

Jones

OTTER-TRAWL INVESTIGATIONS
PROGRESS REPORT

November 1954 - April 1955

INTRODUCTION

The winter period (November -- April) for the otter-trawl investigations was occupied with an abnormal number of extra-curricular activities which sharply curtailed work on regular projects.

The following table lists the meetings attended, location, and personnel involved. Not included are assorted editorial board conferences, and industry conferences regarding the mesh and mink food regulations.

<u>MONTH</u>	<u>MEETING</u>	<u>LOCATION</u>	<u>PERSONNEL</u>
December	P. M. F. C.	Portland	Jones Westrheim
	W. S. D. F. --Staff Meeting	Seattle	Westrheim
	O. F. C.--Project Leaders' Meeting	Newport	Westrheim
January	Oregon State Fur Breeders Association	Portland	Jones Westrheim
	O. F. C.---Staff Meeting	Milwaukie	Jones Westrheim
February	P. M. F. C.--Biologists Meeting	Portland	Jones Westrheim
March	P. F. B.	Gearhart	Jones Westrheim
April	O. F. C.---Public Hearing	Portland	Jones Westrheim
	O. F. C.---Project Leaders' Meeting	Sandy	Westrheim

WINTER

FLEET ACTIVITIES

The trawl fishery was slow throughout November, December, and part of January due to poor weather conditions. Throughout February, and parts of January and March, the weather conditions were more favorable for fishing. However, during parts of March and most of April and May a series of storm fronts kept the drag boats in port or limited them to short trips.

A strike voted for by the cannery workers for the first of May threatened to close down all drag fishing but was averted at the last minute.

LABORATORY ACTIVITIES

Laboratory activities included a number of miscellaneous activities as follows:

1. Progress Report for the period May - October 1954.
2. Marine Fisheries research projects submitted for approval under the Saltonstall-Kennedy Act. (Not accepted)
3. Compilation of otter trawl statistics for inclusion in the Oregon Fish Commission statistical bulletin, 1950-53.
4. Boat histories for Oregon otter trawlers.
5. Mink food analysis of the 1953 and 1954 samples.
6. Preparation of a brief for public hearing on otter-trawl mesh and mink food regulations.
7. Publications:
 - a. Flounder tagging paper.
 - b. Yaquina Bay Juvenile English Sole paper.
 - c. Editing.
8. Preparation of a plan for the organization of the library at the Astoria Laboratory in particular, but also to be applied to the Clackamas Laboratory.

FIELD ACTIVITIES

Normally the winter period is devoid of field activities. However, the discovery and subsequent intensive exploitation by the Astoria otter trawl fleet of a concentration of spawning Dover sole off Willapa Bay (in 180-350 fathoms) led to the organization of a tagging program and some market sampling of these fish.

This area was discovered late in February of 1954 and produced some 600,000 pounds of Dover sole during March and April. Fishing resumed in October when the Dover sole presumably returned, and another 300,000 pounds were taken from this area during October, November, and December. This small area produced approximately 26 per cent of the total Oregon Dover sole production in 1954. During the remaining four months of winter and early spring (January to April) fishing success was poor in this area.

The development of this new area raised considerable discussion in the industry as to the advisability of fishing on these spawning fish. However, no one knew whether these fish were from the inshore grounds fished in the summer or were permanent residents of the deeper waters beyond the continental shelf. The tagging program was designed to answer this question, if possible.

Various delays postponed the tagging until April of 1955. The otter trawler "Marian F" was chartered at \$400 per day for the tagging trips. The dates of the trips and numbers of tags put out are as follows:

DATE	NOS. TAGGED
April 18	324
21	371
22	283
29	663
30	765
TOTAL	2,406

A total of 2,406 Dover sole was tagged. The first two trips were curtailed due to inclement weather, while the last trip was terminated on the expiration date of the contract. Jones and Westrheim participated in the first two trips (April 18 & 21-22) and Denver Fleming was the third man on the team for the last trip. The addition of the third man allowed two taggers to operate simultaneously. The increased numbers of tags per day for April 29 and 30 were largely due to the additional man. During the winter months especially, the ocean rarely remains fishable for more than two or three days, and thus the need for speed in tagging at sea.

