

STATUS OF STOCKS

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Oregon Department of Fish & Wildlife
Marine Region
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Bay Clam, Bait Shrimp, Estuary Habitat

STATUS OF STOCKS-BAY CLAMS

Recreational clam diggers continue to enjoy good digging for bay clams. Catch per effort (CPUE) data revealed diggers averaged 17.2 clams/trip or 11.8 clams/hour in 1989. Since 1975, only during four other years have clam diggers enjoyed better digging rates. Cockle clams continue to be the most popular species dug, comprising nearly 27% of the total harvest.

Commercial bay clam diggers harvested 44,696 lb in 1988, the lowest production since 1975 when 26,550 lb were reported. Final landings for 1989 are unavailable but it looks like the harvest was similar to 1988. Poor recruitment of the gaper clam since 1975 has reduced the availability of gapers in several popular digging areas. Because of the poor recruitment, we discontinued issuing mechanical harvest permits in 1985. Only hand harvest has been allowed since then. In 1988, we issued 136 permits to commercial fishermen to dig clams. Cockle clams comprised 67% (30,068 lb) of the total harvest. Seventy-seven percent of the total production was taken subtidally from Tillamook Bay.

Subtidal stock assessment surveys in Nehalem, Tillamook, Yaquina, and Coos bays have revealed that most clam stocks are in a healthy condition. Only the status of the gaper clam is in question with the poor recruitment since 1975. Population estimates for gaper clams in Yaquina Bay have declined from 36.3 million in 1975 to 7.4 million in 1988.

Since the 1960's we have introduced Manila littleneck clams into several of our estuaries. Our goal was to develop spawning populations of Manila clams. To date, we have released an estimated 3.6 million clam set and nearly 92,000 adult clams. Most of these clams were donated to our project by private industry. Over the years we have conducted numerous experiments utilizing plastic netting and various introduced substrate types to improve survival rates.

ADEQUACY OF DATA BASE-BAY CLAMS

Our data base for bay clams comes from interviewing recreational clam diggers on 22 major clam beds in 8 estuaries. Each year we collect biological data from approximately 1,400 diggers. Data includes CPUE, digger origin, and species and size composition. We attempt to measure 200 clams of each species from each clam bed.

Biological data collected from commercial fishermen includes size composition by species. Logbook data provides

information on CPUE and species composition and is also used to reconcile and error check differences on fish ticket landing reports.

Annual population and biomass estimates, and size and age composition by species, have been collected in Yaquina Bay since 1975. In 1989, time commitments precluded us from doing this survey. Future surveys in Yaquina Bay will depend on staff having the time or there is a change in our priorities. Because of the time required to conduct these types of studies, we discontinued our surveys in the other bays in 1985.

Recent observations revealed successful recruitment has occurred in Netarts Bay with adult Manila clams found in several locations. Annual monitoring of Manila clam plants revealed survival as high as 83%, three years after release, was realized with the application of plastic netting. Testing of survival of Manila's in various substrate types revealed that mixtures of ground oyster shell and pea gravel produced a significantly higher survival than the other tested materials.

MANAGEMENT ISSUES-BAY CLAMS

Two issues concern us; the poor recruitment of the gaper clam and the encroachment of ghost and mud shrimp on clam beds.

STATUS OF STOCKS-BAIT SHRIMP

In 1988, we issued 149 permits to commercial bait shrimp fishermen. These fishermen landed 109,784 lb (69,507 lb were ghost shrimp, and 40,277 lb were mud shrimp). Peak year of harvest was in 1986 when 128,600 lb were reported. Our field studies have revealed that both species have proliferated during the past several years and today several important clam beds have nearly been destroyed by their presence.

ADEQUACY OF DATA BASE-BAIT SHRIMP

During the year we monitor the commercial harvest of shrimp fishermen. Data are collected on size composition for each species. Logbook data are also collected giving us CPUE information for each fisherman and harvest method.

MANAGEMENT ISSUES-BAIT SHRIMP

Our main concern is the expansion of shrimp on clam beds.

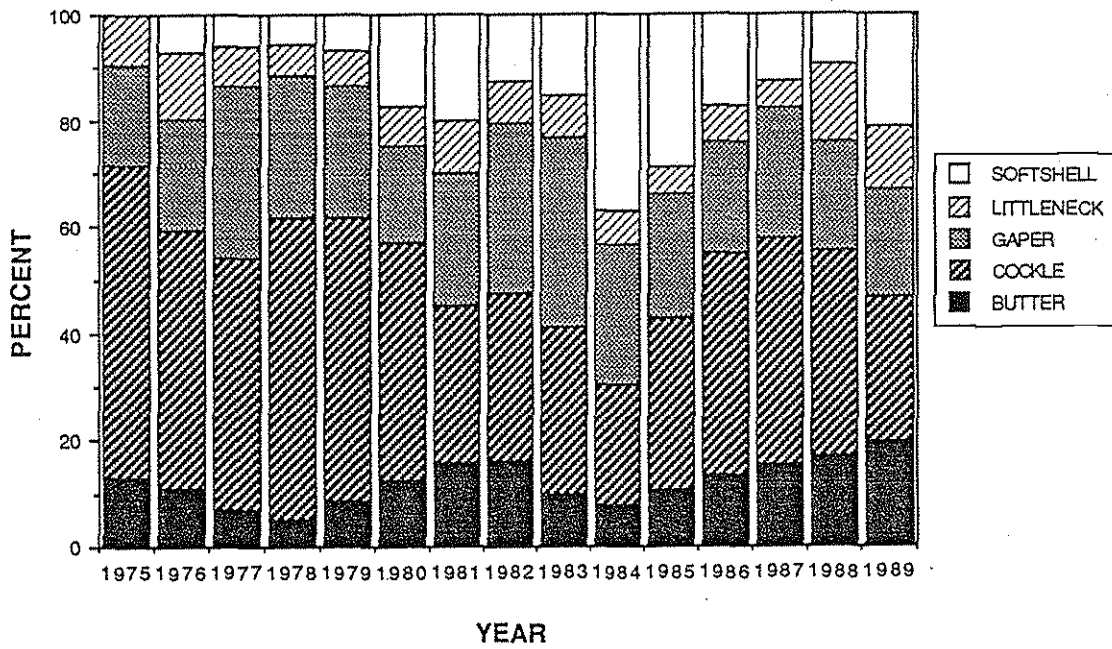


Figure 1. Species composition for recreational harvest in Oregon, (all bays combined), 1975-89.

