

**Annual Survey of Juvenile Salmon, Ecologically-Related Species,
and Environmental Factors in the Marine Waters of
Southeastern Alaska, May–August 2010**

by

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Submitted to the

NORTH PACIFIC ANADROMOUS FISH COMMISSION

by

the United States of America

October 2011

THIS PAPER MAY BE CITED IN THE FOLLOWING MANNER:

Orsi, J. A., E. A. Fergusson, M. V. Sturdevant, W. R. Heard, and E. V. Farley, Jr..
2011. Annual Survey of Juvenile Salmon, Ecologically-Related Species, and
Environmental Factors in the Marine Waters of Southeastern Alaska, May–August
2010. NPAFC Doc. 1342, 87 pp. (Available at <http://www.npafc.org>).

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ABSTRACT

Juvenile Pacific salmon (*Oncorhynchus* spp.), ecologically-related species, and associated environmental (biophysical) data were collected from the marine waters of the northern region of southeastern Alaska in 2010. This annual survey, conducted by the Southeast Coastal Monitoring (SECM) project, marks 14 consecutive years of systematically monitoring how juvenile salmon utilize in marine ecosystems, and was implemented to identify the relationships among biophysical parameters that influence habitat use, marine growth, predation, stock interactions, and year-class strength of juvenile salmon. This report also contrasts the 2010 findings with selected biophysical parameters from the prior 13 sampling years. Up to 13 stations were sampled in epipelagic waters monthly, totaling 21 sampling days, from May to August. Fish, zooplankton, surface water samples, and physical profile data were typically collected during daylight at each station using a surface rope trawl, conical and bongo nets, a water sampler, and a conductivity-temperature-depth profiler. Surface (3-m) temperatures and salinities ranged from approximately 9 to 14 °C and 17 to 32 PSU from May to August. More than 39,000 fish, representing 26 taxa, were captured in 67 rope trawl hauls fished from June to August. Juvenile salmon comprised about 97% of the total fish catch. Juvenile pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), and coho (*O. kisutch*) salmon occurred in 71–87% of the trawls, while juvenile Chinook salmon (*O. tshawytscha*) occurred in 9% of the hauls. Unusually high numbers of juvenile salmon were captured in strait habitat in both June and July, although CPUE was greatest in June for all species except sockeye salmon. Coded-wire tags were recovered from 15 juvenile coho salmon and one juvenile Chinook salmon from hatchery and wild stocks originating in southeastern Alaska and Washington. Alaska enhanced stocks were also identified by thermal otolith marks from 67% of the chum and 16% of the sockeye salmon examined. Onboard stomach analysis revealed predation on highly abundant juvenile salmon by adult coho salmon, a common predator, and adult pink salmon, a rare predator. Biophysical measures from 2010 differed from prior years, in many respects. May integrated (20-m) temperature anomalies were generally positive and salinity anomalies were generally negative; in particular, the positive May temperature anomaly was the highest on record. Zooplankton monthly total densities were near longterm averages, reversing the trend for strongly positive anomalies over the past four years. For juvenile pink, chum, and sockeye salmon, low condition residuals in June were followed by small size and low energy density in July. Regional biophysical data from SECM are used in conjunction with basin-scale biophysical parameters to forecast pink salmon harvest in southeastern Alaska. Longterm 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 roles in North Pacific marine ecosystems.

INTRODUCTION

The Southeast Coastal Monitoring (SECM) project, an ecosystem study focused in the northern region of southeastern Alaska (SEAK), 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 (Downton and Miller 1998; Beauchamp et al. 2007; Farley et al. 2007; Taylor 2007). In particular, climate variables such as temperature have been associated with ocean production and survival of salmon; for example, warming trends benefited many wild and hatchery stocks of Alaskan salmon or enhanced their food supplies (Wertheimer et al. 2001; Beauchamp et al. 2007). Biophysical attributes of climate and habitat, such as temperature, salinity, and mixed layer depth, affect primary and secondary production (Bathen 1972; Kara et al. 2000; Alexander et al. 2001) and therefore may influence the trophic links leading to variable growth and survival of salmon (Mann and Lazier 1991; Francis et al. 1998; Brodeur et al. 2007). However, research is lacking on the links between salmon production and climate variability, intra- and interspecific competition and carrying capacity, and biological interactions among stock groups. In addition, past research has not provided adequate time series data to explain these links (Pearcy 1997; Beamish et al. 2008). Regional salmon production has increased over the last few decades, emphasizing the importance of understanding the consequences of population changes and potential interactions on the growth, distribution, migratory rates, and survival of all salmon stock groups.

A goal of the SECM project is to identify mechanisms linking salmon production to climate change using a time series of synoptic data on salmon and the ocean conditions they experience, including salmon stock-specific life history characteristics. The SECM project obtains stock information from coded-wire tags (CWT; Jefferts et al. 1963) and otolith thermal marks (Hagen and Munk 1994; Courtney et al. 2000) from five Pacific salmon species: pink (*O. gorbuscha*), chum (*O. keta*), sockeye (*O. nerka*), coho (*O. kisutch*), and Chinook (*O. tshawytscha*). Portions of wild and hatchery salmon stocks are tagged or marked prior to ocean entry by enhancement facilities or state and federal agencies in southeastern Alaska, Canada, and the Pacific Northwest. Catches of these marked fish by the SECM project in the northern, southern, and coastal regions of SEAK have provided information on habitat use, migration rates, and timing (e.g., Orsi et al. 2004, 2007a, b); in addition, interceptions in the regional common property fisheries have documented substantial contributions of enhanced fish to commercial harvests (ADFG 2008). Therefore, examining trends in early marine ecology of these marked stock groups provides an opportunity to link increasing salmon production to climate change, particularly in the context of increased enhancement.

The extent of interactions between stock groups in marine ecosystems is also important to examine with regard to carrying capacity. For example, increased hatchery production of juvenile chum salmon has coincided with declines of some wild chum salmon stocks, suggesting

the potential for stock interactions in the marine environment (Seeb et al. 2004; Reese et al. 2009). In SEAK, however, SECM and other studies have shown that growth is not food limited and that stocks interact extensively with little negative impact (Bailey et al., 1975; Orsi et al. 2004; Sturdevant et al. 2004, 2011). Zooplankton prey fields are more likely to be cropped by the more abundant planktivores forage fish, including walleye pollock (*Theragra chalcogramma*) and Pacific herring (*Clupea pallasii*) (Orsi et al. 2004; Sigler and Csepp 2007), than by juvenile salmon. Companion studies in Icy Strait have also suggested that food quantity may be more important than food type for growth and survival of juvenile salmon con-specifics (Weitkamp and Sturdevant 2008) and that predation events can affect salmon year-class strength (Sturdevant et al. 2009). Monitoring jellyfish abundance is also important because of their potential competition with salmon and forage fish (Purcell and Sturdevant 2001), and their association with environmental change (Brodeur et al. 2008; Cieciel et al. 2009). Seasonal and interannual changes in planktivorous jellyfish abundance have been reported by SECM (Orsi et al. 2009). Similarly, regional differences in composition, abundance, and timing of zooplankton taxa with different life history strategies are important to document because of their dependence on environmental conditions which vary seasonally and interannually (Coyle and Paul 1990; Paul et al. 1990; Park et al. 2004). These findings stress the importance of comparing ecological processes between different areas that produce salmon and consistently examining the entire epipelagic community in the context of trophic interactions.

In 2010, SECM sampling was conducted in the northern region of SEAK for the 14th consecutive year to continue annual monitoring, explore juvenile salmon abundance relationships with biophysical parameters, and support models to forecast adult pink salmon returns. This document summarizes data on juvenile salmon, ecologically-related species, and associated biophysical parameters collected by the SECM project in 2010, and contrasts key parameters from 2010 with the entire 14-yr time series.

METHODS

Up to 13 stations were sampled in SEAK monthly from May to August 2010 (Table 1). Sampling was conducted in the northern region, extending 250 km from inshore waters of the Alexander Archipelago along Chatham and Icy Straits to coastal waters 64 km offshore from Icy Point into the Gulf of Alaska (GOA) and over the shelf break (Figure 1). At each station, the physical environment, zooplankton, and fish were typically sampled during daylight hours. Oceanographic sampling was conducted in May, while both trawling and oceanographic sampling were conducted June through August. The NOAA research vessel RV *Quest*, a 7 m work vessel, was used for oceanographic sampling in May in the strait and inshore habitats. The chartered fishing vessel, FV *Northwest Explorer* (NWE), a 52 m stern trawler with twin engines producing 1,800 HP, was used for sampling June through August.

Sampling stations (Table 1; Figure 1) were originally selected by: 1) the presence of historical time series of biophysical data, 2) the intent to sample primary seaward migration corridors used by juvenile salmon, and 3) logistical constraints of the vessel operations. Historical data existed for the inshore station and the four Icy Strait stations (e.g., Bruce et al. 1977; Jaenicke and Celewycz 1994; Orsi et al. 1997). The four Upper Chatham Strait stations were selected to intercept wild and hatchery juvenile salmon entering Icy Strait from both the

north and the south. Historically, sampling operations in the different localities were constrained to 1.5-65 km off shore and bottom depths > 75 m, sea conditions < 2.5 m, and winds < 12.5 m/sec. Bottom depth at the Auke Bay station did not meet the depth criterion, being too shallow to permit trawling (Table 1). Stations in the strait habitat were approximately 3 or 6 km from shore, whereas stations in the coastal habitat were approximately 7, 23, 40, and 65 km from shore. The northern hatchery stocks intercepted in the straits typically originate from the Douglas Island Pink and Chum Hatchery (DIPAC) near Juneau and the Hidden Falls Hatchery (HF) operated by the Northern Southeast Alaska Regional Aquaculture Association (NSRAA) on eastern Baranof Island (Figure 1). Past monitoring has also documented the migration of salmon stocks from the southern region of SEAK through the northern region, primarily from facilities operated by the Southern Southeast Alaska Regional Aquaculture Association (SSRAA); this facility's largest releases are from the Neets Bay (NB) site near Ketchikan, Alaska. Fewer releases from Armstrong Keta Incorporated (AKI), located in central SEAK, have been recovered during monitoring. Stocks from these facilities and from the Pacific Northwest and Canada have also been intercepted at coastal stations off Icy Point.

Oceanographic sampling

The oceanographic data collected at each visit to a station generally consisted of one conductivity-temperature-depth profiler (CTD) cast, one Secchi depth, one surface water sample, one ambient light reading, one or two plankton tows.

The CTD data were collected with a Sea-Bird¹ SBE 19 plus Seacat profiler deployed to 200 m or within 10 m of the bottom. The CTD data profiles were used to determine the 3-m sea surface temperature (SST, °C) and salinity (PSU), the average 20-m integrated water column temperature and salinity, and the mixed layer depth (MLD, m). The average 20-m integrated water column data was used to characterize the upper water column that typically brackets seasonal pycnoclines and MLD. The MLD is the depth where temperature was $\geq 0.2^{\circ}\text{C}$ colder than the water at 5 m, and established the active mixing layer (Kara et al. 2000).

Additional physical data included water clarity (Secchi depth), surface nutrients and chlorophyll, and ambient light. Secchi depths were estimated as the disappearance depth (m) of the CTD during deployment. Surface water samples for nutrient and chlorophyll analysis were taken once at each station per month. Ambient light (W/m^2) was quantified using a Li-Cor Model LI-250A light meter.

Zooplankton was sampled monthly with two net types. One shallow (20-m) vertical NORPAC haul was made with a 50-cm, single ring frame with 243- μm mesh net. One double oblique bongo haul was made at stations along the Icy Strait and Icy Point transects and at ABM (≤ 200 m or within 20 m of bottom) using a 60-cm diameter tandem frame with 333- μm and 505- μm mesh nets. A VEMCO ML-08-TDR time-depth recorder was attached to the bongo frame to record the maximum sampling depth of each haul. General Oceanics Model 2031 flow meters were placed inside the bongo for calculation of filtered water volumes.

Zooplankton samples were immediately preserved in a 5% formalin-seawater solution. In the laboratory, zooplankton settled volumes (ZSV, ml), total settled volumes (TSV, ml),

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

displacement volumes (DV, ml), standing stock (DV/m³), and density (number/m³) were determined for various samples (Omori and Ikeda 1984). For Norpac samples, ZSV and TSV were measured after a 24-hr period in Imhof cones. Mean SVs were determined for pooled stations by habitat and month. For bongo samples (both 333- and 505- μ m mesh), DVs were measured and standing stock was calculated using DV and filtered water volumes. Detailed zooplankton species composition from the 333- μ m samples was determined microscopically from subsamples obtained using a Folsom splitter. Densities were then estimated using the subsample counts, split fractions, and filtered water volumes. Percent total composition was summarized across species by major taxa, including small calanoid copepods (≤ 2.5 mm total length, 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 trawl vessel. The trawl was 184 m long and had a mouth opening of approximately 24 m wide by 30 m deep, with actual fishing dimensions of 18 m wide by 24 m deep (unpub. net mensuration data). A pair of 3-m foam-filled Lite trawl doors, each weighing 544 kg (91 kg submerged), was used to spread the trawl open. 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. Two 50-kg chain-link weights were added to the corners of the foot rope as the trawl was deployed to maximize fishing depth. To keep the trawl head rope fishing at the surface, two clusters of three A-4 Polyform buoys (inflated to 0.75 m diameter 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 diameter) was clipped into a mesh kite pocket in the center of the head rope with a third-wire unit to monitor the net spread. Two AQUAMark 300 pingers (10 kHz, 132 dB) were attached to the corners of the head rope to deter porpoise interactions. The trawl was fished with approximately 150 m of 1.6-cm wire main warp attached to each door, a 9.1 m length of 1.6-cm TS-II Dyneema line trailing off the top and bottom of each trawl door (back strap). Each back strap was connected with a “G” hook and flat link to an 80-m parallel rigging system constructed of 1.6-cm TS-II Dyneema bridles.

For each haul, the trawl was fished across a station for 20 min at approximately 1.5 m/sec (3 knots) to cover 1.9 km (1.0 nautical mile). Station coordinates were targeted as the midpoint of the trawl haul, and current, swell, and wind conditions usually dictated the direction in which the trawl was set. Twenty-eight hauls were scheduled in the strait habitat to meet sampling requirements for the forecasting model and to ensure that sufficient samples of marked juvenile salmon were obtained for interannual comparisons.

After each trawl haul, the fish were separated from the jellyfish, identified, enumerated, measured, labeled, bagged, and frozen. Jellyfish were identified to species when possible, counted, and total volume (including fragments) was estimated 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. In instances of very large fish catches, all fish were counted, but only a

subsample of each species (≤ 100) was processed. Excess fish were enumerated and discarded. 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 could indicate the presence of implanted CWTs. In the laboratory, those Chinook and coho with adipose fins intact were screened with a magnetic detector and CWTs were excised from the snouts of tagged fish. All tags were decoded and verified to determine fish origin.

Potential predators of juvenile salmon from each haul were identified, measured (FL, mm), weighed (g), and stomach contents were examined onboard the vessel. Stomachs were excised, weighed (0.1 g), and visually classified by percent fullness (0, 10, 25, 50, 75, and 100%). Stomach content weight was determined by subtracting the empty stomach weight from the full stomach weight. General prey composition was determined by estimating the 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 percent total volume by the total content weight. Whenever possible, fish prey were identified to species and FLs were measured. Overall diets were summarized by percent weight of major prey taxa and the frequency of feeding fish.

Juvenile salmon catch data were adjusted using calibration coefficients from previous vessels to allow comparisons with the longterm data collected using the NOAA ship *John N. Cobb* (1997-2007). Unfortunately, a direct calibration of the *NWE* with a previously-used vessel was not possible; therefore, the *NWE* was assumed to be comparable to the similarly-sized and -powered chartered vessel *FV Chellissa* used in 2009. The catches from the *FV Chellissa* were directly compared to those from the *RV Medeia*, which had been previously calibrated to the NOAA ship *John N. Cobb* (Wertheimer et al. 2008, 2010). These paired comparisons permitted the computation of species-specific calibration factors to adjust the *FV Chellissa* catches. The calibration factors for the *FV Chellissa* were applied to the $\text{Ln}(\text{CPUE}+1)$ for each trawl haul of the *NWE* to convert the data into “Cobb units”, which were directly comparable to the first 13 years of the SECM time series (Wertheimer et al. 2010).

After each survey, frozen individual juvenile salmon were weighed (0.1 g) in the laboratory. Mean lengths, weights, Fulton condition factor ($\text{g}/\text{mm}^3 \cdot 10^5$; Cone 1989), and residuals from a length-weight linear regression (condition residuals, CR) were computed for each species by habitat and sampling month. To determine stock of origin, sagittal otoliths were extracted from the crania and preserved in 95% ethyl alcohol, then later mounted on slides, ground down to the primordia, and examined for potential thermal marks (Secor et al. 1992). Stock composition and growth trajectories of thermally marked fish were then determined for each month and habitat. An index of seasonal condition was obtained via calorimetry, using a 1425 Parr micro-bomb calorimeter. Whole body energy content (cal/g WW) was determined from ten fish of each species captured in July (Fergusson 2010).

In order to compare biophysical conditions observed in 2010 to the prior 13-yr time series, a set of key parameters was examined. These parameters included: average 20-m integrated temperature and salinity, MLD, zooplankton density and composition, the catch-per-unit-effort (average catch per haul, CPUE), size-at-time (length on July 24), CRs for the principal juvenile salmon species (pink, chum, sockeye, and coho), and the July energy density of juvenile pink, chum, and sockeye salmon. Graphical plots were used to compare annual means

of these values from the core SECM sampling area in Icy Strait and to portray anomalies as deviations from the longterm grand means.

RESULTS AND DISCUSSION

Eight stations at Icy and Upper Chatham Straits and the ABM station were sampled monthly from May to August, while the four stations at Icy Point were sampled only in July and August (Figure 1). In total, data were collected from 67 rope trawl hauls, 78 CTD casts, 28 bongo net samples, 79 Norpac net samples, 44 surface water samples, 75 Secchi readings, and 75 ambient light measures during the four monthly surveys totaling 21 days at-sea (Table 2, Appendix 1). The sampling periods occurred near the ends of each month.

Oceanography

Overall, SST ranged from 9.4 to 14.2°C from May to August, and averaged 11.7 °C (Table 3; Appendix 1). Seasonal SST patterns differed among habitats (Figure 2a), with peaks occurring in June in inshore habitat and in August in strait and coastal habitats. Monthly mean SST differed by as much as ~2°C among habitats. The monthly means for 20-m integrated temperatures followed a similar seasonal pattern as SSTs, but were colder.

Surface salinities ranged from 17.2 to 32.3 PSU from May to August, and averaged 27.2 PSU (Table 3; Appendix 1). Surface salinities followed similar patterns of seasonal decline in strait and inshore habitats (Figure 2b); salinities were lowest in inshore habitat and highest in coastal habitat. Mean salinities for the 20-m integrated water column were higher than the 3-m values, particularly in July and August.

Water clarity depths ranged from 2 to 8 m and MLD ranged from 6 to 23 m (Appendix 1). Water clarity extended deeper in strait and coastal habitats than in inshore habitat (Figure 3a). Seasonally, water clarity was deepest in August in all habitats. Seasonal MLD was similar in inshore and strait habitats and peaked in June, while MLD was deeper in coastal habitat and peaked in August (Figure 3b). Thus, trawl sampling depths (~20 m) spanned a range of habitat conditions that varied with depth, including the active surface layer and the stable waters below the MLD.

Other physical data also showed seasonal and spatial differences. Ambient light measurements ranged from 12 to 883 W/m², with a mean of 310 W/m² (Appendix 1). Light intensity was greatest in May, in conjunction with unusually warm SST for the month. Chlorophyll concentration ranged from 0.2 to 2.3 µg/L, with a mean of 0.7 µg/L, and phaeopigment concentrations ranged from <0.1 to 0.8 µg/L, with a mean of 0.2 µg/L (Table 4). Chlorophyll in surface water samples was highest in strait habitat, and lowest in coastal habitat. Seasonal chlorophyll peaked in inshore, strait, and coastal habitats in May, June, and July, respectively (Figure 4a). The May UCA and July IPA chlorophyll samples were destroyed during laboratory processing. Nutrient concentrations (range and mean) were 0.0–17.4 and 1.2 µM for PO₄, 1.7–24.3 and 5.2 µM for Si(OH)₄, 0.0–10.3 and 0.9 µM for NO₃, 0.0–1.2 and 0.04 µM for NO₂, and 0.1–11.32 and 2.5 µM for NH₄ (Table 4).

Zooplankton SVs ranged from 0.5 to 50 ml and averaged 9.8 ml in June through August (Table 5). A strong phytoplankton bloom in May prevented determination of ZSV, thus excluding May samples from the dataset. Seasonal patterns for ZSV were similar in inshore and

for strait habitats and highest in June (Figure 4b), which coincided with peak chlorophyll in strait habitat but followed peak chlorophyll in inshore habitat (Figure 4a). For coastal habitat, ZSV values were similar in July and August. Qualitative, visual examination of samples indicated a wide diversity of mesozooplankton taxa and phytoplankton present.

Zooplankton standing stock was greater for the 333- than for the 505- μm bongo samples. Standing stock ranged from 0.1 to 11.8 ml/m^3 with a mean of 1.5 ml/m^3 for 333- μm mesh, and ranged from 0.0 to 1.6 ml/m^3 with a mean of 0.5 ml/m^3 for the 505- μm mesh samples (Table 6). Patterns differed among habitats and months (Figure 5). Standing stock was highest in inshore habitat and lowest in coastal habitat. Mean peak values for both mesh sizes occurred in May or June in inshore habitat and in May in strait habitat, coinciding with seasonal warming and increased chlorophyll (Figures 2a, 4a). For coastal habitat, values were similar in July and August.

Seasonal abundance of zooplankton (333- μm) prey fields in Icy Strait ranged approximately 10-fold, from 396 to 3,602 organisms/ m^3 (Table 6). Mean zooplankton density peaked in May (2000 organisms/ m^3) and declined over the season to approximately 800 organisms/ m^3 in August (Figure 6a). Zooplankton taxa were increasingly dominated by small calanoid copepods (33-74%) over the season. In May, seasonal peaks in the percentage composition of larvaceans (29%) and large calanoids (13%) were observed, whereas early life stages of euphausiids comprised approximately 20-24% of organisms in May and June (Figure 6b). Along with calanoids, these taxa are seasonally prominent in diets of juvenile salmon and other planktivores (Coyle and Paul 1992; Landingham et al. 1998; Sturdevant et al. 2004, 2011).

Seasonal patterns in species composition of the dominant taxa (calanoids) were observed. *Metridia* spp. comprised $\geq 70\%$ of large calanoids throughout the four-month season. Other large calanoids mainly included *Neocalanus plumchrus/flemingeri* in May and *Calanus marshallae* in June through August. Small calanoids were dominated by *Pseudocalanus* spp. (46-90%); the principal other small copepods included unknown nauplii and *Oithona similis* (a cyclopoid) in May, *Centropages abdominalis* in June through August, and *Acartia* spp. in June and August.

Catch composition

The trawls sampled a total of five large jellyfish species: *Aequorea* sp., *Aurelia labiata*, *Chrysaora melanaster*, *Cyanea capillata*, and *Staurophora mertensii* (Table 7). The monthly mean total volume of jellyfish ranged from 2.4 to 20.3 L per haul. Overall, jellyfish monthly biomass increased 10-fold from June to August, but species composition varied by habitat (Figure 7). In particular, *Aurelia* biomass showed opposite trends from *Chrysaora* biomass in strait and coastal habitats.

In total, more than 39,000 fish, representing 26 taxa, were captured in 68 rope trawl hauls in strait and coastal habitats (Table 8). Juvenile salmon comprised approximately 97% of the total fish catch (Figure 8). Non-salmonids comprised a high proportion of the fish in coastal habitat, and were primarily represented by squid and rockfish (*Sebastes* spp.) larvae. Juvenile pink, chum, sockeye, and coho salmon occurred in 71-87% of the trawls, while juvenile Chinook salmon occurred in only 9% of the hauls (Table 9). All juvenile salmon species occurred more frequently in strait than in coastal habitat each month. In both habitats, CPUE declined seasonally for all juvenile salmon species except sockeye. Unusually high numbers of juvenile salmon were captured in strait habitat in both June and July, although CPUE was greatest in June for all species except sockeye salmon (Figure 9). In particular, CPUE for pink salmon was nearly

1,100 fish per trawl in June. For strait habitat, when the *NWE* catches were calibrated to “Cobb units”, the $\text{Ln}(\text{CPUE}+1)$ was reduced proportionally, resulting in large changes in nominal CPUE at high catch levels (Table 10).

Size and condition of juvenile salmon differed among the species and months (Tables 11–15, Figures 10–13). Most species increased monthly in both length and weight, indicating growth despite the influx of additional stocks with varied times of saltwater entry. From June to August, mean FLs of juvenile salmon increased from approximately 96 to 167 mm for pink; 104 to 151 mm for chum; 116 to 156 mm for sockeye; 181 to 252 mm for coho; and 192 to 209 mm (June-July only) for Chinook salmon (Tables 11–15, Figure 10). Mean weights of juvenile salmon increased monthly from 8 to 49 g for pink; 11 to 37 g for chum; 17 to 43 g for sockeye; 70 to 195 g for coho; and 88-117 g (June-July only) for Chinook salmon (Tables 11–15, Figure 11). Juvenile coho and Chinook salmon were consistently larger than pink, chum, and sockeye salmon in each month, and fish captured in coastal habitat were larger than those captured in strait habitat. Mean Fulton’s condition for juvenile salmon increased monthly for all species in strait habitat. Samples from coastal habitat were limited, and few differences in Fulton’s condition were apparent between July and August (Figure 12). Condition residuals from L-W regression were positive for pink, chum, and sockeye salmon in both strait and coastal habitats in July and August, suggesting that marine conditions were favorable for growth (Figure 13). Condition residuals for coho salmon were positive only at coastal habitat.

Stock-specific information was obtained from 16 CWT recoveries from 19 adipose fin-clipped juvenile coho and Chinook salmon, primarily caught in the strait habitat. Fifteen of the CWT recoveries were from coho salmon and one was from a Chinook salmon (Table 16). All but one of these fish originated from hatchery and wild stocks in northern SEAK; the one non-Alaska CWT fish was a coho salmon from Washington. All unmarked, adipose-clipped fish were caught in the coastal habitat, and probably originated from Pacific Northwest hatcheries. These facilities are mandated to adipose-clip but not necessarily CWT all fish released, a practice not used in Alaska. Migration rates of the CWT juvenile salmon ranged from 1.2 to 15.4 km/day and averaged 4.2 km/day.

Stock-specific information was also obtained from recoveries of otolith-marked hatchery chum, sockeye, and coho salmon, using the same individuals that were sampled for weight and condition. Releases of these species from SEAK enhancement facilities are commonly mass-marked and not CWTed. A total of 703 otolith-marked juvenile salmon that originated in SEAK were recovered (Tables 17-19; Figures 14-17).

For juvenile chum salmon, stock-specific information was derived from a subsample of 899 otolith-marked fish, representing 20% of those caught (Tables 8 and 17; Figure 14). Of all chum salmon otoliths examined, 601 (67%) were marked by hatcheries in SEAK: 410 (46%) were from DIPAC, 180 (20%) were from NSRAA, 9 (1%) were from AKI, and only 2 (< 1%) were from SSRAA. The remaining 298 (33%) chum salmon otoliths examined were unmarked and presumed to be wild. Hatchery composition declined from 32% in June to 4% in July and 1% in August for chum salmon. This decline is consistent with the pattern of seasonal decline observed in previous years. Catches of SSRAA hatchery chum salmon indicated a pattern of northward movement by these stocks (Table 17).

For juvenile sockeye salmon, stock-specific information was derived from the otoliths of a subsample of 515 fish, representing 64% of those caught (Tables 8 and 18; Figure 15). Of all the sockeye salmon otoliths examined, 80 (16%) were marked and originated from three stock

groups: 67 (13%) were from Speel Arm, Alaska, 9 (2%) were from Tatsamenie Lake/Taku River, British Columbia (this includes both normal release and extended rearing releases), and 4 (1%) were from Sweetheart Lake, Alaska. The remaining 435 (84%) sockeye salmon otoliths examined were unmarked and presumably from wild stocks. Contrary to prior years, no evidence of stocks from southern SEAK was observed in the catch.

For juvenile coho salmon, stock-specific information was derived from the otoliths of a subsample of 488 fish (with adipose fins intact), representing 88% of those caught (Tables 8 and 19; Figure 16). Of all the coho salmon otoliths examined, 22 (5%) were marked and originated from DIPAC. The remaining 466 (95%) coho salmon otoliths examined were unmarked. DIPAC temporarily stopped otolith-marking coho salmon in 2003 (2005 recoveries), then reinstated marking of coho salmon in 2008.

Stock-specific sizes of otolith-marked juvenile chum and sockeye salmon increased monthly for all stock groups. Average weights of these fish were used to plot monthly growth trajectories (Figure 17). Both of these salmon species were released or migrated to sea in 2010 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). Weights approximately doubled for both species from June to July and, for some stock groups, approximately tripled from July to August. The limited recovery of marked coho salmon prevented further stock-specific size analysis.

Stomachs of 58 immature and adult salmon representing all five species, and a single walleye pollock, were examined onboard as potential predators of juvenile salmon (Table 20). In June, we observed predation by pink salmon adults (2 of 9 adults examined) for the first time in the 14 years of SECM monitoring (Table 21; Figure 18). We also observed a high percentage of adult coho salmon (3 of 8) predating on juvenile salmon in August; longterm data indicate that coho salmon are common predators of juvenile salmon in strait habitat in late summer, with an overall 15% incidence of predation (SECM unpublished data). Most of the potential predators had been feeding; however, pink salmon had a high percentage (~34%) of empty guts, mainly during July (Table 21). Diet composition varied considerably among the species, and pink salmon diet was the most diverse. In addition to juvenile salmon prey, pink salmon diet included lanternfish (Myctophidae), larval sandlance (*Ammodytes hexapterus*), rockfish (Scorpaenidae), unidentifiable fish remains, crab larvae, euphausiids, and pteropods. Chum salmon diet consisted primarily of gelatinous invertebrate taxa, including remains of ctenophores and oikopleurans. Coho and Chinook salmon were both highly piscivorous. However, identifiable fish prey of coho salmon included juvenile salmon and lanternfish, while those of immature Chinook salmon included sandlance and fish larvae (walleye pollock and Osmeridae). Sockeye salmon diet consisted exclusively of hyperiid amphipods, which were present as minor prey among the other species.

Longterm trends

Our research in SEAK over the past 14 years indicates annual trends in biophysical factors, as well as seasonal patterns of habitat use and species- and stock-dependent migration for juvenile salmon. Biophysical measures from 2010 in Icy Strait were compared to the longterm time series to examine trends and identify anomalies (Figures 19-31).

Among the 2010 physical factors, anomalies were positive for average 20-m integrated temperatures and negative for salinity in all months except July, when they were reversed (Figures 19, 20, and 22a, b). Anomalies for MLD were also negative (deeper than average MLD)

for all months except June (Figures 21 and 22c). May temperature is one significant biophysical factor that consistently enters the adult pink salmon harvest forecast using CPUE data (Wertheimer et al. 2008, 2009, 2010, 2011). The high mean temperature in May of 2010 was associated with a high forecast, and was similar to the high mean temperature for 2005 (Table 3, Figure 19), the year associated with an overestimated forecast for the 2006 adult pink salmon harvest (Wertheimer et al. 2011). A major difference between these years is that, in 2010, the warm temperatures did not persist through August as they did in 2005 (Figure 22). Moreover, unusual faunal observations were not reported from the GOA adjacent to SEAK in 2010 (Orsi et al. 2006a; Orsi et al. 2010). These contrasts in the effects of marine conditions point to the importance of contrasting annual data to the longterm means of biophysical parameters in order to detect changes in trends.

