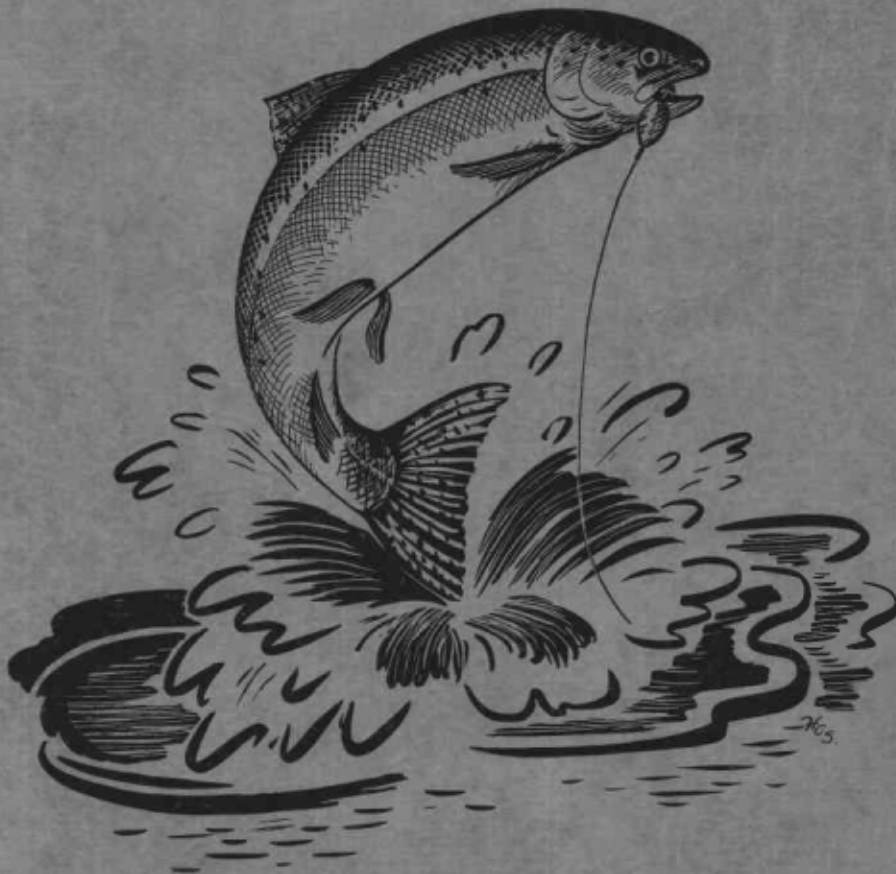


**1959**  
*Annual Report*



**OREGON STATE GAME COMMISSION**  
**FISHERY DIVISION**



# 1959 ANNUAL REPORT

## FISHERY DIVISION

*C.J. CAMPBELL & F.E. LOCKE*  
*Editors*



OREGON STATE GAME COMMISSION

P. W. Schneider  
Director

July, 1960



## INTRODUCTION

The key stream program has proven satisfactory on a number of experimental streams. On the Necanicum River the average catch for the season was  $1\frac{1}{2}$  fish per hour and on the East Fork of Hood River, fish were taken at slightly over one fish per hour.

The Oregon Game Commission joined in a stream improvement research program with the U. S. Forest Service to determine the effect of fencing a stream from cattle. Both the test plot and control areas are in the Silver Creek drainage in southeastern Oregon.

Atlantic salmon planted in Mud Lake at about six inches in length in 1958 were between 14 and 18 inches in length in October 1959.

In 1959, 22 per cent of the opening day's catch of trout at Pelton Reservoir were found to be immature steelhead. In view of this fact, a late opening date will be requested for this impoundment in 1960. Net sets in this reservoir show that the fish population contains more than 50 per cent nongame species.

In the 1959 season an estimated 259,000 trout were taken by 108,000 anglers fishing Detroit Reservoir. This represents the highest yield of trout and the greatest fishing intensity recorded in the six years creel records have been collected.

A creel census conducted on the Wilson and Nestucca Rivers during the extended steelhead season revealed that approximately 50 per cent of the fish retained by the angler were green. A similar survey on the Alsea River revealed that about 65 per cent of the steelhead were green. Twenty-three per cent of the steelhead examined in anglers creels for the entire season on the Wilson River were of hatchery origin.

About 74 per cent of the trout harvest in the North Umpqua River were hatchery trout and 22 per cent downstream migrant steelhead. A small percentage of native trout, migrant salmon, and hatchery steelhead was taken. Approximately 40 per cent of the hatchery rainbow released were caught during the trout season.

It is estimated that in 1959 about one-third of the run of summer steelhead in the North Umpqua were returning hatchery fish. Between 1 and 2 per cent of the summer steelhead released from the hatchery are believed to have returned to the river.

In 1959 a total of 2,626 surface acres of lakes and reservoirs having a normal area of 5,319 acres were treated with fish toxicants. Toxaphene was used on several large reservoirs and one 684-acre lake. The approximate cost of all treatment projects in 1959 was about \$20,000. Based on results obtained in the use of toxaphene, it would appear that the division can include large lakes and reservoirs in future rehabilitation programs.

Over 27 million trout, salmon, and steelhead eggs were eyed in Oregon Game Commission hatcheries in 1959. Approximately 703,000 pounds of game fish were released in Oregon waters.

The following abbreviations are used in this report to identify the indicated species of fish.

AS	Atlantic salmon	GT	Golden trout
B	Bullhead catfish	K	Kokanee
BC	Black crappie	LB	Largemouth bass
BG	Bluegill sunfish	LT	Lake trout
BLB	Black bullhead	Mu	Mullet
BLC	Blue catfish	P	Perch
Br	Brown trout	PK	Pumpkinseed sunfish
BrB	Brown bullhead	PS	Pink salmon
C	Crappie	Rb	Rainbow trout
CC	Channel catfish	Ro	Roach
Ch	Chinook salmon	RsS	Red-sided shiner
ChF	Chinook salmon (fall)	SB	Smallmouth bass
ChS	Chinook salmon (spring)	Sg	Sturgeon
Clm	Chiselmouth	Sh	Shad
Cp	Carp	Sil	Silver salmon
CRC	Columbia River chub	Skb	Stickleback
CS	Chum salmon	Sq	Squawfish
CSu	Coarse-scaled sucker	SS	Sockeye salmon
Ct	Cutthroat trout	St	Steelhead
D	Dace	StB	Striped bass
DV	Dolly Varden trout	Su	Sucker
EB	Eastern brook trout	WC	White crappie
FC	Flathead catfish	Wf	Whitefish
FSu	Fine-scaled sucker	Wm	Warmouth bass
GS	Green sunfish	YB	Yellow bullhead
		YP	Yellow perch

# TABLE OF CONTENTS

	Page
Umpqua River. . . . .	1
Rogue River and South Coastal Streams . . . . .	22
Upper Willamette. . . . .	50
Central Willamette. . . . .	64
Lower Willamette. . . . .	75
Northeastern Oregon . . . . .	86
Southeast Oregon. . . . .	109
Columbia District . . . . .	132
Bend District . . . . .	147
Klamath District. . . . .	175
John Day. . . . .	195
Astoria District. . . . .	216
Tillamook . . . . .	226
Lincoln District. . . . .	243
Coos-Coquille District. . . . .	255
Fish Propagation. . . . .	266
Angling Regulations . . . . .	276
Warm-Water Game Fish. . . . .	277
Stream Improvement. . . . .	284
Oregon Salmon and Steelhead Sport Fishery . . . . .	287
Fish Stocking . . . . .	290
Federal Aid Expenditures. . . . .	297
Rehabilitation. . . . .	298
Fishery Resource Expenditures . . . . .	299
Contributing Personnel. . . . .	300
Game Commission Hatcheries. . . . .	301

## UMPQUA RIVER

J. A. Bauer and W. O. Saltzman

### Fishery resource inventories

#### Winchester Dam fish counts

The 1959 steelhead runs counted at Winchester Dam remained about the same as the past two years, while the salmon runs continued their overall decline. Table 1 illustrates the total runs for the past fourteen years.

The spring chinook run failed for the third consecutive year to equal its parent run. The run was 4,400 fish short of its parent run, and over 1,000 fish short of the fourteen-year average.

The fall chinook appeared in fair numbers while silver salmon runs were below the fourteen-year average.

The summer and winter runs of steelhead remained at about the same level as in 1958. The summer run was nearly 1,000 fish short and the winter run 1,600 fish short of the past fourteen-year averages.

The coastal cutthroat migration over Winchester Dam remained quite low.

#### South Umpqua River spring chinook inventory

The South Umpqua was surveyed for the thirteenth year to enumerate spring chinook in the resting holes. The total of 113 fish is only twenty fish short of the thirteen-year average. Jacks made up 4.4 per cent of the count. The trend of higher numbers of fish above the falls continues since the construction of the ladder in 1955.

Jackson Creek was examined for the third year. While only seven fish were observed, it is possible that more fish were present as a number of redds were observed in the same area in the fall. The past counts for both areas are presented in Table 2.

#### South Umpqua fall chinook inventory

Approximately twenty miles of the South Umpqua between Myrtle Creek and the Douglas County Fairgrounds was drifted by boat for the first time in 1959 to enumerate fall chinook. Fifty-five fall chinook and many redds were observed.

