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Annual Survey of Juvenile Salmon and Ecologically Related Species and Environmental Factors in the Marine Waters of Southeastern Alaska, May–August 2007

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Annual Survey of Juvenile Salmon and Ecologically Related Species and Environmental Factors in the Marine Waters of Southeastern Alaska, May–August 2007

Abstract

Juvenile Pacific salmon (*Oncorhynchus* spp.), ecologically-related species, and associated biophysical data were collected along primary marine migration corridors in the northern and southern regions of southeastern Alaska in 2007. Up to 17 stations were sampled in epipelagic waters over four time periods (27 sampling days) from May to August. This survey marks 11 consecutive years of systematically monitoring how juvenile salmon interact in marine ecosystems, and was implemented to identify the relationships among biophysical parameters that influence the habitat use, marine growth, predation, stock interactions, and year-class strength of salmon. Typically, at each station, fish, zooplankton, surface water samples, and physical profile data were collected using a surface rope trawl, conical and bongo nets, water sampler, and a conductivity-temperature-depth profiler during daylight. Surface (3-m) temperatures and salinities ranged from 7.7 to 15.3 ºC and 12.3 to 30.6 PSU from May to August. A total of 48,170 fish and squid, representing 17 taxa, were captured in 97 rope trawl hauls from June to August. Juvenile salmon comprised about 7% of the total fish and squid catch. Juvenile salmon occurred frequently in the trawl hauls, with pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), and coho salmon (*O. kisutch*) present in 51-92% of the trawls in the southern and northern regions, whereas juvenile Chinook salmon (*O. tshawytscha*) occurred in about 23% of the hauls. Of the 3,412 salmonids caught, over 97% were juveniles. Only two non-salmonid species represented catches of >30 individuals in either region: Pacific herring (*Clupea pallasi*) in the southern region (*n* = 44,637) and crested sculpin (*Blepsias bilobus*) in the northern region (*n* = 34). Catch rates of juvenile salmon in both regions were generally highest in June for all species except pink salmon. However, in the more extended, 11-yr time series in the northern region, juvenile pink salmon catches were among the lowest observed in June and July 2007, suggesting a poor adult return in the subsequent year. Mean size of juvenile salmon generally increased from June to July; however, condition residuals were lower than the long-term average for most species. Coded-wire tags were recovered from 14 juvenile coho salmon and five Chinook salmon (1 juvenile and 4 immature). All but one fish were from hatchery and wild stocks originating in southeastern Alaska. The non-Alaskan stock was a Chinook salmon that originated from the Upper Columbia River. Alaska enhanced stocks were also identified by thermal otolith marks from 67% of the chum and 4% of the sockeye salmon examined. Onboard stomach analysis of 95 potential predators, representing 8 species, did not provide evidence of predation on juvenile salmon. This research suggests that in southeastern Alaska, juvenile salmon exhibit seasonal patterns of habitat use and display species- and stock-dependent migration patterns. This third season of comparing biophysical parameters between the northern and southern regions of southeastern Alaska suggests that summer conditions differ between the regions. Long-term monitoring of key stocks of juvenile salmon, on seasonal and interannual time scales, will enable researchers to understand how growth, abundance, and ecological interactions affect year-class strength of salmon and to better understand their role in North Pacific marine ecosystems.

Introduction

The Southeast Coastal Monitoring Project (SECM), a coastal monitoring study focused in the northern region of southeastern Alaska, was initiated in 1997 to annually study the early marine ecology of Pacific salmon (*Oncorhynchus* spp.) and associated epipelagic ichthyofauna and to better understand effects of environmental change on salmon production. Salmon are a keystone species that constitute an important ecological link between marine and terrestrial habitats, and therefore play a significant, yet poorly understood, role in marine ecosystems. Fluctuations in the survival of this important living marine resource have broad ecological and socio-economic implications for coastal localities throughout the Pacific Rim.

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: Downton and Miller 1998; Beauchamp et al. 2007; Taylor 2007). 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 benefited many wild and hatchery stocks of Alaskan salmon (Wertheimer et al. 2001). Biophysical attributes of climate and habitat such as temperature, salinity and mixed layer depth (MLD) influence primary and secondary production (Bathen 1972; Kara et al. 2000; Alexander et al. 2001) and therefore influence the trophic links leading to variable growth and survival of salmon (Mann and Lazier 1991; Francis and Hare 1994; Brodeur et al. 2007). However, research is lacking in several areas, such as the links between salmon production and climate variability, between intra- and interspecific competition and carrying capacity, and between stock composition and biological interactions. Past research has not provided adequate time-series data to explain such links (Pearcy 1997). Because the numbers of 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.

One SECM goal is to identify mechanisms linking salmon production to climate change using a time series of synoptic data that combines stock-specific life history characteristics of salmon with the ocean conditions they experience. In the past, 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), a technological advance implemented in many parts of Alaska by high numbers of enhancement facilities, enables researchers to collect stock specific data, including growth, survival, and migratory rates, in southeastern Alaska (Courtney et al. 2000). For example, in recent years, two private non-profit enhancement facilities in the northern region of southeastern Alaska annually produced more than 150 million otolith-marked juvenile chum salmon (*O. keta*). Consequently, since the mid-1990s, commercial harvests of adult chum salmon in the common property fishery in the region have averaged about 12 million fish annually, with an ex-vessel commercial value of 27 million $U.S. (ADFG 2008), and have included a high proportion of otolith-marked fish from regional enhancement facilities. In addition, sockeye salmon (*O. nerka*), coho salmon (*O. kisutch*), and Chinook salmon (*O. tshawytscha*) are otolith-marked by some enhancement facilities. Therefore, examining the early marine ecology of these marked stocks provides an opportunity to study stock-specific abundance, distribution, and species interactions of juvenile salmon that will later recruit to the fishery.

The extent of interactions between hatchery and wild salmon stocks in marine ecosystems is also important to examine. Increased hatchery production of juvenile chum salmon has coincided with declines of some wild chum salmon stocks, suggesting the potential for hatchery and wild stock interactions in the marine environment (Reese et al. In Review; Seeb et al. 2004). A study using a bioenergetics approach and SECM data from Icy Strait concluded that hatchery and wild stocks of juvenile salmon consumed only a small percentage of the available zooplankton during their summer residence (Orsi et al. 2004a); and feeding indices remained high for juvenile pink (*O. gorbuscha*), chum, and coho salmon throughout the diel cycle and summer season (Sturdevant et al. 2002, 2004, 2008), suggesting that growth of the fish was not food-limited. The bioenergetics study also suggested that vertically-migrating planktivores may have a greater impact on the zooplankton standing stock than hatchery stock groups of chum salmon, including abundant forage species such as Walleye pollock (*Theragra chalcogramma*) and herring (*Clupea pallasi*) (Sigler and Csepp 2007). Companion studies in Icy Strait suggested that the amount of food consumed may be more important to survival of juvenile salmon con-specifics than the type of food (Sturdevant et al. 2004; Weitkamp and Sturdevant 2008). These findings stress the importance of examining the entire epipelagic community of ichthyofauna in the context of trophic interactions.

This is the third year that the SECM research scope has included sampling in the southern region of southeastern Alaska. This regional study component was added to the SECM project to support an increased emphasis on forecasting of adult pink salmon returns and to understand regional differences in prey, competitor, and predation dynamics. This study component supplements the core sampling of eight stations in the strait habitat of the northern region, and geographically broadens the monitoring to include the strait habitat in the southern region which encompasses a migration corridor at the opposite end of southeastern Alaska. This study is currently proposed for continued funding over a 3-year period by the Northern Fund of the Pacific Salmon Commission. A primary focus is to explore the concordance of adult pink salmon harvests in both the southern and northern regions of southeastern Alaska with biophysical parameters such as juvenile abundance, temperature, and zooplankton abundance in each region.

This document summarizes catches of juvenile salmon, ecologically-related species, and the associated biophysical data collected by SECM scientists in 2007.

Methods

Up to 17 stations were sampled in southeastern Alaska during four time periods from May to August 2007 (Table 1). Sampling was accomplished, as conditions permitted, by the National Oceanic and Atmospheric Administration (NOAA) ship *John N. Cobb*, a 29 m long research vessel with a main engine of 325 hp and a cruising speed of 10 knots. Stations were located along two primary seaward migration corridors used by juvenile salmon that originate in the northern and southern regions of southeastern Alaska. The northern region corridor extends 250 km from inshore waters, within the Alexander Archipelago, along Chatham Strait and Icy Strait into the Gulf of Alaska, whereas the southern region corridor extends 175 km from middle Clarence Strait to Dixon Entrance near the Gulf of Alaska (Figure 1). At each station, the physical environment, zooplankton, and fish were typically sampled during daylight hours; however, in May (when no trawling is conducted), zooplankton and oceanographic samples were collected during daylight from the ABL vessel *Quest* (7 m) or at night from the NOAA ship *Fairweather* (70 m) following engine failure on the *John N. Cobb*.

Sampling in the northern region of southeastern Alaska occurred at up to 13 stations in the vicinity of Icy Strait (Figure 1). The selection of these stations was determined by 1) the presence of historical time series of biophysical data in the region, 2) the intent to sample primary seaward migration corridors used by juvenile salmon, and 3) the operational constraints of the vessel. The inshore station (Auke Bay Monitor, ABM) and the four Icy Strait stations were selected initially because historical data exist for them (Bruce et al. 1977; Jaenicke and Celewycz 1994; Landingham et al.1998; Murphy and Orsi 1999; Murphy et al. 1999; Orsi et al. 1997, 1998, 1999, 2000a and 2000b, 2001a, 2001b, 2002, 2003, 2004b, 2005, 2006, 2007a). The Chatham Strait stations were selected to intercept wild fish and juvenile otolith-marked salmon entering Icy Strait from both the south (i.e., Hidden Falls Hatchery (HF), operated by Northern Southeast Alaska Regional Aquaculture Association (NSRAA), and from the north (i.e., Douglas Island Pink and Chum Hatchery (DIPAC) facilities) (Figure 1). The Icy Point stations were selected to monitor conditions in the coastal habitat of the Gulf of Alaska, in proximity to the outflow of Icy Strait into the Alaska Coastal Current.

Sampling in the southern region of southeastern Alaska occurred at up to eight stations in the vicinity of Clarence Strait, a southern migration corridor approximately 350 km south of the northern migration corridor. Unlike the northern corridor, which is oriented westward, the southern corridor is oriented southward to Dixon Entrance near the Gulf of Alaska. Like the northern region, several salmon enhancement facilities operate adjacent to the southern region (Figure 1). Of these, the largest is the Neets Bay (NB) facility operated by the Southern Southeast Alaska Regional Aquaculture Association (SSRAA); NB is a major producer of chum salmon in the region near Ketchikan. Facilities in the southern region generally began releasing thermally marked juvenile chum salmon in 2003, later than the northern facilities.

Vessel and sampling gear constraints limited operations to within 1.5 and 65 km off shore. Additionally, trawl sampling was restricted to bottom depths greater than 75 m; this precluded trawling at the Auke Bay Monitor station (Table 1). Sea conditions less than 2.5 m and winds less than 12.5 m/sec were necessary to operate gear safely; these conditions often prevented sampling in coastal waters.

Oceanographic sampling

Oceanographic data were collected at each station immediately before or after each trawl haul. These data generally consisted of one conductivity-temperature-depth profiler (CTD) cast, one Secchi reading, one water sample, one ambient light reading, one or more vertical plankton tows with conical nets, and at certain stations, one or more double oblique plankton tows with a bongo net system. 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 (3-m) temperature and salinity data were collected at 1-minute intervals with an onboard thermosalinograph (Sea-Bird SBE 21). We used CTD data profiles to determine mixed layer depth (MLD), defined as the depth where the temperature was at least 0.2°C colder than the water at 5-m. This established the water column depth above which surface mixing is active or recent, while waters below are isolated from surface mixing (Kara et al. 2000). During the deployment of the CTD a Secchi depth (m) reading was recorded when the white top of the CTD was no longer visible from the surface. Surface water samples were taken

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

once monthly at each station for later nutrient and chlorophyll analysis contracted to the Marine Chemistry Laboratory at the University of Washington School of Oceanography. To quantify ambient light levels, light intensities (W/m^2) were recorded at each station with a Li-Cor Model 189 radiometer or LI-250A light meter.

Zooplankton was sampled at all stations with several net types during each month. At least one shallow vertical haul (20 m) was made at each station with a 50-cm, 243-µm mesh NORPAC net. One deep vertical haul (≤ 200 m or within 10 m of bottom) was made at the Auke Bay Monitor station with a 57-cm, 202-µm mesh WP-2 net. Each month, one double oblique bongo haul was made at stations along the Icy Strait and Lower Clarence Strait transects and at ABM, to a depth of 200 m or within 20 m of the bottom, using a 60-cm diameter tandem frame with 505-µm and 333-µm mesh nets. A VEMCO ML-08-TDR time-depth recorder was used with the oblique bongo hauls to record the maximum sampling depth of each haul. General Oceanics model 2031 or Rigosha flow meters were placed inside the bongo and deep conical nets for calculation of filtered water volumes.

Zooplankton samples were preserved in a 5% formalin-seawater solution. In the laboratory, zooplankton settled volumes (SV, ml) and total settled volumes (TSV, ml) of each 20-m vertical zooplankton haul were measured after settling the samples for a 24-hr period in Imhof cones. Mean SVs were determined for pooled stations by habitat and month. Displacement volumes (DV, ml) of zooplankton were measured for bongo net samples (333-µm and 505-µm mesh) collected in Icy Strait and Lower Clarence Strait. Samples were brought to a constant volume (500 ml) by adding water, and then were sieved through 243-µm mesh to separate the zooplankton from the liquid. The volume of decanted liquid was measured, and then subtracted from the sample starting volume to yield zooplankton DV. Standing stock of bongo samples was calculated using DV (ml) divided by the volume of water filtered (m^3) based on flow meter revolutions per haul. Detailed zooplankton species composition from the 333-µm samples was determined microscopically from subsamples obtained using a Folsom splitter. Density was then estimated by multiplying the count in the subsample by the split fraction and dividing the expanded count by the volume filtered, to yielding estimates of number/m^3 for each species. Percent total composition was summarized across species by major taxa, including small calanoid copepods (≤ 2.5 mm TL), large calanoid copepods (> 2.5 mm TL), euphausiids (principally larval and juvenile stages), oikopleurans (Larvacea), decapod larvae, amphipods, chaetognaths, and combined minor taxa.

Fish sampling

Fish sampling was accomplished with a Nordic 264 rope trawl modified to fish the surface water directly astern of the *John N. Cobb*. The trawl was 184 m long and had a mouth opening of approximately 30 m by 24 m (width by depth). A pair of 3-m foam-filled Lite trawl doors, each weighing 544 kg (91 kg submerged), was used to spread the trawl open. Earlier gear trials with this vessel and trawl indicated the actual fishing dimensions of the trawl to be 18 m deep (head rope to foot rope) by 24 m wide (wingtip to wingtip), with a spread between the trawl doors ranging from 52 m to 60 m (Orsi et al., unpubl. cruise report 1996). 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 length of the rope trawl. A 6.1-m long, 0.8-cm knotless liner mesh was sewn into the cod end. The trawl also contained a small mesh panel of 10.2-cm mesh sewn along the jib lines on the top panel between the head rope and the 162.6-cm mesh to reduce loss of small fish. To keep the trawl head rope fishing at the surface, two clusters of three A-4 Polyform buoys (inflated to 0.75 m and encased in knotted mesh bags) were clipped on the opposing corner wingtips of the head rope and one A-3 Polyform float (inflated to 0.5 m) was clipped into a mesh kite pocket in the center of the head rope. The trawl was fished with about 150 m of 1.6-cm wire main warp attached to each door, a 9.1 m length of 1.6-cm wire trailing off the top and bottom of each trawl door (back strap), and each back strap connected with a "G" hook and flat link to a 70.1-m wire swiveled bridle. The head rope bridles were 1.0-cm wire and the footrope bridles were 1.3-cm wire.

For each haul, the trawl was fished across a station for 20 min at about 1.5 m/sec (3 knots), covering approximately 1.9 km (1.0 nautical mile). 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. Hauls were usually fished downwind and with the prevailing current and seas. Replicate hauls were made in the strait habitats to ensure that sufficient samples of marked juvenile salmon were obtained for interannual comparisons. During these replicate hauls only minimal oceanographic sampling occurred, including one 20-m vertical plankton tow and a 50-m ("shallow") CTD haul.

After each trawl haul, the fish were separated from the jellyfish, anaesthetized with tricaine methanesulfonate (MS-222), identified, enumerated, measured, labeled, bagged, and frozen. Jellyfish were identified to genus, counted, and volumetrically measured to the nearest 0.1 liter (L). After the catch was sorted, all fish and squid were typically measured to the nearest mm fork length (FL) or mantle length with a Limnoterra FMB IV electronic measuring board (Chaput et al. 1992). In instances of very large fish catches, all fish were counted but only a subsample was measured for length. Up to 50 juvenile salmon of each species were bagged individually; the remainder was bagged in bulk (≤ 200) or discarded after enumeration. All fish 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 and coho salmon were examined for missing adipose fins that would indicate the possible presence of implanted CWTs; those with adipose fins intact were again screened with a detector in the laboratory. The snouts of these fish were dissected in the laboratory to recover the CWTs, which were then decoded and verified to determine fish origin.

Potential predators of juvenile salmon from each haul were identified, measured (FL, mm), weighed (0.1 kg), and stomach contents were examined onboard the vessel. Stomachs were excised, weighed (g), and visually classified by percent fullness (nearest 10%). Stomach content weight was determined by subtracting the empty stomach weight from the full stomach weight. General prey composition was determined by estimating contribution of major taxa to the nearest 10% of total volume. The wet-weight contribution of each prey taxon to the diets was then calculated by multiplying its volumetric fraction by the total content weight. Whenever possible, fish prey were measured and identified to species. Overall diets were summarized by percent weight of major prey taxa and the frequency of feeding fish.

After each cruise, frozen individual juvenile salmon were weighed in the laboratory to the nearest 0.1 gram (g). Mean lengths, weights, Fulton condition factor ($g/mm^3 \cdot 10^5$; Cone 1989), and residuals from a length-weight linear regression were computed for each species by habitat and sampling month. To identify stock of origin of juvenile chum and sockeye salmon, the sagittal otoliths were extracted from the crania and preserved in 95% ethyl alcohol. Laboratory processing of otoliths for thermal marks was contracted to DIPAC. 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 otolith laboratory. Stock composition and growth trajectories of thermally marked fish were then determined for each month and habitat.

Results and Discussion

During the 4-month (27-d) survey in 2007, data were collected from 97 rope trawl hauls, 110 CTD casts, 56 bongo net samples (double oblique, including tandem 333-µm and 505-µm samples [“deep,” to ≤200 m depths]), 122 conical net hauls (118 Norpac samples from 20 m depths and 4 WP-2 samples from depths to 200 m), and 44 surface water samples (Table 2). The sampling periods occurred near the end of each month from May to August in the northern region and in June and July in the southern region. Oceanographic sampling was completed at ABM and all strait stations from May to August, but sampling scheduled for May and August at Icy Point was not conducted due to inclement weather. Rope trawling was conducted in strait localities in both regions in June and July, as well as in August in the northern region. In general, biophysical and trawl catch data are summarized for comparisons between regions, habitats, and months.

Oceanography

Overall, surface temperatures ranged from 7.7 to 15.3 ºC from May to August (Table 3; Appendix 1). Mean surface (3-m) temperatures followed a similar pattern of seasonal increase among habitats from May to August (Figure 2a); monthly mean temperatures differed by only 1-2 ºC among habitats. In June and July, temperatures were similar between the northern and southern regions, although the southern region was slightly warmer in July.

Overall, surface salinities ranged from 12.0 to 30.6 PSU from May to August (Table 3; Appendix 1). Surface salinities followed a similar seasonal pattern among habitats in the northern region; mean salinities decreased from a seasonal peak in May to a minimum in July, followed by an increase in August (Figure 2b); salinities were considerably lower in inshore habitat than in straits, and were generally higher in the southern region straits compared to the northern region straits. A total of 110 water clarity Secchi depths ranging from 2 to 7 m were recorded, with a mean of 4.3 m (Appendix 1). Secchi depth measurements exhibited a seasonal pattern of declining water clarity from May to June and July, followed by increasing clarity in August (Figure 3a). MLD ranged from 6 to 17 m (Appendix 1). Mean MLD and Secchi depths were both deeper in the southern region than the northern region, but were shallower in inshore than in strait habitat of the northern region (Figure 3a and b).

A total of 44 surface water samples were taken at 17 stations over the course of the season, representing a subset of all sampling occasions (Tables 2 and 4); no water samples were collected in May except at ABM. Overall, nutrient concentration ranges and means were 0.0–0.4 and 0.1 µM for PO_4, 2.0–38.8 and 6.4 µM for $Si(OH)_4$, 0.0–1.9 and 0.1 µM for NO_3, 0.0–0.9 and 0.1 µM for NO_2, and 0.1–3.0 and 0.7 µM for NH_4. Chlorophyll ranged from 0.5 to 5.4 µg/L, with a mean of 1.7 µg/L, and phaeopigment concentrations ranged from 0.1 to 1.1 µg/L, with a mean of 0.3 µg/L (Table 4). Nutrient patterns were complicated and varied among regions, habitats, and strait localities. Overall, however, mean chlorophyll concentrations peaked in June in the southern region and in July in the northern region, coincident with seasonal decline in concentration of most nutrients and seasonally low water clarity (Figure 3).

A total of 110 ambient light readings were taken during daylight (0630–1756 h) hours, concurrent with oceanographic sampling. Light intensities ranged from 16 to 1,152 W/m^2, with a mean of 316 W/m^2. June was the month of greatest of light intensity (Appendix 1).

Seasonal patterns of zooplankton settled volumes, SV, from the 20-m vertical hauls were not consistent among the habitats or between regions (Table 5, Figure 2c). In the inshore habitat, SV declined from May to June, and then remained low from June to August. In the northern strait habitat, SV increased from May to its peak in July, and then declined in August. In the southern strait habitat, SV decreased sharply from June to July. Qualitative, visual examination of samples indicated a wide diversity of mesozooplankton taxa and phytoplankton present.

Seasonal patterns in zooplankton standing stock from bongo samples differed between regions (Table 6, Figure 4). Standing stock varied by a factor of five across all stations, from 0.2 to 0.9 ml/m^3 for both 333- and 505-µm mesh sizes (Table 6). Seasonal patterns were similar for the two mesh sizes, but standing stock of organisms from the smaller, 333-µm mesh were greater than those from the larger 505-µm mesh (Figure 4). Standing stock was greatest in the northern strait habitat. Mean monthly zooplankton standing stock in the inshore habitat declined from May to the seasonal minimum in June and July, then increased in August; in the northern strait habitat, zooplankton standing stock varied little across the 4-month season, whereas in the southern strait habitat, values declined from June to July.

Abundance of seasonal, daytime prey fields present for planktivorous juvenile salmon and ecologically-related ichthyofauna were represented by zooplankton in 333-µm bongo samples from Icy Strait in the northern region and Lower Clarence Strait in the southern region (Table 6, Figure 5). Zooplankton density varied dramatically across these samples, from 232 to 8,990 organisms/m^3 (Table 6). The greatest mean density was encountered in the May nighttime samples from the northern region (Figure 5a). Mean zooplankton density differed between regions. Zooplankton densities were stable from June to July, but were approximately 3 times greater in the northern region than in the southern region (Figure 5a). Zooplankton taxa present across the season included small and large calanoid copepods, euphausiids, oikopleurans, decapod larvae, and combined minor taxa (Figure 5b, c). The minor taxa mainly included chaetognaths, cladocera, bryozoan larvae, gastropods (pteropods), hyperiid amphipods, and barnacle larvae.

