MARINE FISHERIES PROGRESS REPORT

May through October, 1953

OTTER TRAWL INVESTIGATIONS:

Introduction

During the period May through October, 1953, the otter trawl investigation was directed primarily to field work. However, a fair amount of laboratory work was also completed.

The markets for bottom fish varied considerably during the period. Little fishing occurred during May. In June a fair demand for Pacific ocean perch developed and all fillet plants began purchasing this species. The plants imposed limits on the amounts of "perch" the boats could catch in any one trip, but these limits varied from 5,000 to 20,000 pounds for any one trip. Furthermore, at certain times there was no limit placed on the landings. From a statistical standpoint this produced an extremely chaotic situation. Because of the market for "perch", the fishermen did not fish the Dover sole as intensely as they normally do at this time of year, and consequently market samples of this species were difficult to obtain.

During July and August the demand for "perch" fell of sharply, and only one plant remained in the market for any significant quantities of this speices. The other plants bought Dover sole principally.

In September, market conditions caused one plant to cease buying Dover sole almost entirely and this plant reverted to purchasing "perch", but from a reduced fleet. A second plant which

had taken no bottomfish for most of the summer reopened in September and began buying Dover sole and Pacific ocean perch. This situation continued through October.

## FIELD WORK

### Market Samples--Dover Sole

Dover sole was the principal species of sole sought by the Oregon otter trawl fleet during the 1953 season. Consequently all sampling effort was directed at this species.

During the period June 8 through September 21, 20 samples (8,249 fish) of Dover sole caught off the Columbia River were taken, and 1,096 otoliths were collected for age analysis.

### Market Samples--Mink Food

The Oregon Fur Producers' Association continued to operate their Astoria freezer plant for processing of whole fish and fillet scrap for mink food. In addition, they opened a new plant at Newport. The Newport plant processed only whole fish as no fillet plant operated (with the exception of one small operation for fresh fish markets) during 1953. Four boats were employed by the OFPA to supply whole fish to this new plant.

#### Astoria

During the period May 15 through September 28, 13 mink food samples (13,172 fish) were taken at the Astoria plant of the OFPA. Dover, english, and petrale soles aggregated 22 percent, by number, of the samples for the season.

Newport

The opening of the OFPA plant at Newport necessitated samples from the landings as it was expected that considerable portions of the landings would be food fish since there was no market at Newport for fillet fish.

No extra personnel were available from the Astoria laboratory, but through the kind and generous cooperation of Harry Moore, Ken Waldron, and Stan Wilkes, (all stationed at Newport) seven samples (6,397 fish) were obtained for the period July 15 through September 23. Honorable mention should also be made of the assistance provided by Jerry Jurkovich (Washington Department of Fisheries) in obtaining the last two samples in September. Jurkovich was "drafted" for sampling while he was awaiting departure aboard a Newport otter trawler for a tri-state cooperative mesh experiment on Pacific Ocean perch.

Dover, english, and petrale sole totaled 42 percent, by number, of the fish landed as mink food at Newport.

Coos Bay

Small quantities of whole fish were also landed at Charleston (Coos Bay) for mink food. Visual checks were made on 5 separate landings through the efforts of Monte Richards, troll salmon sampler, at that port for the summer.

Based on the visual examination only, it was estimated that Dover, english, and petrale soles accounted for 73 percent, by weight, of the fish landed for mink food at Charleston.

Sampling-at-Sea

With the advent of the otter trawl mesh regulation to become effective during 1954, it was deemed advisable to spend one more summer at the Sampling-at-sea experiments. The results would then be comparable with similar experiments to be conducted in 1955 and 1956. Five trips were taken aboard Astoria otter trawlers and 14,180 fish were sampled from the gross catches at sea.

Mesh Experiments

The tri-state cooperative otter trawl mesh experiments began in 1952 under the auspices of the Pacific Marine Fisheries Commission. The original plans called for studies on Dover, english, and petrale soles; sablefish; and Pacific Ocean perch. The California research vessel, N. B. Scofield, was generously donated for this purpose during August and early September of 1952.