#### Spawning ground counts in the lower Umpqua River area

Most of the streams have shown a decline in numbers of spawning silver salmon for the winter of 1959-60. Low water conditions apparently delayed the main salmon arrival into the Tenmile Lakes system until late December. The

Table 1

## Winchester Dam fish counts, 1946-59

	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
<u>Spring chinook</u>														
Adults	1,974	2,994	2,245	2,109	2,044	2,940	4,702	4,310	6,613	6,266	7,881	4,285	3,856	3,460
Jacks	533	817	248	484	277	677	559	521	1,576	1,378	1,433	943	542	327
Total	2,507	3,811	2,493	2,593	2,321	3,617	5,261	4,831	8,189	7,644	9,314	5,228	4,398	3,787
<u>Fall chinook</u>														
Adults				13	22	13	12	86	1	656	181	14	61	108
Jacks				--	--	--	--	2	--	36	3	1	--	3
Total				13	22	13	12	88	1	692	184	15	61	111
<u>Silver salmon</u>														
Adults	1,380	1,010	737	1,330	1,284	2,098	2,761	1,652	325	2,475	2,303	952	492	768
Jacks	58	28	53	82	91	161	305	704	64	222	457	111	81	50
Total	1,438	1,038	790	1,412	1,375	2,259	3,066	2,356	389	2,697	2,760	1,063	573	818
Summer steelhead	3,361	5,113	2,762	1,672	2,835	3,361	4,443	2,844	3,117	3,430	2,927	2,228	2,041	2,049
Winter steelhead	6,563	11,220	9,700	9,225	7,008	4,188	10,635	5,094	9,124	4,755	10,211	8,923	6,350	6,372
Coastal cutthroat	1,138	794	437	493	644	1,508	755	1,838	706	960	982	87	108	48
Other trout	82	69	79	157	360	266	390	240	64	47	269	25	42	104
Squawfish	726	1,692	471	487	256	336	382	150	2,109	294	438	--	--	---
Suckers	5,158	12,856	6,192	4,930	3,050	972	9,401	265	14,502	11,752	20,924	2,425	7,458	5,248

lower Umpqua and Smith River tributaries were relatively unaffected by low stream flows and maximal counts were obtained in late November and early December.

Table 2

South Umpqua River spring chinook inventory, 1946-59

Year	Number of fish			Total count
	Above falls	Below falls	Jackson Creek	
1946				70
1947				198
1948				141
1949	No inventory taken			
1950	30	74	--	104
1951	53	106	--	159
1952	86	46 <u>/1</u>	--	132
1953	70	54	--	124
1954	41	76 <u>/1</u>	--	117
1955	58	131	--	189
1956	71	67	--	138
1957	113	45	42	200
1958	43	26	26	95
1959	93	20	7	120

/1 Incomplete survey made below South Umpqua Falls because of unfavorable water conditions.

Silver salmon spawning ground counts for 1959-60 are one of the lowest in the fifteen consecutive years that counts have been taken. The results of the spawning ground counts for silver salmon on the Umpqua and Smith River tributaries are tabulated in Table 3.

Table 3

Silver salmon spawning ground counts on tributaries in the lower Umpqua River, 1959-60

Stream	Miles	Water	Adults	Jacks	Total
Scholfield	2.00	clear	61	11	72
Miller	0.75	clear	22	4	26
Dry	0.25	clear	11	0	11
Alder	0.25	clear	9	2	11
Dean	1.25	clear	11	0	11
Mehl	3.00	clear	0	0	0
Paradise	3.50	clear	0	0	0
Little Paradise	2.00	clear	0	0	0
Spencer	4.50	clear	20	1	21
Buck	3.50	clear	42	5	47
Johnson	1.25	clear	0	0	0
Brush	1.50	milky	0	0	0
East Weatherly	1.25	milky	0	0	0
Beaver	2.00	clear	10	0	10
Otter	1.00	clear	5	2	7
South Sister	0.25	milky	1	0	1

Table 4 presents a comparison of the counts for the fifteen consecutive years that such counts have been made.

Table 4

Comparative spawning ground count data  
on selected tributaries of the lower Umpqua and Smith River areas,  
1945-46 through 1959-60

Year	Miles surveyed	Number of adults	Total salmon	Percentage jacks	Adults per mile	Salmon per mile
1945-46 /1	19.00	74	78	5.0	3.9	4.1
1946-47	24.25	133	170	22.0	5.5	7.0
1947-48	25.75	730	764	4.0	28.3	29.7
1948-49	25.75	391	405	3.0	15.2	15.7
1949-50	25.75	537	646	17.0	20.9	25.1
1950-51 /1	23.75	458	510	10.0	19.3	21.5
1951-52 /1	25.75	759	1,012	25.0	29.5	39.3
1952-53	25.75	812	920	12.0	31.5	35.7
1953-54	25.75	307	360	15.0	11.9	14.0
1954-55	25.75	733	939	22.0	28.5	36.5
1955-56 /1	14.75	735	819	10.0	49.8	55.5
1956-57	25.75	425	527	19.0	16.5	20.5
1957-58	25.75	340	382	11.0	13.2	14.8
1958-59	23.75	195	234	17.0	8.2	9.9
1959-60	28.25	192	217	13.0	6.8	7.7

/1 Observations were not made or were hampered on certain streams by high water conditions.

Table 5 shows silver salmon counts in the Tenmile Lakes system for 1959-60.

Table 5

Counts of silver salmon on selected tributaries  
of the Tenmile Lakes system  
1959-60

Stream	Miles	Water	Adults	Jacks	Total
Menegat	0.75	clear	0	0	0
Noble	1.25	milky	124	11	135
Murphy	1.50	milky	208	25	233
Wilkins	1.00	clear	26	6	32

Eel Lake tributary counts for 1959-60 are indicated in Table 6.

Counts of spawning fall chinook were made for the third consecutive year on the North Fork of Smith River and on South Sister Creek, also a tributary of Smith River. An additional count area was established on Mill Creek, tributary to the Umpqua River.



Table 6

Eel Lake tributary counts for 1959-60

Stream	Miles	Water	Adults	Jacks	Total
Main Right Fork	0.50	clear	0	0	0
Main Left Fork	0.75	clear	6	4	10
Swamp Fork	0.25	clear	0	0	0
Cabin Fork	0.25	clear	8	15	23

Table 7 shows the counts on Smith River and on other streams where fall chinook were noted incidental to spawning silver salmon.

Table 7

Fall chinook spawning counts for 1959-60

Stream	Miles	Water	Adults	Jacks	Total
North Fork Smith River	0.50	milky	18	2	20
South Sister Creek	0.25	milky	0	0	0
Paradise	3.50	milky	0	0	0
Buck	3.50	clear	8	3	11
Mill	1.25	milky	75	8	83

#### Umpqua District - Cascade lakes and reservoirs population studies

Two gill nets set in Skookum Lake produced 134 eastern brook trout that had an average length of 12.0 inches and an average weight of about one pound. Skookum Lake was stocked for the first time in 1958 with brook trout fingerling.

Two gill nets set in Maidu Lake produced thirty-seven eastern brook trout between five and fifteen inches in length. The fish had an average length of 11.4 inches and were in excellent condition.

Lucile Lake apparently winterkilled as no fish were taken in gill nets or observed.

Four gill nets set in Lemolo Reservoir produced forty-eight trout and twelve roach. Fully mature roach were taken for the first time. The rainbow was 8.0 inches and weighed 103 grams. The nine eastern brook trout had an average length of 7.9 inches. The thirty-eight brown trout had an average length of 12.6 inches.

One gill net set in Stump Lake produced nine eastern brook trout and two rainbow trout. Brook trout had an average length of 9.7 inches and rainbow trout 8.0 inches.

Two gill nets set in Fish Creek forebay produced forty-six rainbow trout with an average length of 8.3 inches. The fish in the forebays are the result of trout lost down the diversion canals from individual reservoirs.

Three gill nets set in Lemolo #2 forebay produced seven eastern brook trout, one rainbow, and thirty-eight brown trout. All fish were in good condition. The data from experimental net sets in Umpqua River reservoirs and Cascade lakes is presented in Table 8.

Two gill nets set in Clearwater #1 forebay produced nine eastern brook trout having an average length of 11.5 inches.

#### Coastal lake population studies

An investigation of Loon Lake and tributaries initiated in 1958 was completed in 1959. Special reports for these waters have been made.

#### Sport fishery evaluations

##### Spring chinook fishery

For the second consecutive year, creel census data were collected according to a program designed by Dr. Calvin of Oregon State College. It is estimated that 675 adults and 83 jacks were caught in 6,991 angling trips.

An increase in angling pressure and catch was noted in 1959. Catch data for 1958 and 1959 are presented in Table 9. In 1959, the bag limit of one fish a day or two fish in seven days was changed to the regular state bag limit of two and four, plus the taking of jacks was allowed during the entire season. Although the catch for 1959 was greater than for 1958 the increase is believed to be primarily the result of better stream conditions rather than the result of a change in bag limit.

##### Winchester Bay salmon fishery

The 1959 salmon sport fishery at Winchester Bay produced approximately 4,000 less fish than in 1958. Statistical computations reveal a total catch of 11,085 in 1959 as compared to 15,053 salmon in 1958. Salmon anglers fishing at Winchester Bay were calculated at 18,057 in 1959 as compared to 19,871 in 1958. Catch statistics for the fishery since catch records were first compiled in 1949 through 1959 are presented in Table 10.

