

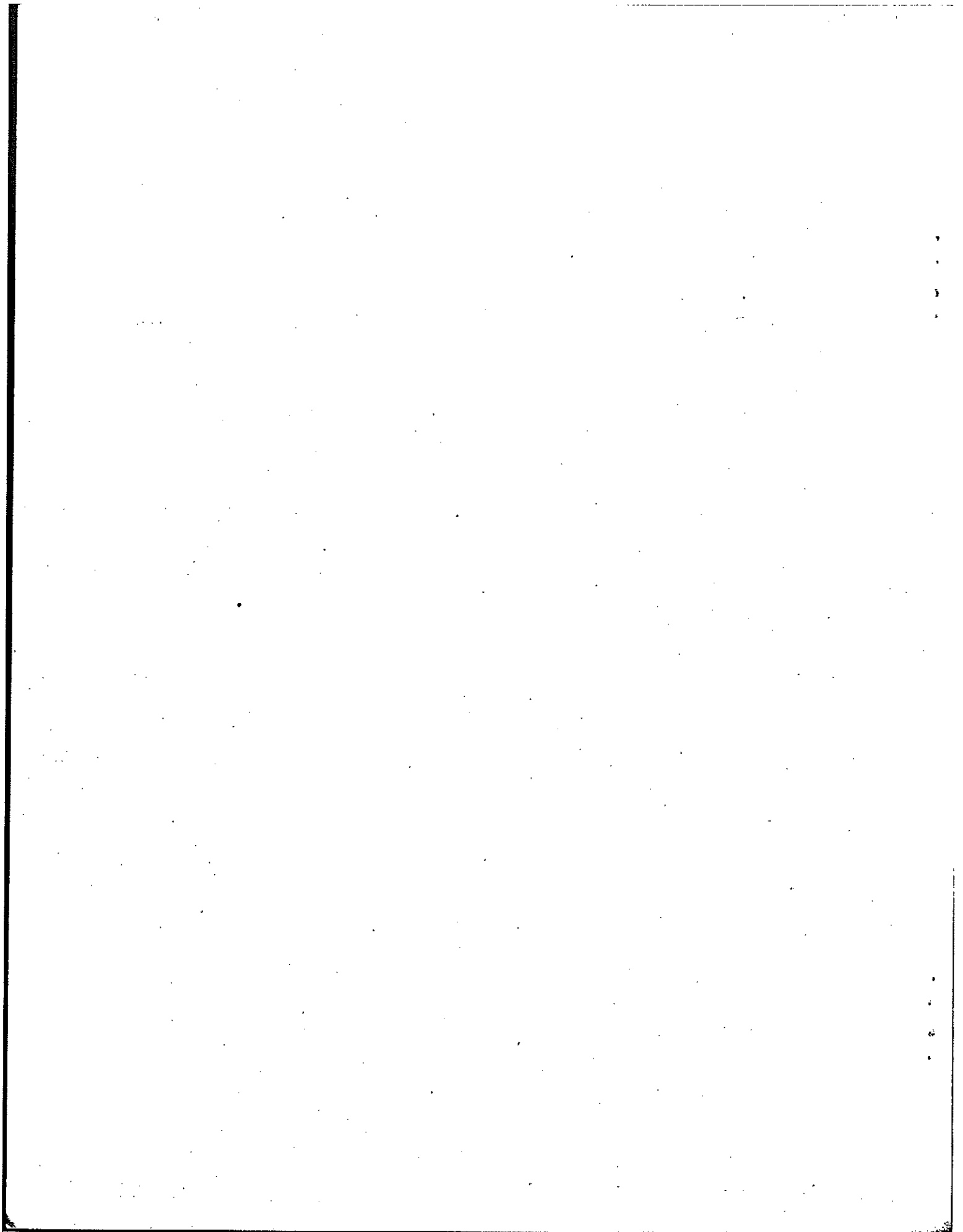
The Seasonal Occurrence and Distribution of Fish
in the Umpqua Estuary, April 1977 through January 1986