Among the 2010 biological factors, monthly total zooplankton densities were near average values except in May, when they showed a positive anomaly (Figures 23 and 24), consistent with anomalously warm temperatures (Figure 19). This zooplankton trend for 2010 contrasts with the previous four years from 2006-2009, when positive density anomalies persisted, and with the nine prior years from 1997-2005, when negative density anomalies persisted (Figure 23). Moreover, zooplankton composition anomalies were unusual in 2010 (Figure 25). In contrast to all prior years, both large and small calanoids showed synchronous, negative anomalies for percent composition, whereas euphausiid larvae and larvaceans showed strongly positive anomalies, particularly in May and June (Figure 25). These changes indicate differences in the 2010 abundance, composition, and timing of zooplankton prey fields, including taxa that are seasonally prominent in diets of juvenile salmon and other planktivores (Coyle and Paul 1992; Sturdevant et al. 2004, 2011).

Catches of juvenile salmon in 2010 were among the largest in the history of SECM sampling, and were the result of both high abundance and the fishing power of the chartered commercial trawl vessel. When juvenile salmon catches were calibrated to “Cobb units” (for consistency with the longterm data series from the NOAA ship *John N. Cobb*), the adjusted CPUEs were above average for all species except chum salmon (Figure 26 and 27). The adjusted pink salmon CPUE was the fourth highest in the 14-year time series.

Longterm trends indicated poor size and condition of juvenile salmon in 2010. Low CRs in June were followed by small size and low energy density in July (Figures 28-31). The large numbers of small-sized juvenile pink salmon could have influenced the unusual observations of cannibalism by adult pink salmon and the high incidence of predation by adult coho salmon, reflecting opportunistic trophic interactions. Poor condition of juvenile salmon in 2010 may also have been influenced by biophysical anomalies, such as abrupt changes in temperature, salinity, and MLD from May to June, low monthly zooplankton abundance, and unusual zooplankton prey composition.

These SECM time series data are used in conjunction with basin-scale biophysical parameters to develop forecast models for pink salmon harvest in SEAK (e.g., Wertheimer et al. 2011). Longterm 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 in this region and to better understand their role in North Pacific marine ecosystems.

ACKNOWLEDGMENTS

We thank the people working onboard the chartered fishing vessel FV *Northwest Explorer* for their superb cooperation and performance (Skipper Ray Haddon, Darwin Barba, Andy Martin, Luke Paranto, Manuel Tiexeira, Tom Weggman, Adam White). We are also grateful for survey participation and laboratory support from Sarah Ballard, Liz Morgan, and Liz Stahl (ABL contractors), Brian Beckman (NWFSC), Steve Heintz (ADFG), Kathy Kroglund (Marine Chemistry Laboratory, UW), Gary Nishimura (Markey Machinery), and Mike Wunderlich (DIPAC Hatchery). We are indebted to Alex Wertheimer for biometric support and editorial comments for this document. We appreciate the assistance of David King and Jim Smart of the NMFS Alaska Fisheries Science Center, Seattle, for their excellent support on trawl gear. Partial funding for these surveys was provided by the Northern Fund of the Pacific Salmon Commission (project NF-2010-I-3).

The findings and conclusions in the paper are those of the authors and do not necessarily represent the views of the National Marine Fisheries Service, NOAA.

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Table 1.—Localities and coordinates of stations sampled in the marine waters of the northern region of southeastern Alaska, May–August 2010. Transect and station positions are shown in Figure 1.

| Station | Latitude north | Longitude west | Distance | | Bottom depth (m) |
|-------------------------------|----------------|----------------|---------------|-------------------------------|------------------|
| | | | Offshore (km) | Between adjacent station (km) | |
| 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 |

Table 2.—Numbers and types of data collected using a laboratory and charter vessel in different habitats sampled monthly in the marine waters of the northern region of southeastern Alaska, May–August 2010.

| | | | Data collection type ¹ | | | | |
|--------------------------|----------------------|---------|-----------------------------------|-----------|---------------|-------------|-------------------------|
| Dates (days) | Vessel | Habitat | Rope trawl | CTD cast | Oblique bongo | 20-m NORPAC | Chlorophyll & nutrients |
| 26-27 May (2 days) | R/V <i>Quest</i> | Inshore | 0 | 1 | 1 | 1 | 1 |
| | | Strait | 0 | 8 | 4 | 8 | 8 |
| | | Coastal | 0 | 0 | 0 | 0 | 0 |
| 24-29 June (6 days) | F/V <i>Northwest</i> | Inshore | 0 | 1 | 1 | 1 | 1 |
| | <i>Explorer</i> | Strait | 20 | 19 | 4 | 19 | 8 |
| | Coastal | 0 | 0 | 0 | 0 | 0 | |
| 25-31 July (7 days) | F/V <i>Northwest</i> | Inshore | 0 | 1 | 1 | 1 | 1 |
| | <i>Explorer</i> | Strait | 20 | 19 | 4 | 20 | 8 |
| | Coastal | 4 | 4 | 4 | 4 | 4 | |
| 24-29 August (6 days) | F/V <i>Northwest</i> | Inshore | 0 | 1 | 1 | 1 | 1 |
| | <i>Explorer</i> | Strait | 20 | 20 | 4 | 20 | 8 |
| | Coastal | 4 | 4 | 4 | 4 | 4 | |
| Total | | | 68 | 78 | 28 | 79 | 44 |

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

Table 3.—Surface (3-m, mean) temperature (°C) and salinity (PSU) data collected monthly at stations in the marine waters of the northern region of southeastern Alaska, May–August 2010. Station code acronyms are listed in Table 1.

| Month | <i>n</i> | Temp (°C) | Salinity (PSU) | <i>n</i> | Temp (°C) | Salinity (PSU) | <i>n</i> | Temp (°C) | Salinity (PSU) | <i>n</i> | Temp (°C) | Salinity (PSU) |
|-------------------------------|----------|--------------|-------------------|----------|--------------|-------------------|----------|--------------|-------------------|----------|--------------|-------------------|
| Auke Bay Monitor | | | | | | | | | | | | |
| | | ABM | | | | | | | | | | |
| May | 1 | 12.6 | 26.0 | | | | | | | | | |
| June | 1 | 13.4 | 21.8 | | | | | | | | | |
| July | 1 | 11.4 | 21.4 | | | | | | | | | |
| August | 1 | 12.5 | 17.2 | | | | | | | | | |
| Upper Chatham Strait transect | | | | | | | | | | | | |
| | | UCA | | | UCB | | | UCC | | | UCD | |
| May | 1 | 10.3 | 29.8 | 1 | 11.2 | 29.9 | 1 | 10.5 | 28.4 | 1 | 10.6 | 27.0 |
| June | 2 | 10.8 | 28.9 | 2 | 10.4 | 29.1 | 2 | 10.9 | 28.9 | 1 | 11.9 | 25.8 |
| July | 2 | 11.6 | 25.2 | 2 | 12.2 | 24.9 | 2 | 11.8 | 24.8 | 1 | 11.7 | 25.8 |
| August | 2 | 12.9 | 23.6 | 2 | 12.9 | 25.1 | 2 | 12.5 | 23.3 | 2 | 12.4 | 24.6 |
| Icy Strait transect | | | | | | | | | | | | |
| | | ISA | | | ISB | | | ISC | | | ISD | |
| May | 1 | 9.7 | 30.4 | 1 | 9.4 | 30.4 | 1 | 9.9 | 30.1 | 1 | 9.4 | 30.4 |
| June | 3 | 10.8 | 28.8 | 3 | 11.5 | 27.3 | 3 | 11.9 | 26.2 | 3 | 11.6 | 26.4 |
| July | 3 | 11.2 | 27.7 | 3 | 11.3 | 27.6 | 3 | 11.4 | 26.4 | 3 | 11.4 | 26.9 |
| August | 3 | 11.1 | 27.8 | 3 | 12.2 | 24.3 | 3 | 12.8 | 22.7 | 3 | 12.8 | 21.9 |
| Icy Point transect | | | | | | | | | | | | |
| | | IPA | | | IPB | | | IPC | | | IPD | |
| July | 1 | 10.9 | 31.5 | 1 | 12.1 | 31.8 | 1 | 12.6 | 31.6 | 1 | 12.5 | 32.3 |
| August | 1 | 10.7 | 31.6 | 1 | 14.2 | 32.1 | 1 | 13.6 | 32.1 | 1 | 13.8 | 32.1 |

Table 4.—Nutrient (μM) and chlorophyll ($\mu\text{g/L}$) concentrations from 200-ml surface water samples collected monthly at stations in the marine waters of the northern and southern regions of southeastern Alaska, May–August 2010. Station code acronyms are listed in Table 1.

| Station | Date | Nutrients [μM] | | | | | Chlorophyll ($\mu\text{g/L}$) | Phaeopigment ($\mu\text{g/L}$) |
|---------|-----------|-----------------------------|------------------------------|-------------------|-------------------|-------------------|------------------------------------|-------------------------------------|
| | | [PO_4] | [$\text{Si}(\text{OH})_4$] | [NO_3] | [NO_2] | [NH_4] | | |
| ABM | 26 May | 0.01 | 10.99 | 0.08 | 0.10 | 0.58 | 0.92 | 0.42 |
| | 24 June | 0.00 | 5.59 | 0.35 | 0.04 | 0.25 | 0.66 | 0.30 |
| | 25 July | 2.32 | 1.97 | 0.03 | 0.03 | 2.27 | 0.64 | 0.00 |
| | 24 August | 0.28 | 5.79 | 0.08 | 0.00 | 6.14 | 0.58 | 0.00 |
| UCA | 27 May | 0.05 | 2.84 | 0.03 | 0.04 | 0.55 | | |
| | 28 June | 1.20 | 1.87 | 0.09 | 0.04 | 0.44 | 1.40 | 1.06 |
| | 30 July | 0.27 | 1.81 | 0.03 | 0.05 | 1.46 | 0.68 | 0.26 |
| | 28 August | 0.34 | 8.69 | 0.29 | 0.00 | 6.03 | 0.40 | 0.00 |
| UCB | 27 May | 0.07 | 3.18 | 0.06 | 0.03 | 1.12 | 0.77 | 0.29 |
| | 28 June | 0.96 | 2.10 | 0.06 | 0.02 | 11.32 | 1.05 | 0.72 |
| | 30 July | 0.38 | 1.69 | 0.03 | 0.02 | 2.05 | 0.61 | 0.14 |
| | 28 August | 0.09 | 8.11 | 0.00 | 0.00 | 0.85 | 0.60 | 0.00 |
| UCC | 27 May | 0.00 | 3.64 | 0.07 | 0.00 | 0.36 | 0.87 | 0.40 |
| | 28 June | 0.80 | 2.67 | 0.05 | 0.02 | 0.16 | 1.11 | 0.32 |
| | 30 July | 0.52 | 1.80 | 0.06 | 0.01 | 2.38 | 0.61 | 0.00 |
| | 28 August | 0.02 | 2.99 | 0.00 | 0.00 | 1.34 | 0.66 | 0.46 |
| UCD | 27 May | 0.00 | 4.44 | 0.38 | 0.01 | 2.81 | 0.84 | 0.37 |
| | 28 June | 2.85 | 1.74 | 0.00 | 0.09 | 2.89 | 1.04 | 0.49 |
| | 30 July | 0.39 | 2.26 | 0.08 | 0.02 | 3.46 | 0.87 | 0.30 |
| | 28 August | 0.15 | 6.97 | 0.66 | 0.01 | 1.01 | 0.81 | 0.43 |
| ISA | 27 May | 0.11 | 4.02 | 0.05 | 0.06 | 0.50 | 0.62 | 0.15 |
| | 26 June | 1.09 | 1.77 | 0.00 | 0.04 | 0.50 | 2.29 | 0.66 |
| | 26 July | 0.51 | 2.42 | 0.08 | 0.03 | 3.61 | 0.55 | 0.00 |
| | 25 August | 0.76 | 11.04 | 4.58 | 0.07 | 3.66 | 0.55 | 0.26 |
| ISB | 27 May | 0.05 | 2.39 | 0.00 | 0.03 | 0.07 | 0.48 | 0.00 |
| | 26 June | 0.60 | 1.65 | 0.11 | 0.04 | 0.25 | 1.44 | 0.67 |
| | 26 July | 0.27 | 2.53 | 0.03 | 0.03 | 1.13 | 1.11 | 0.42 |
| | 25 August | 0.82 | 5.55 | 0.88 | 0.03 | 6.24 | 0.28 | 0.02 |
| ISC | 27 May | 0.05 | 2.39 | 0.00 | 0.03 | 0.85 | 0.60 | 0.41 |
| | 26 June | 0.39 | 1.88 | 0.06 | 0.07 | 0.39 | 0.54 | 0.19 |
| | 26 July | 0.24 | 3.22 | 0.07 | 0.03 | 1.34 | 1.37 | 0.42 |
| | 25 August | 17.4 | 5.66 | 0.45 | 0.02 | 7.49 | 0.23 | 0.07 |

Table 4.—cont.

| Station | Date | Nutrients [μM] | | | | | Chlorophyll ($\mu\text{g/L}$) | Phaeopigment ($\mu\text{g/L}$) |
|---------|-----------|-----------------------------|-----------------------|-------------------|-------------------|-------------------|------------------------------------|-------------------------------------|
| | | [PO_4] | [Si(OH)_4] | [NO_3] | [NO_2] | [NH_4] | | |
| ISD | 27 May | 0.02 | 2.84 | 0.00 | 0.03 | 0.11 | 1.65 | 0.00 |
| | 26 June | 1.50 | 2.11 | 0.05 | 0.08 | 3.14 | 0.58 | 0.37 |
| | 26 July | 0.72 | 5.17 | 0.19 | 0.07 | 5.08 | 1.74 | 0.76 |
| | 25 August | 2.36 | 4.40 | 0.43 | 0.02 | 7.70 | 0.22 | 0.08 |
| IPA | 28 July | 1.04 | 20.30 | 2.86 | 0.05 | 2.28 | | |
| | 27 August | 1.70 | 24.33 | 10.31 | 0.10 | 3.20 | 0.51 | 0.00 |
| IPB | 28 July | 1.10 | 14.90 | 2.40 | 0.08 | 1.57 | 0.97 | 0.47 |
| | 27 August | 1.43 | 4.16 | 0.30 | 0.04 | 1.35 | 0.16 | 0.05 |
| IPC | 28 July | 0.56 | 5.38 | 1.13 | 0.04 | 0.81 | 0.21 | 0.06 |
| | 27 August | 0.94 | 3.81 | 0.91 | 0.03 | 3.47 | 0.25 | 0.05 |
| IPD | 28 July | 0.91 | 10.07 | 5.49 | 0.12 | 3.34 | 0.19 | 0.05 |
| | 27 August | 0.85 | 3.24 | 1.01 | 0.05 | 2.14 | 0.18 | 0.03 |

Table 5.—Mean zooplankton settled volumes (ZSV, ml) and total plankton settled volumes (TSV, ml) from vertical 20-m Norpac hauls (243- μ m mesh) collected monthly at stations in the marine waters of the northern region of southeastern Alaska, May–August 2010. Station code acronyms are listed in Table 1. Volume differences between ZSV and TSV are caused by presence of phytoplankton or slub in the sample. Standing stock (ml/m³) can be computed by dividing by the water volume filtered, a constant factor of 3.9 m³ for these samples. A phytoplankton bloom in May prevented determination of ZSV.

| Month | <i>n</i> | ZSV | TSV | <i>n</i> | ZSV | TSV | <i>n</i> | ZSV | TSV | <i>n</i> | ZSV | TSV |
|-------------------------------|----------|------|------|----------|------|------|----------|------|------|----------|------|------|
| Auke Bay Monitor | | | | | | | | | | | | |
| | ABM | | | | | | | | | | | |
| May | 1 | | 340 | | | | | | | | | |
| June | 1 | 20.0 | 44.0 | | | | | | | | | |
| July | 1 | 3.8 | 12.0 | | | | | | | | | |
| August | 1 | 11.0 | 11.0 | | | | | | | | | |
| Upper Chatham Strait transect | | | | | | | | | | | | |
| | UCA | | | UCB | | | UCC | | | UCD | | |
| May | 1 | | | 1 | | | 1 | | | 1 | | |
| June | 2 | 7.0 | 19.5 | 2 | 19.8 | 52.5 | 2 | 6.3 | 12.5 | 1 | 17.5 | 47.0 |
| July | 2 | 6.8 | 13.5 | 2 | 6.8 | 13.5 | 2 | 14.0 | 28.0 | 2 | 12.5 | 25.0 |
| August | 2 | 3.0 | 4.5 | 2 | 2.2 | 2.5 | 2 | 0.8 | 1.5 | 2 | 1.5 | 2.8 |
| Icy Strait transect | | | | | | | | | | | | |
| | ISA | | | ISB | | | ISC | | | ISD | | |
| May | 1 | | | 1 | | | 1 | | | 1 | | |
| June | 3 | 25.3 | 63.3 | 3 | 29.7 | 53.3 | 3 | 24.7 | 53.3 | 3 | 17.5 | 41.7 |
| July | 3 | 16.0 | 34.7 | 3 | 8.8 | 17.7 | 3 | 3.9 | 9.0 | 3 | 3.3 | 7.5 |
| August | 3 | 5.3 | 6.0 | 3 | 3.8 | 3.8 | 3 | 3.3 | 3.3 | 3 | 6.3 | 6.3 |
| Icy Point transect | | | | | | | | | | | | |
| | IPA | | | IPB | | | IPC | | | IPD | | |
| July | 1 | 1.0 | 2.0 | 1 | 1.5 | 1.5 | 1 | 5.0 | 5.0 | 1 | 8.5 | 12.0 |
| August | 1 | 4.0 | 4.0 | 1 | 3.0 | 3.0 | 1 | 5.0 | 5.0 | 1 | 3.0 | 3.0 |

Table 6.—Zooplankton displacement volumes (DV, ml), standing stock (DV/m³), and total density (number/m³, 333-µm mesh only) from double oblique bongo (333- and 505-µm mesh) hauls collected monthly (n = 1) at the Icy Strait stations in the marine waters of the northern region of southeastern Alaska, May–August 2010. Standing stock (ml/m³) is computed using flow meter readings to determine water volume filtered. Station code acronyms are listed in Table 1.

| 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 | | | | | | | | | | | | | | | | |
| | ISA | | | | ISB | | | | ISC | | | | ISD | | | |
| May | 83 | 150 | 2.6 | 3,601.8 | 196 | 160 | 1.2 | 1,168.9 | 206 | 150 | 1.4 | 1,987.0 | 179 | 210 | 2.1 | 1,442.2 |
| June | 68 | 110 | 1.1 | 3,395.6 | 148 | 390 | 1.6 | 1,239.7 | 181 | 120 | 0.5 | 997.8 | 156 | 110 | 0.4 | 836.8 |
| July | 71 | 80 | 0.5 | 1,501.8 | 192 | 150 | 0.5 | 1,227.8 | 220 | 140 | 0.5 | 970.5 | 204 | 110 | 0.4 | 966.2 |
| August | 59 | 15 | 0.1 | 396.2 | 134 | 105 | 0.4 | 1,338.3 | 183 | 105 | 0.3 | 606.5 | 222 | 105 | 0.4 | 815.8 |
| 505-µm mesh | | | | | | | | | | | | | | | | |
| | ISA | | | | ISB | | | | ISC | | | | ISD | | | |
| May | 83 | 115 | 1.1 | — | 196 | 110 | 0.5 | — | 206 | 150 | 0.8 | — | 179 | 125 | 0.8 | — |
| June | 68 | 70 | 0.7 | — | 148 | 415 | 1.6 | — | 181 | 95 | 0.4 | — | 156 | 75 | 0.3 | — |
| July | 71 | 60 | 0.4 | — | 192 | 120 | 0.4 | — | 220 | 90 | 0.3 | — | 204 | 95 | 0.3 | — |
| August | 59 | 5 | 0.0 | — | 134 | 75 | 0.3 | — | 183 | 90 | 0.3 | — | 222 | 95 | 0.3 | — |

Table 7.—Mean volume (L) of jellyfish captured in rope trawl hauls in the marine waters of the northern region of southeastern Alaska, June-August 2010.

| Genus | Volume (L) | | |
|-----------------------------|------------|------|--------|
| | June | July | August |
| <i>Aequorea</i> sp. | 0.2 | 4.1 | 10.9 |
| <i>Cyanea capillata</i> | 1.5 | 2.9 | 7.5 |
| <i>Chrysaora melanaster</i> | 0.5 | 1.6 | 0.8 |
| <i>Aurelia labiata</i> | 0.2 | 1.1 | 1.0 |
| <i>Staurophora mertensi</i> | — | 0.1 | 0.1 |
| Total | 2.4 | 9.8 | 20.3 |

Table 8.—Numbers of fish captured in rope trawl hauls in the strait ($n = 60$) and coastal ($n = 8$) marine habitats of the northern region of southeastern Alaska, June–August 2010. No trawling was conducted in coastal habitat in June.

| Common Name | Scientific name | Strait | | | Coastal | | |
|-----------------------------|-------------------------------|--------|--------|--------|---------|------|--------|
| | | June | July | August | June | July | August |
| Salmonids | | | | | | | |
| Pink salmon ¹ | <i>Oncorhynchus gorbuscha</i> | 22,095 | 9,728 | 470 | | 190 | 9 |
| Chum salmon ¹ | <i>O. keta</i> | 3,293 | 1,188 | 38 | | 19 | — |
| Sockeye salmon ¹ | <i>O. nerka</i> | 270 | 399 | 10 | | 26 | — |
| Coho salmon ¹ | <i>O. kisutch</i> | 289 | 165 | 82 | | 19 | 1 |
| Pink salmon ³ | <i>O. gorbuscha</i> | 9 | 16 | 1 | | 6 | — |
| Coho salmon ³ | <i>O. kisutch</i> | — | 3 | 12 | | — | — |
| Chinook salmon ² | <i>O. tshawytscha</i> | 8 | — | 4 | | — | — |
| Chinook salmon ¹ | <i>O. tshawytscha</i> | 5 | 2 | — | | — | — |
| Chum salmon ³ | <i>O. keta</i> | 1 | 1 | 1 | | — | — |
| Chum salmon ² | <i>O. keta</i> | 2 | — | — | | — | — |
| Sockeye salmon ³ | <i>O. nerka</i> | — | — | 1 | | — | — |
| Salmonid subtotals | | 25,972 | 11,502 | 619 | | 260 | 10 |
| Non-salmonids | | | | | | | |
| Squid | Gonatidae | — | — | — | | 128 | 411 |
| Rockfish | <i>Sebastes spp.</i> | — | — | — | | — | 229 |
| Pacific herring | <i>Clupea pallasii</i> | 174 | 5 | 1 | | — | — |
| Crested sculpin | <i>Blepsias bilobus</i> | 13 | 10 | 6 | | — | — |
| Soft sculpin | <i>Psychrolutes sigalutes</i> | 7 | 3 | — | | — | — |
| Smooth lumpsucker | <i>Aptocyclus ventricosus</i> | 6 | 2 | 2 | | — | — |
| Spiny lumpsucker | <i>Eumicrotremus orbis</i> | 4 | 2 | 1 | | — | — |
| Pacific sandlance | <i>Ammodytes hexapterus</i> | 6 | — | — | | — | — |
| Unknown larvae | | — | — | — | | — | 6 |
| Prowfish | <i>Zaprora silenus</i> | — | 1 | 3 | | — | — |

Table 8.—cont.

| Common Name | Scientific name | Strait | | | Coastal | | |
|------------------------------|--------------------------------|--------|------|--------|---------|------|--------|
| | | June | July | August | June | July | August |
| Wolf-eel | <i>Anarrhichthys ocellatus</i> | — | 1 | 2 | | 1 | — |
| Flatfish larvae | Pleuronectidae | — | — | — | | — | 4 |
| Walleye pollock ⁴ | <i>Theragra chalcogramma</i> | — | — | 2 | | 1 | — |
| Silver-spine sculpin | <i>Blepsias cirrhosus</i> | 1 | — | — | | — | — |
| Walleye pollock ³ | <i>T. chalcogramma</i> | — | 1 | — | | — | — |
| Salmon shark | <i>Lamna ditropis</i> | — | — | 1 | | — | — |
| Non-salmonid subtotals | | 211 | 25 | 18 | | 130 | 650 |

¹Juvenile

²Immature

³Adult

⁴Larvae

Table 9.—Frequency of occurrence of fish species captured in rope trawl hauls in the strait ($n = 60$) and coastal ($n = 8$) marine habitats of the northern region of southeastern Alaska by rope trawl, June–August 2010. The percent frequency of occurrence is shown in parentheses. No trawling was conducted in coastal habitat in June.

| Common name | Scientific name | Strait | | | | Coastal | | | |
|-----------------------------|--------------------------------|--------|------|--------|------|---------|------|--------|------|
| | | June | July | August | (%) | June | July | August | (%) |
| Pink salmon ¹ | <i>Oncorhynchus gorbuscha</i> | 19 | 19 | 16 | (90) | | 3 | 2 | (63) |
| Chum salmon ¹ | <i>O. keta</i> | 18 | 19 | 10 | (78) | | 3 | — | (38) |
| Sockeye salmon ¹ | <i>O. nerka</i> | 20 | 17 | 8 | (75) | | 3 | — | (38) |
| Coho salmon ¹ | <i>O. kisutch</i> | 18 | 20 | 17 | (92) | | 3 | 1 | (50) |
| Pink salmon ³ | <i>O. gorbuscha</i> | 7 | 5 | 1 | (22) | | 3 | — | (38) |
| Coho salmon ³ | <i>O. kisutch</i> | — | 2 | 5 | (12) | | — | — | (0) |
| Chinook salmon ² | <i>O. tshawytscha</i> | 8 | — | 3 | (18) | | — | — | (0) |
| Chinook salmon ¹ | <i>O. tshawytscha</i> | 5 | 1 | — | (10) | | — | — | (0) |
| Chum salmon ³ | <i>O. keta</i> | 1 | 1 | 1 | (5) | | — | — | (0) |
| Chum salmon ² | <i>O. keta</i> | 2 | — | — | (3) | | — | — | (0) |
| Sockeye salmon ³ | <i>O. nerka</i> | — | — | 1 | (2) | | — | — | (0) |
| Squid | Gonatidae | — | — | — | (0) | | 3 | 4 | (88) |
| Rockfish | <i>Sebastes spp.</i> | — | — | — | (0) | | — | 3 | (38) |
| Pacific herring | <i>Clupea pallasii</i> | 7 | 4 | 1 | (20) | | — | — | (0) |
| Crested sculpin | <i>Blepsias bilobus</i> | 10 | 5 | 5 | (33) | | — | — | (0) |
| Soft sculpin | <i>Psychrolutes sigalutes</i> | 4 | 2 | | (10) | | — | — | (0) |
| Smooth lumpsucker | <i>Aptocycclus ventricosus</i> | 3 | 2 | 2 | (12) | | — | — | (0) |
| Spiny lumpsucker | <i>Eumicrotremus orbis</i> | 4 | 2 | 1 | (12) | | — | — | (0) |
| Pacific sandlance | <i>Ammodytes hexapterus</i> | 3 | — | — | (5) | | — | — | (0) |
| Unknown larvae | | — | — | — | (0) | | — | 2 | (25) |
| Prowfish | <i>Zaprora silenus</i> | — | 1 | 3 | (7) | | — | — | (0) |
| Wolf-eel | <i>Anarrhichthys ocellatus</i> | — | 1 | 2 | (5) | | 1 | — | (13) |
| Flatfish larvae | Pleuronectidae | — | — | — | (0) | | — | 2 | (25) |

Table 9.—cont.

| Common name | Scientific name | Strait | | | | Coastal | | | |
|------------------------------|------------------------------|--------|------|--------|-----|---------|------|--------|------|
| | | June | July | August | (%) | June | July | August | (%) |
| Walleye pollock ⁴ | <i>Theragra chalcogramma</i> | — | — | 2 | (3) | | 1 | — | (13) |
| Silver-spine sculpin | <i>Blepsias cirrhosus</i> | 1 | — | — | (2) | | — | — | (0) |
| Walleye pollock ³ | <i>Theragra chalcogramma</i> | — | 1 | — | (2) | | — | — | (0) |
| Salmon shark | <i>Lamna ditropis</i> | — | — | 1 | (2) | | — | — | (0) |

¹Juvenile

²Immature

³Adult

⁴Larvae

Table 10.—Mean catch-per-unit-effort (CPUE) and mean Ln(CPUE+1) by species for the FV *Northwest Explorer* (NWE) in 2010; calibration factors for adjusting the Ln(CPUE+1) by a commercial fishing trawler to the fishing power of the NOAA ship *John N. Cobb*; and the mean calibrated Ln(CPUE+1) and back-calculated mean nominal CPUE in “Cobb units.” Calibration factors were developed from paired comparisons of research and commercial fishing vessels (Wertheimer et al. 2010).

| Species | Month | NWE | | Calibration Factor | “Cobb units” | |
|---------|--------|--------|------------|-----------------------|--------------|-------|
| | | CPUE | Ln(CPUE+1) | | Ln(CPUE+1) | CPUE |
| Pink | June | 1889.5 | 5.62 | 0.659 | 3.70 | 108.0 |
| | July | 104.1 | 5.57 | | 3.67 | 69.8 |
| | August | 23.5 | 2.08 | | 1.37 | 5.5 |
| Chum | June | 233.3 | 3.88 | 0.705 | 2.74 | 36.2 |
| | July | 40.2 | 4.00 | | 2.82 | 23.3 |
| | August | 1.9 | 0.71 | | 0.50 | 1.0 |
| Sockeye | June | 30.8 | 2.83 | 0.848 | 2.40 | 16.2 |
| | July | 40.2 | 2.78 | | 2.36 | 20.7 |
| | August | 1.1 | 0.55 | | 0.46 | 0.8 |
| Coho | June | 31.7 | 3.09 | 0.803 | 2.48 | 14.5 |
| | July | 16.2 | 2.66 | | 2.14 | 8.6 |
| | August | 8.2 | 1.75 | | 1.40 | 4.6 |

Table 11.—Length (mm, fork), weight (g), Fulton’s condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis of juvenile pink salmon captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June–August 2010. No trawling was conducted at Icy Point in June.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|----------|------------|-------|------|----------|------------|-------|------|----------|------------|-------|------|
| | | <i>n</i> | range | mean | se | <i>n</i> | Range | mean | se | <i>n</i> | range | mean | se |
| Upper Chatham Strait | Length | 285 | 75-137 | 101.2 | 0.6 | 226 | 90-182 | 132.2 | 1.2 | 248 | 123-203 | 164.5 | 0.9 |
| | Weight | 157 | 3.7-23.5 | 9.5 | 0.3 | 151 | 7.4-60.4 | 23.3 | 0.8 | 90 | 14.5-80.1 | 46.5 | 1.4 |
| | Condition | 157 | 0.7-1.9 | 0.9 | 0.0 | 151 | 0.8-1.5 | 0.9 | 0.0 | 90 | 0.7-1.2 | 1.0 | 0.0 |
| | CR | 157 | -0.19-0.82 | 0.00 | 0.01 | 151 | -0.19-0.47 | -0.02 | 0.01 | 90 | -0.35-0.14 | 0.02 | 0.01 |
| Icy Strait | Length | 425 | 70-134 | 92.2 | 0.5 | 816 | 84-175 | 124.0 | 0.4 | 156 | 129-211 | 172.6 | 1.2 |
| | Weight | 300 | 3.3-22.0 | 6.7 | 0.1 | 400 | 7.7-55.5 | 19.4 | 0.4 | 103 | 19.0-92.7 | 51.4 | 1.5 |
| | Condition | 300 | 0.7-1.3 | 0.8 | 0.0 | 400 | 0.7-1.3 | 0.9 | 0.0 | 103 | 0.8-1.5 | 1.0 | 0.0 |
| | CR | 300 | -0.26-0.37 | -0.02 | 0.00 | 400 | -0.36-0.29 | 0.01 | 0.00 | 103 | -0.16-0.39 | 0.01 | 0.01 |
| Icy Point | Length | | | | | 115 | 105-248 | 158.7 | 2.4 | 9 | 131-178 | 154.6 | 5.2 |
| | Weight | | | | | 75 | 15.5-179.3 | 46.3 | 3.2 | 9 | 19.9-54.8 | 36.1 | 3.9 |
| | Condition | | | | | 75 | 0.9-1.2 | 1.0 | 0.0 | 9 | 0.8-1.3 | 0.9 | 0.0 |
| | CR | | | | | 75 | -0.12-0.25 | 0.02 | 0.01 | 9 | -0.22-0.25 | -0.01 | 0.04 |
| Total | Length | 710 | 70-137 | 95.8 | 0.4 | 1157 | 84-248 | 129.1 | 0.6 | 413 | 123-211 | 167.3 | 0.7 |
| | Weight | 457 | 3.3-23.5 | 7.7 | 0.1 | 626 | 7.4-179.3 | 23.6 | 0.6 | 202 | 14.5-92.7 | 48.5 | 1.0 |
| | Condition | 457 | 0.7-1.9 | 0.8 | 0.0 | 626 | 0.7-1.5 | 0.9 | 0.0 | 202 | 0.7-1.5 | 1.0 | 0.0 |
| | CR | 457 | -0.26-0.82 | -0.01 | 0.00 | 626 | -0.36-0.47 | 0.00 | 0.00 | 202 | -0.35-0.39 | 0.02 | 0.01 |