Unsettled bar conditions which prevailed throughout most of the season are believed to be partly responsible for the light catch in 1959.

##### Tenmile Lakes silver salmon fishery

Angling for silver salmon and jack salmon in the Tenmile Lakes in the fall and winter of 1958 was only fair for the second consecutive year. The size of the run was down over past years and low water conditions which extended well into the fall did not attract large numbers of fish into the lakes until late in the season. Catch statistics of the fishery were obtained by dock owners at the lakes and are presented in Table 11.

Table 8

Composition of weights and length frequencies of catch by gill nets  
in Cascade lakes and reservoirs, 1959

Lake or reservoir	Number of sets	Species	Number in sample	Percentage of total	Average fork length (inches)	Average weight (grams)	Size groups								
							4-6	6-8	8-10	10-12	12-14	14-16	16-18		
Lemolo Reservoir	4	Ro	12	20	6.6	--	2	10							
		EB	9	15	7.9	97		3	6						
		Rb	1	2	8.0	103			1						
		Br	38	63	12.6	415		1	8	4	10	11	4		
Stump Lake	1	EB	9	82	9.7	241		3	3	1	2				
		Rb	2	18	8.0	94		1	1						
Lemolo #2 forebay	3	EB	7	15	7.8	115		4	3						
		Rb	1	2	5.5	35	1								
		Br	38	83	11.0	345		3	8	18	2	6	1		
Fish Creek forebay	2	Rb	46	100	8.3	--		23	16	3	2	1	1		
Clearwater #1 forebay	2	EB	9	100	11.5	351		1	1	3	2	2			
Lucile Lake	2	--	0												
Maidu Lake	2	EB	37	100	11.4	--	3	3	2	7	13	9			
Skookum Lake	2	EB	134	100	12.0	--									(14 inches - 134)

Table 9

## Umpqua spring chinook fishery, 1958-59

Year	Anglers	Chinook	Jacks	Fish per angler	Fish per hour	Percentage of run
1958	6,060	487	28	0.09	0.014	11
1959	6,991	675	83	0.11	0.019	18

The Tenmile Lakes salmon fishery for the fall of 1959 was the poorest on record because of prolonged low water conditions. Fish migrated into the lakes throughout the season as rains were insufficient to attract large numbers of salmon over the bar at any one time. One 15-pound striped bass was caught during the fishery. Although not rare in the lakes, they are unusual. Dock owners voluntarily obtained catch statistics which are presented in Table 12.

Fall salmon fishery

The fall salmon and cutthroat fishery in the upper Umpqua River was practically non-existent because of the lack of fall rains and low stream flows.

Striped bass fishery

Anglers in the summer of 1958 discovered that striped bass could be taken in the lower Umpqua River with the same tackle and bait used for salmon. Considerable publicity to this new fishery resulted in large numbers of anglers turning to the pursuit of striped bass in 1959. Angling was heavy for stripers when bar and ocean conditions made salmon angling hazardous or unprofitable. Since many of the trips for striped bass originated at Winchester Bay, it was possible to check effectively a sample of the striped bass catch. These data are presented in Table 13.

The weights of some fifty striped bass were taken. The range in weight was from 5.5 to 53.0 pounds with an average of 19.5 pounds. The striped bass fishery can now be considered an integral part of the summer fishery at Winchester Bay.

Summer steelhead fishery

Angling pressure in 1959 dropped in the fly area but increased nearly three times in the bait area. A comparison of angler pressure and success is illustrated in Table 14. Anglers averaged 0.25 fish per angler. Steelhead were caught at the rate of 0.05 fish per hour in 1959. The practice of releasing unharmed summer steelhead on the Umpqua appears to be declining in the past few years.

Approximately 32.0 per cent of the total harvest were marked fish. Of the 221 marked fish examined, 197 were marked Ad-RM and the remaining 21 marked Ad-RV.

Table 10

## Winchester Bay salmon angling effort and catch, 1949-1959

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Boat trips, pleasure craft charter total	7,243 few	6,452 several	8,190 many	7,324 1,397 8,721	3,890 909 4,799	4,935 1,282 6,217	5,561 906 6,467	4,583 1,355 5,938	8,471 2,625 11,096	5,956 1,619 7,575	2,949 1,433 4,382
Angler trips, pleasure craft charter total	18,107 few	16,947 several	20,475 many	19,189 10,375 29,564	9,531 6,255 15,786	12,345 9,515 21,860	14,380 7,003 21,383	12,188 10,955 23,143	25,104 20,725 45,829	8,246 11,625 19,871	8,198 9,859 18,057
Number of salmon, chinook silvers total	1,153 3,760 4,913	2,482 2,826 5,308	5,979 4,689 10,668	4,124 14,387 18,511	1,517 9,440 10,957	6,262 13,913 20,175	7,019 8,194 15,213	6,291 17,546 23,837	3,440 46,349 49,789	4,232 10,779 15,011	2,788 8,297 11,085
Average weight, chinook silvers	21 9	19 10	22 10	18 9	16 9	14 9	13 8	17 8	17 7	13 9	13 7
Salmon per angler	0.28	0.31	0.52	0.63	0.69	0.92	0.71	1.02	1.09	0.76	0.61
Pounds of salmon taken	58,053	75,418	178,428	203,715	107,159	212,885	154,834	247,315	384,948	118,508	91,084
Pounds of salmon per angler	3.21	4.45	8.71	6.89	6.79	9.74	7.24	10.69	8.40	5.96	5.04

Table 11

Catch records of the salmon fishery kept by dock owners at the Tenmile Lakes in the fall of 1958

Period	Anglers	Silvers	Jacks	Total fish	Fish per angler	Percentage jacks
November 10-15	87	27	44	71	0.8	--
16-30	569	184	129	313	0.6	41
December 1-15	230	77	14	91	0.4	--
16-31	127	1	1	2	0.01	--
Totals	1,013	289	188	477	0.5	39

Table 12

Catch records of the salmon fishery kept by dock owners at the Tenmile Lakes in the fall of 1959

Period	Anglers	Silvers	Jacks	Total fish	Fish per angler	Percentage jacks
October 20-31	96	3	12	15 /1	0.16	80
November 1-15	164	22	14	36	0.22	39
16-30	149	17	14	31	0.21	45
December 1-15	36	1	2	3	0.08	67
16-31	75	3	5	8	0.10	62
Totals	520	46	47	93	0.18	58

/1 Does not include one 15-pound striped bass

Scale samples were obtained from ninety-two unmarked fish and forty-four marked fish taken by the anglers. Table 15 illustrates the average size for these fish by sexes. The unmarked fish were about three inches larger than the marked fish; however, all of the marked fish were on their first spawning run while the unmarked fish included repeat spawners.

#### Winter steelhead fishery

Angler success was determined to be 0.17 fish per angler and steelhead were caught at the rate of 0.06 fish per hour. Success was about the same as in 1958. Creel data are presented in Table 16. Two marked summer steelhead were checked in the winter fishery. One was taken in January and the other on February 5, 1959. Both fish were males, had been to the ocean, and were caught in the North Umpqua.

#### Trout fisheries

Emphasis was again placed on determining the number of migrant steelhead and hatchery trout harvested by trout anglers in the North Umpqua River.

Completed anglers had an average catch of 3.14 fish. Trout were caught at the rate of 0.86 fish per hour. These figures compare to the 2.72 fish per angler taken at the rate of 0.75 fish per hour in 1958 and are illustrated in Table 17. The total harvest consisted of 74.6 per cent hatchery rainbow stocked in season, 22.8 per cent downstream migrant steelhead, 1.1 per cent native trout, 0.6 per cent hatchery migrant steelhead, 0.3 per cent hatchery rainbow from 1958 plants, 0.3 per cent downstream chinook migrants, and 0.3 per cent coastal cutthroats. Anglers harvested 24,169, or 39.6 per cent of the rainbows stocked in 1959. This is a significant increase over the 26.4 per cent harvested in 1958. The one change made in the 1959 liberation program was the stocking of trout twice monthly as compared to once a month in 1958.

Table 13

Creel census records of striped bass anglers fishing from  
Winchester Bay in the summer of 1959

Period	Number of trips	Number of anglers	Fish taken	Fish per angler
Pleasure craft				
June 16-30	1	3	5	1.7
July 1-15	9	28	4	0.1
16-31	12	32	9	0.3
August 1-15	21	59	10	0.2
16-31	4	7	1	0.1
September 1-15	7	18	0	0.0
Charter boats				
July 1-15	1	6	1	0.2
16-31	13	75	13	0.2
August 1-15	8	48	14	0.3
16-31	1	5	7	1.4
September 1-15	3	12	4	0.3
Totals	80	293	68	0.2

Yearling rainbow and cutthroat trout were marked prior to release in south coast streams. Some minor changes in numbers and time of release were made in an attempt to increase angling success.

Angling was generally good at most of the lakes in the area. Angling at the Tenmile Lakes was considerably better than in 1958. Eel Lake continues to yield good catches but only to a few experienced anglers. Loon Lake was a good producer with a number of fish being marked holdover rainbow trout from the release in 1958. Creel census data for the various lakes are shown in Table 18. It was not always possible for dock owners to check all fish for marks.



