FISH COMMISSION OF OREGON

YAQUINA BAY ESTUARY

A STUDY IN RESOURCE USE
DIVISION OF MANAGEMENT AND RESEARCH

1970-71 YAQUINA BAY RESOURCE USE STUDY

by
Tom Gaumer
Darrell Demory
Laimons Osis
Charles Walters

Fish Commission of Oregon
Division of Management and Research

Funded by
State of Oregon
General Fund

U.S. Army Corps of Engineers
Contract No. DACW 57-72-C-0138

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
PL 88-309 Contract Nos. N208-0073-72(N) and NO4-3-208-55

February 1974

CONTENTS

FIGURES

TABLES

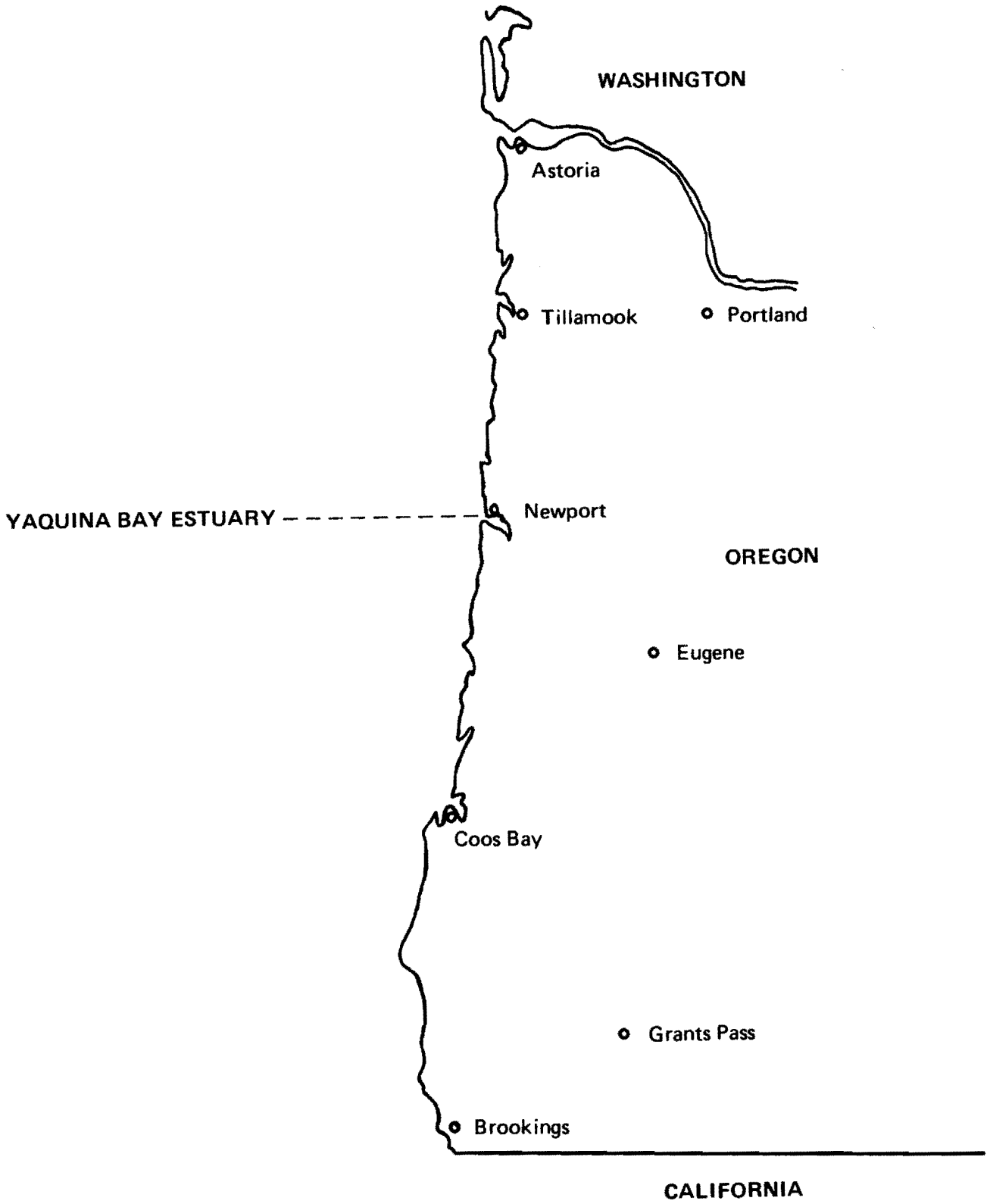

Figure 1. Location of Yaquina Bay Estuary.

1970-71 YAQUINA BAY
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. Anadromous sport fisheries in the upper portions of most estuaries were not included in the study due to 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 Yaquina Bay study.

PROCEDURE

Yaquina Bay is located 152 miles south of the Columbia River (Figure 1). The 3,910-acre bay contains 1,353 acres of tidelands.

The survey period for the Yaquina Bay study differed slightly from that for the other estuaries due to another resource use study in progress on the bay. Results of this study were summarized and included in this report. Sampling of the skin diver fishery occurred from October 1, 1970 through October 31, 1971; the shore fishery from October 1, 1970 through September 30, 1971; and the boat and tideflat fisheries from March 1, 1971 through October 31, 1971. During the study, boat and shore anglers, tideflat users, and skin divers were interviewed for catch, effort, and origin data in a program designed for statistical analysis. 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) nonstate, those people that are not residents of Oregon.

The study area extended from the seaward ends of the two jetties upstream 12 miles to Toledo. Survey areas and their station numbers are outlined in Table 1 and are shown in Figure 2.

The 1971 Yaquina Bay commercial landings of fish and shellfish and their value, taken from Fish Commission catch statistic reports, are included 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. Commercial oyster leases and potential oyster growing area.
5. Food production areas, fish feeding areas, fish migration routes, and known herring spawning areas.

RESULTS

During the study 12,048 boat, shore, tideflat, and skin diver resource user interviews were obtained to estimate catch and effort values and angler origin. 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 Yaquina Bay. 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.

An estimated 27,600 boat angler trips were expended on Yaquina Bay (Table 2). Of this total 75% occurred above the Highway 101 bridge. Boat anglers spent 93,600 hours fishing (Table 3). Peak month of activity was August.

Thirty species of fish and two species of crab were identified in the anglers' catch (Table 4). Dungeness crab, Pacific herring, and starry flounder were the principal species taken accounting for 68% of the total number of animals caught. The area above the Highway 101 bridge was the principal area of catch, providing 79,600 animals or 85% of the harvest. Peak catch and fishing success (catch per hour) were highest during June (Table 5).

Shore Fishery

Interview data revealed that 47,300 shore angler trips were expended on Yaquina Bay (Table 6). The Sause Brothers' Dock at South Beach was the principal fishing area; 31% of the anglers fished there. Shore anglers spent 86,000 hours fishing (Table 7). Peak months of activity were May through August.

Thirty-one species of fish and two species of crab were identified in the shore anglers' catch (Table 8). Pacific herring and starry flounder were the principal species harvested, accounting for 27% of the 90,400 animals caught. Catch was highest in June and fishing success was highest in November (Table 9).

Tideflat Fishery

Figure 4 shows the distribution of bay clams in Yaquina Bay. Several species of clams, including gaper, cockle, littleneck, piddock, and butter clams are found in the intertidal and subtidal zones of the bay below Coquille Point. Softshell clams are found scattered throughout the upper portions of Yaquina Bay to Toledo. Principal areas of digging are outlined on the map.

Table 10 shows that 24,300 tideflat user trips were expended to harvest clams, miscellaneous invertebrates, and fish from Yaquina Bay. Of this total, 23,600 or 97% were clam digger trips. Tideflat users spent 36,300 hours collecting these animals (Table 11). Peak month of activity was July. Major digging effort (43%) was expended in the Idaho Point area where 10,500 tideflat users spent 15,600 hours collecting tideflat animals.

Seven species of clams and 11 species of miscellaneous invertebrates and fish were harvested by tideflat users (Table 12). Cockle, softshell, and gaper clams were the principal species collected, accounting for 99% of the total number of clams dug. Idaho Point was the principal area of catch providing 160,500 animals or 36% of the harvest. Of this total, 140,000 or 87% were clams.

Skin Diver Fishery

An important skin diver fishery occurs in Yaquina Bay primarily along the south jetty below the Highway 101 bridge.

Interview data revealed that 1,500 diver trips were expended on the estuary (Table 13). The divers spent 1,900 hours in the water (Table 13). August was the peak month of activity.

Fifteen species of fish and 5 species of miscellaneous invertebrates were identified in the divers' take (Table 14). Black rockfish, lingcod, and cabezon were the principal species taken, accounting for 60% of the total number of animals caught. Catch was highest during August and fishing success was highest during July.

Angler Origin

Approximately 75% of the anglers interviewed were residents of Oregon living outside of Lincoln County, 18% were Lincoln County residents, and 7% were out-of-state residents.