John A. Johnson
David P. Liscia
David M. Anderson

Southwest Region

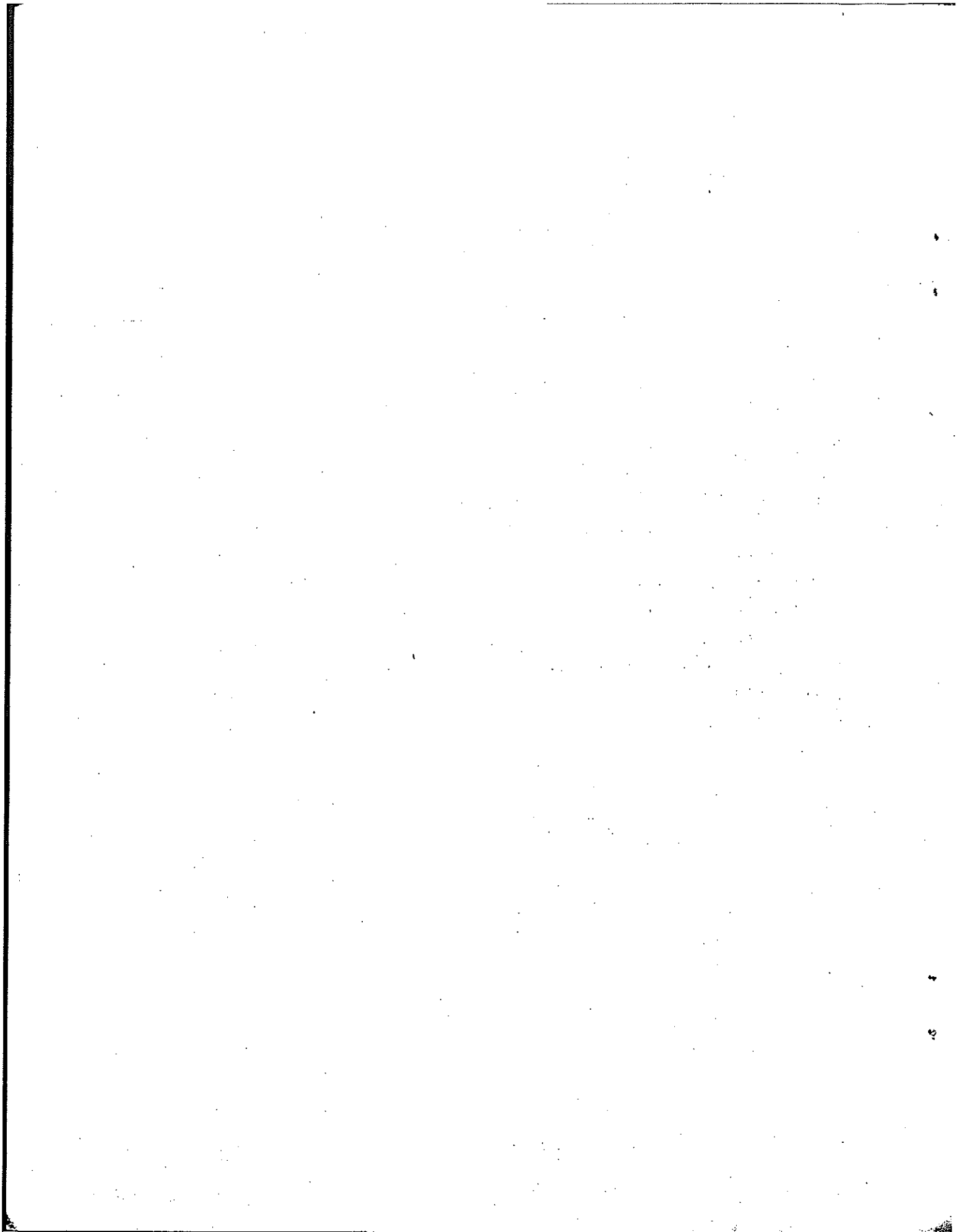
Oregon Department of Fish and Wildlife

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ABSTRACT

The Oregon Department of Fish and Wildlife conducted a fish inventory on the Umpqua estuary from April 1977 through January 1986 using beach seines, a trawl, and SCUBA equipment. The purpose of the study was to determine seasonal abundance and distribution of the species of fish inhabiting the estuary. We collected 35,373 individual fish representing 49 fish species, 10 of which had not been documented before.

