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Survey of Juvenile Salmon in the Marine Waters of Southeastern Alaska, May–September 2000

by

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Abstract

Biophysical data were collected along a primary marine migration corridor of juvenile Pacific salmon (*Oncorhynchus* spp.) in the northern region of southeastern Alaska at 20 stations in five, six-day sampling intervals from May to September 2000. This survey marks the fourth consecutive year of systematic monitoring, and was implemented to identify the relationships among biophysical parameters that influence the habitat use, marine growth, predation, stock interactions, year-class strength, and ocean carrying capacity of salmon. Habitats were classified as inshore (Taku Inlet and Auke Bay), strait (Chatham Strait and Icy Strait), and coastal (Cross Sound and Icy Point), and were sampled from the National Oceanic and Atmospheric Administration ship *John N. Cobb*. At each station, fish, zooplankton, surface water samples, and physical profile data were collected during daylight using a surface rope trawl, conical and bongo nets, and a conductivity-temperature-depth profiler. Surface (2-m) temperatures and salinities during the survey ranged from 6.6 to 14.1°C and 11.5 to 32.0 PSU. A total of 7,920 fish and squid, representing 30 taxa, were captured in 89 rope trawl hauls from June to September. Juvenile Pacific salmon comprised 86% of the total catch and were the most frequently occurring species: pink (*O. gorbuscha*; 60%), chum (*O. keta*; 55%), coho (*O. kisutch*; 49%), sockeye (*O. nerka*; 47%), and chinook salmon (*O. tshawtscha*; 46%). Of the 6,846 salmonids caught, > 99% were juveniles. Non-salmonid species making up > 2% of total catch included walleye pollock (*Theragra chalcogramma*), Pacific herring (*Clupea pallasi*), and soft sculpin (*Psychrolutes sigalutes*). Temporal and spatial differences were observed in the catch rates, size, condition, stock of origin, and predation rates of juvenile salmon species. Catches of juvenile chum, pink, and coho salmon were highest in July, whereas catches of juvenile sockeye and chinook salmon were highest in June and September, respectively. By habitat type, juvenile salmon except chinook were most abundant in straits; juvenile chinook salmon were most abundant in inshore habitat. In the coastal habitat, catches along the Icy Point transect were highest within 40 km of shore. Size of juvenile salmon increased steadily throughout the season; mean fork lengths (mm) in June and September were: pink (95 and 198), chum (106 and 218), sockeye (114 and 196), coho (166 and 285), and chinook salmon (157 and 264). Coded-wire tags (CWTs) were recovered from seven juvenile and one immature chinook; only one was of non-Alaska origin, a juvenile chinook from the Columbia River Basin recovered in September. CWTs were recovered from seven juvenile and two adult coho; all were of Alaska origin. In addition, otoliths of 1,260 juvenile chum and 401 juvenile sockeye salmon revealed that 59% and 27% of these fish were Alaska hatchery stocks represented by thermal marks. Onboard stomach analysis of 214 potential predators, representing eleven species, indicated that 11% of adult coho salmon, 4.5% of spiny dogfish (*Squalus acanthias*), and 1% of adult walleye pollock preyed on juvenile salmon. Our results suggest that, in southeastern Alaska, juvenile salmon exhibit seasonal patterns of habitat use synchronous with environmental change, and display species- and stock-dependent migration patterns. Long term monitoring of key stocks of juvenile salmon, both on intra- and interannual bases, will enable researchers to understand how growth, abundance, and ecological interactions affect year-class strength and ocean carrying capacity for salmon.

Introduction

Studies of the early marine ecology of Pacific salmon (*Oncorhynchus* spp.) in Alaska require adequate time series of biophysical data to relate climate fluctuations to the distribution, abundance, and production of salmon. Because salmon are keystone species and constitute important ecological links between marine and terrestrial habitats, fluctuations in the survival of this important living marine resource have broad ecological and socio-economic implications for coastal localities throughout the Pacific Rim. Increasing evidence for relationships between production of Pacific salmon and shifts in climate conditions has renewed interest in processes governing salmon year-class strength (Beamish 1995). In particular, climate variation has been associated with ocean production of salmon during El Niño and La Niña events, such as the recent warming trends that benefitted many wild and hatchery stocks of Alaskan salmon (Wertheimer et al. 2001). However, research is lacking in areas such as the links between salmon production and climate variability, the links between intra- and interspecific competition and carrying capacity, and the links between stock composition and biological interactions. Past research has not provided adequate time-series data to explain such links (Pearcy 1997). Since the numbers of Alaskan salmonids produced in the region have increased over the last few decades (Wertheimer et al. 2001), mixing between stocks with different life history characteristics has also increased. The consequences of such changes on the growth, survival, distribution, and migratory rates of salmonids remain unknown.

To adequately identify mechanisms linking salmon production to climate change, synoptic data on stock-specific life history characteristics of salmon and on ocean conditions must be collected in a time series. Until recently, stock-specific information relied on labor-intensive methods of marking individual fish, such as coded-wire tagging (CWT; Jefferts et al. 1963), which could not practically be applied to all of the fish released by enhancement facilities. However, mass-marking with thermally induced otolith marks (Hagen and Munk 1994) has provided technological advances. The high incidence of these marking programs in southeastern Alaska (Courtney et al. 2000) offers an opportunity to examine growth, survival, and migratory rates of specific stocks during the current record production of hatchery chum salmon and wild pink salmon in the region. For example, two private non-profit enhancement facilities in the northern region of southeastern Alaska have produced over 100 million otolith-marked juvenile chum salmon (*O. keta*) annually in recent years. Consequently, since the mid-1990s, average annual commercial harvests of about 14 million adult chum salmon have occurred in the common property fishery in the region (ADFG 2000), mostly comprised of otolith-marked fish. In addition, sockeye salmon (*O. nerka*) are marked by some state of Alaska facilities. Examining the early marine ecology of these marked stocks provides an unprecedented opportunity to study stock-specific abundance, distribution, and species interactions of the juveniles that will later recruit to the fishery.

This coastal monitoring study in northern southeastern Alaska, known as Southeast Coastal Monitoring Project (SECM), was initiated in 1997 and repeated in 1998 and 1999 (Orsi et al. 1997, 1998, 2000), to develop our understanding of the relationships between annual time series of biophysical data and stock-specific information. Data collections from prior years have been reported in several documents (Murphy and Orsi 1999; Murphy et al. 1999; Orsi et al.

1999; 2001). This document summarizes data collected by SECM scientists on biophysical parameters from May-September 2000 in southeastern Alaska.

Methods

Twenty stations were sampled in each of five time intervals, as conditions permitted, by the National Oceanic and Atmospheric Administration (NOAA) ship *John N. Cobb* in marine waters of the northern region of southeastern Alaska from May-October 2000 (Table 1). Stations were located along the primary seaward migration corridor used by juvenile salmon that originate in this region. This corridor extends from inshore waters within the Alexander Archipelago along Chatham Strait and Icy Strait, through Cross Sound, and out into offshore waters in the Gulf of Alaska (Figure 1). At each station, the physical environment, zooplankton, and fish were sampled during daylight, between 0700 and 2000 hours.

The selection of sampling stations was determined by 1) the presence of historical time series of biophysical data in the region, 2) the objective of sampling habitats that transition the primary seaward migration corridor used by juvenile salmon, and 3) the operational constraints of the vessel. Three inshore stations (Auke Bay Monitor, False Point Retreat, and Lower Favorite Channel) and the four Icy Strait stations were selected initially because historical data exist for them (Bruce et al. 1977; Mattson and Wing 1978; Jaenicke and Celewycz 1994; Landingham et al. 1997; Orsi et al. 1997, 1998, 1999, 2000, 2001). The fourth inshore station at Taku Inlet was selected to characterize biophysical conditions near a large, glacial, transboundary river system that produces major salmon runs along the mainland coast. The Chatham Strait transect was selected to intercept juvenile otolith-marked chum salmon that enter Icy Strait there from both the south and from the north (i.e., Hidden Falls Hatchery (HF) operated by Northern Southeast Regional Alaska Aquaculture Association (NSRAA) and Douglas Island Pink and Chum Hatchery (DIPAC) facilities) (Figure 1). The 12 stations within these inshore and strait habitats were grouped to represent inside waters. The Cross Sound and Icy Point transects (8 stations representing outside waters) were included to monitor conditions at the point where salmon enter the coastal habitat of the Gulf of Alaska. Vessel and sampling gear constraints limited operations to distances $\geq$ 1.5 km and $\leq$ 65 km of shore, and to bottom depths $\geq$ 75 m, which precluded trawling at the Auke Bay Monitor station (Table 1). Sea conditions of < 2.5 m waves and < 12.5 m/sec winds were usually necessary to operate the sampling gear safely, which particularly influenced sampling opportunities in coastal waters.

Oceanographic sampling

Oceanographic data were collected at each station before or immediately after each trawl haul and consisted of one conductivity-temperature-depth profiler (CTD) cast, one or more vertical plankton hauls with conical nets, and one double oblique plankton haul with a bongo net. The CTD data were collected with a Sea-Bird[1] SBE 19 Seacat profiler to 200 m or within 10 m of the bottom. Surface (2-m) temperature and salinity data were also collected at 1-minute intervals with an onboard thermosalinograph (Sea-Bird SBE 21). Surface water samples were

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

taken at selected stations for later nutrient and chlorophyll analysis contracted to the University of Washington School of Oceanography Marine Chemistry Laboratory. Conical nets were used for vertical plankton hauls. At least one shallow haul (20-m) was made at each station and one deep haul (to 200 m or within 20 m of bottom) was made at the Icy Point and Auke Bay Monitor stations (Table 2). For the shallow vertical hauls, a NORPAC net (50 cm, 243 µm mesh) was used, following previous zooplankton sampling programs in the region; for the deep vertical hauls, a WP-2 net (57 cm, 202 µm mesh) was used, following GLOBEC standards (U.S. GLOBEC 1996). In addition, a double oblique bongo haul was taken at each station to a depth of 200 m or within 20 m of the bottom using a 60-cm diameter frame with 505 µm and 333 µm mesh nets. A Bendix bathykymograph was used with the oblique bongo hauls to record the maximum sampling depths. General Oceanics or Roshiga flow meters were placed inside the bongo and deep conical nets for calculation of filtered water volumes. Ambient light intensities (W/m^2) were recorded at each station with a Li-Cor Model 189 radiometer.

Zooplankton samples were preserved in 5% formalin-seawater solution. In the laboratory, zooplankton settled volumes (ml ZSV) and total settled volumes (ml TSV) of each 20-m vertical haul were measured after 24 hrs in Imhof cones. Volumetric density (ml/m^3) was computed by dividing the ml of ZSV by the water volume sampled, 3.9 m^3. Mean ZSV and mean volumetric density were determined for pooled stations by habitat and month.

Fish sampling

Fish sampling was accomplished with a Nordic 264 rope trawl modified to fish the surface water directly astern of the ship. The trawl was 184 m long and had a mouth opening of 24 m × 30 m (depth × width). A pair of 3-m foam-filled Lite trawl doors, each weighing 544 kg (91 kg submerged), was used to spread the trawl open. The NOAA ship *John N. Cobb* is a 29-m research vessel built in 1950 with a main engine of 325 horsepower and a cruising speed of 10 knots. Earlier gear trials with this vessel and trawl indicated the actual fishing dimensions of the trawl to be 18 m vertical (head rope to foot rope) and 24 m horizontal (wingtip to wingtip), with a spread between the trawl doors ranging from 52 to 60 m (Orsi et al., unpubl. cruise report). Trawl mesh sizes from the jib lines aft to the cod end were 162.6 cm, 81.3 cm, 40.6 cm, 20.3 cm, 12.7 cm, and 10.1 cm over the 129.6 m meshed portion of the rope trawl. A 6.1 m long, 0.8-cm knotless liner was sewn into the cod end. To keep the trawl headrope at the surface, a cluster of three A-4 Polyform buoys, each encased in a knotted mesh bag, was tethered to each wingtip of the headrope and one A-3 Polyform float was clipped onto the center of the headrope. The trawl also contained a small mesh panel of 10.2 cm mesh sewn along the jib lines on the top panel of the trawl between the head rope and the 162.6 cm mesh to reduce loss of small fish. The trawl was fished with 137 m of 1.6-cm wire main warp attached to each door and three 55-m (two 1.0-cm and one 1.3-cm) wire bridles.

Each trawl haul was fished for 20 min at 1.5 m/sec (3 knots), covering approximately 1.9 km (1.0 nautical miles) across a station. Over-water trawl speed was monitored from the vessel using an onboard flowmeter. Station coordinates were targeted as the midpoint of the trawl haul; however, current, swell, and wind conditions dictated the direction in which the trawl was set. More trawling effort was focused in strait and coastal habitats compared to inshore habitats to obtain sufficient samples of marked juvenile salmon from transition areas of concentration indicated by previous annual samples. In particular, replicate trawls were conducted in Icy Strait when weather and time allowed, with minimal accompanying oceanographic sampling.

After each trawl haul, the fish were anesthetized, identified, enumerated, measured, labeled, bagged, and frozen. Tricaine methanesulfonate (MS-222) was used to anesthetize the fish. After the catch was sorted, fish and squid were measured to the nearest mm fork length (FL) or mantle length with a Limnotera FMB IV electronic measuring board (Chaput et al. 1992). Usually all fish and squid were measured, but very large catches were sub-sampled due to processing time constraints. Most juvenile salmon were bagged individually, but large catches were bagged in bulk; all were frozen immediately after measurement. During times of extended processing, fish were chilled with ice packs to minimize tissue decomposition and gastric activity. All chinook (*O. tshawytscha*) and coho salmon (*O. kisutch*) were examined onboard for missing adipose fins, indicating the presence of CWTs (Jefferts et al. 1963); those with adipose fins intact were again screened through a detector in the laboratory. The snouts of all of these salmon were dissected later in the laboratory to recover CWTs, which were then decoded and verified.

In the laboratory, individually frozen fish from each habitat and time period were thawed for measurement of fork length (FL, mm) and wet weight (g, grams). Mean length, weight, and Fulton condition factor (g/FL^3*10^5; Cone 1989) were computed for each species by habitat and sampling interval. For the identification of stock of origin of chum and sockeye salmon, sagittal otoliths were extracted from the crania and preserved in 95% ethyl alcohol. Otolith processing for marks was contracted to DIPAC laboratories. Otoliths were prepared for microscopic examination of potential thermal marks by mounting them on slides and grinding them down to the primordia (Secor et al. 1992). Ambiguous otolith thermal marks were verified by personnel at the Alaska Department of Fish and Game (ADFG) otolith laboratory.

The percent composition of hatchery juvenile chum and sockeye salmon stocks that were thermally marked in the catch was computed by release group for each month and habitat. We adjusted the numbers recovered from HF because this hatchery released an unmarked component of juvenile chum salmon. Therefore, the number of HF chum salmon marks recovered was expanded by a factor of 1.94, derived from the ratio of 38.7 million (M) out of 74.9 M fish released that were marked. The numbers of DIPAC marks were not adjusted, since 100% of both chum and sockeye salmon released were marked. Conversely, the unmarked component of chum salmon, presumably wild, was reduced to account for the HF marks that were expanded.

After the juvenile salmon in each trawl haul were processed, potential predators were identified, measured, and weighed. Their stomachs were then excised, weighed, and classified by percent fullness. Stomach contents were removed, empty stomachs weighed, and total content weight determined by subtraction. Prey were identified onboard to the taxonomic level of order, in general; the contribution of each taxon to the diet was estimated to the nearest 10% of total volume. The wet weight contribution of each prey taxon was then computed as its percent volume times total content weight. Fish prey were identified to species, if possible, and lengths estimated. The incidence and rate of predation on juvenile salmon was computed for each potential predator species. Overall diets were summarized by percent weight of major prey taxa and the frequency of feeding fish.

Results and Discussion

During the 5-month survey in 2000, data were collected from 89 rope trawl hauls, 112 CTD casts, 100 bongo net tows, 146 conical net tows (121 from 20-m depths and 25 from 200-m depths), and 89 surface water samples (Table 2). The 6-day sampling intervals occurred near the ends of each month. In May, oceanographic sampling was completed at all stations but no rope trawling was conducted because juvenile salmon were shown to be absent from trawl catches at the same time in previous years. After May, between 3 and 16 trawls were successfully fished in each habitat-sampling interval (Table 2). All stations in inshore and strait habitats were sampled from June to September. In coastal habitats, stations along the Icy Point transect were sampled each interval but the stations in Cross Sound were only partially sampled in July and not sampled in September due to inclement weather and time constraints.

Oceanography

Sea surface (2 m) temperature and salinity data differed by month and between inside and outside waters. Overall, surface temperatures and salinities during the survey ranged from 6.6 to 14.1°C and 11.5 to 32.0 PSU (Table 3). Temperatures increased from May to June at all stations, and thereafter, temperatures generally declined in inside waters but varied little in outside waters (Figure 2a). Salinities generally decreased from May until August and increased in September in inside waters, but in outside waters, salinities usually varied by ≤ 2 PSU (Figure 2b). Ambient light intensities during the sampling season ranged from 2 to 888 W/m^2.

A total of 89 surface water samples were taken at 20 stations over the course of the season (Tables 2 and 4). Nutrient value ranges and means were 0.0-2.6 and 0.7 µM for PO_4, 0.8-43.0 and 14.7 µM for $Si(OH)_4$, 0.0-20.9 and 4.5 µM for NO_3, 0.0-1.1 and 0.1 µM for NO_2, and 0.0-9.4 and 1.3 µM for NH_4. Chlorophyll ranged from 0.0-9.2 mg/m^3 ($\bar{x}$ = 1.7) and phaeopigment ranged from 0.1-8.4 mg/m^3 ($\bar{x}$ = 0.3; Table 4).

