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# Ichthyoplankton Composition and Plankton Volumes From Inland Coastal Waters of Southeastern Alaska, April-November 1972

Chester R. Mattson and Bruce L. Wing

April 1978



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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# Ichthyoplankton Composition and Plankton Volumes From Inland Coastal Waters of Southeastern Alaska, April-November 1972

CHESTER R. MATTSON AND BRUCE L. WING[1]

## ABSTRACT

**Eighteen families of fish were represented in 119 plankton samples taken on monthly cruises from April to November 1972 in southeastern Alaska. Fifteen kinds of larval fish were identified to species. Abundance of larval fish, fish eggs, and total plankton biomass peaked in May and declined through the summer. Walleye pollock (family Gadidae) were the most abundant larvae in May and June and were more concentrated in large channels than in small bays. Osmeridae and Bathylagidae were the second and third most abundantly represented families; peak abundance for both was in June and July. Other families with distinct peaks in abundance were Agonidae and Ammodytidae in May; Cottidae, Cyclopteridae, Stichaeidae, and Pleuronectidae in June; and Scorpaenidae in July. Small numbers of Bathymasteridae were present from May through July. Myctophidae, Zoarcidae, and Hexagrammidae did not show distinct changes in seasonal abundance. Clupeidae, Gasterosteidae, Pholidae, and Ptilichthyidae were too rare in the catches to exhibit seasonal abundance. Calanoid copepods and phytoplankton made up most of the plankton retained by 0.333-mm mesh nets.**

## INTRODUCTION

This report presents data on the kinds, distribution, and numerical abundance of ichthyoplankton and on total net plankton biomass in northern southeastern Alaska. The data are from an 8-mo study, April-November 1972. The study was intended to develop sampling methods, schedules, and station patterns for routine surveys in Alaska coastal waters. The stations represented three basic types of marine environment in southeastern Alaska—enclosed bays, middle of deep channels, and the margin, or edge, of channels. Stations were grouped from north to south so that differences in species distribution and abundance within and between geographical and environmental areas could be evaluated. Funding and manpower restrictions imposed after completion of the field work have limited sample analyses to one sample per station per month (approximately one quarter of the samples taken). The data have not been subjected to intensive interpretative analyses but are presented here in preliminary form to make them available to other workers, because published ichthyoplankton data for the area are limited to the small amount in Wing and Reid (1972) for Auke Bay.

## METHODS

Eight monthly cruises, extending from April into November 1972, were made aboard the MV *Murre II*. The first cruise, 10-14 April, was a test to determine how many stations could be occupied in a week. As a result, a total of 21 stations were selected that could be sampled in 2-wk cruises (Table 1); five of the original April stations were deleted and replaced by others more convenient to cruise routing (Fig. 1). A northern cruise, con-

Table 1.--Location, bottom depth at station, proposed sampling depth, and habitat category of plankton stations routinely occupied in southeastern Alaska, April-November 1972. (B = Bay, C = midchannel, E = margin of channel).

| Station No. | Station Name | Station Habitat | Lat. N | Long. W. | Bottom depth range (m) | Target sampling depth (m) |
|---|---|---|---|---|---|---|
| 1 | Dyea | C | 59°27.9' | 135°21.5' | 115-164 | 100 |
| 2 | Taiya | C | 59°17.9' | 135°22.8' | 102-343 | 200 |
| 3 | Haines | E | 59°13.2' | 135°23.1' | 80-128 | 100 |
| 4 | Chilkoot Inlet | C,E | 59°04.8' | 135°14.6' | 47-247 | 100 |
| 5 | Chilkat Inlet | C,E | 59°04.7' | 135°20.4' | 113-208 | 100 |
| 6 | Berners Bay | B | 58°41.4 | 134°56.7' | 50-90 | 50 |
| 7 | Mid-Lynn Canal | C | 58°41.4' | 135°03.1' | 250-150 | 200 |
| 8 | Danger Point | E | 58°41.4' | 135°11.1' | 73-130 | 100 |
| 9 | Point Retreat | C | 58°25.7' | 135°00.0' | 265-426 | 300 |
| 10 | Saginaw Channel | E | 58°24.0' | 134°53.4' | 22-120 | 50 |
| 11 | Favorite Channel | E | 58°22.0' | 134°45.3' | 46-100 | 50 |
| 12 | Auke Bay | B | 58°21.9' | 134°40.0' | 43-64 | 50 |
| 13 | Gambier Bay | B | 57°28.7' | 134°00.8' | 46-90 | 75 |
| 14 | False Point Pybus | E | 57°24.2' | 133°52.2' | 47-123 | 50 |
| 15 | South Stephens Passage | C | 57°23.7' | 133°36.1' | 221-315 | 250 |
| 16 | Farragut Bay | B | 57°07.4' | 133°10.2' | 77-90 | 60 |
| 17 | Grand Point | C | 57°03.2' | 133°13.2' | 166-176 | 150 |
| 18 | Boulder Point | E | 57°01.0' | 133°15.0' | 50-181 | 60 |
| 19 | Cornwallis Point | C | 56°56.7' | 134°17.7' | 98-190 | 100 |
| 20 | Saginaw Bay | B | 56°52.9' | 134°11.0' | 36-86 | 50 |
| 21 | Red Bluff | C | 56°50.0' | 134°34.6 | 550-713 | 300 |

[1]Northwest and Alaska Fisheries Center Auke Bay Laboratory, National Marine Fisheries Service, NOAA, P.O. Box 155, Auke Bay, AK 99821.

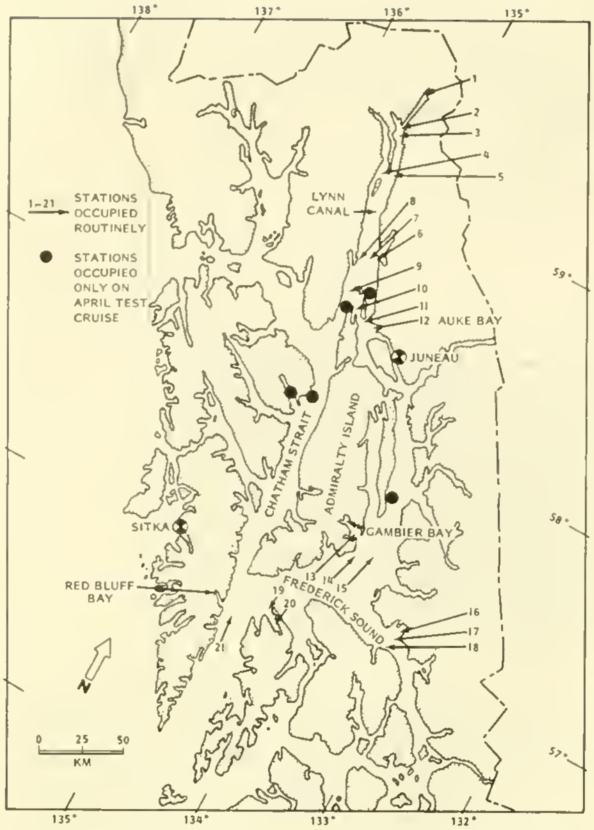


**Figure 1.—Location of plankton and oceanographic sampling stations occupied monthly in southeastern Alaska, April-November 1972.**

sisting of stations 1-12, extended southerly from Dyea in northern Lynn Canal to Auke Bay, located about 19.3 km northwest of Juneau. A southern cruise, stations 13-21, ranged from Gambier Bay on Admiralty Island to the junction of Frederick Sound and Chatham Strait near Red Bluff Bay. The only months when all stations could be sampled were May, June, and July. Beginning in August, stormy weather reduced sampling to 18 stations in August, 15 stations in September, 16 stations in October, and only 7 stations in November.

