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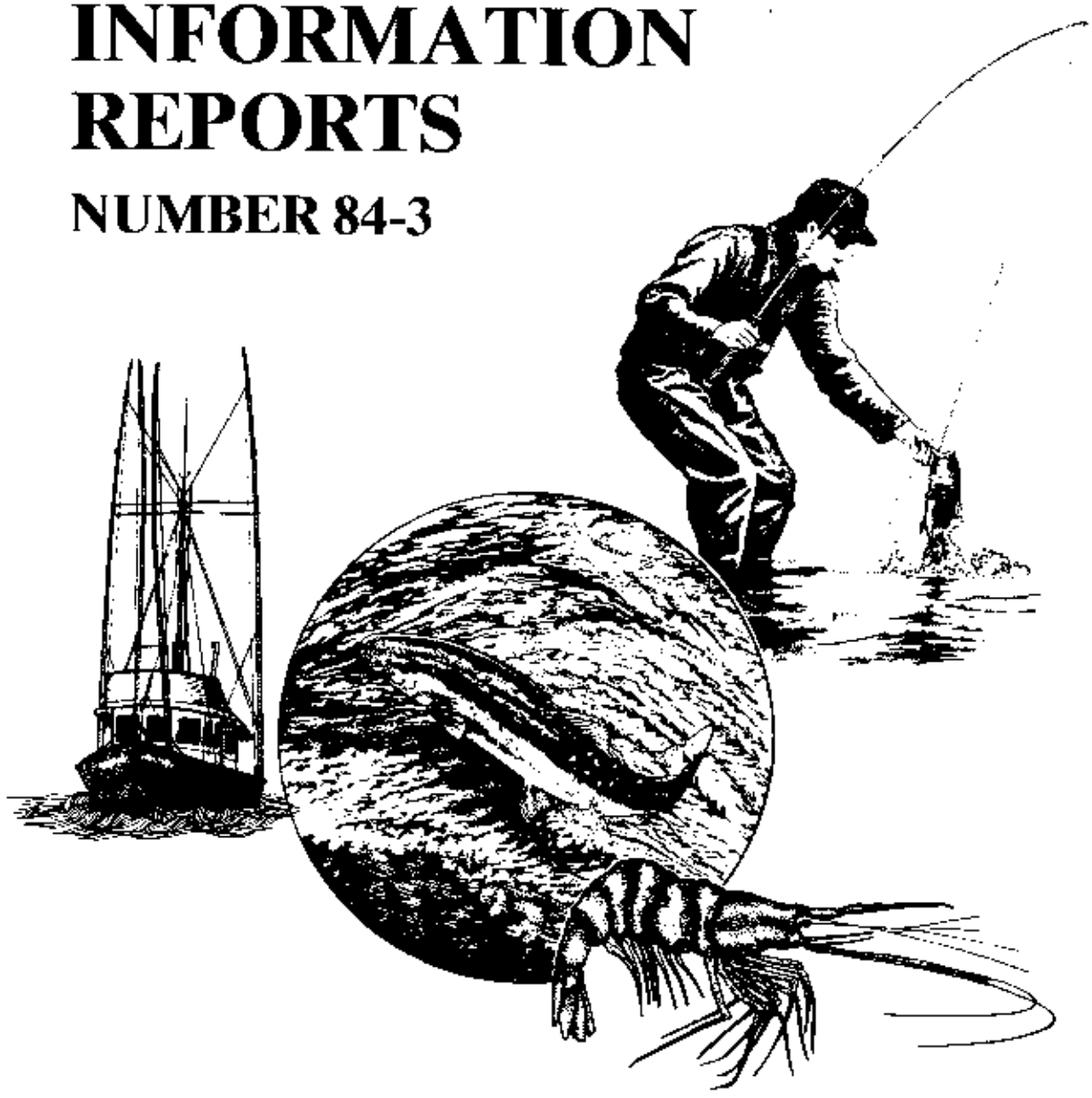

FISH DIVISION

Oregon Department of Fish and Wildlife

THE 1983 OREGON SHRIMP FISHERY

THE 1983 OREGON SHRIMP FISHERY

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Shrimp Investigations
Report 84-3

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

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Ocean pink shrimp (Pandalus jordani) fishery statistics were obtained by the Department of Fish and Wildlife from fishermen's logbooks, ODFW fish tickets, and Marine Region ODFW market samples. Monthly catch and effort statistics were developed from these sources. Age composition, count per pound (grade) and incidental groundfish landed catch were documented as well.

Some catch and effort statistics for Alaska, British Columbia, Washington, and California are also presented in this report. These data were compiled from information gathered in written or oral form from the appropriate state or Canadian resource agency personnel.

Data provided in this report summarize the 1983 pink shrimp fishery primarily for Oregon. A brief discussion including some data for other Pacific coast shrimp fisheries is provided to put Oregon's fishery into perspective with the total coastwide fishery.

THE 1983 OREGON SHRIMP SEASON

Catch and Effort

Oregon pink shrimp (*Pandalus jordani*) landed catch in 1983 totaled 6.5 million pounds (2,948 mt), 65% less than the 18.5 million pounds (8,392 mt) landed in 1982 (Figure 1), and was the lowest season total since 1966 when 4.8 million pounds (2,177 mt) were landed. Astoria had the highest total landings, 3.2 million pounds (1,452mt); and the least decline (49.4%) in production from 1982. Coos Bay and Newport total landings declined 77.8% and 66.2%, respectively (Table 1).

Table 1. Annual shrimp landings at Oregon ports 1980-83 in thousands of pounds. 1/

Port	1980	1981	1982	1983	% Change 82-83
Astoria	9,225	8,061	2/ 6,232	3,154	49.4
Garibaldi	1,116	1,312	928	462	50.2
Newport	6,311	7,000	4,433	1,499	66.2
Winchester Bay	690	348	331	85	74.3
Coos Bay	10,466	8,126	5,543	1,233	77.8
Port Orford	64	4	-	-	-
Gold Beach	-	2	-	-	-
Brookings	2,280	1,065	995	114	88.5
Total	30,152	25,918	18,462	6,547	64.5

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

2/ Includes 207.9 thousand pounds caught of southeast Alaska.

A total of 130 vessels landed shrimp in Oregon in 1982, 34 fewer than in 1982 (Table 2, Figure 2). This was the third consecutive year in which the number of vessels operating declined. The peak year was 1980, when 284 vessels made deliveries into Oregon. The number of

out-of-state vessels remained about the same with 19 in 1982 and 18 in 1983. Double-rigged vessels comprised 78.5% of the fleet (102 vessels).