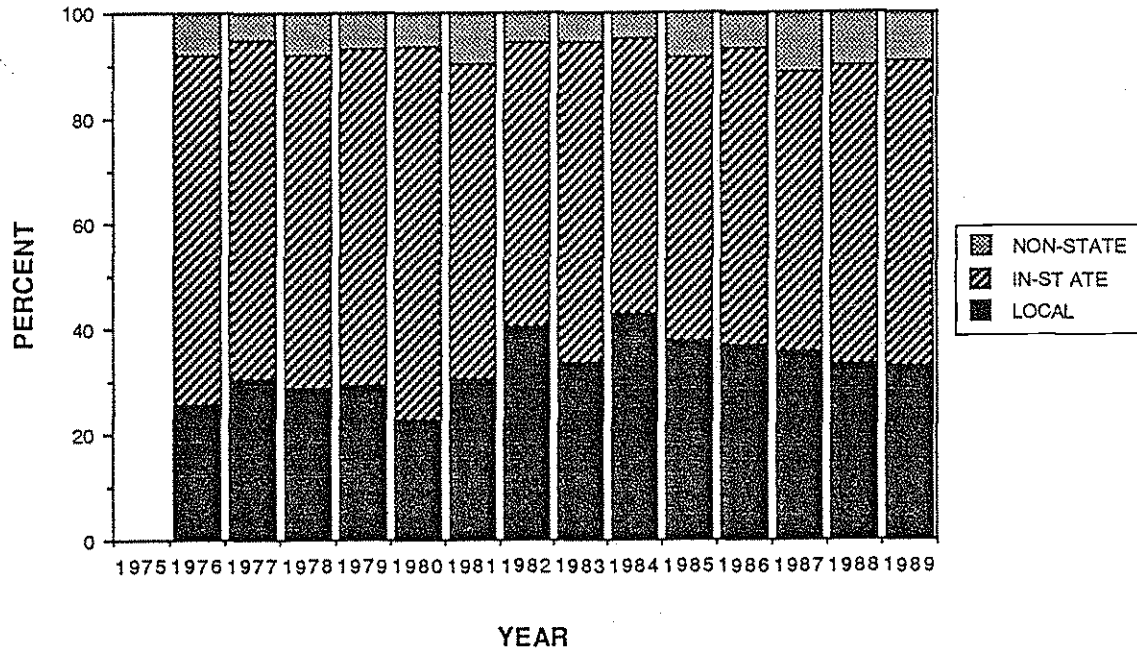


Figure 2. Area of residency for recreational clam diggers in Oregon, (all bays combined), 1976-89.

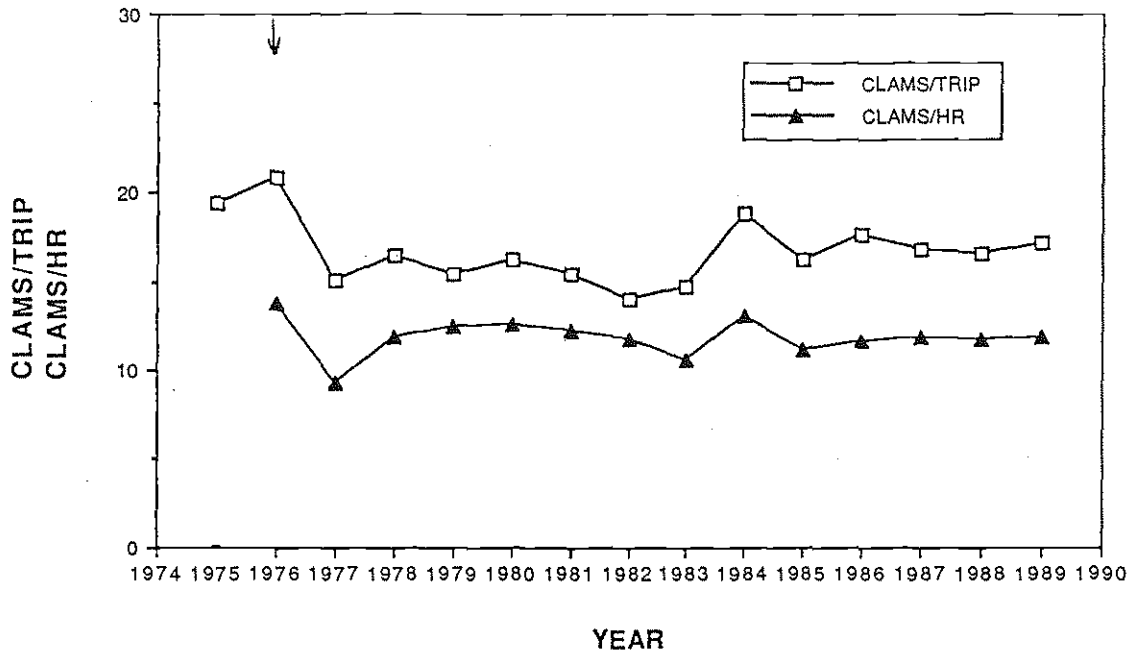


Figure 3. Catch per unit of effort for recreational harvest in Oregon, (all species combined), 1975-89.

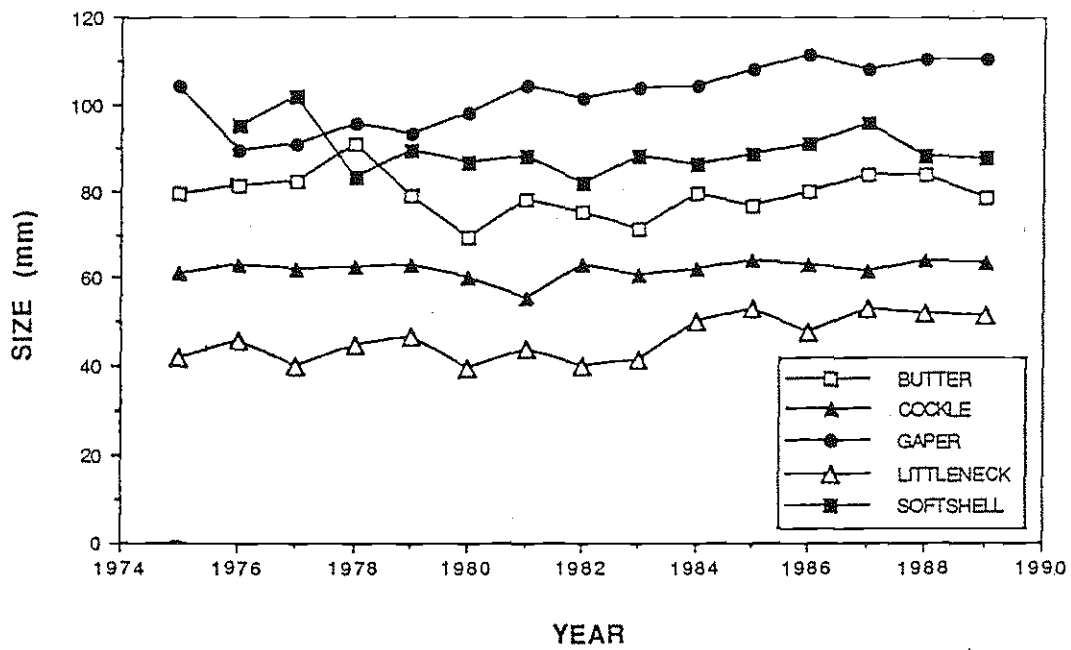


Figure 4. Size composition of recreationally harvested clams in Oregon, (all bays combined), 1975-89.

