

ALSEA BAY SPORT CRAB SURVEY, 1988-89

by

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INTRODUCTION

As the human population has grown, the recreational and commercial use in our estuaries has increased as well. Many people have more leisure time while others facing economic pressures have turned to natural resources to supplement their food needs and/or income. The increased demand has resulted in conflicts of philosophy and purpose among participants and legal redress to favor one activity over another. Large estuaries tend to have more issues, but small estuaries have problems as well. One example is the Dungeness crab fishery in Alsea Bay. In 1988 a study was done in Alsea Bay to obtain data to help resolve the sport/commercial interaction. In 1989 a companion study obtained additional data to estimate the dollar value of the sport fishery.

There is little information on the crab fishery in Alsea Bay except for commercial records starting in 1971 (Table 1), and a resource use survey also in 1971. In the 1971 study, from March through October, 13,900 sport crabbers took 20,500 crabs. July was the peak month for effort with little winter or early spring fishing. Crab studies were also done in four bays in 1977 but did not include Alsea Bay. However, one finding that would have applied to Alsea Bay as well was that in two bays effort peaked in January and February, clearly showing crabbing had become an all year fishery depending mostly on weather conditions. The earlier studies dealt only with catch and effort while the main focus in the present study emphasized economic data.

METHODS

This study was originally designed for one year, but when angler expenditure data were added, we decided to continue the work in Alsea Bay for a second year.

Experience has shown crab fishing in an estuary is greatly affected by the ebb and flow of the tide. During the times when there is a large range between high and low tides (greater than 5 ft), most crabbing is done within one or two hours of high or low tide. When the range is under 5 ft, crabbing can continue all day. Therefore, sampling was done on days when we expected many crabbers to be fishing, so the time spent sampling could be as short as possible. In 1988 sampling started in February and was done 5 days each month, 3 weekdays and 2 weekend days.

In 1989 fishermen were similarly interviewed on five days each month, but the number of counts were expanded so that total effort could be estimated. The count days were determined by randomly picking a weekday in the first week of each month and then picking every third day thereafter. A Saturday or Sunday was randomly picked for each week. This resulted in 10-12 peak counts each month.

Crab fishing in Alsea Bay occurs mainly below the mouth of Lint Slough (Figure 1). On sampling days at high tide, we counted boats and individual people who used the Waldport boat dock to crab. Most were interviewed after they were done fishing for the day. On some days, people on the dock were interviewed before they were done fishing. During the interview, all crabs caught were counted, condition noted, and most were measured to the nearest mm. We asked people their zip code, the number of people in the party (crabbers and

noncrabbers), how many hours they had fished, and whether the trip was for crabbing only or a combination trip. If they fished from a boat we asked if the boat was privately owned, a rental, or a charter boat. We asked boaters the primary purpose of their trip, whether Waldport was their destination for that day, and how many days they would be in the area. We also asked them how many pots or rings were used, if they had a fishing license, and if it was their first trip of the year. General weather conditions for the day were also noted. A sample of the data form is shown in Appendix Table 1.

On sampling days, we counted boats and people fishing off the dock early in the sampling period and added all new boats and people on the dock to the count as they arrived. A peak count was also made near high or low tide depending upon the time of the tide. We estimated a total count of boats and people on the dock for each month by using a regression between the peak and total counts. We estimated boat and shore activity for each month by expanding counts on sampled days within each month. Because of a difference in the level of activity, weekdays and weekend days were expanded separately for each month. Months were combined to estimate annual totals of boat and shore activity.

We multiplied the boat counts by the average number of people per boat to estimate total numbers of individuals crabbing from boats for the year. This number was then added to the total number of shore anglers.

EFFORT

Effort in the Alsea Bay sport crab fishery was measured in number of people (individuals on the shore and parties in boats), number of hours fished, and the amount of gear used. The total number of individual crabbers was estimated but most of the analysis of the boat data was done on a party basis. In crabbing a few people usually do most of the work for the party.

Expenditure data was obtained for specific categories and noted on a separate form (Appendix Table 2). The categories were for transportation, lodging, food from stores, food from restaurants, boat gas and oil, equipment rental, and miscellaneous (launch fee, moorage fee, some equipment purchases, crab cooking fee and bait). Expenditures were estimated separately for coastal and inland parties. Expenditures for each individual were not estimated.

A few parties were interviewed for expenditure data on most sampling days. To avoid bias, the interviewer decided before talking to people who would be asked for expenditure data. Most people were cooperative but some refused.

RESULTS

The results are based on the analysis of 3,759 interviews. It is clear from Figure 2 crab fishing is a year round activity, with peak effort from July through October. Greatly reduced effort early in 1989 was due to several weeks of freezing weather with east winds to 45 mph. Figure 2 also shows most of the crabbers fished from a boat. Of those who used a boat, 94% owned their own, 4-5% were rentals, and 1-2% were charters. The average number of people per party ranged from 2.5 to 2.9.

Crab fishing in Alsea Bay is closely tied to the height and timing of the tide. On days when the difference between high and low tide is under 5 ft, one can successfully fish all day. When the tidal range is over 5 ft, most fishing is done one to two hours either side of slack water when there is little current. Figure 3 shows most crabbers spend less than 4 hours fishing but some fish much longer.

The final measure of effort is the amount of gear used. The most widely used gear is the crab ring but pots are becoming more popular. The average crabbing party uses 3-4 units of gear (Table 2).

CATCH

Crab fishing in Alsea Bay is an all year activity but catching crab is more seasonal and was best from August through October (Figure 4). Early in the year, effort was greater than the catch (Figure 5), but this was reversed as the year progressed; the average catch per party showed a steady increase during the year (Figure 6).

Those who fished from a boat had much greater success and caught 89-95% of the crabs. However, the catch per person was skewed far to the right (Figure 7) with few people getting most of the crabs and nearly 50% catching nothing.

The size frequency of crabs caught during the study showed little difference between the two years (Figure 8), although commercial size crab (6 1/4" (159 mm) or larger) were more abundant in 1989 especially from September through November (Figure 9). The increase during the commercial season (Sept.-Dec.) is illustrated clearer in Figure 10 where the average number of sport crab per person that are of commercial size shows a sharp increase. The average size (Figure 11) showed little difference. The percentage of sublegal crabs was relatively small but in some months the percentage was quite high (Figure 12).

Crab condition is generally determined by the amount of "give" in the shell, hence a crab with a soft pliable shell has less meat than a crab with a hard shell. Many sport crabbers do not recognize crab condition and look more for number and size of crab. In Alsea Bay soft crab were taken all year, with a higher incidence from April through September (Figure 13).

COMMERCIAL FISHERY

The commercial bay crab fishery begins the day after Labor Day and runs through December. Commercial harvest began at the peak of the sport catch and was much less than the sport catch in 1988 and 1989 (Figure 14). Each boat is limited to no more than 15 rings and fishing is allowed weekdays only except holidays. Commercial crabs must be males, 6 1/4" and larger.

During the study 8 to 20 commercial boats landed 8,273 to 31,827 pounds of crab from Alsea Bay valued at \$16,211 and \$58,059 to the fishermen (Table 1). The percent size frequency of commercial and sport crab for 1989 is compared in Figure 15. The 8 boats that fished in Alsea Bay in 1989 ranged from 14-20

feet in length. Six of the boats fished only for bay crab while one fished in the ocean crab fishery and two fished for salmon and bottom fish.

ECONOMIC PARAMETERS

Crabber Origin

Crabber origin by zip code was noted as part of estimating the dollar value of the Alsea Bay sport crab fishery. Most of the crabbers were from Oregon (Table 3) but 11% in 1989 were from 22 other states or countries, notably Washington, California, and Idaho (Table 4). Oregon zip code distribution is shown in Figure 15. Most were from the Willamette Valley and most of the coastal zip codes were in Lincoln County. In all there were 115 Oregon zip codes represented. Oregon residents traveled an average of about 225 miles for each crabbing trip.

Noncrabbers

Individuals in a crabbing party who did not participate in the fishery still represented a dollar value to the area. Table 5 shows the number and percent of noncrabbers by month for 1989. There does not appear to be a trend to the data, but the high percentage for March was probably due to the cold weather. Local people stayed home but visitors came to the coast anyway but few of each party went crab fishing.

Type and Length of Trip and Destination

Table 6 shows 40-50% of the parties interviewed came to the area just to crab, with the remainder participating in some other resource fishery or other activity. Twenty to 24 percent of the parties that did other things indicated crabbing was their primary purpose for coming to the area. Thirty-five to 84 percent said Waldport was their destination.

Figure 17 shows the frequency of days per trip. Nearly 50% were one day. Four to six percent of the trips were more than 7 days.

Crabbers were asked if they had a fishing license to estimate potential licensees hence, revenue. The data (Table 6) show 78 to 90% had a license. However, this is not to say that 10-18% were potential licensees because we did not determine how many people were under age 14.

Fishermen Expenditures

An analysis of fishermen expenditures will be discussed in a companion economic report. A general breakdown of expenses by category are shown in Table 7.

DISCUSSION

There is no doubt the crab fishery in Alsea Bay attracts many people to the area, and, weather permitting, that attraction is all year. It is also apparent there is a growing unrest between sport and commercial crabbers that is aggravated by opinions and perceptions on both sides. Data from this study will help us to understand the character and magnitude of the fisheries. A companion report will discuss fully the economic and social implications of the fisheries. This discussion will pertain mostly to the character of the fisheries.

