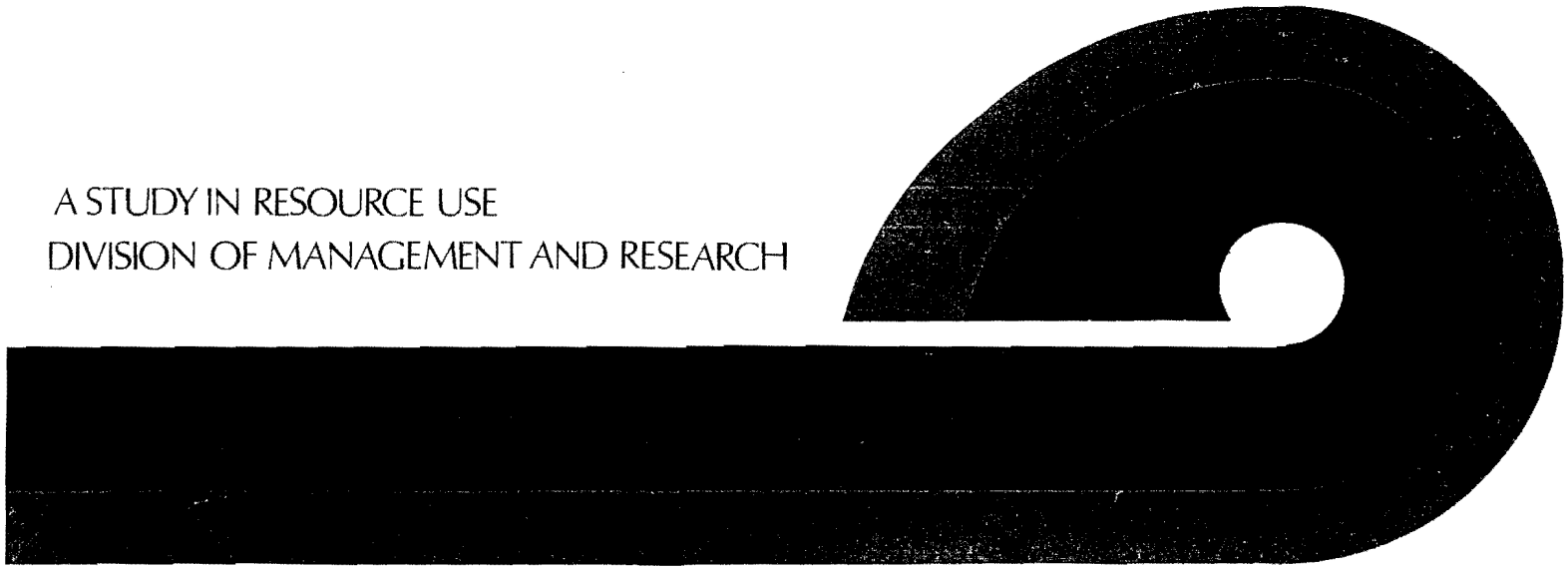
FISH COMMISSION OF OREGON

COLUMBIA RIVER ESTUARY

A STUDY IN RESOURCE USE
DIVISION OF MANAGEMENT AND RESEARCH



1971 COLUMBIA RIVER ESTUARY RESOURCE USE STUDY

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

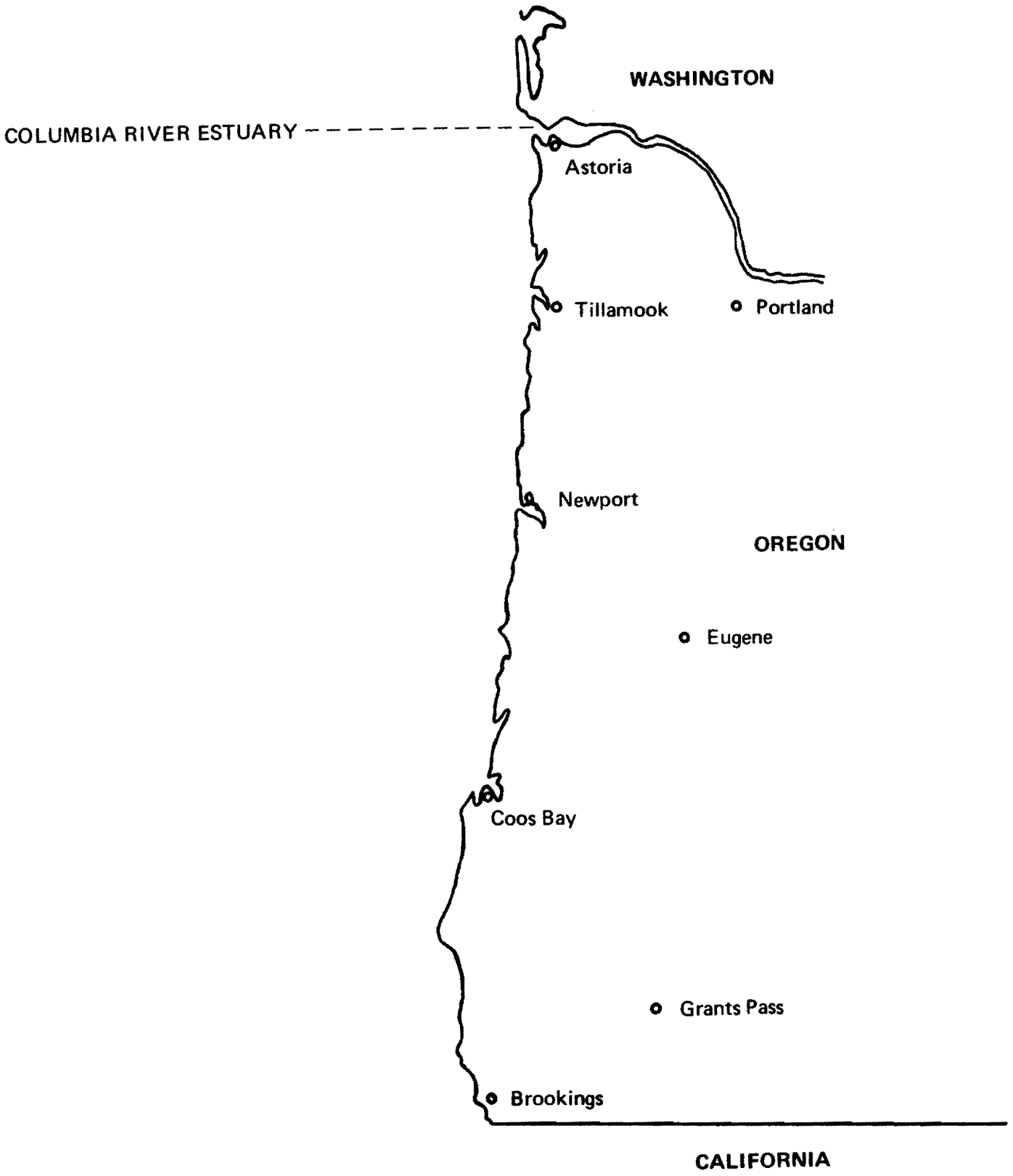


Figure 1. Location of Columbia River Estuary.

1971 COLUMBIA 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 Columbia River Estuary study.

PROCEDURE

The Columbia River Estuary forms the boundary between the states of Washington and Oregon (Figure 1). The amount of tidelands in the 15,000 acre estuary is not known.

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 observed during the study. Resource users were categorized as: (1) county, those people that reside within the county where the sampled estuary is found, but west of the coast range summit; (2) state, those people who are residents of Oregon, but are not classified as county; and (3) non-state, those people that are not residents of Oregon.

The study area extended from the seaward end of the south jetty upstream to the area adjacent to the Jetty Sands parking lot. There is an intensive boat fishery for salmon in the Columbia River Estuary that was not sampled. Only those boat anglers that launched boats across the sand at Jetty Sands were interviewed. The north jetty was not included in the shore sample since this area is in Washington. Survey areas and their station numbers are outlined in Table 1 and are shown in Figure 2.

The 1971 Columbia River Estuary commercial landings of fish and 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. Food production areas, fish feeding areas, fish migration routes, and known herring spawning areas.

RESULTS

During the study 2,212 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 lower Columbia River Estuary. Both sport and commercial boat fishing areas are combined on the map. Principal species of fish and shellfish caught and peak periods of fishing activity are outlined.

Only 18 boat anglers, landing at the Jetty Sands parking lot, were interviewed for catch and effort data during the study. This small number of anglers precluded making estimates of total catch and effort for the boat fishery.