The Pacific Ocean perch were included because the commercial fishermen of Oregon and Washington claimed that the large-meshed nets suitable for sole fishing would prove to be unsatisfactory for Pacific Ocean perch, due to the gilling of this species in the meshes of the net. The gilling allegedly would cause an undue hardship upon the fishermen in handling the nets, e.g., "splitting" and removing the gillers, and would result in a significant loss of fishing time.

Unfortunately time ran out in 1952 before an adequate study could be made of this gilling by the Pacific Ocean perch. Consequently, plans were laid to conduct further tri-state studies of the extent and seriousness of this gilling during the 1953 fishing season. Five trips were taken aboard chartered commercial otter trawlers during 1953. Four of these were made aboard Oregon vessels, and one aboard a Washington vessel.

The following table briefly summarizes the results:

| Trip Number | Date | Port | Results |
|---|---|---|---|
| 1 | 7/20-21 | Newport | None. No fish, rough seas. |
| 2 | 8/29-9/2 | Seattle | Fair. Catches small, little gilling. |
| 3 | 9/24-25 | Newport | None. No fish, rough seas. |
| 4 | 10/13-15 | Astoria | Fair. Rough weather curtailed trip. |
| 5. | 10/22-24 | Astoria | Fair. Boat filled up before all tests could be completed. |

Trips 1, 2, and 3 were undertaken with biologists present from the three cooperating states. Trips 4 and 5 were taken by two Oregon biologists only, since the unpredictable autumn weather made departure times difficult to determine.

A sixth trip was planned to begin immediately after Trip 5; however, owing to a misunderstanding over the departure time, the biologists literally missed the boat. Shortly after leaving the dock on this trip, the boat rammed the north jetty at the mouth

of the Columbia River and sank. Fortunately no lives were lost, but all the gear aboard, including nets, movie camera, measuring boards, etc., were lost. With the loss of the equipment no further experiments were attempted this year.

Early Life History Studies--English Sole

The field work for the two year study of the early-life history of english sole inhabiting Yaquina Bay was completed with the monthly sample caught June 15, 1953.

Statistical System.

Routine monthly trips were taken to the Portland Office to code all otter trawl and long-line catches. This is done to facilitate summarizing by the IBM machine at the end of the fiscal year.

## LABORATORY WORK

### STATISTICS OF OTTER TRAWL FISHERY

The statistical analysis of the Astoria otter trawl landings of dover, english, and petrale soles was rechecked for accuracy for the period 1948-50, incl.

The 1951 otter trawl landings of english and petrale soles were segregated by area of capture.

### STATISTICAL ANALYSIS OF MARKET SAMPLING METHODS

The statistical analysis of the market sampling methods (see MARINE FISHERIES PROGRESS REPORT--Otter Trawl: November, 1952, through April, 1953) was continued.

Chi-square was employed to test for heterogeneity between sex ratios found in otolith and total samples of dover sole taken during 1948-51, incl., and 1953.

Tests were made of each sample, of monthly totals, and for the seasons' totals. For brevity, the results of these tests, by month, by year, are included in Table 1.

These results indicate that the otolith samples are probably representative of the total samples with respect to sex ratio. No explanation is offered at this time for the lower values of Chi-square for the period 1948-50 than for 1951-53.

PACIFIC OCEAN PERCH

Further progress in the study of the Pacific Ocean perch included the calculation of the length-weight formula, and the initiation of an analysis of the growth of these fish based on scale measurements to each annulus.

