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FISH DIVISION Oregon Department of Fish and Wildlife

1982 Clam Studies

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1982 CLAM STUDIES

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Tom Gaumer

INFORMATION REPORT 83-11

Oregon Department of Fish and Wildlife Marine Region, Newport, Oregon

December 1983

1982 BAY CLAM SUMMARY REPORT

INTRODUCTION

This report summarizes the results of our bay clam studies in 1982. Activities summarized include the recreational clam fishery, commercial clam fishery, hatchery stock enhancement studies, natural recruitment studies, and miscellaneous other project.

Recreational Clam Fishery

Recreational clam interviews are conducted annually on each of the major clam harvesting tideflats of the Tillamook, Netarts, Nestucca, Yaquina, Alsea, and Siuslaw estuaries.

Our 1982 recreational clam interviews revealed an increase in digging effort on most of the surveyed tideflats (Table 1). A part of this increase might be a result of the low tides in 1982 which were the lowest in 80 years and that they overlapped weekends. Consequently, beds were accessible for long time periods. Also there was a lot of advertising (newspaper, T.V., etc.) which told people about the low tides. Largest increases in peak digger counts were observed for the bridge bed (225 to 625 diggers) and Idaho Point (38 to 176 diggers) on Yaguina Bay.

Interview data collected included catch/effort, digger origin, species composition, and age and size composition. These data are summarized and pre-sented in Tables 2-14.

Tillamook Bay

<u>Garibaldi Flat.</u> Catch/effort data revealed that clams/trip and clams/ hour have remained relatively constant since the Department's regulation change in 1977 which reduced the bag limit from 36 to 20 clams.

Cockle clams declined from 66.6% of the total recreational catch in 1978 to 27.4% of the catch in 1982 (Table 2). This reflects a dramatic decrease

Estuary	Tideflat	1975	1976	1977	1978	1979	1980	1981	1982
Tillamook	Garibaldi Flat Bay Ocean	425	350 280	131 122	225 39	256 107	300	460 33	516 13
Netarts	Нарру Сатр	mgia 2	175	73	i nhufa	150	160	425	500
Nestucca	Little Nestucca		:,29790 -	10. 10HH	1.112	isnea -	(sin 20	44	6
Yaquina	Bridge Bed	÷	245	138	30	91	84	225	625
	Breakwater Bed Idaho Point	n-17 3	127 110	120 98	62 45	23 66	20 61	27 38	63 176
	NW Gas Plant	ines-1	110	-	40	24	26	41	16
	Coquille Point	-	-	-		17	18	45	41
Alsea	North Beach	<u>-</u>	-		122	-	-	-	4
	Bay Shore	8	-	-	-		61117 * (7)	117	49
Siuslaw	North Fork	-1-60	55		al entre	109	57	146	33

Table 1. Peak Counts of Clam Diggers¹/.

 $\frac{1}{2}$ Number of clam diggers actually on tideflat at time of count. Count occurred at or near low tide.

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Interview data critectel inclusion citatale fort, ingen or (gro, som hu Swoorlting, entige wit Kizospotestelon - These arts are presented and zerconset (b tables 2-14).

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<u>Contractor (Phili</u>) Detter Strong status revealed that the apparticle and share hour teach attacked reletively consiliant affect the Department's regularized charge in Loff Antoh relaced the best from the solar parts from 35 to 20 years.

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Table 2. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Bay: Tillamook

Tideflat: Garibaldi Flat

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Bay: Tillamook							1/	2	Tideflat:	Garibal	di Flat	
	1962	1963	1965	1971	1975	1976	1977	1978	1979	1980	1981	1982
No. Diggers Sampled No. Clams Sampled No. Digger Hours	149 3,296	758 19,053	319 8,414	13,048 389,946 20,439	104 2,472	207 4,825 283.2	252 4,647 335.8	239 4,631 261.1	597 11,104 715.2	456 8,728 548.9	359 6,558 443.3	219 4,249 219.5
Hours/trip Clams/trip Clams/hour	22.1	25.1	22.9	1.6 29.9 19.1	23.8	1.4 23.3 17.0	1.3 18.4 13.8	1.1 19.4 17.7	1.2 18.6 15.5	1.2 19.1 15.9	1.2 18.3 14.0	1.3 19.4 14.6
Digger origin (%)	10	H H	21 141		1	1						
Local State Non-State			38 62	21 73		32.9 57.0	27.8 57.3	33.1 55.2	30.2 64.7	22.4 72.6	27.6 63.5	38.8 57.1 4.1
Species Comp. (%) Butter Cockle Gaper Littleneck Softshell	31.9 38.2 6.3 23.6	27.0 45.0 7.0 21.0	1999 - 19	16.3 16.8 5.4 60.8	20.7 43.4 5.3 29.7	18.2 28.5 18.5 34.7	10.5 46.7 17.2 24.9	11.5 66.6 7.1 14.7	13.5 64.0 9.6 12.7	28.7 46.5 7.1 17.7	42.8 24.2 5.7 27.2	45.8 27.4 6.0 20.8
Clams/trip Butter	7.1	6.8	-	5.0	4.9	4.2	1.9	2.2	2.5	5.5	7.8	8.9
Cockle Gaper Littleneck	8.4 1.4 5.2	11.3 1.8 5.3		4.9 1.6 18.4	10.3 1.3 7.0	6.6 4.3 8.1	8.6 3.2 4.6	12.9 1.4 2.8	11.9 1.8 2.4	8.9 1.4 3.4	4.4 1.4 5.0	5.3 1.2 4.0
Softshell Clams/hour				-				•		1.00		-
Butter Cockle Gaper Littleneck Softshell		Tool and	91, 108, 153	3.2 3.1 1.1 11.7		3.1 4.9 3.2 5.9	1.5 6.5 2.4 3.5	2.0 11.8 1.3 2.6	2.1 9.9 1.5 2.0	4.6 7.4 1.1 2.8	6.3 3.6 0.9 4.0	6.7 4.0 0.9 3.0
Size Comp. (x size)	THE REP.		TP		200.5					-		-
Butter Cockle Gaper Littleneck	10000	an in the	1997 - 19		77.3 63.9 67.5 36.7	81.6 64.3 56.8 36.8	83.8 55.9 69.3 39.4	83.0 55.2 82.0 38.2	72.3 60.9 84.2	64.8 55.0 90.2 36.5	70.6 56.9 91.3	70.3 60.1 114.1
Softshell				1.1.2.1		50.0	39.4	- 30.2	38.5	30.5	39.5	38.0
No. Clams Measured Butter		1.6	1	1.	219	536	394	145	555	304	413	379
Cockle Gaper Littleneck			-	-	290	978 349	1,517	637 84	1,501 327	535 111	254 81	389
Softshell	-				297	518 -	862	233	171	187	251	392

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1/ Regulation change in bag limit; effective January 1, 1977.

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either in cockle clam availability or digger preference. We believe the harvest reduction is due to a decrease in cockle abundance intertidally. Butter clams, on the other hand, have increased from 10.5% of the harvest in 1977 to 45.8% in 1982. Percentage of harvest of gaper and native littleneck clams remained somewhat constant during these four years.

Mean size of gaper clams increased constantly since 1976. Butter clams exhibited an overall decrease in mean size, and mean size of cockle and littleneck clams changed little.

<u>Bay Ocean Flat.</u> Unlike the catch/effort on Garibaldi Flat, the Bay Ocean clam bed has experienced a dramatic decline in clam production. Catch/trip and catch/hour have declined steadily since 1976, to a low value of less than 0.1 animals per trip (Table 3). Total harvest for the 13 clam diggers interviewed in 1982 showed one softshell taken. Historically, cockle clams have made up over 75% of the harvest from this bed. Local oystermen claim a massive increase in sand shrimp in this area in recent years has been the major factor behind this occurrence.

Netarts Bay

<u>Happy Camp</u>. Clam digging on the Happy Camp clam bed continued to be very good in 1982 with 12.0 clams/trip being taken (Table 4). Since gaper clams made up nearly 95% of the harvest, this success rate suggests most diggers were getting their daily bag limit of 12 gapers. Over 87% of the harvested gapers were of the 1975 year-class. No 1977-82 year-class gapers were observed in the take. The gapers averaged 97.7 mm in size.