Interview data revealed that these 18 boat anglers spent 72 hours fishing for 22 marine animals. Coho salmon was the principal species caught followed by chinook salmon, redtail surfperch and Dungeness crab.

Shore Fishery

Interview data revealed that 13,500 shore angler trips were expended on the Columbia River Estuary (Table 2). Shore anglers spent 40,700 hours fishing (Table 3). Jetty Sands was the principal fishing area; 52% of the anglers fished there. The peak month of activity was August.

Sixteen species of fish and one species of crab were identified in the shore anglers' catch (Table 4). Redtail surfperch, Pacific tomcod, and starry flounder were the principal species taken, accounting for 81% of the total number of animals caught. The peak catch occurred during the months of July through September (Table 5). Fishing success (catch per hour) was the highest during October.

Tideflat Fishery

Figure 4 shows the one known bay clam area in the lower Columbia River Estuary. This flat, near the South Jetty, contains standing water that may dry up during some years. In this less than ½ acre area, primarily softshell clams have been found. Twenty-one clam diggers were interviewed for catch and effort data. This scarcity of clam digging effort precluded making estimates of the total catch and effort for the tideflat fishery. Interview data showed that the 21 clam diggers spent 22 hours digging 249 softshell and 4 cockle clams.

Angler Origin

Of the resource users interviewed, 59% were residents of Oregon living outside of Clatsop County, 33% were residents of Clatsop County, and 8% were nonresidents.

Commercial Fishery

Commercial landings of marine food fish and shellfish caught in the Columbia River Estuary in 1971 totaled 3,874,638 pounds valued at $1,329,809 (fisherman's level)

according to Fish Commission landing statistics, listed below, Chinook salmon was the principal species harvested.

Species	Pounds	Value
Chinook salmon	2,544,760	$967,000
Coho salmon	922,491	266,500
White sturgeon	144,864	36,216
Dungeness crab	93,570	23,393
Steelhead trout	65,805	19,742
Sockeye salmon	33,448	13,379
Green sturgeon	48,840	1,997
Shad	16,866	1,012
Chum salmon	2,857	286
Smelt	1,137	284
Total	3,874,638	$1,329,809

Food Production Areas, Fish Feeding Areas, Fish Migration Routes, and Known Herring Spawning Areas

Figure 5 shows the food production areas, fish feeding areas, and fish migration routes in the Columbia River Estuary. Also outlined on the map is the known herring spawning area.

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 Columbia 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 Columbia River Estuary (for finfish and shellfish) include all areas of the estuary 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 tideflats include flounder, perch, rockfish, salmon, crabs, shrimp, and clams. In addition to those species found on tideflats, shad, sturgeon, herring, anchovy, and smelt 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 6.

Rocky areas in the Columbia River Estuary are the preferred feeding and rearing areas of perch, rockfish, greenling, and cabezon. These fish reside near the jetties and rock groins of the lower bay.

Fish migration routes are those areas traveled by fish to and from spawning, feeding, or rearing areas. Fish migration routes through the Columbia 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, shad, sturgeon, perch, flounder, and baitfish is well known. In addition, during high tide, these same fish frequently swim across tideflats to reach their destination.

From January through March, herring eggs can be found adhered to pilings, rocks, or eel grass in these areas. Anticipated studies on herring spawning and rearing in the Columbia River will no doubt reveal other areas used by these fish.

ACKNOWLEDGMENTS

The Fish Commission of Oregon personnel who contributed in the gathering, compiling, analyzing of data, typing, and editing of this report are too numerous to mention by name. However, special thanks are due Mrs. Linda Karlik for the work she did on the resource maps and Mr. Louis Fredd for his assistance in analyzing the data.

Table 1. LOCATION OF SAMPLING STATIONS
Columbia River Estuary, 1971

Fishing Activity	Station Number	Location
Boat	B-1	Hammond Boat Basin to westward end of jetties
Shore	S-1	South Jetty parking lot
	S-2	Jetty Sands parking lot and adjacent beach area

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

	Shore Fishing Area and Station Number			
	South Jetty	Jetty Sands		
Month	S-1	S-2	Total	Percentage
March	74	300	374	2.8
April	280	946	1,226	9.1
May	467	620	1,087	8.1
June	485	754	1,239	9.2
July	1,795	1,126	2,921	21.7
August	2,156	2,087	4,243	31.5
September	1,141	882	2,023	15.0
October	115	237	352	2.6
Total	6,513	6,952	13,465	100.0
Percentage	48.4	51.6	100.0	

