

IDENTIFICATION, DISTRIBUTION, AND NOTES ON FOOD HABITS
OF FISH AND SHELLFISH IN TILLAMOOK BAY, OREGON

CONTRACT REPORT
Contract No. 14-16-0001-5456 RBS
February 1, 1974 to June 30, 1975

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In Cooperation With
U.S. Fish and Wildlife Service
U.S. Department of Interior

September 1975

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INTRODUCTION

Estuaries are among the most productive ecosystems in the world. Tillamook Bay is one of the most important producers of fish and shellfish in Oregon. The in-bay commercial fishery harvest in 1971 amounted to 229,371 pounds which was worth \$288,270 to the fishermen (Cummings, 1973). Recreational fishermen spent \$2,350,000 on anadromous species in habiting Tillamook Bay and its tributaries in 1970 and at least another \$78,000 for marine non-game fish within the county (Heckerth, 1972). No estimate is available for the recreational crab fishery, which is considerable.

Human activities in the estuary have increased in recent years and will probably continue to expand in the future. Many of these activities will occur along shorelines or in shallow waters. Such shallow areas are often necessary to many important fish and shellfish species and the food organisms on which they depend. Misuse of other estuaries in the past has reduced their productivity for fish and wildlife and diversity for human use. The potential for further losses in the estuaries has prompted the formation of several local, regional, and state groups to plan for proper management of the irreplaceable estuarine resources. These agencies need or will need biological and other data on which to base planning.

There have been several modifications proposed or planned on Tillamook Bay that could affect these resources if not properly done or done without adequate knowledge of the estuary (Murray, 1972; Corps of Engineers, 1974; Steiger, 1975). The major modification proposed was to the U.S. Corps of Engineers by the Tillamook County Board of Commissioners for a dredged channel from Garibaldi to Kilchis River Point. Others included a dredged channel as far up bay as the head of navigation on the Tillamook River, expansion of boat basins, dredge spoil disposition, maintenance dredging of the present navigation channel, and a turning basin in Miami Cove.

Gaumer, Demory, and Osis (1973) conducted a resource use study of Tillamook Bay from March to October 1971. Cummings and Berry (1974) made some observations of Tillamook Bay fish and shellfish from June to September 1972. These reports have added to the knowledge of Tillamook Bay fauna but a study encompassing an entire year was needed for proper planning in this delicate habitat.

The major goal of this study was to provide needed basic biological information about the fish and shellfish on Tillamook Bay.

The objectives were: 1) to develop methodology and select equipment suitable for sampling fish in the bay; 2) to identify the species and determine the life stages of fish in the bay; 3) to determine the spatial and temporal distribution of fish and shellfish in the bay; and 4) to measure appropriate biological and physical variables, including temperature, salinity, and tidal stages.

This report is the result of a cooperative study between the Fish Commission of Oregon and the U.S. Fish and Wildlife Service from May 1974 to May 1975.

STUDY AREA

Tillamook Bay is located on the north coast of Oregon approximately fifty miles south of the Columbia River. It is the third largest estuary in Oregon with 8,289 total acres and 4,163 acres in tideland (Division of State Lands, 1973). Five major streams enter Tillamook Bay: the Miami, Kilchis, Wilson, Trask and Tillamook rivers. The bay lies on a northwest to southeast line and is approximately 6 miles long and 3 miles wide.

For the purposes of this report, we divided the bay into lower bay, mid-bay, and upper bay sections (Figure 1). The lower bay and mid-bay sections were divided between Hobsonville Point and the Ghost Hole. The mid-bay and upper bay sections were divided between Sibley Sands and Pitcher Point Channel. Although no clear cut lines were drawn as boundaries there are general differences in substrate, vegetation, depth, and salinities from one end of the bay to the other.

Lower Bay. The lower bay habitat ranges from jetty rock to large, well-sorted sand flats with salinities similar to open ocean. The main navigation channel is located in this area with a width of 200 feet and depth of 18 feet (mean lower low water). The substrate consists of well sorted sand, rock, and shell. The finer sediments do not settle in this area because of relatively high current velocities (Corps of Engineers, 1974). Sampling stations in this habitat type were Buoy 8, Buoy 11, and the Garibaldi boat basin.

The Crab Harbor station was located in a deep sandy channel approximately 15 feet deep with adjacent sandy shorelines. The Range Finders station was another shallow sandy habitat. Kincheloe Point and Hobsonville Point were rocky marine shoreline stations in the lower bay. Garibaldi Flat is a shallow sandy shoreline that becomes a steep-banked shoreline at low tide. Eelgrass and other marine vegetation is associated with each of the last three areas (Figure 2). Another shallow area station with a dense eelgrass bed was Miami Cove. The substrate in Miami Cove is sandy silt. The north and south jetties were composed of large rock.

Mid-Bay. The mid-bay area consists of moderately well sorted sandy silt on the flats and a mixture of rock and shell in some of the lower channeled areas. The major eelgrass beds of the bay are in this large section and aid deposition of finer particles (Corps of Engineers, 1974). This is also the transitional zone between the more saline lower bay and less saline upper bay sections.

This section has two channels which traverse its length on both sides of the bay. A great amount of debris from winter run-off is deposited in these channels. The mid-west channel station was approximately 18 feet deep and consisted mainly of sand. The Ghost Hole and Sibley Sands stations were located in the east channel. The Ghost Hole substrate is mostly rock and shell and has long been known as a sport fishing area for fall chinook salmon. The Bay Ocean, Mid-Bay Flat, and Larson Cove Flat stations were located on dense eelgrass flats.

A unique area on the west side of this section was the Deep Hole station. The Deep Hole is a dredge borrow site approximately 1,000 feet long and 600 feet wide with a maximum depth of 45 feet. The substrate is very fine sediment. This area is the site of a proposed experimental artificial reef to be installed by the Oregon Department of Fish and Wildlife.

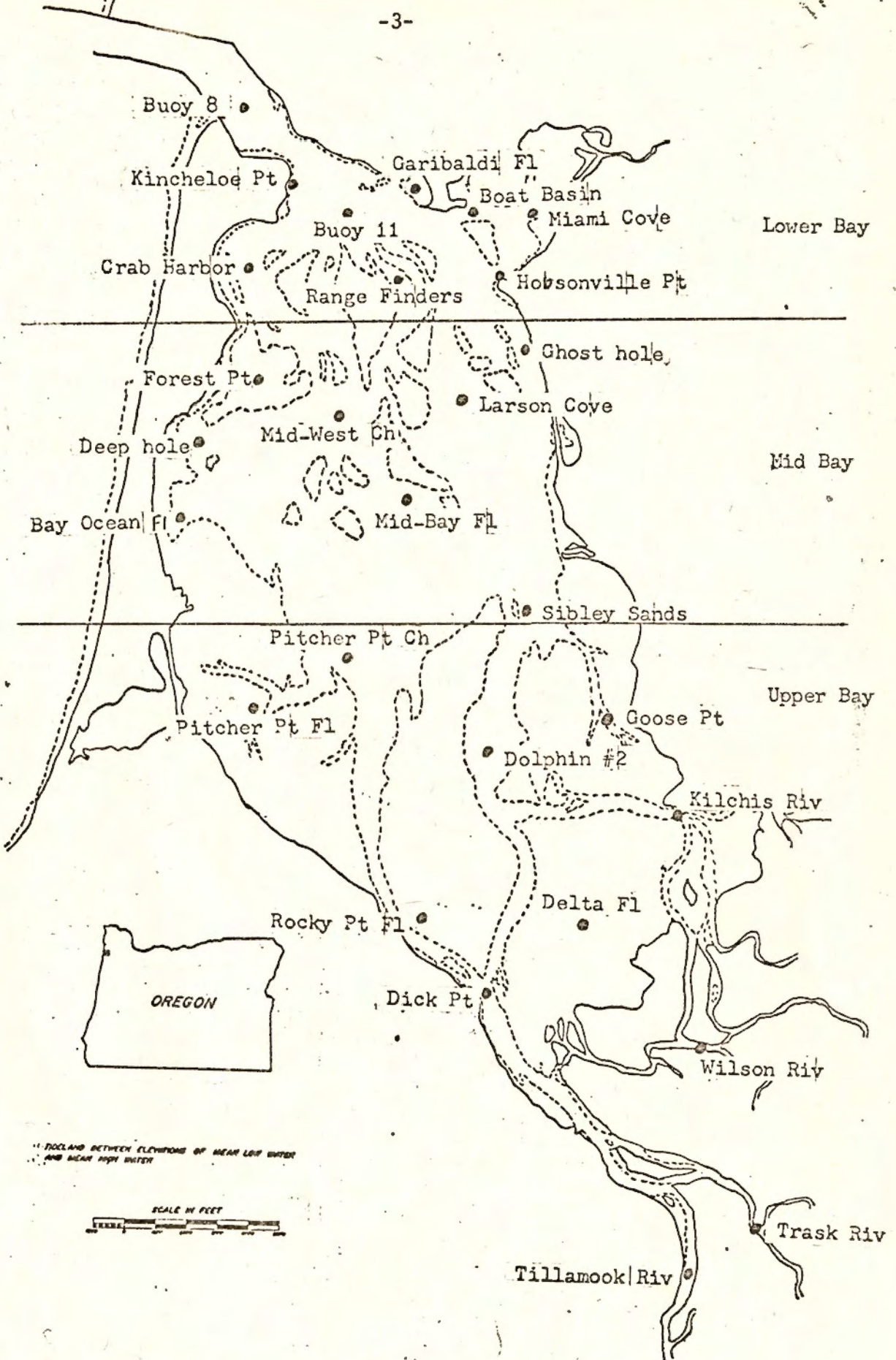
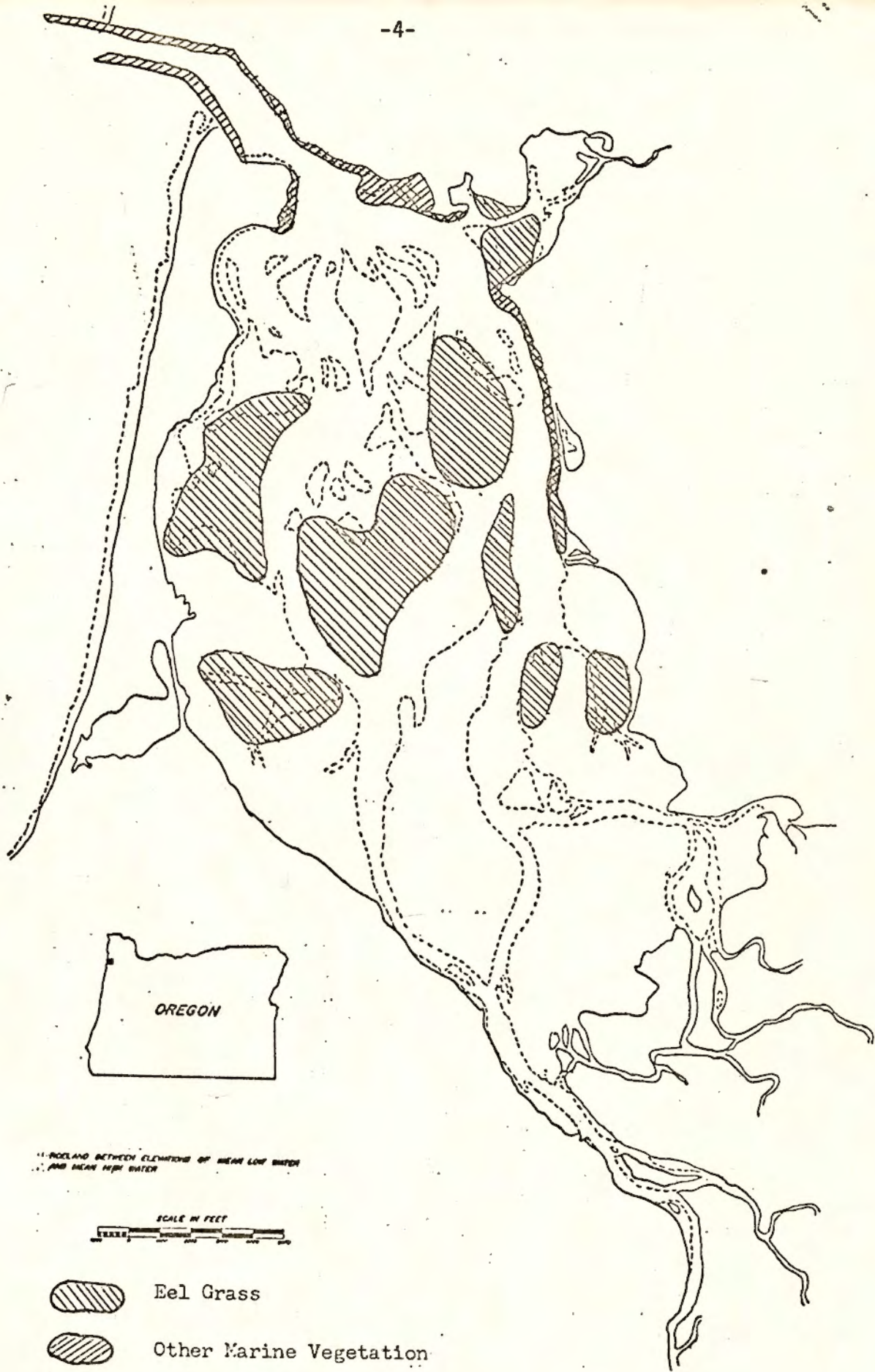


Figure 1. Sampling station locations in Tillamook Bay, Oregon



-Figure 2. Eel grass and other marine vegetation areas in Tillamook Bay.

Forest Point was located on a shallow mid-bay sand flat.

Upper Bay. The upper bay is an area of lower tidal currents and salinity. The substrate consists of mixed sorted silty sand to sandy silt of finer particle size (Corps of Engineers, 1974). This section is much shallower than the others and is mostly exposed at low tides.

The southern portion of the two main bay channels were sampled at Pitcher Point Channel, Dolphin #2, and Dick Point stations. Rocky Point Flat, Goose Point, and Pitcher Point Flat stations were areas of fine silty sand. Eelgrass beds are located on the latter two flats. The tidewater of the Kilchis, Wilson, Trask, and Tillamook rivers are included in this portion.

Dick Point, Delta Flat and the lower reaches of the four rivers are areas where coarse grained sand is deposited.

METHODS AND MATERIALS

Equipment

Most work was done from a 20-foot fiberglass dory powered by two 50 horsepower outboard motors.

We used a small trawl (try net) of 1½-inch (stretched) mesh in the wing and body and ¼-inch mesh in the codend. The bridles, from wings to otter doors, were 15½ feet long. The dandyline, from otter doors to the single warp, was 27 feet long. We wrapped the footrope with 5/8-inch chain and attached an 18 foot "tickler" chain to the wings to move fish off the bottom. The trawl had a vertical opening of approximately 7-8 feet and a horizontal opening of about 7 feet when fishing. We estimated these openings while Scuba diving.

We set the trawl as a side trawler would, over the starboard side of the boat while making a large clockwise semi-circle. When the otter doors were out, we shot the single warp to trawling distance and attached it to a towing bit. Two men worked the trawl.

We used a beach seine 150 feet long by 10 feet deep with a bag measuring 10 by 10 feet; and ¼-inch mesh throughout. We anchored one end of it on the beach and paid out the rest of the net while proceeding in a large semi-circle back to the beach. The seine was then hauled onto the beach. Four men normally were needed to effectively use the seine.

We used monofilament gill nets with variable mesh of 1 to 4 inches, and 100 feet in length. The net was composed of four 25 foot long panels of 1, 2, 3, and 4 inch mesh, respectively.

Identification

Captured fish were identified and counted in the field when possible. Those of unsure identity were determined in the lab using keys (Carl, et al, 1959; Hart, 1973; Miller and Lea, 1972). We recorded a limited amount of lengths to separate adults from juveniles. During Scuba dives, we noted fish species and relative numbers.

We collected some specimens with spear guns for surer identification. Most fish were released alive after identification and data collection.

Sampling

We selected sampling stations on the basis of habitat type from aerial photographs and by on-site inspection of the area. We sampled 25 trawl stations and four seine stations twice each month at high tide from May 1974 to April 1975 (Table 1). Seven of the trawl stations and four of the seine stations were sampled monthly at low tide. Each trawl tow was about five minutes duration. Several other sites were sampled periodically with seine, gill nets and Scuba.

Table 1. Description of regularly sampled stations in Tillamook Bay, Oregon May 1974 - June 1975.

| Station | Section | Sediment | Type of gear | Tidal stage |
|-------------------|-----------|-----------------------------------|--------------|-------------|
| Buoy 8 | lower bay | coarse sand, rock, shell | trawl | high/low |
| Kincheloe Point | lower bay | rock, eelgrass, marine vegetation | seine | high/low |
| Buoy 11 | lower | coarse sand, rock, shell | trawl | high/low |
| Garibaldi Flat | lower bay | coarse sand, eelgrass | seine | high/low |
| Boat Basin | lower bay | coarse sand, rock, shell | trawl | high/low |
| Miami Cove | lower bay | sandy silt, eelgrass | trawl | high |
| Crab Harbor | lower bay | coarse sand | trawl/seine | high/low |
| Range finders | lower bay | coarse sand | trawl | high |
| Hobsonville Point | lower bay | rock, eelgrass, marine vegetation | seine | high/low |
| Ghost Hole | mid-bay | coarse sand, rock, shell | trawl | high/low |
| Forest Point | mid-bay | coarse sand | trawl | high |
| Deep Hole | mid-bay | fine silt | trawl | high/low |
| Mid-West Channel | mid-bay | coarse sand | trawl | high/low |
| Larson Cove Flat | mid-bay | sandy silt, eelgrass | trawl | high |
| Mid-Bay Flat | mid-bay | sandy silt, eelgrass | trawl | high |
| Bay Ocean | mid-bay | sandy silt, eelgrass | trawl | high |
| Sibley Sands | mid-bay | sandy silt | trawl | high |
| Pitcher Point Ch. | upper bay | fine silty sand | trawl | high |
| Dolphin #2 | upper bay | silty sand | trawl | high |
| Goose Point | upper bay | fine silty sand, eelgrass | trawl | high |
| Kilchis River | upper bay | coarse sand | trawl | high |
| Pitcher Point Fl. | upper bay | fine silty sand eelgrass | trawl | high |
| Rocky Point | upper bay | fine silty sand | trawl | high |
| Delta Flat | upper bay | coarse sand | trawl | high |
| Dick Point | upper bay | coarse sand | trawl | high |
| Wilson River | upper bay | coarse sand | trawl | high |
| Trask River | upper bay | coarse sand | trawl | high |
| Tillamook River | upper bay | coarse sand | trawl | high |

During the summer of 1974, we cooperated with Fish Commission of Oregon shellfish biologists on a subtidal clam survey. They laid out 2,000 foot transect lines 50 feet apart in several locations of the lower bay. They dived along these transects and, at 50 foot intervals, made observations of clam species present and relative abundance.

150'

100'

During trawling operations, we collected a water sample near the bottom with a Kemmerer water bottle. At seine stations, we dipped a collection bottle into the surface water. We determined salinities in the laboratory with Kahlsico hydrometers of 0.995-1.011, 1.010-1.021, and 1.020-1.031 specific gravity range, respectively.

We retained some fish after capture for macroscopic stomach content analysis. We examined the preserved fish shortly after returning to the laboratory. Oregon State University personnel cooperated with us on the macroscopic stomach analysis. They examined several species captured in June and July, 1974 (Flynn and Frolander, 1975).

RESULTS AND DISCUSSION

Equipment

We collected 873 samples with all types of gear during the year. More stations were available to the trawl at high tide than at low tide due to the shallow water and exposed tidal flats at low tide. We made 566 trawl sets at high tide compared to 113 at low tide. The beach seine stations were limited mostly to the lower bay because of the shallow water and soft substrate up bay. We made 82 seine sets at high tide and 79 at low tide. We set the gill nets 21 times on an irregular basis and at different locations in the lower bay. The twelve Scuba observations we made were mainly along the jetties, but also were made in the lower bay below Hobsonville Point.

The gear was selective in the capture of fish. We caught 40 species with the beach seine; 44 species with the trawl. Thirty-three of these species apparently had no pronounced selectivity to either trawl or seine and were captured in both. The seine captured seven species that the trawl did not while the trawl captured 11 species not caught in the seine. We caught 11 species with the gill net, but only one was unique to this gear. During Scuba diving operations, we either observed or captured 15 species. Scuba diving was the only method by which three species were taken.