In 1987 six meetings were held on the coast and inland to hear comments on the bay crab issues. One of the most common concerns among many sport crabbers was a sense of unfairness. They are aware that 98% of the public's access to the crab resource is through the ocean commercial fishery, and perceive it as unfair that another one half percent comes from our estuaries. Sport crabbers have several perceptions related to the commercial bay fishery. First, sport crabbers perceive that without a commercial fishery all of the crabs not taken by the commercial crabbers would be taken by sport crabbers. This is highly unlikely as nearly 50% of the sport crabbers interviewed didn't catch anything. This was particularly true for those who fished off the boat dock where catch rates were usually very low because the dock is located in a marginal crabbing area. If sport crabbers did catch all the commercial catch for 1989, it would have added two crab to each sport crabbers catch.

Secondly, many sport crabbers perceive commercial crabbers take all the large crab. We must first understand crabs in all bays come from the ocean, and their abundance can vary greatly even on a daily basis. When heavy rains and high river flows lower the salinity the crabs move back to the ocean. When this happened in Alsea Bay it was several months before many crab re-entered the bay. Even on good crabbing days some parties don't catch any crab or very few. This reflects primarily using poor bait, inexperience, or poor crabbing techniques. We can also see from Figure 9 that the catch rate for commercial size crab by the sport crabbers increases during the commercial season (September through December). Overall the sport fishery took 65% of the commercial size crab from Alsea Bay in 1989.

Another concern of sport crabbers is they are being crowded by commercial crabbers for space to fish. Prior to 1987 this claim had more merit when the number of rings was unlimited and fishing was allowed all year. Since 1987 commercial crabbers have been limited to no more than 15 rings per boat and a 4 month season. Most of the gear seen on any given day is sport gear. Also, in Alsea Bay much of the commercial fishing takes place at night when few sport crabbers are fishing.

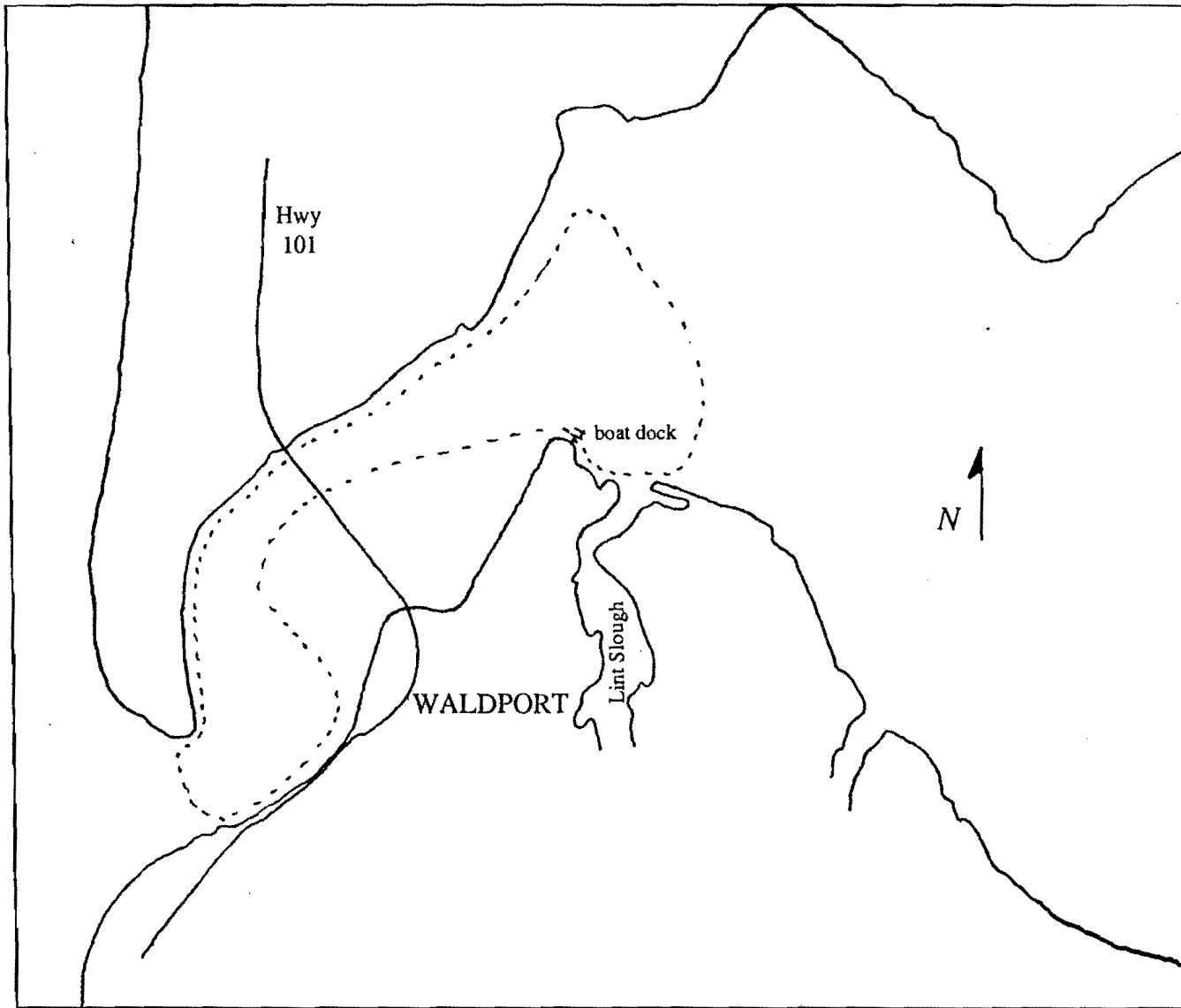
In our meetings concerning the bay crab issues many sport concerns were for reasons mentioned above. However, there was another contingent that objected to commercial crabbing but gave no reason.

There is another widely held perception that if commercial crabbing was banned in the bays crabbing would improve and attract more sport crabbers to the area. This and the socioeconomic concerns of the commercial crabber will be discussed in the economic analyses report.

Aside from the sport/commercial interaction and socioeconomic ramifications this study also produced information that may be of interest to others.

The amount of time spent to catch a few crab suggests that for many sport crabbers the catch is not of first importance. Rather, the opportunity to fish appears to be very important. This is especially true of people fishing off the boat dock. Of course those people with boats who frequently catch crab tend to return to the area because Alsea Bay is less crowded and the pace is more "laid back". Sport crabbers also retain a fairly large number of soft unfilled crab which again reflects a desire to catch something even if quality is lacking.

The data from this study should provide an adequate basis to determine a strategy for the bay crab fishery. Although Alsea Bay ranked fifth as a crabbing estuary in 1971, much of what was learned could be applied to other estuaries as well. The larger estuaries, of course, have more crabbers, but catch rates and the general character of the fishery should be similar. The one exception may be the Columbia River. A sizeable commercial fishery that uses pots, a growing sport fishery including charter boats and dissimilar regulations with Washington state makes management in this area more complex.



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Figure 1. Outline of lower Alsea Bay and general crabbing area.

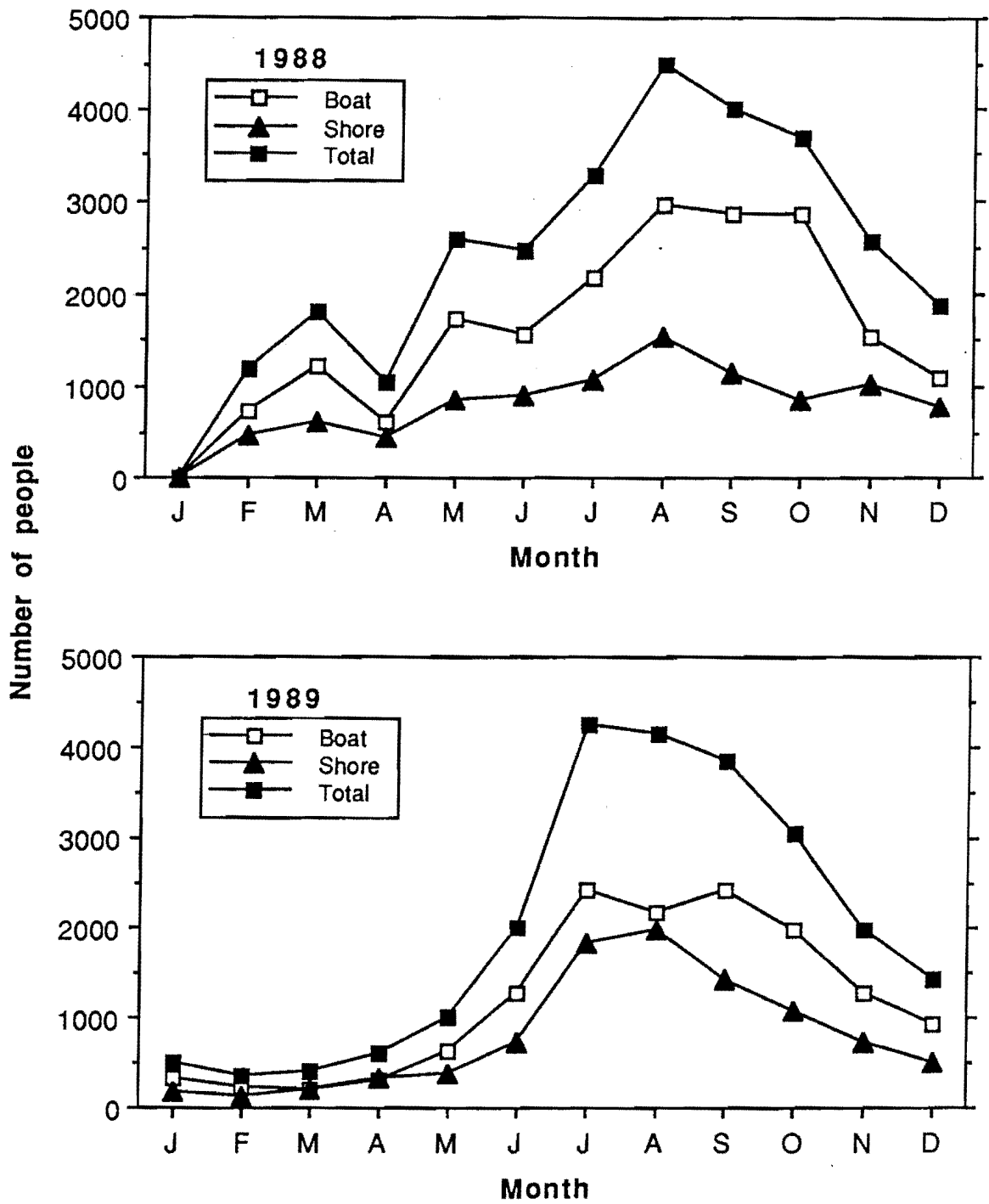


Figure 2. Estimated number of sport crabbers for boat and shore fisheries by month, Alsea Bay 1988 and 1989.