Before sampling for zooplankton, we completed a standard oceanographic station including surface observations (wind, wave, cloud cover, temperatures, barometric pressure, and water transparency), subsurface observations (temperature, salinity, oxygen, phosphates, nitrates, silicates, and chlorophyll a), and a surface phytoplankton collection. The physical and chemical observations are on file at the National Oceanographic Data Center, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Rockville, MD 20852, and data on the phytoplankton composition were reported by Williamson.[2]

Zooplankton samples were collected with a bongo net array consisting of a 20-cm (mouth diameter) frame equipped with 0.253- and 0.333-mm mesh nets placed 1.0 m above a 61-cm frame equipped with 0.333- and 0.505-mm mesh nets. A 1.2-m Braincon type 275 v-fin depressor was suspended 1 m below the larger bongo frame. Sampling depths were recorded with a Bendix Model T1 bathykymograph of 300-m depth range. General Oceanics Model 2030 digital flowmeters were used to estimate water filtered.

Sampling technique was a single oblique tow in depths over 150 m, and multiple oblique tows in shallow depths (100 m or less). Target sampling depths ranged from 50 m in shallow bays and channel margins to 300 m at the deepest channel stations (Table 1). Towing was at a constant surface speed of 2 kn (1.029 m/s). Tow cable was served out at 60 m/min and retrieved at 20 m/min, while rates were monitored by stopwatch and cable amounts by a dial-reading meter wheel. When necessary, winch speed changes were made verbally to the winch operator. Towing times ranged from 12 to 47 min, depending upon target depth and maneuvering room within confined bays. Towing distances ranged from 0.7 km (0.4 n.mi.) to 2.9 km (1.6 n.mi.). When multiple shallow oblique tows were made, the nets were raised until visible, checked for debris or plugging, then lowered. Upon tow completion, all samples were preserved in 3-5% unbuffered seawater formaldehyde.

For processing, the samples were taken to the laboratory where the formaldehyde was buffered with a saturated borax solution. We processed only the catches by the 61-cm, 0.333-mm mesh net. Each sample was sorted in its entirety under a dissecting microscope at magnifications of 7-10×. All fish eggs and fish larvae were removed and counted. Only the fish larvae were identified. Notes were kept on the abundance rank of general plankton categories. Total settling volumes of plankton were estimated to the nearest 25 ml in a graduated 0.95-liter (1 qt) widemouth bottle.

The data were converted to standardized tows as numbers under 10 $m^2$ of water surface (computed as number per 10 $m^3$ per meter of tow depth (Ahlstrom 1948)) for larval fish and eggs and to milliliters per 1,000 $m^3$ of water filtered for the plankton settling volumes.

## RESULTS

One hundred twenty-six plankton tows were completed at the regular stations of which 119 were sorted for fish eggs and fish larvae (Table 2). Three samples, station 13 in May and stations 13 and 14 in June, were processed for plankton volumes but not for ichthyoplankton because of exceptionally high quantities of phytoplankton. Samples from four tows could not be processed because they contained large amounts of mud

[2]Williamson, R. 1974. Phytoplankton species and their geographical distribution in southeast Alaska. Northwest and Alaska Fisheries Center Auke Bay Laboratory, National Marine Fisheries Service, NOAA, Auke Bay, AK 99821. Unpubl. manuscr.

(Station 10, May; stations 4 and 14, August) or surface trash (station 15, September) (Appendix 1).

### Relative Abundance of Fish Eggs

A total of 18,354 fish eggs were sorted from 119 samples (Table 2). During the peak month of May, a tenfold difference in abundance was evident between the northern stations (averaging 2,072.2 eggs/10 $m^2$) and the southern stations (averaging only 210.1 eggs/10 $m^2$). Exceptionally high egg counts were obtained from the Taiya (station 2) and Berners Bay (station 6) samples. Exceptions to the May peak abundance were evident in Saginaw Channel (station 10) and Farragut Bay (station 16), where maximum numbers occurred in July. The 1972 peak egg abundance in May contrasts to a previous

Table 2.--Abundance of larval fish and fish eggs (number per 10 $m^2$) collected with 61-cm, 0.333-mm-mesh Bongo net at 21 stations in southeastern Alaska, April-November 1972. In fish listed only to family, the species were not identified.