	Angler Origin		
	County	State	Non-State
Boat	2,698	23,795	1,061
Shore	6,627	37,298	3,408
Tideflat	8,720	13,371	2,168
Skin Diving	109	340	9
Total	**18,154**	**74,804**	**6,646**
Percentage	**18.2**	**75.1**	**6.7**

Combined Recreational Fisheries

A total of 100,700 resource user trips (27,600 boat, 47,300 shore, 24,300 tideflat, and 1,500 diver) were expended on Yaquina Bay during the study (Table 15). The 100,700 user trips represented 217,800 hours of effort (93,600 boat, 86,000 shore, 36,300 tideflat, and 1,900 diver). August was the peak month of activity for the boat, shore, and skin diving fisheries while July was the peak month for the tideflat fishery (Table 16). Combining all fisheries, July was the peak month of activity. Areas receiving the principal use for the boat, shore, tideflat, and skin diving fisheries were above the 101 bridge (75%), Sause Brothers' Dock (31%), Idaho Point (43%), and below 101 bridge (100%), respectively.

Anglers of the four fisheries harvested 626,500 animals (402,400 clams, 133,600 fish, 53,100 crabs, and 37,400 miscellaneous invertebrates). Principal species harvested by boat anglers were Dungeness crab (39%), Pacific herring (15%), and starry flounder (14%). Fish represented 87% of the shore anglers' catch with Pacific herring, starry flounder, and northern anchovy the main species landed. Clams comprised 90% of the tideflat users' total take with cockle, softshell, and gaper clams the principal species dug. Black rockfish, lingcod, and cabezon were the main species harvested by skin divers. Comparing the catch for all four fisheries revealed that tideflat users harvested 440,400 or 70% of the animals taken. Boat and shore anglers and skin divers harvested 94,000, 90,400, and 1,700 marine animals, respectively. Combining all four fisheries showed that July was the peak month of catch.

Commercial Fishery

Commercial landings of marine food fish and shellfish caught in Yaquina Bay in 1971 totaled 67,968 pounds valued at $97,121 (fisherman's level) according to Fish Commission landing statistics. Oysters, the principal species harvested, had a value of $81,000.

Species	Pounds	Value
Oysters	39,560	$81,000
Herring	8,175	8,175
Anchovy	11,825	5,913
Dungeness crab	5,906	1,477
Bay clams	2,039	347
Ghost and mud shrimp	113	114
Smelt	350	95
Total	**67,968**	**$97,121**

Eel Grass Beds

Eel grass beds are found scattered throughout Yaquina Bay up to Boone Slough at river mile 9 (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.

Commercial Oyster Leases and Potential Oyster Growing Area

Oysters are grown commercially from river mile 6 (Riverbend) upstream to river mile 8. Figure 6 shows the commercial oyster leases, totaling 411.75 acres. An estimated 1,800 acres of Yaquina Bay are considered suitable for oyster culture.

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

Figure 7 shows the food production areas, fish feeding areas, and fish migration routes in the bay. Also outlined on the map are the known herring spawning areas.

Estuaries are some of the most productive lands on earth. 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.

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.

Fish feeding areas of Yaquina Bay (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.

Fifty-six species of fish have been identified in Yaquina Bay (Charles Walters, personal communication). A taxonomic list of the species of marine animals observed in this study is contained in Table 17.

Fish and shellfish typically found associated with the tideflats include flounder, sole, perch, rockfish, salmon, crabs, shrimp, and clams. In addition to those species found on tideflats, shad, sturgeon, herring, anchovy, and smelt reside in estuary channels; period of residency is dependent on species, season, and location.

Rocky areas in the bay are preferred feeding and rearing areas of perch, rockfish, greenling, and cabezon. These fish reside near 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 bay 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.

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.

During the months of January through April, herring eggs can be found adhered to pilings, rocks, or eel grass in the areas outlined in Figure 7. More complete observations in the future will no doubt reveal other areas used by these fish.

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. We also wish to thank Mr. Bill Herder, owner of Deep Sea Bill's in South Beach, for his assistance in interviewing skin divers.

Table 1. LOCATION OF SAMPLING STATIONS
Yaquina Bay, 1970-71

Fishing Activity	Station Number	Location
Boat	B-1	Below 101 bridge
	B-2	Above 101 bridge
Shore	S-1	South Jetty
	S-2	North Jetty
	S-3	Fish Plants
	S-4	Meester's Fish Market
	S-5	Public Dock #1 (Undersea Gardens)
	S-6	Public Dock #3 (Sea Gull Landing)
	S-7	Public Dock #5 (commercial boat dock)
	S-8	Public Dock #7
	S-9	Moore's Marina
	S-10	Coquille Point
	S-11	Sawyer's Marina
	S-12	Yaquina Marina
	S-13	River Bend Marina
	S-14	Buoy 25
	S-15	Float House
	S-16	Oregon Oyster Company
	S-17	Fowler's Oyster Company
	S-18	Sause Brothers' Dock
Tideflat	T-1	Bridge flats (Highway 101 bridge beds)
	T-2	Idaho Point
	T-3	Breakwater flat
	T-4	Sally's Bend
	T-5	Softshell flats
Diver	D-1	Below 101 bridge

Table 2. NUMBER OF BOAT ANGLER TRIPS
By Month and Area, Yaquina Bay
March 1 through October 31, 1971

Month	Boat Fishing Area and Station Number: Below 101 Bridge B-1	Above 101 Bridge B-2	Total	Percentage
March	153	1,571	1,724	6.3
April	144	1,992	2,136	7.8
May	142	2,298	2,440	8.9
June	521	3,224	3,745	13.6
July	1,357	4,249	5,606	20.3
August	3,643	3,302	6,945	25.2
September	926	1,886	2,812	10.2
October	133	2,013	2,146	7.8
Total	7,019	20,535	27,554	100.1
Percentage	25.5	74.5	100.0	

Table 3. HOURS OF BOAT ANGLER USE
By Month and Area, Yaquina Bay
March 1 through October 31, 1971

Month	Boat Fishing Area and Station Number: Below 101 Bridge B-1	Above 101 Bridge B-2	Total	Percentage
March	499	5,099	5,598	6.0
April	486	6,546	7,032	7.5
May	503	8,002	8,505	9.1
June	1,654	10,388	12,042	12.9
July	4,783	14,776	19,559	20.9
August	10,004	9,091	19,095	20.4
September	4,176	8,503	12,679	13.6
October	570	8,497	9,067	9.7
Total	22,675	70,902	93,577	100.1
Percentage	24.2	75.8	100.0	

Table 4. MARINE ANIMALS CAUGHT BY BOAT ANGLERS
Yaquina Bay, by Species and Area
March 1 through October 31, 1971

Species	Boat Fishing Area and Station Number		Total	Percentage
	Below 101 Bridge B-1	Above 101 Bridge B-2		
Dungeness crab	451	36,380	36,831	39.2
Red rock crab	92	3,942	4,034	4.3
Pacific herring	6,365	8,023	14,388	15.3
Starry flounder	1,016	11,897	12,913	13.7
Striped seaperch	1,334	3,143	4,477	4.8
White seaperch	210	3,749	3,959	4.2
Walleye surfperch	288	2,980	3,268	3.5
Redtail surfperch	51	2,266	2,317	2.5
Black rockfish	1,986	93	2,079	2.2
Pile perch	42	1,847	1,889	2.0
Buffalo sculpin	305	974	1,279	1.4
Silver surfperch	0	1,004	1,004	1.1
Northern anchovy	584	220	804	0.9
Pacific staghorn sculpin	46	692	738	0.8
Coho salmon (adult)	261	423	684	0.7
Shiner perch	213	181	394	0.4
Pacific tomcod	0	325	325	0.4
Kelp greenling	87	203	290	0.3
Lingcod	245	14	259	0.3
Chinook salmon (adult)	218	0	218	0.2
Sand sole	113	44	157	0.2
English sole	0	60	60	0.1
Whitespotted greenling	47	0	47	0.1
Cabezon	14	26	40	<0.1
Coho salmon (juveniles)	0	39	39	<0.1
Copper rockfish	29	0	29	<0.1
Red Irish lord	0	14	14	<0.1
Big skate	0	14	14	<0.1
Topsmelt	0	14	14	<0.1
American shad	0	14	14	<0.1
Rock greenling	0	11	11	<0.1
Wolf-eel	11	0	11	<0.1
Rainbow trout	0	9	9	<0.1
Unidentified fish	458	950	1,408	1.5
Total	14,466	79,551	94,017	100.1
Percentage	15.4	84.6	100.1	

