WB-00957

Shellfish Investigations Progress Report Number 35 April 1962 through March 1964

#### INTRODUCTION

In order to make the Shellfish Progress reports current, report number 35 covers a two-year period. This report will of necessity appear in a shortened form. Materials discussed in this report can be found in completed form in the investigations files or in informational reports on file at Clackamas.

Shellfish personnel and changes during the period appear in Table 1. The most noteworthy changes occurred in July 1962 and October 1963. In 1962 Emery Wagner transferred to Redmond and Nelson E. Stewart replaced him at Newport. The 1963 legislature approved a new position at Newport on marine non-food animals and this position is now filled by Waldemar DeBen, bringing the fulltime shellfish staff to 4 biologists.

Time distribution for shellfish personnel from April 1962 through December 1963 is shown in Table 2. Since the beginning of 1964, time is no longer allotted by species and will not appear in future reports.

## BAY CLAMS

Bay clam work primarily involved population indices in all of Oregon's major clam-producing estuaries. Work, other than the standard surveys, involved regulation hearings, condition studies, age and growth work on the cockle clam, and personal-use utilization in two estuaries.

### Bay Clam Surveys

Standard surveys were conducted on all major clam-producing bays. The objective of these surveys was to obtain information on abundance, distribution size range and overall observations on condition of the clam population. The bays surveyed and evaluation of the bay as a clam producer at the time of the survey appears in Table 3.

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Charles D. Snow	7-18-55	107 24100
Nelson E. Stewart	6-8-62	@ 3200
Darrall Demory	6-14-61	MIN (Spilite
Waldemar DeBen	10-28-63	65 yr 69
Emery J. Wagner	6-11-57	7-6-62 1/
Paul Gregory	6-4-62	9-21-62
Milton K. Daily	6-8-62	9-24-62
George R. Spangler	6-4-62	10-1-62
Harry Forquer	3-14-62	9-21-62
George R. Spangler	6-7-63	9-24-63
Gary A. Gebhardt	6-10-63	9-1.9-63
Jorry E. Burdick	7-1-63	9-25-63
Jin Slick	4-1-63	9~30=63

Table 1. Shellfish Personnel and Personnel Changes, April 1962-March 1964.

1/ Transferred to Redmond.

Table 2. Per Cent of Man Days Spont on Various Projects by Shellfish Staff Members, April 1962-December 1963. 1/

**************************************	Per Cent of
Ass lement	Total Man Dave
Razor Clams	33
Bay Clams	32
Crabs	22
Ecology	5
Oysters	3
Shellfish-General	3
Miscellaneous (abalone, crayfish, seal) stream surveys, troll se	lop, almon) 3

1/ Time since January 1964 not assigned to species.

and a second sec	Principal Species Involved	Year of Survey and 1962	Condition of Stocks 1/ 1963
Nehalem	Softshell	E	NS
Tillamook	Gaper-Cockle	G	NS
Tillerook	Softshell	NS	E
Netarts	Gaper-Cockle	RS	G
Yaquina	Gaper-Cockle	G	G
Sinslav	Softahell	F	Р
Ump <b>que</b>	Softshell	E	NS
Coos Bay	Gaper-Cockle	G	G
Coquille	Softshell	NS	Р

Table 3. Summary of Bay Clam Surveys, Showing Evaluation of Bay as a Clam Producer.

1/ KS-No Survey; E-Excellent; G-Good; F-Fair; P-Poor.

Nehalem, Tillamook, and Umpqua softshell clam beds are in excellent condition. Densities for these areas in 1963 were 0.57, 0.58, and 0.16clams per square foot, respectively. The Siuslaw softshell population is still showing a decline in abundance; clams per square foot have dropped from 0.15 in 1960 to 0.072 in 1963.

