

## OTTER TRAWL INVESTIGATIONS PROGRESS REPORT

May - October 1955

## INTRODUCTION

The summer season for the otter trawl investigations was marked by a rather chaotic personnel situation. A total of 6 different people worked on our projects from time to time.

The field work consisted of market sampling of Dover sole and mink food landings, and one sampling-at-sea trip.

The laboratory work consisted of: (1) compilation of otter trawl landing records for Dover, English, and petrale soles, and Pacific Ocean perch; (2) compilation and preliminary analysis of the 1955 mink food samples; (3) compilation of Dover sole market samples; (4) otolith reading of the 1955 market samples of Dover sole and special samples (taken from the mink food landings) of undersized Dover sole; and (5) editing.

Two project leaders' meetings were attended by Westrheim: in June at Lewiston, Idaho; and in October at Oakridge, Oregon.

## PERSONNEL

In addition to the regular personnel (Jones and Westrheim), the following people worked on otter trawl studies during the summer:

Wayne A. Burck	June 16-Sept. 19
Denver H. Fleming	May 27-June 19 July 16-July 29 Aug. 27-Sept. 12
Clarence E. Jordan	May 27-June 19
Ray M. Ward	June 13-Aug. 5

Summer

Walt Jones accompanied Ed Holmberg on the "Brown Bear" tuna cruise during the period June 13-July 3. Fleming and Jordan worked intermittently on otter trawl studies between gill-net seasons. Jordan resigned June 30 to enter the mink-raising industry. Fleming resigned September 12 to enter the plywood industry. Ray Ward resigned August 5 due to the unfortunate death of his father. Wayne Burck resigned September 19 to return to Oregon State College.

Despite this chaotic picture the work progressed satisfactorily, and this summer was one of the most productive we have had.

#### FLEET ACTIVITIES

The fillet markets were fair to good throughout the summer, and virtually all the Astoria trawlers could sell their marketable species. New England Fish Company closed its Astoria fillet plant June 1 and transferred its operation to Everett, Washington. The company's fleet of six trawlers ("Oregonian", "Coolidge II", "Al H", "Harold J", "Washington", and "Barbara S") also transferred north.

Every Oregon trawler made at least one mink food landing during the year. In Astoria, all but one fillet plant also bought whole bottomfish for mink food.

Bioproducts bought a small amount of whole bottomfish (principally dogfish shark, skates, and hake) for reduction purposes.

All four Newport trawlers ("Margaret E", "Dare II", "Destiny", and "Alten") fished for mink food and/or small markets for fillet fish, principally petrale sole and sablefish.

A new mink food operation began at Winchester Bay in June. Two trawlers ("Hero" and "Alta") were engaged to fish for this plant. The principal product was mink food, but some marketable bottomfish were sorted out of the landings and sold for human consumption.

One vessel ("Nel-Ron-Dic") landed mink food at Charleston more or less on a "short-order" style. We also received reports that Eureka, California, trawlers also made occasional landings of whole bottomfish for mink food in this area.

## FIELD ACTIVITIES

The two principal field activities were market sampling of Dover sole and mink food landings. The Dover sole sampling was restricted to Astoria landings from the local trawl grounds near the mouth of the Columbia River. This represents a long-range project activated in 1948 to study the sex ratio, size composition, and age composition of the Dover sole catches taken from this important area.

The mink food sampling occurred at Astoria, Newport, Winchester Bay, and Charleston. This program was designed to: (a) provide a qualitative and quantitative measure of the mink food landings; and (b) assess the effect of the new mink food regulation. This regulation, which became effective June 1, 1955, restricts the quantity of Dover, English, and petrale sole sold for animal food or reduction to no more than 20 per cent, by weight, of each total landing by a vessel.

One sampling-at-sea experiment was conducted in mid-September.

### Dover Sole Sampling

A total of 16 market samples (5,702 fish) were taken from Astoria landings of Dover sole caught on the local grounds during the period June-August 1955. The otolith sub-sample for this period totalled 879. All of these otoliths were read at least twice while fresh.

An additional special otolith sampling program for undersized Dover sole in the Astoria mink food landings yielded 673 otoliths. All of these otoliths were read during the summer.

### Mink Food Sampling

Mink food samples totalled 130 for the period May-September 1955. We tallied 91,162 fish (99,200 lbs.) by species, and measured the lengths of all Dover, English, and petrale sole encountered.

The results by port are as follows:

<u>Port</u>	<u>No. Samples</u>	<u>No. Fish</u>	<u>No. Pounds</u>
Astoria	108	77,637	72,887
Newport	17	11,497	22,538
Winchester Bay	4	1,704	3,452
Charleston	<u>1</u>	<u>324</u>	<u>300</u>
TOTAL	130	91,162	99,177

In addition to the regular sampling, average weights were collected for as many species as possible. We have length-weight formulae for the Dover, English and petrale sole which were measured.

