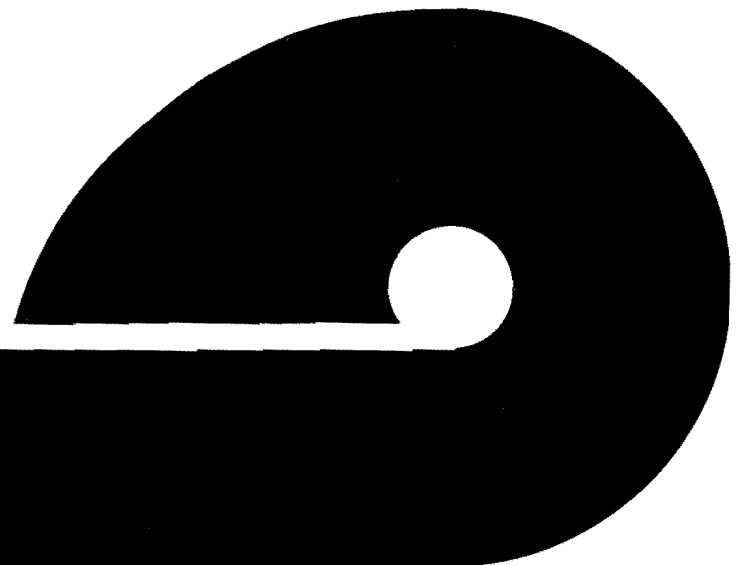


FISH COMMISSION OF OREGON

# SALMON RIVER ESTUARY

A STUDY IN RESOURCE USE  
DIVISION OF MANAGEMENT AND RESEARCH



# **1971 SALMON RIVER ESTUARY RESOURCE USE STUDY**

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Division of Management and Research

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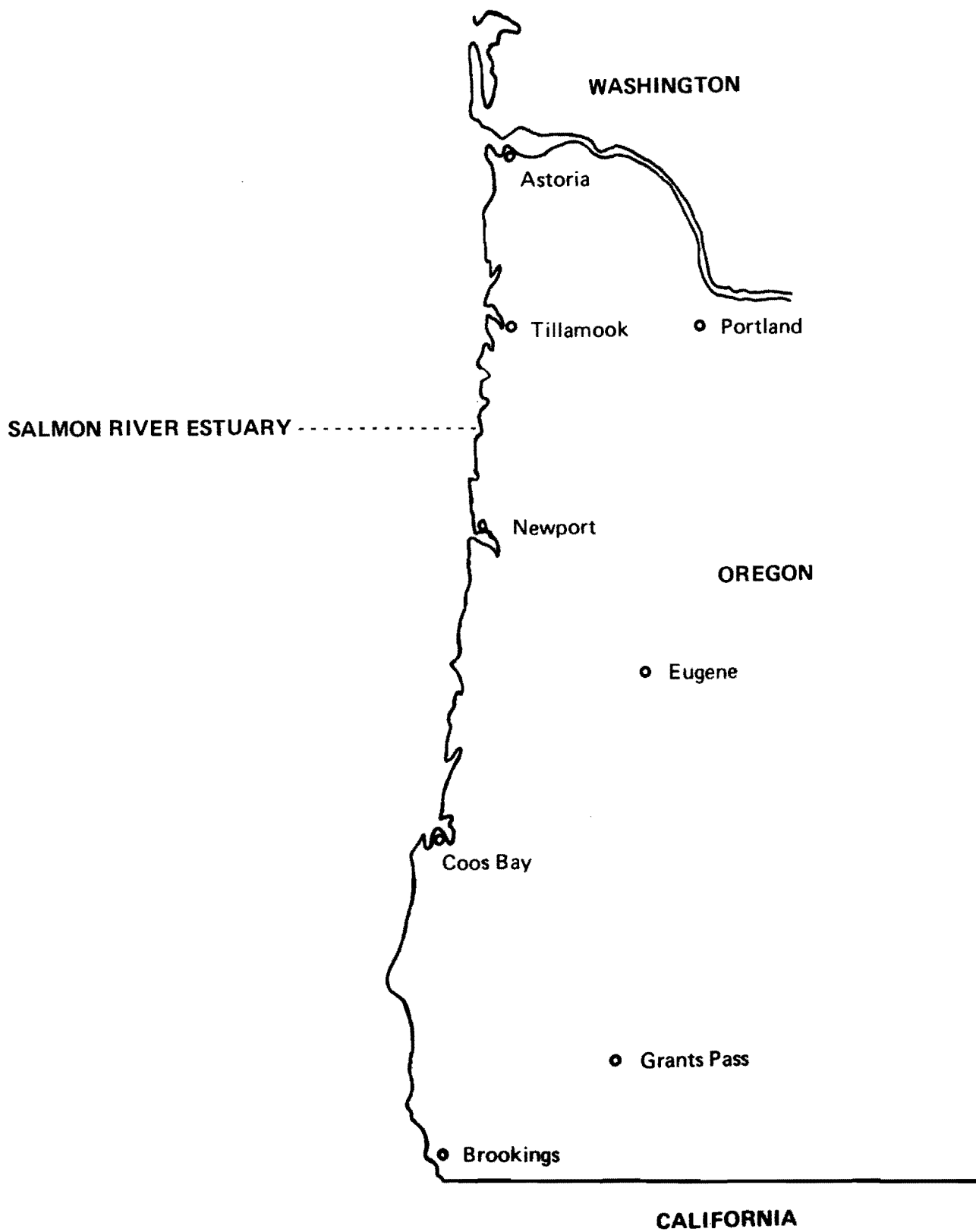


Figure 1. Location of Salmon River Estuary.

