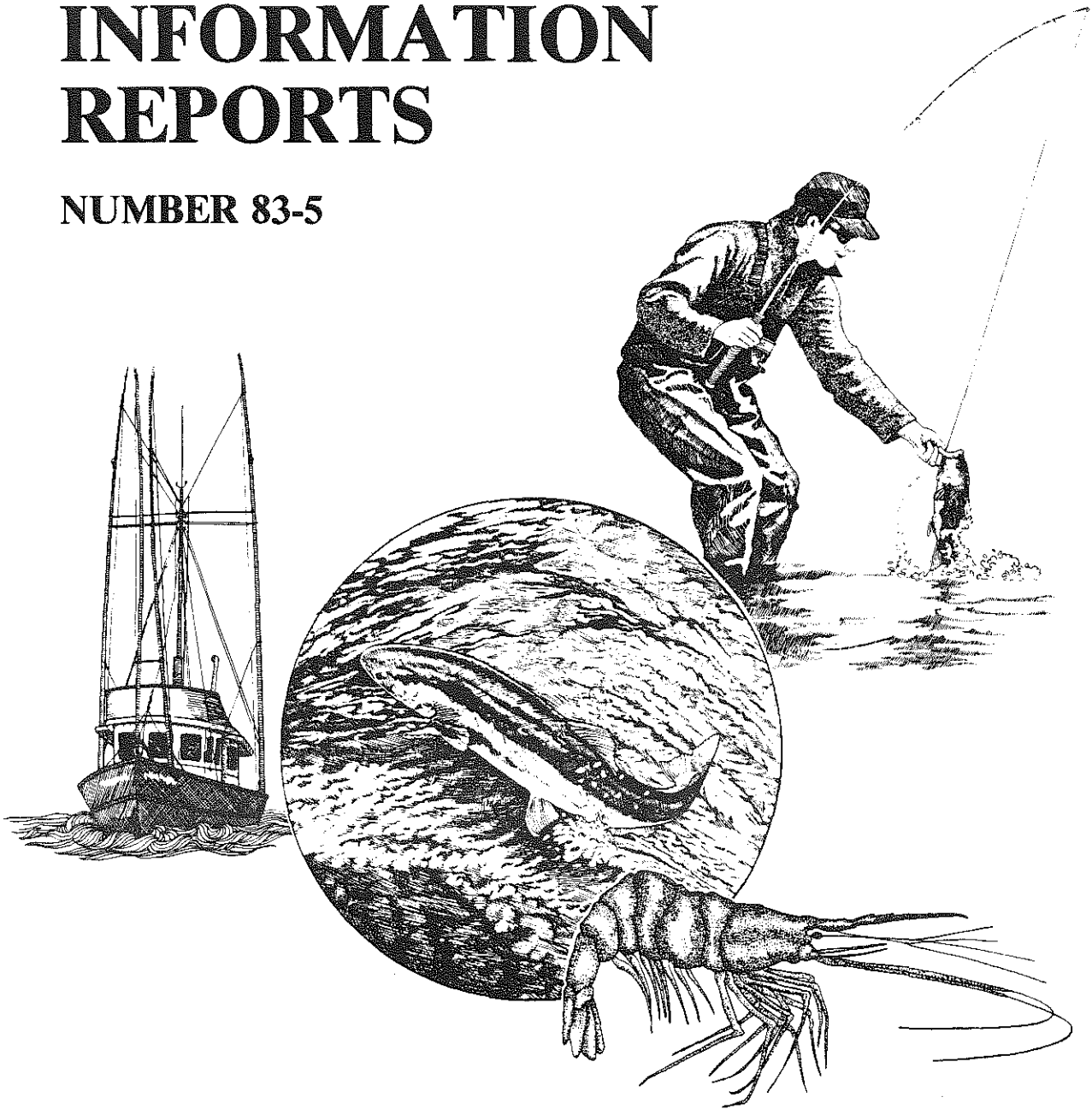


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INFORMATION REPORTS

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FISH DIVISION

Oregon Department of Fish and Wildlife
Shrimp Investigations

1982 OREGON SHRIMP FISHERY

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Shrimp Investigations
Report 83-5

Oregon Department of Fish and Wildlife
Marine Region
Newport, Oregon 97365

April 1983

INTRODUCTION

The ocean pink shrimp (Pandalus jordani) fishery statistics are obtained by the Department of Fish and Wildlife from logbooks, fish tickets and market samples. Monthly catch and effort statistics are developed from these sources. Also estimates of age composition and count per pound (grade) are calculated. Incidental groundfish landed catch is documented as well. No adequate estimate of bycaught rockfish species composition is available. Efforts begun in 1982 will continue in 1983 to estimate species composition of the shrimp trawl incidental catch of rockfish. The data provided in this report summarize results of work in 1982.

1982 OREGON SHRIMP SEASON

Catch and Effort

Oregon pink shrimp (Pandalus jordani) landed catch in 1982 totaled 18.5 million pounds (8,370 mt), 28.6% less than the 25.9 million pounds (11,756 mt) landed in 1981 (Figure 1). For the first time since 1979 Coos Bay was not the highest production port. Astoria had the highest total landings, 6.2 million pounds (2,827 mt) which represented a decrease of 22.7% from 1981. Coos Bay and Newport landings were down 31.8% and 36.7% respectively from 1981 (Table 1).

Table 1. Annual Shrimp Landings at Oregon Ports 1979-82 in Thousands of Pounds. 1/

Port	1979	1980	1981	1982
Astoria	7,647	9,225 2/	8,061	6,232
Garibaldi	1,473	1,116	1,312	928
Newport	7,124	6,311	7,000	4,433
Winchester Bay	821	690	348	331
Coos Bay	9,131	10,466	8,126	5,543
Port Orford	22	64	4	-
Gold Beach	42	-	2	-
Brookings	3,327	2,280	1,065	995
Total	29,587	30,152	25,918	18,462

1/ Figures represent only the shrimp poundage landed at each port, not the poundage that was processed (Some was trans-shipped to other ports).

2/ Includes 207.9 thousand pounds caught of southeast Alaska.

A total of 164 vessels landed shrimp in Oregon in 1982, 85 fewer than in 1981 (Table 2, Figure 2). The number of out-of-state vessels decreased from 44 in 1981 to 19 in 1982. Coos Bay experienced the largest decline in fleet size from 125 vessels in 1981 to 74 in 1982 while still accomodating the largest portion of the fleet.