Prey field composition also differed between regions. Patterns in percent number of the dominant taxa (small and large calanoid copepods) were opposite; from June to July, small calanoids increased as large calanoids declined in the northern region, whereas small calanoids declined as large calanoids increased in the southern region (Figure 5b, c). Small calanoids were principally comprised of *Pseudocalanus* spp. and *Acartia* spp. in both regions. Large calanoid species differed, however; *Metridia* spp. predominated in the northern region, whereas *Neocalanus plumchrus/flemingeri*, *Calanus marshallae, and Gaetanus* sp. were more prominent in the southern region. Non-calanoid taxa were most diverse and abundant in May in the northern region and in July in the southern region. Euphausiids (mainly larvae and juveniles) comprised the highest percentages of zooplankton in May due to the non-standard night sampling time in Icy Strait, but were also prominent in the southern region in July. Many of these taxa are prominent in diets of juvenile salmon and other planktivores (Landingham et al. 1998; Sturdevant et al. 2002; Orsi et al. 2004a; Purcell and Sturdevant 2001; Weitkamp and Sturdevant 2008). The abundance and timing of large and small calanoids and other zooplankters with different life history strategies may depend on environmental conditions which differ between the northern and southern regions (Coyle and Paul 1990; Paul et al. 1990; Park et al. 2004).

Catch composition

The trawls sampled a total of five genera of jellyfish: *Aequorea*, *Cyanea*, *Aurelia*, *Chrysaora*, and *Staurophora* (Table 7). The monthly mean volume of jellyfish per haul ranged from 0.1 to 37.8 L. Overall, biomass of jellyfish increased monthly in both regions, but abundance was greater and jellyfish occurred earlier in the southern region (Figure 6). *Aequorea* comprised 75% of the total jellyfish biomass, but contributed a greater percentage in the southern region (86%) than in the northern region (51%).

A total of 48,170 fish and squid, representing 17 taxa, were captured in 97 rope trawl hauls from June to August (Tables 8 and 9). Juvenile salmon comprised about 7% of the total fish and squid catch. However, juvenile salmon were generally the primary catch component in each region and sampling period, except in the southern region in July (Figure 7). Juvenile salmon occurred frequently in the trawl hauls, with pink, chum, sockeye, and coho salmon occurring in 51-92% of the trawls in both regions, whereas, juvenile Chinook salmon (*O. tshawytscha*) occurred in only 23% of the hauls in the southern and northern regions (Tables 10 and 11). Of the 3,412 salmonids caught, over 97% were juveniles. Catches and life history stages of the salmon are listed by date, haul number, and station in Appendix 2. In both regions, only two non-salmonid species represented catches of >30 individuals: Pacific herring in the southern region (n = 44,637) and crested sculpin (*Blepsias bilobus*) in the northern region (n = 34). The large catches of Pacific herring were young-of-the-year fish (70-100 mm) and occurred in more than half of the hauls, suggesting a strong year class.

Catch rates of juvenile salmon in both regions were generally highest in June for all species except pink salmon, which were highest in the southern region in July and highest in the northern region in August (Figure 8). However, catch rates for pink salmon in the northern region were some of the lowest recorded during the 11-yr SECM time series in June. This anomalously low catch data resulted in a greatly reduced commercial harvest forecast (16.1 M) for 2008 (NOAA 2008; Wertheimer et al. 2008). To date, near the close of the commercial season, the harvest is very close to the forecasted amount (15.2 M; ADFG 2008 website).

Size and condition of juvenile salmon differed among the species and sampling periods (Tables 12–16, Figures 9–12). Most species increased in both length and weight in successive time periods, indicating growth despite the influx of additional stocks with varied times of saltwater entry. Mean FLs of juvenile salmon in June and July were: 101.6 and 117.5 mm for pink; 100.8 and 120.7 mm for chum; 126.5 and 128.2 mm for sockeye; 162.4 and 185.3 mm for coho; and 244.5 and 210.1 for Chinook salmon. Mean weights of juvenile salmon in June and July were: 9.0 and 16.5 g for pink; 9.4, and 17.5 g for chum; 20.3 and 22.8 g for sockeye; 48.4 and 78.9 g for coho; and 182.8 and 126.6 g for Chinook salmon. Juvenile coho and Chinook salmon were consistently 25-100 mm longer and 50-150 g heavier than sockeye, chum, and pink salmon in a given time period. Mean Fulton's condition factor values for juvenile salmon in June and July were: 0.8 and 1.1 for pink; 0.9 and 0.9 for chum; 0.9 and 1.0 for sockeye; 1.1 and 1.1 for coho; and 1.2 and 1.3 for Chinook salmon. Compared to the 11-yr time series of length/weight condition residuals, mean condition residuals in 2007 were negative for all species in June and July, suggesting that marine conditions were not favorable to early marine growth for juvenile salmon in this warmer than average year.

Nineteen of the 21 juvenile and immature salmon lacking adipose fins contained CWTs (Table 17). CWTs were recovered from 14 juvenile coho salmon and five Chinook salmon (1 juvenile and 4 immature). All but one fish were from hatchery and wild stocks originating in southeastern Alaska. The non-Alaskan stock was an age 0.1 Chinook salmon that originated from the Upper Snake River in Idaho. This fish was released on 26 May 06 and recovered on 26 June 07 in the Middle Clarence Strait transect, the fish had travelled 1150 km in 395 days (2.9 km/day). Of the Alaskan stocks, migration rates of juvenile coho salmon averaged 4.5 km/day while migration rates of Chinook salmon averaged 0.8 km/day.

In addition to the CWT information on stock origins, stock-specific information was obtained from otolith-marked enhanced salmon recovered in both regions (Tables 18 and 19, Figures 13 and14). Reading of the otolith marks enabled stock information to be obtained from species like chum and sockeye salmon that are normally not tagged with CWTs but comprise a major enhancement component in southeastern Alaska.

For juvenile chum salmon, stock-specific information was derived from the otoliths of a subsample of 1,145 fish, representing 95% of those caught (Tables 8, 9, and 18, Figure 13). These fish were the same individuals sampled for weight and condition (Tables 13 and 18). Of all chum salmon otoliths examined, 767 (67%) were marked from hatcheries in southeastern Alaska: 181 (16%) were from DIPAC, 94 (8%) were from NSRAA, and 492 (43%) were from SSRAA. The remaining 378 (33%) of chum salmon examined were unmarked and probably included both wild stocks and unmarked hatchery stocks. Chum salmon stock composition differed by region. In the southern region, hatchery stocks comprised 87% of the chum salmon catch in June and 39% of the catch in July. In the northern region, hatchery stocks comprised 84% of the chum salmon catch in June, 46% of the catch in July, and 45% of the catch in August. No chum salmon released in the northern region were caught in the southern region, and only three chum salmon released in the southern region were caught in the northern region (Table 18).

For juvenile sockeye salmon, stock-specific information was derived from the otoliths of a subsample of 636 fish, representing 98% of those caught (Tables 8, 9, and 19, Figure 14). These fish were the same individuals sampled for weight and condition (Tables 14 and 19). Of all the sockeye salmon otoliths examined, 26 (4%) were marked and originated from four stock groups: 22 from Speel Arm, Alaska (3%), 1 from Sweetheart Lake, Alaska (<1%), 1 from Tahltan Lake/Stikine River, British Columbia (<1%), and 1 from Tuya/Stikine River, British Columbia (<1%). The remaining 610 (96%) sockeye salmon examined were unmarked and presumably from wild stocks. Sockeye salmon stocks were only detected in the northern region, where a higher proportion of thermally marked sockeye were recovered in July and August, compared to June.

Monthly samples of thermally marked juvenile chum and sockeye salmon were used to examine stock-specific growth trajectories for weights (Figure 15). Both of these salmon species were released in 2007 at the following approximate dates and size ranges: chum salmon in April–May (1–4 g) and sockeye salmon in April–June (5–10 g). Stock-specific size of these species increased monthly for all stock groups (Figure 15).

Stomachs of 95 potential predators of juvenile salmon were analyzed onboard, but no incidents of predation on juvenile salmon were observed for the 8 species represented (Tables 20 and 21, Figure 16). Immature and adult Pacific salmon represented 94% of the 62 potential predators captured in the northern region and 47% of the 32 potential predators captured in the southern region; non-salmonids included Pacific hake (*Merluccius productus*), spiny dogfish (*Squalus acanthias*), and walleye pollock (*Theragra chalcogramma*) (Table 20). Most potential predators were caught in July in both regions, and most had been feeding on both fish and invertebrates (Figure 16). Empty stomachs were observed for half of the pink salmon and two immature Chinook salmon in the northern region, half of the chum salmon and more than half of the spiny dogfish in the southern region, and all sockeye salmon and walleye pollock. Principal prey included: decapod larvae and fish in pink salmon; gelatinous taxa (ctenophores, jellyfish and oikopleurans) in chum salmon; fish and cephalopods in Chinook salmon; decapods and fish in coho salmon; fish in Pacific hake; and euphausiids and fish in spiny dogfish. Notably, one spiny dogfish stomach contained pieces of adult salmon, as identified by the characteristic salmon flesh color. Other fish species consumed as prey included Pacific herring, lanternfish (Myctophidae), walleye pollock, capelin (*Mallotus villosus*), and unidentified larvae and fish remains. Limited predation on juvenile salmon has been documented from past SECM shipboard analyses, but coho salmon, spiny dogfish, and juvenile sablefish (*Anoplopoma fimbria*) are among the few commonly-caught species with regular, low incidents of predation (Orsi et al. 2007b; Sturdevant et al., In Review).

Our research over the past eleven years suggests that in southeastern Alaska, juvenile salmon exhibit seasonal patterns of habitat use and display species- and stock-dependent migration patterns. This third season of comparing biophysical parameters between the northern and southern regions of southeastern Alaska also suggests that summer conditions differ between the regions. Coastal monitoring in the northern region has shown both similar and contrasting annual patterns for biophysical data across both temporal and spatial scales. For example, surface temperatures and salinity typically increase spatially from inshore to coastal habitats each year; however, this pattern could not be confirmed in 2007 because coastal sampling was prevented by vessel constraints. In 2008, monitoring of northern strait stations was completed but, unfortunately, the southern region was not sampled due to the breakdown of the *John N. Cobb* in early June. Hopefully, sampling can be resumed in the southern region to maximize regional coverage of the SECM project and extend this time series. Long-term monitoring of key stocks of juvenile salmon, on seasonal and interannual time scales, will enable researchers to understand how growth, abundance, and ecological interactions affect year-class strength of salmon and to better understand their role in North Pacific marine ecosystems.

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Table 1.—Localities and coordinates of stations sampled in the marine waters of the northern and southern regions of southeastern Alaska using the NOAA ship *John N. Cobb*, May–August 2007. Transect and station positions are shown in Figure 1. Sampling in May in the strait habitats was conducted aboard the Auke Bay Laboratories vessel *Quest* and NOAA vessel *Fairweather*.

			Distance		
Station	Latitude north	Longitude west	Offshore (km)	Between adjacent station (km)	Bottom depth (m)
		Northern region			
		Auke Bay Monitor			
ABM	58°22.00'	134°40.00'	1.5	—	60
		Upper Chatham Strait transect			
UCA	58°04.57'	135°00.08'	3.2	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	3.2	128
ISB	58°14.22'	135°29.26'	6.4	3.2	200
ISC	58°15.28'	135°26.65'	6.4	3.2	200
ISD	58°16.38'	135°23.98'	3.2	3.2	234
		Icy Point transect			
IPA	58°20.12'	137°07.16'	6.9	16.8	160
IPB	58°12.71'	137°16.96'	23.4	16.8	130
IPC	58°05.28'	137°26.75'	40.2	16.8	150
IPD	57°53.50'	137°42.60'	65.0	24.8	1,300
		Southern region			
		Middle Clarence Strait transect			
MCA	55°23.05'	131°55.49'	3.2	3.2	346
MCB	55°24.26'	131°58.23'	6.4	3.2	439

Table 1.—cont.

Station	Latitude north	Longitude west	Distance: Offshore (km)	Distance: Between adjacent station (km)	Bottom depth (m)
MCC	55°25.06'	132°01.19'	6.4	3.2	412
MCD	55°25.79'	132°03.93'	3.2	3.2	461
		Lower Clarence Strait transect			
LCA	55°07.53'	131°48.09'	3.2	3.2	413
LCB	55°07.32'	131°51.09'	6.4	3.2	459
LCC	55°07.14'	131°56.79'	6.4	3.2	466
LCD	55°06.93'	131°56.79'	3.2	3.2	315

Table 2.—Numbers and types of data collected in different habitats sampled monthly in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Samples were generally collected during daylight from the NOAA vessel *John N. Cobb*; however, zooplankton samples collected in May in Icy Strait were obtained at night from the NOAA ship *Fairweather* (bongos) or from the Auke Bay Laboratory's vessel *Quest* (20-m verticals) following engine failure on the *Cobb*. No samples were obtained from coastal habitat in 2007.

		Data collection type[1]					
Dates (days)	Habitat	Rope trawl	CTD cast	Oblique bongo	20-m vertical	WP-2 vertical	Chlorophyll & nutrients
Northern region							
22-24 May	Inshore	0	1	2	3	1	1
(3 days)	Strait	0	8	8	8	0	0
	Coastal	0	0	0	0	0	0
27 June-1 July	Inshore	0	1	2	3	1	1
(5 days)	Strait	20	20	8	20	0	8
	Coastal	0	0	0	0	0	0
26-31 July	Inshore	0	1	2	3	1	1
(6 days)	Strait	28	28	8	28	0	8
	Coastal	0	0	0	0	0	0
21-23 August	Inshore	0	1	2	3	1	1
(3 days)	Strait	12	12	8	12	0	8
	Coastal	0	0	0	0	0	0
Southern region							
21-25 June (5 days)	Strait	20	20	8	20	0	8
20-24 July (5 days)	Strait	17	18	8	18	0	8
Total		97	110	56	118	4	44

[1]Rope trawl = 20-min hauls with Nordic 264 surface trawl 18 m deep by 24 m wide; CTD casts = to 200 m or within 10 m of the bottom; oblique bongo = 60-cm diameter frame, 505- and 333-µm meshes, towed double obliquely down to and up from a depth of 200 m or within 20 m of the bottom; 20-m vertical = 50-cm diameter frame, 243-µm conical net towed vertically from 20 m; WP-2 vertical = 57-cm diameter frame, 202-µm conical net towed vertically from 200 m or within 10 m of the bottom; chlorophyll and nutrients are surface seawater samples.

Table 3.—Surface (3-m, mean) temperature (°C) and salinity (PSU) data collected monthly in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Station code acronyms are listed in Table 1.

Month	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)
Northern region												
Auke Bay Monitor												
	ABM											
May	1	9.4	27.8									
June	1	11.9	18.7									
July	1	12.5	13.6									
August	1	14.3	19.3									
Upper Chatham Strait transect												
	UCA			UCB			UCC			UCD		
May	1	8.3	30.1	1	8.1	29.6	1	8.4	29.6	1	8.3	29.6
June	2	11.9	27.5	2	11.8	27.2	2	12.2	25.0	2	11.8	25.6
July	3	13.0	19.9	3	13.0	18.1	3	13.1	20.6	3	12.8	20.6
August	1	13.0	26.6	1	14.4	26.1	1	13.5	24.6	1	14.3	24.7
Icy Strait transect												
	ISA			ISB			ISC			ISD		
May	1	8.5	30.2	1	7.7	30.3	1	8.0	30.5	1	8.3	30.6
June	3	12.5	26.5	3	13.1	25.5	3	13.1	25.3	3	13.1	24.9
July	4	13.0	22.7	4	13.4	21.9	4	13.5	19.4	4	13.6	19.1
August	2	13.4	25.2	2	13.3	25.3	2	14.2	25.1	2	14.3	24.9

Table 3.—cont.

Month	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)	*n*	Temp (°C)	Salinity (PSU)
Southern region												
Middle Clarence Strait transect												
	MCA			MCB			MCC			MCD		
June	2	13.3	25.6	2	12.7	26.3	2	12.3	26.5	2	11.8	28.0
July	2	15.2	24.0	2	15.1	24.3	1	12.6	26.1	1	13.0	26.3
Lower Clarence Strait transect												
	LCA			LCB			LCC			LCD		
June	3	12.5	25.5	3	12.3	26.4	3	12.0	25.6	3	12.2	26.7
July	3	15.3	23.1	3	14.8	24.0	3	14.4	24.4	3	13.7	25.9

Table 4.—Nutrient (µM) and chlorophyll (µg/L) concentrations from 200-ml surface water samples in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Station code acronyms are listed in Table 1. Water samples were not collected in May from the strait habitat stations (see text).

		Nutrients [µM]						
Station	Date	[PO_4]	[$Si(OH)_4$]	[NO_3]	[NO_2]	[NH_4]	Chlorophyll (µg/L)	Phaeopigment (µg/L)
				Northern region				
ABM	22 May	0.18	3.63	0.08	0.01	0.58	0.49	0.24
	27 June	0.02	38.82	0.04	0.04	0.52	1.48	0.71
	31 July	0.00	15.73	0.05	0.00	0.89	2.19	0.07
	21 August	0.11	8.61	0.20	0.01	2.12	0.81	0.06
UCA	28 June	0.06	11.83	0.03	0.00	0.18	0.80	0.16
	27 July	0.06	4.50	0.00	0.07	0.61	1.83	0.10
	23 August	0.08	4.63	0.06	0.00	0.30	1.59	0.11
UCB	28 June	0.07	13.42	0.04	0.00	0.46	0.90	0.17
	27 July	0.02	4.42	0.02	0.00	1.23	3.37	0.09
	23 August	0.10	3.24	0.02	0.00	0.44	2.33	0.18
UCC	28 June	0.00	5.09	0.03	0.00	1.08	1.08	0.28
	27 July	0.00	6.89	0.00	0.00	1.09	1.31	0.26
	21 August	0.10	6.15	0.09	0.00	0.35	1.43	0.12
UCD	28 June	0.06	13.36	0.44	0.00	1.53	1.82	0.55
	27 July	0.00	7.43	0.00	0.00	0.73	1.83	0.38
	21 August	0.16	4.66	0.15	0.02	0.87	2.30	0.16
ISA	29 June	0.14	8.99	0.37	0.01	0.31	1.10	0.29
	28 July	0.04	2.96	0.00	0.00	0.65	1.56	0.15
	22 August	0.06	3.36	0.00	0.03	0.18	1.47	0.30
ISB	29 June	0.03	10.50	0.01	0.00	0.22	0.54	0.13
	28 July	0.10	4.29	0.00	0.00	0.60	2.92	0.28
	22 August	0.26	4.25	0.14	0.00	1.00	1.09	0.12
ISC	29 June	0.00	11.30	0.05	0.00	0.19	0.90	0.07
	28 July	0.13	2.81	0.00	0.00	0.50	1.82	0.22
	22 August	0.14	4.61	0.06	0.00	0.37	2.33	0.25
ISD	29 June	0.00	9.20	0.01	0.00	0.15	0.74	0.14
	28 July	0.11	2.99	0.00	0.00	2.98	1.26	0.14
	22 August	0.06	4.09	0.02	0.00	0.16	1.98	0.11

Table 4.—cont.

Station	Date	Nutrients [μM] [PO_4]	[$Si(OH)_4$]	[NO_3]	[NO_2]	[NH_4]	Chlorophyll (μg/L)	Phaeopigment (μg/L)
Southern region								
MCA	24 June	0.18	3.66	0.02	0.00	0.42	1.14	0.32
	24 July	0.26	1.95	0.00	0.00	0.77	1.35	0.43
MCB	24 June	0.21	2.09	0.06	0.00	0.37	0.65	0.26
	24 July	0.15	2.14	0.04	0.00	0.66	1.45	0.42
MCC	25 June	0.10	3.68	0.02	0.00	0.58	0.94	0.25
	20 July	0.36	8.91	1.92	0.93	0.48	1.60	0.41
MCD	25 June	0.02	5.53	0.04	0.00	1.25	0.80	0.23
	20 July	0.36	8.30	1.37	0.33	0.40	3.10	0.53
LCA	22 June	0.17	3.49	0.08	0.00	0.96	2.43	0.46
	22 July	0.10	2.22	0.00	0.08	0.29	2.39	0.69
LCB	22 June	0.12	2.97	0.08	0.00	0.52	3.27	0.52
	22 July	0.11	2.05	0.00	0.23	0.43	1.20	0.32
LCC	22 June	0.19	3.59	0.12	0.00	0.67	4.23	0.77
	22 July	0.10	2.41	0.00	0.11	0.52	1.73	0.44
LCD	22 June	0.24	2.81	0.11	0.01	0.49	5.38	1.14
	22 July	0.33	2.77	0.00	0.18	0.07	1.50	0.42

Table 5.— Mean zooplankton settled volumes (ZSV, ml) and total plankton settled volumes (TSV, ml) from vertical 20-m NORPAC hauls sampled in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Station code acronyms are listed in Table 1. Volume differences between SV and TSV are caused by presence of slub in sample. Standing stock (ml/m^3) can be computed by dividing by the water volume filtered, a constant factor of 3.9 m^3 for these samples.

Month	*n*	ZSV	TSV	*n*	ZSV	TSV	*n*	ZSV	TSV	*n*	ZSV	TSV
Northern region												
Auke Bay Monitor												
	ABM											
May	3	28.7	33.0									
June	3	8.7	8.7									
July	3	7.0	14.0									
August	3	9.0	20.7									
Upper Chatham Strait transect												
	UCA			UCB			UCC			UCD		
May	3	6.0	6.0	1	4.5	4.5	1	7.0	7.0	1	8.0	8.0
June	3	17.0	17.0	3	23.3	23.3	3	5.3	5.3	3	6.7	6.7
July	3	28.4	58.8	4	23.5	38.0	4	23.8	48.0	4	34.3	77.5
August	3	3.8	6.0	2	5.3	6.5	2	4.5	8.8	2	5.3	8.5
Icy Strait transect												
	ISA			ISB			ISC			ISD		
May	1	10.0	10.0	1	10.0	10.0	1	7.5	7.5	1	5.0	5.0
June	2	4.3	4.3	2	3.3	3.3	2	7.5	7.5	2	7.0	7.0
July	3	17.7	28.8	3	21.2	37.7	3	24.8	49.7	3	30.3	56.0
August	1	2.0	3.0	1	6.0	12.0	1	3.0	6.5	1	2.5	5.0
Southern region												
Middle Clarence Strait transect												
	MCA			MCB			MCC			MCD		
June	2	32.5	32.5	2	47.5	47.5	2	21.5	21.5	2	25.0	25.0
July	2	4.3	7.0	2	5.8	11.5	2	5.5	11.0	1	3.5	7.0
Lower Clarence Strait transect												
	LCA			LCB			LCC			LCD		
June	3	80.0	80.0	3	38.7	38.7	3	28.7	28.7	3	22.0	22.0
July	3	4.3	8.0	3	6.5	7.5	3	4.3	7.3	3	4.5	5.5

Table 6.—Zooplankton displacement volumes (DV, ml), standing stock (DV/m^3), and total density (number/m^3, 333-µm only) from daytime, double oblique bongo (333- and 505-µm mesh) hauls at stations sampled in the strait habitats in the marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Standing stock (ml/m^3) is computed using flow meter readings to determine water volume filtered. The northern region is represented by the Icy Strait transect and the southern region is represented by the Lower Clarence Strait transect. The May samples in the northern region were collected at night (see text).