Landed catch, effort and catch per unit effort (CPUE) were highest in April when 2,036,000 pounds (924 mt) were caught at an average rate of 144.5 lbs/hr in single rig equivalents (SRE) (Table 3, Table 4). Effort was 14,124 hours (SRE), and then declined through the remainder of the season. The greatest annual amount of effort was expended in State Statistical Area 32 (Destruction Island area) where 18,639 hours (SRE) yielded 2.3 million pounds (1,043 mt) (Table 5).

Other important areas were State Statistical Area 22 (Mudhole), 21 (Cape Blanco area), 28 (Tillamook Head area), and 30 (Grays Harbor area) although Area 22 was the only area which produced more than a million pounds (Figure 3, Table 5). The best annual CPUE's did not occur in areas of high production. Areas 18 (Oregon-California boundary south) and 20 (Rogue River to Cape Blanco) had the highest CPUE at 324 and 256 lbs/hr (SRE) respectively, but were also among the lowest production areas in 1983.

Market Conditions

Twenty processors operated in 1983, the same as in 1982. The number of peeler machines used dropped from 65 in 1982 to 56 in 1983. The season opened with an ex-vessel price for shrimp at 60 cents per pound after short price negotiations which lasted until April 4. During the remainder of April up to 72 cents per pound was paid depending on the grade. During May and June processors paid 72-77 cents per pound for shrimp. From July through September the ex-vessel price ranged from 75-80 cents per pound. By October some deliveries were purchased at up to 86 cents per pound.

Market Samples

Analyses of sample data indicated the largest shrimp were caught during May in State Area 22 at 72.6 shrimp per pound (Table 6). The smallest recorded average shrimp in landings were caught in State Area 32 (Destruction Island) during June at 168.3 shrimp per pound. Average age composition of landings in Oregon (by number of shrimp) was 0.2% zero-age shrimp, 44.0% age 1, 47.4% age 2, and 8.4% age 3+.

Incidental Groundfish Catch

Landed catch of incidentally caught groundfish totaled 1.3 million pounds (590 mt) in 1983, down 31% from the 1.9 million pounds (862 mt) landed in 1982. Rockfish was the major component (76.1%) of the incidental catch at 990,059 pounds (449 mt). Lingcod and Dover sole landed catch totaled 81,297 pounds (37 mt) and 75,516 pounds (34 mt), respectively (Table 7). State areas 32 and 28 were the top producers of incidental catch at 541,451 pounds (246 mt) and 246,959 pounds (112 mt) respectively.

PACIFIC COAST

Catch and Effort

Pacific coast 1983 landed catch of pink shrimp (including Alaska and British Columbia) reached only 22.0 million pounds (9,979 mt), a 45% decrease from the 39.9 million pounds (18,098 mt) landed in 1982 (Table 8), and was the lowest total Pacific coast landing since 1965 when 21.8 million pounds (9,888 mt) were delivered.

Landed catch of shrimp in Oregon (6.5 million pounds) represented 29.5% of the total Pacific coast landed catch in 1983; however, only 3.5 million pounds (1,588 mt) were caught in waters off Oregon. Only

2,102 pounds were caught off Oregon and delivered at California ports, and 25,837 pounds were delivered at Washington ports. This brought the total landed catch from off Oregon to 3.8 million pounds (1,724 mt), or 17.3% of the total 1983 Pacific coast shrimp landed catch.

Washington was the only state to show an increase in landings over 1982 where landings were up 14% from 5.0 million pounds (2,268 mt) in 1982, to 5.7 million pounds (2,585 mt) in 1983. The landings in 1983 included 60 thousand pounds caught off southeast Alaska. Vessels fishing off Washington landed 3.0 million pounds (1,361 mt) in Oregon, or 46% of Oregon's total landings. This 3.0 million pounds, combined with another 5.6 million pounds (2,540 mt) caught off Washington and landed at Washington ports totaled 8.6 million pounds (3,901 mt), 39.1% of the total Pacific coast landed catch.

California 1983 landed catch totaled only 1.1 million pounds (499 mt). Of this total, approximately 16% was caught off Oregon. Most of the California landings were caught in California Statistical Area C (Morro Bay) which totaled 944.7 thousand pounds (428 mt).

Combined fishing effort in SRE for Washington, Oregon, and California continued to decline in 1983 to approximately 123 thousand hours (Figure 5). In 1983 total effort was 152 thousand hours (SRE). A decrease in effort occured in all three states. The combined CPUE for the three states was 108 lbs/hr (SRE) continuing a trend of reduced CPUE from 202, 190 and 183 lbs/hr (SRE) in 1980, 1981 and 1982, respectively. Catch per unit effort was 109, 98 and 155 lbs/hr (SRE) in Washington, Oregon and California, respectively for trips made in areas adjacent to each state.

REGULATIONS

During 1982 The Oregon Fish and Wildlife Commission (OFWC) adopted two administrative rules which affect the shrimp fishery. The first, OAR 635-05-186, required 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, specified 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. These regulations were in effect during most of the 1983 shrimp season. In September and October 1983 a 3,000 lb/trip (Sebastes complex) and 1,000 lb/trip (Widow rockfish) limit was adopted by the OFWC as a temporary rule to be in compliance with Federal and State regulations governing groundfish during the period.

Mesh Restriction

635-05-186 (1) It is unlawful to land shrimp taken south of the Oregon-Califonia 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 has examined yield and recruitment relationships for the pink shrimp stock off Oregon. This required evaluation of a wide variety of models and population assessment techniques to determine methods most applicable to pink shrimp biology and the data available. The special biological characteristics of pink shrimp, in particular their short life span, presented a number of problems. Strong apparent relationships between environmental variation and sometimes predator population size and shrimp dynamics also increased the complexity of the problem.

A short life span, generally not much over four years off Oregon, was a problem since we found that pink shrimp were not fully recruited to fishing gear at age-1 and age-2, and that age-3+ shrimp are not consistently represented in catches probably due to low abundance or dispersal. These constraints limited the usefulness of some techniques such as cohort analysis for estimating natural mortality rates and other parameters in these animals.

This work suggests that environmental variation, as measured by changes in the Bakun upwelling index, are very important in determining pink shrimp recruitment from year to year. Predation, particularly by

Pacific whiting (Merluccius productus) also may be an important external variable but only in some years - probably when very large year classes of whiting appear.

Evaluation of the effect of net mesh size on yield indicated that gear presently widely used off Oregon, which averages near 1-1/4 inches between the knots, is acceptable at present levels of fishing mortality.

A disturbing outcome of yield modelling, however, was a suggestion that the catchability coefficient (q) decreased as effort increased in the shrimp fishery after 1977. Fishing vessels may have been interfering with each other at high levels of effort or continuous trawling may cause shrimp to become unavailable to the gear through dispersal or induced but unmeasured mortality. Additional research is needed to understand this apparent interaction between effort and catchability, and further gear studies are planned to that end.