Table 12.—Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis of juvenile chum salmon captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June–August 2010. No trawling was conducted at Icy Point in June.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|----------|------------|-------|------|----------|------------|-------|------|----------|------------|-------|------|
| | | <i>n</i> | range | mean | se | <i>n</i> | Range | mean | se | <i>n</i> | range | mean | se |
| Upper Chatham Strait | Length | 218 | 82-140 | 107.5 | 0.7 | 93 | 87-171 | 132.7 | 2.0 | 22 | 109-190 | 149.7 | 4.8 |
| | Weight | 134 | 5.6-24.0 | 12.2 | 0.3 | 89 | 8.9-47.6 | 23.7 | 1.0 | 22 | 16.2-74.8 | 36.7 | 3.7 |
| | Condition | 134 | 0.8-1.6 | 0.9 | 0.0 | 89 | 0.8-1.0 | 0.9 | 0.0 | 22 | 0.9-1.3 | 1.0 | 0.0 |
| | CR | 134 | -0.24-0.51 | -0.05 | 0.01 | 89 | -0.23-0.08 | -0.04 | 0.01 | 22 | -0.12-0.28 | 0.05 | 0.02 |
| Icy Strait | Length | 335 | 75-144 | 101.5 | 0.6 | 716 | 84-198 | 124.8 | 0.6 | 16 | 105-204 | 151.6 | 6.1 |
| | Weight | 245 | 4.3-31.6 | 10.4 | 0.2 | 398 | 5.9-49.5 | 20.8 | 0.4 | 16 | 11.0-88.1 | 38.3 | 5.3 |
| | Condition | 245 | 0.5-1.2 | 0.9 | 0.0 | 398 | 0.5-2.1 | 1.0 | 0.0 | 16 | 0.9-1.2 | 1.0 | 0.0 |
| | CR | 245 | -0.75-0.15 | -0.03 | 0.01 | 398 | -0.74-0.74 | 0.03 | 0.00 | 16 | -0.13-0.13 | 0.02 | 0.02 |
| Icy Point | Length | | | | | 19 | 110-208 | 145.1 | 5.6 | — | — | — | — |
| | Weight | | | | | 19 | 11.6-90.0 | 33.1 | 4.6 | — | — | — | — |
| | Condition | | | | | 19 | 0.9-1.2 | 1.0 | 0.0 | — | — | — | — |
| | CR | | | | | 19 | -0.12-0.15 | 0.00 | 0.02 | — | — | — | — |
| Total | Length | 553 | 75-144 | 103.9 | 0.5 | 828 | 84-208 | 126.1 | 0.6 | 38 | 105-204 | 150.5 | 3.8 |
| | Weight | 379 | 1.3-31.6 | 11.0 | 0.2 | 506 | 5.9-90.0 | 21.8 | 0.4 | 38 | 11.0-88.1 | 37.3 | 3.1 |
| | Condition | 379 | 0.5-1.6 | 0.9 | 0.0 | 506 | 0.5-2.0 | 1.0 | 0.0 | 38 | 0.9-1.3 | 1.0 | 0.0 |
| | CR | 379 | -0.75-0.51 | -0.04 | 0.00 | 506 | -0.74-0.74 | 0.02 | 0.00 | 38 | -0.13-0.28 | 0.03 | 0.01 |

Table 13.—Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis of juvenile sockeye salmon captured in the marine habitat of the northern region of southeastern Alaska by rope trawl, June–August 2010. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|----------|------------|-------|------|----------|------------|-------|------|----------|------------|-------|------|
| | | <i>n</i> | range | mean | se | <i>n</i> | Range | mean | se | <i>n</i> | range | mean | se |
| Upper Chatham Strait | Length | 49 | 78-170 | 121.2 | 2.9 | 14 | 85-199 | 140.7 | 9.4 | 2 | 140-152 | 146.0 | 6.0 |
| | Weight | 49 | 3.6-49.9 | 18.4 | 1.4 | 14 | 4.7-79.8 | 32.7 | 6.3 | 2 | 32.4-37.3 | 34.9 | 2.5 |
| | Condition | 49 | 0.8-1.2 | 0.9 | 0.0 | 14 | 0.8-1.2 | 1.0 | 0.0 | 2 | 1.1-1.2 | 1.1 | 0.1 |
| | CR | 49 | -0.22-0.12 | -0.05 | 0.01 | 14 | -0.22-0.13 | -0.03 | 0.03 | 2 | 0.05-0.17 | 0.11 | 0.06 |
| Icy Strait | Length | 137 | 77-253 | 114.2 | 1.9 | 384 | 80-197 | 119.2 | 0.8 | 8 | 120-194 | 158.5 | 9.0 |
| | Weight | 112 | 4.3-178.2 | 16.3 | 1.6 | 305 | 5.2-85.6 | 18.9 | 0.5 | 8 | 16.3-77.5 | 44.5 | 7.1 |
| | Condition | 112 | 0.6-1.3 | 0.9 | 0.0 | 305 | 0.3-1.3 | 1.0 | 0.0 | 8 | 1-1.2 | 1.0 | 0.0 |
| | CR | 112 | -0.53-0.22 | -0.05 | 0.01 | 305 | -1.53-0.23 | 0.04 | 0.01 | 8 | -0.09-0.16 | 0.03 | 0.03 |
| Icy Point | Length | | | | | 26 | 120-203 | 182.1 | 3.7 | — | — | — | — |
| | Weight | | | | | 26 | 16.1-89.2 | 66.9 | 3.5 | — | — | — | — |
| | Condition | | | | | 26 | 0.9-1.2 | 1.1 | 0.0 | — | — | — | — |
| | CR | | | | | 26 | -0.06-0.15 | 0.04 | 0.01 | — | — | — | — |
| Total | Length | 186 | 77-253 | 116.0 | 1.6 | 424 | 80-203 | 123.8 | 1.1 | 10 | 120-194 | 156.0 | 7.3 |
| | Weight | 161 | 3.6-178.2 | 16.9 | 1.2 | 345 | 4.7-89.2 | 23.1 | 0.9 | 10 | 16.3-77.5 | 42.6 | 5.8 |
| | Condition | 161 | 0.6-1.3 | 0.9 | 0.0 | 345 | 0.3-1.3 | 1.0 | 0.0 | 10 | 1-1.2 | 1.1 | 0.0 |
| | CR | 161 | -0.53-0.22 | -0.05 | 0.01 | 345 | -1.53-0.23 | 0.04 | 0.01 | 10 | -0.09-0.17 | 0.04 | 0.02 |

Table 14.—Length (mm, fork), weight (g), Fulton’s condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis of juvenile coho salmon captured in the marine habitat of the northern region of southeastern Alaska by rope trawl, June–August 2010. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|----------|------------|-------|------|----------|------------|-------|------|----------|-------------|-------|------|
| | | <i>n</i> | range | mean | se | <i>n</i> | range | mean | se | <i>n</i> | range | mean | se |
| Upper Chatham Strait | Length | 108 | 95-225 | 174.9 | 2.7 | 66 | 170-270 | 210.1 | 2.5 | 15 | 214-320 | 250.1 | 6.7 |
| | Weight | 76 | 8.4-128.5 | 65.1 | 3.3 | 66 | 49.7-210.8 | 107.7 | 3.7 | 15 | 127.3-416.2 | 196.1 | 18.1 |
| | Condition | 76 | 0.7-1.4 | 1.1 | 0.0 | 66 | 0.9-1.4 | 1.1 | 0.0 | 15 | 1.1-1.4 | 1.2 | 0.0 |
| | CR | 76 | -0.52-0.14 | -0.07 | 0.01 | 66 | -0.36-0.19 | -0.02 | 0.01 | 15 | -0.09-0.16 | 0.02 | 0.02 |
| Icy Strait | Length | 164 | 109-313 | 184.5 | 2.2 | 100 | 132-292 | 211.2 | 3.0 | 67 | 198-335 | 252.7 | 3.1 |
| | Weight | 163 | 11.6-358.4 | 72.3 | 2.8 | 100 | 22.3-327.7 | 116.7 | 4.9 | 67 | 87.4-438.0 | 195.6 | 7.6 |
| | Condition | 163 | 0.9-1.8 | 1.1 | 0.0 | 100 | 0.9-1.4 | 1.2 | 0.0 | 67 | 1.1-1.4 | 1.2 | 0.0 |
| | CR | 163 | -0.24-0.49 | -0.07 | 0.01 | 100 | -0.29-0.19 | 0.00 | 0.01 | 67 | -0.15-0.11 | -0.02 | 0.01 |
| Icy Point | Length | | | | | 23 | 192-279 | 249.5 | 4.8 | 1 | 214 | 214.0 | — |
| | Weight | | | | | 23 | 94.9-274.2 | 207.1 | 11.9 | 1 | 123.9 | 123.9 | — |
| | Condition | | | | | 23 | 1.1-1.5 | 1.3 | 0.0 | 1 | 1.3 | 1.3 | — |
| | CR | | | | | 23 | -0.13-0.21 | 0.08 | 0.02 | 1 | 0.09 | 0.08 | — |
| Total | Length | 272 | 95-313 | 180.7 | 1.7 | 189 | 130-292 | 215.0 | 2.1 | 83 | 198-335 | 251.8 | 2.8 |
| | Weight | 239 | 8.4-358.4 | 70.0 | 2.2 | 189 | 22.3-327.7 | 124.5 | 3.9 | 83 | 87.4-438.0 | 194.8 | 7.0 |
| | Condition | 239 | 0.7-1.8 | 1.1 | 0.0 | 189 | 0.9-1.5 | 1.2 | 0.0 | 83 | 1.1-1.4 | 1.2 | 0.0 |
| | CR | 239 | -0.52-0.49 | -0.07 | 0.01 | 189 | -0.36-0.21 | 0.00 | 0.01 | 83 | -0.15-0.16 | -0.01 | 0.01 |

Table 15.—Length (mm, fork), weight (g), Fulton’s condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis of juvenile Chinook salmon captured in the marine habitat of the northern region of southeastern Alaska by rope trawl, June–August 2010. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|----------|------------|-------|------|----------|------------|-------|------|----------|-------|------|----|
| | | <i>n</i> | range | mean | se | <i>n</i> | Range | mean | se | <i>n</i> | range | mean | se |
| Upper Chatham Strait | Length | 2 | 183-185 | 184.0 | 1.0 | — | — | — | — | — | — | — | — |
| | Weight | 2 | 69.8-79.4 | 74.6 | 4.8 | — | — | — | — | — | — | — | — |
| | Condition | 2 | 1.2-1.3 | 1.2 | 0.1 | — | — | — | — | — | — | — | — |
| | CR | 2 | -0.07-0.03 | -0.02 | 0.05 | — | — | — | — | — | — | — | — |
| Icy Strait | Length | 2 | 175-225 | 200.0 | 25.0 | 2 | 201-217 | 209.0 | 8.0 | — | — | — | — |
| | Weight | 2 | 57.3-146.7 | 102.0 | 44.7 | 2 | 99.5-134.4 | 117.0 | 17.5 | — | — | — | — |
| | Condition | 2 | 1.1-1.3 | 1.2 | 0.1 | 2 | 1.3-1.4 | 1.3 | 0.0 | — | — | — | — |
| | CR | 2 | -0.12-0.01 | -0.06 | 0.05 | 2 | -0.03-0.03 | 0.00 | 0.02 | — | — | — | — |
| Icy Point | Length | — | — | — | — | — | — | — | — | — | — | — | — |
| | Weight | — | — | — | — | — | — | — | — | — | — | — | — |
| | Condition | — | — | — | — | — | — | — | — | — | — | — | — |
| | CR | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | Length | 4 | 175-225 | 192.0 | 11.2 | 2 | 201-217 | 209.0 | 8.0 | — | — | — | — |
| | Weight | 4 | 57.3-146.7 | 88.3 | 20.0 | 2 | 99.5-134.4 | 117.0 | 17.5 | — | — | — | — |
| | Condition | 4 | 1.1-1.3 | 1.2 | 0.1 | 2 | 1.3-1.4 | 1.3 | 0.0 | — | — | — | — |
| | CR | 4 | -0.12-0.03 | -0.04 | 0.03 | 2 | -0.03-0.03 | 0.00 | 0.02 | — | — | — | — |

Table 16.—Release and recovery information decoded from coded-wire tags (CWT) recovered from coho and Chinook salmon lacking an adipose fin. Fish were captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June–August 2010. Station code acronyms and coordinates are shown in Table 1.

| Species | CWT code | Brood year | Release information | | | | Recovery information | | | | | Days ² since release | Distance traveled (km) | | |
|---------|----------|------------|---------------------|-----------------------|-----------|---------|----------------------|--------------|--------------|-----------|---------|---------------------------------|------------------------|-------|------|
| | | | Agency ¹ | Locality | 2010 date | FL (mm) | W (g) | Locality | Station code | 2010 date | FL (mm) | | | W (g) | |
| June | | | | | | | | | | | | | | | |
| Coho | 040996 | 2008 | ADFG | Chilkat R., AK (Wild) | 5 /12 | | | Icy Strait | ISB | 6/25 | 141 | 26.8 | 1.0 | 44 | 145 |
| Coho | 040997 | 2008 | ADFG | Chilkat R., AK (Wild) | 5 /24 | | | Chatham Str. | UCC | 6/28 | 171 | 55.9 | 1.0 | 35 | 120 |
| Coho | 040997 | 2008 | ADFG | Chilkat R., AK (Wild) | 5 /24 | | | Chatham Str. | UCD | 6/28 | 152 | 35.6 | 1.0 | 35 | 120 |
| Coho | 041512 | 2008 | ADFG | Berners R., AK (Wild) | 6 /11 | 90 | | Icy Strait | ISA | 6/25 | 182 | 66.1 | 1.0 | 14 | 95 |
| Coho | 041544 | 2008 | ADFG | Taku River, AK (Wild) | 5 /20 | | | Icy Strait | ISB | 6/26 | 165 | 47.6 | 1.0 | 38 | 120 |
| Coho | 041765 | 2008 | NSRAA | Kasnyku Bay, AK | 5 /11 | | 20.5 | Icy Strait | ISA | 6/25 | 198 | 91.6 | 1.0 | 45 | 135 |
| Coho | 041766 | 2008 | NSRAA | Kasnyku Bay, AK | 5 /11 | | 20.5 | Icy Strait | ISD | 6/25 | 215 | 112.1 | 1.0 | 45 | 130 |
| Coho | 042286 | 2008 | DIPAC | Gastineau Channel, AK | 6 /3 | | 24.6 | Icy Strait | ISD | 6/26 | 151 | 33.2 | 1.0 | 24 | 87 |
| July | | | | | | | | | | | | | | | |
| Chinook | 042064 | 2008 | NSRAA | Kasnyku Bay, AK | 6 /1 | | 69.8 | Icy Strait | ISD | 7/29 | 217 | 134.4 | 1.0 | 58 | 130 |
| Coho | 040996 | 2008 | ADFG | Chilkat R., AK (Wild) | 5 /12 | | | Chatham Str. | UCA | 7/30 | 220 | 123.1 | 1.0 | 79 | 130 |
| Coho | 040997 | 2008 | SSRAA | Chilkat R., AK (Wild) | 5 /24 | | | Icy Strait | ISC | 7/27 | 210 | 112.6 | 1.0 | 64 | 145 |
| Coho | 041544 | 2008 | ADFG | Taku River, AK (Wild) | 5 /20 | | | Chatham Str. | UCC | 7/31 | 221 | 124.7 | 1.0 | 72 | 115 |
| Coho | 041766 | 2008 | NSRAA | Kasnyku Bay, AK | 5 /11 | | 20.5 | Icy Strait | ISB | 7/27 | 245 | 168.5 | 1.0 | 77 | 135 |
| Coho | 042269 | 2008 | SSRAA | Nakat Inlet, AK | 5 /21 | 139 | 26.6 | Icy Point | IPC | 7/28 | 261 | 226.7 | 1.0 | 68 | 670 |
| Coho | 634971 | 2008 | WDFW | Fork Creek, WA | 4 /15 | 137 | 30.2 | Icy Point | IPC | 7/28 | 268 | 263.9 | 1.0 | 104 | 1600 |
| Coho | No tag | | | | | | | Icy Point | IPD | 7/28 | 279 | 265.0 | | | |
| Coho | No tag | | | | | | | Icy Point | IPC | 7/28 | 273 | 264.0 | | | |
| Coho | No tag | | | | | | | Icy Point | IPC | 7/28 | 265 | 274.2 | | | |

Table 16.—cont.

| Table 10. Coho | | | | | | | | | | | | | | | |
|----------------|-------------|---------------|---------------------|-----------------------|--------------|------------|----------|----------------------|-----------------|--------------|------------|----------|-----|---------------------------------------|------------------------------|
| Species | CWT code | Brood year | Release information | | | | | Recovery information | | | | | Age | Days ² since release | Distance traveled (km) |
| | | | Agency ¹ | Locality | 2010 date | FL (mm) | W (g) | Locality | Station code | 2010 date | FL (mm) | W (g) | | | |
| | | | | | | | | | | | | | | | |
| August | | | | | | | | | | | | | | | |
| Coho | 041543 | 2008 | ADFG | Taku River, AK (Wild) | 5 /18 | | | Icy Strait | ISC | 8/26 | 229 | 153.1 | 1.0 | 100 | 120 |

¹ ADFG = Alaska Department of Fish and Game; DIPAC = Douglas Island Pink and Chum Inc.; NSRAA = Northern Southeast Regional Aquaculture Association; SSRAA = Southern Southeast Regional Aquaculture Association; WDFW = Washington Department of Fish and Wildlife.

² Days since release may potentially include freshwater residence periods, such as for salmon fry marked and released in fall that over-wintered in freshwater and smolted the subsequent year.

Table 17.—Stock-specific information on juvenile chum salmon released from regional enhancement facilities and captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June-August 2010. Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis are reported for each stock group. See Table 15 for agency acronyms. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------|-----------|------|------------|-------|------|------|------------|-------|------|--------|-----------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| DIPAC | | | | | | | | | | | | | |
| Upper | Length | 65 | 93-140 | 112.4 | 1.2 | 21 | 103-171 | 144.6 | 4.2 | 1 | 186 | 186.0 | — |
| Chatham | Weight | 65 | 7.6-23.9 | 13.5 | 0.4 | 21 | 9.8-47.6 | 30.8 | 2.4 | 1 | 68.0 | 68.0 | — |
| Strait | Condition | 65 | 0.7-1.2 | 0.9 | 0.0 | 21 | 0.9-1 | 1.0 | 0.0 | 1 | 1.1 | 1.1 | — |
| | CR | 65 | -0.24-0.21 | -0.02 | 0.01 | 21 | -0.09-0.06 | 0.00 | 0.01 | 1 | 0.07 | 0.07 | — |
| Icy | Length | 185 | 84-126 | 105.0 | 0.7 | 132 | 95-161 | 131.3 | 1.3 | 2 | 180-204 | 192.0 | 12.0 |
| Strait | Weight | 185 | 4.5-18.7 | 10.9 | 0.2 | 132 | 7.7-45.4 | 23.8 | 0.7 | 2 | 65.5-88.1 | 76.8 | 11.3 |
| | Condition | 185 | 0.4-1.1 | 0.9 | 0.0 | 132 | 0.5-2 | 1.0 | 0.0 | 2 | 1.0-1.1 | 1.1 | 0.0 |
| | CR | 185 | -0.74-0.14 | -0.03 | 0.01 | 132 | -0.73-0.74 | 0.04 | 0.01 | 2 | 0.04-0.13 | 0.09 | 0.04 |
| Icy Point | Length | | | | | 4 | 122-160 | 140.8 | 9.3 | — | — | — | — |
| | Weight | | | | | 4 | 16.5-40.3 | 28.2 | 5.6 | — | — | — | — |
| | Condition | | | | | 4 | 0.9-1 | 1.0 | 0.0 | — | — | — | — |
| | CR | | | | | 4 | -0.05-0.05 | 0.0 | 0.0 | — | — | — | — |
| Total | Length | 250 | 84-140 | 106.9 | 0.6 | 157 | 95-171 | 133.3 | 1.3 | 3 | 180-204 | 190.0 | 7.2 |
| | Weight | 250 | 4.5-23.9 | 11.6 | 0.2 | 157 | 7.7-47.6 | 24.8 | 0.7 | 3 | 65.5-88.1 | 73.9 | 7.2 |
| | Condition | 250 | 0.4-1.2 | 0.9 | 0.0 | 157 | 0.5-2 | 1.0 | 0.0 | 3 | 1-1.1 | 1.1 | 0.0 |
| | CR | 250 | -0.74-0.21 | -0.03 | 0.01 | 157 | -0.73-0.74 | 0.04 | 0.01 | 3 | 0.04-0.13 | 0.08 | 0.03 |
| Port Armstrong | | | | | | | | | | | | | |
| Upper | Length | 2 | 103-111 | 107.0 | 4.0 | 1 | 145 | 145.0 | — | — | — | — | — |
| Chatham | Weight | 2 | 9.2-12.7 | 11.0 | 1.8 | 1 | 26.3 | 26.3 | — | — | — | — | — |
| Strait | Condition | 2 | 0.8-0.9 | 0.9 | 0.0 | 1 | 0.9 | 0.9 | — | — | — | — | — |

Table 17.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|------|-------------|-------|------|------|------------|-------|------|--------|-----------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| | CR | 2 | -0.11--0.02 | -0.07 | 0.05 | 1 | -0.11 | -0.11 | — | — | — | — | — |
| Icy Strait | Length | — | — | — | — | 5 | 128-157 | 144.0 | 5.1 | — | — | — | — |
| | Weight | — | — | — | — | 5 | 19.1-40.1 | 30.0 | 3.7 | — | — | — | — |
| | Condition | — | — | — | — | 5 | 0.9-1 | 1.00 | 0.00 | — | — | — | — |
| | CR | — | — | — | — | 5 | -0.05-0.06 | 0.01 | 0.02 | — | — | — | — |
| Icy Point | Length | | | | | 1 | 157 | 157.0 | — | — | — | — | — |
| | Weight | | | | | 1 | 34.9 | 34.9 | — | — | — | — | — |
| | Condition | | | | | 1 | 0.9 | 0.9 | — | — | — | — | — |
| | CR | | | | | 1 | -0.08 | -0.08 | — | — | — | — | — |
| Total | Length | 2 | 103-111 | 107.0 | 4.0 | 7 | 128-157 | 146.0 | 4.0 | — | — | — | — |
| | Weight | 2 | 9.2-12.7 | 11.0 | 1.8 | 7 | 19.1-40.1 | 30.2 | 2.7 | — | — | — | — |
| | Condition | 2 | 0.8-0.9 | 0.9 | 0.0 | 7 | 0.9-1 | 1.0 | 0.0 | — | — | — | — |
| | CR | 2 | -0.11--0.02 | -0.07 | 0.05 | 7 | -0.11-0.06 | -0.02 | 0.02 | — | — | — | — |
| NSRAA | | | | | | | | | | | | | |
| Kasnyku Bay | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 33 | 90-132 | 108.4 | 1.7 | 20 | 101-151 | 135.3 | 3.4 | 1 | 175 | 175.0 | — |
| | Weight | 33 | 5.6-24.0 | 11.6 | 0.7 | 20 | 8.9-34.1 | 23.5 | 1.8 | 1 | 54.3 | 54.3 | — |
| | Condition | 33 | 0.8-1.6 | 0.9 | 0.0 | 20 | 0.8-1.0 | 0.9 | 0.0 | 1 | 1.0 | 1.0 | — |
| | CR | 33 | -0.19-0.51 | -0.07 | 0.02 | 20 | -0.22-0.06 | -0.06 | 0.02 | 1 | 0.03 | 0.03 | — |
| Icy Strait | Length | — | — | — | — | 46 | 100-159 | 130.9 | 2.0 | 3 | 150-158 | 154.7 | 2.4 |
| | Weight | — | — | — | — | 46 | 9.6-38.7 | 22.1 | 1.0 | 3 | 34.9-39.3 | 37.6 | 1.4 |
| | Condition | — | — | — | — | 46 | 0.5-1.1 | 1.0 | 0.0 | 3 | 1.0-1.0 | 1.0 | 0.0 |
| | CR | — | — | — | — | 46 | -0.64-0.17 | -0.01 | 0.02 | 3 | 0.02-0.06 | 0.04 | 0.01 |

Table 17.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|------|-------------|-------|------|------|------------|-------|------|--------|------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Icy Point | Length | | | | | 3 | 130-142 | 134.7 | 3.7 | — | — | — | — |
| | Weight | | | | | 3 | 19.3-32.2 | 23.8 | 4.2 | — | — | — | — |
| | Condition | | | | | 3 | 0.9-1.1 | 1.0 | 0.1 | — | — | — | — |
| | CR | | | | | 3 | 0.86-1.12 | 0.95 | 0.09 | — | — | — | — |
| Total | Length | 33 | 90-132 | 108.4 | 1.7 | 69 | 100-159 | 132.3 | 1.7 | 4 | 150-175 | 159.8 | 5.4 |
| | Weight | 33 | 5.6-24.0 | 11.6 | 0.7 | 69 | 8.9-38.7 | 22.6 | 0.9 | 4 | 34.9-54.3 | 41.8 | 4.3 |
| | Condition | 33 | 0.8-1.6 | 0.9 | 0.0 | 69 | 0.5-1.1 | 0.9 | 0.0 | 4 | 1.0-1.0 | 1.0 | 0.0 |
| | CR | 33 | -0.19-0.51 | -0.07 | 0.02 | 69 | -0.64-0.17 | -0.02 | 0.01 | 4 | 0.02-0.06 | 0.04 | 0.01 |
| Deep Inlet | | | | | | | | | | | | | |
| Icy Strait (Total) | Length | — | — | — | — | 1 | 120 | 120.0 | — | — | — | — | — |
| | Weight | — | — | — | — | 1 | 15.9 | 15.9 | — | — | — | — | — |
| | Condition | — | — | — | — | 1 | 0.9 | 0.9 | — | — | — | — | — |
| | CR | — | — | — | — | 1 | -0.03 | -0.03 | — | — | — | — | — |
| Takatz Bay | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 9 | 95-104 | 99.1 | 0.9 | 15 | 105-150 | 126.1 | 4.1 | 2 | 135-138 | 136.5 | 1.5 |
| | Weight | 9 | 6.8-9.4 | 8.2 | 0.3 | 15 | 10.2-29.6 | 18.6 | 1.8 | 2 | 23.4-25.4 | 24.4 | 1.0 |
| | Condition | 9 | 0.8-0.9 | 0.8 | 0.0 | 15 | 0.8-1.0 | 0.9 | 0.0 | 2 | 1.0-1.0 | 1.0 | 0.0 |
| | CR | 9 | -0.19--0.06 | -0.11 | 0.01 | 15 | -0.15-0.03 | -0.08 | 0.01 | 2 | -0.01-0.00 | 0.00 | 0.01 |
| Icy Strait | Length | — | — | — | — | 41 | 96-148 | 125.5 | 1.7 | 5 | 128-149 | 136.8 | 3.9 |
| | Weight | — | — | — | — | 41 | 8.0-30.2 | 19.7 | 0.8 | 5 | 18.2-36.5 | 24.8 | 3.3 |
| | Condition | — | — | — | — | 41 | 0.8-1.2 | 1.0 | 0.0 | 5 | 0.8-1.1 | 0.9 | 0.0 |
| | CR | — | — | — | — | 41 | -0.15-0.21 | 0.02 | 0.01 | 5 | -0.12-0.13 | -0.02 | 0.04 |

Table 17.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|------|-------------|-------|------|------|------------|-------|------|--------|------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Icy Point | Length | | | | | 1 | 123 | 123.0 | | — | — | — | — |
| | Weight | | | | | 1 | 16.0 | 16.0 | | — | — | — | — |
| | Condition | | | | | 1 | 0.9 | 0.9 | | — | — | — | — |
| | CR | | | | | 1 | -0.10 | -0.10 | | — | — | — | — |
| Total | Length | 9 | 95-104 | 99.1 | 0.9 | 57 | 96-150 | 125.6 | 1.6 | 7 | 128-149 | 136.7 | 2.7 |
| | Weight | 9 | 6.8-9.4 | 8.2 | 0.3 | 57 | 8.0-30.2 | 19.4 | 0.7 | 7 | 18.2-36.5 | 24.7 | 2.3 |
| | Condition | 9 | 0.8-0.9 | 0.8 | 0.0 | 57 | 0.8-1.2 | 1.0 | 0.0 | 7 | 0.8-1.1 | 0.9 | 0.0 |
| | CR | 9 | -0.19--0.06 | -0.11 | 0.01 | 57 | -0.15-0.21 | -0.01 | 0.01 | 7 | -0.12-0.13 | -0.02 | 0.03 |
| SSRAA | | | | | | | | | | | | | |
| Anita Bay | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | — | — | — | — | — | — | — | — | 1 | 185 | 185.0 | — |
| | Weight | — | — | — | — | — | — | — | — | 1 | 71.7 | 71.7 | — |
| | Condition | — | — | — | — | — | — | — | — | 1 | 1.1 | 1.1 | — |
| | CR | — | — | — | — | — | — | — | — | 1 | 0.14 | 0.14 | — |
| Icy Strait | Length | — | — | — | — | — | — | — | — | — | — | — | — |
| | Weight | — | — | — | — | — | — | — | — | — | — | — | — |
| | Condition | — | — | — | — | — | — | — | — | — | — | — | — |
| | CR | — | — | — | — | — | — | — | — | — | — | — | — |
| Icy Point | Length | | | | | 1 | 158 | 158.0 | — | — | — | — | — |
| | Weight | | | | | 1 | 40.4 | 40.4 | — | — | — | — | — |
| | Condition | | | | | 1 | 1.0 | 1.0 | — | — | — | — | — |
| | CR | | | | | 1 | 0.05 | 0.05 | — | — | — | — | — |
| Total | Length | — | — | — | — | 1 | 158 | 158.0 | — | 1 | 185 | 185.0 | — |

