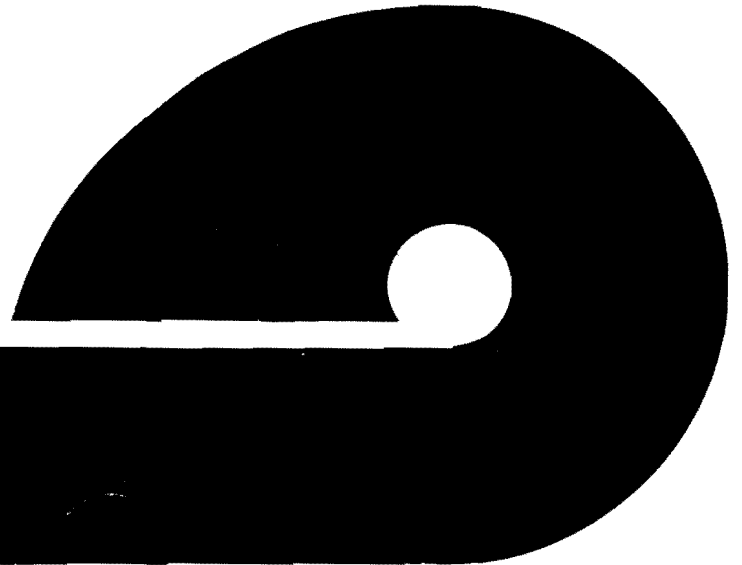


FISH COMMISSION OF OREGON

NESTUCCA RIVER ESTUARY

A STUDY IN RESOURCE USE
DIVISION OF MANAGEMENT AND RESEARCH



1971 NESTUCCA RIVER ESTUARY RESOURCE USE STUDY

by
**Tom Gaumer
Darrell Demory
Laimons Osis**

Fish Commission of Oregon
Division of Management and Research

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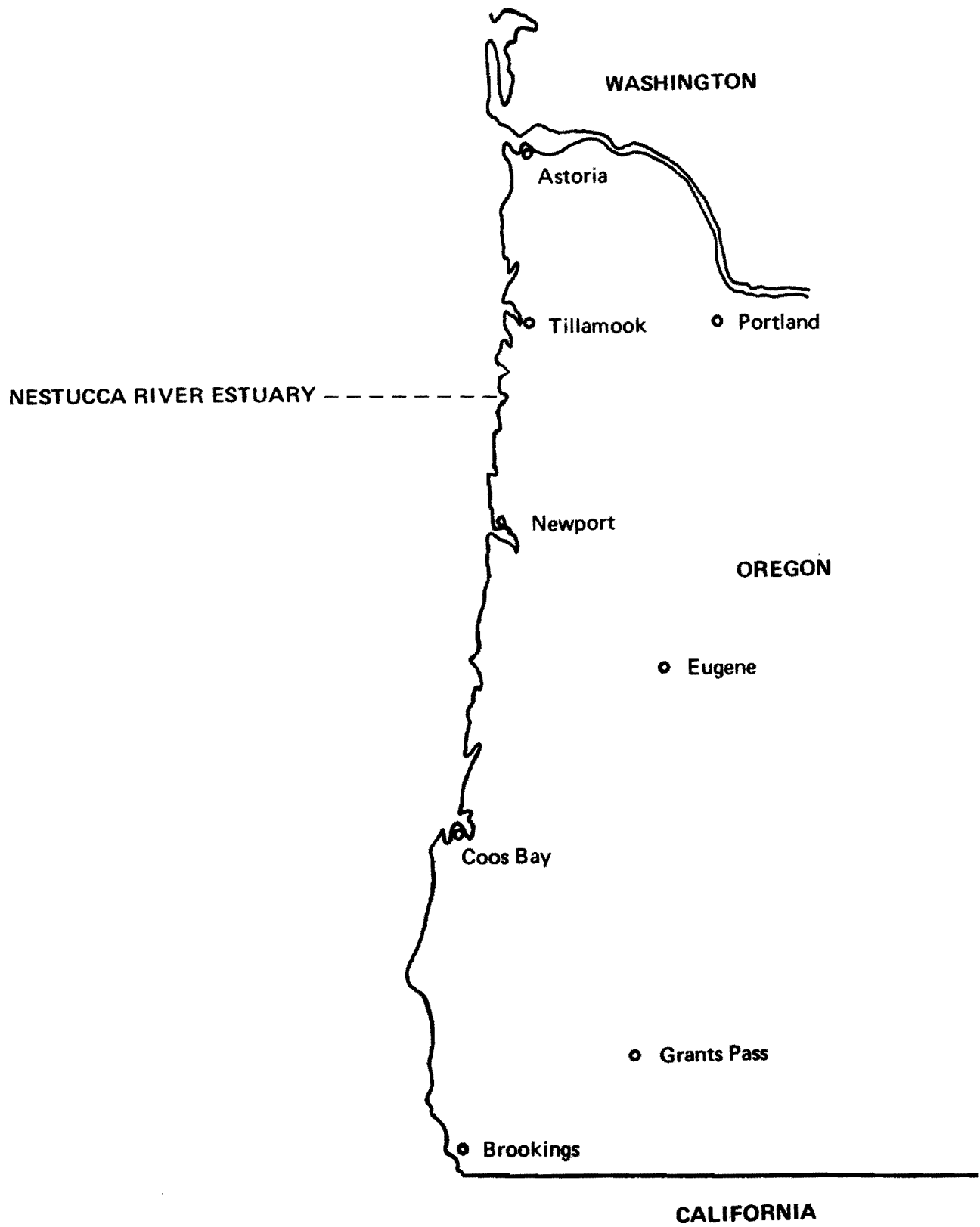


Figure 1. Location of Nestucca River Estuary.