# **1971 SALMON 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 Salmon River Estuary study.

## **PROCEDURE**

The Salmon River Estuary is located 119 miles south of the Columbia River (Figure 1). The 204-acre bay contains 126 acres of tidelands.

From March 1 through October 31, 1971, boat and shore anglers, tideflat users, and scuba divers were interviewed for catch, effort, and origin data in a program designed for statistical analysis. 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 of the estuary upstream 3 miles to the Highway 101 bridge. Survey areas and their station numbers are outlined in Table 1 and are shown in Figure 2.

No commercial fishery exists in the Salmon River Estuary.

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 285 boat, shore, tideflat, and scuba 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 Salmon River Estuary. Only sport boat fishing areas are shown on the maps since no commercial boat fishery occurs on the estuary. Principal species of fish and shellfish caught and peak periods of fishing activity are outlined.

An estimated 800 boat angler trips were expended on the estuary below the Highway 101 bridge (Table 2). Boat anglers spent 2,600 hours fishing (Table 3). Peak months of activity were May and August.

Two species of fish and one species of crab were identified in the boat anglers' catch (Table 4). Dungeness crab and starry flounder were the principal species taken, accounting for 97% of the total number of animals caught. The peak catch occurred during May (Table 5).

### Shore Fishery

Interview data revealed that 2,200 shore angler trips were expended on the Salmon River Estuary (Table 6). The Highway 101 bridge was the principal fishing area; 62% of the anglers fished there. Shore anglers spent 3,700 hours fishing (Table 7). Peak activity was in September.

Eight species of fish and one species of crab were identified in the shore anglers' catch (Table 8). Pacific staghorn sculpin and starry flounder were the principal species landed, accounting for 81% of the total number of animals caught. Catch and fishing success were highest during July (Table 9).

### Tideflat Fishery

Figure 4 shows the distribution of bay clams in the Salmon River Estuary. Softshell clam is the only species found in the bay although none were observed collected during the study.

Table 10 shows that 70 tideflat user trips were expended to harvest marine animals from the estuary. The tideflat users spent 60 hours collecting 1,700 shrimp (Tables 11 and 12). May was the peak month of activity and catch.

### Scuba Fishery

The small number of scuba divers interviewed on the estuary precluded making an estimate of catch and effort for this fishery.

### Angler Origin

About 61% of the anglers interviewed were Oregon residents living outside of Lincoln County, 36% were Lincoln County residents, and 3% were out-of-state residents.



	Angler Origin		
	County	State	Non-State
Boat	366	338	63
Shore	698	1,436	27
Tideflat	22	44	0
<b>Total</b>	<b>1,086</b>	<b>1,818</b>	<b>90</b>
<b>Percentage</b>	<b>36.3</b>	<b>60.7</b>	<b>3.0</b>

### Combined Recreational Fisheries

A total of 3,000 resource user trips (800 boat, 2,100 shore, and 100 tideflat) were expended on the Salmon River Estuary during the study (Table 14). The 3,000 user trips represented 6,300 hours of effort (2,500 boat, 3,700 shore, and 100 tideflat). The peak months of activity were May and August for the boat fishery, September for the shore fishery, and May for the tideflat fishery. Combining all fisheries, Table 15 shows that peak activity occurred in September.

Anglers of the three fisheries harvested 4,500 marine animals (1,900 fish, 1,700 shrimp, and 900 crabs). Nearly equal numbers of fish and crabs were caught by the boat anglers. Dungeness crab and starry flounder were the principal species harvested. Fish were the principal animals harvested by shore anglers and represented 96% of their total take. Pacific staghorn sculpin and starry flounder were the principal species caught. Shrimp comprised 100% of the tideflat users' total take. Comparing the catch for all three fisheries revealed that nearly equal numbers of marine animals were harvested by each group of resource users. Peak months of catch for the boat, shore, and tideflat fisheries were May, July, and May, respectively. Combining all fisheries, the principal catch occurred in May.

### Eel Grass Beds

Eel grass beds are found scattered throughout the Salmon River Estuary (Figure 5). These beds are usually found in areas of shallow water and high salinities. Clams and other important marine 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 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 Salmon 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 estuary (for finfish and shellfish) include all areas under tidal influence. Tideflats 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 the tideflats include flounder, sole, perch, salmon, trout, crabs, shrimp, and clams. These same species 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 lower Salmon River Estuary are the preferred feeding and rearing areas of perch, rockfish, greenling, and cabezon.