Table 14

## North Umpqua summer steelhead fishery, 1958-59

Area	Angler trips	Steelhead	Fish per angler	Fish per hour
Winchester Dam - Rock Creek				
1958	363	163	0.45	0.11
1959	1,162	308	0.26	0.07
Fly area				
1958	1,847	709	0.38	0.07
1959	1,553	374	0.24	0.05
Totals				
1958	2,210	872	0.39	0.07
1959	2,715	682	0.25	0.05

Table 15

## A comparison of average lengths between marked and unmarked Umpqua summer steelhead by sexes

Type	Females	Males
Marked (44)	22.1 (19)	22.2 (25)
Unmarked (92)	25.1 (51)	25.3 (41)

Note: Numbers in parentheses are the numbers of fish in the sample.

Table 16

## Creel sampling results for winter steelhead, upper Umpqua District 1958-59 season

Area	Anglers	Steelhead	Fish per angler	Fish per hour
South Umpqua	58	4	0.07	0.03
North Umpqua	197	41	0.21	0.08
Main Umpqua	113	16	0.14	0.04
Totals	368	61	0.17	0.06

Lemolo continues to receive the greatest angling pressure of the North Umpqua reservoirs. Angling success was up in Toketee and Soda Springs, but down in Lemolo. Rainbows stocked as four to five inch fingerlings late in the summer of 1958 made up 49 per cent of the catch at Lemolo, 82 per cent at Toketee, and 87 per cent at Soda Springs. On opening weekend, these rainbows were just under twelve inches in length at Lemolo, just under ten inches at Toketee, and just over eight inches at Soda Springs. The catch of brown trout continued to decline in all reservoirs.

Table 17

A comparison of angler creels in North Umpqua bait and fly areas  
1958 and 1959 seasons

Area	Anglers	Marked fish		Native trout		Migrant chinook	Migrant steelhead	Fish per angler	Fish per hour
		Rainbow	Steelhead	Rainbow	Cutthroat				
Bait	1958	5,544	8,895	130	236	12	1,535	2.11	0.61
	1959	4,782	13,184 /1	15	107		1,593	3.17	0.91
Fly	1958	5,568	10,455	740	315	75	6,810	3.30	0.87
	1959	5,526	11,069 /2	138	172	17	5,776	3.11	0.82
Totals									
1958	11,112	19,350	897	870	551	87	8,345	2.71	0.75
1959	10,308	24,253 /3	197	153	279	17	7,369	3.14	0.86

/1 Includes 15 fish from 1958 plant

/2 Includes 69 fish from 1958 plant

/3 Includes 84 fish from 1958 plant

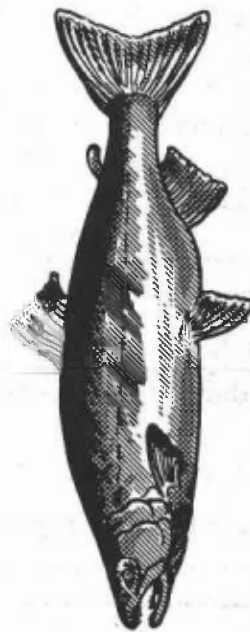


Table 18

Trout angling effort and catch in the  
lower Umpqua River area in 1959

Water	Anglers	Wild		Marked		Percentage marked	Fish per angler
		Rb	Ct	Rb	Ct		
Tenmile Lakes							
April (GC)	9	5	13	23	11		5.8
(OSP)		No records obtained					
(docks)	66		65		136	68	3.0
May (GC)	5	0	10	11	5		5.2
(OSP)	9		1		12		1.4 <u>/1</u>
(docks)	181		192		604	76	4.4
June (GC)		No records obtained					
(OSP)	13		21		22	51	3.3 <u>/1</u>
-----							
Eel Lake							
April (GC)	23	0	38	20	1		2.6
(OSP)	1		6		0	32	6.0
May (GC)	5	0	0	7	0		1.4
(OSP)	4		5		5	71	2.5
-----							
Loon Lake							
April (all sources)	No records obtained						
May (OSP)	19	0	11	45	0		2.9
(dock)	129	0	94	384	0	80	3.7
June (dock)	21	0	10	88	0	90	4.7
-----							
Saunders Lake							
April (GC)	7	0	1	0	58	99	8.4
-----							
Marie Lake							
April (all sources)	No records obtained						
May (GC)	8	0	4	0	14	78	2.3
/1 Trips incomplete when checked.							

/1 Trips incomplete when checked.

Table 19

Creel sampling results for North Umpqua reservoirs, 1959

Reservoir	Anglers	Rainbow	Eastern brook	Brown trout	Fish per angler	Fish per hour
Lemolo	558	541	491	72	1.98	0.54
Toketee	105	258	-	55	2.98	0.73
Soda Springs	53	181	-	28	3.94	0.74
Totals	716	980	491	155	2.27	0.59

## Salmon restoration

### Propagation and stocking

The 1959 spring chinook below Soda Springs produced 174,581 green eggs. Nearly 52,000 excess fry from the 1958 egg take were stocked in Loon Lake in December.

A heavy loss from Columnaris in the summer of 1959 leaves about 56,000 spring chinook for stocking in March of 1960. The fall chinook program was altered in 1959 with the stocking of fish at 176 to the pound into Loon Lake in May. A better evaluation of the program can be made as the returning fish are more easily observed in Camp Creek below the lake than in the main river. The history of salmon stocking in the Umpqua system is presented in Table 20.

Table 20

Salmon stocking in the Umpqua basin, 1949-1959

Brood year	Spring chinook	Fall chinook	Silver salmon	Brood year total stocking
1949	52,000 (18)	384,500 (fry)	20,000 (15)	456,500
1950		416,500 (fry)	3,500 ( 9)	
1950	31,500 (18)	25,000 (15)	31,500 (15)	508,000
1951	39,000 (18)	21,500 (15)	18,500 (15)	79,000
1952	51,000 (13)	25,500 (15)	27,000 (15)	103,500
1953	62,000 (14)	19,000 (14)	27,000 (14)	108,000
1954	205,000 (fry)			
1954	62,000 (14)	23,000 (12)	27,500 (12)	317,500
1955	122,000 (fry)			
1955	75,000 (14)	23,000 (12)	30,000 (12)	250,000
1956	702,000 (fry)			
1956	10,000 (13)	34,500 (15)	29,000 (14)	775,500
1957	75,600 (fry)			
1957	52,000 (18)	23,800 (15)		151,400
1958	51,800 (fry)			
1958	56,000 (18)	31,300 ( 6)		139,100
Totals	1,646,900	1,027,600	214,000	2,888,500

Note: Age in months from egg take to liberation is given in parentheses following the number of fish.

### Marked salmon returns

A total of 239 spring chinook was examined at Winchester Dam during the period April 13 - October 10, 1959. The number marked was thirty-nine, or 16.3 per cent. The first marked fish was observed the last week of April. No marked fish were observed after the middle of July.

In the fall, 239 silvers and 62 fall chinook were examined at Winchester, but no marked fish were observed.

A five-mile section of lower Rock Creek just above the hatchery was examined to enumerate spring chinook using the creek. A total of sixty-nine chinook, all marked, substantiates the belief that all or nearly all of the spring chinook in Rock Creek are of hatchery origin.

A total of thirty-four marked salmon was observed among 4,043 specimens at Winchester Bay in the summer of 1959. Of the marked fish, six were chinook salmon and twenty-eight were silver salmon. Only four marked fish, all silver salmon, were of Game Commission origin. A new law in effect in 1959 made it illegal to land ocean-caught salmon under 20 inches in length so the smaller fish were not available for examination.

### Steelhead restoration and studies

#### Propagation and stocking

Summer steelhead brood fish captured in the ladder at Winchester Dam were held as an egg source for the fifth consecutive year. Some eighty-eight adults were taken during the period July 9-13, 1959. The 1958 brood stock produced 47,586 green eggs, from which 38,724 eyed eggs were transferred to the Bandon Hatchery for rearing.

The second plant of summer steelhead occurred in March 1959, when 34,908 yearlings were liberated below Winchester. The fish were between 6.8 and 9.1 per pound when released.

#### Marked steelhead returns

There were 408 summer steelhead examined at Winchester Dam during the period of July 9 - October 10, 1959, and a total of 138 fish, or 33.8 per cent, was marked. Marked fish made up 32.0 per cent of the anglers' creel.

Of the 815 marks recovered, 693 were taken above the dam, and 122 were caught below the dam. In the anglers' harvest 122 were caught below the dam, 81 in the bait area above the dam, and 18 in the fly area. Approximately 50 per cent of the harvest occurred in the exact area of stocking. Of the adult marked fish recovered 81 per cent were planted as yearlings and 19 per cent as 2-year-olds. Marked hatchery steelhead recovered by anglers represented about 0.32 of one per cent of the plant. Yearling plants gave slightly better return than 2-year-olds.

The 815 recovered marks represent a return of 1.2 per cent of the total number stocked. The per cent return appears much higher when we consider the following factors: A harvest of the migrants took place during the trout season, a harvest of premature adults occurred during last winter, and marked summer adults are appearing in the present winter season catch. We should have a return of two-plus per cent from the ocean.