<u>Cape Lookout Sand Spit.</u> As with Happy Camp, the Cape Lookout sand spit continued to produce clams at a relatively constant rate. Catch/trip and catch/hour averaged 18.4 and 12.4 clams, respectively (Table 5). This was a slight increase over previous years. As in previous years, cockles were the

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Table 3. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Bay: Tillamook

Tideflat: Bay Ocean 1/ 1971 1976 1977 1978 1979 1981 1980 19 1982 19 19 19 No. Diggers Sampled 10.379 94 170 38 79 119 34 13 No. Clams Sampled 216,728 2,242 2,664 574 1,063 1,465 314 1 1 No. Digger Hours 16,156 333 70.4 146.1 215.6 171 57.5 17.0 Hours/trip 1.6 1.8 2.0 1.9 1.8 1.8 1.3 1.7 Clams/trip 20.9 23.9 15.7 15.1 13.5 12.3 9.2 <0.1 Clams/hour 13.4 13.1 8.0 8.2 7.3 6.8 5.5 <0.1 Digger origin (%) Local 21.0 20.2 14.7 13.2 10.1 21.8 20.6 15.4 State 73.0 74.5 79.0 89.9 76.3 73.1 70.6 84.6 Non-State 16.0 5.3 10.5 6.5 0.0 5.0 8.8 0.0 Species Comp. (%) <0.1 0.1 0.6 Butter 0.4 ---Cockle 85.0 78.5 87.3 91.4 74.2 85.8 89.6 12.3 17.5 Gaper 8.8 12.2 8.0 7.1 1.3 -Littleneck 1.3 0.1 0.8 0.1 0.5 1.3 7 I -Softshell 100.0 --.... • -- 1 C Clams/trip Butter <0.1 <0.1 0.1 <0.1 --Cockle 17.1 20.5 12.3 13.2 12.3 6.9 11.0 1.8 2.9 2.7 Gaper 1.8 1.1 0.9 0.1 -Littleneck 0.3 <0.1 0.1 <0.1 <0.1 0.1 --Softshell <0.1 -. . ---. Clams/hour 0 <0.1 <0.1 <0.1 Butter <0.1 --Cockle 11.0 11.3 6.3 7.1 6.7 6.1 4.1 -1.1 1.6 Gaper 1.4 1.0 0.6 0.5 0.1 -Littleneck 0.2 <0.1 0.1 <0.1 <0.1 0.1 100 -Softshell -<0.1 -----Size Comp. (x size) Butter 1 ----Cockle 66.0 66.1 64.0 71.2 68.4 60.6 -110.6 Gaper 107.9 104.7 109.3 106.2 105.5 Littleneck 42.0 37.0 Is 100 -1 -165 Softshell ----No. Clams Measured Butter Cockle 1,075 781 318 525 277 213 Gaper 224 118 68 79 44 4 Littleneck --4 -Softshell -1 --

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Regulation change in bag limit; effective January 1, 1977. 1/

Table 4. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Bay: Netarts

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Bay: Netarts		n Sig	110	1/				Ţ	ideflat:	Нарру Са	mp	
and support	1971	1975	1976	1977	1978	1979	1980	1981	1982	19	19	19
No. Diggers Sampled	5,106	18	141	187	146	222	106	71	168			
No. Clams Sampled	85,230	164	1,709	2,727	1,747	2,823	1,293	991	2,020			
No. Digger Hours	6,613	100	193	254	149.2	204.4	67.7	66.8	150.5			
Hours/trip	1.3		1.4	1.4	1.0	0.9	0.6	0.9	0.9			
Clams/trip	16.7	9.1	12.1	14.6	12.0	12.7	12.2	12.9	12.0			
Clams/hour	12.9	-	8.9	10.7	11.7	13.8	19.1	14.8	13.4			
Digger origin (%)				in an IDa	11.57							
Local	17.6	<0.0	29.1	14.9	11.0	28.4	17.9	40.3	48.2			
State	74.8	-	66.0	75.9	71.2	59.9	73.6	50.6	44.0			
Non-State	7.6	1.0	5.0	9.1	17.8	11.7	8.5	9.1	7.7			
Species Comp. (%)	ROAT	2015	SHITT			1177		73				
Butter	2.6	47.1	20.8	9.2	5.8	7.7	5.4	13.7	5.0			
Cockle	1.0	0.0	0.1	21.9	-		0.1	0	<0.1			
Gaper	95.7	36.6	73.6	62.5	91.0	90.3	92.5	82.7	94.3			
Littleneck	0.8	15.9	5.3	5.4	3.1	0.2	2.0	3.4	0.6			
Softshell	1997 (A. 1997)		(* /*	200	-	Recht)	ser à	-				
Clams/trip	222.1	- AACU	1.1	70 ~~	- 14X	100	and the second sec	in sa				
Butter	0.4	3.3	2.5	1.3	0.7	1.0	0.7	1.8	0.6			
Cockle	0.2	0.0	<0.1	3.2	0.0	-	<0.1	0	<0.1			
Gaper	16.0	4.3	8.9	9.1	10.9	11.5	11.3	10.6	11.3			
Littleneck	0.1	1.4	0.6	0.8	0.4	0.2	0.2	0.4	0.1	10		
Softshell	0.000	1.00		and the	37.545	14:15	1815		-			
Clams/hour	XD#T	0.011	0.50			11.24		water to sta				
Butter	0.3	1.	1.8	1.0	0.7	1.1	1.0	2.0	0.7			
Cockle	0.1	1 7 50	<0.1	2.3	0.0		<0.1	0	<0.1			
Gaper	12.3	.	6.5	6.7	10.7	12.5	17.7	12.3	12.7			
Littleneck	0.1		0.5	0.6	0.4	0.3	0.4	0.5	0.1			
Softshell	-	(1)		-	-	-		-	-			
Size Comp. (x size)	11.1	webwich.	122153227.55		1478-141 (MI)	12.12	Constant P	man of	Marcanetter.			
Butter	Storic	102.8	100.2	103.0	103.2	107.2	105.9	109.7	102.5			
Cockle	9.0	1 8		113			200		15			
Gaper	93.2	112.1	96.3	86.1	87.5	92.1	93.6	98.9	97.7			
Littleneck	STP ST	65.3	67.6	70.0	70.1	73.6	66.7	71.3	70.7			
Softshell	THE PERMIN	5.A.		7038	2/57	111	0.57	513	1993 B			
No. Clams Measured		ALC: Martin		-940-940-940-840-1449 1949	AS-0228-0 - 228							
Butter		66	219	TRUB	NB See	() in the second	24	109	62		10	
Cockle	-	190	1. Jack			2 3 5).	Barren				
Gaper	282	190	643	557	921	417	468	454	565			
Littleneck	-	43	99	28	54	34	3	22	9			
Softshell	÷	1 at 1 at	Children	ALL ALL ALL AND	Weet Ball	TOBLE NO	1.000	1000U	Yas			

Regulation change in bag limit; effective January 1, 1977. 1/

Table 5. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

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Bay: Netarts

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Tideflat: Cape Lookout Sand Spit

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	1971	1975	1976	1/ 1977	1978	1979	1980	1981	1982	19	19	19
		22/0	10/0		13/0	1010	1900	1301	TJOE	19	13	15
No. Diggers Sampled	6,473	43	76	509	72	85	63	80	56			
No. Clams Sampled	115,811	1,038	2,433	9,293	1,324	1,560	1,074	1,397	1,029			
No. Digger Hours	8,656	÷ .	148	1,055	148.8	178	88.5	149.5	83.0			
Hours/trip	1.3		1.9	2.1	2.1	2.1	1.4	1.9	1.5			
Clams/trip	17.9	24.1	32.0	18.3	18.4	18.4	17.0	17.5	18.4			
Clams/hour	13.4	17/2017	16.5	8.8	8.9	8.8	12.1	9.3	12.4			
Digger origin (%)	100	1	11 0	30	10 10							
Local	17.6	-	23.7	23.1	22.2	36.5	17.5	12.5	44.6			
State	74.8	- 1 <u>-</u>	76.3	66.6	77.8	61.2	76.2	81.3	51.8			
Non-State	7.6	-	0.0	10.6	0.0	2.3	6.3	7.5	3.6			
Species Comp. (%)				1010	0.0		0.0	1.5	5.0			
Butter	38.4	49.0	15.8	6.6	2.0	5.5	1.9	7.7	0.3			
Cockle	44.4	46.0	76.9	72.3	72.7	74.4	93.3	76.7	84.9			
Gaper	8.9	2.7	3.7	15.3	22.4	16.0	4.8	13.3	12.1			
Littleneck	6.9	1.3	3.2	2.1	1.3	3.8	4.0	1.9	2.6			
Softshell	3 -2	1.5		-	0 1.3	-	-	1.9	2.0			
Clams/trip	TE O		1 15			and the state of	10			0 6		
Butter	6.9	11.8	5.1	1.2	0.4	1.0	0.3	1.4	0.1			
Cockle	8.0	11.1	24.6	13.2	13.4	13.6	15.9	13.4	15.6			
Gaper	1.6	0.7	1.2	2.8	4.1	2.9	0.8	2.3	2.2			
Littleneck	1.2	0.3	1.0	0.4	0.2	0.7	0.0					
Softshell	1.2	0.5	1.0	0.4	0.2	0.7	1.25	0.3	0.5			
Clams/hour	2-2-2-	6-8-1			-	-	-	- 202 0	10 m - 10			
Butter	5.1	ă a l	2.6	0.6	0.2	0.5	0.2	0.7	<0.1			
Cockle	5.9	1	12.7	6.4		6.5						
Gaper	1.2	8 8 3			6.5		11.3	7.2	10.5			
Littleneck		8 5 3	0.6	1.3	2.0	1.4	0.6	1.2	1.5			
Softshell	0.9	9.8	0.5	0.2	0.1	0.3	-	0.2	0.3			
Size Comp. (x size)	92	-					• 1		- Section of the sect			
	04 5	00.0	71.0	74 1	76.0							
Butter	84.5	80.3	71.8	74.1	76.9	80.4	75.6	74.2	67.7			
Cockle	65.4	73.3	73.0	75.7	72.7	75.2	72.2	72.0	71.3			
Gaper	108.1	80.4	87.4	103.4	100.5	91.7	110.7	104.7	119.0			
Littleneck	2 1	57.8			57.9	53.7	100	53.3	49.5			
Softshell	-3	1		and the second	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	成 唐 武	300.2	1. ar.	-			
No. Clams Measured	1		200	ing an		67260	12		100			
Butter	32	237	294	80	11	86	20	49	3			
Cockle	245	257	674	851	555	812	525	486	534			
Gaper	52	257	36	170	144	191	44	48	71			
Littleneck	3 4 1	31	-		12	60	343	13	71 26			
Softshell	-	H 1100			SAN SAN	2 ²⁰⁰	-	A REAL	30, 22, 26			