1971 NESTUCCA RIVER ESTUARY RESOURCE USE STUDY

INTRODUCTION

In 1971 the Fish Commission of Oregon conducted a comprehensive study of the recreational use of marine food fish, shellfish, and other miscellaneous invertebrates in 16 Oregon estuaries. The anadromous sport fisheries in the upper portions of most estuaries were not included in the study due to the lack of manpower to adequately sample those areas. The study was supported by state general funds and by the National Marine Fisheries Service under the Commercial Fisheries Research and Development Act. The U.S. Army Corps of Engineers funded portions of the data processing, preparation of a series of marine resource maps, and a special report for each estuary. This report summarizes the results of the Nestucca River Estuary study.

PROCEDURE

The Nestucca River Estuary is located 101 miles south of the Columbia River (Figure 1). The 1,000-acre bay contains 578 acres of tidelands.

From March 1 through October 31, 1971, boat and shore anglers and tideflat users were interviewed for catch, effort, and origin data in a program designed for statistical analysis. No scuba divers were encountered during the study. Resource users were categorized as (1) county: people that reside west of the coast range summit within the county where the sampled estuary is found, (2) state: residents of Oregon not classified as county, and (3) nonstate: nonresidents of Oregon.

The study area extended from the mouth upstream to the community of Woods on the main Nestucca River and to the Highway 101 bridge on the Little Nestucca River. Survey areas and their station numbers are outlined in Table 1 and are shown in Figure 2.

The 1971 Nestucca River Estuary commercial landings of shellfish and their value, taken from Fish Commission catch statistic reports, are included in the results as supplemental information.

The following maps were prepared using information collected in previous Fish Commission studies and the 1971 resource use survey.

1. Principal boat fishing areas.
2. Clam beds.
3. Eel grass beds.
4. Food production areas, fish feeding areas, and fish migration routes.

RESULTS

During the study 1,238 boat, shore, and tideflat resource user interviews were obtained to estimate catch and effort values and angler origin. The values presented in the tables are estimates and have been rounded off when used in the text.

Boat Fishery

Figure 3 shows the principal boat fishing areas of the Nestucca River Estuary. Only sport boat fishing areas are shown on the map since no commercial boat fishing occurs on the estuary. Principal species of fish and shellfish caught and peak periods of fishing activity are outlined.

An estimated 3,900 boat angler trips were expended on the estuary (Table 2). The lower bay (below the town of Woods) was the most popular boat fishing area; 100% of the anglers checked fished there. Boat anglers spent 15,200 hours fishing (Table 3). Peak activity occurred in September.

Five species of fish and one species of crab were identified in the boat anglers' catch (Table 4). Dungeness crab and cutthroat trout were the principal species taken and accounted for 84% of the total number of animals caught. The major catches occurred during August (Table 5).

Shore Fishery

Interview data revealed that 4,700 shore angler trips were expended on the Nestucca River Estuary (Table 6). The Highway 101 bridge was the most popular fishing area; 56% of the anglers fished there. Shore anglers spent 11,900 hours fishing (Table 7). Peak activity was in September.

Eight species of fish were identified in the shore anglers' catch (Table 8). Pacific staghorn sculpin and shiner perch were the principal species taken, accounting for 80% of the total number of animals caught. The peak catches occurred during July and August (Table 9). Fishing success (catch per hour) was highest during June.

Tideflat Fishery

Figure 4 shows the distribution of bay clams in the Nestucca River Estuary. Softshell clams occur in the Little Nestucca River arm of the estuary. Principal areas of digging are outlined on the map.

Table 10 shows that 1,500 tideflat user trips were expended to harvest clams and shrimp from the estuary. Of this total, 1,400 or 93% were clam digger trips. Tideflat users spent 1,600 hours collecting marine animals (Table 11). The peak month of activity was July. The entire digging effort by tideflat users was expended on the Little Nestucca tideflats.

Softshell clams and shrimp were the only species of animals harvested by tideflat users (Table 12). Clams comprised 85% of the animals collected. The peak catch occurred during June when 13,000 or 48% of the clams and shrimp were dug (Table 13). Digging success was highest during May and June.

Angler Origin

The majority (84%) of the anglers interviewed were Oregon residents living outside of Tillamook County, 11% were Tillamook County residents, and 5% were out-of-state residents.

	Angler Origin		
	County	State	Non-State
Boat	548	3,229	82
Shore	363	4,145	224
Tideflat	182	1,078	206
Total	1,093	8,452	512
Percentage	10.9	84.0	5.1

Combined Recreational Fisheries

A total of 10,100 resource user trips (3,900 boat, 4,700 shore, and 1,500 tideflat) were expended on the Nestucca River Estuary during the study (Table 14). The 10,100 user trips represented 28,800 hours of effort (15,300 boat, 11,900 shore, and 1,600 tideflat). Peak activity occurred in September for the boat and shore fisheries and July for the tideflat fishery. Combining all fisheries, Table 15 shows that September was the peak month of activity. Areas receiving the principal use for the boat, shore, and tideflat fisheries were below the town of Woods (100%), Highway 101 bridge (56%), and Little Nestucca tideflats (100%), respectively.