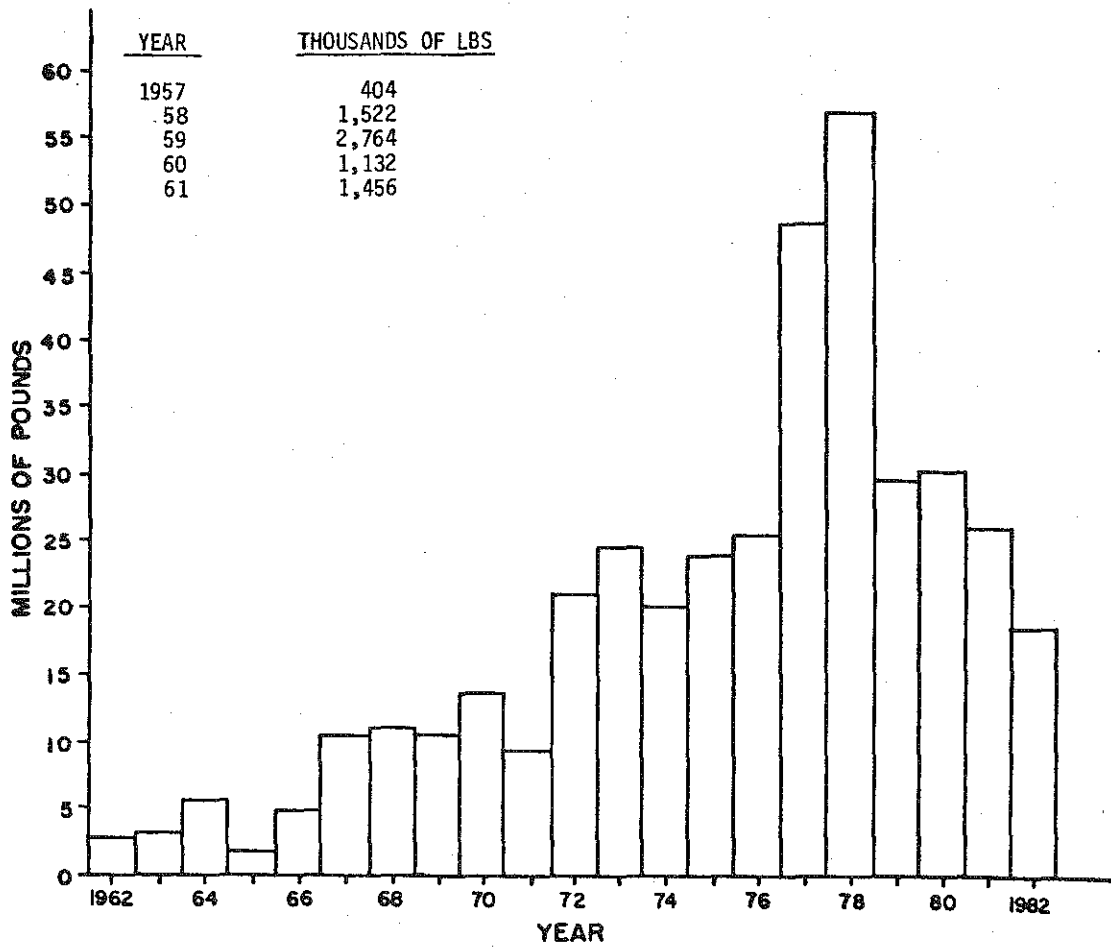


Figure 1. Annual Oregon Shrimp Landed Catch, 1957-1982.

Table 2. Number of Vessels Delivering Shrimp into Oregon by Port, 1981-82.

Port	Home Port		Oregon Trans		1/Out-of-State		Total	
	1981	1982	1981	1982	1981	1982	1981	1982
Astoria	38	27	30	22	13	8	81	57
Garibaldi	15	8	8	11	1	-	24	19
Newport	58	42	8	6	4	-	70	48
Win. Bay	6	4	6	5	-	-	12	9
Coos Bay	68	52	32	15	25	7	125	74
Bandon	-	-	1	-	-	-	1	-
Port Orford	1	-	1	-	-	-	2	-
Gold Beach	-	-	1	-	-	-	1	-
Brookings	19	12	4	2	12	4	35	18
Total Oregon	205	145						
Out-of-State								
California	31	11						
Washington	13	8						
Total Vessels Delivering to Oregon ports <u>2/</u>	249	164						

1/ Oregon vessels which delivered to ports other than their home port.

2/ Oregon double-rig count is 108 for 1982.

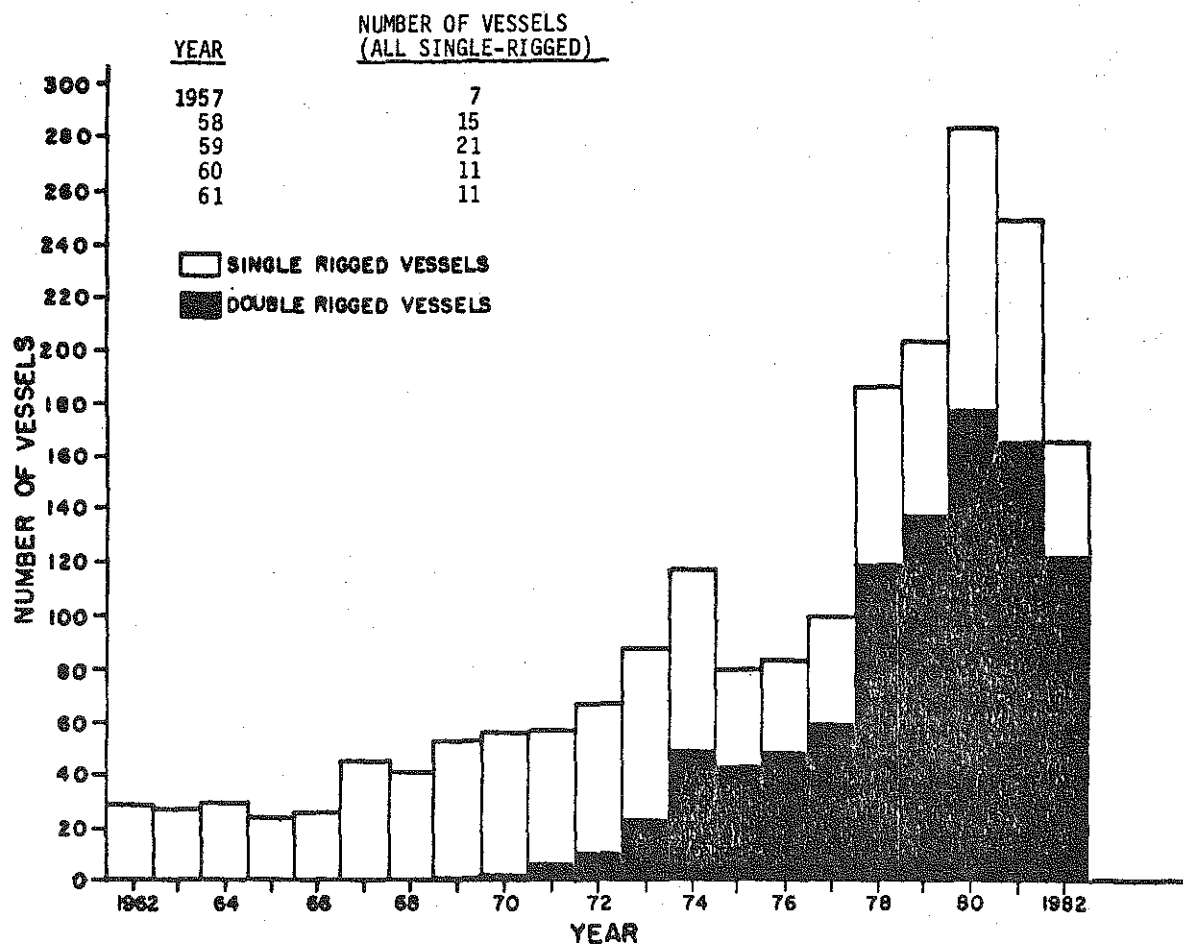


Figure 2. Annual Number of Shrimp Vessels by Gear, 1957-1982.

Landed catch, and catch per unit effort (CPUE) were highest in May when 4.8 million pounds (2,165 mt) were caught at an average rate of 249.8 lbs/hr in single rig equivalents (SRE) (Table 3, Table 4). Effort peaked in July at 19,675 hours (SRE), and then declined through the remainder of the season. The greatest annual amount of effort and catch was expended in Area 22 "Mudhole" where 26,675 hours (SRE) yielded 6.2 million pounds (2,801 mt) (Table 5).

Other important areas were State Statistical Area 21 (Cape Blanco bed), 28 (Tillamook Head), and 32 (Destruction Island) which produced 2.6, 2.8, and 3.2 million pounds from 14,864, 19,084, and 15,577 hours (SRE) respectively (Figure 3, Table 5). The best annual CPUE's did not occur in areas of high production. Areas 18 (Oregon-California border south) and 20 (Rogue River to Cape Blanco) had the highest CPUE at 324 and 256 lbs/hr (SRE) respectively, but were also the lowest production areas with the exception of Area 29 (Columbia River to Willapa Bay) from which only 600 pounds were produced in 1982.

Market Conditions

Processors in 1982 decreased by one for a total of 20. The number of peeler machines used dropped from 68 in 1981 to 65 in 1982. The season opened with an ex-vessel price for shrimp at 52 cents per pound after lengthy price negotiations which lasted until mid-April. During June processors paid 30-40 cents per pound for shrimp smaller than 150-160 shrimp per pound, and 50 cents per pound for larger grade shrimp. From July through September the ex-vessel price ranged from 50-60 cents per pound. By October almost all deliveries were purchased at 60 cents per pound, with a few deliveries at 55 cents per pound.