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

	Shore Fishing Area and Station Number			
	South Jetty	Jetty Sands		
Month	S-1	S-2	Total	Percentage
March	226	918	1,144	2.8
April	851	2,876	3,727	9.2
May	1,398	1,852	3,250	8.0
June	1,476	2,294	3,770	9.3
July	5,391	3,382	8,773	21.6
August	6,562	6,353	12,915	31.7
September	3,416	2,640	6,056	14.9
October	349	716	1,065	2.6
Total	19,669	21,031	40,700	100.1
Percentage	48.3	51.7	100.0	

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

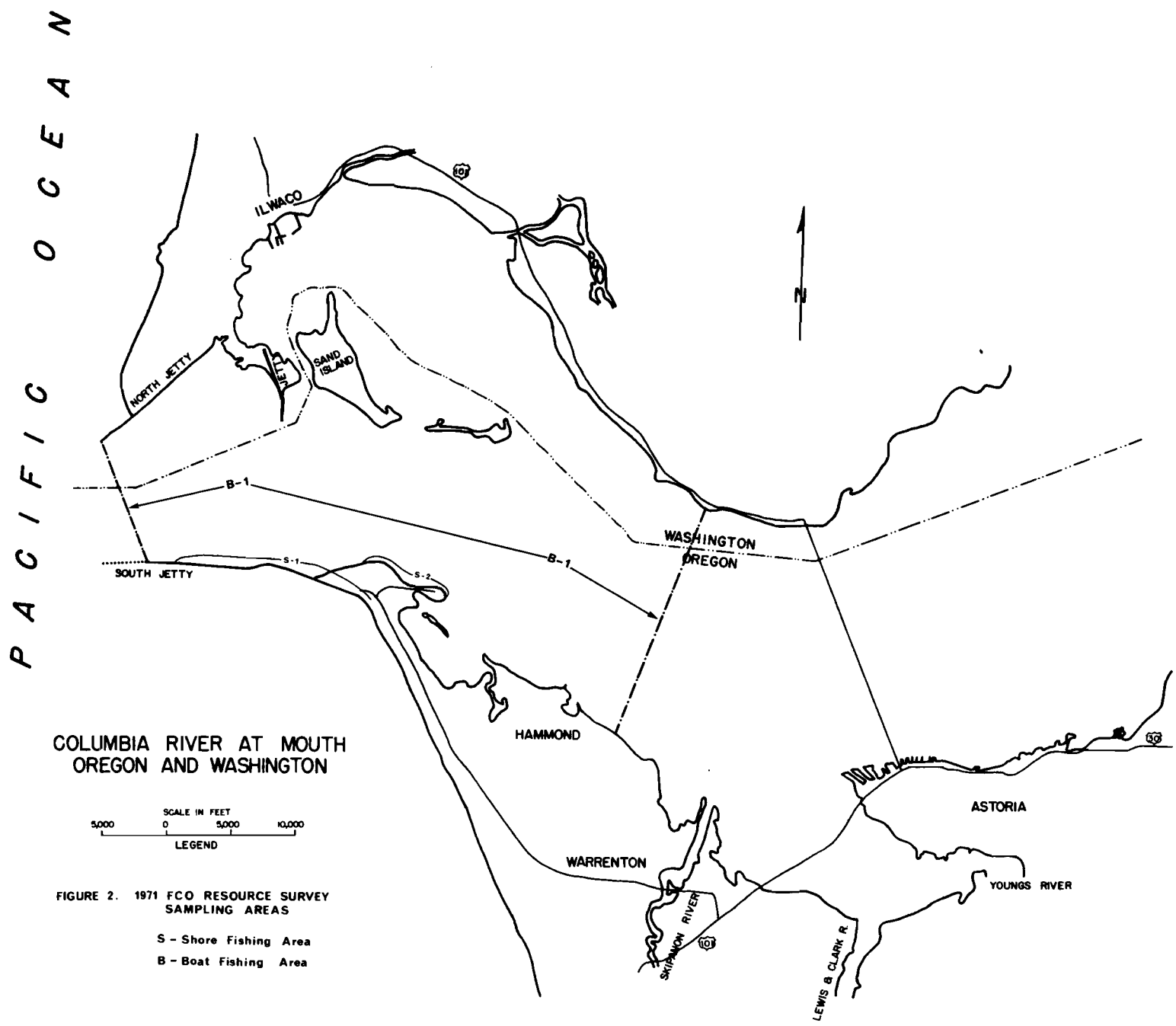
Species	Shore Fishing Area and Station Number: South Jetty S-1	Jetty Sands S-2	Total	Percentage
Dungeness crab	51	0	51	0.3
Redtail surfperch	6,285	3,872	10,157	55.7
Pacific tomcod	1,090	1,672	2,762	15.2
Starry flounder	373	1,416	1,789	9.8
Coho salmon (adult)	365	147	512	2.8
Columbia River chub	0	94	94	0.5
Striped seaperch	67	0	67	0.4
Red Irish lord	53	0	53	0.3
Chinook salmon (adult)	14	21	35	0.2
Whitespotted greenling	28	0	28	0.2
Black rockfish	18	0	18	0.1
Spiny dogfish	13	0	13	0.1
Lingcod	8	0	8	<0.1
Sand sole	6	0	6	<0.1
Pacific staghorn sculpin	0	5	5	<0.1
Cabezon	5	0	5	<0.1
Shiner perch	0	5	5	<0.1
Unidentified fish	215	2,396	2,611	14.3
Total	8,591	9,628	18,219	99.9
Percentage	47.1	52.8	99.9	