Month	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density
									333-µm mesh							
									Northern region							
	ISA				ISB				ISC				ISD			
May	100	120	0.9	8,990.2	180	165	0.7	8,683.3	200	145	0.5	1,978.4	200	215	0.7	2,294.4
June	80	80	0.7	4,556.4	180	155	0.7	2,637.5	221	150	0.6	1,625.0	202	180	0.7	1,568.8
July	78	65	0.6	3,567.5	185	130	0.5	1,227.5	213	205	0.8	2,064.1	209	180	0.8	1,704.9
August	61	30	0.3	1,287.2	193	85	0.4	779.4	232	170	0.6	936.7	225	235	0.9	1,290.3
									Southern region							
	LCA				LCB				LCC				LCD			
June	218	130	0.5	1,310.8	240	105	0.4	929.9	226	90	0.3	827.0	230	105	0.4	873.2
July	191	60	0.2	514.4	205	50	0.2	333.2	224	60	0.2	231.6	217	75	0.3	651.3
									505-µm mesh							
									Northern region							
	ISA				ISB				ISC				ISD			
May	100	60	0.4	—	180	100	0.4	—	200	90	0.3	—	200	115	0.3	—
June	80	25	0.0	—	180	110	0.5	—	221	125	0.5	—	202	180	0.7	—
July	78	25	0.2	—	185	85	0.3	—	213	150	0.6	—	209	135	0.6	—
August	61	20	0.2	—	193	60	0.3	—	232	145	0.5	—	225	225	0.9	—

Table 6.—cont.

Month	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density	Depth (m)	DV	DV/m^3	Total density
Southern region																
	LCA				LCB				LCC				LCD			
June	218	85	0.3	—	240	85	0.3	—	226	60	0.2	—	230	90	0.3	—
July	191	55	0.2	—	205	35	0.1	—	224	55	0.2	—	217	60	0.2	—

Table 7.—Mean volume (L) of jellyfish captured in rope trawl hauls in the marine waters of the northern and southern regions of southeastern Alaska, June-August 2007. No trawling was conducted in the southern region in August.

	Volume (L)		
Genus	June	July	August
Northern region			
Aequorea sp.	—	7.2	8.7
Cyanea sp.	0.1	3.1	7.3
Aurelia sp.	—	0.6	1.7
Chrysaora sp.	—	0.7	1.0
Staurophora sp.	—	0.2	0.5
Unknown	—	—	0.1
Total	0.1	11.7	19.3
Southern region			
Aequorea sp.	27.1	31.2	
Cyanea sp.	2.6	6.0	
Aurelia sp.	—	0.4	
Chrysaora sp.	0.3	0.2	
Total	30.0	37.8	

Table 8.—Numbers of fish captured in 60 rope trawl hauls in marine waters of the northern region of southeastern Alaska, June–August 2007.

		Number caught			
Common name	Scientific name	June	July	August	Total
	Salmonids				
Coho salmon[1]	*Oncorhynchus kisutch*	347	108	86	541
Chum salmon[1]	*O. keta*	154	252	125	531
Pink salmon[1]	*O. gorbuscha*	15	173	161	349
Sockeye salmon[1]	*O. nerka*	126	99	19	244
Pink salmon[3]	*O. gorbuscha*	1	26	7	34
Chinook salmon[1]	*O. tshawytscha*	14	6	2	22
Chinook salmon[2]	*O. tshawytscha*	9	5	2	16
Coho salmon[3]	*O. kisutch*	0	1	4	5
Chum salmon[3]	*O. keta*	0	2	2	4
Sockeye salmon[3]	*O. nerka*	1	3	0	4
Salmonid subtotals		667	675	408	1,750
	Non-salmonids				
Crested sculpin	*Blepsias bilobus*	5	18	11	34
Pacific herring	*Clupea pallasi*	15	6	2	23
Prowfish	*Zaprora silenus*	0	4	7	11
Walleye Pollock larvae	*Theragra chalcogramma*	0	5	0	5
Walleye pollock	*T. chalcogramma*	0	2	0	2
Smooth lumpsucker	*Aptocyclus ventricosus*	0	1	1	2
Big mouth sculpin	*Hemitripterus bolini*	2	0	0	2
Pacific hake	*Merluccius productus*	1	0	1	2
Spiny lumpsucker	*Eumicrotremus orbis*	1	0	0	1
Wolf-eel	*Anarrhichthys ocellatus*	0	0	1	1
Non-salmonid subtotals		24	36	23	83
Grand total fish and squid		691	711	431	1,833

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

Table 9.—Numbers of fish and squid captured in 37 rope trawl hauls in marine waters of the southern region of southeastern Alaska, June–July 2007.

Common name	Scientific name	Number caught		
		June	July	Total
Salmonids				
Chum salmon[1]	*Oncorhynchus keta*	497	177	674
Sockeye salmon[1]	*O. nerka*	398	5	403
Pink salmon[1]	*O. gorbuscha*	193	209	402
Coho salmon[1]	*O. kisutch*	132	26	158
Chinook salmon[1]	*O. tshawytscha*	9	1	10
Pink salmon[3]	*O. gorbuscha*	0	5	5
Chinook salmon[2]	*O. tshawytscha*	3	1	4
Coho salmon[3]	*O. kisutch*	2	1	3
Chum salmon[2]	*O. keta*	2	1	3
Salmonid subtotals		1,236	426	1,662
Non-salmonids				
Pacific herring	*Clupea pallasi*	0	44,637	44,637
Spiny dogfish	*Squalus acanthias*	0	16	16
Walleye pollock larvae	*Theragra chalcogramma*	0	14	14
Soft sculpin	*Psychrolutes sigalutes*	4	0	4
Prowfish	*Zaprora silenus*	0	1	1
Wolf-eel	*Anarrhichthys ocellatus*	1	0	1
Market squid (black)	*Loligo* sp.	0	1	1
Pacific hake	*Merluccius productus*	0	1	1
Non-salmonid subtotals		5	44,670	44,675
Grand total fish and squid		1,241	45,096	46,337

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

Table 10.—Frequency of occurrence of fish captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–August 2007. The percent occurrence of fish in 60 total hauls is shown in parentheses.

		Frequency of occurrence				
Common name	Scientific name	June	July	August	Total	(%)
Salmonids						
Coho salmon[1]	*Oncorhynchus kisutch*	19	24	12	55	(92)
Chum salmon[1]	*O. keta*	13	22	12	47	(78)
Pink salmon[1]	*O. gorbuscha*	4	19	12	35	(58)
Sockeye salmon[1]	*O. nerka*	19	21	9	49	(82)
Pink salmon[3]	*O. gorbuscha*	1	13	4	18	(30)
Chinook salmon[1]	*O. tshawytscha*	7	6	1	14	(23)
Chinook salmon[2]	*O. tshawytscha*	7	5	2	14	(23)
Coho salmon[3]	*O. kisutch*	0	1	3	4	(7)
Chum salmon[3]	*O. keta*	0	2	2	4	(7)
Sockeye salmon[3]	*O. nerka*	1	2	0	3	(5)
Non-salmonids						
Crested sculpin	*Blepsias bilobus*	4	9	7	20	(33)
Pacific herring	*Clupea pallasi*	4	3	1	8	(13)
Prowfish	*Zaprora silenus*	0	3	4	7	(12)
Walleye Pollock larvae	*Theragra chalcogramma*	0	3	0	3	(5)
Walleye pollock	*T. chalcogramma*	0	2	0	2	(3)
Smooth lumpsucker	*Aptocyclus ventricosus*	0	1	1	2	(3)
Big mouth sculpin	*Hemitripterus bolini*	2	0	0	2	(3)
Pacific hake	*Merluccius productus*	1	0	1	2	(3)
Spiny lumpsucker	*Eumicrotremus orbis*	1	0	0	1	(2)
Wolf-eel	*Anarrhichthys ocellatus*	0	0	1	1	(2)

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

Table 11.—Frequency of occurrence of fish and squid captured in marine waters of the southern region of southeastern Alaska by rope trawl, June–July 2007. The percent occurrence of fish in 37 total hauls is shown in parentheses.

		Frequency of occurrence			
Common name	Scientific name	June	July	Total	(%)
	Salmonids				
Chum salmon[1]	*Oncorhynchus keta*	10	11	21	(57)
Sockeye salmon[1]	*O. nerka*	16	3	19	(51)
Pink salmon[1]	*O. gorbuscha*	9	8	17	(46)
Coho salmon[1]	*O. kisutch*	18	10	28	(76)
Chinook salmon[1]	*O. tshawytscha*	7	1	8	(22)
Pink salmon[3]	*O. gorbuscha*	0	5	5	(14)
Chinook salmon[2]	*O. tshawytscha*	3	1	4	(11)
Coho salmon[3]	*O. kisutch*	2	1	3	(8)
Chum salmon[2]	*O. keta*	2	1	3	(8)
	Non-salmonids				
Pacific herring	*Clupea pallasi*	0	11	11	(30)
Spiny dogfish	*Squalus acanthias*	0	9	9	(24)
Walleye pollock larvae	*Theragra chalcogramma*	0	7	7	(19)
Soft sculpin	*Psychrolutes sigalutes*	4	0	4	(11)
Prowfish	*Zaprora silenus*	0	1	1	(3)
Wolf-eel	*Anarrhichthys ocellatus*	1	0	1	(3)
Market squid (black)	*Loligo* sp.	0	1	1	(3)
Pacific hake	*Merluccius productus*	0	1	1	(3)

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

Table 12.—Length (mm, fork), weight (g), Fulton's condition [$(g/mm^3) \cdot (10^5)$], and condition residuals from length-weight regression analysis of juvenile pink salmon captured in the strait marine habitats of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	Range	mean	se	*n*	range	mean	se
Upper	Length	—	—	—	—	49	112-175	146.0	2.1	19	144-212	171.6	3.8
Chatham	Weight	—	—	—	—	49	12.1-48.5	30.2	1.4	19	26.0-96.6	50.9	4.0
Strait	Condition	—	—	—	—	49	0.8-1.1	0.9	0.0	19	0.9-1.1	1.0	0.0
	Residual	—	—	—	—	47	-0.09-0.05	0.0	0.0	19	-0.03-0.03	0.0	0.0
Icy	Length	15	84-114	95.6	2.1	124	93-171	120.1	1.3	132	131-214	166.0	1.1
Strait	Weight	15	4.8-11.0	7.3	0.5	124	7.5-47.0	16.2	0.6	97	19.0-97.2	42.8	1.1
	Condition	15	0.6-1.0	0.8	0.0	124	0.8-1.0	0.9	0.0	97	0.8-1.1	0.9	0.0
	Residual	15	-0.14-0.04	0.0	0.0	124	-0.08-0.05	0.0	0.0	97	-0.07-0.05	0.0	0.0
Middle	Length	172	86-125	101.5	0.5	5	109-117	113.6	1.4				
Clarence	Weight	167	5.2-17.3	8.9	0.2	5	11.8-15.5	13.4	0.7				
Strait	Condition	167	0.5-1.6	0.8	0.0	5	0.9-1.0	0.9	0.0				
	Residual	167	-0.25-0.26	0.0	0.0	5	-0.02-0.03	0.0	0.0				
Lower	Length	21	81-120	107.0	2.7	204	89-129	109.2	0.5				
Clarence	Weight	21	4.4-15.1	11.0	0.8	129	5.7-19.2	11.7	0.2				
Strait	Condition	21	0.8-1.2	0.9	0.0	129	0.6-1.1	0.9	0.0				
	Residual	21	-0.06-0.11	0.0	0.0	129	-0.15-0.06	0.0	0.0				
Total	Length	208	81-125	101.6	0.6	382	89-175	117.5	0.8	151	131-214	166.7	1.1
	Weight	203	4.4-17.3	9.0	0.2	307	5.7-48.5	16.5	0.5	116	19.0-97.2	44.1	1.2
	Condition	203	0.5-1.6	0.8	0.0	307	0.6-1.1	1.1	0.0	116	0.8-1.1	0.9	0.0
	Residual	203	-0.25-0.26	0.0	0.0	305	-0.15-0.06	0.0	0.0	116	-0.07-0.05	0.0	0.0

Table 13.—Length (mm, fork), weight (g), Fulton's condition [$(g/mm^3)\cdot(10^5)$], and condition residuals from length-weight regression analysis of juvenile chum salmon captured in the strait marine habitats of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	Range	mean	se	*n*	range	mean	se
Upper	Length	7	88-125	98.9	4.6	35	99-167	136.8	3.1	14	148-192	168.9	2.8
Chatham	Weight	7	5.8-19.6	9.4	1.8	35	8.6-48.0	26.3	1.8	14	29.6-76.1	48.7	2.9
Strait	Condition	7	0.8-1.0	0.9	0.0	35	0.8-1.1	1.0	0.0	14	0.9-1.2	1.0	0.0
	Residual	7	-0.05-0.04	-0.01	0.01	35	-0.07-0.05	0.00	0.00	14	-0.03-0.09	0.01	0.00
Icy	Length	147	70-121	91.6	0.6	217	79-171	123.8	1.0	81	127-218	165.1	1.8
Strait	Weight	144	2.5-15.8	6.9	0.2	215	4.8-49.5	18.7	0.5	81	17.4-107.5	45.8	1.6
	Condition	144	0.7-1.3	0.9	0.0	215	0.8-1.1	0.9	0.0	81	0.8-1.1	1.0	0.0
	Residual	144	-0.11-0.15	-0.03	0.00	215	-0.10-0.08	0.00	0.00	81	-0.06-0.06	0.01	0.00
Middle	Length	462	73-135	102.9	0.4	7	91-133	117.3	5.3				
Clarence	Weight	454	3.7-25.3	9.9	0.1	7	6.9-21.6	15.3	1.9				
Strait	Condition	454	0.6-1.1	0.9	0.0	7	0.8-1.0	0.9	0.0				
	Residual	454	-0.20-0.08	-0.02	0.00	7	-0.05-0.00	-0.02	0.00				
Lower	Length	36	79-149	110.6	1.9	170	89-139	113.6	0.8				
Clarence	Weight	36	4.5-28.0	12.7	0.7	170	6.2-26.8	14.1	0.3				
Strait	Condition	36	0.8-1.1	0.9	0.0	170	0.8-1.1	0.9	0.0				
	Residual	36	-0.07-0.05	-0.02	0.00	170	-0.08-0.06	-0.01	0.00				
Total	Length	652	70-149	100.8	0.4	429	79-171	120.7	0.7	95	127-218	165.7	1.6
	Weight	641	2.5-28.0	9.4	0.1	427	4.8-49.5	17.5	0.4	95	17.4-107.5	46.2	1.5
	Condition	641	0.6-1.3	0.9	0.0	427	0.8-1.1	0.9	0.0	95	0.8-1.2	1.0	0.0
	Residual	641	-0.20-0.15	-0.02	0.00	427	-0.10-0.08	0.00	0.00	95	-0.06-0.09	0.01	0.00

Table 14.—Length (mm, fork), weight (g), Fulton's condition [(g/mm^3)·(10^5)], and condition residuals from length-weight regression analysis of juvenile sockeye salmon captured in the strait marine habitats of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	range	Mean	se	*n*	range	mean	se
Upper	Length	14	110-169	131.0	4.3	29	103-183	148.8	3.5	7	167-188	177.6	3.0
Chatham	Weight	14	10.4-52.9	21.6	2.9	29	10.4-61.2	34.9	2.4	7	49.1-77.5	61.9	3.7
Strait	Condition	14	0.8-1.1	0.9	0.0	29	0.6-1.1	1.0	0.0	7	1.0-1.2	1.1	0.0
	Residuals	14	-0.11-0.04	-0.04	0.01	29	-0.20-0.07	0.01	0.00	7	0.00-0.07	0.04	0.00
Icy	Length	113	86-168	128.5	1.6	70	85-157	119.9	2.2	12	133-188	161.4	5.3
Strait	Weight	113	5.3-42.7	20.7	0.7	70	5.5-40.2	18.0	1.1	12	22.9-71.9	45.0	4.4
	Condition	113	0.3-2.5	0.9	0.0	70	0.9-1.1	1.0	0.0	12	0.9-1.2	1.0	0.0
	Residuals	113	-0.11-0.15	-0.02	0.00	70	-0.05-0.04	-0.01	0.00	12	-0.03-0.07	0.02	0.00
Middle	Length	90	87-169	111.4	1.6	—	—	—	—				
Clarence	Weight	88	5.4-43.6	13.2	0.7	—	—	—	—				
Strait	Condition	88	0.7-1.1	0.9	0.0	—	—	—	—				
	Residuals	88	-0.12-0.03	-0.04	0.00	—	—	—	—				
Lower	Length	308	79-186	130.0	1.3	5	111-133	126.2	3.9				
Clarence	Weight	303	4.0-67.4	22.1	0.7	5	13.5-24.3	20.1	1.8				
Strait	Condition	303	0.7-1.1	0.9	0.0	5	0.9-1.0	1.0	0.0				
	Residuals	303	-0.13-0.06	-0.04	0.00	5	-0.01-0.02	0.00	0.00				
Total	Length	525	79-186	126.5	0.9	104	85-183	128.2	2.2	19	133-188	167.4	3.9
	Weight	518	4.0-67.4	20.3	0.5	104	5.5-61.2	22.8	1.3	19	22.9-77.5	51.2	3.6
	Condition	518	0.3-2.5	0.9	0.0	104	0.6-1.1	1.0	0.0	19	0.9-1.2	1.1	0.0
	Residuals	518	-0.13-0.15	-0.03	0.00	104	-0.20-0.07	0.00	0.00	19	-0.03-0.07	0.03	0.00

Table 15.—Length (mm, fork), weight (g), Fulton's condition [$(g/mm^3)\cdot(10^5)$], and condition residuals from length-weight regression analysis of juvenile coho salmon captured in the strait marine habitats of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	Range	mean	se	*n*	range	mean	se
Upper Chatham Strait	Length	130	98-199	154.4	1.7	71	133-226	177.9	2.7	31	190-262	241.0	2.7
	Weight	128	9.8-83.0	40.0	1.4	71	26.8-129.9	66.8	3.1	31	82.1-218.9	169.0	5.3
	Condition	128	0.8-1.2	1.0	0.0	71	1.0-1.3	1.1	0.0	31	1.1-1.4	1.2	0.0
	Residuals	128	-0.14-0.03	0.0	0.0	71	-0.06-0.06	0.0	0.0	31	-0.05-0.05	0.0	0.0
Icy Strait	Length	217	91-207	159.0	1.5	37	135-237	178.0	4.2	55	166-265	219.1	2.8
	Weight	216	7.3-90.7	44.3	1.2	37	25.6-146.1	65.2	4.9	55	48.5-211.9	129.5	4.7
	Condition	216	0.7-1.3	1.0	0.0	37	1.0-1.2	1.1	0.0	55	1.1-1.4	1.2	0.0
	Residuals	216	-0.18-0.05	0.0	0.0	37	-0.09-0.03	0.0	0.0	55	-0.05-0.06	0.0	0.0
Middle Clarence Strait	Length	47	107-207	173.6	3.1	6	197-228	210.8	5.2				
	Weight	46	11.6-100.9	60.5	2.9	6	96.8-151.2	118.9	7.8				
	Condition	46	0.9-1.2	1.1	0.0	6	1.1-1.4	1.3	0.0				
	Residuals	46	-0.08-0.03	0.0	0.0	6	-0.02-0.08	0.0	0.0				
Lower Clarence Strait	Length	85	121-230	177.2	2.0	20	157-284	217.2	6.2				
	Weight	85	17.9-138.4	64.2	2.3	20	46.1-279.2	134.9	12.2				
	Condition	85	0.9-1.2	1.1	0.0	20	1.1-1.4	1.3	0.0				
	Residuals	85	-0.09-0.05	0.0	0.0	20	-0.02-0.06	0.0	0.0				
Total	Length	479	91-230	162.4	1.0	134	133-284	185.3	2.4	86	166-265	227.0	2.3
	Weight	475	7.3-138.4	48.4	0.9	134	25.6-279.2	78.9	3.6	86	48.5-218.9	143.7	4.1
	Condition	475	0.7-1.3	1.1	0.0	134	1.0-1.4	1.1	0.0	86	1.1-1.4	1.2	0.0
	Residuals	475	-0.18-0.05	0.0	0.0	134	-0.09-0.08	0.0	0.0	86	-0.05-0.06	0.0	0.0

Table 16.—Length (mm, fork), weight (g), Fulton's condition [$(g/mm^3)\cdot(10^5)$], and condition residuals from length-weight regression analysis of juvenile Chinook salmon captured in the strait marine habitats of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	range	mean	se	*n*	range	mean	se
Upper	Length	10	178-297	241	12.3	5	135-249	212.6	20.3	—	—	—	—
Chatham	Weight	10	64.8-333.1	184.2	28.7	5	30.3-207.6	137.7	30.3	—	—	—	—
Strait	Condition	10	1.1-1.3	1.2	0.0	5	1.1-1.4	1.3	0.1	—	—	—	—
	Residuals	10	-0.14--0.03	-0.08	0.01	5	-0.15-0.12	0.02	0.05	—	—	—	—
Icy	Length	4	189-271	234.3	17.0	2	181-224	202.5	21.5	2	289-304	296.5	7.5
Strait	Weight	4	73.5-247.1	170.3	36.3	2	71.2-128.8	100.0	28.8	2	348.2-408.5	378.4	30.1
	Condition	4	1.1-1.5	1.3	0.1	2	1.1-1.2	1.2	0.0	2	1.4-1.5	1.4	0.0
	Residuals	4	-0.13-0.14	-0.05	0.06	2	-0.12-0.00	-0.06	0.06	2	0.02-0.03	0.03	0.00
Middle	Length	2	231-277	254.0	23.0	—	—	—	—				
Clarence	Weight	2	158.5-239.1	198.8	40.3	—	—	—	—				
Strait	Condition	2	1.1-1.3	1.2	0.1	—	—	—	—				
	Residuals	2	-0.21--0.01	-0.11	0.10	—	—	—	—				
Lower	Length	7	159-290	252.7	16.9	1	213	213.0	—				
Clarence	Weight	5	50.8-250.6	183.9	36.0	1	123.7	123.7	—				
Strait	Condition	5	1.1-1.3	1.3	0.0	1	1.3	1.3	—				
	Residuals	5	-0.16-0.09	-0.04	0.04	1	0.01	0.01	—				
Total	Length	23	159-297	244.5	7.9	8	135-249	210.1	12.9	2	289-304	296.5	7.5
	Weight	21	50.8-333.1	182.8	16.9	8	30.3-207.6	126.6	19.9	2	348.2-408.5	378.4	30.1
	Condition	21	1.1-1.5	1.2	0.0	8	1.1-1.4	1.3	0.0	2	1.4-1.5	1.4	0.0
	Residuals	21	-0.21-0.14	-0.07	0.02	8	-0.15-0.12	0.00	0.03	2	0.02-0.03	0.03	0.00

Table 17.—Release and recovery information, decoded from coded-wire tags recovered from coho and Chinook salmon lacking an adipose fin. Fish were captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Station code acronyms and coordinates are shown in Table 1.

