

ESTUARY RESOURCE STUDY

ANNUAL REPORT  
July 1, 1971 to June 30, 1972

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U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Commercial Fisheries Research and Development Act  
Subproject 1-77-D  
Contract No. N 208-0073-72 (N)

July 1972

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## ESTUARY RESOURCE STUDY

### INTRODUCTION

Oregon's 16 estuaries contain approximately 57,000 acres. Only three coastal states in the nation have fewer estuarine acres. Since 1960, approximately 1,000 acres of estuarial lands in Oregon have been destroyed by industrial and recreational developments. Land use planning and zoning is currently being implemented by county governments to control the development of these estuarial area and adjacent uplands. State and federal agencies have coordinated their efforts in providing assistance to county governments in developing land use plans.

On March 1, 1971, the Fish Commission of Oregon initiated an estuary resource study with two objectives designed to provide input into coastal land use planning: (1) to obtain for each bay, by month, an estimate of angler effort and species composition of the commercial and sport catch of marine non-game fish, crabs, clams, and miscellaneous invertebrates; and, (2) to develop clam sampling techniques to be used eventually to determine intertidal and subtidal clam distribution and abundance in all Oregon estuaries.

Field activities for the estuary resource use study were completed on October 31, 1971. Planning, collection of data, and preparation of the data for computer processing utilized most of the contract staff's time in FY 72. Results of these analyses will be presented in a final report in 1973.

Field activities for the clam inventory study are continuing. Progress to date is presented in this report.

### SUMMARY OF ACCOMPLISHMENTS

#### Estuary Resource Use Survey

Sixteen Oregon estuaries were selected for our resource use survey (Table 1). Selection of sampling priorities and fisheries studied in each of the estuaries

Table 1. Estuaries Surveyed During and Effort Priorities Used in the Estuary Resource Use Study, 1971.

Estuary	Acres	Priority for Survey		
		Sportfish	Crabs	Clams
Columbia	15,000	1	2	2
Nehalem	3,766	2	2	2
Tillamook	8,839	1	1	1
Netarts	2,406	1	1	1
Sand Lake	700	2	2	2
Nestucca	1,149	2	2	2
Salmon River	438	2	2	2
Siletz	1,203	2	2	2
Yaquina	2,853	1	1	1
Alsea	2,227	2	1	2
Siuslaw	1,589	2	2	2
Umpqua	5,712	2	2	2
Coos	9,543	1	1	1
Coquille	703	2	2	2
Rogue	750	2	2	2
Chetco	500	2	2	2

were based on two criteria: (1) prior knowledge of the resource uses of each estuary, and (2) the potential for recreational and industrial development.

Survey crews were stationed at Astoria, Tillamook, Newport, Charleston, Port Orford, and Brookings. Personnel assigned to these offices were responsible for interviewing shore and boat anglers, skin divers, and clam diggers for catch and effort data. Limitations in manpower restricted our sampling to areas within each estuary that supported the majority of recreational uses of non-game fish and shellfish. This sampling procedure precluded sampling the sport harvest of anadromous fishes in the upper portions of several of the estuaries. In addition, sampling of the resource uses on the Rogue River was terminated in May due to the transfer of project personnel.

The first month of the resource use study was devoted to developing a sampling program adaptable to each estuary. Following this developmental period, sampling stations and routes were established specifically for each estuary. Adjustment of technique continued as needed throughout the field phase producing a well tested procedure by the studies end in October.

#### Development of a Clam Sampling Dredge

Inventorizing the bay clams of Oregon has awaited the development of effective sampling equipment. A hydraulic clam dredge, patterned after one the Washington Department of Fisheries uses for inventorizing the abundance of hard clams in Puget Sound, was purchased for testing its suitability in sampling all clams.

The dredge pump is powered by a 9 hp gasoline motor capable of discharging water at 105 psi (Figure 1). The outlet hose, when connected to a 6-inch diameter suction tube, creates a water lift. A wire basket, covered with  $\frac{1}{2}$ -inch hardware cloth, is attached to the discharge end of the suction tube.

To date, all testing of the dredge has been done on intertidal clam beds in six of Oregon's estuaries (Table 2). Composition of bottom types ranged from mud