Plankton volumes were highly variable among habitats, but seasonal patterns were evident in the 20-m ZSV of NORPAC hauls (Table 5, Figure 2c). Qualitative, visual examination of samples indicated a wide diversity of zooplankton taxa. Samples from the coastal stations contained limited amounts of phytoplankton and zooplankton, whereas samples from the inside stations had dense, patchy concentrations of phytoplankton and zooplankton. The temporal pattern in most habitats showed peak volumes in May or June and the lowest volumes in September (Figure 2c). The spatial pattern generally showed highest zooplankton volumes in strait and inshore habitats and the lowest volumes in coastal habitat. The peak mean volume for all stations and months was approximately 40 ml ZSV (10.3 ml/m^3) during June in the strait habitat.

Catch composition

A total of 7,920 fish and squid, representing 30 taxa, were captured with the rope trawl. Five species of juvenile Pacific salmon comprised 86% of the total catch (Table 6). Of the 6,846 salmonids caught, > 99% were juveniles, and < 1% were immature or adult. Non-salmonid species making up > 2% of the catch included walleye pollock (*Theragra chalcogramma*), Pacific herring (*Clupea pallasi*), and soft sculpin (*Psychrolutes sigalutes*). Juvenile pink (*O. gorbuscha*) and chum (*O. keta*) salmon were the dominant species occurring in strait and coastal habitat, whereas Pacific herring, juvenile chinook (*O. tshawtscha*) and coho (*O. kisutch*) salmon were the dominant species occurring in inshore habitat (Figure 3). Juvenile salmon were the most frequently occurring species in the trawl catches: chum (60%), pink (55%), coho (49%), sockeye (47%), and chinook (46%) (Table 7). Catches and life history stages of the salmon are listed in Appendix 1 by date, haul number, and station.

Distribution of juvenile salmon differed for the months, habitats, and species sampled and was consistent with patterns reported from previous years (Orsi et al. 2000). By month, the overall catch rates were highest in June and July and lowest in August and September (Figure 4). By habitat, higher catches of all species generally occurred in straits. By species, catch rates for pink and chum salmon were highest in all habitats in July, whereas catch rates for sockeye salmon were highest in the strait habitat in June and in inshore and coastal habitats in July. Catch rates for coho salmon were highest in the inshore habitat in July, the strait habitat in July, and the coastal habitat in August. Monthly catch rates for chinook salmon were uniform in the inshore habitat, were highest in the coastal habitat in June, and were highest in the strait habitat in September. Overall, in the coastal habitat, juvenile salmon catch rates along the 65 km Icy Point offshore transect were highest within 40 km of shore (Figure 5).

A seasonal pattern was apparent for the species considered to be abundant (> 100 individuals caught). Among the juvenile salmonids, pink, chum, sockeye, and coho salmon were captured early- to mid-season, primarily in June and July, whereas chinook were captured later, primarily in September (Table 6). Walleye pollock and Pacific herring were found mainly early (June), spiny dogfish in mid-season (July), and soft sculpin late (September). These seasonal patterns represent the relative abundance of species caught with our trawl gear during daylight hours, but for vertically migrating species, such as walleye pollock and Pacific herring, different catch patterns were evident from night sampling (Orsi et al., unpubl cruise reports; Smith 1981; Foy and Norcross 1999).

Size and condition of juvenile salmon differed among species and sampling intervals (Tables 8-12; Figures 6-8). Juvenile coho and chinook salmon were consistently 25–100 mm longer than sockeye, chum, and pink salmon. All species increased in both length and weight in successive intervals, indicating growth despite the influx of additional stocks with varied times of saltwater entry. Mean FL (mm) for each species of juvenile salmon in June–July–August–September were: pink (95–121–160–198), chum (106–130–177–218), sockeye (114–143–171–196), coho (166–201–245–285), and chinook (157–192–214–264). Mean weight (g) for each species of juvenile salmon in June–July–August–September were: pink (8.5–17.9–40.6–93.4), chum (12.2–22.9–59.7–122.2), sockeye (16.3–32.5–56.8–89.1), coho (60.9–97.8–199.5–296.5), and chinook (54.7–123.1–146.1–263.5). Values greater than one for species condition indicated healthy feeding environments, and generally increased monthly. Condition factor for each species of juvenile salmon in June–July–August–September were: pink (0.9–0.9–0.9–1.1), chum (1.0.–1.0–1.1–1.2), sockeye (1.1–1.0–1.1–1.1), coho (1.2–1.1–1.2–1.3), and chinook (1.1–1.5–1.3–1.4) (Figure 8).

Seventeen of the 26 juvenile and immature salmon lacking adipose fins contained CWTs (Table 13). Nine CWTs were recovered from juvenile coho salmon and 8 from juvenile and immature chinook salmon. All CWT fish except one were from hatchery and wild stocks originating in the northern region of southeastern Alaska. The one CWT fish of non-Alaska origin was a juvenile chinook from the Columbia River Basin recovered in the coastal habitat. Most CWT fish, however, were recovered in strait habitat. Of the nine salmon lacking an adipose fin that did not contain CWTs, six were from juvenile coho and three were from juvenile chinook. The coho salmon lacking an adipose fin and not containing CWTs were sampled exclusively in the Icy Point transect in the Gulf of Alaska from July to September. They likely originated from Washington and Oregon, where all coho of hatchery origin are adipose-clipped, but may not be implanted with CWTs. The occurrence of these stocks in Alaskan coastal waters directly adjacent to the Gulf of Alaska is supported by previous recoveries of CWT juvenile coho salmon from Washington and Oregon in July to September (Orsi et al. 1987, 1997). Migration rates of juvenile coho and chinook differed by species and stock. For Alaska stocks, juvenile coho migrated faster than juvenile chinook salmon, at rates of 0.3-5.0 km/d ($\bar{x}$ = 2.1 km/d) compared to rates of 0.4-1.7 km/d ($\bar{x}$ = 1.2 km/d). The migration rate of the CWT juvenile chinook salmon originating from the Columbia River basin was faster than for Alaska stocks, 8.1 km/d.

For juvenile chum salmon, stock-specific information was derived from the otoliths of a sub-sample of 1,260 fish, representing about 33% of those caught (Figure 9). These fish were the same individuals sampled for weight and condition (Table 14). Of all chum salmon otoliths examined, 557 (44%) were marked: 367 (29%) from DIPAC, 184 (15%) from HF, and 6 (<1%) from Deep Inlet (Sitka). The remaining 703 (56%) chum salmon were unmarked and included both wild stocks and unmarked HF stocks (Figure 9), which therefore required a composition adjustment in the HF component from 15% to 31%. Thus, the three hatchery stocks of chum salmon represented 59% of all juvenile chum salmon caught. In strait habitat, where sufficient numbers of chum salmon were sampled in all four time periods, the composition of hatchery chum salmon declined from about 80% in June to 20% in September; DIPAC and Deep Inlet stocks contributed most in June, whereas the HF stock contributed most later, in July (Figure 9).

For juvenile sockeye salmon, stock-specific information was derived from the otoliths of a sub-sample of 401 fish, representing about 77% of those caught (Figure 10). These fish were the same individuals sampled for weight and condition (Table 15). The 27% (107) that were marked originated from five Alaska stocks: DIPAC Snettisham Hatchery (87), Sweetheart Lake (15), Tuya Lake (2), Tahltan Lake (2), and Tatsamenie Lake (1). Hatchery stock contribution was greatest in June for all habitats, although only June and July samples were available in inshore and coastal habitats. As with chum salmon, only the strait habitat had sufficient numbers of sockeye in all four time periods, with hatchery stocks contributing about 40% in June and July and 15% in August and September.

Weight of selected marked stocks of juvenile chum and sockeye salmon were compared with weights of unmarked stocks (Figure 11). The marked chum salmon stocks were from two hatcheries (HF and DIPAC) while the marked sockeye salmon stock was from one hatchery (Snettisham). These chum salmon were released in late May at a weight of about 2 grams, while the sockeye were released on 17-27 May at sizes of 6 or 10 grams. Individual hatchery stocks for both species tended to be larger than unmarked stocks, probably because hatchery fish were fed before release, and because unmarked stocks were comprised of late out migrants from many stocks which were constantly recruiting.

Stomachs of 214 potential predators of juvenile salmon were examined, representing 11 species of fish: 79 adult walleye pollock, 64 adult spiny dogfish (*Squalus acanthias*), 25 immature chinook salmon, 15 adult pink salmon, 13 adult chum salmon, 4 adult Pacific sandfish (*Trichodon trichodon*), 9 adult coho salmon, 2 adult starry flounder (*Platichthys stellatus*), 1 adult wolf eel (*Anarrhichthys ocellatus*), 1 adult black rockfish (*Sebastes melanops*), and 1 adult pomfret (*Brama japonica*) (Table 16). Overall, 81% of the stomachs contained food. Fish with relatively high rates of non-feeding included chum salmon and starry flounder. We observed a total of 5 incidences of predation on juvenile salmon, by 11% of adult coho salmon, 4.5% of spiny dogfish, and 1% of adult walleye pollock (Table 16). These predation events occurred in coastal and strait habitats in June, July and August.

Fish comprised the bulk of the prey weight in stomach samples pooled across months for black rockfish, immature chinook salmon, adult coho salmon and sandfish (Figure 12a). A variety of non-salmonid species was consumed: juvenile Pacific herring, capelin, sandlance, walleye pollock, and unidentified larvae or remains. The piscivorus feeding mode was consistent across months for immature chinook salmon, but adult walleye pollock consistently preyed on euphausiids and hyperiid amphipods (Figure 12b). The dominant invertebrate prey included crab larvae (zoeae and megalops) for adult pink and chum salmon, hyperiid amphipods, euphausiids, and occasionally gelatinous taxa such as oikopleura and salps (Figure 12); the other category was mainly unidentified liquified prey remains and chyme, and was particularly noticeable in adult spiny dogfish.

This fourth year of monitoring in southeastern Alaska has shown patterns both consistent with and distinctly different from prior years with respect to the temporal and spatial occurrence of biophysical data. A common annual pattern of seasonality existed in surface temperatures and salinity levels which increased progressively westward from inshore to coastal habitats. When compared to the El Niño conditions of 1997-1998, the La Niña conditions of 1999 indicated lower temperatures and lower zooplankton volumes which may have led to the lower growth observed for juvenile salmon in 1999 compared to 1997-98 (Orsi et al. 2000). The coastal monitoring of stations from May-October is currently ongoing in the northern region of southeastern Alaska in 2001. Long-term ecological monitoring of key juvenile salmon stocks, including ocean sampling programs that operate at appropriate spatial and temporal scales and encompass a variety of environmental conditions, is needed to understand relationships of habitat use, marine growth, and hatchery and wild stock interactions to year-class strength and ocean carrying capacity for salmon.

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Table 1.—Localities and coordinates of stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–September 2000.

Locality	Station	Latitude	Longitude	Offshore distance (km)	Bottom depth (m)
Inside waters					
Inshore					
Auke Bay Monitor	ABM	58° 22.00′N	134° 40.00′W	1.5	60
Taku Inlet	TKI	58° 11.19′N	134° 11.71′W	2.2	175
False Point Retreat	FPR	58° 22.00′N	135° 00.00′W	1.8	680
Lower Favorite Channel	LFC	58° 20.98′N	134° 43.73′W	1.5	75
Strait					
Upper Chatham Strait	UCA	58° 04.57′N	135° 00.08′W	3.2	400
Upper Chatham Strait	UCB	58° 06.22′N	135° 00.91′W	6.4	100
Upper Chatham Strait	UCC	58° 07.95′N	135° 04.00′W	6.4	100
Upper Chatham Strait	UCD	58° 09.64′N	135° 02.52′W	3.2	200
Icy Strait	ISA	58° 13.25′N	135° 31.76′W	3.2	128
Icy Strait	ISB	58° 14.22′N	135° 29.26′W	6.4	200
Icy Strait	ISC	58° 15.28′N	135° 26.65′W	6.4	200
Icy Strait	ISD	58° 16.38′N	135° 23.98′W	3.2	234
Outside waters					
Coastal					
Cross Sound	CSA	58° 09.53′N	136° 26.96′W	3.2	300
Cross Sound	CSB	58° 10.91′N	136° 28.68′W	6.4	60
Cross Sound	CSC	58° 12.39′N	136° 30.46′W	6.4	200
Cross Sound	CSD	58° 13.84′N	136° 32.23′W	3.2	200
Icy Point	IPA	58° 20.12′N	137° 07.16′W	6.9	160
Icy Point	IPB	58° 12.71′N	137° 16.96′W	23.4	130
Icy Point	IPC	58° 05.28′N	137° 26.75′W	40.2	150
Icy Point	IPD	57° 53.50′N	137° 42.60′W	65.0	1300

Table 2.—Numbers and types of data collected at different habitat types sampled monthly in marine waters of the northern region of southeastern Alaska, May–September 2000.

		Data collection type*					
Dates	Habitat	Rope trawl	CTD cast	Bongo tow	20-m vertical	WP-2 vertical	Chlorophyll & nutrients
19–23 May	Inshore	0	4	4	6	1	4
	Strait	0	8	8	8	0	4
	Coastal	0	8	8	8	4	6
	All May	0	20	20	22	5	14
26 June–01 July	Inshore	3	4	4	6	1	4
	Strait	13	12	8	12	0	8
	Coastal	8	8	8	8	4	6
	All June	24	24	20	26	5	18
19-24 July	Inshore	3	4	4	6	1	4
	Strait	10	10	8	10	0	10
	Coastal	6	6	6	6	4	6
	All July	19	20	18	22	5	20
25–30 August	Inshore	3	4	4	6	1	4
	Strait	12	12	8	12	0	8
	Coastal	8	8	9	8	4	8
	All August	23	24	21	26	5	20
25–30 September	Inshore	3	4	4	6	1	4
	Strait	16	15	12	14	0	8
	Coastal	4	5	5	5	4	5
	All September	23	24	21	25	5	17
Total		89	112	100	121	25	89

*Rope trawl = 20-min hauls with NORDIC 264 surface trawl 20 X 24 m; CTD casts = to 200 m or within 10 m of the bottom; Bongo tow = 60-cm diameter frame, 505 and 333 µ meshes, double oblique haul to 200 m or within 20 m of the bottom; 20-m vertical = 50-cm diameter frame, 243 µ conical net towed vertically from 20 m; WP-2 vertical = 57-cm diameter frame, 202 µ conical net towed vertically from 200 m or within 20 m of the bottom.

Table 3.—Surface (2-m) temperature and salinity data sampled monthly in marine waters of the northern region of southeastern Alaska, May–September 2000. Station code acronyms are defined in Table 1. NS denotes no sampling.

Locality	Month	Temp. (°C)	Salin. (PSU)	Temp. (°C)	Salin. (PSU)	Temp. (°C)	Salin. (PSU)	Temp. (°C)	Salin. (PSU)
Inside waters									
Inshore		TKI		ABM		LFC		FPR	
	May	7.4	24.4	8.2	26.7	7.6	28.0	7.9	30.0
	June	10.7	18.3	13.6	17.6	13.9	19.1	13.1	21.9
	July	10.4	14.6	13.0	17.1	12.8	17.0	13.3	15.3
	August	8.9	13.0	11.3	17.9	10.4	15.8	11.9	11.5
	September	8.3	19.9	9.2	22.3	9.3	22.2	9.8	26.3
Upper Chatham		UCA		UCB		UCC		UCD	
Strait	May	7.0	30.6	7.5	30.4	7.7	30.4	7.4	30.5
	June	13.4	22.5	13.2	23.0	12.7	24.0	12.5	24.5
	July	12.8	27.0	10.8	28.9	12.5	28.1	12.0	27.4
	August	11.6	24.0	11.6	22.7	11.3	23.0	11.6	20.5
	September	8.5	29.8	8.6	29.5	9.2	28.1	9.5	27.6
Icy Strait		ISA		ISB		ISC		ISD	
	May	6.6	31.4	7.2	31.2	7.0	31.0	7.9	30.7
	June	12.6	25.8	12.2	26.2	12.5	25.7	12.5	25.8
	July	11.6	27.9	11.5	28.2	12.7	27.4	13.0	26.9
	August	11.5	27.1	11.6	26.7	11.8	21.1	12.0	21.2
	September	8.6	28.8	8.9	28.3	9.3	27.0	9.4	27.0
Outside waters									
Cross Sound		CSA		CSB		CSC		CSD	
	May	7.4	31.6	7.0	31.9	6.9	31.9	6.8	31.9
	June	11.6	31.4	7.9	31.7	8.1	31.5	8.0	31.6
	July	NS	NS	NS	NS	8.7	30.3	7.3	26.0
	August	10.9	30.7	7.9	31.7	8.2	31.0	7.9	27.5
	September	NS	NS	NS	NS	NS	NS	8.0	31.5
Icy Point		IPA		IPB		IPC		IPD	
	May	8.7	31.6	8.1	31.6	7.8	31.7	8.4	32.0
	June	12.9	29.3	13.2	31.0	13.0	31.4	12.9	31.8
	July	13.1	31.4	12.9	31.3	13.4	31.1	14.1	31.6
	August	12.5	31.4	13.2	31.5	13.0	31.5	12.5	31.5
	September	11.5	30.9	11.6	30.9	11.6	31.1	11.9	31.8

Table 4.—Nutrient and chlorophyll measurements from surface water samples in marine waters of the northern region of southeastern Alaska, May–September 2000. Station code acronyms are defined in Table 1. NS denotes no sampling.