Table 5. SHORE FISHING DATA
Columbia River Estuary, All Areas
1971

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	374	1,226	1,087	1,239	2,921	4,243	2,023	352	13,465	–
Fishing effort (hours)	1,144	3,727	3,250	3,770	8,773	12,915	6,056	1,065	40,700	–
Fishing success (catch/hr.)	0.17	0.25	0.49	0.63	0.51	0.32	0.52	1.30	0.45	–
Catch (number)										
Dungeness crab	0	0	0	6	21	24	0	0	51	0.3
Redtail surfperch	12	368	1,101	1,935	3,427	1,434	1,077	803	10,157	55.7
Pacific tomcod	0	26	16	166	339	1,684	287	244	2,762	15.2
Starry flounder	181	395	367	61	252	424	99	10	1,789	9.8
Coho salmon (adult)	0	0	0	0	0	312	200	0	512	2.8
Columbia River chub	0	0	0	24	38	32	0	0	94	0.5
Striped seaperch	0	67	0	0	0	0	0	0	67	0.4
Red Irish lord	0	0	5	0	32	0	6	10	53	0.3
Chinook salmon (adult)	0	13	0	0	0	16	6	0	35	0.2
Whitespotted greenling	0	0	0	18	10	0	0	0	28	0.2
Black rockfish	0	0	10	0	0	8	0	0	18	0.1
Spiny dogfish	0	0	0	0	5	8	0	0	13	0.1
Lingcod	0	0	0	0	0	8	0	0	8	<0.1
Sand sole	0	0	0	6	0	0	0	0	6	<0.1
Pacific staghorn sculpin	0	0	0	0	5	0	0	0	5	<0.1
Cabezon	0	0	0	0	5	0	0	0	5	<0.1
Shiner perch	0	0	5	0	0	0	0	0	5	<0.1
Unidentified fish	6	46	92	153	299	192	1,504	319	2,611	14.3
Total	199	915	1,596	2,369	4,433	4,142	3,179	1,386	18,219	99.9
Percentage	1.1	5.0	8.8	13.0	24.3	22.7	17.4	7.6	99.9	

Table 6. TAXONOMIC LIST OF SPECIES HARVESTED By Estuarine Resource Users, Columbia River Estuary March 1 through October 31, 1971

Common Name	Local Names	Scientific Name
Fish		
Black rockfish	Black sea bass, black snapper	*Sebastes melanops*
Cabezon	Rock cod, bullhead	*Scorpaenichthys marmoratus*
Chinook salmon	King salmon, salmon	*Oncorhynchus tshawytscha*
Coho salmon	Silver salmon	*Oncorhynchus kisutch*
Columbia River chub	Peamouth	*Mylocheilus caurinus*
Spiny dogfish		*Squalus acanthias*
Lingcod		*Ophiodon elongatus*
Pacific staghorn sculpin	Bullhead	*Leptocottus armatus*
Pacific tomcod		*Microgadus proximus*
Red Irish lord	Bullhead	*Hemilepidotus hemilepidotus*
Redtail surfperch		*Amphistichus rhodoterus*
Sand sole		*Psettichthys melanostictus*
Shiner perch	Shiners	*Cymatogaster aggregata*
Starry flounder		*Platichtys stellatus*
Striped seaperch	Rainbow perch	*Embiotoca lateralis*
Whitespotted greenling	Seatrout	*Hexagrammos stelleri*
Crab		
Dungeness crab	Market crab	*Cancer magister*
Clams		
Cockle clam	Basket cockle, steamer	*Clinocardium nuttallii*
Softshell clam	Mud clam, bay clam	*Mya arenaria*



