

SHELLFISH / MARINE HABITAT INVESTIGATION

INFORMATION REPORT

1994 RAZOR CLAM FISHERY

BY

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INTRODUCTION

The razor clam fishery north of Cape Lookout opened in November after being closed for three year do to biological toxins. The fisheries on Clatsop beach (Tillamook Head to Columbia River) were sampled several days per tide series in November and December. Sport and commercial diggers were interviewed to obtain data on digging effort, number and age composition of clams, and harvest area. Data from beaches south of Tillamook Head were collected as time permitted. Random age and length data, samples for PSP toxins analysis and other miscellaneous data were collected and reported.

SPORT FISHERY

CLATSOP BEACH

The beaches were closed to digging on November 17, 1991 when domoic acid was detected in clams. The closure was extended September 1,1992 after paralytic shellfish toxin contaminated clams. This closure continued to November 1,1994. The first digging in three years created a 532% increase in effort over the 1984 fall record. Diggers made 58,555 trips and averaged 15.1 clams per trip. A total of 884,555 clams were harvested. Table 1 list harvest, catch rates and number of diggers by area.

Wastage was not a problem, because small clams were not available. Large numbers of the 1991 and 1992 year classes were found high on the beach and provided most of the digging. The age composition of the sport catch is listed in Table 2. A large die off of 1 to 3 year old clams occurred on Seaside beach (area 5) during the summer. This die off most likely came from a combination of factors, such as clams being quite high on the beach where summer heat could effect them, lack of feed and after spawning stress. Clams remaining in the area showed a lack of growth and stress rings appeared on the shells.

Concerned sport diggers have requested changes in regulations. These request are listed in order of importance: 1. A license to harvest clams. 2. Every other day digging. 3. Ban Oregon's razor clams from being used as bait. 4. Stop driving on the clam beds. 5. Ban commercial digging. 6. Lower sport bag limit. Users have been encouraged to put their request in writing to aid staff in documenting users concerns.

Table 1. SPORT HARVEST OF RAZOR CLAMS AND NUMBER OF DIGGERS BY AREA FROM CLATSOP BEACH, NOVEMBER AND DECEMBER, 1994.

AREA	MILES OF BEACH	NO. OF DIGGER TRIPS	CLAMS / DIGGER TRIPS	NO. OF CLAMS DUG	NO. OF CLAMS WASTED	TOTAL CLAMS HARVESTED
1,2,3	14.8	42772	16.2	693853	0	693853
4	1.2	5735	13.3	76216	0	76216
5	2.0	10048	11.4	114486	0	114486
TOTAL		58555	15.1	884555	0	884555

Area 1,2,3 Columbia River to Gearhart Beach road.

Area 4 Gearhart Beach road to Necanicum River.

Area 5 Necanicum River to Tillamook Head.

Table 2. AGE COMPOSITION OF SPORT DUG CLAMS IN PERCENT FROM CLATSOP BEACH, 1989-1994.

YEAR OF HARVEST	AGE					
	0	1	2	3	4	5
1989	28.1	55.3	12.1	3.4	1.0	0.0
1990	14.3	52.1	25.5	5.9	2.1	0.1
1991	16.0	26.5	47.0	8.5	1.6	0.4
1992	no season					
1993	no season					
1994	3.1	44.6	47.6	4.5	0.2	0.0
10 YR. AV.	23.8	54.6	18.4	2.5	0.6	0.1

BEACHES SOUTH OF TILLAMOOK HEAD

Digging occurred on many beaches along the coast but effort was minimal and production poor. The best producing areas were Newport beaches. Surveys found few clams on beaches in the Cannon Beach area.