Table 3. Oregon Monthly Shrimp Landed Catch, in Thousands of Pounds, and Catch-Per-Effort (Hours) by Statistical Area for Single-rigged and Double-rigged Vessels.

State Area	April	May	June	July	Aug.	Sept.	Oct.	Total
32C	1/195.2	414.9	565.2	270.4	890.7	760.6	80.4	3,177.4
C/E1	2/179.2	321.1	0	0	0	123.3	0	225.1
C/E2	3/287.3	377.6	296.5	321.9	339.0	328.0	299.1	326.2
30C	110.7	114.1	271.5	363.9	144.4	237.4	107.8	1,349.8
C/E1	0	0	0	0	0	0	0	0
C/E2	222.9	255.9	177.7	224.9	158.8	240.3	221.8	208.6
29C	0.4	0	0	0	0	0	0.2	0.6
C/E1	0	0	0	0	0	0	0	0
C/E2	24.5	0	0	0	0	0	14.4	16.8
28C	407.8	813.7	500.1	582.3	64.4	62.9	388.0	2,819.2
C/E1	0	0	0	327.8	0	0	150.5	199.0
C/E2	317.0	295.7	192.1	228.8	124.0	153.3	211.8	236.1
26C	94.3	68.1	432.5	266.3	166.7	15.4	0.1	1,043.4
C/E1	82.3	0	0	202.4	83.8	20.6	0	96.3
C/E2	114.2	108.2	216.6	185.3	125.0	124.0	3.2	163.7
24C	23.4	41.7	9.6	2.4	0.2	193.8	6.3	277.4
C/E1	65.7	24.4	41.8	182.3	0	157.9	0	116.8
C/E2	111.1	150.9	63.7	0	4.8	390.3	63.1	214.2
22C	540.6	2,823.6	797.7	1,348.5	466.8	171.2	26.2	6,174.6
C/E1	157.1	209.3	219.1	182.0	75.3	115.8	79.2	180.0
C/E2	451.8	544.2	320.5	394.7	162.9	180.5	121.3	378.8
21C	414.3	192.7	198.3	794.0	665.3	231.4	120.4	2,616.4
C/E1	188.8	85.0	85.0	225.8	120.0	0	0	167.2
C/E2	341.9	385.1	316.0	345.4	264.0	164.5	233.0	283.8
20C	0	31.9	49.7	85.4	8.5	0	0	175.5
C/E1	0	280.1	0	167.1	0	0	0	192.4
C/E2	0	845.5	803.5	331.4	177.3	0	0	437.3
19C	146.7	272.3	14.2	0	91.8	18.1	7.0	550.1
C/E1	136.4	188.7	0	0	0	0	0	159.5
C/E2	518.0	400.9	107.0	0	461.2	454.9	344.9	398.4
18C	81.4	1.0	80.8	48.4	60.4	5.3	0.3	277.6
C/E1	360.6	35.9	258.5	0	182.1	413.8	0	252.3
C/E2	1,239.1	0	691.7	1,143.3	255.1	0	43.2	575.0
Totc	2,014.8	4,774.0	2,919.6	3,761.6	2,559.2	1,696.1	736.7	18,462.0
C/E1	176.9	195.3	201.3	209.8	112.4	139.8	101.9	175.7
C/E2	313.0	406.6	247.8	299.2	226.4	251.7	212.0	287.6

1/ C is total catch in thousands of pounds.

2/ C/E1 is average catch per hour effort (in lbs) for single-riggers.

3/ C/E2 is average catch per hour effort (in lbs) for double-riggers.

Table 4. Catch (in Thousands of Pounds), Hours of Effort Expended, and CPUE in the 1981 Shrimp Fishery by Month.

	Month							Total
	April	May	June	July	Aug.	Sept.	Oct.	
SINGLE RIG								
CATCH	210.4	273.2	144.3	224.0	115.6	29.8	14.7	1012.0
EFFORT	1189.1	1399.1	717.0	1067.7	1028.3	213.3	143.8	5758.3
CPUE	176.9	195.3	201.3	209.8	112.4	139.8	101.9	175.7
DOUBLE RIG								
CATCH	1804.4	4500.9	2775.2	3537.6	2443.6	1666.2	722.1	17450.0
EFFORT	5765.3	11069.0	11199.7	11822.4	10793.0	6620.0	3406.4	60675.8
CPUE	313.0	406.6	247.8	299.2	226.4	251.7	212.0	287.6
TOTAL								
CATCH	2014.8	4774.1	2919.5	3761.6	2559.2	1696.0	736.8	18462.0
EFFORT (SRE)	10413.6	19109.5	18636.5	19983.5	18297.1	10805.3	5594.0	102839.0
CPUE (SRE)	193.5	249.8	156.6	188.2	139.9	157.0	131.7	179.3

(SRE) = Single Rig Equivalent

1982 2

Table 5. Catch (in Thousands of Pounds), Hours of Effort Expended, and CPUE in the 1981 Shrimp Fishery by State Statistical Area.

STATE AREAS NORTH OF CAPE PERPETUA							
	32	30	29	28	26	24	TOTAL
SINGLE RIG							
CATCH	19.0	0	0	13.8	11.9	10.4	55.1
EFFORT	84.6	0	0	69.2	123.5	89.4	366.7
CPUE	224.6	0	0	199.4	96.4	116.3	150.3
DOUBLE RIG							
CATCH	3158.3	1349.8	0.6	2805.4	1031.2	266.9	8612.2
EFFORT	9682.7	6471.3	35.3	11884.5	6301.9	1245.9	35621.6
CPUE	326.2	208.6	17.0	236.1	163.6	214.2	241.8
TOTAL							
CATCH	3158.3	1349.8	0.6	2819.2	1043.1	277.4	8667.3
EFFORT (SRE)	15576.9	10354.1	56.5	19084.4	10206.5	2082.8	57361.3
CPUE (SRE)	202.8	130.4	10.6	147.7	102.2	133.2	151.1

Table 5 (Continued)

STATE AREAS SOUTH OF CAPE PERPETUA						
	22	21	20	19	18	TOTAL
SINGLE RIG						
CATCH	440.4	333.2	29.1	82.5	71.7	956.9
EFFORT	2446	1993	151.2	517.2	284.2	5391.6
CPUE	180	167.2	192.5	159.5	252.3	177.5
DOUBLE RIG						
CATCH	5734.2	2283.2	146.4	467.7	205.8	8837.3
EFFORT	15142.9	8044.6	334.8	1174	357.9	24719.4
CPUE	378.7	283.8	437.3	398.4	575	352.7
TOTAL						
CATCH	6174.6	2616.4	175.5	550.2	277.5	9794.2
EFFORT (SRE)	26674.6	14864.4	686.9	2395.6	856.8	45478.3
CPUE (SRE)	231.5	176	255.5	229.7	323.9	215.4