Fish migration routes are those areas traveled by fish to and from spawning, feeding, or rearing areas. Fish migration routes through the 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 tideflats 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. 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  
Salmon River Estuary, 1971**

Fishing Activity	Station Number	Location
Boat	B-1	Below Highway 101 bridge
Shore	S-1	County Ramps (Tillamook County boat ramp to Lincoln County boat ramp)
	S-2	101 Bridge (Highway 101 bridge)
Tideflat	T-1	All Tideflats (all tideflats in estuary below Highway 101 bridge)

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

Month	Boat Fishing Area and Station Number		Percentage
	Below Highway 101 Bridge Total (B-1 Only Station)		
March	27		3.5
April	38		5.0
May	162		21.1
June	70		9.1
July	112		14.6
August	162		21.1
September	134		17.5
October	62		8.1
Total	767		100.0

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

Month	Boat Fishing Area and Station Number		Percentage
	Below Highway 101 Bridge Total (B-1 Only Station)		
March	66		2.6
April	94		3.7
May	393		15.4
June	171		6.7
July	273		10.7
August	703		27.6
September	582		22.8
October	268		10.5
Total	2,550		100.0

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

Species	Boat Fishing Area and Station Number	
	Below Highway 101 Bridge Total (B-1 Only Station)	Percentage
Dungeness crab	828	53.6
Starry flounder	663	42.9
Cutthroat trout	55	3.6
<b>Total</b>	<b>1,546</b>	<b>100.1</b>

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

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	27	38	162	70	112	162	134	62	767	—
Fishing effort (hours)	66	94	393	171	273	703	582	268	2,550	—
Fishing success (catch/hr.)	0.88	0.88	0.89	0.88	0.89	0.43	0.42	0.42	0.61	—
Catch (number)										
Dungeness crab	17	25	105	45	73	255	211	97	828	53.6
Starry flounder	41	58	246	106	171	19	15	7	663	42.9
Cutthroat trout	0	0	0	0	0	25	21	9	55	3.6
<b>Total</b>	<b>58</b>	<b>83</b>	<b>351</b>	<b>151</b>	<b>244</b>	<b>299</b>	<b>247</b>	<b>113</b>	<b>1,546</b>	<b>100.1</b>
<b>Percentage</b>	<b>3.8</b>	<b>5.4</b>	<b>22.7</b>	<b>9.8</b>	<b>15.8</b>	<b>19.3</b>	<b>16.0</b>	<b>7.3</b>	<b>100.1</b>	

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

Month	Shore Fishing Area and Station Number		Total	Percentage
	County Ramps S-1	101 Bridge S-2		
March	217	0	217	10.0
April	208	0	208	9.6
May	116	68	184	8.5
June	100	183	283	13.1
July	72	93	165	7.6
August	50	302	352	16.3
September	3	535	538	24.9
October	54	160	214	9.9
<b>Total</b>	<b>820</b>	<b>1,341</b>	<b>2,161</b>	<b>99.9</b>
<b>Percentage</b>	<b>37.9</b>	<b>62.0</b>	<b>99.9</b>	

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

Month	Shore Fishing Area and Station Number		Total	Percentage
	County Ramps S-1	101 Bridge S-2		
March	359	0	359	9.8
April	340	0	340	9.3
May	202	119	321	8.8
June	172	314	486	13.3
July	120	155	275	7.5
August	87	520	607	16.6
September	6	898	904	24.7
October	92	275	367	10.0
<b>Total</b>	<b>1,378</b>	<b>2,281</b>	<b>3,659</b>	<b>100.0</b>
<b>Percentage</b>	<b>37.6</b>	<b>62.3</b>	<b>99.9</b>	

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

Species	Shore Fishing Area and Station Number		Total	Percentage
	County Ramps	101 Bridge		
	S-1	S-2		
Dungeness crab	48	0	48	4.0
Pacific staghorn sculpin	176	454	630	51.9
Starry flounder	347	0	347	28.6
Cutthroat trout	0	50	50	4.1
Chinook salmon (adult)	0	45	45	3.7
Shiner perch	14	0	14	1.2
Buffalo sculpin	13	0	13	1.1
English sole	13	0	13	1.1
Redtail surfperch	7	0	7	0.6
Unidentified fish	47	0	47	3.9
Total	665	549	1,214	100.2
Percentage	54.8	45.2	100.0	

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

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	217	208	184	283	165	352	538	214	2,161	—
Fishing effort (hours)	359	340	321	486	275	607	904	367	3,659	—
Fishing success (catch/hr.)	0.29	0.50	0.22	0.14	1.22	0.54	0.07	0.21	0.33	—
Catch (number)										
Dungeness crab	0	0	0	0	0	48	0	0	48	4.0
Pacific staghorn sculpin	0	8	0	0	310	255	0	57	630	51.9
Starry flounder	103	162	63	0	0	12	0	7	347	28.6
Cutthroat trout	0	0	0	23	0	12	15	0	50	4.1
Chinook salmon (adult)	0	0	0	0	0	0	45	0	45	3.7
Shiner perch	0	0	0	0	0	0	0	14	14	1.2
Buffalo sculpin	0	0	0	0	13	0	0	0	13	1.1
English sole	0	0	0	0	13	0	0	0	13	1.1
Redtail surfperch	0	0	7	0	0	0	0	0	7	0.6
Unidentified fish	0	0	0	47	0	0	0	0	47	3.9
Total	103	170	70	70	336	327	60	78	1,214	100.2
Percentage	8.5	14.0	5.8	5.8	27.7	26.9	4.9	6.4	100.0	