The softshell clam beds in Siuslaw Bay are relatively small, containing about 300 acres of tideland. Of this only one half or less is productive ground. The largest bed is readily accessible by State Highway 36. The first decline in abundance in the bay was noticed on this clam bed and depletion radiated out from the edge of the highway. It appears that this area will not support unrestricted digging and produce at its maximum capacity. Plans are being formulated to monitor digging and harvest from this bay and initiate some clam cultural methods. From this we hope to arrive at management practices that will aid clam production in this bay.

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The Coquille softshell population is considered to be poor. However, this bay is probably producing at about its maximum level. This condition stems from ecological conditions that are inherent in this estuary. The tide flats where softshell clams occur are exposed for long periods of time on even minor tidal run outs.

Cockle and gaper clam populations in Tillamook, Netarts, Yaquina, and Coos Bay areas are remaining at relatively stable levels, and are probably producing at maximum levels under current digging pressure and regulations.

## Cockle Tagging

During the summer of 1962, 531 cockle clams (<u>Clinogardium nuttalli</u>) were tagged with Petersen disc tags and marine resin. 1/ Of this group, 276 were planted intertidally and 255 were planted subtidally. No effort was made until the summer of 1963 to recover any of the marked clams. At the end of 13 months, 60 tagged clams were recovered from the intertidal planting. Also, 24 elams had been turned in by commercial and personal-use diggers prior to this date. The 60 clams recovered intertidally ranged in initial size from 33 to 80 millimeters in longest rib length and at recovery exhibited growth increases from 1 to 94%, the smaller clams exhibiting the greatest per cent increase. None of the subtidally planted clams were recovered.

During 1963 another 230 cockle clams were marked and placed intertidally in Yaquina Bay. Of this number, 110 were marked with Petersen disc tags and 120 marked with plastic base paint. The objective of this experiment is to determine if plastic base paints are suitable for marking clams. An attempt will be made to recover these clams during 1964.

1/ Reported in Progress Report No. 34.

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## Condition Studies

Between July 1962 and August 1963, monthly samples of gaper clams were dug for condition studies. The per cent dry weight of shueked meats was determined for each sample. Gaper clams were found to be in poorest condition following spawning between January and April. The results of this study will appear in an informational report in the near future.

# Subtidal Clam Harvest

Subtidal harvest of gaper clams in Coos Bay by personal-use and commercial diggers using mechanical equipment continued in 1962 and 1963. 1/ Commercial landings of this species increased from 7,405 pounds in 1960 to 46,626 pounds in 1962. The increased usage of this equipment indicated a potential hazard to clam beds and caused some alarm for the resource. Consequently, in 1963 a public hearing was held and regulations for the harvest of clams were altered. The use of mechanical equipment to harvest clams was made unlawful in intertidal areas and restricted to a permit basis in subtidal areas.

# Personal-Use Fishery

During the summer of 1963 some effort was made to determine the personaluse utilization of selected clam beds in Yaquina and Tillamook bays. Yaquina Bay diggers were counted or checked on 9 tide days between June 22 and July 21, 1963. During this period, 1,281 diggers were observed and 472 were checked in conjunction with Oregon State Police bag checks at road blocks. The 472 diggers harvested 12,563 clams for an average of 26.6 clams per digger. If this average number holds true for all diggers then a minimum harvest of 34,000 clams was realized during the nine days that counts were made. The reason this figure is minimal is the fact that digger counts are low. Only the maximum number of people observed during a low tide was used and this does not take into account those people who limit out or leave the clam beds before the maximum count is reached, nor does it take into consideration those people

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arriving on the clam beds after the peak count is reached.

Sport diggers using Garibaldi clam flat in Tillamook Bay were checked on 8 different low tides between May and September 1963. During the 8 check periods 1,109 clam diggers were observed on the flat and 758 were checked, as they left the flat, for number and species of clams dug.

The estimated sport harvest of bay clams from Garibaldi flat during the 8 check periods was 28,176 clams. A minimal estimate of the total sport harvest during 1963 was 171,000 clams. The majority of these clams came from the western section of the flat which comprises approximately 16 acres.