RECREATIONAL HARVEST OF GAPER CLAMS

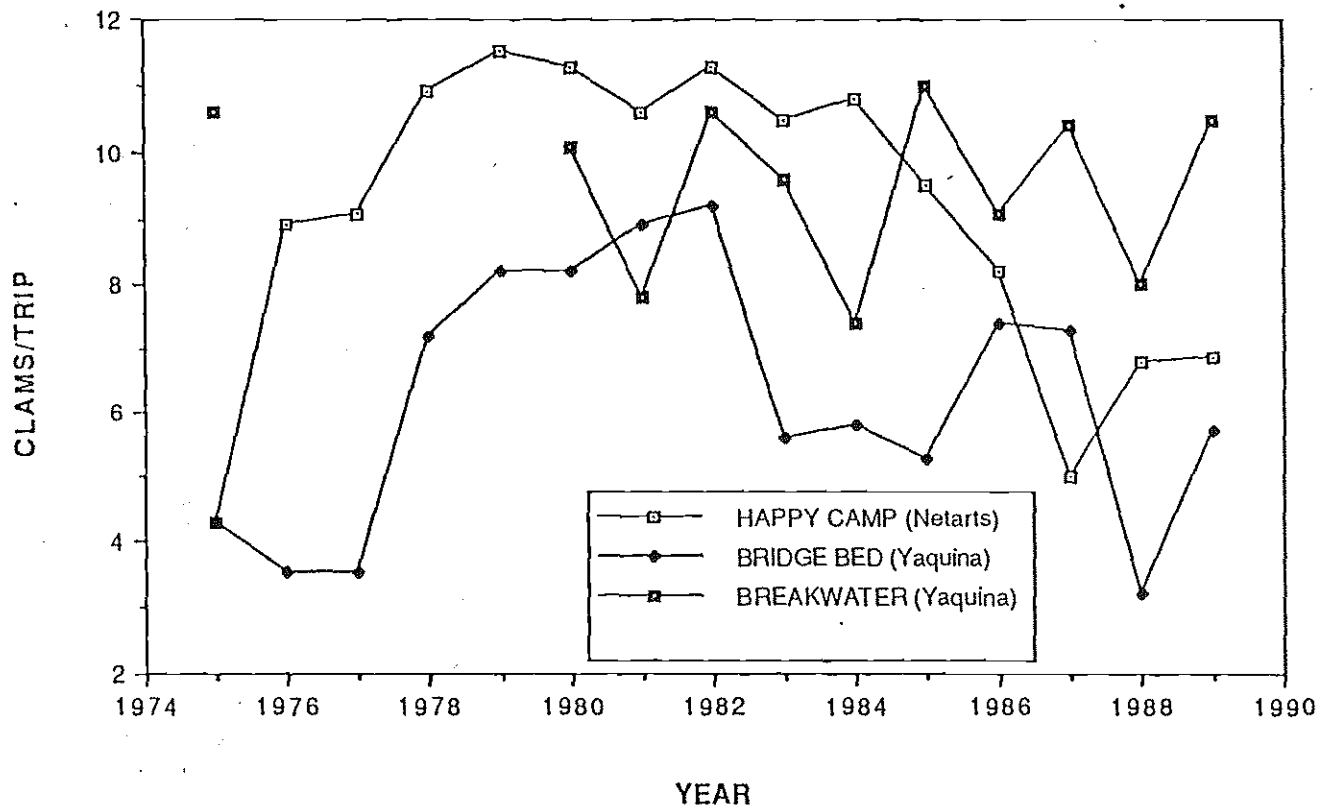


Figure 5. Catch per unit of effort for recreational harvest of gaper clams in three major clam beds, 1975-89.

Table 7. Peak clam digger counts on tideflats, 1975-88.

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Tillamook														
Garibaldi	425	350	131	225	256	300	460	516	487	350	118	380	400	257
Bay Ocean	-	280	122	39	107	-	33	13	10	4	0	17	3	-
Netarts														
Happy Camp	-	175	73	-	150	160	425	500	478	200	191	314	265	116
Yaquina														
Bridge Bed	-	245	138	30	91	84	225	625	275	84	107	204	225	110
Breakwater	-	127	120	62	23	20	27	63	26	28	25	30	46	17
Idaho Flat	-	110	98	45	66	61	38	176	46	35	31	50	56	39
Gas Plant	-	-	-	-	24	26	41	16	12	10	11	34	20	10
Coquille Point	-	-	-	-	17	18	5	41	20	5	9	14	7	4
Sally's Bend	-	159	67	14	41	44	46	57	32	15	20	48	27	14
Alsea														
Breakwater	-	-	-	-	-	-	-	12	9	0	22	22	4	45
Bay Shore	-	-	-	-	-	-	-	49	31	14	20	10	15	44
North Bank	-	-	-	-	-	-	-	4	3	0	5	0	13	18
Siuslaw														
North Fork	-	55	-	-	109	57	146	33	22	43	41	44	56	45
Coos														
Charleston Triangle	-	-	76	-	-	-	-	-	31	24	41	39	87	82
Charleston Flat	-	-	138	-	-	-	-	-	64	30	26	27	66	103
Peterson's Flat	-	-	35	-	-	-	-	-	5	-	2	15	14	4
Pigeon Point	-	-	112	-	-	-	-	-	62	50	42	67	97	52
North Spit	-	-	322	-	-	-	-	-	-	37	-	83	158	102
Clam Island	-	-	-	-	-	-	-	-	-	58	-	86	119	93

Figure 6.