Five samples of Dover sole from the "deep" were taken during the period October through May, in order to determine the sex ratio and size composition of these fish for comparison with those sampled from the "local" inshore grounds during the summer.

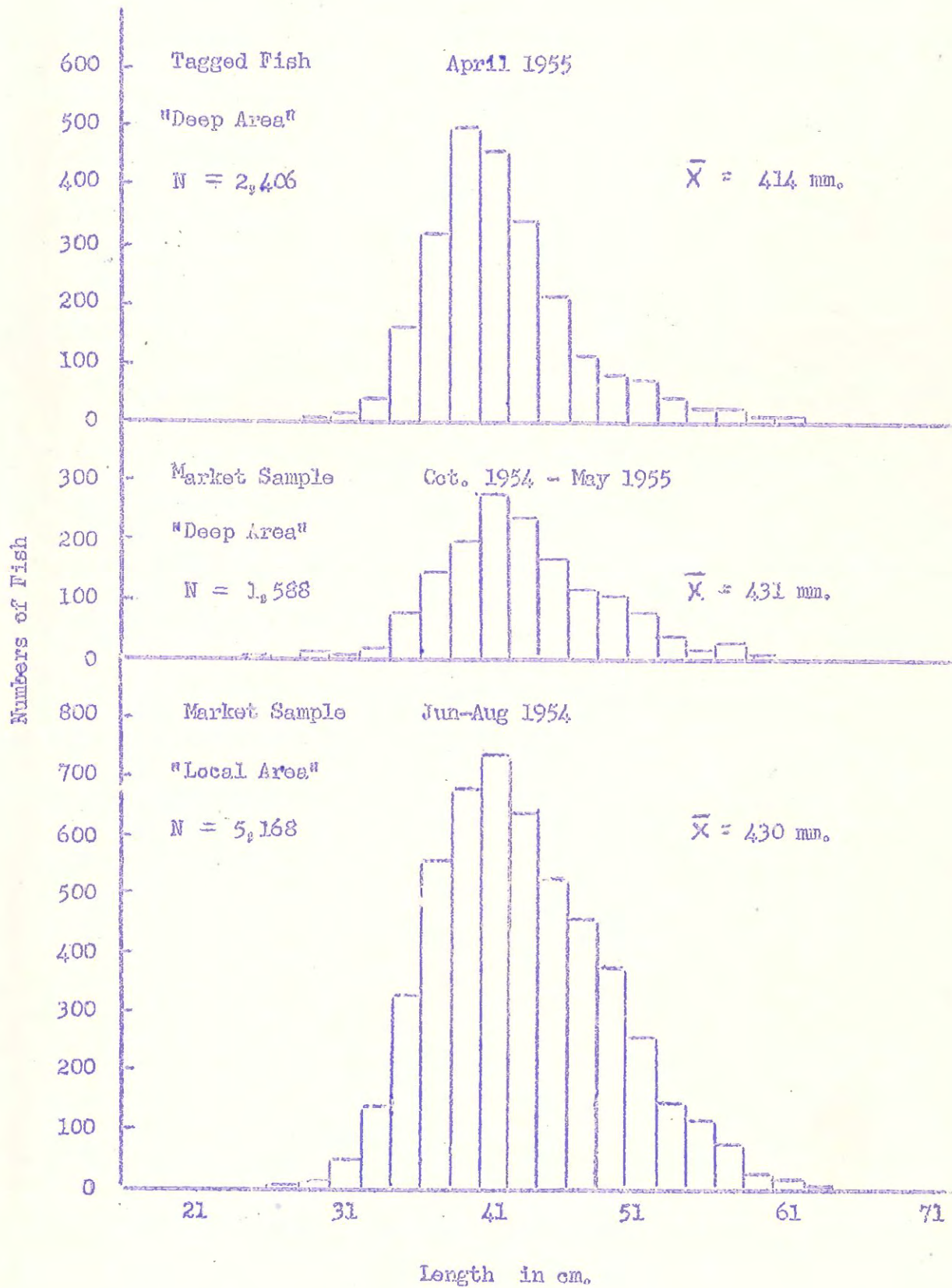
In Figure 1 are the length-frequencies and mean lengths for (1) tagged Dover sole; (2) market samples from Dover sole caught on the local otter trawl grounds (less than 100 fms.) during the summer of 1954; and (3) market samples of Dover sole caught in the deep area (190-350 fms.) during the fall and winter of 1954 and spring of 1955.