Species	Coded-wire tag code	Release information: Brood year	Agency[1]	Locality	Date	FL (mm)	Wt. (g)	Recovery information: Locality	Station code	2007 date	FL (mm)	Wt. (g)	Age	Days[2] since release	Distance traveled (km)
							June								
Coho	04:13/11	2005	NSRAA	Kasnyku Bay, AK	5/21/2007		18.3	U. Chatham	UCB	6/28	171	48.7	1.0	39	100
Coho	04:13/77	2005	ADFG	Taku River, AK (Wild)	6/6/2007			U. Chatham	UCB	7/1	161	47.8	1.0	26	110
Coho	04:13/94	2005	ADFG	Hugh Smith Lake, AK	6/2/2007	100		L. Clarence	LCC	6/22	175	59.2	1.0	20	89
Coho	04:13/94	2005	ADFG	Hugh Smith Lake, AK	6/2/2007	100		L. Clarence	LCB	6/22	180	58.6	1.0	20	90
Coho	04:14/35	2005	SSRAA	Neets Bay, AK	5/31/2007	140	28.7	L. Clarence	LCA	6/23	190	84.0	1.0	24	90
Coho	04:14/38	2005	SSRAA	Nakat Inlet, AK	5/27/2007	147	29.4	L. Clarence	LCA	6/23	191	86.1	1.0	28	95
Coho	04:14/38	2005	SSRAA	Nakat Inlet, AK	5/27/2007	147	29.4	L. Clarence	LCC	6/24	193	81.8	1.0	29	100
Coho	04:14/52	2005	DIPAC	Gastineau Channel, AK	6/11/2007		19.0	U. Chatham	UCD	6/28	158	40.2	1.0	18	95
Coho	04:14/52	2005	DIPAC	Gastineau Channel, AK	6/11/2007		19.0	U. Chatham	UCC	6/28	134	21.7	1.0	18	100
Coho	04:14/52	2005	DIPAC	Gastineau Channel, AK	6/11/2007		19.0	U. Chatham	UCC	6/28	121	15.8	1.0	18	100
Coho	04:14/52	2005	DIPAC	Gastineau Channel, AK	6/11/2007		19.0	Icy Strait	ISB	6/30	156	36.4	1.0	20	120
Coho	04:14/58	2005	KTHC	Ward Lake, AK	11/15/2006	106	13.3	M. Clarence	MCA	6/24	184	70.9	2.0	—	20
Coho	04:14/97	2005	NSRAA	Mist Cove, AK	6/3/2007		16.0	Icy Strait	ISD	7/1	169	51.8	1.0	29	210
Chinook	04:12/23	2004	DIPAC	Gastineau Channel, AK	6/15/2006		20.5	U. Chatham	UCA	6/28	326	451.4	1.1	379	105
Chinook	04:12/23	2004	DIPAC	Gastineau Channel, AK	6/15/2006		20.5	U. Chatham	UCD	7/1	279	290.8	1.1	382	95
Chinook	04:12/26	2004	DIPAC	Fish Creek, AK	6/15/2006		22.8	Icy Strait	ISB	6/30	312	430.7	1.1	381	80
Chinook	04:13/53	2005	NSRAA	Kasnyku Bay, AK	5/13/2007		46.3	U. Chatham	UCD	6/28	220	126.1	1.0	47	110
Chinook	61:01/75	2005	NEZP	Big Canyon, ID	5/26/2006	91	8.3	M. Clarence	MCC	6/25	353	550.0	0.1	395	1150
Chinook	No tag							L. Clarence	LCB	6/23	251	179.7			
Chinook	No tag							M. Clarence	MCD	6/25	277	239.1			
							July								
Coho	04:10/49	2005	ADFG	Berners R., AK (Wild)	6/21/2007	100		U. Chatham	UCC	7/31	182	65.9	1.0	41	80

[1] ADFG = Alaska Department of Fish and Game; DIPAC = Douglas Island Pink and Chum; KTHC = Ketchikan Tribal Hatchery Corporation; NEZP = Nez Perce Tribal Hatchery; NSRAA = Northern Southeast Regional Aquaculture Association; SSRAA = Southern Southeast Regional Aquaculture Association.

[2] Days since release may potentially include freshwater residence periods.

Table 18.—Stock-specific information on juvenile chum salmon released from regional enhancement facilities and captured at transects in marine strait habitats of the northern and southern regions of southeastern Alaska by rope trawl, June-August 2007. Length (mm, fork), weight (g), Fulton's condition [(g/mm^3) · (10^5)], and condition residuals from length-weight regression analysis are reported for each stock group by sample size (*n*), range, mean, and standard error (se) about the mean. See Table 16 for agency acronyms. L/L = late large release size. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	n	range	mean	se	n	range	mean	se	n	range	mean	se
						Northern region stocks							
						DIPAC							
Upper Chatham Strait	Length	2	97.0-99.0	98.0	1.0	5	111.0-152.0	133.2	8.2	2	171.0-192.0	181.5	10.5
	Weight	2	8.0-10.0	9.0	1.0	5	12.2-34.1	23.9	4.3	2	49.2-76.1	62.7	13.4
	Condition	2	0.9-1.0	1.0	0.1	5	0.9-1.0	1.0	0.0	2	1.0-1.1	1.0	0.0
	Residual	2	-0.06-0.10	0.02	0.08	5	-0.06-0.08	0.01	0.02	2	0.02-0.10	0.06	0.04
Icy Strait	Length	106	70.0-106.0	91.1	0.7	49	99.0-160.0	124.3	2.0	17	154.0-189.0	173.1	2.3
	Weight	106	2.5-11.2	6.8	0.2	49	8.9-41.3	19.2	1.0	17	37.2-70.8	53.7	2.6
	Condition	106	0.7-1.3	0.9	0.0	49	0.8-1.1	1.0	0.0	17	0.9-1.1	1.0	0.0
	Residual	106	-0.25-0.34	-0.06	0.01	49	-0.16-0.16	0.01	0.01	17	-0.05-0.14	0.05	0.01
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
Total	Length	108	70.0-106.0	91.2	0.7	54	99.0-160.0	125.1	1.9	19	154.0-192.0	174.0	2.3
	Weight	108	2.5-11.2	6.8	0.2	54	8.9-41.3	19.7	1.0	19	37.2-76.1	54.6	2.6
	Condition	108	0.7-1.3	0.9	0.0	54	0.8-1.1	1.0	0.0	19	0.9-1.1	1.0	0.0
	Residual	108	-0.25-0.34	-0.06	0.01	54	-0.16-0.16	0.01	0.01	19	-0.05-0.14	0.05	0.01
NSRAA 17MI Chilkat													
Upper Chatham Strait	Length	—	—	—	—	1	152.0	152.0	—	—	—	—	—
	Weight	—	—	—	—	1	33.9	33.9	—	—	—	—	—
	Condition	—	—	—	—	1	1.0	1.0	—	—	—	—	—
	Residual	—	—	—	—	1	0.01	0.01	—	—	—	—	—
Icy Strait	Length	2	79.0-83.0	81.0	2.0	—	—	—	—	—	—	—	—
	Weight	2	4.2-4.8	4.5	0.3	—	—	—	—	—	—	—	—
	Condition	2	0.8-0.8	0.8	0.0	—	—	—	—	—	—	—	—
	Residual	2	-0.10--0.09	-0.09	0.00	—	—	—	—	—	—	—	—
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
Total	Length	2	79.0-83.0	81.0	2.0	1	152.0	152.0	—	—	—	—	—
	Weight	2	4.2-4.8	4.5	0.3	1	33.9	33.9	—	—	—	—	—
	Condition	2	0.8-0.8	0.8	0.0	1	1.0	1.0	—	—	—	—	—
	Residual	2	-0.10--0.09	-0.09	0.00	1	0.01	0.01	—	—	—	—	—
						Kasnyku Bay							
Upper Chatham Strait	Length	2	88.0-93.0	90.5	2.5	—	—	—	—	1	164.0	164.0	—
	Weight	2	5.8-6.7	6.2	0.4	—	—	—	—	1	42.4	42.4	—
	Condition	2	0.8-0.9	0.8	0.0	—	—	—	—	1	1.0	1.0	—
	Residual	2	-0.12--0.09	-0.10	0.02	—	—	—	—	1	0.00	0.00	—
Icy Strait	Length	3	91.0-103.0	97.7	3.5	16	103.0-145.0	126.9	2.9	7	127.0-181.0	152.1	6.3
	Weight	3	6.7-9.5	8.3	0.8	16	11.4-31.0	19.7	1.4	7	20.6-57.5	35.8	4.4
	Condition	3	0.9-0.9	0.9	0.0	16	0.8-1.1	0.9	0.0	7	0.9-1.0	1.0	0.0
	Residual	3	-0.08--0.04	-0.05	0.01	16	-0.14-0.14	-0.02	0.02	7	-0.01-0.07	0.03	0.01
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Total	Length	5	88.0-103.0	94.8	2.7	16	103.0-145.0	126.9	2.9	8	127.0-181.0	153.6	5.7

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
	Weight	5	5.8-9.5	7.5	0.7	16	11.4-31.0	19.7	1.4	8	20.6-57.5	36.6	3.9
	Condition	5	0.8-0.9	0.9	0.0	16	0.8-1.1	0.9	0.0	8	0.9-1.0	1.0	0.0
	Residual	5	-0.12--0.04	-0.07	0.02	16	-0.14-0.14	-0.02	0.02	8	-0.01-0.07	0.03	0.01
Kasnyku Bay L/L													
Upper Chatham Strait	Length	1	99.0	99.0	—	1	123.0	123.0	—	—	—	—	—
	Weight	1	8.8	8.8	—	1	18.0	18.0	—	—	—	—	—
	Condition	1	0.9	0.9	—	1	1.0	1.0	—	—	—	—	—
	Residual	1	-0.03	-0.03	—	1	0.02	0.02	—	—	—	—	—
Icy Strait	Length	3	86.0-101.0	94.0	4.4	4	122.0-145.0	134.3	5.0	2	181.0-185.0	183.0	2.0
	Weight	3	5.1-8.3	6.9	1.0	4	15.6-28.3	22.0	2.7	2	60.6-60.7	60.7	0.1
	Condition	3	0.8-0.8	0.8	0.0	4	0.9-0.9	0.9	0.0	2	1.0-1.0	1.0	0.0
	Residual	3	-0.16--0.10	-0.14	0.02	4	-0.10--0.03	-0.06	0.01	2	-0.01-0.06	0.02	0.03
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Total	Length	4	86.0-101.0	95.3	3.3	5	122.0-145.0	132.0	4.5	2	181.0-185.0	183.0	2.0
	Weight	4	5.1-8.8	7.4	0.8	5	15.6-28.3	21.2	2.3	2	60.6-60.7	60.7	0.1
	Condition	4	0.8-0.9	0.8	0.0	5	0.9-1.0	0.9	0.0	2	1.0-1.0	1.0	0.0

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
	Residual	4	-0.16--0.03	-0.11	0.03	5	-0.10-0.02	-0.05	0.02	2	-0.01-0.06	0.02	0.03
						Takatz Bay							
Upper Chatham Strait	Length	1	91.0	91.0	—	4	133.0-150.0	138.8	3.8	4	160.0-167.0	163.5	1.6
	Weight	1	6.7	6.7	—	4	19.2-35.0	26.0	3.4	4	37.9-53.2	44.3	3.8
	Condition	1	0.9	0.9	—	4	0.8-1.0	1.0	0.1	4	0.9-1.2	1.0	0.1
	Residual	1	-0.05	-0.05	—	4	-0.15-0.08	0.00	0.05	4	-0.08-0.21	0.04	0.06
Icy Strait	Length	2	84.0-91.0	87.5	3.5	30	117.0-144.0	128.6	1.1	10	132.0-184.0	162.5	4.9
	Weight	2	4.7-5.6	5.2	0.4	30	14.3-29.2	20.5	0.6	10	21.5-61.8	43.4	4.0
	Condition	2	0.7-0.8	0.8	0.0	30	0.9-1.1	1.0	0.0	10	0.9-1.1	1.0	0.0
	Residual	2	-0.22--0.15	-0.19	0.04	30	-0.09-0.18	0.00	0.01	10	-0.07-0.11	0.02	0.02
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Total	Length	3	84.0-91.0	88.7	2.3	34	117.0-150.0	129.8	1.2	14	132.0-184.0	162.8	3.5
	Weight	3	4.7-6.7	5.7	0.6	34	14.3-35.0	21.1	0.7	14	21.5-61.8	43.7	3.0
	Condition	3	0.7-0.9	0.8	0.0	34	0.8-1.1	1.0	0.0	14	0.9-1.2	1.0	0.0
	Residual	3	-0.22--0.05	-0.14	0.05	34	-0.15-0.18	0.00	0.01	14	-0.08-0.21	0.02	0.02

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
Southern region stocks													
SSRAA Anita Bay													
Upper Chatham Strait	Length	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Icy Strait	Length	—	—	—	—	1	135.0	135.0	—	—	—	—	—
	Weight	—	—	—	—	1	21.5	21.5	—	—	—	—	—
	Condition	—	—	—	—	1	0.9	0.9	—	—	—	—	—
	Residual	—	—	—	—	1	-0.09	-0.09	—	—	—	—	—
Middle Clarence Strait	Length	21	85.0-107.0	99.5	1.3	2	127.0-133.0	130.0	3.0				
	Weight	21	6.6-11.2	8.9	0.3	2	18.8-21.6	20.2	1.4				
	Condition	21	0.8-1.1	0.9	0.0	2	0.9-0.9	0.9	0.0				
	Residual	21	-0.19-0.18	-0.05	0.02	2	-0.04--0.04	-0.04	0.00				
Lower Clarence Strait	Length	—	—	—	—	18	109.0-132.0	118.9	1.4				
	Weight	—	—	—	—	18	11.8-22.9	16.0	0.6				
	Condition	—	—	—	—	18	0.9-1.0	0.9	0.0				
	Residual	—	—	—	—	18	-0.07-0.07	-0.01	0.01				

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
Total	Length	21	85.0-107.0	99.5	1.3	21	109.0-135.0	120.8	1.6	—	—	—	—
	Weight	21	6.6-11.2	8.9	0.3	21	11.8-22.9	16.6	0.7	—	—	—	—
	Condition	21	0.8-1.1	0.9	0.0	21	0.9-1.0	0.9	0.0	—	—	—	—
	Residual	21	-0.19-0.18	-0.05	0.02	21	-0.09-0.07	-0.01	0.01	—	—	—	—
Anita Bay and Neets Bay													
Upper Chatham Strait	Length	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Icy Strait	Length	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Middle Clarence Strait	Length	22	88.0-128.0	107.4	2.5	—	—	—	—				
	Weight	22	5.5-18.8	11.7	0.9	—	—	—	—				
	Condition	22	0.8-1.0	0.9	0.0	—	—	—	—				
	Residual	22	-0.16-0.06	-0.04	0.02	—	—	—	—				
Lower Clarence Strait	Length	1	114.0	114.0	—	4	115.0-136.0	121.3	4.9				
	Weight	1	13.9	13.9	—	4	14.8-24.0	17.4	2.2				
	Condition	1	0.9	0.9	—	4	0.9-1.0	1.0	0.0				
	Residual	1	-0.01	-0.01	—	4	-0.03-0.07	0.01	0.02				
Total	Length	23	88.0-128.0	107.7	2.4	4	115.0-136.0	121.3	4.9	—	—	—	—

Table 18.—cont.

Locality	Factor	June n	June range	June mean	June se	July n	July range	July mean	July se	August n	August range	August mean	August se
	Weight	23	5.5-18.8	11.8	0.8	4	14.8-24.0	17.4	2.2	—	—	—	—
	Condition	23	0.8-1.0	0.9	0.0	4	0.9-1.0	1.0	0.0	—	—	—	—
	Residual	23	-0.16-0.06	-0.04	0.01	4	-0.03-0.07	0.01	0.02	—	—	—	—
Kendrick Bay													
Upper	Length	—	—	—	—	—	—	—	—	—	—	—	—
Chatham	Weight	—	—	—	—	—	—	—	—	—	—	—	—
Strait	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Icy	Length	1	85.0	85.0	—	1	118.0	118.0	—	—	—	—	—
Strait	Weight	1	4.6	4.6	—	1	14.9	14.9	—	—	—	—	—
	Condition	1	0.7	0.7	—	1	0.9	0.9	—	—	—	—	—
	Residual	1	-0.2	-0.22	—	1	0.0	-0.04	—	—	—	—	—
Middle	Length	61	91.0-123.0	106.9	0.8	1	125.0	125.0	—				
Clarence	Weight	61	6.7-16.8	10.9	0.3	1	17.5	17.5	—				
	Condition	61	0.8-1.1	0.9	0.0	1	0.9	0.9	—				
	Residual	61	-0.2-0.1	-0.07	0.01	1	-0.1	-0.06	—				
Lower	Length	12	99.0-117.0	106.3	1.5	17	107.0-139.0	117.8	2.0				
Clarence	Weight	12	8.4-14.4	10.7	0.6	17	10.6-25.4	15.3	0.9				
	Condition	12	0.8-1.0	0.9	0.0	17	0.8-1.0	0.9	0.0				
	Residual	12	-0.2-0.1	-0.07	0.02	17	-0.2-0.1	-0.02	0.02				
Total	Length	74	85.0-123.0	106.5	0.8	19	107.0-139.0	118.2	1.8	—	—	—	—
	Weight	74	4.6-16.8	10.7	0.3	19	10.6-25.4	15.4	0.8	—	—	—	—
	Condition	74	0.7-1.1	0.9	0.0	19	0.8-1.0	0.9	0.0	—	—	—	—

Table 18.—cont.

Locality	Factor	June n	June range	June mean	June se	July n	July range	July mean	July se	August n	August range	August mean	August se
	Residual	74	-0.2-0.1	-0.07	0.01	19	-0.2-0.1	-0.03	0.02	—	—	—	—
Nakat Inlet (fall)													
Middle	Length	1	96.0	96.0	—	—	—	—	—				
Clarence	Weight	1	7.6	7.6	—	—	—	—	—				
Strait	Condition	1	0.9	0.9	—	—	—	—	—				
(Total)	Residual	1	-0.08	-0.08	—	—	—	—	—				
Neets Bay (fall)													
Upper	Length	—	—	—	—	—	—	—	—	—	—	—	—
Chatham	Weight	—	—	—	—	—	—	—	—	—	—	—	—
Strait	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Icy	Length	—	—	—	—	—	—	—	—	—	—	—	—
Strait	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Middle	Length	13	80.0-100.0	90.4	1.4	—	—	—	—				
Clarence	Weight	13	5.6-8.0	6.7	0.2	—	—	—	—				
	Condition	13	0.7-1.1	0.9	0.0	—	—	—	—				
	Residual	13	-0.23-0.19	-0.02	0.03	—	—	—	—				
Lower	Length	—	—	—	—	8	107.0-124.0	116.8	2.2				
Clarence	Weight	—	—	—	—	8	11.7-20.7	15.4	1.1				
	Condition	—	—	—	—	8	0.8-1.1	1.0	0.0				
	Residual	—	—	—	—	8	-0.14-0.13	0.01	0.03				

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
Total	Length	13	80.0-100.0	90.4	1.4	8	107.0-124.0	116.8	2.2	—	—	—	—
	Weight	13	5.6-8.0	6.7	0.2	8	11.7-20.7	15.4	1.1	—	—	—	—
	Condition	13	0.7-1.1	0.9	0.0	8	0.8-1.1	1.0	0.0	—	—	—	—
	Residual	13	-0.23-0.19	-0.02	0.03	8	-0.14-0.13	0.01	0.03	—	—	—	—
Neets Bay (summer)													
Upper Chatham Strait	Length	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Icy Strait	Length	—	—	—	—	—	—	—	—	—	—	—	—
	Weight	—	—	—	—	—	—	—	—	—	—	—	—
	Condition	—	—	—	—	—	—	—	—	—	—	—	—
	Residual	—	—	—	—	—	—	—	—	—	—	—	—
Middle Clarence	Length	276	73.0-125.0	101.7	0.5	—	—	—	—				
	Weight	276	3.7-18.5	9.6	0.2	—	—	—	—				
	Condition	276	0.6-1.1	0.9	0.0	—	—	—	—				
	Residual	276	-0.45-0.13	-0.06	0.00	—	—	—	—				
Lower Clarence	Length	13	101.0-125.0	109.3	1.9	19	109.0-137.0	124.7	1.7				
	Weight	13	9.2-17.5	12.3	0.6	19	11.2-26.8	18.8	0.9				
	Condition	13	0.9-1.0	0.9	0.0	19	0.9-1.1	1.0	0.0				
	Residual	13	-0.06-0.06	-0.01	0.01	19	-0.10-0.11	0.00	0.01				
Total	Length	289	73.0-125.0	102.0	0.5	19	109.0-137.0	124.7	1.7	—	—	—	—

Table 18.—cont.

Locality	Factor	June n	June range	June mean	June se	July n	July range	July mean	July se	August n	August range	August mean	August se
	Weight	289	3.7-18.5	9.7	0.2	19	11.2-26.8	18.8	0.9	—	—	—	—
	Condition	289	0.6-1.1	0.9	0.0	19	0.9-1.1	1.0	0.0	—	—	—	—
	Residual	289	-0.45-0.13	-0.05	0.00	19	-0.10-0.11	0.00	0.01	—	—	—	—
Northern and southern region unmarked stocks													
Upper	Length	1	125.0	125.0	—	24	99.0-167.0	137.2	4.1	7	148.0-182.0	169.0	4.2
Chatham	Weight	1	19.6	19.6	—	24	8.6-48.0	26.9	2.3	7	29.6-60.8	48.2	3.6
Strait	Condition	1	1.0	1.0	—	24	0.8-1.1	1.0	0.0	7	0.9-1.1	1.0	0.0
	Residual	1	0.05	0.05	—	24	-0.12-0.12	0.02	0.01	7	-0.05-0.13	0.02	0.02
Icy	Length	23	85.0-121.0	95.1	1.8	108	79.0-171.0	120.8	1.6	45	127.0-218.0	163.9	2.5
Strait	Weight	23	4.9-15.8	7.8	0.5	108	4.8-49.5	17.7	0.8	45	17.4-107.5	44.2	2.3
	Condition	23	0.8-1.0	0.9	0.0	108	0.8-1.1	0.9	0.0	45	0.8-1.1	1.0	0.0
	Residual	23	-0.17-0.03	-0.06	0.01	108	-0.22-0.13	-0.01	0.01	45	-0.15-0.14	0.00	0.01
Middle	Length	55	90.0-135.0	106.5	1.4	4	91.0-121.0	109.0	6.6				
Clarence	Weight	55	6.7-25.3	11.1	0.5	4	6.9-17.0	12.3	2.2				
	Condition	55	0.8-1.0	0.9	0.0	4	0.8-1.0	0.9	0.0				
	Residual	55	-0.18-0.10	-0.06	0.01	4	-0.11-0.01	-0.03	0.03				
Lower	Length	9	79.0-149.0	118.2	6.5	102	89.0-133.0	109.2	1.0				
Clarence	Weight	9	4.5-28.0	15.9	2.3	102	6.2-23.6	12.4	0.3				
	Condition	9	0.8-1.1	0.9	0.0	102	0.8-1.1	0.9	0.0				
	Residual	9	-0.13-0.12	-0.05	0.02	102	-0.15-0.12	-0.02	0.01				
Total	Length	88	79.0-149.0	104.9	1.4	238	79.0-171.0	117.3	1.1	52	127.0-218.0	164.6	2.2
	Weight	88	4.5-28.0	10.8	0.5	238	4.8-49.5	16.3	0.5	52	17.4-107.5	44.7	2.1
	Condition	88	0.8-1.1	0.9	0.0	238	0.8-1.1	0.9	0.0	52	0.8-1.1	1.0	0.0

Table 18.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	n	range	mean	se	n	range	mean	se
	Residual	88	-0.18-0.12	-0.05	0.01	238	-0.22-0.13	-0.01	0.00	52	-0.15-0.14	0.01	0.01

Table 19.—Stock-specific information on juvenile sockeye salmon released from regional enhancement facilities and captured at transects in marine strait habitats of the northern and southern regions of southeastern Alaska by rope trawl, June-August 2007. Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals from length-weight regression analysis are reported for each stock group by sample size (*n*), range, mean, and standard error (se) about the mean. See Table 16 for agency acronyms. Abbreviations: L/L = Late Large release. No sampling was conducted in the southern region in August.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	range	mean	se	*n*	range	mean	se
Northern region stocks													
DIPAC													
Speel Arm													
Upper	Length	—	—	—	—	7	137.0-171.0	153.6	4.3	3	175.0-188.0	183.0	4.0
Chatham	Weight	—	—	—	—	7	26.9-51.3	38.9	3.3	3	63.0-77.5	70.4	4.2
Strait	Condition	—	—	—	—	7	1.0-1.1	1.1	0.0	3	1.1-1.2	1.1	0.0
	Residual	—	—	—	—	7	0.03-0.11	0.06	0.01	3	0.09-0.16	0.13	0.02
Icy	Length	2	107.0-123.0	115.0	8.0	9	129.0-157.0	151.1	3.1	1	169.0	169.0	—
Strait	Weight	2	12.1-17.9	15.0	2.9	9	20.7-40.2	35.1	2.0	1	55.8	55.8	—
	Condition	2	1.0-1.0	1.0	0.0	9	1.0-1.0	1.0	0.0	1	1.2	1.2	—
	Residual	2	-0.01-0.02	0.00	0.02	9	-0.02-0.05	0.01	0.01	1	0.15	0.15	—
Middle	Length	—	—	—	—	—	—	—	—				
Clarence	Weight	—	—	—	—	—	—	—	—				
Strait	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower	Length	—	—	—	—	—	—	—	—				
Clarence	Weight	—	—	—	—	—	—	—	—				
Strait	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				

Table 19.—cont.