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

Month	All Tideflats	
	Total (T-1 Only Station)	Percentage
March	0	0.0
April	4	6.1
May	62	93.9
June	0	0.0
July	0	0.0
August	0	0.0
September	0	0.0
October	0	0.0
<b>Total</b>	<b>66</b>	<b>100.0</b>

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

Month	All Tideflats	
	Total (T-1 Only Station)	Percentage
March	0	0.0
April	2	3.1
May	62	96.9
June	0	0.0
July	0	0.0
August	0	0.0
September	0	0.0
October	0	0.0
<b>Total</b>	<b>64</b>	<b>100.0</b>

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

Species	All Tideflats	
	Total (T-1 Only Station)	Percentage
Mud shrimp	213	12.5
Unidentified shrimp	1,493	87.5
<b>Total</b>	<b>1,706</b>	<b>100.0</b>

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

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	0	4	62	0	0	0	0	0	66	—
Fishing effort (hours)	0	2	62	0	0	0	0	0	64	—
Fishing success (catch/hr.)	0.0	79.0	25.0	0.0	0.0	0.0	0.0	0.0	26.7	—
Catch (number)										
Mud shrimp	0	0	213	0	0	0	0	0	213	12.5
Unidentified shrimp	0	158	1,335	0	0	0	0	0	1,493	87.5
<b>Total</b>	<b>0</b>	<b>158</b>	<b>1,548</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,706</b>	<b>100.0</b>
<b>Percentage</b>	<b>0.0</b>	<b>9.3</b>	<b>90.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>100.0</b>	



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

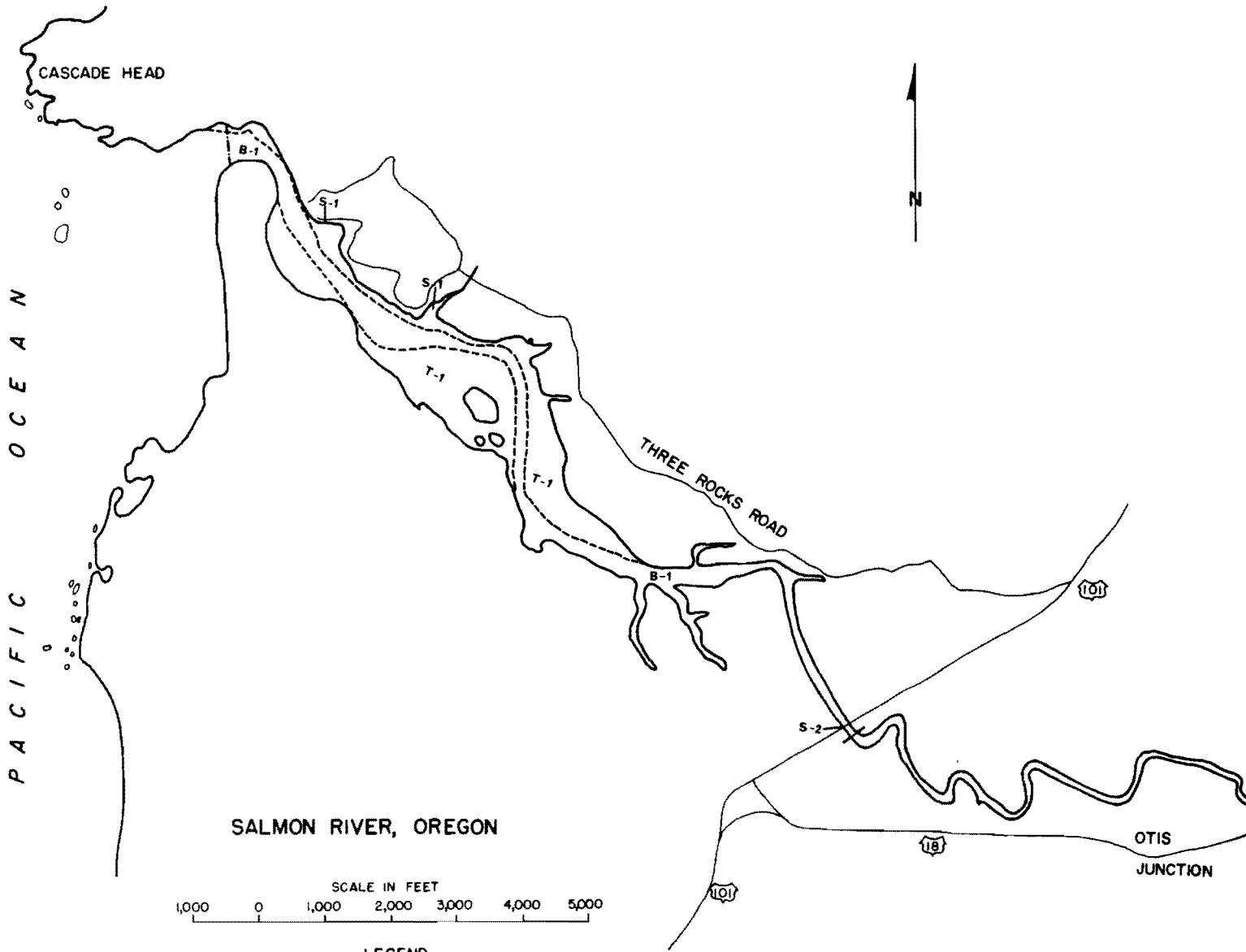
Station Number	No. Angler Trips	Angler Hours	Catch			Total
			Fish	Crabs	Shrimp	
B-1	767	2,550	718	828	0	1,546
Total	767	2,550	718	828	0	1,546
S-1	820	1,378	617	48	0	665
S-2	1,341	2,281	549	0	0	549
Total	2,161	3,659	1,166	48	0	1,214
T-1	66	64	0	0	1,706	1,706
Total	66	64	0	0	1,706	1,706
<b>Grand Total</b>	<b>2,994</b>	<b>6,273</b>	<b>1,884</b>	<b>876</b>	<b>1,706</b>	<b>4,466</b>