#### LABORATORY ACTIVITIES

The laboratory activities included compilation and preliminary analysis of (a) landing records for Dover, English, and petrale sole, and Pacific Ocean perch; (b) mink food samples; and (c) Dover sole market samples.

#### Landing Records

The landing records for the three sole and Pacific Ocean perch have now been compiled through 1954, complete with allocation by area, using pounds per significant landing as a measure of relative abundance. The following tables show the results (Table 1, 2, 3, and 4).

There are some changes in the figures as they were reported in the May-October 1954 Progress Report. This was due to the unfortunate inclusion of mink food landings in the IBM compilation for code 9 (human consumption) deliveries.

#### Mink Food Samples

A separate report has been written on the summer mink food sampling program, but the following table summarizes the results of this season's sampling, in numbers of fish by species (Table 5).

Dover Sole Market Samples

The size composition and sex ratios of the Dover market samples were compiled for comparison with those taken in previous seasons. The preliminary results are included in Table 6. The mean length of the male Dover sole declined from 412 mm. in 1948 to 396 mm. in 1951 and 1952; rose slightly to 400 mm. in 1954; and then declined sharply to 386 mm. in 1955. The mean length of the female Dover sole followed a more irregular pattern. The mean length peaked at 454 mm. in 1949; declined to 436 mm. in 1952; rose to 445 mm. in 1953; dipped to 444 mm. in 1954; and rose again to 447 mm. in 1955. Statistical evaluation of these variations has not yet been made so that we do not know the significance, if any, of these fluctuations. The causes of the fluctuations, if other than chance, will also be difficult to evaluate. However, the otolith readings for all the samples taken since 1948 will have to be completed before too much conjecture is permitted. To date we have not read the otoliths from the 1949, 1950, and 1953 samples, and have only an incomplete analysis of the 1951 samples.

The sex ratios since 1948 are represented as per cent males. They ranged from 41 to 48 per cent during the period 1948-53. A sharp decline to 32.5 per cent occurred in 1954 and in 1955 the per cent males was 37.0. The lower per cent males during the latter two years may have been due in part to the minimum mesh regulation. However, the coincident decline in average size of males during 1955 indicates that perhaps other factors are also present.

Sigurd J. Westrheim  
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Aquatic Biologists

Table 1.

Total Pounds Landed, Calculated Numbers of Landings,  
and Pounds Per Significant Landing, in Astoria of  
Dover Sole, 1942-54. Allocation of Catch by Area\*  
for the period 1951-54.

YEAR	TOTAL POUNDS LANDED	CAICULATED NUMBERS OF LANDINGS	POUNDS PER SIGNIFICANT LANDING
1942	2,189,287	140	15,604
1943	6,587,312	379	17,395
1944	1,318,179	103	12,759
1945	2,570,845	164	15,722
1946	2,979,687	245	12,157
1947	1,737,933	145	11,990
1948	2,943,453	247	11,913
1949	2,457,719	191	12,848
1950	4,763,173	346	13,767
1951	4,688,405	405	11,578
North	784,416	71	11,075
Local	3,804,559	326	11,674
South	99,430	8	12,368
1952	5,801,715	582	9,977
North	727,697	71	10,316
Local	3,204,437	376	8,514
South	1,869,581	137	13,647
1953	2,282,292	242	9,436
North	387,889	34	11,563
Local	1,254,706	146	8,566
South	639,697	62	10,309
1954	3,608,088	316	11,405
North	1,467,445	101	14,476
Local	1,470,777	164	8,953
South	669,866	59	11,439

\*Area definitions:

North--all areas north of Willapa Bay (including Willapa Deep).

Local--Cape Falcon to Willapa Bay.

South--all areas south of Cape Falcon.

Table 2.

Total Pounds Landed, Calculated Numbers of Landings,  
and Pounds Per Significant Landing, in Astoria of  
English Sole, 1942-54. Allocation of Catch by Area\*  
for the Period 1951-54.

YEAR	TOTAL POUNDS LANDED	CALCULATED NUMBERS OF LANDINGS	POUNDS PER SIGNIFICANT LANDING
1942	181,126	138	1,311
1943	665,331	126	5,280
1944	766,236	264	2,897
1945	726,314	114	6,380
1946	2,956,058	417	7,091
1947	1,338,543	166	8,071
1948	2,214,577	212	10,426
1949	765,958	72	10,602
1950	1,903,658	208	9,158
1951	2,086,088	293	7,115
North	302,053	30	10,171
Local	1,720,846	251	6,863
South	63,189	9	6,706
1952	1,736,007	334	5,201
North	396,670	39	10,090
Local	1,016,460	264	3,851
South	322,877	60	5,349
1953	937,468	220	4,252
North	171,882	18	9,359
Local	610,627	173	3,524
South	154,959	35	4,372
1954	817,882	213	3,848
North	130,166	15	8,821
Local	528,697	205	2,578
South	159,019	27	5,857

\*Area definitions:

North--all areas north of Grays Harbor.  
Local--Cape Falcon to Grays Harbor.  
South--all areas south of Cape Falcon.