Locality	Factor	June				July				August			
		n	range	mean	se	*n*	range	mean	se	*n*	range	mean	se
Total	Length	2	107.0-123.0	115.0	8.0	16	129.0-171.0	152.2	2.5	4	169.0-188.0	179.5	4.5
	Weight	2	12.1-17.9	15.0	2.9	16	20.7-51.3	36.7	1.8	4	55.8-77.5	66.7	4.7
	Condition	2	1.0-1.0	1.0	0.0	16	1.0-1.1	1.0	0.0	4	1.1-1.2	1.1	0.0
	Residual	2	-0.01-0.02	0.00	0.02	16	-0.02-0.11	0.04	0.01	4	0.09-0.16	0.14	0.02
Sweetheart Lake													
Upper	Length	—	—	—	—	1	142.0	142.0	—	—	—	—	—
Chatham	Weight	—	—	—	—	1	17.9	17.9	—	—	—	—	—
Strait	Condition	—	—	—	—	1	0.6	0.6	—	—	—	—	—
(Total)	Residual	—	—	—	—	1	-0.46	-0.46	—	—	—	—	—
Tahltan Lake													
Icy	Length	1	150.0	150.0	—	—	—	—	—	1	177.0	177.0	—
Strait	Weight	1	30.0	30.0	—	—	—	—	—	1	60.3	60.3	—
(Total)	Condition	1	0.9	0.9	—	—	—	—	—	1	1.1	1.1	—
	Residual	1	-0.11	-0.11	—	—	—	—	—	1	0.08	0.08	—
Tuya Lake													
Upper	Length	—	—	—	—	1	135.0	135.0	—	—	—	—	—
Chatham	Weight	—	—	—	—	1	23.6	23.6	—	—	—	—	—
Strait	Condition	—	—	—	—	1	1.0	1.0	—	—	—	—	—
	Residual	—	—	—	—	1	-0.02	-0.02	—	—	—	—	—
Icy	Length	—	—	—	—	—	—	—	—	1	179.0	179.0	—
Strait	Weight	—	—	—	—	—	—	—	—	1	53.2	53.2	—
	Condition	—	—	—	—	—	—	—	—	1	0.9	0.9	—

Table 19.—cont.

		June				July				August			
Locality	Factor	*n*	range	mean	se	*n*	range	mean	se	*n*	range	mean	se
	Residual	—	—	—	—	—	—	—	—	1	-0.08	-0.08	—
Middle Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Lower Clarence Strait	Length	—	—	—	—	—	—	—	—				
	Weight	—	—	—	—	—	—	—	—				
	Condition	—	—	—	—	—	—	—	—				
	Residual	—	—	—	—	—	—	—	—				
Total	Length	—	—	—	—	1	135.0	135.0	—	1	179.0	179.0	—
	Weight	—	—	—	—	1	23.6	23.6	—	1	53.2	53.2	—
	Condition	—	—	—	—	1	1.0	1.0	—	1	0.9	0.9	—
	Residual	—	—	—	—	1	-0.02	-0.02	—	1	-0.08	-0.08	—
Northern and Southern region unmarked stocks													
Upper Chatham Strait	Length	14	110.0-169.0	131	4.3	19	103.0-183.0	148.1	5.1	4	167.0-181.0	173.5	3.3
	Weight	14	10.4-52.9	21.6	2.9	19	10.4-61.2	34.9	3.3	4	49.1-62.6	55.6	2.8
	Condition	14	0.8-1.1	0.9	0.0	19	0.9-1.1	1.0	0.0	4	1.0-1.2	1.1	0.0
	Residual	14	-0.25-0.09	-0.09	0.03	19	-0.12-0.15	0.02	0.01	4	0.01-0.16	0.06	0.04
Icy Strait	Length	110	86.0-168.0	128.5	1.6	61	85.0-157.0	115.3	1.9	9	133.0-188.0	156.9	6.3
	Weight	110	5.3-42.7	20.8	0.7	61	5.5-38.7	15.5	0.9	9	22.9-71.9	41.2	5.3
	Condition	110	0.3-2.5	0.9	0.0	61	0.9-1.1	1.0	0.0	9	0.9-1.1	1.0	0.0
	Residual	110	-0.25-0.35	-0.06	0.01	61	-0.12-0.10	-0.02	0.01	9	-0.05-0.10	0.03	0.02

Table 19.—cont.

Locality	Factor	June *n*	June range	June mean	June se	July *n*	July range	July mean	July se	August *n*	August range	August mean	August se
Middle Clarence Strait	Length	87	87.0-169.0	111.7	1.6	—	—	—	—				
	Weight	87	5.4-43.6	13.2	0.7	—	—	—	—				
	Condition	87	0.7-1.1	0.9	0.0	—	—	—	—				
	Residual	87	-0.27-0.08	-0.10	0.01	—	—	—	—				
Lower Clarence Strait	Length	301	79.0-186.0	130.2	1.3	5	111.0-133.0	126.2	3.9				
	Weight	301	4.0-67.4	22.1	0.7	5	13.5-24.3	20.1	1.8				
	Condition	301	0.7-1.1	0.9	0.0	5	0.9-1.0	1.0	0.0				
	Residual	301	-0.30-0.15	-0.09	0.00	5	-0.03-0.05	0.01	0.01				
Total	Length	512	79.0-186.0	126.7	0.9	85	85.0-183.0	123.2	2.3	13	133.0-188.0	162	4.9
	Weight	512	4.0-67.4	20.3	0.5	85	5.5-61.2	20.1	1.3	13	22.9-71.9	45.6	4.1
	Condition	512	0.3-2.5	0.9	0.0	85	0.9-1.1	1.0	0.0	13	0.9-1.2	1.0	0.0
	Residual	512	-0.30-0.35	-0.08	0.0	85	-0.12-0.15	-0.01	0.01	13	-0.05-0.16	0.04	0.02

Table 20.—Number examined and feeding attributes of potential predators of juvenile salmon captured by rope trawl in the marine waters of the northern and southern regions of southeastern Alaska, June–August 2007. Summary of potential predators examined at sea is computed from samples pooled across months; see Tables 8 and 9 for scientific names and catches by month.

Predator species	Life history stage	Number examined	Number empty	Percent feeding	Number with juv. salmon	Percent feeders with juv. salmon
			Northern region			
Pink salmon	Adult	34	17	50.0	0	0.0
Chum salmon	Immature	1	0	100.0	0	0.0
Chum salmon	Adult	3	0	100.0	0	0.0
Sockeye salmon	Adult	4	4	0.0	0	--
Coho salmon	Adult	5	0	100.0	0	0.0
Chinook salmon	Immature	11	2	81.8	0	0.0
Pacific hake	Adult	2	0	100.0	0	0.0
Walleye pollock	Imm./Adult	2	2	0.0	0	--
Regional total		62	25			
			Southern region			
Pink salmon	Adult	5	0	100.0	0	0.0
Chum salmon	Adult	3	2	33.3	0	0.0
Chinook salmon	Immature	4	0	100.0	0	0.0
Coho salmon	Adult	3	0	100.0	0	0.0
Pacific hake	Adult	1	0	100.0	0	0.0
Spiny dogfish*	Imm./Adult	16	7	56.3	0	0.0
Regional total		32	9			
Total		95	34			

*The stomach of one spiny dogfish contained flesh pieces from an adult salmon.

Table 21.—Number examined, length (mm, fork), wet weight (g), stomach content as percent body weight (%BW), and visual index of stomach fullness (0-100% volume) of potential predators of juvenile salmon captured in marine straits of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. See Tables 8 and 9 for scientific names and Table 20 and Figure 16 for additional feeding data.

		June				July				August			
Species	Factor	*n*	range	mean	sd	*n*	range	mean	sd	*n*	range	mean	sd
Northern region													
Salmonids													
Pink Salmon[2]	Length	1	615	615.0	—	26	340-618	528.0	54.1	7	470-535	507.9	25.5
	Weight	1	2600	2600.0	—	26	1050-5650	1899.2	852.3	7	1150-1900	1558.6	261.8
	%BW	1	0.4	0.4	—	26	0-2.4	0.1	0.5	7	0.0-0.6	0.2	0.2
	Fullness	1	75	75.0	—	26	0-100	12.5	25.4	7	0-75	37.1	36.3
Chum Salmon[1]	Length	—	—	—	—	1	595	595.0	—	—	—	—	—
	Weight	—	—	—	—	1	2450	2450.0	—	—	—	—	—
	%BW	—	—	—	—	1	0.3	0.3	—	—	—	—	—
	Fullness	—	—	—	—	1	50	50.0	—	—	—	—	—
Chum salmon[2]	Length	—	—	—	—	1	685	685	—	2	645-690	667.5	31.8
	Weight	—	—	—	—	1	4500	4500	—	2	2750-3800	3275	742.5
	%BW	—	—	—	—	1	0.3	0.3	—	2	0.1-0.3	0.2	0.2
	Fullness	—	—	—	—	1	25	25	—	2	25-25	25.0	0.0
Sockeye salmon[2]	Length	1	635	635.0	—	3	590-620	606.7	15.3	—	—	—	—
	Weight	1	3000	3000.0	—	3	2650-3100	2833.3	236.3	—	—	—	—
	%BW	1	0.0	0.0	—	3	0.0-0.0	0.0	0.0	—	—	—	—
	Fullness	1	0	0.0	—	3	0-0	0.0	0.0	—	—	—	—

Table 21.—cont.

Species	Factor	June				July				August			
		n	range	mean	sd	*n*	range	mean	sd	*n*	range	mean	sd
Coho salmon[2]	Length	—	—	—	—	1	568	568.0	—	4	615-750	662.5	60.1
	Weight	—	—	—	—	1	1950	1950.0	—	4	2850-4750	3637.5	804.5
	%BW	—	—	—	—	1	0.0	0.0	—	4	0.3-0.7	0.5	0.2
	Fullness	—	—	—	—	1	5	5.0	—	4	25-100	75.0	35.4
Chinook Salmon[1]	Length	5	297-603	414.2	119.2	4	295-585	406.5	133.3	2	355-535	445.0	127.3
	Weight	5	350-2800	1106.0	983.2	4	350-2600	1112.5	1038.7	2	600-2100	1350.0	1060.7
	%BW	5	0.2-3.4	1.0	1.3	4	0.0-3.0	1.7	1.3	2	0.0-2.1	1.0	1.5
	Fullness	5	50-110	77.0	21.4	4	0-110	71.3	49.7	2	0-110	55.0	77.8
Non-salmonids													
Pacific hake	Length	1	545	545.0	—	—	—	—	—	1	572	572.0	—
	Weight	1	800	800.0	—	—	—	—	—	1	1100	1100.0	—
	%BW	1	0.7	0.7	—	—	—	—	—	1	4.7	4.7	—
	Fullness	1	100	100.0	—	—	—	—	—	1	110	110.0	—
Walleye pollock	Length	—	—	—	—	2	530-560	545.0	21.2	—	—	—	—
	Weight	—	—	—	—	2	850-1000	925.0	106.1	—	—	—	—
	%BW	—	—	—	—	2	0.0-0.0	0.0	0.0	—	—	—	—
	Fullness	—	—	—	—	2	0-0	0.0	0.0	—	—	—	—
Southern region													
Salmonids													
Pink Salmon[2]	Length	—	—	—	—	5	515-565	540.0	20.0	—	—	—	—
	Weight	—	—	—	—	5	1600-2150	1850.0	242.4	—	—	—	—
	%BW	—	—	—	—	5	0.5-3.6	1.5	1.3	—	—	—	—
	Fullness	—	—	—	—	5	75-110	92.0	16.0	—	—	—	—
Chum	Length	2	650-790	720.0	99.0	1	730	730.0	—	—	—	—	—

Table 21.—cont.

Species	Factor	June				July				August			
		n	range	mean	sd	*n*	range	mean	sd	*n*	range	mean	sd
Salmon[1]	Weight	2	3200-6400	4800.0	2262.7	1	4550	4550.0	—	—	—	—	—
	%BW	2	0.0-0.5	0.2	0.3	1	0.0	0.0	—	—	—	—	—
	Fullness	2	0-10	5.0	7.1	1	0	0.0	—	—	—	—	—
Coho	Length	2	485-580	532.5	67.2	1	655	655.0	—	—	—	—	—
salmon[2]	Weight	2	1300-2700	2000.0	989.9	1	3300	3300.0	—	—	—	—	—
	%BW	2	0.0-4.4	2.2	3.1	1	1.3	1.3	—	—	—	—	—
	Fullness	2	5-110	57.5	74.2	1	100	100.0	—	—	—	—	—
Chinook	Length	3	350-552	475.7	109.7	1	335	335.0	—	—	—	—	—
Salmon[1]	Weight	3	550-2150	1483.3	832.7	1	550	550.0	—	—	—	—	—
	%BW	3	0.3-1.7	1.2	0.8	1	1.6	1.6	—	—	—	—	—
	Fullness	3	75-100	83.3	14.4	1	100	100.0	—	—	—	—	—
						Non-salmonids							
Pacific	Length	—	—	—	—	1	535	535.0	—	—	—	—	—
hake	Weight	—	—	—	—	1	900	900.0	—	—	—	—	—
	%BW					1	1.0	1.0	—	—	—	—	—
	Fullness	—	—	—	—	1	50	50.0	—	—	—	—	—
Spiny	Length	—	—	—	—	16	480-685	583.4	51.8	—	—	—	—
dogfish	Weight	—	—	—	—	16	700-1950	1210.0	353.4	—	—	—	—
	%BW	—	—	—	—	16	0.0-10.3	1.5	2.7	—	—	—	—
	Fullness	—	—	—	—	16	0-110	16.1	27.4	—	—	—	—

[1]Immature
[2]Adult

Appendix 1.— Temperature (°C), salinity (PSU), light level (W/m^3), Secchi depth (m), mixed layer depth (MLD, m; see text for definition), and zooplankton and total plankton settled volumes (ml) by haul number at each station sampled in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Triplicate zooplankton samples were taken at the Auke Bay Monitor station each month.

Date	Haul #	Station	Temperature (°C)	Salinity (PSU)	Light level (wt/m^3)	Secchi (m)	MLD (m)	Zoop. SV (ml)	Total SV (ml)
				Northern region					
22 May	11001	ABM	9.4	27.8	724	4.0	6	11.0	16.0
								60.0	63.0
								15.0	20.0
24 May	11002	UCD	8.3	29.6	282	4.0	7	5.0	5.0
24 May	11003	UCC	8.4	29.6	306	5.0	6	7.5	7.5
24 May	11004	UCB	8.1	29.6	257	4.0	7	10.0	10.0
24 May	11005	UCA	8.3	30.1	316	6.0	6	10.0	10.0
24 May	11006	ISA	8.5	30.2	111	5.0	6	6.0	6.0
24 May	11007	ISB	7.7	30.3	204	4.0	6	4.5	4.5
24 May	11008	ISC	8.0	30.5	218	5.0	6	7.0	7.0
24 May	11009	ISD	8.3	30.6	218	7.0	8	8.0	8.0
27 June	11030	ABM	11.9	18.7	643	2.5	6	9.0	9.0
								9.0	9.0
								8.0	8.0
28 June	11031	UCD	11.7	23.8	199	3.0	6	5.0	5.0
28 June	11032	UCC	12.2	22.9	190	3.5	6	10.0	10.0
28 June	11033	UCB	11.9	26.7	445	3.0	6	4.0	4.0
28 June	11034	UCA	12.0	27.1	944	4.0	6	4.0	4.0
28 June	11035	UCA	11.9	27.9	828	4.5	6	4.5	4.5
29 June	11036	ISA	12.7	26.9	366	3.0	6	20.0	20.0
29 June	11037	ISB	12.6	26.5	576	4.5	6	20.0	20.0
29 June	11038	ISC	12.2	25.8	827	5.0	6	9.0	9.0

Appendix 1.—cont.

Date	Haul #	Station	Temperature (°C)	Salinity (PSU)	Light level (wt/m^3)	Secchi (m)	MLD (m)	Zoop. SV (ml)	Total SV (ml)
29 June	11039	ISD	13.6	24.4	774	5.0	6	10.0	10.0
30 June	11040	ISD	12.8	26.3	89	5.0	7	5.0	5.0
30 June	11041	ISC	13.8	24.3	75	5.0	6	3.5	3.5
30 June	11042	ISB	13.3	23.6	264	5.0	6	25.0	25.0
30 June	11043	ISA	12.3	26.3	580	5.0	6	11.0	11.0
30 June	11044	ISA	12.5	25.5	313	4.0	6	20.0	20.0
30 June	11045	ISB	13.3	24.2	216	4.0	6	25.0	25.0
01 July	11046	ISC	13.4	24.9	62	4.0	6	3.5	3.5
01 July	11047	UCB	11.8	27.6	285	5.0	9	2.5	2.5
01 July	11048	UCC	12.1	27.1	418	4.0	6	5.0	5.0
01 July	11049	UCD	12.0	27.4	418	4.5	8	9.0	9.0
01 July	11050	ISD	13.0	24.9	310	4.0	6	5.0	5.0
31 July	11069	ABM	12.5	13.6	297	2.5	6	7.0	14.0
								7.0	14.0
								7.0	14.0
26 July	11070	UCD	12.5	20.9	227	2.0	6	42.0	70.0
26 July	11071	UCC	12.6	22.0	142	2.5	7	35.0	70.0
27 July	11072	UCB	13.0	16.5	221	2.5	7	32.0	50.0
27 July	11073	UCA	12.4	23.0	230	3.0	6	19.5	19.5
27 July	11074	UCD	12.9	20.4	415	2.0	6	40.0	80.0
27 July	11075	UCC	13.0	19.3	472	2.0	6	30.0	60.0
27 July	11076	UCB	12.9	16.2	84	3.5	7	17.5	35.0
27 July	11077	UCA	13.0	16.5	380	3.5	6	18.5	37.0
28 July	11078	ISA	13.1	22.9	34	6.5	6	27.0	54.0
28 July	11079	ISB	12.7	22.8	231	4.5	7	36.0	36.0
28 July	11080	ISC	13.4	19.1	192	3.0	6	21.5	45.0
28 July	11081	ISD	13.5	19.3	241	3.0	6	39.0	80.0
28 July	11082	ISD	13.5	20.6	330	2.5	6	5.0	30.0

Appendix 1.—cont.

Date	Haul #	Station	Temperature (°C)	Salinity (PSU)	Light level (wt/m^3)	Secchi (m)	MLD (m)	Zoop. SV (ml)	Total SV (ml)
29 July	11083	ISD	13.9	15.4	490	3.0	6	43.0	100.0
29 July	11084	ISC	13.6	19.5	508	4.5	7	30.0	60.0
29 July	11085	ISB	13.2	22.7	698	5.0	6	15.0	30.0
29 July	11086	ISA	12.2	24.5	1033	5.5	6	18.0	44.0
29 July	11087	ISB	13.9	22.3	986	5.0	6	20.0	40.0
29 July	11088	ISA	13.1	24.6	280	5.0	6	36.0	72.0
30 July	11089	ISA	13.7	18.5	36	3.0	6	32.5	65.0
30 July	11090	ISB	13.9	17.9	50	3.5	6	23.0	46.0
30 July	11091	ISC	13.7	19.1	113	4.0	6	21.0	42.0
30 July	11092	ISC	13.1	20.2	146	3.5	6	22.5	45.0
30 July	11093	ISD	13.4	20.5	205	3.0	6	50.0	100.0
30 July	11094	UCA	13.6	20.3	95	4.5	6	15.0	30.0
31 July	11095	UCB	13.0	21.7	75	5.5	6	14.0	28.0
31 July	11096	UCC	13.6	20.4	150	6.5	8	9.5	19.0
31 July	11097	UCD	13.1	20.6	198	4.5	10	9.0	18.0
21 August	11098	UCD	14.3	24.7	158	5.0	6	2.5	5.0
21 August	11099	UCC	13.5	24.6	146	5.5	6	3.0	6.5
21 August	11100	ABM	14.3	19.3	182	5.0	6	7.5	18.0
								8.0	20.0
								11.5	24.0
22 August	11101	ISA	13.4	25.1	16	5.0	6	4.5	9.0
22 August	11102	ISB	13.5	24.9	140	6.0	6	2.5	5.0
22 August	11103	ISC	14.0	25.1	236	5.0	7	2.0	4.0
22 August	11104	ISD	14.2	24.9	284	4.0	6	6.5	13.0
22 August	11105	ISD	14.3	25.0	219	5.0	9	4.0	4.0
22 August	11106	ISC	14.3	25.0	128	4.0	6	7.0	13.5
23 August	11107	ISA	13.5	25.3	81	4.5	6	3.0	3.0
23 August	11108	ISB	13.1	26.7	21	5.0	6	8.0	8.0

Appendix 1.—cont.

Date	Haul #	Station	Temperature (°C)	Salinity (PSU)	Light level (wt/m^3)	Secchi (m)	MLD (m)	Zoop. SV (ml)	Total SV (ml)
23 August	11109	UCB	14.4	26.1	42	4.0	6	6.0	12.0
23 August	11110	UCA	13.0	26.6	129	5.0	6	2.0	3.0
				Southern region					
21 June	11010	MCD	10.8	28.5	81	4.5	8	25.0	25.0
21 June	11011	MCB	12.5	26.6	416	3.5	9	35.0	35.0
21 June	11012	MCC	11.6	27.8	664	3.5	7	13.0	13.0
21 June	11013	MCA	12.7	26.2	365	4.0	16	30.0	30.0
22 June	11014	LCD	11.5	26.6	490	4.0	15	25.0	25.0
22 June	11015	LCC	12.4	25.5	389	4.0	7	35.0	35.0
22 June	11016	LCB	12.4	25.7	444	3.5	7	28.0	28.0
22 June	11017	LCA	13.0	25.4	172	3.5	6	100.0	100.0
23 June	11018	LCD	11.7	27.2	144	5.0	7	30.0	30.0
23 June	11019	LCC	12.0	27.2	239	4.5	7	28.0	28.0
23 June	11020	LCB	12.1	27.5	414	4.0	8	60.0	60.0
23 June	11021	LCA	12.4	25.4	394	4.0	12	60.0	60.0
23 June	11022	LCA	12.0	26.0	897	5.0	10	80.0	80.0
23 June	11023	LCB	12.5	27.5	780	5.0	6	28.0	28.0
24 June	11024	LCC	11.7	24.1	185	5.5	7	23.0	23.0
24 June	11025	LCD	13.3	26.5	85	5.0	6	11.0	11.0
24 June	11026	MCB	12.9	25.9	789	5.0	17	60.0	60.0
24 June	11027	MCA	13.8	25.0	370	4.5	7	35.0	35.0
25 June	11028	MCC	13.0	25.2	97	4.0	12	30.0	30.0
25 June	11029	MCD	12.8	27.5	131	4.0	8	25.0	25.0
23 July	11051	MCA	15.2	24.3	198	4.5	10	4.5	6.0
23 July	11052	MCB	15.3	24.5	139	4.0	7	6.5	13.0
20 July	11053	MCC	12.6	26.1	370	5.0	8	5.5	11.0
20 July	11054	MCD	13.0	26.3	89	5.0	6	3.5	7.0

Appendix 1.—cont.