Limitations. The selectivity of the gear was a limiting factor in catching fish. There were only four regularly sampled seine stations, all in the lower bay, and twenty-five trawl stations, located throughout the bay. The seine was more effective on fast pelagic species (such as salmon) than the trawl; therefore, most of our pelagic species collections were taken only at seine stations and up-bay pelagic fish distribution was not so adequately sampled. The shallow water in the upper bay precluded our seining at low tide or near the shoreline at high tide with a twenty foot dory and two long-shafted outboard motors. The effectiveness of the seine was only to a depth of ten feet from the surface. In steep-banked areas such as Crab Harbor and Kincheloe Point, the seine captured only pelagic species until it approached the beach. However, the trawl captured only near-bottom species in relatively deep water.

The weather made sampling difficult during frequent winter storms and during late afternoon in summer when strong northwesterly winds are prevalent. During windy weather we could not set the seine properly, if at all. We had to set the trawl with the wind which could have been against the tidal current. This may have resulted in "flying the net" and therefore reduced the catch.

We were not always successful in sampling slack water. Fishing success may have been affected because fish were hidden or "buried in". While diving during strong

tidal flows, we observed crabs "sanded in" and inactive. DeWess and Gotshall (1974) noted that fishing success decreased during strong tidal currents, suggesting fish wait until slack water to forage.

We had difficulty fishing gill nets in the current. They filled with floating algae and debris, becoming visible to fish. Gill nets were more selective to pelagic fish, but when they did fish near or on the bottom, crabs ate the fish and became entangled in the net, adding further to sampling problems.

Quality of Scuba observations was influenced by water turbidity. During months of rough and turbid water conditions, diving and identification of species was difficult.

During the first two months (all sites) and at beach seine sites, we took only surface salinity and temperature samples. Therefore, the temperature or salinity associated with a bottom living species during that period must be viewed with caution. During periods of high river run-off, the surface and bottom salinities can differ greatly in the ten foot fishing depth of the seine.

Identification

There are 63 species of fish now recorded for Tillamook Bay (Appendix A). We caught 56 of the species during this estuary survey. Cummings and Berry (1974) and Heckerroth (1972) listed the other seven. We recorded the presence of fifteen new species in Tillamook Bay.

Fish Distribution

Species diversity seems to be related to location. Although each station varied in the number of species caught, the average species diversity per station was highest in the lower bay with 20 species per station (Table 2). The middle and upper bay section had progressively less diversity, averaging 17 and 10 species per station, respectively. We caught more estuarine species in the middle salinities (Figure 3) and temperatures (Figure 4) than the extremes. We recorded the maximum and minimum salinity and temperature ranges for fish we caught in Tillamook Bay (Appendix B and Appendix C).

We caught more species in the summer months (43) than fall (37), winter (32), or spring (38).

The tidal stage had an effect on the number of fish we caught. We made a comparison of catches at both high and low tide stations, and found 70.6% of the fish were caught at low tide, although 58.7% of the effort was at high tide. Most of the upper bay is exposed at low tide and the fish probably moved into the lower bay where they were more concentrated.

Although every habitat type was utilized by the fish in Tillamook Bay, each species generally showed a preference for a certain habitat. As a result, some habitats, or combination of habitats, were more important than others. Shallow shorelines and tidal flats were preferred by more species than the deeper channels.

Presence of species, in total numbers caught at each station, are shown in Table 3 by station. A few species were very abundant, including Pacific herring, chinook

salmon smolts, surf smelt, shiner perch, staghorn sculpin, English sole juveniles, and starry flounder. Dungeness crabs were also abundant. However, most of these species were taken in only a few stations. Twenty-nine species were caught in shoal water, only 15 in deep water (Table 4).

Eelgrass beds, or areas associated with eelgrass, were preferred by 28 species (74%), and proved to be the most productive habitat in the bay. Although other marine vegetation was less abundant than eelgrass it was an important habitat for 20 species (53%).

Two substrates were very important. These were rock and coarse sand. Rocky substrate occurred mainly downbay and was a preferred habitat for 26 species (69%). Coarse sand occurred at 15 areas throughout the bay and was one of the preferred habitats for 24 species (64%).

Table 2. Number of Species Caught at Each Station in Tillamook Bay, May 1974 - April 1975.

| Station | Number of Species | Sector | Mean Number of Species |
|---------------------|-------------------|-----------|------------------------|
| Buoy 8 | 13 | Lower Bay | 20 |
| Kincheloe Point | 30 | | |
| Buoy 11 | 14 | | |
| Garibaldi Flat | 29 | | |
| Boat Basin | 19 | | |
| Miami Cove | 13 | | |
| Crab Harbor | 20 | | |
| Range Finders | 9 | | |
| Hobsonville Point | 33 | | |
| Ghost Hole | 27 | Mid Bay | 17 |
| Forest Point | 12 | | |
| Deep Hole | 22 | | |
| Mid-West Channel | 20 | | |
| Larson Cove | 14 | | |
| Mid-Bay Flat | 14 | | |
| Bay Ocean | 14 | | |
| Sibley Sands | 15 | | |
| Pitcher Pt. Channel | 10 | Upper Bay | 10 |
| Dolphin #2 | 13 | | |
| Goose Point | 15 | | |
| Kilchis River | 9 | | |
| Pitcher Point Flat | 11 | | |
| Rocky Point Flat | 11 | | |
| Delta Flat | 8 | | |
| Dick Point | 10 | | |
| Wilson River | 9 | | |
| Trask River | 7 | | |
| Tillamook River | 7 | | |

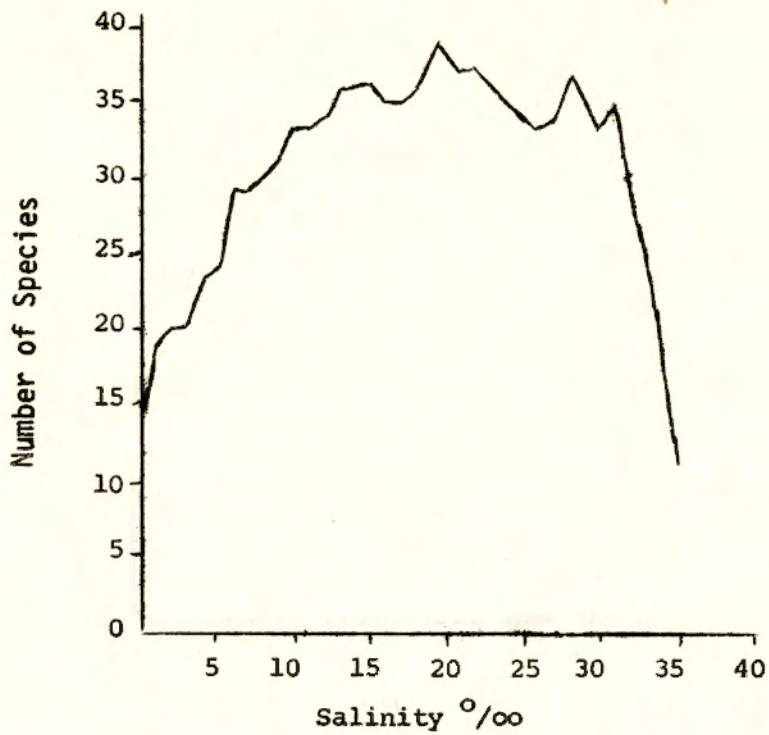


Figure 3. Species abundance in relation to salinities of Tillamook Bay, May 1974 - April 1975.

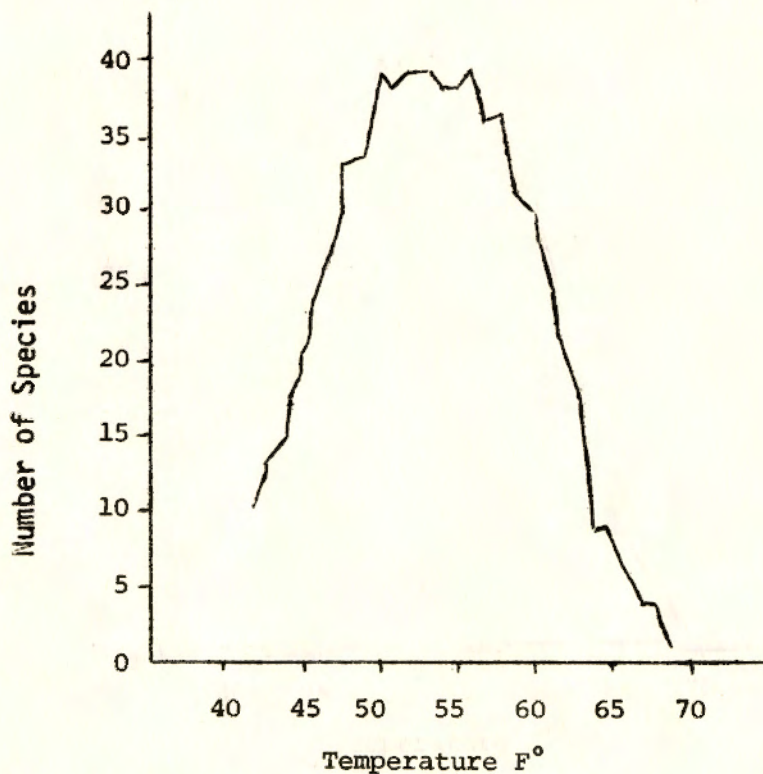


Figure 4. Species abundance in relation to temperature of Tillamook Bay, May 1974 - April 1975.

Table 3, Presence, in total numbers captured of species caught by station during the period May 1974 to April 1975.

| Station | Pacific Herring | American Shad | Northern Anchovy | Chinook Salmon | Coho Salmon | Chum Salmon | Cutthroat Trout | Rainbow Trout | Surf Smelt | Top Smelt | Pacific Tomcod | Tubesnout | Threespine Stickleback |
|-----------------------|-----------------|---------------|------------------|----------------|-------------|-------------|-----------------|---------------|---------------|------------|----------------|-----------|---------------------------|
| North Jetty | | | | | | | | | | | | | |
| Buoy 8 | 5 | | | 4 | | | | | | | | | |
| Kincheloe Point | 1,260 | 1 | 4 | 899 | 14 | 108 | 1 | 1 | 1,790 | 150 | | | 5 |
| Buoy 11 | 0 | | 1 | | | | | | | | 1 | | |
| Garibaldi Flat | 80 | 1 | 204 | 566 | 5 | 71 | 1 | 1 | 3,184 | | | 3 | 42 |
| Boat Basin | 2 | | | | 14 | | | | | | 7 | | |
| Miami Cove | 5 | | | | | 3 | | | 1 | | | | |
| Crab Harbor | 6,815 | 11 | 100 | 250 | 6 | 48 | | 2 | 4,818 | 3 | | 2 | 3 |
| Range Finders | 0 | | | | | | | | | | 1 | | |
| Hobsonville Point | 435 | | 27 | 1,280 | 11 | 77 | 14 | 7 | 1,603 | | | 3 | 13 |
| Ghost Hole | 0 | | | 1 | | | | | 3 | | 2 | | 12 |
| Forest Point | 0 | | 3 | | | | | | | | | 4 | |
| Deep Hole | 0 | | 1 | | | | | | 13 | | 48 | 4 | |
| Mid-West Channel | 0 | 1 | 1 | | | | | | 102 | | 1 | | |
| Larson Cove | 0 | | | | | | | | | | | 13 | 1 |
| Mid-Bay Flat | 0 | | | | | | | | 1 | | | 4 | 5 |
| Bay Ocean | 0 | | | | | 3 | | | 20 | | | 8 | 13 |
| Sibley Sands | 0 | | | 20 | 1 | | | | 2 | | | 1 | |
| Pitcher Point Channel | 0 | | | | | | | | | | | | |
| Dolphin #2 | 0 | 1 | | 8 | | | | | 1 | | | | |
| Goose Point | 0 | | | 1 | | | | | | | | 1 | 11 |
| Kilchis River | 0 | | | | | | | | | | | | |
| Pitcher Point Flat | 1 | | | | | | | | 1 | | | | 3 |
| Rocky Point Flat | 0 | | | | | | | | | | | | 1 |
| Delta Flat | 0 | | | | 1 | | | | | | | | |
| Dick Point | 0 | | | | | | | | | | | | |
| Wilson River | 0 | | | | | | 2 | | | | | | 3 |
| Trask River | 0 | | | | | | | | | | | | |
| Tillamook River | 0 | | | 1 | | | | | | | | | |
| Total | 8,603 | 15 | 341 | 3,030 | 52 | 310 | 18 | 11 | 11,539 | 153 | 60 | 43 | 112 |

Table 3. Continued.

| Station | Bay Pipefish | Shiner Perch | Pile Perch | Striped Seaperch | Snake Prickleback | Saddleback Gunnel | Penpoint Gunnel | Pacific Sandlance | Rockfish <i>Sebastes</i> spp. | Lingcod | Kelp and rock greenling | Staghorn Sculpin | Buffalo Sculpin |
|-----------------------|--------------|--------------|------------|------------------|-------------------|-------------------|-----------------|-------------------|-------------------------------|---------|-------------------------|------------------|-----------------|
| North Jetty | | | | | | | | | | | | | |
| Buoy 8 | | 2 | | | | 5 | | | 2 | | | 3 | 107 |
| Kincheloe Point | | 632 | 2 | 10 | | 3 | 4 | | 517 | | 64 | 4 | 16 |
| Buoy 11 | | 25 | | | | 4 | | | | 2 | | 6 | 28 |
| Garibaldi Flat | 12 | 2,797 | 3 | 3 | | 6 | 5 | | 14 | | 10 | 321 | |
| Boat Basin | 4 | 429 | | | 1 | 25 | | | 19 | 2 | | 16 | 3 |
| Miami Cove | 1 | 5 | | | | 26 | | | | | | 43 | 1 |
| Crab Harbor | 1 | 1,378 | 2 | | 2 | 1 | | 1 | | | | 93 | 13 |
| Range Finders | | | | | | 1 | | | | | | 2 | |
| Hobsonville Point | 7 | 572 | 14 | 5 | | 12 | 3 | 6 | 67 | 2 | 4 | 81 | 3 |
| Ghost Hole | | 32 | 4 | | | 56 | | 1 | 9 | | 3 | 26 | 259 |
| Forest Point | 1 | 1 | | | | 1 | | | | | | 8 | 1 |
| Deep Hole | 8 | | | | 6 | 22 | | | 8 | | | 9 | |
| Mid-West Channel | 1 | 34 | 2 | | 1 | 2 | | | | | 1 | 25 | 4 |
| Larson Cove | 22 | 24 | | | | 38 | | | 4 | 1 | | 11 | 4 |
| Mid-Bay Flat | 9 | 18 | | | 1 | 46 | | | | | | 20 | |
| Bay Ocean | 9 | 22 | 1 | | | 8 | | | | | | 81 | |
| Sibley Sands | 1 | 50 | | | | 13 | | | | | | 17 | |
| Pitcher Point Channel | 5 | 20 | | 1 | | 18 | | | | | | 9 | |
| Dolphin #2 | | 93 | | | 1 | 13 | | | | | | 13 | |
| Goose Point | 4 | 46 | | | | 10 | | | | | | 68 | 5 |
| Kilchis River | 2 | 63 | | | | 24 | | | | | | 63 | |
| Pitcher Point Flat | 10 | 65 | | | | 26 | | | | | | 53 | |
| Rocky Point Flat | 1 | 2 | | | | | | | | | | 55 | |
| Delta Flat | | 12 | | | | 4 | | | | | | 30 | |
| Dick Point | | 20 | | | | 11 | | | | | | 10 | 2 |
| Wilson River | | 23 | | | | 19 | | | | | | 124 | |
| Trask River | | 12 | | | | 1 | | | | | | 14 | |
| Tillamook River | | 2 | | | | 2 | | | | | | 12 | |
| Total | 98 | 6,379 | 28 | 19 | 12 | 397 | 12 | 8 | 640 | 7 | 82 | 1,222 | 446 |

Table 3. Continued.

| Station | Padded Sculpin | Prickly Sculpin | Tidepool Sculpin | Sharpnose Sculpin | Cabezon | Red Irish Lord | Ringtail Snailfish | Pacific Sanddab | English Sole | Sand Sole | Starry Flounder | Other species (fish) (see Table 42) | Dungeness Crab |
|-----------------------|----------------|-----------------|------------------|-------------------|---------|----------------|--------------------|-----------------|--------------|-----------|-----------------|--|----------------|
| North Jetty | | | | | | | | | | | | 2 | |
| Buoy 8 | 9 | | | | | | 8 | | 4 | 1 | | 3 | 160 |
| Kincheloe Point | | | | | 60 | 9 | | | 34 | 1 | 22 | 4 | 14 |
| Buoy 11 | 2 | | | | 1 | | | 3 | 30 | 9 | 2 | | 176 |
| Garibaldi Flat | | | 2 | 3 | 19 | | | 2 | 696 | 1 | 111 | | 79 |
| Boat Basin | | | | | | | | 11 | 153 | 4 | 9 | 2 | 1,845 |
| Miami Cove | | 1 | | | | | | | 69 | | 31 | | 53 |
| Crab Harbor | | | | 1 | 1 | | | 2 | 424 | 24 | 39 | | 169 |
| Range Finders | | | | | | | | | 25 | 9 | 3 | | 23 |
| Hobsonville Point | 2 | | 2 | 6 | 10 | | | 1 | 126 | | 24 | | 72 |
| Ghost Hole | 56 | | 1 | 5 | 4 | 2 | 4 | 2 | 51 | | 2 | 3 | 971 |
| Forest Point | | | | | 1 | | | 1 | 51 | 2 | 7 | | 12 |
| Deep Hole | 1 | | | | | | | | 257 | 5 | 9 | 6 | 130 |
| Mid-West Channel | | | | | | | | | 193 | 14 | 9 | 1 | 72 |
| Larson Cove | | | | | | | | | 260 | 2 | 1 | | 205 |
| Mid-Bay Flat | | | | | | | | | 90 | 1 | 11 | | 81 |
| Bay Ocean | | | | | | | | | 77 | 2 | 26 | | 29 |
| Sibley Sands | | | | | | | 1 | | 104 | 3 | 12 | 1 | 204 |
| Pitcher Point Channel | | | | | | | | | 66 | 2 | 7 | | 249 |
| Dolphin #2 | | | | | | | | | 11 | 1 | 46 | 1 | 107 |
| Goose Point | | | 1 | | | | | | 21 | 3 | 69 | | 44 |
| Kilchis River | | 7 | | | | | | | 3 | | 53 | | 47 |
| Pitcher Point Flat | | | | | | | | | 52 | | 12 | | 202 |
| Rocky Point Flat | | 1 | | | | | | | 1 | | 33 | | 7 |
| Delta Flat | | | | | | | | | 3 | | 73 | | 20 |
| Dick Point | | 2 | | | | | | | 1 | 1 | 47 | | 42 |
| Wilson River | | 6 | | | | | | | | | 148 | | |
| Trask River | | 4 | | | | | | | | | 141 | | 4 |
| Tillamook River | | | | | | | | | | | 69 | | 14 |
| Total | 70 | 21 | 6 | 15 | 96 | 11 | 13 | 22 | 2,802 | 85 | 1,016 | 23 | 5,031 |

Table 4. Preferred Habitats of Fish and Dungeness Crab in Tillamook Bay.

| Species | Habitat | | | | | | | | Deep Water | Shallow Water |
|--------------------------|---------|-----------|-------------------|-------|-------------|------------|-----------------|-----------------|------------|---------------|
| | Rocky | Eel Grass | Marine Vegetation | Shell | Coarse Sand | Sandy Silt | Fine Silty Sand | Fine Silty Sand | | |
| Pacific Herring | X | X | X | | X | | | | | X |
| American Shad | | | | | X | | | | | X |
| Northern Anchovy | | X | | | X | | | | | X |
| Chinook Salmon | X | X | X | | | | | | | X |
| Coho Salmon | X | X | X | | | | | | | X |
| Chum Salmon | X | X | X | | X | | | | | X |
| Cutthroat Trout | X | X | X | | | | | | | X |
| Steelhead Trout | X | X | X | | | | | | | X |
| Surf Smelt | X | X | X | | X | | | | | X |
| Top Smelt | X | X | X | | | | | | | X |
| Pacific Tomcod | | | | | | | | X | X | |
| Tube-snout | | X | | | | | | X | | X |
| Threespine Stickleback | | X | | | X | | | | | X |
| Bay Pipefish | | X | | | | | | X | | X |
| Shiner Perch | | X | | | X | | | | X | X |
| Pile Perch | X | X | X | | | | | | | X |
| Striped Seaperch | X | X | X | | | | | | | X |
| Snake Prickleback | | | | | | | | X | | |
| Saddleback Gunnel | X | X | | X | X | X | | | X | X |
| Penpoint Gunnel | X | X | X | | X | | | | | X |
| Pacific Sandlance | X | X | X | | | | | | | X |
| Rockfish (juv.) | X | X | X | | | | | | | X |
| Lingcod | X | X | X | X | X | | | | X | X |
| Greenling | X | X | X | | X | | | | | X |
| Pacific Staghorn Sculpin | X | X | X | | X | X | | | | X |
| Buffalo Sculpin | X | | | X | X | | | | X | |
| Padded Sculpin | X | | | X | X | | | | X | |
| Prickly Sculpin | | | | | X | | | | X | |
| Tidepool Sculpin | X | X | X | | X | | | | | X |
| Sharpnose Sculpin | X | X | X | X | X | | | | X | X |
| Cabezon | X | X | X | | X | | | | | X |
| Red Irish lord | X | X | X | | | | | | | X |
| Ringtail Snailfish | X | | | X | X | | | | X | |
| Pacific Sanddab | X | | | X | X | | | | X | |
| English Sole | | X | | | X | X | | | X | X |
| Sand Sole | | | | | X | | | | X | |
| Starry Flounder | | X | | | X | | | | X | X |
| Dungeness Crab | X | | | X | X | | | | X | |
| Total | 26 | 28 | 20 | 8 | 24 | 5 | 2 | 1 | 15 | 29 |
| Percent | 69% | 74% | 53% | 21% | 64% | 14% | 6% | 3% | 40% | 77% |

Shell substrate was associated with rock, coarse sand, and deep water down bay, that created a preferred habitat for 8 species (21%).