We have initiated studies of environmental characteristics of some known production areas (beds) in order to better identify mechanisms linking environmental variation so strongly to shrimp survival. These studies include release of sea-bed drifters around shrimp beds to track bottom currents affecting shrimp, and recovery data for these drifters have already provided us with some exciting information. Unfortunately, recovery rates are not as good as they could be since we rely on shrimp trawl effort to recapture drifters and such fishing effort has been low since drifter studies began.

Outlook for the Oregon pink shrimp fishery is poor for the 1984 season and likely for 1985 as well. Our recruitment model indicated production would be mediocre in 1982 and 1983 as a result of a low spawner

abundance index, below-average and average, respectively, survival conditions (upwelling levels), and very strong whiting year classes present offshore. Few age-1 shrimp appeared in the 1983 Oregon fishery, which indicates that the age-2 year class of shrimp will be scarce in 1984. The 1983 El Nino event likely also had some effect on pink shrimp production and survival.

SUMMARY

During the 1983 shrimp season two-year-old shrimp contributed to the catch to a much higher degree than in many recent years. As a result the grade in most areas was relatively good at the beginning of the season. In June, commercial quantities of shrimp were not found in most areas off Oregon, and off Washington the percentage of two-year-old shrimp began to decrease. Low catches of fair grade shrimp continued through the remainder of the season.

These low levels of catch were expected for the 1983 season due to poor predicted survival of the 1981 and 1982 year classes, poor upwelling, and an abundance of Pacific whiting. In addition to these conditions the effects of an El Nino of the magnitude we experienced in 1983 could not be projected.

Late season market samples did not indicate an abundance of zero age shrimp (1983 yearclass) off the coast of Oregon. The effects of the many factors that had an impact on shrimp stocks during 1983 will most likely continue during 1984, and as a result shrimp stocks will still be at low levels.

ACKNOWLEDGEMENTS

Thanks are once again due to Betsy Hunt whose efforts provided all of the figures contained within this report. I also thank Jim Golden and Malcolm Zirges for their contributions to the text. Finally, appreciation is due to the port biologists and their assistants who collected much of the raw data summarized; to the many fishermen and processors who supplied much of the information in the first place; and to conservation personnel from other states who are very helpful in supplying data for their respective jurisdictions.

Table 2. Number of Vessels Delivering Shrimp into Oregon by Port, 1982-83.

Port	Home Port		Oregon Trans		1/ Out-of-State		Total	
	1982	1983	1982	1983	1982	1983	1982	1983
Astoria	27	21	22	20	8	9	57	50
Garibaldi	8	7	11	10	-	-	19	17
Newport	42	33	6	19	-	1	48	53
Win. Bay	4	5	5	1	-	-	9	6
Coos Bay	52	39	15	13	7	13	74	65
Brookings	12	7	2	3	4	2	18	12
Total Oregon	145	112						
Out-of-State								
California	11	13						
Washington	8	5						
Total Vessels Delivering to Oregon ports 2/	164	130						

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

2/ Oregon double-rig count was 88 for 1983.

Table. 3 Oregon 1983 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	August	Septemb	October	Total
32 C	219.7	363.7	486	432.4	352.3	237.9	173.2	2265.2
C/E1	-	-	-	-	-	126.6	103.7	115.2
C/E2	265.1	227.1	225.3	203.2	153.4	146.4	164.8	194.6
30 C	92.1	376.9	44.4	49.5	44.9	84.9	91.0	692.7
C/E1	-	-	-	-	-	-	33.3	33.3
C/E2	321.9	304.7	81.9	117.8	113.2	143.9	113.4	183.6
29 C	0	0	0.2	0	0	1.5	0	1.5
C/E1	-	-	-	-	-	-	-	-
C/E2	-	0	19.5	-	0	133.2	-	71.8
28 C	64.5	96.0	263.0	166.2	45.8	61.2	91.5	429.2
C/E1	67.4	-	64.8	108.7	74.8	63.7	33.0	61.1
C/E2	137.5	164.7	136.8	105.6	81.6	107.3	107.9	121.4
26 C	11.1	53.7	9.3	1.7	2.5	0	0	78.3
C/E1	-	-	86.4	183.2	-	-	-	118.2
C/E2	49.4	137.9	55.6	70.2	51.0	-	0	91.6
24 C	0.6	1.4	0	0	0	0	0	2.0
C/E1	-	48.8	-	-	-	-	-	48.8
C/E2	10.1	7.9	-	-	-	-	-	9.5
22 C	1065.1	409.3	200.7	34.4	31.2	0	1.1	1741.8
C/E1	85.3	91.4	66.3	38.6	52.6	-	-	77.4
C/E2	233.3	139.6	114.3	87.6	95.5	-	130.7	175.1
21 C	582.7	170.2	49.9	8.8	0.8	0	0	811.6
C/E1	164.3	74.4	45.5	28.8	-	-	-	127.0
C/E2	250.0	110.7	98.7	90.1	25.9	-	-	178.0
20 C	0	0	26.1	TRACE	0	0	0	26.1
C/E1	-	-	-	-	-	-	-	0
C/E2	0	0	227.4	.4	-	-	-	193.9
19 C	0	19.8	0.1	16.1	0	0.4	11.2	47.1
C/E1	-	51.7	-	-	-	24.5	122.1	91.2
C/E2	0	255.9	4.2	85.4	-	-	43.5	115.8
18 C	0.1	0	0	0	0	0	0	0.1
C/E1	-	-	-	-	-	-	-	-
C/E2	4.1	-	-	-	-	-	-	4.1
Total C	2035.2	1491.0	816.4	709.1	476.7	385.5	368.0	4422.9
C/E1	144.6	75.6	59.9	88.2	64.4	97.5	72.4	98.3
C/E2	230.6	179.7	150.5	147.7	131.3	138.1	130.5	170.4

1/ C is total catch in thousands of pounds.
2/ C/E1 Average catch in pounds per hour effort for single-rigged vessels.
3/ C/E2 Average catch in pounds per hour effort for double-rigged vessels.

Table 4. Catch (in Thousands of Pounds), Hours of Effort Expended, and CPUE in the 1983 Oregon Shrimp Fishery by Month.