The size composition and mean lengths are quite similar for the market samples taken from the local and deep areas. Both distributions are positively skewed with modes at the 41 cm. interval. The mean lengths are 430 mm. for the local fish and 431 mm. for the deep fish.

The size composition and mean length of the tagged Dover sole differ from the two market samples. Its distribution is positively skewed, but the mode is at 39 cm. and the mean length is 414 mm.

It is not known why the tagged fish averaged smaller than the market sampled fish. The possible explanations are: (1) selectivity by the fishermen

Figure 1. Dover Sole Length-Frequencies



for the marketable fish from the gross catch at sea which favored the larger fish more than did the biologists who selected the fish to be tagged; (2) a true size difference; (3) a difference in the sex ratio such that there were more males (smaller than females) among the tagged fish than in the market samples.

Since it was impossible to sex the tagged fish at the time of tagging, no comparison was possible between the size composition of these and the market samples, by sex. However, a comparison was made between the summer and winter market samples, by sex, and the results are included in Figure 2. The mean length for deep area males was 411 mm. compared with 400 mm. for local area males; the mean length for deep area females was 459 mm. as compared with 444 mm. for local area females. The modal size for males was 41 cm. for deep area fish and 39 cm. for local area fish. The modal size for females was 45-49 cm. for the deep area fish and 41 cm. for the local fish. This size differential is presumably due to the accumulation and preponderance of mature fish in the deep area during the spawning season.

Sex ratios, expressed as per cent males, are presented in Table 1, for local and deep areas. The per cent males in the market samples during the summer of 1954 ranged from 28.4 in July to 34.5 in August. The per cent males from the deep area were 78.5 and 57.0 in October, 38.2 and 42.9 in December, and 92.6 in May. The May sample was taken from the catch of our charter vessel and is presumably representative of the sex ratio in the catches made in the deep area during our last two days of tagging, i.e., April 29 and 30.

The sex ratios from the local area indicate that the commercial-sized females predominate over commercial-sized males during the summer months. This situation has been apparent since the inception of our sampling program in 1948. The following table gives the percentage males in the market samples for each summer, 1948-54, inclusive.

<u>YEAR</u>	<u>PER CENT MALES</u>
1948	48.1
1949	41.1
1950	44.8
1951	44.6
1952	43.5
1953	44.1
1954	32.5

The sex ratios from the deep area indicate that the males precede the females to the spawning grounds (79 and 57 per cent males in October) in the fall, and probably follow the females off the grounds in the spring (93 per cent males in May).

MINK FOOD STUDIES

The work on the landings of bottomfish for mink food for the period covered by this report was confined chiefly to compiling and evaluating the 1954 statistics and comparison of the sale of marine fish for mink food with the sale of marine fish for fillets. Graphs and charts of these data were prepared for presentation to a biologist meeting of the Pacific Marine Fisheries Commission, to a meeting of the Oregon Fur Breeders Association, and to meetings with the Fish Commission of Oregon in relation to otter-trawl mesh and mink food regulations.

The 1954 species composition, in pounds, of the whole fish landed in Oregon for mink food as calculated from the samples taken during the summer is as follows:

SPECIES	POUNDS	PER CENT
Dover Sole	693,000	11
English Sole	315,000	5
Petrals Sole	63,000	1
Bellingham Sole	189,000	3
Rex Sole	504,000	8
Rockfish	1,449,000	23
Starry Flounder	315,000	5
Turbot	1,952,000	31
Miscellaneous	818,000	13
Total	6,298,000	100

Table 1

Sex Ratios of Dover Sole in Catches From
Local and Deep Areas

<u>DATE</u>	<u>AREA</u>	<u>MALES</u>	<u>FEMALES</u>	<u>TOTAL</u>	<u>Per Cent Males</u>
June 1954	Local	682	1,436	2,118	32.2
July 1954	Local	246	619	865	28.4
August 1954	Local	753	1,432	2,185	34.5
Oct. 5, 1954	Deep	314	86	400	78.5
Oct. 27, 1954	Deep	195	147	342	57.0
Dec. 2, 1954	Deep	94	246	340	38.2
Dec. 7, 1954	Deep	130	173	303	42.9
May 2, 1955	Deep	188	15	203	92.6