Date	Haul #	Station	Temperature (°C)	Salinity (PSU)	Light level (wt/m^3)	Secchi (m)	MLD (m)	Zoop. SV (ml)	Total SV (ml)
21 July	11055	LCA	14.8	24.6	421	5.5	6	3.0	6.0
21 July	11056	LCB	15.7	24.6	596	5.0	7	2.5	2.5
21 July	11057	LCC	14.5	25.2	324	4.5	6	7.0	10.0
22 July	11058	LCD	14.3	25.4	85	4.5	6	3.0	6.0
22 July	11059	LCA	15.7	22.4	149	3.5	6	6.0	10.0
22 July	11060	LCB	14.9	24.0	105	4.0	7	7.0	10.0
22 July	11061	LCC	15.0	23.7	168	4.0	6	2.0	4.0
22 July	11062	LCD	13.7	26.0	255	5.0	8	6.0	6.0
23 July	11063	LCD	13.2	26.1	149	3.0	6	4.5	4.5
23 July	11064	LCC	13.7	25.8	325	4.0	9	4.0	8.0
23 July	11065	LCB	13.7	23.6	1152	5.5	7	10.0	10.0
23 July	11066	LCA	15.5	23.6	741	6.5	7	4.0	8.0
24 July	11067	MCA	15.1	23.7	25	4.5	11	4.0	8.0
24 July	11068	MCB	14.9	24.0	121	5.5	9	5.0	10.0

Appendix 2.—Catch and life history stage of salmonids captured in marine waters of the northern and southern regions of southeastern Alaska, June–August 2007.

			Juvenile salmon					Immature and adult salmon				
Date	Haul #	Station	Pink	Chum	Sockeye	Coho	Chinook	Pink	Chum	Sockeye	Coho	Chinook
						Northern region						
28 June	11031	UCD	0	0	1	22	3	0	0	0	0	0
28 June	11032	UCC	0	0	1	38	3	0	0	0	0	0
28 June	11033	UCB	0	0	1	27	3	0	0	0	0	0
28 June	11034	UCA	0	1	3	12	0	0	0	0	0	1
28 June	11035	UCA	0	0	2	7	0	0	0	0	0	0
29 June	11036	ISA	0	0	0	0	0	0	0	1	0	0
29 June	11037	ISB	1	14	3	12	0	0	0	0	0	0
29 June	11038	ISC	0	29	7	6	1	0	0	0	0	2
29 June	11039	ISD	0	7	2	20	0	0	0	0	0	0
30 June	11040	ISD	0	0	3	8	1	0	0	0	0	0
30 June	11041	ISC	0	12	5	14	0	0	0	0	0	1
30 June	11042	ISB	5	38	31	25	0	0	0	0	0	0
30 June	11043	ISA	1	14	19	5	0	0	0	0	0	0
30 June	11044	ISA	0	2	10	4	0	1	0	0	0	1
30 June	11045	ISB	0	2	5	3	0	0	0	0	0	2
01 July	11046	ISC	8	22	9	52	0	0	0	0	0	0
01 July	11047	UCB	0	0	4	9	0	0	0	0	0	0
01 July	11048	UCC	0	1	1	4	1	0	0	0	0	1
01 July	11049	UCD	0	5	1	11	0	0	0	0	0	1
01 July	11050	ISD	0	7	18	68	2	0	0	0	0	0
26 July	11070	UCD	1	0	0	1	0	0	0	0	0	0
26 July	11071	UCC	1	3	6	15	0	0	0	0	0	0
27 July	11072	UCB	0	2	1	5	0	0	0	0	0	0
27 July	11073	UCA	0	0	0	14	0	0	0	0	0	0

Appendix 2.—cont.

Date	Haul #	Station	Juvenile salmon					Immature and adult salmon				
			Pink	Chum	Sockeye	Coho	Chinook	Pink	Chum	Sockeye	Coho	Chinook
27 July	11074	UCD	1	1	4	4	1	4	1	2	0	0
27 July	11075	UCC	0	0	0	6	1	3	0	0	0	1
27 July	11076	UCB	1	1	1	1	1	3	0	0	0	0
27 July	11077	UCA	0	2	3	8	1	0	0	0	0	0
28 July	11078	ISA	0	0	0	5	0	1	0	0	0	0
28 July	11079	ISB	1	0	1	1	0	1	0	0	0	1
28 July	11080	ISC	0	1	0	1	0	0	0	0	1	1
28 July	11081	ISD	46	47	9	2	0	0	0	0	0	0
28 July	11082	ISD	12	21	7	3	0	0	0	0	0	0
29 July	11083	ISD	2	8	3	2	0	2	0	0	0	0
29 July	11084	ISC	1	6	3	0	0	0	0	1	0	1
29 July	11085	ISB	4	7	1	6	0	0	0	0	0	0
29 July	11086	ISA	1	9	2	4	0	0	0	0	0	0
29 July	11087	ISB	1	18	9	1	0	1	0	0	0	0
29 July	11088	ISA	8	17	6	4	0	0	0	0	0	0
30 July	11089	ISA	27	50	6	2	0	3	0	0	0	1
30 July	11090	ISB	0	6	1	1	0	1	1	0	0	0
30 July	11091	ISC	8	23	19	5	1	0	0	0	0	0
30 July	11092	ISC	5	2	1	0	0	1	0	0	0	0
30 July	11093	ISD	8	2	2	0	0	0	0	0	0	0
30 July	11094	UCA	21	7	6	8	0	3	0	0	0	0
31 July	11095	UCB	24	17	8	6	1	2	0	0	0	0
31 July	11096	UCC	0	2	0	3	0	1	0	0	0	0
21 August	11098	UCD	2	1	1	3	0	0	0	0	0	0
21 August	11099	UCC	9	8	4	4	0	0	0	0	0	1
22 August	11101	ISA	12	14	1	3	0	2	1	0	1	0
22 August	11102	ISB	9	15	2	8	0	0	0	0	0	0
22 August	11103	ISC	8	30	0	6	0	0	0	0	0	1

Appendix 2.—cont.

Date	Haul #	Station	Juvenile salmon					Immature and adult salmon				
			Pink	Chum	Sockeye	Coho	Chinook	Pink	Chum	Sockeye	Coho	Chinook
22 August	11104	ISD	10	9	3	8	0	1	0	0	0	0
22 August	11105	ISD	8	2	1	5	0	0	0	0	0	0
22 August	11106	ISC	14	18	2	19	2	0	0	0	0	0
23 August	11107	ISA	1	4	0	2	0	0	0	0	0	0
23 August	11108	ISB	80	19	3	4	0	0	0	0	2	0
23 August	11109	UCB	6	4	0	16	0	2	0	0	1	0
23 August	11110	UCA	2	1	2	8	0	2	1	0	0	0
Southern region												
21 June	11010	MCD	0	0	0	2	0	0	0	0	0	0
21 June	11011	MCB	0	0	1	5	0	0	0	0	0	0
21 June	11013	MCA	0	0	3	4	0	0	0	0	0	1
22 June	11014	LCD	1	1	73	4	0	0	1	0	0	0
22 June	11015	LCC	7	6	72	7	1	0	0	0	0	0
22 June	11016	LCB	8	15	31	10	0	0	0	0	0	0
22 June	11017	LCA	4	2	14	7	2	0	0	0	0	0
23 June	11019	LCC	0	1	0	3	1	0	0	0	1	0
23 June	11020	LCB	0	0	13	7	1	0	0	0	0	1
23 June	11021	LCA	1	0	5	15	1	0	0	0	1	0
23 June	11022	LCA	0	10	42	15	0	0	0	0	0	0
23 June	11023	LCB	0	0	45	8	1	0	0	0	0	0
24 June	11024	LCC	0	0	11	7	0	0	0	0	0	0
24 June	11025	LCD	0	0	2	2	0	0	0	0	0	0
24 June	11026	MCB	26	82	21	6	0	0	0	0	0	0
24 June	11027	MCA	26	103	39	9	0	0	0	0	0	0
25 June	11028	MCC	60	177	11	1	0	0	0	0	0	1
25 June	11029	MCD	60	100	15	20	2	0	1	0	0	0
20 July	11053	MCC	0	2	0	5	0	1	0	0	0	0

Appendix 2.—cont.

Date	Haul #	Station	Juvenile salmon					Immature and adult salmon				
			Pink	Chum	Sockeye	Coho	Chinook	Pink	Chum	Sockeye	Coho	Chinook
21 July	11055	LCA	0	0	0	7	0	1	0	0	0	0
21 July	11056	LCB	9	14	0	0	0	1	0	0	0	0
21 July	11057	LCC	7	29	1	0	0	1	0	0	0	0
22 July	11058	LCD	184	100	2	0	0	0	0	0	0	0
22 July	11059	LCA	0	2	0	1	0	0	0	0	0	0
22 July	11060	LCB	2	6	0	3	1	0	0	0	0	0
22 July	11061	LCC	0	0	0	1	0	0	0	0	0	0
22 July	11062	LCD	1	11	2	4	0	0	0	0	0	0
23 July	11051	MCA	2	3	0	0	0	0	0	0	1	0
23 July	11052	MCB	0	0	0	1	0	0	0	0	0	0
23 July	11063	LCD	0	1	0	1	0	0	1	0	0	0
23 July	11064	LCC	1	7	0	2	0	0	0	0	0	1
23 July	11066	LCA	0	0	0	1	0	1	0	0	0	0
24 July	11067	MCA	3	2	0	0	0	0	0	0	0	0

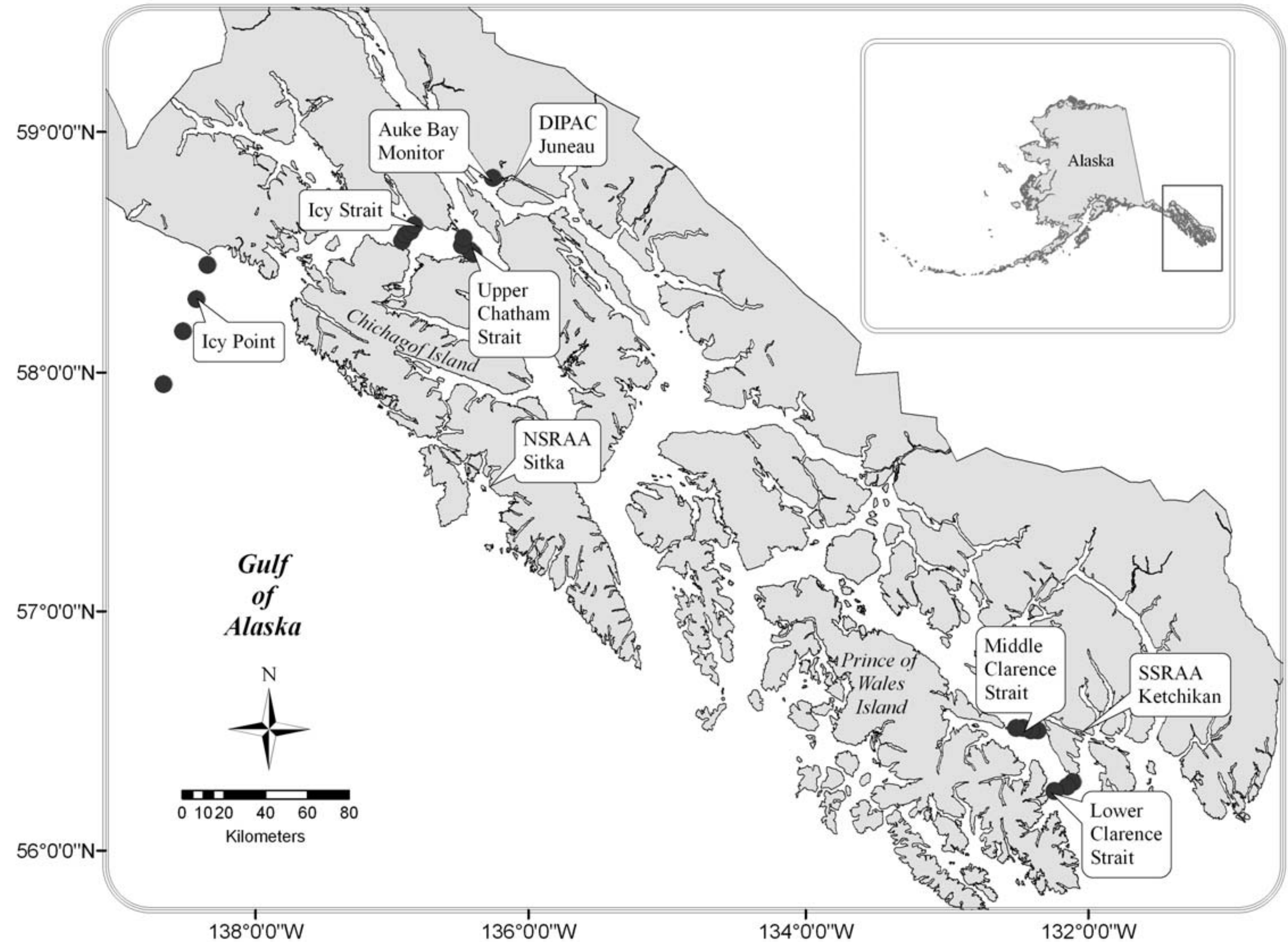

Figure 1.—Stations sampled in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Transect and station coordinates are shown in Table 1.

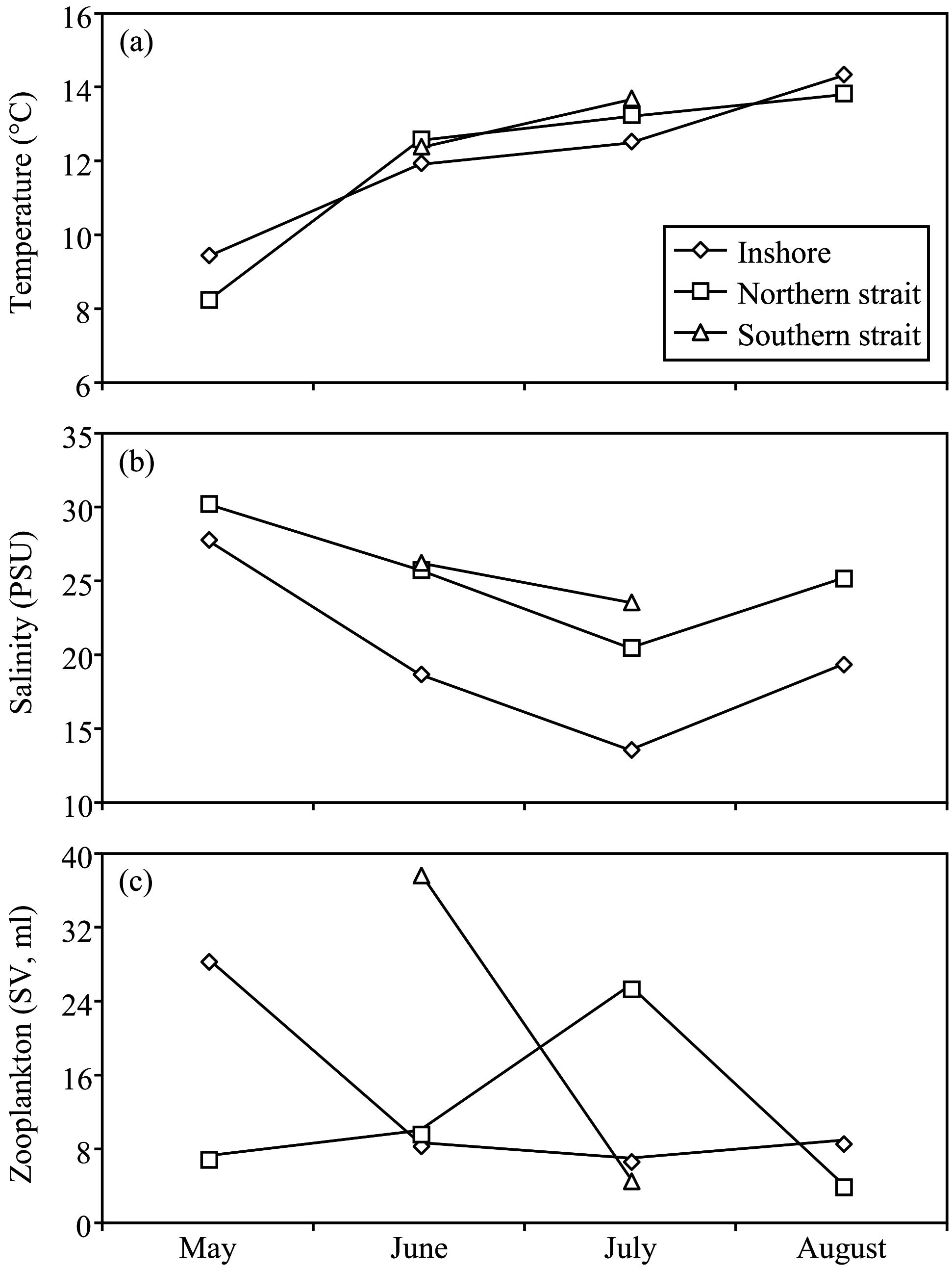

Figure 2.—Surface (mean, 3-m) temperature (a), salinity (b), and 20-m zooplankton settled volumes from vertical NORPAC hauls (c) in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Zooplankton standing stock (ml/m^3) can be computed by dividing by water volume filtered, a constant factor of 3.9 m^3 for these samples.

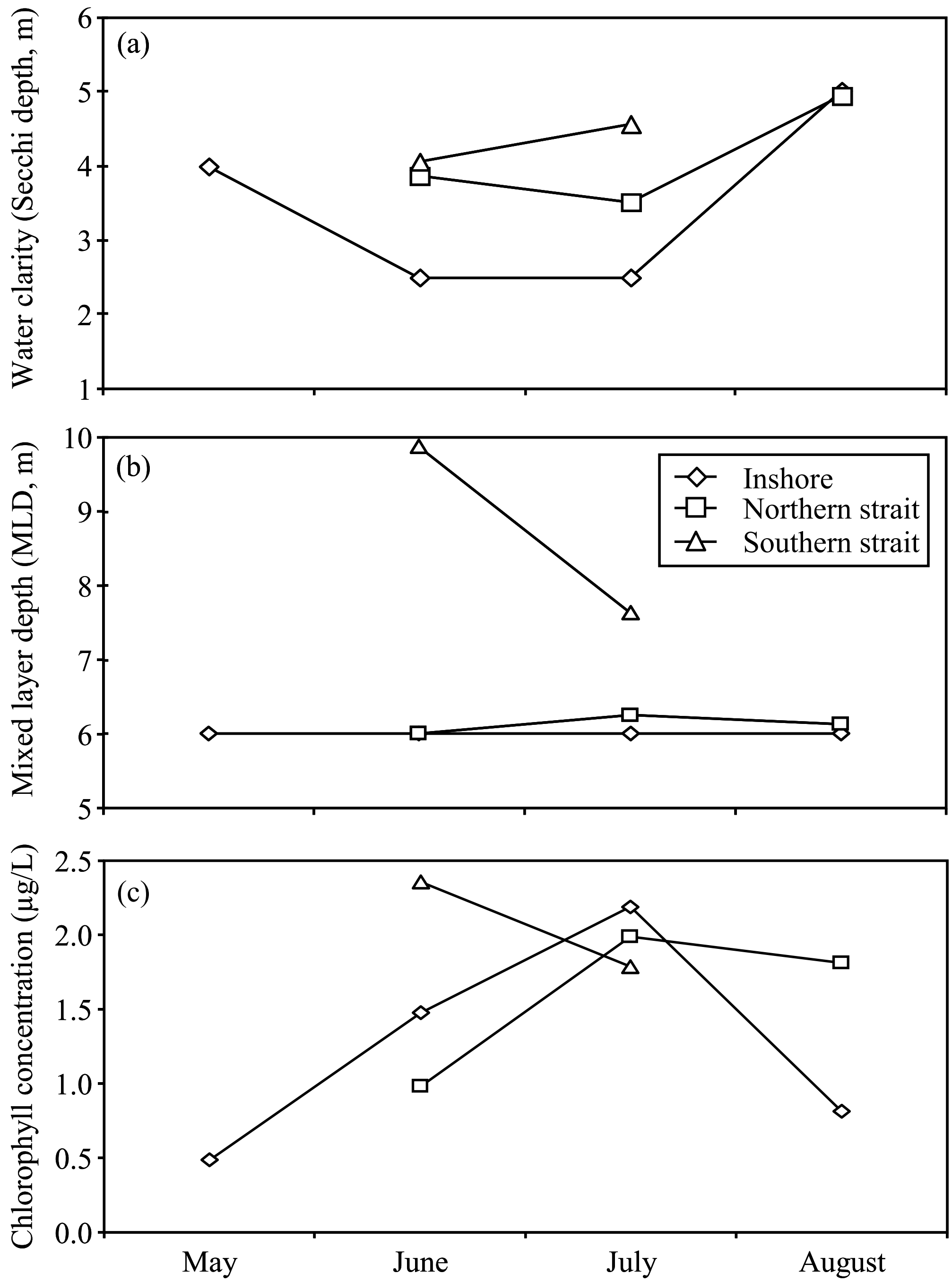

Figure 3.—Water clarity (a) as mean depth (m) of Secchi disappearance, mean chlorophyll concentration (µg/L) from surface water samples (b), and mixed layer depth (MLD, m) calculated from CTD profiles (c) in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Monthly values are represented by the subset of hauls with water samples ($n = 4$), but MLD and SV means from the larger dataset were similar (see Appendix 1).

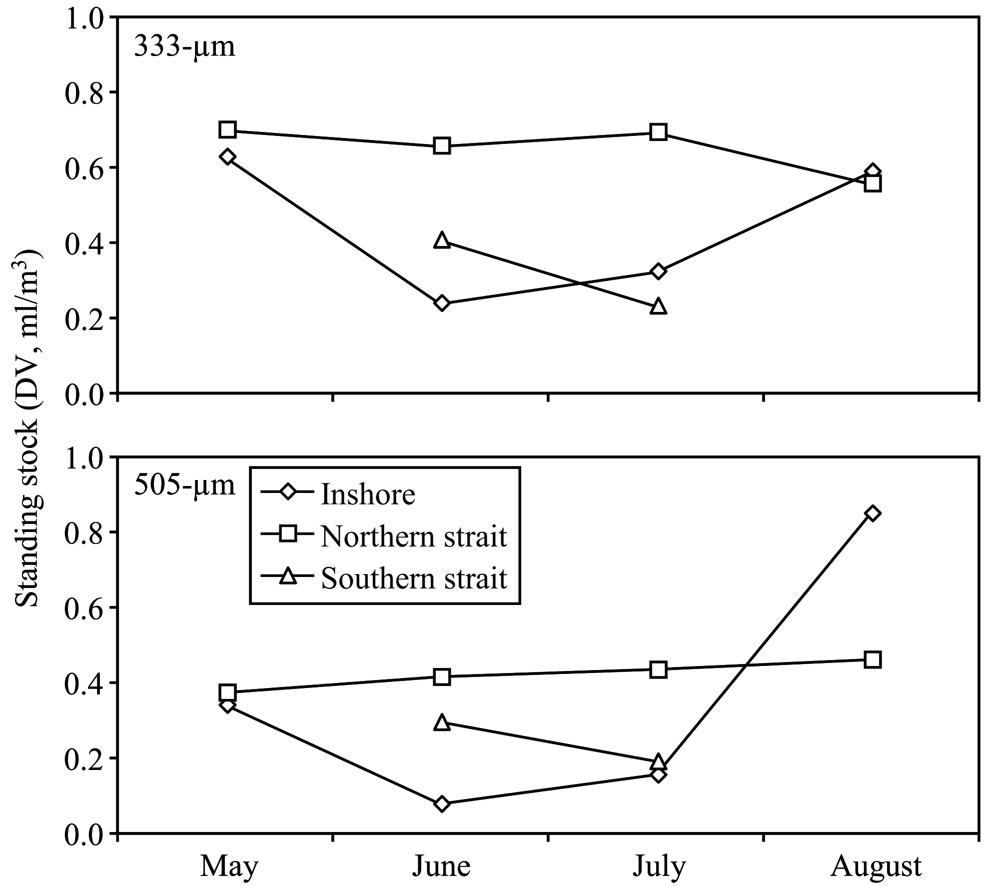

Figure 4.—Monthly zooplankton standing stock (mean ml/m^3, ± 1 standard error) from 333-µm and 505-µm mesh double oblique bongo net samples hauled from ≤ 200 m depths in marine waters of the northern and southern regions of southeastern Alaska, May–August 2007. Strait habitat is represented by Lower Clarence Strait in the southern region and by Icy Strait in the northern region; inshore habitat is represented by Auke Bay Monitor in the northern region.