	Month							
	April	May	June	July	Aug.	SEPT.	Oct.	Total
Single Rig								
Catch	112.6	39.5	11.5	9.1	6.5	26.4	34.2	239.8
Effort	778.9	522.5	191.6	102.9	100.7	270.5	472.7	2439.8
CPUE	144.6	75.6	59.9	88.2	64.4	97.5	72.4	98.3
Double Rig								
Catch	1923.3	1451.5	1068.2	700.0	471.0	359.5	333.8	6307.3
Effort	8340.4	8078.8	7097.7	4740.3	3586.5	2603.2	2558.5	37005.4
CPUE	230.6	179.7	150.5	147.7	131.3	138.1	130.5	170.4
Total								
Catch	2035.9	1491.0	1079.7	709.1	477.5	385.9	368.0	6547.1
Effort (SRE)	14123.5	13448.6	11547.9	7687.4	5839.1	4435.6	4566.3	61648.4
CPUE (SRE)	144.1	110.9	93.5	92.2	81.8	87.0	80.6	106.2

(SRE) = Single Rig Equivalent

Table 5. Catch (in Thousands of Pounds), Effort Expended (Hours) and CPUE (Pounds/Hour Trawled in the 1983 Oregon Shrimp Fishery by State Statistical Area.

	State Areas North of Cape Perpetua						
	32	30	29	28	26	24	Total
Single Rig							
Catch	35.4	2.2	0	27.7	0.8	1.2	66.5
Effort	307.4	65.3	2.8	454.1	6.7	24.1	860.4
CPUE	115.2	33.3	0	61.1	118.2	48.8	78.2
Double Rig							
Catch	2229.7	781.7	1.6	760.6	77.4	0.8	3851
Effort	11457.1	4256.5	22.7	6268.1	844.9	84.2	22933.5
CPUE	194.6	183.6	71.8	121.4	91.6	9.5	168.0
Total							
Catch	2265.1	783.9	1.6	788.3	77.4	2.0	3916.3
Effort (SRE)	18638.8	6875.7	39.1	10483.1	1358.5	158.8	37554.0
CPUE (SRE)	121.5	114.0	40.9	75.2	57.6	12.6	104.5

Table 5. (Continued)

	State Areas South of Cape Perpetua					
	22	21	20	19	18	Total
Single Rig						
Catch	35.6	123.5	0	13.4	0	172.5
Effort	459.8	972.3	0	147.3	0	1579.4
CPUE	77.4	127.0	0	91.2	0	109.2
Double Rig						
Catch	1706.3	688.9	26.1	34.1	0.1	2455.4
Effort	9746.2	3870.2	134.7	294.3	26.5	14071.9
CPUE	175.1	178.0	193.9	115.8	4.1	174.5
Total						
Catch	1741.9	812.4	26.1	47.5	0.1	2628.0
Effort (SRE)	16053.7	7164.6	215.5	618.2	42.4	16096.1
CPUE (SRE)	231.5	176.0	255.5	229.7	323.9	109.1

(SRE) = Single Rig Equivalent

Table 6. Oregon 1983 Monthly Shrimp Age Composition (percent by number), Count per Pound, and Number Sampled (no. of shrimp) by State Statistical Area. 1/

State Area	Age	Month April	May	June	July	Aug.	Sept.	Oct.
32	1	24.1	56.1	55.0	67.5	78.2	73.5 2/	80.6
	2	69.8	38.8	37.9	29.2	17.6	16.8	12.2
	3+	6.1	5.1	7.1	3.3	4.2	9.4	3.6
	Ct	159.6	167.0	168.3	158.3	161.5	139.8	130.2
	N	477	631	409	400	455	612	253 3/
30	1	15.9	18.0	71.0	-	80.2	65.1	63.1
	2	68.6	75.0	18.3	-	18.3	30.1	17.7
	3+	15.5	7.0	10.7	-	1.5	4.8	19.2
	Ct	141.5	127.3	155.1	-	137.7	107.2	102.7
	N	440	383	131	-	344	249	130
28	1	8.8	7.1	66.7	75.2	77.3	-	62.1
	2	77.2	22.5	33.3	20.8	21.0	-	17.7
	3+	14.0	70.4	0	4.0	1.7	-	20.2
	Ct	135.4	108.3	143.5	137.1	120.9	-	112.0
	N	114	240	105	125	119	-	248
26	1	-	46.2	-	-	-	-	-
	2	-	51.8	-	-	-	-	-
	3+	-	2.0	-	-	-	-	-
	Ct	-	129.8	-	-	-	-	-
	N	-	195	-	-	-	-	-
24	1	-	4.0	-	-	-	-	-
	2	-	96.0	-	-	-	-	-
	3+	-	0	-	-	-	-	-
	Ct	-	98.1	-	-	-	-	-
	N	-	200	-	-	-	-	-
22	1	21.0	1.0	33.4	37.2	43.4	-	-
	2	72.5	81.0	56.2	56.7	52.2	-	-
	3+	6.5	18.0	10.4	6.2	4.4	-	-
	Ct	99.7	72.6	100.0	102.3	85.9	-	-
	N	600	100	1093	812	544	-	-
21	1	8.8	63.6	26.4	-	-	-	-
	2	76.8	32.9	63.4	-	-	-	-
	3+	14.4	3.5	10.2	-	-	-	-
	Ct	97.8	137.3	85.7	-	-	-	-
	N	1036	826	738	-	-	-	-

Table 6. Continued

State Area	Age	Month April	May	June	July	Aug.	Sept.	Oct.
20	1	-	-	45.9	-	-	-	-
	2	-	-	52.7	-	-	-	-
	3+	-	-	1.4	-	-	-	-
	Ct	-	-	108.6	-	-	-	-
	N	-	-	146	-	-	-	-
19	1	7.0	6.0	30.8	-	-	-	-
	2	41.0	73.0	57.7	-	-	-	-
	3+	52.0	21.0	11.5	-	-	-	-
	Ct	79.3	82.0	94.7	-	-	-	-
	N	100	100	26	-	-	-	-

1/ Due to low effort, no market samples were collected in Areas 18 or 29.
2/ Zero-age shrimp comprised 0.3 percent of the catch.
3/ Zero-age shrimp comprised 3.6 percent of the catch.

Table 7. Oregon 1983 Incidental Groundfish Catch (Pounds) by State Statistical Area..