Figure 2. Dover Sole Length-Frequencies

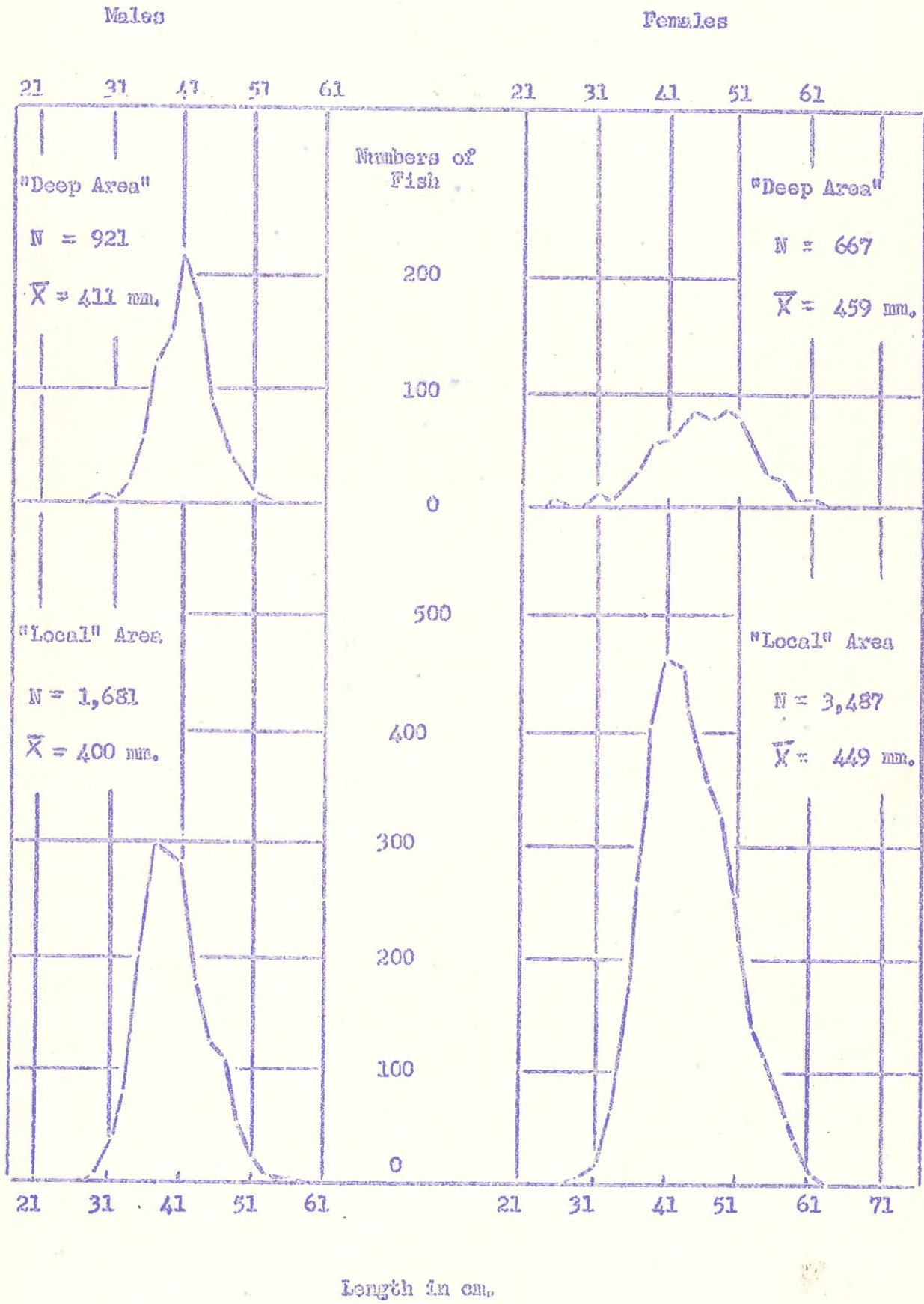


Table 2 shows the relative status of the mink food fishery to the fillet market fishery over the past eight years.

