

Southeast Alaska Coastal Monitoring Project

JC-04-06 Cruise Report

15 July 2004

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 conducted a 6-day cruise aboard the NOAA ship *John N. Cobb* in the marine waters of the northern region of southeastern Alaska, from 18 to 23 May 2004. This cruise, JC-04-06, was the first in a series of five Southeast Alaska Coastal Monitoring (SECM) Project cruises scheduled for 2004.

The SECM project was initiated in 1997 to study the habitat and early marine ecology of juvenile Pacific salmon (*Oncorhynchus* spp.) in inshore, strait, and coastal habitats along their primary seaward migration corridor, as well as to examine the intra- and inter-annual variability of physical and biological oceanographic indices in relation to the distribution, abundance, growth, and survival of salmon and other fish populations at the same localities. These habitats span from near Juneau 250 km westward through Icy Strait, culminating 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 these habitats.

Sampling in 2004 marks the eighth year of the SECM long-term study. The information collected will also provide insight into potential effects of oceanographic changes on stock-specific growth and recruitment of salmonids, interactions between hatchery and wild stocks of juvenile salmon, and the utilization of marine habitat by key fish species. This year in , in addition to the standard monitoring suite, three stations in Taku Inlet were added to accomplish research objectives of a new cooperative project between Auke Bay Laboratory, University of Alaska Juneau Center for Fisheries and Ocean Sciences, Douglas Island Pink and Chum hatchery, and the Alaska Department of Fish and Game. This study investigates hatchery and wild chum salmon interactions in nearshore habitats, and is funded by Southeast Sustainable Salmon Funds (SSSF).

METHODS

Sixteen stations were scheduled for sampling on cruise JCB04-06 (Table 1, Figure 1). Stations were located in Auke Bay (1), Taku Inlet (3), Upper Chatham Strait (4), Icy Strait (4), and Icy Point (4). Oceanographic measurements were planned for all stations

and trawling was planned for the three stations in Taku Inlet. Due to the absence of juvenile salmon in trawl catches taken in previous years, in May, trawling was limited to Taku Inlet to coincide with the SSSF beach seining and totnet trawling occurring during the sample time period.

Oceanographic sampling:

Oceanographic and biological sampling was conducted at 16 stations (Table 1, Figure 1). Two-meter depth temperatures and salinities throughout the cruise were logged with an onboard SeaBird SBE-21¹ thermosalinograph. At each station oceanographic profiles of salinity and temperature were taken with a SeaBird SBE-19 conductivity-temperature-depth (CTD) profiler. Profile depths were to 200 m or within 10 m of bottom at stations shallower than 200 m. Surface water samples were taken at each station, filtered, and frozen for later determination of chlorophyll and nutrient content.

Zooplankton Sampling:

At least one shallow (20 m) vertical tow was made at each station with a 50-cm, 243- Φ m mesh NORPAC net. One deep vertical tow was made at most stations with a 57-cm, 202- Φ m mesh WP-2 net. In addition, one deep, double oblique bongo (60-cm, 333- Φ m and 505- Φ m mesh) tow was made at all stations, except those in Upper Chatham Strait. The WP-2 and bongo tows sampled to a depth of 200 m or within 20 m of the bottom at stations shallower than 200 m (Table 2). A Bendix bathykymograph was used with the bongo tows to record the maximum sampling depths. General Oceanics model 2031 or Rigosha flow meters were placed inside all of the net frames for calculation of filtered water volumes. During the replicate haul at the Auke Bay station only one NORPAC and one bongo sample were taken.