COLUMBIA RIVER AT MOUTH
OREGON AND WASHINGTON

FIGURE 2. 1971 FCO RESOURCE SURVEY SAMPLING AREAS

S - Shore Fishing Area

B - Boat Fishing Area

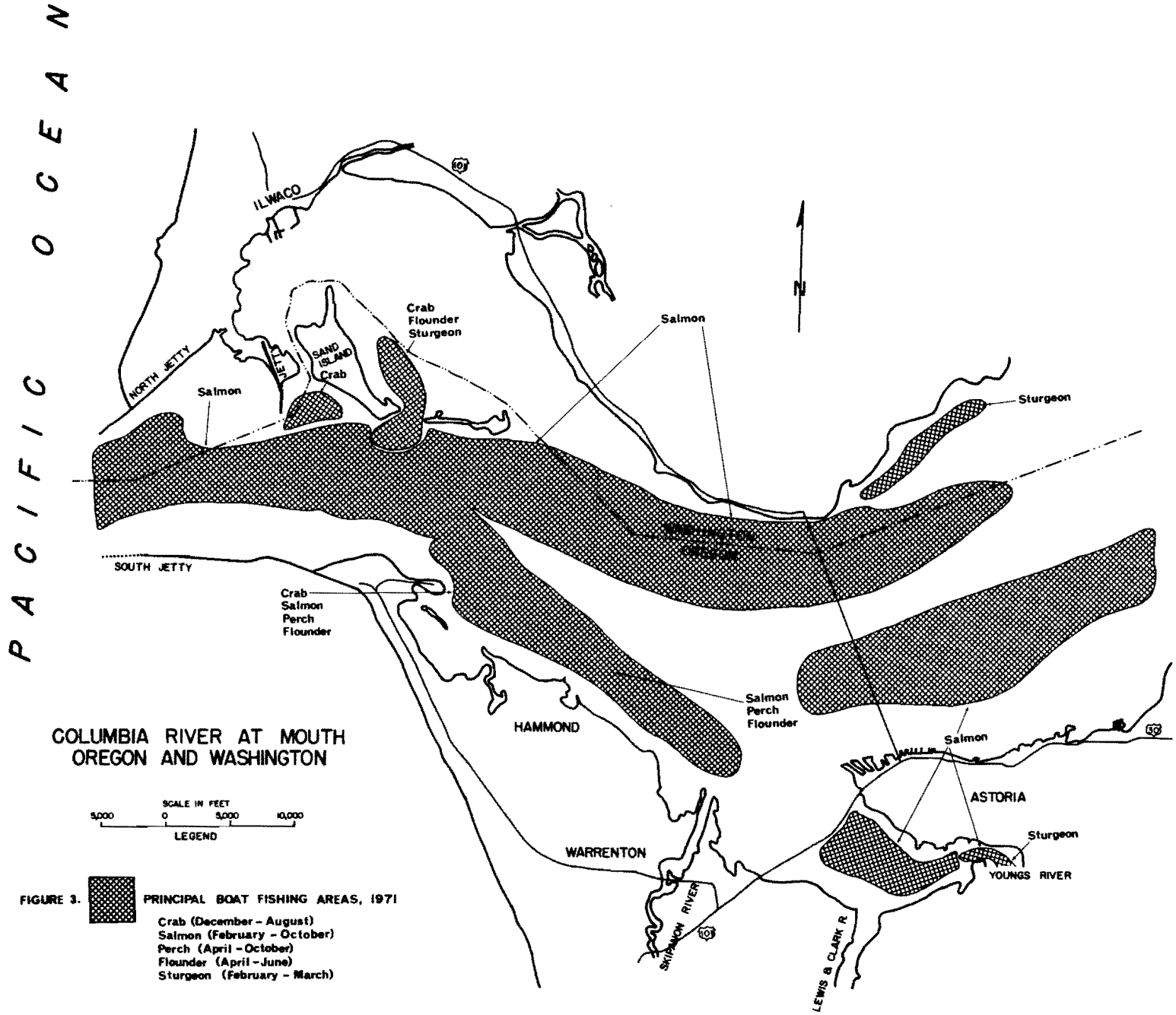


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FIGURE 3. PRINCIPAL BOAT FISHING AREAS, 1971