1/ Regulation change in bag limit; effective January 1, 1977.

principal species collected representing nearly 85% of the take. Gaper, butter and native littleneck clams made up the remainder of the bag. Unlike Happy Camp, most of the gaper clams (69.2%) were of year-classes younger than 1975. Only 23.1% were of the 1975 year-class. The cockle clams averaged 71.3 mm in size and were dominated by the 1979 and 1980 year-classes.

Nestucca Bay

<u>Little Nestucca Flat.</u> After a relatively poor digging year in 1981, 1982 showed catch/effort back up to a respectable 29.7 clams/trip (Table 6). Softshell clams were the only species taken and averaged 75.6 mm in size. A majority of the softshells were of the 1978 and 1979 year-classes.

Yaquina Bay

<u>Bridge Bed.</u> Little change was seen in the catch/effort for this tideflat from previous years (Table 7). Gaper clams comprised over 85% of the harvest and averaged 105.9 mm in size. Over 63% of the gapers were of the 1975 yearclass. Most of this fishery occurs on the gravel island under the 101 Highway Bridge.

<u>Breakwater Bed.</u> As with the bridge bed, catch/effort on the breakwater has remained relatively constant for the past several years (Table 8). Access is strictly by boat which limits the digging pressure on this area. Over 94% of the harvest is gaper clams. The gapers averaged 106.4 mm in size. No single year-class dominated the harvest.

<u>Idaho Point.</u> The past several years have shown a slight reduction in catch/effort of clams from this area (Table 9). The clam bed is subjected to a very intensive cockle fishery where 95% of the take is this species. the cockles averaged 54.4 mm in size. Since 1977, there has been a gradual decrease in mean size of the cockle suggesting possible over harvest. Cockles of the 1979 and 1980 year-classes were dominant in the 1982 harvest. L' Reputation change in bag limit: offentive January 1, 1977.

Table 6. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Bay:	Nestucca

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Bay: Nestucca		1/	338						Tideflat:	LILLIE	estucci	a riat
1.1.261	1971	<u>1/</u> 1977	1979	1980	1981	1982	1983	19	19	19	19	19
No. Diggers Sampled	1,466	34	16	38	23	22						
No. Clams Sampled	23,211	1,049	484	1,120	357	653				24		
No. Digger Hours	1,584	43	21	72	27	31	0èl B		Eth SA			
Hours/trip	1.1	1.3	1.3	1.9	1.2	1.4			23.14			
Clams/trip	15.8	30.9	30.3	29.5	15.5	29.7						
Clams/hour	14.7	24.4	23.2	15.6	13.2	21.4						
Digger origin (%)	10.4			(art		10 10				14 C		
Local	12.4	52.9	18.8	0	13.0	4.5						
State	73.5	47.1	62.5	86.8	87.0	86.4						
Non-State Species Comp. (%)	14.1	0	18.8	13.2	0.0	9.1		36.71				
Butter	1015											
Cockle	0	0	0	0	0	0						
Gaper	ŏ	Ő	ŏ	Ö	0	0						
Littleneck	ŏ	ŏ	ŏ	ŏ	Ő	0						
Softshell	100.0	100.0	100.0	100.0	100.0	100.0	375					
Clams/trip		20010	10010	100.0		100.0	177A 1713	301/1				
Butter												
Cockle	0	0	0	0	0	0	5					
Gaper	0	0	0	0	Ō	ŏ						
Littleneck	0	0	0	0	•	Ō	18-8					
Softshell	15.8	30.9	30.3	29.5	15.5	29.7	3-0					
Clams/hour	0*5		0.19	0.5	1858	0.16	0.8					
Butter												
Cockle	0	0	0	0 0	0	0	124					
Gaper	0	0	- 0	0	0	0 69	1075		01851	1913		
Littleneck	1. 0	0	0	0	0	0			10.75			
Softshell	14.7	24.4	23.2	15.6	13.2	21.4						
Size Comp. (x size) Butter	6.2								· 전문 · 작			
Cockle	2.5	0	0	14		10.10			11/10	1616		
Gaper		0	0	0	0	0						
Littleneck	61264	0	Ö	Ö	ő	CALL OF			353.6			
Softshell	11 269	86.0	84.2	79.9	78.3	75 6			1. 73			
No. Clams Measured		00.0	04.4	13.3	70.5	75.6						
Butter												
Cockle	0	0	0	0	0	0					1.1	
Gaper	õ	õ	õ	ŏ	ŏ	0						
Littleneck	õ	Ó	ŏ	ŏ	õ	0					mg.	
Softshell	Ő	250	332	254	163	547						

Table 7. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

				105.90								
Bay: Yaquina		(0 1)			1/			1	ideflat:	Bridge B	Bed	
	1971	1972	1975	1976	1977	1978	1979	1980	1981	1982	19	19
No. Diggers Sampled	4,518		88	29	357	89	143	142	342	149		
No. Clams Sampled	41,769		694	414	2,838	892	1,313	1,222	3,773	1,609		
No. Digger Hours	6,769	trent of the	-	36.0	488	109.9	120.0	159.5	353.9	154.0		
Hours/trip	1.5	-	- 0	1.2	1.4	1.2	0.8	1.1	1.0	1.0		
Clams/trip	9.2	-	7.9	14.3	7.9	10.0	9.2	8.6	11.0	10.8		
Clams/hour	6.2		0.00	11.7	5.8	8.1	10.9	7.7	10.7	10.4		
Digger origin (%)	E.F.	Tel 14	Others with	Y0 91			1010		1017	1011		
Local	-	12	32 8	31.0	19.6	24.7	22.4	18.3	44.7	48.3		
State	1 2 2	19 4 1	S# 8	48.3	70.9	69.7	76.2	70.4	49.1	48.3		
Non-State		14 M	- X	20.7	9.5	4.5	1.4	11.3	6.1	3.4		
Species Comp. (%)									0.11			
Butter	0.2	A STATE	0.8	0.2	0.8	0.6	0.2	1.7	0.8	1.9		
Cockle	79.4		42.1	72.2	45.4	24.6	7.9	1.4	15.7	7.2		
Gaper	19.5		54.8	24.6	43.6	72.1	89.6	94.8	81.0	85.4		
Littleneck	0.8		2.3	1.4	1.4	1.1	0.4	2.1	1.7	4.5		
Softshell	-		-	-		- 0	-	-		4.5		
Clams/trip					a Reality	- 1977 - 19 						
Butter	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2		
Cockle	7.3		3.3	10.3	3.6	2.5	0.7	<0.1	1.7	0.8		
Gaper	1.8	109.6	4.3	3.5	3.5	7.2	8.2	8.2	8.9	9.2		
Littleneck	<0.1	0240	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.5		
Softshell			0.1	0.2	-	-	-	-	0.2	0.5		
Clams/hour				a second s	- 5-11							
Butter	<0.1		22	<0.1	<0.1	0.1	<0.1	0.1	0.1	0.2		
Cockle	4.9	- 2 -		8.4	2.6	2.0	0.9	0.1	1.1			
Gaper	1.2		12.3	2.9	2.5	5.9	9.8	7.3	8.6	0.8		
Littleneck		2.31	1.1	2.5				1.3	0.0	8.9		
Softshell	1.11	850 0	15-0		1510	1910	-	-	23 2	-		
Size Comp. (x size)	t the second											
Butter	14.1		08	1.5		1200	67.5	71 0	70 E	00 4		
Cockle	60.5	31.1	49.3	46.7	57.5	60.0		71.9	72.5	80.4		
Gaper	-	51.1	107.1	115.5		69.9	66.8	55.8	57.4	65.1		
Littleneck	112801		CONTRACTOR IN THE CASE	115.5	95.0	101.7	96.8	100.0	107.7	105.9		
Softshell	23.201	1ª Cea	60.3	동지	3101		51.5	62.2	54.7	54.7		
No. Clams Measured	- Aller	and all a		• II.				1.(2.)				
Butter							-111-		00	-		
Cockle		25	276	-	-	-		14	20	5		
	6.65		276	205	592	202	51	6	536	86		
Gaper	1.53	•	316	62	593	154	279	419	1,370	308	Street and	
Littleneck	500 A		12	-			2	19	55	9		
Softshell		ublistigt.	-YUNTOT	14012 1	10.000	Lines. 1	1.11	OKUST	-			

