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OREGON CRAB SEASONS

Introduction

The purpose of this report is to discuss the following items: (1) ocean and Columbia River crab seasons; and (2) results of the 1960-61 and 1961-62 sampling program as related to crab seasons.

Ocean Seasons

Until 1947-48 there were no coastwide seasonal restrictions on the harvest of crabs in Oregon. That year, following research findings, seasonal ocean restrictions were adopted by the Oregon Fish Commission. The first seasonal restrictions were based on crab condition. When 10% or more of the crabs became soft the season was closed, and when, according to sampling, the catch reached less than 10% soft the season was reopened. This type of season brought complaints from the crab industry: (1) the plants did not know when to prepare for operation; and (2) fishermen did not know when to get boats and gear ready. Also, sampling at sea twice a year was extremely costly and time consuming to the Fish Commission. On the basis of the 1947-48 sampling program and at the request of industry it was then decided to establish set seasons during the period when it was believed that less than 10% of the catch would be soft shelled. The dates recommended to the commission for a closed season were based on samples obtained in 1948 (Area I, 572 crabs; Area II, 747 crabs). These closed periods were September 15 to December 15 for Area I (north of Cascade Head) and August 15 to November 15 for Area II (south of Cascade Head). These dates were in effect until 1961. It was also recommended that the boundary between the areas be moved north to Tillamook Head since the Tillamook area more closely conformed with the southern area. This change was not made however. Samples taken at Astoria

in 1958, 1959, and 1960 and Newport in 1955, 1958, and 1960, though limited in number, continued to show a difference in time of hardening for Areas I and II (Table 1).

The present regulations restrict the fishery to adult male crabs in their third or fourth year of life which are probably approaching the end of their life span. Males mate at least once before reaching a marketable size. Results of tagging experiments conducted in Washington and Oregon suggest that the fishery harvests about 90% of the marketable crabs each season. The problem then becomes one of establishing season dates that will result in the harvest of crabs in prime condition and offer protection during the soft-shelled stage when they are most vulnerable to injury from handling or confinement with other crabs. In the early years of the fishery handling and confinement injuries were minimized because only relatively few fishermen were fishing crabs in the offshore waters. Now we have over 100 crabbers that fish in excess of 20,000 traps off the Oregon coast each season (Table 2). This number of pots fishing during the shedding period or shortly after could result in a serious loss of crabs to the fishery.

Columbia River Season

At the time ocean seasons were adopted it was decided not to regulate the estuaries on a seasonal basis. This decision was based on the inability of the biologists to establish any seasonal pattern of shedding within the estuaries south of the Columbia River. These areas contain a high percentage of soft-shell crabs during every month of the year. It was assumed at that time that the Columbia River followed the same pattern as other estuaries. However, studies conducted during the fall of 1957 and 1958 indicated that in the Columbia River the shedding and soft-shell period is virtually the same as in the ocean. The high percentage of soft-shell crabs available during

Table 1. Per Cent Legal Soft-Shell Ocean Crabs Sampled at Ports of Astoria and Newport, 1955 and 1958-60.

| Year | Date | Area I | | Area II | |
|------|----------------|-------------------|--------------|-------------------|--------------|
| | | No. Crabs Sampled | % Soft shell | No. Crabs Sampled | % Soft shell |
| 1955 | November 24 | | | 271 | 18 |
| 1958 | January 4 | 207 | 11 | | |
| | August 26 | 430 | 36 | | |
| | November 24-25 | | | 845 | 12 |
| | December 4 | 292 | 20 | | |
| | " 9 | 341 | 18 | | |
| | " 16 | 478 | 20 | | |
| | " 22 | 578 | 17 | | |
| | " 31 | 198 | 10 | | |
| 1959 | November 30 | | | 227 | 18 |
| | December 4 | 79 | 46 | | |
| | " 8 | 510 | 51 | | |
| | " 16-17 | 140 | 35 | 438 | 14 |
| 1960 | November 23 | 5253 | | 1781 | 38 |
| | December 6 | 581 | 57 | 426 | 19 |