INTRODUCTION

The occurrence and distribution of fishes in many Oregon estuaries have been extensively studied in recent years. Most studies have been directed toward a specific species as the immediate need for information was required. Some comprehensive estuary studies have been completed that provide information that can be used by managers and researchers to protect and preserve Oregon estuaries. Recent comprehensive estuary studies have included Coos Bay (Cummings and Schwartz 1971; Hostick 1975), Sixes River (Reimers and Baxter 1976), and Tillamook Bay (Cummings and Berry 1974; Forsberg et al. 1975, 1977). Inventory studies have also been conducted in Coos and Siuslaw bays.

The Umpqua estuary is the fourth largest estuary in Oregon. Only one limited inventory study, during the summer of 1972, has been conducted (Mullen 1977). The Oregon Department of Fish and Wildlife, using both U.S. Fish and Wildlife Service and State of Oregon equipment, conducted a fish inventory from April 1977 through January 1986 on the Umpqua estuary using beach seines, a trawl, and SCUBA equipment. The purpose of the study was to determine relative abundance and distribution of the species of fish that inhabit the estuary. We hope that the information and data gathered will help to better manage the estuarine resources and make more accurate management decisions.

STUDY AREA

Regular samples were taken from the Umpqua estuary from the mouth to Echo Resort (6 miles east of Reedsport). The Smith River estuary was also sampled

from the mouth to river mile 5; however, most samples were taken below the U.S. Highway 101 bridge in the Umpqua estuary (Figure 1).

METHODS AND MATERIALS

Equipment

A 20-foot fiberglass dory was used exclusively to complete all trawl sample stations and was also used for most lower bay seine sites. A 17-foot aluminum sled was used to sample the seine sites in the shallow upper bay and river areas.

A small trawl with an estimated 10 foot horizontal and 4 foot vertical opening was used to capture the fish. A "tickler" chain was attached and pulled ahead of the weighted footrope to flush fish off the bottom and into the mouth of the trawl. The body of the trawl had a 1.5 inch (stretch) mesh and a much finer liner was used in the cod-end.

The trawl was set from the side of the dory in a clock-wise direction and was towed at various distances and speeds behind the boat. Twelve sites were selected in deep water or channel areas where beach seines could not capture fish.

The large beach seine measured 150 feet long by 10 feet deep with a catch bag near the center. The mesh was 1/4-inch throughout. This seine was used to sample the 10 down-bay stations in areas where the dory could be taken close to shore.

A smaller beach seine (75 feet long with 1/4-inch mesh) was used in the 10 up-bay sites.

Sampling

Thirty-one sample sites were selected: 11 trawl stations, 10 large-seine sites, and 10 small-seine sites (Figure 1). An attempt was made to sample each site once a month; however, high water and floods occasionally prevented complete sampling.

Salinity, water temperature, and dissolved oxygen were scheduled to be collected simultaneously at each sample site with a hydrolab surveyor, but the