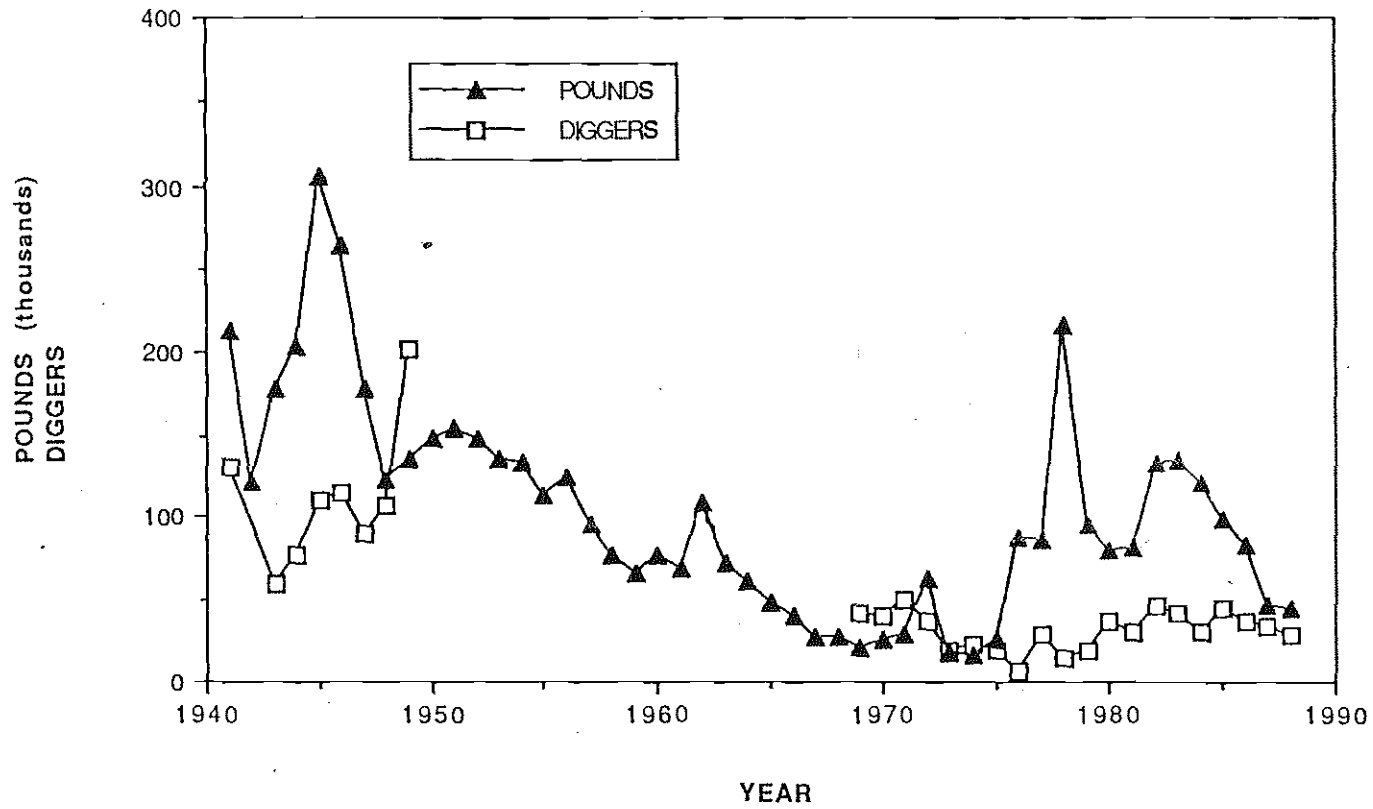


Figure 7. Commercial landings of bay clams in Oregon, 1941-88.

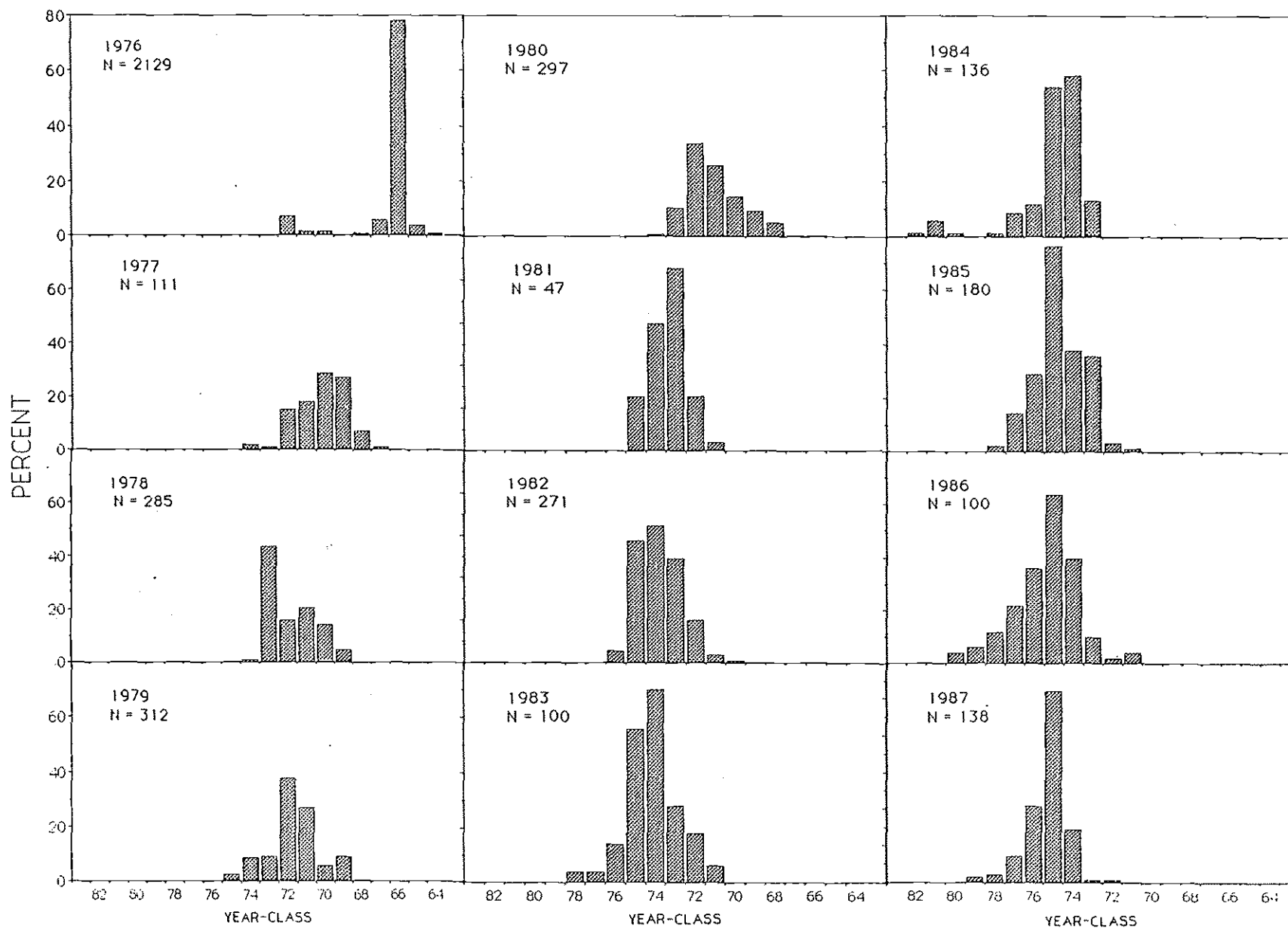


Figure 8. Age composition of commercial subtidal gaper clam harvest, Coos Bay, 1976-87.