Trawl Sampling:

A Nordic 264 rope trawl fished at the surface directly astern of the *John N. Cobb* was used to sample fish. The mouth opening of the trawl was approximately 20 m deep and 24 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 cod end. 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, captured fish were anaesthetized with tricaine methanesulfonate, identified, enumerated, and measured, and stomachs were sampled (if appropriate);

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

measurements were made to the nearest mm fork length (FL) using a Limnoterra FMB IV electronic measuring board. The heads of all coho (*O. kisutch*) and chinook (*O. tshawytscha*) salmon lacking the adipose fin 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 prey were identified to a general taxonomic level and visually 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:

Settled volume (ml) of zooplankton in the 20-m vertical NORPAC samples was obtained using settling cones. Laboratory processing still in progress includes 1) examination of stomach contents of sandfish caught in rope trawls for incidence of predation on juvenile salmon, 2) measurement of plankton displacement volumes of all bongo net samples, and 3) microscopic analysis of zooplankton species composition and abundance estimation from all NORPAC, WP-2, and bongo net samples taken at the Auke Bay, Taku Inlet (no WP-2), Icy Strait, and Icy Point stations. The additional information will be reported in a North Pacific Anadromous Fish Commission document.

RESULTS and DISCUSSION

Sampling was conducted according to the following schedule at the sixteen stations:

Day 1: Depart NMFS Support in Juneau and transit to and conduct oceanographic sampling at Auke Bay.

Day 2: Oceanographic sampling at the Icy Strait and Upper Chatham Strait transects.

Day 3: Oceanographic and rope trawl sampling at the Taku Inlet transect.

Day 4: Replicate oceanographic sampling at Auke Bay.

Day 5: Oceanographic sampling at the Icy Point transect.

Day 6: Return to NMFS Support in Juneau.

Oceanographic sampling was accomplished at all stations. A total of 17 CTD casts, 16 water samples, 19 NORPAC tows, 9 WP-2 tows, and 13 bongo tows (two samples taken during each tow) were made during the cruise (Table 2). Surface (2-m) temperatures and salinities ranged from 6.9 to 12.3EC and from 21.3 to 31.0 PSU (Table 3). Settled volumes of zooplankton from the 20-m vertical NORPAC samples ranged from 6.5 to 28.0 ml. Phytoplankton blooms were apparent in all sample areas, except Icy Point, as evidenced by phytoplankton volumes ranging from 3.5 to 21.0 ml (Table 3).

A total of three rope trawl hauls were made during the cruise, all at the Taku Inlet stations (Table 2). A total of 275 fish were captured, consisting of 10 species, mostly herring (*Clupea pallasii*) and capelin larvae (*Mallotus villosus*), sandfish (*Trichodon trichodon*) and starry flounder (*Platichthys stellatus*) (Table 4). Only one juvenile salmon (a

sockeye, *O. nerka*) was caught, at the middle inlet station, TKH. The largest single catch was made at station TKG where 117 sandfish were caught. The stomachs of these fish will be analyzed for incidence of predation on juvenile salmon. One immature chinook salmon lacking the adipose fin was retained for later CWT detection. Stomachs were examined from two potential predators (both chinook salmon) of juvenile salmon, from the outermost station, TKI. Neither fish contained juvenile salmon; one fish contained amphipods whereas the other contained capelin larvae.

ACKNOWLEDGMENTS

We acknowledge and compliment the command and crew of the NOAA ship *John N. Cobb* for their cooperation and performance during the cruise. We appreciate their willingness to be flexible with the sampling schedule in order to complete all of the cruise objectives.