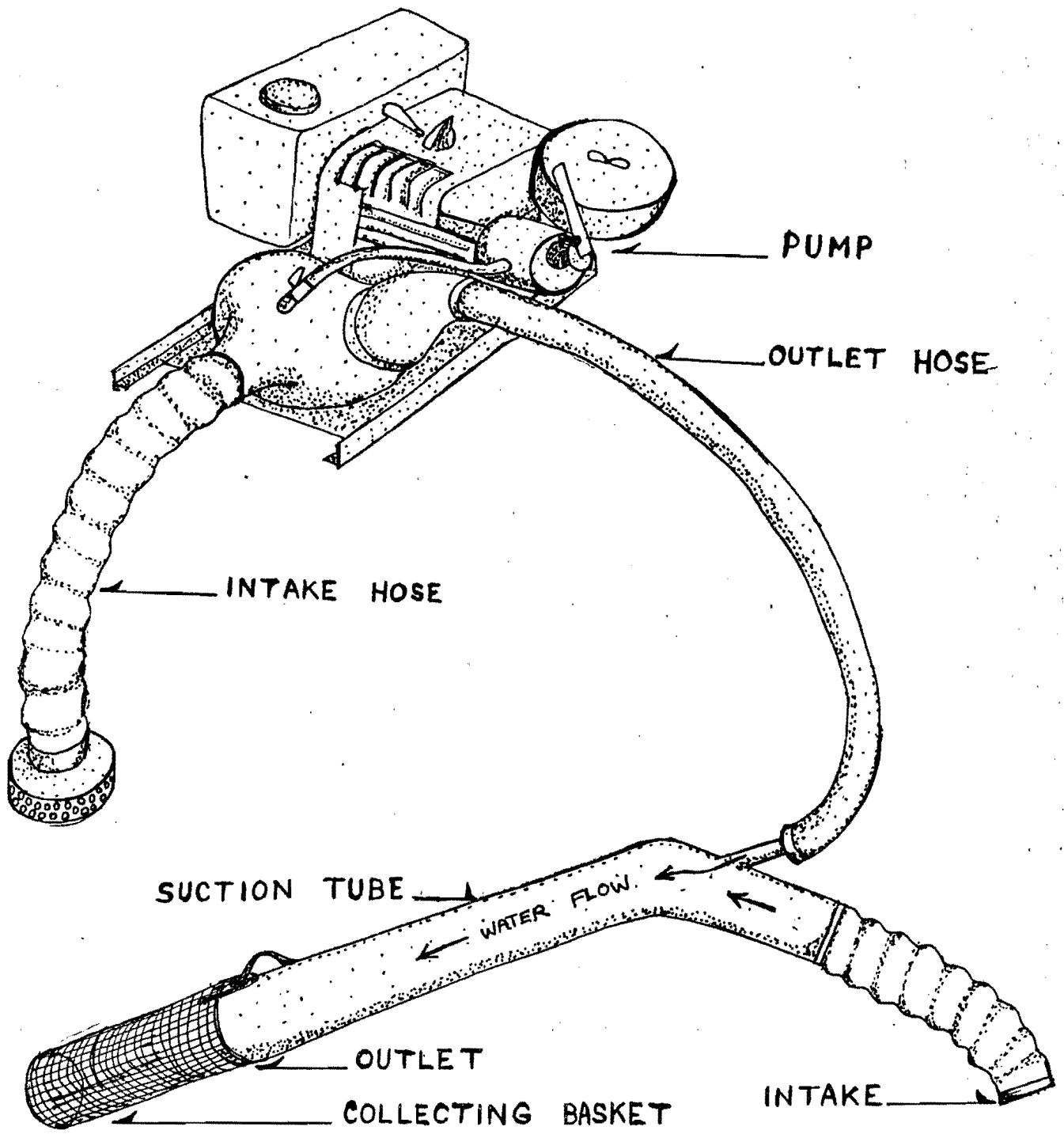


Fig.1. Clam Sampling Dredge.

Table 2. Summary of Dredge Sampling Data, by Bay.

Estuary	Bottom Type	Species of Clams Dredged	Dredge Effectiveness for Digging Various Substrates <sup>1/</sup>
Tillamook	Mud and silt	Bentnose	3
Nestucca	Rock & Rubble	None	0
	Sand	Softshells	3
Salmon	Mud & Detritus	Softshells	3
	Mud & Sand	Softshells	3
	Sand	Softshells	3
	Sand & Gravel	Softshells	3
	Small Gravel	None	3
	Gravel & Hardpan	None	0
Yaquina	Mud & Sand	Bentnose, Softshells, Gapers Cockles, Macoma, sp.	3
	Sand	Softshells	3
	Gravel & Clay	Softshells	0
	Mud	Softshells	0-2
Alsea	Mud & Sand	Softshells	3
	Small Gravel	Cockles	2
Siuslaw	Mud	Softshells	3

<sup>1/</sup> 0 = Dredge totally ineffective in digging substrate.

1 = Dredge experienced considerable difficulty in digging substrate.

2 = Dredge generally had little difficulty in digging substrate.

3 = Dredge had no difficulty in digging substrate.



to a rock and rubble substrate. Sample sizes varied, but generally an attempt was made to excavate a minimum of 2-cubic feet of substrate per sample. Selection of dredging sites was made using knowledge of where clam beds were located in each of the selected estuaries.

#### Results of Clam Sampling

The five species of clams dredged while developing our sampling techniques included the softshell (*Mya arenaria*), bentnose (*Macoma nasuta*), gaper (*Tresus capax*), cockle (*Clinocardium nuttalli*), and (*Macoma iris*). The dredge caught smaller individuals of the five species of clams. This was attributed to the scarcity of larger clams in most of the sample areas. The dredge effectively removed the larger clams when they were encountered.

The effectiveness of the dredge was directly related to the type of substrate. When used in a sand substrate, the dredge was capable of removing 2 to 3 cubic feet in less than one minute. Compacted mud, gravel, and rocky substrates reduced the speed and effectiveness of the dredge. A compacted rocky substrate and dense eel grass also rendered the dredge ineffective.

Testing of the effectiveness of the dredge in sampling clams in other types of substrates, intertidally and subtidally, and on other species of clams will continue.