Anglers of the three fisheries harvested 34,100 marine animals (23,200 clams, 5,200 fish, 4,000 shrimp, and 1,700 crabs). Dungeness crab comprised 58% of the boat anglers' total catch. Fish were the only animals caught by the shore anglers. Pacific staghorn sculpin and shiner perch were the principal species harvested. Clams comprised 85% of the tideflat users' total take. Softshell clam was the only species collected. Comparing the catch for all three fisheries revealed that tideflat users harvested 27,200 or 80% of the total animals taken. Shore and boat anglers caught 4,000 and 2,900 animals, respectively. Peak catch was in August for the boat fishery, July for the shore fishery, and June for the tideflat fishery. Combining all fisheries, June was the principal month of catch.

Commercial Fishery

Commercial landings of shellfish caught in the Nestucca River Estuary in 1971 totaled 148 pounds of ghost and mud shrimp valued at \$151 (fisherman's level) according to Fish Commission landing statistics.

Eel Grass Beds

Eel grass beds are located in both the main Nestucca and Little Nestucca river sections of the estuary (Figure 5). These beds are usually found in areas of shallow water and high salinities. Clams and other important fauna are usually an integral part of the eel grass beds.

Food Production Areas, Fish Feeding Areas, and Fish Migration Routes

Figure 6 shows the food production areas, fish feeding areas, and fish migration routes in the Nestucca River Estuary.

Estuaries are some of the most productive lands on earth. The productivity of estuarial areas is directly related to length of shore line, depth of water, and geographical location. Within each estuary tidelands are generally more productive than deep water channel areas.

In the Nestucca River Estuary, the production of food organisms occurs throughout the entire estuary. These food organisms include the microscopic phytoplankton and other algae, zooplankton, small crustaceans, mollusks, annelids, and fish which are all important in the estuarine food chain.

The fish feeding areas of the Nestucca River Estuary (for finfish and shellfish) include all areas of the estuary under tidal influence. Tidelands as well as deep water channels and rocky areas provide a variety of rearing habitat. Species of fish, numbers, and distribution within each area are generally related to type of food organisms, bottom type, water depth, and water quality.

Fish and shellfish typically found associated with tidelands include flounder, perch, salmon, trout, crabs, shrimp, and clams. These same species frequently reside in the estuary channels; period of residency is dependent on species, season, and location. A taxonomic list of the species of marine animals observed in this study is contained in Table 16.

Rocky areas in the estuary are the preferred feeding and rearing areas of perch, rockfish, greenling, and cabezon. These fish reside in the lower portion of the main Nestucca River.

Fish migration routes are those areas traveled by fish to and from spawning, feeding, or rearing areas. Fish migration routes through the Nestucca River Estuary are as varied as the fish that use them. Species and age class of fish, season, water depth, and water quality all play an important role in fish migration patterns.

The use of channel areas throughout the estuary by salmon, trout, perch, flounder, and baitfish is well known. In addition, during high tide these same fish frequently swim across tidelands to reach their destination.

ACKNOWLEDGMENTS

Many Fish Commission of Oregon personnel contributed in the gathering, compiling, analyzing of data, typing, and editing of this report. However, special thanks are due Mrs. Linda Karlik for preparing the resource maps and Mr. Louis Fredd for his assistance in analyzing the data.

**Table 1. LOCATION OF SAMPLING STATIONS
Nestucca River Estuary, 1971**

Fishing Activity	Station Number	Location
Boat	B-1	Lower Bay (mouth of estuary upstream to Woods Bridge)
	B-2	Upper Bay (Woods Bridge upstream to head of tide)
Shore	S-1	Pacific City (Tillamook County boat ramp, Fisher's Landing, and Pacific City to Woods Bridge)
	S-2	101 Bridge (Highway 101 bridge)
Tideflat	T-1	Big Nestucca (Big Nestucca tideflats below Pacific City)
	T-2	Little Nestucca (Little Nestucca tideflats below Highway 101 bridge)

**Table 2. NUMBER OF BOAT ANGLER TRIPS
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	<u>Boat Fishing Area and Station Number</u>		Total	Percentage
	Lower Bay B-1	Upper Bay B-2		
March	6	0	6	0.1
April	65	0	65	1.7
May	483	0	483	12.6
June	276	0	276	7.1
July	446	0	446	11.6
August	752	0	752	19.5
September	1,007	0	1,007	26.1
October	824	0	824	21.4
Total	3,859	0	3,859	100.1
Percentage	100.0	0.0	100.0	

**Table 3. HOURS OF BOAT ANGLER USE
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	<u>Boat Fishing Area and Station Number</u>		Total	Percentage
	Lower Bay B-1	Upper Bay B-2		
March	22	0	22	0.1
April	233	0	233	1.5
May	1,719	0	1,719	11.3
June	982	0	982	6.4
July	1,588	0	1,588	10.4
August	2,847	0	2,847	18.7
September	4,236	0	4,236	27.8
October	3,618	0	3,618	23.7
Total	15,245	0	15,245	99.9
Percentage	100.0	0.0	100.0	

**Table 4. MARINE ANIMALS CAUGHT BY BOAT ANGLERS
Nestucca River Estuary, by Species and Area
March 1 through October 31, 1971**

Species	Boat Fishing Area and Station Number		Total	Percentage
	Lower Bay B-1	Upper Bay B-2		
Dungeness crab	1,663	0	1,663	58.4
Cutthroat trout	715	0	715	25.1
Coho salmon (adult)	102	0	102	3.6
Chinook salmon (adult)	94	0	94	3.3
Pacific staghorn sculpin	87	0	87	3.1
Starry flounder	51	0	51	1.8
Unidentified fish	138	0	138	4.8
Total	2,850	0	2,850	100.1
Percentage	100.0	0.0	100.0	