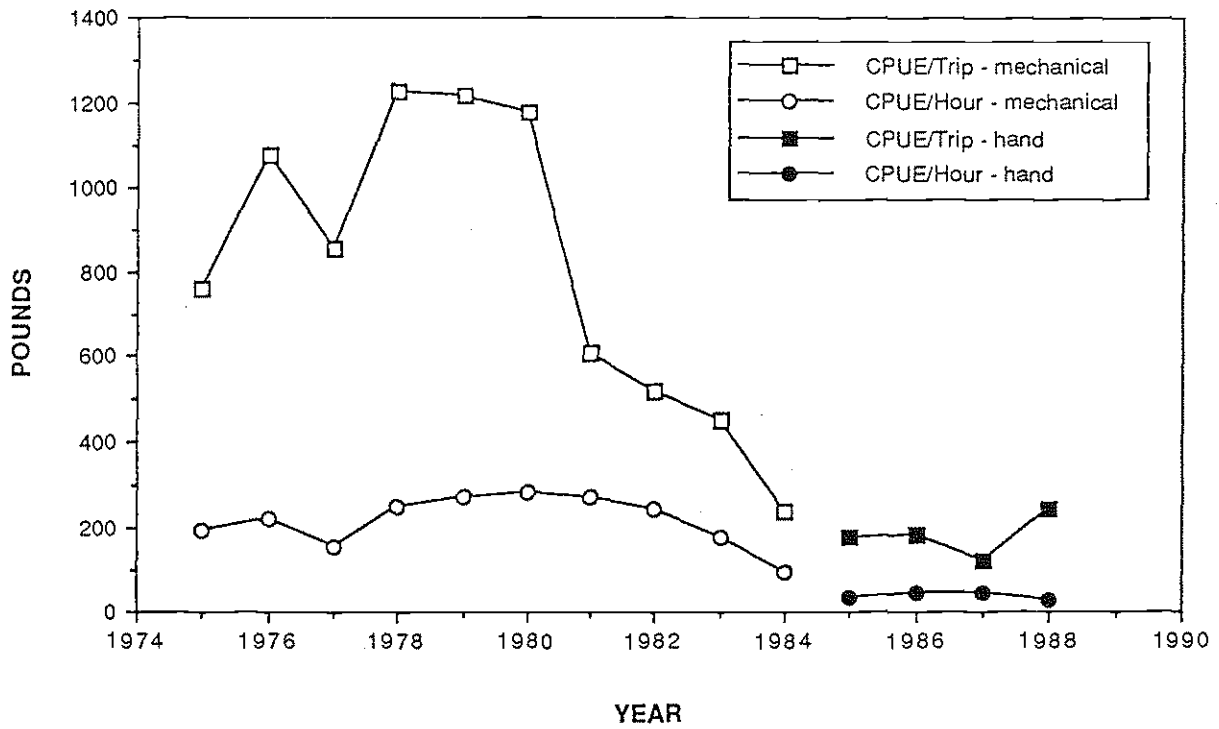


Figure 9. Catch per unit of effort for commercially harvested gaper clams in Coos Bay, 1975-88.

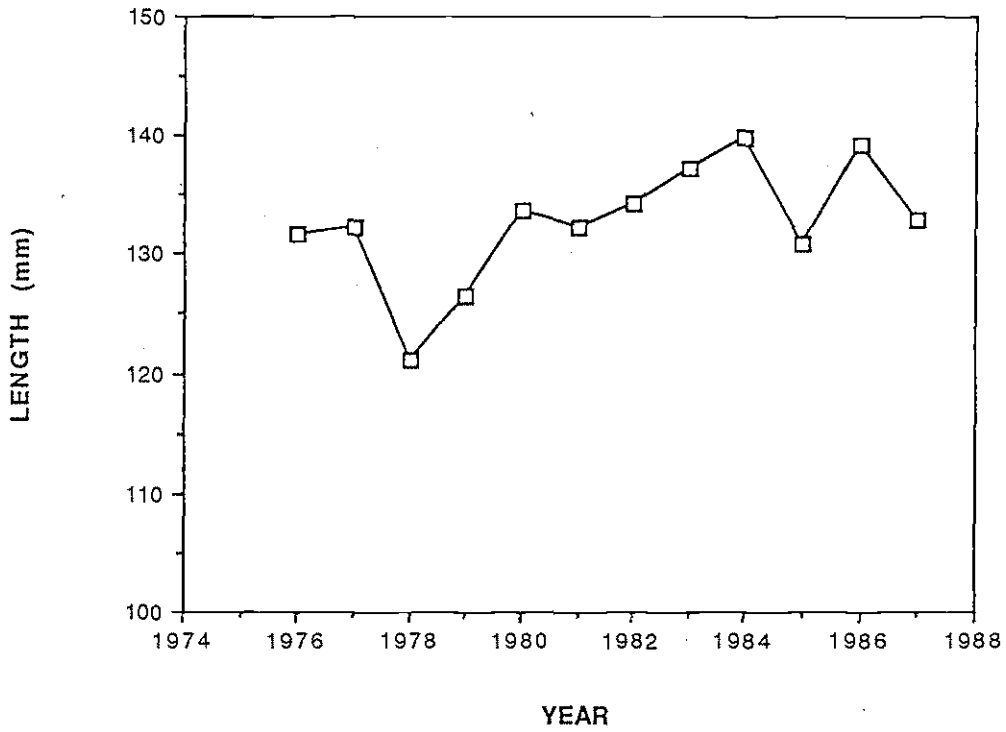


Figure 10. Size composition of commercially harvested gaper clams in Coos Bay, 1976-87.