Table 5. SPORT BOAT FISHING DATA
Yaquina Bay, All Areas
1971

	March	April	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Angler trips (number)	1,724	2,136	2,440	3,745	5,606	6,945	2,812	2,146	27,554	–
Fishing effort (hours)	5,598	7,032	8,505	12,042	19,559	19,095	12,679	9,067	93,577	–
Fishing success (catch/hr.)	1.07	1.49	1.45	1.98	0.94	0.83	0.34	0.31	1.00	–
Catch (number)										
Dungeness crab	4,273	4,288	2,995	8,419	6,483	6,541	2,316	1,516	36,831	39.2
Red rock crab	270	376	610	518	593	976	396	295	4,034	4.3
Pacific herring	0	0	1,838	4,922	5,011	2,617	0	0	14,388	15.3
Starry flounder	1,215	3,733	2,175	2,256	2,099	1,139	225	71	12,913	13.7
Striped seaperch	115	1,126	797	1,046	780	540	73	0	4,477	4.8
White seaperch	0	75	811	2,096	514	343	120	0	3,959	4.2
Walleye surfperch	0	75	590	1,313	548	465	277	0	3,268	3.5
Redtail surfperch	96	421	1,466	172	137	16	9	0	2,317	2.5
Black rockfish	0	79	73	751	412	467	110	187	2,079	2.2
Pile perch	0	15	428	380	408	640	9	9	1,889	2.0
Buffalo sculpin	0	0	0	629	185	120	56	289	1,279	1.4
Silver surfperch	0	0	487	460	57	0	0	0	1,004	1.1
Northern anchovy	0	0	0	0	187	617	0	0	804	0.9
Pacific staghorn sculpin	0	15	14	57	101	180	312	59	738	0.8
Coho salmon (adult)	0	0	0	0	11	191	206	276	684	0.7
Shiner perch	0	0	0	147	169	50	28	0	394	0.4
Pacific tomcod	0	45	0	0	28	252	0	0	325	0.4
Kelp greenling	0	15	0	0	254	16	0	5	290	0.3
Lingcod	0	31	0	146	25	35	0	22	259	0.3
Chinook salmon (adult)	0	0	0	0	67	151	0	0	218	0.2
Sand sole	0	0	0	0	28	74	55	0	157	0.2
English sole	19	30	0	11	0	0	0	0	60	0.1
Whitespotted greenling	0	47	0	0	0	0	0	0	47	0.1
Cabezon	0	15	0	25	0	0	0	0	40	<0.1
Coho salmon (juveniles)	0	0	0	0	0	0	0	39	39	<0.1
Copper rockfish	0	0	0	0	11	0	18	0	29	<0.1
Red Irish lord	0	0	0	0	14	0	0	0	14	<0.1
Big skate	0	0	0	0	14	0	0	0	14	<0.1
Topsmelt	0	0	14	0	0	0	0	0	14	<0.1
American shad	0	0	0	0	14	0	0	0	14	<0.1
Rock greenling	0	0	0	11	0	0	0	0	11	<0.1
Wolf-eel	0	0	0	0	11	0	0	0	11	<0.1
Rainbow trout	0	0	0	0	0	0	0	9	9	<0.1
Unidentified fish	0	75	45	495	294	426	73	0	1,408	1.5
Total	5,988	10,461	12,343	23,854	18,455	15,856	4,283	2,777	94,017	100.1
Percentage	6.4	11.1	13.1	25.4	19.6	16.9	4.6	3.0	100.1	

Table 6. NUMBER OF SHORE ANGLER TRIPS
By Month and Area, Yaquina Bay
October 1, 1970 through September 30, 1971

Month	Shore Fishing Area and Station Number [1]																			
	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	Total	Percentage
October	182	101	133	0	32	19	59	8	0	0	0	0	0	14	0	0	0	50	598	1.3
November	71	39	22	5	18	0	29	38	0	9	0	24	0	0	0	0	0	746	1,001	2.1
December	151	40	0	0	0	0	0	0	0	2	0	0	0	16	0	0	0	715	924	2.0
January	100	38	0	0	1	0	0	2	0	89	0	0	0	0	0	0	0	1,158	1,388	2.9
February	109	268	173	8	37	61	69	20	18	204	118	0	37	149	3	0	0	823	2,097	4.4
March	366	914	187	212	0	20	405	11	0	702	407	0	282	147	143	21	0	1,408	5,225	11.0
April	141	418	99	20	0	72	94	0	0	446	270	41	209	191	142	78	0	856	3,077	6.5
May	739	1,428	208	127	96	21	372	0	86	754	364	52	114	565	590	421	62	1,680	7,679	16.2
June	596	695	230	41	64	96	62	7	0	714	167	370	28	195	788	113	90	1,593	5,849	12.4
July	1,265	1,798	238	28	101	22	152	86	10	682	188	377	70	339	396	0	0	1,897	7,649	16.2
August	1,837	2,150	125	0	216	46	408	14	0	271	76	93	43	110	309	14	0	2,009	7,721	16.3
September	808	757	28	87	148	9	97	221	0	113	158	45	33	51	41	0	0	1,529	4,125	8.7
Total	6,365	8,646	1,443	528	713	366	1,747	407	114	3,986	1,748	1,002	816	1,777	2,412	647	152	14,464	47,333	100.0
Percentage	13.4	18.3	3.0	1.1	1.5	0.8	3.7	0.9	0.2	8.4	3.7	2.1	1.7	3.8	5.1	1.4	0.3	30.6	100.0	

[1] *For description of sampling stations see Table 1.*

Table 7. HOURS OF SHORE ANGLER USE
By Month and Area, Yaquina Bay
October 1, 1970 through September 30, 1971

Month	Shore Fishing Area and Station Number [1]																			
	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	Total	Percentage
October	327	182	239	0	58	35	107	14	0	0	0	0	0	26	0	0	0	90	1,078	1.3
November	128	71	40	9	13	0	52	69	0	17	0	43	0	0	0	0	0	1,343	1,785	2.1
December	271	72	0	0	0	0	0	0	0	4	0	0	0	29	0	0	0	1,287	1,663	1.9
January	180	68	0	0	2	0	0	4	0	160	0	0	0	0	0	0	0	2,085	2,499	2.9
February	197	482	312	15	67	109	124	36	32	367	212	0	67	269	5	0	0	1,482	3,776	4.4
March	512	1,280	262	297	0	28	567	16	0	983	570	0	395	206	200	29	0	1,971	7,316	8.5
April	281	835	197	40	0	144	187	0	0	891	539	81	418	381	283	155	0	1,711	6,143	7.1
May	1,331	2,570	375	229	173	38	669	0	155	1,358	655	94	205	1,017	1,062	758	111	3,024	13,824	16.1
June	1,252	1,439	484	86	134	201	130	14	0	1,500	350	778	59	410	1,655	237	189	3,345	12,263	14.3
July	2,277	3,237	429	50	182	40	274	155	18	1,227	339	679	126	610	712	0	0	3,415	13,770	16.0
August	3,491	4,085	238	0	411	87	775	27	0	514	145	176	81	209	588	27	0	3,818	14,672	17.1
September	1,455	1,363	51	156	267	17	175	398	0	204	284	81	60	92	74	0	0	2,573	7,250	8.4
Total	11,702	15,684	2,627	882	1,307	699	3,060	733	205	7,225	3,094	1,932	1,411	3,249	4,579	1,206	300	26,144	86,039	100.1
Percentage	13.6	18.2	3.1	1.0	1.5	0.8	3.6	0.9	0.2	8.4	3.6	2.3	1.6	3.8	5.3	1.4	0.4	30.4	100.1	

[1] *For description of sampling stations see Table 1.*

Table 8. MARINE ANIMALS CAUGHT BY SHORE ANGLERS
Yaquina Bay, by Species and Area
October 1, 1970 through September 30, 1971

Species	Shore Fishing Area and Station Number[1]																			
	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S-11	S-12	S-13	S-14	S-15	S-16	S-17	S-18	Total	Percentage
Dungeness crab	16	0	0	0	17	0	86	30	0	0	303	52	251	0	0	0	0	6,011	6,766	7.5
Red rock crab	40	0	0	0	41	56	554	339	0	0	520	30	0	0	0	0	0	3,121	4,701	5.2
Pacific herring	13	18	5,442	2,077	479	103	0	0	0	0	0	0	66	0	0	0	0	4,606	12,804	14.2
Starry flounder	2,694	1,361	169	161	28	47	243	19	76	2,430	256	246	461	525	1,292	373	70	509	10,960	12.1
Northern anchovy	0	46	588	0	73	0	0	667	191	0	0	132	859	0	0	0	0	5,745	8,301	9.2
Pacific staghorn sculpin	665	423	454	269	105	45	711	166	0	543	155	38	65	553	132	0	0	3,345	7,669	8.5
Walleye surfperch	8	21	16	0	0	0	0	0	0	811	371	1,825	22	419	1,479	81	184	198	5,435	6.0
Buffalo sculpin	682	882	945	126	411	36	252	37	27	198	78	108	40	367	15	0	0	1,221	5,425	6.0
Striped seaperch	541	499	116	17	32	0	19	0	9	740	236	390	40	152	792	536	596	221	4,936	5.5
White seaperch	61	39	19	16	15	0	20	13	0	960	97	88	55	280	1,470	404	264	85	3,886	4.3
Greenling sp.	1,191	1,411	185	128	79	13	105	25	0	107	119	21	0	21	24	0	0	131	3,560	3.9
Pile perch	73	25	6	0	7	0	0	0	9	867	85	189	55	293	1,129	390	97	50	3,275	3.6
Redtail surfperch	175	1,007	0	0	0	0	0	0	18	163	361	27	191	234	564	150	102	27	3,019	3.3
Shiner perch	29	29	121	27	169	20	43	315	0	109	601	148	14	37	73	0	0	1,149	2,884	3.2
Black rockfish	1,948	297	35	0	0	0	0	0	36	0	118	0	0	0	33	0	0	165	2,632	2.9
Bocaccio rockfish	0	0	149	0	0	0	39	17	0	0	0	0	0	0	0	0	0	807	1,012	1.1
Topsmelt	0	0	833	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	842	0.9
Silver surfperch	0	0	0	40	0	0	0	0	0	16	0	16	0	112	225	72	115	13	609	0.7
Lingcod	121	213	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	349	0.4
American shad (juvenile)	0	0	132	0	0	0	7	0	0	0	0	0	0	0	0	0	0	201	340	0.4
Cabezon	63	163	13	0	0	0	0	0	0	0	9	0	0	0	0	0	0	9	257	0.3
Sole sp.	123	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	33	163	0.2
Copper rockfish	64	22	9	0	8	0	0	20	0	0	0	0	0	0	0	8	0	0	131	0.1
Coho salmon (adult)	109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	0.1
Wolf-eel	16	39	0	0	0	0	20	0	0	24	0	0	0	0	0	0	0	9	108	0.1
Blue rockfish	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	0.1
Pacific tomcod	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	26	42	<0.1
Chinook salmon (adult)	19	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	33	<0.1
Chinook salmon (juvenile)	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	32	<0.1
Skate sp.	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	<0.1
Red Irish lord	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	<0.1
Brown Irish lord	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	<0.1
Grass rockfish	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	<0.1
Total	8,702	6,577	9,238	2,861	1,464	320	2,099	1,648	366	6,968	3,340	3,310	2,119	3,009	7,228	2,014	1,428	27,715	90,406	99.8
Percentage	9.6	7.3	10.2	3.2	1.6	0.4	2.3	1.8	0.4	7.7	3.7	3.7	2.3	3.3	8.0	2.2	1.6	30.7	100.0	