**Table 5. SPORT BOAT FISHING DATA
Nestucca River Estuary, All Areas
1971**

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	6	65	483	276	446	752	1,007	824	3,859	—
Fishing effort (hours)	22	233	1,719	982	1,588	2,847	4,236	3,618	15,245	—
Fishing success (catch/hr.)	0.23	0.27	0.28	0.28	0.28	0.27	0.06	0.16	0.19	—
Catch (number)										
Dungeness crab	4	43	321	183	296	276	65	475	1,663	58.4
Cutthroat trout	1	19	140	80	129	346	0	0	715	25.1
Coho salmon (adult)	0	0	0	0	0	0	43	59	102	3.6
Chinook salmon (adult)	0	0	0	0	0	0	65	29	94	3.3
Pacific staghorn sculpin	0	0	0	0	0	0	87	0	87	3.1
Starry flounder	0	2	20	11	18	0	0	0	51	1.8
Unidentified fish	0	0	0	0	0	138	0	0	138	4.8
Total	5	64	481	274	443	760	260	563	2,850	100.1
Percentage	0.2	2.2	16.9	9.6	15.5	26.7	9.1	19.8	100.0	

**Table 6. NUMBER OF SHORE ANGLER TRIPS
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	Shore Fishing Area and Station Number		Total	Percentage
	Pacific City S-1	101 Bridge S-2		
March	7	7	14	0.3
April	0	0	0	0.0
May	70	91	161	3.4
June	99	82	181	3.8
July	341	213	554	11.7
August	480	611	1,091	23.1
September	853	1,000	1,853	39.2
October	219	659	878	18.6
Total	2,069	2,663	4,732	100.1
Percentage	43.7	56.3	100.0	

**Table 7. HOURS OF SHORE ANGLER USE
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	Shore Fishing Area and Station Number		Total	Percentage
	Pacific City S-1	101 Bridge S-2		
March	17	17	34	0.3
April	0	0	0	0.0
May	176	228	404	3.4
June	259	215	474	4.0
July	868	543	1,411	11.8
August	1,204	1,533	2,737	22.9
September	2,121	2,486	4,607	38.6
October	564	1,699	2,263	19.0
Total	5,209	6,721	11,930	100.0
Percentage	43.7	56.3	100.0	

**Table 8. MARINE ANIMALS CAUGHT BY SHORE ANGLERS
Nestucca River Estuary, by Species and Area
March 1 through October 31, 1971**

Species	Shore Fishing Area and Station Number		Total	Percentage
	Pacific City S-1	101 Bridge S-2		
Pacific staghorn sculpin	944	937	1,881	46.6
Shiner perch	595	730	1,325	32.9
Starry flounder	171	120	291	7.2
Cutthroat trout	89	102	191	4.7
Chinook salmon (adult)	88	70	158	3.9
Coho salmon (adult)	0	59	59	1.5
Buffalo sculpin	30	0	30	0.7
Redtail surfperch	20	0	20	0.5
Unidentified fish	37	41	78	1.9
Total	1,974	2,059	4,033	99.9
Percentage	48.9	51.1	100.0	

Table 9. SHORE FISHING DATA
Nestucca River Estuary, All Areas
1971

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	14	0	161	181	554	1,091	1,853	878	4,732	—
Fishing effort (hours)	34	0	404	474	1,411	2,737	4,607	2,263	11,930	—
Fishing success (catch/hr.)	0.00	0.00	0.24	1.16	1.01	0.50	0.04	0.17	0.34	—
Catch (number)										
Pacific staghorn sculpin	0	0	0	331	547	894	24	85	1,881	46.6
Shiner perch	0	0	16	0	792	304	12	201	1,325	32.9
Starry flounder	0	0	49	157	60	20	0	5	291	7.2
Cutthroat trout	0	0	32	63	0	30	55	11	191	4.7
Chinook salmon (adult)	0	0	0	0	0	50	80	28	158	3.9
Coho salmon (adult)	0	0	0	0	0	0	31	28	59	1.5
14. Buffalo sculpin	0	0	0	0	30	0	0	0	30	0.7
Redtail surfperch	0	0	0	0	0	20	0	0	20	0.5
Unidentified fish	0	0	0	0	0	50	0	28	78	1.9
Total	0	0	97	551	1,429	1,368	202	386	4,033	99.9
Percentage	0.0	0.0	2.4	13.7	35.4	33.9	5.0	9.6	100.0	

**Table 10. NUMBER OF TIDEFLAT USER TRIPS
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	<u>Tideflat and Station Number</u>		Total	Percentage
	Big Nestucca T-1	Little Nestucca T-2		
March	0	0	0	0.0
April	0	0	0	0.0
May	0	107	107	7.3
June	0	411	411	28.0
July	0	767	767	52.3
August	0	181	181	12.3
September	0	0	0	0.0
October	0	0	0	0.0
Total	0	1,466	1,466	99.9
Percentage	0.0	100.0	100.0	

**Table 11. HOURS OF TIDEFLAT USE
By Month and Area, Nestucca River Estuary
March 1 through October 31, 1971**

Month	<u>Tideflat and Station Number</u>		Total	Percentage
	Big Nestucca T-1	Little Nestucca T-2		
March	0	0	0	0.0
April	0	0	0	0.0
May	0	234	234	14.8
June	0	602	602	38.0
July	0	567	567	35.8
August	0	181	181	11.4
September	0	0	0	0.0
October	0	0	0	0.0
Total	0	1,584	1,584	100.0
Percentage	0.0	100.0	100.0	