Habitats with silt were less important to the fish of Tillamook Bay. Sandy silt substrate was important for five species, but in each instance eelgrass was associated with the substrate and may have been responsible for the fish concentrations. Fine silt was the substrate for the Deep Hole and was preferred by two species. Fine silty sand in combination with sandy silt and eelgrass was preferred by only one specie.

Pacific Herring. Adult herring are normally caught by sport and commercial fishermen from January through March in Tillamook Bay (Cummings and Berry, 1974). We noted herring eggs down bay deposited on rocks and vegetation in February and caught five adults in January and February. We began to catch juveniles in May; peak catches occurred in July. The catch by Cummings and Berry (1974) peaked in September but was also high in July. The three summer months (June, July and August) accounted for 97% of the 8,603 fish we caught (Table 5). The catch tapered off to only 4% in the fall. All juveniles appeared to be gone by the end of November.

The spacial distribution was primarily down bay. It appears that adult herring may wander in and out of Tillamook Bay during other seasons of the year also. Sport fishermen caught seven in August on the north jetty during the 1971 survey (Gaumer, et al., 1973).

Pacific herring preferred the 15-20 ppt. salinity range (59%) and the 56-60°F. temperature range (89%).

American Shad. We caught 15 juvenile shad on our survey, 14 in June and July (Table 6). Cummings and Berry (1974) caught 25 in June and July. Shad normally enter fresh water to spawn in the spring and the young emigrate shortly after hatching (Hart 1973). June and July were the peak emigration months.

Northern Anchovy. We caught 341 anchovies, 200 in one catch at Garibaldi flat in September (Table 7). Of the remaining 141 fish, 100 were caught in one set at Crab Harbor in July. We caught all but five of these fish in the lower bay seine sites. This is probably their preferred portion of the bay. We also sighted a school of several hundred adults in October at the boat basin station. Cummings and Berry (1974) caught anchovies in every month of their June to September survey, but the peak month was June. Anchovies normally spawn in July and August (Hart, 1973) and the juvenile fish we caught during these months were recruits of June-July spawning. The adults we observed in October and the juveniles we caught in January and March indicate there may be repeated smaller spawnings through the year.

Anchovies we caught preferred the 15-20 ppt. salinity range (73%) and the 56-60°F. temperature range (93%).

Chinook Salmon. We collected 3,030 juvenile chinook salmon (Table 8). We caught them down bay because of the seine sites. They seemed to prefer shoreline areas of comparatively high-salinity water.

The Fish Commission released approximately 169,000 fall chinook salmon into Trask River tidewater on August 5, 1974 and another 120,000 chinook salmon at the Trask River hatchery on November 1, 1974. Catches revealed that some juvenile fall chinook salmon from the August release required only two days to reach the lower bay. Most fish released in August remained in the upper bay through September (Cummings 1975) and

through October in the lower bay. We seined some fish (released in November at Trask River) four days later in lower bay, and they were gone by December. Very few fish remained in the bay during the winter and spring.

Adult fall chinook salmon enter the bay in August and adult spring chinook enter the bay in May (Cummings and Berry 1974).

An angler survey in the fall of 1974 (Cummings, 1975b) showed large numbers of fall chinook salmon in the lower bay, upper bay, and tidewater during September and October. By November it appeared most adults had moved up through the bay and were in tidewater or beyond.

Sportsmen begin to catch spring chinook salmon in May and peak catches are usually in June (Gaumer, et al., 1973).

Although juvenile chinook salmon pass through the full range of salinities moving to the ocean, 91% of our catch was in the 21-35 ppt salinity range. We made our largest catches in water of 50-60°F. temperature.

Coho Salmon. We caught 52 coho salmon; most were taken in the lower bay (Table 9). The March, April and May catches indicated the peak spring out-migration of juvenile coho salmon. Smaller catches in June, July and August showed some fish take a little longer to emigrate. Catches in November and December indicated some juveniles remained in the rivers during the summer and emigrated through the bay with the winter run-offs.

We caught two adults in the lower bay in October and November. An angler survey in 1974 showed peak adult catches in the lower bay during September, in upper bay and tidewater during October and only in tidewater by November (Cummings, 1975b). Recreational fishermen normally catch adults in the rivers through December (Cummings and Berry 1974).

Coho salmon preferred the 51-55°F. temperature range (62%) and the 11-15 ppt. salinity range (54%).

Chum Salmon. We caught 306 juvenile chum salmon and four adults (Table 10). Juveniles preferred the lower section along the vegetated shorelines. Juveniles quickly moved out of the rivers and spent very little time in the bay. They appeared in the bay in March with peak emigration in May and were gone by the end of June. Adults entered the bay in the fall.

Juvenile chum salmon preferred the 50-55°F. temperatures and 10-28 ppt. salinities.

Cutthroat Trout. We caught 18 cutthroat trout (Table 11). Adults apparently preferred Hobsonville Point; we caught them there during the summer and fall (78% were collected there).

Recreational fishermen caught cutthroat trout at Larson Cove culvert during May and September and in the rivers in October (Gaumer, et al., 1973).

Steelhead Trout. We caught ten steelhead trout smolts between May and July as they were emigrating from the bay (Table 12); they preferred Hobsonville Point in the lower bay. We also caught an adult steelhead at Kincheloe Point in June. We are unable to explain why we caught so few steelhead; perhaps they were in unsampled areas.

Surf Smelt. We caught 11,539 surf smelt (Table 13), which was the most abundant fish species in the bay. Approximately 99% were caught in the lower bay and most of the remainder were caught in mid-bay. We captured adults throughout the summer with an occasional juvenile. Larval and juvenile surf smelt were only caught after the June to September spawning season (Clemens and Wilby, 1961). Our peak catches occurred in June and July as did Cummings and Berry's (1974).

Juvenile surf smelt provided the major food source for chinook and coho salmon smolts in the bay. We found juvenile surf smelt present in 72% of the chinook salmon smolt stomachs we examined and in 33% of the coho smolt stomachs.

Surf smelt preferred the 15-20 ppt. salinity range (33%) and the 56-60°F. temperature range (49%).

Top Smelt. We caught 153 top smelt (Table 14). In one seine haul at Kincheloe Point, we caught 150 adults in November. This influx seemed to be unrelated to spawning which usually takes place from May through July (Hart 1973).

Pacific Tomcod. We caught 60 Pacific tomcod (Table 15). We caught all larval and juvenile tomcod in the protected area of the Deep Hole. The adults were caught in the channel areas down bay.

Anglers caught most tomcod in August at Garibaldi, although they captured some at Larson Cove culvert in June (Gaumer et al., 1973).

Tube-snout. We captured 43 tube-snouts (Table 16). Tube-snouts preferred the mid-bay eelgrass beds but were also associated with eelgrass areas in the lower bay. We recorded highest catches of tube-snouts in the winter months of December, January and February (54%).

Threespine Stickleback. We caught 112 threespine sticklebacks (Table 17). Sticklebacks inhabited the bay in greatest numbers during the winter months (58%). We caught them in all sections of the bay, but they preferred the lower bay (57%) and shallow eelgrass flats.

Bay Pipefish. We caught 98 bay pipefish throughout the year (Table 18). We made the greatest catches in the fall (36%) and spring (40%). Pipefishes preferred the mid-bay section in areas associated with eelgrass. They vacated the upper bay during periods of high run-off in the winter.

Pipefish preferred salinities of 30-35 ppt. and temperatures of 46-50°F.

Shiner Perch. We caught 6,379 shiner perch (Table 19) throughout the bay, but most were caught down bay (92%) in the summer (56%). We caught adults in May and June with juveniles starting to appear in July. Peak adult catch was in July; juvenile catches peaked in September. Cummings and Berry (1974) caught 76% of the shiner perch collection in July. Gaumer, et al., (1973) showed shiner perch being caught from May through October with greatest catches in June and July at Garibaldi and Larson Cove culvert. Shiner perch leave the bay by December.

We caught 49% of the shiner perch in salinities from 25-30 ppt. and 84% in temperatures from 56-60°F.

Pile Perch. We caught 28 pile perch (Table 20) from July through November.

Sport fishermen catches indicate pile perch enter the bay in April and peak abundance occurs in May (Gaumer, et al., 1973). Larson Cove culvert accounted for 87% of their catch. Pile perch enter the bay in the spring to spawn.

We saw pile perch near the north jetty in July and under a pier on Garibaldi flat in October while Scuba diving. Pile perch prefer habitat of high salinities near rocky shorelines or pilings.

Redtail Surfperch. We caught only one redbtail surfperch in July at the Ghost Hole and one at Garibaldi flat in January. Anglers, however, caught them from March through August with peak catches occurring in June (Gaumer, et al., 1973). Larson Cove culvert accounted for most of the fish.

Walleye Surfperch. Although we caught only two walleye surfperch, at the Ghost Hole in August, anglers caught them from April through October. The peak catch was in May at Larson Cove culvert (Gaumer, et al., 1973).

Striped Seaperch. We caught 19 striped perch (Table 21). In addition, we saw many striped seaperch near the north and south jetties and the pier on Garibaldi flat while Scuba diving. We caught or saw all fish between June and October. Sport fishermen caught striped seaperch from March to October (Gaumer, et al., 1973). They made their greatest catches in May at Larson Cove culvert.

White Seaperch. We only caught four white seaperch; three in July at the Ghost Hole and one in November at Hobsonville Point. Gaumer, et al., (1973), on the other hand, reported 118 caught by sport fishermen between May and August at Larson Cove culvert. Their peak catch occurred in May.

Snake Prickleback. We caught 12 snake pricklebacks (Table 22). The protected area of the Deep Hole accounted for six of these in one catch in April. The others were collected in channels from the Boat Basin to Dolphin #2. We caught snake pricklebacks from April through August.

Saddleback Gunnel. We caught 397 saddleback gunnels throughout the year (Table 23). Most saddleback gunnel inhabited the mid-bay section (47%). They showed no special preference for any particular habitat, but we caught them more consistently at the Ghost Hole.

They showed a preference (54%) for salinities of 25-35 ppt.

Penpoint Gunnel. We caught 12 penpoint gunnels down bay (Table 24). We collected them in the spring and summer, except for one in November.

Pacific Sand Lance. We collected eight sand lances (Table 25). We caught seven down bay in June. The other was a fresh specimen found on the beach at the Ghost Hole in December. We also noticed large schools of sand lances in June while diving near the north jetty.

Rockfish. We caught 640 juvenile rockfish (*Sebastes spp.*) of unidentified species (Table 26). They inhabited the bay from June through November with peak abundance during July. Most fish (97%) preferred the lower bay, especially Kincheloe Point.

Catches in the Deep Hole and on Larson Cove flat showed they inhabit the mid-bay section also. Forty-nine percent of juveniles were found in a salinity range of 26-30‰. Most (71%) preferred a temperature range from 56-60°F.

Sport fishermen caught adult black rockfish (*Sebastes melanops*) from March through October (Gaumer, et al., 1973). They caught most adults on the north jetty during this period, but some fish were caught as far up bay as Larson Cove culvert in June and July. Anglers also caught blue rockfish (*Sebastes mystinus*) on the north jetty in August. We saw many schools of both black and blue rockfish adults during the spring and summer while Scuba diving along the jetties in relatively high salinity water.

Lingcod. We caught seven juvenile lingcod in May, July and August (Table 27). They preferred the channels in the lower bay and the Ghost Hole. We saw several large adults while diving on the north jetty. Sport fishermen caught adults in the greatest numbers in May on the north jetty (Gaumer, et al., 1973).

Greenling. We caught 82 juvenile greenling (Table 28). During the first several months of the survey, we did not distinguish between kelp and rock greenling; therefore we combined the catch records. They preferred Kincheloe Point and were most abundant in spring and summer. Cummings and Berry (1974) presented similar data.

Adult kelp and rock greenling are more distinguishable than juveniles. Anglers caught kelp greenling from March through October with peak catches in July on the north jetty. Larson Cove culvert was also a popular fishing location between May and September (Gaumer, et al., 1973).

Anglers caught rock greenling from April through September. Peak catches again were in July on the north jetty.

Pacific Staghorn Sculpin. We caught 1,222 Pacific staghorn sculpins during the year (Table 29). We caught them at every station, although they seemed to prefer the shallower areas with a little vegetation. Garibaldi flat was the predominant area for them down bay while the Wilson River attracted the most up bay.

Staghorn sculpins were most abundant in the summer months (62%). Anglers caught most in July and August from Larson Cove culvert (Gaumer, et al., 1973). Other productive areas were Garibaldi and the north jetty. Cummings and Berry (1974) made their peak catches in June in the upper bay. Staghorn sculpins spawn in February (Hart 1973) and this may explain why we caught relatively few fish in February. They may have been concentrated out of the sample area.

Staghorn sculpins preferred salinities of 25-30 ppt. and temperatures of 46-60°F.

Buffalo Sculpin. We caught 446 buffalo sculpins during the year (Table 30). They definitely preferred the rock-shell channels down bay. We made our greatest catches from February through July. They ranged up bay as far as Dick Point in June and October.

Padded Sculpin. We caught 70 padded sculpins (Table 31). They preferred the rocky-shell channel areas down bay, and especially the Ghost Hole. We collected 80% of them at this station.

Prickly Sculpin. We caught 21 prickly sculpins (Table 32). Prickly sculpins are normally thought to be a fresh or brackish water species (Carl, Clemens and Lindsey 1959). We caught them in the upper bay and rivers, 53% during the summer. The one specimen caught in Miami Cove was dead upon capture and was apparently washed down the Miami River by high water.

Tidepool Sculpin. We captured six tidepool sculpins (Table 33), five in November and December. Five were caught from Garibaldi flat to the Ghost Hole down bay: one was caught at Goose Point, up bay, however.

Sharpnose Sculpin. We caught 18 sharpnose sculpins (Table 34). We caught 74% of them in the Hobsonville Point - Ghost Hole area and 80% during the winter months.

Cabazon. We caught 96 juvenile cabazon (Table 35). We seined all but five from lower bay, 63% from Kincheloe Point. Cummings and Berry (1974) found this station the most productive also. We caught 84% of the catch in spring and summer with the peak catch in June.

Sport fishermen caught adult cabazon from March to August on the north jetty and in September at Larson Cove culvert (Gaumer, et al., 1973).

We caught 39% of the catch in salinities of 10-15 ppt. and 42% in temperatures of 51-55°F.

Red Irish Lord. We collected 11 juvenile red Irish lords in May, June, and July (Table 36). They preferred the Kincheloe Point and Ghost Hole areas. Cummings and Berry (1974) caught 21 at Kincheloe Point in June, August, and September. Salinities during these months are normally higher and seem to be optimal for this species in the lower bay.

Ringtail Snailfish. We caught 13 ringtail snailfish (Table 37). They preferred areas of rock and shell substrate which was expected; they have a ventral disc for attachment. The snailfish we caught at Sibley Sands may be an artifact. We found the fish gilled in the net. It may have been overlooked at the previous station (Ghost Hole).

Pacific Sanddab. We caught 22 juvenile sanddabs (Table 38). We caught 59% in the summer. They preferred down-bay habitat of deep water.

English Sole. We caught 2,802 juvenile English sole (Table 39). They preferred the lower bay (56%) and mid-bay (40%) to the upper bay (6%). Juvenile English sole also preferred areas with eelgrass.

We caught English sole in substantial numbers during every month of the year. They immigrated into the bay in the late winter and spring with the largest concentrations in the summer months. Emigration from the bay began in the fall and most had left by November. Cummings and Berry (1974) made their greatest catches in June and July also. They recorded juvenile English sole as far up-bay as the Tillamook River.

English sole preferred salinities of 26-30 ppt. and temperatures of 46-50°F.

Sand Sole. We caught 85 juvenile sand sole (Table 40), 84% in the summer and fall. These juveniles were probably the result of offshore spawnings in January through March. By winter most juvenile sand sole had emigrated from the bay.

Sand sole preferred the lower bay (58%) but during the summer and fall months of high salinity intrusion, they extended into the upper bay. They seemed to prefer sand substrate without much vegetation within these sections of the bay.

Starry Flounder. We caught 1,016 starry flounders (Table 41). They preferred the upper bay, where we caught 69% of them. We caught only 8% of the fish in the mid-bay section, which indicates they may avoid eelgrass flats. Adult flounders seemed to prefer the lower bay while juveniles seemed to concentrate up-bay.

Starry flounders inhabit the bay year-around, but we made greater catches in the summer. The large catch in October reflected the increased effort during that month. During the winter months, adults left the lower bay and juveniles seemed to concentrate in the rivers.

Recreational fishermen caught most adults in the spring at Larson Cove culvert (Gaumer, et al., 1973). Cummings and Berry (1974) caught more flounders up bay in September.

Most starry flounders preferred salinities of 0-5 ppt. and temperatures of 46-50°F.

Other Species. We caught another 14 species in so few numbers, we can only record their presence in Tillamook Bay (Table 42). These included Pacific lampreys, green sturgeon, sablefish, and longnose skate among others.

Crab Distribution

We caught 5,031 Dungeness crabs during the year (Table 43). They inhabited the entire bay but preferred the lower section (49%). We caught legal-sized crabs only in the lower and mid-bay, while sublegal crabs were caught throughout the bay. We made the largest catches at the Boat Basin station. Shrimp processing plants discharge waste at this location and cause the crab concentration. Another area of noteworthy concentration was the Ghost Hole.

We caught most crabs (59%) during the summer and very few (5%) in the winter. The furthest intrusion by crabs into upper bay was during summer and fall, probably associated with summer low freshwater runoff and subsequent higher estuarine salinity.

We caught Dungeness crabs in salinities from 0.0 to 35.5 ppt., but they preferred the higher salinities (Figure 5). Their temperature range in Tillamook Bay was from 43° to 66°F.; although we recorded 72% from water of 51° to 60°F. temperature.