# RAZOR CLAMS

Razor clam activities during the period April to September 1962 and 1963 included sampling the sport fishery for number of diggers, number of clams dug, and the age composition of dug clams. Commercially-dug clams were sampled for age composition and number of clams per pound. Other activities included continued operation of aquarium experiments, limited screening for razor clam set, wastage estimates, a digger origin inquiry, and a drift bottle study. Also, beaches south of Tillamook Head were surveyed for razor clam densities.

#### Sport Fishery

The 1962-63 sampling programs were similar to those described in Progress Report No. 32, except that sampling in 1962 was conducted from 1/2 hour before to 1/2 hour after low water to allow more time during the minus tides for other activities.

#### Digging Intensity

Digging intensity in 1962 and 1963 continued to increase. It was estimated that 52,040 and 52,939 diggers took part in the sport fishery for these two years, respectively (Table 4).

	Miles of Beach	Number of Digers	Average No. Clams Per Digger	No. Clans Dug	No, Clans Wasted
1962					
I-IV ]/	16	28,023	16.8	471, 313	12,725
¥ 2/	2	24,017	17.5	420, 533	72,669
Total	18	52,040	17.1 3/	891, 846	85, 394
1963					
I-IV	16	21, 184	9.6	207, 795	No Estimate
V	2	31, 755	16.0	505, 333	No Estimate
Total	18	52,939	11.3	713, 128	No Estimate

Table 4. Sport Harvest of Razor Clams by Area from Clatsop Beaches, April-September 1962 and 1963.

Necanicum River to Columbia River (North Beach).
Tillamook Head to Necanicum River (Seaside).

3/ Meano

Although there are 18 miles of razor clam beaches in Clatsop County, 47 to 59% of the digging takes place on the 2-mile Seaside beach. In spite of this heavy pressure, the Seaside beach remains the most stable and largest producer of razor clams.

## Sport Harvest

The calculated sport harvest for 1962 and 1963 was 891,846 and 713,128 clams, respectively. The catch-per-unit of effort was 17,1 and 11.3 clams. The 1962 average was a substantial improvement over the 11.4 average of 1961, but the increase was not sustained and fell off in 1963. Seaside had the highest catch-per-unit of effort at 17.5 and 16.0 clams (Table 4). Figure 1 shows the sport harvest for the period 1955-63.

## Digger Origin

A study was conducted in 1962-63 to determine what per cent of the sport diggers were local people. The diggers that were interviewed were asked if



Figure 1. Sport Harvest of Razor Clams from Clatsop Beaches, 1955-1963.

they were from Clatsop County and if they had come to the beach just to dig clams. It was learned that 73% (1962) and 65% (1963) of the 5,211 diggers interviewed were local people. The increase of visitors in 1963 reflects the cocurrence of the lowest tides on weekends, whereas in 1963 the tides occurred in the middle of the week. It was also learned that 3,4% (1962) and 21.3% (1963) of the visitors had come to the beach just to dig clams and that 61 to 70% of them were from the Portland area. The results of the study are summarized in Tables 5-7.

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<u>1962</u> Seaside	462	74.7%	25.3%	5.24
North Beach	1,614	66.5	33.5	2.6
Total	2,076	72.9	27.1	3.4
<u>1962</u> Seaside	847	63.4	36.6	16.8
North Beach	2, 288	66.3	33.7	23.1
Total	3,135	65.5	34.5	21.3

Table 5. Results of Digger Origin Study, 1962-63.

1/ The percentage of diggers who came to Clatsop Beaches only to dig razor clams.

### Sport Wastage

Wanton waste of clams by sport diggers was determined in 1962, following the procedure outlined in Shellfish Progress Report No. 32. An estimated 85,394 clams were wasted which represents 8.7% of the sport catch. The bulk of the wastage (85%) occurred at Seaside and the vast majority of the clams were in their first year of life (Table 4).