Species	State Area											TOTAL
	32	30	29	28	26	24	22	21	20	19	18	
English Sole	446	309	0	611	5	0	87	4	0	0	0	1463
Petrale Sole	386	385	0	337	95	0	643	473	0	0	0	2317
Dover Sole	30620	5007	2	8503	7515	0	9536	14105	75	153	0	75516
Rex Sole	3027	1085	0	1351	46	0	1794	528	0	0	0	7832
Arrowtooth Flour.	13187	1007	0	492	0	0	0	0	0	0	0	14686
Flathead Sole	978	457	0	654	0	0	4	0	0	0	0	2093
Sand Dab	0	0	0	65	6	0	1158	87	0	0	0	1316
Sand Sole	0	0	0	6	1	0	527	0	0	0	0	535
Pac. True Cod	15869	870	0	445	4	0	41	0	0	0	0	17229
Lingcod	45799	20578	2	8854	1291	0	3403	1220	4	147	0	81297
Sablefish	31721	5068	0	8440	3529	0	1913	4127	0	0	0	54798
Pac. Ocean Perch	9128	355	0	3220	56	1	938	1416	0	0	0	15113
Other Rockfish	389100	102386	236	208164	16167	297	134273	126718	8921	3796	0	990059
Pacific Whiting	182	795	0	5405	0	0	4416	2743	910	6	0	14457
Misc. Species	1009	1050	0	412	185	0	877	938	0	0	0	4471
TOTAL LANDINGS	541451	139352	240	246959	28900	298	159610	152359	9910	4102	0	1283182

Table 8. Annual Landed Catch of Shrimp by State, Province, and Entire Pacific Coast, 1968-1983, (in thousands of pounds; primarily Pandalus sp.) source PMFC Crab & Shrimp Data Series and Personal Communication with State and Provincal Authorities

Year	Alaska	Br. Columbia	Washington	Oregon	California	Total
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	15,640	199,090
1978	73,397	2,969	13,987	56,997	13,167	160,517
1979	50,916	1,578	12,135	29,587	4,922	99,138
1980	52,865	1,175	12,600	30,152	4,400	101,192
1981	28,100	1,200	10,055	25,918	3,673	68,946
1982	16,987	1,160	4,999	18,462	4,207	45,815
1983	7,500	1,200	5,656 2/	6,547	1,132	22,035

1/ Primarily Pandalus sp. from PMFC Crab & Shrimp Data Series and conversation with state and provincal authorities.
2/ Includes 60,294 pounds caught off Southeast Alaska.

Table 9. Annual Oregon Shrimp Landings in Thousands of Pounds and Catch-Per-Effort (Hours) by Statistical Area for Single and Double-Rigged Vessels, 1968-1983.

Year		Area of Catch											
		34	32	30	29	28	26	24	22	21	20	19	18
1968	C	0	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	0	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	0	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	0	9.8	461.5	1/	430.2	5,575.9	5/	1,534.4	6/	656.0	576.0	46.7
	C2	2/ 0	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	0	1,553.6	1/	14.0	9,295.8	5/	7,011.3	6/	1,344.9	1,464.6	187.0
	C2	0	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	0	1,829.3	113.9	1/	105.9	8,665.9	5/	10,757.4	6/	2,240.7	802.3	0.9
	C2	0	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	5,366.6	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	0	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	0	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/	0	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	0	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	0	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	0	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	0	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	296.8
	C2	0	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	0	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	0	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	264	437	398	176
1983	C	0	2,265.1	783.9	1.6	788.3	76.2	2.0	1,741.9	812.4	26.3	47.5	0.1
	C2	0	2,229.7	781.7	1.6	760.6	77.4	0.8	1,706.3	688.9	26.1	34.1	0.1
	C/E1	-	115	33	-	61	118	49	77	127	-	91	-
	C/E2	-	195	184	72	121	92	10	175	178	194	116	4