Table 2. Crab Season, Number of Boats, and Maximum Number of Crab Pots Fished.

| Year | Numbers of Boats Fishing | Max. No. of Pots Fished |
|---------|--------------------------|-------------------------|
| 1947-48 | 67 | 8,015 |
| 1948-49 | 35 | 3,935* |
| 1949-50 | 29 | 3,795* |
| 1950-51 | 63 | 13,626 |
| 1951-52 | 83 | 15,709 |
| 1952-53 | 71 | 13,507 |
| 1953-54 | 83 | 16,177 |
| 1954-55 | 91 | 19,634 |
| 1955-56 | 92 | 18,923 |
| 1956-57 | 94 | 19,206 |
| 1957-58 | 73 | 21,307 |
| 1958-59 | 81 | 21,824 |
| 1959-60 | 97 | 20,623 |
| 1960-61 | 118 | 24,443 |
| 1961-62 | 134 | 28,399 |
| 1962-63 | 118 | 24,618 |

* Probably a low estimate.

321,939
27,905

3253
1781
5039
27905
32939

Duplicated

September, October, and November precludes considering a year-round season in the river. Also, tagging during 1957-58 demonstrated a free interchange of crabs between the ocean and Columbia River. In this study 25% of the tagged crabs released in the river were recovered in the ocean and 13% of the ocean releases were recovered in the river. This further substantiates the theory that the crab populations within the Columbia River estuary and the offshore area are one and the same.

The Washington Department of Fisheries is interested in the Columbia River closure; when the river was open Washington was faced with the problem of fishermen fishing offshore and landing crab as river caught (conversation with Cedric Lindsay). Some fishermen reason that Washington wants the Columbia River closed to give an economic advantage to the Puget Sound fishery, which is open from October 1 through May 15. Although the opening date of this season has varied by 15 days periodically to reduce conflict in water usage by gill netters and crabbers, the original timing was based on the studies conducted by Fred Cleaver in 1945-48. He was able to show that crabs in Puget Sound were in prime condition during the period October-May. No subsequent studies have been conducted in this area.

1960-61 and 1961-62 Crab Sampling

The condition of Dungeness crabs at the inception of each season fluctuates considerably between years. In some years only a small portion of the marketable crabs have soft shells (and little meat) and in other years substantial portions are soft shelled. The poor quality of crabs during the early portion of the 1959-60 season caused considerable concern within the industry and resulted in a recommendation to the Pacific Marine Fisheries Commission in November 1960 to delay the opening date along the coast. A concurrent recommendation called for uniform opening dates

for all areas. The northern California, northern Oregon (Area I), and Washington areas opened December 15; southern Oregon (Area II), opened November 15. The variable opening dates recommended for Oregon were based upon condition studies in 1948.

The Oregon Fish Commission acted in December 1960 to change the opening date for Area I from December 15 to January 1, and for Area II from November 15 to December 1. These new dates were to become effective in the 1961-62 season if the Washington season was altered to coincide with that proposed for Area I in Oregon. Subsequently the Washington season was altered.

The OFC action created controversy among some segments of the Oregon industry who alleged that the crab condition did not vary sufficiently between areas to warrant different opening dates for Areas I and II. In accordance with a FWFC request, a 2-year investigation was undertaken to determine the condition of crabs landed in the principal Oregon ports.

Methods

Through the cooperation of the processing plants and fishermen, crabs were sampled at sea and dockside for shell condition during the 1960-61 season and at dockside only during the 1961-62 season. Condition of the crabs was determined by pinching the shell at the base of the tenth antero-lateral spine. If the shell was immovable at this point, the crab was considered to be condition 1, or hard shelled. If the shell was flexible under pressure, it was considered as condition 2 or soft shelled. If it was very soft or compressed readily it was classified as condition 3. Samples were taken weekly when weather and landings permitted until the soft-shelled percentage declined to minimum levels. Also, each staff member sampled at least once in every port in order to minimize bias. Width frequencies were taken of all legal soft-shelled crabs and a portion of the hard-shelled crabs.