Clam Distribution

The subtidal clam survey indicated that there are several productive beds in the lower and mid-bay. With the shellfish biologists, we dived on 84,000 feet of transect lines and made 840 observations (Figure 6), (Gaumer and Lukas, 1975). We observed four species of clams: cockle, gaper, littleneck, and butter clam. We found gapers

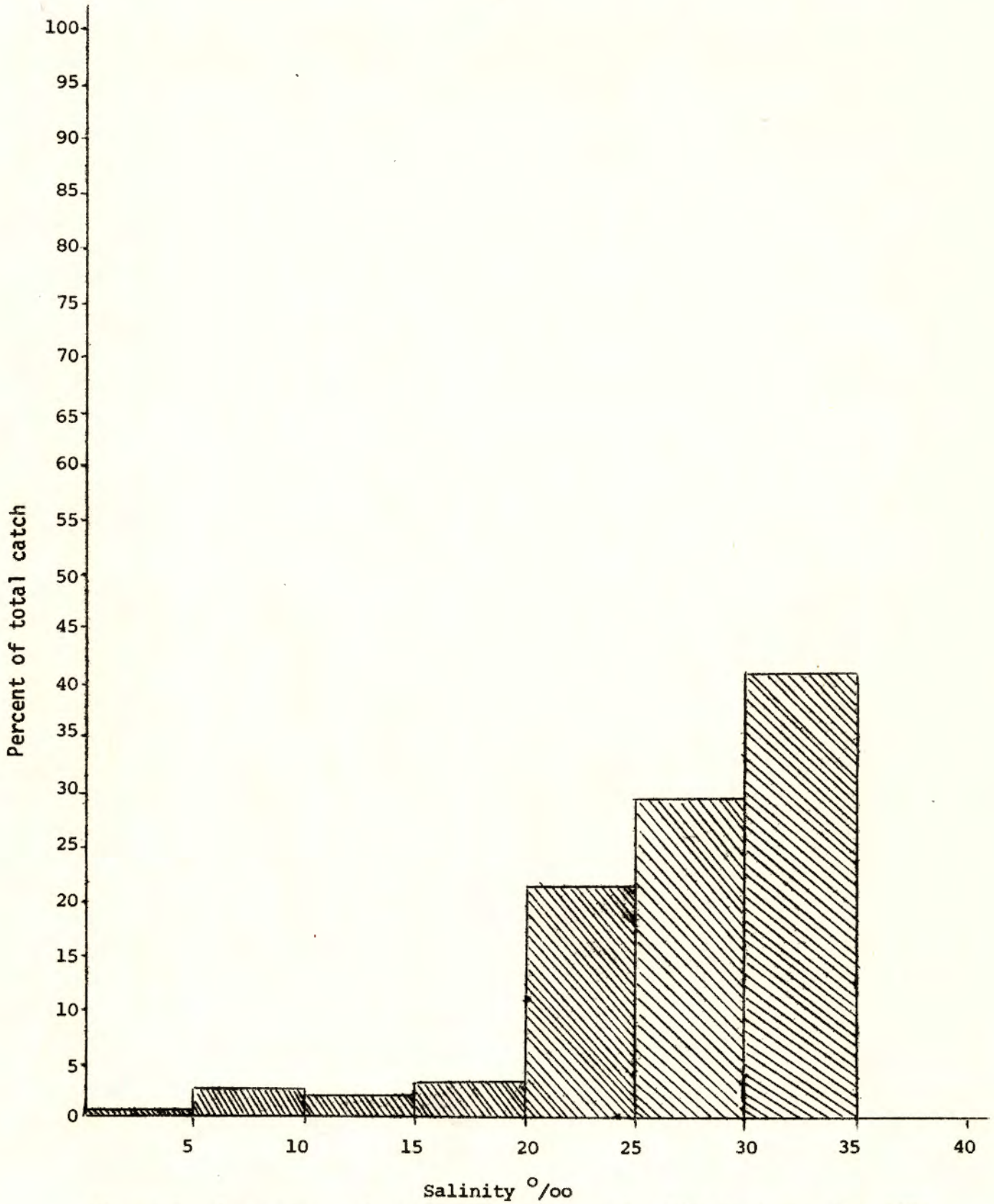


Figure 5. Dungeness crab salinity preference for Tillamook Bay, May 1974 - April 1975.

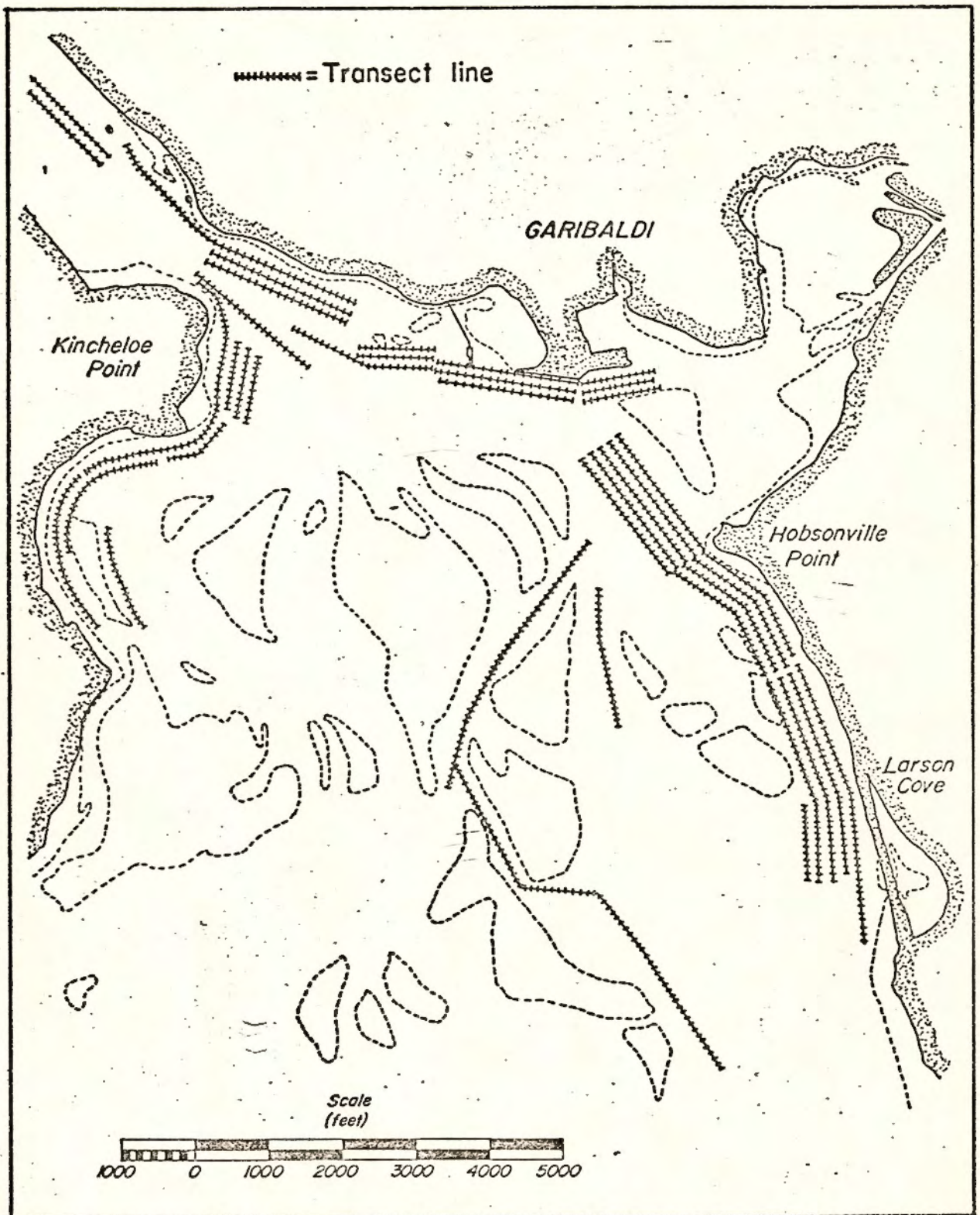


Figure 6. Subtidal clam survey transects in Tillamook Bay (From Gaumer and Lukas, 1975)

and cockles in all beds outlined in Figure 7, but littleneck and butter clams were found only in the dense Hobsonville Point bed and the middle Garibaldi flat bed. Gaumer et al. (1973) listed several other clams and invertebrates for Tillamook Bay (Appendix D).

Recreational diggers took clams and invertebrates in some of the more popular intertidal areas, including Garibaldi flat, Hobsonville Point and the Bay Ocean area. The clams may be in the subtidal beds also, but were not visible to the Scuba divers. Clam distribution will probably be expanded when an intertidal survey, now underway, is complete.

The sand shrimp was extremely common in our survey. We caught sand shrimp at every station, throughout the year, although they seemed to concentrate in the mid-bay eelgrass beds and the Deep Hole.

Recreational fishermen use invertebrates, especially ghost-shrimp, as bait for perch, salmon, and rockfish.

Temperature and Salinity

Temperature in Tillamook Bay ranged from a high of 69°F. at the Wilson River station in September to a low of 42°F. in December at Garibaldi flat, Crab Harbor, and the Ghost Hole. Previous temperature extremes for the estuary have been between 2°C. (35.6°F.) and 21°C. (69.8°F.) (Corps of Engineers, 1974). Salinity ranged from freshwater, 0.0 ppt., in the upper portions of the estuary to 35.2 ppt. in the lower bay.

Thermosalinographs illustrating temperature and salinity observations for each sample station are shown in Appendix E. The graphs show general patterns for both temperature and salinity throughout the year. Temperature and salinity fluctuations were more noticeable in the upper bay and were modified by ocean conditions in the lower bay. These fluctuations were closely related to meteorological conditions in the area. Over 70% of average rainfall occurs during the five months of November through March (Corps of Engineers, 1974), causing these extremes.

Salinity and temperature variation were more apparent in bay channels (Tables 44 and 45). Bottom high tide salinities ranges for down bay, mid-bay, and upper bay were 26-34 ppt. (Buoy 11) 5-33 ppt. (Sibley Sands), and 0-28 ppt. (Dick Point). Low tributary flows during the months of August and September resulted in greater salinity intrusion into the bay as far up as Dick Point, eight miles above the Tillamook Bay entrance. Temperature extremes were greatest up bay with higher highs and lower lows than down bay. Temperature and salinity were less pronounced over tidal flats where tidal mixing is more thorough, thus modifying or eliminating any differences from surface to bottom.

We took periodic salinity and temperature readings from the Deep Hole (Table 46). Most of the year, the Deep Hole is stratified with more dense saline water occurring near the bottom. Tidal mixing in the hole appears slight during the winter months of high runoff. A temperature turnover occurred during November and April. This turnover between warmer and cooler water is caused by colder winter freshets flowing over more dense saline water on the bottom.

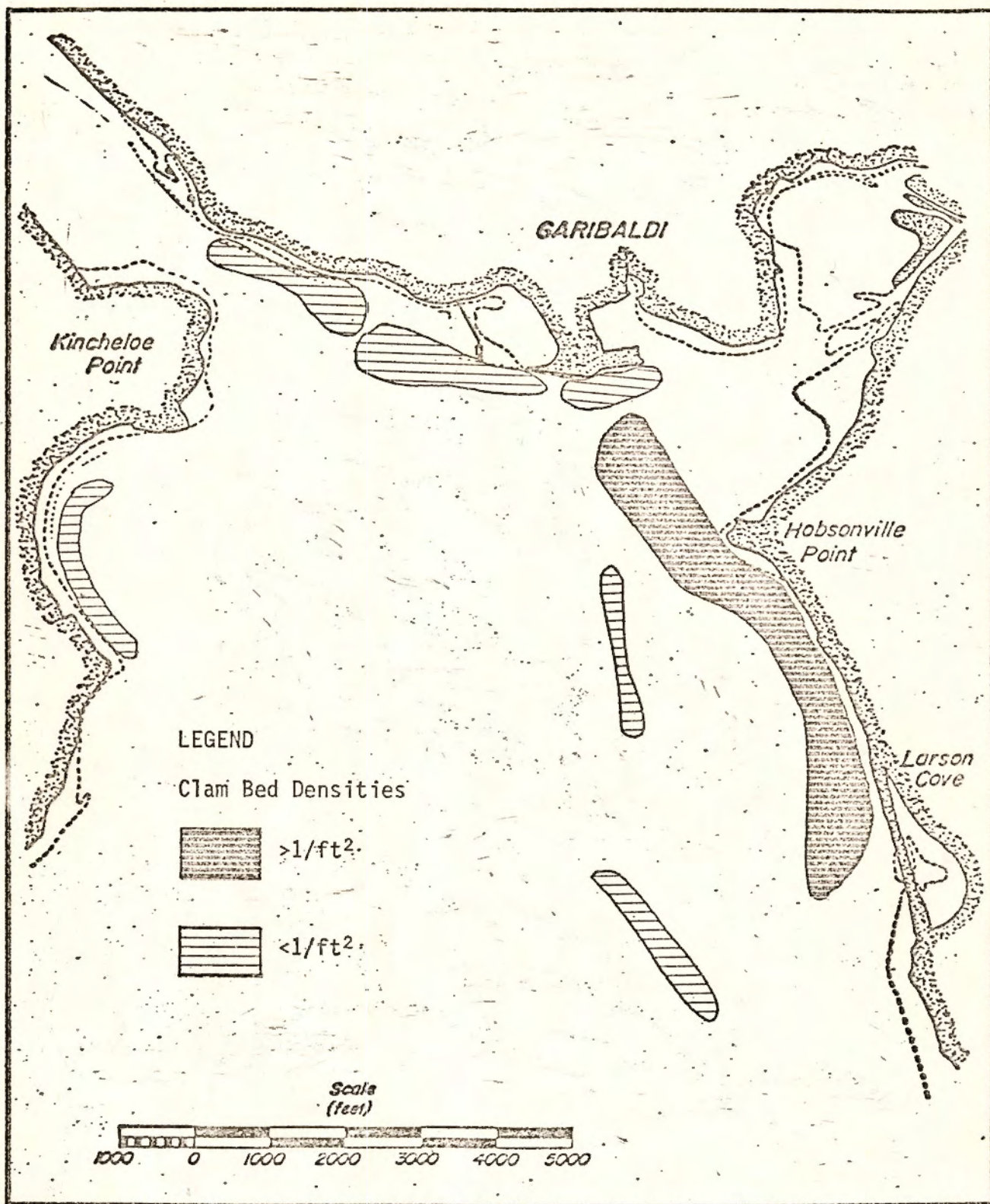


Figure 7. Subtidal clam beds in Tillamook Bay (From Gaumer and Lukas, 1975)

On the basis of circulation patterns and salinity changes from surface to bottom, Tillamook Bay is classified as a two-layered system during January and as a well mixed, vertically homogeneous system during April and October (Burt and McAllister, 1959). Based on the same system, the up bay portion of the estuary appears to fluctuate between completely mixed to relatively stratified depending upon runoff quantities and tidal action (Corps of Engineers, 1974).

Food Habits

We and Flynn and Frolander (1975) examined stomach contents from many species, but concentrated on 15 species (187 fish). We captured most fish from the lower bay and only identified larger food items. The food items were divided into five basic groups including epibenthic organisms, large planktonic organisms, small planktonic organisms, insects, and algae (Flynn and Frolander, 1975). For the species we examined, epibenthic organisms were the most important food.

The five basic groups were divided into small food groups (Table 47). Some fish showed a preference for more than just one group. Amphipods were, by far, the most often eaten food, and were one of the preferred items for four species. Fish and isopods were also one of the main foods in the bay. Other groups of organisms that were eaten quite often included Copepods, Cumaceans, Decapods and Decapod larvae. The other food groups listed in Table 47 may have fulfilled a need in some species but were less important as a preferred food item in the bay.

Chinook Salmon. Of 112 juvenile salmon examined from down bay seine stations, a preference for large food items was shown. Epibenthic organisms were the main food item. Large planktonic organisms, including larval fish and decapods were the second most preferred food. The larval fish species included surf smelt, herring, anchovy, rockfish, sculpin and an unidentified fish. Insects were also an important food. Small planktonic organisms were the least abundant food found in juvenile chinook salmon.

Hatchery reared chinook salmon in the lower bay had empty stomachs a week or more after release. Wild chinook salmon during the same time had full stomachs of larval fish. Hatchery fish, therefore, may need a short period to acclimate to wild conditions.

Coho Salmon. Of nine juvenile coho salmon stomachs examined, epibenthic organisms in the form of amphipods and isopods, were the preferred food. Larval and juvenile fish included surf smelt and English sole. Other foods of lesser importance were crustacean remains and decapod larvae. The one adult stomach contained adult surf smelt.

Cutthroat Trout. Four adult cutthroat stomachs contained sand shrimp, ghost shrimp, larval surf smelt and amphipods. We caught these fish at Hobsonville Point.

Starry Flounder. We examined 22 stomachs from all sections of the bay including the lower rivers. Starry flounders preferred amphipods in the upper bay and rivers and ghost shrimp down bay. They also ate small Dungeness crabs.

Pacific Staghorn Sculpin. We examined seven adult stomachs from the lower bay. This sculpin preferred mud shrimp and ghost shrimp. They also ate sand shrimp, shore crab, Dungeness crab and juvenile English sole.

Pile Perch. We examined three adult perch stomachs and found juvenile clams as the main food. They also ate amphipods, small Dungeness crabs and barnacles. We caught two fish at Hobsonville Point and one at a pier on Garibaldi flat.

Striped Seaperch. We examined two adult perch captured at a pier on Garibaldi flat. They preferred barnacles and muscles but also ate small Dungeness crabs and amphipods.

Kelp Greenling. We examined two adult kelp greenling. We caught one from the north jetty that contained small Dungeness crabs, staghorn sculpin and Oregon pill bugs. The other greenling, from Kincheloe Point, contained hermit crabs, amphipods and an unidentified shrimp.

Black Rockfish. We examined eight adult rockfish from the north jetty. Five of the eight had empty stomachs. The others contained Pacific sand lance as the preferred food and surf smelt followed in abundance. They also ate kelp isopods.

Flynn examined five juvenile rockfish (*Sebastes spp.*) and found only epibenthic organisms.

Chum Salmon. Flynn and Frolander (1975) examined three juvenile chum salmon and found insects and insect larva in all three. Other items included 1 surf smelt, 1 unidentified fish larva and 10 *Callinassa* larvae.

Pacific Herring. Forty-one herring showed a definite preference for small planktonic organisms, occurring in all but two stomachs. Flynn and Frolander (1975) found epibenthic organisms in 19 stomachs and fish larvae in two.

Surf Smelt. Flynn and Frolander (1975) examined 28 stomachs. Surf smelt preferred small planktonic organisms first and epibenthic organisms second. The stomachs contained only a few decapod larva and insects.

English Sole. Flynn and Frolander (1975) examined 10 juvenile English sole stomachs. They preferred epibenthic organisms first and small planktonic organisms second. Only English sole consumed two types of crustacean, tanaids and ostracods.

Northern Anchovy. Flynn and Frolander (1975) found planktonic and epibenthic organisms in all five stomachs. Four of the five stomachs contained phytoplankton.

Shiner Perch. Flynn and Frolander (1975) examined five shiner perch stomachs. Four stomachs contained epibenthic organisms, two contained zooplankton and one contained an insect.

CONCLUSIONS

We reached the following conclusions based on the results of this study:

1. The gear was adequate to catch a variety of fish. We feel the limitations were mainly weather and shallow water up bay.
2. Tillamook Bay serves as a migration route, a spawning area, a rearing area, and as a home for at least 63 species of fish, 10 species of clams, 3 species of crab and many other invertebrates.
3. Every type of habitat is utilized by fish or shellfish in Tillamook Bay. Although tideflats are exposed at low tide, they are inhabited by foraging fish at high tide.
4. Although many of the species we caught are not of direct importance to man, stomach analysis showed at least some are major food items for economically important species.

RECOMMENDATIONS

As a result of data presented in this report, we recommend the following:

1. Continue this survey to refine techniques and knowledge of distribution patterns in Tillamook Bay.
2. State and federal resource agencies use this report for estuarine management recommendations.
3. Local and regional planning groups use this report to better understand the habitat use of estuarine areas.