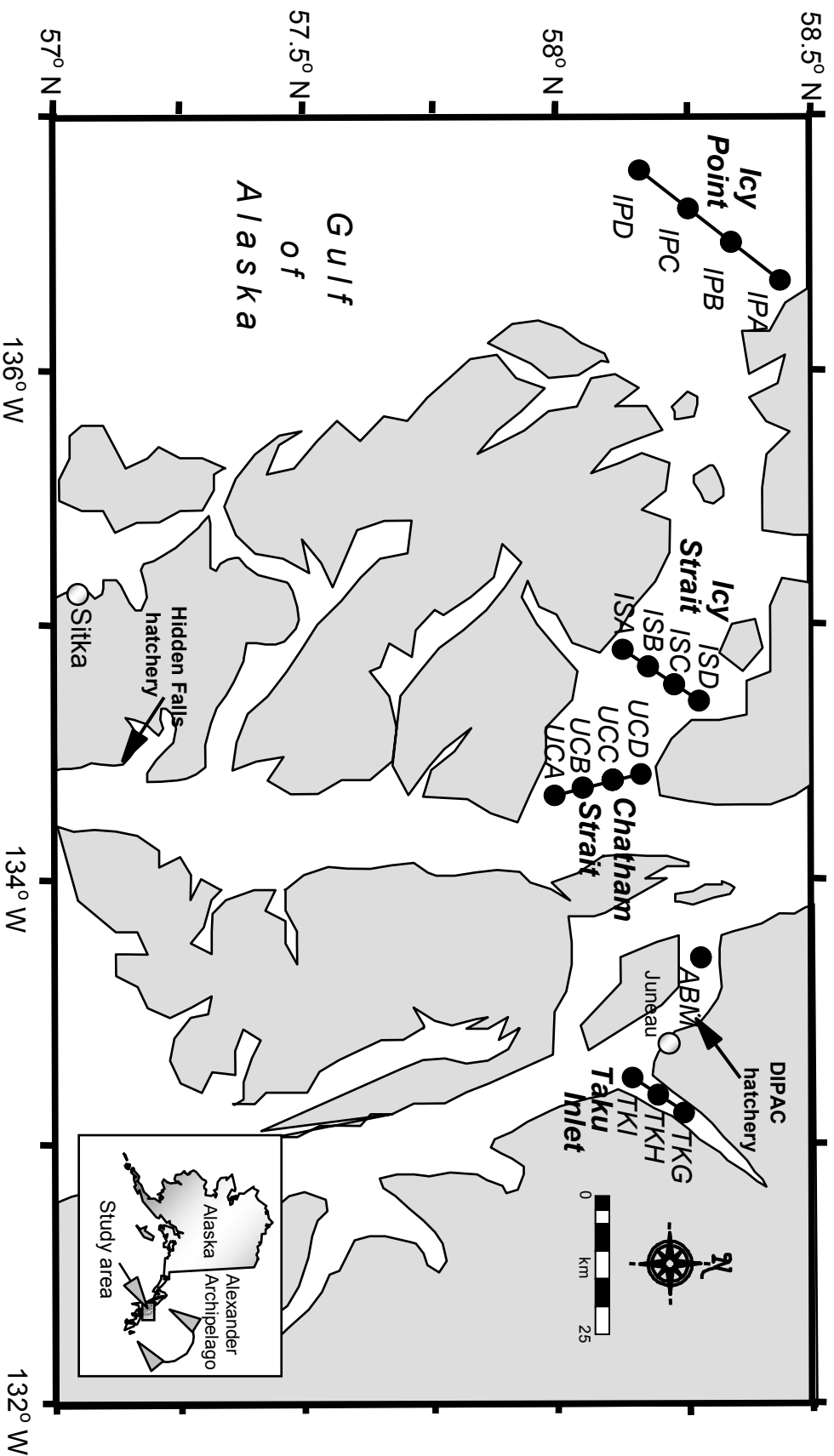


Figure 1.—Locations of stations sampled in marine waters of the northern region of southeastern Alaska, 18-23 May 2004.

Table 1.—Localities and coordinates of stations sampled in marine waters of the northern region of southeastern Alaska, 18-23 May 2004.

Habitat	Station	Latitude North	Longitude West	Distance		Depth m
				Offshore km	Between km	
Inshore						
	Auke Bay Monitor					
	ABM	58° 22.00'	134° 40.00'	1.5	—	60
	Taku Inlet transect					
	TKG	58° 15.88'	134° 05.74'	1.4	6.0	71
	TKH	58° 12.62'	134° 06.55'	1.4	6.0	105
	TKI	58° 11.19'	134° 11.71'	2.2	6.0	175
Strait						
	Upper Chatham Strait transect					
	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 transect					
	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
Coastal						
	Icy Point transect					
	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	58° 53.50'	137° 42.60'	65.0	24.8	1,300

Table 2.—Types of data collected at stations sampled in marine waters of the northern region of southeastern Alaska, 18-23 May 2004.