[1] *For description of sampling stations see Table 1.*

Table 9. SHORE FISHING DATA
Yaquina Bay, All Areas
1970-71

	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Total	Percentage
Angler trips (number)	598	1,001	924	1,388	2,097	5,225	3,077	7,679	5,849	7,649	7,721	4,125	47,333	–
Fishing effort (hours)	1,078	1,785	1,663	2,499	3,776	7,316	6,143	13,824	12,263	13,770	14,672	7,250	86,039	–
Fishing success (catch/hr.)	2.15	2.19	1.51	1.13	0.78	0.67	0.59	1.06	1.67	1.36	0.61	0.64	1.05	
Catch (number)														
Dungeness crab	[1]	525	1,241	1,812	201	533	197	418	728	405	617	89	6,766	7.5
Red rock crab	–	53	46	58	82	522	235	276	721	417	1,454	837	4,701	5.2
Pacific herring	1,111	378	0	0	690	0	12	2,985	5,865	1,400	348	15	12,804	14.2
Starry flounder	33	17	93	355	369	1,652	1,453	2,137	1,658	1,651	985	557	10,960	12.1
Northern anchovy	0	0	0	0	0	0	0	0	0	7,722	579	0	8,301	9.2
Pacific staghorn sculpin	33	1,485	709	294	987	639	37	261	833	628	927	836	7,669	8.5
Walleye surfperch	0	0	0	0	0	0	37	325	2,965	1,527	493	88	5,435	6.0
Buffalo sculpin	605	318	140	75	79	405	249	1,677	641	661	355	220	5,425	6.0
Striped seaperch	13	0	84	96	12	149	356	1,497	1,610	793	282	44	4,936	5.5
White seaperch	0	0	0	0	85	43	119	848	1,947	575	254	15	3,886	4.3
Greenling sp.	151	52	149	55	49	181	193	496	593	846	384	411	3,560	3.9
Pile perch	20	0	0	27	0	43	387	1,371	537	608	282	0	3,275	3.6
Redtail surfperch	0	17	0	0	0	64	206	1,190	513	350	254	425	3,019	3.3
Shiner perch	158	17	0	7	0	0	0	36	449	528	956	733	2,884	3.2
Black rockfish	20	43	28	27	36	43	44	929	681	264	297	220	2,632	2.9
Bocaccio rockfish	33	979	0	0	0	0	0	0	0	0	0	0	1,012	1.1
Topsmelt	0	0	0	0	327	490	0	18	0	7	0	0	842	0.9
Silver surfsmelt	0	0	0	0	0	0	0	126	457	26	0	0	609	0.7
Lingcod	0	0	19	14	0	43	19	0	80	79	51	44	349	0.4
American shad (juvenile)	118	0	0	0	0	0	0	0	8	33	152	29	340	0.4
Cabezon	0	0	0	0	0	0	19	18	80	60	51	29	257	0.3
Sole sp.	0	17	0	0	0	0	0	9	0	13	80	44	163	0.2
Copper rockfish	0	0	0	0	12	0	12	27	40	26	14	0	131	0.1
Coho salmon (adult)	0	0	0	0	0	0	0	0	0	0	80	29	109	0.1
Wolf-eel	20	9	9	7	0	0	19	36	8	0	0	0	108	0.1
Blue rockfish	0	0	0	0	0	75	0	0	0	0	0	0	75	0.1
Pacific tomcod	0	0	0	0	0	0	0	0	16	26	0	0	42	<0.1
Chinook salmon (adult)	0	0	0	0	0	0	0	0	0	26	7	0	33	<0.1
Chinook salmon (juvenile)	6	0	0	0	0	0	0	0	0	26	0	0	32	<0.1
Skate sp.	0	0	0	0	0	0	0	0	0	26	0	0	26	<0.1
Red Irish lord	0	0	0	0	0	0	0	9	0	0	0	0	9	<0.1
Brown Irish lord	0	0	0	0	0	0	0	0	8	0	0	0	8	<0.1
Grass rockfish	0	0	0	0	0	0	0	0	8	0	0	0	8	<0.1
Total	2,321	3,910	2,518	2,827	2,929	4,882	3,594	14,689	20,446	18,723	8,902	4,665	90,406	99.8
Percentage	2.6	4.3	2.7	3.1	3.2	5.4	4.0	16.2	22.6	20.7	9.8	5.2	99.8	

[1] No shore crabbing data collected during October 1970.

Table 10. NUMBER OF TIDEFLAT USER TRIPS
By Month and Area, Yaquina Bay,
March 1 through October 31, 1971

	Tideflat and Station Number						
Month	Bridge Flats T-1	Idaho Point T-2	Breakwater Flat T-3	Sally's Bend T-4	Softshell Flats T-5	Total	Percentage
March	303	1,319	145	772	422	2,961	12.2
April	523	1,411	248	941	246	3,369	13.8
May	673	1,442	111	757	332	3,315	13.6
June	1,135	1,859	143	1,306	312	4,755	19.5
July	1,426	2,515	531	1,327	519	6,318	26.0
August	382	1,513	247	622	211	2,975	12.2
September	76	403	30	132	13	654	2.7
October	0	0	0	0	0	0	0.0
Total	4,518	10,462	1,455	5,857	2,055	24,347	100.0
Percentage	18.6	43.0	6.0	24.1	8.4	100.1	

Table 11. HOURS OF TIDEFLAT USE
By Month and Area, Yaquina Bay
March 1 through October 31, 1971

	Tideflat and Station Number						
Month	Bridge Flats T-1	Idaho Point T-2	Breakwater Flat T-3	Sally's Bend T-4	Softshell Flats T-5	Total	Percentage
March	404	1,759	193	1,029	563	3,948	10.9
April	793	2,138	376	1,426	372	5,105	14.1
May	1,036	2,218	170	1,164	510	5,098	14.0
June	1,694	2,775	213	1,949	465	7,096	19.5
July	2,128	3,753	792	1,980	775	9,428	25.9
August	606	2,402	392	988	335	4,723	13.0
September	108	576	43	189	18	934	2.6
October	0	0	0	0	0	0	0.0
Total	6,769	15,621	2,179	8,725	3,038	36,332	100.0
Percentage	18.6	43.0	6.0	24.0	8.4	100.0	

Table 12. MARINE ANIMALS CAUGHT BY TIDEFLAT USERS
Yaquina Bay, by Species and Area
March 1 through October 31, 1971

Species	Tideflat and Station Number					Total	Percentage
	Bridge Flats T-1	Idaho Point T-2	Breakwater Flat T-3	Sally's Bend T-4	Softshell Flats T-5		
Cockle clam	33,180	107,781	3,409	101,905	0	246,275	55.9
Softshell clam	21	8	0	1,042	77,331	78,402	17.8
Gaper clam	8,158	30,143	18,407	15,206	0	71,914	16.3
Bentnose clam	496	1,177	293	565	0	2,531	0.1
Native littleneck clam	338	504	93	784	0	1,719	0.1
Butter clam	72	348	266	765	0	1,451	0.1
Sand clam	14	8	0	0	0	22	0.1
Ghost shrimp	3,823	13,140	0	269	351	17,583	4.0
Mud shrimp	2,729	654	0	1,349	1,049	5,781	1.3
Kelp worm	280	721	0	433	76	1,510	<0.1
Sea star	288	8	0	12	0	308	<0.1
Red rock crab	180	82	26	12	0	300	<0.1
Snail	129	24	0	62	0	215	<0.1
Shore crab	187	0	0	0	0	187	<0.1
Dungeness crab	57	49	13	12	0	131	<0.1
Algae	72	0	0	12	5	89	<0.1
Hermit crab	7	0	0	12	0	19	<0.1
Saddleback gunnel	0	0	0	6	0	6	<0.1
Unidentified shrimp and fish	0	5,819	0	5,907	211	11,937	2.7
Total	50,031	160,466	22,507	128,353	79,023	440,380	100.0
Percentage	11.4	36.4	5.1	29.2	17.9	100.0	

Table 13. NUMBER OF SKIN DIVER TRIPS AND HOURS OF USE
By Month, Yaquina Bay
October 1, 1970 through October 31, 1971