| Month | Station | Habitat | Station totals Fish eggs | Station totals Fish larvae | *Clupea harengus pallasi* | *Thaleichthys pacificus* | Other Osmeridae | *Bathylagus stilbius schmidti* | *Stenobrachius leucopsaurus* | *Theragra chalcogramma* | Other Gadidae | Zoarcidae | *Gasterosteus aculeatus* | Scorpaenidae | Hexagrammidae | Cottidae | Agonidae | Cyclopteridae | Bathymasteridae | Stichaeidae | *Ptilichthys goodei* | Pholidae | *Ammodytes hexapterus* | *Glyptocephalus zachirus* | *Hippoglossoides elassodon* | *Lepidopsetta bilineata* | *Limanda aspera* | *Parophrys vetulus* | *Platichthys stellatus* | *Psettichthys melanostictus* | Other Pleuronectidae | Unidentified larvae |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| April | 11 | E | -- | 18.5 | -- | -- | 1.0 | 2.9 | -- | -- | -- | -- | -- | -- | 1.9 | -- | -- | 1.9 | -- | -- | -- | -- | -- | -- | 4.9 | -- | -- | -- | -- | -- | 1.0 | -- |
| | 19 | E | -- | 28.8 | -- | -- | -- | 8.2 | -- | -- | -- | -- | -- | 4.1 | 2.1 | 8.2 | -- | 2.1 | -- | -- | -- | -- | 4.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 3.2 | 41.7 | -- | -- | -- | 33.8 | -- | 1.8 | -- | 1.8 | -- | 0.8 | 0.8 | 0.8 | 0.8 | 1.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 21 | C | -- | 48.0 | -- | -- | -- | -- | 4.8 | -- | -- | 28.8 | -- | 4.8 | -- | -- | -- | 9.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| May | 1 | C | 1926.6 | 1858.2 | -- | 5.6 | -- | -- | -- | 1693.1 | -- | -- | -- | 18.8 | 1.9 | 15.0 | 3.8 | 1.9 | -- | 31.9 | -- | 1.9 | 77.0 | -- | -- | -- | -- | -- | -- | 3.8 | -- | 3.8 |
| | 2 | C | 6233.6 | 4513.3 | -- | 5.1 | -- | -- | 5.1 | 4293.1 | -- | -- | -- | 7.7 | 2.6 | 48.1 | 2.8 | 5.1 | 20.5 | 48.6 | -- | -- | 69.1 | -- | -- | 7.7 | -- | -- | -- | -- | -- | -- |
| | 3 | E | 1401.3 | 2108.0 | -- | -- | -- | 0.8 | -- | 2024.9 | -- | -- | -- | -- | 0.8 | 13.6 | 0.8 | 12.8 | 0.8 | 24.9 | -- | -- | 17.4 | -- | -- | 3.8 | -- | -- | -- | -- | 2.3 | 5.3 |
| | 4 | C,E | 1322.5 | 2389.4 | -- | -- | -- | 1.1 | -- | 2326.4 | -- | -- | -- | -- | -- | 5.7 | 4.4 | 5.7 | -- | 14.9 | -- | -- | 13.8 | -- | -- | -- | -- | -- | 2.3 | -- | -- | 14.9 |
| | 5 | C,E | 2299.9 | 2070.8 | -- | -- | -- | 1.3 | -- | 2023.7 | -- | -- | -- | 7.9 | 1.3 | 10.5 | -- | 3.9 | -- | 9.2 | -- | -- | 2.8 | -- | -- | -- | -- | 1.3 | -- | 3.9 | -- | 5.2 |
| | 6 | B | 4010.1 | 477.9 | -- | -- | -- | 7.5 | -- | 383.5 | -- | -- | -- | -- | -- | 24.0 | 10.5 | 3.0 | -- | 15.0 | -- | -- | 28.5 | -- | -- | 4.5 | -- | -- | -- | -- | 1.5 | -- |
| | 7 | C | 1448.5 | 1448.5 | -- | -- | -- | 32.3 | -- | 1390.4 | -- | -- | -- | 6.5 | -- | 3.2 | 3.2 | -- | -- | 9.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.2 |
| | 8 | E | 749.0 | 2465.7 | -- | -- | -- | 53.4 | -- | 2382.5 | -- | -- | -- | -- | -- | 8.9 | -- | 7.1 | -- | 7.8 | -- | -- | 1.8 | -- | -- | -- | -- | -- | -- | -- | 12.3 | -- |
| | 9 | C | 352.9 | 1315.1 | -- | -- | -- | 26.0 | 3.7 | 1226.0 | -- | 3.7 | -- | 3.7 | -- | 48.3 | -- | -- | 3.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 11 | E | 2160.9 | 102.3 | -- | -- | -- | -- | -- | 78.9 | -- | -- | -- | -- | -- | -- | -- | 11.7 | -- | -- | -- | -- | 2.9 | -- | -- | -- | -- | -- | -- | -- | 11.7 | -- |
| | 12 | B | 544.4 | 153.2 | -- | -- | -- | 2.5 | -- | 37.7 | 1.3 | -- | -- | -- | -- | 25.3 | 7.6 | 6.3 | 1.3 | 60.8 | -- | -- | 3.8 | -- | -- | -- | -- | -- | -- | -- | 2.5 | 5.1 |
| | 14 | E | 108.1 | 60.3 | -- | -- | -- | 7.5 | -- | 27.8 | -- | -- | -- | -- | 2.5 | -- | -- | 5.0 | 5.0 | 12.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 15 | C | 160.5 | 198.2 | -- | -- | -- | 53.5 | -- | 83.2 | -- | 5.9 | -- | -- | -- | 35.7 | -- | -- | -- | 5.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 16 | B | 512.1 | 225.4 | -- | -- | 94.0 | -- | -- | 1.0 | -- | -- | -- | 1.0 | -- | 1.0 | -- | 2.9 | -- | 15.3 | -- | -- | 110.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 17 | C | 231.1 | 142.5 | -- | -- | -- | -- | -- | 92.4 | -- | -- | -- | 15.4 | -- | 11.6 | -- | 3.9 | -- | -- | -- | -- | 3.9 | -- | -- | -- | -- | -- | -- | -- | -- | 15.4 |
| | 18 | E | 47.0 | 500.3 | -- | -- | 8.4 | 19.2 | 2.1 | 395.5 | -- | -- | -- | 2.1 | 2.1 | 25.7 | 10.7 | 29.9 | 2.1 | -- | -- | -- | 2.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 19 | E | 165.2 | 156.3 | -- | 2.2 | -- | 2.2 | -- | 140.7 | -- | -- | -- | 4.5 | -- | -- | -- | -- | -- | 4.5 | 2.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 45.7 | 402.1 | -- | -- | 54.8 | -- | -- | 322.9 | -- | -- | -- | 12.2 | -- | -- | -- | 3.0 | -- | 3.0 | -- | -- | 6.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 21 | C | 167.6 | 5444.4 | -- | -- | -- | 93.1 | 8.2 | 4966.4 | -- | 15.5 | -- | 18.6 | 34.1 | -- | -- | -- | 239.0 | 71.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| June | 1 | C | 52.2 | 266.0 | -- | 7.1 | 173.9 | -- | -- | 41.2 | -- | -- | -- | -- | -- | 14.2 | -- | 0.6 | 0.6 | 7.7 | -- | -- | 5.6 | -- | 12.2 | -- | -- | -- | 3.3 | -- | 3.3 | 0.6 |
| | 2 | C | 83.3 | 412.6 | -- | 3.9 | 48.4 | 7.7 | -- | 246.0 | -- | -- | -- | 3.9 | -- | 27.1 | -- | 17.4 | -- | 21.3 | -- | -- | 5.8 | -- | 11.6 | -- | 5.8 | -- | -- | 9.7 | -- | -- |
| | 3 | E | 171.1 | 539.5 | -- | -- | 6.8 | 8.5 | -- | 415.3 | -- | -- | -- | -- | -- | 18.2 | -- | 25.5 | 2.6 | 35.7 | -- | -- | 11.9 | -- | -- | -- | -- | -- | -- | 4.3 | 12.8 | -- |
| | 4 | C,E | 76.7 | 468.9 | -- | -- | 22.6 | 27.9 | -- | 363.2 | -- | -- | -- | 1.5 | -- | 1.5 | -- | 9.8 | 7.6 | 27.9 | -- | -- | 3.0 | -- | -- | -- | -- | -- | -- | 1.5 | 2.3 | -- |
| | 5 | C,E | 35.9 | 404.8 | -- | -- | 4.8 | 16.8 | -- | 344.7 | -- | -- | -- | -- | -- | 2.4 | -- | 6.0 | -- | 21.5 | -- | -- | 4.8 | -- | 2.4 | -- | 1.2 | -- | -- | -- | -- | -- |
| | 6 | B | 547.0 | 717.3 | -- | 4.5 | 105.5 | 128.1 | -- | 458.1 | -- | -- | -- | -- | -- | -- | -- | 3.0 | -- | 12.1 | -- | -- | 3.0 | -- | -- | -- | -- | -- | -- | 3.0 | -- | -- |