**Table 12. MARINE ANIMALS CAUGHT BY TIDEFLAT USERS
Nestucca River Estuary, by Species and Area
March 1 through October 31, 1971**

Species	Tideflat and Station Number		Total	Percentage
	Big Nestucca T-1	Little Nestucca T-2		
Softshell clam	0	23,211	23,211	85.3
Mud shrimp	0	3,258	3,258	12.0
Ghost shrimp	0	235	235	0.9
Unidentified shrimp	0	508	508	1.9
Total	0	27,212	27,212	100.1
Percentage	0.0	100.0	100.0	

**Table 13. TIDEFLAT FISHING DATA
Nestucca River Estuary, All Areas
1971**

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	0	0	107	411	767	181	0	0	1,466	—
Fishing effort (hours)	0	0	234	602	567	181	0	0	1,584	—
Fishing success (catch/hr.)	0.0	0.0	21.3	21.6	16.3	0.0	0.0	0.0	17.2	—
Catch (number)										
Softshell clam	0	0	4,444	9,757	9,010	0	0	0	23,211	85.3
Mud shrimp	0	0	33	3,225	0	0	0	0	3,258	12.0
Ghost shrimp	0	0	0	0	235	0	0	0	235	0.9
Unidentified shrimp	0	0	508	0	0	0	0	0	508	1.9
Total	0	0	4,985	12,982	9,245	0	0	0	27,212	100.1
Percentage	0.0	0.0	18.3	47.7	34.0	0.0	0.0	0.0	100.0	

Table 14. SUMMARY
Number of Angler Trips, Hours of Effort, and Animals Caught
Nestucca River Estuary, by Station
March 1 through October 31, 1971

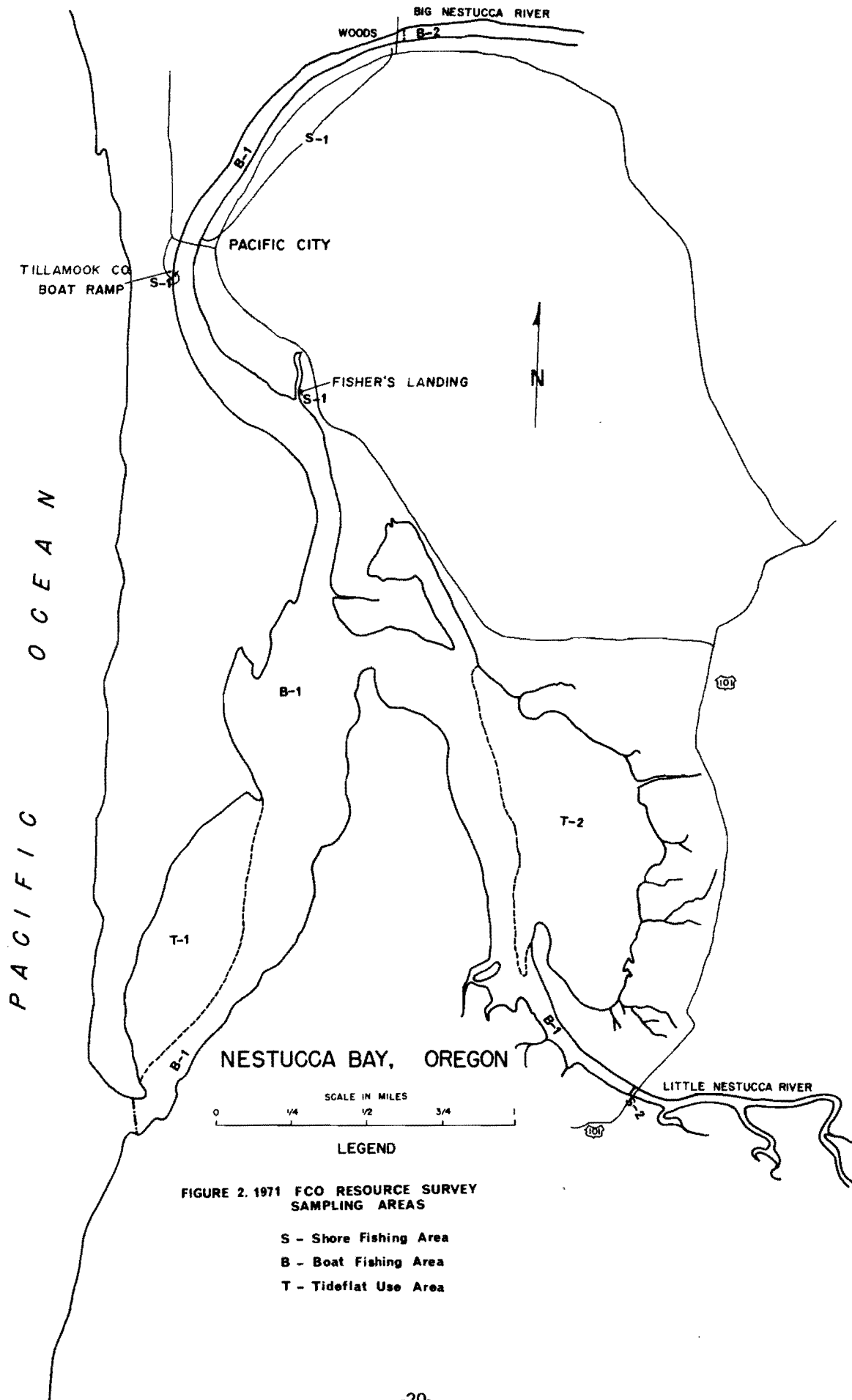
Station Number	No. Angler Trips	Angler Hours	Catch				Total
			Fish	Crabs	Clams	Shrimo	
B-1	3,859	15,245	1,187	1,663	0	0	2,850
B-2	0	0	0	0	0	0	0
Total	3,859	15,245	1,187	1,663	0	0	2,850
S-1	2,069	5,209	1,974	0	0	0	1,974
S-2	2,663	6,721	2,059	0	0	0	2,059
Total	4,732	11,930	4,033	0	0	0	4,033
T-1	0	0	0	0	0	0	0
T-2	1,466	1,584	0	0	23,211	4,001	27,212
Total	1,466	1,584	0	0	23,211	4,001	27,212
Grand Total	10,057	28,759	5,220	1,663	23,211	4,001	34,095