Month	Number of Trips	Percentage	Hours of Effort	Percentage
October	75	5.2	86	4.6
November	62	4.3	64	3.5
December	20	1.4	20	1.1
January	49	3.4	52	2.8
February	74	5.1	79	4.3
March	103	7.1	111	6.0
April	54	3.7	71	3.8
May	239	16.4	386	20.8
June	94	6.5	116	6.3
July	172	11.8	187	10.1
August	244	16.8	306	16.5
September	123	8.5	231	12.5
October	144	9.9	144	7.8
Total	1,453	100.1	1.853	100.1

Table 14. SKIN DIVER FISHING DATA
Yaquina Bay, All Areas
1970-71

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total	Percentage
Diver trips (number)	75	62	20	49	74	103	54	239	94	172	244	123	144	1,453	–
Fishing effort (hours)	86	64	20	52	79	111	71	386	116	187	306	231	144	1,853	–
Fishing success (catch/hr.)	1.21	0.33	1.10	0.56	1.30	0.77	0.89	0.71	1.01	1.42	1.12	1.03	0.38	0.93	–
Catch (number)															
Black rockfish	41	5	11	22	54	28	30	118	36	91	145	97	10	688	40.0
Lingcod	11	2	3	1	16	9	9	58	13	17	33	20	8	200	11.6
Cabezon	5	4	2	4	6	1	3	49	5	12	29	27	0	147	8.6
Kelp greenling	1	0	0	0	0	7	4	0	13	14	45	28	5	117	6.8
Striped seaperch	18	0	0	0	0	0	0	8	2	10	12	26	6	82	4.8
Starry flounder	0	0	0	2	5	0	0	20	1	32	8	5	5	78	4.5
Buffalo sculpin	0	10	0	0	1	27	4	0	0	1	6	8	1	58	3.4
Copper rockfish	12	0	0	0	2	11	0	4	2	6	10	3	1	51	3.0
Pile perch	2	0	0	0	0	0	0	0	1	1	4	3	0	11	0.6
Walleye surfperch	0	0	0	0	0	0	0	0	0	0	0	8	1	9	0.5
Rock greenling	0	0	0	0	0	0	0	0	0	2	3	0	0	5	0.3
Grass rockfish	0	0	0	0	0	0	0	3	0	0	0	1	0	4	0.2
White seaperch	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0.1
Red Irish lord	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.1
Wolf-eel	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.1
Unidentified fish	2	0	5	0	17	2	2	14	0	7	23	0	0	72	4.2
Red rock crab	7	0	0	0	0	0	0	0	25	1	17	5	8	63	3.7
Dungeness crab	5	0	1	0	2	0	5	0	6	7	5	3	2	36	2.1
Gaper clam	0	0	0	0	0	0	6	0	0	17	2	0	6	31	1.8
Cockle clam	0	0	0	0	0	0	0	0	12	36	0	3	2	53	3.1
Sea star	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0.6
Total	104	21	22	29	103	85	63	275	117	265	343	237	55	1,719	100.1
Percentage	6.0	1.2	1.3	1.7	6.0	4.9	3.7	16.0	6.8	15.4	20.0	13.8	3.2	100.0	

Table 15. SUMMARY
Number of Angler Trips, Hours of Effort, and Animals Caught
Yaquina Bay, By Station
1970-71

Station Number	No. Angler Trips	Angler Hours	Catch				
			Fish	Crabs	Clams	Misc. Invert.	Total
B-1	7,019	22,675	13,923	543	0	0	14,466
B-2	20,535	70.902	39,229	40,322	0	0	79,551
Total	27,554	93,577	53,152	40,865	0	0	94,017
S-1	6,365	11,702	8,646	56	0	0	8,702
S-2	8,646	15,684	6,577	0	0	0	6,577
S-3	1,443	2,627	9,238	0	0	0	9,238
S-4	528	882	2,861	0	0	0	2,861
S-5	713	1,307	1,406	58	0	0	1,464
S-6	366	699	264	56	0	0	320
S-7	1,747	3,060	1,459	640	0	0	2,099
S-8	407	733	1,279	369	0	0	1,648
S-9	114	205	366	0	0	0	366
S-10	3,986	7,225	6,968	0	0	0	6,968
S-11	1,748	3,094	2,517	823	0	0	3,340
S-12	1,002	1,932	3,228	82	0	0	3,310
S-13	816	1,411	1,868	251	0	0	2,119
S-14	1,777	3,249	3,009	0	0	0	3,009
S-15	2,412	4,579	7,228	0	0	0	7,228
S-16	647	1,206	2,014	0	0	0	2,014
S-17	152	300	1,428	0	0	0	1,428
S-18	14,464	26,144	18,583	9,132	0	0	27,715
Total	47,333	86,039	78,939	11,467	0	0	90,406
T-1	4,518	6,769	0	431	42,279	7,321	50,031
T-2	10,462	15,621	0	131	139,969	20,366	160,466
T-3	1,455	2,179	0	39	22,468	0	22,507
T-4	5,857	8,725	6	36	120,267	8,038	128,347
T-5	2,055	3,038	0	0	77,331	1,692	79,023
Total	24,347	36,332	6	637	402,314	37,417	440,374
D-1	1,453	1,853	1,526	99	84	10	1,719
Total	1,453	1,853	1,526	99	84	10	1,719
Grand Total	100,687	217,801	133,623	53,068	402,398	37,427	626,516

Table 16. SUMMARY
Number of Angler Trips, Hours of Effort, and Animals Caught
Yaquina Bay, By Month
1970-71

Fishery	Month	No. Angler Trips	Angler Hours	Catch				
				Fish	Crabs	Clams	Misc. Invert.	Total
Boat	March	1,724	5,598	1,445	4,543	0	0	5,988
	April	2,136	7,032	5,797	4,664	0	0	10,461
	May	2,440	8,505	8,738	3,605	0	0	12,343
	June	3,745	12,042	14,917	8,937	0	0	23,854
	July	5,606	19,559	11,379	7,076	0	0	18,455
	August	6,945	19,095	8,339	7,517	0	0	15,856
	September	2,812	12,679	1,571	2,712	0	0	4,283
	October	2,146	9,067	966	1,811	0	0	2,777
	Total	27,554	93,577	53,152	40,865	0	0	94,017
Shore	October	598	1,078	2,321	—[1]	0	0	2,321
	November	1,001	1,785	3,332	578	0	0	3,910
	December	924	1,663	1,231	1,287	0	0	2,518
	January	1,388	2,499	957	1,870	0	0	2,827
	February	2,097	3,776	2,646	283	0	0	2,929
	March	5,225	7,316	3,827	1,055	0	0	4,882
	April	3,077	6,143	3,162	432	0	0	3,594
	May	7,679	13,824	13,995	694	0	0	14,689
	June	5,849	12,263	18,997	1,449	0	0	20,446
	July	7,649	13,770	17,901	822	0	0	18,723
	August	7,721	14,672	6,831	2,071	0	0	8,902
	September	4,125	7,250	3,739	926	0	0	4,665
	Total	47,333	86,039	78,939	11,467	0	0	90,406
Tideflat	March	2,961	3,948	1	80	48,900	4,600	53,581
	April	3,369	5,105	1	90	55,700	5,200	60,991
	May	3,315	5,098	1	90	54,800	5,100	59,991
	June	4,755	7,096	1	120	78,600	7,300	86,021
	July	6,318	9,428	2	160	104,400	9,700	114,262
	August	2,975	4,723	1	80	49,200	4,600	53,881
	September	654	934	0	20	10,800	1,000	11,820
	October	0	0	0	0	0	0	0
	Total	24,347	36,332	7	640	402,400	37,500	440,547[2]

Table 16. (Continued)

Fishery	Month	No. Angler Trips	Angler Hours	Catch				
				Fish	Crabs	Clams	Misc. Invert.	Total
Skin Diving	October	75	86	92	12	0	0	104
	November	62	64	21	0	0	0	21
	December	20	20	21	1	0	0	22
	January	49	52	29	0	0	0	29
	February	74	79	101	2	0	0	103
	March	103	111	85	0	0	0	85
	April	54	71	52	5	6	0	63
	May	239	386	275	0	0	0	275
	June	94	116	74	31	12	0	117
	July	172	187	194	8	53	10	265
	August	244	306	319	22	2	0	343
	September	123	231	226	8	3	0	237
	October	144	144	37	10	8	0	55
	Total	1,453	1,853	1,526	99	84	10	1,719
Combined	October	673	1,164	2,413	12	0	0	2,425
	November	1,063	1,849	3,353	578	0	0	3,931
	December	944	1,683	1,252	1,288	0	0	2,540
	January	1,437	2,551	986	1,870	0	0	2,856
	February	2,171	3,855	2,747	285	0	0	3,032
	March	10,013	16,973	5,358	5,678	48,900	4,600	64,536
	April	8,636	18,351	9,012	5,191	55,706	5,200	75,109
	May	13,673	27,813	23,009	4,389	54,800	5,100	87,298
	June	14,443	31,517	33,989	10,537	78,612	7,300	130,438
	July	19,745	42,944	29,476	8,066	104,453	9,710	151,705
	August	17,885	38,796	15,490	9,690	49,202	4,600	78,982
	September	7,714	21,094	5,536	3,666	10,803	1,000	21,005
	October	2,290	9,211	1,003	1,821	8	0	2,832
Grand Total		100,687	217,801	133,624	53,071	402,484	37,510	626,689

[1] *No shore crabbing data collected during October 1970.*

[2] *Catch data for the tideflat fishery determined by multiplying the average catch per year times the number of angler trips per month. Catch data totals consequently differ from those shown in Table 15.*