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

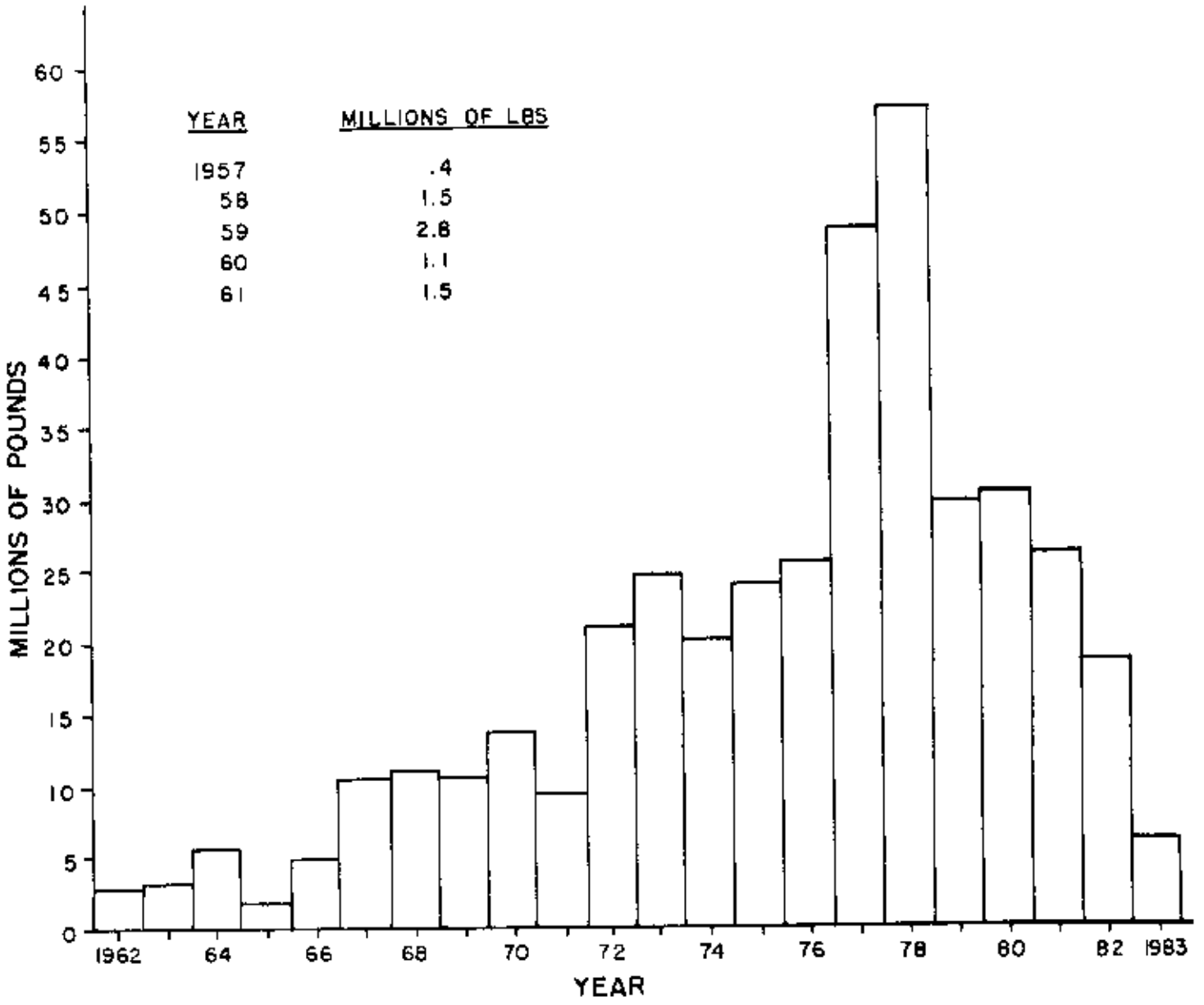

Figure 1. Annual Oregon Shrimp Landed Catch, 1957-1983

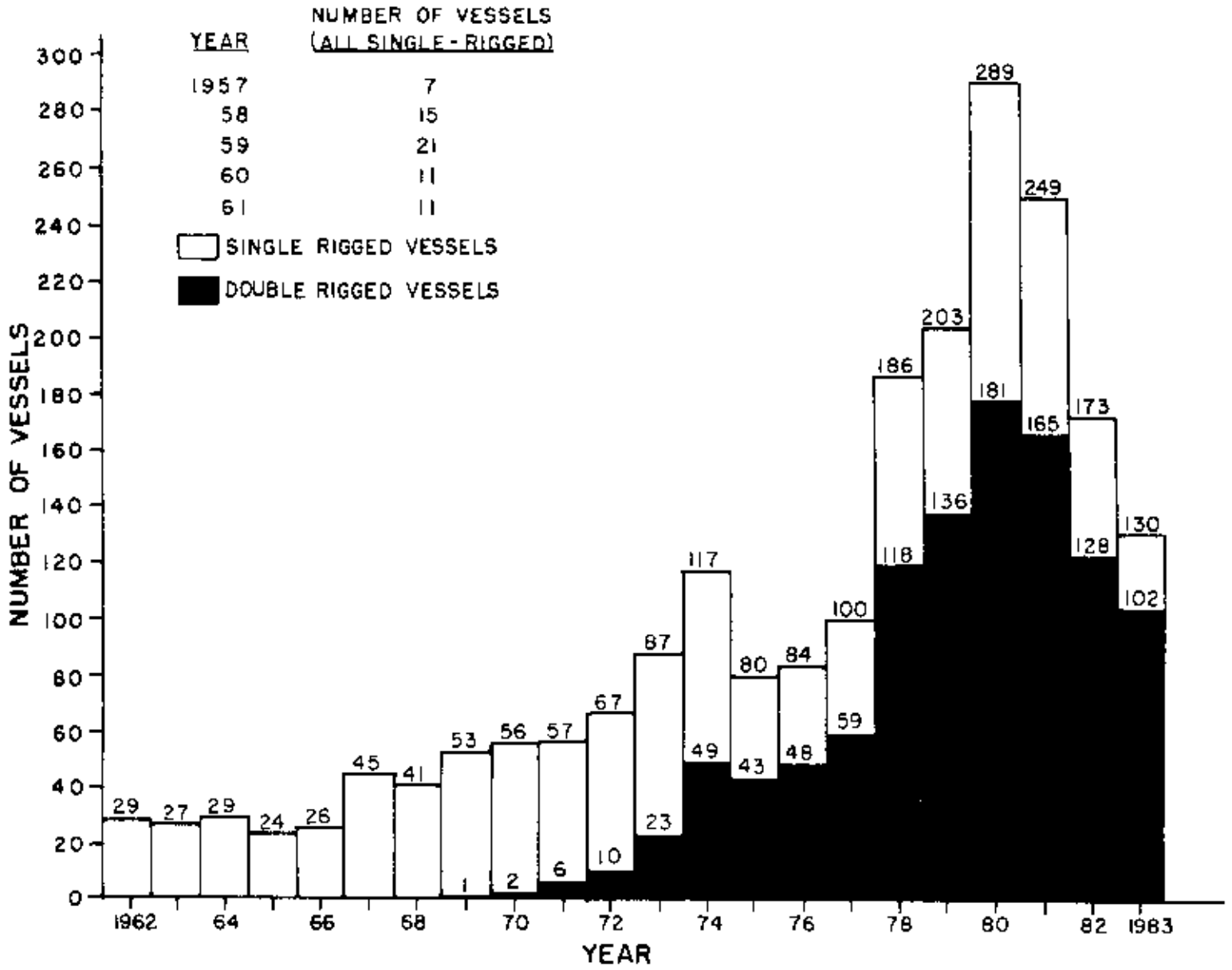

Figure 2. Annual Number of Shrimp Vessels by Gear, 1957-1983.