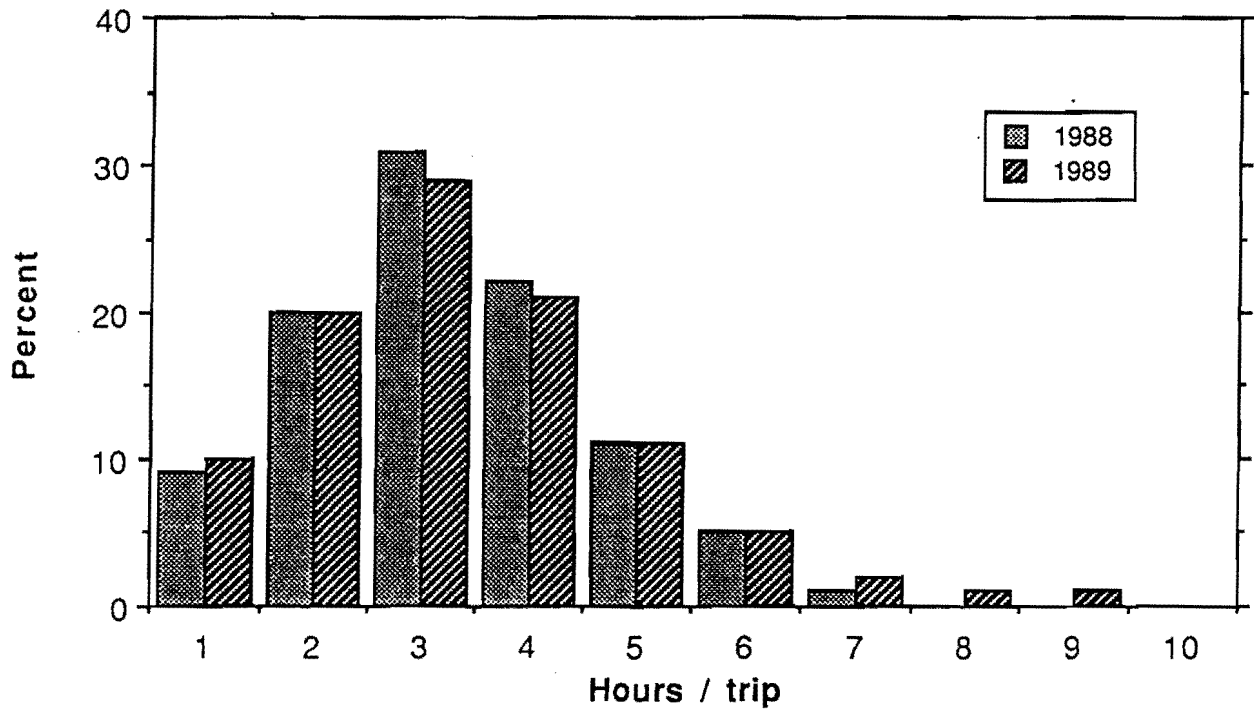


Figure 3. Percent of parties and hours spent sport crabbing per trip in Alsea Bay, 1988-89.

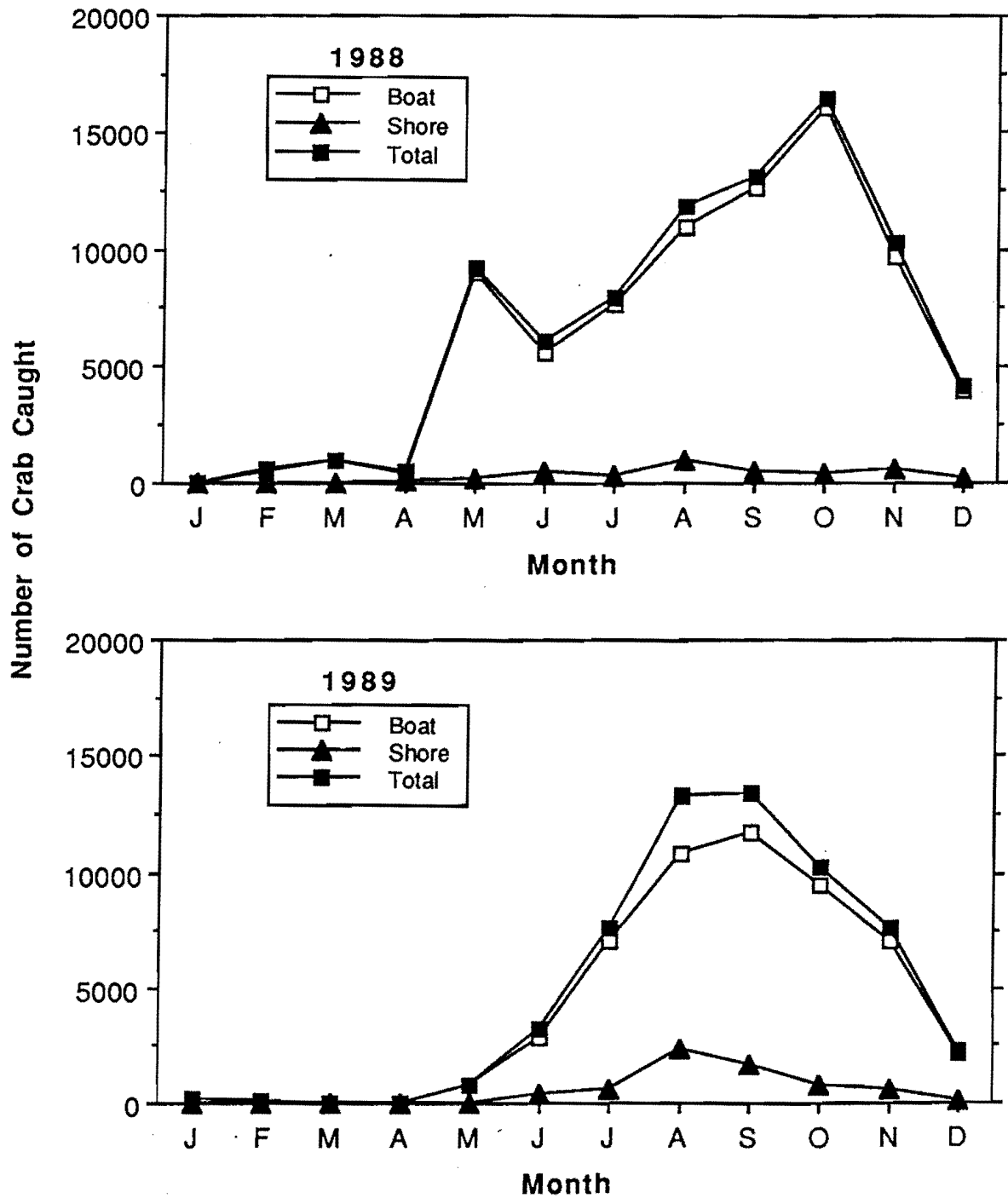


Figure 4. Estimated sport catch of crab by boat and shore fisheries, by month in Alsea Bay, 1988-89.