In this type of sampling the following assumptions must be made: (1) a crab with a soft or flexible shell is a crab that has not completely filled out since shedding; (2) uniform interpretation of shell condition by all samplers; and (3) the samples taken are representative of the crabs being caught in the fishing area.

During the 1960-61 season, 17,030 crabs were sampled for shell condition and in 1961-62, 10,825 crabs were sampled. Sampling took place at all major ports from Astoria to Brookings.

Crab Condition--1960-61

Table 3 summarizes the information collected concerning the condition of crabs as measured by the per cent soft shelled in the samples during the 1960-61 season. In general, the per cent soft-shelled crabs declined steadily after the season opened in all fishing areas. However, there was a decided difference in the condition of crabs between fishing areas, in the same week, during the early portion of the season. For the week ending January 1, percentage for southern Washington was 37 (Area I). For Area II, exclusive of the southernmost portion (Rogue River Reef to the California border), the percentages were 3, 5, and 13, respectively, moving southward. Curiously, the southernmost sub-area had a high percentage of 30. This area has only recently been extensively exploited by Oregon fishermen. Further study is indicated to determine whether this condition is consistent. The data indicates that a later opening in 1960 for all areas would have reduced the proportion of soft-shelled crabs landed, and that the crab condition does vary markedly between areas.

Crab Condition--1961-62

Table 4 summarizes the information collected concerning the condition of crabs landed by the per cent soft shelled in the samples during the 1961-62

Table 3. Summary of Crab Sampling by Area and Time for the 1960-61 Season.

| Date | Per Cent Soft Shelled by Area | | | | | | |
|----------------------------|-------------------------------|-----------|------------|------------|-----------|---------------|---------------|
| | Longbeach | Col. R. | C. Falcon | C. Lookout | Umpqua R. | C. Blanco | Rogue R. Reef |
| | to | to | to | to | to | to | to |
| Ending | Col. R. | C. Falcon | C. Lookout | Umpqua R. | C. Blanco | Rogue R. Reef | Calif. Border |
| Nov. 27 | --- | --- | --- | 38 | --- | --- | --- |
| Dec. 13 | 57 | --- | --- | 20 | 14 | 6 | 36 |
| Dec. 26 | 41 | 29 | --- | 7 | --- | --- | 36 |
| Jan. 1 | 37 | --- | --- | 3 | 5 | 13 | 20 |
| Jan. 8 | --- | 13 | --- | 5 | --- | --- | --- |
| Jan. 15 | --- | --- | --- | 8 | --- | 10 | 20 |
| Jan. 22 | 13 | 9 | --- | 7 | 6 | --- | --- |
| Jan. 29 | 9 | --- | --- | 9 | --- | 9 | 13 |
| Feb. 5 | --- | --- | --- | 6 | --- | --- | --- |
| Feb. 19 | 7 | 22 | --- | --- | --- | --- | --- |
| Feb. 26 | --- | --- | --- | 2 | --- | --- | --- |
| Mar. 5 | --- | --- | --- | 6 | 29 | --- | 12 |
| Mar. 19 | 5 | 6 | --- | --- | --- | --- | --- |
| Mar. 26 | --- | --- | --- | 3 | --- | --- | 5 |
| Apr. 2 | 63 | 10 | --- | --- | --- | --- | --- |
| Apr. 16 | --- | --- | --- | 5 | 2 | --- | --- |
| Apr. 30 | 23 | --- | --- | --- | --- | --- | --- |
| May 7 | 13 | --- | --- | --- | --- | --- | --- |
| Total Number Sampled | 3,391 | 1,602 | 0 | 6,052 | 1,968 | 1,223 | 2,844 |

Table 4. Summary of Crab Sampling by Area and Time For the 1961-62 Season.