Station	Date	Nutrients [µM] $[PO_4]$	$[Si(OH)_4]$	$[NO_3]$	$[NO_2]$	$[NH_4]$	Chlorophyll (mg/m^3)	Phaeopigment (mg/m^3)
TKI	19 May	0.27	5.26	1.21	0.01	3.80	3.04	0.74
	26 June	0.20	34.14	3.42	0.02	2.66	0.52	0.19
	19 July	0.27	20.66	2.08	0.00	1.54	0.73	0.01
	25 August	0.23	20.01	2.15	0.07	1.21	0.64	0.09
	25 September	0.23	40.62	6.49	0.08	2.43	0.03	0.02
ABM	19 May	0.26	3.48	0.19	0.07	2.04	3.93	0.19
	01 July	0.04	7.21	0.00	0.03	1.01	3.93	0.19
	19 July	1.00	2.32	0.00	0.00	1.28	1.61	0.62
	30 August	0.13	7.53	0.00	0.02	0.41	1.40	0.12
	25 September	0.40	27.66	4.76	0.14	0.54	3.93	0.19
LFC	19 May	0.37	3.90	1.09	0.03	1.94	1.43	0.00
	26 June	0.44	2.64	0.34	0.03	2.76	1.00	0.44
	19 July	0.52	4.65	0.06	0.00	0.93	1.13	1.16
	25 August	0.20	13.49	1.03	0.04	1.95	0.53	0.02
	25 September	0.39	27.24	3.84	0.14	0.61	7.15	0.00
FPR	19 May	0.24	1.79	0.45	1.07	1.95	0.00	8.41
	26 June	0.20	1.95	0.40	0.02	2.53	1.09	0.06
	22 July	0.24	2.84	0.00	0.00	0.94	1.36	0.03
	25 August	0.23	7.25	0.00	0.00	0.22	0.82	0.28
	28 September	1.20	29.33	12.98	0.21	1.25	0.82	0.28
UCA	20 May	0.68	5.37	3.88	0.17	1.86	6.26	1.29
	30 June	0.10	0.95	0.00	0.03	0.81	0.97	0.06
	21 July	1.41	6.27	0.33	0.04	1.74	1.25	0.24
	29 August	0.18	10.11	0.00	0.03	0.19	1.75	0.00
	28 September	1.74	43.00	20.17	0.31	0.72	0.40	0.15
UCB	30 June	0.22	0.78	0.00	0.02	1.31	0.45	0.03
	21 July	0.60	7.13	0.68	0.04	0.51	1.22	0.24
	29 August	0.23	9.08	0.00	0.05	0.57	3.17	0.00
	28 September	1.68	41.40	19.72	0.30	0.74	0.49	0.12
UCC	30 June	0.22	1.12	0.00	0.03	2.27	0.54	0.08
	21 July	0.92	6.92	0.18	0.02	1.86	1.64	0.62
	29 August	0.21	9.44	0.00	0.02	0.22	2.82	0.06
	28 September	1.43	35.56	16.28	0.26	0.93	0.75	0.14
UCD	30 May	0.87	5.28	3.18	0.06	3.17	9.18	0.56
	30 June	0.19	1.04	0.00	0.07	0.90	0.70	0.25
	21 July	0.71	2.75	0.00	0.04	1.09	0.85	0.16

Table 4.—(Cont.)

Station	Date	Nutrients [μM] [PO_4]	[$Si(OH)_4$]	[NO_3]	[NO_2]	[NH_4]	Chlorophyll (mg/m^3)	Phaeopigment (mg/m^3)
UCD	29 August	0.25	8.51	0.00	0.02	0.26	3.09	0.00
	28 September	1.32	33.78	15.17	0.23	0.91	0.91	0.17
ISA	20 May	1.49	25.22	13.79	0.24	2.59	1.54	0.01
	29 June	0.07	1.30	0.14	0.04	1.26	0.97	0.06
	20 July	0.40	2.89	0.28	0.00	0.49	2.15	0.60
	26 August	0.22	17.61	0.00	0.03	0.28	2.68	0.41
	27 September	1.57	38.90	18.08	0.28	1.10	0.50	0.13
ISB	29 June	0.08	0.96	0.00	0.01	1.06	0.45	0.03
	20 July	1.75	3.25	0.10	0.05	1.11	3.62	0.76
	26 August	0.35	20.42	1.44	0.04	0.90	6.08	0.00
	27 September	1.46	37.40	18.14	0.28	0.66	0.82	0.00
ISC	29 June	0.25	1.14	0.27	0.02	1.33	0.54	0.08
	20 July	1.39	6.31	0.30	0.04	1.62	1.16	0.30
	22 July	0.96	7.52	0.60	0.05	1.15	1.55	0.28
	26 August	0.44	8.56	0.38	0.05	0.92	1.29	0.00
	27 September	1.32	32.77	17.22	0.27	0.55	1.13	0.20
ISD	20 May	0.33	2.75	0.11	0.08	0.97	6.62	0.59
	29 June	0.12	1.14	0.00	0.01	0.69	0.70	0.25
	20 July	0.60	5.19	0.11	0.01	0.41	1.37	0.37
	22 July	0.30	5.34	0.16	0.01	0.36	1.25	0.29
	26 August	0.32	8.56	0.23	0.04	0.79	0.73	0.01
	27 September	1.26	32.57	14.44	0.25	0.55	0.97	0.34
CSA	21 May	0.83	9.29	5.64	0.15	2.10	3.58	0.54
	28 June	0.53	8.60	2.36	0.11	1.14	1.97	0.05
	27 August	1.04	24.27	7.27	0.26	0.29	0.93	0.20
CSB	21 May	1.20	13.28	7.38	0.09	1.58	NS	NS
	28 June	1.31	29.41	14.21	0.16	2.23	2.27	0.23
	27 August	1.80	41.28	20.00	0.19	0.60	0.47	0.11
CSC	21 May	1.20	13.28	7.48	0.09	1.65	NS	NS
	28 June	1.24	27.89	13.30	0.16	1.82	2.77	0.15
	23 July	1.69	32.03	16.46	0.21	9.40	1.31	0.21
	27 August	1.85	42.53	20.91	0.19	0.53	0.47	0.22
CSD	21 May	1.21	13.27	7.56	0.11	1.62	1.16	0.64
	28 June	1.03	25.61	10.73	0.12	2.48	0.53	0.04
	23 July	2.57	33.31	16.45	0.23	4.48	1.02	0.11
	27 August	1.76	40.68	19.55	0.19	0.90	0.47	0.19
	29 September	NS	NS	NS	NS	NS	0.32	0.20

Table 4.—(Cont.)

Station	Date	Nutrients [μM] $[PO_4]$	$[Si(OH)_4]$	$[NO_3]$	$[NO_2]$	$[NH_4]$	Chlorophyll (mg/m^3)	Phaeopigment (mg/m^3)
IPA	23 May	0.83	3.80	4.01	0.23	1.59	2.19	0.38
	27 June	0.56	17.83	1.33	0.11	2.03	NS	NS
	24 July	0.56	11.12	0.06	0.02	0.41	2.50	0.00
	28 August	0.73	20.28	2.98	0.11	0.13	0.82	0.22
	26 September	0.92	26.39	6.47	0.20	0.67	2.46	0.59
IPB	23 May	0.76	4.31	3.47	0.16	1.30	2.68	0.48
	27 June	0.39	6.51	0.30	0.04	1.66	0.80	0.16
	24 July	0.48	11.62	0.00	0.04	0.46	0.78	0.08
	28 August	0.59	15.99	0.27	0.06	0.29	1.00	0.20
	26 September	0.88	26.00	6.13	0.12	0.41	3.22	0.34
IPC	23 May	0.69	3.89	3.52	0.12	0.83	3.13	0.69
	27 June	0.49	9.55	0.28	0.02	1.03	NS	NS
	24 July	0.46	8.37	0.00	0.01	0.35	0.31	0.06
	28 August	0.69	11.61	0.67	0.06	0.29	0.80	0.17
	26 September	1.00	26.17	6.49	0.16	0.45	1.85	0.24
IPD	23 May	0.74	1.95	1.72	0.15	1.08	3.49	0.63
	27 June	0.53	3.81	0.00	0.04	1.09	0.33	0.04
	24 July	0.34	6.89	0.00	0.01	1.12	0.23	0.04
	28 August	1.27	11.79	0.68	0.06	1.30	0.79	0.14
	26 September	0.67	18.15	2.50	0.07	0.26	0.63	0.16

Table 5.—Zooplankton (ZSV) and total plankton (TSV) settled volumes (ml) from 20-m NORPAC hauls sampled monthly in marine waters of the northern region of southeastern Alaska, May–September 2000. Station code acronyms are defined in Table 1. NS denotes no sampling. Asterisk denotes that separation of zooplankton was not distinct but was estimated.

Locality	Month	ZSV	TSV	ZSV	TSV	ZSV	TSV	ZSV	TSV
Inside waters									
Inshore		TKI		ABM		LFC		FPR	
	May	6	35	**10**	**63**	10	120	15	100
	June	15	18	**21**	**23**	35	60	20	26
	July	15	23	**25**	**60**	20	65	11	21
	August	9	11	**21**	**21**	12	21	10	20
	September	4	5	**3**	**4**	3	7	0.5	—
Upper Chatham Strait		UCA		UCB		UCC		UCD	
	May	14	104	20	95	24	104	10	40
	June	22	25	24	27	18	20	15	20
	July	3.5	4	2.5	2	2	2	2.5	2
	August	1	1	6.5	6	9	11	5	5
	September	—	—	—	—	0.5	—	0.5	—
Icy Strait		ISA		ISB		ISC		ISD	
	May	5	27	7	39	5	105	10	60
	June	26	36	40	50	40	50	15	30
	July	12	15	8	60	7	7	7	7
	August	2	2	3.5	3.5	7.5	7.5	4.5	4.5
	September	1	1	0.8	1	1.8	2	1.5	2
Outside waters									
Cross Sound		CSA		CSB		CSC		CSD	
	May	17	63	17	35	13	22	14	25
	June	5	7	6	8	6	8	4	7
	July	NS	NS	NS	NS	5	5	2	2
	August	1	1	3	3	1	1	1	1
	September	NS	NS	NS	NS	NS	NS	2	2
Icy Point		IPA		IPB		IPC		IPD	
	May	25	30	15	25	22	31	17	37
	June	12	12	2	2	3	3	10	10
	July	7	7	4.5	4	8	8	1	1
	August	4	4	10	10	15	15	6	6
	September	11	11	3.5	4	2.5	2	2	2

Table 6.—Monthly catches of fishes and squid sampled with a rope trawl in marine waters of the northern region of southeastern Alaska, June–September 2000.

Common name	Scientific name	Number caught June	July	August	September	Total
Chum salmon[1]	*Oncorhynchus keta*	919	2,711	81	26	3,737
Pink salmon[1]	*O. gorbuscha*	254	1,519	199	149	2,121
Sockeye salmon[1]	*O. nerka*	270	153	77	22	522
Coho salmon[1]	*O. kisutch*	93	109	31	22	255
Chinook salmon[1]	*O. tshawtscha*	9	16	21	106	152
Chinook salmon[2]	*O. tshawtscha*	12	7	4	3	26
Pink salmon[3]	*O. gorbuscha*	1	11	3	0	15
Chum salmon[3]	*O. keta*	5	3	5	0	13
Coho salmon[3]	*O. kisutch*	1	0	7	1	9
Walleye pollock	*Theragra chalcogramma*	177	34	8	10	229
Pacific herring	*Clupea harengus*	92	22	51	53	218
Soft sculpin	*Psychrolutes sigalutes*	5	0	0	176	181
Spiny dogfish	*Squalus acanthias*	2	113	0	3	118
Squid	Gonatidae	64	0	0	23	87
Crested sculpin	*Blepsias bilobus*	4	21	27	19	71
Lingcod	*Ophiodon elongatus*	44	0	0	0	44
Black rockfish	*Sebastes melanops*	1	21	0	0	22
Prowfish	*Zaprora silenus*	7	5	6	2	20
Pacific sandlance	*Ammodytes hexapterus*	15	0	0	0	15
Pacific cod	*Gadus macrocephalus*	13	0	1	0	13
Pacific spiny lumpsucker	*Eumicrotremus orbis*	0	2	4	1	7
Capelin	*Mallotus villosus*	1	1	1	4	7
Rockfish	*Sebastes* spp.	6	0	1	0	7
Pacific sandfish	*Trichodon trichodon*	0	4	2	0	6
Wolf-eel	*Anarrhichthys ocellatus*	1	0	3	1	5
Rex Sole	*Glyptocephalus zachirus*	0	0	0	4	4
Arrowtooth flounder	*Atheresthes stomias*	4	0	0	0	4
Starry flounder	*Platichthys stellatus*	2	0	0	0	2
Silverspotted sculpin	*Blepsias cirrhosus*	1	1	0	0	2
Eulachon	*Thaleichthys pacificus*	2	0	0	0	2
Smooth lumpsucker	*Aptocyclus ventricosus*	0	1	0	1	2
Sablefish	*Anoplopoma fimbria*	0	0	1	0	1
Salmon shark	*Lamna ditropis*	0	0	0	1	1
Pomfret	*Brama japonica*	0	1	0	0	1
Greenling	*Hexagrammos* spp.	1	0	0	0	1
Total		2,006	4,755	532	627	7,920

[1]Juvenile
[2] Immature
[3] Adult

Table 7.—Frequency of occurrence for fishes and squid sampled with a rope trawl in marine waters of the northern region of southeastern Alaska, June–September 2000. Percentage occurrence per 89 hauls shown in parentheses.

		Frequency of occurrence					
Common name	Scientific name	June	July	August	September	Total	(%)
Chum salmon[1]	*Oncorhynchus keta*	14	17	12	6	49	(55)
Pink salmon[1]	*O. gorbuscha*	9	16	17	11	53	(60)
Sockeye salmon[1]	*O. nerka*	13	16	6	7	42	(47)
Coho salmon[1]	*O. kisutch*	12	16	9	7	44	(49)
Chinook salmon[1]	*O. tshawtscha*	3	11	11	16	41	(46)
Chinook salmon[2]	*O. tshawtscha*	8	5	2	3	18	(20)
Pink salmon[3]	*O. gorbuscha*	1	7	2	0	10	(11)
Chum salmon[3]	*O. keta*	4	3	5	0	12	(13)
Coho salmon[3]	*O. kisutch*	1	0	5	1	7	(8)
Walleye pollock	*Theragra chalcogramma*	13	9	7	8	37	(42)
Pacific herring	*Clupea harengus*	7	4	5	4	20	(22)
Soft sculpin	*Psychrolutes sigalutes*	4	0	0	11	15	(17)
Spiny dogfish	*Squalus acanthias*	2	3	0	1	6	(7)
Squid	Gonatidae	3	0	0	2	5	(6)
Crested sculpin	*Blepsias bilobus*	4	9	10	9	32	(36)
Lingcod	*Ophiodon elongatus*	6	0	0	0	6	(7)
Black rockfish	*Sebastes melanops*	1	1	0	0	2	(2)
Prowfish	*Zaprora silenus*	5	5	4	2	16	(18)
Pacific sandlance	*Ammodytes hexapterus*	3	0	0	0	3	(3)
Pacific cod	*Gadus macrocephalus*	5	0	0	0	5	(6)
Pacific spiny lumpsucker	*Eumicrotremus orbis*	0	2	4	1	7	(8)
Capelin	*Mallotus villosus*	1	1	1	2	5	(6)
Rockfish	*Sebastes* spp.	1	0	1	0	2	(2)
Pacific sandfish	*Trichodon trichodon*	0	1	1	0	2	(2)
Wolf-eel	*Anarrhichthys ocellatus*	1	0	3	1	5	(6)
Rex Sole	*Glyptocephalus zachirus*	0	0	0	2	2	(2)
Arrowtooth flounder	*Atheresthes stomias*	1	0	0	0	1	(1)
Starry flounder	*Platichthys stellatus*	1	0	0	0	1	(1)
Silverspotted sculpin	*Blepsias cirrhosus*	1	1	0	0	2	(2)
Eulachon	*Thaleichthys pacificus*	1	0	0	0	1	(1)
Smooth lumpsucker	*Aptocyclus ventricosus*	0	1	0	1	2	(2)
Sablefish	*Anoplopoma fimbria*	0	0	1	0	1	(1)
Salmon shark	*Lamna ditropis*	0	0	0	1	1	(1)
Pomfret	*Brama japonica*	0	1	0	0	1	(1)
Greenling	*Hexagrammos* spp.	1	0	0	0	1	(1)

[1]Juvenile
[2]Immature
[3]Adult

Table 8.— Juvenile pink salmon length (mm fork), weight (g), and condition [(weight/length^3)*(10^5)] in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. NS denotes no sampling.