Crab (December – August)
Salmon (February – October)
Perch (April – October)
Flounder (April – June)
Sturgeon (February – March)

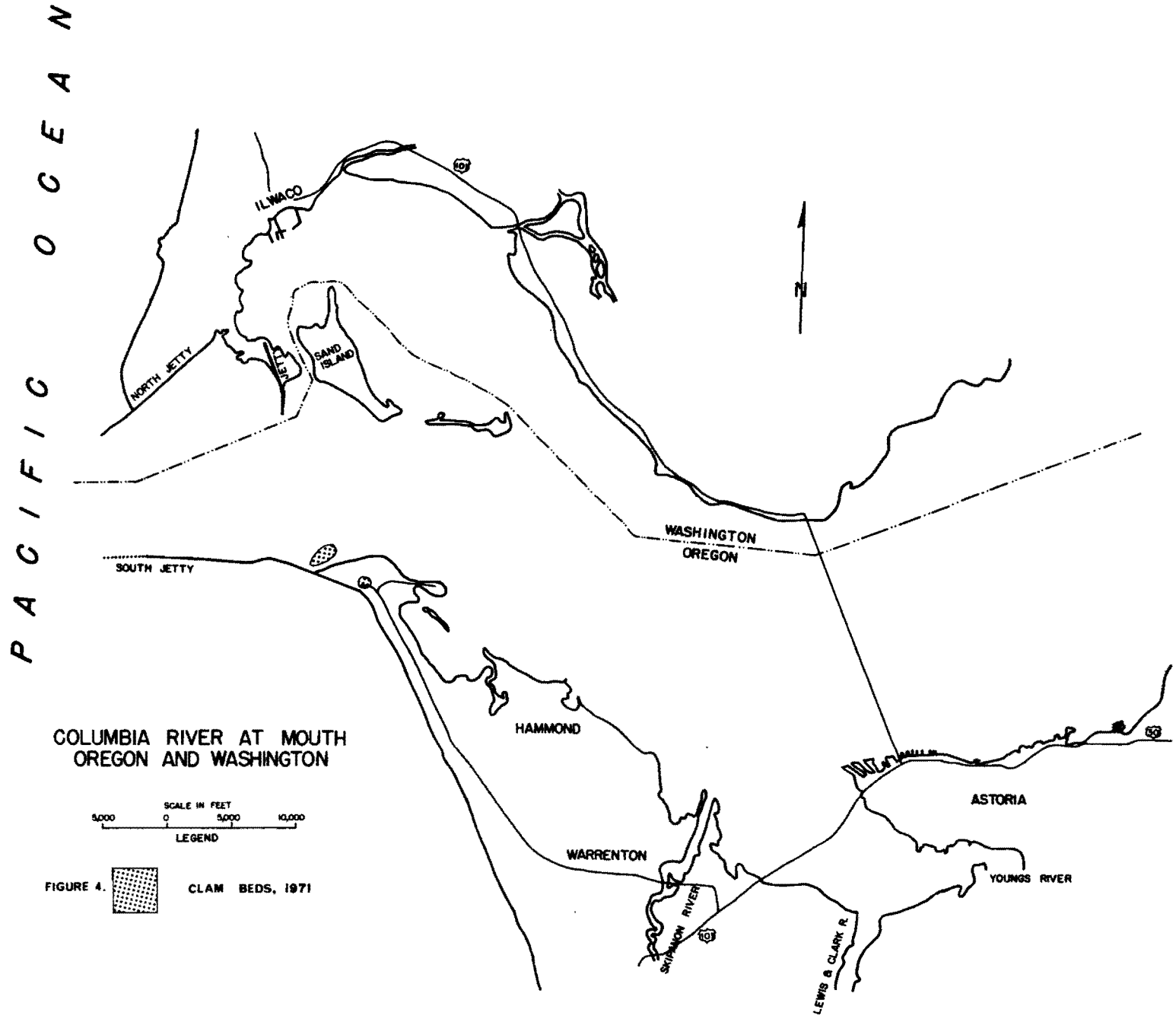

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FIGURE 4. CLAM BEDS, 1971