TABLE 3. ANNUAL EFFORT AND HARVEST DATA FOR THE RAZOR CLAM FISHERY

YEAR	COMMERCIAL FISHERY		SPORT FISHERY				TOTAL
	NO. OF DIGGERS	NO. OF CLAMS	NO. OF TRIPS	CLAMS/ TRIP	NO. OF CLAMS DUG	NO. OF CLAMS WASTED	CLAMS HARVESTED
1955	295	904000	56000	22	1212000	295000	2411000
1956	253	490000	60000	18	1061000	295000	1846000
1957	193	336000	77000	21	1646000	416000	2398000
*1958	221	386000	89000	19	1679000	218000	2283000
1959	118	179000	54000	12	646000	124000	949000
1960	93	154000	48000	12	596000	46000	796000
1961	58	80000	51000	11	583000	70000	733000
1962	79	102000	56000	16	892000	105000	1099000
1963	77	107000	55000	13	713000	70000	890000
1964	125	125000	71000	16	1098000	264000	1487000
1965	213	399000	76000	15	1134000	186000	1719000
1966	217	282000	78000	14	1052000	434000	1768000
1967	297	494000	74000	20	1472000	195000	2161000
1968	340	361000	64000	13	831000	162000	1354000
1969	185	111000	59000	14	851000	155000	1117000
1970	79	61000	56000	13	715000	125000	901000
1971	134	123000	77000	13	968000	213000	1304000
1972	76	49000	69000	9	636000	139000	824000
*1973	111	89000	76000	10	725000	159000	973000
1974	58	32000	44000	8	347000	5000	384000
1975	146	171000	75000	10	785000	157000	1113000
1976	391	717000	119000	12	1431000	63000	2211000
*1977	269	143000	51000	10	499000	33000	675000
1978	253	205000	72000	12	849000	137000	1191000
1979	236	180000	90000	11	958000	63000	1201000
1980	145	116000	70000	11	747000	143000	1006000
1981	91	128000	30000	6	187000	49000	364000
1982	209	165000	84000	9	758000	123000	1046000
*1983	9	1000	32000	3	105000	12000	118000
1984	34	37000	23000	15	341000	15000	393000
1985	340	303000	94000	10	984000	147000	1434000
1986	51	18000	46000	5	260000	33000	311000
1987	173	236000	68000	15	1010000	83000	1329000
1988	178	161000	84000	11	1016000	168000	1345000
1989	228	195000	97000	11	1082000	136000	1413000
1990	151	75000	55000	11	579000	61000	715000
*1991	129	130000	57000	11	643000	80000	853000
1992	NO SEASON BECAUSE OF DOMOIC ACID AND PSP						
1993	NO SEASON BECAUSE OF PSP						
1994	107	78000	59000	15	885000	0	963000

COMMERCIAL FISHERY

CLATSOP BEACH

Harvesters landed 78000 clams (18,854 pounds) in the fall fishery. Harvest data is listed in Table 3 Areas 3 and 4 produced 73.9% of the catch. Commercial catch-effort and area harvest data is listed in Table 4. Most of the catch was made up of one and two year old clams with area 4 producing some three and four year olds. Age composition is listed in Table 5.

One hundred seventy commercial harvesters were issued ODF&W shellfish harvest permits but only 129 diggers sold clams. The Oregon Department of Agriculture issued 62 permits to sell clams for human consumption but only 46 used their permits. Many diggers dug and sold clams for bait because: buyers limited the number diggers, the big demand for bait, the extra cost of the \$75 ODA permit, and clams for bait and human consumption were being bought at the same price. A calculated 28.7% of the fall fishery or 5350 pounds was sold for crab bait. This poundage is a minimum poundage, as many pounds were sold illegally to crab boats. The value of clams to the digger started at \$1.00 a pound and increased to \$1.85.

Problems between commercial and sport fisheries developed when commercial diggers started: 1. Digging high on the beach among the sport diggers. 2. Using several helpers to stomp down clams (even driving vehicles to put down clams) and then keep sport diggers out of the area. These interactions prompted several sport groups to consider legislative action against commercial digging.

Table 4. COMMERCIAL CATCH/EFFORT AND POUNDS IN PERCENT LANDED BY AREA FROM CLATSOP BEACH, 1994.

	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	TOTAL
POUNDS/HOUR	10.8	9.6	10.9	8.2	6.9	8.9
PERCENT OF POUNDS LANDED	3.8	11.2	31.3	42.6	11.1	100.0

Table 5. AGE COMPOSITION IN PERCENT FOR COMMERCIALY DUG CLAMS, CLATSOP BEACH, 1989-1994.

YEAR OF HARVEST	AGE					
	0	1	2	3	4	5
1989	6.5	87.1	2.2	3.7	0.3	0.2
1990	0.0	52.3	42.9	3.7	0.8	0.3
1991	4.5	18.5	60.4	13.8	2.2	0.6
1992	NO SEASON					
1993	NO SEASON					
1994	1.5	38.5	46.4	12.0	1.5	0.1
10 YR. AV.	6.2	58.8	29.5	4.8	.6	0.1

BEACHES SOUTH CAPE LOOKOUT

Several Clatsop harvesters dug in the Newport area. They made 27 landings amounting to 262 pounds. Clam abundance did not support a commercial fishery.

MISCELLANEOUS PROJECTS

PARALYTIC SHELLFISH TOXIN IN RAZOR CLAMS

Deborah Cannon from Ore. Dept. Of Health (people and program transferred to Ore. Dept. Of Agriculture, July 1994) enlisted ODF&W staff help to collect samples in 1991. This program continued on Clatsop beach with samples being collected each tide series and sent to the ODA laboratory for analysis of toxins.