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Inshore	Length	—	—	—	—	11	95-137	117.7	14.7	2	157-161	159.0	2.8	—	—	—	—
	Weight	—	—	—	—	11	6.4-21.6	14.3	5.5	2	39.5-42.3	40.9	2.0	—	—	—	—
	Condition	—	—	—	—	11	0.7-0.9	0.8	0.0	2	1.0	1.0	0.0	—	—	—	—
Upper	Length	39	79-123	95.6	9.1	86	91-168	132.0	16.1	45	118-205	156.2	21.1	8	192-244	226.1	16.9
Chatham	Weight	39	4.7-16.6	8.3	2.5	86	6.1-48.1	22.2	8.4	45	14.0-85.5	37.2	16.6	8	73-161.5	124.5	29.6
Strait	Condition	39	0.6-1.4	0.9	0.1	86	0.7-1.1	0.9	0.1	45	0.8-1.0	0.9	0.1	8	1.0-1.2	1.1	0.1
Icy	Length	210	76-125	95.3	10.6	644	79-173	124.6	15.5	135	135-212	165.4	15.9	141	137-260	196.9	21.7
Strait	Weight	127	3.9-19.1	8.6	3.2	234	5.8-54.3	19.5	8.9	135	19.9-97.0	44.7	15.2	97	24.2-206.6	90.8	35.0
	Condition	127	0.8-1.1	0.9	0.1	234	0.5-1.6	0.9	0.1	135	0.6-1.8	1.0	0.1	97	0.9-1.3	1.1	0.1
Cross	Length	1	85	85.0	0.0	273	65-148	112.2	11.5	2	133-143	138.0	7.1	NS	NS	NS	NS
Sound	Weight	1	5	5.0	0.0	53	4.8-27.6	13.2	4.3	2	20.2-23.6	21.9	2.4	NS	NS	NS	NS
	Condition	1	0.8	0.8	0.0	53	0.7-0.9	0.8	0.1	2	0.8-0.9	0.8	0.0	NS	NS	NS	NS
Icy	Length	1	79.0	79.0	0.0	163	92-184	118.2	13.5	15	105-144	125.5	11.3	—	—	—	—
Point	Weight	1	5.0	5.0	0.0	151	5.6-59.0	14.9	6.9	15	9.4-26.4	17.1	5.1	—	—	—	—
	Condition	1	1.0	1.0	0.0	151	0.7-1.0	0.8	0.1	15	0.7-1.0	0.8	0.1	—	—	—	—
Total	Length	251	76-125	95.2	10.4	1177	65-184	121.3	15.6	199	105-212	160.0	19.9	149	137-260	198.4	22.4
	Weight	168	3.9-19.1	8.5	3.0	535	4.8-59.0	17.9	8.4	199	9.4-97.0	40.6	16.7	105	24.2-206.6	93.4	35.7
	Condition	168	0.6-1.4	0.9	0.1	535	0.5-1.6	0.9	0.1	199	0.6-1.8	0.9	0.1	105	0.9-1.3	1.1	0.1

Table 9.—Juvenile chum salmon length (mm fork), weight (g), and condition [(weight/length^3)*(10^5)] in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. NS denotes no sampling.

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Inshore	Length	—	—	—	—	16	114-160	135.3	12.1	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	16	13.0-14.5	23.6	7.7	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	16	0.8-1.1	0.9	0.1	—	—	—	—	—	—	—	—
Upper	Length	143	80-125	99.8	7.9	331	101-163	135.1	11.6	20	128-208	172.9	22.8	—	—	—	—
Chatham	Weight	143	5.0-19.6	10.5	2.5	251	10-43.9	24.4	6.4	20	20.4-90.1	55.7	17.6	—	—	—	—
Strait	Condition	143	0.9-1.5	1.0	0.1	251	0.3-2.2	1.0	0.1	20	0.9-2.4	1.1	0.3	—	—	—	—
Icy	Length	661	79-135	107.5	7.4	816	85-179	130.9	12.8	56	128-207	179.9	16.2	26	188-257	217.6	17.5
Strait	Weight	202	4.3-24.7	13.4	3.1	353	4.6-52.9	23.0	6.9	56	20.9-94.7	62.3	16.3	26	76.7-198.6	122.2	30.9
	Condition	202	0.8-1.2	1.0	0.1	353	0.7-1.2	1.0	0.1	56	0.5-2.1	1.1	0.2	26	1.0-1.3	1.2	0.1
Cross	Length	8	97-115	105.6	6.0	257	92-164	120.6	12.6	—	—	—	—	NS	NS	NS	NS
Sound	Weight	8	7.9-15.2	10.8	2.2	54	12.2-40.4	19.8	5.9	—	—	—	—	NS	NS	NS	NS
	Condition	8	0.8-1.0	0.9	0.0	54	0.8-1.0	0.9	0.0	—	—	—	—	NS	NS	NS	NS
Icy	Length	3	106-128	117.3	11.0	203	101-171	130.8	12.4	4	149-178	163.5	12.0	—	—	—	—
Point	Weight	3	10.6-21.2	16.3	5.3	129	9.6-51.3	21.2	6.7	4	33.2-54.3	42.5	8.8	—	—	—	—
	Condition	3	0.9-1.0	1.0	0.1	129	0.8-1.1	0.9	0.1	4	0.9-1.0	1.0	0.0	—	—	—	—
	Length	815	79-135	106.2	8.1	1623	85-179	130.1	13.2	80	128-208	177.3	18.2	26	188-257	217.6	17.5
Total	Weight	356	4.3-24.7	12.2	3.2	803	4.6-52.9	22.9	6.8	80	20.4-94.7	59.7	16.9	26	76.7-198.6	122.2	30.9
	Condition	356	0.8-1.5	1.0	0.1	803	0.3-2.2	1.0	0.1	80	0.5-2.4	1.1	0.3	26	1.0-1.3	1.2	0.1

Table 10.—Juvenile sockeye salmon length (mm fork), weight (g), and condition [(weight/length^3)*(10^5)] in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. NS denotes no sampling.

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Inshore	Length	1	103	103.0	0.0	7	99-146	123.7	17.2	—	—	—	—	—	—	—	—
	Weight	1	9.9	9.9	0.0	7	8.5-33.3	20.9	9.0	—	—	—	—	—	—	—	—
	Condition	1	0.9	0.9	0.0	7	0.9-1.2	1.0	0.1	—	—	—	—	—	—	—	—
Upper	Length	36	83-125	99.5	11.1	7	119-156	136.6	15.7	18	113-207	175.3	25.2	1	183.0	183.0	0.0
Chatham	Weight	36	5.8-21.8	11.0	4.0	7	15.8-39.6	27.2	9.5	18	24.2-95.9	62.4	22.0	1	69.8	69.8	0.0
Strait	Condition	36	0.9-1.2	1.1	0.1	7	0.9-1.1	1.0	0.1	18	1.0-1.7	1.0	0.2	1	1.1	1.1	0.0
Icy	Length	226	89-158	117.0	13.9	108	101-193	145.2	20.2	58	128-212	170.0	18.6	21	144-227	196.3	25.0
Strait	Weight	111	7.3-38.5	18.2	6.5	106	10.9-75.3	33.6	13.7	56	22.0-111.7	55.0	19.4	21	29.1-133	90.0	31.3
	Condition	111	0.8-1.3	1.1	0.1	106	0.3-1.2	1.0	0.1	56	0.9-1.2	1.1	0.1	21	1.0-1.3	1.1	0.1
Cross	Length	3	103-129	114.0	13.5	8	104-117	110.0	5.2	—	—	—	—	NS	NS	NS	NS
Sound	Weight	3	10.9-21.5	15.3	5.5	8	10.4-16.0	12.7	2.0	—	—	—	—	NS	NS	NS	NS
	Condition	3	1.0	1.0	0.0	8	0.9-1.0	0.9	0.0	—	—	—	—	NS	NS	NS	NS
Icy	Length	4	101-117	109.0	9.2	23	103-190	154.4	25.3	—	—	—	—	—	—	—	—
Point	Weight	4	9.8-14.8	12.3	2.8	23	10.6-74.8	39.6	18.0	—	—	—	—	—	—	—	—
	Condition	4	0.9-1.0	0.9	0.0	23	0.9-1.1	1.0	0.1	—	—	—	—	—	—	—	—
	Length	270	83-158	114.4	14.7	153	99-193	143.4	22.4	76	113-212	171.3	20.3	22	144-227	195.7	24.6
Total	Weight	155	5.8-38.5	16.3	6.7	151	8.5-75.3	32.5	15.0	74	22-111.7	56.8	20.2	22	29.1-133	89.1	30.8
	Condition	155	0.8-1.3	1.1	0.1	151	0.3-1.2	1.0	0.1	74	0.9-1.7	1.1	0.1	22	1.0-1.3	1.1	0.1

Table 11.—Juvenile coho salmon length (mm fork), weight (g), and condition [(weight/length^3)*(10^5)] in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. NS denotes no sampling.

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Inshore	Length	17	117-178	131.3	16.8	5	144-182	164.6	14.0	—	—	—	—	—	—	—	—
	Weight	16	18.3-64.1	28.7	12.3	3	49.5-60.7	54.1	5.8	—	—	—	—	—	—	—	—
	Condition	16	1.0-1.4	1.2	0.1	3	1.0-1.1	1.1	0.0	—	—	—	—	—	—	—	—
Upper	Length	37	131-203	168.6	18.5	14	163-264	213.9	29.0	11	173-272	209.5	26.2	—	—	—	—
Chatham	Weight	36	25.4-96.3	63.7	19.9	14	46.4-265.1	124.3	57.1	11	48.7-254	111.9	53.0	—	—	—	—
Strait	Condition	36	1.1-1.5	1.3	0.1	14	1.0-1.4	1.2	0.1	11	0.9-1.3	1.1	0.1	—	—	—	—
Icy	Length	35	120-219	172.6	26.2	84	138-247	199.2	20.0	8	213-269	233.1	19.2	19	249-344	279.9	26.5
Strait	Weight	35	20.7-147.7	68.9	31.6	79	29.8-169.7	93.1	27.0	8	114.1-212.7	149.7	34.2	19	192.1-493.5	282.5	78.6
	Condition	35	1.1-1.4	1.2	0.1	79	0.7-2.1	1.1	0.1	8	1.0-1.4	1.2	0.1	19	1.1-1.3	1.3	0.1
Cross	Length	—	—	—	—	1	214	214.0	0.0	1	230	230.0	0.0	NS	NS	NS	NS
Sound	Weight	—	—	—	—	1	117.9	117.9	0.0	1	145.9	145.9	0.0	NS	NS	NS	NS
	Condition	—	—	—	—	1	1.2	1.2	0.0	1	1.2	1.2	0.0	NS	NS	NS	NS
Icy	Length	4	148-226	195.8	37	5	201-255	228.4	20.9	11	261-322	291.4	18.6	3	282-333	313.7	27.6
Point	Weight	4	34.1-141.1	95.9	50.3	4	91.3-148.6	125.7	24.9	11	226.7-434.5	328.2	75.5	3	269.8-458	385.2	101.1
	Condition	4	1.1-1.2	1.2	0.1	4	0.6-1.5	1.2	0.4	11	1.2-1.5	1.3	0.1	3	1.2-1.2	1.2	0.0
	Length	93	117-226	164.5	27.6	109	138-264	200.9	23.5	31	173-322	245.3	41.5	22	249-344	284.5	28.5
Total	Weight	91	18.3-147.7	60.9	30.1	101	29.8-265.1	97.8	34.9	31	48.7-434.5	199.5	112.9	22	192.1-493.5	296.5	87.0
	Condition	91	1.0-1.5	1.2	0.1	101	0.6-2.1	1.1	0.2	31	0.9-1.5	1.2	0.1	22	1.1-1.3	1.3	0.1

Table 12.—Juvenile chinook salmon length (mm fork), weight (g), and condition [(weight/length^3)*(10^5)] different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. NS denotes no sampling.

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Inshore	Length	7	131-152	140.4	7.9	7	131-179	156.7	18.7	7	138-188	168.3	18.9	7	175-209	188.7	13.3
	Weight	7	21.2-41.1	29.4	6.7	5	26.4-65.0	45.8	13.7	7	29.5-82.8	56.8	19.2	7	58.7-112.6	80.1	19.9
	Condition	7	0.9-1.2	1.0	0.1	5	1.1-1.2	1.2	0.0	7	1.0-1.2	1.1	0.1	7	1.1-1.2	1.2	0.1
Upper	Length	1	177.0	177.0	0.0	3	216-225	220.7	4.5	4	220-256	238.8	17.5	1	284	284.0	0.0
Chatham	Weight	1	72.3	72.3	0.0	2	134.1-152.3	143.2	12.9	4	140.1-222.5	179.3	37.9	1	323.9	323.9	0.0
Strait	Condition	1	1.3	1.3	0.0	2	1.3-1.4	1.4	0.1	4	1.3-1.3	1.3	0.0	1	1.4	1.4	0.0
Icy	Length	—	—	—	—	4	211-221	216.8	4.3	10	195-265	235.8	26.9	97	190-391	268.2	29.8
Strait	Weight	—	—	—	—	5	128.3-275.8	190.4	63.4	8	99.9-263.4	207.7	49.8	96	87.4-565.4	274.7	88.7
	Condition	—	—	—	—	5	1.4-2.6	1.8	0.6	8	1.3-1.4	1.4	0.1	96	1.1-1.9	1.4	0.1
Cross	Length	—	—	—	—	—	—	—	—	—	—	—	—	NS	NS	NS	NS
Sound	Weight	—	—	—	—	—	—	—	—	—	—	—	—	NS	NS	NS	NS
	Condition	—	—	—	—	—	—	—	—	—	—	—	—	NS	NS	NS	NS
Icy	Length	1	249	249.0	0.0	2	219-219	219.0	0.0	—	—	—	—	1	310.0	310.0	0.0
Point	Weight	1	214.2	214.2	0.0	1	132.8	132.8	0.0	—	—	—	—	1	415.9	415.9	0.0
	Condition	1	1.4	1.4	0.0	1	1.3	1.3	0.0	—	—	—	—	1	1.4	1.4	0.0
Total	Length	9	131-249	156.6	37.4	16	131-225	191.5	33.9	21	138-265	213.9	39.6	106	175-391	263.5	35.3
	Weight	9	21.2-214.2	54.7	61.7	13	26.4-275.8	123.1	76.6	19	29.5-263.4	146.1	79.7	105	58.7-565.4	263.5	99.3
	Condition	9	0.9-1.4	1.1	0.2	13	1.1-2.6	1.5	0.5	19	1.0-1.4	1.3	0.1	105	1.1-1.9	1.4	0.1

Table 13.—Release and recovery information for coded-wire tagged chinook and coho salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June—September 2000. Station code position coordinates are shown in Table 1.

Species	Coded-wire tag code	Brood year	Agency*	Release information: Locality	Date	Size (mm)	Size (g)	Recovery information: Locality	(station code)	Date	Size (mm)	Size (g)	Age	Days since release	Distance traveled (km)
						June									
Chinook	No Tag	—	—	—	—	—	—	False Pt. Retreat	(FPR)	06/26/00	131	23.60	—	—	—
Coho	04:46/57	1997	ADFG	Berner's R., AK (Wild)	05/27/00	95	—	Chatham Strait	(UCD)	06/30/00	152	46.60	2.0	34	50
						July									
Chinook	04:01/60	1998	DIPAC	Gastineau Channel, AK	06/12/00		23.0	L. Fav. Channel	(LFC)	07/19/00	136	26.4	1.0	37	15
Coho	50:31/16	1998	DIPAC	Gastineau Channel, AK	06/07/00		20.9	Icy Strait	(ISA)	07/20/00	175	53.8	1.0	43	70
Coho	04:49/05	1998	NSRA	Kasnyku Bay, AK	06/02/00		20.6	Icy Strait	(ISD)	07/22/00	210	99.3	1.0	50	130
Coho	50:31/05	1998	DIPAC	Sheep Creek, AK	06/07/00		14.9	Icy Strait	(ISC)	07/22/00	189	73.6	1.0	45	100
Coho	50:31/07	1998	DIPAC	Sheep Creek, AK	06/07/00		14.9	Icy Strait	(ISC)	07/22/00	182	67.1	1.0	45	100
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPA)	07/24/00	255	193.6	—	—	—
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPB)	07/24/00	219	108.1	—	—	—
						August									
Chinook	04:46/63	1998	NSRA	Kasnyku Bay, AK	05/24/00		37.1	Icy Strait	(ISC)	08/26/00	258	244.3	1.0	94	130
Chinook	No Tag	—	—	—	—	—	—	Taku Inlet	(TKI)	08/25/00	172	51.9	—	—	—
Chinook	Tag Lost	—	—	—	—	—	—	Taku Inlet	(TKI)	08/25/00	186	75.1	—	—	—
Coho	50:04/61	1997	DIPAC	Gastineau Channel, AK	06/09/99		16.7	Cross Sound	(CSB)	08/27/00	643	3500.0	1.1	445	130
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPA)	08/28/00	292	286.8	—	—	—
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPC)	08/28/00	293	315.1	—	—	—
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPC)	08/28/00	322	429.5	—	—	—
						September									
Chinook	05:32/16	1998	FWS	Clear Cr/Salmon R., ID	04/06/00		22.7	Icy Point	(IPA)	09/26/00	310	415.9	1.0	173	1,400
Chinook	04:46/63	1998	NSRA	Kasnyku Bay, AK	05/24/00	—	37.1	Icy Strait	(ISA)	09/27/00	278	318.8	1.0	126	130
Chinook	04:49/06	1998	NSRA	Medvejie Bear Cove, AK	05/24/00	—	92.5	Icy Strait	(ISB)	09/27/00	286	302.5	1.0	126	220
Chinook	03:62/42	1998	NMFS	Little Port Walter, AK	05/18/00	—	21.1	Icy Strait	(ISA)	09/30/00	251	205.0	1.0	135	225
Chinook	03:01/54	1998	NMFS	Little Port Walter, AK	05/18/00	—	16.1	Icy Strait	(ISB)	09/30/00	258	236.5	1.0	135	225
Chinook	04:01/49	1997	ADFG	Crystal Lake, AK	05/27/99	125	27.5	Icy Strait	(ISB)	09/30/00	439	1150.0	1.1	492	275
Coho	04:01/23	1997	ADFG	Chilkat R., AK (Wild)	06/02/99	—	—	Icy Strait	(ISB)	09/27/00	688	4300.0	1.1	483	180
Coho	50:31/05	1998	DIPAC	Sheep Creek, AK	06/07/00	—	14.9	Icy Strait	(ISA)	09/30/00	261	228.2	1.0	115	145
Coho	50:31/08	1998	DIPAC	Sheep Creek, AK	06/07/00	—	14.9	Icy Strait	(ISB)	09/30/00	293	325.1	1.0	115	145
Coho	No Tag	—	—	—	—	—	—	Icy Point	(IPB)	09/26/00	333	459.5	—	—	—

*ADFG = Alaska Department of Fish and Game; DIPAC = Douglas Island Pink and Chum; FWS = Fish and Wildlife Service; NMFS = National Marine Fisheries Service; NSRA = Northern Southeast Regional Aquaculture Association.