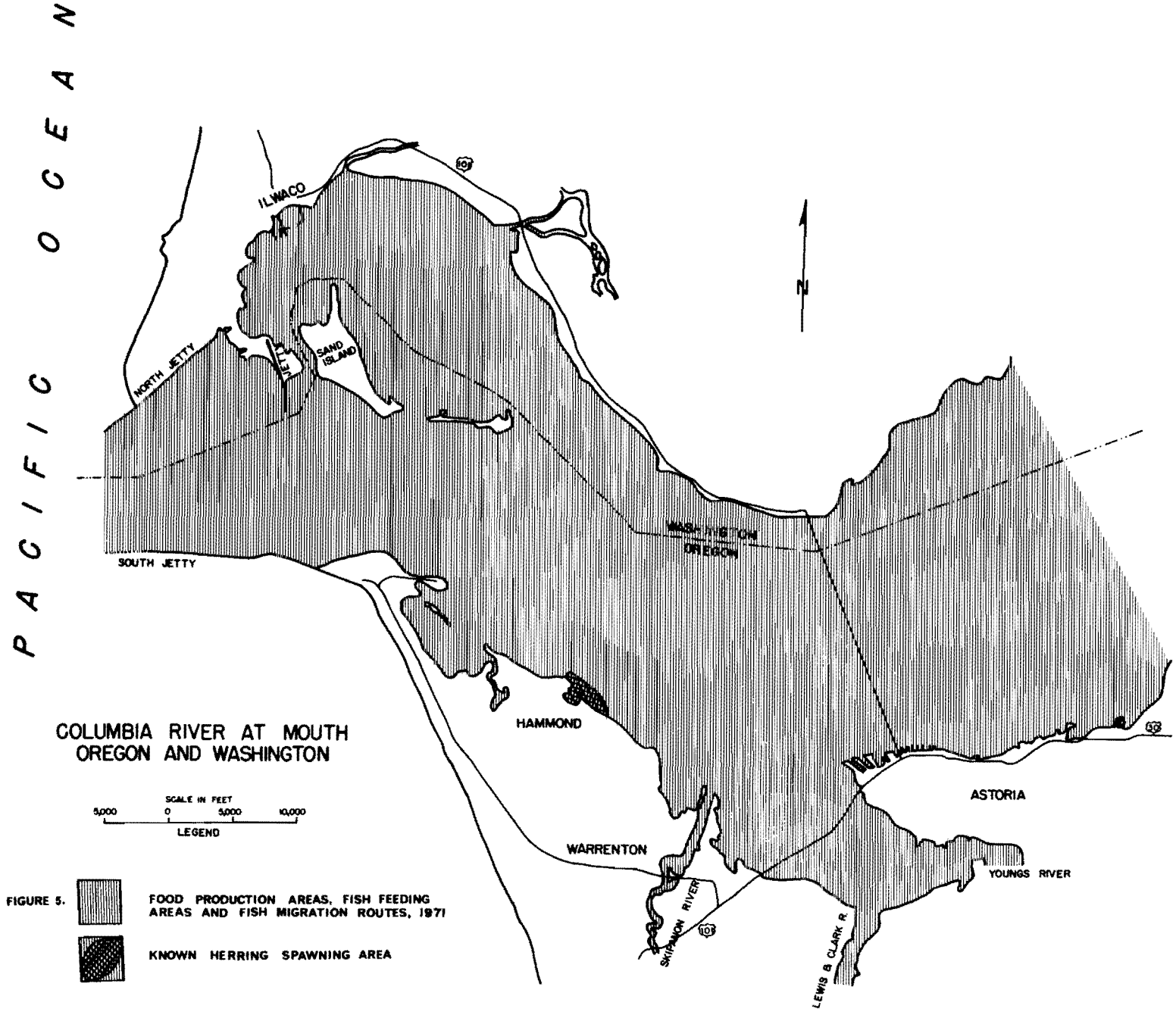

FIGURE 5. FOOD PRODUCTION AREAS, FISH FEEDING AREAS AND FISH MIGRATION ROUTES, 1971

KNOWN HERRING SPAWNING AREA


STATE OF OREGON
THE UNION
1859