1/ Regulation change in bag limit; effective January 1, 1977.

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Table 8. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

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Bay: Yaquina				1/					Tideflat:	Breakwa	ter	
man with the state of the	1971	1975	1976	<u>1/</u> 1977	1978	1979	1980	1981	1982	19	19	19
No. Diggers Sampled	1,455	46	-	48	20	10	21	16	14			
No. Clams Sampled	22,175	515	-	511	270	142	261	166	157			
No. Digger Hours	2,179	-	1	69.1	21.5	20.0	44	27	20.5			
Hours/trip	1.5		-	1.4	1.1	2.0	2.1	1.7	1.5			
Clams/trip	15.2	11.2	12	10.6	13.5	14.2	12.4	10.4	11.2			
Clams/hour	10.2			7.4	12.6	7.1	5.9	6.1	7.7			
Digger origin (%)	10.1			7.4	12.0	/.1	5.5	0.1	1.1			
Local	01		- <u>1</u> 2-1	35.4	55.0	30.0	28.6	18.8	71.4			
State	- 1 -1-3 - 1 -1-3		2.0	64.6	45			50.0				
Non-State	(E)		19		45	50	71.4	31.3	28.6			
Species Comp. (%)	T			501 L				31.3	0			
Butter	1.2	1.5		1.4	0.7	0	6.5	1.8	2 5			
Cockle	15.3	3.9	1000	18.2	13.7				2.5			
Gaper	83.0	95.0	21	78.9	84.4	7.0	11.1	19.9	1.9	,		
Littleneck	0.4	0.2	10.10			84.5	81.2	75.3	94.9			
Softshell	0.4	0.2	1.1	0.8	0.4	7.7 0	1.1	1.2	0.6			
Clams/trip		1011	111						the second second			
Butter	0.2	<0.1		0.1	0.1	•	0.0					
Cockle	0.2		140	0.1	0.1	. 0	0.8	0.2	0.3			
	2.3	0.4	19-14	1.9	1.8	1.0	1.4	2.1	0.2			
Gaper	12.7	10.6	1914		0	0	10.1	7.8	10.6			
Littleneck	<0.1	<0.1	2.1	0.1	0.1	0	0.1	0.1	0.1			
Softshell Class/baum				The second		-	.		-			
Clams/hour Butter	0.1							1200				
	0.1		1.1	0.1	0.1	0	0.4	0.1	0.2			
Cockle	1.6		1.3	1.3	1.7	0.5	0.6	1.2	0.1			
Gaper	8.4	-		5.8	10.6	6.0	4.8	4.6	7.3			
Littleneck	<0.1	-	-	0.1	0.1	0	0.1	0.1	<0.1			
Softshell			and the second		1.00			the second	-			
Size Comp. (x size)	1000	5111	1605	72.50	7.6720	101 3	10.00	1:278	1123			
Butter	<0.1	-	100	0.1	<0.1	<0.1	85.3		10.0			
Cockle	75.6		1.5	72.5	76.1	100	Tord	62.6	Cate Con			
Gaper	113.8	116.2	-	123.3	118.9		109.1	106.4	106.4			
Littleneck	-	-	-	1.	-		64.0	-	-			
Softshell	10-2E1	-		-2000	COLD.	- 1 Cal.	-	· • · · · · ·	-			
No. Clams Measured			100		T.G.M.				Contraction of the			
Butter		1014	37.21	- 1913	Teaster.	- 1903I	16	0	4			
Cockle				-	79	37	0		3			
Gaper		310	. 	198	207	Court.	195	27 69	142			
Littleneck	-		-			¥		0	1			
Softshell	1000	14019.3		20MARTS IS			0.0003		*			

1/ Regulation change in bag limit; effective January 1, 1977.

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Table 9. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Tideflat: Idaho Point

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Bay: Yaquina

1/ 1977 1976 1971 1975 1978 1979 1980 1981 1982 19 19 19 No. Diggers Sampled 10,462 123 42 309 20 193 182 147 80 No. Clams Sampled 138,784 2,600 812 3,773 298 2,783 3,118 2,339 1,219 15,621 No. Digger Hours 76.5 464 25.2 247.8 222.3 144.5 301.6 -Hours/trip 1.5 1.8 1.5 1.3 1.3 1.5 1.8 -1.7 13.3 21.1 19.3 Clams/trip 12.2 14.9 14.4 17.1 15.9 15.2 Clams/hour 8.9 10.6 8.1 11.8 11.2 10.3 10.5 8.4 -Digger origin (%) 35.7 45.0 12.3 31.6 28.6 15.6 18.8 Local -State 33.3 84.1 50.0 62.7 65.4 81.3 70.7 Non-State 31.0 3.6 5.0 5.7 6.0 13.6 0 Species Comp. (%) 0.3 <0.1 0.5 0.5 0 1.7 0 0.1 0 Butter Cockle. 77.7 93.2 72.5 78.5 83.9 70.2 87.2 93.4 95.0 21.7 5.8 13.1 Gaper 18.4 15.1 20.7 12.8 4.1 2.9 0.4 <0.1 0.1 0.2 0.1 Littleneck 0 0.5 0.9 0 Softshell ---• Ξ. ---Clams/trip <0.1 0.1 Butter <0.1 0.1 0 0.2 0 0 0 Cockle 10.3 19.7 14.0 9.6 12.5 10.1 14.9 14.9 14.5 3.0 Gaper 1.2 2.9 3.6 1.6 2.3 2.2 0.6 0.4 Littleneck <0.1 <0.1 <0.1 <0.1 <0.1 <0.1 0 0 <0.1 Softshell ---------Clams/hour 0.1 0.1 Butter 0.1 0.2 0 0 0 0 -Cockle 6.9 7.7 6.4 7.9 9.9 1.3 9.8 8.0 -Gaper 2.0 1.1 1.8 2.3 9.0 1.9 0.4 0.2 -<0.1 <0.1 Littleneck <0.1 0 <0.1 0 0.0 0.1 -Softshell ------Size Comp. (x size) 75.1 87.3 Butter -. 61.0 58.6 Cockle. 58.3 60.2 59.0 57.8 58.2 54.3 54.4 113.0 96.6 91.3 93.5 95.2 95.9 Gaper 94.5 91.7 83.3 Littleneck 55.3 50.1 42.7 ---- -. -Softshell -----No. Clams Measured 2 Butter 4 Cockle 45 1,620 1,302 ---Gaper 369 522 1,804 250 1,471 181 75 Littleneck 171 126 173 42 24 Bar investa 9 -Softshell

1/ Regulation change in bag limit; effective January 1, 1977.

<u>Northwest Gas Plant</u>. The harvest of clams from this clam bed has shown a steady and alarming rate of decline since 1971 (Table 10). Changes in shellfish regulations during 1977 had no apparent impact on changing this downward trend. Clam diggers averaged less than 4.5 clams/trip in 1982. Species composition data revealed that over 91% of the harvest was cockle clams, averaging 50.2 mm in size. The fishery was primarily on young cockles;over 51% were of the 1981 year-class.

<u>Coquille Point.</u> This tideflat is starting to experience more digging pressure, perhaps because of the poor digging at the N.W. gas plant. Catch/ effort has improved since 1981 with 5.0 clams/trip being taken (Table 11). Over 93% of the clams were gapers that averaged 96.6 mm in size.

Alsea Bay

Alsea Bay was added to our sampling program in 1982. Two areas were surveyed; North Shore and Bay Shore.