(SRE) = Single Rig Equivalent

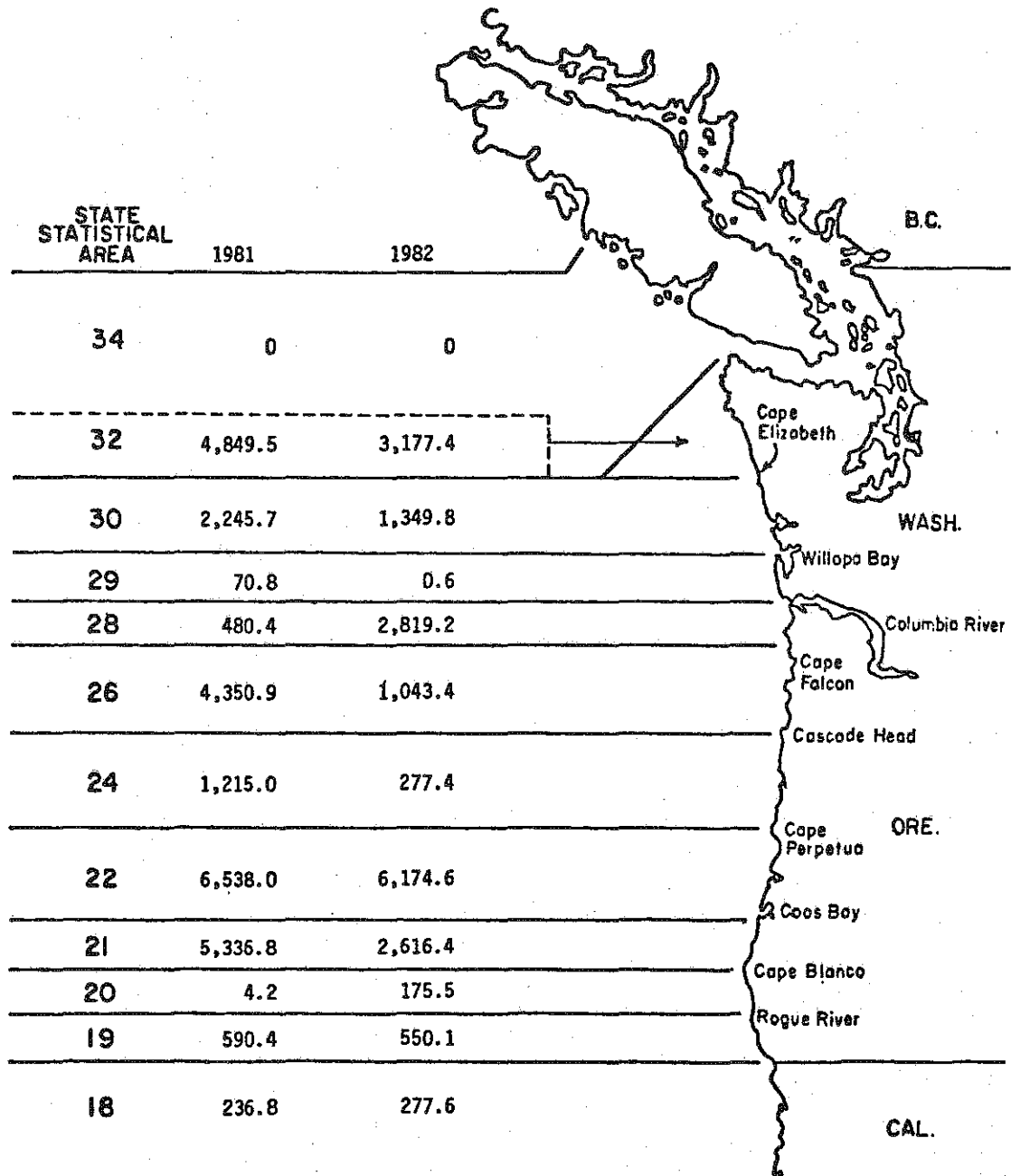


Figure 3. Oregon 1981 and 1982 Landed Catch of Shrimp, in Thoudands of Pounds, by Oregon Statistical Area of Catch.

Market Samples

Sample data analyses indicate the largest shrimp were caught during June in State Area 24 (Cape Perpetua to Cascade Head) at 68 shrimp per pound (Table 6). The smallest shrimp recorded were caught in State Area 21 (Cape Blanco bed) during June at 247 shrimp per pound. Age composition of landings in Oregon (by number of shrimp) was 0.6% zero-age shrimp, 74.2% age 1, 21.6% age 2, and 3.6% age 3+.

Incidental Groundfish Catch

Incidentally caught groundfish landed catch totaled 1.9 million pounds (866 mt) in 1982, down 14% from the 2.2 million pounds (1000 mt) landed in 1981. Rockfish was the major component of the incidental catch at 1.5 million pounds (682 mt), and was largely composed of yellowtail rockfish (Sebastes flavidus). Dover sole and lingcod landed catch totaled 127 (58 mt) and 106 (48 mt) thousand pounds respectively (Table 7). State areas 28, 22 and 32 were the top three producers of incidental catch at 435 (197 mt), 360 (163 mt) and 345 (157 mt) thousand pounds respectively.

PACIFIC COAST

Catch and Effort

Pacific coast 1982 landed catch of pink shrimp reached 39.9 million pounds (18,085 mt), a 42% decrease from the 68.9 million pounds (31,274 mt) landed in 1981 (Table 8), and the lowest total Pacific coast landings since 1966 when 36.1 million pounds (16,375 mt) were delivered, including Alaska and British Columbia.

Total catch for Oregon, Washington, and California in 1982 was 27.7 million pounds (12,550 mt), 30% less than the combined total of 39.6 million pounds (17,986 mt) landed in 1981 (Figure 4).

2

Table 6. Oregon 1981 Monthly Shrimp Age Composition (by number),
Count per Pound, and Number Sampled by State Statistical
Area. 1/

State Area	Age	April	May	June	July	Aug.	Sept.	Oct.
32	1	14.0	42.4	62.8	72.2	82.2	84.5 2/	-
	2	70.7	57.6	35.0	26.7	16.9	16.9	-
	3+	15.3	0	2.2	1.1	0.9	1.2	-
	Ct	119.7	206.7	169.3	167.8	161.9	147.7	-
	N	629	132	1405	663	1194	562	-
30	1	23.0	58.0	39.2	45.5	83.9	58.5	67.0
	2	52.0	34.6	41.5	44.0	15.3	23.7	24.2
	3+	25.0	7.4	19.3	10.5	0.8	17.8	8.8
	Ct	111.4	170.4	110.5	113.3	131.5	115.1	105.4
	N	710	474	492	373	380	258	215
28	1	48.6	43.7	59.7	84.5	-	73.4	78.2
	2	34.0	37.2	30.1	11.1	-	17.4	18.3
	3+	17.4	19.1	10.2	4.4	-	9.2	3.5
	Ct	117.8	107.8	129.6	138.3	-	103.5	98.1
	N	1047	538	375	251	-	109	547
26	1	24.5	86.3	75.1	63.2	81.6	-	-
	2	40.4	11.4	19.4	20.8	15.9	-	-
	3+	35.1	2.3	5.5	16.0	2.5	-	-
	Ct	85.4	199.4	140.1	103.9	114.8	-	-
	N	371	176	736	125	201	-	-
24	1	12.3	34.9	4.3	-	-	-	-
	2	53.6	39.7	55.9	-	-	-	-
	3+	34.1	25.4	39.8	-	-	-	-
	Ct	78.3	90.2	67.7	-	-	-	-
	N	138	453	118	-	-	-	-
22	1	61.9	87.7	89.8	84.9 3/	78.2	76.3	82.4
	2	28.6	10.9	8.2	3.5	13.5	8.3	8.4
	3+	9.5	1.4	2.0	3.1	8.3	15.4	9.2
	Ct	134.5	167.9	146.4	137.6	113.0	98.6	91.3
	N	378	495	882	515	423	410	142
21	1	68.6	92.1	97.4	93.6	98.6	95.0	87.6
	2	28.6	5.2	2.0	6.4	1.4	4.2	8.1
	3+	4.8	2.7	0.6	0	0	0.8	4.3
	Ct	155.0	180.5	247.1	163	155.2	132.0	103.0
	N	920	630	153	205	210	401	210

Table 6. Continued

State Area	Age	April	May	June	July	Aug.	Sept.	Oct.
20	1	-	-	-	93.7	96.0	-	-
	2	-	-	-	5.0	3.5	-	-
	3+	-	-	-	1.3	0.5	-	-
	C†	-	-	-	131.1	126.9	-	-
	N	-	-	-	399	400	-	-
19	1	7.4	45.5	-	81.0	86.3	99.2	-
	2	64.5	46.5	-	17.0	12.2	0.8	-
	3+	28.1	8.0	-	2.0	1.5	0	-
	C†	90.8	103.3	-	118.6	105.5	103.2	-
	N	299	101	-	400	400	398	-
18	1	-	-	98.0	-	-	-	-
	2	-	-	1.5	-	-	-	-
	3+	-	-	0.5	-	-	-	-
	C†	-	-	172.0	-	-	-	-
	N	-	-	200	-	-	-	-

- 1/ Due to low effort, no market samples were collected in Area 29.
 2/ Zero-age shrimp comprised 0.4 percent of the catch.
 3/ Zero-age shrimp comprised 8.5 percent of the catch.

Table 7. Oregon 1982 incidental groundfish catch in pounds by State statistical area.