| | 7 | C | 20.8 | 526.8 | -- | -- | 47.6 | 95.2 | 8.9 | 315.5 | -- | 8.9 | -- | 3.0 | -- | 20.8 | -- | 3.0 | 3.0 | 6.0 | -- | -- | 14.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 8 | E | 28.4 | 191.4 | -- | 2.8 | -- | 21.3 | -- | 143.2 | -- | -- | -- | -- | -- | 1.4 | -- | 5.7 | -- | 1.3 | -- | -- | -- | -- | 2.8 | -- | -- | -- | -- | 2.8 | -- | -- |
| | 9 | C | 0 | 130.8 | -- | -- | -- | 37.3 | 3.7 | 26.1 | -- | 3.7 | -- | 3.7 | -- | 22.4 | -- | -- | -- | -- | -- | -- | 28.7 | -- | -- | -- | -- | -- | -- | -- | 3.7 | 3.7 |
| | 10 | E | 67.7 | 255.5 | -- | 1.9 | 15.4 | 63.4 | -- | 155.6 | -- | -- | -- | 3.8 | -- | 1.9 | -- | 3.8 | -- | 9.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 11 | E | 259.9 | 313.6 | -- | 9.0 | 180.8 | 22.6 | -- | 88.4 | -- | -- | -- | 0.6 | -- | 2.8 | 1.1 | 10.7 | 2.3 | 5.1 | -- | -- | -- | -- | 2.8 | -- | -- | -- | 6.2 | 0.6 | 0.8 | -- |
| | 12 | B | 108.8 | 337.1 | -- | 0.6 | 136.7 | 3.2 | -- | 146.3 | -- | -- | -- | 3.2 | -- | 6.4 | 1.9 | 6.4 | -- | 18.4 | -- | -- | 4.5 | -- | 3.2 | -- | -- | -- | -- | -- | 5.1 | 1.3 |
| | 15 | C | 6.3 | 31.5 | -- | 4.2 | -- | 4.2 | 4.2 | 2.1 | -- | 2.1 | -- | -- | -- | 8.4 | -- | 5.9 | -- | 2.1 | -- | -- | 5.9 | -- | -- | -- | -- | -- | -- | -- | 4.2 | -- |
| | 16 | B | 843.5 | 460.2 | -- | 43.2 | 198.0 | -- | -- | 150.6 | -- | -- | -- | -- | -- | 14.7 | -- | 3.2 | -- | 47.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.2 | -- |
| | 17 | C | 18.5 | 172.0 | -- | 10.6 | -- | -- | -- | 13.2 | -- | -- | -- | 21.2 | 7.9 | 23.8 | -- | 2.6 | 10.8 | 63.5 | 2.8 | -- | 15.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 18 | E | 22.1 | 166.0 | -- | 7.9 | 0.9 | 10.6 | -- | 12.4 | -- | -- | -- | 33.6 | -- | 38.9 | 0.9 | 7.1 | 41.5 | 2.1 | -- | -- | -- | -- | 9.7 | -- | -- | -- | -- | -- | -- | 0.9 |
| | 19 | E | 0 | 28.8 | -- | -- | -- | -- | -- | 6.8 | -- | -- | -- | 15.1 | -- | -- | -- | -- | -- | 6.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 6.7 | 327.1 | -- | -- | 101.8 | -- | -- | 125.5 | -- | -- | -- | 2.9 | -- | 38.0 | 4.8 | 3.8 | -- | 33.3 | -- | -- | 1.0 | 1.0 | 4.8 | -- | -- | -- | -- | 4.8 | 1.9 | 3.8 |
| | 21 | C | 111.9 | 402.2 | -- | 3.5 | -- | 56.0 | -- | 49.0 | -- | 45.5 | -- | 216.8 | 14.0 | -- | -- | 10.5 | -- | 7.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| July | 1 | C | 32.8 | 149.2 | -- | 12.7 | 98.4 | 16.9 | 1.1 | -- | -- | -- | -- | 2.1 | -- | 2.1 | -- | 1.1 | -- | -- | -- | -- | 5.3 | -- | 1.1 | -- | -- | 3.2 | 2 | 2.1 | -- | -- |
| | 2 | C | 120.0 | 442.7 | -- | 34.7 | 298.7 | 45.1 | 2.7 | [illegible] | -- | -- | -- | -- | -- | -- | -- | 5.3 | 16.0 | 2.7 | -- | -- | 10.7 | -- | -- | -- | -- | -- | -- | -- | -- | 5.3 |
| | 3 | E | 62.2 | 234.1 | 1.0 | 5.2 | 120.2 | 31.1 | -- | 32.1 | -- | -- | -- | 2.1 | -- | 12.4 | -- | 7.3 | 5.2 | 2.1 | -- | -- | 1.0 | -- | -- | -- | -- | 8.3 | -- | 5.2 | -- | 1.0 |
| | 4 | C,E | 39.5 | 163.7 | -- | 5.9 | 83.9 | 69.7 | -- | 24.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5 | C,E | 0 | 365.5 | -- | 69.5 | 108.1 | 61.8 | -- | 77.2 | -- | -- | -- | 12.9 | -- | 1.3 | -- | 1.3 | 6.4 | 5.1 | -- | -- | 5.1 | -- | -- | -- | -- | 7.7 | -- | -- | 1.3 | 1.3 |
| | 6 | B | 134.2 | 238.3 | -- | 105.6 | -- | 104.1 | -- | 7.5 | -- | -- | -- | -- | -- | 3.0 | 1.5 | 3.0 | -- | -- | -- | -- | -- | -- | 7.5 | -- | -- | -- | -- | -- | -- | -- |
| | 7 | C | 3.1 | 107.3 | -- | -- | 84.4 | 30.7 | -- | 3.1 | -- | -- | -- | -- | -- | 6.1 | -- | -- | 3.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 8 | E | 0 | 512.3 | -- | 24.5 | 357.8 | 51.5 | -- | 27.0 | -- | -- | -- | 4.9 | -- | 9.8 | -- | 4.9 | 4.9 | -- | -- | -- | -- | -- | 2.5 | 12.3 | -- | 9.8 | -- | -- | 2.5 | 12.3 |
| | 9 | C | 6.0 | 147.6 | -- | 8.0 | 8.0 | 67.8 | 8.0 | 4.0 | -- | 8.0 | -- | 23.9 | -- | -- | -- | 8.0 | 8.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 10 | E | 84.5 | 202.6 | -- | 26.0 | 128.3 | 18.8 | -- | 1.9 | -- | -- | -- | -- | -- | -- | -- | 1.9 | 11.2 | -- | -- | -- | -- | -- | 1.9 | -- | -- | -- | -- | -- | 7.4 | 5.6 |
| | 11 | E | 187.3 | 907.1 | -- | 17.0 | 739.3 | 94.8 | -- | 2.4 | -- | -- | -- | 7.3 | -- | 7.3 | -- | -- | 24.3 | -- | -- | -- | -- | -- | 7.3 | -- | -- | -- | -- | -- | 2.4 | 4.9 |
| | 12 | B | 81.1 | 145.7 | -- | -- | 120.9 | -- | -- | 5.0 | -- | -- | -- | -- | -- | 1.7 | 1.7 | -- | -- | -- | -- | -- | -- | -- | 16.6 | -- | -- | -- | -- | -- | -- | -- |
| | 13 | B | 277.5 | 52.0 | -- | 2.2 | 10.8 | -- | -- | 2.2 | -- | -- | -- | 6.5 | -- | 8.7 | -- | 4.3 | -- | 15.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.2 |
| | 14 | E | 10.0 | 1.7 | -- | -- | -- | -- | -- | 1.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 15 | C | 3.3 | 96.4 | -- | -- | 3.3 | 6.7 | 16.8 | -- | -- | -- | -- | 63.2 | -- | -- | -- | -- | 3.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.3 | -- |
| | 16 | B | 1290.7 | 504.3 | -- | 12.2 | 331.8 | 12.2 | 1.1 | 118.3 | -- | -- | -- | 2.2 | -- | 15.5 | -- | 3.3 | 7.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 17 | C | 27.8 | 67.4 | -- | -- | 6.1 | 6.1 | -- | -- | -- | -- | -- | 33.7 | -- | 3.1 | -- | -- | 9.2 | -- | -- | -- | -- | -- | -- | -- | -- | 3.1 | -- | -- | 3.1 | 3.1 |
| | 18 | E | 5.7 | 42.5 | -- | -- | -- | 4.0 | -- | 1.4 | -- | -- | -- | 38.4 | -- | 4.3 | -- | 2.8 | 5.7 | 1.8 | -- | -- | 4.3 | -- | -- | -- | -- | -- | -- | -- | -- | 2.8 |
| | 19 | E | 0.9 | 148.9 | -- | -- | 1.7 | 5.1 | -- | -- | -- | -- | 0.9 | 124.8 | [illegible] | 9.4 | -- | -- | [illegible] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 2.3 | 95.3 | 4.5 | -- | 35.2 | -- | -- | 1.1 | -- | -- | -- | 6.8 | -- | [illegible] | -- | 3.4 | 28.4 | 3.4 | -- | -- | -- | -- | [illegible] | -- | -- | -- | -- | -- | 3.4 | -- |
| | 21 | C | 5.9 | 666.9 | -- | -- | -- | 17.7 | 5.9 | -- | -- | 82.6 | -- | 560.[illegible] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| August | 1 | C | 0 | 16.8 | -- | 2.4 | -- | 2.4 | 2.4 | -- | -- | -- | -- | -- | -- | 2.4 | -- | -- | -- | 4.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.4 | -- |