Table 14.—Stock-specific information on juvenile chum salmon captured in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. No juvenile salmon were captured in May. Numbers (*n*), range, mean, and standard deviation (sd) are shown for length (mm), weight (g) and Fulton's condition factor (g/FL^3*10^5).

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
DIPAC																	
Inshore	Length	—	—	—	—	3	136-154	144.7	9.0	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	3	25.5-35.1	30.8	4.9	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	3	1.0-1.1	1.0	0.1	—	—	—	—	—	—	—	—
Upper	Length	95	85-117	99.4	6.9	30	124-157	141.8	9.2	2	172-187	179.5	10.6	—	—	—	—
Chatham	Weight	95	6.3-15.7	10.3	2	30	17.3-39.8	29	5.9	2	49.8-67.5	58.7	12.5	—	—	—	—
Strait	Condition	95	0.9-1.2	1.0	0.1	30	0.9-1.1	1.0	0	2	1	1.0	0	—	—	—	—
Icy	Length	141	91-127	109	6.8	62	117-173	139.1	9.6	8	166-201	186.9	11.8	—	—	—	—
Strait	Weight	141	6.6-19.2	13.3	2.6	62	14.6-52.9	27.2	6	8	42.7-75.7	63.1	13.5	—	—	—	—
	Condition	141	0.8-1.2	1.0	0.1	62	0.9-1.1	1.0	0.1	8	0.5-1.1	1.0	0.2	—	—	—	—
Cross	Length	1	109	109	0	11	120-154	135.5	11.5	—	—	—	—	—	—	—	—
Sound	Weight	1	11	11	0	11	14.1-36.1	23.4	7.0	—	—	—	—	—	—	—	—
	Condition	1	0.8	0.8	0	11	0.8-1.0	0.9	0.1	—	—	—	—	—	—	—	—
Icy	Length	1	106	106	0	13	123-157	132.5	10.3	8	166-201	186.9	11.8	—	—	—	—
Point	Weight	1	10.6	10.6	0	13	15.9-34.9	21.4	5.3	8	42.7-75.7	63.1	13.5	—	—	—	—
	Condition	1	1	1.0	0	13	0.9-1.0	0.9	0	8	0.5-1.1	1.0	0.2	—	—	—	—
	Length	238	85-127	105.1	8.2	119	117-173	138.9	10.0	10	166-201	185.4	11.4	—	—	—	—
Total	Weight	238	6.3-19.2	12.1	2.8	119	14.1-52.9	26.8	6.4	10	42.7-75.7	62.2	12.7	—	—	—	—
	Condition	238	0.8-1.2	1.0	0.1	119	0.8-1.1	1.0	0.1	10	0.5-1.1	1.0	0.2	—	—	—	—

Table 14.—(Cont.)

Locality	Factor	June				July				August				September			
		n	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Hidden Falls																	
Inshore	Length	—	—	—	—	2	120-143	131.5	16.3	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	2	26.4-13.9	20.2	8.8	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	2	0.8-0.9	0.9	0.1	—	—	—	—	—	—	—	—
Upper	Length	10	97-117	106	6.6	47	107-161	139.1	10.2	3	179-191	186.7	6.7	—	—	—	—
Chatham	Weight	10	9.9-16.2	12.3	2.1	47	10-39.5	26.0	6.2	3	50.6-73.5	63.3	11.6	—	—	—	—
Strait	Condition	10	1.0-1.1	1.0	0.0	47	0.3-1.1	1.0	0.1	3	0.9-1.1	1.0	0.1	—	—	—	—
Icy	Length	16	105-121	113.7	5.0	72	111-163	137.1	9.2	9	143-205	187.9	23.7	4	211-236	225.3	10.5
Strait	Weight	16	11.3-21	14.8	2.6	72	12.7-39.2	25.2	5.1	9	52.5-94.7	75.1	25.8	4	119.1-143	130.2	10.2
	Condition	16	0.9-1.2	1.0	0.1	72	0.9-1.1	1.0	0.1	9	1.0-1.9	1.2	1.5	4	1.1-1.3	1.1	0.1
Cross	Length	7	97-115	105.1	6.3	5	113-135	125.4	8.3	—	—	—	—	—	—	—	—
Sound	Weight	7	7.9-15.2	10.8	2.3	5	13-22.7	17.6	3.6	—	—	—	—	—	—	—	—
	Condition	7	0.9-1.0	0.9	0.0	5	0.9	0.9	0.0	—	—	—	—	—	—	—	—
Icy	Length	1	128	128	0	6	120-148	133.5	5.0	2	149-178	163.5	20.5	—	—	—	—
Point	Weight	1	21.2	21.2	0	6	15.7-28.9	21.3	0.0	2	33.2-54.3	43.8	14.9	—	—	—	—
	Condition	1	1	1	0	6	0.8-1.0	0.9	0.0	2	1	1.0	0.0	—	—	—	—
	Length	34	97-128	110.1	7.5	132	107-163	137.1	9.9	14	143-205	184.1	19.6	4	211-236	225.3	10.5
Total	Weight	34	7.9-21.2	13.4	3.1	132	10-39.5	25.0	5.7	14	33.2-94.7	68.1	18.3	4	119.1-143	130.2	10.2
	Condition	34	0.9-1.2	1	0.1	132	0.3-1.1	1	0.1	14	0.9-1.9	1.1	0.3	4	1.1-1.3	1.1	0.1
Deep Inlet																	
Icy Strait	Length	1	111	111	0.0	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	1	14.1	14.1	0.0	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	1	1.0	1.0	0.0	—	—	—	—	—	—	—	—	—	—	—	—
Upper	Length	1	116	116	0.0	1	138	138	0.0	—	—	—	—	—	—	—	—
Chatham	Weight	1	17.6	17.6	0.0	1	25.7	25.7	0.0	—	—	—	—	—	—	—	—
Strait	Condition	1	1.1	1.1	0.0	1	1.0	1.0	0.0	—	—	—	—	—	—	—	—

Table 14.— (Cont.)

Locality	Factor	June *n*	June range	June x̄	June sd	July *n*	July range	July x̄	July sd	August *n*	August range	August x̄	August sd	September *n*	September range	September x̄	September sd
Icy Point	Length	1	118	118	0.0	2	135-171	153	25.5	—	—	—	—	—	—	—	—
	Weight	1	17.1	17.1	0.0	2	20.5-51.3	35.9	21.8	—	—	—	—	—	—	—	—
	Condition	1	1.0	1.0	0.0	2	0.8-1.0	0.9	0.1	—	—	—	—	—	—	—	—
Total	Length	3	111-118	115	3.6	3	135-171	148	20.0	—	—	—	—	—	—	—	—
	Weight	3	14.1-17.6	16.3	1.9	3	20.5-51.3	32.5	16.5	—	—	—	—	—	—	—	—
	Condition	3	1.0-1.1	1.0	0.1	3	0.8-1.0	0.9	0.1	—	—	—	—	—	—	—	—
Unmarked																	
Inshore	Length	—	—	—	—	11	114-160	133.5	12.0	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	11	13-41.5	22.2	7.5	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	11	0.8-1.0	0.9	0.0	—	—	—	—	—	—	—	—
Upper	Length	37	80-125	98.8	9.5	173	103-163	132.3	11.5	14	131-208	175.2	20.9	—	—	—	—
Chatham	Weight	37	5-19.6	10.3	3.2	173	10.1-43.9	23.2	6.2	14	20.4-90.1	56.4	18.6	—	—	—	—
Strait	Condition	37	0.9-1.5	1.0	0.1	173	0.6-2.2	1.0	0.1	14	0.9-1.1	1.0	0.0	—	—	—	—
Icy Strait	Length	43	79-135	108.3	10.7	218	85-163	127.3	14.2	39	128-207	176.6	15	22	188-257	216.2	18.4
	Weight	43	4.3-24.7	13.3	4.4	218	4.6-43.5	21.0	6.9	39	20.9-93.6	59.2	15.6	22	76.7-198.6	120.7	33.3
	Condition	43	0.9-1.2	1.0	0.1	218	0.7-1.2	1.0	0.1	39	0.6-2.1	1.1	0.2	22	1.0-1.3	1.2	0.1
Cross	Length	—	—	—	—	37	111-159	127.2	11.1	—	—	—	—	—	—	—	—
Sound	Weight	—	—	—	—	37	12.2-40.4	19.2	5.6	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	37	0.7-1.2	1.0	0.1	—	—	—	—	—	—	—	—
Icy Point	Length	—	—	—	—	108	103-164	130.6	12.2	2	161-166	163.5	3.5	—	—	—	—
	Weight	—	—	—	—	108	9.6-41.6	20.9	6.4	2	40.2-42.4	41.3	1.6	—	—	—	—
	Condition	—	—	—	—	108	0.8-1.1	0.9	0.1	2	0.9-1.0	2.6	1.3	—	—	—	—
	Length	80	79-135	103.9	11.2	547	85-164	129.6	12.9	54	128-208	175.8	16.3	22	188-257	216.2	18.4
Total	Weight	80	4.3-24.7	11.9	4.1	547	4.6-43.9	21.6	6.6	54	20.4-93.6	57.9	16.3	22	76.7-198.6	120.7	33.3
	Condition	80	0.9-1.5	1.0	0.1	547	0.6-2.2	1.0	0.1	54	0.6-2.1	1.0	0.2	22	1.0-1.3	1.2	0.2

Table 15.—Stock-specific information on juvenile sockeye salmon captured in different marine habitats of the northern region of southeastern Alaska by rope trawl, June–September 2000. No juvenile salmon were captured in May. Numbers (n), range, mean, and standard deviation (sd) are shown for length (mm), weight (g) and Fulton's condition factor ($g/FL^3 * 10^5$).

		June				July				August				September			
Locality	Factor	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd	*n*	range	x̄	sd
Snettisham																	
Inshore	Length	1	103	103	0.0	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	1	9.9	9.9	0.0	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	1	0.9	0.9	0.0	—	—	—	—	—	—	—	—	—	—	—	—
Upper	Length	7	94-125	107.6	11.0	1	156	156	0.0	1	177	177	0.0	—	—	—	—
Chatham	Weight	7	9.4-20.6	14.0	4.0	1	39.6	39.6	0.0	1	63.9	63.9	0.0	—	—	—	—
	Condition	7	1.1	1.1	0.0	1	1.0	1.0	0.0	1	1.2	1.2	0.0	—	—	—	—
Icy Strait	Length	40	97-130	114.8	8.2	29	111-173	151.5	15.4	4	181-197	187.8	6.8	2	225-227	226	1.4
	Weight	40	9.9-24.6	16.7	3.5	28	13.5-54.4	37.5	10.6	4	66.7-82.3	74.1	8.0	2	120.3-133	126.7	9.0
	Condition	40	0.9-1.3	1.0	0.1	28	0.3-1.2	1.0	0.2	4	1.1-1.2	1.1	0.1	2	1.1	1.1	0.1
Cross Sound	Length	2	103-110	106.5	5.0	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	2	10.9-13.4	12.2	1.8	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	2	1	1	0.0	—	—	—	—	—	—	—	—	—	—	—	—
Total	Length	50	94-130	113.2	8.9	30	111-173	151.7	15.1	5	177-197	185.6	7.6	2	225-227	226	1.4
	Weight	50	9.4-24.6	16.0	3.8	29	13.5-54.4	37.6	10.4	5	63.9-82.3	72.1	8.3	2	120.3-133	126.7	9.0
	Condition	50	0.9-1.3	1.1	0.1	29	0.3-1.2	1.0	0.2	5	1.1-1.2	1.1	0.1	2	1.1	1.1	0.1
Sweetheart Lake*																	
	Length	9	109-133	119.3	7.4	6	135-152	143.5	7.7	—	—	—	—	—	—	—	—
Total	Weight	9	13.9-24.0	18.5	3.1	6	25.3-35.7	30.8	4.9	—	—	—	—	—	—	—	—
(Icy	Condition	9	1.0-1.2	1.1	0.1	6	1.0-1.1	1.0	0.0	—	—	—	—	—	—	—	—

Table 15.—(Cont.)

		June				July				August				September			
Locality	Factor	n	range	x̄	sd	n	range	x̄	sd	n	range	x̄	sd	n	range	x̄	sd
Tahltan																	
Icy Strait	Length	—	—	—	—	—	—	—	—	1	167	167	0.0	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	1	45.6	45.6	0.0	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	1	1.0	1.0	0.0	—	—	—	—
Icy Point	Length	—	—	—	—	1	127	127	0.0	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	1	18.2	18.2	0.0	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	1	0.9	0.9	0.0	—	—	—	—	—	—	—	—
Total	Length	—	—	—	—	1	127	127	0.0	1	167	167	0.0	—	—	—	—
	Weight	—	—	—	—	1	18.2	18.2	0.0	1	45.6	45.6	0.0	—	—	—	—
	Condition	—	—	—	—	1	0.9	0.9	0.0	1	1.0	1.0	0.0	—	—	—	—
Tuya*																	
Total	Length	—	—	—	—	—	—	—	—	1	192	192	0.0	1	218	218	0.0
(Icy Strait)	Weight	—	—	—	—	—	—	—	—	1	83.1	83.1	0.0	1	113.5	113.5	0.0
	Condition	—	—	—	—	—	—	—	—	1	1.2	1.2	0.0	1	1.1	1.1	0.0
Tatsumenie*																	
Total	Length	—	—	—	—	1	149	149	0.0	—	—	—	—	—	—	—	—
(Icy Strait)	Weight	—	—	—	—	1	35.7	35.7	0.0	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	1	1.1	1.1	0.0	—	—	—	—	—	—	—	—
Unmarked																	
Inshore	Length	—	—	—	—	7	99-146	123.7	17.2	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	7	8.5-33.3	20.9	9.0	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	7	0.9-1.2	1.0	0.1	—	—	—	—	—	—	—	—

Table 15.—(Cont.)

		June				July				August				September			
Locality	Factor	n	range	$\bar{x}$	sd	n	range	$\bar{x}$	sd	n	range	$\bar{x}$	sd	n	range	$\bar{x}$	sd
Upper Chatham	Length	29	83-125	97.6	10.4	6	119-152	133.3	14.4	16	135-207	179.1	21.1	1	183	183	0.0
	Weight	29	5.8-21.8	10.3	3.7	6	15.8-37.9	25.1	8.5	16	26.3-95.9	64.7	21.1	1	69.8	69.8	0.0
	Condition	29	0.9-1.2	1.1	0.1	6	0.9-1.1	1.0	0.1	16	1.0-1.2	1.1	0.1	1	1.1	1.1	0.0
Icy Strait	Length	61	90-151	118.9	16.3	71	101-193	142.6	22.4	50	128-212	167.8	18.8	18	144-219	191.8	24.1
	Weight	61	7.3-38.5	19.2	8.1	70	10.9-75.3	32.2	15.2	50	22-111.7	53.1	19.2	18	29.1-125	84.6	30.4
	Condition	61	0.8-1.2	1.1	0.1	70	0.3-1.2	1.0	0.2	50	0.9-1.2	1.1	0.1	18	1.0-1.3	1.1	0.1
Icy Point	Length	4	101-117	109	9.2	22	103-190	155.7	25.1	—	—	—	—	—	—	—	—
	Weight	4	9.8-14.8	12.3	2.8	22	10.6-74.8	40.6	17.7	—	—	—	—	—	—	—	—
	Condition	4	0.9-1.0	1.0	0.1	22	0.9-1.1	1.0	0.1	—	—	—	—	—	—	—	—
Cross Sound	Length	1	129	129	0.0	8	104-117	110	5.2	—	—	—	—	—	—	—	—
	Weight	1	21.5	21.5	0.0	8	10.4-16.0	12.7	2.0	—	—	—	—	—	—	—	—
	Condition	1	1.0	1.0	0.0	8	0.9-1.0	0.9	0.1	—	—	—	—	—	—	—	—
Total	Length	90	83-151	112.0	17.7	77	101-193	141.9	22.0	66	128-212	170.5	19.8	19	144-219	191.3	23.5
	Weight	90	5.8-38.5	16.4	8.1	76	10.9-75.3	31.7	14.9	66	22-111.7	55.9	20.1	19	29.1-125	83.9	29.8
	Condition	90	0.8-1.2	1.1	0.1	76	0.3-1.2	1.0	0.1	66	0.9-1.2	1.1	0.1	19	1.0-1.3	1.1	0.1

*only location

Table 16.--Number of potential predators of juvenile salmon examined from rope trawl collections, number of empty stomachs, percentage of predator stomachs that contained food, and number and percentage of feeding fish that ate juvenile salmon, June-September, 2000.

Predator species	Life history stage	Number examined	Number empty	Percent feeding	Number with salmon	Percent feeders w/ salmon
	Predation on juvenile salmon					
Walleye pollock	A	78	12	85	1	1
Spiny dogfish	A	64	7	89	3	5
Coho salmon	A	9	1	89	1	11
	No predation on juvenile salmon					
Chinook salmon	I	25	6	76	0	0
Pink salmon	A	15	4	73	0	0
Chum salmon	A	13	8	38	0	0
Pacific sandfish	A	4	0	100	0	0
Starry flounder	A	2	2	0	0	0
Wolf eel	A	1	0	100	0	0
Pomfret	A	1	0	100	0	0
Black rockfish	A	1	0	100	0	0
Total		214	40		5	

I=immature; A=adult of spawning age.

Appendix 1.—Catches and life history stage of salmonids captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–September 2000.