Species	State Area											Total
	32	30	29	28	26	24	22	21	20	19	18	
English sole	219	267	7	1,604	159	-	757	110	1	36	30	3,190
Petrale sole	162	687	7	2,574	453	6	2,878	217	28	19	-	7,031
Dover sole	23,374	11,407	15	19,737	14,799	356	29,132	15,620	2,431	10,506	-	127,377
Rex sole	1,958	1,242	-	4,829	1,259	3	136	-	-	-	100	9,527
Arrowtooth flnd	20,456	3,713	-	3,080	231	1,494	29	2	-	-	-	29,005
Flathead sole	412	212	58	589	302	3	-	-	-	-	190	1,766
Other flatfish	-	3	-	25	-	-	-	-	-	1	-	29
Pac. true cod	1,769	1,232	-	690	66	-	-	-	-	-	-	3,757
Lingcod	32,127	22,140	201	10,105	2,250	158	26,501	3,954	2,489	6,363	28	106,316
Sablefish	40,601	11,892	339	14,469	6,384	1,822	3,272	1,408	734	5,396	-	86,317
Pac. ocean perch	4,770	498	2	530	7,572	-	154	35	-	-	-	13,561
Other rockfish	219,575	203,549	14,557	376,764	73,035	16,590	288,276	233,835	37,260	21,639	19,517	1,504,597
Misc. species	57	92	7	101	-	7,567	8,731	-	-	23	48	16,626
Total Landings	345,480	256,934	15,193	435,097	106,510	27,999	359,866	255,181	42,943	43,983	19,913	1,909,099

Washington shrimp landings totaled 5.0 million pounds (2,266 mt), or 50% less than the 1981 total of 10.1 million pounds (4,561 mt) and the lowest total since 1973 when 5.3 million pounds (2,391 mt) were landed. Vessels fishing off Washington landed 4.5 million pounds (2,041 mt) in Oregon, or 24% of Oregon's total landings. Both the Destruction Island grounds (State Area 32), and the Gray's Harbor bed (State Area 30) showed decreased production declining 33% to 3.2 million pounds (1,452 mt), and 41% to 1.3 million pounds (590 mt) respectively.

California was the only state or province to show an increase in landings over 1981. Landings were up 10.5% from 3.7 million pounds (1,678 mt) in 1981, to 4.2 million pounds (1,905 mt) in 1982. Vessels fishing off California (State Area 18) landed only 0.3 million pounds (126 mt) in Oregon.

Total fishing effort in SRE continued to decline in 1982 to 152 thousand hours (Figure 5). In 1981 total effort was 209 thousand hours SRE. Oregon and California effort declined while California effort increased slightly.

The combined CPUE for the three states was 183 lbs/hr (SRE), continuing a trend of reduced CPUE from 202 and 190 lbs/hr (SRE) in 1980 and 1981 respectively. Catch per unit effort was 180, 161, and 274 lbs/hr (SRE) in Oregon, Washington, and California respectively, for shrimp caught in waters adjacent to each state.

Table 8. Annual Landed Catch of Shrimp by State, Province and Entire Pacific Coast 1957-1982 (in Thousands of Pounds). 1/

Year	Alaska	Br. Columbia	Washington	Oregon	California	Total
1957	2,380	1,598	2,384	404	1,374	8,140
1958	7,862	1,960	6,531	1,522	1,729	19,604
1959	13,052	1,039	2,943	2,764	1,785	21,583
1960	7,436	1,678	1,781	1,132	2,019	14,046
1961	15,981	1,206	1,437	1,456	2,003	22,083
1962	16,943	1,624	1,367	2,750	1,783	24,467
1963	15,127	1,788	956	3,115	2,093	23,079
1964	7,727	1,052	314	5,477	968	15,538
1965	16,819	1,755	23	1,748	1,421	21,766
1966	28,193	1,682	283	4,751	1,187	36,096
1967	41,813	1,696	1,029	10,374	1,408	56,320
1968	42,023	1,566	1,164	10,976	2,270	57,999
1969	47,851	2,119	1,425	10,505	2,948	64,848
1970	74,256	1,538	926	13,735	4,048	94,503
1971	94,891	735	678	9,291	3,081	108,676
1972	83,830	794	1,582	20,861	2,434	109,501
1973	119,964	1,729	5,271	24,517	1,240	152,720
1974	108,275	2,644	9,325	19,968	2,338	142,550
1975	98,535	1,728	10,167	23,893	4,993	139,316
1976	129,011	7,723	9,261	25,392	3,400	174,787
1977	116,891	6,176	11,803	48,580	15,633	199,083
1978	73,293	3,460	12,298	56,997	13,163	159,211
1979	50,916	1,578	12,135	29,579	4,922	99,130
1980	52,568	1,500	12,629	30,152	5,050	101,899
1981	28,029	1,841	10,055	25,918	3,673	69,516
1982	11,042	1,160	4,999	18,462	4,207	39,870

1/ Primarily Pandalus sp. from PMFC Crab & Shrimp Data Series and conversation with state and provincial authorities.

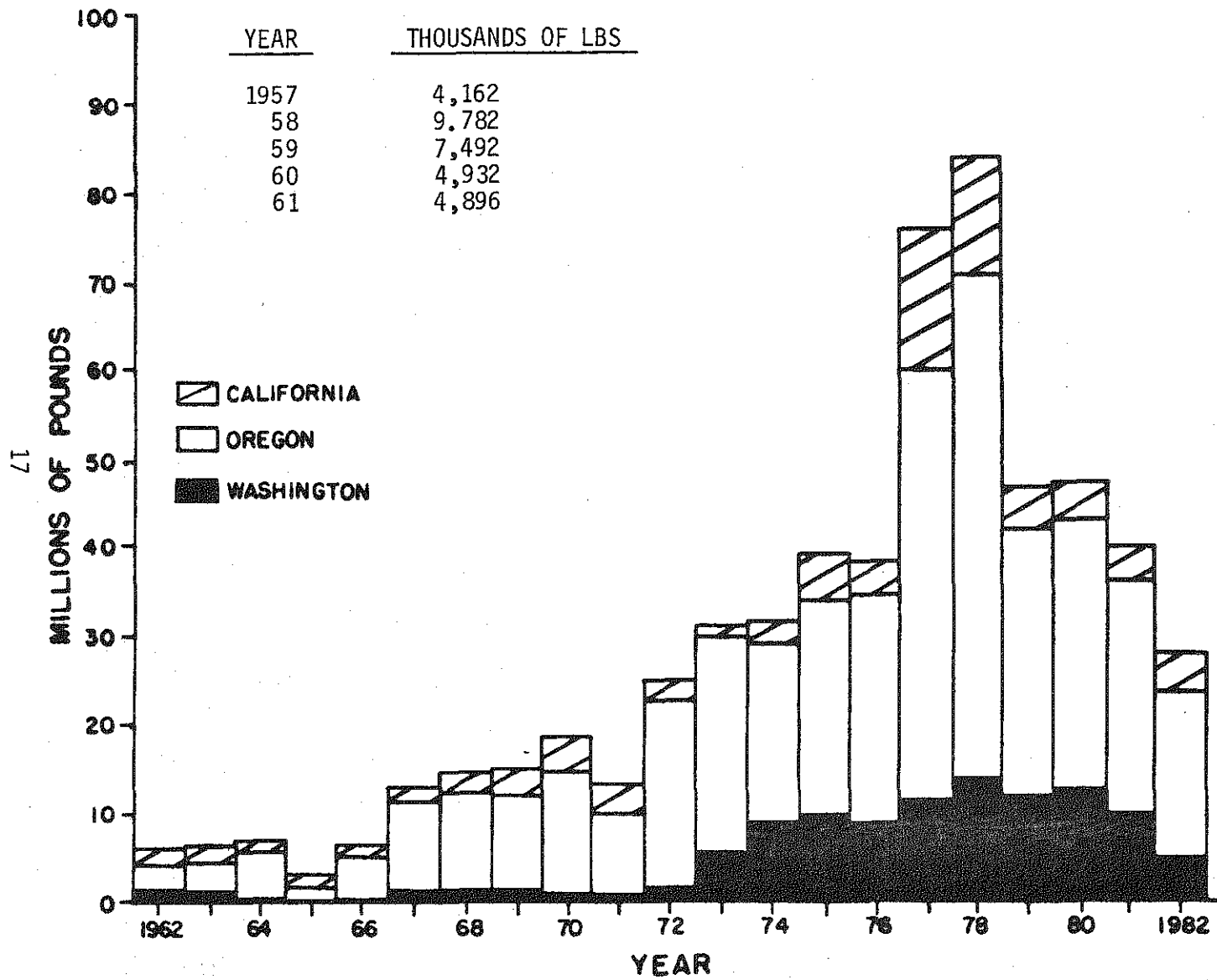


Figure 4. Pink Shrimp Landed Catch by State, 1957-1982.