County	Number	Per Cent
Multnomeh	151	46.0
Columbia	42	12.8
Washington	35	10.7
Clacksmas	19	5.8
Lano	17	5.2
Linn	13	4.0
Marion	10	3.1
Tillemook	9	2.8
Deschutes	4	1.2
Umatilla	4	1.2
Polk	6	1.2
Douglas	3	0,9
Lincoln	3	0.9
Wasco	3	0,9
Benton	3	0,9
Yamhill	2	0,6
Crook	2	0,6
Jefferson	2	0,6
Morrow	2	0,6
Total	328	100.0

Table 6. Origin of 328 Oregon Razor Clam Diggers, April-September 1962.

Table 7. Origin of 76 Out-of-State Razor Clam Diggers, April-September 1962.

State	Number	Per Cent
Washington	22	28,9
California	22	28.9
Idaho	4	5.3
Arisona	2	2,6
North Dakota	2	2.6
Vermont	2	2.6
Kansas	2	2.6
Connecticut	2	2.6
Colorado	2	2.6
Florida	2	2.6
Virginia	2	2.6
Kentucky	2	2.6
New Jersey	2	2.6
Minnesota	3	6.0
Utah	1	1.3
Iowa	and the second s	1.2
Total	76	100.0

## Age Composition

Table 8 shows the number and per cent each age group contributed to the sport fishery in 1962 and 1963. It is evident that clams 3 years and older contribute little to the fishery. It is also interesting to note that 87-925 of the catch are 0<sup>+</sup> and 1<sup>+</sup> clams which means that the bulk of a year class is being removed during its first two years of existence.

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ৰাজনাৱ হিচিয়েলাটোইটাৰাটো কাঠাবিকা প্ৰশান্ত	04	J.4-	anna 2 th	3+	6+	5+	Total
<u>1962</u> Masber S	301, 264 33.8	520, 212 58.4	53,488 6.0	11,655 1.3	4, 708 0,4	519 0,1	<b>891, 846</b> 100
1963 Number %	245, 238 34.4	377, 241 52.9	77, 892 10, 9	10, 032 1.4	2,641 0.4	84 <0.1	<b>713, 128</b> 100

Table 8. Sport Harvest of Razer Clams by Age Group from Clatsop Beaches, April-September 1962-63.

#### Winter Sport Harvest

The sport harvest of razor clans was sampled during the winter months of 1952-63 to determine its magnitude in relation to the summer sport catch. A harvest of perhaps 5% has been assumed in the past, but there is no data to verify this claim.

There were SL evening minus tides between October 1962 and March 31, 1963. Diggers were sampled on 11 of 16 tides that occurred before or shortly after dark using standard sampling procedures. At least 95% of the digging occurred on these 16 tides.

An estimated 7,800 diggers dug 91,000 clams for a mean catch of 11.7 clams per digger. The catch is 9.3% of the sport catch, but does not include wastage.

Three tide series, one each in January, February, and March were of primary importance. The first series in March, although only 5 days long and

ranging to a -0.4 tide, accounted for 38% of the winter harvest.

During the 1963-64 winter season (October-February) 66 minus tides occurred, ranging to -1.8 feet. Digging occurred on only two of these tides except for sporadic commercial digging.

It is obvious that the occurrence of most of the minus tides at night and adverse weather conditions severely limit the winter fishery. However, on days when the tides occurred before dark and weather and surf were favorable, many diggers took it to full advantage. Only a handful of diggers felt enough confidence to dig by gas light.

# Commercial Fishery

#### Digging Intensity and Harvest

License receipts show there were 101 potential commercial diggers in 1962. It is estimated that 40 of these diggers sold clams at least once, 33 dug for personal use, and 28 claimed no landings.

IBM records show that 24,221 pounds were reported by commercial diggers which is approximately 102,000 clams or about 10% of the total sport-commercial harvest. Figure 2 shows the commercial catch from 1955-1952.