			Juvenile					Immature	Adult		
Date	Haul#	Station	Pink	Chum	Sockeye	Coho	Chinook	Chinook	Chum	Pink	Coho
26 June	4022	LFC	—	—	1	—	7	—	—	—	—
26 June	4023	FPR	—	—	—	17	—	—	2	1	—
27 June	4024	IPA	1	1	—	1	1	—	—	—	—
27 June	4025	IPB	2	—	4	3	—	—	1	—	—
28 June	4029	CSB	8	—	3	—	—	—	—	—	—
28 June	4030	CSC	—	1	—	—	—	—	—	—	—
28 June	4031	CSD	—	—	—	—	—	—	1	—	—
29 June	4032	ISA	17	—	6	3	—	1	—	—	—
29 June	4033	ISB	302	140	123	—	—	1	1	—	—
29 June	4034	ISC	2	—	1	11	—	1	—	—	—
29 June	4035	ISD	10	1	1	—	—	—	—	—	—
29 June	4036	ISB	170	7	37	—	—	—	—	—	—
30 June	4037	UCD	73	23	24	20	—	2	—	—	—
30 June	4039	UCB	67	16	12	7	1	3	—	—	—
30 June	4040	UCA	3	—	—	10	—	2	—	—	—
1 July	4041	ISA	2	—	2	5	—	—	—	—	—
1 July	4042	ISB	—	—	—	6	—	—	—	—	—
1 July	4043	ISC	247	26	40	8	—	1	—	—	1
1 July	4044	ISD	15	39	16	2	—	1	—	—	—
19 July	4046	TKI	—	—	—	—	5	—	—	1	—
19 July	4047	LFC	—	—	2	2	2	—	—	—	—
20 July	4049	ISA	28	3	2	9	—	1	—	—	—
20 July	4050	ISB	95	70	11	5	1	2	—	—	—
20 July	4051	ISC	461	217	37	15	1	2	—	2	—
20 July	4052	ISD	52	42	5	17	—	—	—	—	—
21 July	4054	UCD	51	26	1	2	1	—	—	—	—
21 July	4055	UCC	103	34	4	5	—	—	—	—	—
21 July	4056	UCB	59	8	2	4	1	—	—	3	—
21 July	4057	UCA	120	18	—	3	1	—	1	—	—
22 July	4053	FPR	15	11	5	3	—	1	—	—	—
22 July	4058	ISD	1,144	592	34	26	1	—	—	2	—
22 July	4059	ISC	91	61	19	12	1	1	1	1	—

Appendix 1.—(Cont.)

Date	Haul#	Station	Juvenile Pink	Juvenile Chum	Juvenile Sockeye	Juvenile Coho	Juvenile Chinook	Immature Chinook	Adult Chum	Adult Pink	Adult Coho
23 July	4060	CSD	283	270	8	—	—	—	—	—	—
23 July	4061	CSC	4	4	—	1	—	—	—	—	—
24 July	4062	IPA	63	60	2	2	1	—	—	1	—
24 July	4063	IPB	89	41	10	2	1	—	—	—	—
24 July	4064	IPC	51	62	6	1	—	—	—	—	—
24 July	4065	IPD	2	—	5	—	—	—	1	1	—
25 August	4066	TKI	—	—	—	—	4	2	—	—	—
25 August	4067	LFC	—	—	—	—	3	—	—	—	—
25 August	4069	FPR	—	2	—	—	—	—	—	—	—
26 August	4070	ISA	2	7	1	—	1	2	—	—	—
26 August	4071	ISB	15	18	3	2	1	—	1	—	1
26 August	4072	ISC	7	10	—	—	2	—	—	—	—
26 August	4073	ISD	2	1	—	—	—	—	—	—	—
27 August	4074	CSA	—	—	—	1	—	—	—	1	1
27 August	4075	CSB	—	1	—	—	—	—	1	—	2
27 August	4076	CSC	—	—	—	—	—	—	—	—	—
27 August	4077	CSD	—	1	—	—	—	1	—	—	—
28 August	4078	IPA	4	14	—	6	—	—	—	—	—
28 August	4079	IPB	—	1	—	—	—	—	—	—	—
28 August	4080	IPC	—	—	—	3	—	—	—	—	—
28 August	4081	IPD	—	—	—	2	—	—	—	—	—
29 August	4082	UCA	2	4	—	—	1	—	—	—	—
29 August	4083	UCB	—	1	1	—	—	—	—	—	—
29 August	4084	UCC	15	34	16	6	—	—	1	—	—
29 August	4085	UCD	3	6	1	5	3	—	—	—	—
30 August	4086	ISA	2	1	—	2	1	—	—	—	—
30 August	4087	ISB	2	3	—	—	1	—	—	2	2
30 August	4088	ISC	24	82	55	—	2	—	—	—	—
30 August	4089	ISD	3	13	—	4	2	—	1	—	1

Appendix 1.—(Cont.)

Date	Haul#	Station	Juvenile Pink	Juvenile Chum	Juvenile Sockeye	Juvenile Coho	Juvenile Chinook	Immature Chinook	Adult Chum	Adult Pink	Adult Coho
25 September	4090	TKI	—	—	—	—	5	—	—	—	—
25 September	4091	LFC	—	—	—	—	2	—	—	—	—
26 September	4093	IPA	—	—	—	1	1	—	—	—	—
26 September	4094	IPB	—	—	—	2	—	—	—	—	—
27 September	4097	ISA	—	2	1	9	5	—	—	—	—
27 September	4098	ISB	12	94	12	3	13	—	—	—	1
27 September	4099	ISC	1	5	—	—	6	—	—	—	—
27 September	4100	ISD	—	4	4	—	1	—	—	—	—
28 September	4102	UCD	—	—	—	—	1	—	—	—	—
28 September	4103	UCC	—	8	1	—	—	—	—	—	—
29 September	4110	ISA	2	5	1	—	11	—	—	—	—
29 September	4111	ISB	6	3	1	—	21	—	—	—	—
29 September	4112	ISC	—	11	2	1	4	—	—	—	—
29 September	4113	ISD	—	4	—	—	4	—	—	—	—
30 September	4114	ISA	2	—	—	1	3	1	—	—	—
30 September	4115	ISA	—	—	—	—	5	1	—	—	—
30 September	4116	ISB	3	12	—	5	15	—	—	—	—
30 September	4117	ISB	—	1	—	—	9	1	—	—	—
Total catch			3,737	2,121	522	255	152	26	13	15	9

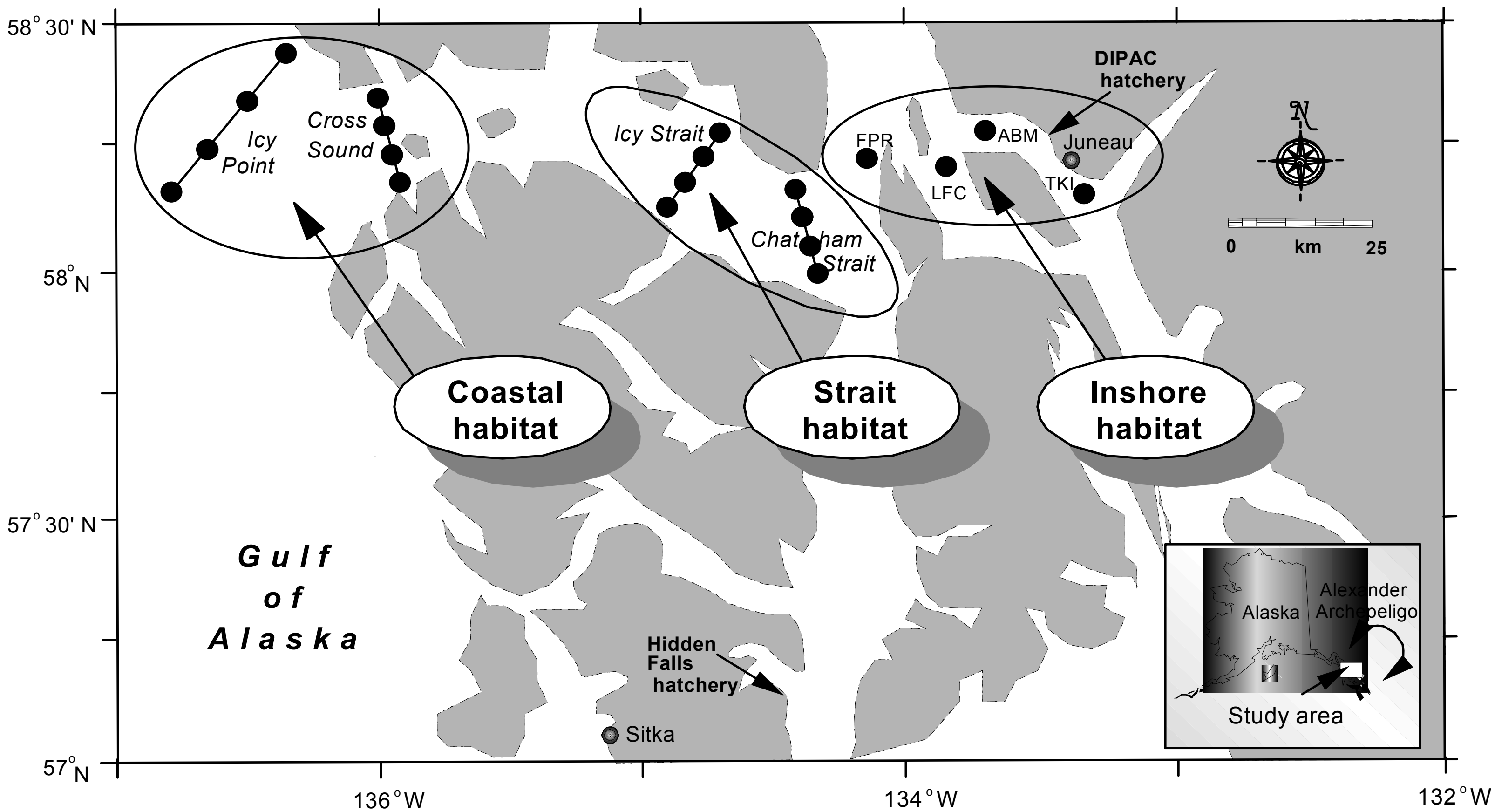

Figure 1.—Stations sampled monthly in marine waters of the northern region of southeastern Alaska, May–September 2000. Small arrows indicate two major enhancement facilities: DIPAC (Douglas Island Pink and Chum) hatchery and Hidden Falls hatchery.

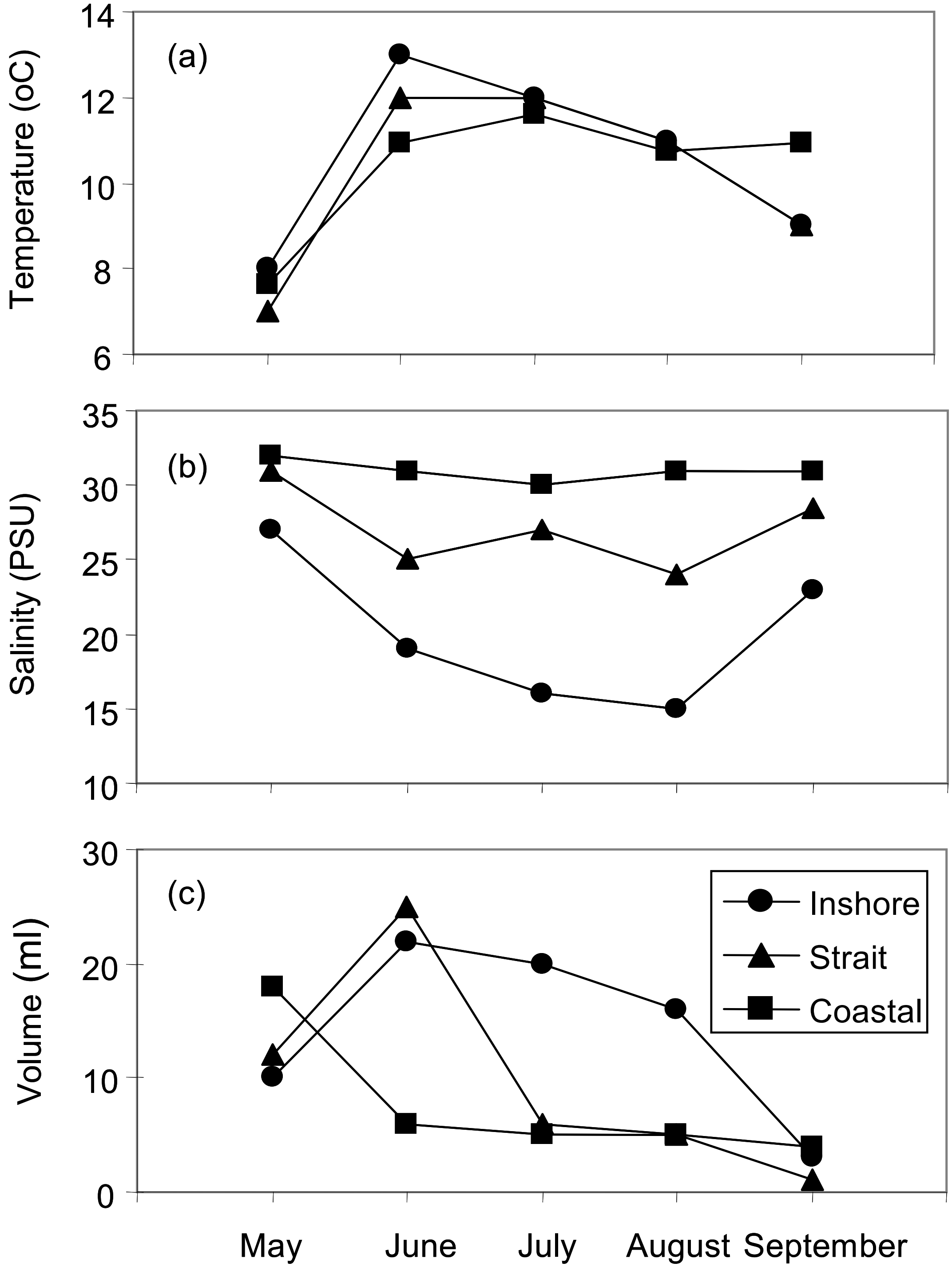

Figure 2.—Surface (2-m) temperature and salinity and 20-m zooplankton volume in inshore, strait, and coastal marine habitats of the northern region of southeastern Alaska, May–September 2000. Zooplankton volumetric density (ml/m^3) can be computed by dividing by a factor of 3.9.

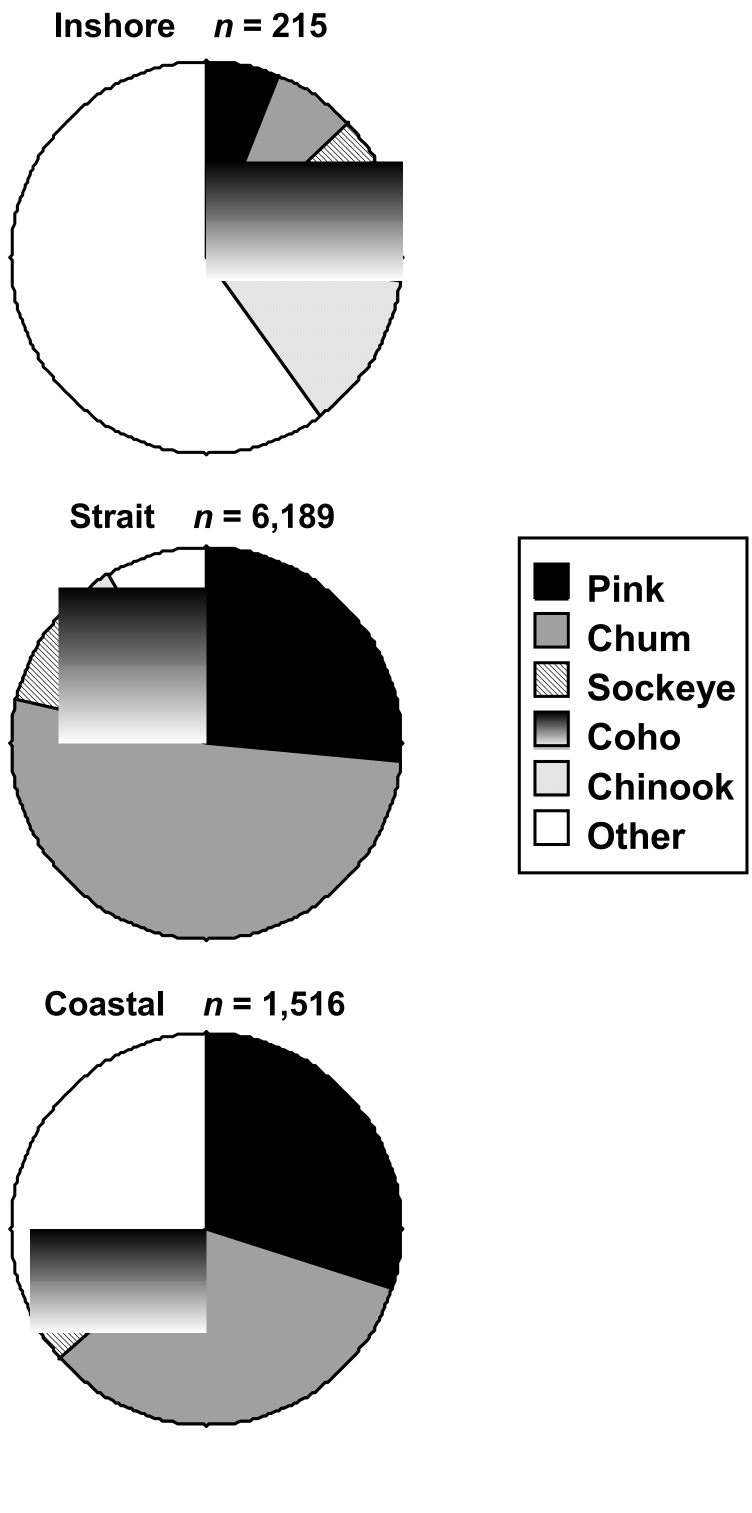

Figure 3.—Fish catch composition in inshore, strait, and coastal marine habitats of the northern region of southeastern Alaska, June–September 2000.