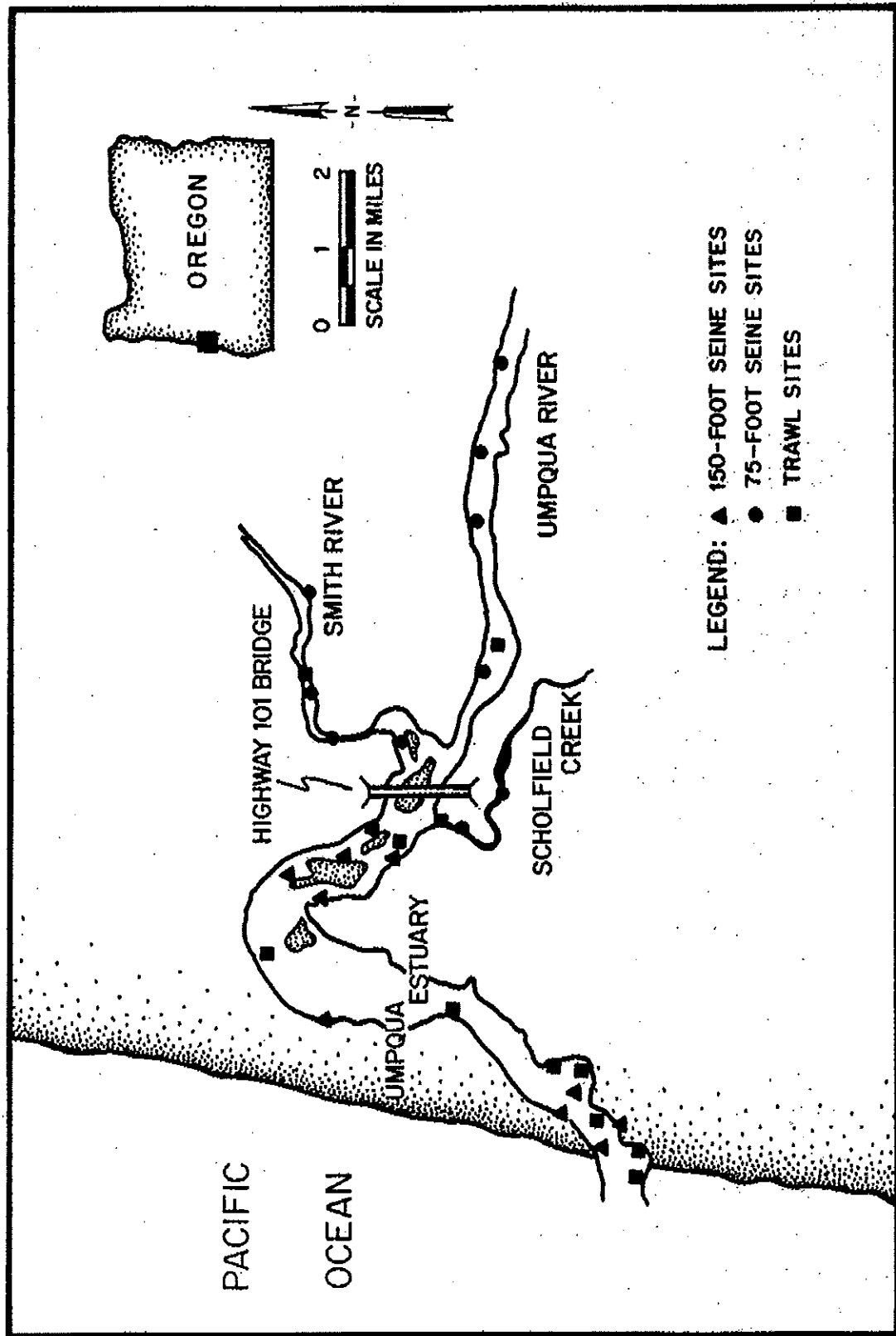


Figure 1. The Umpqua River estuary showing seine and trawl sites.

device was found to be defective part way through the study and the data could not be used.

SCUBA equipment was used to observe and identify fish species in areas where other gear could not be used. Two previously unknown gaper clam beds were found in this manner.

RESULTS AND DISCUSSION

Species Collected

This estuary study collected 48 fish species and 35,373 individual fish (Table 1). The total effectiveness of the gear was questionable and this list should not be considered complete.

Forty-nine species of fish were previously known to inhabit the Umpqua estuary (Oregon Department of Fish and Wildlife, unpublished data). Ten species previously undocumented in the Umpqua estuary were identified during this study making a total of 58 species of fish that have been captured in the estuary. Warmouth and yellow perch, which were captured after a large winter flood, are not thought to inhabit the bay under normal conditions.

Fish that are known to inhabit the estuary but were not captured during this study include green sturgeon *Acipenser medirostris*, white sturgeon *A. transmontanus*, striped bass *Morone saxatilis*, largemouth bass *Micropterus salmoides*, brown bullhead *Ictalurus nebulosus*, black crappie *Pomoxis nigromaculatus*, whitespotted greenling *Hexagrammos stelleri*, silverspotted sculpin *Blepias cirrhosus*, night smelt *Spirinchus starksi*, and Pacific sand lance *Ammodytes hexapterus*.

Spatial Distribution

The Umpqua estuary, like the Rogue, has limited salinity intrusion as compared with the Columbia estuary (Mullen 1973). Seventy-seven percent of all species were captured below U.S. Highway 101 bridge (river mile 12), and the majority of the sampling effort was spent down-bay from this point. Fresh water species captured above river mile 10 were threespine stickleback, Umpqua squawfish, redbottom shiner, and largescale sucker. Marine species known

Table 1. Species and relative abundance of fish caught in the Umpqua estuary, 1977-86. Species listed in boldface had not previously been documented in the Umpqua estuary.