| | 3 | E | 16.0 | 145.[illegible] | -- | 72.0 | -- | 57.4 | -- | -- | -- | 3.2 | -- | -- | -- | -- | -- | -- | -- | 12.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5 | C,E | [illegible] | 59.9 | -- | 12.2 | -- | 44.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | [illegible] |
| | 6 | C | 61.2 | 147.4 | -- | 107.2 | -- | 24.9 | -- | 1.9 | -- | -- | -- | -- | -- | -- | 1.0 | 4.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4.8 | 2.9 | -- | -- |
| | 7 | B | 0 | 73.2 | -- | 11.7 | -- | 43.9 | 14.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 8 | C | 0 | 161.9 | -- | 116.5 | -- | 40.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.5 | 1.5 | -- | -- | -- |
| | 9 | C | 78.6 | 144.2 | -- | 3.3 | 22.9 | 9.8 | 26.2 | -- | -- | 26.2 | 3.3 | 3.3 | 36.0 | -- | -- | 3.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.3 | -- | 6.6 | -- | -- |
| | 10 | E | 0 | 88.0 | -- | 1.5 | 45.5 | 10.4 | -- | 1.5 | -- | -- | -- | 3.0 | -- | 1.5 | -- | 4.6 | 12.1 | 1.5 | -- | -- | -- | -- | -- | -- | -- | 3.0 | -- | 1.5 | -- | 5 |
| | 11 | E | 20.7 | 37.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 37.3 |
| | 12 | B | 14.8 | 75.4 | -- | 59 | -- | 1.5 | -- | -- | -- | -- | -- | 4.4 | -- | -- | -- | 1.5 | 4.4 | 3.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 5 |
| | 13 | B | 56.9 | 50.9 | -- | 4.0 | -- | 3.0 | -- | 26.9 | -- | -- | -- | 6.0 | -- | -- | -- | -- | 3.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.0 | -- | -- | -- |
| | 15 | C | 0 | 35.5 | -- | 8.9 | -- | -- | 8.9 | -- | -- | -- | 4.4 | -- | -- | 8.9 | -- | -- | -- | 4.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 16 | B | 12.0 | 115.6 | -- | 91.7 | -- | -- | -- | 15.9 | -- | -- | -- | 4.0 | -- | 4.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 18 | E | 0 | 11.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.7 | -- | 1.8 | -- | 3.7 | 1.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 19 | E | 0 | 22.2 | -- | 2.6 | -- | 10.4 | -- | -- | -- | -- | -- | 1.3 | -- | 5.2 | -- | 1.3 | -- | 1.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 1.6 | 20.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.6 | -- | 12.7 | -- | -- | 4.7 | 1.6 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 21 | C | 0 | 122.9 | -- | -- | -- | 11.9 | -- | -- | -- | 11.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sept | 1 | C | 0 | 2.2 | -- | 1.1 | -- | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 3 | E | 29.1 | 8.7 | -- | 2.9 | -- | 5.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 4 | C,E | 6.2 | 33.2 | -- | 3.7 | -- | 29.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 5 | C,E | 2.7 | 21.5 | -- | 4.3 | 2.2 | 15.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 9 | C | 3.0 | 47.5 | -- | -- | -- | 20.8 | 5.9 | -- | -- | 5.9 | -- | 8.9 | 3.0 | -- | -- | 3.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 10 | E | 0 | 14.7 | -- | -- | -- | 2.1 | 2.1 | -- | -- | -- | -- | 2.1 | 8.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 11 | E | 18.0 | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 12 | B | 6.8 | 49.7 | -- | 4.5 | 43.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 13 | B | 0 | 26.9 | -- | 2.2 | -- | -- | -- | 17.9 | -- | -- | -- | -- | 2.2 | 4.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 14 | E | 1.3 | 9.2 | -- | 1.3 | 1.3 | -- | -- | 1.3 | 1.3 | -- | -- | -- | 2.6 | -- | -- | 1.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 16 | B | 14.7 | 2.1 | -- | -- | 2.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 18 | E | 0 | 4.5 | -- | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 19 | E | 0 | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 0 | 6.3 | -- | -- | 3.1 | -- | -- | -- | -- | -- | -- | -- | -- | 3.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| October | 4 | C,E | 12.7 | 11.6 | -- | 3.5 | 1.2 | 5.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 6 | B | 22.8 | 7.0 | -- | -- | 5.0 | -- | 2.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 7 | C | 3.0 | 45.1 | -- | -- | -- | 12.0 | 27.0 | -- | -- | 6.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 9 | C | 20.9 | 37.7 | -- | -- | -- | 16.7 | 12.6 | -- | -- | -- | -- | -- | -- | -- | -- | 8.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 10 | E | 3.8 | 1.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 11 | C | 22.5 | 2.9 | -- | -- | -- | 2.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 12 | B | 25.7 | 5.8 | -- | 0.9 | 4.4 | -- | -- | -- | -- | -- | -- | -- | -- | [illegible] | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 13 | B | 12.0 | 6.0 | -- | -- | 1.5 | -- | -- | 1.5 | -- | -- | -- | 1.5 | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 14 | E | 0.9 | 0.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 15 | C | 0 | 27.2 | -- | -- | -- | 2.7 | 24.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 16 | B | 34.2 | 8.9 | -- | -- | 2.5 | -- | -- | 3.8 | -- | -- | -- | -- | 2.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 17 | C | 0 | 10.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 10.8 |
| | 18 | C | 0 | 2.3 | -- | -- | 0.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 19 | E | 0 | 1.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 20 | B | 0 | 13.5 | -- | -- | 10.1 | -- | -- | -- | -- | -- | -- | -- | -- | 1.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 21 | C | 2.5 | 9.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 9.9 |
| Nov | 6 | B | 3.1 | 1.5 | -- | -- | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 7 | C | 6.7 | 53.4 | -- | -- | -- | 30.0 | 13.4 | -- | -- | -- | -- | -- | -- | 6.7 | 3.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 8 | E | 0 | 4.7 | -- | -- | -- | 2.3 | -- | -- | -- | -- | -- | -- | 2.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 9 | C | 0 | 31.4 | -- | -- | -- | 11.4 | 20.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 10 | E | 0.9 | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 11 | E | 7.2 | 1.0 | -- | -- | 1.0 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 12 | B | 0 | 0.9 | -- | -- | 0.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