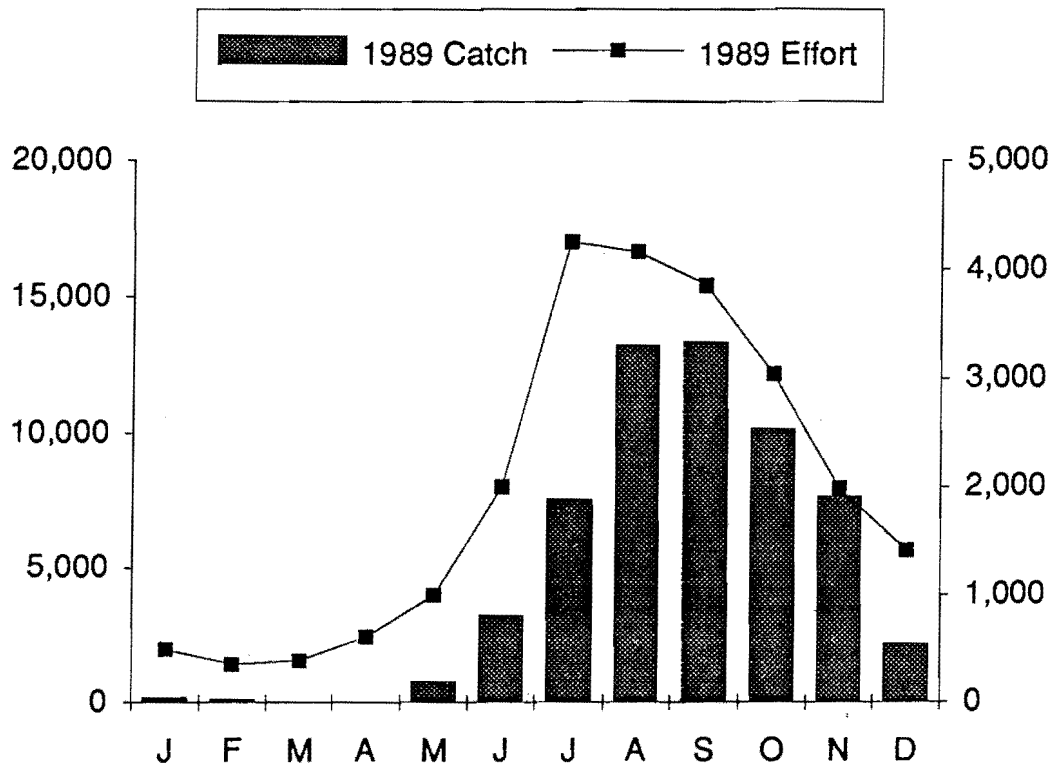
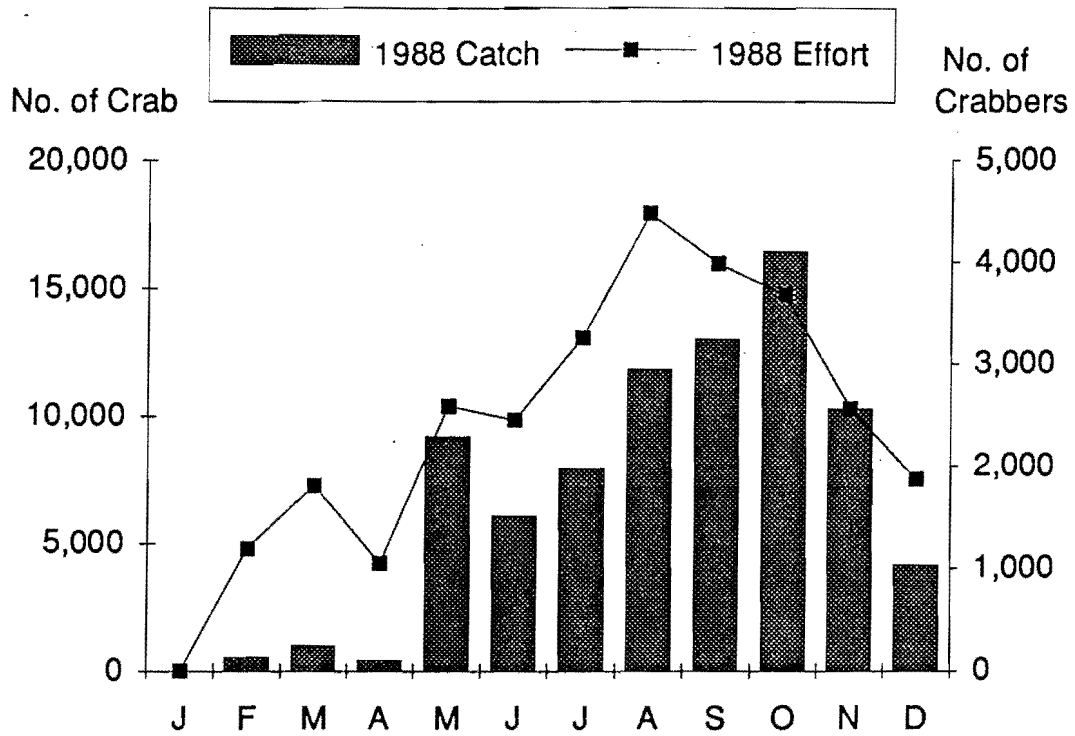


Figure 5. Sport crab catch and effort by month in Alsea Bay, 1988-89.

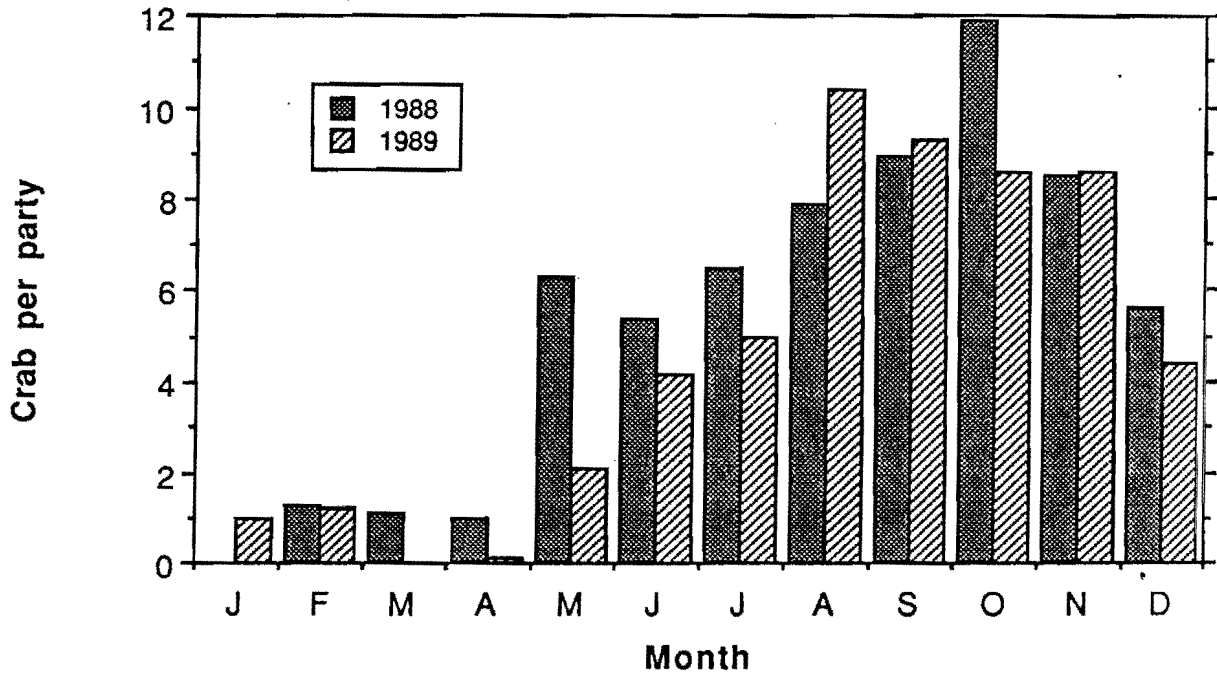


Figure 6. Average sport catch of crab per party by month in Aisea Bay, 1988-89.

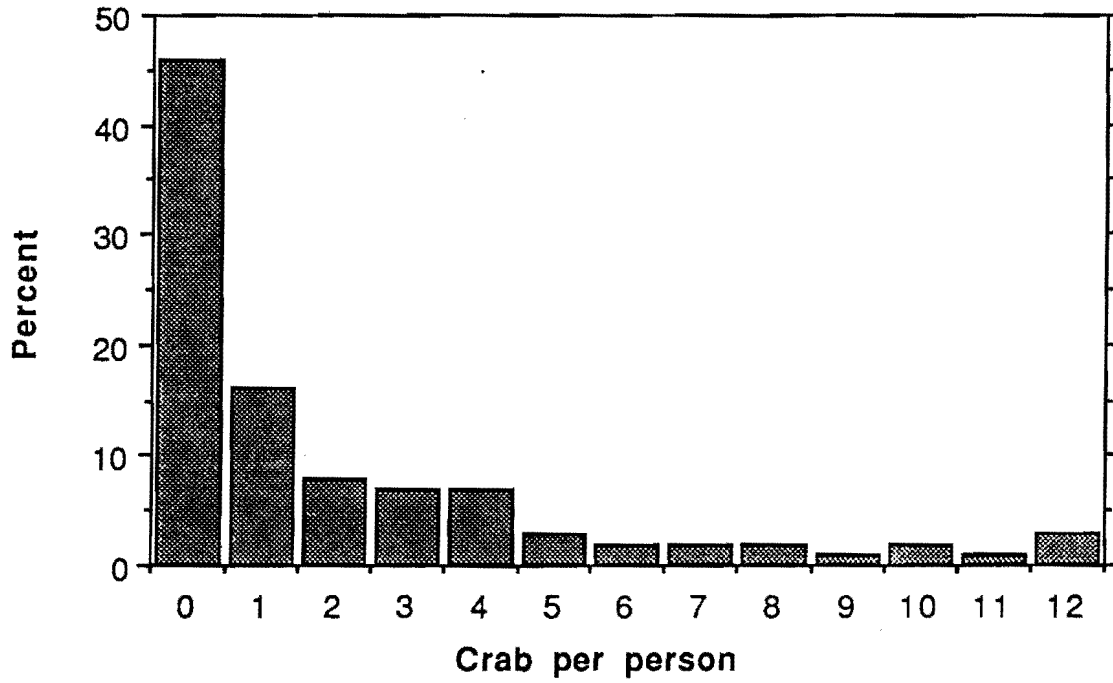


Figure 7. Average percent frequency of sport crab caught per person in Alsea Bay, 1989