Common name	Scientific name	Percent of total
Shiner perch	<i>Cymatogaster aggregata</i>	39.8
Surf smelt	<i>Hypomesus pretiosus</i>	21.4
Threespine stickleback	<i>Gasterosteus aculeatus</i>	14.7
Pacific herring	<i>Clupea harengus pallasii</i>	10.0
Pacific staghorn sculpin	<i>Lepto cottus armatus</i>	2.8
Starry flounder	<i>Platichthys stellatus</i>	2.3
English sole	<i>Parophrys vetulus</i>	1.8
Umpqua squawfish	<i>Ptychocheilus umpquae</i>	1.5
Speckled sanddab	<i>Citharichthys stigmaeus</i>	0.8
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	0.7
Coho salmon	<i>Oncorhynchus kisutch</i>	0.7
Striped seaperch	<i>Embiotoca lateralis</i>	0.6
Redside shiner	<i>Richardsonius balteatus</i>	0.3
Pile perch	<i>Rhacochilus vaoca</i>	0.3
Rockfish	<i>Sebastes</i> spp.	0.3
American shad	<i>Alosa sapidissima</i>	0.3
Silver surfperch	<i>Hyperprosopon ellipticum</i>	0.2
Topsmelt	<i>Atherinops affinis</i>	0.2
Prickly sculpin	<i>Cottus asper</i>	0.2
Bay pipefish	<i>Syngnathus leptorhynchus</i>	0.2
Sand sole	<i>Psettichthys melanostictus</i>	0.2
Walleye surfperch	<i>Hyperprosopon argenteum</i>	0.1
Cabezon	<i>Scorpaenichthys marmoratus</i>	0.1
Longfin smelt	<i>Spirinchus thaleichthys</i>	0.1
Buffalo sculpin	<i>Enophrys bison</i>	0.1
Saddleback gunnel	<i>Pholis ornata</i>	0.1
Cutthroat trout	<i>Salmo clarki</i>	0.1
Kelp greenling	<i>Hexagrammos decagrammus</i>	tr
Steelhead	<i>Salmo gairdneri</i>	tr
Lingcod	<i>Ophiodon elongatus</i>	tr
Largescale sucker	<i>Catostomus macrocheilus</i>	tr
Pacific tomcod	<i>Microgadus proximus</i>	tr
Northern anchovy	<i>Engraulis mordax</i>	tr
Chum salmon	<i>Oncorhynchus keta</i>	tr
White seaperch	<i>Phanerodon furcatus</i>	tr
Snake prickleback	<i>Lumpenus sagitta</i>	tr
Penpoint gunnel	<i>Apodichthys flavidus</i>	tr
Arrow goby	<i>Clevelandia ios</i>	tr
Tidepool sculpin	<i>Oligocottus maculosus</i>	tr
Warmouth	<i>Lepomis gulosus</i>	tr
Yellow perch	<i>Perca flavescens</i>	tr
Redtail surfperch	<i>Amphistichus rhodoterus</i>	tr
Copper rockfish	<i>Sebastes caurinus</i>	tr
Brown Irish lord	<i>Hemilepidotus spinosus</i>	tr
Eulachon	<i>Thaleichthys pacificus</i>	tr
Sharpnose sculpin	<i>Clinocottus acuticeps</i>	tr
Padded sculpin	<i>Artedius fenestralis</i>	tr
Bluegill	<i>Lepomis macrochirus</i>	tr

to have high fresh water tolerance (Forsberg et al. 1977) captured above river mile 10 were shiner perch, starry flounder, English sole, Pacific staghorn sculpin, and coho and chinook salmon.

Temporal Distribution

Comparatively few fish and fish species inhabited the Umpqua estuary during the winter months (Figures 2 and 3). Increased numbers of individual fish and of fish species entered the estuary in March, and a gradual buildup occurred until August. Sampling in August produced the largest number of fish per month with 9,372 fish. Greatest species diversity occurred during June when we caught 29 species. Large numbers of fish and fish species remained in the estuary through October.

Juvenile chinook salmon first appeared in the estuary in early April at an average size of 64 mm and reared through August (Figure 4) at which time their average size was 112 mm. A total of 162 juvenile chinook were captured during the study.