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

Fishery	Month	No. Angler Trips	Angler Hours	Catch			Total
				Fish	Crabs	Shrimp	
Boat	March	27	66	41	17	0	58
	April	38	94	58	25	0	83
	May	162	393	246	105	0	351
	June	70	171	106	45	0	151
	July	112	273	171	73	0	244
	August	162	703	44	255	0	299
	September	134	582	36	211	0	247
	October	62	268	16	97	0	113
	Total		767	2,550	718	828	0
Shore	March	217	359	103	0	0	103
	April	208	340	170	0	0	170
	May	184	321	70	0	0	70
	June	283	486	70	0	0	70
	July	165	275	336	0	0	336
	August	352	607	279	48	0	327
	September	538	904	60	0	0	60
	October	214	367	78	0	0	78
	Total		2,161	3,659	1,166	48	0
Tideflat	March	0	0	0	0	0	0
	April	4	2	0	0	158	158
	May	62	62	0	0	1,548	1,548
	June	0	0	0	0	0	0
	July	0	0	0	0	0	0
	August	0	0	0	0	0	0
	September	0	0	0	0	0	0
	October	0	0	0	0	0	0
	Total		66	64	0	0	1,706
Combined	March	244	425	144	17	0	161
	April	250	436	228	25	158	411
	May	408	776	316	105	1,548	1,969
	June	353	657	176	45	0	221
	July	277	548	507	73	0	580
	August	514	1,310	323	303	0	626
	September	672	1,486	96	211	0	307
	October	276	635	94	97	0	191
	<b>Grand Total</b>		<b>2,994</b>	<b>6,273</b>	<b>1,884</b>	<b>876</b>	<b>1,706</b>