Table 17.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|------------------------|-----------|------|------------|-------|------|------|------------|-------|------|--------|------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| | Weight | — | — | — | — | 1 | 40.4 | 40.4 | — | 1 | 71.7 | 71.7 | — |
| | Condition | — | — | — | — | 1 | 1.0 | 1.0 | — | 1 | 1.1 | 1.1 | — |
| | CR | — | — | — | — | 1 | 0.05 | 0.05 | — | 1 | 0.14 | 0.14 | — |
| Unmarked stocks | | | | | | | | | | | | | |
| Upper | Length | 22 | 89-121 | 105.5 | 1.9 | 29 | 100-165 | 127.8 | 3.4 | 13 | 109-190 | 141.8 | 6.2 |
| Chatham | Weight | 22 | 5.8-17 | 10.9 | 0.7 | 29 | 9.8-42.2 | 21.1 | 1.7 | 13 | 16.2-74.8 | 31.4 | 4.5 |
| Strait | Condition | 22 | 0.8-1.0 | 0.9 | 0.0 | 29 | 0.8-1.1 | 1.0 | 0.0 | 13 | 0.9-1.3 | 1.0 | 0.0 |
| | CR | 22 | -0.15-0.06 | -0.05 | 0.01 | 29 | -0.11-0.08 | -0.01 | 0.01 | 13 | -0.10-0.28 | 0.07 | 0.03 |
| Icy | Length | 57 | 80-144 | 97.4 | 1.6 | 163 | 84-170 | 120.2 | 1.2 | 6 | 105-186 | 149.0 | 11.4 |
| Strait | Weight | 57 | 4.3-31.6 | 8.8 | 0.6 | 163 | 5.9-49.5 | 18.2 | 0.6 | 6 | 11.0-72.1 | 36.9 | 8.7 |
| | Condition | 57 | 0.7-1.1 | 0.9 | 0.0 | 163 | 0.8-1.4 | 1.0 | 0.0 | 6 | 1.0-1.1 | 1.0 | 0.0 |
| | CR | 57 | -0.28-0.15 | -0.03 | 0.01 | 163 | -0.22-0.4 | 0.05 | 0.01 | 6 | 0.00-0.13 | 0.03 | 0.02 |
| Icy | Length | | | | | 8 | 110-208 | 153.9 | 11.3 | — | — | — | — |
| Point | Weight | | | | | 8 | 11.6-90.0 | 42.2 | 9.5 | — | — | — | — |
| | Condition | | | | | 8 | 0.9-1.1 | 1.0 | 0.0 | — | — | — | — |
| | CR | | | | | 8 | -0.08-0.15 | 0.04 | 0.03 | — | — | — | — |
| Total | Length | 79 | 80-144 | 99.7 | 1.3 | 200 | 84-208 | 122.7 | 1.3 | 19 | 105-190 | 144.1 | 5.4 |
| | Weight | 79 | 4.3-31.6 | 9.4 | 0.5 | 200 | 5.9-90.0 | 19.6 | 0.7 | 19 | 11.0-74.8 | 33.1 | 4.0 |
| | Condition | 79 | 0.7-1.1 | 0.9 | 0.0 | 200 | 0.8-1.4 | 1.0 | 0.0 | 19 | 0.9-1.3 | 1.0 | 0.0 |
| | CR | 79 | -0.28-0.15 | -0.04 | 0.01 | 200 | -0.22-0.40 | 0.04 | 0.01 | 19 | -0.10-0.28 | 0.06 | 0.02 |

Table 18.—Stock-specific information on juvenile sockeye salmon released from regional enhancement facilities and captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June-August 2010. Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis are reported for each stock group. See Table 15 for agency acronyms. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|------|------------|-------|------|------|------------|-------|------|--------|-------|-------|----|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| DIPAC | | | | | | | | | | | | | |
| Speel Arm | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 12 | 110-140 | 125.6 | 3.0 | 3 | 130-147 | 135.7 | 5.7 | 1 | 140 | 140.0 | — |
| | Weight | 12 | 13.6-26.5 | 19.3 | 1.3 | 3 | 21.8-33.3 | 26.1 | 3.6 | 1 | 32.4 | 32.4 | — |
| | Condition | 12 | 0.9-1.0 | 1.0 | 0.0 | 3 | 1.0-1.1 | 1.0 | 0.0 | 1 | 1.2 | 1.2 | — |
| | CR | 12 | -0.10-0.06 | -0.03 | 0.01 | 3 | 0.00-0.06 | 0.03 | 0.02 | 1 | 0.16 | 0.16 | — |
| Icy Strait | Length | 19 | 113-138 | 121.5 | 1.6 | 32 | 106-160 | 132.4 | 1.8 | — | — | — | — |
| | Weight | 19 | 13.2-26.3 | 17.9 | 0.9 | 32 | 12.2-42.1 | 24.9 | 1.1 | — | — | — | — |
| | Condition | 19 | 0.9-1.1 | 1.0 | 0.0 | 32 | 0.9-1.2 | 1.0 | 0.0 | — | — | — | — |
| | CR | 19 | -0.15-0.14 | -0.01 | 0.02 | 32 | -0.06-0.20 | 0.05 | 0.01 | — | — | — | — |
| Icy Point | Length | | | | | — | — | — | — | — | — | — | — |
| | Weight | | | | | — | — | — | — | — | — | — | — |
| | Condition | | | | | — | — | — | — | — | — | — | — |
| | CR | | | | | — | — | — | — | — | — | — | — |
| Total | Length | 31 | 110-140 | 123.1 | 1.5 | 35 | 106-160 | 132.7 | 1.7 | 1 | 140 | 140.0 | — |
| | Weight | 31 | 13.2-26.5 | 18.4 | 0.7 | 35 | 12.2-42.1 | 25.0 | 1.0 | 1 | 32.4 | 32.4 | — |
| | Condition | 31 | 0.9-1.1 | 1.0 | 0.0 | 35 | 0.9-1.2 | 1.0 | 0.0 | 1 | 1.2 | 1.2 | — |
| | CR | 31 | -0.15-0.14 | -0.02 | 0.01 | 35 | -0.06-0.20 | 0.05 | 0.01 | 1 | 0.16 | 0.16 | — |

Table 18.—cont.

| | | June | | | | July | | | | August | | | |
|----------------------|-----------|------|-------------|-------|------|------|-----------|-------|------|--------|-------|------|----|
| Locality | Factor | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Sweetheart Lake | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 1 | 100 | 100.0 | — | — | — | — | — | — | — | — | — |
| | Weight | 1 | 9.5 | 9.5 | — | — | — | — | — | — | — | — | — |
| | Condition | 1 | 1.0 | 1.0 | — | — | — | — | — | — | — | — | — |
| | CR | 1 | -0.02 | -0.02 | — | — | — | — | — | — | — | — | — |
| Icy Strait | Length | 1 | 111 | 111.0 | — | 2 | 145-152 | 148.5 | 3.5 | — | — | — | — |
| | Weight | 1 | 12.9 | 12.9 | — | 2 | 33.8-36.6 | 35.2 | 1.4 | — | — | — | — |
| | Condition | 1 | 0.9 | 0.9 | — | 2 | 1.0-1.1 | 1.1 | 0.0 | — | — | — | — |
| | CR | 1 | -0.04 | -0.04 | — | 2 | 0.03-0.10 | 0.06 | 0.03 | — | — | — | — |
| Icy Point | Length | — | — | — | — | — | — | — | — | — | — | — | — |
| | Weight | — | — | — | — | — | — | — | — | — | — | — | — |
| | Condition | — | — | — | — | — | — | — | — | — | — | — | — |
| | CR | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | Length | 2 | 100-111 | 105.5 | 5.5 | 2 | 145-152 | 148.5 | 3.5 | — | — | — | — |
| | Weight | 2 | 9.5-12.9 | 11.2 | 1.7 | 2 | 33.8-36.6 | 35.2 | 1.4 | — | — | — | — |
| | Condition | 2 | 0.9-1.0 | 0.9 | 0.0 | 2 | 1.0-1.1 | 1.1 | 0.0 | — | — | — | — |
| | CR | 2 | -0.04--0.02 | -0.03 | 0.01 | 2 | 0.03-0.10 | 0.06 | 0.03 | — | — | — | — |
| Tatsamenie Lake | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | — | — | — | — | 1 | 199 | 199.0 | — | — | — | — | — |
| | Weight | — | — | — | — | 1 | 79.8 | 79.8 | — | — | — | — | — |
| | Condition | — | — | — | — | 1 | 1.0 | 1.0 | — | — | — | — | — |
| | CR | — | — | — | — | 1 | -0.03 | -0.03 | — | — | — | — | — |

Table 18.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|------------------------|-----------|------|-------------|-------|------|------|-------------|-------|------|--------|------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Icy Strait | Length | 6 | 96-121 | 110.7 | 3.7 | 2 | 123.0-143.0 | 133.0 | 10.0 | — | — | — | — |
| | Weight | 6 | 6.9-15.8 | 11.5 | 1.3 | 2 | 18.5-29.3 | 23.9 | 5.4 | — | — | — | — |
| | Condition | 6 | 0.8-0.9 | 0.8 | 0.0 | 2 | 1.0-1.0 | 1.0 | 0.0 | — | — | — | — |
| | CR | 6 | -0.23--0.10 | -0.17 | 0.05 | 2 | 0.00-0.01 | 0.00 | 0.01 | — | — | — | — |
| Icy Point | Length | | | | | — | — | — | — | — | — | — | — |
| | Weight | | | | | — | — | — | — | — | — | — | — |
| | Condition | | | | | — | — | — | — | — | — | — | — |
| | CR | | | | | — | — | — | — | — | — | — | — |
| Total | Length | 6 | 96-121 | 110.7 | 3.7 | 3 | 123.0-199.0 | 155.0 | 22.7 | — | — | — | — |
| | Weight | 6 | 6.9-15.8 | 11.5 | 1.3 | 3 | 18.5-79.8 | 42.5 | 18.9 | — | — | — | — |
| | Condition | 6 | 0.8-0.9 | 0.8 | 0.0 | 3 | 1.0-1.0 | 1.0 | 0.0 | — | — | — | — |
| | CR | 6 | -0.23--0.10 | -0.17 | 0.05 | 3 | -0.03-0.01 | -0.01 | 0.02 | — | — | — | — |
| Unmarked stocks | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 35 | 78-170 | 120.7 | 3.9 | 10 | 85-185 | 136.4 | 11.7 | 1 | 152 | 152.0 | — |
| | Weight | 35 | 3.6-49.9 | 18.5 | 2.0 | 10 | 4.7-63.2 | 30.0 | 7.3 | 1 | 37.3 | 37.3 | — |
| | Condition | 35 | 0.8-1.1 | 0.9 | 0.0 | 10 | 0.8-1.2 | 1.0 | 0.0 | 1 | 1.1 | 1.1 | — |
| | CR | 35 | -0.22-0.12 | -0.06 | 0.01 | 10 | -0.22-0.12 | -0.05 | 0.03 | 1 | 0.05 | 0.05 | — |
| Icy Strait | Length | 85 | 80-253 | 113.3 | 2.8 | 269 | 80-197 | 118.5 | 1.0 | 9 | 120-194 | 161.0 | 8.3 |
| | Weight | 85 | 4.3-178.2 | 16.3 | 2.2 | 269 | 5.2-85.6 | 18.1 | 0.6 | 9 | 16.3-77.5 | 46.7 | 6.6 |
| | Condition | 85 | 0.6-1.2 | 0.9 | 0.0 | 269 | 0.2-1.2 | 1.0 | 0.0 | 9 | 0.9-1.2 | 1.1 | 0.0 |
| | CR | 85 | -0.52-0.22 | -0.06 | 0.01 | 269 | -1.53-0.23 | 0.04 | 0.01 | 9 | -0.08-0.16 | 0.03 | 0.02 |
| Icy Point | Length | | | | | 26 | 120-203 | 182.1 | 3.7 | — | — | — | — |
| | Weight | | | | | 26 | 16.1-89.2 | 66.9 | 3.5 | — | — | — | — |
| | Condition | | | | | 26 | 0.9-1.2 | 1.1 | 0.0 | — | — | — | — |
| | CR | | | | | 26 | -0.06-0.14 | 0.04 | 0.01 | — | — | — | — |

Table 18.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------|-----------|------|------------|-------|------|------|------------|-------|------|--------|------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Total | Length | 120 | 78-253 | 115.5 | 2.3 | 305 | 80-203 | 124.5 | 1.4 | 10 | 120-194 | 160.1 | 7.5 |
| | Weight | 120 | 3.6-178.2 | 17.0 | 1.6 | 305 | 4.7-89.2 | 22.6 | 1.0 | 10 | 16.3-77.5 | 45.7 | 6.0 |
| | Condition | 120 | 0.6-1.2 | 0.9 | 0.0 | 305 | 0.2-1.2 | 1.0 | 0.0 | 10 | 0.9-1.2 | 1.1 | 0.0 |
| | CR | 120 | -0.52-0.22 | -0.06 | 0.01 | 305 | -1.53-0.23 | 0.04 | 0.01 | 10 | -0.08-0.16 | 0.03 | 0.02 |

Table 19.—Stock-specific information on juvenile coho salmon released from regional enhancement facilities and captured in the marine waters of the northern region of southeastern Alaska by rope trawl, June-August 2010. Length (mm, fork), weight (g), Fulton's condition $[(g/mm^3) \cdot (10^5)]$, and condition residuals (CR) from length-weight regression analysis are reported for each stock group. See Table 15 for agency acronyms. No trawling was conducted in June at Icy Point.

| Locality | Factor | June | | | | July | | | | August | | | |
|----------------------|-----------|------|-------------|-------|------|------|-------------|-------|------|--------|-------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| DIPAC | | | | | | | | | | | | | |
| Gastineau Channel | | | | | | | | | | | | | |
| Upper Chatham Strait | Length | 4 | 147-158 | 153.5 | 2.4 | 7 | 210-235 | 221.7 | 3.1 | 2 | 242-253 | 247.5 | 5.5 |
| | Weight | 4 | 32.6-38.7 | 36.2 | 1.3 | 7 | 107.2-121.8 | 115.6 | 2.0 | 2 | 168.5-195.5 | 182.0 | 13.5 |
| | Condition | 4 | 1.0-1.0 | 1.0 | 0.0 | 7 | 0.8-1.2 | 1.1 | 0.0 | 2 | 1.2-1.2 | 1.2 | 0.0 |
| | CR | 4 | -0.13--0.07 | -0.10 | 0.01 | 7 | -0.35-0.02 | -0.09 | 0.05 | 2 | 0.01-0.02 | 0.01 | 0.00 |
| Icy Strait | Length | 1 | 154 | 154.0 | — | 3 | 200-218 | 210.0 | 5.3 | 5 | 228-266 | 249.8 | 6.8 |
| | Weight | 1 | 38.1 | 38.1 | — | 3 | 87.6-119.7 | 102.8 | 9.3 | 5 | 135.5-221.2 | 176.2 | 14.9 |
| | Condition | 1 | 1.0 | 1.0 | — | 3 | 1.1-1.2 | 1.1 | 0.0 | 5 | 1.0-1.2 | 1.1 | 0.0 |
| | CR | 1 | -0.06 | -0.06 | — | 3 | -0.09--0.01 | -0.05 | 0.02 | 5 | -0.14--0.02 | -0.06 | 0.02 |
| Icy Point | Length | | | | | — | — | — | — | — | — | — | — |
| | Weight | | | | | — | — | — | — | — | — | — | — |
| | Condition | | | | | — | — | — | — | — | — | — | — |
| | CR | | | | | — | — | — | — | — | — | — | — |
| Total | Length | 5 | 147-158 | 153.6 | 1.9 | 10 | 200-235 | 218.2 | 3.1 | 7 | 228-266 | 249.1 | 4.9 |
| | Weight | 5 | 32.6-38.7 | 36.5 | 1.1 | 10 | 87.6-121.8 | 111.8 | 3.4 | 7 | 135.5-221.2 | 177.9 | 10.7 |
| | Condition | 5 | 1.0-1.0 | 1.0 | 0.0 | 10 | 0.8-1.2 | 1.1 | 0.0 | 7 | 1.0-1.2 | 1.1 | 0.0 |
| | CR | 5 | -0.13--0.06 | -0.10 | 0.01 | 10 | -0.35-0.02 | -0.08 | 0.03 | 7 | -0.14-0.02 | -0.04 | 0.02 |

Table 19.—cont.

| Locality | Factor | June | | | | July | | | | August | | | |
|-----------------|-----------|------|------------|-------|------|------|------------|-------|------|--------|-------------|-------|------|
| | | n | range | mean | se | n | range | mean | se | n | range | mean | se |
| Unmarked stocks | | | | | | | | | | | | | |
| Upper | Length | 69 | 95-225 | 181.3 | 3.4 | 57 | 170-270 | 208.3 | 2.7 | 13 | 214-320 | 250.5 | 7.7 |
| Chatham | Weight | 69 | 8.4-128.5 | 67.9 | 3.5 | 57 | 49.7-210.8 | 106.1 | 4.3 | 13 | 127.3-416.2 | 198.3 | 20.9 |
| Strait | Condition | 69 | 0.7-1.3 | 1.1 | 0.0 | 57 | 0.9-1.4 | 1.1 | 0.0 | 13 | 1.1-1.4 | 1.2 | 0.0 |
| | CR | 69 | -0.51-0.13 | -0.07 | 0.01 | 57 | -0.27-0.19 | -0.01 | 0.01 | 13 | -0.08-0.16 | 0.03 | 0.02 |
| Icy | Length | 152 | 109-313 | 185.5 | 2.3 | 95 | 132-292 | 210.9 | 3.1 | 59 | 198-335 | 253.6 | 3.4 |
| Strait | Weight | 152 | 11.6-358.4 | 72.8 | 2.9 | 95 | 22.3-327.7 | 116.6 | 5.1 | 59 | 87.4-438.0 | 198.3 | 8.5 |
| | Condition | 152 | 0.9-1.7 | 1.1 | 0.0 | 95 | 0.9-1.3 | 1.2 | 0.0 | 59 | 1.0-1.3 | 1.2 | 0.0 |
| | CR | 152 | -0.23-0.48 | -0.07 | 0.01 | 95 | -0.29-0.19 | 0.01 | 0.01 | 59 | -0.14-0.11 | -0.01 | 0.01 |
| Icy Point | Length | | | | | 20 | 192-279 | 247.3 | 5.4 | 1 | 214 | 214.0 | — |
| | Weight | | | | | 20 | 94.9-274.2 | 201.4 | 13.1 | 1 | 123.9 | 123.9 | — |
| | Condition | | | | | 20 | 1.0-1.5 | 1.3 | 0.0 | 1 | 1.3 | 1.3 | — |
| | CR | | | | | 20 | -0.12-0.21 | 0.08 | 0.02 | 1 | 0.1 | 0.1 | — |
| Total | Length | 221 | 95-313 | 184.2 | 1.9 | 172 | 132-292 | 214.2 | 2.2 | 73 | 198-335 | 252.5 | 3.1 |
| | Weight | 221 | 8.4-358.4 | 71.3 | 2.3 | 172 | 22.3-327.7 | 123.0 | 4.1 | 73 | 87.4-438.0 | 197.3 | 7.8 |
| | Condition | 221 | 0.7-1.7 | 1.1 | 0.0 | 172 | 0.9-1.5 | 1.2 | 0.0 | 73 | 1.0-1.4 | 1.2 | 0.0 |
| | CR | 221 | -0.51-0.48 | -0.07 | 0.01 | 172 | -0.29-0.21 | 0.01 | 0.01 | 73 | -0.14-0.16 | 0.00 | 0.01 |

Table 20.—Number examined, length (mm, fork), wet weight (g), stomach content as percent body weight (%BW), and feeding intensity (0-100% volume fullness) of 59 potential predators of juvenile salmon captured in marine waters of the northern region of southeastern Alaska by rope trawl, June–August 2011. For scientific names, see Tables 8 and 9. For additional feeding data, see Table 20 and Figure 17. No trawling was conducted in coastal habitat in June.

| Species | Factor | June | | | | July | | | | August | | | |
|-----------------------------|----------|----------|-----------|--------|-------|----------|----------|--------|-------|----------|-----------|--------|--------|
| | | <i>n</i> | range | mean | sd | <i>n</i> | range | mean | sd | <i>n</i> | range | mean | sd |
| Pink salmon ¹ | Length | 9 | 445-535 | 494.8 | 31.9 | 22 | 425-582 | 519.5 | 39.7 | 1 | 459 | 459 | — |
| | Weight | | 1550-2350 | 1961.1 | 331.5 | | 860-2600 | 1774.5 | 412.1 | | 1100 | 1100 | — |
| | %BW | | 0-1.3 | 0.4 | 0.4 | | 0-1.7 | 0.3 | 0.4 | | 0.1 | 0.1 | — |
| | Fullness | | 0-100 | 50 | 33.1 | | 0-75 | 27 | 31.6 | | 25 | 25 | — |
| Chum salmon ¹ | Length | 3 | 590-638 | 611.0 | 24.6 | 1 | 700 | 700.0 | — | 1 | 713 | 713.0 | — |
| | Weight | | 3300-4900 | 4133.3 | 802.1 | | 4190 | 4190.0 | — | | 4270 | 4270.0 | — |
| | %BW | | 0.4-0.6 | 0.5 | 0.1 | | 0.5 | 0.5 | — | | 0.1 | 0.1 | — |
| | Fullness | | 1-75 | 50.3 | 42.7 | | 25 | 25 | — | | 10 | 10 | — |
| Coho salmon ² | Length | — | — | — | — | — | — | — | — | 8 | 545-768 | 661.8 | 73.8 |
| | Weight | — | — | — | — | — | — | — | — | | 3070-6650 | 4378.8 | 1340.2 |
| | %BW | — | — | — | — | — | — | — | — | | 0.0-3.9 | 1.2 | 1.4 |
| | Fullness | — | — | — | — | — | — | — | — | | 10-110 | 76.9 | 42.7 |
| Chinook salmon ² | Length | 8 | 275-417 | 335.4 | 52.1 | | — | — | — | 4 | 400-505 | 451.3 | 59.2 |
| | Weight | | 300-1500 | 762.5 | 402.4 | | — | — | — | | 820-3000 | 1777.5 | 904.2 |
| | %BW | | 0.0-1.8 | 0.7 | 0.6 | | — | — | — | | 0-0.5 | 0.2 | 0.2 |
| | Fullness | | 25-100 | 68.8 | 29.1 | | — | — | — | | 0-50 | 27.5 | 26.3 |
| Sockeye salmon ² | Length | — | — | — | — | | — | — | — | 1 | 600 | 600.0 | — |
| | Weight | — | — | — | — | | — | — | — | | 2600 | 2600.0 | — |
| | %BW | — | — | — | — | | — | — | — | | 0.1 | 0.1 | — |
| | Fullness | — | — | — | — | | — | — | — | | 75 | 75 | — |

Table 20.—cont.

| Species | Factor | June | | | | July | | | | August | | | |
|------------------------------|----------|----------|-------|------|----|----------|-------|------|----|----------|-------|------|----|
| | | <i>n</i> | range | mean | sd | <i>n</i> | range | mean | sd | <i>n</i> | range | mean | sd |
| Walleye pollock ² | Length | — | — | — | — | 1 | 320 | 320 | — | — | — | — | — |
| | Weight | — | — | — | — | | 2400 | 2400 | — | — | — | — | — |
| | %BW | — | — | — | — | | 0.1 | 0.1 | — | — | — | — | — |
| | Fullness | — | — | — | — | | 75 | 75 | — | — | — | — | — |

¹ Adult

² Immature

Table 21.—Feeding intensity of potential predators of juvenile salmon examined from rope trawl hauls in the marine waters of the northern region of southeastern Alaska, June–August 2010. No trawling was conducted in coastal habitat in June.

| Predator species | Life history stage | Number examined | Number empty | Percent feeding | Number with salmon | Percent feeders with salmon |
|------------------|--------------------|-----------------|--------------|-----------------|--------------------|-----------------------------|
| Pink salmon | Adult | 32 | 11 | 66 | 2 | 9.5 |
| Chum salmon | Adult | 5 | 0 | 100 | 0 | 0 |
| Coho salmon | Adult | 8 | 0 | 100 | 3 | 37.5 |
| Chinook salmon | Immature | 12 | 1 | 92 | 0 | 0 |
| Sockeye salmon | Adult | 1 | 0 | 100 | 0 | 0 |
| Walleye pollock | Immature | 1 | 0 | 100 | 0 | 0 |

Appendix 1.— Temperature (°C), salinity (PSU), ambient light (W/m³), Secchi depth (m), mixed layer depth (MLD, m; see text for definition), zooplankton settled volume (ZSV, ml), and total plankton settled volumes (TSV, ml) by haul number at each station sampled in the marine waters of the northern region of southeastern Alaska, May–August 2010. Station code acronyms are listed in Table 1.

| Date | Haul # | Station | Temperature (°C) | Salinity (PSU) | Light level (W/m ³) | Secchi (m) | MLD (m) | ZSV (ml) | TSV (ml) |
|---------|--------|---------|---------------------|-------------------|------------------------------------|---------------|------------|-------------|-------------|
| 26 May | 14001 | ABM | 12.6 | 26.0 | 859 | 2.5 | 6 | | 340.0 |
| 27 May | 14002 | ISD | 9.4 | 30.4 | 607 | 5.0 | 7 | | 500.0 |
| 27 May | 14003 | ISC | 9.9 | 30.1 | 637 | 5.5 | 6 | | 500.0 |
| 27 May | 14004 | ISB | 9.4 | 30.4 | 883 | 4.0 | 6 | | 500.0 |
| 27 May | 14005 | ISA | 9.7 | 30.4 | 465 | 5.5 | 7 | | 500.0 |
| 27 May | 14006 | UCA | 10.3 | 29.8 | 511 | 5.5 | 6 | | 500.0 |
| 27 May | 14007 | UCB | 11.2 | 29.9 | 431 | 7.0 | 7 | | 500.0 |
| 27 May | 14008 | UCC | 10.5 | 28.4 | 187 | 3.5 | 7 | | 500.0 |
| 27 May | 14009 | UCD | 10.6 | 27.0 | 438 | 4.0 | 7 | | 500.0 |
| 24 June | 14010 | ABM | 13.4 | 21.8 | 140 | 2.5 | 8 | 20.0 | 44.0 |
| 25 June | 14011 | ISA | 10.7 | 28.9 | 118 | 3.5 | 6 | 35.8 | 100.0 |
| 25 June | 14012 | ISB | 11.9 | 26.3 | 550 | 6.0 | 6 | 50.0 | 60.0 |
| 25 June | 14013 | ISC | 12.1 | 25.7 | 325 | 5.0 | 7 | 32.5 | 75.0 |
| 25 June | 14014 | ISD | 12.2 | 25.8 | 136 | 4.5 | 9 | 25.0 | 50.0 |
| 26 June | 14015 | ISA | 10.3 | 29.1 | 51 | 3.5 | 7 | 20.0 | 50.0 |
| 26 June | 14016 | ISB | 11.0 | 27.8 | 71 | 4.0 | 9 | 29.0 | 58.0 |
| 26 June | 14017 | ISC | 12.0 | 26.2 | 87 | 5.5 | 7 | 17.5 | 35.0 |
| 26 June | 14018 | ISD | 11.8 | 26.2 | 257 | 5.5 | 9 | 15.0 | 30.0 |
| 27 June | 14019 | ISD | 10.9 | 27.7 | 254 | 4.5 | 6 | 12.5 | 45.0 |
| 27 June | 14020 | ISC | 11.5 | 26.7 | 393 | 6.0 | 6 | 24.0 | 50.0 |
| 27 June | 14021 | ISB | 11.5 | 26.8 | 278 | 6.0 | 7 | 10.0 | 42.0 |
| 27 June | 14022 | ISA | 11.4 | 27.6 | 681 | 6.0 | 7 | 20.0 | 40.0 |
| 28 June | 14023 | UCA | 10.2 | 29.7 | 395 | 3.5 | 6 | 8.5 | 15.0 |
| 28 June | 14024 | UCB | 9.3 | 30.1 | 413 | 3.5 | 6 | 14.5 | 50.0 |

Appendix 1.—cont.

| Date | Haul # | Station | Temperature (°C) | Salinity (PSU) | Light level (W/m ³) | Secchi (m) | MLD (m) | ZSV (ml) | TSV (ml) |
|-----------|--------|---------|---------------------|-------------------|------------------------------------|---------------|------------|-------------|-------------|
| 28 June | 14025 | UCC | 10.4 | 29.7 | 705 | 5.0 | 17 | 7.8 | 12.0 |
| 29 June | 14028 | UCA | 11.5 | 28.0 | 293 | 4.5 | 9 | 5.5 | 24.0 |
| 29 June | 14029 | UCB | 11.5 | 28.1 | 299 | 5.0 | 10 | 25.0 | 55.0 |
| 29 June | 14030 | UCC | 11.4 | 28.0 | 423 | 4.5 | 7 | 4.8 | 13.0 |
| 25 July | 14031 | ABM | 11.4 | 21.4 | 236 | 2.0 | 8 | 3.8 | 12.0 |
| 26 July | 14032 | ISA | 11.3 | 27.8 | 81 | 4.0 | 6 | 10.5 | 25.0 |
| 26 July | 14033 | ISB | 11.2 | 27.6 | 446 | 5.0 | 8 | 9.0 | 18.0 |
| 26 July | 14034 | ISC | 11.3 | 27.0 | 810 | 4.0 | 6 | 4.5 | 15.0 |
| 26 July | 14035 | ISD | 11.2 | 27.7 | 751 | 5.0 | 6 | 2.5 | 7.5 |
| 27 July | 14036 | ISA | 10.6 | 28.7 | 123 | | 7 | 7.5 | 19.0 |
| 27 July | 14037 | ISB | 11.0 | 28.4 | 264 | 4.0 | 7 | 3.8 | 8.0 |
| 27 July | 14038 | ISC | 11.2 | 28.1 | 314 | 4.0 | 7 | 2.3 | 5.0 |
| 27 July | 14039 | ISD | 11.6 | 28.1 | 476 | 5.0 | 6 | 2.3 | 5.0 |
| 28 July | 14040 | IPD | 12.5 | 32.3 | 42 | 7.0 | 9 | 8.5 | 12.0 |
| 28 July | 14041 | IPC | 12.6 | 31.6 | 495 | 7.0 | 16 | 5.0 | 5.0 |
| 28 July | 14042 | IPB | 12.1 | 31.8 | 526 | 3.0 | 9 | 1.5 | 1.5 |
| 28 July | 14043 | IPA | 10.9 | 31.5 | 293 | 3.0 | 7 | 1.0 | 2.0 |
| 29 July | 14044 | ISD | 11.3 | 23.2 | 24 | 5.0 | 6 | 5.0 | 10.0 |
| 29 July | 14045 | ISC | 11.6 | 22.7 | 31 | 6.0 | 7 | 4.8 | 7.0 |
| 29 July | 14046 | ISB | 11.7 | 26.7 | 118 | 5.0 | 6 | 13.5 | 27.0 |
| 29 July | 14047 | ISA | 11.8 | 26.3 | 297 | 6.0 | 6 | 30.0 | 60.0 |
| 30 July | 14048 | UCA | 12.0 | 23.7 | 95 | 5.0 | 6 | 7.5 | 15.0 |
| 30 July | 14049 | UCB | 11.8 | 25.5 | 222 | 6.0 | 8 | 6.0 | 12.0 |
| 30 July | 14050 | UCC | 11.5 | 26.9 | 470 | 6.0 | 8 | 8.0 | 16.0 |
| 30 July | 14051 | UCD | 11.7 | 25.8 | 743 | 4.0 | 7 | 9.5 | 19.0 |
| 30 July | 14052 | UCB | 12.5 | 24.3 | 325 | 6.0 | 6 | 7.5 | 15.0 |
| 30 July | 14053 | UCA | 11.2 | 26.6 | 298 | 5.0 | 6 | 6.0 | 12.0 |
| 24 August | 14056 | ABM | 12.5 | 17.2 | 375 | 4.0 | 8 | 11.0 | 11.0 |

Appendix 1.—cont.