<u>North Shore.</u> Four diggers were interviewed and they averaged 17.8 cockles/digger (Table 12). The cockles averaged 80.1 mm in size and were primarily five-year-old clams (1976 year-class). The North Shore flat is located directly under the Alsea bridge on the north side of the estuary.

<u>Bay Shore.</u> We interviewed 32 diggers on this tideflat and they averaged 16.5 clams/digger (Table 13). Over 99% of the clams taken were cockles that averaged 72.9 mm. Over 80% of the clams were of the 1978 and 1979 yearclasses (3-4 year olds). This fishery occurs primarily subtidally with clams taken with long handled rakes made out of modified pitch forks. Siuslaw Bay

The Siuslaw is the most southern estuary that we routinely survey.

Table 10. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

Bay: Yaquina

Tideflat: Northwest Gas Plant

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	1971	1975	1976	<u>2/</u> 1977	1978	1979	1980	1981	1982	19	19	19
No. Diggers Sampled	E 057	92	93	315	49	137	63	38	29	- 91	100	1
No. Clams Sampled	5,857 119,702	13,541	583	3,852	684	1,073	495	151	128			
	8,725	13, 541	139.0	402.0	66.8	164.8	84.3	54.4	32.5			
No. Digger Hours	1.5		1.5	1.3	1.4	1.2	1.3	1.4	1.1			
Clams/trip	20.4	14.7	17.0	12.2	14.0	7.8	7.9	4.0	4.4			
	13.7		11.0	9.6		6.5						
Clams/hour	13./		11.4	9.0	10.2	0.0	5.9	2.8	3.9			
Digger origin (%)			0.7	00 F	E0 0	22 6	20.2	26.0	65.5			
Local	-		9.7	22.5	59.2	33.6	30.2	36.8				
State	-		86.0	72.1	38.8	49.6	68.3	57.9	34.5			
Non-State		De l'Artes	4.3	5.4	2.0	16.8	1.5	5.3	0	1		
Species Comp. (%)	0.0	1.0	0.1		0.1	0.0		0.0				
Butter	0.6	1.9	0.1	1.1	0.1	0.2	0.6	2.0	01 0			
Cockle	85.1	60.6	71.3	74.5	82.6	81.9	78.4	11.3	91.4			
Gaper	12.7	29.8	22.0	13.8	16.8	11.9	19.6	34.4	7.0			
Littleneck	0.7	1.3	0.3	0.5	0.4	0.6	1.4	2.0	1.6			
Softshell		- -	1. A	1 1 1	3(#)	-		47.0	• ?			
Clams/trip	0200020	6. 4.	Service .	Diameter Pro-	12 10	202 82	Page and	E Zaunan	199			
Butter	0.1	0.3	<0.1	0.1	<0.1	<0.1	0.1	0.1	0		The second	
Cockle	17.4	8.9	12.1	9.1	11.5	6.4	6.2	0.4	4.0			
Gaper	2.6	4.4	3.7	1.7	2.3	0.9	1.5	1.4	0.3			
Littleneck	0.1	0.2	<0.1	0.1	0.1	<0.1	0.1	0.1	0.1	a (1		
Softshell	-							1.9				
Clams/hour	10		Th. 8. 1	× 1	11. 19		1 St 914-	and the second s		1.11		
Butter	<0.1	-81	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0	311		
Cockle	11.7		8.1	7.1	8.5	5.3	4.6	0.3	3.6			
Gaper	1.7	1	2.5	1.3	1.7	0.8	1.2	1.0	0.3			1115
Littleneck	<0.1	3. . a.	<0.1	0.1	<0.1	<0.1	0.1	0.1	0.1			
Softshell		-	-10	- 1-	- 3	-	1. S.	1.3	-	10		
Size Comp. (x size)	and the second second	12		1 12	14		6	0 0	1			
Butter		- ²¹	£	5 - 0	õer 3	1.1.4	99.0	80.0	0			
Cockle1/	66.3	63.4	56.5	60.7	60.0	59.4	52.5	47.1	50.2			
Gaper	95.3	91.3	91.5	92.8	101.1	94.9	96.0	88.8	87.3			
Littleneck			3 - 1				47.4	48.0	45.5			
Softshell	North H	-8	김 말씀 것		2 3	98V P	Sector Sector	57.5				
No. Clams Measured	16 12	100 H	D1 2	S		17 10 10		0110	100	날 물		
Butter	15. S. S.	10 million (197	Sc 120	: 3a R	2 8	14	1	1	0	S-Fand		
Cockle	1000000	219	648	889	525	606		18	60			
Gaper	estate -	451	217	152	106	96	349 61	46	50			
Littleneck	Sec. 1.	451	21/	152	100		5		6			
Softshell	655-0		2 5 724	350		5	5	22	0			
1/ 1972, Cockle = 6	S		5-2	3.572		(#2)	(1. T)	4	-			

Table 11. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

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1.1411.002		Table 11.	ANNUAL	SUMMARY (JF REUKEA	TIONAL	INTERVIEW	DATA				
Bay: Yaquina									Tideflat:	Coquill	e Point	
	1981	1982	19	19	19	19	19	19	19	19	19	19
No. Diggers Sampled	11	53										
No. Clams Sampled	24	267										
No. Digger Hours	9	75.0										
Hours/trip	0.8	1.4										
Clams/trip	2.2	5.0										
Clams/hour	2.7	3.6										
Digger origin (%)												
Local	0	9.4		54								
State	100	75.5										
Non-State	0	15.1										
Species Comp. (%)	1	1000 - 100 -										
Butter	4.2	3.0										
Cockle	0	0										
Gaper	95.8	93.3										
Littleneck	0	3.0										
Softshell	14.5年	2 P. M.										
Clams/trip	11											
Butter	0.1	0.2										
Cockle	0	0										
Gaper	2.1	4.7										
Littleneck	0	0.2					0.15					
Softshell	10020	-										
Clams/hour												
Butter	0.1	0.1										
Cockle	0	Ő										
Gaper	2.6	3.3										1.41
Littleneck	o	0.1										
Softshell	- 0											
Size Comp. (x size)	11.1											
Butter	88.0	93.6										
Cockle	00.0											
Gaper	94.5	96.6										
Littleneck		61.3										
Softshell	- 1											
No. Clams Measured												
Butter	1001	5										
Cockle												
	0	0										
Gaper	23	142										
Littleneck	0	4					MARKAN					
Softshell	-	그 맛!! !!!=!!!										