Table 15. SUMMARY
Number of Angler Trips, Hours of Effort, and Animals Caught
Nestucca River Estuary, by Month
March 1 through October 31, 1971

Fishery	Month	No. Angler Trips	Angler Hours	Catch				Total
				Fish	Crabs	Clams	Shrimp	
Boat	March	6	22	1	4	0	0	5
	April	65	233	21	43	0	0	64
	May	483	1,719	160	321	0	0	481
	June	276	982	91	183	0	0	274
	July	446	1,588	147	296	0	0	443
	August	752	2,847	484	276	0	0	760
	September	1,007	4,236	195	65	0	0	260
	October	824	3,618	88	475	0	0	563
	Total	3,859	15,245	1,187	1,663	0	0	2,850
Shore	March	14	34	0	0	0	0	0
	April	0	0	0	0	0	0	0
	May	161	404	97	0	0	0	97
	June	181	474	551	0	0	0	551
	July	554	1,411	1,429	0	0	0	1,429
	August	1,091	2,737	1,368	0	0	0	1,368
	September	1,853	4,607	202	0	0	0	202
	October	878	2,263	386	0	0	0	386
	Total	4,732	11,930	4,033	0	0	0	4,033
Tideflat	March	0	0	0	0	0	0	0
	April	0	0	0	0	0	0	0
	May	107	234	0	0	4,444	541	4,985
	June	411	602	0	0	9,757	3,225	12,982
	July	767	567	0	0	9,010	235	9,245
	August	181	181	0	0	0	0	0
	September	0	0	0	0	0	0	0
	October	0	0	0	0	0	0	0
	Total	1,466	1,584	0	0	23,211	4,001	27,212
Combined	March	20	56	1	4	0	0	5
	April	65	233	21	43	0	0	64
	May	751	2,357	257	321	4,444	541	5,563
	June	868	2,058	642	183	9,757	3,225	13,807
	July	1,767	3,566	1,576	296	9,010	235	11,117
	August	2,024	5,765	1,852	276	0	0	2,128
	September	2,860	8,843	397	65	0	0	462
	October	1,702	5,881	474	475	0	0	949
	Grand Total	10,057	28,759	5,220	1,663	23,211	4,001	34,095

**Table 16. TAXONOMIC LIST OF SPECIES HARVESTED
By Estuarine Resource Users, Nestucca River Estuary
March 1 through October 31, 1971**

Common Name	Local Names	Scientific Name
Fish		
Buffalo sculpin	Bullhead	<i>Enophrys bison</i>
Chinook salmon	King salmon, salmon	<i>Oncorhynchus tshawytscha</i>
Coho salmon	Silver salmon	<i>Oncorhynchus kisutch</i>
Cutthroat trout	Blueback, harvest trout, sea run	<i>Salmo clarki</i>
Pacific staghorn sculpin	Bullhead	<i>Leptocottus armatus</i>
Redtail surfperch		<i>Amphistichus rhodoterus</i>
Shiner perch	Shiner	<i>Cymatogaster aggregata</i>
Starry flounder		<i>Platichthys stellatus</i>
Crabs		
Dungeness crab	Market crab	<i>Cancer magister</i>
Clams		
Softshell clam	Mud clam, bay clam	<i>Mya arenaria</i>
Miscellaneous Invertebrates		
Ghost shrimp	Sand shrimp	<i>Callinassa californiensis</i>
Mud shrimp	Sand shrimp	<i>Upogebia pugettensis</i>