| Date | Haul # | Station | Temperature (°C) | Salinity (PSU) | Light level (W/m ³) | Secchi (m) | MLD (m) | ZSV (ml) | TSV (ml) |
|-----------|--------|---------|---------------------|-------------------|------------------------------------|---------------|------------|-------------|-------------|
| 25 August | 14057 | ISA | 10.8 | 28.2 | 32 | 4.0 | 6 | 4.0 | 6.0 |
| 25 August | 14058 | ISB | 12.3 | 24.3 | 123 | 6.0 | 7 | 5.0 | 5.0 |
| 25 August | 14059 | ISC | 12.5 | 24.1 | 148 | 6.0 | 7 | 4.5 | 4.5 |
| 25 August | 14060 | ISD | 12.7 | 21.9 | 195 | 6.0 | 6 | 10.0 | 10.0 |
| 25 August | 14061 | ISB | 11.9 | 26.2 | 191 | 4.0 | 6 | 3.5 | 3.5 |
| 25 August | 14062 | ISA | 10.9 | 28.1 | 179 | 5.0 | 7 | 6.0 | 6.0 |
| 26 August | 14063 | ISA | 11.5 | 26.3 | 31 | 5.0 | 6 | 6.0 | 6.0 |
| 26 August | 14064 | ISB | 12.4 | 22.3 | 49 | 6.0 | 6 | 3.0 | 3.0 |
| 26 August | 14065 | ISC | 12.8 | 21.1 | 117 | 7.0 | 7 | 2.0 | 2.0 |
| 26 August | 14066 | ISD | 12.8 | 21.7 | 124 | 6.0 | 7 | 5.0 | 5.0 |
| 26 August | 14067 | ISC | 13.0 | 20.1 | 490 | 6.0 | 6 | 3.5 | 3.5 |
| 26 August | 14068 | ISD | 12.9 | 22.0 | 683 | 8.0 | 6 | 4.0 | 4.0 |
| 27 August | 14069 | IPD | 13.8 | 32.1 | 12 | 6.0 | 14 | 3.0 | 3.0 |
| 27 August | 14070 | IPC | 13.6 | 32.1 | 163 | 7.0 | 23 | 5.0 | 5.0 |
| 27 August | 14071 | IPB | 14.2 | 32.1 | 178 | 6.0 | 15 | 3.0 | 3.0 |
| 27 August | 14072 | IPA | 10.7 | 31.6 | 259 | 7.0 | 12 | 4.0 | 4.0 |
| 28 August | 14073 | UCA | 13.0 | 23.3 | 21 | 6.0 | 6 | 1.5 | 3.0 |
| 28 August | 14074 | UCB | 13.1 | 24.4 | 49 | 6.0 | 6 | 2.3 | 3.0 |
| 28 August | 14075 | UCC | 12.7 | 22.6 | 152 | 5.0 | 8 | 0.5 | 1.0 |
| 28 August | 14076 | UCD | 12.3 | 24.4 | 228 | 4.0 | 7 | 1.5 | 2.5 |
| 28 August | 14077 | UCB | 12.6 | 25.7 | 125 | 5.5 | 8 | 2.0 | 2.0 |
| 28 August | 14078 | UCA | 12.9 | 24.0 | 105 | 5.0 | 6 | 4.5 | 6.0 |
| 29 August | 14079 | UCC | 12.4 | 24.0 | 29 | 5.0 | 6 | 1.0 | 2.0 |
| 29 August | 14080 | UCD | 12.5 | 24.8 | 82 | 5.0 | 6 | 1.5 | 3.0 |

Appendix 2.—Catch and life history stage of salmonids captured in the marine waters of the northern region of southeastern Alaska, June–August 2010. Length of trawl (minutes) is indicated for each haul. No trawling was conducted in June at Icy Point. Station code acronyms are listed in Table 1.

| Date | Haul # | Station | Trawl time | Juvenile salmon | | | | | Immature and adult salmon | | | | |
|---------|--------|---------|---------------|-----------------|-------|---------|------|---------|---------------------------|------|---------|------|---------|
| | | | | Pink | Chum | Sockeye | Coho | Chinook | Pink | Chum | Sockeye | Coho | Chinook |
| 25 June | 14011 | ISA | 20 | 308 | 30 | 14 | 20 | 2 | 1 | 1 | 0 | 0 | 0 |
| 25 June | 14012 | ISB | 20 | 31 | 3 | 3 | 29 | 0 | 1 | 0 | 0 | 0 | 0 |
| 25 June | 14013 | ISC | 20 | 1,206 | 128 | 7 | 1 | 0 | 2 | 1 | 0 | 0 | 1 |
| 25 June | 14014 | ISD | 20 | 5,919 | 431 | 25 | 31 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 June | 14015 | ISA | 20 | 0 | 0 | 5 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 June | 14016 | ISB | 20 | 4,520 | 1,810 | 118 | 27 | 0 | 1 | 0 | 0 | 0 | 0 |
| 26 June | 14017 | ISC | 2 | 698 | 62 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 June | 14018 | ISD | 10 | 3 | 0 | 2 | 13 | 1 | 0 | 0 | 0 | 0 | 0 |
| 27 June | 14019 | ISD | 10 | 6,240 | 316 | 25 | 12 | 0 | 1 | 0 | 0 | 0 | 0 |
| 27 June | 14020 | ISC | 10 | 1,462 | 53 | 7 | 10 | 0 | 0 | 0 | 0 | 0 | 1 |
| 27 June | 14021 | ISB | 10 | 238 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 June | 14022 | ISA | 10 | 532 | 38 | 3 | 9 | 0 | 2 | 0 | 0 | 0 | 0 |
| 28 June | 14023 | UCA | 10 | 260 | 142 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 1 |
| 28 June | 14024 | UCB | 10 | 260 | 144 | 9 | 5 | 1 | 1 | 0 | 0 | 0 | 0 |
| 28 June | 14025 | UCC | 10 | 3 | 2 | 4 | 22 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 June | 14026 | UCD | 10 | 107 | 34 | 6 | 57 | 1 | 0 | 1 | 0 | 0 | 1 |
| 28 June | 14027 | UCD | 10 | 13 | 3 | 3 | 19 | 0 | 0 | 0 | 0 | 0 | 1 |
| 29 June | 14028 | UCA | 10 | 218 | 66 | 7 | 7 | 0 | 0 | 0 | 0 | 0 | 1 |
| 29 June | 14029 | UCB | 10 | 60 | 21 | 9 | 5 | 0 | 0 | 0 | 0 | 0 | 1 |
| 29 June | 14030 | UCC | 10 | 17 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 26 July | 14032 | ISA | 20 | 3,132 | 287 | 63 | 10 | 0 | 1 | 0 | 0 | 0 | 0 |
| 26 July | 14033 | ISB | 10 | 901 | 101 | 34 | 6 | 0 | 0 | 1 | 0 | 0 | 0 |
| 26 July | 14034 | ISC | 10 | 255 | 44 | 43 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 July | 14035 | ISD | 10 | 966 | 120 | 44 | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 July | 14036 | ISA | 10 | 672 | 114 | 10 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 July | 14037 | ISB | 10 | 644 | 53 | 16 | 17 | 0 | 0 | 0 | 0 | 0 | 0 |

Appendix 2.—cont.

| Date | Haul # | Station | Trawl time | Juvenile salmon | | | | | Immature and adult salmon | | | | |
|-----------|--------|---------|---------------|-----------------|------|---------|------|---------|---------------------------|------|---------|------|---------|
| | | | | Pink | Chum | Sockeye | Coho | Chinook | Pink | Chum | Sockeye | Coho | Chinook |
| 27 July | 14038 | ISC | 10 | 888 | 56 | 36 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 July | 14039 | ISD | 10 | 958 | 69 | 58 | 19 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 July | 14040 | IPD | 20 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 |
| 28 July | 14041 | IPC | 20 | 35 | 4 | 13 | 12 | 0 | 1 | 0 | 0 | 0 | 0 |
| 28 July | 14042 | IPB | 20 | 125 | 5 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 July | 14043 | IPA | 20 | 30 | 10 | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| 29 July | 14044 | ISD | 10 | 129 | 30 | 15 | 13 | 2 | 0 | 0 | 0 | 0 | 0 |
| 29 July | 14045 | ISC | 10 | 473 | 137 | 46 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 July | 14046 | ISB | 10 | 340 | 57 | 18 | 8 | 0 | 6 | 0 | 0 | 0 | 0 |
| 29 July | 14047 | ISA | 10 | 128 | 27 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 July | 14048 | UCA | 10 | 20 | 4 | 2 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 July | 14049 | UCB | 10 | 67 | 20 | 3 | 7 | 0 | 0 | 0 | 0 | 2 | 0 |
| 30 July | 14050 | UCC | 10 | 32 | 15 | 0 | 11 | 0 | 4 | 0 | 0 | 0 | 0 |
| 30 July | 14051 | UCD | 10 | 7 | 1 | 3 | 6 | 0 | 3 | 0 | 0 | 0 | 0 |
| 30 July | 14052 | UCB | 10 | 67 | 30 | 5 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 July | 14053 | UCA | 10 | 26 | 12 | 0 | 8 | 0 | 2 | 0 | 0 | 1 | 0 |
| 31 July | 14054 | UCC | 10 | 23 | 11 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 July | 14055 | UCD | 10 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 August | 14057 | ISA | 20 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 1 | 0 |
| 25 August | 14058 | ISB | 20 | 6 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 August | 14059 | ISC | 20 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 August | 14060 | ISD | 20 | 14 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 August | 14061 | ISB | 20 | 78 | 5 | 2 | 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 August | 14062 | ISA | 20 | 12 | 2 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 August | 14063 | ISA | 20 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 August | 14064 | ISB | 20 | 8 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 August | 14065 | ISC | 20 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 August | 14066 | ISD | 20 | 8 | 2 | 1 | 4 | 0 | 0 | 1 | 0 | 5 | 0 |
| 26 August | 14067 | ISC | 20 | 21 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 1 | 0 |

Appendix 2.—cont.

| Date | Haul # | Station | Trawl time | Juvenile salmon | | | | | Immature and adult salmon | | | | |
|-----------|--------|---------|---------------|-----------------|------|---------|------|---------|---------------------------|------|---------|------|---------|
| | | | | Pink | Chum | Sockeye | Coho | Chinook | Pink | Chum | Sockeye | Coho | Chinook |
| 26 August | 14068 | ISD | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 August | 14071 | IPB | 20 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 August | 14072 | IPA | 20 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 August | 14073 | UCA | 20 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 1 |
| 28 August | 14074 | UCB | 20 | 8 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 August | 14075 | UCC | 20 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 |
| 28 August | 14076 | UCD | 20 | 156 | 10 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 August | 14077 | UCB | 20 | 5 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 August | 14078 | UCA | 20 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 29 August | 14079 | UCC | 20 | 109 | 8 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 August | 14080 | UCD | 20 | 33 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |

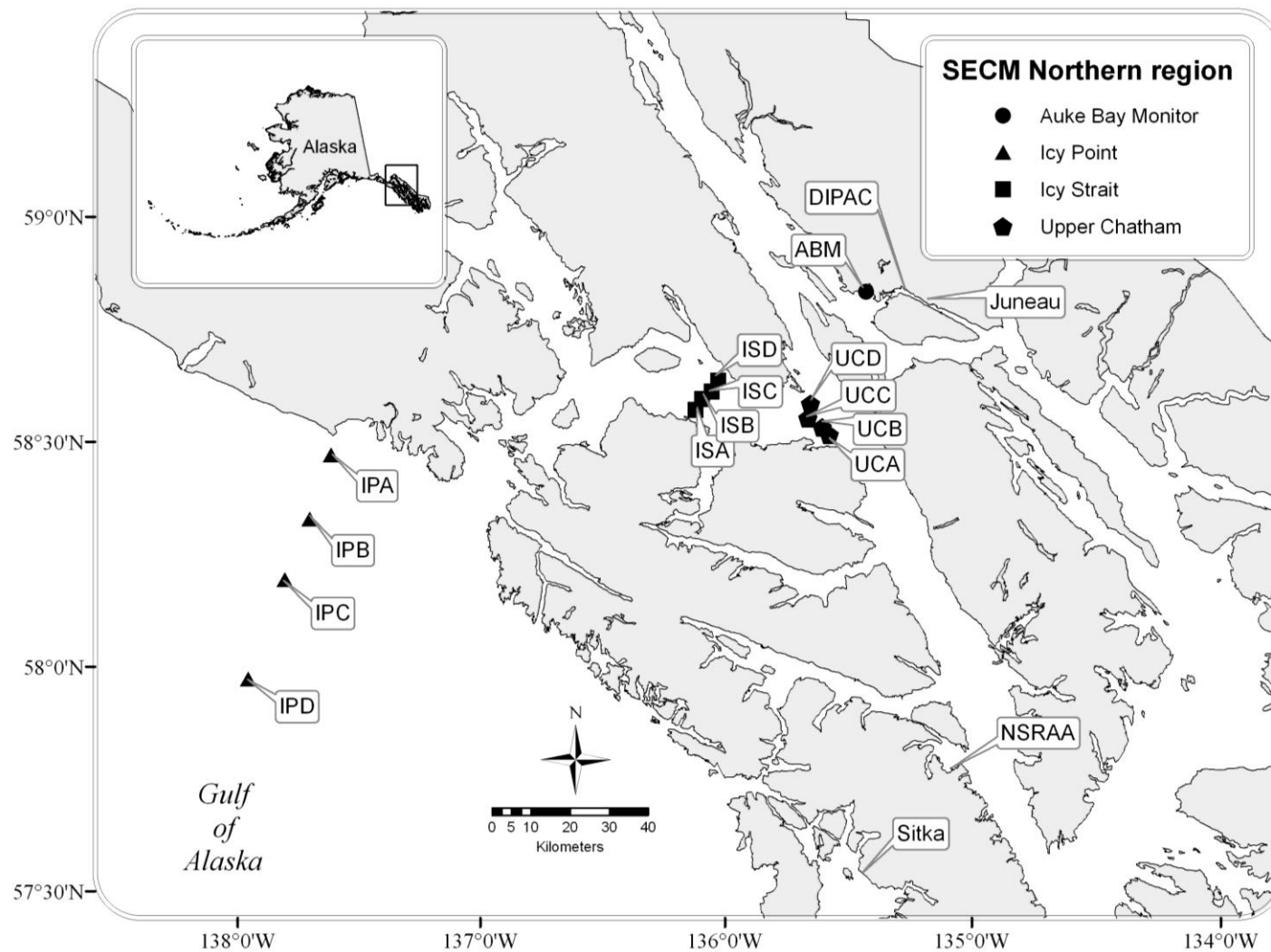


Figure 1.—Stations sampled in the marine waters of the northern region of southeastern Alaska, May–August 2011. Transect and station coordinates and station code acronyms are shown in Table 1.

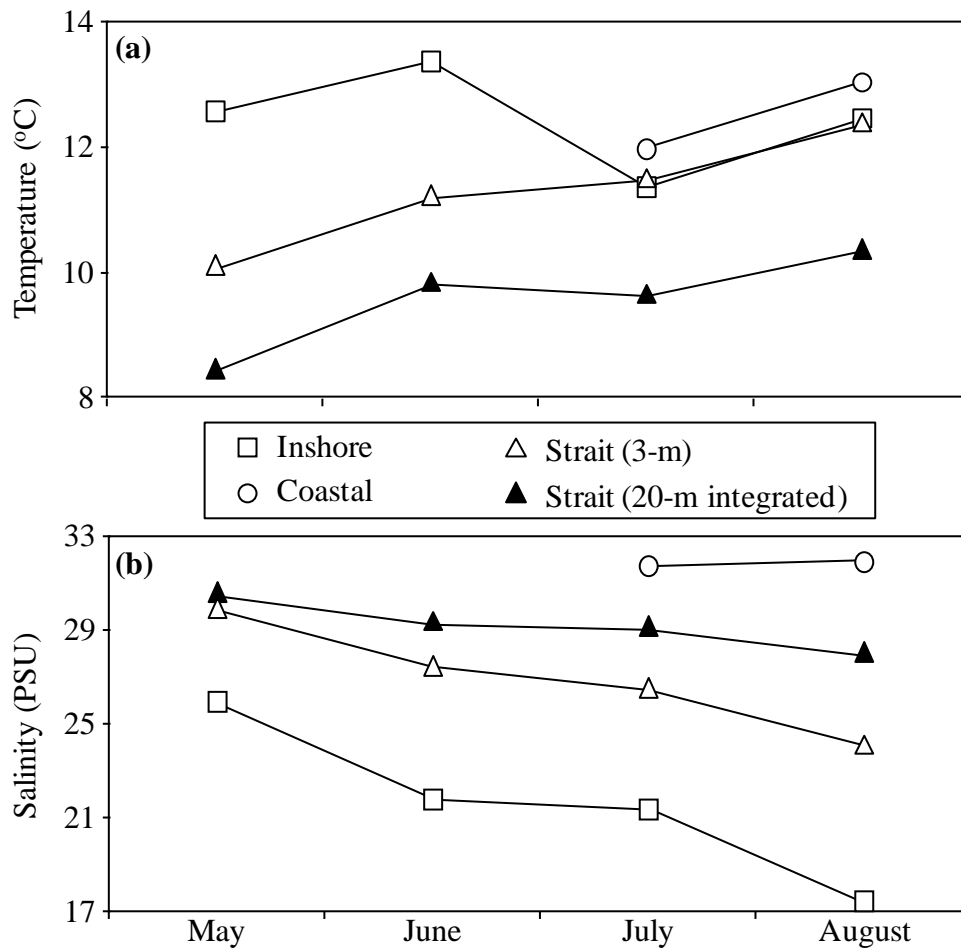


Figure 2.—Mean surface (3-m) and 20-m integrated temperature (a, °C) and salinity (b, PSU) measures in the marine waters of the northern region of southeastern Alaska, May–August 2010. The 3-m measures represent the most active segment of the water column, while the 20-m integrated measures represent more stable waters also sampled by the trawl (see also Figure 3). See Table 2 for monthly sample sizes and Appendix 1 for data values.

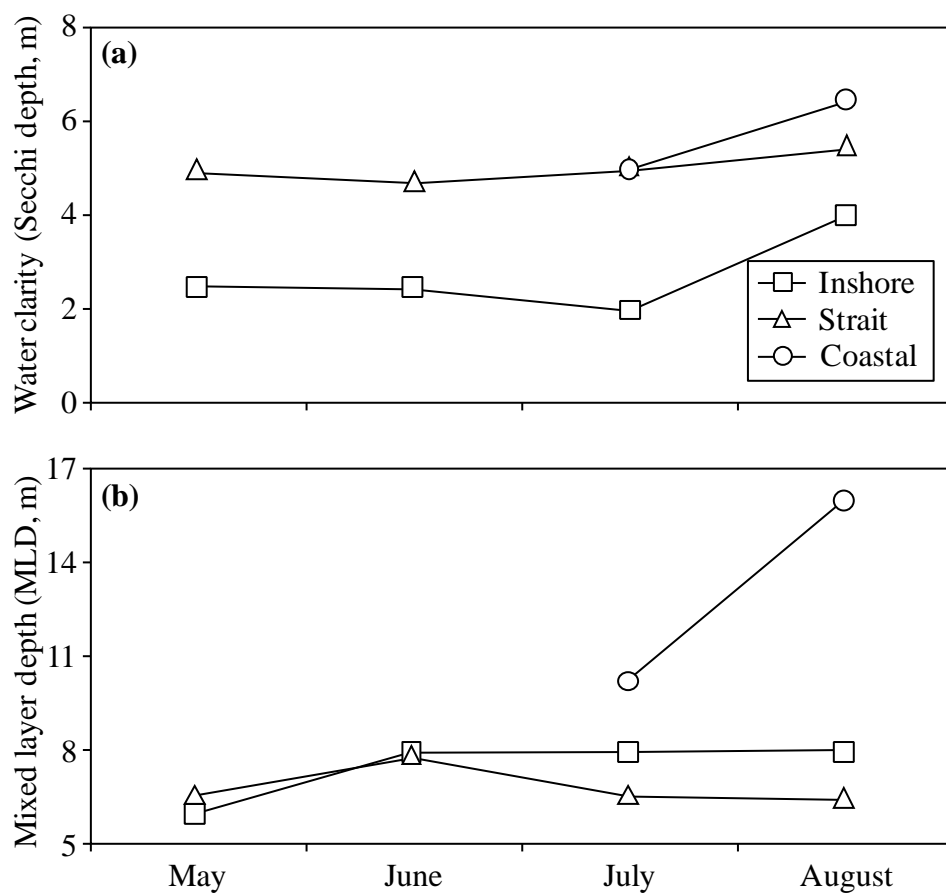


Figure 3.—Water clarity as mean depth (a, m) of Secchi disappearance and mixed layer depth (b, MLD, m) calculated from CTD profiles of the marine water column in the northern region of southeastern Alaska, May–August 2010. See Table 2 for monthly sample sizes and Appendix 1 for data values.

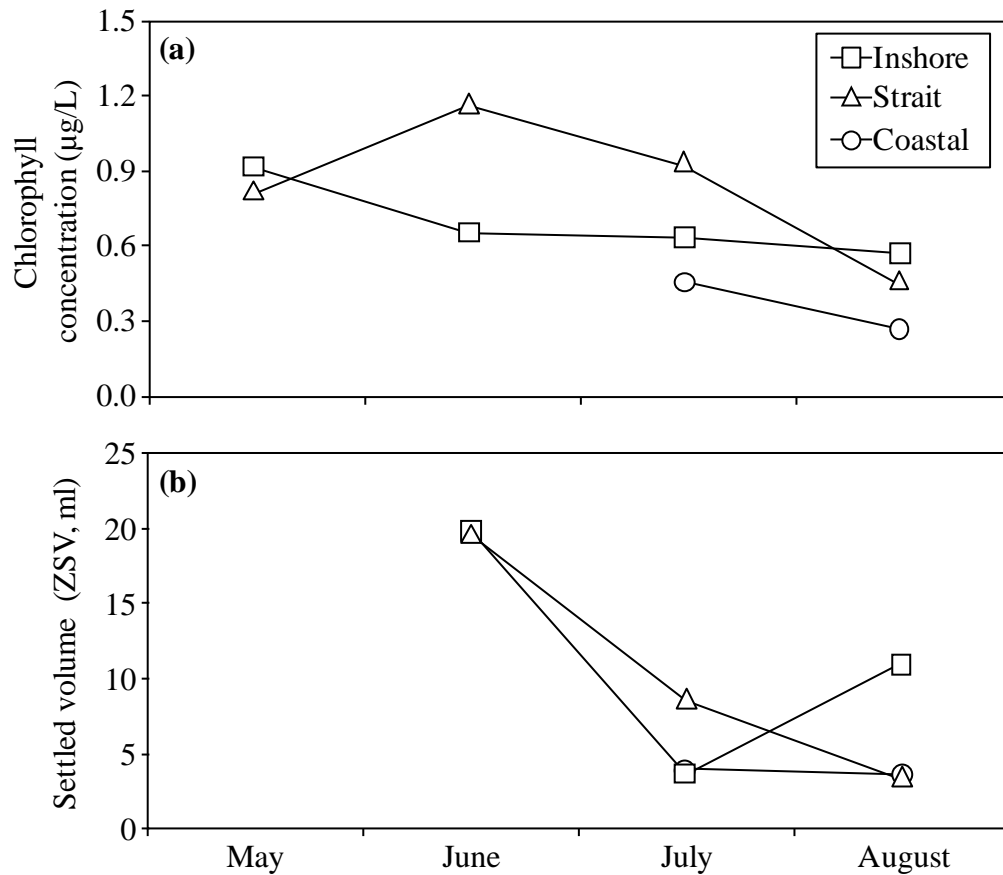


Figure 4.—Mean chlorophyll-a concentration (a, $\mu\text{g/L}$) from surface water samples and zooplankton settled volumes (b, ZSV, ml) from 20-m Norpac hauls in the marine waters of the northern region of southeastern Alaska, May–August 2010. Chlorophyll was estimated from single monthly samples per station, while ZSV was measured during all hauls at each station. A phytoplankton bloom in May prevented determination of ZSV. See Table 2 for monthly sample sizes and Appendix 1 for data values. Zooplankton 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.

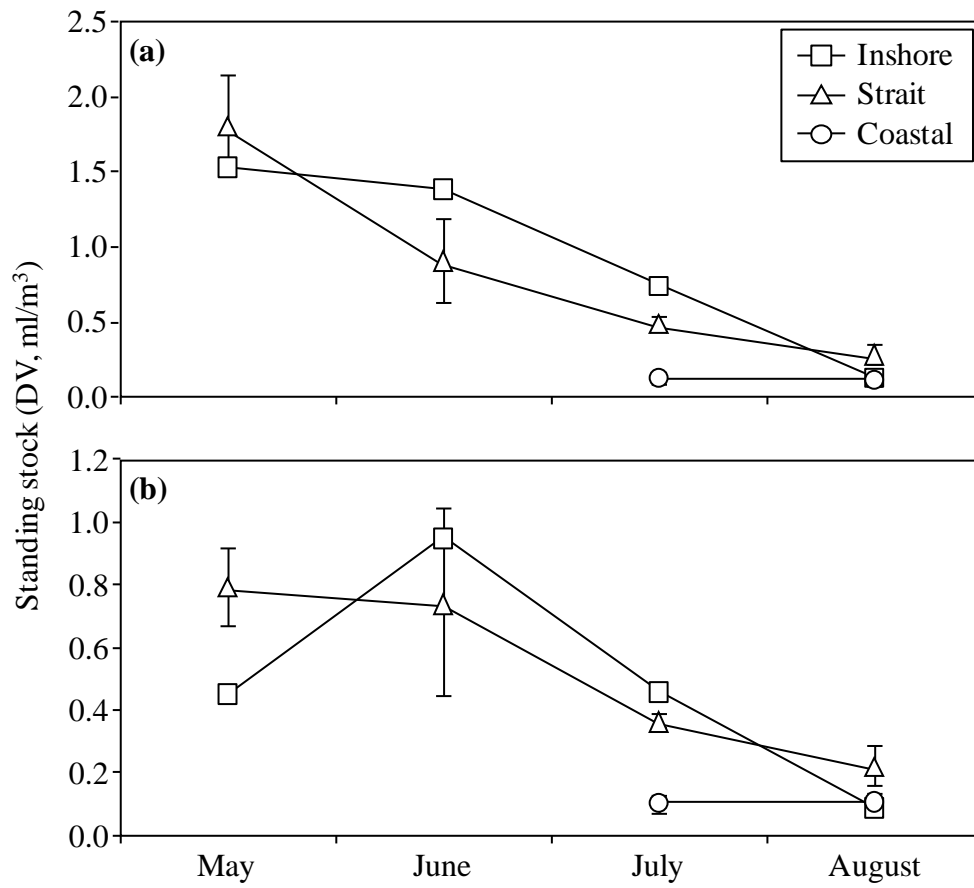


Figure 5.—Monthly zooplankton standing stock (mean ml/m^3 , ± 1 standard error) from (a) 333- μm and (b) 505- μm mesh double oblique bongo net samples hauled from ≤ 200 m depths during daylight in the marine waters of the northern region of southeastern Alaska, May–August 2010.

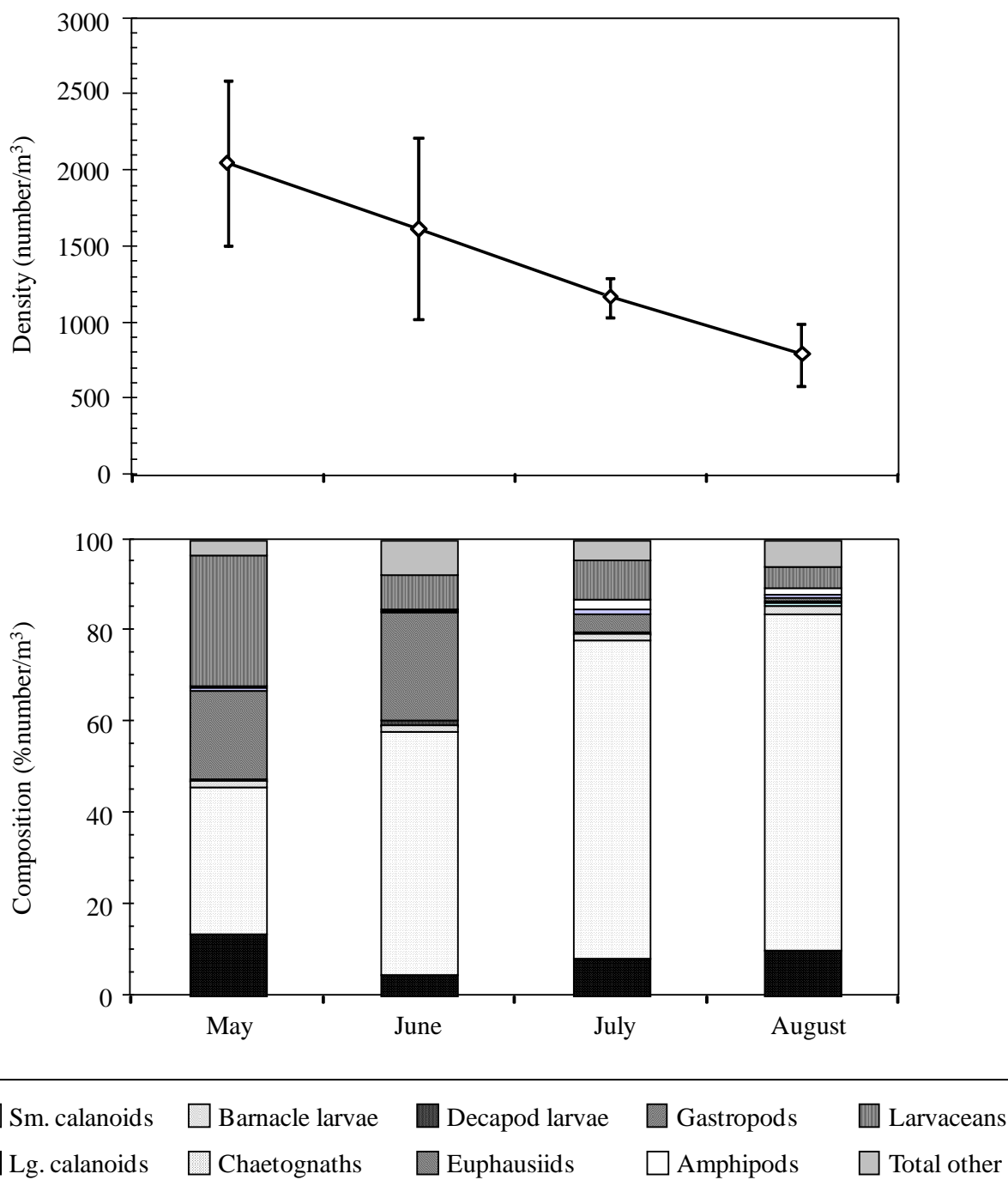


Figure 6.—Monthly “deep” (≤ 200 m depth) zooplankton collected in marine waters of the northern region of southeastern Alaska, May–August 2010. Data include (a) mean total density of organisms (thousands/m³) \pm 1 standard error, and (c) taxonomic composition (mean percent/m³). Samples were collected in daylight using a 333- μ m mesh bongo net (double oblique tow) at 4 stations in Icy Strait each month.