Table 12. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

1982No. Diggers Sampled4No. Clams Sampled71No. Digger Hours6.0Hours/trip1.5Clams/trip17.8Clams/hour11.8Digger origin (%)100.0Local100.0State0Non-State0Species Comp. (%)8Butter0Gaper0Littleneck0Softshell-Clams/trip17.8Butter0Cockle100.0Gaper0Littleneck0Cockle17.8Gaper0Littleneck0Softshell-Clams/hour8Butter0Cockle11.8Gaper0Littleneck0Softshell-Softshell-Softshell-Size Comp. (x size)8Butter0Size Comp. (x size)8Butter0Size Comp. (x size)0Butter0		19	19	19	19	19	19	19	19	19	19
No. Clams Sampled 71 No. Digger Hours 6.0 Hours/trip 1.5 Clams/trip 17.8 Clams/hour 11.8 Digger origin (%) Local 100.0 State 0 Non-State 0 Species Comp. (%) Butter 0 Cockle 100.0 Gaper 0 Littleneck 0 Softshell - Clams/trip 8 Butter 0 Cockle 17.8 Gaper 0 Littleneck 0 Softshell - Clams/hour 8 Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour 8 Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour 8 Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Size Comp. (x size) 8 Butter 0 Cockle 12.8 Cockle 11.8 Cockle 11.8											
No. Digger Hours6.0Hours/trip1.5Clams/trip17.8Clams/hour11.8Digger origin (%)100.0Local100.0State0Non-State0Species Comp. (%)8Butter0Gaper0Littleneck0Softshell-Clams/trip0Butter0Cockle17.8Gaper0Littleneck0Softshell-Clams/hour0Butter0Cockle11.8Gaper0Littleneck0Softshell-Clams/hour0Butter0Cockle11.8Gaper0Littleneck0Softshell-Size Comp. (x size)8Butter0Size Comp. (x size)8Butter0											
Hours/trip 1.5 Clams/trip 17.8 Clams/hour 11.8 Digger origin (%) Local 100.0 State 0 Non-State 0 Species Comp. (%) Butter 0 Cockle 100.0 Gaper 0 Littleneck 0 Softshell - Clams/trip Butter 0 Cockle 17.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell -											
Clams/trip 17.8 Clams/hour 11.8 Digger origin (%) Local 100.0 State 0 Non-State 0 Species Comp. (%) Butter 0 Cockle 100.0 Gaper 0 Littleneck 0 Softshell - Clams/trip 8 Butter 0 Cockle 17.8 Gaper 0 Littleneck 0 Softshell - Clams/hour 8 Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Size Comp. (x size) 8 Butter 0 Cockle 10 Cockle											
Clams/hour11.8Digger origin (%)Local100.0State0State0Non-State0Species Comp. (%)Butter0Gaper0Littleneck0Softshell-Clams/trip0Butter0Cockle17.8Gaper0Littleneck0Softshell-Clams/hour0Butter0Cockle11.8Gaper0Littleneck0Softshell-Clams/hour0Butter0Littleneck0Softshell-Softshell-Size Comp. (x size)0Butter0Size Comp. (x size)0Butter0Size Comp. (x size)0Butter0Size Comp. (x size)0Sutter0											
Digger origin (%) Local 100.0 State 0 Non-State 0 Species Comp. (%) Butter 0 Cockle 100.0 Gaper 0 Littleneck 0 Softshell - Clams/trip Butter 0 Cockle 17.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Softshell - Clams/hour Butter 0 Softshell - Size Comp. (x size) Butter 0											
Local 100.0 State 0 Non-State 0 Species Comp. (%) Butter 0 Cockle 100.0 Gaper 0 Littleneck 0 Softshell - Clams/trip Butter 0 Cockle 17.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Cockle 11.8 Gaper 0 Littleneck 0 Softshell - Clams/hour Butter 0 Softshell - Clams/hour Butter 0 Softshell - Clams/hour Butter 0 Softshell - Size Comp. (x size) Butter 0 Cockle 11.8 Cockle 11.8 Coc))										
StateONon-StateOSpecies Comp. (%)ButterButterOCockle100.0GaperOLittleneckOSoftshell-Clams/tripButterButterOCockle17.8GaperOLittleneckOSoftshell-Clams/hourButterButterOCockle11.8GaperOLittleneckOSoftshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Softshell-Size Comp. (x size)ButterButterO))										
Non-StateOSpecies Comp. (%)ButterCockle100.0GaperLittleneckSoftshell-Clams/tripButterCockle17.8GaperCockle17.8GaperCockle17.8GaperCockleSoftshell-Clams/hourButterCockle11.8GaperLittleneckCockle11.8GaperLittleneckSoftshell-Softshell-Size Comp. (x size)ButterButterCockleSize Comp. (x size)ButterCockleCockleCockleCockleSoftshell-Size Comp. (x size)ButterCockle	2										
Species Comp. (%) Butter (%) Gaper (%) Gaper (%) Littleneck (%) Softshell - Clams/trip (%) Butter (%) Cockle 17.8 Gaper (%) Littleneck (%) Gaper (%) Littleneck (%) Softshell - Clams/hour - Butter (%) Cockle 11.8 Gaper (%) Littleneck (%) Softshell - Softshell - Softshell - Softshell - Size Comp. (x size) - Butter (%)	<u>-</u>										
ButterCCockle100.0GaperCLittleneckCSoftshell-Clams/tripButterButterCCockle17.8GaperCLittleneckCSoftshell-Clams/hourButterButterCCockle11.8GaperCLittleneckCSoftshell-Softshell-Softshell-Size Comp. (x size)ButterButterCSutterC											
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Softshell -	-										
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Table 13. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

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Bay: Alsea

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Tideflat: Bayshore

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	1982	19	19	19	19	19	19	19	19	19	19	19
No. Diggers Sampled No. Clams Sampled No. Digger Hours Hours/trip Clams/trip Clams/hour	32 529 46 1.4 16.5 11.5	and we like to be		to the printing	and she was	and second second		sta fenn fo Y apinda enti		and a state and		
Digger origin (%) Local State	59.4 25.0 15.6			gath non itra villa	autos ou							
Non-State Species Comp. (%)	15.6									1 1		
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Cockle	99.8				18 B							
Gaper	0.2		1 6		100							
Littleneck		18 R		1000								
Softshell	B. • B									101	COLO I	
Clams/trip	12				100							
Butter	Satis						-					
Cockle	16.5					- The T						
Gaper	<0.1											
Littleneck					- <u>a</u> - a							
Softshell	111			9 9 9	9			G (T)				
Clams/hour				1 1 1				The		bun		
Butter												
Cockle	11.5											
Gaper	<0.1			6. J T								
Littleneck	17 - 12							10				
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Cockle	72.9											
Gaper	-		8	0. 11 12								
Littleneck	5											
Softshell												de la
No. Clams Measured	10-11-		18 E.		101					prilip		
Butter			100	正正					10	8		
Cockle	159		2 7									
Gaper	-											
Littleneck	-											
Softshell	-											

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<u>North Fork Flat.</u> Clam digging continues to be excellent on this clam bed where catch/effort information revealed over 41 clams/trip taken (Table 14). Considering that the bag limit is 36/person, the 41 clam average shows that a number of interviewed diggers exceeded their bag limits. Only softshell clams were taken from this area and they averaged 90.7 mm in size. Although the digging pressure is very heavy in this area, little impact has been observed on the availability or size of the clams.

Recreational Clam Fishery Summary

The 1977 shellfish regulation change reduced the bag limit of most clams from 36 to 20 and allowed sorting of unbroken hardshell clams. This change appears to have had little favorable impact on the intertidal hardshell clam stocks. The general decline in availability of these stocks suggest that digging pressure may still be depressing the recovery of our clam resources. One unmeasurable variable that undoubtedly has some bearing on the condition of clam stocks is the environment. We have reason to believe that environmental variation is a greater factor in stock decline than digging pressure. This has become apparent during the past decade, especially with the gaper clam, where in major subtidal portions of our estuaries we have observed little or no recruitment since 1975. These areas can be considered a control since little or no digging activity occurs there.

Commercial Clam Harvest

In 1982, 134,105 pounds of clams were reported to be commercially harvested in Oregon's estuaries (Table 15). Of this total, 106,440 pounds (79.4%) were gaper clams. Coos Bay produced 106,385 pounds (99.9%) of the total gaper harvest. Other clams reported harvested coastwide were native littlenecks (13,231 lbs), cockles (10,517 lbs), butters (3,654 lbs), and softshells (248 lbs). Forty-six fishermen reported landings in 1982, 15 more Table 14. ANNUAL SUMMARY OF RECREATIONAL INTERVIEW DATA

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Bay: Siuslaw				34	3 2	5 8	3		Tidef				6	-33811	
	1971	1976	1977	1978	1979	1980	1981	1982	N. 1	9	ie.	19	Cite L	19	1
No. Diggers Sampled	3,203	39	51	21	42	7	115	21							
No. Clams Sampled	72,756	1,067	1,426	670	1,140	188	3,445	875							
No. Digger Hours	4,844	54	101	31.5	55.3	5.0	145.2	28							
Hours/trip	1.5	1.4	2.0	1.5	1.3	0.7	1.3	1.3							
Clams/trip	22.7	27.4	28.0	31.9	27.1	26.9	30.0	41.7							
Clams/hour	15.0	19.8	14.1	21.3	20.6	37.6	23.7	31.3							
Digger origin (%)															
Local	-	12.8	28.8	28.6	19.0	28.6	38.3	47.6							
State	(84.6	66.7	71.4	47.6	71.4	48.7	52.4							
Non-State	-	2.6	4.4		33.3	0	13.0	0							
Species Comp. (%)		THE PARTY													
Butter		-	-)))# (•	-							
Cockle	10 -	-	-	3 8 0	()	-	-	-							
Gaper		-	-		22	-		543							
Littleneck					1. S	用。自己	30.3221	1. 18							
Softshell	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0							
Clams/trip							211								
Butter	-	<u>÷</u>	-	-	-	#	-	-							
Cockle	-	-	-	-	1.00	-									
Gaper		-	-			-		-							
Littleneck	-	-	-		2	出。就	18	1 3 0 .41							
Softshell	22.7	27.4	28.0	31.9	27.1	26.9	30.0	41.7							
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Cockle	3 - 1	-		-		-	-	-							
Gaper	2 44 1	=	14	5 4 0		÷	141								
Littleneck	-			341		2.20	125	1.1							
Softshell	15.0	19.8	14.1	21.3	20.6	37.6	23.7	31.3						150	
Size Comp. (x size)															
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Cockle	-	-	-		6 . .	-		3 9 -0							
Gaper	350	5	100		5 -2	#	1 33	12 100							
Littleneck	2.7		85562	8.00		-	5 (+)	3 							
Softshell	N877	107.4	96.5	99.0	89.5	90.0	89.4	90.7							
No. Clams Measured															
Butter	5. (-		- 1 (i)	S. 4.	· ·	•	10 mar.							
Cockle	22 — 5	-	(#))	040	- 1	92 -22	20.00	1.000							
Gaper	-	-	-	Sas	S 48	10.000	19	1980							
Littleneck	3742	H	-		-	-		-							
Softshell		741	408	335	676	110	1,629	757							

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		19/0-82.					
Year	Butter	Cockle	Gaper	Littleneck	Softshell	Macoma	Total
1970	885	12,257	1,218	863	10,661	0	25,884
1971	217	9,391	10,345	639	7,714	220	28,526
1972	52	7,269	34,006	1,406	18,772	0	61,505
1973	95	5,756	185	9,771	1,349	0	17,156
1974	412	6,073	0	8,987	843	0	16,319
1975	0	6,855	15,024	4,311	360	0	26,550
1976	816	322	85,831	455	630	0	88,054
1977	607	859	81,775	232	1,366	894	85,733
1978	1,452	6,717	207,685	1,056	16	0	216,926
1979	606	2,299	91,028	0	979	0	94,912
1980	40	2,244	74,459	4,268	456	0	81,467
1981	2,409	4,580	68,508	4,892	749	0	81,138
1982	3,654	10,517	106,440	13,231	248	0	134,105
1	18 19 11		and a	15		Section 2	12
					-		191
				All I. I. I. I. M. Dipetti M. Dipetti M. M.			