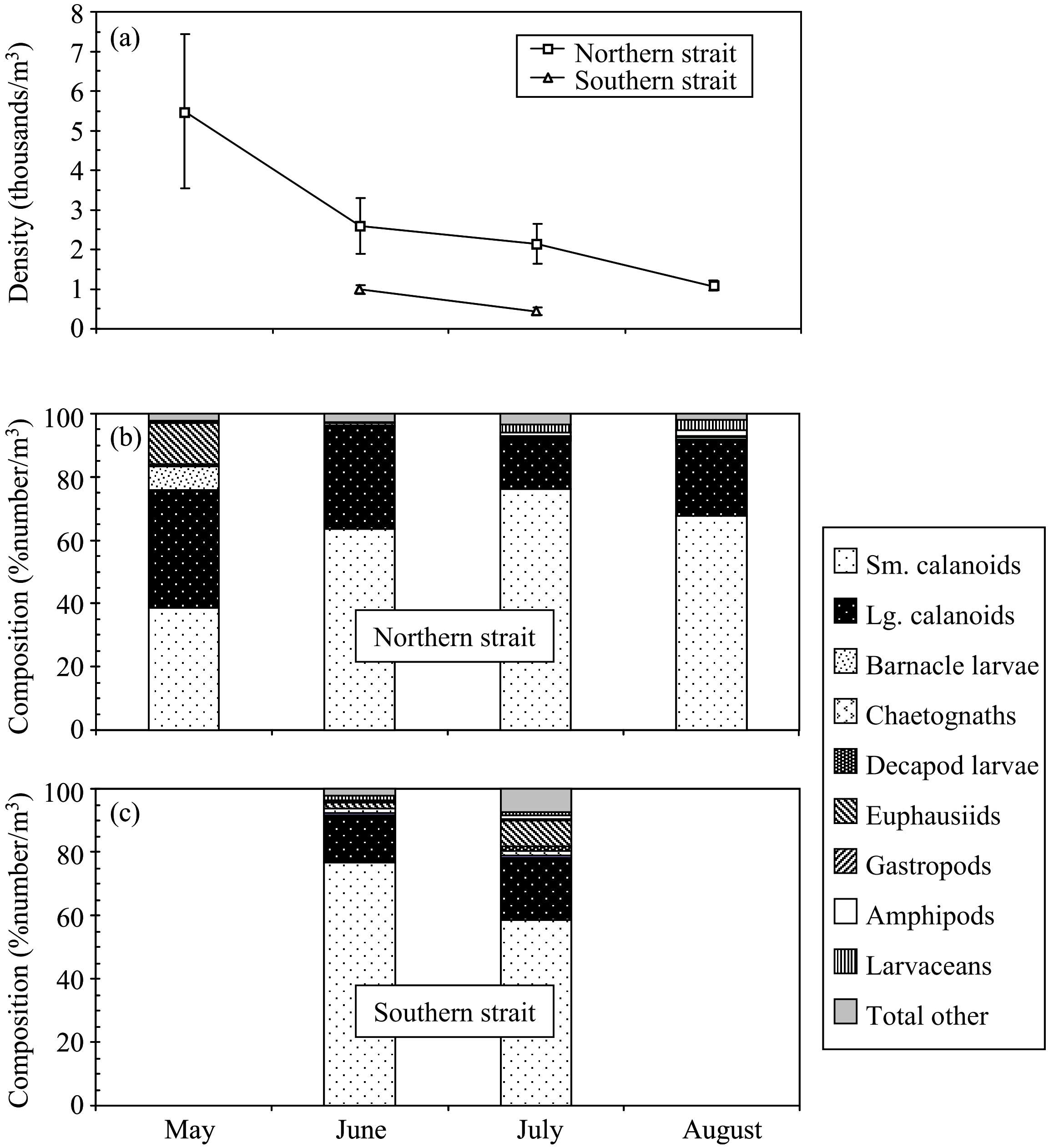

Figure 5.—Monthly "deep" (≤200 m depth) zooplankton collected in marine waters of the southern and northern regions of southeastern Alaska, May–August 2007. Data include (a) mean total density of organisms (thousands/m^3) ± 1 standard error, and (b), (c) taxonomic composition (mean percent/m^3). Samples were collected using a 333-μm mesh bongo net towed in double oblique fashion during daylight, except in May when they were collected near midnight. The northern region is represented by Icy Strait (n = 4 stations) and the southern region is represented by Lower Clarence Strait (n = 4 stations) each month.

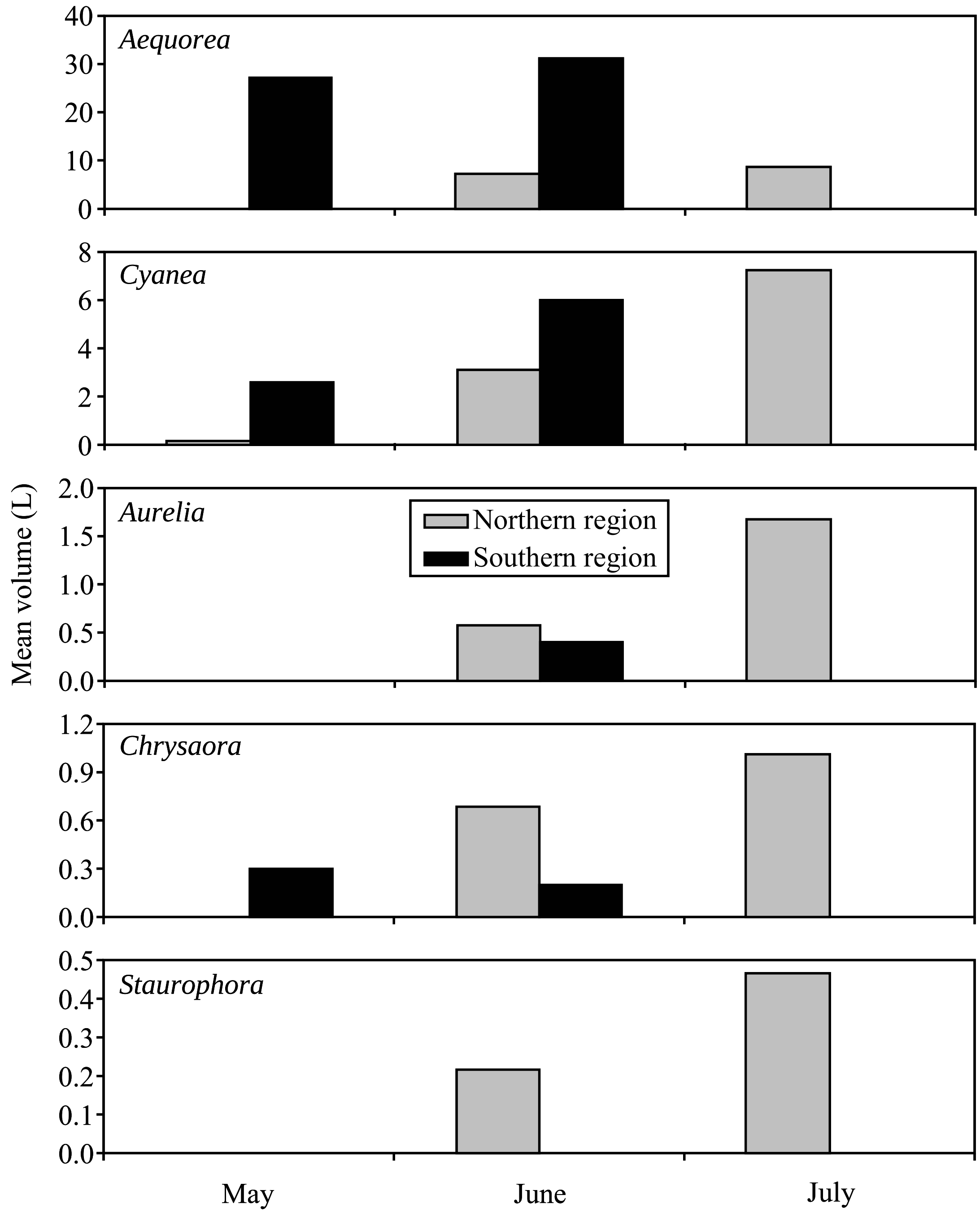

Figure 6.—Mean volume of jellyfish captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. No sampling was conducted in the southern region in August.

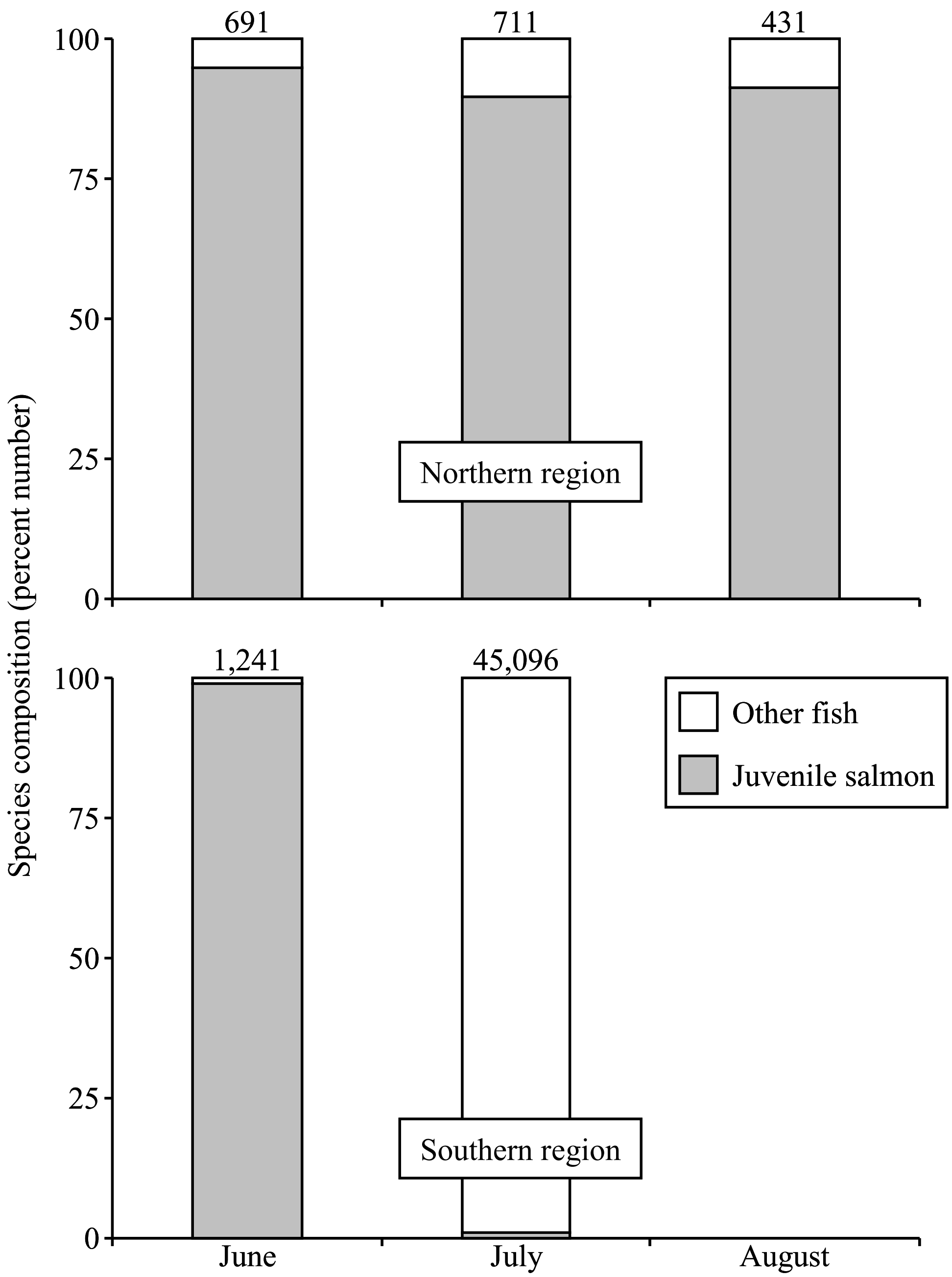

Figure 7.—Fish composition from rope trawl catches in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Number of fish is indicated above each bar. No sampling was conducted in the southern region in August.

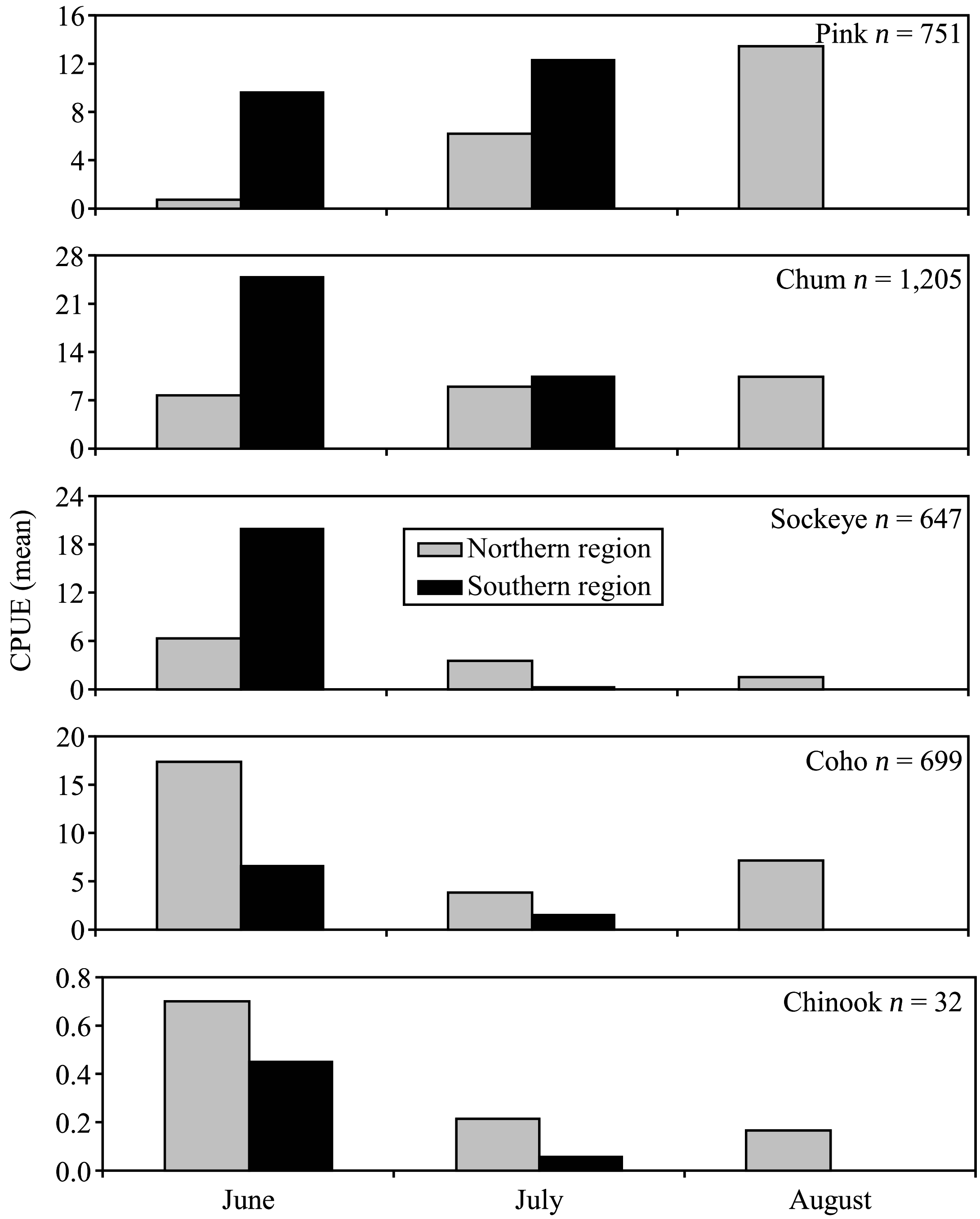

Figure 8.—Mean catch per rope trawl haul (CPUE) of juvenile salmon in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August, 2007. Total catch is indicated for each species. No sampling was conducted in the southern region in August.

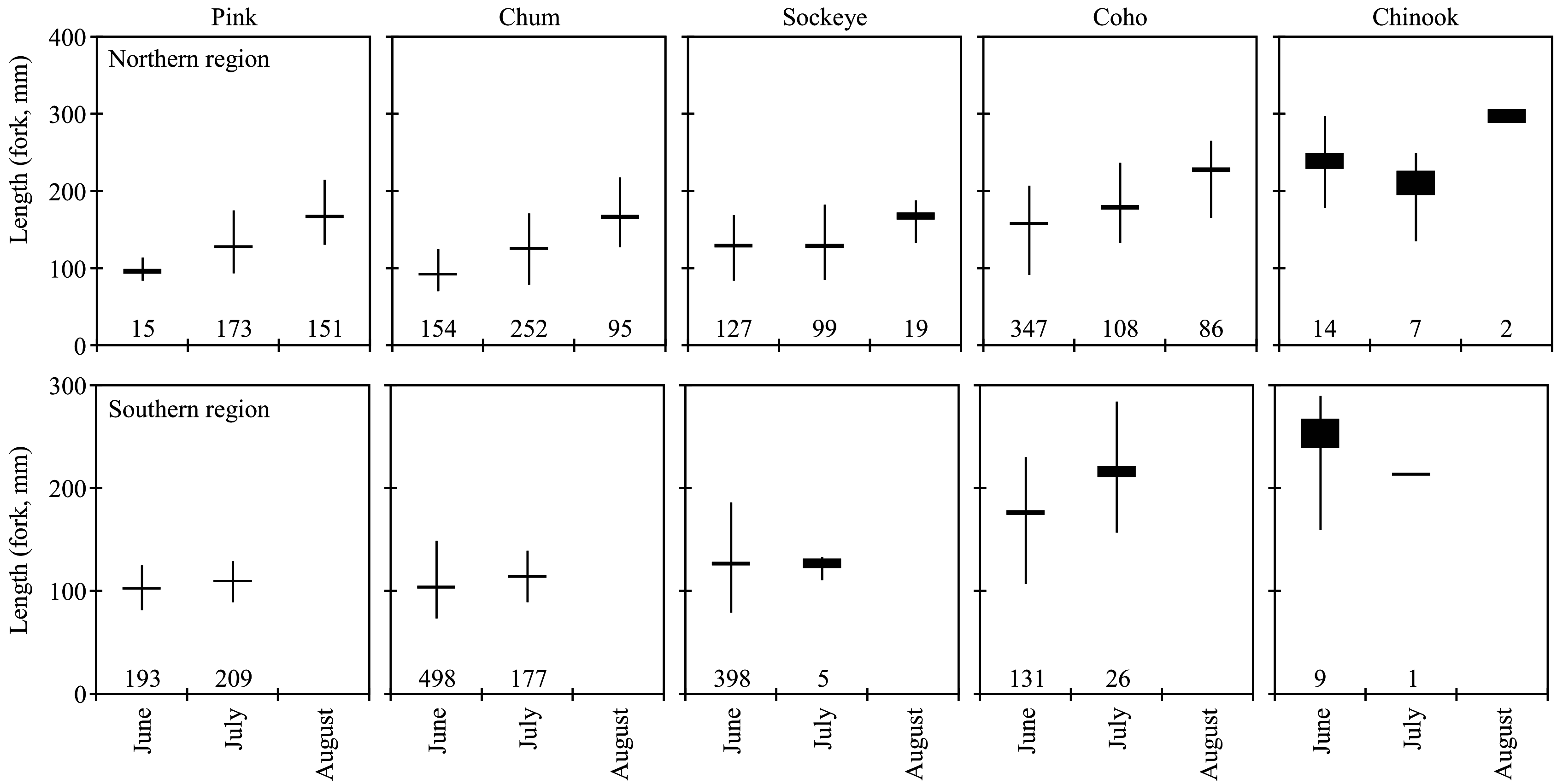

Figure 9.—Length (mm, fork) of juvenile salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Length of vertical bars is the size range for each sample, and the boxes within the size range are one standard error on either side of the mean. Sample sizes are reported for each month. No sampling was conducted in the southern region in August.

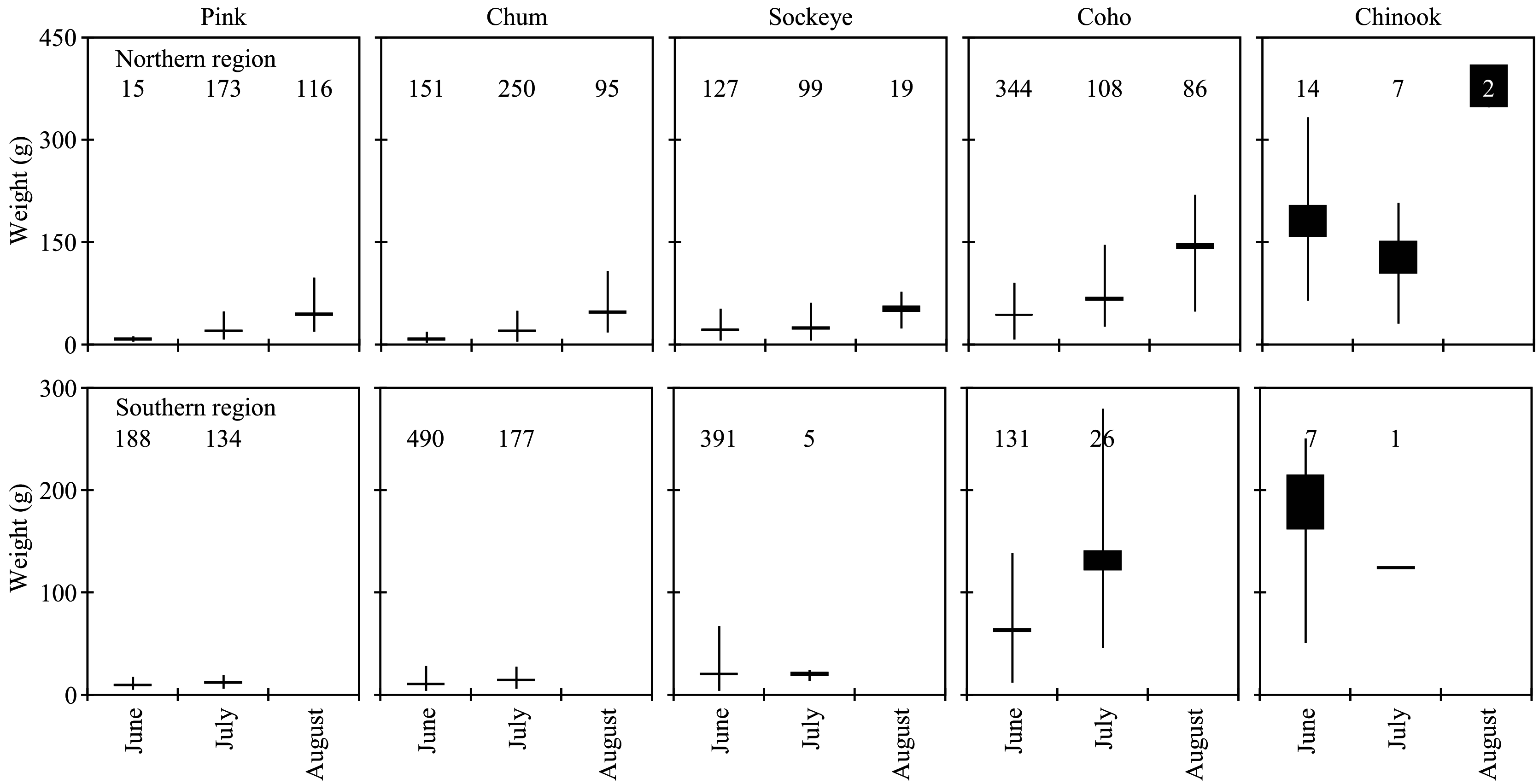

Figure 10.—Weight (g) of juvenile salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Length of vertical bars is the size range for each sample, and the bars within the size range are one standard error on either side of the mean. Sample sizes are reported for each month. No sampling was conducted in the southern region in August.