Juvenile coho salmon were first captured in February after a heavy rain prematurely flushed the fry from their parent streams. Under normal conditions juvenile coho salmon entered the Umpqua estuary in April at an average size of 71 mm. They were last observed in August at an average size of 115 mm (Figure 5). A total of 154 juvenile coho salmon were captured during the study.

Table 2 compares trawl and beach seine catch per effort information for Umpqua, Siuslaw, and Tillamook estuaries. These data are comparable since the same basic gear was used during each study. Comparing beach seine catch per effort data, Siuslaw, and Umpqua estuaries were similar. The major difference was that the Umpqua had a large population of Umpqua squawfish that are not present in the Siuslaw. Fall chinook salmon smolts were abundant in the Siuslaw. A small run of fall chinook salmon in the Umpqua system produces very few smolts.

Trawl information is similar among the three estuaries with English sole, shiner perch, and starry flounder being the most abundant in all estuaries in terms of catch per effort.

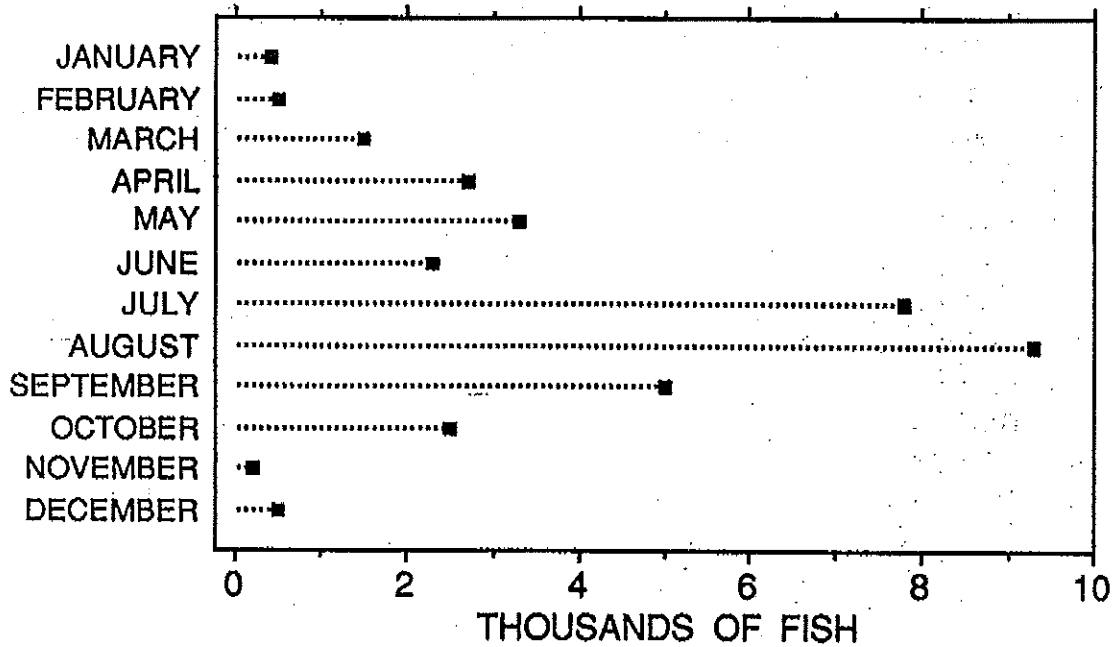


Figure 2. Number of fish captured in the Umpqua estuary by month, 1977-86 ($N = 35,373$).