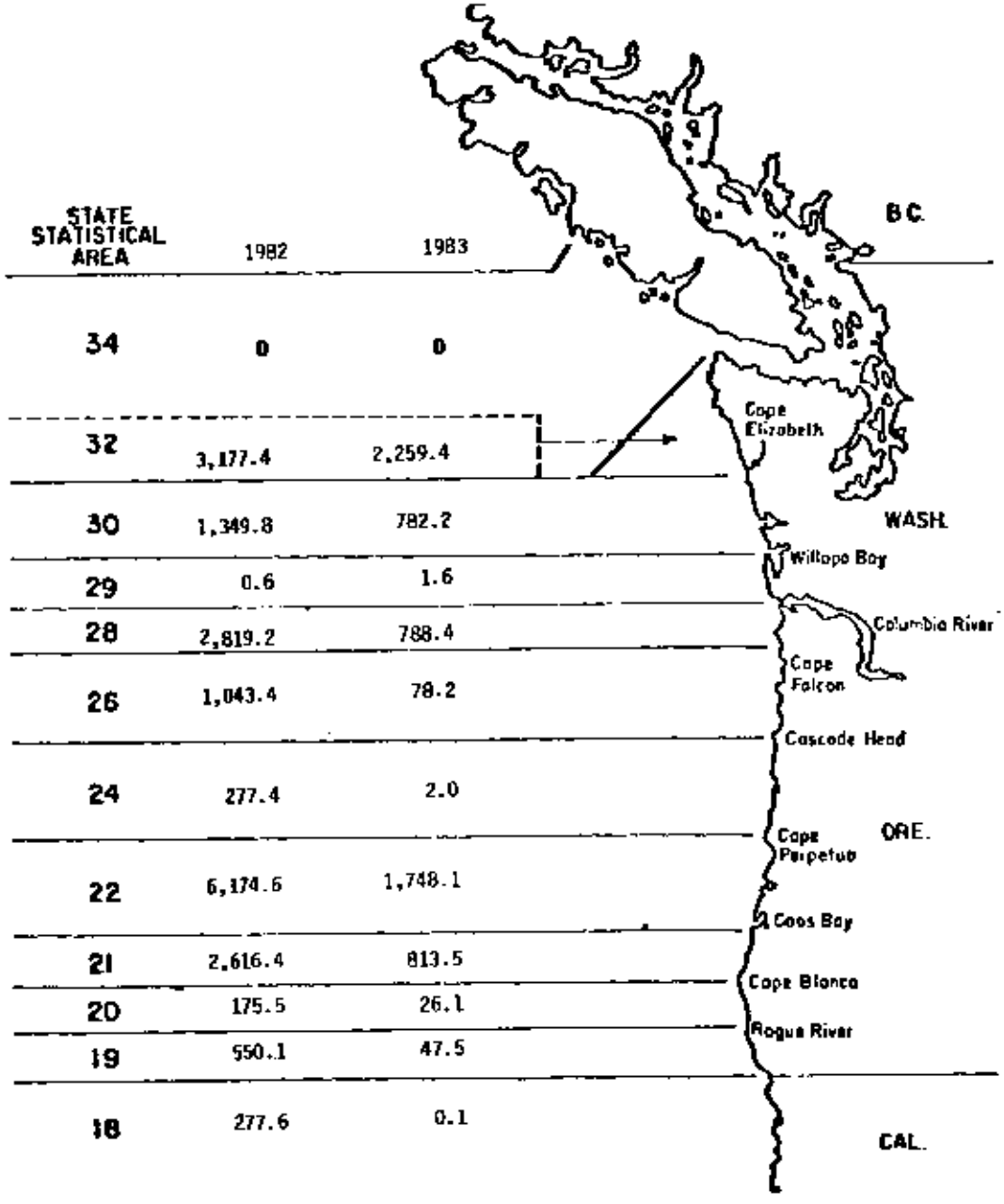

Figure 3. Oregon 1982 and 1983 Landed Catch of Shrimp, in Thousands of Pounds, by Oregon Statistical Area.

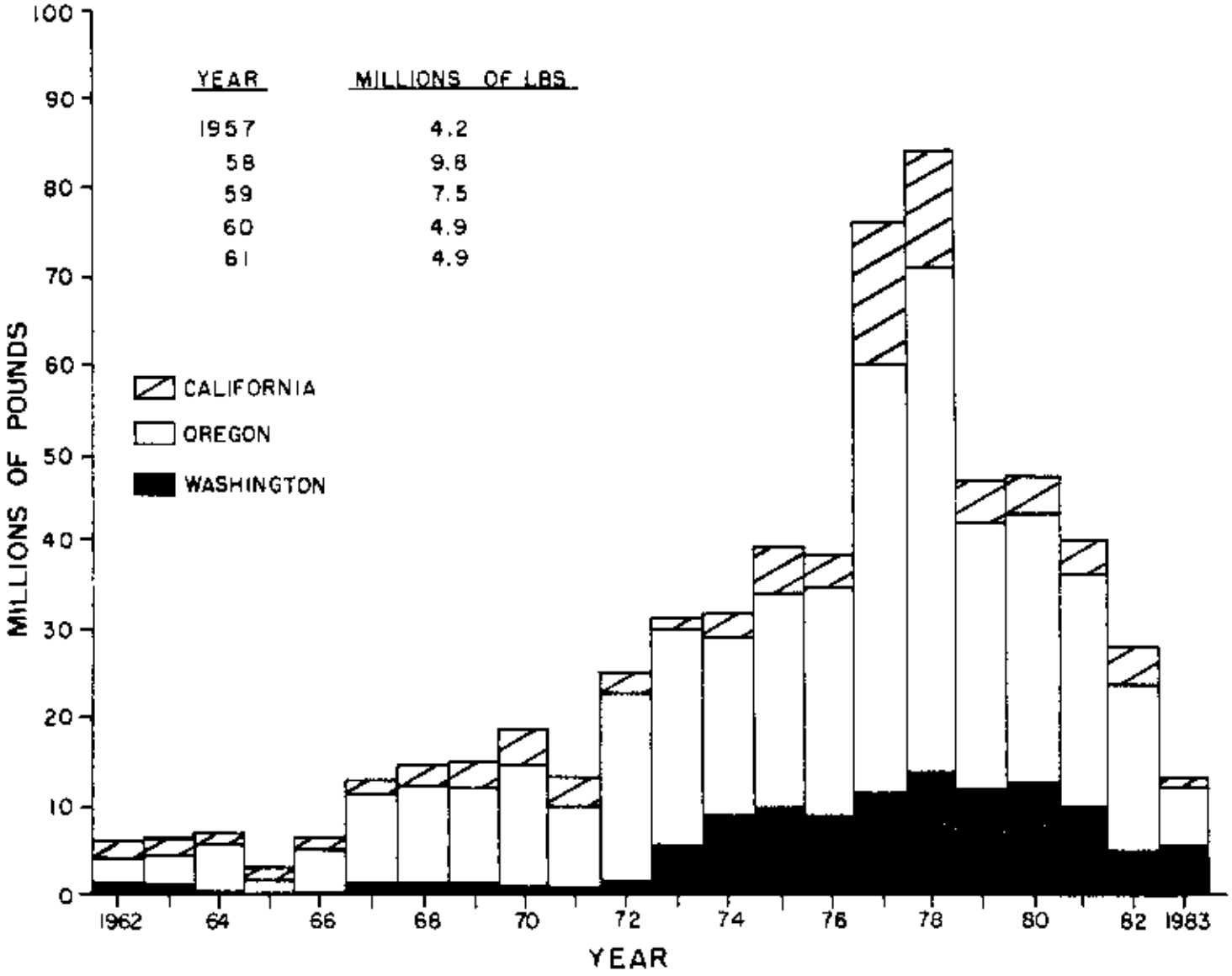

Figure 4. Pink Shrimp Landed Catch by State, 1957-1983.

