Introduction

The history of the striped bass fishery in the Coos Bay area was reviewed and summarized through 1950 in a report to the 46th legislature dated December 1950 (Morgan and Gerlach, 1950). This paper was the result of a combined effort of the Oregon Fish Commission and Oregon Game Commission.

Earlier fishing regulations from 1931 to 1946 permitted the taking of bass from April 1 to June 30, July 15 to November 20, and December 10 to March 20. Following the closure of the commercial salmon fishery after 1946, the taking of bass by netting was restricted to the period allowed for the shad fishery of April 1 to June 30. Commercial fishing by hook and line and set lines was allowed the year around through 1948. In 1949 legislation was enacted which limited the commercial fishery to the shad season of April through June.

The current commercial gill-net mesh regulations permit a minimum stretched mesh of 4 1/2 inches with a maximum stretched mesh of 6 1/2 inches. Before the development of nylon nets, the fishermen used a 3-ply 5 3/4-inch mesh linen. In the 1957 season most of the fishermen used a 3-ply, 5 3/4-inch nylon net designated as #139. These nets were selected primarily for the catching of shad, and the catching of bass was more or less incidental, with the exception of a heavy mesh net fished near the forks in the early part of the season primarily for catching bass.

Commercial Fishing Intensity, 1947-1957

Table 1 gives the number of drift and set-net licenses issued for commercial fishing in Coos Bay since 1947.

The licenses issued since 1949 were used only for the purpose of fishing for shad and striped bass during the shad season; consequently, the number of licenses might be considered an indication of the fishing effort on these species.
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The average catch per license issued is shown for the years 1947 through 1957. The 1957 average catch of 143.9 pounds is the lowest on record and is considerably lower than the immediately preceding ten-year average of 323 pounds.

**Fishing Areas**

Fishing at the start of the season in 1957 was confined to an area at the confluence of the Millicoma River and the South Fork of the Coos River by one fisherman. Later in the season net sites of the other fishermen were scattered out from an area just below the forks up each fork to the deadlines located below Deaton Creek on the Millicoma and near Rogers Creek on the South Fork. Still later in the season some sporadic drift netting was done in the upper bay area across from North Bend. Two fishermen were known to have fished in this area with another one drifting near the railroad bridge.

**Relationship to the Shad Fishery**

It was known that only one fisherman using a heavier salmon-type net fished solely for the purpose of catching striped bass up to the time that the shad fishery improved which was about April 23. He stated that this early fishing for bass paid the fishing expenses for the year.

Most of the time the shad fishermen were fishing a fragile nylon net as described earlier but they are known to have used a stronger mesh net at times when larger numbers of bass were observed in the vicinity of the fishing areas.

No large catches of bass materialized from this type of fishing in 1957 even though it was learned from frequent contacts with the individual fishermen that large numbers of bass were observed passing through the fishing areas.

The annual landings of striped bass and shad from 1949 to 1957 are shown in Figure 1. The catch in 1957 is considerably below the eight-year average (1949 to 1956) of 24,205 pounds.
Table 1. Gill-Net Licenses Issued for Shad and Striped Bass on Coos Bay and the Average Catch Per License, 1947-1957.

<table>
<thead>
<tr>
<th>Year</th>
<th>Licenses</th>
<th>Catch in Pounds</th>
<th>Lbs. Bass/License</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drift</td>
<td>Set</td>
<td>Bass</td>
</tr>
<tr>
<td>1947</td>
<td>34</td>
<td>245</td>
<td>87,414</td>
</tr>
<tr>
<td>1948</td>
<td>21</td>
<td>179</td>
<td>94,448</td>
</tr>
<tr>
<td>1949</td>
<td>10</td>
<td>140</td>
<td>23,413</td>
</tr>
<tr>
<td>1950</td>
<td>11</td>
<td>121</td>
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<td>1951</td>
<td>7</td>
<td>90</td>
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<td>1952</td>
<td>9</td>
<td>75</td>
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<td>59</td>
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</tr>
<tr>
<td>1954</td>
<td>4</td>
<td>56</td>
<td>20,094</td>
</tr>
<tr>
<td>1955</td>
<td>4</td>
<td>63</td>
<td>22,383</td>
</tr>
<tr>
<td>1956</td>
<td>3</td>
<td>50</td>
<td>27,696</td>
</tr>
<tr>
<td>1957</td>
<td>3</td>
<td>52</td>
<td>7,912</td>
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</table>
Figure 1. Annual Landings of Striped Bass and Shad on Coos Bay, 1949 - 1957.