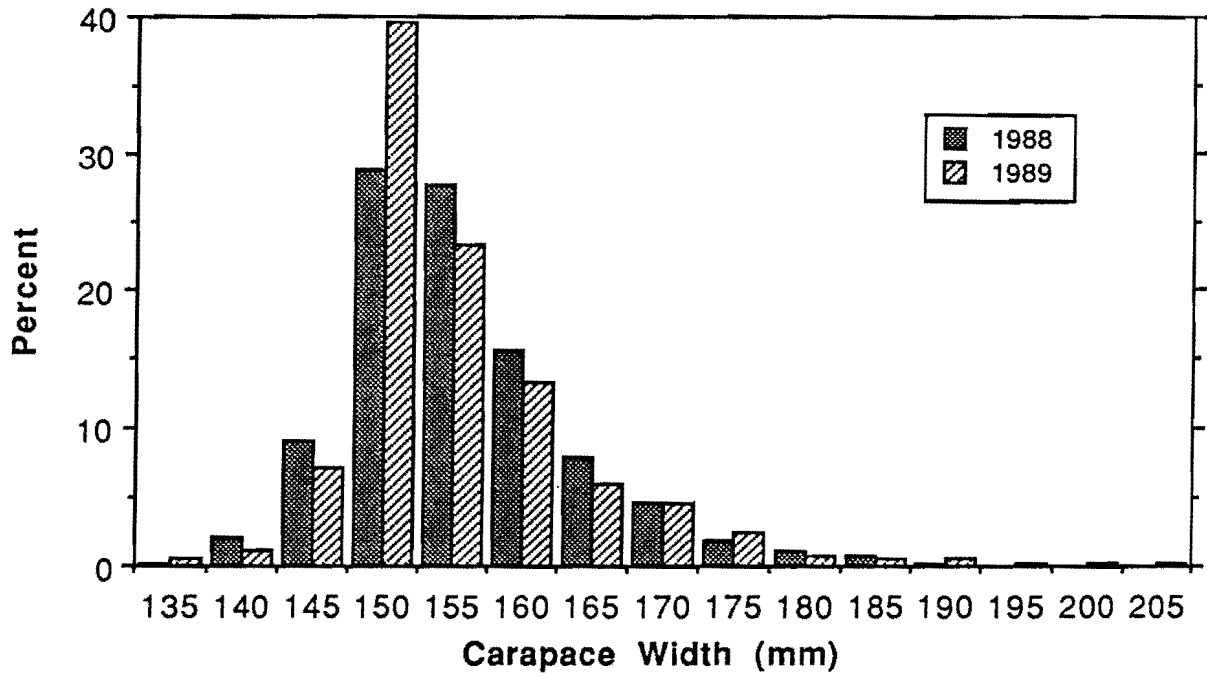


Figure 8. Carapace width (mm) in percent frequency of sport caught crab in Alsea Bay, 1988-89.

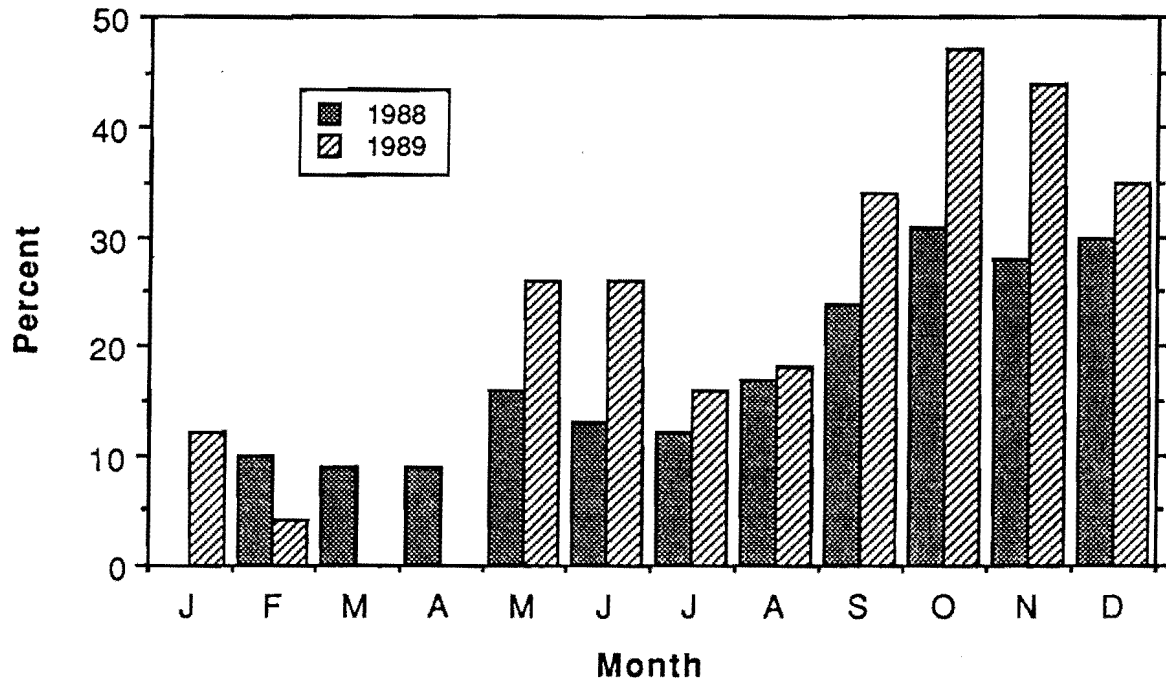


Figure 9. Percent of sport caught crab with carapace width greater than 6 1/4 inches by month in Alsea Bay, 1988-89.

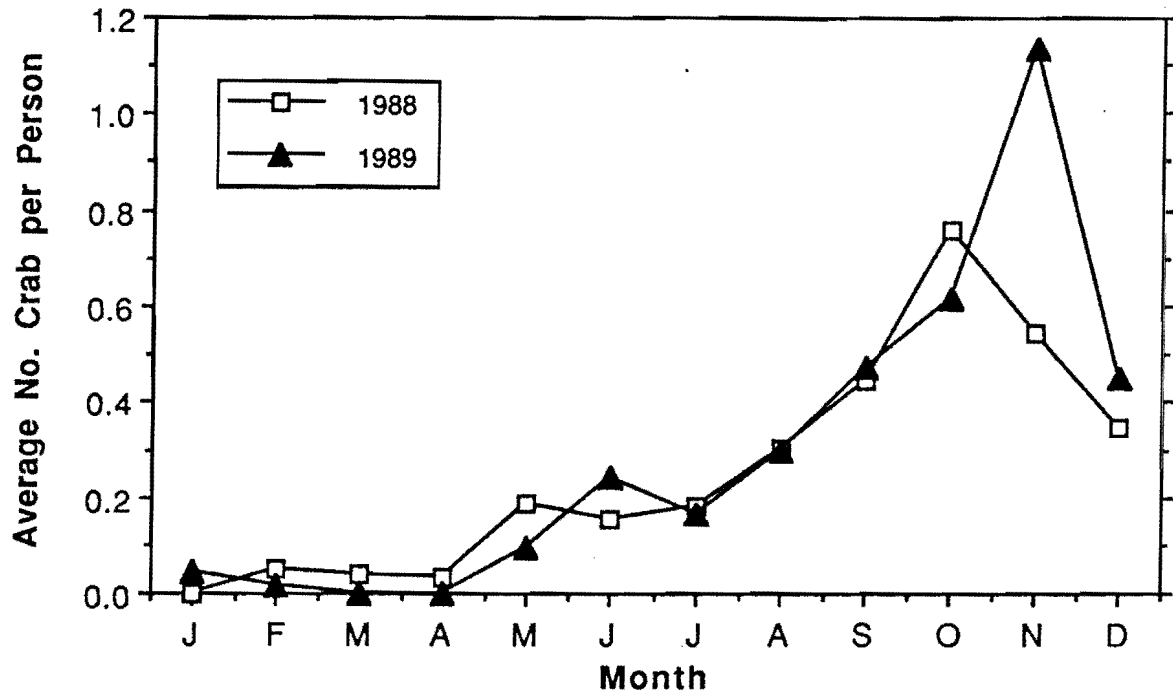


Figure 10. Average number of sport caught crab with carapace width greater than 6 1/4 inches per person in Alesia Bay, 1988-89.

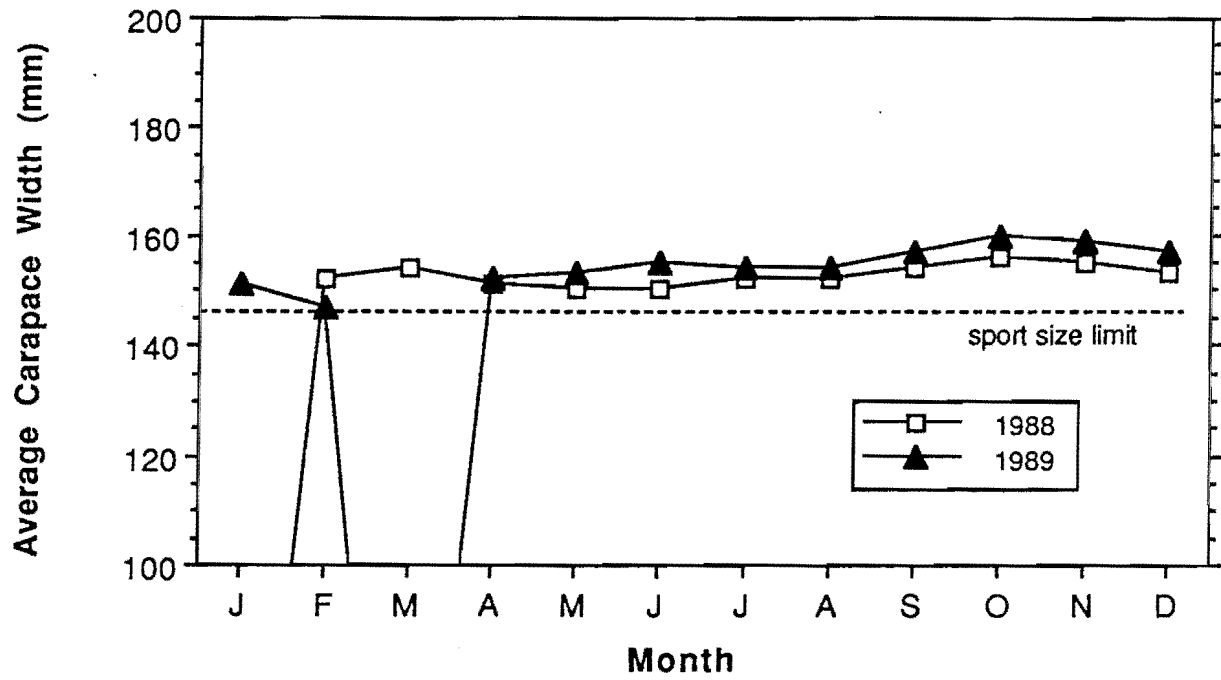


Figure 11. Average carapace width (mm) of sport crabs caught in Alsea Bay, 1988-89.