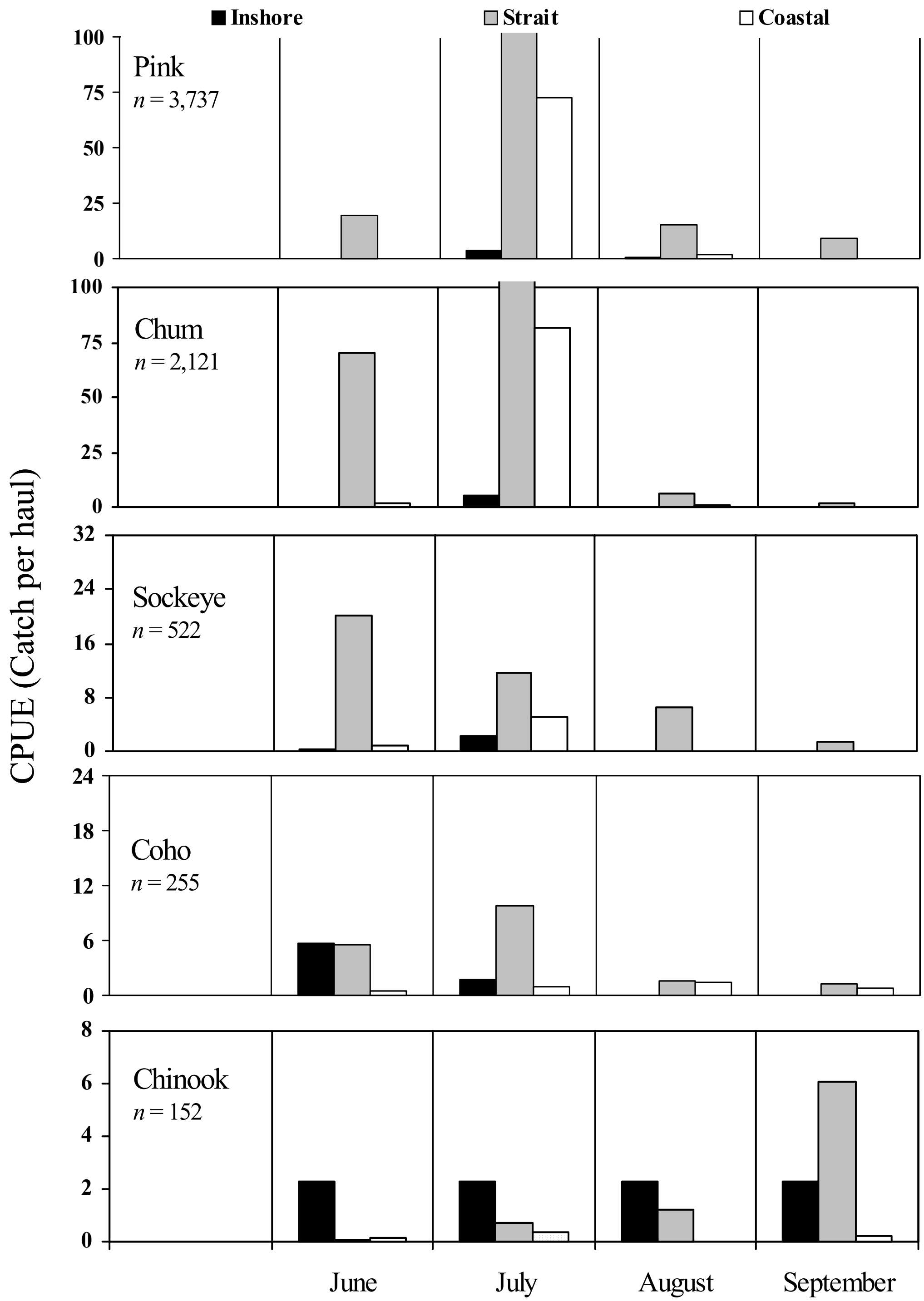

Figure 4.—Catch per rope trawl haul of juvenile salmon in inshore, strait, and coastal marine habitats of the northern region of southeastern Alaska, June–September 2000.

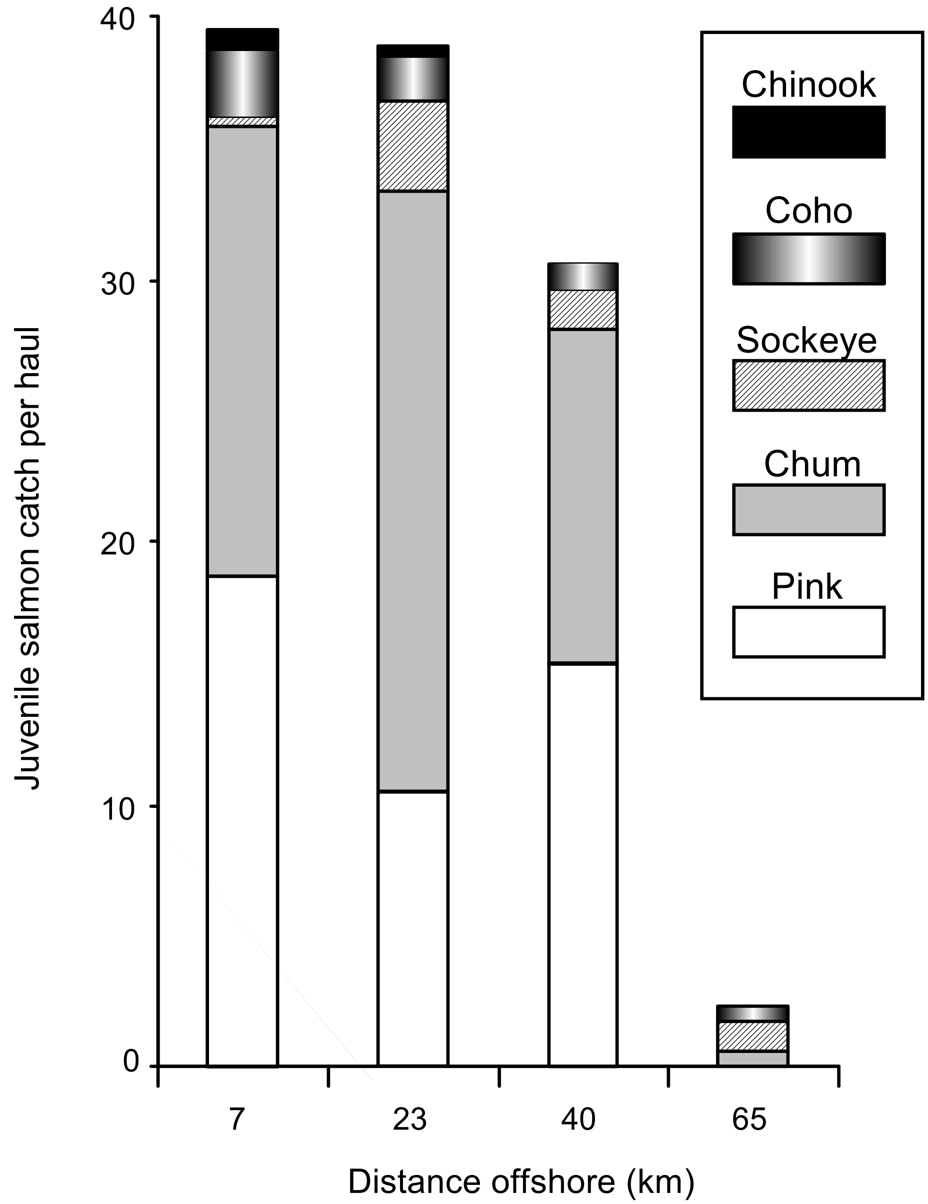

Figure 5.—Mean number of juvenile salmon captured per 16 rope trawl hauls in coastal habitat (Icy Point transect) of the northern region of southeastern Alaska, June—September 2000. Four hauls were fished, one each month, for each distance offshore.

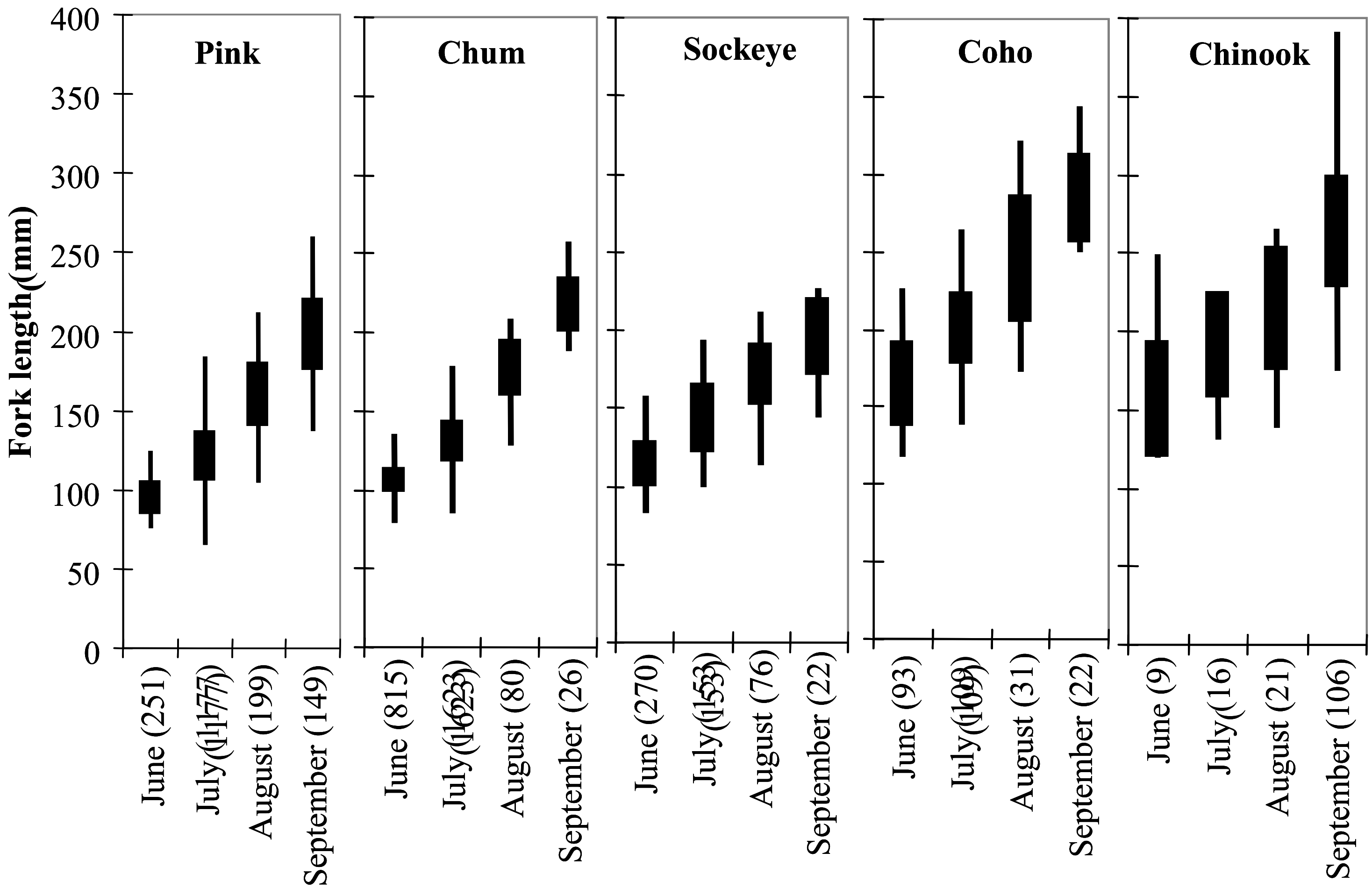

Figure 6.—Fork lengths of juvenile salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–September 2000. Length of vertical bars is the size range for each sample, and the boxes within the size range are one standard error on either side of the mean. Sample sizes are shown in parentheses.

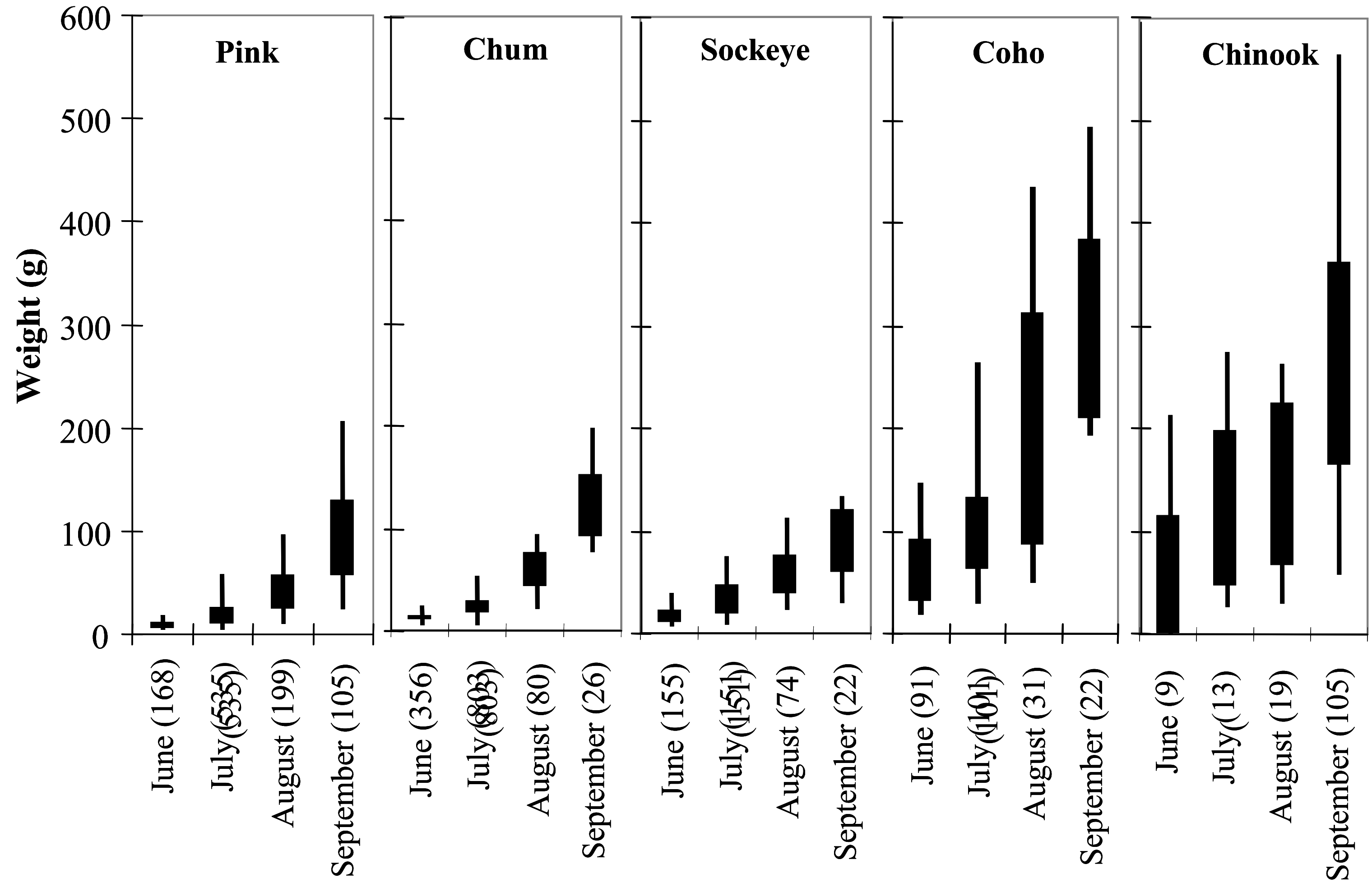

Figure 7.—Weights of juvenile salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–September 2000. Length of vertical bars is the size range for each sample, and the boxes within the size range are one standard error on either side of the mean. Sample sizes are shown in parentheses.