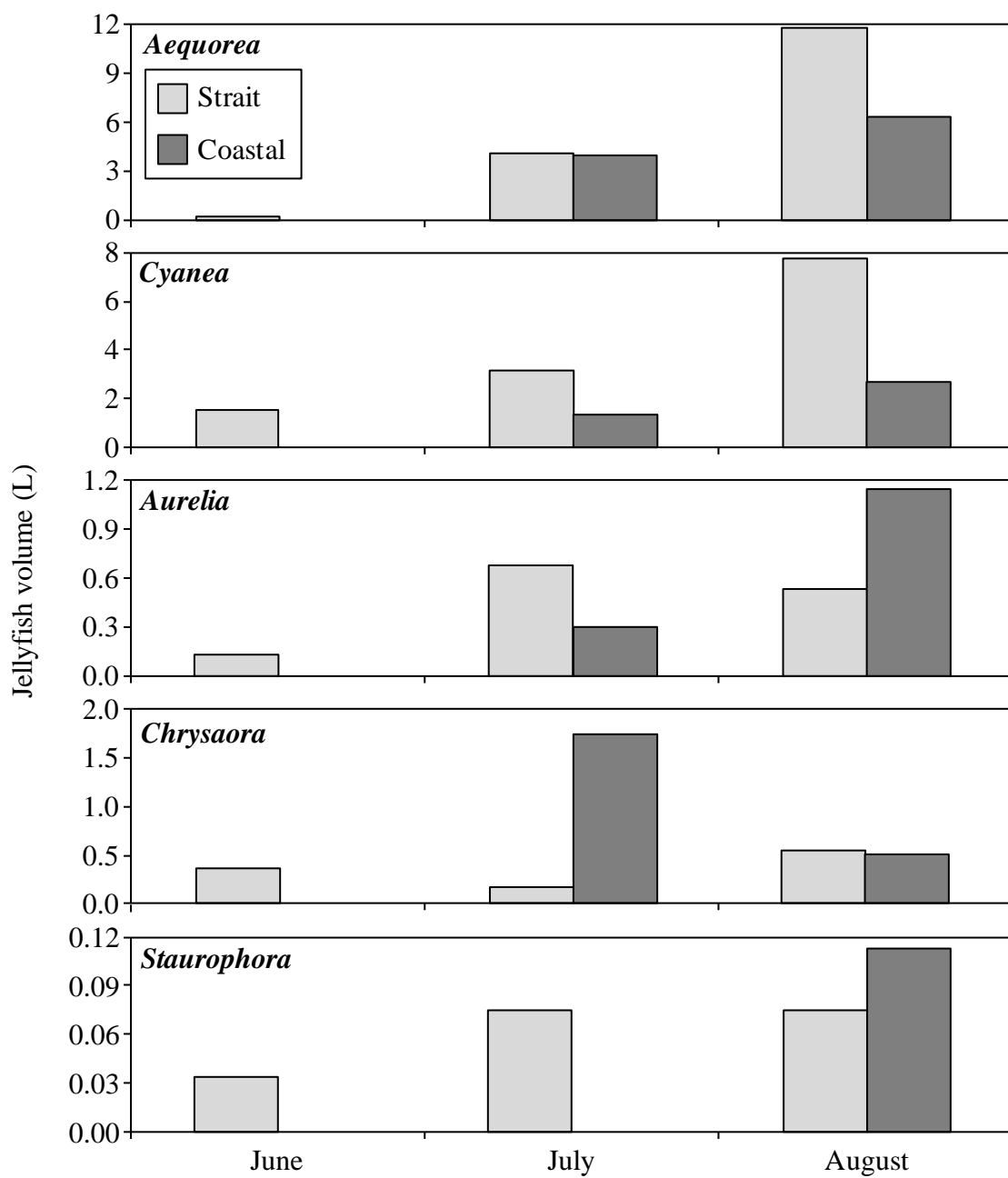


Figure 7.—Mean volume (L) of jellyfish captured in the strait and coastal marine habitats of the northern region of southeastern Alaska by rope trawl, June–August 2010. See Table 2 for monthly sample sizes. No trawling was conducted in the coastal habitat in June. Note difference in y-axis scales.

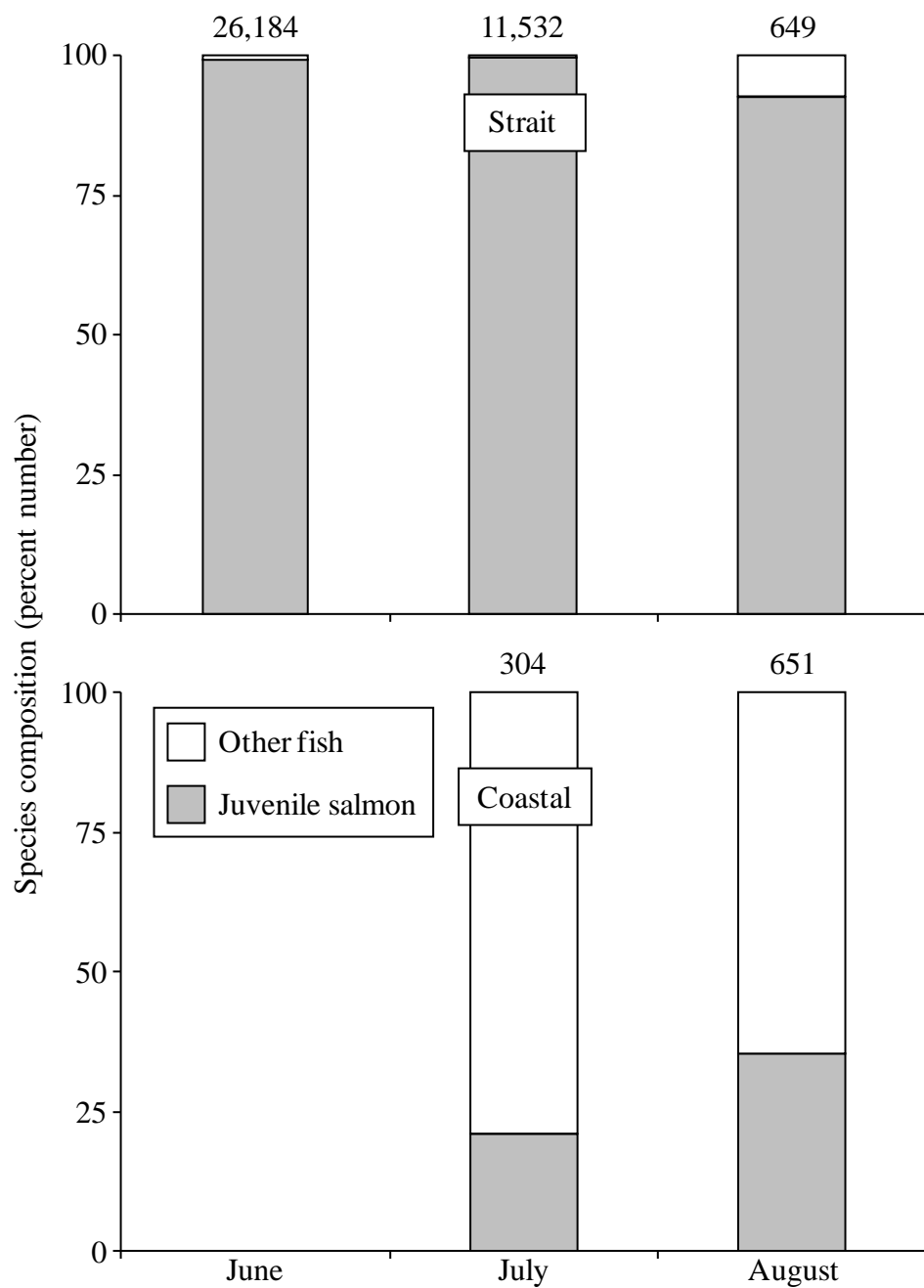


Figure 8.—Fish composition from rope trawl catches in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Total number of fish is indicated above each bar. See Tables 2 and 8 for monthly sample sizes by species. No trawling was conducted in coastal habitat in June. Other fish in coastal habitat were primarily squid and rockfish larvae.

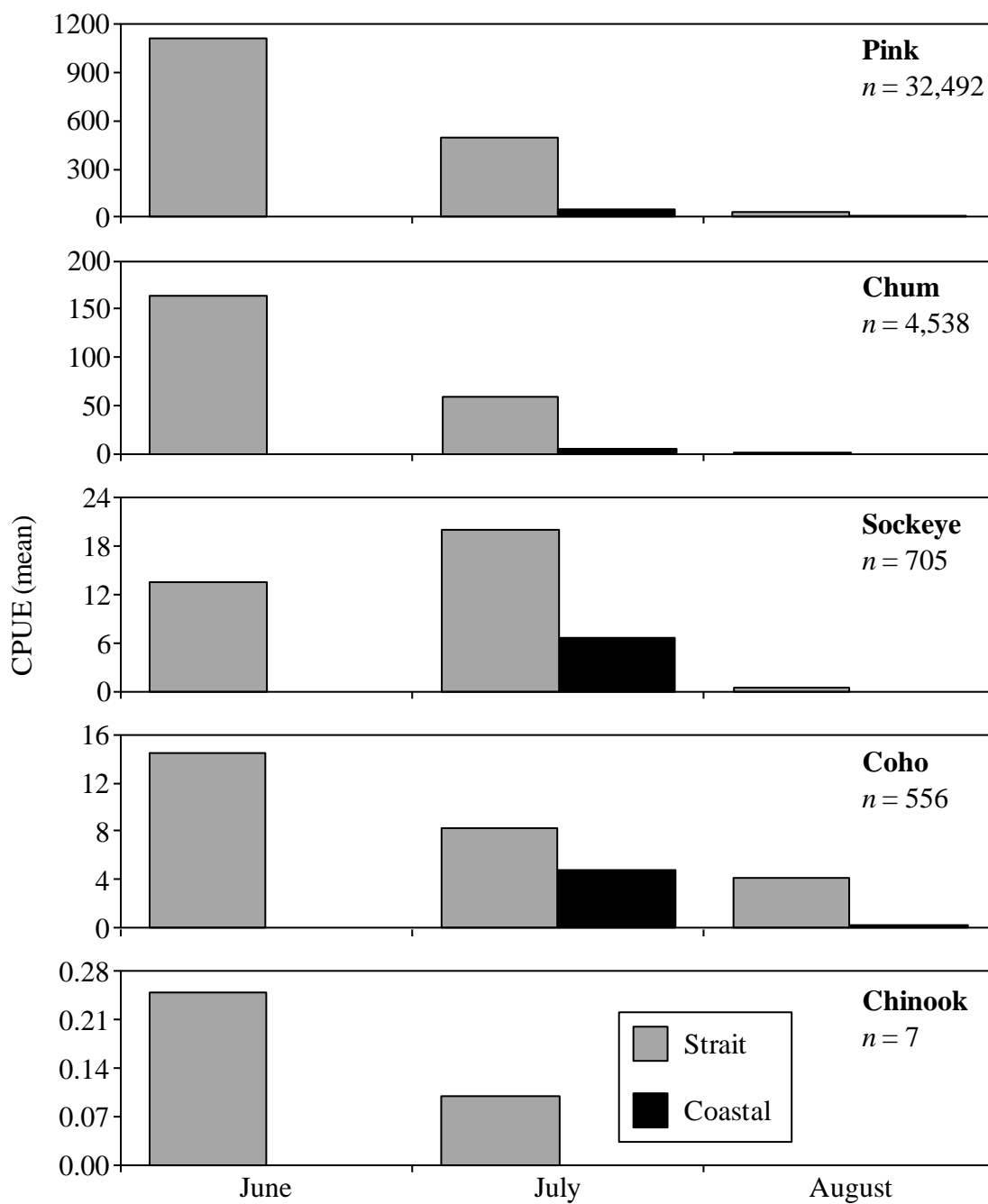


Figure 9.—Catch-per-unit-effort (CPUE, mean catch per trawl haul) of juvenile salmon captured in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Total seasonal catch is indicated for each species. See Table 2 for the number of trawl samples per month. No trawling was conducted in the coastal habitat in June. Note difference in y-axis scales.

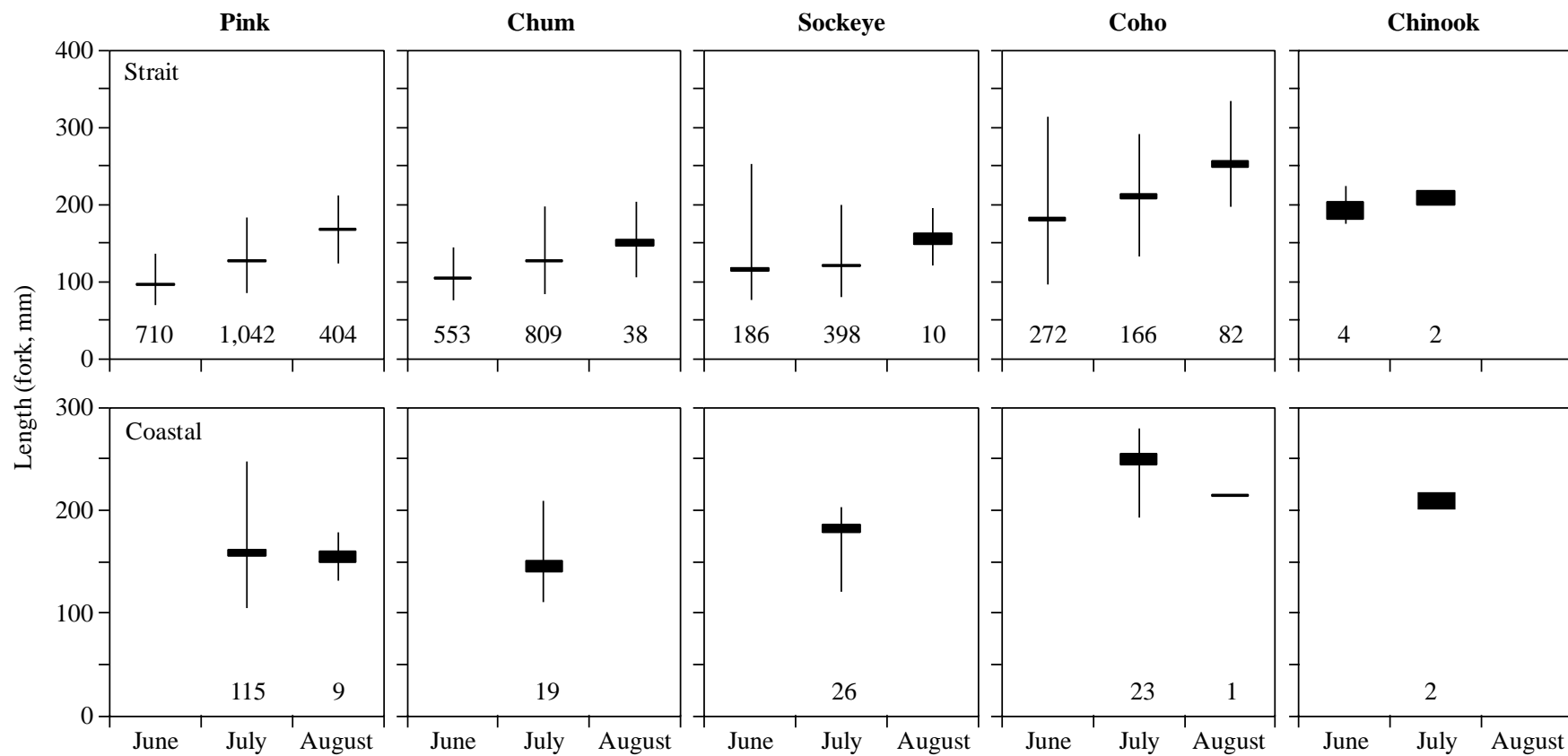


Figure 10.—Length (mm, fork) of juvenile salmon captured by rope trawl in the marine waters of the northern region of southeastern Alaska, June–August 2010. Length of vertical bars is the length range for each sample, and the boxes within the range are one standard error on either side of the mean. Sample sizes are indicated for each month. No trawling was conducted in the coastal habitat in June. Note difference in y-axis scales.

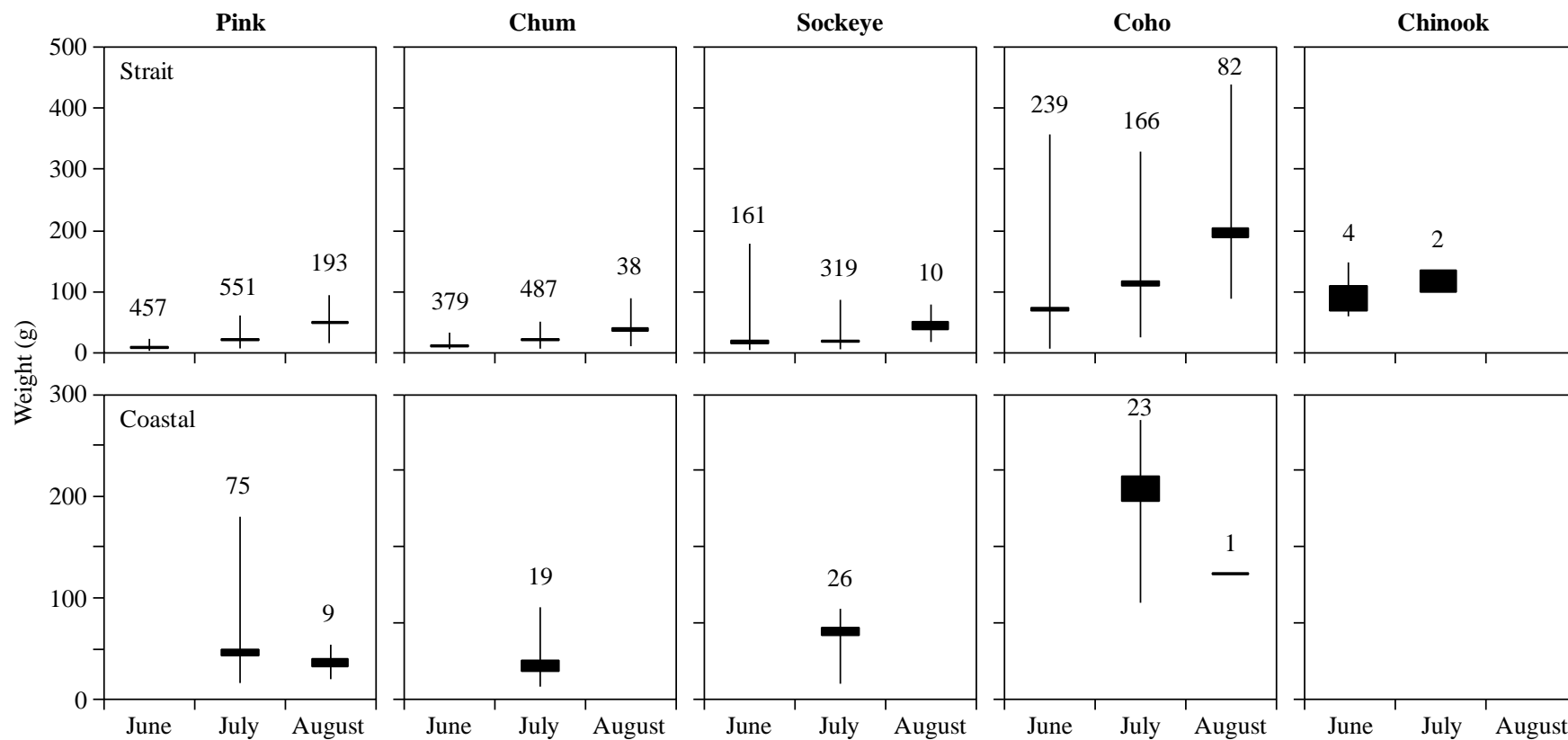


Figure 11.—Weight (g) of juvenile salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Length of vertical bars is the weight range for each sample, and the bars within the range are one standard error on either side of the mean. Sample sizes are indicated for each month. No trawling was conducted in the coastal habitat in June. Note difference in y-axis scales.

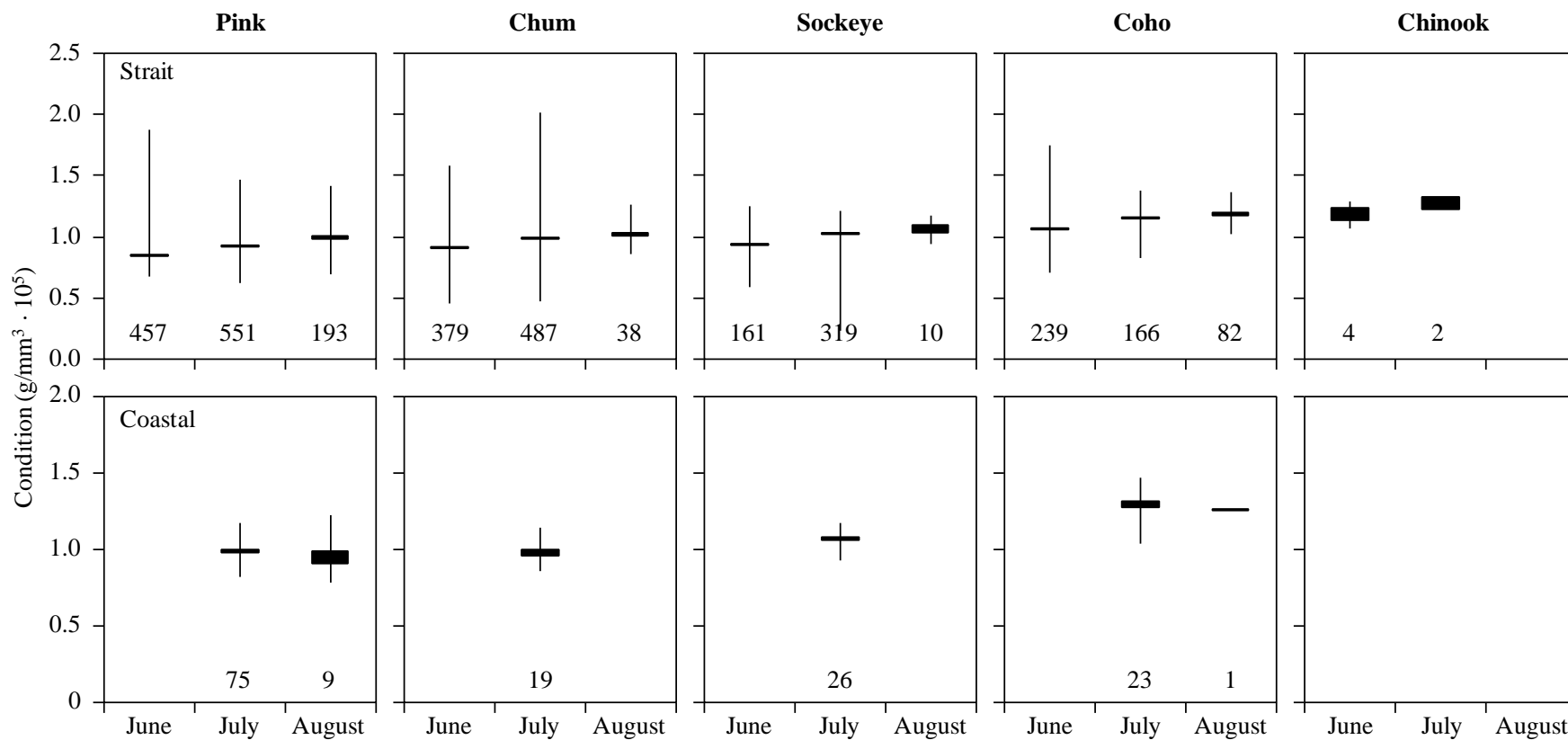


Figure 12.—Fulton's condition ($\text{g/mm}^3 \cdot 10^5$) of juvenile salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Length of vertical bars is the range of condition for each sample, and the bars within the range are one standard error on either side of the mean. Sample sizes are indicated for each month. No trawling was conducted in the coastal habitat in June. Note difference in y-axis scales.

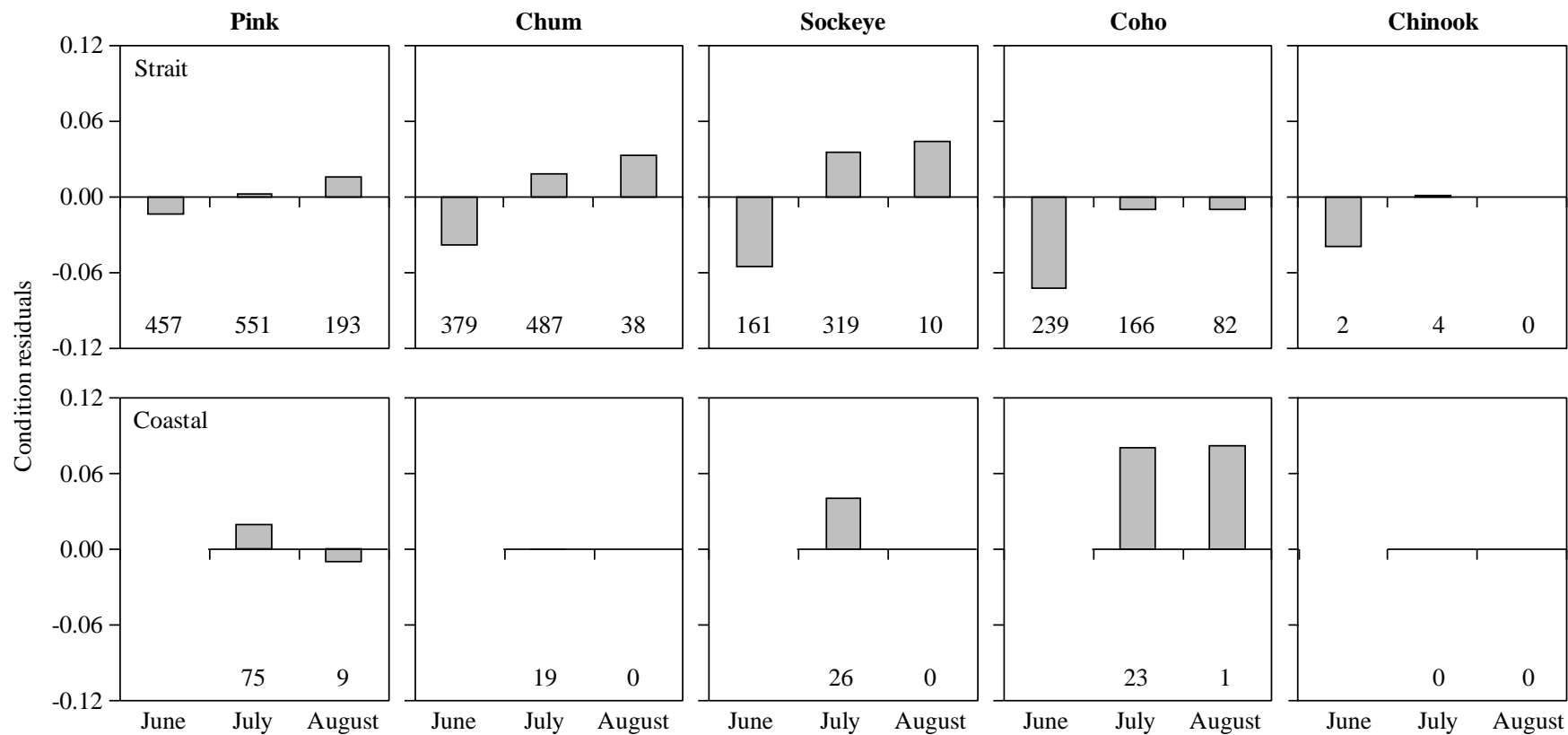


Figure 13.—Condition residuals from length-weight regression analysis of juvenile salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Sample sizes are indicated for each month. No trawling was conducted in the coastal habitat in June.

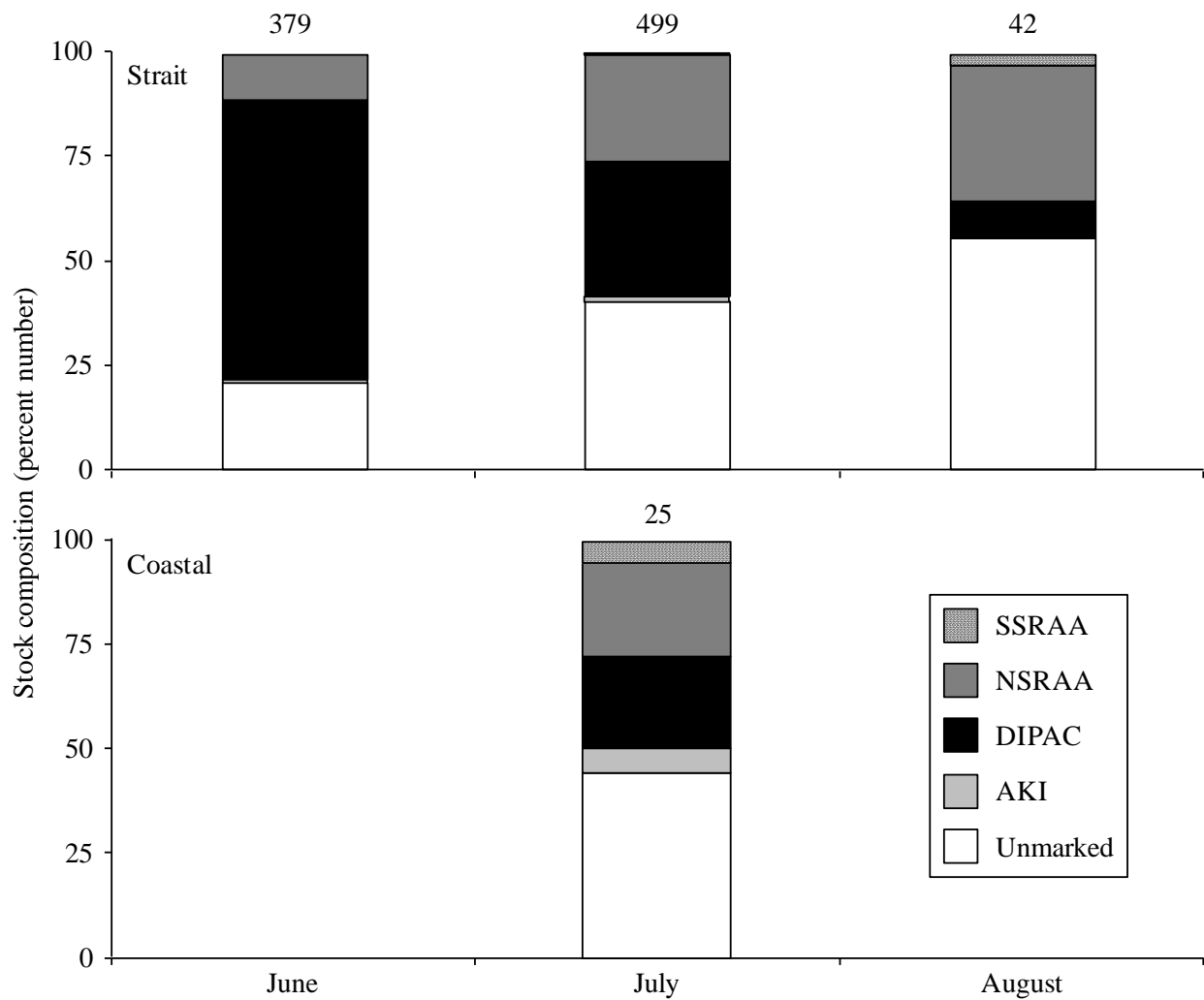


Figure 14.—Monthly stock composition (based on otolith thermal marks) of juvenile chum salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Number of salmon sampled per month is indicated above each bar. No trawling was conducted in June in the coastal habitat. No chum salmon were caught in August in the coastal habitat.