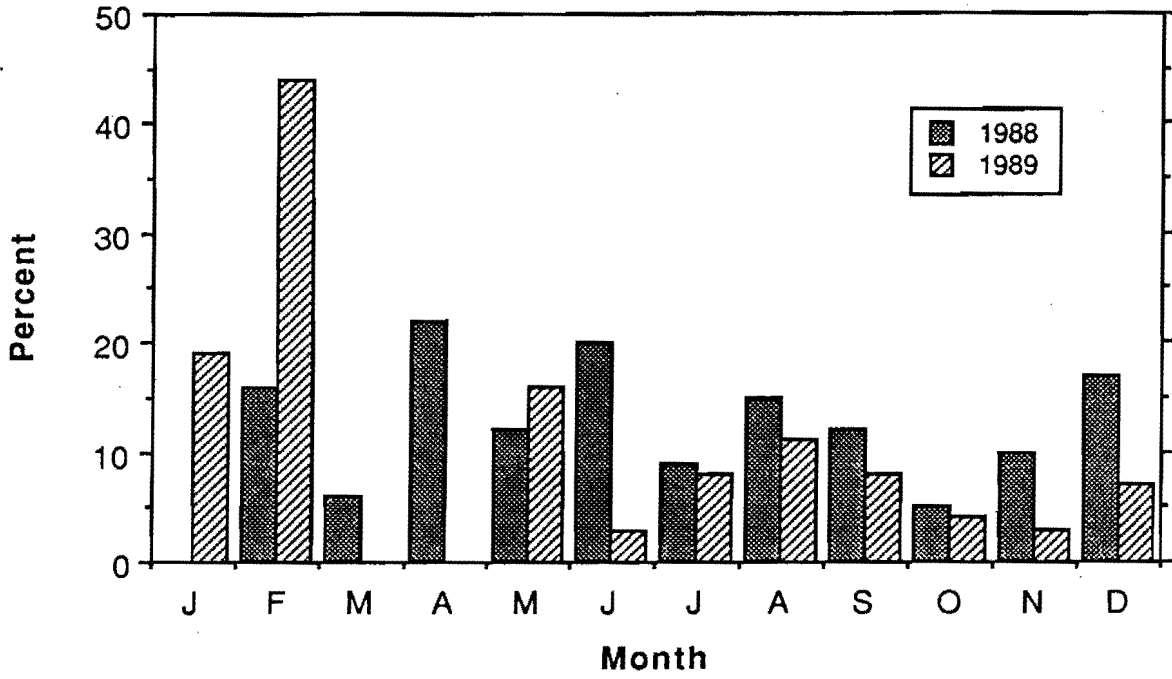


Figure 12. Percent of sublegal size ($5 \frac{3}{4}$ inches) crab in the Alsea Bay sport catch, 1988-89.

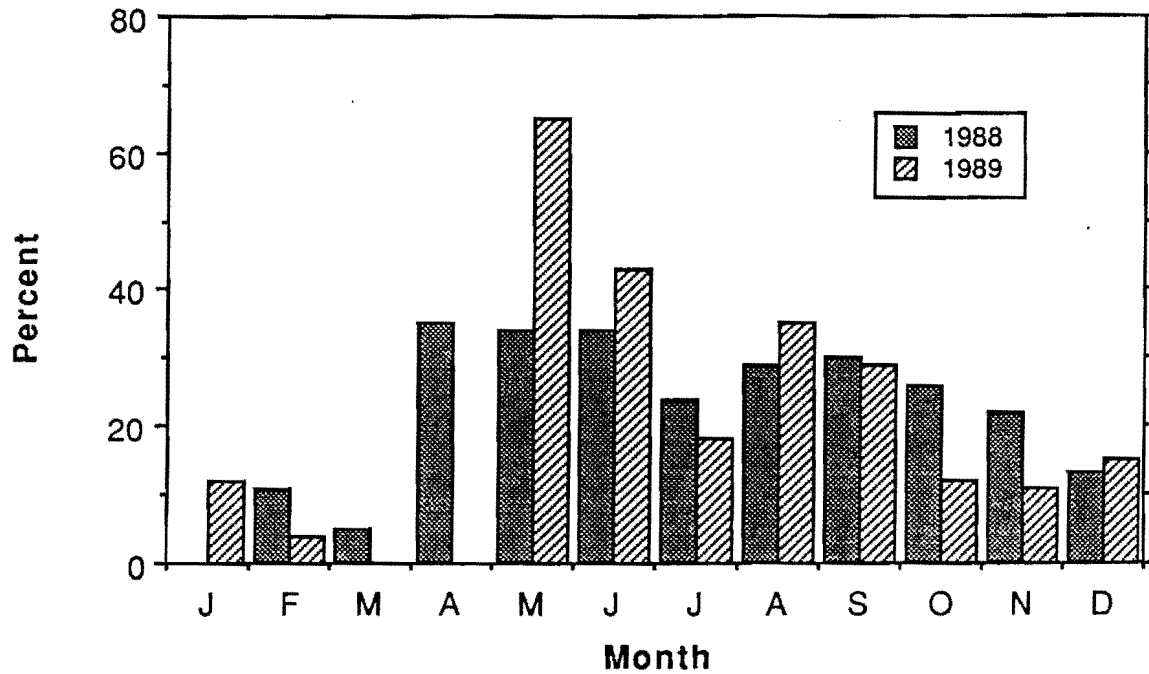


Figure 13. Percent of softshell crab by month in the Alsea Bay sport fishery, 1988-89.

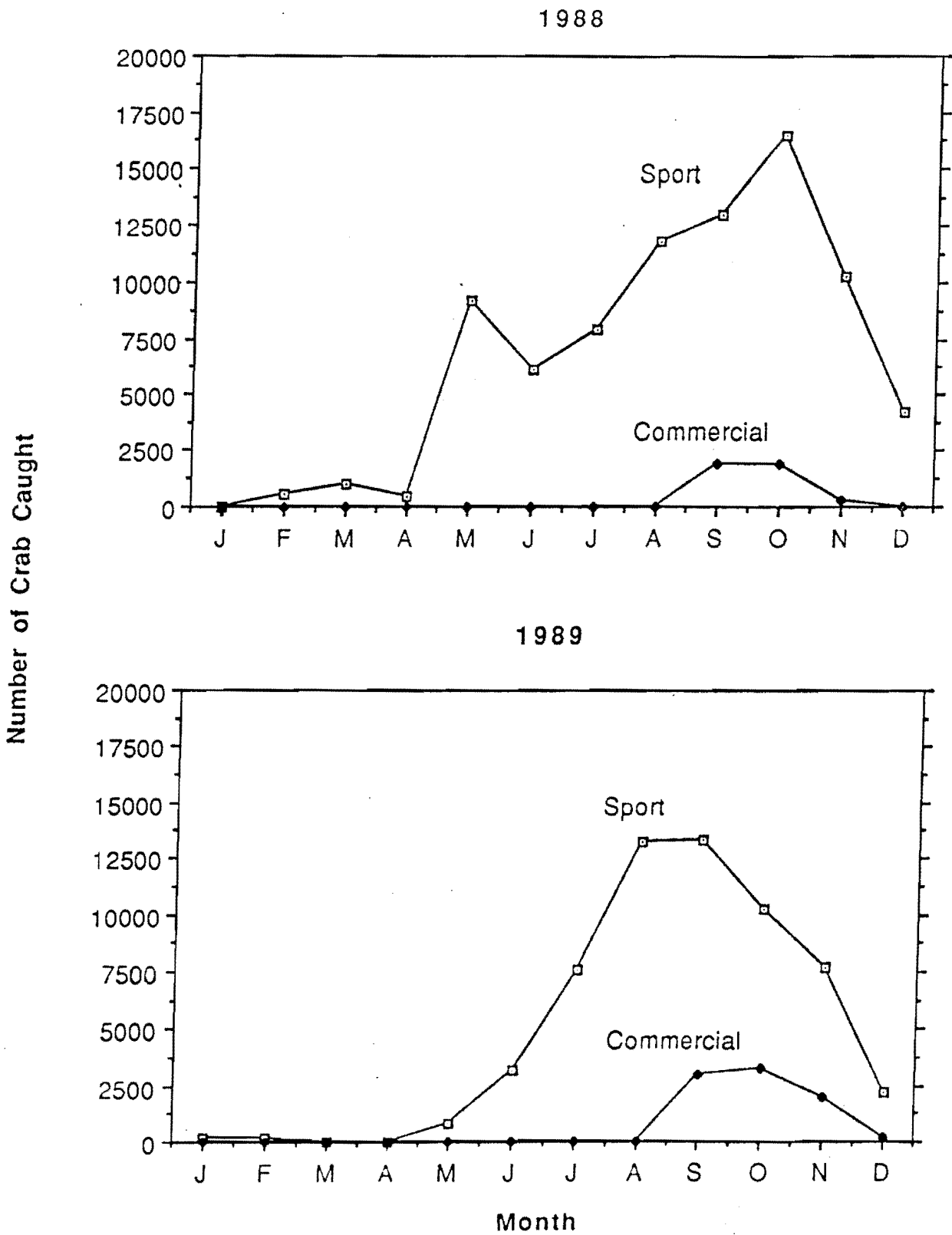


Figure 14. Number of sport and commercial crab caught by month in Alsea Bay, 1988-89.