The 1963 data is not yet complete, but a similarly low commercial harvest is anticipated.

### Age Composition

Figure 3 shows the per cent age composition of commercially dug clams from Clatsop beaches for 1955-1963. The 1+ clams are obviously the most important in the fishery.

# Research Studies

# Drift Bottle Study

A pilot run for a forthcoming drift bottle study was initiated March 7, 1963, with a release of 140 bottles at 1-mile intervals along the 5-fathom curve



Figure 2. Commercial Razor Clam Harvest from Clatsop Beaches, 1955-1962.





(about one mile aff shore) between Tillamook Head and the Columbia River. The initial run was designed to provide preliminary information for a comprehensive study which will continue through the summer of 1963.

The purpose of the study is to determine the pattern of the inshore coean currents between Tillamook Head and the Columbia River and its relationship to the razer clam, and in particular to the setting of larval clams.

The study was temporarily interrupted in July 1963 when the recovery vehicle broke down. Continuance of the study is now planned for the summer of 1964. Details of the pilot run are presented in an informational report.

### Aquarium Studies

The aquarium studies as described in Progress Report No. 34 were continued until September 11, 1962 at which time proposed expansion of the Seaside Aquarium facilities necessitated the removal of the clam tank.

In April 1962, the tank was removed temporarily for repairs. Only 4 of the original 57 clams survived from the June 1961 stocking. The tank was back in operation on May 4 at which time 24 clams were placed in it. Upon final removal on September 11, (4 months later) the sand was screened and 15 of the planted clams had survived. In addition, 15 razor clams, 24 softshell and 3 littleneck clam set were discovered. The set probably came in with the water supply, but it is possible that the razor clams were spawned in the tank.

All of the adult clams were spawned out except one which was fully mature. All of the clams had reddish brown gills which were much darker than those found in clams in their natural environment. A more detailed account of the aquarium work will be presented in an informational report.

# Screening

Screening for razor clam set during the late fall and winter was discontinued. The method encountered so many uncontrollable factors and rendered the information questionable at best. Screening in October to December did produce more encouraging results than for the same period in 1961, but no significant correlation is evident. There is a possible application for screening in connection with a fortheoning drift bottle study, but the general operation has been terminated.

### Beach Surveys

During the summer season of 1963, several beaches, other than Clatsop Beaches were checked for razor clams. The primary purpose of the survey is to determine other productive areas for razor clams and publicize them in an attempt to lessen the digging pressure on Clatsop Beaches.

The results of the 1963 study are given in Table 9. Several interesting observations were made during the study. Cannon Beach, and Manzanita Beach appear to be peor producers.

Short Sands Beach and Bastendorf Beach near Coos Bay and Meyers Creek Beach between Goldbeach and Brockings appear to have sizable populations of clams which are regularly dug. Reports indicate that Netarts and Bayosean spits are reliable areas to dig, but a boat is required to reach these areas. Cove, Indian, Agate, and South Beaches tend to be sporadic and are dug on the nost favorable tides.

Generally, the size of the clans from these areas are small with very few large ones. Cove Beach is an exception with a better than 4 1/2 inch average size. However, the complete lack of small clans or set would indicate a sporadic population.

Agate Beach had not heretofore been checked for clams, but Mr. Joe Day of Newport provided a 2-day dig for our benefit. The South Beach area at Newport also produced some clams.

There are reports from other areas of the coast of razor clam stocks which have not been checked since the 1949 survey. It is anticipated that a similar survey will be conducted in 1964 for comparison.