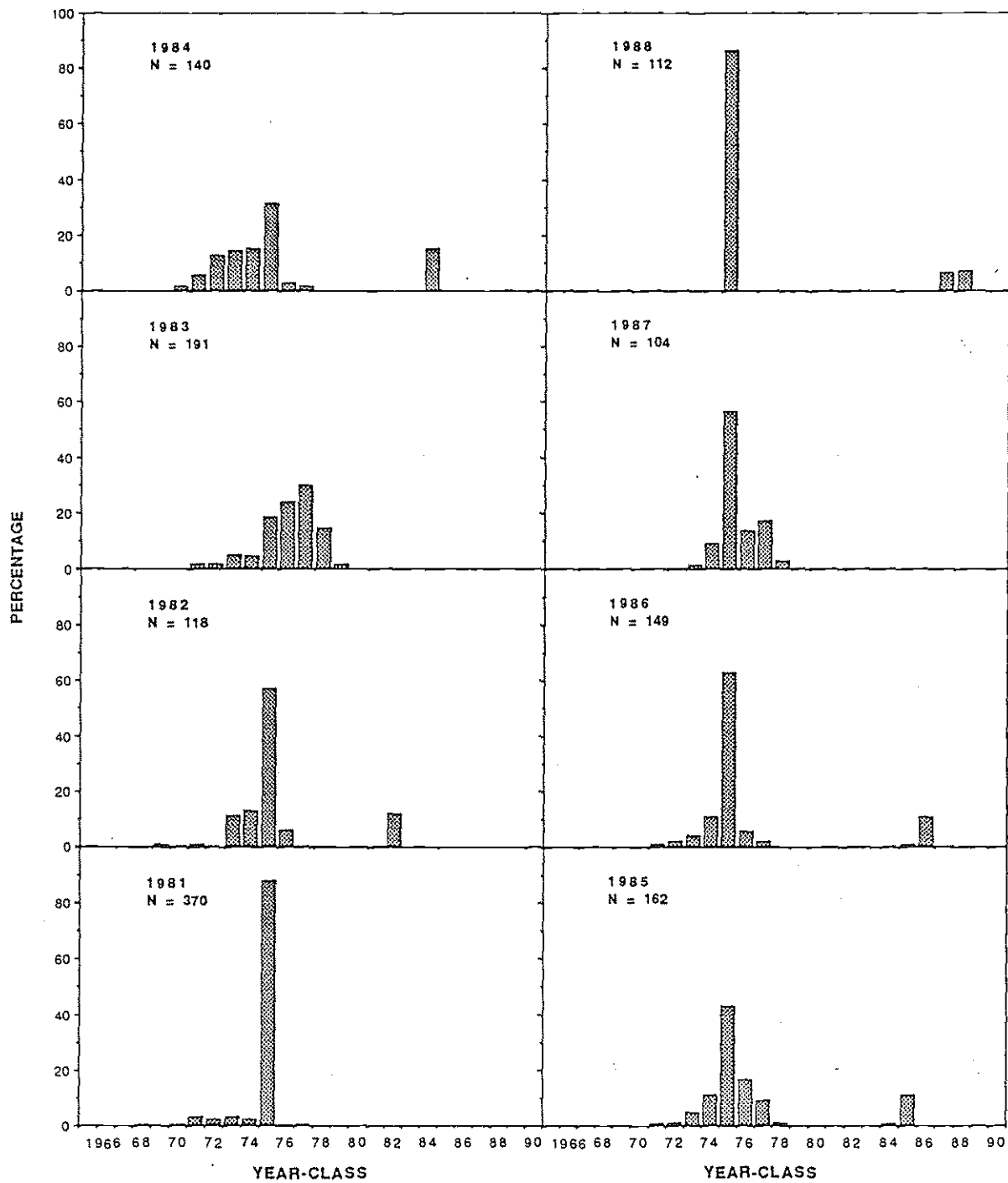


Figure 11 Age composition of subtidal gaper clams, Area 2, Yaquina Bay, 1981-1988.