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Table 5. Pacific herring caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|----------|-----------|--------------|------------|-----------|------------|-----------|------|----------|----------|------|------|--------------|
| Buoy 8 | | 5 | | | | | | | | | | | 5 |
| Kincheloe Pt. | | 30 | 359 | 683 | 36 | 151 | | | 1 | | | | 1,260 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Flat | | 20 | 2 | 6 | 50 | 2 | | | | | | | 80 |
| Boat Basin | | 1 | 1 | | | | | | | | | | 2 |
| Miami Cove | | 5 | | | | | | | | | | | 5 |
| Crab Harbor | | 5 | 6,750 | 26 | | 30 | | | 1 | 3 | | | 6,815 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 21 | 151 | 228 | | | 35 | | | | | | 435 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | 1 | | | | | | | | | | | | 1 |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 1 | 87 | 7,263 | 943 | 86 | 183 | 35 | | 2 | 3 | | | 8,603 |

Table 6. American shad caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | 1 | | | | | | | | | | | 1 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Flat | | 1 | | | | | | | | | | | 1 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | 11 | | | | | | | | | | | 11 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | 1 | | | 1 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | 1 | | | | | | | | | 1 |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Flat | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 13 | | 1 | | | | | | 1 | | | 15 |

Table 7. Northern anchovy caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|-------------------|-------------------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | 3 | | | | | | | 1 | | 4 |
| Buoy 11 | | | | | | | | | 1 | | | | 1 |
| Garibaldi Fl. | | | | 4 | 200 ^{1/} | | | | | | | | 204 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | 100 ^{1/} | | | | | | | | | 100 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 3 | 22 | 2 | | | | | | | | | 27 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | 3 | | | | 3 |
| Deep Hole | | | | | | | | | 1 | | | | 1 |
| Mid-West Ch. | | | | | | | | | 1 | | | | 1 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 3 | 122 | 9 | 200 | | | | 6 | | 1 | | 341 |

^{1/} Juvenile fish

Table 8. Chinook salmon caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----------|------------|--------------|------------|------------|------------|------|------|----------|----------|----------|------|--------------|
| Buoy 8 | | | | | | 4 | | | | | | | 4 |
| Kincheloe Pt. | | | 33 | 200 | 221 | 413 | 32 | | | | | | 899 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | 3 | 41 | 263 | 180 | 48 | 28 | | 1 | 2 | | | 566 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | 30 | 77 | 70 | 7 | 65 | | 1 | | | | 250 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 11 | 155 | 461 | 251 | 219 | 174 | | 7 | | 2 | | 1,280 |
| Ghost Hole | | 1 | | | | | | | | | | | 1 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | 9 | 11 | | | | | | | | 20 |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | 3 | 5 | | | | | | | | | | 8 |
| Goose Point | | | 1 | | | | | | | | | | 1 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | 1 | | | | | | | | | | 1 |
| Total | 18 | 266 | 1,010 | 733 | 691 | 299 | | | 9 | 2 | 2 | | 3,030 |

Table 9. Coho salmon caught in Tillamook Bay May 1974-April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----------|----------|----------|----------|-------|----------|-----------|----------|------|----------|-----------|------|-----------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 8 | 1 | | | | | 3 | 1 | | | | 1 | 14 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Flat | | | | | | 1 | 2 | | | 1 | 1 | | 5 |
| Boat Basin | | | | | | | | | | | | 14 | 14 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | 3 | | 1 | | | | 1 | 1 | | | | | 6 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | 1 | 1 | | | 7 | | | 2 | | | 11 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | 1 | | | | | | | | | 1 |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | 1 | | | | | | | | | | | | 1 |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 12 | 1 | 2 | 2 | | 1 | 13 | 2 | | 3 | 16 | | 52 |

Table 10. Chum salmon caught in Tillamook Bay May 1974-April 1975

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|----------|------|------|-------|------|----------|------|------|------|-----------|------------|------------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 100 | | | | | | 1 | | | | | 7 | 108 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Flat | 34 | | | | | | 1 | | | | 2 | 34 | 71 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | 3 | | 3 |
| Crab Harbor | 32 | 1 | | | | | | | | | | 15 | 48 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 3 | 3 | | | | | 2 | | | | 9 | 60 | 77 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | 3 | | | | | | | | | | 3 |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Flat | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 169 | 7 | | | | | 4 | | | | 14 | 116 | 310 |

Table 11. Cutthroat trout caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 1 | | | | | | | | | | | | 1 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | 1 | | | | | | 1 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 1 | 2 | 1 | 4 | | 5 | | | 1 | | | | 14 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | 1 | | | | | | 1 | | | | | 2 |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 2 | 3 | 1 | 4 | | 5 | 1 | 1 | 1 | | | | 18 |

Table 13. Surf smelt caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|--------------|--------------|------------|------------|--------------|------------|-----------|------------|-----------|------------|------------|---------------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 24 | 400 | 106 | 438 | 66 | 95 | 1 | 6 | 103 | | 551 | | 1,790 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | 800 | 2,000 | 102 | 150 | | | | | 5 | 6 | | 121 | 3,184 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | 1 | | 1 |
| Crab Harbor | | 340 | 3,210 | 92 | 22 | 1,000 | 5 | 30 | 2 | | 115 | 2 | 4,818 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 800 | 410 | 1 | 52 | 10 | 173 | | 39 | 1 | 1 | 116 | 1,603 |
| Ghost Hole | | | | | | | | | | | 3 | | 3 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | 7 | | 1 | | | | | 2 | | 1 | 2 | | 13 |
| Mid-West Ch. | | | | | | | | | | | 100 | 2 | 102 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | 1 | | | | | | | | | | | 1 |
| Bay Ocean | | 15 | | | | | | | 1 | 2 | 1 | 1 | 20 |
| Sibley Sands | 1 | | | | 1 | | | | | | | | 2 |
| Dolphin #2 | | | | | | | | | | 1 | | | 1 |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | 1 | | | | 1 |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Pt. | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 832 | 3,556 | 3,829 | 681 | 141 | 1,105 | 179 | 38 | 151 | 11 | 774 | 242 | 11,539 |

Table 14. Top smelt caught in Tillamook Bay, May 1974-April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | 150 | | | | | | 150 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | 1 | 1 | | | | | | 1 | | | | 3 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 1 | 1 | | | | 150 | | 1 | | | | 153 |

Table 15. Pacific tomcod caught in Tillamook Bay, May 1974-April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | 1 | | | | | | | | | 1 |
| Garibaldi Flat | | | | | | | | | | | | | |
| Boat Basin | | 4 | | 2 | | | | 1 | | | | | 7 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | 1 | | | | | | | | | 1 |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | 1 | 1 | | | | | | | | 2 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | 4 | 10 | 26 | 7 | | | | | | | | 1 | 48 |
| Mid-West Ch. | | | | | | 1 | | | | | | | 1 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 4 | 14 | 28 | 11 | 1 | | | 1 | | | | 1 | 60 |

Table 16. Tube snout caught in Tillamook Bay, May 1974-April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|----------|----------|------|------|----------|----------|----------|-----------|----------|-----------|----------|------|-----------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | 2 | 1 | | | | 3 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | 1 | 1 | | | | 2 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 1 | | | | | 2 | | | | | | | 3 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Point | | | | | | | | | | | 4 | | 4 |
| Deep Hole | | 1 | | | | | | 2 | | 1 | | | 4 |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | 4 | 1 | | | 5 | | 1 | | | 1 | 1 | | 13 |
| Mid-Bay Flat | | | | | | 1 | | | | 1 | 2 | | 4 |
| Bay Ocean | 1 | | | | | | | 5 | | 2 | | | 8 |
| Sibley Sands | | | | | | | | 1 | | | | | 1 |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | 1 | | | 1 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 6 | 2 | | | 5 | 3 | 1 | 11 | 2 | 10 | 3 | | 43 |

Table 17. Threespine stickleback caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|----------|----------|----------|------|-------|----------|-----------|-----------|-----------|----------|----------|----------|------------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | 1 | 2 | 2 | | | | 5 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | 3 | | | | | | 10 | 1 | 20 | | 6 | 2 | 42 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | 3 | | | | 3 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 3 | 4 | | | | | | | 5 | | | 1 | 13 |
| Ghost Hole | | | | | | | | 12 | | | | | 12 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | 1 | | | 1 |
| Mid-Bay Flat | 1 | | | | | 1 | 1 | | 2 | | | | 5 |
| Bay Ocean | | 2 | | | | 7 | | | | 4 | | | 13 |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | 6 | 3 | 2 | | | 11 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | 1 | | | | | | | | 1 | | | 1 | 3 |
| Rocky Pt. Fl. | | | | | | | | 1 | | | | | 1 |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | 3 | | | | | | | | | | 3 |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 8 | 6 | 3 | | | 8 | 12 | 22 | 36 | 7 | 6 | 4 | 112 |

Table 18. Bay pipefish caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----------|----------|----------|----------|-----------|-----------|----------|----------|----------|----------|-----------|-----------|-----------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | | | | | 12 | 12 |
| Boat Basin | | | | | | | | 1 | | 1 | 2 | | 4 |
| Miami Cove | 1 | | | | | | | | | | | | 1 |
| Crab Harbor | | | | | | | 1 | | | | | | 1 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 1 | | | | 1 | 1 | | 1 | | 2 | 1 | 7 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Point | | | | | | | | | | 1 | | | 1 |
| Deep Hole | | | | | | | | 5 | | 1 | 2 | | 8 |
| Mid-West Ch. | | | | | | 1 | | | | | | | 1 |
| Larson Cove Fl. | | 1 | | | 5 | 7 | | 3 | | | 3 | 3 | 22 |
| Mid-Bay Flat | 3 | | | | | 3 | 3 | | | | | | 9 |
| Bay Ocean | 2 | | | | 1 | 3 | | | | 2 | 1 | | 9 |
| Sibley Sands | | | | | | 1 | | | | | | | 1 |
| Pitcher Pt. Ch. | 2 | | 1 | | 2 | | | | | | | | 5 |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | 1 | 3 | | | | | | | | 4 |
| Kilchis River | 1 | | | | | 1 | | | | | | | 2 |
| Pitcher Pt. Fl. | 2 | 4 | 1 | | 1 | | | | | | 1 | 1 | 10 |
| Rocky Pt. Flat | | | | | | 1 | | | | | | | 1 |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 11 | 6 | 2 | 1 | 12 | 18 | 5 | 9 | 1 | 5 | 11 | 17 | 98 |

Table 19. Shiner perch caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|------------|--------------|------------|--------------|------------|------------|----------|----------|----------|------|----------|--------------|
| Buoy 8 | | 1 | | 1 | | | | | | | | | 2 |
| Kincheloe Pt. | 35 | 27 | 123 | 105 | 331 | 8 | 3 | | | | | | 632 |
| Buoy 11 | 11 | 12 | | 2 | | | | | | | | | 25 |
| Garibaldi Fl. | 251 | 155 | 651 | 150 | 1,508 | 80 | | | 1 | | | 1 | 2,797 |
| Boat Basin | 112 | 240 | 58 | 7 | 8 | 4 | | | | | | | 429 |
| Miami Cove | | | 4 | | 1 | | | | | | | | 5 |
| Crab Harbor | 20 | 20 | 1,052 | 283 | 2 | | 1 | | | | | | 1,378 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 19 | 31 | 185 | 74 | 17 | 94 | 150 | | | | | 2 | 572 |
| Ghost Hole | 6 | 6 | 3 | 10 | 1 | 2 | | 1 | | | | 3 | 32 |
| Forest Pt. | | | | | | | | | | 1 | | | 1 |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | 2 | | 32 | | | | | | | | | | 34 |
| Larson Cove Fl. | | 10 | 4 | 3 | 7 | | | | | | | | 24 |
| Mid-Bay Fl. | 9 | | | 6 | | | 3 | | | | | | 18 |
| Bay Ocean | 4 | 6 | 1 | | 7 | 3 | | 1 | | | | | 22 |
| Sibley Sands | | 17 | 16 | 15 | 2 | | | | | | | | 50 |
| Pitcher Pt. Ch. | 8 | | 2 | | 10 | | | | | | | | 20 |
| Dolphin #2 | 3 | 80 | 10 | | | | | | | | | | 93 |
| Goose Pt. | | 8 | 23 | 9 | 3 | | 1 | 2 | | | | | 46 |
| Kilchis River | 17 | 40 | 6 | | | | | | | | | | 63 |
| Pitcher Pt. Fl. | 30 | 5 | 18 | | 11 | | 1 | | | | | | 65 |
| Rocky Pt. Fl. | | | 2 | | | | | | | | | | 2 |
| Delta Flat | 3 | | 8 | | 1 | | | | | | | | 12 |
| Dick Point | 7 | 1 | 11 | 1 | | | | | | | | | 20 |
| Wilson River | | 1 | 3 | 4 | | 15 | | | | | | | 23 |
| Trask River | | 2 | | 7 | 2 | 1 | | | | | | | 12 |
| Tillamook River | 1 | | 1 | | | | | | | | | | 2 |
| Total | 538 | 662 | 2,213 | 677 | 1,911 | 207 | 159 | 4 | 1 | 1 | | 6 | 6,379 |

Table 20. Pile perch caught in Tillamook Bay, May 1974 - April 1975

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | 2 | | | | | | | | | 2 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | 1 | 2 | | | | | | 3 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | 2 | | | | | | | | | 2 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | 4 | 2 | | 5 | 3 | | | | | | 14 |
| Ghost Hole | | | 4 | | | | | | | | | | 4 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | 2 | | | | | | | | | | 2 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | 1 | | | | | | | 1 |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | | 10 | 6 | 1 | 6 | 5 | | | | | | 28 |

Table 21. Striped seaperch caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | 1 | 1 | 8 | | | | | | | | | 10 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | 2 | 1 | | | | | | | | 3 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | 1 | 2 | 2 | | | | | | | 5 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | 1 | | | | | | | | 1 |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 1 | 1 | 11 | 4 | 2 | | | | | | | 19 |

Table 23. Saddleback gunnel caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | 1 | 2 | | 1 | | 1 | | | | | | | 5 |
| Kincheloe Pt. | 1 | 2 | | | | | | | | | | | 3 |
| Buoy 11 | 1 | 1 | | | | | | | | | 2 | | 4 |
| Garibaldi Fl. | | 1 | | 1 | 4 | | | | | | | | 6 |
| Boat Basin | | | 1 | 1 | 20 | | 1 | | | | 1 | 1 | 25 |
| Miami Cove | | 3 | 15 | 7 | | 1 | | | | | | | 26 |
| Crab Harbor | | | | | | | | | | 1 | | | 1 |
| Range Finders | | 1 | | | | | | | | | | | 1 |
| Hobsonville Pt. | 3 | 2 | | 5 | | 1 | | | | | | 1 | 12 |
| Ghost Hole | | 5 | | 3 | 2 | | 2 | 2 | 2 | 15 | 23 | 2 | 56 |
| Forest Point | | | | | | | | | | 1 | | | 1 |
| Deep Hole | 2 | 2 | 6 | 7 | 2 | | | | | | | 3 | 22 |
| Mid-West Ch. | | | 1 | | | 1 | | | | | | | 2 |
| Larson Cove Fl. | 2 | 12 | 13 | | 5 | 1 | 1 | | 4 | | | | 38 |
| Mid-Bay Flat | 20 | 1 | 7 | | | | 15 | | 3 | | | | 46 |
| Bay Ocean | 4 | | 3 | | | 1 | | | | | | | 8 |
| Sibley Sands | 1 | 10 | 1 | | | | | | | | | 1 | 13 |
| Pitcher Pt. Ch. | 1 | 7 | 3 | | 1 | | | 6 | | | | | 18 |
| Dolphin #2 | 2 | 9 | 1 | | 1 | | | | | | | | 13 |
| Goose Point | | 2 | 1 | 4 | 1 | | | 2 | | | | | 10 |
| Kilchys River | 4 | 12 | 2 | 3 | 1 | 2 | | | | | | | 24 |
| Pitcher Pt. Fl. | 1 | 6 | 6 | | 8 | 4 | | 1 | | | | | 26 |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | 2 | | 1 | | 1 | | | | | | | 4 |
| Dick Point | 1 | | | 9 | | | | | | | | 1 | 11 |
| Wilson River | | | | | 2 | 17 | | | | | | | 19 |
| Trask River | | | | | 1 | | | | | | | | 1 |
| Tillamook River | | | | | 1 | 1 | | | | | | | 2 |
| Total | 44 | 80 | 60 | 42 | 49 | 31 | 19 | 11 | 9 | 17 | 26 | 9 | 397 |

Table 24. Penpoint gunnel caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | 2 | 1 | | | | 1 | | | | | | 4 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | 2 | | | 1 | | | | | | | 2 | | 5 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 2 | | | 1 | | | | | | | | | 3 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 4 | 2 | 1 | 2 | | | 1 | | | | 2 | | 12 |

Table 25. Pacific sand lance caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | 1 | | | | | | | | | | 1 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | 6 | | | | | | | | | | 6 |
| Ghost Hole | | | | | | | | 1 | | | | | 1 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 7 | | | | | | 1 | | | | | 8 |

Table 26. Rockfish species caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | 1 | | | 1 | | | | | | | 2 |
| Kincheloe Pt | 12 | 373 | 119 | | | | 13 | | | | | | 517 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | 1 | | 5 | 8 | | | | | | | | | 14 |
| Boat Basin | | 7 | 1 | 4 | 7 | | | | | | | | 19 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 2 | 29 | 10 | 2 | 22 | 2 | | | | | | | 67 |
| Ghost Hole | | 3 | 1 | | 5 | | | | | | | | 9 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | 3 | | 3 | | | 1 | 1 | | | | | | 8 |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | 1 | 2 | 1 | | | | | | | | | 4 |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 18 | 414 | 141 | 15 | 36 | 16 | | | | | | | 640 |

Table 28. Kelp and Rock greenling caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 15 | 26 | 12 | 1 | 4 | 4 | 1 | | | | | 1 | 64 |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Flat | 7 | | | 1 | 2 | | | | | | | | 10 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 1 | 2 | | | 1 | | | | | | | 4 |
| Ghost Hole | | 1 | 2 | | | | | | | | | | 3 |
| Forest Point | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | 1 | 1 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Flat | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Point | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 22 | 28 | 16 | 2 | 6 | 5 | 1 | | | | | 2 | 82 |

Table 29. Pacific staghorn sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|
| Buoy 8 | 3 | | | | | | | | | | | | 3 |
| Kincheloe Pt. | | 1 | | | | 1 | | | | | 1 | 1 | 4 |
| Buoy 11 | | | | 4 | | | | | | 1 | 1 | | 6 |
| Garibaldi Fl. | 14 | 79 | 80 | 68 | 45 | 7 | 12 | | 3 | 3 | 4 | 6 | 321 |
| Boat Basin | | 1 | 2 | 7 | 1 | 2 | | | 2 | | | 1 | 16 |
| Miami Cove | 10 | 7 | 8 | 4 | 2 | | | | 2 | | 5 | 5 | 43 |
| Crab Harbor | 1 | | 55 | 15 | 4 | 12 | 3 | 1 | | 1 | | 1 | 93 |
| Range Finders | 1 | | 1 | | | | | | | | | | 2 |
| Hobsonville Pt. | 4 | 12 | 48 | 3 | 3 | 6 | 5 | | | | | | 81 |
| Ghost Hole | 1 | 4 | 4 | 3 | | 1 | | 12 | | | 1 | | 26 |
| Forest Pt. | 3 | 1 | | | 2 | 1 | | | | | | 1 | 8 |
| Deep Hole | | 1 | 1 | 2 | | | | | | 2 | 3 | | 9 |
| Mid-West Ch. | | 1 | 15 | | | 1 | | 1 | 1 | 1 | | 5 | 25 |
| Larson Cove Fl. | | 5 | 2 | | 1 | | | | 2 | | 1 | | 11 |
| Mid-Bay Fl. | 11 | 5 | 1 | | | | | | 1 | 2 | | | 20 |
| Bay Ocean | 8 | 44 | 4 | | 1 | | | 3 | 8 | | | 13 | 81 |
| Sibley Sands | 2 | 1 | 3 | 5 | 1 | | | | | | 1 | 4 | 17 |
| Pitcher Pt. Ch. | | 5 | 1 | | 1 | | | | | | 2 | | 9 |
| Dolphin #2 | 2 | 6 | 8 | | 1 | | | | | | | 1 | 18 |
| Goose Pt. | 20 | 20 | 10 | | | | | 5 | 10 | | | 3 | 68 |
| Kilchis River | 20 | 30 | 6 | 1 | 1 | 2 | | 1 | 2 | | | | 63 |
| Pitcher Pt. Fl. | 29 | 6 | 5 | | 2 | 1 | | 2 | 3 | 1 | 4 | | 53 |
| Rocky Pt. Fl. | 23 | 1 | 12 | | | 1 | | 8 | 2 | | 2 | 6 | 55 |
| Delta Flat | 11 | 4 | 9 | 4 | | 1 | | 1 | | | | | 30 |
| Dick Point | | 4 | | 2 | | 3 | 1 | | | | | | 10 |
| Wilson River | 2 | 35 | 58 | 9 | 1 | 18 | | | | 1 | | | 124 |
| Trask River | 1 | 1 | 1 | 3 | | 8 | | | | | | | 14 |
| Tillamook River | | | 12 | | | | | | | | | | 12 |
| Total | 166 | 274 | 346 | 130 | 66 | 65 | 21 | 34 | 36 | 12 | 25 | 47 | 1,222 |

Table 30. Buffalo sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|------------|
| Buoy 8 | 32 | 22 | 4 | 1 | 1 | 5 | 5 | 2 | 1 | 3 | 26 | 5 | 107 |
| Kincheloe Pt. | 1 | 8 | 1 | 4 | | | 1 | | | | 1 | | 16 |
| Buoy 11 | 7 | 3 | 2 | 1 | | 1 | | | | 6 | 7 | 1 | 28 |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | 1 | | 1 | | | | | | 1 | | | 3 |
| Miami Cove | | 1 | | | | | | | | | | | 1 |
| Crab Harbor | | 1 | | 11 | | | | | 1 | | | | 13 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | 1 | 1 | | | 1 | | | | | | 3 |
| Ghost Hole | 5 | 10 | 32 | 12 | 1 | 37 | 3 | 14 | 2 | 79 | 59 | 5 | 259 |
| Forest Pt. | 1 | | | | | | | | | | | | 1 |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | 3 | 1 | | 4 |
| Larson Cove Fl. | | | 1 | | 1 | 1 | | | 1 | | | | 4 |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | 5 | | | | | | | | 5 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | 1 | | | | 1 | | | | | | | 2 |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 46 | 47 | 41 | 31 | 8 | 45 | 10 | 16 | 5 | 92 | 94 | 11 | 446 |

Table 31. Padded sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | 1 | | | | | | 1 | | | 5 | 1 | 1 | 9 |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | 1 | | | | | | | | | | 1 | | 2 |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | 2 | | | | 2 |
| Ghost Hole | | | 2 | | | 1 | | 3 | | 35 | 15 | | 56 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | 1 | | | | | | | | | | | | 1 |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 3 | | 2 | | | 1 | 1 | 3 | 2 | 40 | 17 | 1 | 70 |