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Table 15. Summary of pounds of Bay Clams Reported Harvested in Oregon, 1970-82.

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than in 1981. Five hundred thirty eight landings were made.

Coos Bay produced the most clams in 1982 with 111,427 lbs reported (Table 16). Tillamook and Nehalem bays produced 11,501 lbs and 10,862 lbs, respectively. Netarts, Yaquina, Siuslaw, and Umpqua bays all produced minor poundages of clams.

Commercial Clam Fishery by Mechanical Means

Yaquina Bay. No commercial clam harvesting permits were issued for Yaquina Bay in 1982. Three permits were issued in 1981. No mechanical harvest has occurred in Yaquina Bay since 1979.

<u>Coos Bay.</u> We issued seven commercial clam harvesting permits for Coos Bay in 1982; eight were issued in 1981. Of the seven permits issued, only two were used and resulted in a production of 88,341 pounds of clams. Of the 88,341 pounds, 85,551 pounds (96.8%) were gaper clams. Fishermen received 30 to 45¢/pound for the gaper clams.

The gaper clams harvested in the permit area averged 134.2 mm in size and were primarily of the 1973, 74 and 75 year-classes (Figure 1). Clams harvested in 1981, from the same area, averaged 132.3 mm in size. No clams younger than the 1976 year-class were observed taken.

Commercial Clam Harvest by Hand

Commercial clam fishermen harvested a reported 43,614 lbs of clams by hand in Oregon's estuaries in 1982. Many of these clams were taken in Tillamook and Nehalem bays where a reported 11,501 lbs and 10,862 lbs, respectively, were taken. The Tillamook Bay landings were primarily intertidal cockles (84.8%) whereas the Nehalem Bay landings were entirely subtidal native littlenecks. The littlenecks brought \$1.00 to \$1.15/pound to the fishermen.

Oregon State Police (OSP) in Tillamook reported a concern expressed by

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Year	Nehalem	Tillamook	Netarts	Yaquina	Alsea	Siuslaw	Umpqua	Coos	Total
1970	258	7,819	2,210	444	0	0	10,631	4,522	25,884
1971 <u>1</u> /	589	5,948	1,598	1,819	0	0	7,459	10,893	28,306
1972	80	9,637	914	57	70	0	6,105	44,642	61,505
1973	329	11,997	1,191	0	0	0	786	2,853	17,156
1974 <u>1</u> /	882	9,309	2,409	398	0	0	445	3,232	16,675
19751/	0	4,637	0	0	13	0	309	21,553	26,512
1976 <u>1</u> /	0	820	0	0	480	0	0	86,529	87,829
1977 <u>1</u> /	0	1,881	0	71,013	0	0	35	12,066	84,995
19781/	0	2,905	0	172,047	0	0	0	41,804	216,756
1979	174	433	0	74,565	0	3,432	0	16,308	94,912
1980	373	5,320	486	244	0	9,109	0	65,935	81,467
1981	65	4,259	0	128	0	684	0	76,002	81,138
19821/	10,862	11,501	37	15	0	223	25	111,427	134,090

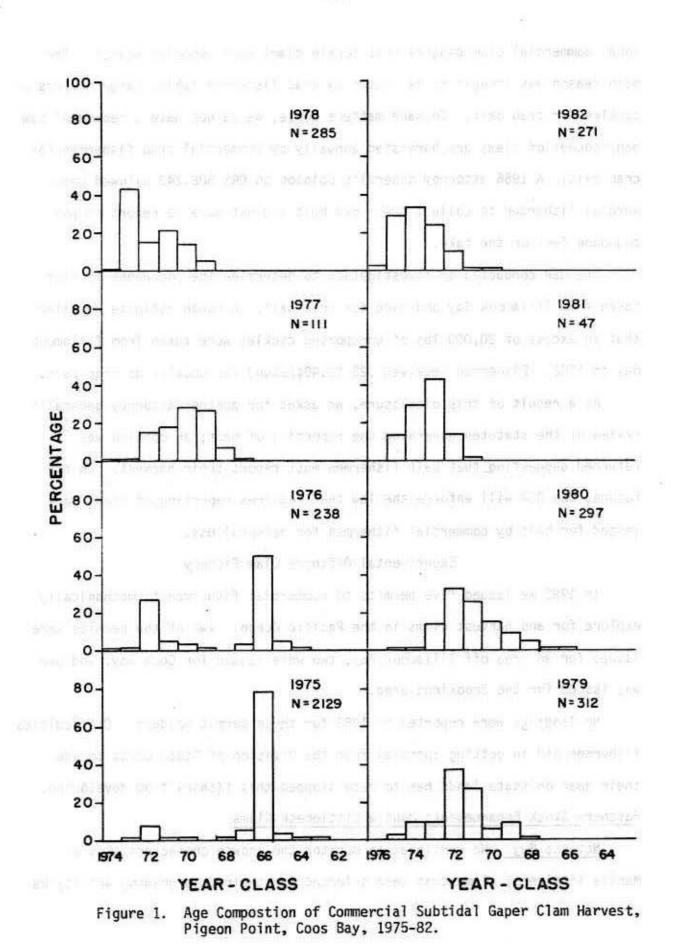
Table 16. Summary of Reported Commercial Harvest of Bay Clams in Major Oregon Estuaries, 1969-82.

1/ Totals exclude landings of clams reported from Columbia River, Astoria, Bandon and Port Orford.

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local commercial clam diggers that cockle clams were becoming scarce. The main reason was thought to be caused by crab fishermen taking large numbers of cockles for crab bait. To make matters worse, we do not have a record of how many pounds of clams are harvested annually by commercial crab fishermen for crab bait. A 1966 attorney general's opinion on ORS 508.240 allowed commercial fishermen to collect their own bait and not have to report or pay poundage fees on the take.

The OSP conducted an investigation to determine the poundages of clams taken from Tillamook Bay and used for crab bait. A rough estimate revealed that in excess of 20,000 lbs of unreported cockles were taken from Tillamook Bay in 1982. Fishermen received .25 to.40¢/pound for cockles as crab bait.

As a result of this disclosure, we asked for another attorney general's review of the statutes governing the reporting of bait; an opinion was returned suggesting that bait fishermen must report their harvest. In the future, the OSP will enforce the law that requires reporting of clams harvested for bait by commercial fishermen for personal use.

Experimental Offshore Clam Fishery

In 1982 we issued five permits to commercial fishermen to mechanically explore for and harvest clams in the Pacific Ocean. Two of the permits were issued for an area off Tillamook Bay, two were issued for Coos Bay, and one was issued for the Brookings area.

No landings were reported in 1982 for these permit holders. Difficulties fishermen had in getting approval from the Division of State Lands to use their gear on state lands has to date stopped this fishery from developing. <u>Hatchery Stock Enhancement; Manila Littleneck Clams</u>

<u>Netarts Bay.</u> We continued to monitor the growth characteristics of Manila littleneck clams that were selected for their fast growing ability vs.

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normal growing clams (Gaumer and Lukas, 1975). We also compared growth of clams in a screened vs. unscreened area.

Results showed that clams spawned in August 1974 from fast growing parent stock grew 2.7 mm from June 1981 to July 1982, and averaged 43.1 mm in size whereas progeny from "normal" clams grew 1.4 mm and averaged 39.8 mm (Figure 2).