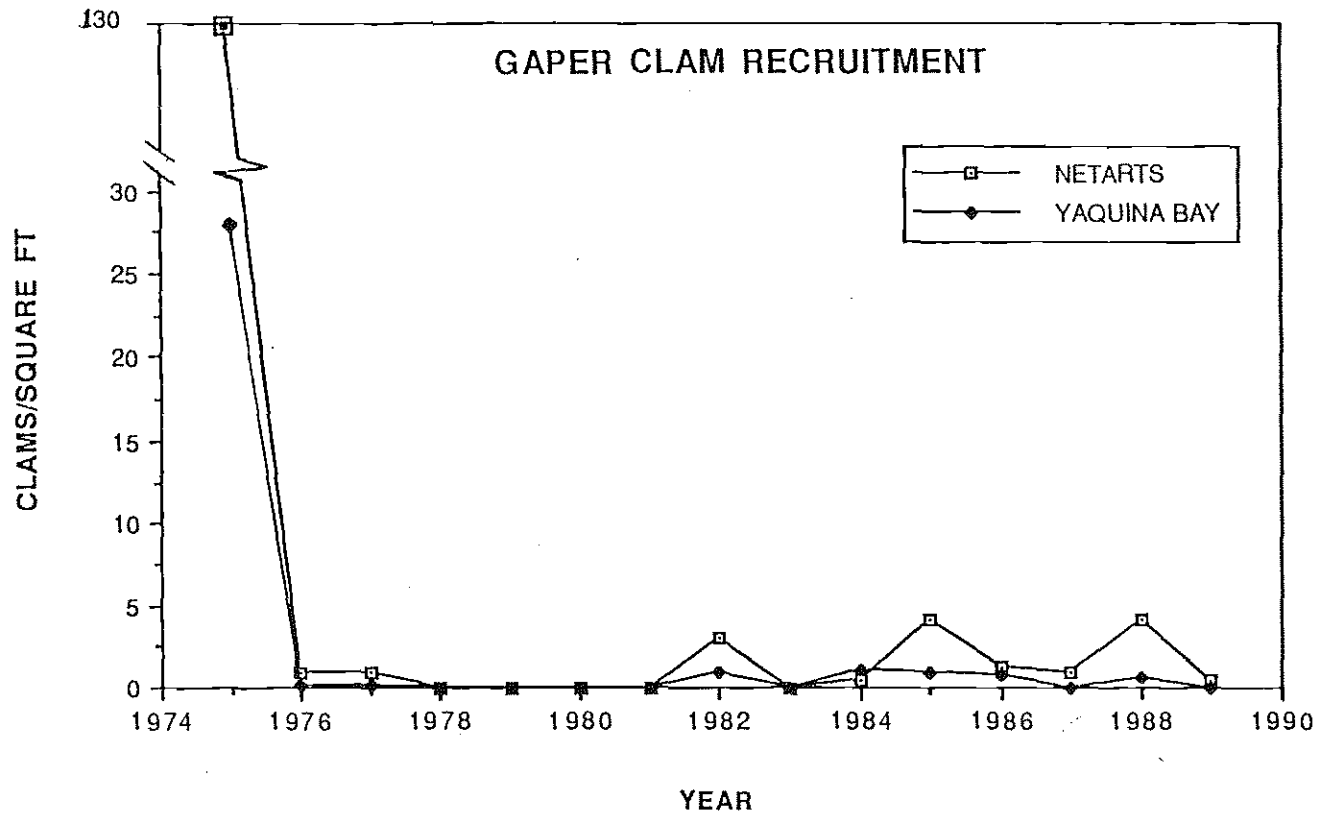


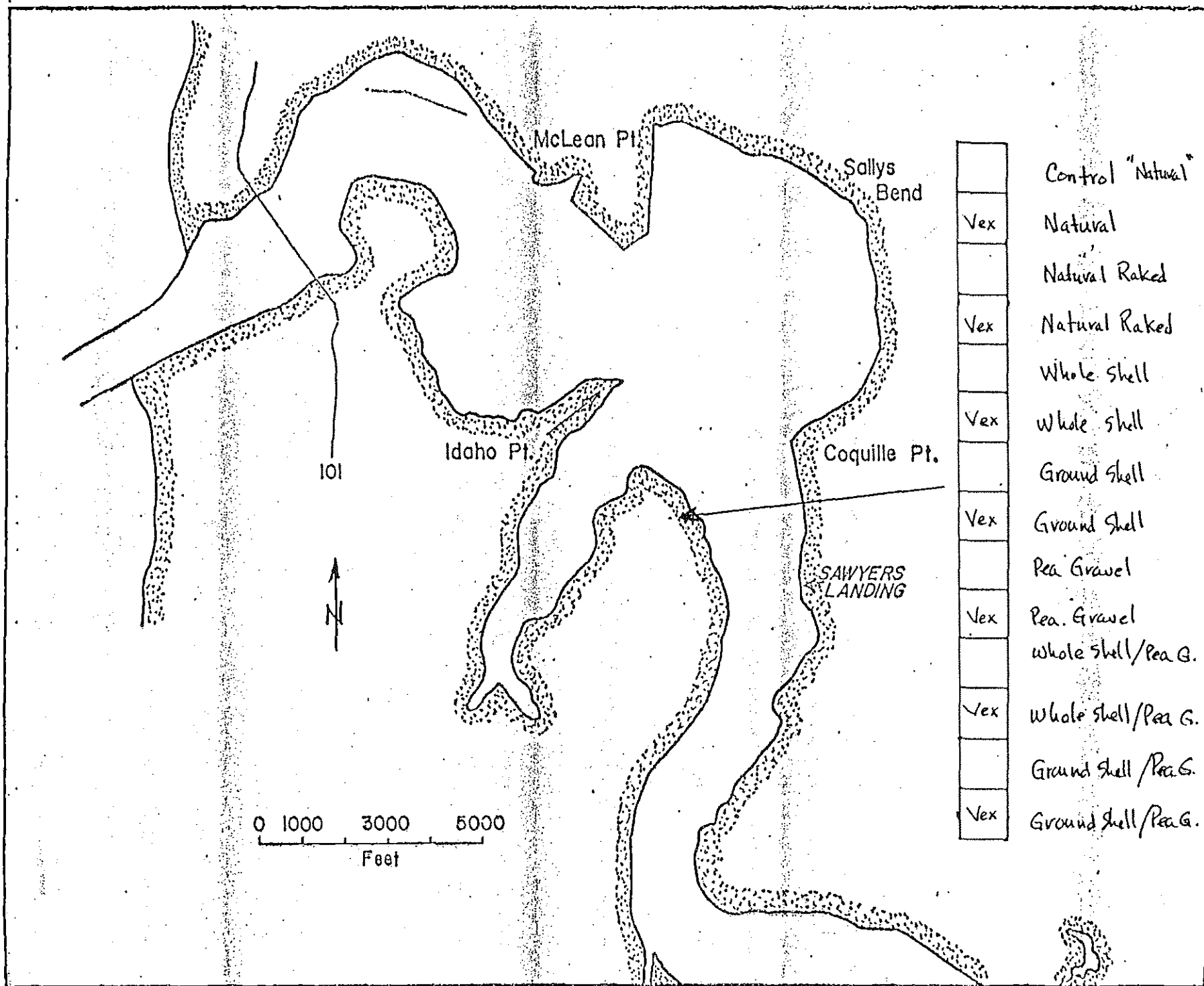
Figure 12. Recruitment of gaper clams in Netarts and Yaquina bays, 1975-89.

Table 8. Population and biomass estimates (95% CI) for gaper clams in Yaquina Bay, 1975-88.

Year	Population Estimates		Biomass Estimates	
	No.	%	No.	%
1975	36,302,000	+56.1	5,084,200	N/A
1976	25,566,400	+51.5	5,217,200	N/A
1977	29,316,000	+44.5	4,969,000	N/A
1978	10,560,000	+48.9	4,136,800	N/A
1979	11,116,700	+51.7	3,459,900	+39.0
1980	11,050,000	+51.6	4,252,500	+33.2
1981	6,160,000	+49.4	2,569,700	+36.9
1982	6,320,000	+42.6	4,424,900	+30.4
1983	7,680,000	+40.3	5,042,100	+29.7
1984	5,600,000	+59.2	3,528,700	+54.2
1985	6,480,000	+32.6	4,708,200	+32.7
1986	5,920,000	+48.8	4,350,600	+50.3
1987	7,563,600	+66.1	6,507,400	+58.6
1988	7,467,000	+35.5	7,430,500	+31.1

Figure 13.

Figure 14.



Manila Claws

Multiple comparisons, Manila littleneck clams, Yaquina Bay, 1986.