The Number of ranch mink in Oregon from 1947 through 1950 was computed from statistics in the 1951 edition of Facts and Figures on the U. S. Fur Farm Industry published by the National Board of Fur Farm Organizations. The 1952 figures were supplied by the same organization. The numbers of ranch mink in 1951 was obtained from F. H. Dahl, Oregon State College Agriculture Extension Economist. The numbers of ranch mink in Oregon in 1953 and 1954 were obtained from estimates made by the secretary of the Oregon Fur Breeders Association, and Marvin Hille, manager of the Oregon Fur Producers' fish plants.

The otter trawl fillet market production was obtained from Oregon Fish Commission records. The 1954 figures are provisional.

The fillet scrap production was calculated as 60 per cent of the fillet market production of whole fish.

The amount of whole fish landed for mink food for the years 1947 through 1950 was obtained from data compiled by George Y. Harry, Jr. from a poll of Oregon mink ranchers. The amount of whole fish landed in 1953 and 1954 was obtained from Oregon Fish Commission records.

There were approximately 79,000 ranch mink in Oregon in 1947. Subsequently there has been a steady increase to a peak of 221,000 in 1954. Meanwhile Oregon's otter trawl production of whole fish for filleting rose from 14.1 million pounds in 1947 to a peak of 22.0 million pounds in 1951, and subsequently slumped to 10.4 million pounds in 1953 and 12.0 in 1954. The by-product, fillet scrap, naturally followed the same pattern at 60 per cent of the magnitude.

The Oregon production of whole fish for mink food rose from 2.8 million pounds in 1947 to 4.5 million pounds in 1949, corresponding to the low of 16.0 million pounds of fillet fish for the same year. Subsequently the production of whole fish remained low, c. 2.0 million pounds, during the period 1950-52

Table 2

Data on Numbers of Mink in Oregon, Otter Trawl Production,
Estimated for Mink Food Fish, and Estimated Supply of Mink Food Fish

Year	Numbers of Mink $\times 10^3$	Pounds of Fillet Fish $\times 10^6$	Pounds of Fillet Fish $\times 10^6$	Pounds of Whole Fish for Mink $\times 10^6$	Estimated Pounds Needed for Mink $\times 10^6$	Estimated Pounds Available for Mink $\times 10^6$
1947	79.0	14.1	8.5	2.8	4.4	11.3
1948	90.7	20.1	12.1	3.3	5.1	15.4
1949	91.5	16.0	9.6	4.5	5.2	14.1
1950	99.7	20.2	12.1	2.0	5.6	14.1
1951	128.2	22.0	13.2	2.0	7.5	15.2
1952	141.3	21.3	12.8	2.0	8.1	14.8
1953	186.4	10.4	6.2	5.0	11.5	11.2
1954	221.4	12.0	7.2	6.2	13.3	13.4

when fillet production was high (20-22 million pounds annually). However, although the fillet production fell in 1953 and 1954, the population of ranch mink continued to rise, and the result was a sharp increase in the production of whole fish for mink food from 2.0 million pounds in 1952 to 5.0 million pounds in 1953 and 6.2 million pounds in 1954.

The last two columns in Table 2 indicate the estimated pounds of fish needed for mink food in Oregon, and the amount of mink food available at dockside (including fillet scrap). During the early years, the estimated need was considerably below the amount available, particularly from 1947-52.

However, in 1953 and 1954, estimated need and the amount available have come into equilibrium. These estimates of the supply and demand unfortunately do not take into consideration the unknown amount of mink food (whole fish & fillet scrap) which is exported from the state to satisfy demand in other areas.

The mink food problem is evidently a serious one which cannot be disregarded. Presumably there are sufficient supplies of "scrap" fish (those with little or no market for fillets), and the purpose of the present regulation is to limit the use of the principal species of bottom fish, viz., Dover, English, and petrale soles, for mink food. This regulation, which became effective June 1, 1955, prohibits the sale or purchase of whole otter-trawl-caught fish for mink food or reduction from landings which constitute more than 20 per cent, by weight, Dover, English, and petrale soles. The 20 per cent applies to the entire landing, which, unfortunately includes fillet fish. This feature causes enforcement to be extremely difficult, if not impossible. It is hoped that the regulation can be altered so that the 20 per cent, or some other suitable figure, would apply only to sales and purchases of whole fish for mink food or reduction.

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Aquatic Biologists