study, indicating an April peak (Wing and Reid 1972). Such a difference could result from annual variations in environmental conditions which may affect spawning times.

## Larval Fish Abundance

A total of 23,819 larval and juvenile fish were sorted from 119 samples. Identification of larval fishes for the northwest Pacific Ocean, and Alaskan waters in particular, is very difficult. Therefore, we were able to identify only 15 species from 18 identified families (Table 2). Larval fishes in three families, Gadidae, Osmeridae, and Bathylagidae, contributed 87.5% of the catch in the samples processed. Walleye pollock, *Theragra chalcogramma*, the most abundant gadid, formed 68.2% of the total catch identified. Abundance of pollock was greatest in May and June when they formed 92.6% and 49.8%, respectively, of the total catch identified. Their distribution favored the channels rather than inside bays. Only three larval gadids were not walleye pollock, but unfortunately we could not identify these.

Osmerids were second in abundance, accounting for 14.9% of the total catch processed. Greatest abundance occurred in June and July (24.9% and 55.6% of the total, respectively). Eulachon, *Thaleichthys pacificus*, was the only osmerid identified to species, but capelin, *Mallotus villosus*, the most common osmerid in southeastern Alaska, was believed to compose the bulk of the osmerid samples. Greatest osmerid abundance was noted in the northern area with exceptions of Point Retreat (station 9) and Auke Bay (station 12), where they were scarce. In the southern areas, osmerids were abundant in Farragut Bay (station 16) and Saginaw Bay (station 20) and scarce elsewhere.

The third most abundant species was the northern smoothtongue, *Bathylagus stilbius schmidti* (Bathylagidae), composing 4.5% of the total processed catch. Abundance was high from May to August, peaking in June and July with 5.8% and 12.4% of the processed catch. Geographical abundance was markedly greater, with the exception of Auke Bay, in the northern stations where they were taken in 54 of 68 samples, and average catch per haul was generally much higher than in the southern stations. In the south, they were represented in only 20 of 51 samples.

Pacific herring, *Clupea harengus pallasi*, were conspicuous by their absence. Although adult herring are fished commercially throughout southeastern Alaska, larval herring were found only among the Haines (station 3) and Saginaw Bay (station 20) samples. Auke Bay (station 12) generally is a productive spring spawning area for herring and is heavily fished in the spring for roe and bait herring. Larval and postlarval herring are known to occur in the Auke Bay area from early June through September although our sampling did not collect them.

The families Scorpaenidae, Cottidae, and Stichaeidae each contributed approximately 2% to the total catch. Scorpaenid abundance was greatest in July and geographical distribution favored the channel rather than bay stations. Cottid and stichaeid abundance was

Table 3.--Settling volumes in 122 samples of plankton collected with 61-cm, 0.333-mm-mesh bongo net in southeastern Alaska, April-November 1972.

| | Milliliters per 1,000 $m^3$ of water filtered | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Station | April | May | June | July | Aug. | Sept. | Oct. | Nov. |
| 1 | -- | 2,174 | 2,146 | 1,199 | 1,284 | 495 | -- | -- |
| 2 | -- | 2,412 | 2,459 | 2,224 | -- | -- | -- | -- |
| 3 | -- | 2,968 | 1,646 | 1,590 | 1,674 | 654 | -- | -- |
| 4 | -- | 2,126 | 1,114 | 1,451 | -- | 855 | 253 | -- |
| 5 | -- | 3,447 | 1,496 | 1,422 | 1,105 | 673 | -- | -- |
| 6 | -- | 346 | 1,412 | 1,412 | 938 | -- | 133 | 149 |
| 7 | -- | 2,258 | 1,687 | 1,819 | 1,768 | -- | 2,128 | 1,471 |
| 8 | -- | 5,660 | 3,369 | 882 | 557 | -- | -- | 218 |
| 9 | -- | 3,120 | 3,937 | 1,616 | 1,039 | 928 | 1,430 | 1,265 |
| 10 | -- | -- | 1,753 | 1,673 | 1,858 | 768 | 199 | 624 |
| 11 | 239 | 7,885 | 484 | 2,027 | 2,203 | 661 | 255 | 199 |
| 12 | -- | 1,793 | 742 | 1,159 | 1,594 | 3,141 | 163 | 170 |
| 13 | -- | 25,000 | 20,000 | 1,084 | 1,701 | 1,402 | 884 | -- |
| 14 | -- | 4,583 | 10,000 | 713 | -- | 437 | 201 | -- |
| 15 | -- | 860 | 3,131 | 1,031 | 1,820 | -- | 1,124 | -- |
| 16 | -- | 285 | 421 | 2,046 | 2,057 | 785 | 328 | -- |
| 17 | -- | 883 | 1,597 | 1,267 | 1,448 | 882 | 2,338 | -- |
| 18 | -- | 606 | 1,003 | 987 | 846 | 281 | 136 | - |
| 19 | 257 | 4,583 | 639 | 1,069 | 573 | 631 | 228 | -- |
| 20 | 1,505 | 3,311 | 6,002 | 2,041 | 1,005 | 1,031 | 452 | -- |
| 21 | 374 | 506 | 1,253 | 843 | 868 | -- | 238 | -- |
| Means | 593.6 | 3,740.3 | 3,156.7 | 1,407.4 | 1,352.1 | 851.6 | 655.6 | 581.1 |