Table 1. Chi-square Test for Heterogeneity ($H_o$: M:F ≠ m:f) Between Sex Ratios Found in Total Samples and Otolith Samples, Respectively, of Dover Sole, by Month, by Year, 1948-53, Inclusive.

| | | Total Sample | | | Otolith Sample | | | Chi-Square | P* |
|---|---|---|---|---|---|---|---|---|---|
| | Month | M | F | T | m | f | t | | |
| 1948 | Jul | 169 | 180 | 349 | 92 | 76 | 168 | 5.403 | 0.02 - 0.05 |
| | Aug | 210 | 175 | 385 | 48 | 54 | 102 | 2.306 | 0.10 - 0.20 |
| | Sep | 149 | 132 | 281 | 26 | 18 | 44 | 0.099 | 0.70 - 0.80 |
| | Oct | 68 | 196 | 264 | 8 | 20 | 28 | 0.888 | 0.30 - 0.50 |
| | Totals | 596 | 683 | 1279 | 174 | 168 | 342 | 0.134 | 0.70 - 0.80 |
| 1949 | Jun | 90 | 268 | 358 | 16 | 63 | 79 | 1.002 | 0.30 - 0.50 |
| | Jul | 269 | 339 | 608 | 49 | 71 | 120 | 0.566 | 0.30 - 0.50 |
| | Aug | 1250 | 1617 | 2867 | 147 | 171 | 318 | 0.892 | 0.30 - 0.50 |
| | Sep | 391 | 646 | 1037 | 45 | 75 | 120 | 0.002 | 0.95 - 0.98 |
| | Totals | 2000 | 2870 | 4870 | 257 | 380 | 637 | 0.137 | 0.70 - 0.80 |
| 1950 | Jun | 645 | 954 | 1599 | 65 | 94 | 159 | 0.019 | 0.80 - 0.90 |
| | Jul | 463 | 537 | 1000 | 46 | 54 | 100 | 0.036 | 0.80 - 0.90 |
| | Aug | 499 | 501 | 1000 | 47 | 53 | 100 | 2.496 | 0.10 - 0.20 |
| | Sep | 492 | 508 | 1000 | 48 | 52 | 100 | 0.058 | 0.80 - 0.90 |
| | Oct | 276 | 423 | 699 | 33 | 47 | 80 | 1.043 | 0.30 - 0.50 |
| | Totals | 2375 | 2923 | 5298 | 234 | 305 | 539 | 0.436 | 0.50 - 0.70 |
| 1951 | Jun | 244 | 356 | 600 | 45 | 65 | 110 | 0.003 | 0.95 - 0.98 |
| | Jul | 1254 | 1352 | 2606 | 202 | 183 | 385 | 2.915 | 0.05 - 0.10 |
| | Aug | 837 | 1161 | 1998 | 112 | 163 | 275 | 0.153 | 0.50 - 0.70 |
| | Sep | 293 | 389 | 682 | 46 | 64 | 110 | 0.059 | 0.80 - 0.90 |
| | Totals | 2628 | 3298 | 5886 | 405 | 475 | 880 | 0.673 | 0.30 - 0.50 |
| 1952 | Jun | 930 | 1380 | 2310 | 110 | 164 | 274 | 0.001 | 0.98 |
| | Jul | 1313 | 1252 | 2565 | 156 | 174 | 330 | 2.026 | 0.10 - 0.20 |
| | Aug | 860 | 1345 | 2205 | 194 | 246 | 440 | 0.474 | 0.30 - 0.50 |
| | Sep | 316 | 463 | 779 | 36 | 74 | 110 | 2.714 | 0.05 - 0.10 |
| | Oct | 94 | 270 | 364 | 9 | 46 | 55 | 2.570 | 0.10 - 0.20 |
| | Totals | 3513 | 4710 | 8223 | 505 | 704 | 1209 | 1.456 | 0.20 - 0.30 |
| 1953 | Jun | 694 | 842 | 1536 | 110 | 108 | 219 | 2.251 | 0.10 - 0.20 |
| | Jul | 1146 | 1380 | 2526 | 158 | 169 | 327 | 1.148 | 0.20 - 0.30 |
| | Aug | 497 | 948 | 1445 | 74 | 146 | 220 | 0.056 | 0.80 - 0.90 |
| | Sep | 1304 | 1438 | 2742 | 156 | 174 | 330 | 0.011 | 0.90 - 0.95 |
| | Totals | 3641 | 4608 | 8249 | 499 | 597 | 1096 | 0.859 | 0.30 - 0.50 |

* Probability that a greater value of Chi-square could occur due to chance alone.