#### Experimental rearing ponds

Three farm ponds and the hatchery brood pond were stocked with unfed winter steelhead fry to determine growth rates under natural rearing conditions. A three-acre pond was stocked with 3,000 fry, a one-acre pond with 1,000 fry,

a three-quarter acre pond with 2,000 fry and the one-half acre hatchery pond with 6,000 fry.

Sampling for growth in mid-November gave an average of 4.3 inches fork length in the three-acre pond, 4.8 inches in the one-acre pond, and about 4.5 inches for the hatchery pond. No fish were taken in the three-quarter acre pond.

No figures are available at the present as to the exact number of fish remaining in each pond.

#### Steamboat migrant traps

Downstream traps in Steamboat Creek tributaries showed that a peak in migration occurred during the period April 20-27. The peak in 1958 was reached in May 15-20. Two peaks were again observed in the migration of fish of the year. The first peak occurred the fourth week of June and a smaller peak occurred the last of July.

There were approximately 8,000 more steelhead migrants trapped in 1959 than in 1958. This is illustrated in Table 21. Of particular interest were the silver salmon migrants taken in the Canton Creek trap. These were the first silvers taken in any trap during the two years of trapping.

Table 21

A comparison of Steamboat Creek migrant trapping results, 1958-59

Year	Rainbow (steelhead)				Cutthroat			Dace
	0-2"	2-4"	4-6"	6-8"	4-6"	6-8"	over 8"	
1958	9,616	2,494	525	12	59	86	27	2,508
1959	13,326	5,962	1,595	79	122	56	27	1,500

In conjunction with the Steamboat Creek trapping, temperatures were recorded on tributary streams. Temperature data for the period January through August are presented in Table 22.

Table 22

Steamboat Creek tributary temperatures, January-August, 1959

Period (15th-15th)	Number of readings	Average temperature	Temperature range
January-February	24	42° F.	37° - 46°
February-March	24	43° F.	40° - 45°
March-April	28	44° F.	41° - 46°
April-May	43	49° F.	42° - 56°
May-June	55	54° F.	45° - 62°
June-July	49	62° F.	53° - 72°
July-August	13	67° F.	58° - 73°

### Spawning ground counts

Two steelhead spawning peaks were observed on Steamboat Creek and the North Umpqua River. The first peak occurred the third week of April and the second in the fifth week of April. No counts were made as to fish per mile.

### Life history studies

An analysis of information obtained from scale studies on North Umpqua steelhead is shown in Table 23. As shown in Table 23 summer steelhead predominately spend three years in the ocean before spawning while most of the winter run remain two years at sea before returning to spawn.

Approximately 60 per cent of the summer steelhead and 73 per cent of the winter steelhead migrated to the ocean when they were over six inches in length.

Table 25 illustrates the calculated fork lengths at each annulus for the recovered marked summer steelhead. Fish released at about 7.5 inches in length returned as normal adults while those released at an average length of 9.3 inches returned the same year as 15-17 inch fish. The smaller fish released seem to remain in the stream, many being caught in the summer trout fishery at 5.75-6.5 inches in length.

### Habitat maintenance and improvement

### Rotary fish screens

Rotary fish screens prevented the loss of 2,252 steelhead migrants, 786 silver migrants, and 9 cutthroat trout in eight irrigation canals on Myrtle and Cow Creeks. Bypass traps showed a peak in silver migration the last of May while steelhead migration peaked in June. Bypass trapping results are presented in Table 26. All screens were removed the second week of September.

### California-Oregon Power Company canal investigations

A sampling program was initiated with Copco to test for fish losses in Fish Creek and Lemolo #2 diversion canals. The Game Commission conducted the sampling on Fish Creek, while Copco investigated Lemolo #2. Seventeen sampling periods of twenty-four hours on Fish Creek canal produced seventeen rainbow trout. The trout ranged in size from two to seven inches. A six-foot fyke net was used to sample the ten-foot canal. A report from Copco stated that 328 hours of sampling produced only one 3-inch brown trout. Sampling will be continued in both canals in 1960.

### Fishways

The Steamboat Falls fish ladder was completed and put into operation in late August 1959. Summer steelhead moved through the ladder almost immediately and were soon observed fifteen miles upstream.

It was found necessary to remove debris from the exit of the South Umpqua Falls ladder on seven different occasions during the winter of 1958-59.



Table 23

## Umpqua River steelhead life history patterns

Pattern	First time females	First time males	Repeat spawners females	Repeat spawners males	Total
Summer steelhead	(100 samples)	(80 samples)	(13 samples)	(12 samples)	(205 samples)
2/1	2	3			2%
2/2	14	11	1		13%
2/3	7				3%
3/1	4	2	8	9	11%
3/2	61	57	4	2	61%
3/3	12	7		1	10%
Winter steelhead	(13 samples)	(14 samples)	(6 samples)		(33 samples)
2/1					
2/2	13	10	4		82%
2/3		3	1		12%
3/1					
3/2		1	1		6%
3/3					

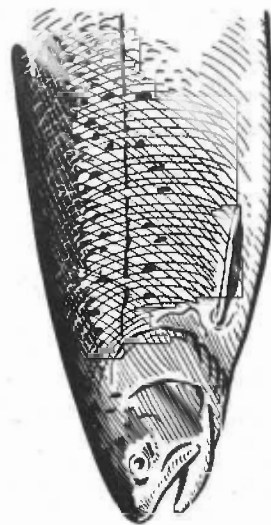


Table 24

Calculated fork lengths for Umpqua River steelhead

Pattern	Annuli					
	I	II	III	IV	V	VI
Summer steelhead						
2/1	3.6	6.7	19.8			
2/2	3.2	5.2	19.4	24.2	(27.0)	
2/3	3.2	5.1	17.6	25.3	27.0	
3/1	3.0	4.9	6.5	20.3	(25.1)	(29.0)
3/2	2.8	4.6	6.2	19.9	24.6	(26.6)
3/3	2.4	4.0	5.4	17.7	25.6	27.9
Winter steelhead						
2/1						
2/2	3.9	6.1	18.8	26.8	(30.4)	(30.5)
2/3	2.1	3.4	12.9	20.8	(27.2)	(30.0)
3/1						
3/2	3.1	4.8	6.2	18.1	25.3	(26.0)
3/3						

Note: Figures in parentheses are for repeat spawners.

Table 25

Marked summer steelhead calculated lengths, 1959

Pattern	I	II	III	IV
1/1	9.3 <u>1</u>	15.3		
1/2	7.3 <u>1</u>	18.9	22.4	
2/1		9.3 <u>2</u>	17.0	
2/2		7.6 <u>2</u>	19.8	23.6

1 Raised in hatchery one year before release2 Raised in hatchery two years before release

Table 26

Results from six bypass traps on Myrtle-Cow Creek areas, 1959

Period	Steelhead	Silver salmon	Cutthroat
March-April		116	
April-May		298	2
May-June	782	361	3
June-July	1,285	10	4
July-August	148	1	
August-September	37		
Totals	2,252	786	9

## Lake improvement

Game Commission personnel participated to a considerable degree in the removal of old logging debris from the surface of Eel Lake in the winter of 1958-59. Large quantities of debris were burned as a part of the project to clean the lake and shoreline of old logging debris. The accumulation of floating and partially submerged logs and debris has hampered angling activity and created conditions hazardous to boating.

## Rearing ponds

The location of sites suitable for the development of impoundments for rearing salmon and steelhead has been a major activity in the Umpqua basin. A number of sites have been located which appear to have possibilities. Oar Creek, Three Mile Creek, Frairie Creek, Soup Creek, and Brush Creek in the lower river appear to merit further consideration.

Following preliminary engineering, the Hemlock Meadows site on the upper river shows great promise as a steelhead rearing pond. Estimated cost is about \$40,000 for an eighty-plus acre pond. Also on the upper river, twenty-five to thirty potential rearing or public fishing pond sites have been cataloged for future investigations.

## Tenmile Lakes fry marking project

The removal of stranded silver salmon fry from drying stream channels of the Tenmile Lakes system has been an annual summer project by members of the Tenmile Lakes Sportsmen's Association. A marking project was initiated in 1959 in an attempt to evaluate the contribution such salvage activity makes to the subsequent run of adult fish. Ten thousand silver salmon fry were collected from drying potholes of the tributaries of Big and Benson Creeks in the spring and summer of 1959. Chloretone was used as an anesthetic and the fish were immediately returned to the main flowing stream following marking.

The search for marked fish will be made on the tributaries of the Tenmile Lakes in the fall and winter of 1960-61 when the marked fish returning as jack salmon can be expected and in the following winter when the adult three-year-old fish arrive.



# ROGUE RIVER AND SOUTH COASTAL STREAMS

Cole M. Rivers and Henry E. Mastin

Low water, high water temperatures and extensive disease losses were disturbing features of the 1959 fishery. A spectacular fall run of steelhead appeared and was judged by veteran anglers as the best run since 1935. Fish production in most of the Rogue district lakes was considered excellent for the 1959 season.

## Upstream migrant counts at Gold Ray Dam

The 1959 count of spring chinook over Gold Ray represented an 88.8 per cent return of the 1955 parent run. Low flows and high temperatures apparently stimulated an early migration to the upper river.

The winter steelhead of the 1958-59 run had little difficulty ascending the Gold Ray ladder. A representative count was made of the run. A good catch was enjoyed by sport fishermen and all evidence indicates that the total winter run was moderate in size.