Table 4.--Predominant forms of plankton collected with 61-cm, 0.333-mm-mesh bongo net in southeastern Alaska, April-November 1972. (Cope = calanoid copepods; (Chaeto = chaetognaths, Euph = euphausiids; Parath = *Parathemisto libellula*, Phyto = phytoplankton.)

| Station | April | May | June | July | Aug. | Sept. | Oct. | Nov. |
|---|---|---|---|---|---|---|---|---|
| 1 | -- | Phyto | Cope | Cope | Chaeto | Chaeto | -- | -- |
| 2 | -- | Cope | Cope | Cope | -- | -- | -- | -- |
| 3 | -- | Cope | Cope | Cope | Cope | Chaeto | -- | -- |
| 4 | -- | Cope | Cope | Cope, Chaeto | -- | Cope, Chaeto | Euph, Chaeto | -- |
| 5 | -- | Cope | Cope | Cope, Chaeto | Cope | Euph | -- | -- |
| 6 | -- | Barnacle nauplii | Cope | Cope, Chaeto | Cope | -- | Phyto | Parath. |
| 7 | -- | Phyto | Cope | Cope | Cope | -- | Cope | Cope |
| 8 | -- | Cope | Cope | Phyto | Cope | -- | -- | Euph |
| 9 | -- | Phyto | Cope | Cope | Cope | Cope | Cope | Cope |
| 10 | -- | Phyto[1/] | Cope | Cope | Phyto | Phyto | Phyto | Parath |
| 11 | Cope | Phyto | Cope | Phyto | Phyto | Phyto | Phyto | Phyto |
| 12 | -- | Phyto | Cope | Phyto | Phyto | Phyto | Phyto | Phyto, Parath |
| 13 | -- | Phyto | Phyto | Cope | Cope | Phyto | Euph, Chaeto | -- |
| 14 | -- | Phyto | Phyto | Phyto | -- | Phyto | Phyto | -- |
| 15 | -- | Cope | Phyto, | Cope | Cope | -- | Cope | -- |
| 16 | -- | Cope | Cope | Cope | Phyto | Cope, Phyto | Phyto | -- |
| 17 | -- | Cope | Cope | Cope | Cope | Phyto | Cope | -- |
| 18 | -- | Cope | Cope | Cope | Phyto | Cope | Phyto | -- |
| 19 | Cope | Phyto | Phyto | Cope | Cope | Euph | Phyto | -- |
| 20 | Phyto | Phyto | Cope | Cope | Cope | Phyto | Euph, Cope | -- |
| 21 | Cope | Phyto | Phyto, Cope | Phyto | Cope | -- | Cope | -- |

[1/] From catch by 20-cm, 0.333-mm-mesh net.

highest in May and June, but no geographical preference was evident.

The families Ammodytidae, Bathymasteridae, Cyclopteridae, and Pleuronectidae each contributed 1.0 to 1.4% of the total catch. Sand lance, *Ammodytes hexapterus*, were most abundant in May with a geographical preference for the northern stations. Bathymasterid abundance was about equal for May, June, and July followed by a significant drop in August. Cyclopterids and pleuronectids were most abundant in June. Of the less frequently collected families, agonids were most abundant in May, and myctophids, zoarcids, and hexagrammids did not have distinct seasonal changes. Pholids, gasterosteids, and ptilichthyids were too rare to exhibit any geographic or seasonal trends.

### Plankton Volumes and Composition

Plankton settling volumes were measured for 122 samples and converted into milliters per 1,000 $m^3$ of water filtered (Table 3). Maximum abundance occurred in May, when the mean was 3,740.3 ml/$1{,}000^3$, followed by June with a mean of 3,156.7 ml/1,000 $m^3$. In July abundance had dropped sharply and then continued a consistent decline into November. In a previous study, planktonic abundance in Auke Bay had peaked in June (Wing and Reid 1972), but results were not quite comparable as a larger mesh net (0.526 mm) was used which retained less phytoplankton and fewer small copepods.

Predominant forms of plankters were determined during sorting (Table 4). In order of complete biomass dominance, copepods lead with 62 samples, followed by phytoplankton in 40, and chaetognaths and euphausiids in 3 each, amphipods in 2, and barnacle nauplii in 1. Eleven samples shared dominance between two organisms. On several occasions phytoplankton clogged the nets, sharply reducing efficienty of the nets. The greatest diversity among dominant organisms occurred in November, when phytoplankton, copepods, and amphipods dominated at two stations each and euphausiids at one.

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## APPENDIX

Appendix I.--Collection data for analyzed ichthyoplankton samples taken with a 61-cm, 0.333-mm-mesh bongo net in southeastern Alaska, April-November 1972.

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | April | | | | |
| 11 | 10 | 1447 | 30 | 51 | 524 |
| 19 | 13 | 1106 | 27 | 100 | 486 |
| 20 | 13 | 0852 | 26 | 34 | 432 |
| 21 | 12 | 1800 | 47 | 385 | 803 |
| | May | | | | |
| 1 | 16 | 0915 | 29 | 95 | 506 |
| 2 | 16 | 1243 | 26 | 138 | 539 |
| 3 | 16 | 1424 | 21 | 42 | 556 |
| 4 | 16 | 1645 | 29 | 66 | 576 |
| 5 | 16 | 1814 | 25 | 75 | 573 |
| 6 | 17 | 1410 | 25 | 65 | 434 |
| 7 | 17 | 1236 | 27 | >200 | 620 |
| 8 | 17 | 1017 | 26 | 66 | 371 |
| 9 | 18 | 1110 | 39 | 250 | 673 |
| 10 | 18 | 1300 | 16 | 40 | 195 1/ |
| 11 | 18 | 1447 | 16 | 38 | 130 |
| 12 | 18 | 1615 | 16 | 30 | 237 |
| 13 | 27 | 1557 | 15 | 50 | 114 2/ |
| 14 | 27 | 1413 | 13 | 46 | 183 |
| 15 | 27 | 1241 | 26 | 242 | 407 |
| 16 | 26 | 1640 | 17 | 42 | 438 |
| 17 | 26 | 1510 | 16 | 109 | 283 |

Appendix 1.--Continued.

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | May | | | | |
| 18 | 26 | 1341 | 25 | 115 | 538 |
| 19 | 25 | 1526 | 20 | 67 | 300 |
| 20 | 25 | 1703 | 12 | 46 | 151 |
| 21 | 25 | 1235 | 32 | 230 | 741 |
| | June | | | | |
| 1 | 13 | 0910 | 34 | 75 | 1165 |
| 2 | 13 | 1137 | 23 | 130 | 671 |
| 3 | 13 | 1316 | 33 | 75 | 881 |
| 4 | 13 | 1603 | 33 | 80 | 1032 |
| 5 | 13 | 1756 | 32 | 110 | 919 |
| 6 | 14 | 1440 | 23 | 80 | 531 |
| 7 | 14 | 1237 | 33 | 225 | 756 |
| 8 | 14 | 1009 | 33 | 100 | 705 |
| 9 | 15 | 1134 | 37 | 225 | 756 |
| 10 | 15 | 1344 | 25 | 63 | 328 |
| 11 | 15 | 1540 | 27 | 38 | 672 |
| 12 | 15 | 1736 | 26 | 45 | 708 |
| 13 | 20 | 0804 | 13 | 88 | 141[3/] |
| 14 | 20 | 0952 | 15 | 50 | 189[4/] |
| 15 | 20 | 1200 | 42 | 208 | 990 |
| 16 | 20 | 1703 | 20 | 50 | 475 |
| 17 | 21 | 0922 | 21 | 145 | 548 |

Appendix 1.--Continued.