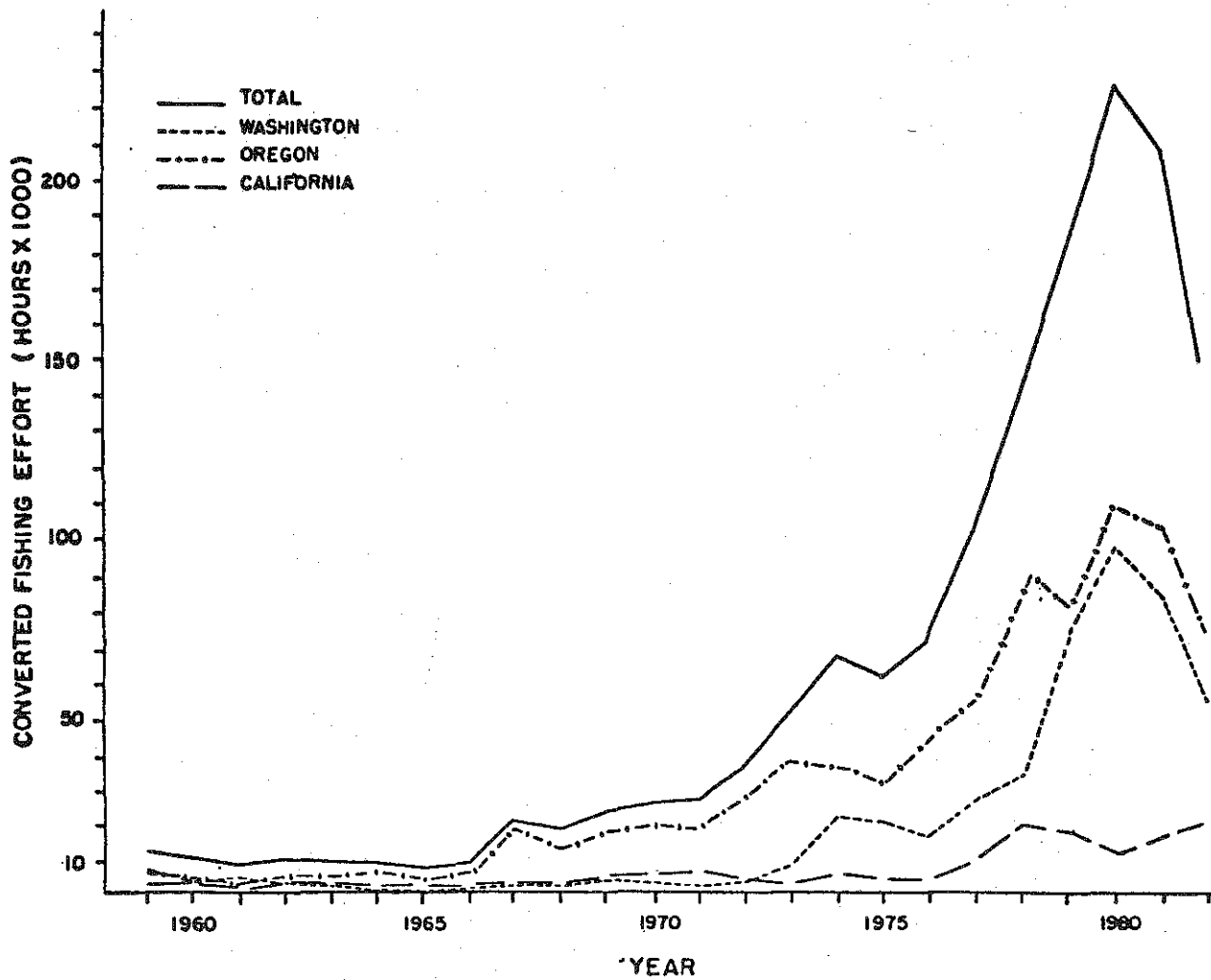


Figure 5. Converted Fishing Effort (in Hours) for Pink Shrimp by U.S. Vessels Coastwide and by State in Adjacent Waters.

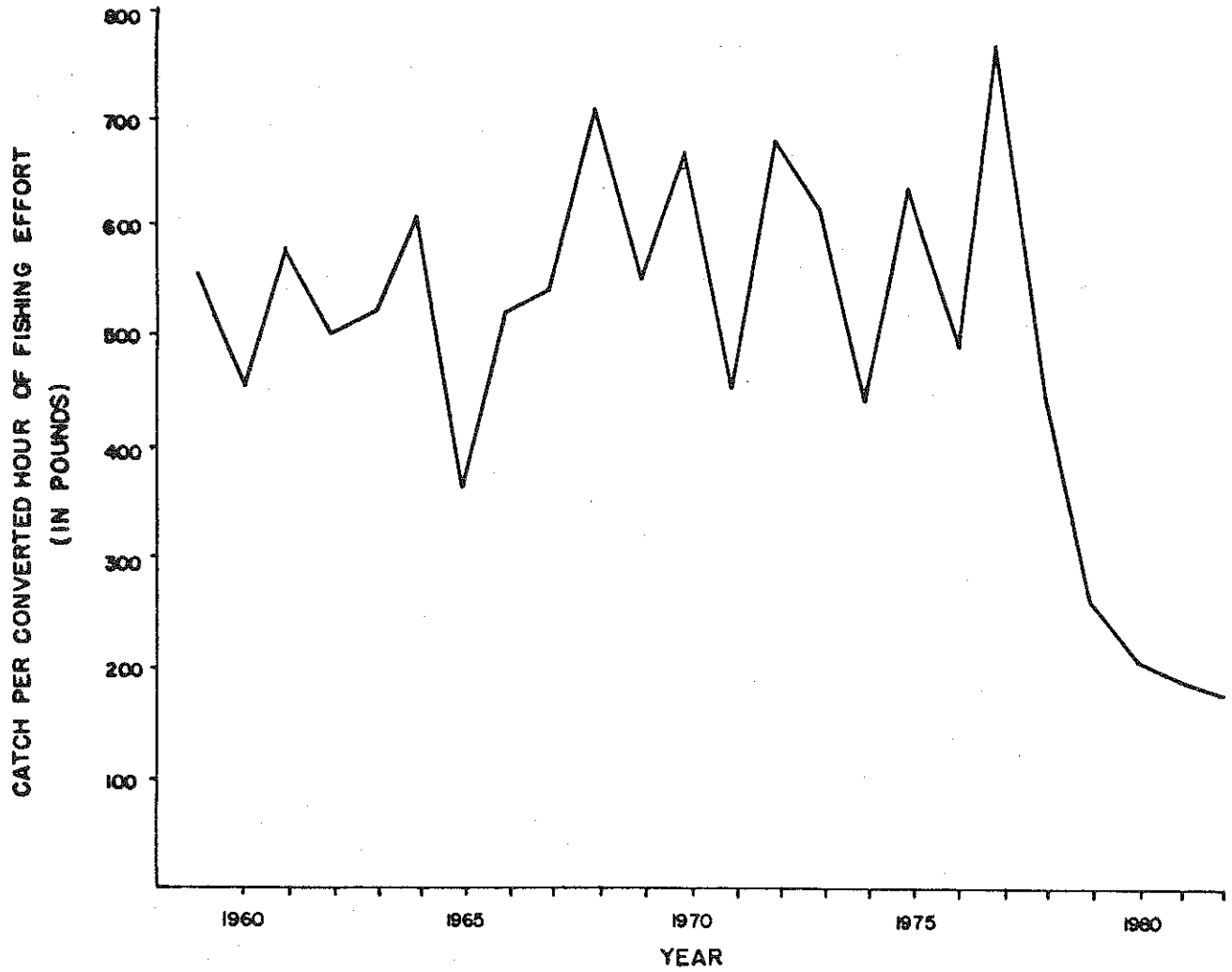


Figure 6. Washington, Oregon, and California Pink Shrimp Landed Catch Per Hour, 1960-1982. Fishing Effort Adjusted to Single-Rig Equivalent Hours.