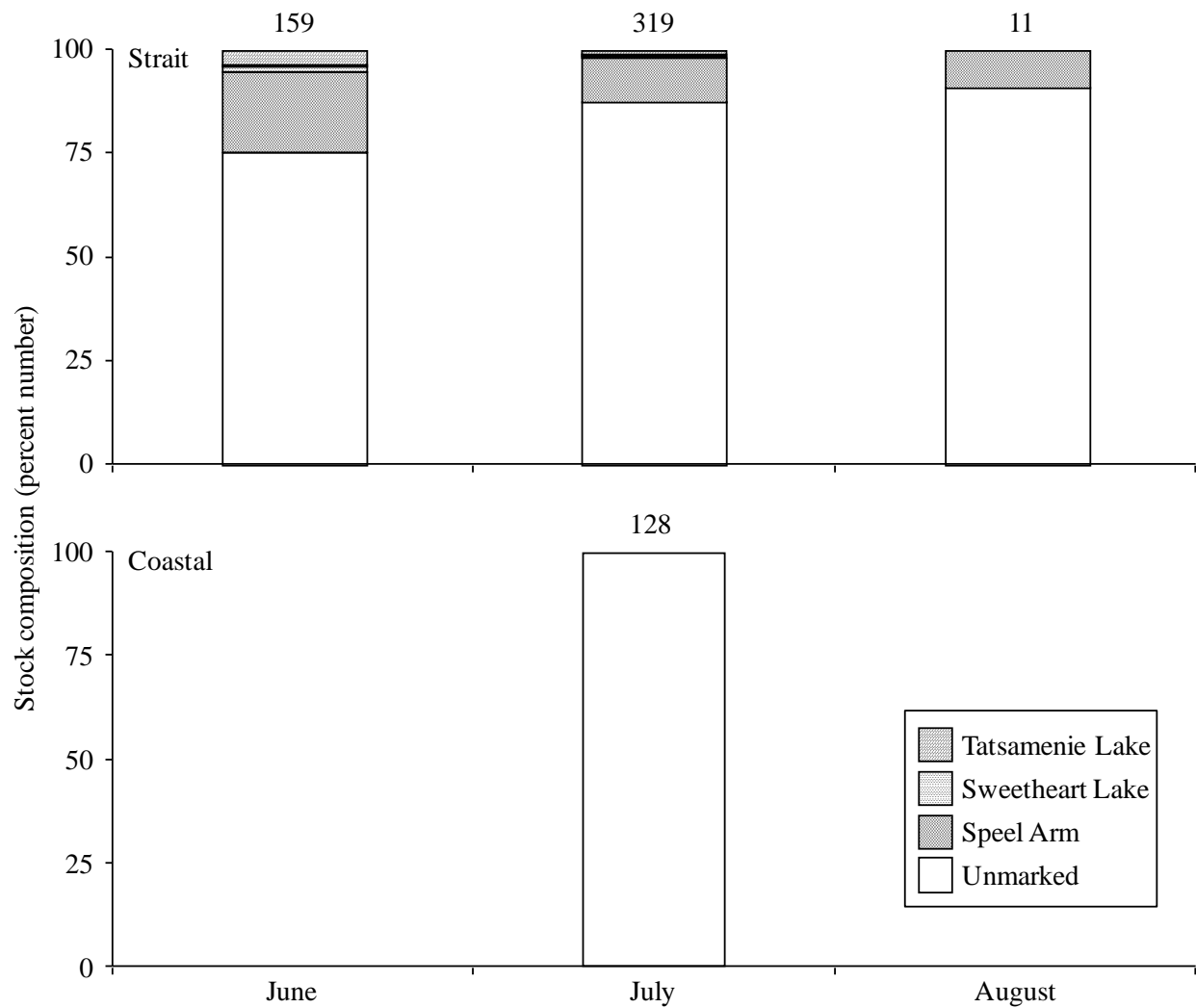


Figure 15.—Monthly stock composition (based on otolith thermal marks) of juvenile sockeye salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Number of salmon sampled per month is indicated above each bar. No trawling was conducted in June in the coastal habitat. No sockeye salmon were caught in August in the coastal habitat.

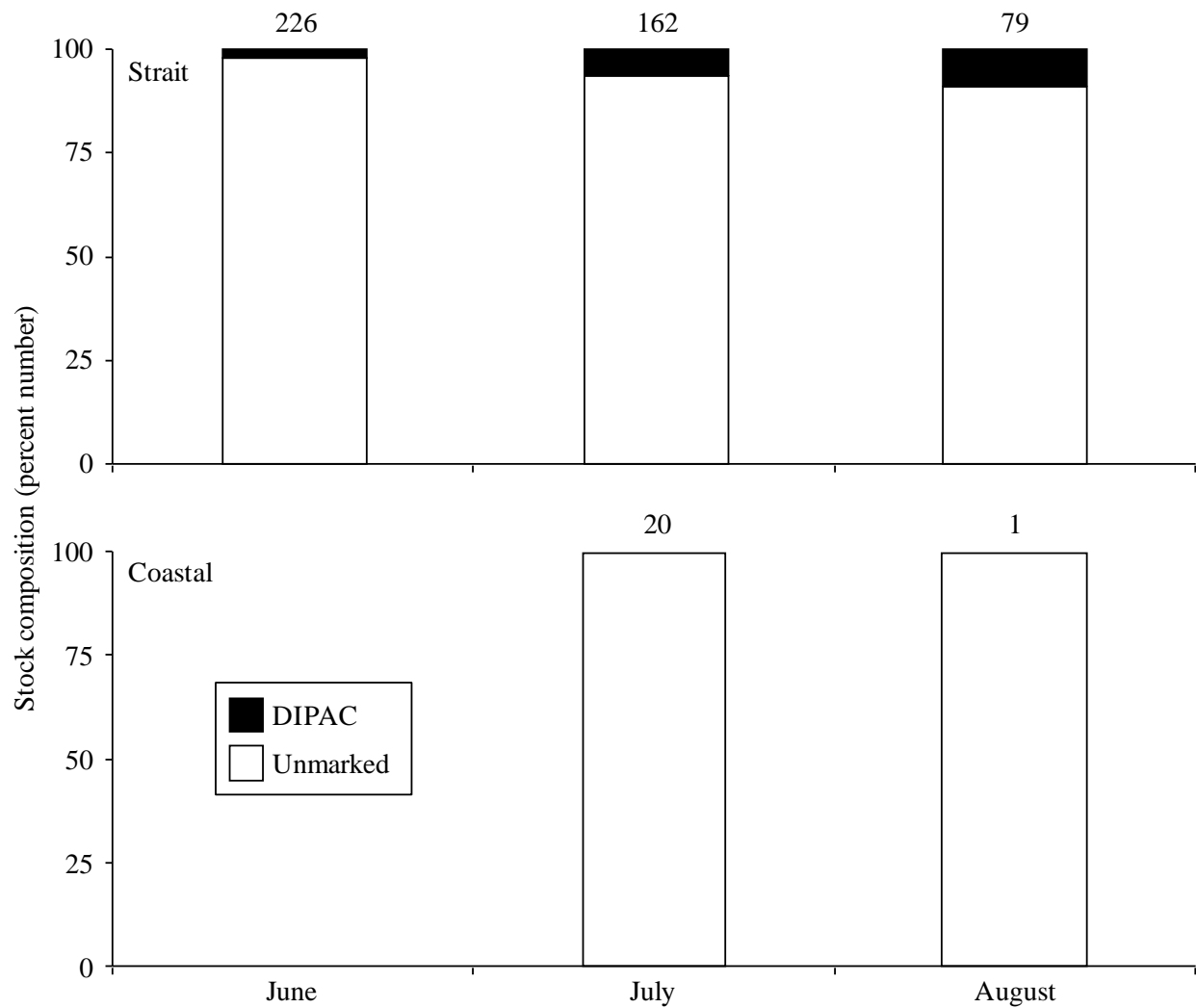


Figure 16.—Monthly stock composition (based on otolith thermal marks) of juvenile coho salmon captured by rope trawl in the strait and coastal marine habitats of the northern region of southeastern Alaska, June–August 2010. Number of salmon sampled per month is indicated above each bar. No trawling was conducted in June in the coastal habitat.

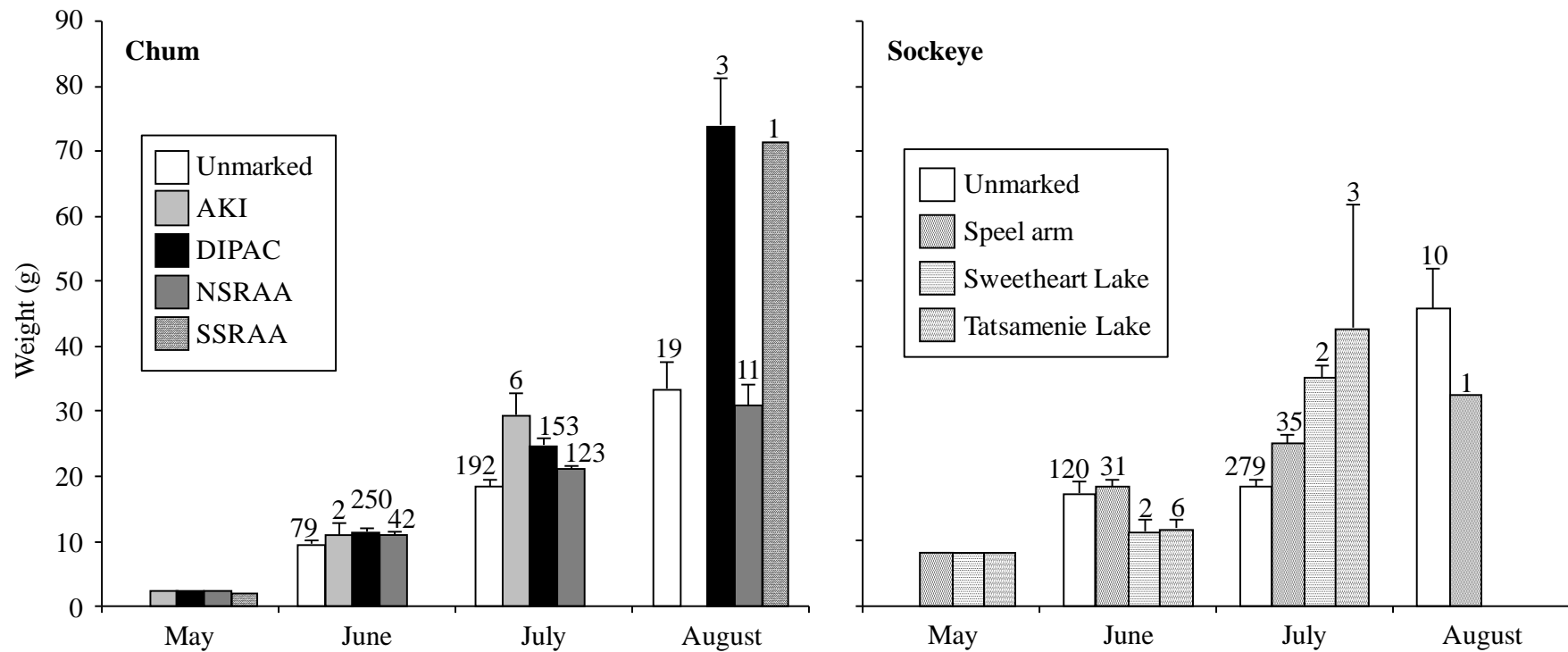


Figure 17.—Stock-specific growth trajectories of juvenile chum and sockeye salmon captured by rope trawl in the strait marine habitat of the northern region of southeastern Alaska, June–August 2010. Weights of May fish are mean values at time of hatchery release. No trawling was conducted in June in the coastal habitat. The sample sizes and the standard error of the mean are indicated above each bar.

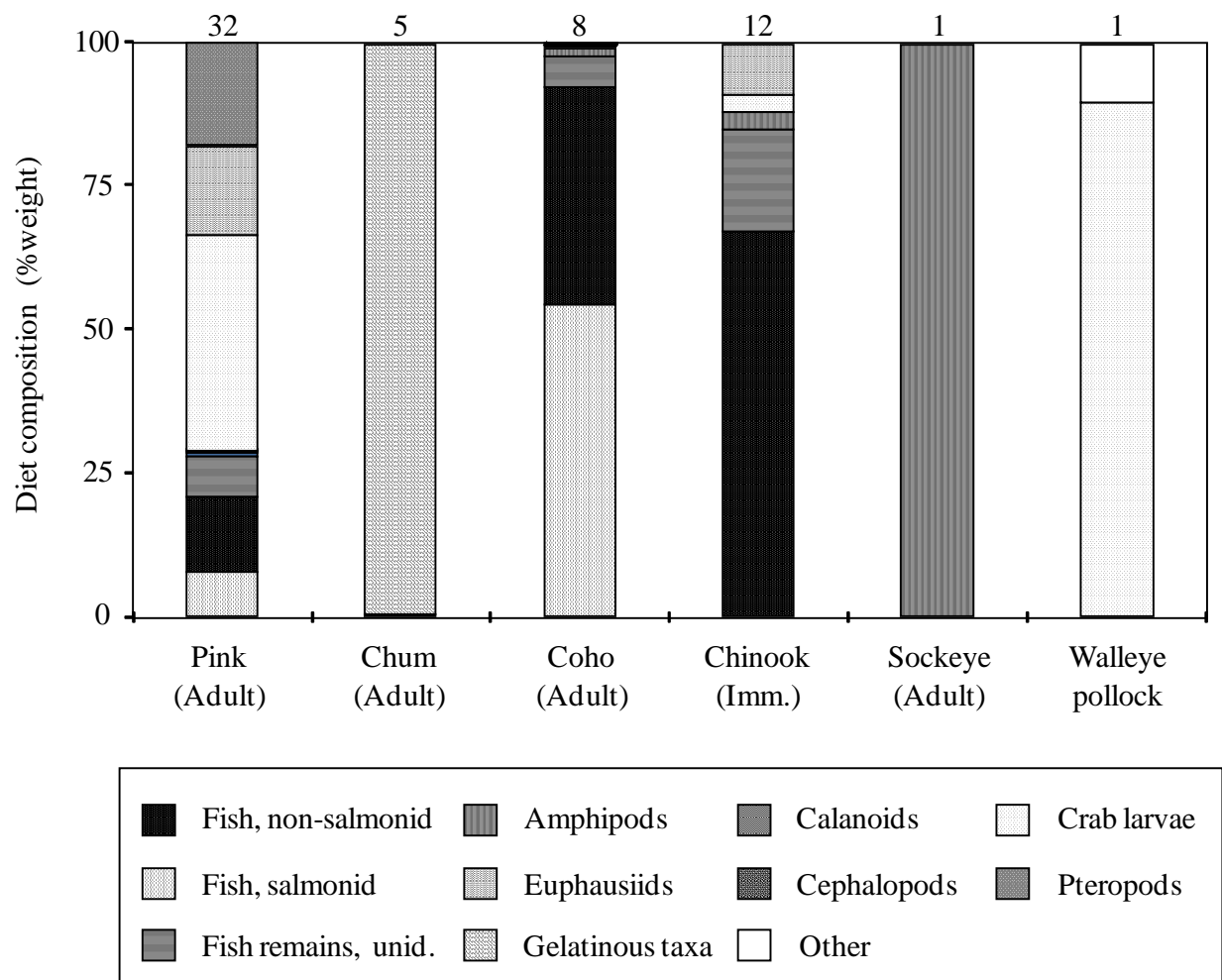


Figure 18.—Prey composition of 59 potential predators of juvenile salmon captured in 67 rope trawl hauls in the marine waters of the northern region of Southeast Alaska, June–August 2010. The numbers of fish examined per species are shown above the bars. See Tables 18-19 for additional feeding attributes.

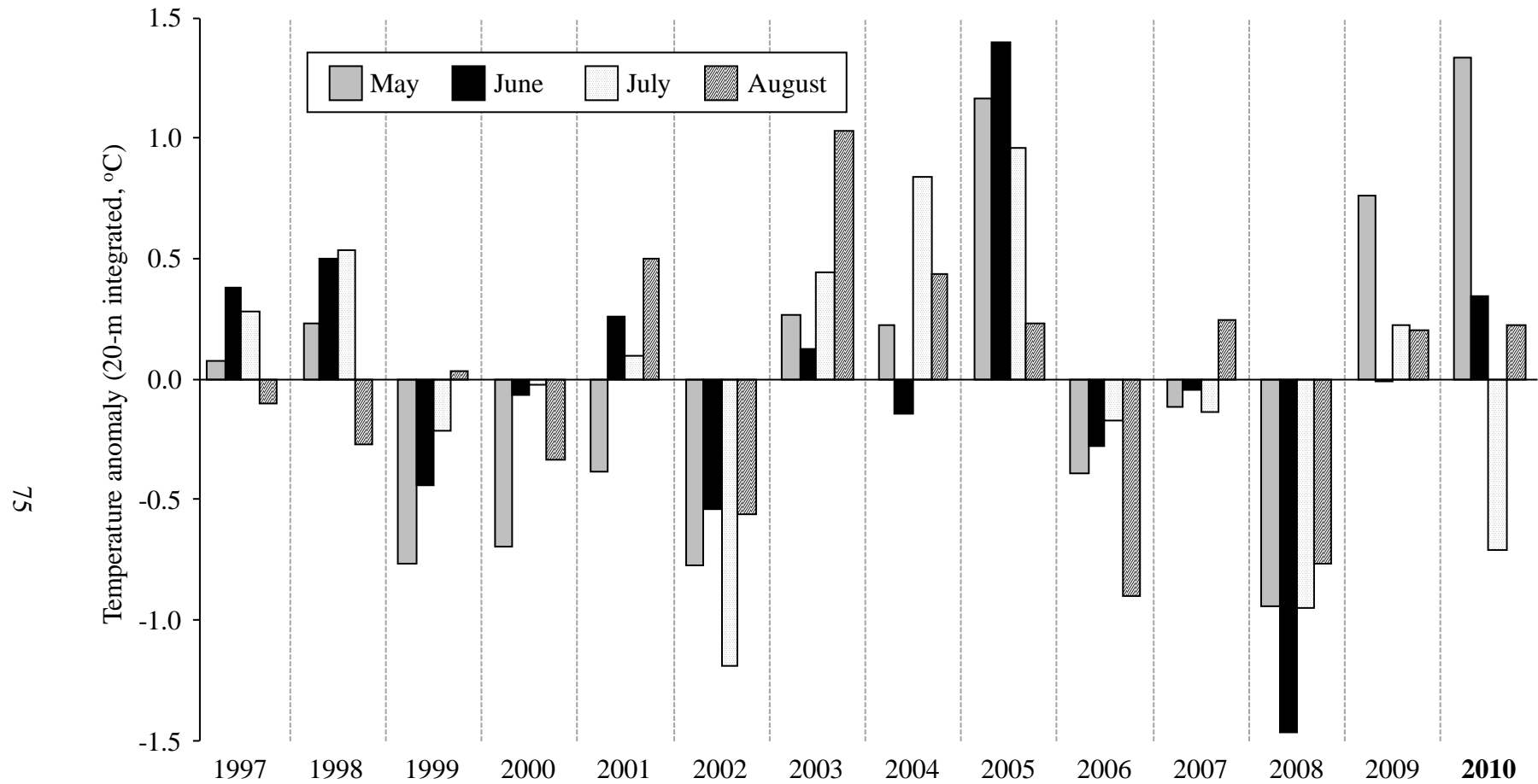


Figure 19.—Monthly anomalies for temperature (20-m integrated, °C) across the 14-yr time series from the strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from monthly mean values (0-lines) by year. See also Figures 2 and 3.

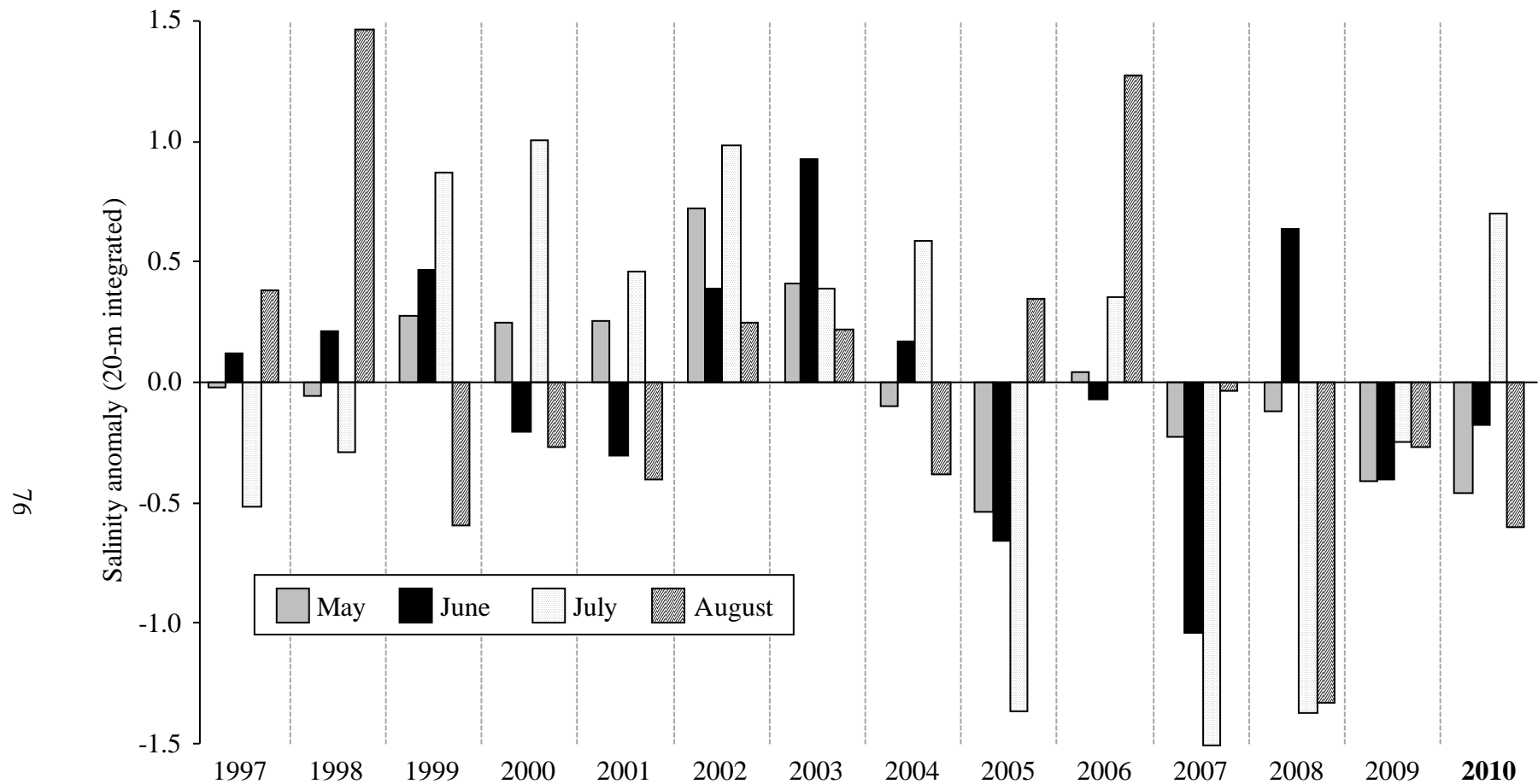


Figure 20.—Monthly anomalies for salinity (20-m integrated, PSU) across the 14-yr time series from the strait habitat in the northern region of southeastern Alaska, 1997-20010. Data (shaded bars) are deviations from monthly mean values (0-lines) by year. See also Figures 2 and 3.

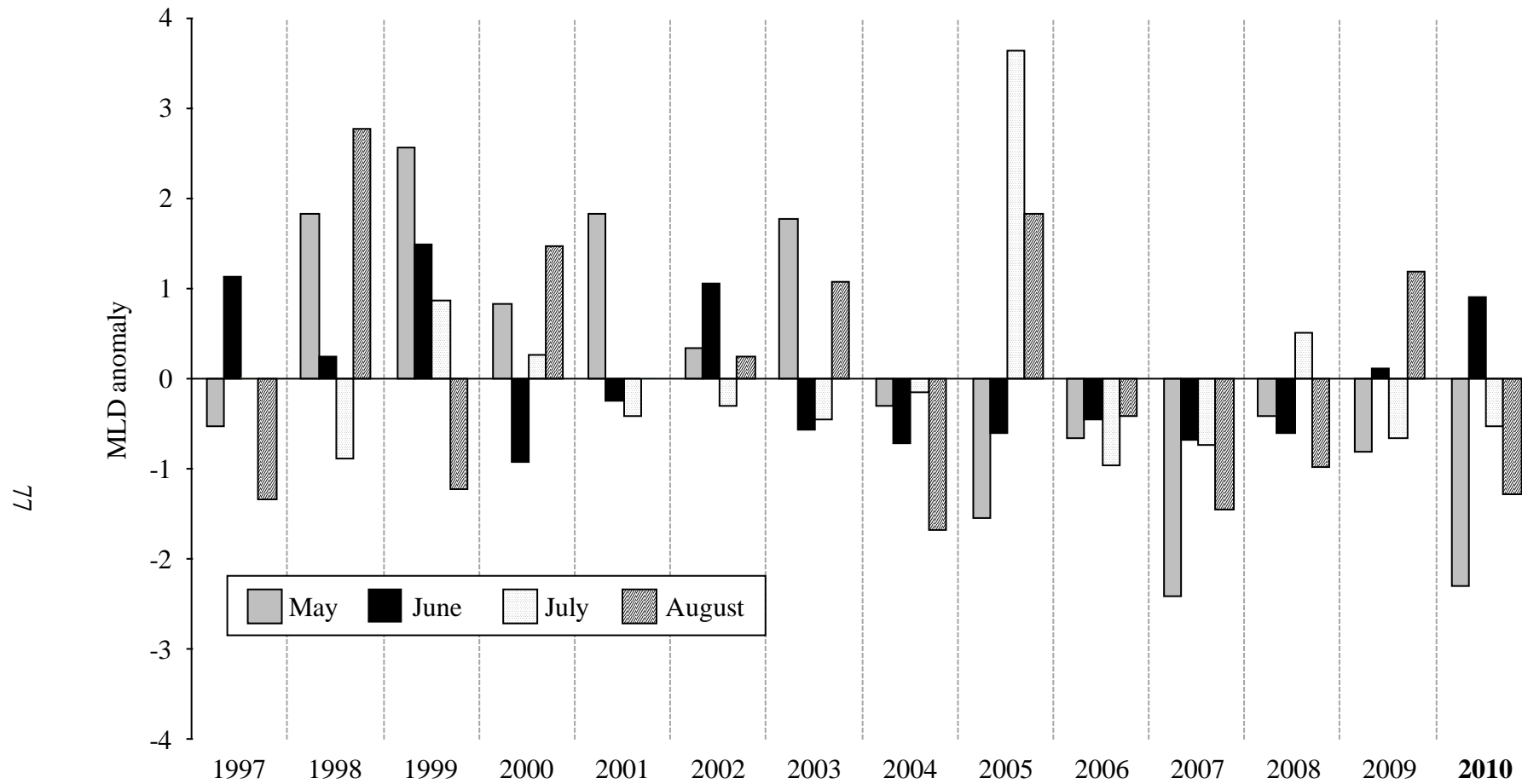


Figure 21.—Monthly anomalies for mixed layer depth (MLD, m) across the 14-yr time series from the strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from monthly mean values (0-lines) by year. See also Figures 2 and 3.

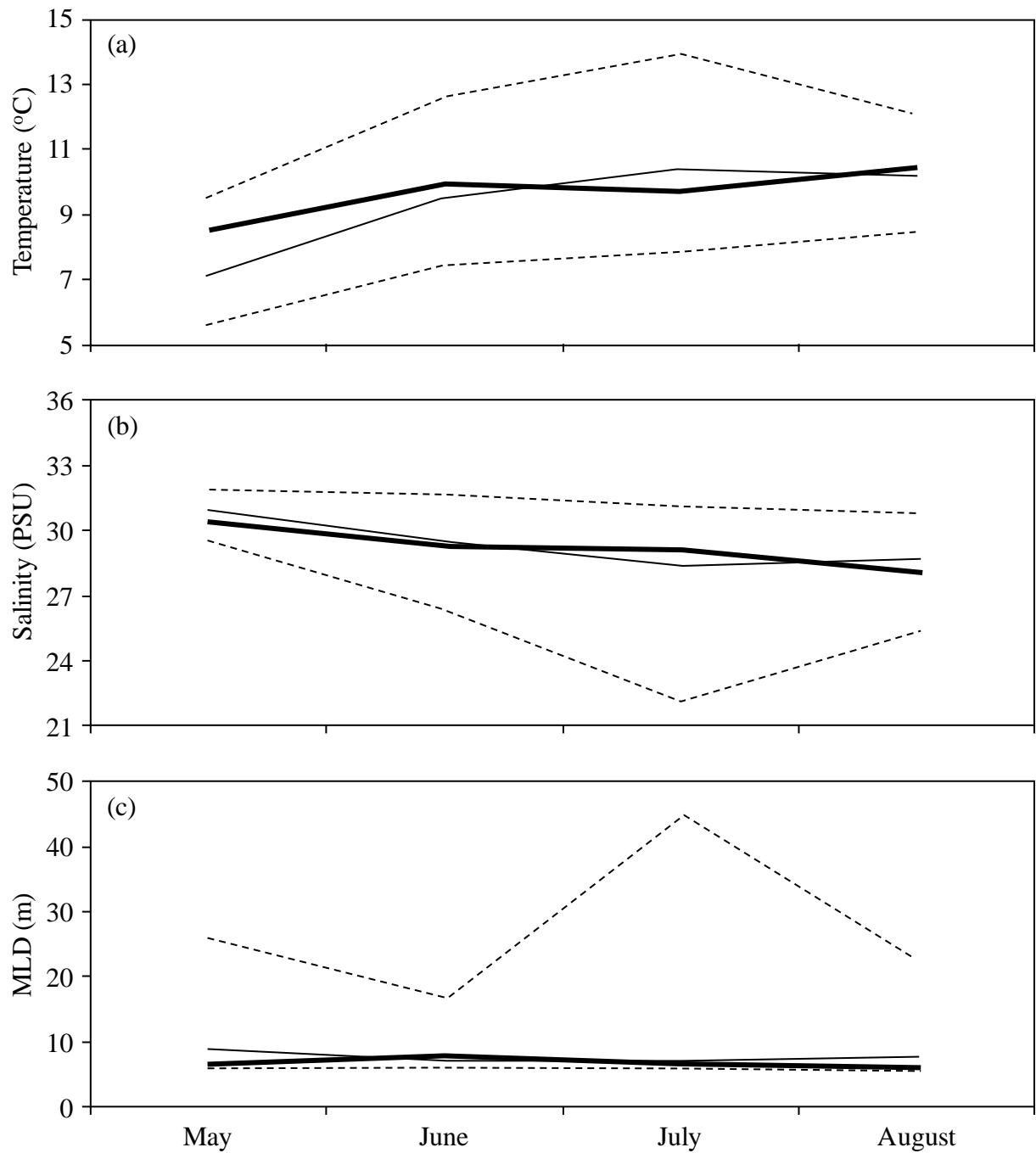


Figure 22.—Temperature (20-m integrated; °C), salinity (20-m integrated, PSU), and mixed layer depth (MLD, m) across a 14-yr time series from the strait habitat in the northern region of southeastern Alaska, 1997-2010. Data compare the 2010 means for (a) temperature, (b) salinity, and (c) MLD (thick solid lines) to the grand mean values (thin solid lines) within observed ranges (minimum and maximum, dashed lines), by month. See also Figures 2 and 3.

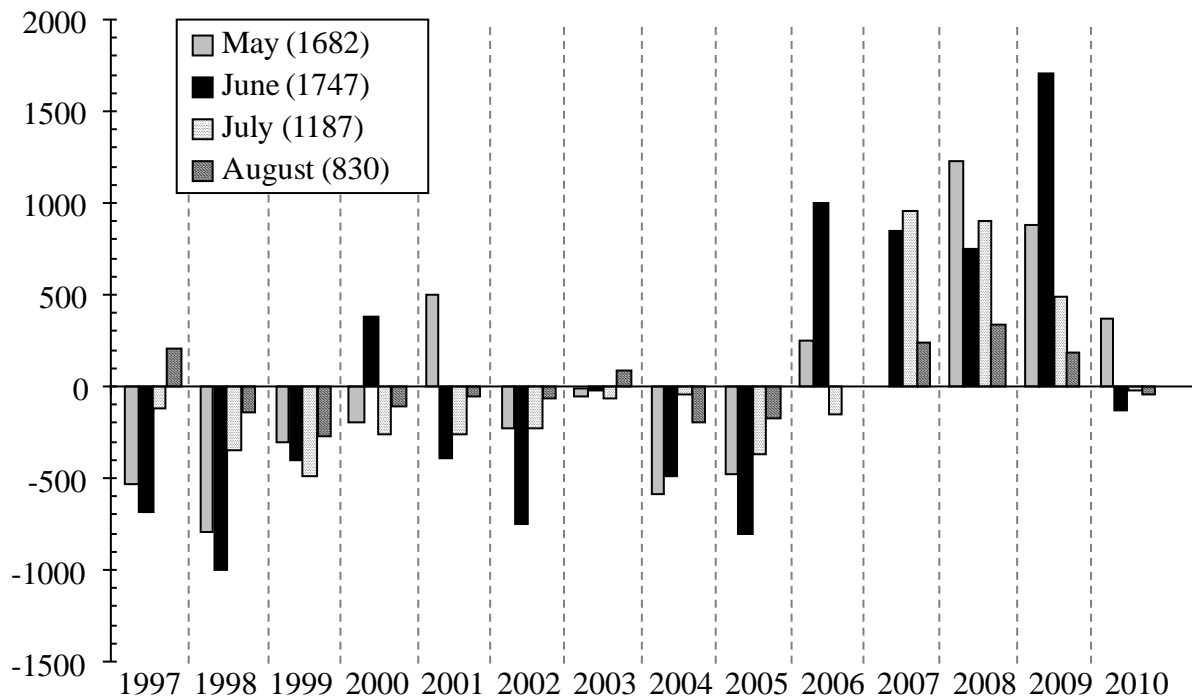


Figure 23.—Montly anomalies for zooplankton total density across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from longterm monthly mean density (numbers/m³) indicated by the 0-line; longterm mean monthly values are indicated in the key. Monthly samples ($n = 4$) were collected using a 333- μ m mesh bongo net deployed to a maximum depth of 200 m and retrieved using a double oblique trajectory. No samples were collected in August 2006, and the May 2007 nighttime values were omitted because high densities did not represent standard daytime sampling protocol. See also Figures 6, 24, and 25.