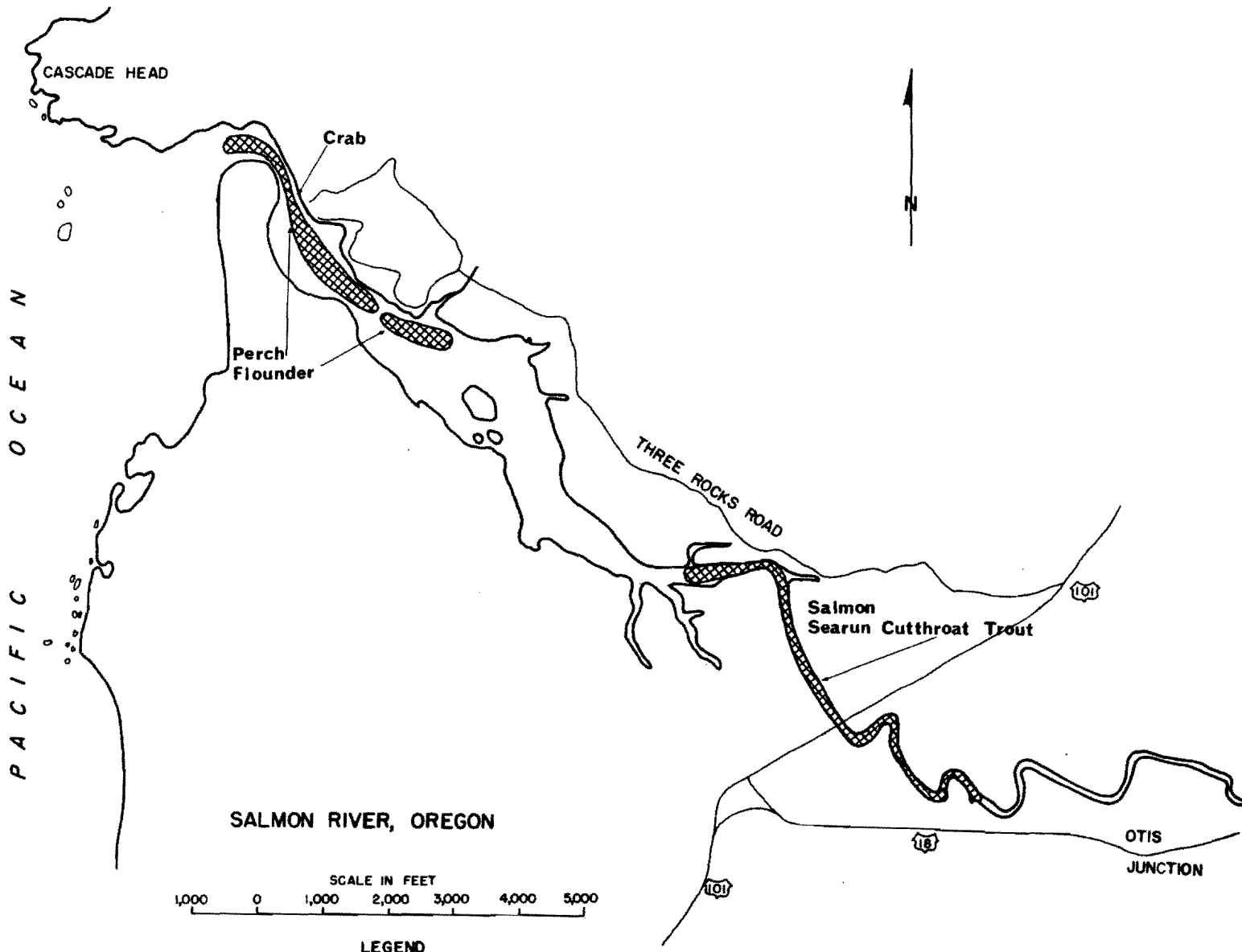
**Table 16. TAXONOMIC LIST OF SPECIES HARVESTED  
By Estuarine Resource Users, Salmon River Estuary  
March 1 through October 31, 1971**


Common Name	Local Names	Scientific Name
<b>Fish</b>		
Buffalo sculpin	Bullhead	<i>Enophrys bison</i>
Chinook salmon	King salmon, salmon	<i>Oncorhynchus tshawytscha</i>
Cutthroat trout	Blueback, harvest trout, sea run	<i>Salmo clarki</i>
English sole		<i>Parophrys vetulus</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>
<b>Crab</b>		
Dungeness crab	Market crab	<i>Cancer magister</i>
<b>Shrimp</b>		
Mud shrimp	Sand shrimp	<i>Upogebia pugettensis</i>



**FIGURE 2. 1971 FCO RESOURCE SURVEY SAMPLING AREAS**

- S - Shore Fishing Area**
- B - Boat Fishing Area**
- T - Tideflat Use Area**



**FIGURE 3.  PRINCIPAL BOAT FISHING AREAS, 1971**

<b>Crab (May - October)</b>	<b>Searun Cutthroat Trout (May - August)</b>
<b>Salmon (September - October)</b>	
<b>Perch (March - October)</b>	
<b>Flounder (April - August)</b>	