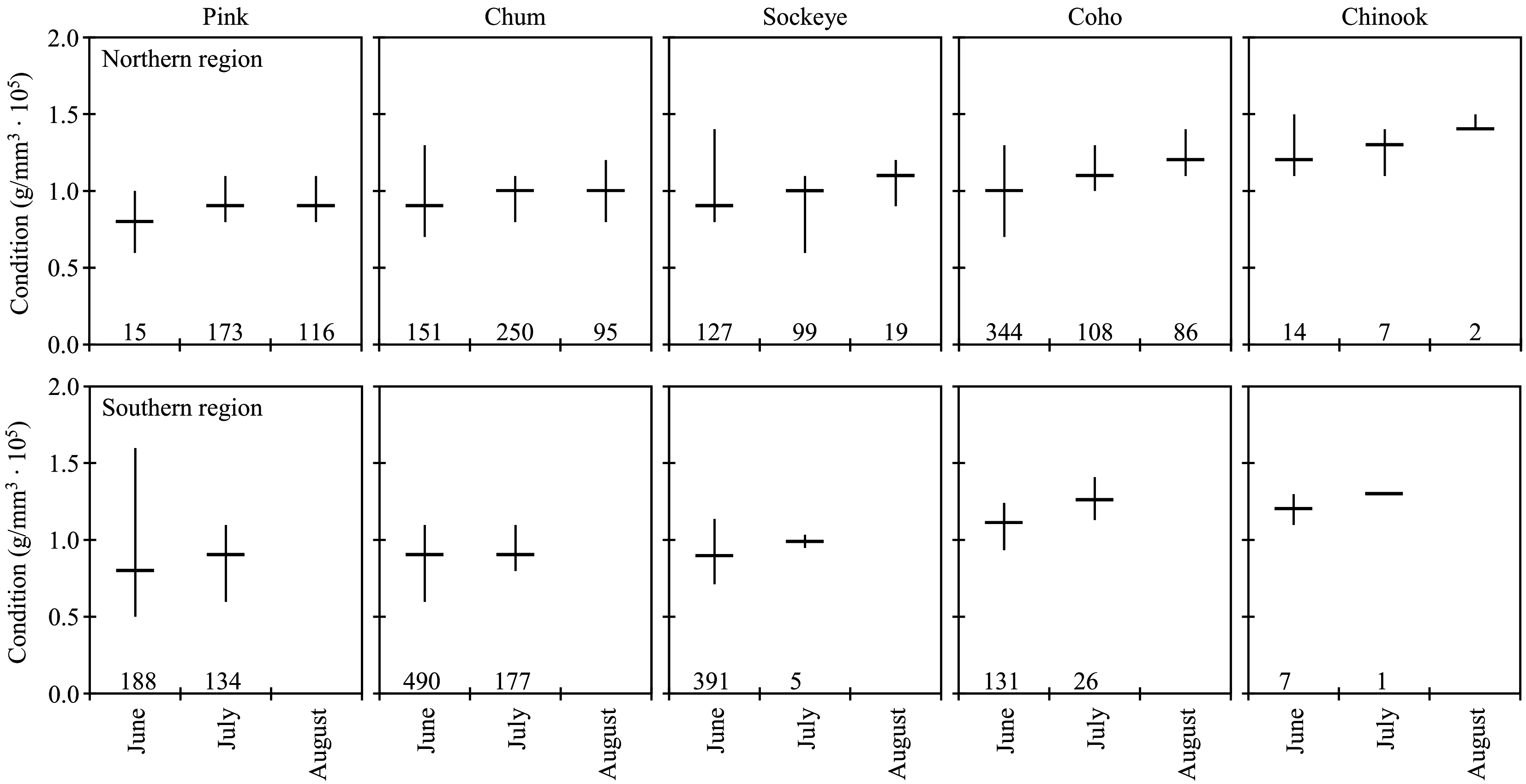

Figure 11.—Fulton's condition ($g/mm^3 \cdot 10^5$) of juvenile salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Length of vertical bars is the size range for each sample, and the boxes within the size range are one standard error on either side of the mean. Sample sizes are reported for each month. No sampling was conducted in the southern region in August.

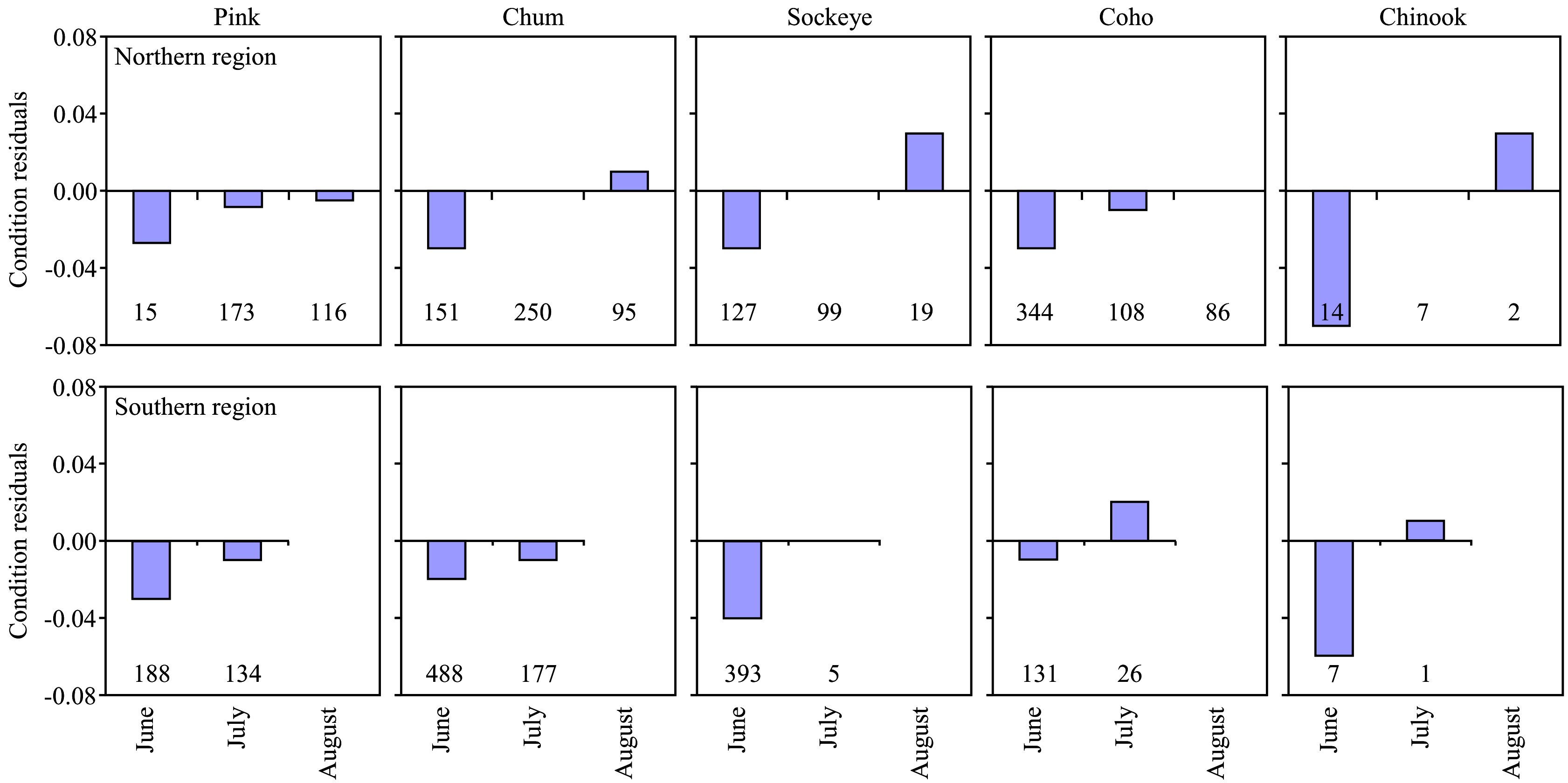

Figure 12.—Condition residuals from length-weight regression analysis of juvenile salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. The 2007 condition residuals are calculated as the average deviation from the long term (1997-2006) length/weight regression equation. No sampling was conducted in the southern region in August.

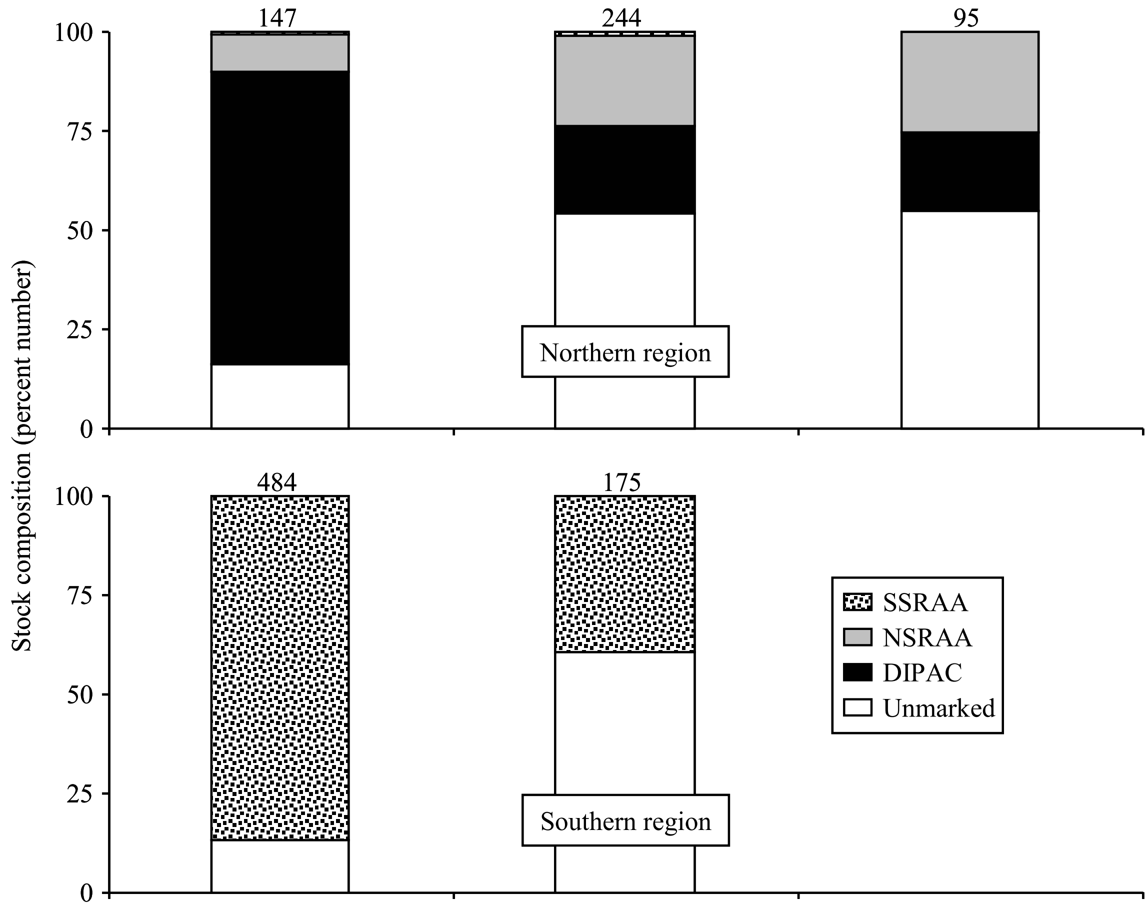

Figure 13.—Monthly stock composition of juvenile chum salmon based on otolith thermal marks in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Number of salmon sampled per month and region is indicated above each bar. No sampling was conducted in the southern region in August.

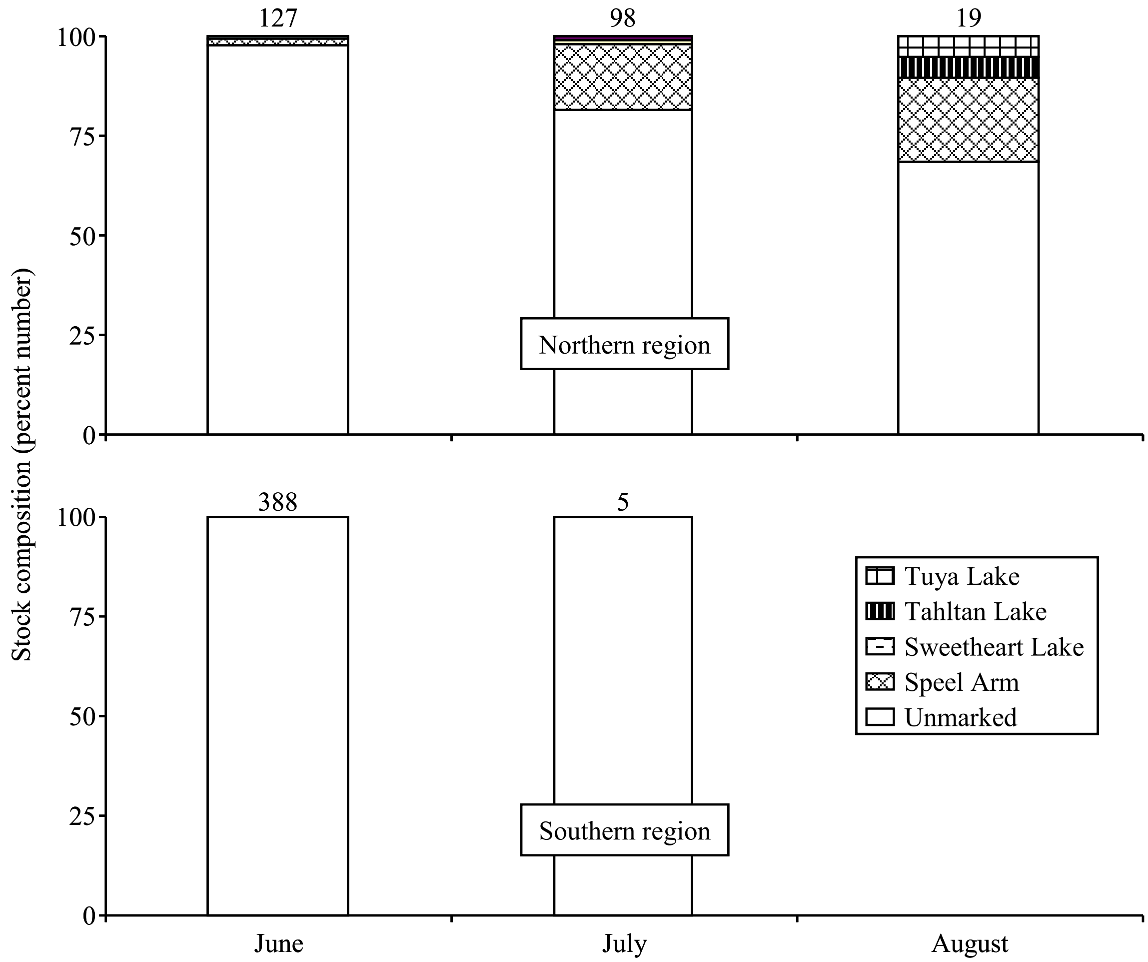

Figure 14.—Monthly stock composition of juvenile sockeye salmon based on otolith thermal marks in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Number of salmon sampled per month and region is indicated above each bar. No sampling was conducted in the southern region in August.

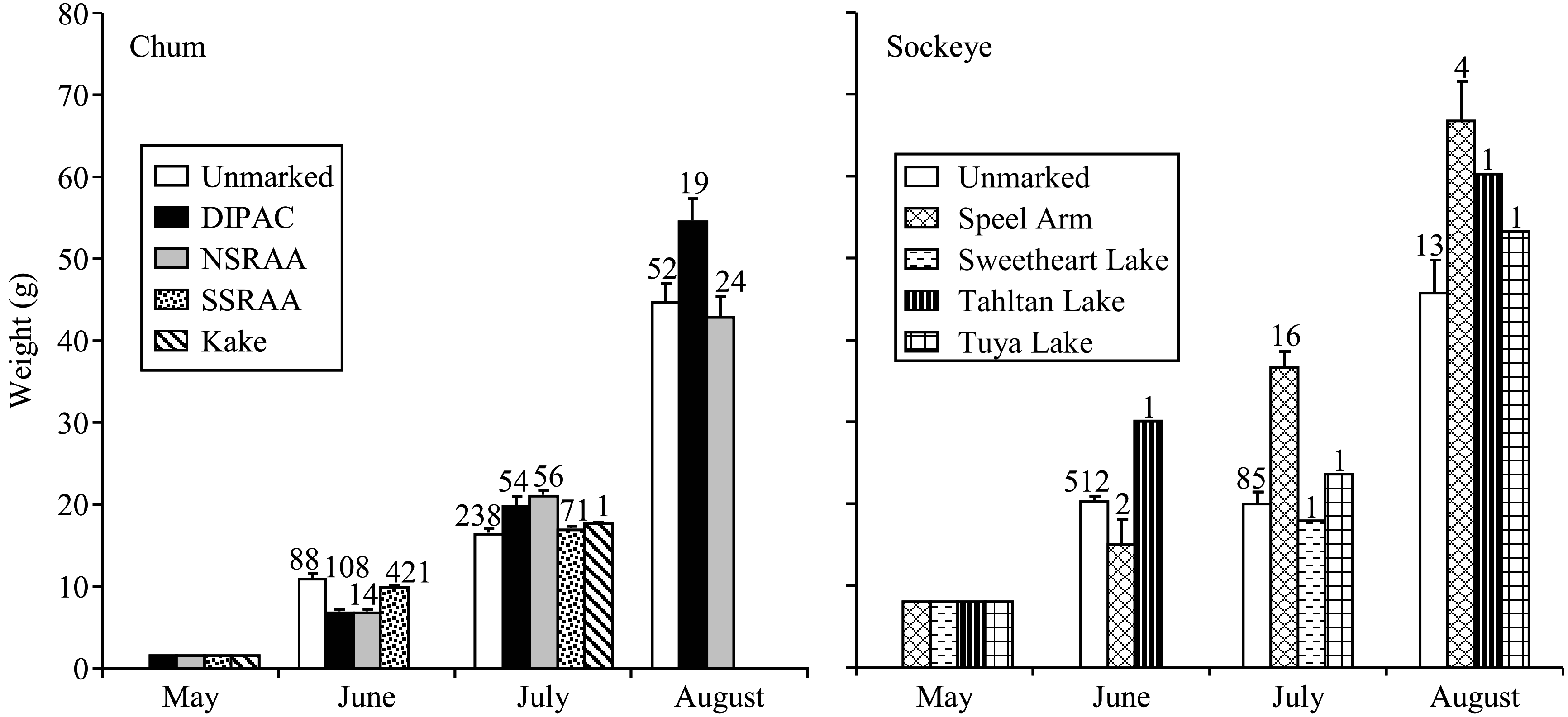

Figure 15.—Stock-specific growth trajectories of juvenile chum and sockeye salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Weights of May fish are mean values at time of hatchery release. The sample sizes and the standard error of the mean are indicated above each bar.

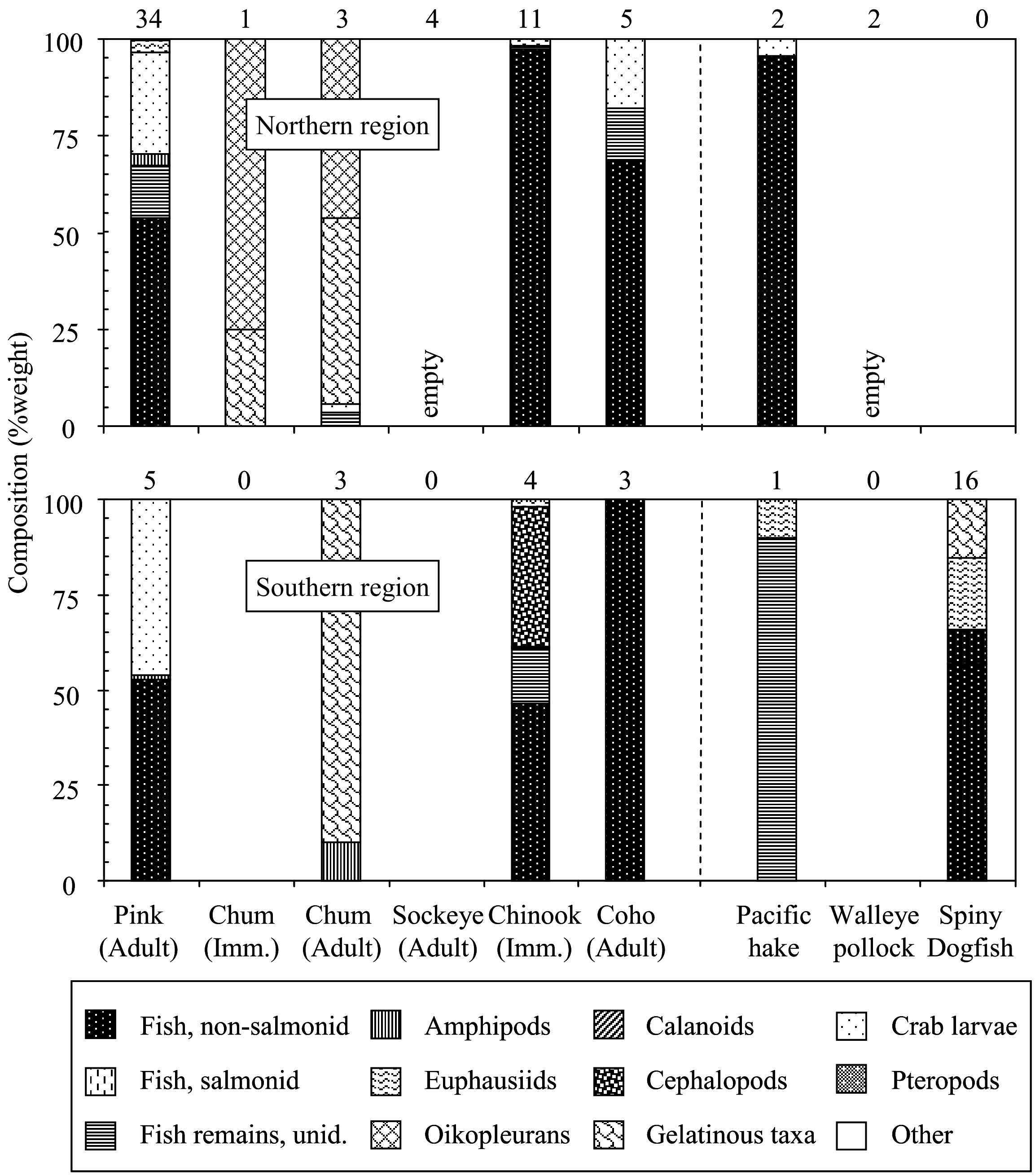

Figure 16.—Prey composition of potential predators of juvenile salmon captured in marine waters of the northern and southern regions of southeastern Alaska by rope trawl, June–August 2007. Panels are divided by dashed lines to show salmon on the left, non-salmon on the right. The numbers of fish examined for each species are shown above the bars; species with only empty stomachs are indicated. See Table 20 for additional feeding attributes.