L=larval fish, J=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.

Table 6.—Release and recovery information for salmon lacking the adipose fin or coded-wire tagged caught in rope trawl hauls from the NOAA ship *John N. Cobb* in the northern region of southeastern Alaska, 23-30 August 2002.

Species	Release information						Recovery information						Days since release	Marine distance traveled	
	Coded-wire tag code	Brood year	Agency ⁴	Locality	Date	Size		Locality (station code)	Date	Size		Age ⁵			
						mm	g			mm	g				
Chinook	04:01/57	1999	DIPC	Auke Bay, AK	6/13/01	—	23.95	Icy Strait (ISD) Haul#6092 Fish#1	8/28/02	392	750.0	1.1	410	45	0.1
Chinook	No tag	—	—	—	—	—	—	Chatham St. (UCC) Haul#6095 Fish#1	8/29/02	236	166.7	—	—	—	—
Coho	04:06/66	2000	SSRA	Burnett Inlet, AK	5/28/02	137	25.9	Icy Point (IPB) Haul#6083 Fish#1	8/26/02	277	270.4	1.0	91	65	0.7
Coho	04:03/99	1999	ADFG	Chickamin R., AK	10/19/01 ⁶	81	25.9	Icy Point (IPA) Haul#6082 Fish#2	8/26/02	259	246.5	2.0	~100 ⁶	350	0.9
Coho	04:05/57	2000	DIPC	Gastineau Ch., AK	6/17/02	—	19.1	Icy Strait (ISC) Haul#6076 Fish#1	8/24/02	180	55.1	1.0	71	100	0.7

⁴ADFG=Alaska Department of Fish and Game, DIPC=Douglas Island Pink and Chum Corporation, and SSRA=Southern Southeast (AK) Regional Aquiculture.

⁵European age notation, with the numeral before the decimal denoting the number of freshwater winters and the numeral following the decimal denoting marine winters.

⁶Size data and release data are for fry, smolt released in 2002.

Table 7.—Percent frequency of occurrence (FO) of prey categories and %FO of empty stomachs for predators examined aboard the NOAA ship *John N. Cobb*, 23-30 August 2002. The number of stomachs examined is shown in the heading in parentheses for each species.

Prey category	Pacific salmon (immature/adult)				Non-salmonids	
	Chinook (5)	Chum (1)	Coho (12)	Pink (3)	Sablefish (2)	Walleye pollock (4)
Empty stomachs	80.0	100.0	16.7	66.7	0.0	0.0
	<u>Invertebrate prey</u>					
Amphipods, Hyperiid	0.0	0.0	0.0	33.3	0.0	0.0
Cephalopods	20.0	0.0	0.0	0.0	0.0	0.0
Crab megalops	0.0	0.0	0.0	33.3	0.0	0.0
Crab zoeae	0.0	0.0	0.0	33.3	0.0	0.0
Euphausiids	20.0	0.0	16.7	33.3	0.0	50.0
Other	0.0	0.0	16.7	0.0	0.0	25.0
	<u>Fish prey</u>					
Herring	0.0	0.0	8.3	0.0	0.0	0.0
Juvenile Salmon	0.0	0.0	25.0	0.0	100.0	0.0
Walleye Pollock	0.0	0.0	8.3	0.0	0.0	0.0
Unidentified larvae	0.0	0.0	0.0	33.3	0.0	0.0
Unknown remains	0.0	0.0	41.7	0.0	0.0	25.0

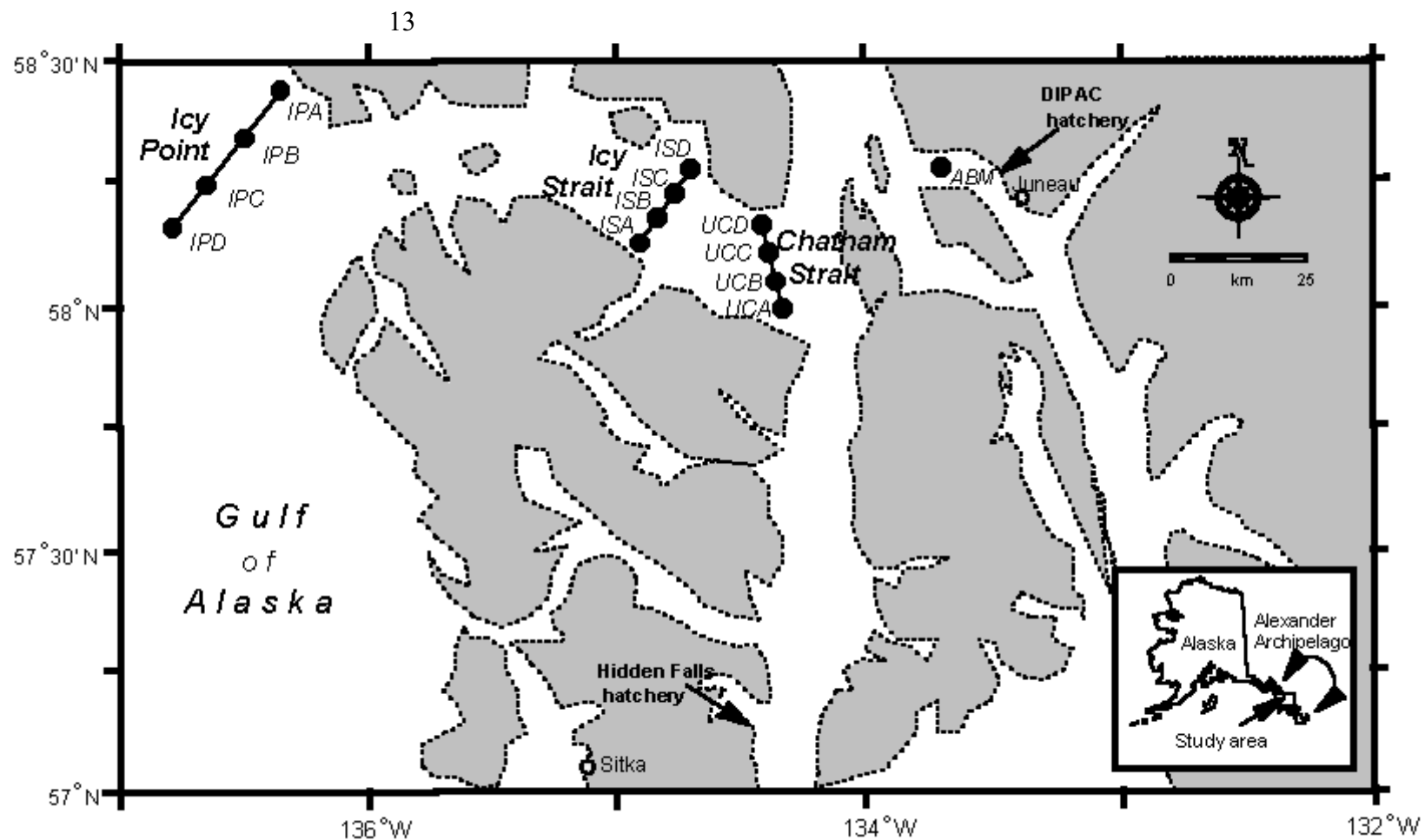


Figure 1.—Thirteen stations sampled in the marine waters of the northern region of southeastern Alaska off the NOAA ship John N. Cobb, 23-30 August 2002.