NEW REGULATIONS

During 1982 Oregon adopted two new Administrative Rules which affect the shrimp fishery. The first, OAR 635-05-186 requires vessels landing shrimp in Oregon that were caught off Washington or California to use a mesh size which is legal in each respective state's waters. The second rule, OAR 635-05-200 specifies a maximum average count per pound of 160 whole shrimp per pound applicable only to landings of 3,000 lbs or greater. In addition to the above rules an incidental Groundfish catch limit (1,500 lbs/day of the trip) was adopted, effective March 1, 1983. to be consistent with Federal Redulations adopted by the U.S. government January 1, 1983.

Mesh Restriction

635-05-186 (1) It is unlawful to land shrimp taken south of the Oregon-California border with nets having a mesh size of less than 1-3/8 inches between knots.

(2) It is unlawful to land shrimp taken north of the Oregon-Washington border with nets having a mesh size of less than 1-1/2 inches, including one knot.

Maximum Count Per Pound

635-05-200 (1) It is unlawful to possess or land shrimp from any one trip or landing which exceeds an average count of 160 whole shrimp per pound. This rule shall not apply to landings or possession of less than 3,000 pounds of shrimp.

(2) To determine average count per pound when a landing exceeds 3,000 pounds of shrimp, one sample must be taken from each one thousand pounds up to a maximum requirement of twenty samples. The sampling unit shall consist of at least one pound of whole unbroken shrimp.

Incidental Catch Limit

635-05-195 It is unlawful to have on board a commercial fishing boat taking shrimp for commercial purposes an aggregate incidental catch of more than 250 Dover, English, or petrale sole less than 11 inches in length. It is unlawful for a commercial fishing boat taking shrimp for commercial purposes to land an incidental catch of groundfish in excess of 1,500 pounds per day accumulated over the trip. Pacific whiting, shortbelly rockfish and arrowtooth flounder are excluded from the incidental landing restriction.

SHRIMP ASSESSMENT

The Shrimp Assessment Project evaluated a broad range of population models for estimation of yield and recruitment in pink shrimp. Traditional models, using number of spawners, CPUE, growth, and other characteristics of the shrimp population itself, did not adequately explain observed population fluctuations.

We tested environmental variables for influence on shrimp and found several relationships. Both shrimp availability to the gear (catchability) and recruitment (survival) were strongly correlated with components of upwelling. It is unclear if upwelling itself or a related event is influencing shrimp abundance, but we concluded that environmental factors had to be included in any shrimp model.

Our model is not yet refined, but does permit a preliminary evaluation of Oregon shrimp stocks. The model shows that spawning population size and environmental conditions at the time of larval release are major determinants of recruitment. Predation may also be important in some cases, as when particularly large age-classes of a predator, such as Pacific Whiting (Merluccius productus) are present.

All variables our model predicts are important in successful recruitment indicate a relatively poor recruitment will occur in 1983. Extremely high effort levels in 1980 probably depressed spawner abundance and increased mortality. In addition, relatively poor upwelling occurred in spring 1981, which together with the relatively low parent stock should lead to relatively poor 1981 year class. Last, the very abundant Pacific whiting population present since 1981 probably is adding to the predation shrimp stocks suffer.

Further refinement of our model and constituent data will, we hope, allow us to decide whether or not a minimum mesh regulation is needed in addition to the minimum size rule we have (actually expressed in terms of maximum count/lb).

For these reasons we expect the 1983 Oregon pink shrimp catch will not exceed the low 1982 catch.

SUMMARY

During the 1982 shrimp season the abundance of one-year-old shrimp, were expectedly dominant in early landings. Early in the season sufficient amounts of two-year-olds entered catches to improve the count per pound. However, by May it was evident there was a problem with the high incidence of one-year-old shrimp producing counts of 170-210 shrimp per pound in many of the high production areas. In June a maximum count per pound rule was adopted to prohibit landing a shrimp catch which exceeded an average count of 160 shrimp per pound. This regulation was meant to discourage directed fishing on concentrations of very small shrimp, and it did.

Overall, the catch in 1982 was composed of 74% one-year-old, 22% two-year-old, and 4% older than two years old shrimp. Late season samples did not indicate an abundant 0 age group. Therefore, the 1983 season will probably open with less of a "pinhead" (one-year-old shrimp) problem than in several recent years, and a greater proportion of two-year-old shrimp which will improve the grade. However, these two-year-old shrimp may not be very abundant.

Regulations adopted in Oregon during 1982 have been aimed at uniformity of coast wide regulations and to provide effective and needed conservation. To that end Oregon will continue with an April 1 to

October 31 season, an incidental catch limit, a maximum count per pound limit, and a mesh size limit which applies only to vessels fishing in other state waters and delivering in Oregon. A yield analysis has not yet been completed to determine the desirability of a 1-3/8 inch mesh size management measure off Oregon.

Future catches will be tied to abundance, availability, market conditions, and operating costs. In 1982 depressed markets, high operating costs and low shrimp abundance or availability reduced effort and produced the lowest landings in eleven years.

ACKNOWLEDGEMENTS

Thanks are due to Betsy Hunt for her efforts in producing all of the figures contained within this report. I also thank Jim Golden and Malcolm Zirges for their contributions to the text of this report. Finally, appreciation is due port biologist's Mike Hosie and Dave Douglas for providing timely catch, effort and age frequency data.

Table 9. Annual Oregon Shrimp Landings in Thousands of Pounds and Catch-Per-Effort (Hours) by Statistical Area for Single and Double-Rigged Vessels, 1968-1982.

YEAR	AREA OF CATCH											
	34	32	30	29	28	26	24	22	21	20	19	18
1968 C		0	25.2	1/	1,771.6	2,660.8	325.9	4,062.8	238.9	1,302.9	307.2	281.2
C/E		-	494		792	635	556	580	636	1,087	554	895
1969 C		166.4	1,067.4	1/	1,220.0	3,852.1	251.1	3,666.9	159.4	2.1	15.0	140.4
C/E		692	690		662	567	430	431	398	58	157	551
1970 C		475.2	787.1	1/	601.3	2,915.8	2,207.6	4,686.9	199.7	1,550.4	141.9	168.0
C/E		775	539		497	560	675	565	494	1,228	443	740
1971 C		9.8	461.5	1/	430.2	5,575.9	5/	1,534.4	6/	656.0	576.0	46.7
C2	2/	1.9	190.2		337.0	1,762.1		0		0	0	0
C/E1	3/	416	497		368	465		357		879	472	341
C/E2	4/	552	902		926	720		-		-	-	-
1972 C		0	1,553.6	1/	14.0	9,295.8	5/	7,011.3	6/	1,344.9	1,454.6	187.0
C2		0	606.7		0	4,381.0		0		0	0	0
C/E1		-	933		469	671		632		975	677	727
C/E2		-	1,253		-	1,001		1,213		-	-	-
1973 C		1,829.3	113.9	1/	105.9	8,665.9	5/	10,757.4	6/	2,240.7	802.3	0.9
C2		84.4	35.8		40.3	5,947.8		3,228.6		38.8	89.1	0
C/E1		722	702		489	617		627		1,098	549	132
C/E2		356	702		1,061	795		778		2,589	810	-
1974 C	893.2	2,526.3	2,936.0	642.5	626.0	3,366.6	5/	5,661.5	6/	1,038.2	251.8	25.6
C2	838.6	1,983.1	2,271.4	359.6	479.4	3,607.4		2,888.2		392.3	41.6	18.8
C/E1	872	746	592	624	639	362		355		565	213	171
C/E2	1,248	1,182	726	677	846	550		563		1,261	633	692
1975 C	1.9	259.9	2,630.4	1,350.1	734.0	4,936.9	2,780.4	9,502.4	927.0	754.1	14.8	0.6
C2	1.9	218.8	2,224.9	142.0	617.3	3,891.7	2,076.6	6,048.1	463.0	246.5	14.8	0
C/E1	-	556	827	551	590	608	603	731	903	654	-	158
C/E2	97	753	931	717	808	757	813	1,180	1,352	1,500	388	-

1/ Areas 30 and 29 Combined through 1973.