The count of summer steelhead was 905 which is 37.0 per cent of the previous ten-year average.

The 1958 run of silvers showed a large percentage return from the 1955 parent run, but because so few fish made up the total count, little significance can be attached to the high figure.

The annual counts of anadromous fish over Gold Ray since 1942 are presented in Table 27. Table 28 shows the percentage return of spring chinook and silver salmon from their respective parent runs.

Table 27

Counts of anadromous fish runs over Gold Ray Dam

Year	Spring chinook	Silvers	Steelhead	
			Summer run	Winter run
1942	43,429 (15.6)	4,608 (4.7)	5,725	
1943	38,052 (11.0)	3,290 (6.1)	5,768	16,534
1944	31,940 (13.1)	3,230 (10.4)	5,282	13,855
1945	33,718 (17.8)	1,907 (4.4)	4,804	14,196
1946	30,065 (16.5)	3,840 (5.5)	3,266	11,185
1947	34,740 (9.5)	5,340 (3.1)	3,431	10,754
1948	27,742 (10.8)	1,764 (4.8)	1,995	8,707
1949	20,028 (10.5)	9,440 (4.3)	2,761	8,073
1950	16,767 (18.8)	2,007 (11.8)	3,570	9,667
1951	21,111 (25.0)	2,738 (8.4)	2,630	6,608
1952	18,488 (23.0)	320 (2.2)	3,954	11,550
1953	33,558 (13.8)	1,453 (9.2)	3,266	11,143
1954	25,785 (21.6)	2,138 (10.8)	2,352	7,599
1955	16,550 (17.7)	480 (9.6)	1,123	5,251
1956	29,952 (13.7)	421 (5.4)	2,358	9,370
1957	18,770 (16.9)	1,075 (7.2)	1,316	5,045
1958	15,716 (13.1)	732 (11.5)	1,099	3,888
1959	14,707 (19.9)	227 (7.9) /1	905	4,755

Figures in parentheses are percentages of jack salmon.

/1 Incomplete

Table 28

## Percentage of return of salmon progeny at Gold Ray

Year of run	Chinook		Silvers	
	Parent year	Percentage return	Parent year	Percentage return
1945			1942	41.1
1946	1942	69.2	1943	116.7
1947	1943	91.3	1944	165.3
1948	1944	87.2	1945	92.5
1949	1945	59.4	1946	245.5
1950	1946	55.8	1947	37.6
1951	1947	60.8	1948	155.2
1952	1948	66.7	1949	3.4
1953	1949	167.6	1950	72.4
1954	1950	153.7	1951	78.9
1955	1951	78.4	1952	150.0
1956	1952	162.0	1953	28.9
1957	1953	55.9	1954	51.2
1958	1954	60.9	1955	152.5
1959	1955	88.8		

Note: A 100 per cent return indicates that a run equalled the number from which it originated.

## Salmon fishery

A drop in river flow early in the season followed by temperatures of 68° to 70° F. between Dodge Bridge and Gold Ray apparently were factors in stimulating spring chinook salmon to move over Gold Ray into the upper river. Disease losses were severe on downstream migrants in the lower canyon in July and August, but losses of adults in the upper river were minor.

Catch

Anglers spent 25,856 angler days on the lower Rogue to catch 6,375 salmon in 1959. The catch was 32 per cent lower than that of the 1955 parent run. The decline in catch was noticeable on both the spring and fall chinook.

The lower river catch of spring chinook (March through June) was 45 per cent lower than the take of the 1955 parent run and 61 per cent below the average of the preceding ten years. The spring season peaked on May 4 when a catch of 66 salmon was recorded. The 1959 daily catch for April and May is compared to the 1955 parent run as well as the average daily catch for the ten preceding years in Figures 1 and 2.

The take of fall chinook (September through November) was 56 per cent less than the catch of the parent run and 44 per cent less than the ten-year average.

The catch for July and August, which is influenced by ocean fish entering the bay to feed on herring and smelt, showed a definite increase of 43 per cent over the parent run and 19 per cent over the previous ten-year average.

Figure 1

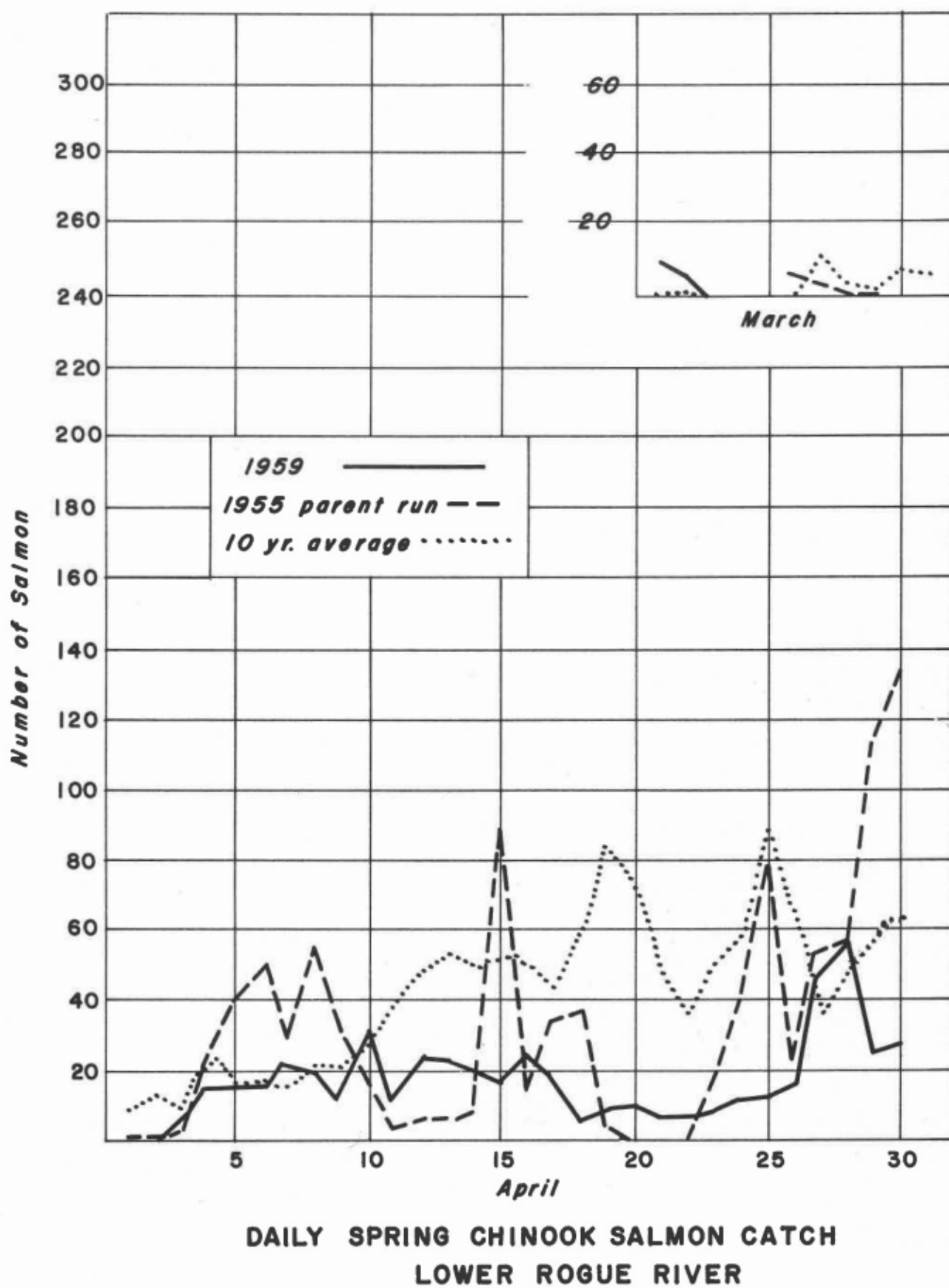
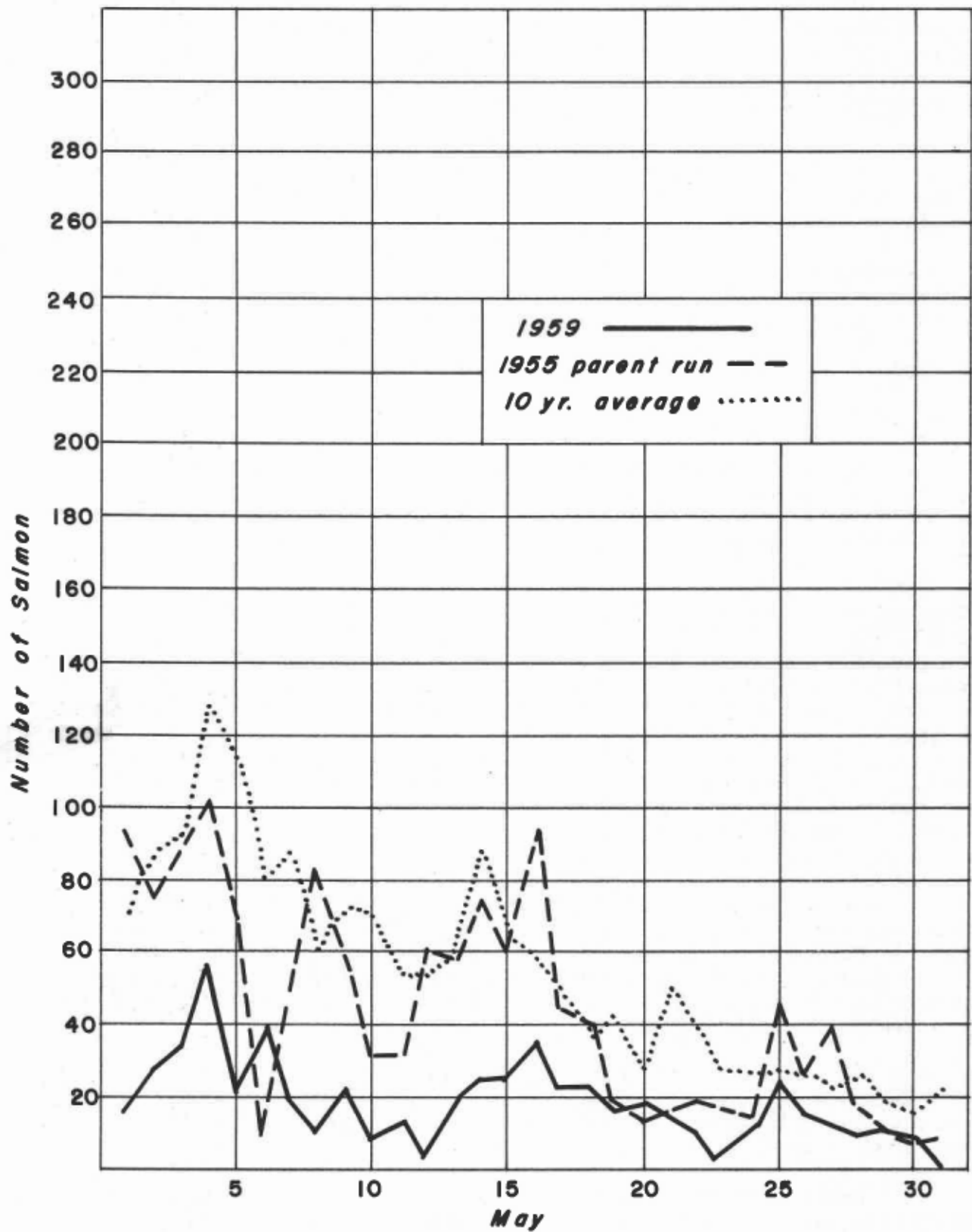