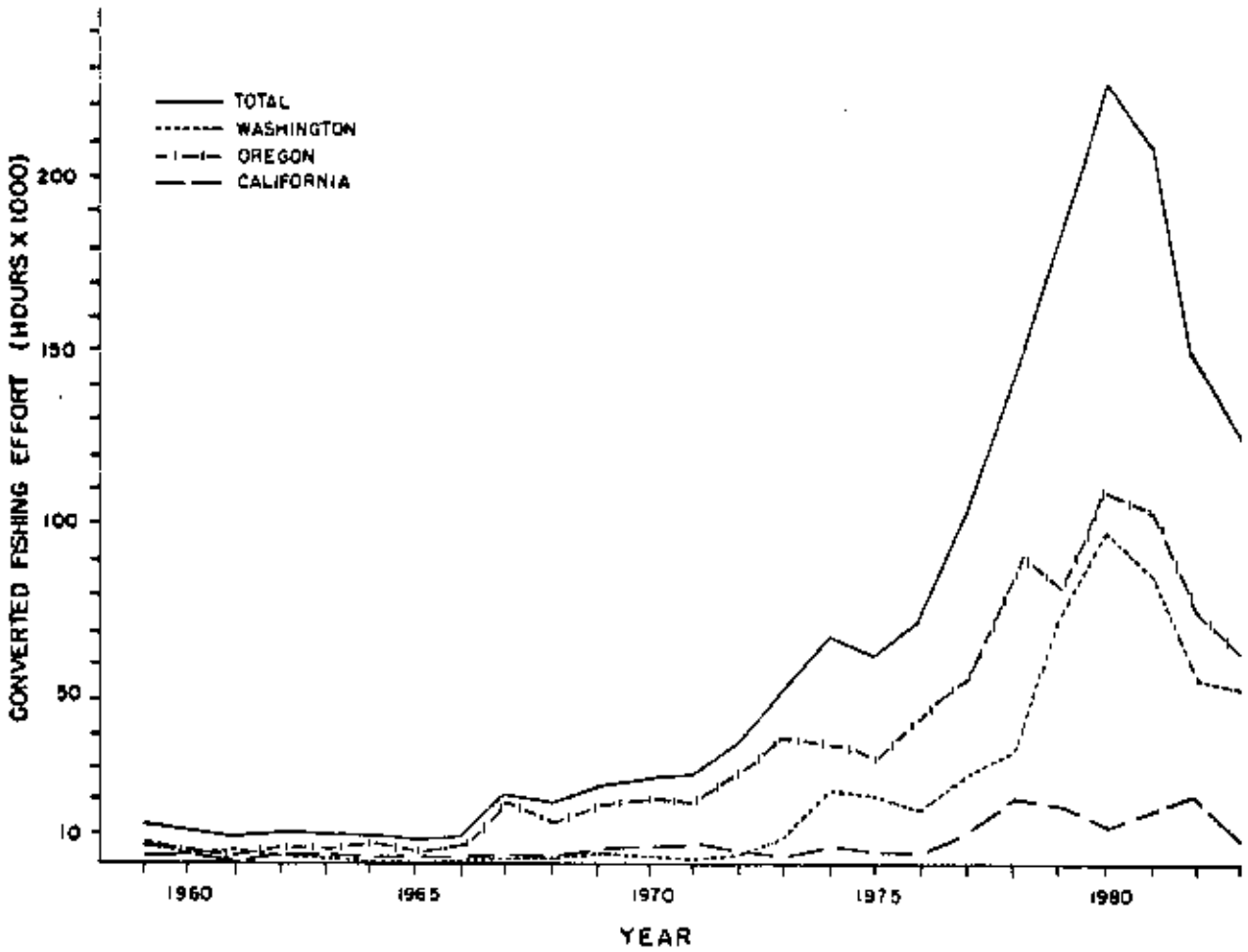

Figure 5. Converted Fishing Effort (in Hours) For Ocean Pink Shrimp by U.S. Vessels Coastwide and by State in Adjacent Waters, 1959-1983.

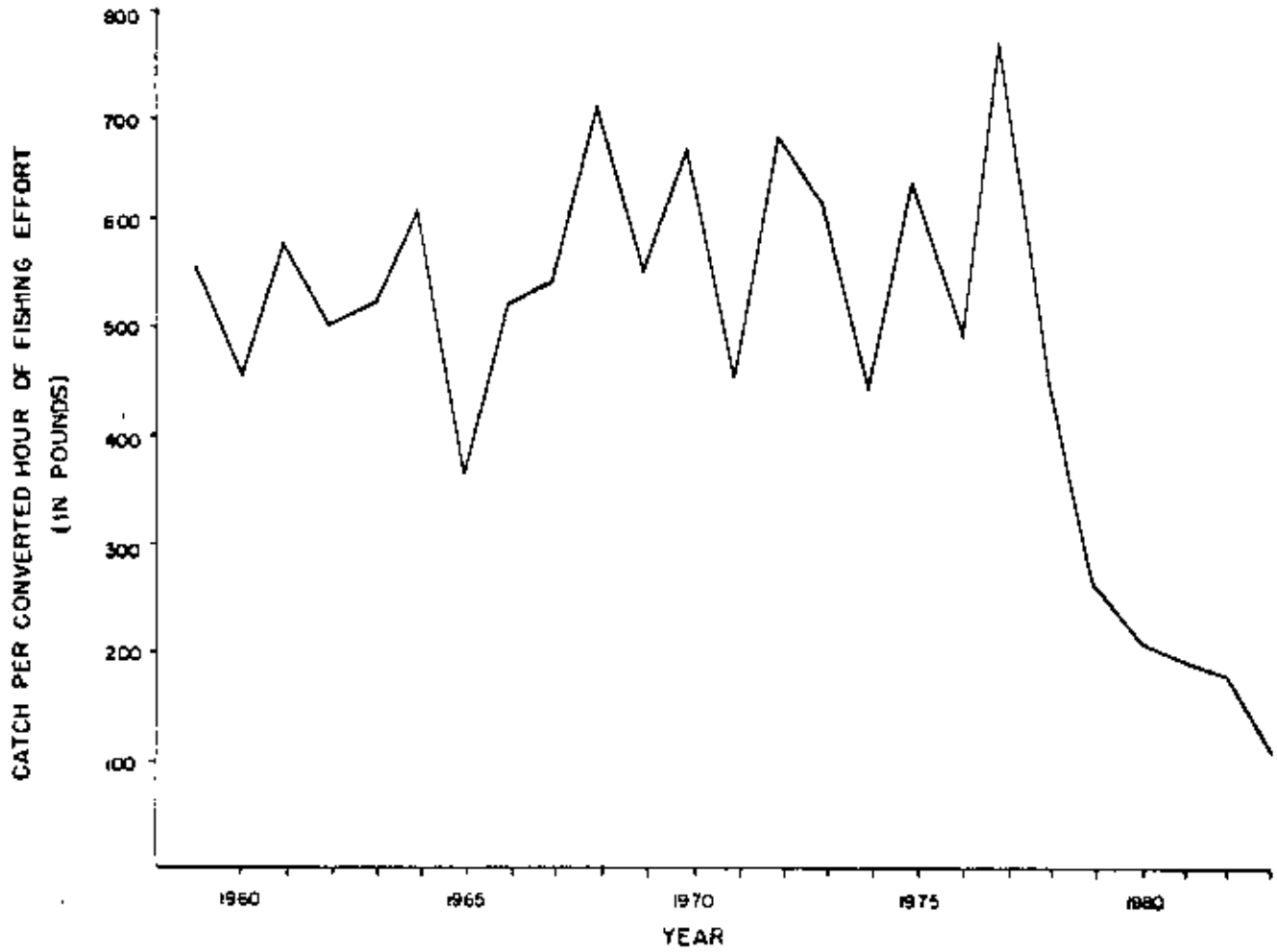

Figure 6. Washington, Oregon, and California Pink Shrimp Landed Catch Per Hour, 1960-1983. Fishing Effort Adjusted to Single-Rig Equivalent Hours.