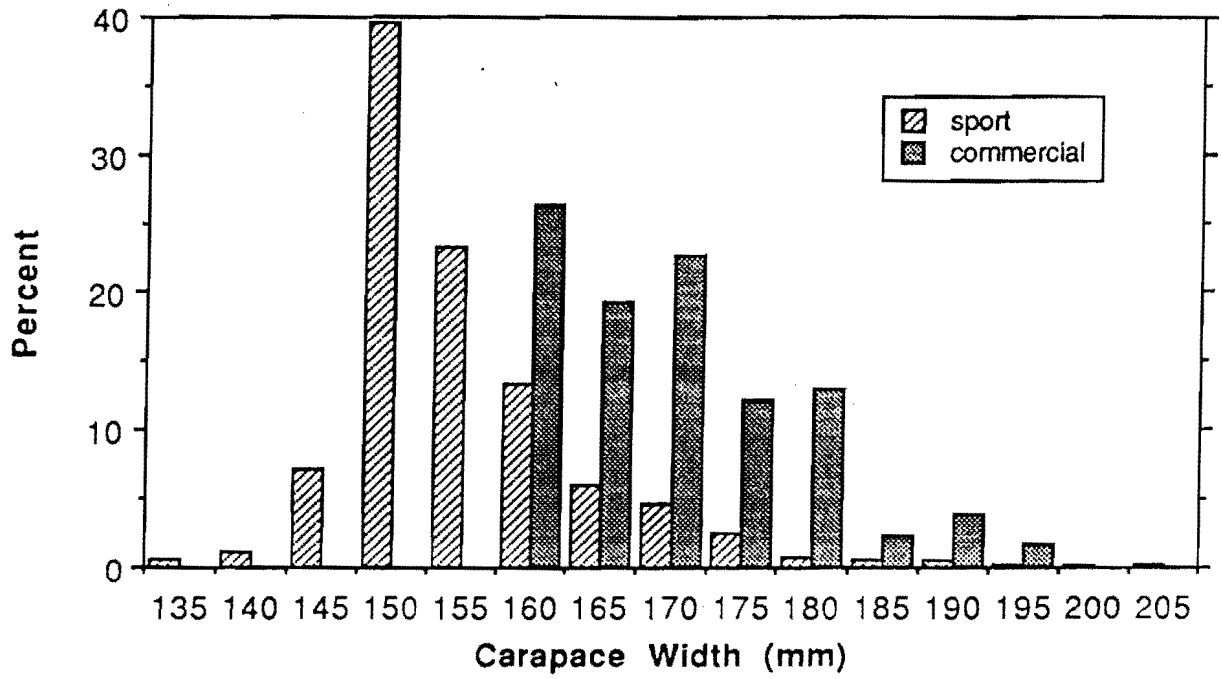


Figure 15. Carapace width (mm) in percent frequency of sport and commercially caught crab in Alsea Bay, 1989.

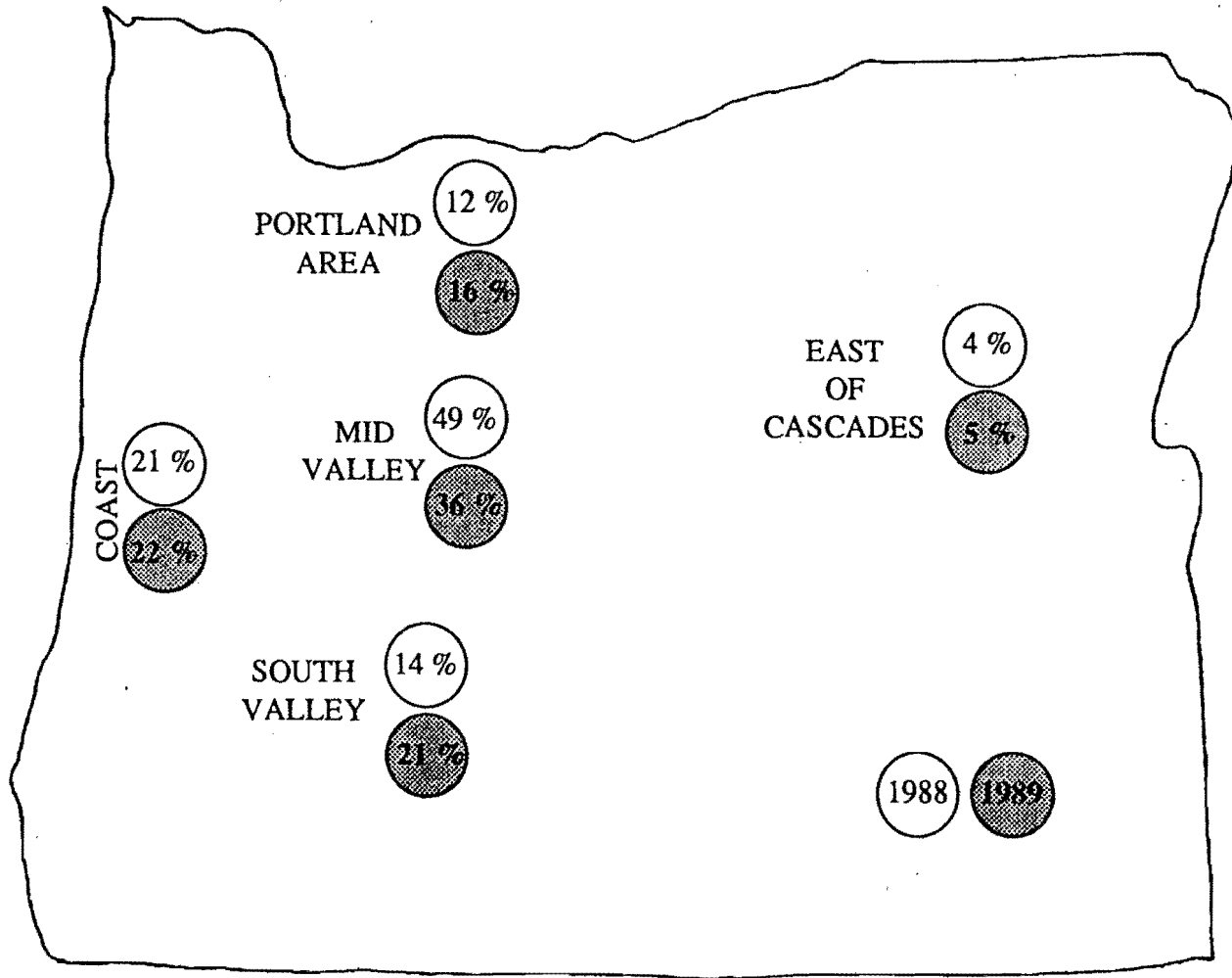


Figure 16. Percent distribution of Oregon zip codes, Alsea Bay sport crab fishery, 1988, 1989.

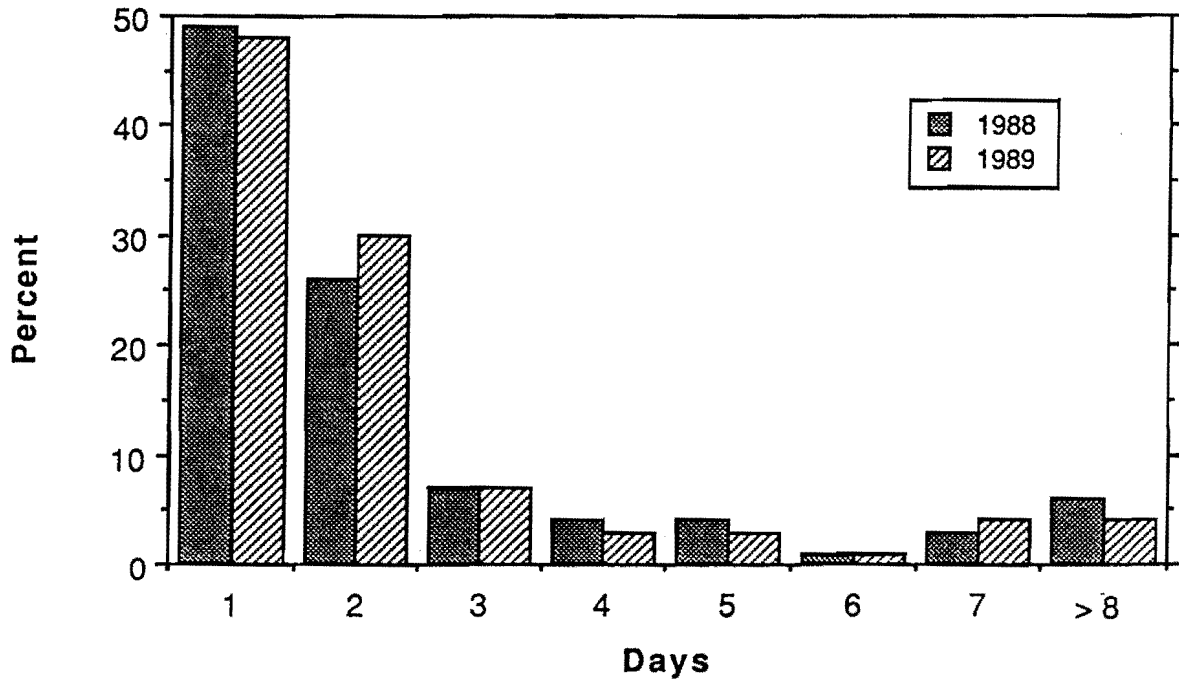


Figure 17. Percent frequency of days per sport crabbing trip in Alsea Bay, 1988-89.