2/ C2 is Landed Catch by Double-Rig Vessels; Included in C.

3/ C/E1 = Catch per Hour by Single-Rig Vessels.

4/ C/E2 = Catch per Hour by Double-Rig Vessels.

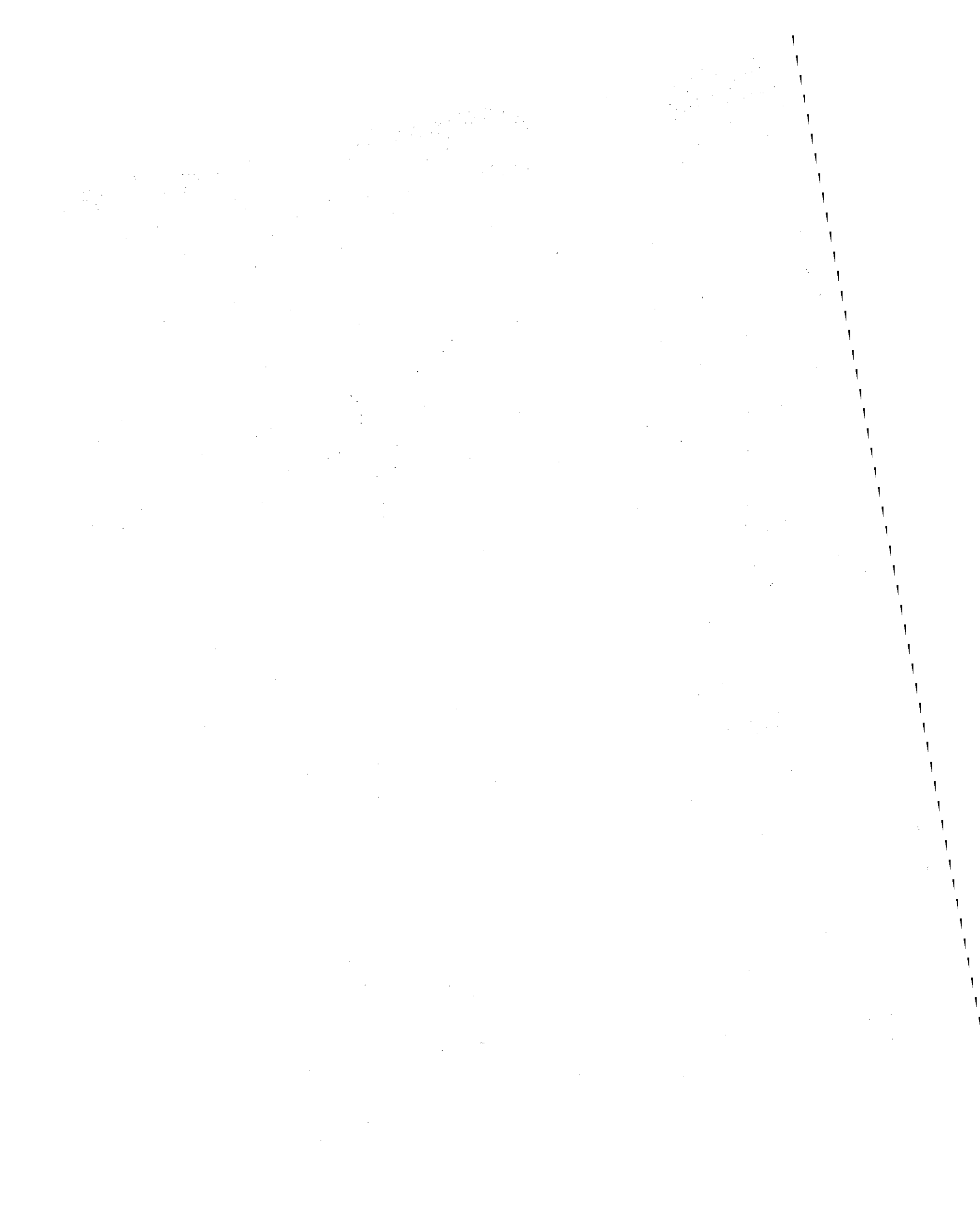
5/ Area 24 Included with Area 26 Data.

6/ Area 21 Included with Area 22 Data.

Table 9. Continued

YEAR	AREA OF CATCH											
	34	32	30	29	28	26	24	22	21	20	19	18
1976 C	1,466.2	108.8	1,728.4	955.1	986.7	7,236.8	3,311.7	6,752.1	1,674.0	704.9	105.5	361.6
C2	1,120.3	92.2	1,358.0	665.1	727.3	6,459.1	2,899.1	4,491.3	538.5	254.8	81.7	227.1
C/E1	1,462	551	702	544	628	433	374	595	724	690	383	526
C/E2	1,394	594	745	542	730	658	582	800	875	963	829	993
1977 C	5.1	1,396.6	5,822.4	827.0	3,686.2	5,461.1	2,836.0	17,208.7	8,435.1	1,755.1	811.9	155.0
C2	5.1	1,196.5	5,239.9	587.3	2,870.3	4,649.2	2,639.1	12,601.1	4,844.4	571.0	307.0	126.1
C/E1	-	1,045	922	465	695	582	437	786	1,120	1,424	1,585	4,012
C/E2	565	1,170	1,052	751	886	751	790	1,232	1,526	1,920	1,424	1,838
1978 C	-	2,353.8	2,325.8	78.4	782.5	2,478.4	350.2	21,026.4	20,321.0	353.0	5,875.0	1,052.6
C2	-	2,154.0	2,090.0	70.5	748.2	2,027.8	325.7	18,024.8	16,021.0	306.8	3,213.0	889.4
C/E1	-	562	569	173	408	360	256	515	782	507	684	447
C/E2	-	691	585	248	490	461	420	927	1,085	769	1,112	855
1979 C A/	-	3,356.0	4,134.7	254.0	150.3	2,852.1	795.1	6,132.2	8,513.7	839.5	1,011.6	1,315.6
C2	-	3,223.3	4,050.6	225.8	150.3	2,756.1	719.1	4,994.0	6,937.9	650.7	608.0	1,045.0
C/E1	-	434	225	181	6	182	189	260	280	292	285	305
C/E2	-	413	325	212	300	311	257	419	490	565	477	635
1980 C	-	3,976.9	4,134.7	157.1	834.4	300.8	205.1	5,684.5	7,807.8	150.6	1,290.7	780.8
C2	-	3,844.6	4,060.3	149.4	817.3	276.8	185.5	4,425.8	5,643.6	114.9	795.1	537.2
C/E1	-	215	154	95	112	148	138	180	271	159	195	243
C/E2	-	344	288	246	305	221	225	258	414	292	318	616
1981 C	-	4,849.5	2,245.7	70.8	480.4	4,350.9	1,215.0	6,538.0	5,336.8	4.2	590.4	236.8
C2	-	4,773.4	2,224.9	70.8	459.7	4,304.9	1,199.2	5,563.6	3,974.7	4.2	441.0	178.7
C/E1	-	196	240	-	122	130	96	162	229	-	224	219
C/E2	-	380	272	175	230	254	246	282	338	82	400	415
1982 C	-	3,177.4	1,349.8	0.6	2,819.2	1,043.4	277.4	6,174.6	2,616.4	175.5	550.1	277.6
C2	-	3,158.3	1,349.8	0.6	2,805.4	1,031.2	266.9	5,734.2	2,283.2	146.4	467.7	205.8
C/E1	-	225	-	-	199	96	117	180	167	192	160	252
C/E2	-	326	209	17	236	164	214	379	284	437	398	176

A/ Catch and Catch per Unit Effort Based on Preliminary Landing Estimates of 29.4 Million Pounds.



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