Table 17. TAXONOMIC LIST OF SPECIES HARVESTED By Estuarine Resource Users, Yaquina Bay 1970-71

Common Name	Local Names	Scientific Name
Fish		
American shad	Shad	*Alosa sapidissima*
Big skate		*Raja binoculata*
Black rockfish	Black sea bass, black snapper	*Sebastes melanops*
Blue rockfish	Sea bass	*Sebastes mystinus*
Bocaccio rockfish		*Sebastes paucispinis*
Brown Irish lord	Bullhead	*Hemilepidotus spinosus*
Buffalo sculpin	Bullhead	*Enophrys bison*
Cabezon	Rock cod, bullhead	*Scorpaenichthys marmoratus*
Chinook salmon	King salmon, salmon	*Oncorhynchus tshawytscha*
Coho salmon	Silver salmon	*Oncorhynchus kisutch*
Copper rockfish	Red snapper, bass	*Sebastes caurinus*
English sole		*Parophrys vetulus*
Grass rockfish	Sea bass	*Sebastes rastrelliger*
Kelp greenling	Seatrout	*Hexagrammos decagrammus*
Lingcod		*Ophiodon elongatus*
Northern anchovy		*Engraulis mordax*
Pacific herring		*Clupea harengus pallasi*
Pacific staghorn sculpin	Bullhead	*Leptocottus armatus*
Pacific tomcod		*Microgadus proximus*
Pile perch		*Rhacochilus vacca*
Rainbow trout		*Salmo gairdneri*
Red Irish lord	Bullhead	*Hemilepidotus hemilepidotus*
Redtail surfperch		*Amphistichus rhodoterus*
Rock greenling	Seatrout	*Hexagrammos lagocephalus*
Saddleback gunnel		*Pholis ornata*
Sand sole		*Psettichthys melanostictus*
Shiner perch	Shiner	*Cymatogaster aggregata*
Silver surfperch		*Hyperprosopon ellipticum*
Starry flounder		*Platichthys stellatus*
Striped seaperch	Rainbow perch	*Embiotoca lateralis*
Topsmelt		*Atherinops affinis*
Walleye surfperch		*Hyperprosopon argenteum*
White seaperch		*Phanerodon furcatus*
Whitespotted greenling	Seatrout	*Hexagrammos stelleri*
Wolf-eel		*Anarrhichthys ocellatus*
Crabs		
Dungeness crab	Market crab	*Cancer magister*
Hermit crab		*Pagurus sp.*
Red rock crab	Japanese crab, rock crab	*Cancer productus*
Shore crab	Mud crab	*Hemigrapsus oregonensis* and *Hemigrapsus nudus*
Clams		
Bentnose clam		*Macoma nasuta*
Butter clam	Washington clam, quahog, Coney Island, beef steak clam, giant Oregon clam	*Saxidomus giganteus*
Cockle clam	Basket cockle, steamer	*Clinocardium nuttallii*
Gaper clam	Blue clam, Empire clam, horse clam, horseneck clam, blueneck	*Tresus capax*
Native littleneck clam	Steamer clam, butter clam	*Venerupis staminea*
Piddock clam	Rock oyster	*Zirfaea pilsbryi* and *Penitella penita*
Sand clam		*Macoma secta*
Softshell clam	Mud clam, bay clam	*Mya arenaria*
Miscellaneous Invertebrates		
Ghost shrimp	Sand shrimp	*Callianassa californiensis*
Kelp worm	Clam worm, mussel worm	*Nereis sp.*
Mud shrimp	Sand shrimp	*Upogebia pugettensis*