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | June | | | | |
| 18 | 21 | 1126 | 25 | 55 | 623 |
| 19 | 21 | 1707 | 24 | 75 | 548 |
| 20 | 22 | 0835 | 22 | 50 | 526 |
| 21 | 22 | 1148 | 39 | >300 | 858 |
| | July | | | | |
| 1 | 11 | 0842 | 24 | 75 | 709 |
| 2 | 11 | 1142 | 19 | 120 | 450 |
| 3 | 11 | 1344 | 21 | 70 | 676 |
| 4 | 11 | 1620 | 29 | 80 | 689 |
| 5 | 11 | 1755 | 33 | 95 | 738 |
| 6 | 12 | 1422 | 22 | 54 | 358 |
| 7 | 12 | 1243 | 32 | 215 | 701 |
| 8 | 12 | 1017 | 32 | 125 | 510 |
| 9 | 13 | 1134 | 44 | 325 | 821 |
| 10 | 13 | 1344 | 19 | 50 | 269 |
| 11 | 13 | 1520 | 20 | 54 | 222 |
| 12 | 13 | 1702 | 18 | 50 | 302 |
| 13 | 24 | 1747 | 20 | 75 | 346 |
| 14 | 25 | 0913 | 21 | 50 | 300 |
| 15 | 25 | 1057 | 43 | 258 | 776 |
| 16 | 25 | 1631 | 21 | 50 | 452 |
| 17 | 25 | 1825 | 20 | 133 | 434 |
| 18 | 26 | 0831 | 21 | 54 | 380 |

Appendix 1.--Continued.

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | July | | | | |
| 19 | 26 | 1416 | 22 | 42 | 491 |
| 20 | 26 | 1522 | 20 | 50 | 441 |
| 21 | 27 | 1103 | 43 | 350 | 593 |
| | Aug. | | | | |
| 1 | 15 | 0841 | 29 | 140 | 584 |
| 3 | 15 | 1142 | 28 | 110 | 687 |
| 4 | 15 | 1421 | 25 | 88 | 467[1/] |
| 5 | 15 | 1555 | 30 | 80 | 588 |
| 6 | 16 | 1440 | 23 | 51 | 533 |
| 7 | 16 | 1300 | 27 | 182 | 622 |
| 8 | 16 | 1030 | 24 | 95 | 628 |
| 9 | 17 | 1151 | 43 | 347 | 1959 |
| 10 | 17 | 1400 | 18 | 49 | 323 |
| 11 | 17 | 1600 | 18 | 47 | 227 |
| 12 | 17 | 1738 | 19 | 51 | 345 |
| 13 | 21 | 1755 | 18 | 88 | 294 |
| 14 | 22 | 0905 | 21 | 56 | 343[1/] |
| 15 | 22 | 1125 | 34 | 250 | 563 |
| 16 | 22 | 1830 | 24 | 63 | 158 |
| 17 | 22 | 1632 | 20 | 151 | 397 |
| 18 | 23 | 0910 | 23 | 60 | 325 |
| 19 | 23 | 1500 | 23 | 57 | 436 |
| 20 | 23 | 1630 | 24 | 59 | 373 |
| 21 | 24 | 1100 | 42 | 297 | 749 |

Appendix 1.--Continued.

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | Sept. | | | | |
| 1 | 12 | 0830 | 29 | 96 | 858 |
| 3 | 12 | 1120 | 13 | >100 | 344 |
| 4 | 12 | 1350 | 23 | 72 | 585 |
| 5 | 12 | 1520 | 20 | 96 | 446 |
| 9 | 14 | 1250 | 35 | 296 | 997 |
| 10 | 14 | 1430 | 17 | 48 | 228 |
| 11 | 14 | 1600 | 15 | 56 | 156 |
| 12 | 14 | 1730 | 15 | 45 | 199 |
| 13 | 18 | 1645 | 18 | 72 | 321 |
| 14 | 19 | 0955 | 19 | 64 | 485 |
| 15 | 19 | 1035 | 38 | 176 | 1103[5/] |
| 16 | 19 | 1630 | 20 | 80 | 382 |
| 17 | 19 | 1510 | 17 | 148 | 397 |
| 18 | 20 | 0915 | 22 | 80 | 534 |
| 19 | 20 | 1520 | 23 | 60 | 515 |
| 20 | 20 | 1640 | 18 | 50 | 315 |
| | Oct. | | | | |
| 4 | 10 | 1830 | 21 | 80 | 619 |
| 6 | 11 | 1555 | 21 | 56 | 564 |
| 7 | 10 | 1330 | 34 | 240 | 799 |
| 9 | 12 | 1130 | 35 | 300 | 717 |
| 10 | 12 | 1320 | 24 | 48 | 502 |
| 11 | 12 | 1450 | 24 | 48 | 490 |

| Station | Date | Starting time of tow | Duration of tow (min) | Maximum sample depth (m) | Volume of water filtered ($m^3$) |
|---|---|---|---|---|---|
| | Oct. | | | | |
| 12 | 12 | 1700 | 24 | 34 | 765 |
| 13 | 16 | 1750 | 23 | 72 | 481 |
| 14 | 17 | 1000 | 26 | 56 | 621 |
| 15 | 17 | 1120 | 32 | 224 | 823 |
| 16 | 17 | 1720 | 19 | 58 | 458 |
| 17 | 17 | 1530 | 19 | 150 | 417 |
| 18 | 18 | 0915 | 26 | 56 | 736 |
| 19 | 18 | 1430 | 30 | 88 | 870 |
| 20 | 18 | 1615 | 22 | 56 | 498 |
| 21 | 19 | 1120 | 40 | 260 | 1051 |
| | Nov. | | | | |
| 6 | 14 | 1500 | 22 | 52 | 673 |
| 7 | 14 | 1301 | 35 | 261 | 782 |
| 8 | 14 | 1640 | 23 | 80 | 688 |
| 9 | 15 | 1305 | 44 | 310 | 1087 |
| 10 | 16 | 1025 | 22 | 56 | 641 |
| 11 | 16 | 1215 | 23 | 60 | 582 |
| 12 | 16 | 1435 | 23 | 52 | 596 |

1/ The net hit bottom; the sample was discarded.

2/ Greater than 3,000 ml of phytoplankton; sample was discarded.

3/ Greater than 2,800 ml of phytoplankton; sample was discarded.

4/ Greater than 2,000 ml of phytoplankton; sample was discarded.

5/ Because of trash on the surface, the sample could not be processed.

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