Date	Area Area	No. Digs Observed	Clams Per Dig	Biol. Semple	Mean Length (mm)	Size Range (mm)
4-24-63	Cannon Beach	1	0	1	<b>Que</b>	-
5-23-63	Bayocean	0	63	33	101	81-122
5-27-63	Manzanita	0	63	0	c <u>a</u> se	6:44.50
6-8-63	Short Sands	22	13.1	30	6845s	0.52056
6-10-63	Indian Beach	0	ça	4	- CARDO	Siles
6-21-63	Short Sands		6.0	339	102	43-135
6-23-63	Indian Beach	10	ag.	17	107	98-117
6-25-63	Indian Beach	5	69	22	102	71-118
7-6-63	Cove Beach	15	11.4	13	118	114-128
7-8-63	Netarts Spit	0	650	23	113	85-129
7-10-63	Oceanside	6	5.5	38	100	83-114
7-22-63	Meyers Creek	9	3.8	34	113	82-145
7-24-63	Bastendorf Beach	17	16.3	54	82	43-119
7-18 & 19-63	Agate Beach	1	38		109	99-128
7-18 & 19-63	South Beach (Newport)	ش	ෂ	77	107	63-130
12-2-63	Short Sands	1	0	22	89	62=109

Table 9. Summary of 1963 Razor Clam Beach Survey.

# CRABS

Crab studies consisted of a tagging program on the Oregon-California border area in cooperation with the California Department of Fish and Game; attempting to determine the effect of seismic blasting on crabs; condition studies as measured by shell condition; preparing for and attending hearings; and making pot counts and monitoring landings.

# Pot Counts and Landings

The number of crab pots fished off the Oregon coast and pounds of crabs

landed by season appear in Table 10.

Table 10. Crab Landings and Estimated Number of Crab Pots Fished on the Oregon Coast for the 1961-62 and 1962-63 Seasons.

Yeer	Pounds Landed 1/	Estimated Number of Pots Fished
1%1-62	6,077,975	28,399
1%2-63	3, 583, 275	24,618
WHENDY LONDON STREET, STORE STORE STREET, STORE STORE STREET, STORE STREET, STORE STREET, STORE STREET, STORE STREET, STORE STREET, STORE STORE STORE STORE STREET, STORE ST	iliotalin milit Aran entrearen ingeler berten bereinikerter anteren ingeler eren eren in ein anteren eren eren	multer on an exercise interesting and the second

1/ Based on 25 pounds per dozen.

It can be seen that both seasons were poor as far as production is concerned. The 1962-63 season represents the poorest season on record since the fishery has been fully exploited. Prior to this, 5 million pounds was the poorest year on record. This decline in abundance occurred during two seasons when the fishing intensity was the greatest. The 28,000 pots fished in 1961-62 represents the most gear fished in any season on record. Also, it should be noted that the decline in abundance is not unique to Oregon. Both Washington and California have suffered similar declines during this period. The exact cause is unknown, but environmental conditions in the ocean are suspected. Of particular concern is the earlier than normal intrusion of warm water currents from the south which may be displacing the free swimming larvae into the oceanic deeps where they are lost from the fishery.

# Cooperative Crab Work With California

In 1952, the Oregon Fish Commission (OFC) in cooperation with the California Department of Fish and Game conducted a tagging program on the northern Californiasouthern Oregon border. The objectives of this program were to obtain additional information on the population structures, migrations, and mortalities of crabs in this area.

During the period of November 23 to December 10, 1962, 901 crabs were tagged between Cape Ferelo in Oregon and the Klamath River in California. To date we have recovered 528 tags or 59% of the total number released. Upon completion of the program, it will be written up and reported in a PMFC bulletin.

During the fall of 1963, OFC personnel again joined the California biologists on board the research vessel N. E. Scofield on the Oregon-California border to observe crab populations. The objective of this cruise was to make a population estimate, determine sex ratios, and observe the percentage of male crabs bearing mating marks on the chela.

During the period of November 18 through December 1, 1963, 1,859 male crabs were caught in 248 trap-nights. Of this number, 241 were legal-sized males. Seven per cent of the sub-legal males had definite mating marks. From this study it was concluded that crab fishing in the Brookings-Crescent City area would be poor this year, but based on the high number of sub-legal crabs, the 1964-65 season is expected to improve.