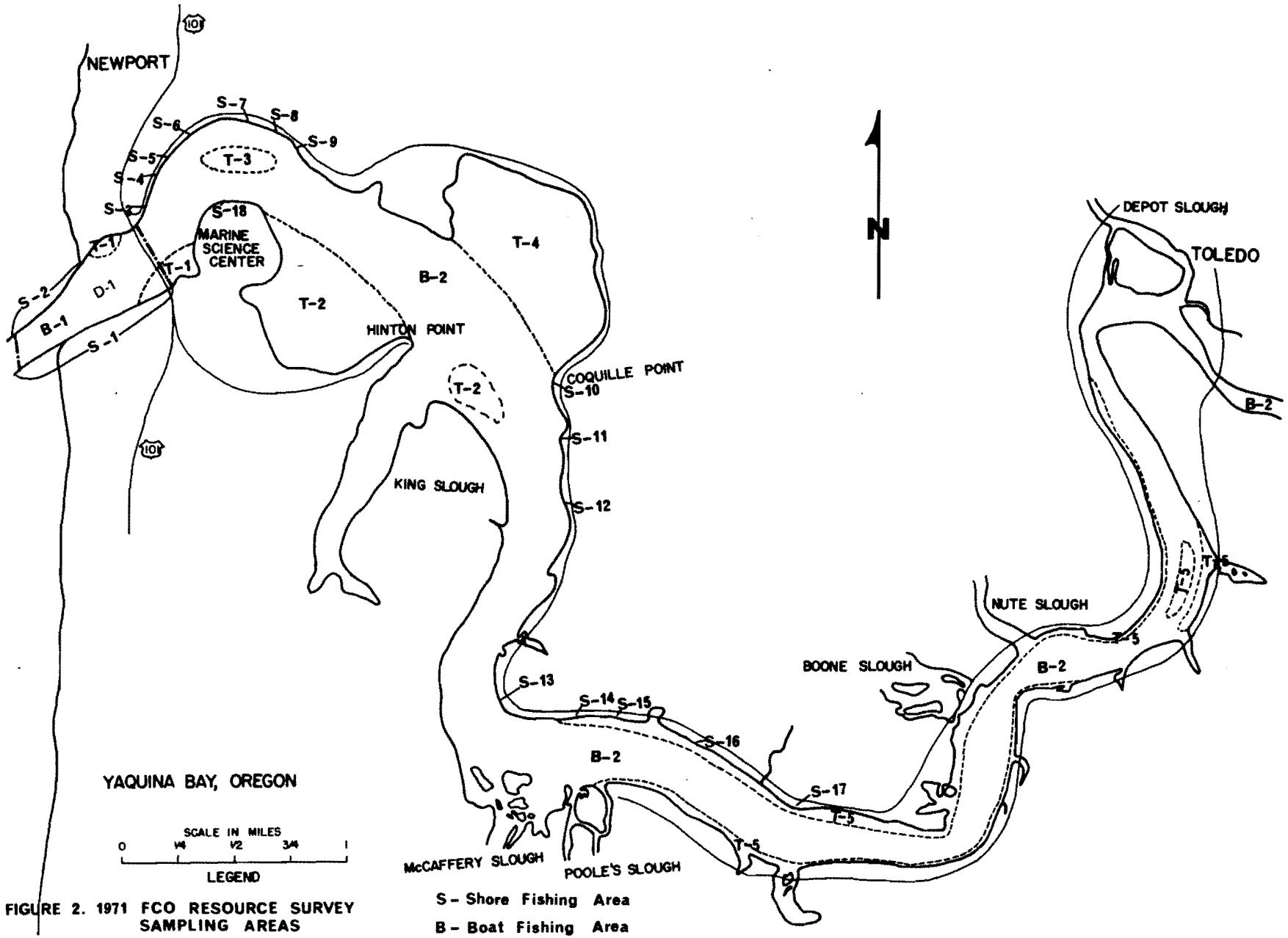

FIGURE 2. 1971 FCO RESOURCE SURVEY SAMPLING AREAS

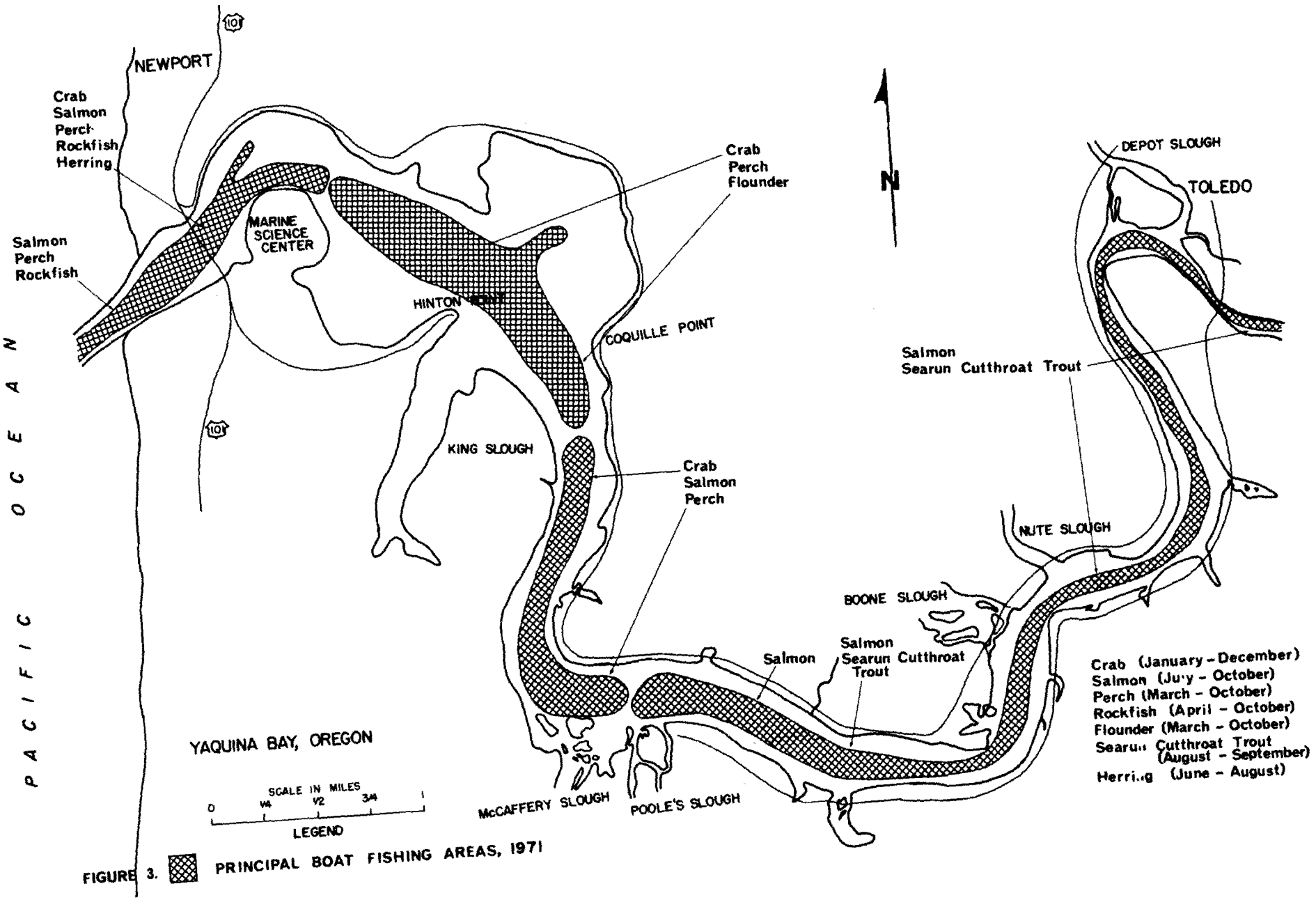

FIGURE 3. PRINCIPAL BOAT FISHING AREAS, 1971

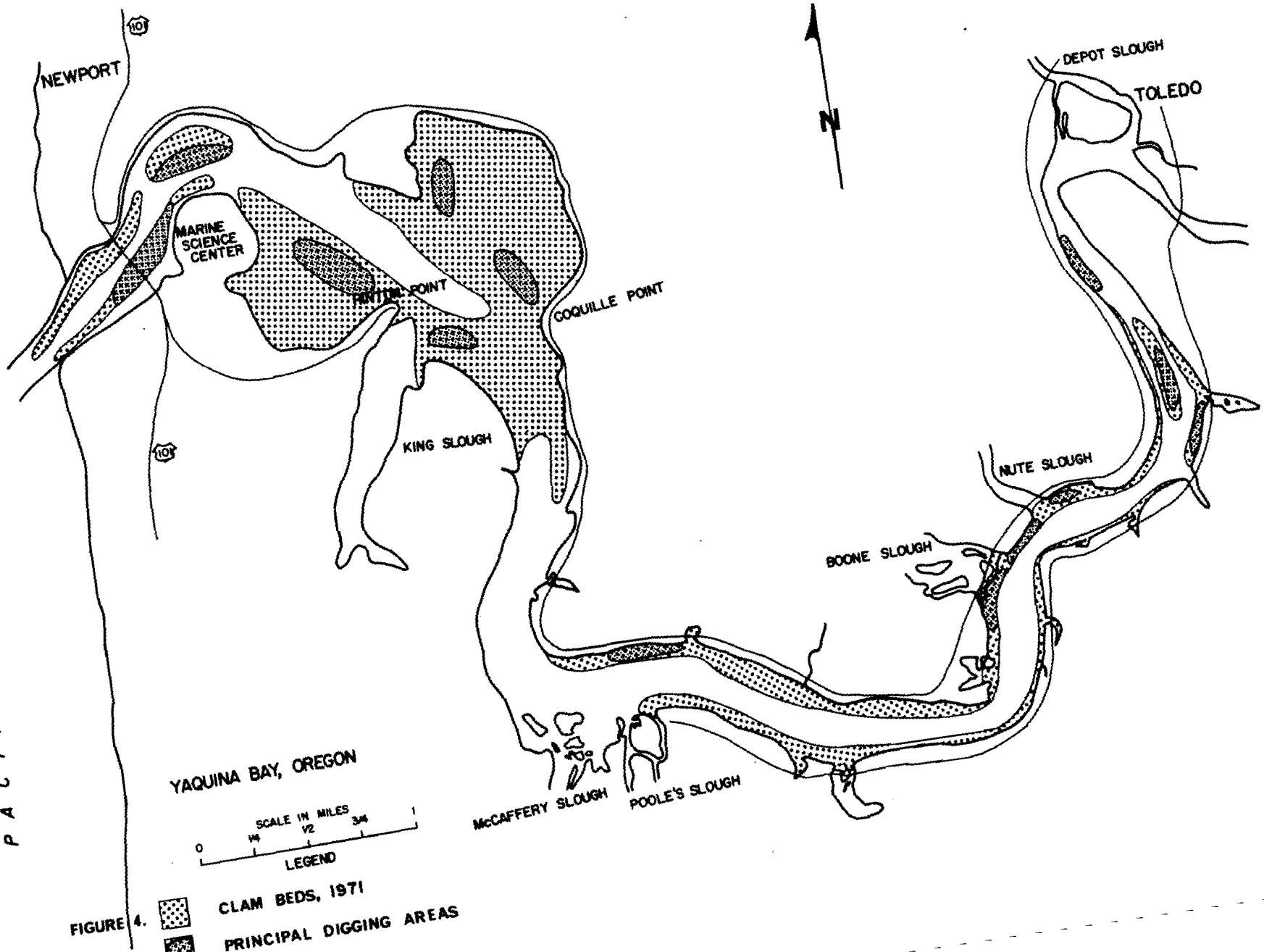
NEWPORT
101
MARINE SCIENCE CENTER
YAQUINA POINT
COQUILLE POINT
KING SLOUGH
DEPOT SLOUGH
TOLEDO
N
NUTE SLOUGH
BOONE SLOUGH
McCAFFERY SLOUGH
POOLE'S SLOUGH
PACIFIC OCEAN
YAQUINA BAY, OREGON
SCALE IN MILES
0
1/4
1/2
3/4
1
LEGEND
CLAM BEDS, 1971
PRINCIPAL DIGGING AREAS

FIGURE 4.