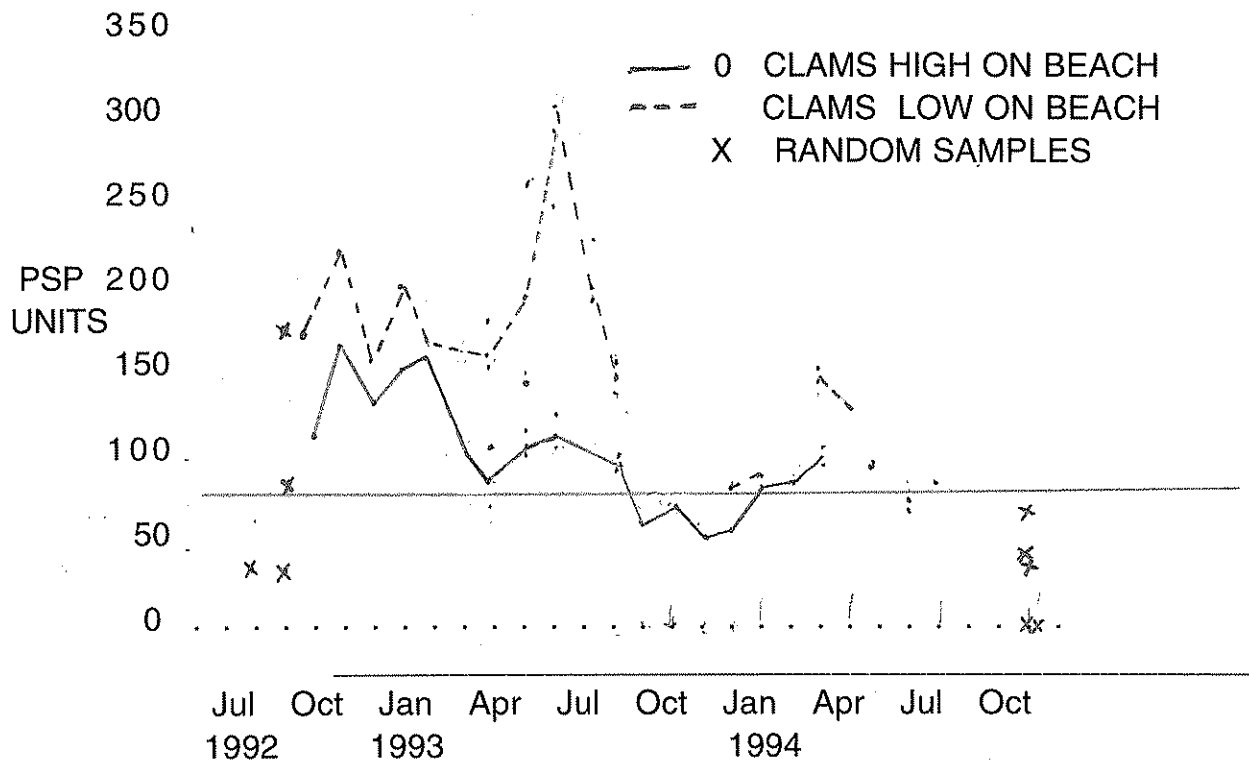
Paralitic shellfish toxins in razor clams has occurred in the past but has always been a short term management problem. It has caused temporary digging closures when toxin levels over 80 units per 100 grams were reached. Razor clams with toxin levels as high as 1100 units have had toxins concentrated in siphons, gills and gut tract these clams were able to flush contaminates in several months . But razor clams from Clatsop beach reacted differently from the contamination of the record setting 3000+ units of PSP toxin detected in August ,1992. Testing of the parts of clams found high concentrations of toxin in the meaty parts, determined later to be in the fatty tissues. Other tests indicated that the toxicity was not declining. The high level of

contamination caused more extensive reactions in the clams than in the past.

Test results from fall, 1992 random samples indicated that the toxicity fluctuated between tide series. To find the cause of the fluctuations two sets of samples were collected in the Gearhart area; No.1 Samples were collected of small (first year) clams and larger (older) clams. No. 2. Samples were collected from low and high on the beach. Test results indicated that young clams had lower toxicity levels than older clams. And clams collected from low on the beach had higher toxicity levels than clams from high on the beach. Based on the test results, select samples of older clams from as low as possible on the beach were collected in the future.

A study to prove a spatial variability in toxin levels was done in July 1993. Two samples from high on the beach and two from low on the beach were collected from 5 areas. No significant statistical differences between beach levels on Clatsop Beach were found by statistician Bob Hannah. This was predictable as the summer beach cycle had started and samples contained more younger clams that lacked toxicity. Older clams were available in the Gearhart area and significant differences between high and low beach levels were found and can be seen in Figure 1.

FIGURE 1. PSP TOXIN RATES FROM GEARHART BEACH



Test results from samples collected in the spring of 1994 continued to indicate high levels of toxin in older clams (3, 4 and 5 year old) while samples of one and two year clams contained little toxin. It became apparent that clams contaminated in 1992 were flushing the toxin very slowly if at all. Age-weight tables were examined and the rate of weight gain suggested that toxin levels were decreasing as clams increased body mass. Younger clams grow quickly doubling their weight, where as older clams grow more slowly. This can be seen in Table 6. The percentage of older clams (3,4,5 year olds) in the population and the toxicity of age groups became important factors in opening the season. These factors

Table 6. RAZOR CLAM GROWTH BY AGE GROUP.