- Striped Bass
- Shad

Thousands of Pounds

Catch Per Unit of Effort

The average daily delivery instead of the total catch was used as a measure of abundance by Morgan and Gerlach (1950) to avoid the changes in the intensity of the fishery which might vary due to changes in regulations and a fluctuating market. This measure of abundance was used again only to conform to the pattern set up by the original investigation as there have been no regulation changes since 1949 and the 1957 market price was fairly stable at 14 cents per pound throughout the season.

The average catch of striped bass per delivery has been determined for the years 1949 to 1957 and is shown in Figure 2 along with the total catches for these years. The average daily delivery for the five years previous to 1957 was 36 pounds compared to the average in 1957 of 23 pounds. The ten-year average of the total yearly catches from 1947 to 1956 was found to be 37,550 pounds. This is considerably more than the total catch for 1957 of 7,912 pounds.

Average Weights

It has been stated by Morgan and Gerlach (1950) that one indication of overfishing in a fish population composed of several year classes may be a decrease in the average size of the fish. This average size may be reduced by the removal of fish of the older age groups which are subjected to the fishery for a number of years. In 1949 and 1950 the average weights were 8.2 and 9.1 pounds, respectively, as shown in Figure 3. In 1951 this average weight fell to 7.1 pounds. This low average weight is perhaps a reflection of the larger proportion of 3-to 4-year-old fish entering the fishery. Weights from 1953 and 1955 were not available, but from 1955 to date there has been an increase in the average weights from 9.1 to 9.4 pounds. This general increase in average weights can be explained by examining Figure 4 which shows the mode in the random length frequencies increasing with relatively more fish of the older age groups entering the fishery. The appearance of the large group of 45.55 cm. fish in 1957 was more than offset in weight by
Figure 2. Annual Commercial Catch and Average Daily Delivery of Striped Bass During the Shad Season on Coos Coos Bay, 1949-1957.
Figure 3. Average Weights of Striped Bass Taken During Shad Season on Coos Bay as Determined from the Records of One Buyer, 1949-1957.
Figure 4. Random Length Frequency Curves for Striped Bass Sampled in Commercial Catch in Coos Bay 1949-1957.
the numbers of large fish in the 70 to 85 cm. group in the catch. This in itself would appear to indicate that the stocks of fish are in fairly good condition. There is, however, some incongruity here when compared with the decline in the average daily landings which was used as a measure of abundance.

**Gonadal Development and Sex Ratio**

Figure 5 shows the sexual development of a sample of female bass for three weekly periods.

Observations of the gonadal development of some female bass were made during the period of May 1-27 at one buying station. After this date most of the fish were shipped in the round and were not available for inspection.

The stage of development was difficult to determine in some of the fish due to the presence of two sets of gonads, one contained within the other.

A large egg sac was normally filled with what was apparently very ripe eggs which spilled out onto the table when cut open. A portion of these eggs were of a normal green color, but the remainder were light brown or tan color next to a portion of the ovary which adhered to the inner lining of the body cavity. Within this loose mass of eggs was contained a much smaller pair of very immature egg sacs 3-to-4 inches long. This described condition was recorded for three females. Early in the season it was observed in other fish, but no record was made of the number of fish. The plant workers reported seeing this condition in other fish on days when sampling was not done.

Sex ratios in the commercial catch sample (Figure 6) were determined for the same weekly periods as shown in Figure 4.

During the first sampling period the males constituted 68 per cent of the examined fish outnumbering the females 64 to 27; with 3 per cent of the sample being hermaphrodites. The females were more numerous during the last two sampling periods, the ratio being 16 to 3, and 38 to 25, respectively.
Figure 5. Gonad Conditions of Female Striped Bass From Samples in the Commercial Catch inCoos Bay 1957.

![Bar chart showing gonad conditions of female striped bass from samples in the commercial catch in Coos Bay 1957.](chart.png)

- Maturing
- Ripe
- Spent
Figure 6. Sex Ratios of Striped Bass from Samples in the Commercial Catch in Coos Bay in 1957.

- Females
- Males
- Hermaphrodites

<table>
<thead>
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<th>Month</th>
<th>N</th>
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<tbody>
<tr>
<td>May 1-8</td>
<td>91</td>
</tr>
<tr>
<td>May 9-16</td>
<td>24</td>
</tr>
<tr>
<td>May 20-27</td>
<td>63</td>
</tr>
</tbody>
</table>
Sampling Data 1949 to 1957

During 1949 and 1950, scale samples were taken from striped bass of all available lengths. These scales were mounted in cellulose acetate and later read with a binocular microscope for age determination. Having determined the age composition of the fish in each length group and relating it to the random length frequency samples, it is possible to make assumptions relative to the different age groups present in the commercial catch sampling in subsequent years. These previous data from 1949 and 1950 were used in determining the age groups from the random-length frequency curves obtained in the sampling for the years 1951 to 1957 with the exception of 1952 and 1953 when very little sampling was done. Since very small numbers of the larger fish were available for sampling, no age determination was made for fish above the 10-year-old group.