| Date | Per Cent Soft Shelled by Area | | | | | | |
|----------------------------|-------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|----------------------------------|--------------------------------------|
| | Longbeach to Col. R. | Col. R. to C. Falcon | C. Falcon to C. Lookout | C. Lookout to Uniquis R. | Uniquis R. to C. Blanco | C. Blanco to Rogue R. Reef | Rogue R. Reef to Calif. Border |
| Dec. 10 | | | | 13 | 11 | | 10 |
| Dec. 17 | | | | 10 | 12 | 14 | 10 |
| Dec. 24 | | | | | | | |
| Dec. 31 | | | | 12 | | | |
| Jan. 7 | | | | | 19 | | 25 |
| Jan. 14 | 21 | 50 | | | | | |
| Jan. 21 | 7 | 17 | | 4 | 23 | 0 | 16 |
| Jan. 28 | | | | | | | |
| Feb. 4 | 5 | 14 | | 7 | 7 | | 5 |
| Feb. 11 | 4 | | | | | | |
| Feb. 18 | | | | | | | |
| Feb. 25 | | 3 | | 1 | 15 | | 7 |
| Mar. 4 | 3 | | | | | | |
| Mar. 11 | 4 | | | | | | |
| Mar. 18 | 5 | | | 7 | | | |
| Total Number Sampled | 2,612 | 773 | 0 | 2,444 | 2,167 | 784 | 2,045 |

season. Crab condition was better on the opening in all areas in 1961-62 than in 1960-61 except for those taken just south of the Columbia River. This area contained an unusually high percentage of soft-shelled crabs. In general the trend was for the soft-shelled percentage to decline as the season progressed. However, what appeared to be a group of late-shedding crabs entered the fishery in mid-January and increased the soft-shelled percentages at Coos Bay and Brookings. Differences in condition between areas were not pronounced as in 1960-61, perhaps because of the lower incidence of soft-shelled crabs in 1961-62.

Crab Size

Information was also collected concerning the size of hard and soft crabs. The soft-shelled crabs in almost all samples in both seasons were smaller than the hard-shelled crabs. Furthermore, the mean width of soft crabs declined throughout the season in most areas. One or more of the following reasons may account for this: (1) crabs which were sublegal during the early portion of the seasons molted and reached marketable size but had not hardened up; (2) freshets may have caused bay crabs to emigrate to the sea—these are smaller crabs and a substantial portion of them are soft at any time of year; or (3) smaller crabs have thinner shells and may have been categorized as soft merely because the thinner shells offered less resistance to squeezing.

Conclusions and Recommendations

The 1960-61 and 1961-62 crab sampling substantiated the difference in condition of crabs from different areas, particularly in 1960-61. The differences within Area II on the opening in 1961 were small, however, crabs captured off the Umpqua River some time later were softer than those landed

immediately after the opening. This area traditionally contains small, soft crabs during the winter that probably come out of the Umpqua River during freshets. The area from the Rogue River Reef south has only recently been exploited by Oregon fishermen and merits further study before any conclusions are reached.

In general the 2-year study shows variations in crab condition at the season opening. However, the data do indicate that a later opening would result in a higher percentage of crabs in prime condition. This study also indicates, because of the high degree of variation, that a longer period of sampling is needed to establish long-term variations in crab condition during the early weeks of each season.

In view of the foregoing data it is recommended, because of the high incidence of soft-shelled crabs in the Columbia River in October, November, and December, that the Columbia River season should remain the same as the offshore season. It is also recommended that one of the following alternatives be selected for the offshore season: (1) maintain the present seasons until we can gather at least three more years of data on shell condition at the season opening; (2) divide the coast into three areas with the extreme northern and southern portions opening January 1 and the area from Cascade Head to Cape Blanco opening December 1; or (3) open the entire coast on January 1 if California would alter their opening to correspond. It is true that crabs harden earlier along the central coast, however, with a delay in opening these crabs would be in even better condition.

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