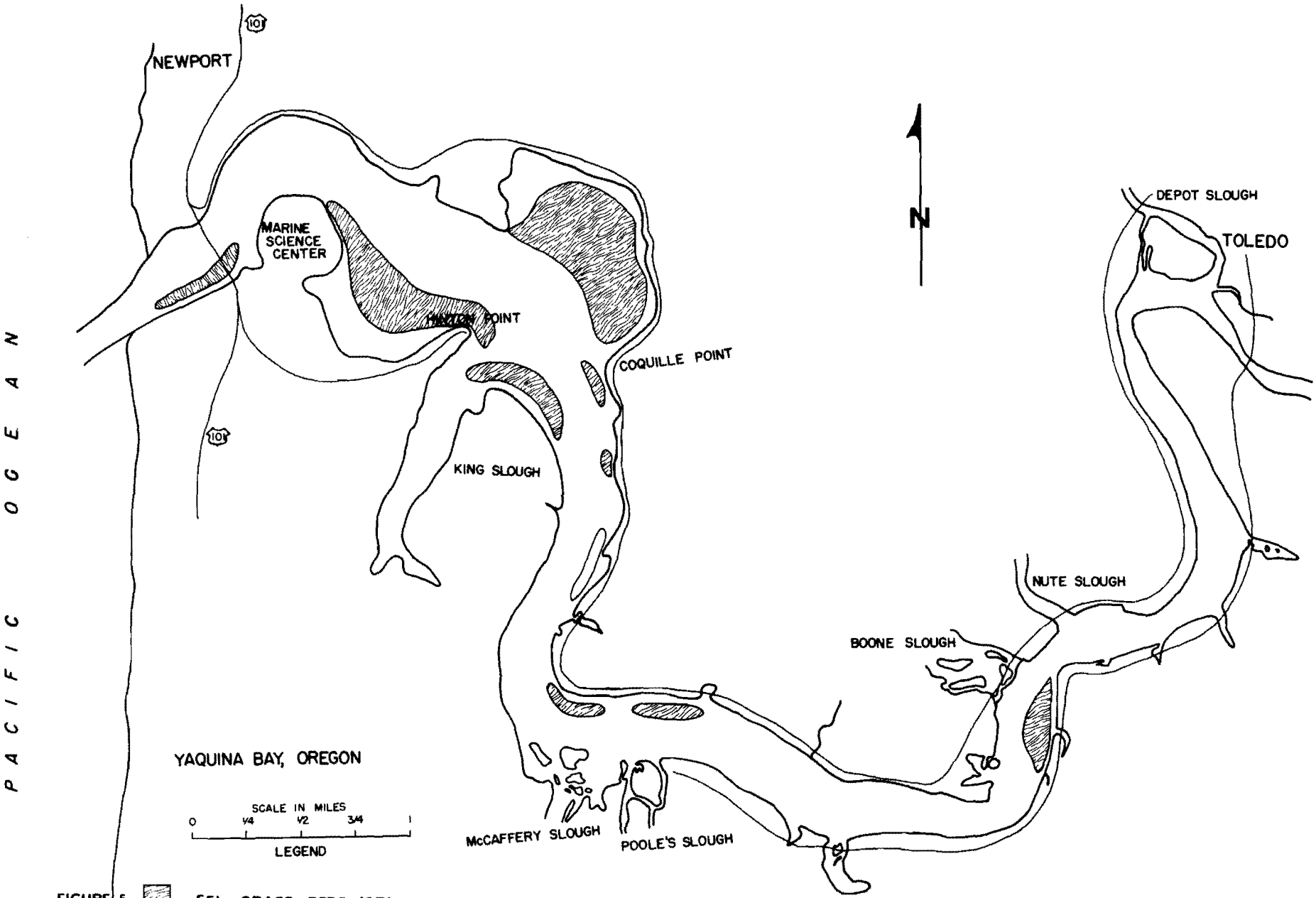

FIGURE 5. EEL GRASS BEDS, 1971

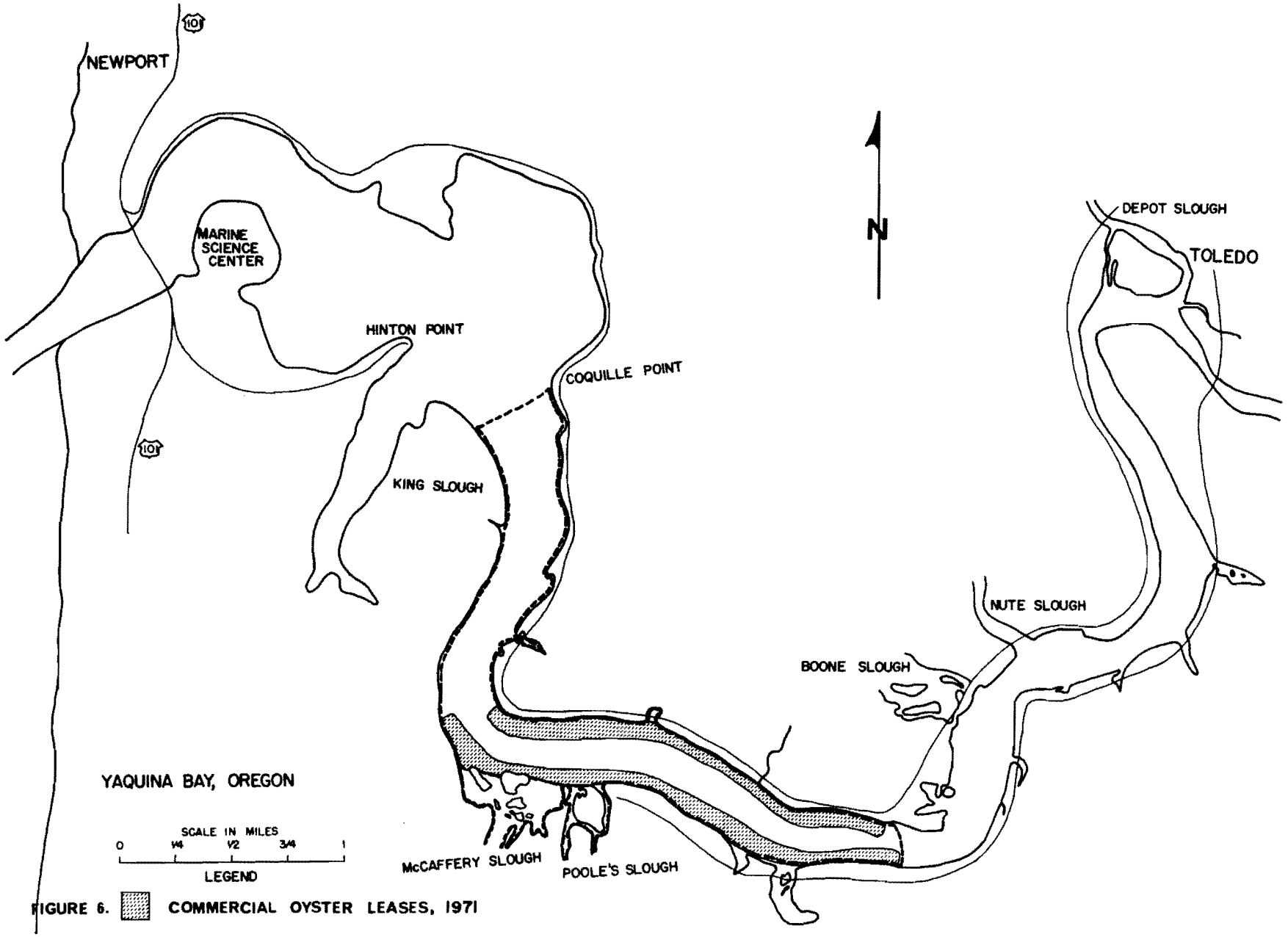

FIGURE 6. COMMERCIAL OYSTER LEASES, 1971

POTENTIAL OYSTER GROWING AREA

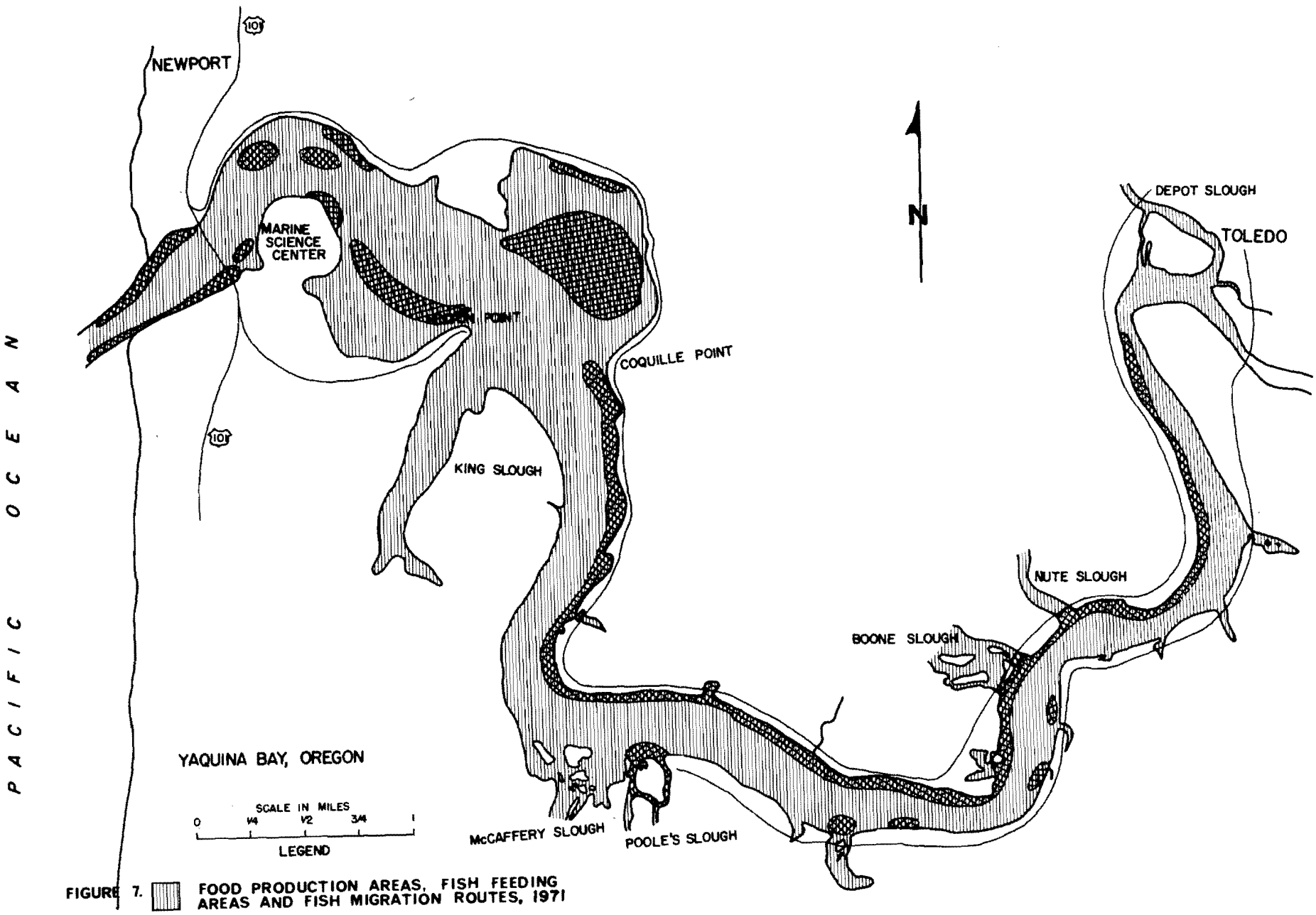
NEWPORT
101
MARINE SCIENCE CENTER
COQUILLE POINT
KING SLOUGH
DEPOT SLOUGH
TOLEDO
N
NUTE SLOUGH
BOONE SLOUGH
McCAFFERY SLOUGH
POOLE'S SLOUGH
PACIFIC OCEAN
YAQUINA BAY, OREGON
SCALE IN MILES
0 1/4 1/2 3/4 1
LEGEND
FOOD PRODUCTION AREAS, FISH FEEDING AREAS AND FISH MIGRATION ROUTES, 1971
KNOWN HERRING SPAWNING AREAS

FIGURE 7.


STATE OF OREGON
THE UNION
1859