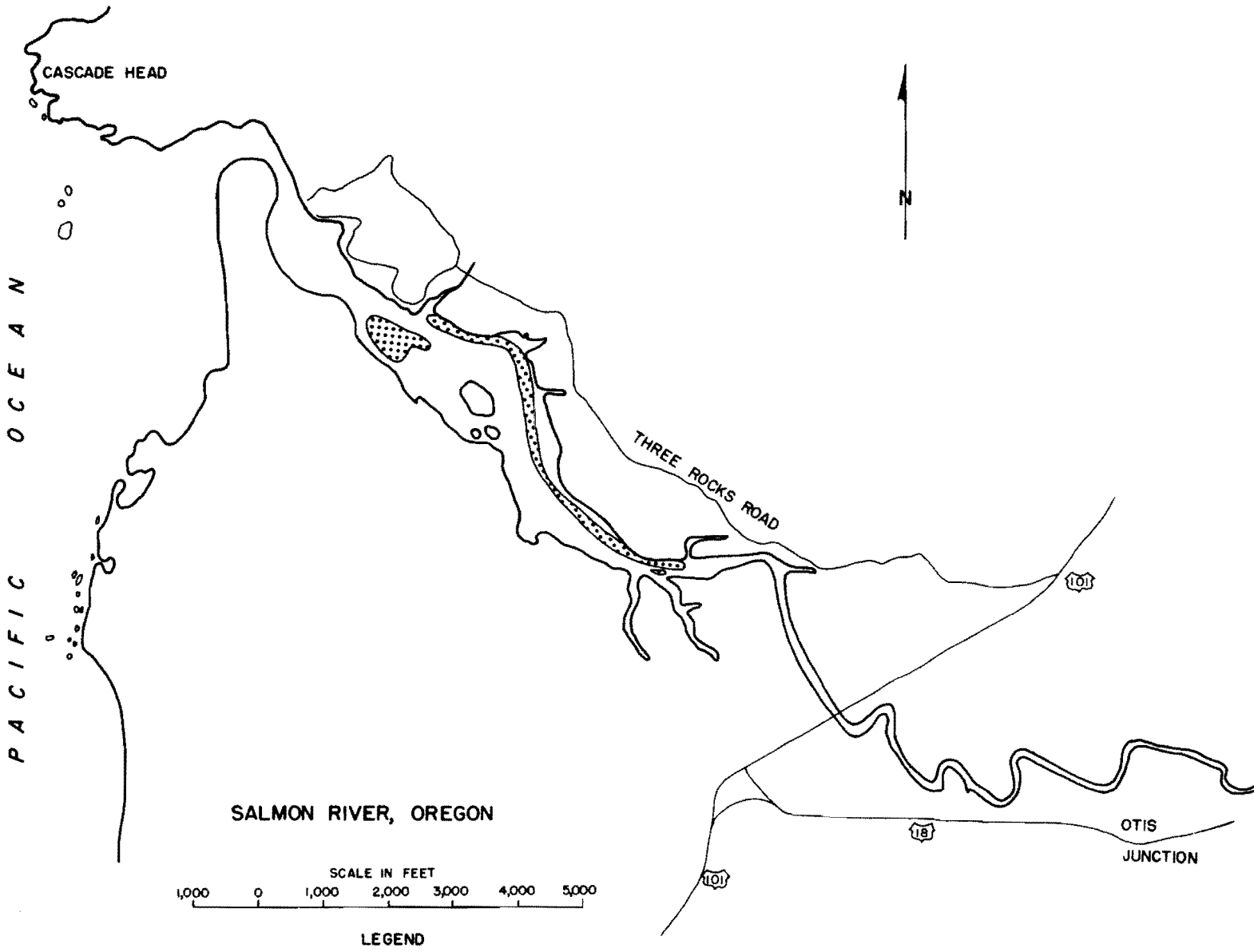


FIGURE 4.  CLAM BEDS, 1971

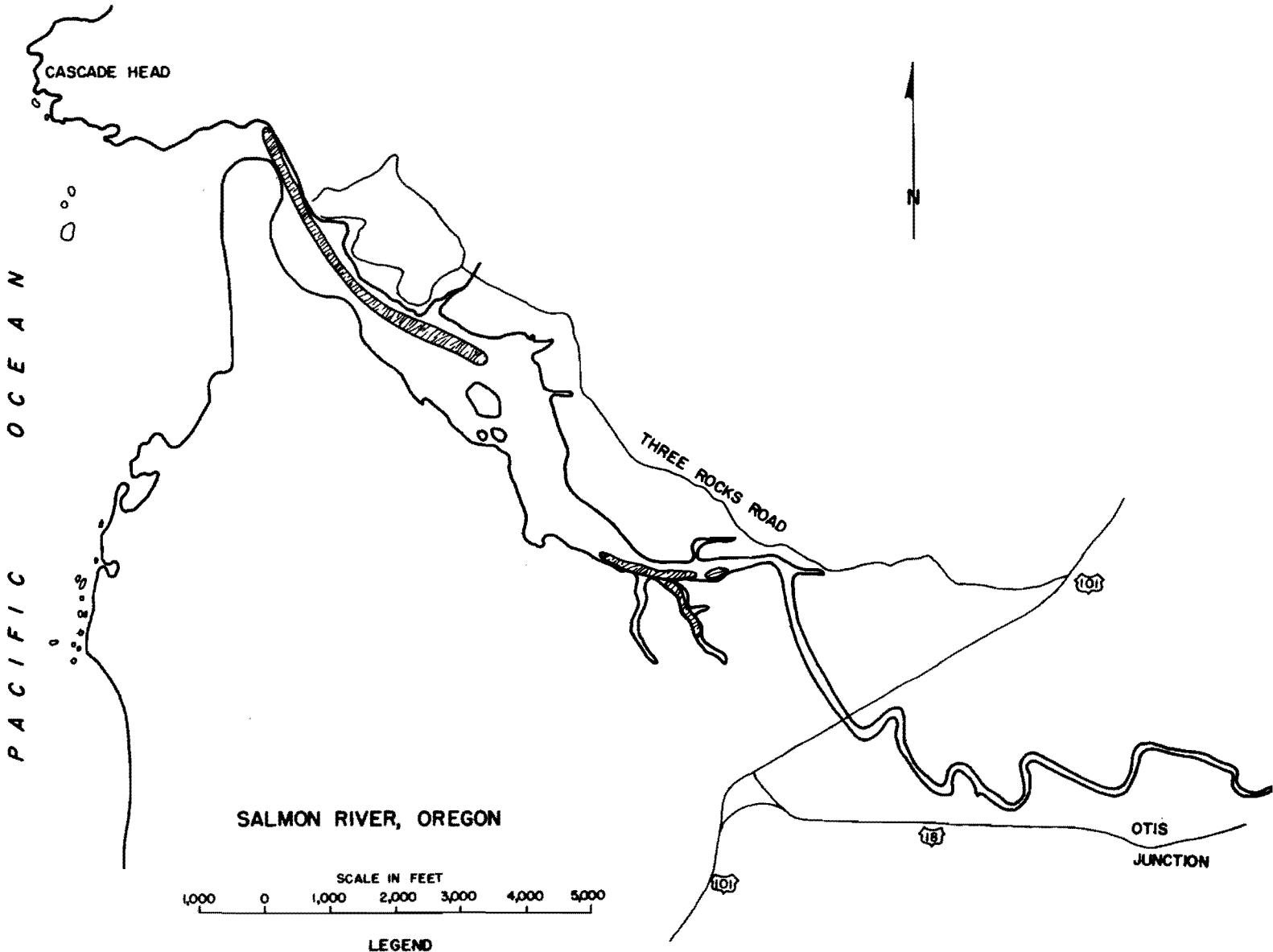


FIGURE 5.  EEL GRASS BEDS, 1971