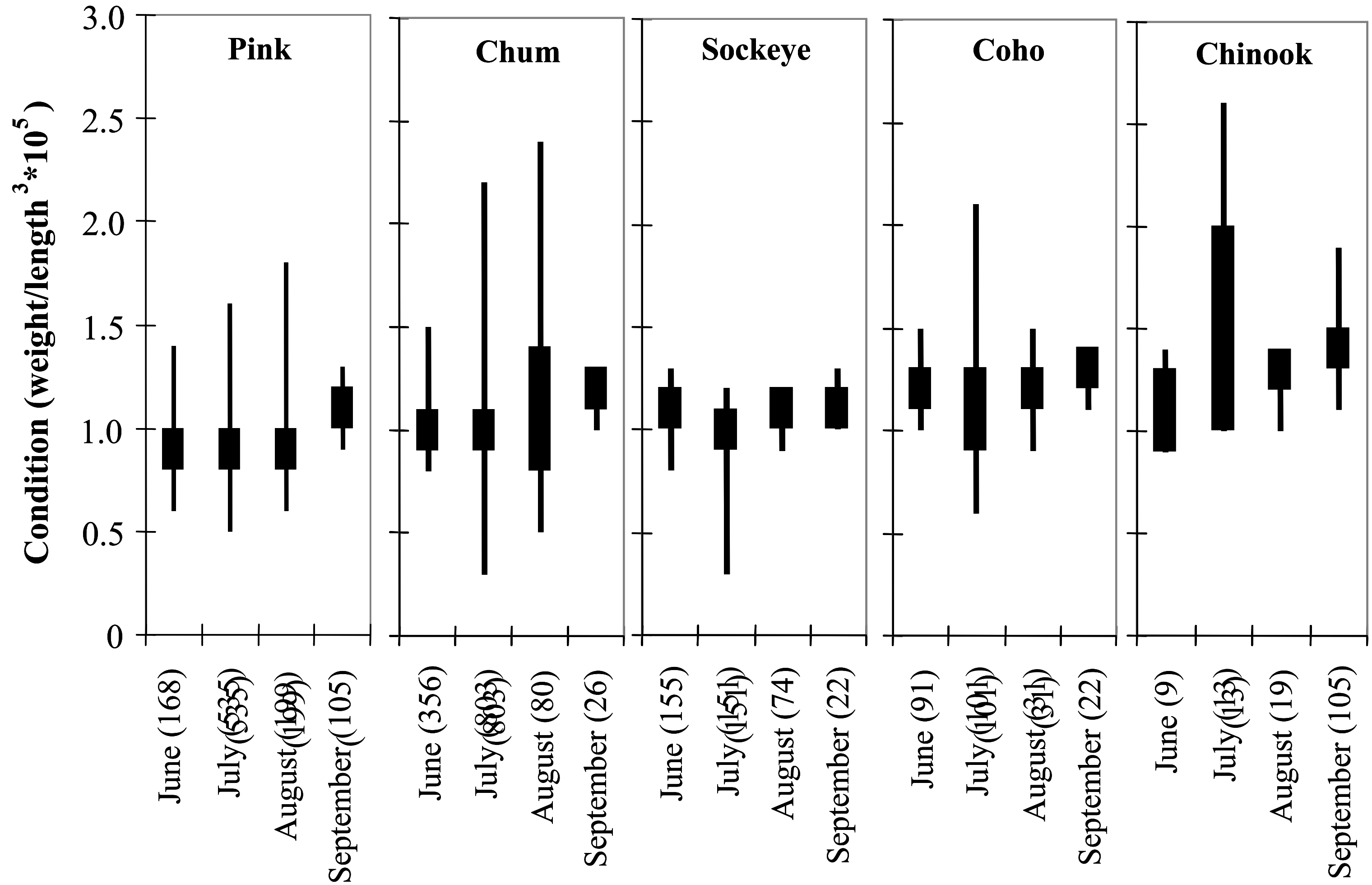

Figure 8.—Condition factors of juvenile salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–September 2000. Length of vertical bars is the size range for each sample, and the boxes within the size range are one standard error on either side of the mean. Sample sizes are shown in parentheses.

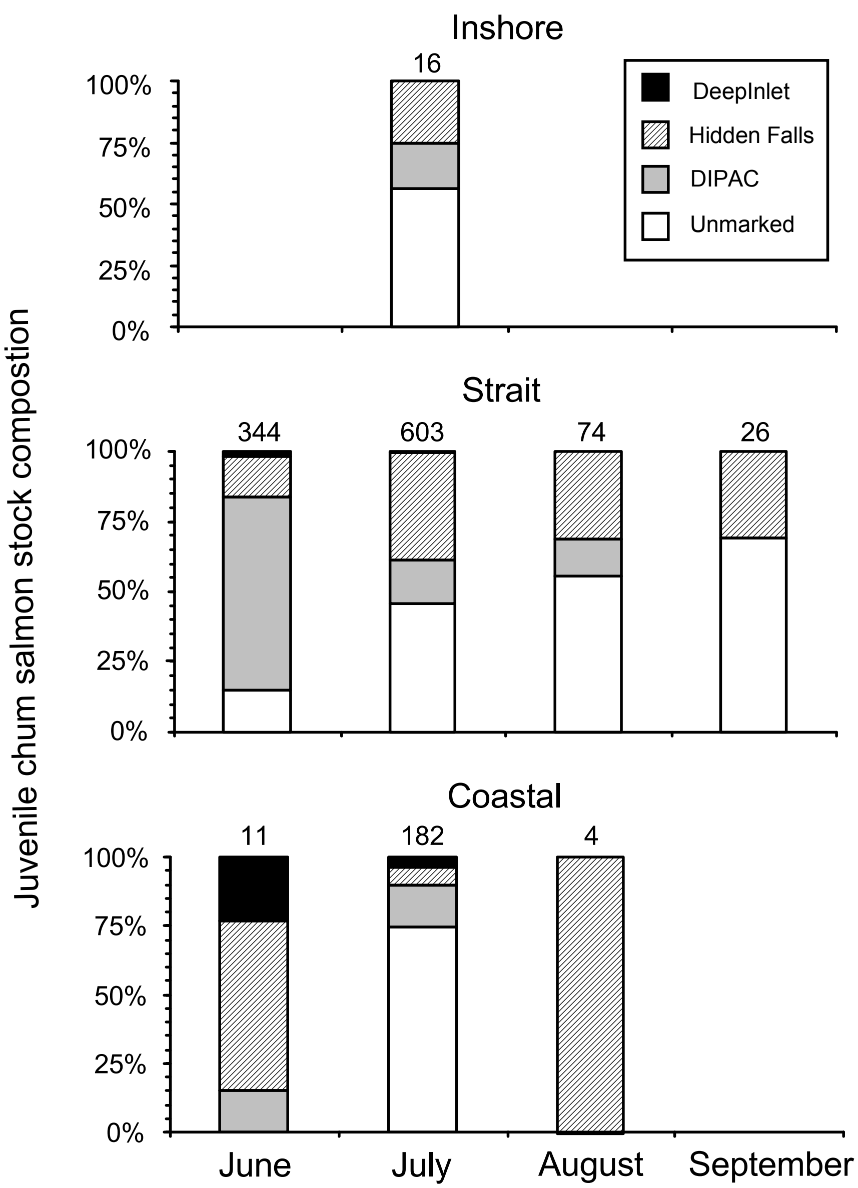

Figure 9.—Monthly stock composition of juvenile chum salmon based on otolith thermal marks in inshore, strait, and coastal marine habitats of the northern region of southeastern Alaska, June–September 2000. Number of salmon sampled per month and habitat is indicated above each bar. Stock compositions were adjusted for the unmarked component of fish released from each hatchery.

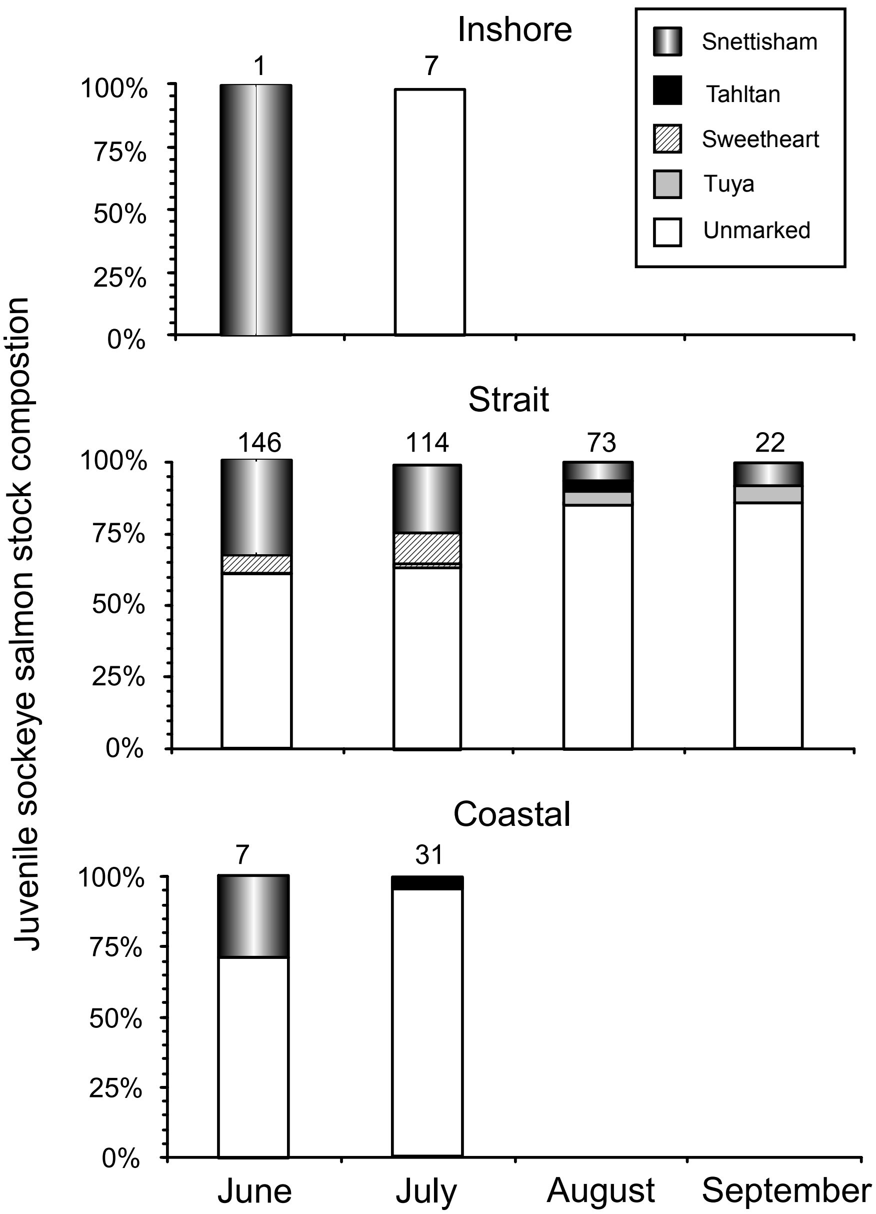

Figure 10.—Seasonal stock composition of sockeye salmon based on otolith thermal marks in inshore, strait, and coastal marine habitats of the northern region of southeastern Alaska, June–September 2000. Number of salmon sampled per month and habitat is indicated above each bar. One additional stock (Tatsamenie) was identified but not shown, and is represented by one fish in the strait habitat during July.

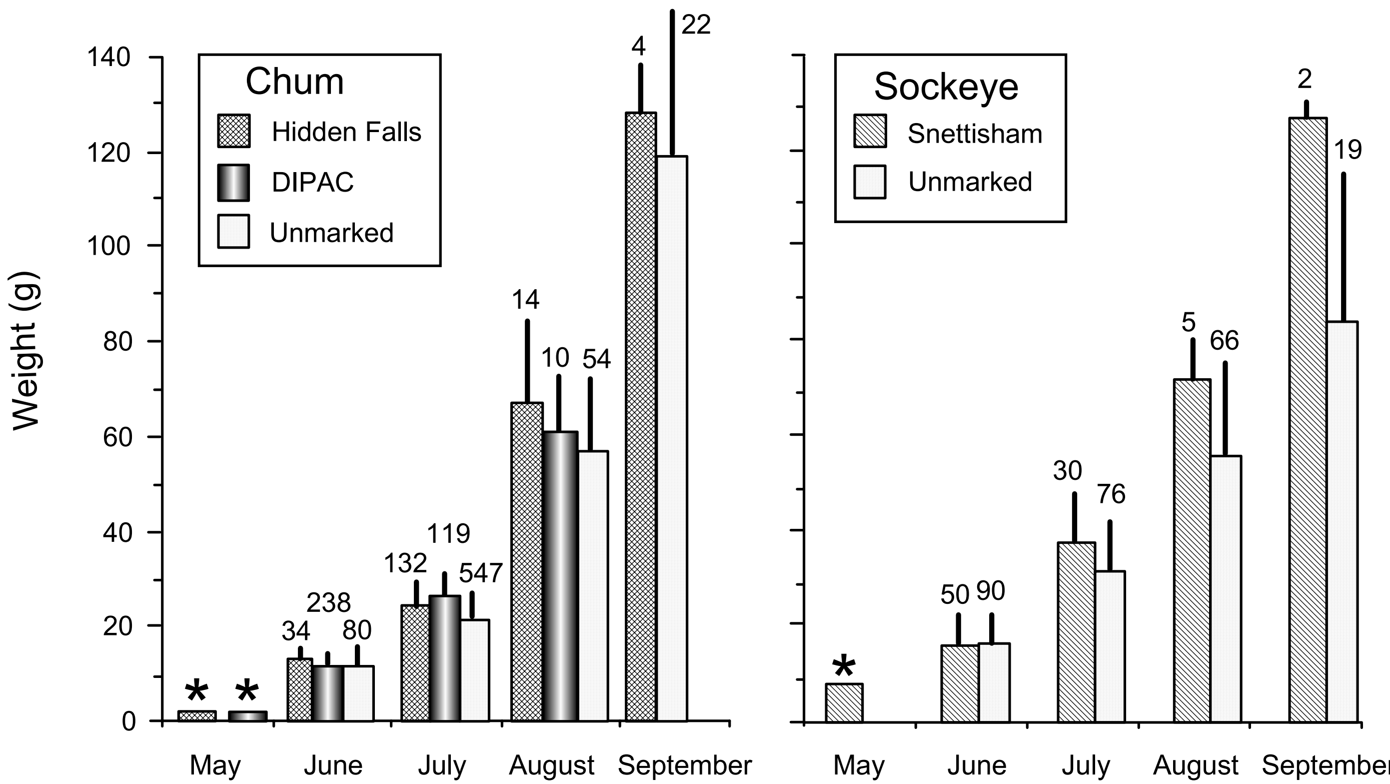

Figure 11.—Weight of selected stocks of juvenile chum and sockeye salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–September 2000. Size of marked fish at the time of hatchery release are indicated by an asterisk above the bars in May. The sample sizes and the standard deviations are indicated above each bar.

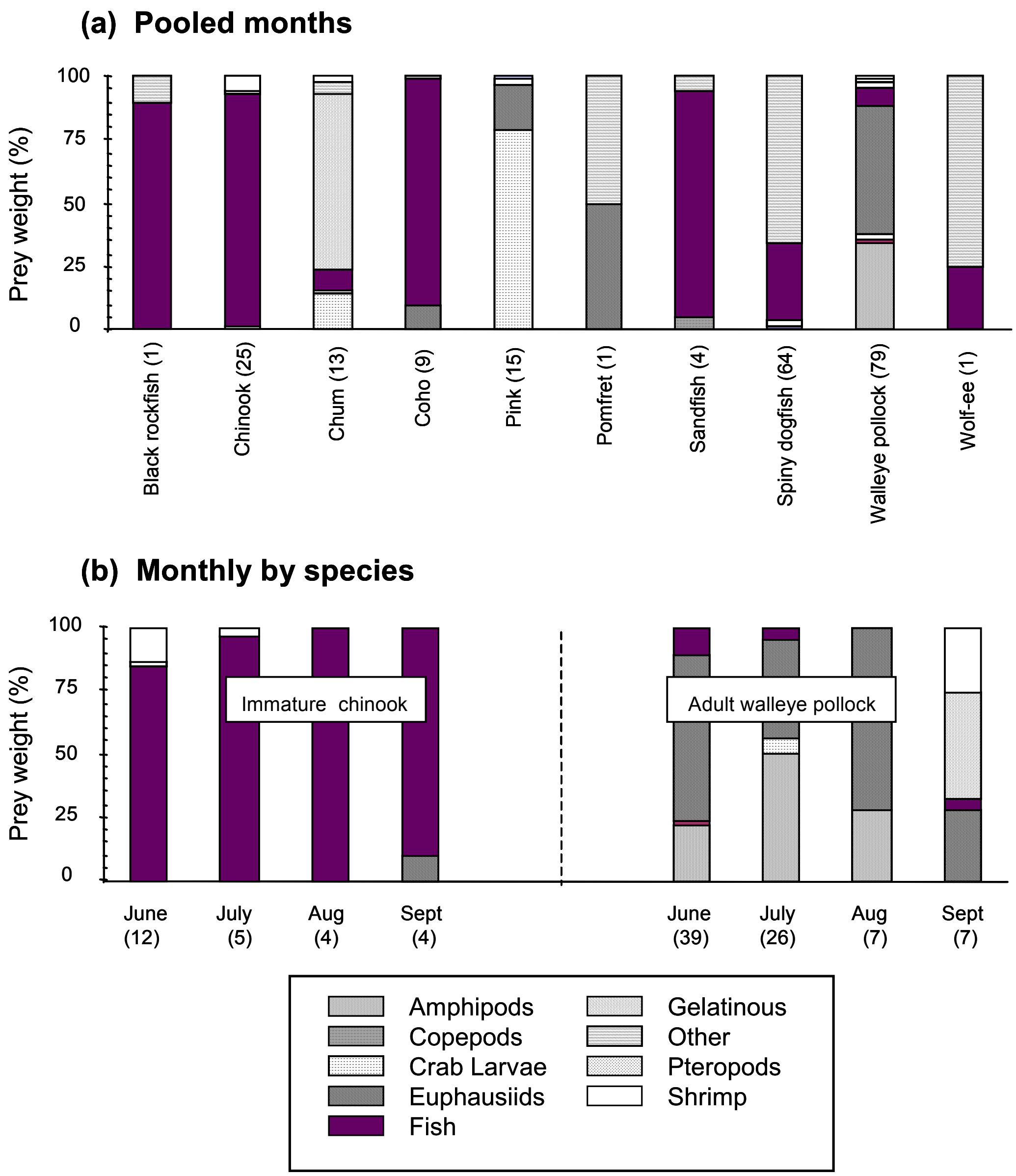

Figure 12.–(a) Prey composition (percent weight of stomach contents) of fish species caught in surface trawl hauls in all habitats and sampling intervals combined for the northern region of southeastern Alaska, June–September 2000. All species except chinook salmon (immature) were adults. See also Table 16 for sample sizes and rates of predation on juvenile salmon. (b) Monthly prey composition for the two species caught in each sampling interval. Gelatinous prey refers principally to oikopleurans. The numbers of fish examined are shown in parentheses.