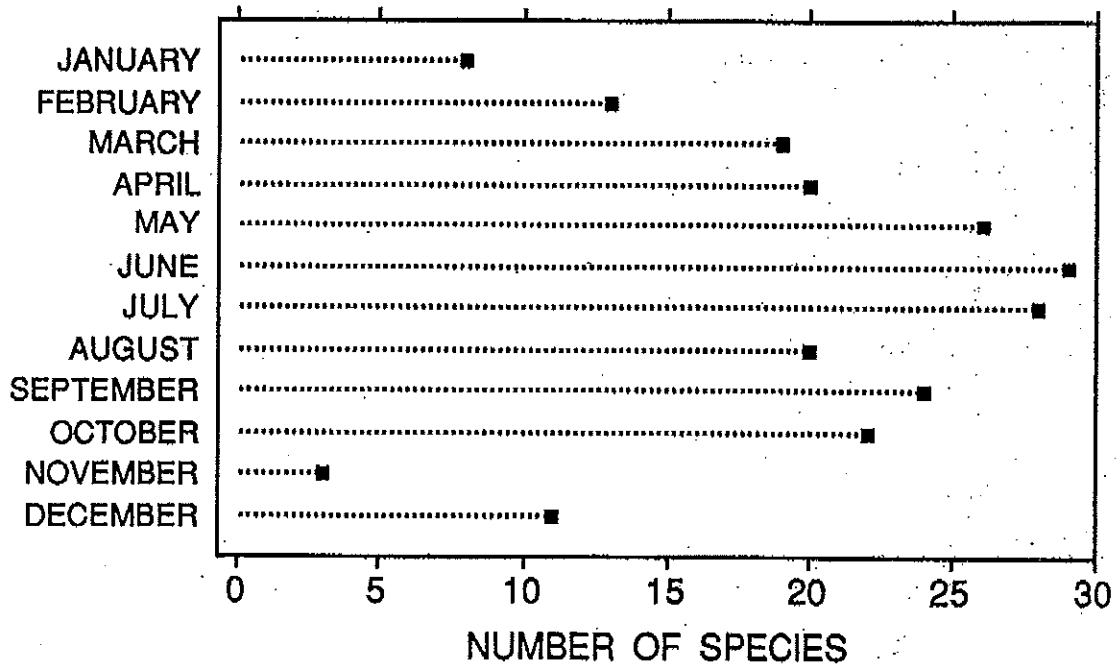


Figure 3. Number of fish species captured in the Umpqua estuary by month, 1977-86.

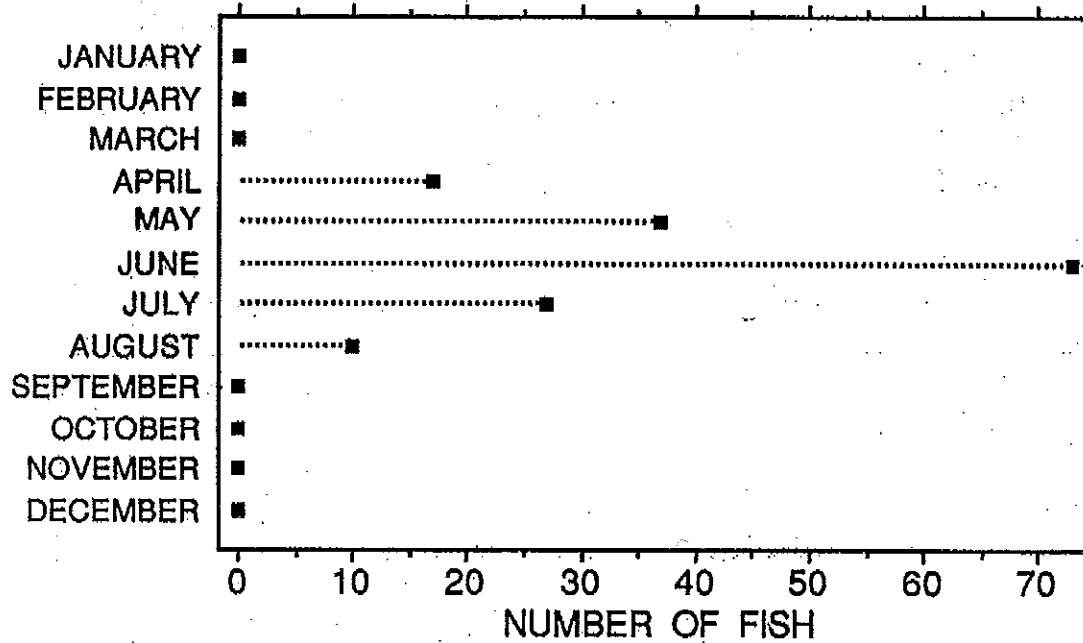


Figure 4. Number of juvenile chinook salmon captured in the Umpqua estuary by month, 1977-86 (N = 162).