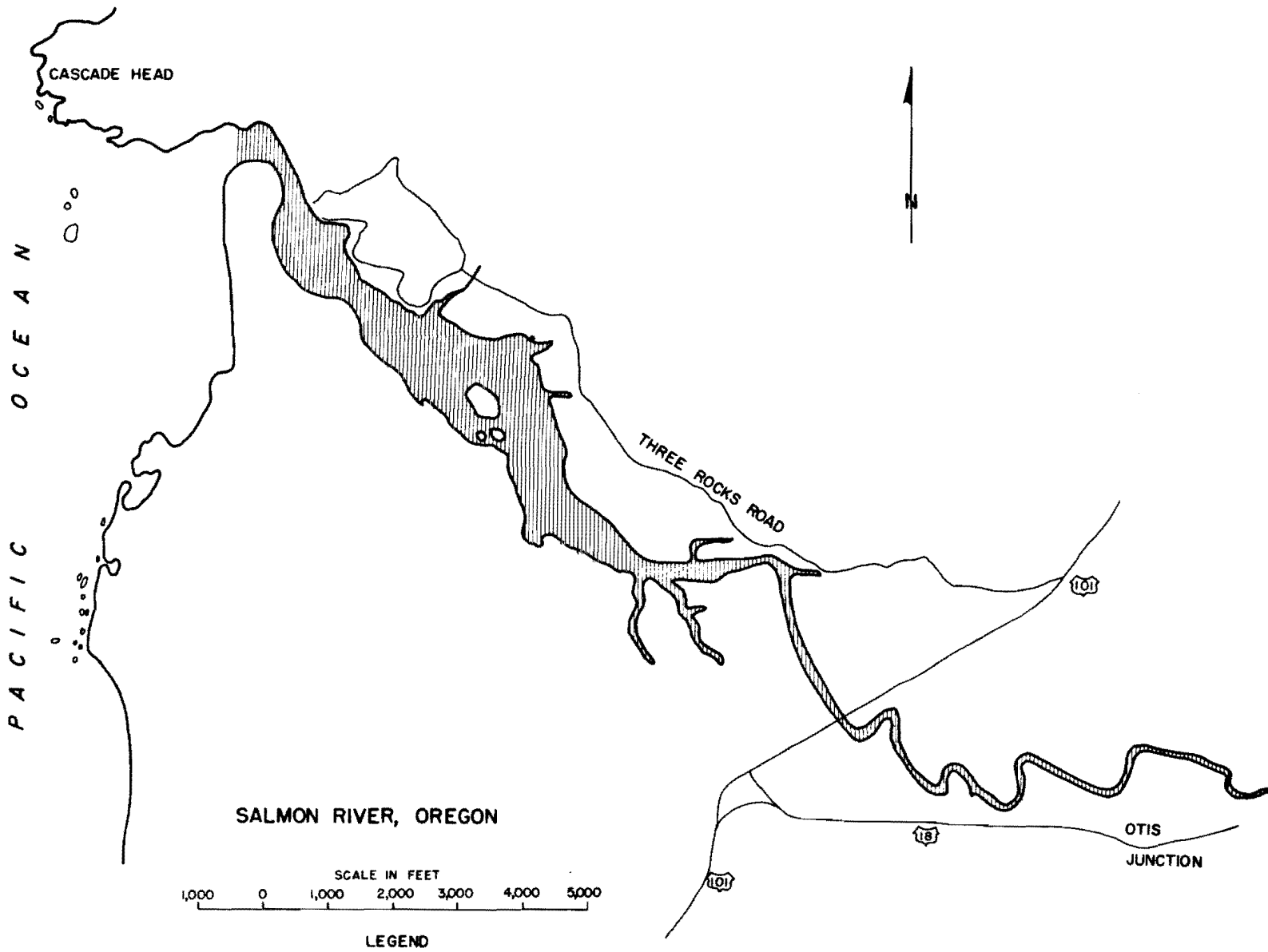


FIGURE 6.  FOOD PRODUCTION AREAS, FISH FEEDING AREAS AND FISH MIGRATION ROUTES, 1971