Table 3.

Total Pounds Landed, Calculated Numbers of Landings,  
and Pounds Per Significant Landing, in Astoria of  
Petrale Sole, 1942-54. Allocation of Catch by Area\*  
for the Period 1951-54.

YEAR	TOTAL POUNDS LANDED	CALCULATED NUMBERS OF LANDINGS	POUNDS PER SIGNIFICANT LANDING
1942	2,319,758	290	8,010
1943	1,693,983	201	8,408
1944	1,278,244	203	6,298
1945	905,428	163	5,546
1946	1,694,604	420	4,037
1947	957,082	201	4,755
1948	1,447,155	218	6,639
1949	864,113	164	5,256
1950	1,859,142	271	6,849
1951	1,054,676	232	4,539
North	240,426	61	3,963
Local	735,293	186	3,955
South	78,957	3	24,987
1952	1,305,997	222	5,874
North	159,772	132	14,993
Local	679,070	136	5,004
South	467,155	54	8,728
1953	705,608	174	4,049
North	43,435	18	15,429
Local	453,756	141	3,216
South	208,417	25	8,285
1954	1,173,272	189	6,196
North	480,828	79	6,076
Local	501,299	81	6,223
South	191,145	29	6,497

\*Area definitions:

North--all areas north of Willapa Bay (including Willapa Deep).

Local--Cape Falcon to Willapa Bay.

South--all areas south of Willapa Bay.



Table 4.

Total Pounds Landed, Calculated Numbers of Landings,  
and Pounds Per Significant Landing, in Astoria of  
Pacific Ocean Perch, 1951-54, Allocated by Area\*.

YEAR	TOTAL POUNDS LANDED	CALCULATED NUMBERS OF LANDINGS	POUNDS PER SIGNIFICANT LANDING
1951	1,023,390	87	11,711
North	39,889	4	11,155
Local	953,232	82	11,638
South	30,269	2	14,888
1952	2,994,262	294	10,180
North	566,784	39	14,386
Local	1,737,820	190	9,123
South	689,658	66	10,500
1953	2,609,142	182	14,304
North	429,866	19	23,145
Local	1,063,590	92	11,548
South	1,115,686	72	15,601
1954	3,647,675	222	16,401
North	470,581	32	14,909
Local	1,722,464	113	15,287
South	1,454,580	79	18,512

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\*Area definitions:

North--all areas north of Willapa Bay.

Local--Cape Falcon to Willapa Bay.

South--all areas south of Willapa Bay.

Table 5.

Species Composition, in Numbers, for 129 Mink Food Samples  
Taken During the Period June 1 through September 30, 1955, by Port of Landing

SPECIES	ASTORIA		NEWPORT		WINCHESTER BAY		CHARLESTON		TOTAL	
	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
DOVER SOLE	5,523	7	1,025	9	226	13	29	9	6,802	8
ENGLISH SOLE	12,968	17	1	Tr	1	Tr	48	15	13,018	15
PETRALE SOLE	1,260	2	62	1	32	2	21	6	1,375	2
Bellingham Sole	4,049	5	0	--	0	--	6	2	4,055	4
Flounder	2,576	3	0	--	110	7	1	Tr	2,687	3
Rex Sole	34,347	45	412	4	145	9	142	44	35,046	39
Turbot	7,762	10	3,905	34	646	38	13	4	12,326	14
Rockfish/ <sup>1</sup>	1,633	2	5,517	48	305	18	1	Tr	7,456	8
Misc./ <sup>2</sup>	5,804	8	575	5	239	14	63	19	6,681	7
TOTAL	75,922	99	11,497	101	1,704	101	324	99	89,447	100
No. of Samples	107		17		4		1		129	
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1. Includes at least 18 species.

2. Includes at least 20 species.

Table 6.

Mean Length, by Sex, and Per Cent Males in Dover  
Sole Market Samples from Local Trawling Grounds  
off the Columbia River, 1948-55.

YEAR	MEAN LENGTH IN MM		PER CENT MALES
	Males	Females	
1948	412	443	48.1
1949	411	454	41.1
1950	400	442	44.8
1951	396	437	44.6
1952	396	436	43.5
1953	398	445	44.1
1954	400	444	32.5
1955	386	447	37.0