Rather intensive sampling for random lengths, average weights, and scales was done in 1955, 1956, and 1957. The per cent of the commercial catch sampled in each year was 60, 45, and 65, respectively. Less intensive sampling in 1951 included only 23 of the commercial catch. Very limited sampling was done in 1952 and 1954. Figure 4 shows the random length frequency curves for bass examined in the commercial catch samples since 1949.

The 1949 sampling showed two distinct size groups around 55 and 73 cm. This is followed through to some extent in 1950, but the mode at 55 cm has shifted to around 62 cm, showing the presence of that particular year class in the fishery. Another large group has appeared at 53 cm. The 1951 sampling produced nearly the same modal trend as in 1950.

The very small sample of 1954 produced a mode at 60 cm, with fewer of the smaller or larger fish being available for sampling. A more or less normal distribution appeared in the 1955 sampling with the mode occurring at 62 cm. This modal point of around 62 cm, which has appeared in the length frequency curves since 1950, is apparently due to the numbers of five-year-old fish. This group appears in 1956 as a dominant year class, but in addition a large segment at 67 cm...
presumably six-year-old fish, produces a near dominant mode.

The 1957 sampling produced a multi-modal curve with fairly large numbers of fish appearing in the 49, 63, 69, and 73 cm. groups. Referring to the data of Morgan (loc. cit.) these are presumed to be 3%, 7%, 6% to 7% and 8 to 9-year-old fish respectively. Some smaller modes of apparently 10- and 11-year age groups were also present.

In 1956 a small mode at 33 to 43 cm. appeared in the catch. This group presumably appeared again in 1957 at a large mode around 49 cm, as 3-year-old fish.

The mesh size used in the commercial fishery allows the escape of most of the fish younger than the 3-year-old groups or below 45 cm, which the 4- to 7-year-old fish appear to contribute the bulk of the catch.

Numbers of larger fish in the 8- and 9-year age groups were also much in evidence in the catch of 1956 and 1957.

Sport Fishery

The annual reports of the Game Commission on the sport fishery catch of striped bass do not contain any data for the years of 1952 to 1954. In 1955 for the sampling period of November 1954 to October 1955, 769 anglers checked caught 216 bass, as reported in the Annual Report, Oregon State Game Commission Fishery Division (1955).

During the period of November 1955 to October 1956, as reported in the Oregon State Game Commission, fishery division, Annual Report (1956), 494 anglers were checked with a total of 25 fish.

Preliminary reports for the period of October 1956 to September 1957 by the Oregon State Game Commission reveal that 317 bass were caught in a sample of the sport catch.

These data represent only that portion of the sport catch which was sampled, the total catch being greater than the number sampled.
This partial count in 1957 of 817 striped bass is nearly equivalent in numbers to the total commercial catch of 842 fish.

In 1949 and 1950 Morgan and Gerlach (1950) found the average weight of sport-caught bass to be 5.8 pounds. This figure was used to produce a partial sport catch weight of 8,798 pounds for the fish sampled October 1956 to September 1957.

A total sport catch estimate of the 1949 striped bass fishery was 7,168 bass weighing 60,928 pounds.

Summary

1. Considerable decline is noted in the total number of licenses issued for commercial fishing of striped bass and shad from 150 in 1949 to 55 in 1957.
2. The commercial striped bass has declined from 23,413 pounds in 1949 to 7,912 pounds in 1957. The ten-year average from 1946 to 1957 is 37,530 pounds.
3. The average weight as measured by samples of the commercial catch remained about 9 pounds in 1955-57.
4. The average daily delivery which is used as a measure of abundance shows an increase from 18.5 pounds per delivery in 1953 to 66.4 pounds in 1956 with a drop to 23.1 pounds in 1957.
5. Sex ratios in 1957 indicated that female bass predominated in the catch during the latter part of May, but the sampling was not sufficient to make a comparison for the entire season.
6. Length frequency curves and previous age-size data indicate that fish of 52 to 73 cm. in length (4 to 7 years old) make up the bulk of the fish in the commercial fisheries. A large group of 3-year-old fish appeared in the 1957 sampling.
7. Partial sport catch figures for 1956-57 season of 817 (sampled) fish compares closely in numbers with the total commercial catch of 842 fish. The total sport catch estimate for the 1949 season was 7,168 fish weighing 60,928 pounds.
Recommendations

From the data summarized since 1950 and that secured in 1957 it is felt that continued complete and extensive sampling of the commercial fisheries is very necessary in analyzing the changes in the stocks of fish and in addition it is quite possible that additional effort by tagging should be considered.

Literature Cited

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1956.
1957 Annual Reports, Fishery Division.

Raymond H. Breuer

March 27, 1959