Table 32. Prickly sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | 1 | | | | 1 |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | 3 | 2 | | 1 | 1 | | | | | | | | 7 |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | 1 | | | | | | | | | 1 |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | 1 | | | | 1 | | | | | | | | 2 |
| Wilson River | 3 | 1 | 1 | 1 | 1 | | | | | | | | 6 |
| Trask River | 1 | 1 | 2 | | | | | | | | | | 4 |
| Tillamook River | | | | | | | | | | | | | |
| Total | 8 | 4 | 4 | 3 | 1 | | | | 1 | | | | 21 |

Table 33. Tidepool sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | 2 | | | | | 2 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | 1 | | | | | 1 | | | | | | 2 |
| Ghost Hole | | | | | | | | 1 | | | | | 1 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | 1 | | | | | 1 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 1 | | | | | 1 | 4 | | | | | 6 |

Table 34. Sharpnose sculpin caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | 1 | | 2 | | | 3 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | 1 | | | 1 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | 1 | | | | 2 | | | 3 | | | 6 |
| Ghost Hole | | | | | | | | 5 | | | | | 5 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | | 1 | | | | 2 | 6 | | 6 | | | 15 |

Table 35. Cabezon caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 10 | 30 | 7 | 3 | 1 | 3 | 1 | | | | | 5 | 60 |
| Buoy 11 | | | | | | | | | | 1 | | | 1 |
| Garibaldi Fl. | 5 | | 1 | 3 | 1 | | | | 3 | | 2 | 4 | 19 |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | 1 | 1 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | 3 | 2 | 1 | 1 | 1 | | 2 | | | | | | 10 |
| Ghost Hole | | 1 | | | 1 | 1 | 1 | | | | | | 4 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | 1 | | | | | | | | | | | 1 |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 18 | 34 | 9 | 7 | 4 | 4 | 4 | | 3 | 1 | 2 | 10 | 96 |

Table 37. Ringtail snailfish caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | 2 | 6 | | | | | | | | | | | 8 |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | | | | | | | | | | | | |
| Garibaldi Fl. | | | | | | | | | | | | | |
| Boat Basin | | | | | | | | | | | | | |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | | | | | | | | | | | |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | | | | | | | 3 | 1 | | 4 |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | | | | | | | | |
| Mid-West Ch. | | | | | | | | | | | | | |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | 1 | | | | | 1 |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 2 | 6 | | | | | | 1 | | 3 | 1 | | 13 |

Table 38. Pacific sanddab caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | | | | | | | | | | | | | |
| Buoy 11 | | 2 | 1 | | | | | | | | | | 3 |
| Garibaldi Fl. | | | | 1 | | | | | 1 | | | | 2 |
| Boat Basin | | 2 | 1 | 3 | | 2 | 1 | 2 | | | | | 11 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | | 1 | 1 | | | | | | | | | 2 |
| Range Finders | | | | | | | | | | | | | |
| Hobsonville Pt. | | | | | | | | | | | 1 | | 1 |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | | | | | | | | | | | | | |
| Deep Hole | | | | | | 1 | | | | | 1 | | 2 |
| Mid-West Ch. | | | 1 | | | | | | | | | | 1 |
| Larson Cove Fl. | | | | | | | | | | | | | |
| Mid-Bay Fl. | | | | | | | | | | | | | |
| Bay Ocean | | | | | | | | | | | | | |
| Sibley Sands | | | | | | | | | | | | | |
| Pitcher Pt. Ch. | | | | | | | | | | | | | |
| Dolphin #2 | | | | | | | | | | | | | |
| Goose Pt. | | | | | | | | | | | | | |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | | | | | | | | | |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | | 4 | 4 | 5 | | 3 | 1 | 2 | 1 | | 2 | | 22 |

Table 39. English sole caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|------------|------------|------------|------------|--------------|
| Buoy 8 | 1 | | | | | | | | 1 | 2 | | | 4 |
| Kincheloe Pt. | 1 | 4 | | 1 | 3 | 3 | 2 | | 2 | | 12 | 6 | 34 |
| Buoy 11 | 8 | 12 | 1 | 1 | | 4 | | | | 1 | 2 | 1 | 30 |
| Garibaldi Fl. | 21 | 63 | 66 | 80 | 61 | 6 | 19 | 20 | 21 | 19 | 284 | 36 | 696 |
| Boat Basin | 15 | 29 | 7 | 37 | 3 | 6 | 8 | | 6 | 17 | 25 | | 153 |
| Miami Cove | | 28 | 26 | 1 | | 1 | | | 5 | | 5 | 3 | 69 |
| Crab Harbor | 6 | 32 | 141 | 73 | 4 | 8 | 1 | | 37 | 8 | 108 | 6 | 424 |
| Range Finders | | 5 | 8 | 1 | 2 | | | | | | | 9 | 25 |
| Hobsonville Pt. | 25 | 65 | 4 | 7 | 1 | 2 | 7 | | | 4 | 10 | 1 | 126 |
| Ghost Hole | 3 | 5 | | 2 | | 1 | | 1 | | 10 | 25 | 4 | 51 |
| Forest Pt. | 2 | 1 | 5 | | 2 | 1 | | 4 | | 27 | 6 | 3 | 51 |
| Deep Hole | 11 | 34 | 40 | 80 | 2 | 14 | | 7 | 16 | 12 | 26 | 15 | 257 |
| Mid-West Ch. | 8 | 9 | 44 | 1 | 9 | 10 | | | 30 | 30 | 25 | 27 | 193 |
| Larson Cove Fl. | 37 | 60 | 48 | 30 | 4 | | 2 | 6 | 15 | 1 | 22 | 35 | 260 |
| Mid-Bay Fl. | 22 | 17 | 26 | | | | 1 | 8 | | 15 | 1 | 1 | 90 |
| Bay Ocean | 5 | 31 | 1 | | 2 | 2 | | | 11 | 12 | | 13 | 77 |
| Sibley Sands | 3 | 4 | 32 | 3 | 4 | | | 2 | | | 1 | 55 | 104 |
| Pitcher Pt. Ch. | 16 | 30 | 4 | | 4 | | | 9 | 3 | | | | 66 |
| Dolphin #2 | | 4 | 1 | | | 3 | | | | | 1 | 2 | 11 |
| Goose Pt. | 1 | 5 | 9 | | 1 | 2 | | | | | 1 | 2 | 21 |
| Kilchis River | | 3 | | | | | | | | | | | 3 |
| Pitcher Pt. Fl. | 20 | 20 | 4 | | 5 | | | | 2 | | 1 | | 52 |
| Rocky Pt. Fl. | | | | | | | | 1 | | | | | 1 |
| Delta Flat | 1 | | | | 2 | | | | | | | | 3 |
| Dick Point | | | | 1 | | | | | | | | | 1 |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 206 | 461 | 467 | 318 | 109 | 63 | 40 | 58 | 149 | 158 | 555 | 219 | 2,802 |

Table 40. Sand sole caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | 1 | | | | | | | 1 |
| Kincheloe Pt. | | | | | | | | 1 | | | | | 1 |
| Buoy 11 | 1 | 1 | 1 | 4 | | 1 | 1 | | | | | | 9 |
| Garibaldi Fl. | 1 | | | | | | | | | | | | 1 |
| Boat Basin | | | | | | 1 | | | | 1 | 2 | | 4 |
| Miami Cove | | | | | | | | | | | | | |
| Crab Harbor | | 1 | 13 | 2 | 3 | 3 | 1 | | | | 1 | | 24 |
| Range Finders | | 3 | 4 | | | | 1 | | | | | 1 | 9 |
| Hobsonville Pt. | | | | | | | | | | | | | |
| Ghost Hole | | | | | | | | | | | | | |
| Forest Pt. | 1 | | | 1 | | | | | | | | | 2 |
| Deep Hole | | 1 | 1 | 3 | | | | | | | | | 5 |
| Mid-West Ch. | | 1 | 6 | | 2 | 2 | | | 3 | | | | 14 |
| Larson Cove Fl. | | | 2 | | | | | | | | | | 2 |
| Mid-Bay Fl. | | | | | | | | | 1 | | | | 1 |
| Bay Ocean | | | 2 | | | | | | | | | | 2 |
| Sibley Sands | | | 1 | 2 | | | | | | | | | 3 |
| Pitcher Pt. Ch. | 1 | | | | | | 1 | | | | | | 2 |
| Dolphin #2 | | | | | | 1 | | | | | | | 1 |
| Goose Pt. | | | | 3 | | | | | | | | | 3 |
| Kilchis River | | | | | | | | | | | | | |
| Pitcher Pt. Fl. | | | | | | | | | | | | | |
| Rocky Pt. Fl. | | | | | | | | | | | | | |
| Delta Flat | | | | | | | | | | | | | |
| Dick Point | | | | | 1 | | | | | | | | 1 |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | | | | | | | | |
| Tillamook River | | | | | | | | | | | | | |
| Total | 4 | 7 | 30 | 15 | 6 | 9 | 4 | 1 | 4 | 1 | 3 | 1 | 85 |

Table 41. Starry flounder caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|-----|------|------|------|-------|------|------|------|------|------|------|------|-------|
| Buoy 8 | | | | | | | | | | | | | |
| Kincheloe Pt. | 11 | 3 | 3 | | | 1 | | | | | 2 | 2 | 22 |
| Buoy 11 | | | | | | | | | | | 2 | | 2 |
| Garibaldi Fl. | 8 | 25 | 16 | 12 | 13 | 2 | 1 | 1 | 8 | 4 | 9 | 12 | 111 |
| Boat Basin | 3 | 1 | 4 | | | | 1 | | | | | | 9 |
| Miami Cove | 3 | 2 | 4 | 8 | 3 | 2 | | | | 4 | 5 | | 31 |
| Crab Harbor | 1 | 4 | 12 | 8 | 2 | 1 | | | 2 | 3 | 4 | 2 | 39 |
| Range Finders | | 1 | | | | 1 | | | | | | 1 | 3 |
| Hobsonville Pt. | 1 | 13 | | 1 | | 1 | 4 | | | 2 | | 2 | 24 |
| Ghost Hole | 1 | | | | | | | | | | 1 | | 2 |
| Forest Pt. | | 1 | | | 3 | 1 | | | | | 2 | | 7 |
| Deep Hole | | 1 | 2 | | 1 | | | | | | 3 | 2 | 9 |
| Mid-West Ch. | | | | | | | | | | 3 | 1 | 5 | 9 |
| Larson Cove Fl. | | | | | 1 | | | | | | | | 1 |
| Mid-Bay Fl. | 1 | | 1 | | | | | | 6 | 2 | | 1 | 11 |
| Bay Ocean | 2 | 13 | | 1 | 2 | 4 | | 1 | 1 | 1 | | 1 | 26 |
| Sibley Sands | 1 | 1 | | | 3 | 3 | | 1 | | 1 | | 2 | 12 |
| Pitcher Pt. Ch. | | | 1 | 1 | | | | 1 | 1 | | 1 | 2 | 7 |
| Dolphin #2 | 5 | 6 | 15 | 1 | | 3 | | | 10 | 2 | 1 | 3 | 46 |
| Goose Pt. | 2 | 4 | 28 | 20 | 2 | 4 | 1 | 2 | 5 | | 1 | | 69 |
| Kilchis River | 21 | 5 | 15 | 6 | | 4 | | | | 1 | | 1 | 53 |
| Pitcher Pt. Fl. | 1 | | 6 | 2 | 1 | 2 | | | | | | | 12 |
| Rocky Pt. Fl. | 6 | 5 | 8 | | 1 | 4 | | 1 | 4 | | 3 | 1 | 33 |
| Delta Flat | 1 | 12 | 26 | 8 | 8 | 14 | 1 | | | | | 3 | 73 |
| Dick Point | 1 | 8 | 7 | 9 | 3 | 3 | 1 | 4 | 5 | | 1 | 5 | 47 |
| Wilson River | 1 | 8 | 15 | 7 | 1 | 78 | 30 | 1 | | | 7 | | 148 |
| Trask River | 8 | 5 | 19 | 15 | 3 | 63 | | 1 | 6 | 1 | 19 | 1 | 141 |
| Tillamook River | 1 | 1 | 8 | 8 | 10 | 5 | 8 | 10 | 14 | | | 4 | 69 |
| Total | 79 | 119 | 190 | 107 | 57 | 196 | 47 | 23 | 62 | 24 | 62 | 50 | 1,016 |

Table 42. Other fishes caught during Tillamook Bay Survey, May 1974-April 1975.

| Species | Station | Month | Number Caught |
|-----------------------|------------------|-----------|---------------|
| Pacific lamprey | Kincheloe Point | January | 1 |
| Longnose skate | Boat Basin | October | 1 |
| Green sturgeon | Mid-West Channel | April | 1 |
| Longfin smelt | Deep Hole | March | 5 |
| | Ghost Hole | March | 1 |
| Silver surfperch | Kincheloe Point | October | 2 |
| High cockscomb | Kincheloe Point | May | 1 |
| Red gunnel | Sibley Sands | May | 1 |
| | Dolphin #2 | May | 1 |
| Wolf-eel | Buoy 8 | May | 2 |
| | North Jetty | April | 1 |
| | North Jetty | August | 1 |
| Arrow goby | Goose Point | March | 1 |
| Sablefish | Ghost Hole | August | 1 |
| Pricklebreast poacher | Boat Basin | February | 1 |
| Warty poacher | Buoy 8 | June | 1 |
| Slipskin snailfish | Ghost Hole | September | 1 |
| Butter sole | Deep Hole | October | 1 |

Table 43. Dungeness Crab caught in Tillamook Bay, May 1974 - April 1975.

| Station | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | Total |
|-----------------|------------|--------------|------------|------------|------------|------------|------------|-----------|------------|-----------|------------|-----------|--------------|
| Buoy 8 | 31 | 55 | 3 | 2 | 4 | 23 | 5 | 2 | 1 | 3 | 26 | 5 | 160 |
| Kincheloe Pt. | 1 | 8 | 3 | | 1 | 1 | | | | | | | 14 |
| Buoy 11 | 74 | 34 | 22 | 4 | 3 | 17 | 6 | 3 | | 2 | 8 | 3 | 176 |
| Garibaldi Flat | 14 | 1 | 9 | 51 | | | 4 | | | | | | 79 |
| Boat Basin | 323 | 710 | 177 | 284 | 60 | 41 | 16 | 5 | 115 | 25 | 89 | | 1,845 |
| Miami Cove | 2 | 41 | 3 | 1 | 1 | 1 | 3 | | | | | 1 | 53 |
| Crab Harbor | 18 | 9 | 89 | 3 | 17 | | 2 | 1 | 9 | 12 | 5 | 4 | 169 |
| Range Finders | | | 18 | 1 | 1 | | | | | | 3 | | 23 |
| Hobsonville Pt. | 2 | 10 | 22 | 15 | 2 | 8 | 6 | | | | 7 | | 72 |
| Ghost Hole | 52 | 281 | 191 | 131 | 67 | 153 | 30 | 12 | | 5 | 39 | 10 | 971 |
| Forest Point | | | | 2 | 3 | 1 | 2 | | | 2 | 2 | | 12 |
| Deep Hole | 4 | 9 | 4 | 25 | 6 | 32 | | 3 | 12 | 19 | 14 | 2 | 130 |
| Mid-West Ch. | 11 | 5 | 27 | 1 | 10 | 1 | | 1 | 8 | 3 | 4 | 1 | 72 |
| Larson Cove | 5 | 82 | 35 | 27 | 8 | 23 | 12 | 6 | 7 | | | | 205 |
| Mid-Bay Flat | 13 | 12 | 14 | 19 | 1 | 19 | | | 3 | | | | 81 |
| Bay Ocean | | 15 | 3 | 3 | 1 | 1 | 1 | 2 | | 1 | 1 | 1 | 29 |
| Sibley Sands | 8 | 38 | 105 | 17 | 15 | 15 | 4 | | 1 | | | 1 | 204 |
| Pitcher Pt. Ch. | 85 | 37 | 74 | 11 | 31 | 9 | | 2 | | | | | 249 |
| Dolphin #2 | | 5 | 6 | 20 | 52 | 21 | 2 | | 1 | | | | 107 |
| Goose Point | | 7 | 8 | 12 | 12 | 2 | 2 | 1 | | | | | 44 |
| Kilchis River | | | | | 9 | 36 | 2 | | | | | | 47 |
| Pitcher Pt. Fl. | 40 | 106 | 18 | 2 | 16 | 19 | | 1 | | | | | 202 |
| Rocky Pt. Flat | | 2 | | 3 | | 2 | | | | | | | 7 |
| Delta Flat | | | | 7 | 10 | 3 | | | | | | | 20 |
| Dick Point | | | | 10 | 8 | 23 | 1 | | | | | | 42 |
| Wilson River | | | | | | | | | | | | | |
| Trask River | | | | | | 4 | | | | | | | 4 |
| Tillamook River | | | | 1 | 1 | 7 | 5 | | | | | | 14 |
| Total | 683 | 1,467 | 831 | 652 | 339 | 462 | 103 | 39 | 157 | 72 | 198 | 28 | 5,031 |

Table 44. Average Monthly (High Tide) Temperatures from Channel Stations in Tillamook Bay, Oregon, May 1974 - April 1975.

| Month | Buoy 8 | Buoy 11 | Ghost Hole | Sibley Sands | Dolphin #2 | Dick Point |
|-----------|--------|---------|------------|--------------|------------|------------|
| May | *50.5 | *53.0 | *54.5 | *51.7 | *56.5 | *60.0 |
| June | 51.0 | 54.5 | 54.0 | *55.7 | *58.0 | *56.7 |
| July | 56.5 | 56.0 | 56.0 | 59.0 | 59.0 | 63.5 |
| August | 58.0 | 55.0 | 53.0 | 55.0 | 58.0 | 62.0 |
| September | 53.0 | 53.0 | 54.0 | 54.5 | 56.5 | 62.5 |
| October | 50.5 | 50.0 | 50.4 | 51.4 | 52.4 | 53.0 |
| November | 52.0 | 51.5 | 53.0 | 54.0 | 54.0 | - |
| December | 50.5 | 50.0 | 52.0 | 51.0 | 51.0 | 47.0 |
| January | 49.0 | 49.4 | 49.3 | 49.0 | 48.0 | 46.7 |
| February | - | - | 48.0 | 50.0 | 48.0 | 46.0 |
| March | 48.5 | 48.0 | 48.0 | 48.0 | 47.0 | 47.0 |
| April | - | - | - | - | - | - |

* = Surface temperatures

Table 45. Average Monthly (High Tide) Salinities from Selected Channel Stations in Tillamook Bay, Oregon, May 1974 - April 1975.

| Month | Buoy 8 | Buoy 11 | Ghost Hole | Sibley Sands | Dolphin #2 | Dick Point |
|-----------|--------|---------|------------|--------------|------------|------------|
| May | *28.6 | *27.2 | *27.2 | *30.0 | *23.1 | *8.1 |
| June | 32.0 | 28.2 | 27.5 | *22.0 | *12.8 | *8.4 |
| July | 30.6 | 30.2 | 30.3 | 26.4 | 21.8 | 6.9 |
| August | 32.4 | 31.5 | 32.6 | 32.4 | 30.3 | 21.4 |
| September | 32.3 | 32.1 | 32.6 | 32.5 | 31.6 | 27.5 |
| October | 32.5 | 32.5 | 33.3 | 31.9 | 31.1 | 27.5 |
| November | 31.8 | 31.8 | 31.4 | 31.4 | 30.7 | 21.2 |
| December | 29.9 | 29.8 | 31.5 | 27.6 | 23.1 | 0.6 |
| January | 29.9 | 30.1 | 27.8 | 18.0 | 12.5 | 5.0 |
| February | - | - | 29.5 | 30.8 | 26.5 | 0.8 |
| March | 30.9 | 31.3 | 30.7 | 27.5 | 11.2 | 6.9 |
| April | - | - | - | - | - | - |

* = Surface Salinities

Table 46. Average Monthly High Tide Temperature and Salinity from the Deep Hole Station in Tillamook Bay, Oregon, May 1974 - April 1975.

| Temperature | | | | | | | | | | | | |
|-------------|------|------|------|------|-------|------|------|------|------|------|------|-------|
| | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | April |
| Surface | 58 | 55 | - | - | - | 53 | 53 | 49 | 44.4 | 47.5 | 47.5 | 50.5 |
| Bottom | - | 48 | 56.5 | 53.7 | 55 | 51 | 53 | 50.5 | 47.4 | 48 | 48 | 49 |
| Salinity | | | | | | | | | | | | |
| | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | April |
| Surface | 20.5 | 24.3 | - | - | - | 31.1 | 28.5 | 18.7 | 20.2 | 21.3 | 19.2 | 21.9 |
| Bottom | - | 33.5 | 29.5 | 32.2 | 32.1 | 34.0 | 31.2 | 29.4 | 28.6 | 28.1 | 29.1 | 29.0 |