#### Condition Studies

Shell condition studies of crabs at the season openings in 1962 and 1963 were conducted at all major ports of landing for the early portion of the season. Both seasons' crabs were in good condition and the percentage of softshells fell within acceptable limits at the opening dates.

# Seismic Experiments

The appearance of several oil companies' seismic boats off the Oregon coast in the summer of 1961 caused concern among some segments of the fishing industry. It was felt by the fishermen that the use of explosives was killing fish and crabs. Experiments with live-caged crabswere conducted and the results of this work appear in reports released by the Water Resources Analyst's office.

#### Maryland Crab Race

The governor of Maryland invited the governor of Oregon to enter a crab in the annual governor's trophy race at Crisfield, Maryland in 1962 and 1963.

Four Dungeness crabs were shipped successfully each year to the contest. The Dungeness crab appears to be more adapted to table qualities than to running, as we lost both races.

#### Crab Hearings

Public hearings involving crab regulations were held in 1962 and 1963. At the 1962 hearing no change in regulations was adopted. However, at the 1963 hearing the season opening dates were altered. In the past, Oregon had two separate opening dates for the offshore crab fishery. Area I, from Caseade Head north to the Columbia River, opened January 1, and Area II, from Caseade Head south to the California border, opened December 1. These dates were established on a basis of shell condition studies started in 1948. More recent studies indicated that some of the soft crabs from Area I yielded as much meat as the hard-shelled ones and consequently the staff recommended a uniform opening date of December 1 for the entire Oregon coast. The results of this change will be carefully monitored.

#### OYSTERS

Oyster work was confined to investigating undue mortalities of Kunamoto spat, experimenting with pesticides in an attempt to control oyster competitors in Tillsmook Bay, and aiding the University of Washington in their <u>Mytilicola</u> studies in Yaquina Bay.

#### SCALLOP

Shellfish personnel accompanied biologists of the Bureau of Commercial Fisheries on board the research vessel John N. Cobb during the fall of 1%3. The object of this cruise was to obtain information on the location of commercial quantities of the Weather Vane scallop (<u>Pecter caurinus</u>) between Coos Bay and the Columbia River. Several areas look quite promising and will be investigated further during the summer of 1964.

#### ABALONE

On August 4, 1958, the OFC entered into a two-year agreement with two California fishermen to do exploratory work off the Oregon coast for red abalance (<u>Haliotis rufescans</u>). In August 1960 the contract with one of these fishermen was renewed for two years. In 1962, a public hearing was held and upon staff recommendation the following action was taken: (1) the present personal-use regulations were retained; (2) commercial fishing for red abalane was prohibited; and (3) the contract agreement was terminated. Information obtained and results of the contract period study are contained in an informational report entitled Abalane Research Studies, 1958-62.

## INTERTIDAL NON-FOOD ANIMAIS

A General Order protecting intertidal non-food animals was adopted in 1952. However, investigation into the intertidal area was fairly limited until the spring of 1954. A lack of manpower prior to this time prevented the initiation of any detailed studies. Work on this project to date has consisted primarily of speaking to several high school and college groups on the importance of conserving these animals, investigating a major kill of sea urchins resulting from freezing during the winter of 1963, and summarizing information from collecting permits.

During the permit year, April 1, 1%2 to March 31, 1963, 153 collecting permits were issued for the harvest of intertidal non-food forms. It was estimated that these people collected approximately 280,000 animals of which 67% were echinoderms (starfish, sea urchins, etc.). A report containing information extracted from collecting permits is on file at Clackamas.

Zalas

## HYDROGRAPHY

Hydrographic work during the period of this report was confined to obtaining surface temperature and salinity records at the Newport Laboratory site. It must be emphasized that these are surface temperatures and salinities and reflect only gross changes within the estuary. These observations appear in Table 11.