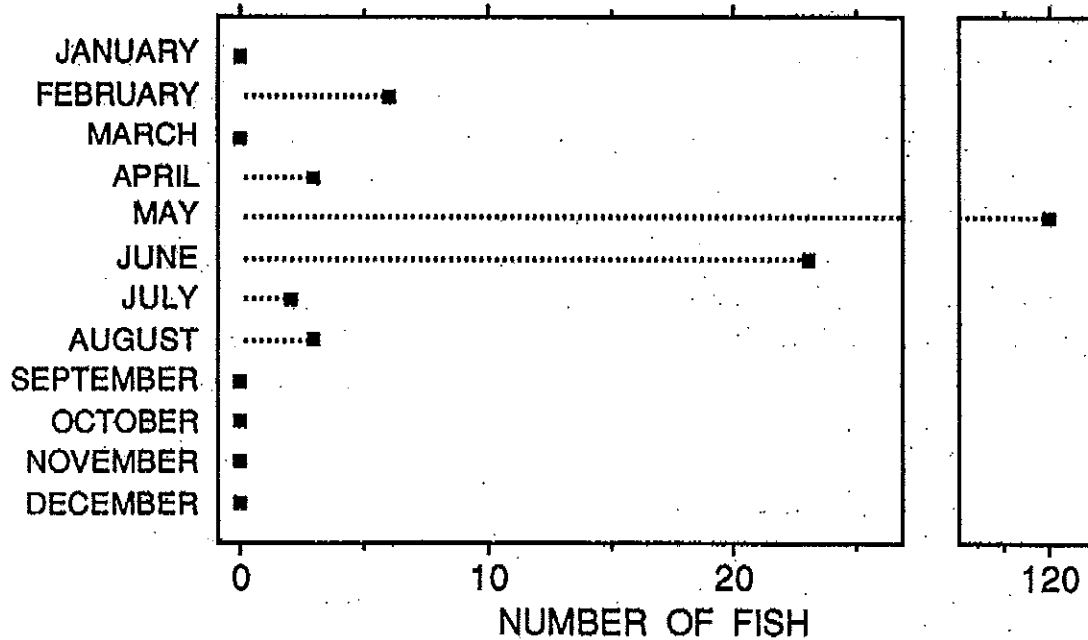


Figure 5. Number of juvenile coho salmon captured in the Umpqua estuary by month, (N = 154).

Table 2. Average catch per effort (fish per seine haul or per trawl tow) for the 10 most often caught species in each of three Oregon estuaries.

Gear, species	Umpqua ^a	Siuslaw ^b	Tillamook ^c
Seine:			
Shiner perch	72.6	55.8	64.3
Surf smelt	39.9	73.1	83.2
Threespine stickleback	27.4	21.9	--
Pacific herring	18.6	2.2	36.6
Pacific staghorn sculpin	4.8	9.1	4.7
Starry flounder	3.6	--	1.3
Umpqua squawfish	2.7	--	--
English sole	1.9	2.2	6.2
Chinook salmon	1.3	10.3	13.6
Speckled sanddab	0.7	--	--
Coho salmon	--	5.8	--
Redside shiner	--	2.4	--
Topsmelt	--	2.3	--
Northern anchovy	--	--	76.3
Rockfish spp.	--	--	2.5
Chum salmon	--	--	2.3
Trawl:			
Shiner perch	3.6	2.2	1.3
English sole	3.3	1.2	2.7
Starry flounder	1.5	3.2	0.9
Speckled sanddab	1.1	--	--
Pacific staghorn sculpin	1.0	0.6	0.8
Sand sole	0.3	0.1	--
Rockfish spp.	0.2	0.1	0.1
Longfin smelt	0.1	--	--
Bay pipefish	0.1	--	--
Cabezon	0.1	--	--
Prickley sculpin	--	0.3	--
Striped seaperch	--	0.1	--
Kelp greenling	--	0.1	--
Pacific sanddabd	--	0.1	--
Saddleback gunnel	--	--	0.6
Surf smelt	--	--	0.2
Pacific herring	--	--	0.1
Northern anchovy	--	--	0.1
Chum salmon	--	--	0.1

a 190 seine hauls and 82 trawl tows during present study.

b 173 seine hauls and 88 trawl tows.

c 356 seine hauls and 1,049 trawl tows.

d *Citharichthys sordidus*.

ACKNOWLEDGEMENTS

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