Figure 2



DAILY SPRING CHINOOK SALMON CATCH  
LOWER ROGUE RIVER



### Catch success

The catch success for the entire 1959 season was lower than the seasonal average for the past ten years. Table 29 summarizes the 1959 salmon fishery for the lower river by months as compared with the preceding ten years.

### Catch weight

The total weight of salmon caught by sport fishermen from the lower Rogue in 1959 was 102,721 pounds. The average weight per fish was 16.7 pounds. Spring chinook had an average weight of 17.9 pounds and fall chinook 15.8 pounds. For silvers the average weight was 9.4 pounds per fish.

### Catch escapement

Since 1949, the largest percentage of escapement of spring chinook past the lower Rogue fishery occurred in 1959, at least as indicated by the ratio of catch on the lower river to the Gold Ray count. This ratio in 1959 was 1 to 10.7. The average ratio of catch to escapement since 1949 has been 1 to 5.9, and the lowest, or heaviest catch, was 1 to 3.7 in 1952.

The 1959 catch represented 8.56 per cent of the known number of spring chinook entering the river. The highest take was 21.4 in 1952, and the average for the previous ten-year period has been 14.29 per cent. Table 30 shows the relationship of the catch to the Gold Ray escapement for the years 1950 through 1959.

### Hatchery release studies

The history of Rogue River contains little or no evidence that any successful contribution has been made to the Rogue fishery by hatchery operations. The study of marked spring chinook salmon on the Rogue since 1949 has been designed to determine the most successful pattern of rearing and releasing which could be used as a guide for expansion of hatchery operations. The instigation of large scale artificial propagation of spring chinook does not seem desirable in view of unsatisfactory returns to date. It is suggested that a limited experimental work be done along these lines until satisfactory returns indicate a large scale program.

Spring chinook eggs have been obtained from Rogue River stock at the McLeod egg-taking station on Big Butte Creek. The eggs have been hatched and reared at different hatchery stations for various lengths of time to secure optimum growth rates and in an attempt to avoid onset of diseases and infections. The fish have been released at different sizes, locations and times of the year to determine the release pattern that will produce the best return.

The return of adults has been evaluated by random sampling of the sport catch at Gold Beach. The number of marked fish entering the river has been obtained by computing the total run from the ratio of marked to unmarked fish in the sample.

Table 31 shows the marked groups of salmon liberated and the percentage return from total numbers released of the brood years 1949 to and including 1954. The return of the 1954 brood year is not complete because the fish returning as five-year-olds have not been added.

Table 29

## Lower Rogue River salmon catch and angler success

Season Month	Catch		Percentage catch				Angler days		Average fish per day		Fish per angler day	
	1959	10-year average	1959	Season 10-year average	1959	Year 10-year average	1959	10-year average	1959	10-year average	1959	10-year average
Spring												
March /2 /3	17	32	0.5	0.6	0.3	0.3	246	205	1.54	5.80	0.07	0.16
April	548	1,314	17.5	26.7	8.6	13.4	2,787	5,451	18.26	43.78	0.20	0.24
May	596	1,718	19.0	34.9	9.3	17.5	3,363	6,042	19.22	55.42	0.18	0.28
June	216	484	6.9	9.8	3.4	5.0	1,085	1,661	7.20	16.13	0.20	0.29
July	1,058	718	33.7	14.6	16.6	7.3	4,401	2,859	34.13	23.17	0.24	0.25
August /4	701	658	22.4	13.4	11.0	6.7	2,460	2,161	46.73	43.87	0.28	0.30
Spring total	3,136	4,924	100.0	100.0	49.2	50.2	14,342	18,379	21.19	34.55	0.22	0.26
Fall												
August /5	1,038	965	32.0	19.8	16.3	9.8	3,551	3,174	64.88	60.32	0.29	0.30
September	1,604	2,709	49.5	55.4	25.2	27.6	5,602	6,014	53.47	90.31	0.28	0.45
October	549	1,185	17.0	24.2	8.6	12.1	2,217	1,857	17.71	38.22	0.25	0.64
November /6	48	29	1.5	0.6	0.7	0.3	144	66	2.40	3.24	0.33	0.44
Fall total	3,239	4,888	100.0	100.0	50.8	49.8	11,514	11,111	33.39	56.84	0.28	0.44
Season total	6,375	9,812			100.0	100.0	25,856	29,490	26.12	42.94	0.24	0.33

/1 10-year average - 1950 to 1959, inclusive

/2 Last 10 days in March

/3 8-year average - 1952 to 1959, inclusive

/4 First 15 days in August

/5 Total August catch: 1,739; 10-year average 1,623; fish per day 56.09; 10-year average 52.36; fish per angler day 0.29; 10-year average 0.30

/6 First 20 days in November

Weight of salmon catch 1959 - 102,721 pounds  
10-year average - 174,408 pounds

Table 30

Comparison of the lower Rogue spring chinook catch to the Gold Ray escapement for the years 1950 through 1959

Year	Catch	Escapement	Ratio of catch to escapement	Total run	Percentage catch
1950	3,885	16,767	1 to 4.3	20,652	18.81
1951	2,857	21,111	1 to 7.4	23,968	11.92
1952	5,034	18,488	1 to 3.7	23,522	21.40
1953	7,750	33,558	1 to 4.3	41,308	18.76
1954	3,764	25,785	1 to 6.8	29,549	12.74
1955	2,493	16,550	1 to 6.6	19,043	13.09
1956	2,923	29,952	1 to 10.2	32,875	8.89
1957	2,593	18,770	1 to 7.2	21,363	12.14
1958	2,563	15,716	1 to 6.1	18,279	14.02
1959	1,377	14,707	1 to 10.7	16,084	8.56
Average	3,524	21,140	1 to 5.9	24,664	14.29

Figure 3 illustrates the percentage return of the brood years with comparisons of lower river, middle river and Big Butte Creek releases. Generally the best returns have been enjoyed from middle river plants. No returns were found from the 1951 brood year groups that were released at Grants Pass in February, 1953, and November, 1952. Although the outstanding return from the Big Butte Creek plant of the 1954 brood year was obtained from a small number of fish released it would appear that this release site deserves further investigation.

The return of fish released at different months is illustrated in Figure 4. The month of the year in which the fish are released does not appear to be important.

Figure 5 plots the size per pound upon release of each group of marked fish with their percentage return. This comparison shows that fish that are reared to larger sizes before release produce a better return than those that are released at smaller sizes. Because many variables are influencing the returns, an ideal size for release is difficult to establish, but the figure indicates that the Rogue River spring chinook show larger returns when released at eight or nine to the pound.

Many things have been suspected of influencing the level of return. Comparison of returns with known biological and ecological factors have shown a few relationships, but most of them cannot be proven with statistical significance because of numerous interrelating influences, both known and unknown.