Table 47. Foods of selected fish in Tillamook Bay. Preferred food are circled.

| Basic Group: | Epibenthic Organisms | | | | | | | | Large Planktonic Organisms | | Small Planktonic Organisms | | | | | | | | |
|------------------|----------------------|---------|----------|-----------|--------------|-----------|----------|-----------|----------------------------|----------------|----------------------------|-------------------|-----------|----------|-----------------|------------------|-------------------|------------------|-----------------------|
| | Amphipods | Isopods | Copepods | Cumaceans | Mysid larvae | Barnacles | Decapods | Pelcypods | Fish & fish larvae | Decapod larvae | Barnacle Cypris | Barnacle Nauplius | Clodocera | Copepods | Pelcypod larvae | Gastropod larvae | Polychaete larvae | Insects & larvae | Ulva-like green algae |
| Species | | | | | | | | | | | | | | | | | | | |
| Chinook Salmon | (X) | X | X | X | X | | | X | X | | X | X | X | | | X | (X) | X | |
| Coho Salmon | (X) | (X) | | | | | | X | X | | | | | X | | | | | |
| Cutthroat Trout | X | | | | | | (X) | X | | | | | | | | | | | |
| Starry Flounder | (X) | | | | | | (X) | | | | | | | | | | | | |
| Staghorn Sculpin | | | | | | | (X) | X | | | | | | | | | | | |
| Pile Perch | X | | | | | X | X | (X) | | | | | | | | | | | |
| Striped Seaperch | | | | | | (X) | X | (X) | | | | | | | | | | | |
| Kelp Greenling | X | X | | | | | | (X) | | | | | | | | | | | |
| Black Rockfish | | | | | | | | X | | | | | | | | | | | |
| Rockfish (juv.) | X | X | (X) | X | | | | | | | | | | | | | | | |
| Chum Salmon | | | | | | | | X | X | | | | | | | | (X) | | |
| Pacific Herring | X | X | X | | X | | | X | X | (X) | X | X | (X) | X | | | | | |
| Surf Smelt | X | | (X) | X | X | | | | X | (X) | X | X | X | X | X | X | X | | |
| English Sole | X | X | (X) | (X) | X | | | | | X | | | X | X | X | X | | | |
| Northern Anchovy | X | X | | X | X | | | | X | X | | | (X) | X | | | | | |
| Shiner Perch | (X) | | (X) | X | | | | | | X | | | | | X | | X | | |
| Total | 12 | 7 | 6 | 6 | 5 | 2 | 6 | 2 | 8 | 6 | 5 | 3 | 3 | 5 | 5 | 3 | 3 | 4 | 1 |
| Preferred Total | 4 | 1 | 4 | 1 | 0 | 1 | 3 | 2 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 |

Appendix A. Species Recorded for Tillamook Bay.

| Family and Common Name | Scientific Name |
|--|--|
| Petromyzonidae Pacific lamprey | <i>Lampetra tridentata</i> |
| Rajidae **longnose skate | <i>Raja rhina</i> |
| Acipenseridae **green sturgeon | <i>Acipenser medirostris</i> |
| Clupeidae Pacific herring American shad | <i>Clupea harengus</i> <i>Alosa sapidissima</i> |
| Engraulididae northern anchovy | <i>Engraulis mordax</i> |
| Salmonidae *pink salmon chum salmon coho salmon chinook salmon *sockeye salmon cutthroat trout rainbow/steelhead | <i>Oncorhynchus gorbuscha</i> <i>Oncorhynchus keta</i> <i>Oncorhynchus kisutch</i> <i>Oncorhynchus tshawytscha</i> <i>Oncorhynchus nerka</i> <i>Salmo clarkii</i> <i>Salmo gairdneri</i> |
| Osmeridae surf smelt **longfin smelt | <i>Hypomesus pretiosus</i> <i>Spirinchus thaleichthys</i> |
| Atherinidae *jacksmelt topsmelt | <i>Atherinopsis californiensis</i> <i>Atherinops affinis</i> |
| Gadidae Pacific tomcod | <i>Microgadus proximus</i> |
| Gasterosteidae tubesnout threespine stickleback | <i>Aulorhynchus flavidus</i> <i>Gasterosteus aculeatus</i> |
| Syngnathidae bay pipefish | <i>Syngnathus griseolineatus</i> |
| Embiotocidae shiner perch pile perch redtail surfperch walleye surfperch silver surfperch striped seaperch white seaperch | <i>Cymatogaster aggregata</i> <i>Damalichthys vacca</i> <i>Amphistichus rhodotermis</i> <i>Hyperprosopon argenteum</i> <i>Hyperprosopon ellogticum</i> <i>Embiotoca lateralis</i> <i>Phanerodon furcatus</i> |
| Stichaeidae **high cockscomb snake prickleback | <i>Anoplarchus purpurescens</i> <i>Lumpenus sagitta</i> |
| Pholididae penpoint gunnel saddleback gunnel **red gunnel *rockweed gunnel | <i>Apodichthys flavidus</i> <i>Pholis ornata</i> <i>Pholis schultzi</i> <i>Xerepes fucorum</i> |
| Anarrhichadidae wolf-eel | <i>Anarrhichthys ocellatus</i> |

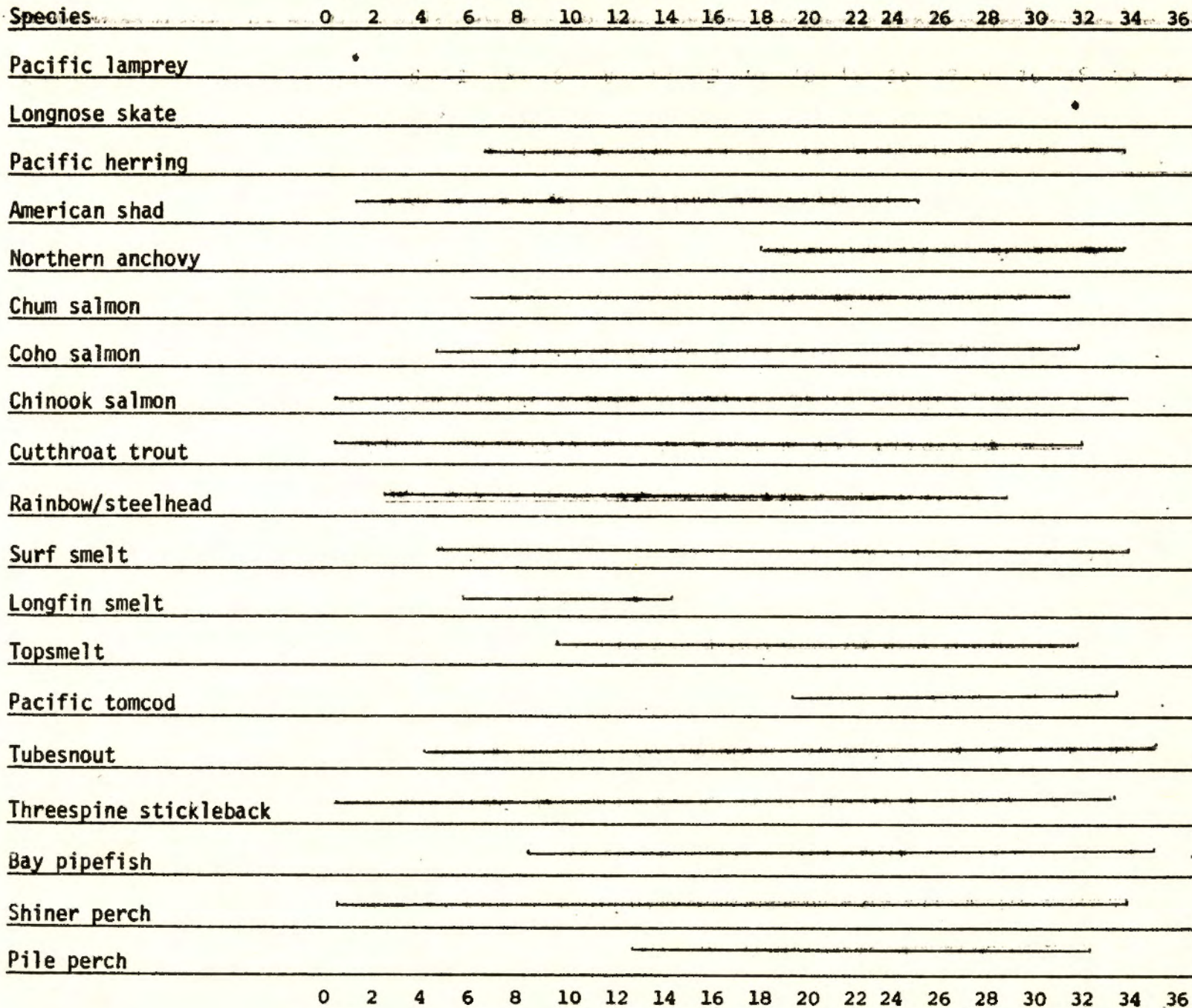
Appendix A. Continued.

| Family and Common Name | Scientific Name |
|-------------------------|------------------------------------|
| Ammodytidae | |
| Pacific sandlance | <i>Ammodytes hexapterus</i> |
| Gobiidae | |
| **arrow gobie | <i>Clevelandia ios</i> |
| Liparididae | |
| **ringtail snailfish | <i>Liparis rutteri</i> |
| **slipskin snailfish | <i>Liparis fucensis</i> |
| Scorpaenidae | |
| black rockfish | <i>Sebastes melanops</i> |
| blue rockfish | <i>Sebastes mystinus</i> |
| *copper rockfish | <i>Sebastes caurinus</i> |
| Anoplopomatidae | |
| **sablefish | <i>Anoplopoma fimbria</i> |
| Hexagrammidae | |
| Lingcod | <i>Ophiodon elongatus</i> |
| kelp greenling | <i>Hexagrammos decagrammos</i> |
| rock greenling | <i>Hexagrammos superciliosus</i> |
| Cottidae | |
| staghorn sculpin | <i>Leptocottus armatus</i> |
| buffalo sculpin | <i>Enophrys bison</i> |
| padded sculpin | <i>Artedius fenestralis</i> |
| prickly sculpin | <i>Cottus asper</i> |
| **tidepool sculpin | <i>Oligocottus maculosus</i> |
| *silver spotted sculpin | <i>Blepsias cirrhosus</i> |
| **sharpnose sculpin | <i>Clinocottus acuticeps</i> |
| cabezon | <i>Scorpaenichthys marmoratus</i> |
| *brown Irish lord | <i>Hemilepidotus spinosus</i> |
| red Irish lord | <i>Hemilepidotus hemilepidotus</i> |
| Agonidae | |
| **pricklebreast poacher | <i>Stellerina xyosterna</i> |
| **warty poacher | <i>Ocella verrucosa</i> |
| Bothidae | |
| **Pacific sanddab | <i>Citharichthys sordidus</i> |
| Pleuronectidae | |
| English sole | <i>Parophrys vetulus</i> |
| sand sole | <i>Psettichthys melanostictus</i> |
| **butter sole | <i>Isopsetta isolepis</i> |
| starry flounder | <i>Platichthys stellatus</i> |

* Not caught on this survey.

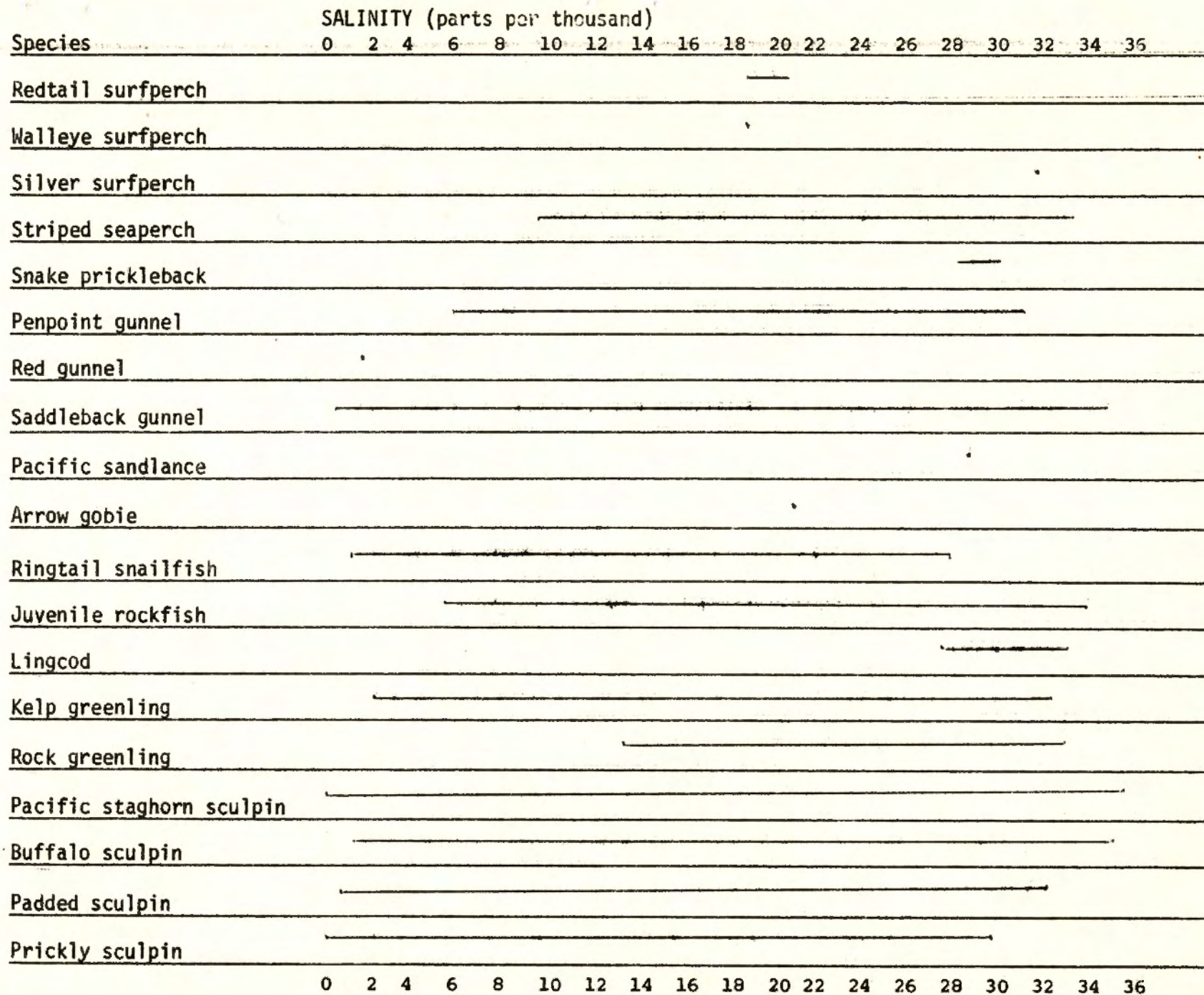
** Newly recorded for Tillamook Bay.

SALINITY (parts per thousand)



-73-

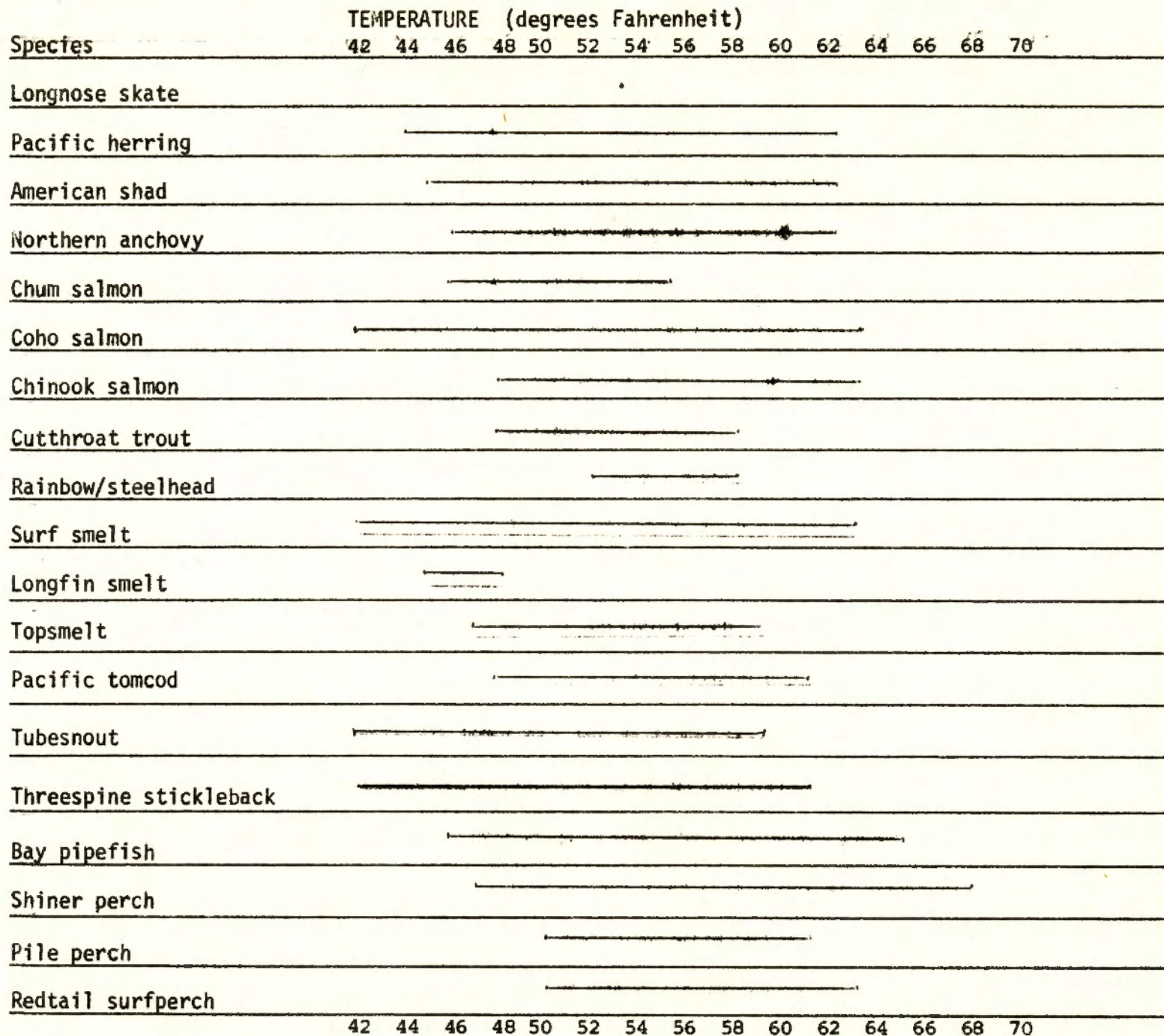
Appendix B. Salinity ranges of fish caught in Tillamook Bay.