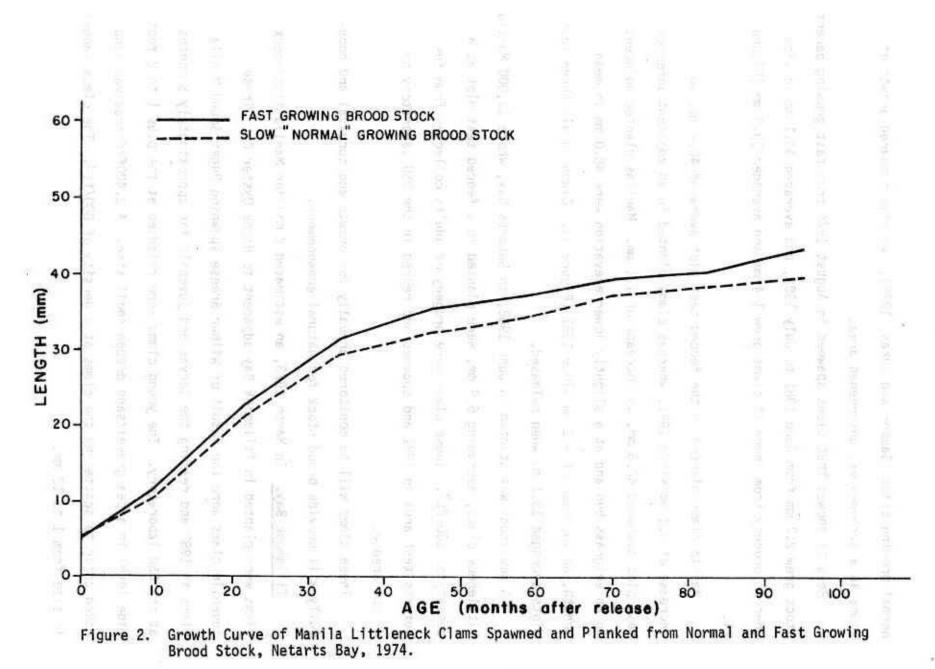
Manila clams planted in the fenced test plot averaged 40.4 mm, an increase of 0.2 mm since 1981, whereas clams planted in an adjacent unfenced test plot averaged 42.6 mm, an increase of 1.1 mm. Manilas planted adjacent to an eelgrass bed and at a slightly lower elevation were 48.0 mm in mean length, an increase of 4.2 mm since 1981 (Figure 3). Clams in all three test plots averaged 13.1 mm when released.

A new study was started in June 1982, in Netarts Bay, where 18,000 Manila littleneck clams, averaging 6.9 mm, were planted in a fenced test plot at a density of 100/ft². These clams were progeny of adults collected from the Netarts test area in 1981 and spawned and reared in the OSU laboratory by Wilbur Breese.

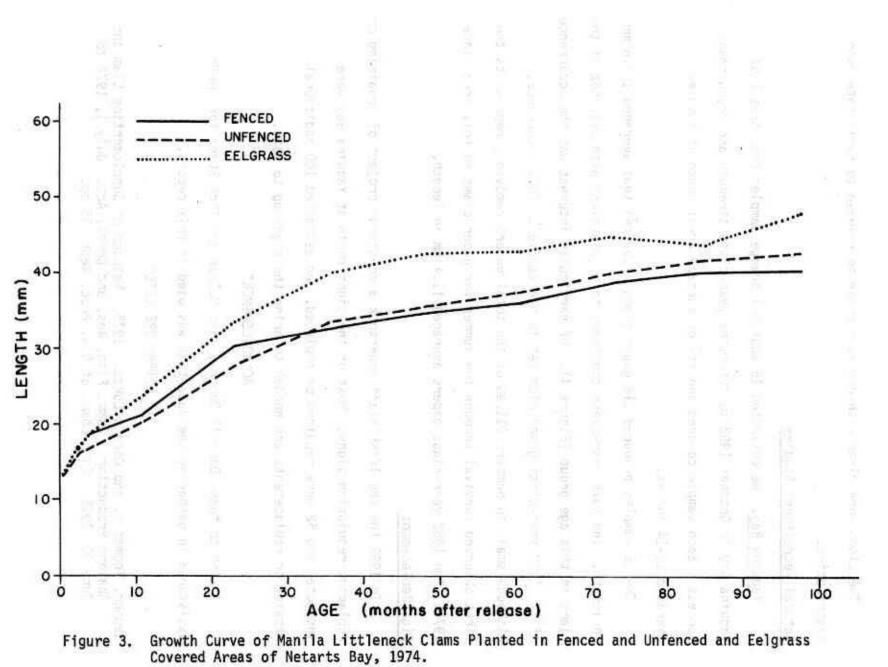
These clams will be monitored annually for growth and survival and hopefully will provide brood stock for natural enhancement.

<u>Tillamook Bay.</u> In March 1983, an estimated 2 million Manila littleneck clams were planted in Tillamook Bay adjacent to Hayes Oyster Co. These juvenile clams were the result of Wilbur Breese spawning Puget Sound Manila clams in 1982 and rearing the larvae and juvenile for approximately 8 months at the OSU laboratory. The young clams were released at the plus 1 to 2 foot tide level in a pea gravel/sand dredge spoil site. A 2,400ft² area was hand raked prior to scattering the clams at a density of 800/ft². The clams ranged in size from 1 to 12 mm.

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The clams were mixed with dry sand prior to release to facilitate even distribution.

Natural Recruitment Studies

<u>Yaquina Bay</u>. We collected 15 subtidal dredge samples from Area 2 of Yaquina Bay in October 1982 to determine year-class strength and recruitment success. Each sample covered one ft² of surface area; depth of samples averaged 12-14 inches.

The 15 samples produced 118 gaper clams (7.9/ft²) that averaged 102.6 mm in length. The 1975 year-class continues to be prevalent with over 56% of the clams in this age group (Figure 4). Of particular interest was the occurrence of 14 1982 year-class gaper clam set in the samples. This occurrence, although small in numbers (11.9% of the total gapers removed), represents the first observed survival through the summer for gaper clams in this area since 1975. The 1982 year-class gapers averaged 11.4 mm in length.

Sign Replacement

In 1982 the shellfish staff undertook a coastwide project of repairing or replacing regulation signs. Most of the signs south of Yaquina Bay were inspected and 52 were repaired or replaced. An estimated 100 additionalrepairs or replacements are needed to bring the signs up to date.

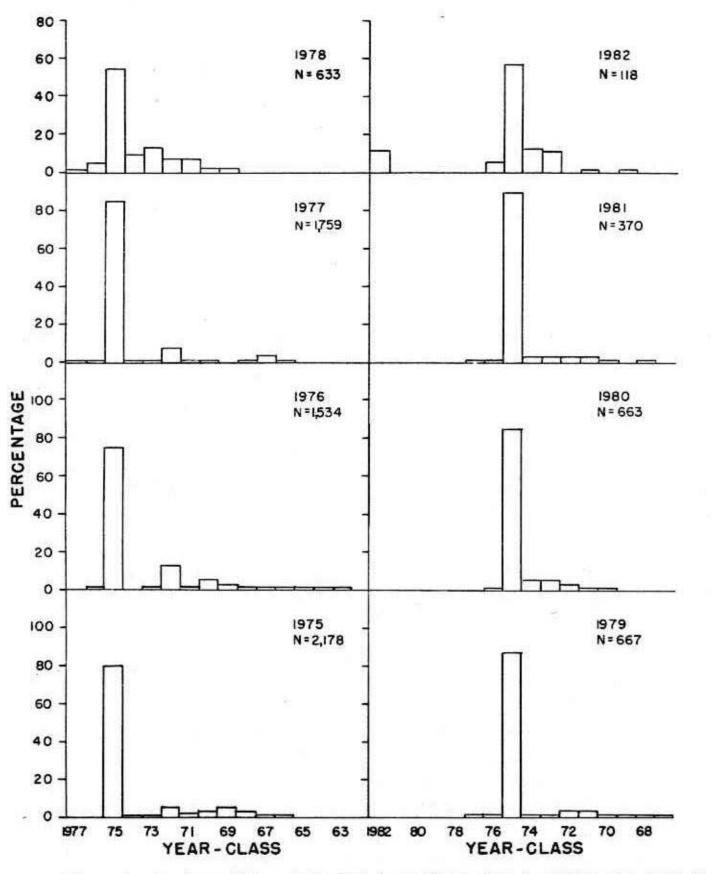
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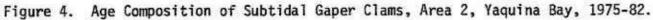
I wish to thank Darrell Demory, Jean McCrae and Rick Starr for their assistance in gathering the data that was used in this report.

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Gaumer, Thomas F. and Gerald Lukas. 1975. Methods of Supplementing Clam and Abalone Production. Comm. Fish. Res. and Devel. Act. July 1, 1974 to June 30, 1975. Fish Comm. of Ore. Proc. Rept. 35 pp.

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