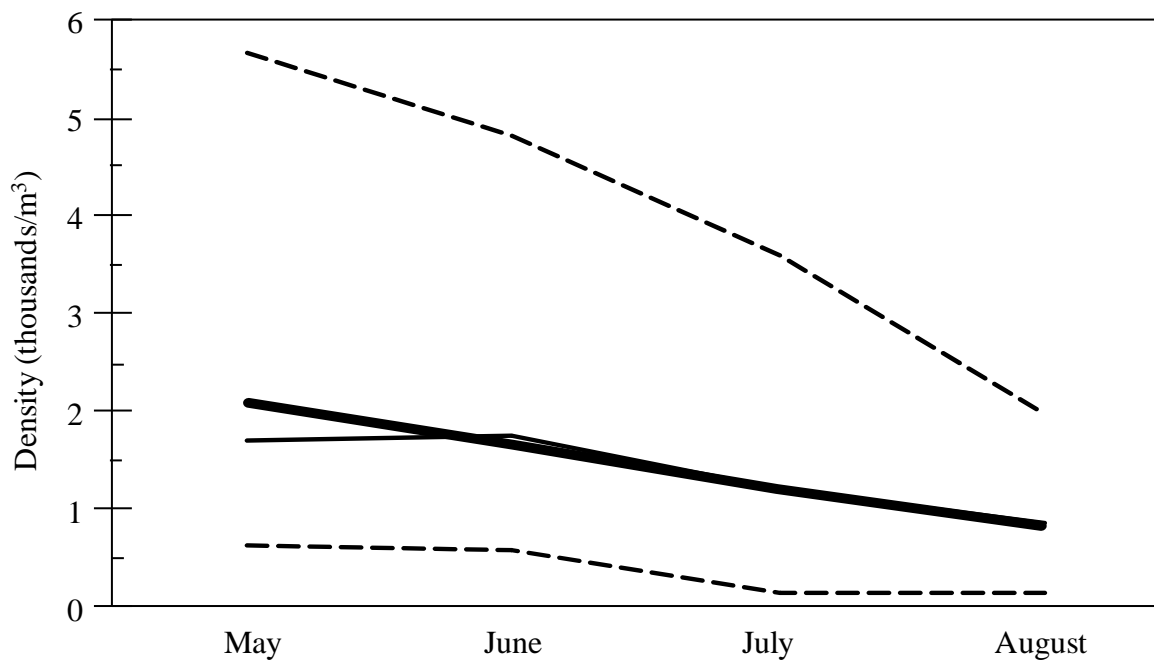


Figure 24.—Monthly zooplankton total density (thousands/m³) for 2010 compared to the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data are mean densities for 2010 (thick solid line) compared to grand mean densities (thin solid line) within the observed density range (minimum and maximum, dashed lines) by month, from 333- μ m mesh bongo net samples as described in Figure 23. No samples were collected in August 2006 and the May 2007 nighttime values were omitted. See also Figures 6, 23, and 25.

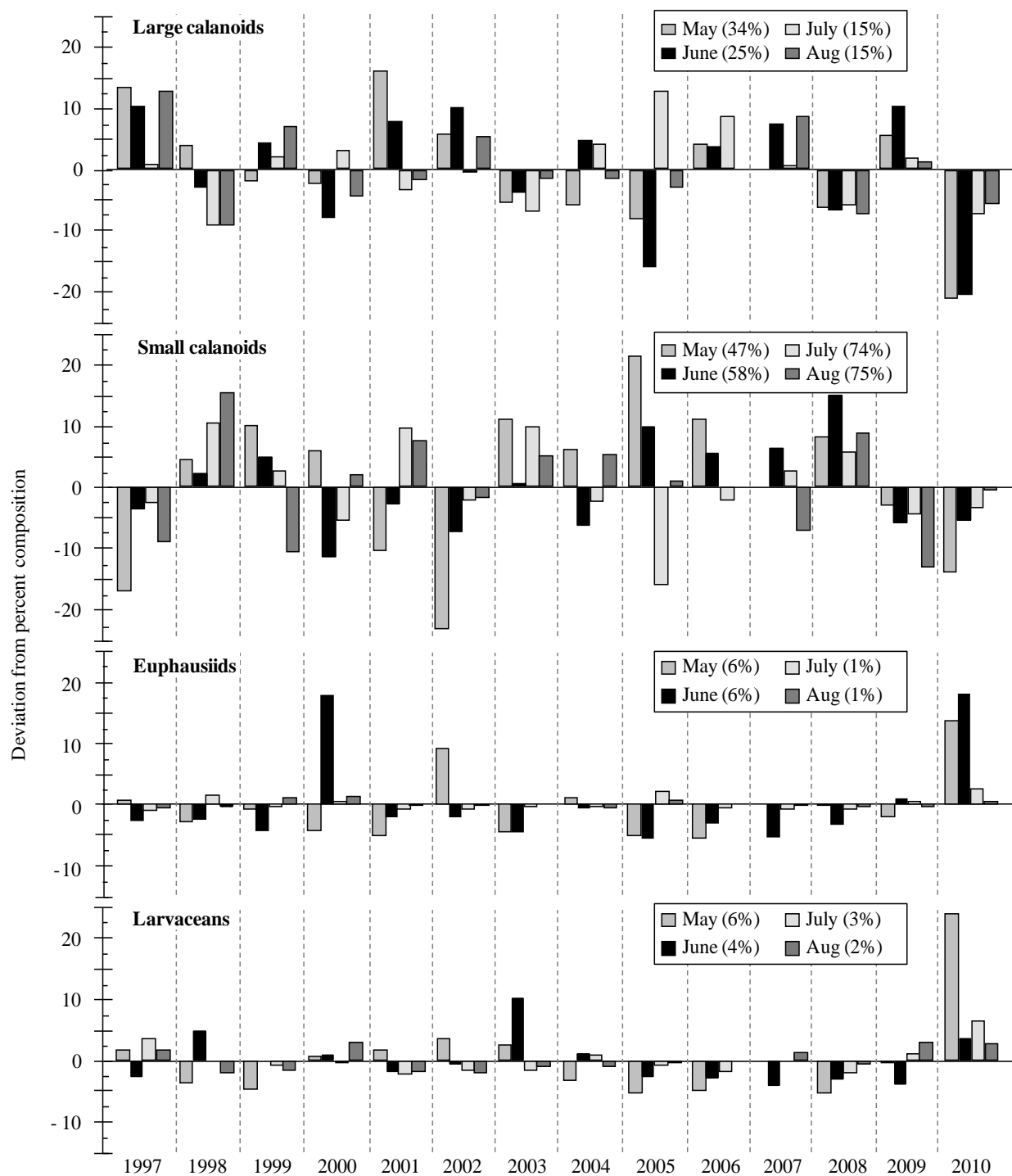


Figure 25.—Monthly anomalies for zooplankton composition across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from longterm mean percent of total density (percent number/m³), indicated by the 0-line; longterm mean monthly percentages are indicated in the key. Samples were from 333- μ m mesh bongo nets as described in Figure 23. See also Figures 6 and 24.

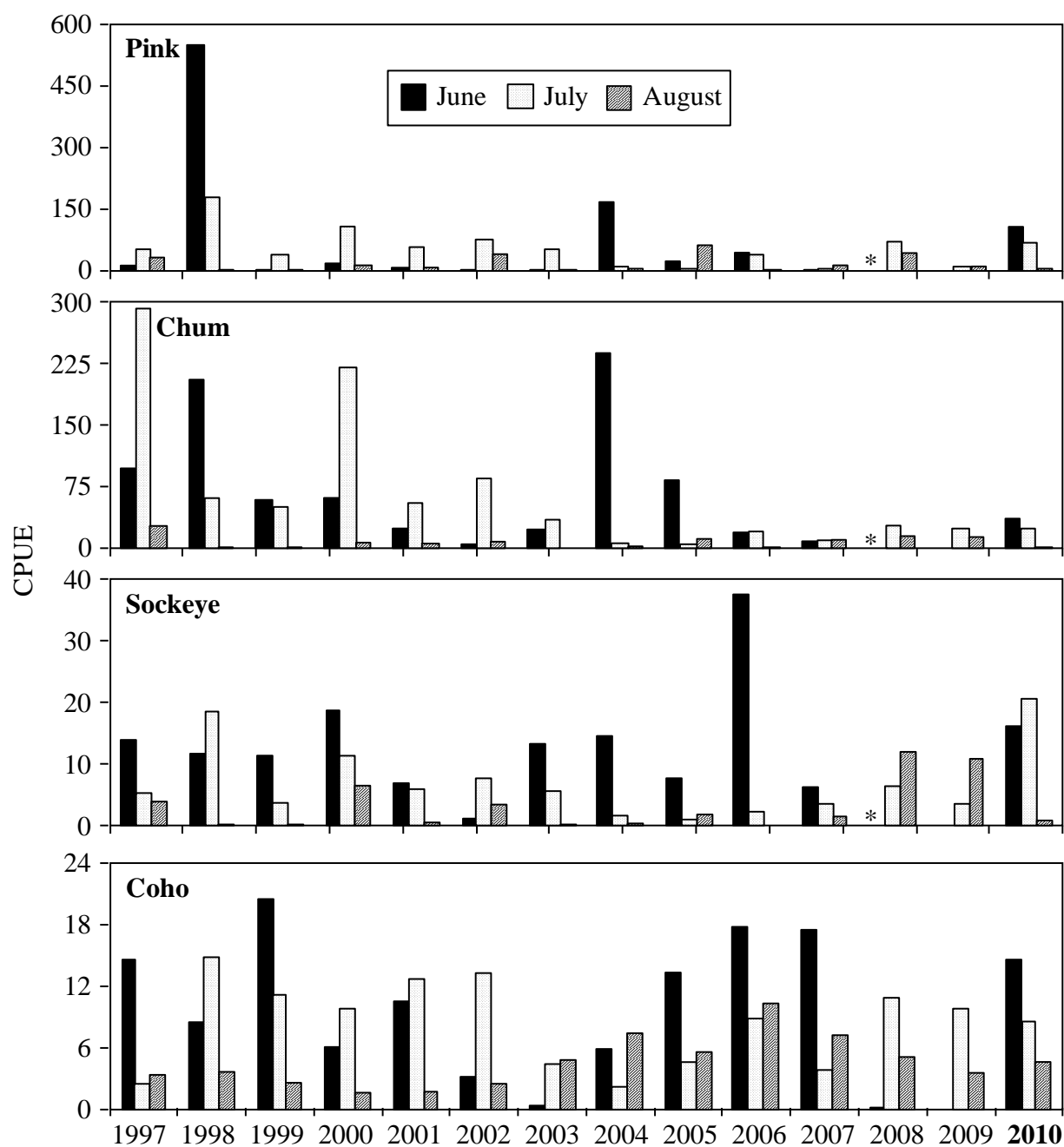


Figure 26.—Monthly catch-per-unit-effort (CPUE, mean catch per trawl haul) for juvenile pink, chum, sockeye, and coho salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Asterisks indicate a zero catch. Note differences in scale of y-axes by species. No trawling was conducted in June, 2009. See also Figure 9. These values are in “Cobb units” see Table 10 for conversion factors.

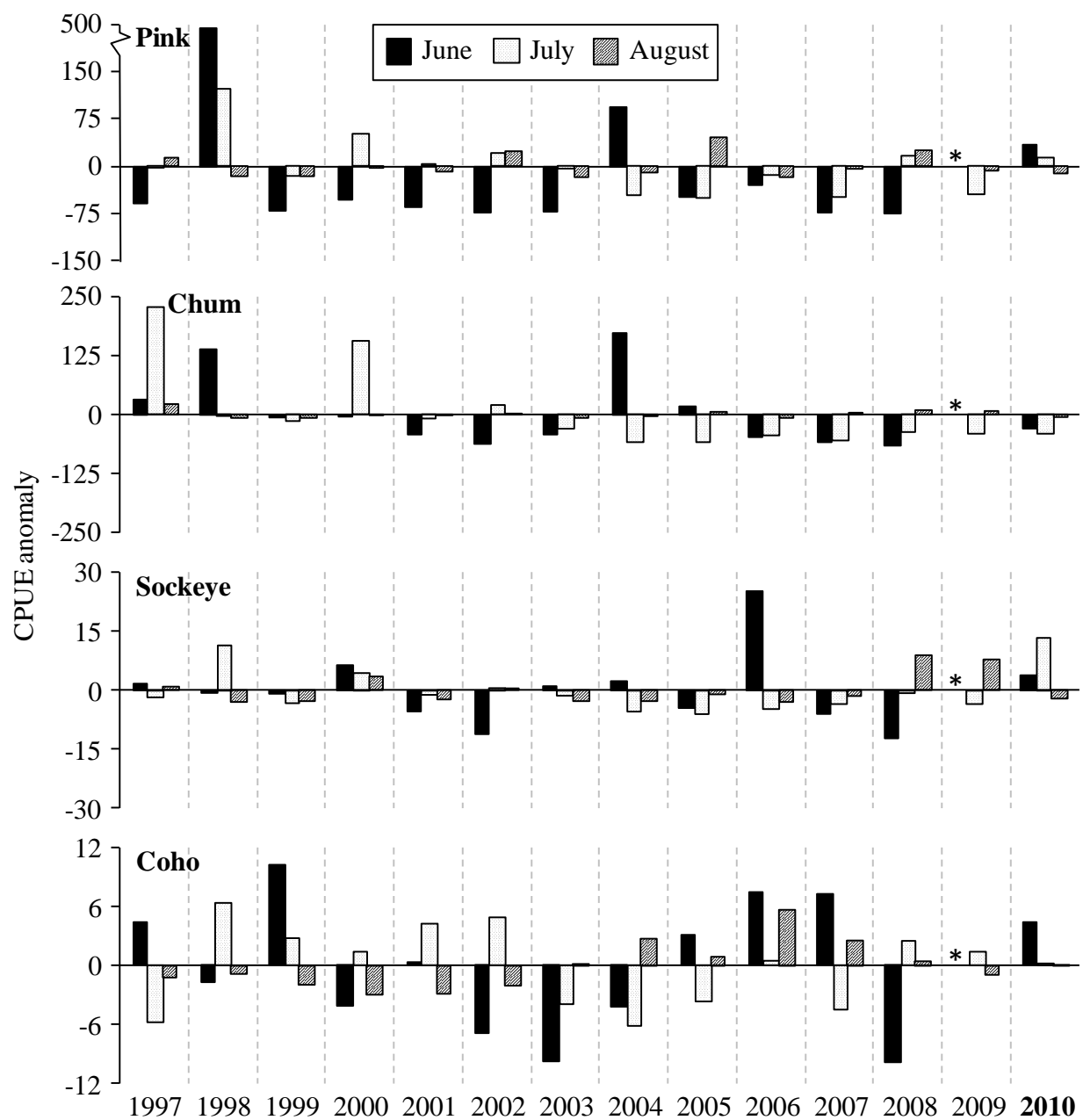


Figure 27.—Monthly anomalies for catch-per-unit-effort (CPUE, mean catch per trawl haul) for juvenile pink, chum, sockeye, and coho salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from the longterm monthly mean CPUE (0-lines). No trawling was conducted in June 2009 (asterisks). Note differences in scale of y-axes by species. See also Figure 9. Values are in “Cobb units” (Table 10).

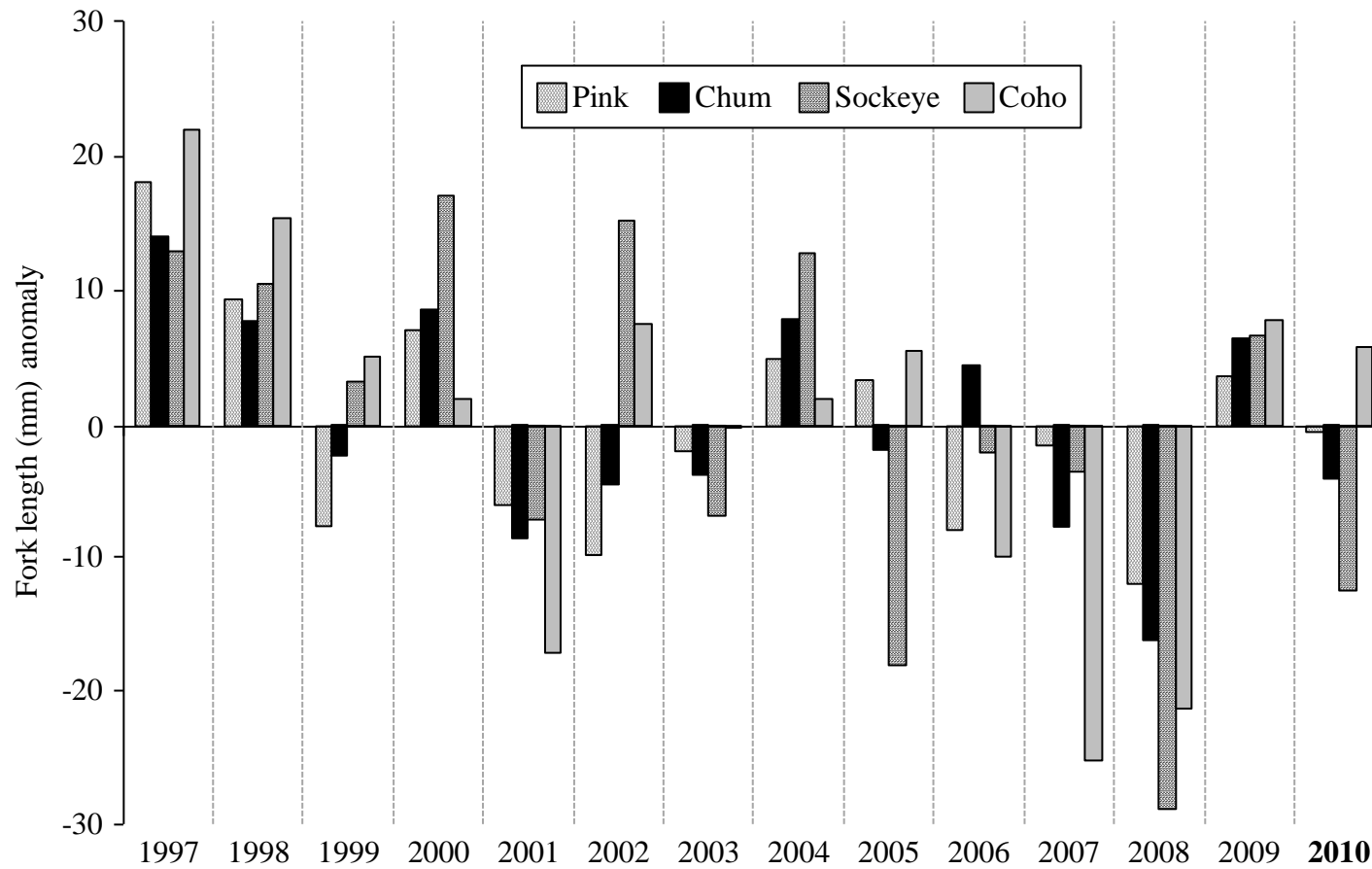


Figure 28.—Anomalies for annual size-at-time (fork length, mm, on July 24) for juvenile pink, chum, sockeye, and coho salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from the longterm monthly mean size-at-time (0-line). See also Figure 10.

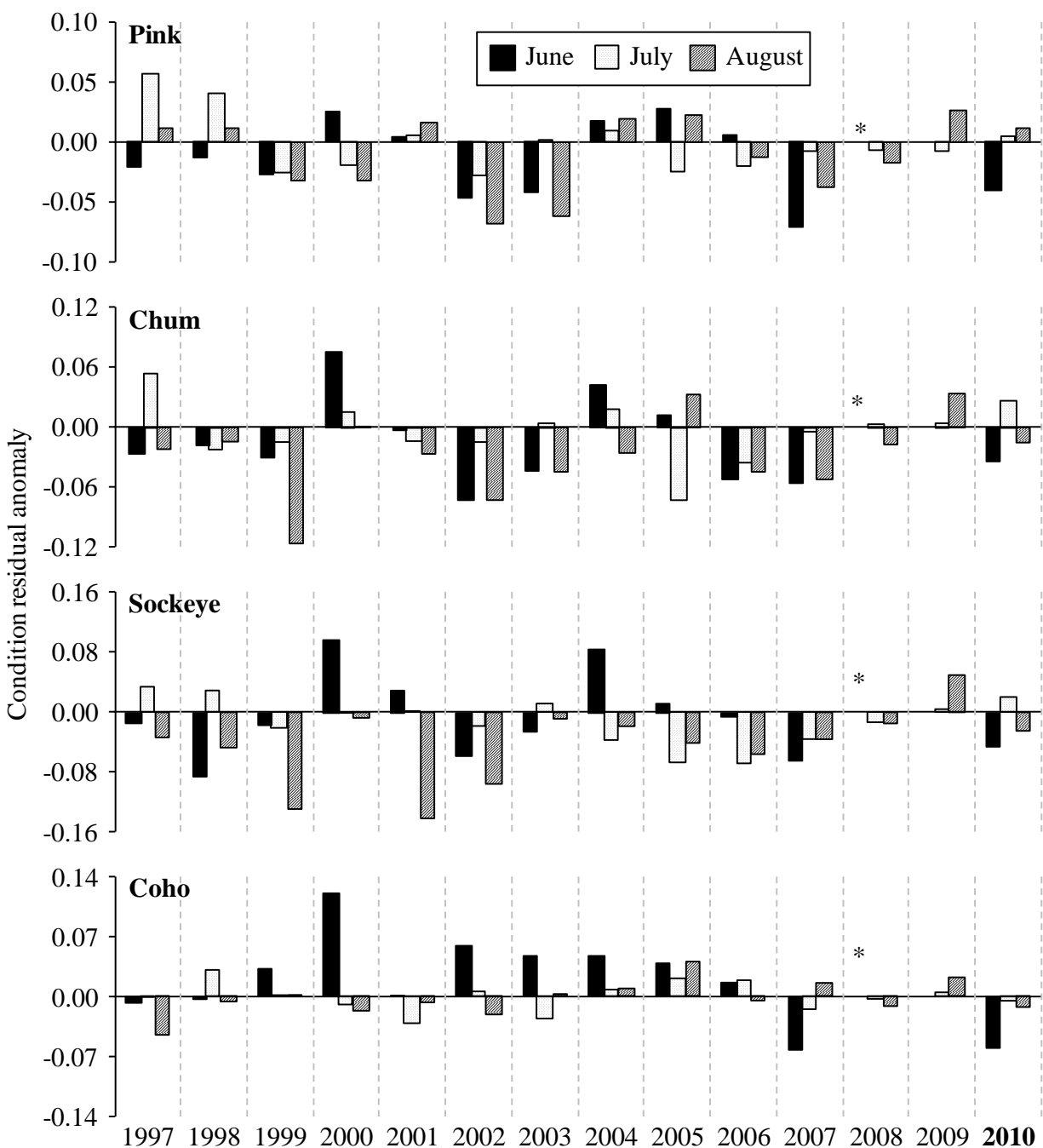


Figure 29.—Monthly anomalies for condition residuals (CR) from length-weight linear regressions for juvenile pink, chum, sockeye, and coho salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from the longterm monthly mean CR (0-lines). No trawling was conducted in June of 2009. Asterisks indicate insufficient samples available for processing in June 2008. Note difference in y-axis scales. See also Tables 10-13 and Figure 13.

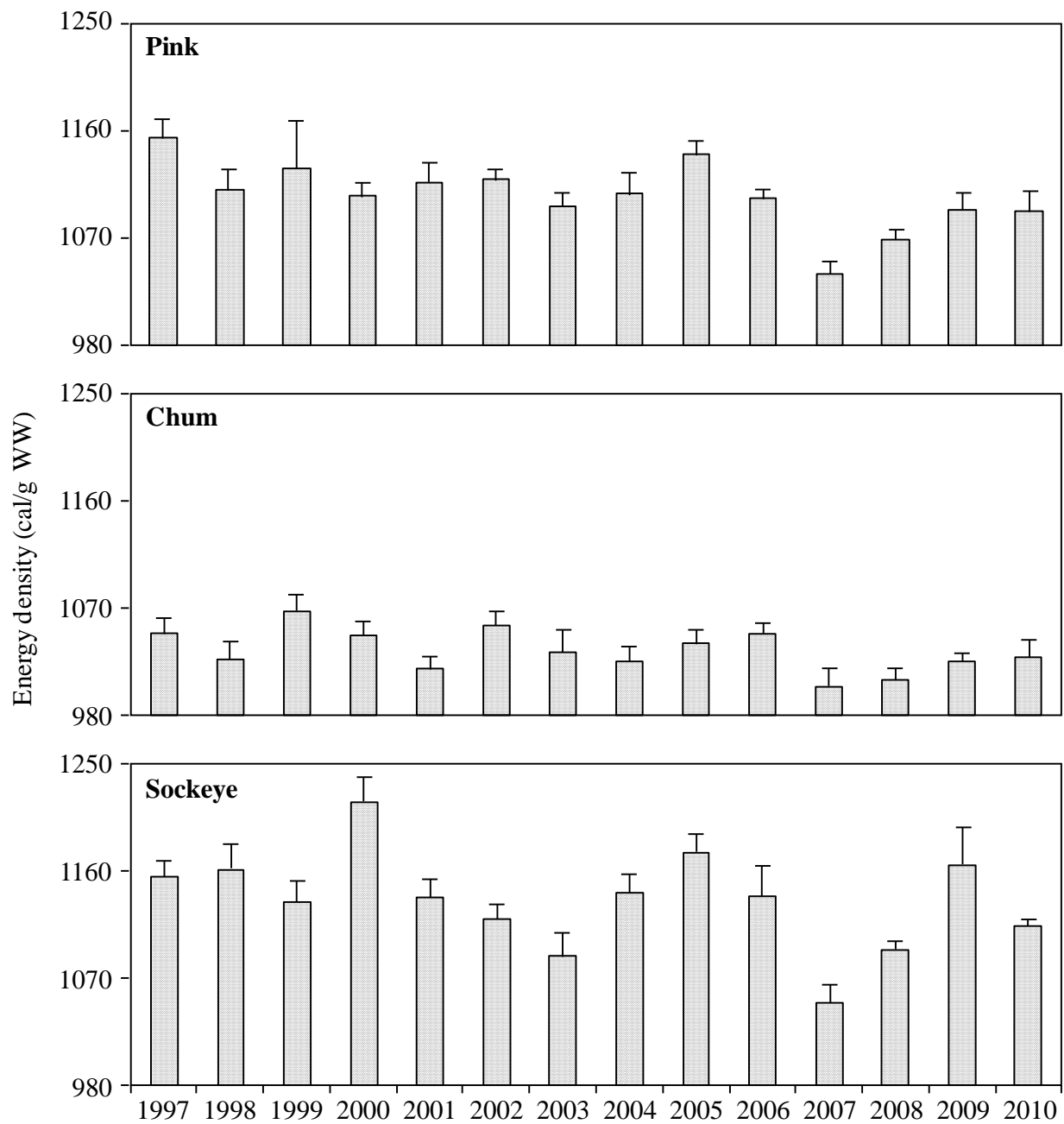


Figure 30.—Annual July energy density (cal/g WW) for juvenile pink, chum, and sockeye salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010.

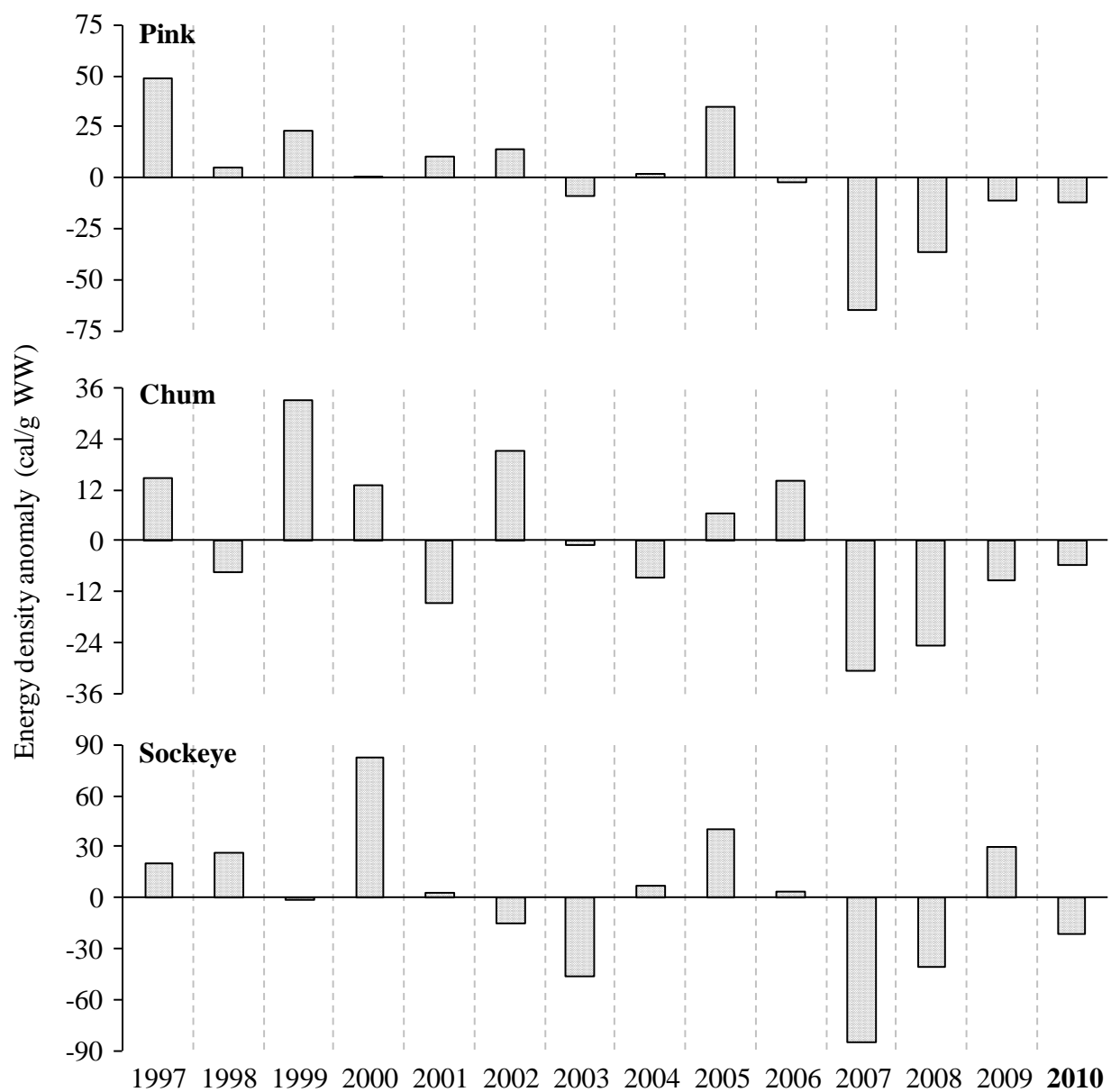


Figure 31.—Annual July anomalies for energy density (cal/g WW) of juvenile pink, chum, and sockeye salmon across the 14-yr time series from strait habitat in the northern region of southeastern Alaska, 1997-2010. Data (shaded bars) are deviations from the longterm July mean energy density (0-line). See also Figure 30.