Year	Tem	perature	(°C)	Sal	inity (%)	0)
and	Mino	Max.	Mean	Mino	Maxo	Mean
Month	an alana ang ang ang ang ang ang ang ang ang	and the subscription of th	generatenterskyrskaanse entratierskyrster	F1141/1920-2017/2012254200-1920-2019-2019-2019-2019-2019-2019-2	n fan de ferste soon de ferste seren ferste seren ferste seren ferste seren ferste seren ferste seren ferste s F	autoranters dagera enginatione
1962						
January	6.5	9.0	8.0	22.5	30.4	26.1
February	6.0	10.0	8.1	19.7	32.1	25.5
March	8.0	10.0	8.7	9.2	30.2	19.1
April	9.0	12.5	11.0	22.9	31.4	26.8
May	10.0	12.0	11.2	23.3	33.1	28.0
June	9.0	13.0	10.8	27.3	33.6	31.9
July	8.5	12.0	9.9	33.3	34.0	33.6
August	9.5	18.0	12.6	32.4	33.7	33.1
September	9.0	12.5	11.2	32.1	34.0	33.1
October	12.0	13.5	12.7	28.4	32.9	31.2
November	10.0	13.0	12.1	20.3	32.4	29.8
December	9.5	11.0	10.2	20.4	29.9	26.9
Annuel Average	8.9	12.2	10.5	24.3	32.3	28,8
1963						
January	7.5	10.0	8.5	27.7	32.5	29.3
February	10.0	11.0	10.4	14.2	20.9	21.9
March	9.0	10.5	9.8	20,9	32.7	28.0
April	10.0	11.0	10.3	10.2	30.4	22.1
May	11.0	14.5	12.2	12.9	33.7	26.8
June	9.0	13.0	10.9	31.0	34.04	32.4
July	9.5	16.0	12.9	28.0	34.6	32.5
August	9.5	13.5	11.4	33.3	34.2	33.8
September	69	63	413			80
October	(5)	-	cia	-		
November	ශ	69	520	8	Geo	63
December	8.5	11.0	10.2	19.0	34.1	31.1
Annual Average	9.3	12.3	10.7	21.9	32.9	28.7

Table	11.	Monthly Minimum,	Maximum,	and Mean	Water	Temperat	ures
		and Salinities f	rom Surface	e Samples	Taken	at the	Trade-
		winds Dock in Ya	quina Bay,	1962-63.			

#### MISCE LLANE OUS

Several items pertaining to clams, crabs, meetings, etc. are worthy only

of mention rather than a lengthy discussion and reflect special work rather than routine operational work by the investigation. The following is a list of such activities and in most cases reports are on file for these items: (1) participating in Toledo High School career day program; (2) collecting idiot fish (Sebastolobus alascanus) gonads for Oregon State University; (3) stream surveys for Coastal Rivers Investigations; (4) conservation talks at Lowell High School and Carlin Nevada High School: (5) talks at Newport Chamber of Commerce and Yachats Chamber of Commerce; (6) investigating crayfish mortalities on Dairy Creek near Hillsborc; (7) investigating sand removal request at Glenedin Beach; (8) investigation of dredging operations in Umpqua Bay; (9) investigating and monitoring oil pollution of Yaquina Bay by an oil barge; (10) collecting Limnoria for Dr. Quayle of the Fisheries Research Board of Canada; (11) judging student Science Fair at Newport; (12) collecting sea water and crabs for the University of Oregon; (13) investigating possible pollution problems in Umpqua Bay from International Pulp and Paper Mill; (14) investigating stream obstruction in Steer Creek; (15) investigation of mineral lease applications on the beach at Goldbeach; and (16) aiding Oregon State Police in collecting and disposing of a fur seal pup born on the beach at Seal Rocks.

> C. Dale Snow Nelson E. Stewart Darrell Demory Waldemar DeBen Aquatic Biologists