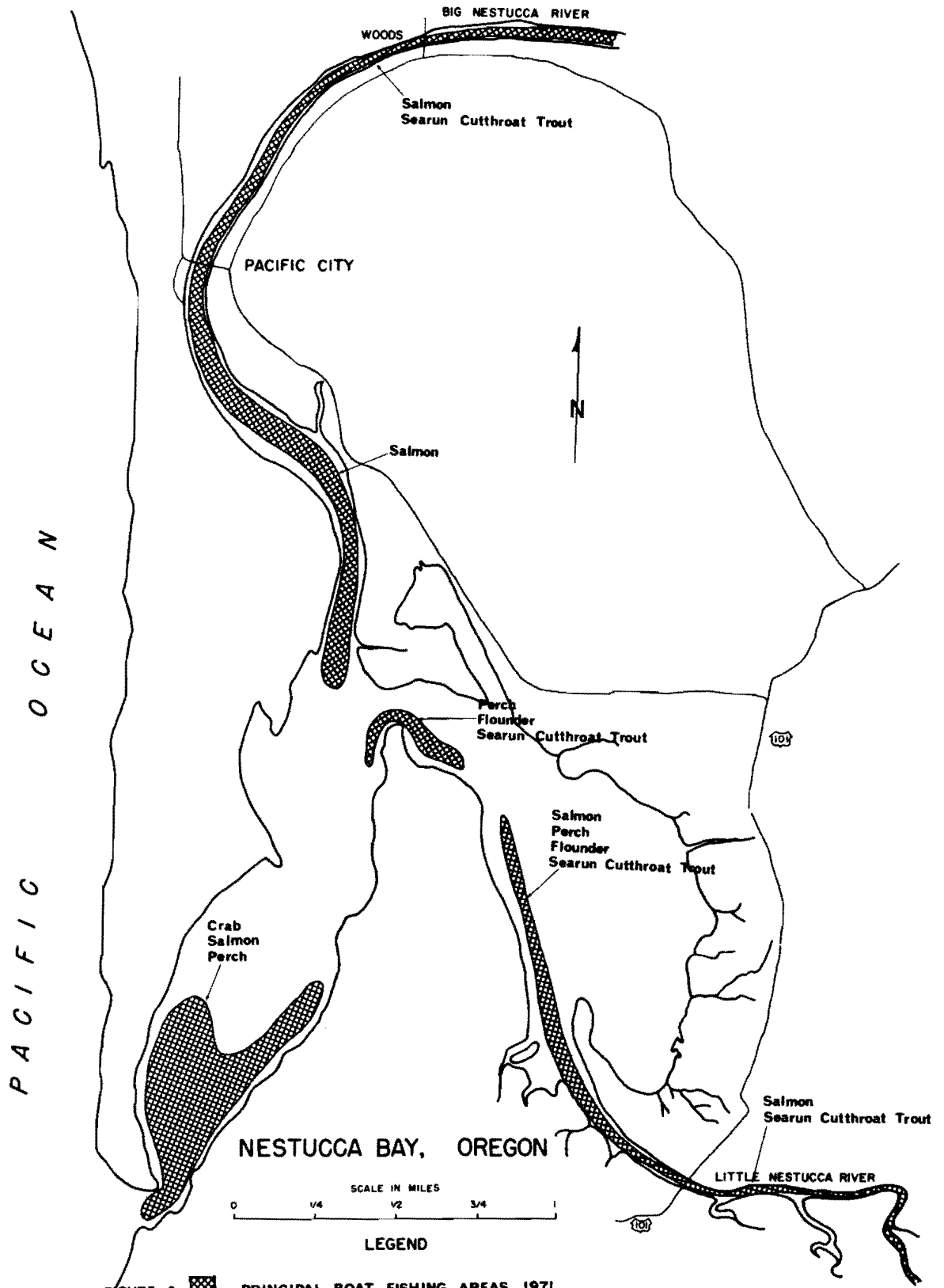
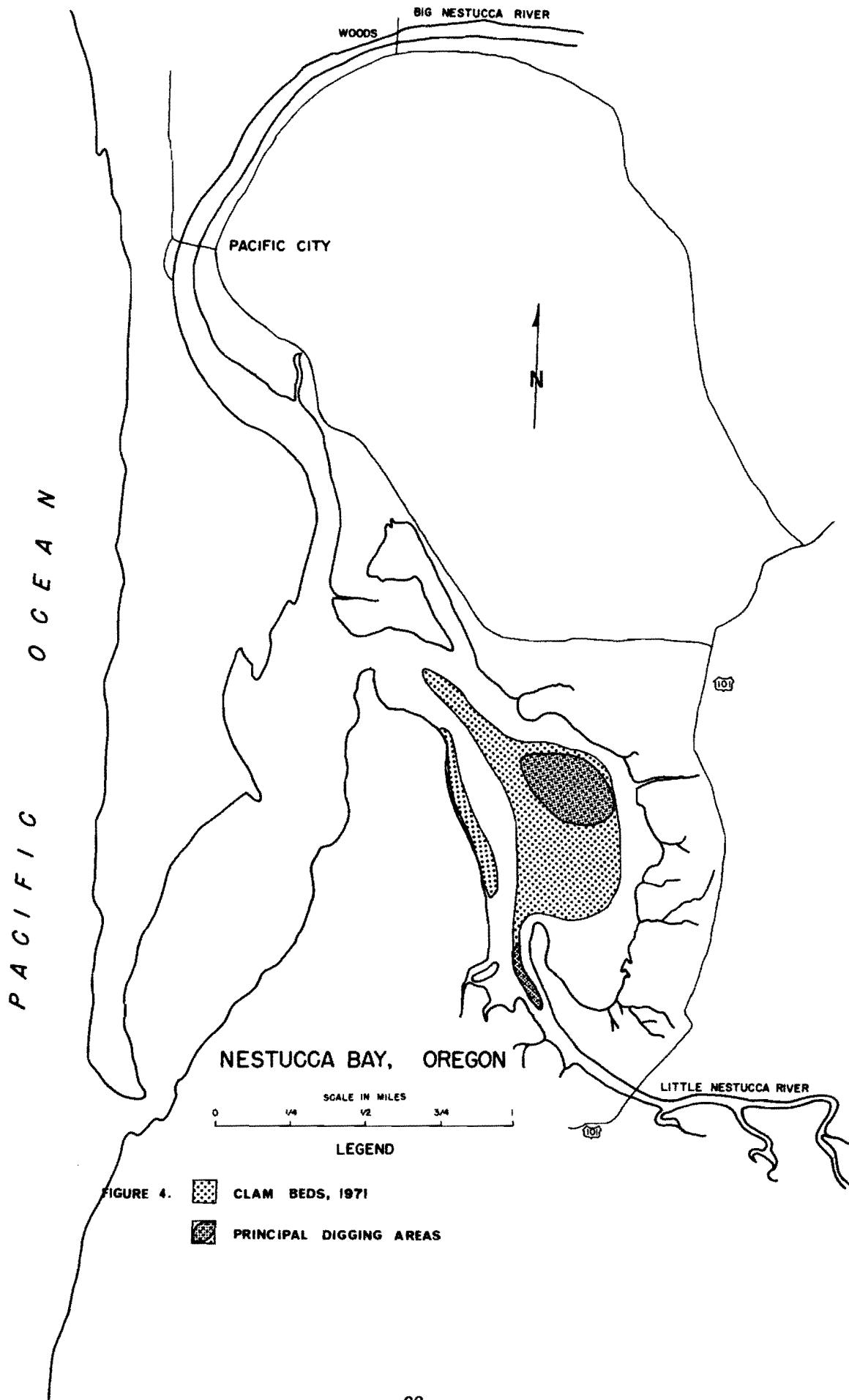