Date	Time	Haul #	Station	Data collection type					
				Rope trawl	CTD cast	bongo	NORPAC vertical	WP-2 vertical	Chlorophyll & nutrients
18 May	1030	8001	ABM	0	1	1	3	1	1
19 May	0745	8002	ISA	0	1	1	1	1	1
19 May	0900	8003	ISB	0	1	1	1	1	1
19 May	1030	8004	ISC	0	1	1	1	1	1
19 May	1215	8005	ISD	0	1	1	1	1	1
19 May	1650	8006	UCA	0	1	0	1	0	1
19 May	1615	8007	UCB	0	1	0	1	0	1
19 May	1540	8008	UCC	0	1	0	1	0	1
19 May	1459	8009	UCD	0	1	0	1	0	1
20 May	0940	8010	TKI	1	1	1	1	0	1
20 May	1225	8011	TKH	1	1	1	1	0	1
20 May	1535	8012	TKG	1	1	1	1	0	1
21 May	1030	8013	ABM	0	1	1	1	0	0
22 May	1434	8014	IPD	0	1	1	1	1	1
22 May	1215	8015	IPC	0	1	1	1	1	1
22 May	1015	8016	IPB	0	1	1	1	1	1
22 May	810	8017	IPA	0	1	1	1	1	1
Total				3	17	13	19	9	16

Table 3.—Temperature (2-m), salinity (2-m), and NORPAC (20-m) zooplankton settled volume at stations sampled in marine waters of the northern region of southeastern Alaska, 18-23 May 2004. Slub, a mucous material formed by larvaceans and ctenophores, was present in some samples (indicated by asterisk) resulting in zoo- and phyto- not equaling total settled volume.

Date	Haul #	Station	Temp. (°C)	Salinity (PSU)	Settled volumes (ml)		
					Zoo-	Phyto-	Total
18 May	8001	ABM	11.6	24.5	14.5	9.2	25.0*
19 May	8002	ISA	8.2	30.0	9.5	15.5	32.0*
19 May	8003	ISB	8.6	29.9	11.5	9.5	24.0*
19 May	8004	ISC	8.1	29.8	6.5	15.5	29.0*
19 May	8005	ISD	8.3	29.7	12.0	5.0	17.0
19 May	8006	UCA	9.7	29.7	10.0	8.0	18.0
19 May	8007	UCB	9.7	29.5	11.5	3.5	15.0
19 May	8008	UCC	8.1	30.2	10.0	12.0	22.0
19 May	8009	UCD	7.2	30.3	12.0	21.0	33.0
20 May	8010	TKI	9.9	21.3	9.0	9.0	24.0*
20 May	8011	TKH	7.6	22.1	23.0	0.0	23.0
20 May	8012	TKG	6.9	27.4	11.0	0.0	11.0
21 May	8013	ABM	12.3	25.8	11.0	0.0	11.0
22 May	8014	IPD	9.1	30.9	28.0	0.0	28.0
22 May	8015	IPC	8.9	31.0	20.0	0.0	20.0
22 May	8016	IPB	8.2	31.0	14.0	0.0	14.0
22 May	8017	IPA	7.3	30.9	13.0	0.0	13.0

Table 4.—Catches in numbers of fish with a rope trawl at stations sampled in marine waters of the northern region of southeastern Alaska, 18-23 May 2004.

Date	Haul #	Station	Juvenile									
			sockeye salmon	Pacific herring	Capelin	Crested sculpin	Soft sculpin	Pacific sandfish	Starry flounder	Smooth lump sucker	Big mouth sculpin	Imm. chinook salmon
20 May	8010	TKI	0	33	22	0	1	2	1	1	4	2
20 May	8011	TKH	1	4	0	8	1	3	13	0	0	0
20 May	8012	TKG	0	0	55	0	2	117	5	0	0	0
Total catch			1	37	77	8	4	122	19	1	4	2