Table 1. Commercial crab catch, effort and value, Alsea Bay, 1971-89.

Year	Pounds	Boats	\$ Value to Fishermen
1971	8,300	--	--
1972	1,500	--	--
1973	300	--	--
1974	--	--	--
1975	--	--	--
1976	--	--	--
1977	0	0	0
1978	606	1	600
1979	4,558	4	3,900
1980	11,718	8	9,200
1981	4,135	10	4,300
1982	6,764	12	5,400
1983	5,360	12	7,000
1984	1,825	11	2,700
1985	14,758	15	23,900
1986	10,052	15	20,100
1987	31,827	20	58,059
1988	8,273	20	16,211
1989	15,348	8	30,328
1990	15,325	--	33,151

Table 2. Type and number of crab gear used in Alsea Bay sport fishery, 1988-89.

Year	Pots	Rings	Average per party	Range
1988	16%	84%	4.0	1-10
1989	33%	67%	3.7	1-11

Table 3. Estimated effort for Oregon and out of state people, 1989.

Month	Oregon	Non-state	Total	% Non-state
January	448	45	493	9
February	354	0	354	0
March	261	130	391	33
April	522	87	609	14
May	870	125	995	13
June	1,795	206	2,001	10
July	3,664	587	4,251	14
August	3,647	511	4,158	12
September	3,417	435	3,852	11
October	2,828	216	3,044	7
November	1,750	232	1,982	12
December	1,378	44	1,422	3
Total	20,934	2,618	23,552	11

Table 4. States and countries represented in the Alsea Bay sport crab fishery, 1988, 1989.

Alaska	Indiana	Oregon
Arizona	Maryland	Pennsylvania
Arkansas	Massachusetts	Texas
California	Minnesota	Utah
Colorado	Missouri	Washington
Connecticut	Montana	Wisconsin
Georgia	Nebraska	Wyoming
Hawaii	Nevada	British Columbia
Idaho	New Jersey	Alberta
Illinois	New Mexico	

Table 5. Percent and number of noncrabbers by month, Alsea Bay, 1989.

Month	Percent	Number
Jan	16	79
Feb	8	28
Mar	38	148
Apr	6	37
May	22	219
Jun	17	340
Jul	12	510
Aug	9	374
Sep	14	539
Oct	10	304
Nov	14	277
Dec	5	71

Table 6. Economic parameters, Alsea Bay sport crab fishery, 1988, 1989.

	1988	1989
Destination Waldport	35%	84%
Type of trip:		
crab	52%	40%
combination	48%	60%
Primary purpose		
crabbing	20%	24%
Had license	78%	90%

Table 7. Summary of trip expenditures, 1989.

Item	%
Lodging	28
Food - store	26
Transportation	19
Food - restaurant	12
Equipment rental	9
Boat, gas, oil	5
Misc.	1

APPENDIX

TRIP EXPENDITURES

DATE _____

PORT _____

	Interview No.	Transportation	Lodging	Food - Stores	Food - Restaurant	Boat gas and oil	Equipment rental	Misc.
Coast								
Inland								
Coast								
Inland								
Coast								
Inland								
Coast								
Inland								
Coast								
Inland								
Coast								
Inland								

1/89

entered

checked

Appendix Table 2. Trip expenditure form.

Appendix Table 3. Estimated number of sport crabbers for boat and shore fisheries by month, Alsea Bay, 1988-89.

Month	1988			1989		
	Boat	Shore	Total	Boat	Shore	Total
January	-	-	-	321	172	493
February	741	455	1,196	222	132	354
March	1,212	602	1,814	189	202	391
April	611	441	1,052	288	321	609
May	1,733	856	2,589	618	377	995
June	1,562	891	2,453	1,275	726	2,001
July	2,173	1,084	3,257	2,418	1,833	4,251
August	2,948	1,530	4,478	2,172	1,986	4,158
September	2,852	1,138	3,990	2,430	1,422	3,852
October	2,821	851	3,672	1,968	1,076	3,044
November	1,528	1,034	2,562	1,263	719	1,982
December	1,088	781	1,869	918	504	1,422
Total	19,269	6,963	28,932	14,082	9,470	23,552

Appendix Table 4. Frequency of hours per trip 1988-89.

Hours	1988		1989	
	No. Parties	%	No. Parties	%
1	65	9	65	10
2	151	20	132	20
3	232	31	193	29
4	163	22	138	21
5	83	11	71	11
6	39	5	30	5
7	12	1	14	2
8	7	1	8	1
≥9	2	<1	4	1
Total	754	100	655	100
\bar{X} hrs/trip	3.3		3.2	

Appendix Table 5. Estimated number of crab caught by boat and shore fisheries by month, Alsea Bay 1988-89.

Month	1988			1989		
	Boat	Shore	Total	Boat	Shore	Total
January	-	-	-	192	7	199
February	519	32	551	133	5	138
March	970	42	1,012	0	0	0
April	367	88	455	29	0	29
May	9,012	171	9,183	742	38	780
June	5,623	446	6,069	2,805	436	3,241
July	7,606	325	7,931	7,012	550	7,562
August	10,908	918	11,827	10,860	2,383	13,243
September	12,549	455	13,004	11,664	1,706	13,370
October	16,080	340	16,420	9,446	753	10,199
November	9,626	620	10,246	7,073	575	7,648
December	3,917	234	4,151	2,111	101	2,212
Total	77,177	3,671	80,848	52,067	6,554	58,621

Appendix Table 6. Average crab catch per party by month, Alsea Bay, 1988-89.

Month	1988	1989
January	-	1.0
February	1.3	1.2
March	1.1	0.0
April	1.0	0.1
May	6.3	2.1
June	5.4	4.2
July	6.5	5.0
August	7.9	10.4
September	8.9	9.3
October	11.9	8.6
November	8.5	8.6
December	5.6	4.4

Appendix Table 7. Frequency of average catch of crab per person, Alsea Bay, 1989.

No. of Crabs	Percent
0	46
1	16
2	8
3	7
4	7
5	3
6	2
7	2
8	2
9	1
10	2
11	1
12	3

Appendix Table 8. Width frequency in percent of sport crab, Alsea Bay, 1988-89.

Carapace width (mm)	1988	1989
135	0.1	0.5
140	2.1	1.2
145	9.0	7.2
150	28.8	39.7
155	27.6	23.2
160	15.5	13.2
165	7.8	5.9
170	4.6	4.7
175	2.0	2.5
180	1.2	0.7
185	0.8	0.6
190	0.2	0.5
195	0	0.1
200	0	0.1
205	0	0.1

Appendix Table 9. Percent size frequency of sport and commercial crabs, Alsea Bay, 1989.

Carapace width (mm)	Sport %	Commercial %
135	0.5	
140	1.2	
145	7.2	
150	39.7	
155	23.2	
160	13.2	26.4
165	5.9	19.2
170	4.7	22.6
175	2.5	12.1
180	0.7	12.8
185	0.6	2.3
190	0.5	3.8
195	0.1	0.7
200	0.1	0
205	0.1	0

Appendix Table 10. Percent of sport crabs over 6 1/4 inches by month, Alsea Bay, 1988-89.

Month	1988	1989
January	-	12
February	10	4
March	9	0
April	9	0
May	16	26
June	13	26
July	12	16
August	17	18
September	24	34
October	31	47
November	28	44
December	30	35

Appendix Table 11. Ratio of crab over 6 1/4 inches per person by month, Alsea Bay sport crab fishery, 1988-89.

Month	1988	1989
January	-	4.4
February	4.7	1.5
March	3.7	0
April	3.2	0
May	18.8	9.2
June	15.5	24.3
July	18.3	16.5
August	30.5	30.0
September	44.6	47.4
October	75.8	61.5
November	54.6	113.2
December	34.5	44.9

Appendix Table 12. Average carapace width (mm) of sport crabs by month, Alsea Bay 1988-89.

Month	1988	1989
January	-	151
February	152	147
March	154	-
April	151	152
May	150	153
June	150	155
July	152	154
August	152	154
September	154	157
October	156	160
November	155	159
December	153	156
Mean	154	156

Note: Sport size limit is 146 mm.

Appendix Table 13. Percent sublegal sport crabs by month, Alsea Bay, 1988-89.

Month	1988	1989
January	-	19
February	16	44
March	6	0
April	22	0
May	12	16
June	20	3
July	9	8
August	15	11
September	12	8
October	5	4
November	10	3
December	17	7
Mean	11	7

Appendix Table 14. Percent softshell crab by month, Alsea Bay sport fishery, 1988-89.

Month	1988	1989
January	-	12
February	11	4
March	5	0
April	35	0
May	34	65
June	34	43
July	24	18
August	29	35
September	30	29
October	26	12
November	22	11
December	13	15
Mean	26	24

Appendix Table 15. Percent frequency of days per sport crabbing trip, Alsea Bay, 1988-89.

No. Days	1988	1989
1	49	48
2	26	30
3	7	7
4	4	3
5	4	3
6	1	1
7	3	4
8-90	6	4