 One factor ANOVA:substrate Y1:clams/sq ft

Comparison	Mean Diff.	Fisher PLDS
Natural vs raked	-1.071	7.875
Natural vs wh shell	-0.071	7.875
Natural vs gr shell	-2.571	7.875
Natural vs gravel	-7.285	7.875
Natural vs wh shell/gravel	-6.857	7.875
Natural vs gr shell/gravel	-17.786*	7.875
Raked vs wh shell	1.000	7.875
Raked vs gr shell	-1.500	7.875
Raked vs gravel	-6.214	7.875
Raked vs wh shell/gravel	-5.786	7.875
Raked vs gr shell/gravel	-16.714*	7.875
Wh shell vs gr shell	-2.500	7.875
Wh shell vs gravel	-7.214	7.875
Wh shell vs wh shell/gravel	-6.786	7.875
Wh shell vs gr shell/gravel	-17.714*	7.875
Gr shell vs gravel	-4.714	7.875
Gr shell vs wh shell/gravel	-4.286	7.875
Gr shell vs gr shell/gravel	-15.214*	7.875
Gravel vs wh shell/gravel	0.429	7.875
Gravel vs gr shell/gravel	-10.500*	7.875
Wh shell/gravel vs gr shell/gravel	-10.929*	7.875

 * Significant at 95% CI

Figure 15

One Factor ANPVA X_1 = Treatment Y_1 = Numbers or Lengths Manila Clams, Tillamook Bay, Sam Hayes Plot

Group	Count	Mean	Std. Dev.	Std. Error	Comparison	Mean Diff.	Fisher PLSD
1986 Numbers							
Vexar	5	14.8	12.194	5.453	Vexar vs. No Vexar	13.8	12.64*
No Vexar	5	1.0	1.225	0.548			
1987 Numbers							
Vexar	3	15	1.732	1.0	Vexar vs. No Vexar	14.8	1.903*
No Vexar	5	0.2	0.447	0.2			
1988 Numbers							
Vexar	4	5.5	1.915	0.957	Vexar vs. No Vexar	5.5	2.343*
No Vexar	4	0	0	0			
1986 Lengths							
Vexar	74	25.005	4.287	0.498	Vexar vs. No Vexar	0.685	4.032
No Vexar	5	24.32	5.856	2.619			
1987 Lengths							
Vexar	45	30.398	2.672	0.398	Vexar vs. No Vexar	-0.002	5.444
No Vexar	1	30.4	--	--			
1988 Lengths							
Vexar		Insufficient Data					
No Vexar		"	"				

* Significant at 95% CI

Figure 16.

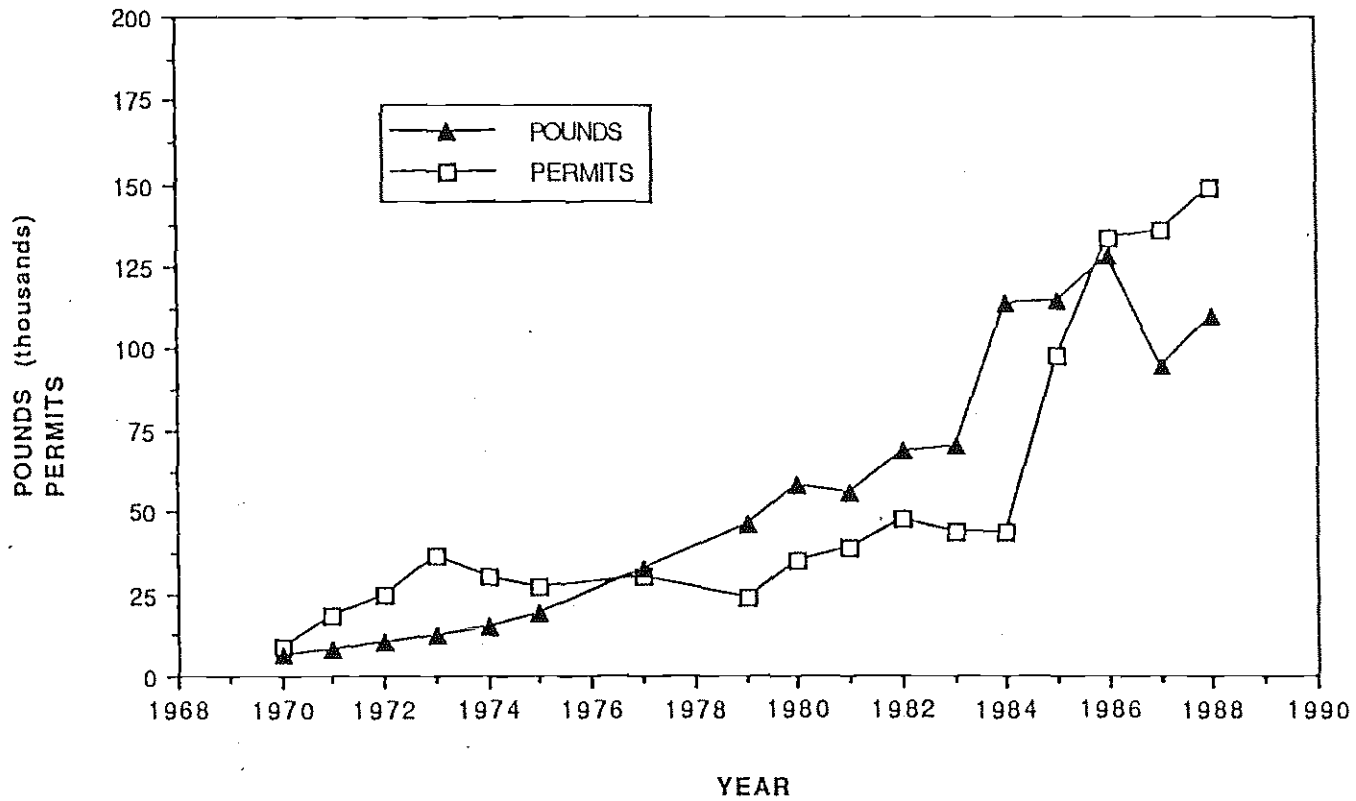


Figure 17. Commercial landings of bait shrimp (ghost and mud) in Oregon, 1970-88.

POSSIBILITIES FOR FUTURE EFFORTS IN CLAMS AND BAIT SHRIMP

BAY CLAMS

1. POOR RECRUITMENT OF GAPER CLAMS
2. ENCROACHMENT OF SHRIMP ON CLAM BEDS
3. LEASING OF TIDELANDS FOR PRIVATE MARICULTURE
4. LACK OF STAFF TO CONDUCT FIELD STUDIES TO MAINTAIN CURRENT DATA BASE

BAIT SHRIMP

1. ENCROACHMENT OF SHRIMP ON CLAM BEDS
2. IMPACT OF FISHERY ON HABITAT
3. CHEMICAL CONTROL OF SHRIMP (SEVIN)
4. COMPETITION FOR ACCESSIBLE PRODUCTIVE SHRIMP BEDS
5. LACK OF STAFF TO COLLECT BIOLOGICAL DATA

Figure 18. 4