AGE	AV. WEIGHT IN GRAMS	PERCENT WEIGHT INCREASE IN 1 YEAR	PERCENT WEIGHT INCREASE IN 2 YEARS
First Year	36.8	141	265
One Year	88.6	52	86
Two Year	134.4	22	37
Three Year	165.1	11	21
Four Year	184.7		

were discussed with Deborah Cannon from ODA, It was agreed that: No.1. ODA would determine what percent of 4 year or older clams in the population would be considered safe.. No. 2. ODF&W staff would collect clam age compositions from five areas on Clatsop beach. No. 3 Random samples from the five areas, plus several select samples of 3 year old clams and 4 year and older clams, would be collected.. The first tide series in October was selected for sampling do to the low tides and the completion of the annual summer beach cycle .

In October random samples were collected from 5 areas of Clatsop Beach. Data in Table 7 indicates an increase in younger clams and a 16.8 percent decrease in older clams in the age composition from Clatsop Beach from March to October. Toxin testing indicated that all five random samples and three year old samples were below 80 units /100 grams. Although the PSP toxin levels were slightly above 80 units/100 grams for four year olds and older clams, they only made up 7.9% of the population. This percentage was determined low enough to protect the average

consumers from getting paralytic shellfish poisoning. Toxin rates are listed in Table 8.

A November 1 opening date was selected to allow time to notify all sport and commercial users. Random samples from the Gearhart area continue to be collected by staff and sent in for testing. No sport dug clams were reported to have caused health symptoms of PSP. But two commercial diggers and one processor suffered symptoms of PSP after consuming 10 to 12 large clams in 24 hours.

TABLE 7. RAZOR CLAM AGE COMPOSITION FOR MARCH AND OCTOBER, 1994.

	AGE IN YEARS					
	0	1	2	3	4	5
MARCH	11.3	20.8	28.9	28.9	5.0	5.0
OCTOBER	16.1	30.5	31.2	14.2	6.9	1.0

TABLE 8. PSP RATES FOR MARCH AND OCTOBER, 1994

TYPE OF SAMPLE	AREA 1	AREA 2	AREA 3	AREA 4	AREA 5	SPECIAL SAMP.	
MARCH (SELECT)	115.1	105.1	44.1	97.6H 137.2L	92.7	1YR.	44.1
OCTOBER (RANDOM)	44.5	ND	ND	47.8	64.3	3YR. 4+YR.	63.9 85.7

nd=nondetectable

SUMMARY OF THE FISHERY AFTER THREE YEAR CLOSURE

Opening the fishery (which had been closed for nearly three years) with afternoon and night digging, with one biologist and several enforcement personnel looked to be a challenge. The concerns of Senator Joan Dukes made available more enforcement people and ODF&W staff to work during the first tide series. Enforcement spent 212 hours on the

beach and two ODF&W technicians helped to collect nearly 500 digger interviews.

Record numbers of diggers faced rough surf conditions, cold weather, and most of the digging at night by lantern light. Users faced competition on the beach and traffic jams getting their vehicles off the beach (some beach approaches had vehicles backed up nearly two miles) Despite the hardships, diggers found lots of large clams high on the beach. On the first tide series harvesters dug 246,373 clams on 16,600 trips for an average of 14.8 clams per trip. OSP estimated that 5 to 7% of the vehicles were from out of state.

Effort varied by area do to the size or number of clams available. Area 1 had large numbers of first year clams which caused diggers to shift to other areas to find bigger clams. Area 2 had large numbers of one and two year old clams that were in very good meat conditions, this combination drew heavy effort.. Area 3 had more two year old clams then other areas and they were in good meat condition, this combination drew the largest number of diggers. Area 4 had fair numbers of older clams (three and four year old) but clam numbers decline quickly with harvest and effort decreased rapidly. Area 5 lacked clams and effort shifted to northern areas.

The harvest showed little increase in older clams (3,4,5 year clams). Harvesting in the fall did enabled each year class to obtain its maximum growth, giving diggers larger clams then would be dug in a normal spring season.

In summary clams were of a larger size but not older and the number of available clams was not much larger then in a normal year. The fall record effort should reduce the number of clams available for 1995.

REPORTS

- 1 Status of the razor clam fishery, MR meeting ,1994
2. Status of the razor clam fishery, Directors Review.
3. Razor clam sections for 1992 and 1993 Annual Shellfish /Marine Habitat Report.
4. Razor clam section to Shellfish/Marine Habitat sampling Manual.