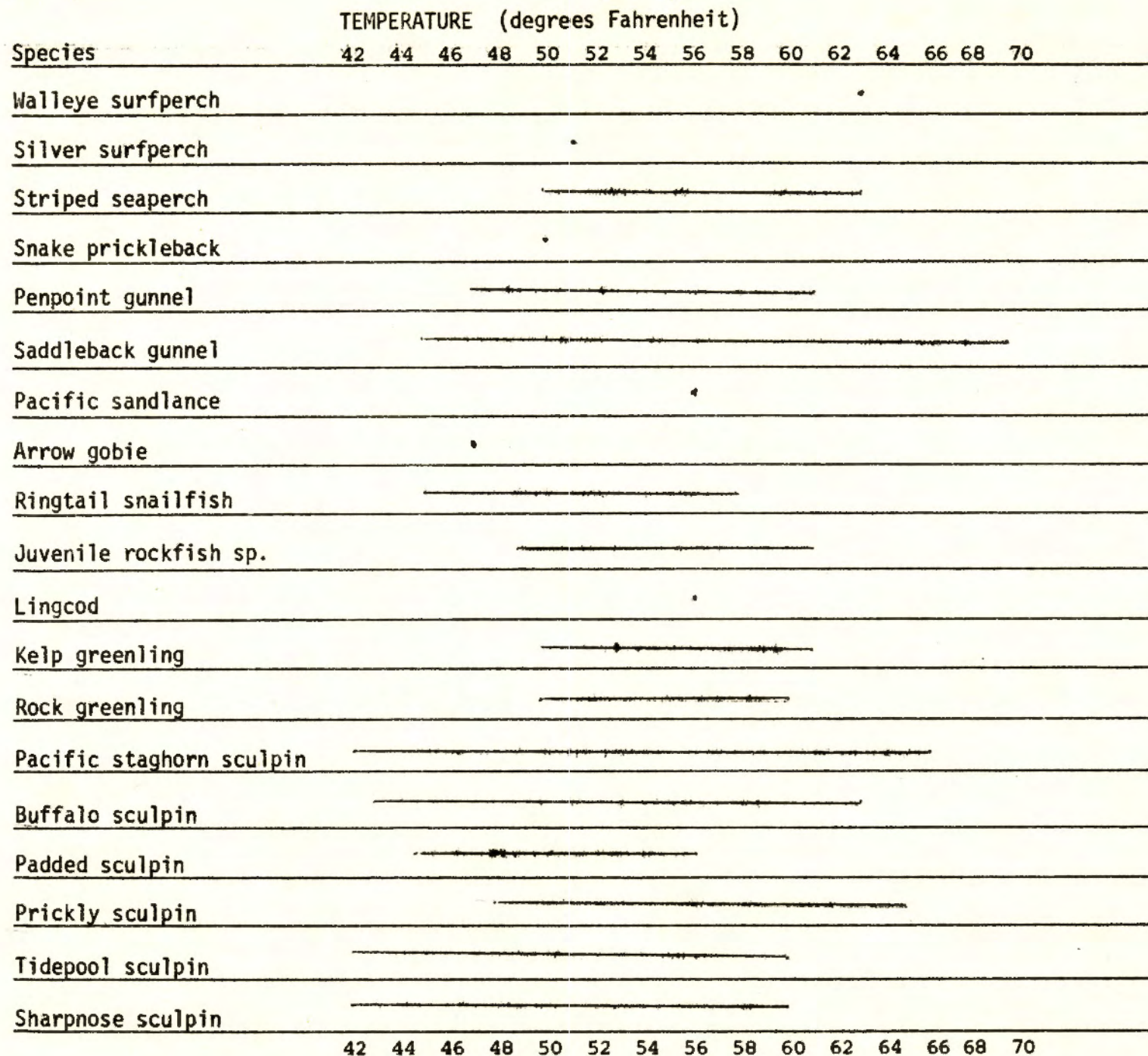
-74-

| Species | SALINITY (parts per thousand) | | | | | | | | | | | | | | | | | | |
|-----------------------|-------------------------------|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 |
| Tidepool sculpin | _____ | | | | | | | | | | | | | | | | | | |
| Sharpnose sculpin | _____ | | | | | | | | | | | | | | | | | | |
| Cabezon | _____ | | | | | | | | | | | | | | | | | | |
| Red Irish lord | _____ | | | | | | | | | | | | | | | | | | |
| Pricklebreast poacher | _____ | | | | | | | | | | | | | | | | | | |
| Warty poacher | _____ | | | | | | | | | | | | | | | | | | |
| Pacific sanddab | _____ | | | | | | | | | | | | | | | | | | |
| English sole | _____ | | | | | | | | | | | | | | | | | | |
| Sand sole | _____ | | | | | | | | | | | | | | | | | | |
| Butter sole | _____ | | | | | | | | | | | | | | | | | | |
| Starry flounder | _____ | | | | | | | | | | | | | | | | | | |
| | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 |

Appendix B. Salinity ranges, continued.



Appendix C. Temperature ranges of fish caught in Tillamook Bay.



Appendix C. Temperature ranges, continued.

TEMPERATURE (degrees Fahrenheit)

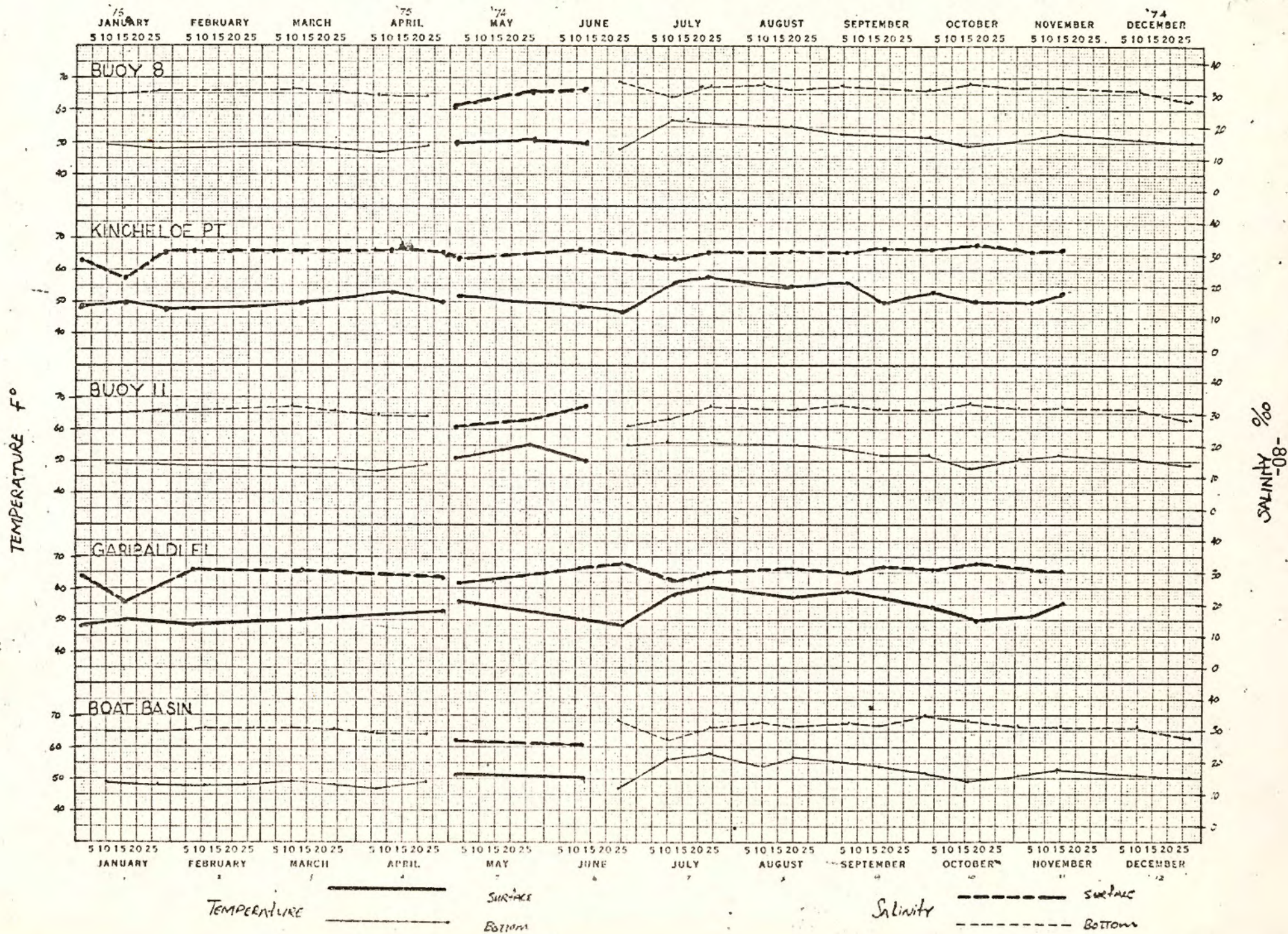
| Species | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 |
|-----------------------|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Cabezon | ————— | | | | | | | | | | | | | | |
| Red Irish lord | ————— | | | | | | | | | | | | | | |
| Pricklebreast poacher | • | | | | | | | | | | | | | | |
| Warty poacher | • | | | | | | | | | | | | | | |
| Pacific sanddab | ————— | | | | | | | | | | | | | | |
| English sole | ————— | | | | | | | | | | | | | | |
| Sand sole | ————— | | | | | | | | | | | | | | |
| Butter sole | ————— | | | | | | | | | | | | | | |
| Starry flounder | ————— | | | | | | | | | | | | | | |
| | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 |

Appendix C. Temperature ranges, continued.

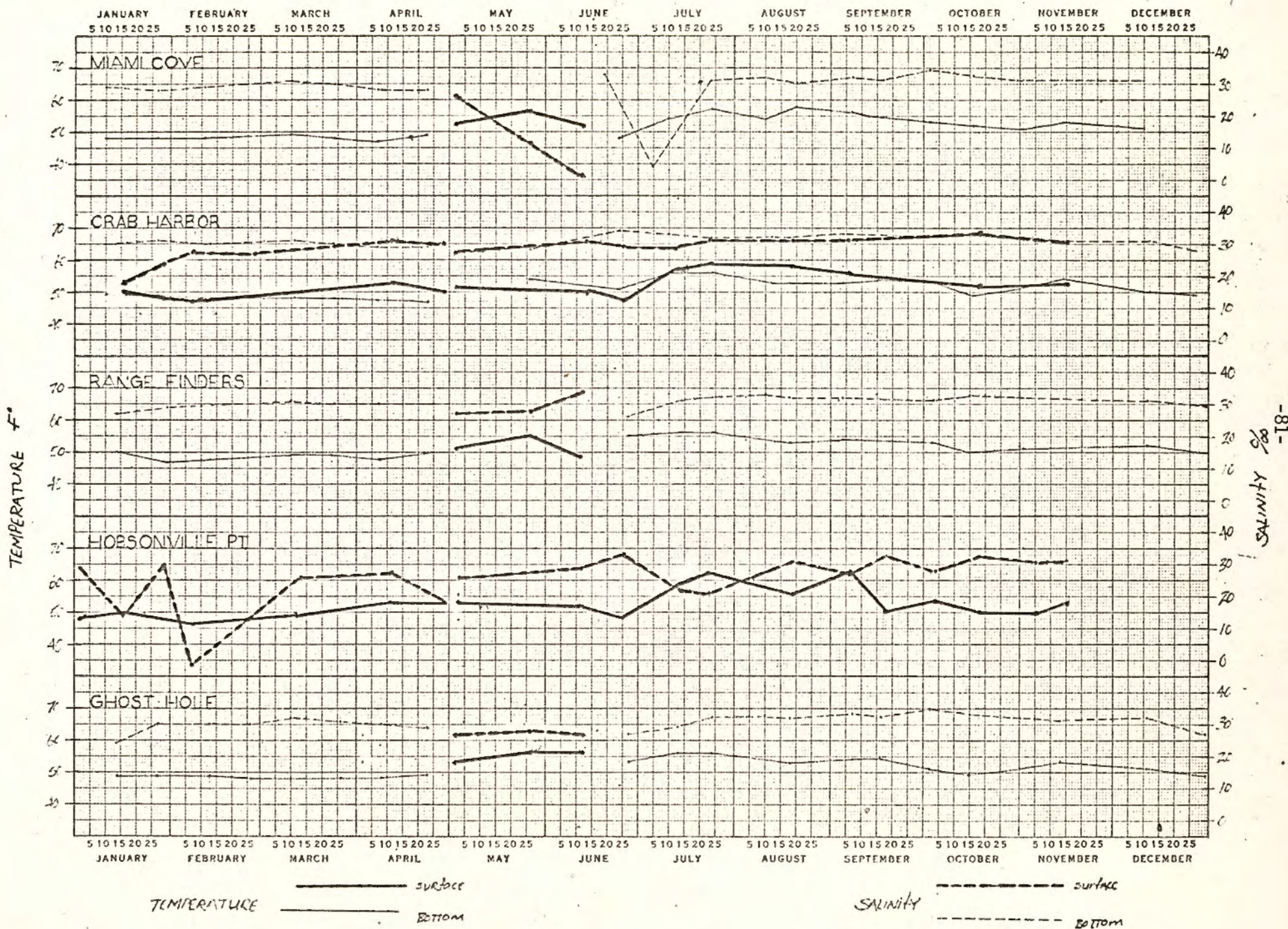
Appendix D. Clams, crabs, and other miscellaneous invertebrates in Tillamook Bay.

| Common Name | Scientific Name |
|------------------------------------|----------------------------------|
| Clams | |
| bentnose clam | <i>Macoma nasuta</i> |
| bodega tellen clam | <i>Tellina bodegensis</i> |
| butter clam | <i>Saxidomus giganteus</i> |
| cockle clam | <i>Clinocardium nuttallii</i> |
| gaper clam | <i>Tresus capax</i> |
| manila littleneck clam | <i>Venerupis semidecussata</i> |
| native littleneck clam | <i>Venerupis staminea</i> |
| razor clam | <i>Siliqua patula</i> |
| sand clam | <i>Macoma secta</i> |
| softshell clam | <i>Mya arenaria</i> |
| Crabs | |
| Dungeness crab | <i>Cancer magister</i> |
| red rock crab | <i>Cancer productus</i> |
| shore crab | <i>Hemigrapsus oregonensis</i> |
| pea crabs assoc. with gapers | <i>Hemigrapsus nudus</i> |
| Miscellaneous Invertebrates | |
| bay mussel | <i>Mytilus edulis</i> |
| ghost shrimp | <i>Callinassa californiensis</i> |
| kelp worm | <i>Nereis sp.</i> |
| mud shrimp | <i>Upogebia pugettensis</i> |
| sand shrimp | <i>Crangon sp.</i> |

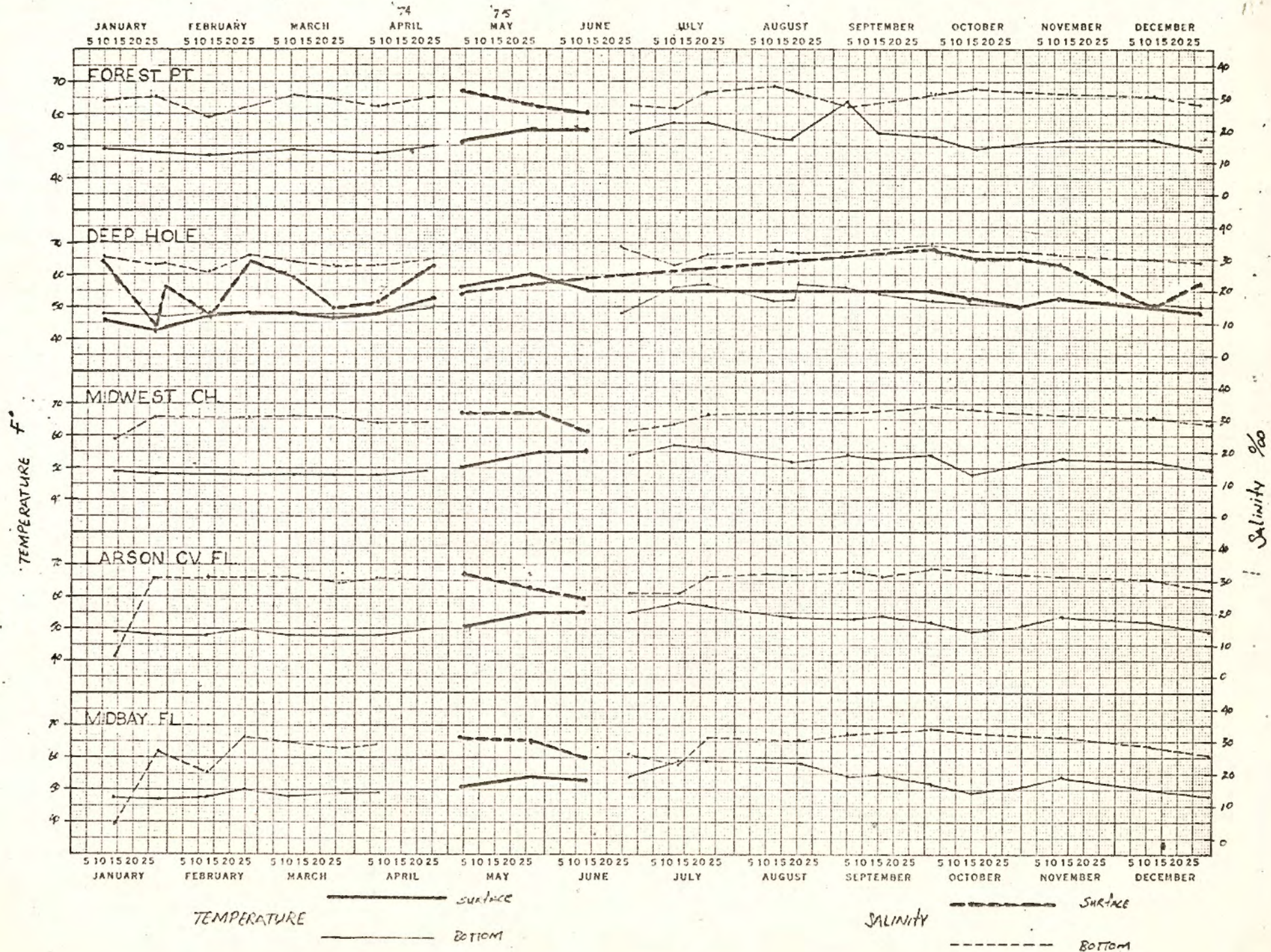
Appendix E. Thermosalinographs for survey stations in Tillamook Bay, May 1974 - April 1975.



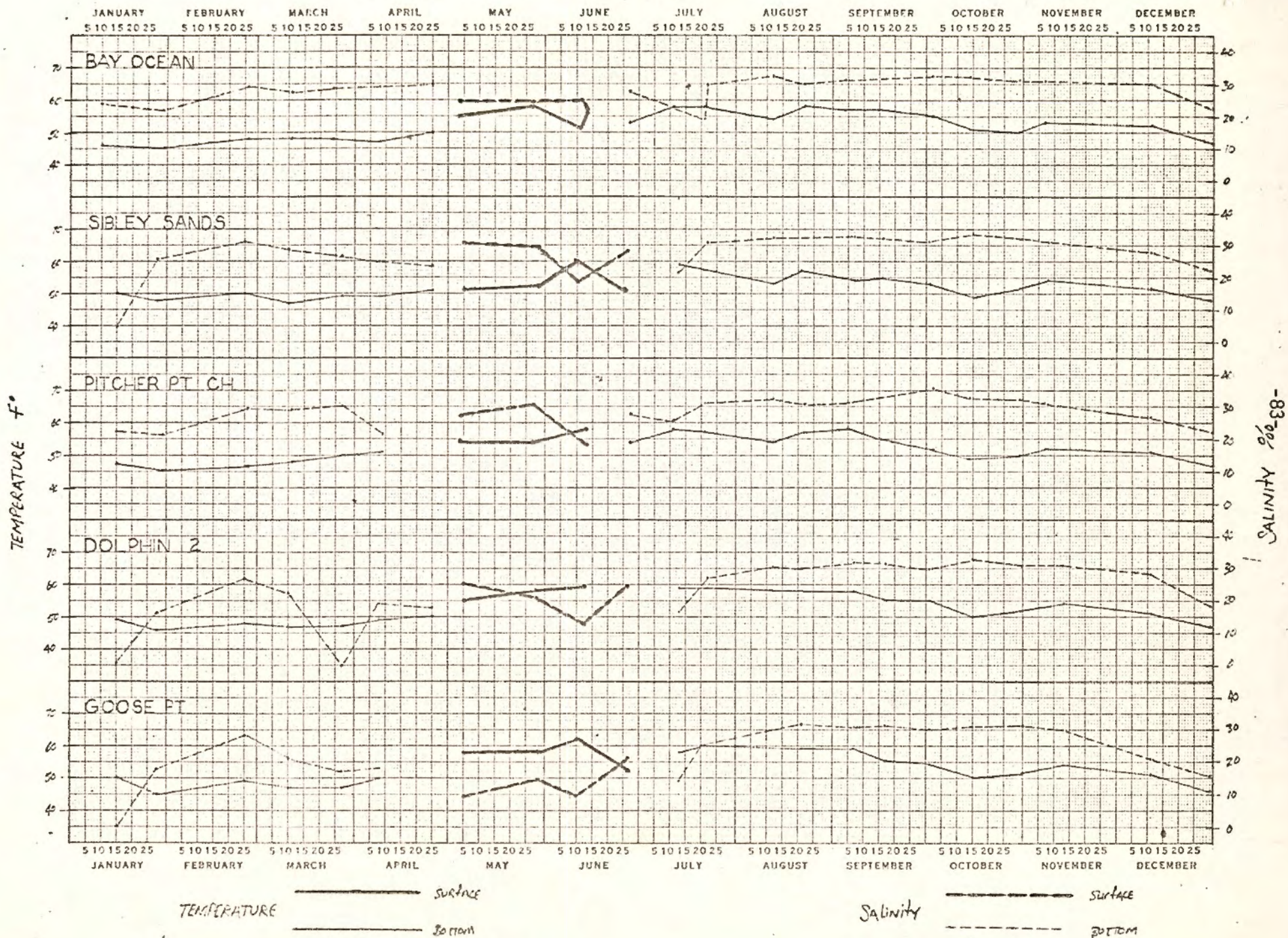
Appendix E. Thermosalinographs continued.



Appendix E. Thermosalinographs continued.



Appendix E. Thermosalinographs continued.



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Appendix E. Thermosalinographs continued.