FIGURE 3. PRINCIPAL BOAT FISHING AREAS, 1971

Crab (May - October)
Salmon (September - October)
Perch (May - September)
Flounder (May - September)
Searun Cutthroat Trout (May - August)



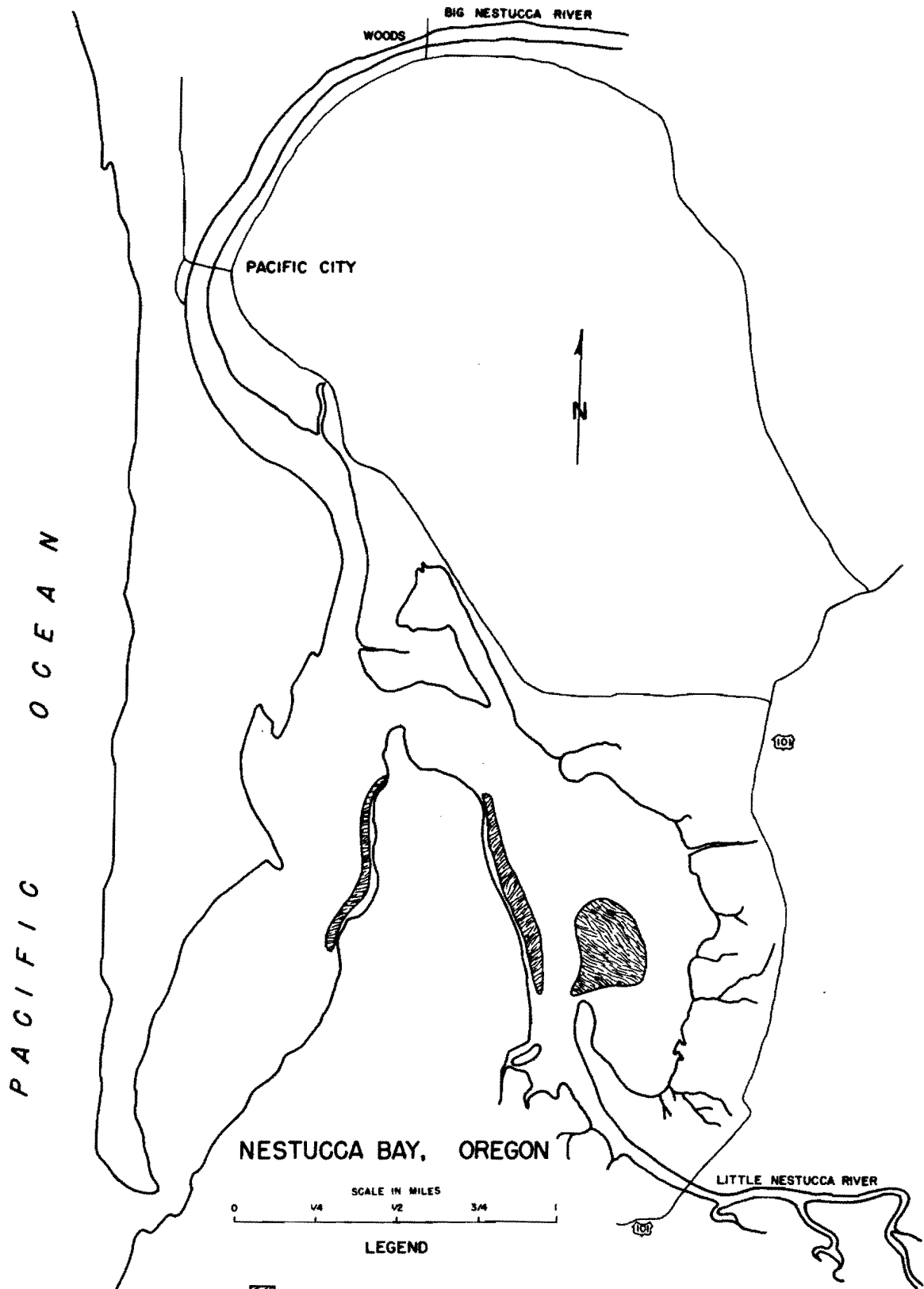


FIGURE 5.  EEL GRASS BEDS, 1971