Much interest has been aroused in losses after release that might be caused by the carry-over of diseases and infections acquired in the hatchery. The percentage loss in the hatchery before release is compared with the percentage return as adults in Figure 6. It indicates that those groups of salmon that

Table 31

Hatchery-reared spring chinook salmon study,  
Rogue River, 1949 to 1959

Brood year	Group mark	Release			Return	
		Number	Place	Date	Number	Percentage
1949	LM-Ad	19,301	Middle river	March 1951	34	0.176
	LM-BV	20,385	Lower river	March 1951	11	0.053
		39,686			45	0.113
1950	LM-Ad	15,169	Middle river	March 1952	32	0.211
	LM-BV	14,643	Lower river	March 1952	54	0.368
		29,812			86	0.288
1951	LM-Ad	24,079	Middle river	February 1953	38	0.157
	LM-BV	24,236	Lower river	March 1953	0	0.0
	LM-RV	23,996	Middle river	November 1952	0	0.0
	LM- ? /1				13	0.211
		72,311			51	0.070
1952	LM-Ad	23,188	Middle river	March 1954	199	0.858
	LM-BV	17,940	Lower river	March 1954	80	0.445
	LM-RV	9,247	Middle river	November 1953	80	0.865
	LM- ?				64	1.134
		50,375			423	0.839
1953	LM-Ad	25,130	Middle river	December 1954	941	3.744
	LM-BV	24,999	Lower river	December 1954	582	2.328
	LM-RV	27,532	Big Butte Creek	December 1954	179	0.650
	LM- ?				112	4.190
		77,661			1,814	2.335
1954	LM-Ad	24,930	Middle river	October 1955	163	0.653
	LM-BV	16,894	Lower river	October 1955	51	0.301
	LM-RV	2,492	Big Butte Creek	October 1955	51	2.046
	LM- ?				40	0.814
		44,316			305	0.688 /2

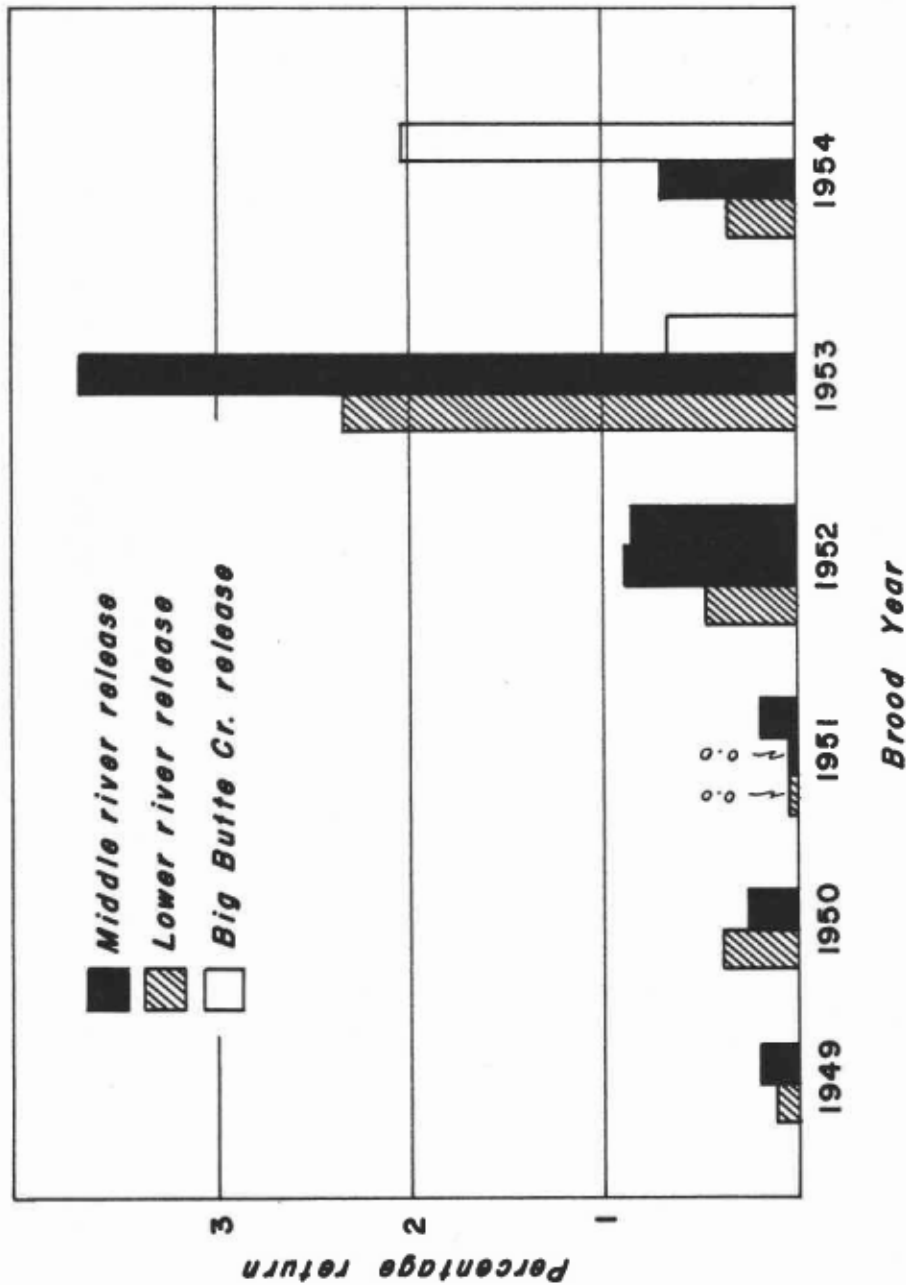
/1 Adult fish returning with LM mark only; no accompanying fin mark

/2 Total return not complete

have suffered heavy losses in the hatchery before release do not show a significant return. In computing the losses at the hatchery, the mechanical losses were not included as a part of the starting inventory.

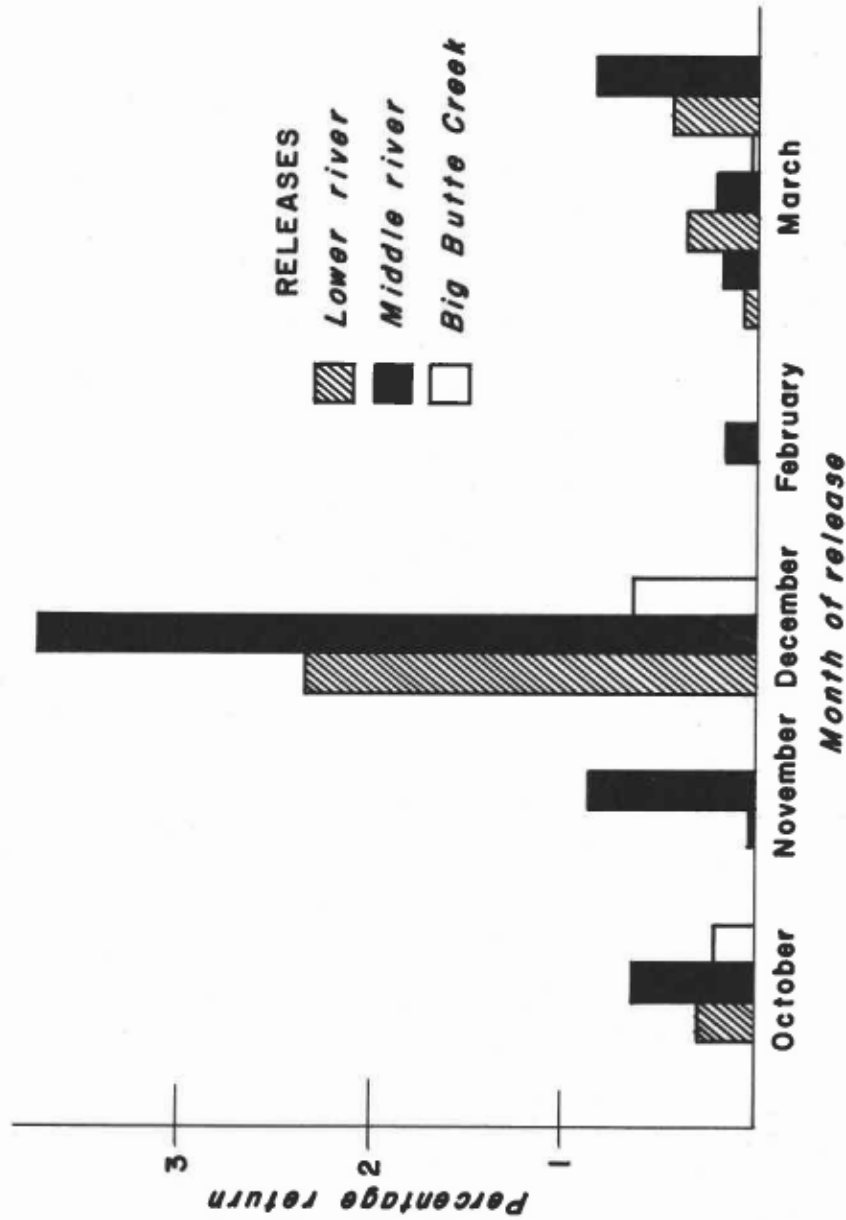
The first month after release is thought to be the most critical period for survival because of the major adjustments that must be made to the new environment. The relationship between the percentage return of the Rogue hatchery salmon and floods or high waters to which the fish were exposed after release is plotted in Figure 7. Generally, the fish that were subjected to elevated flows returned at a low percentage level.

Figure 3



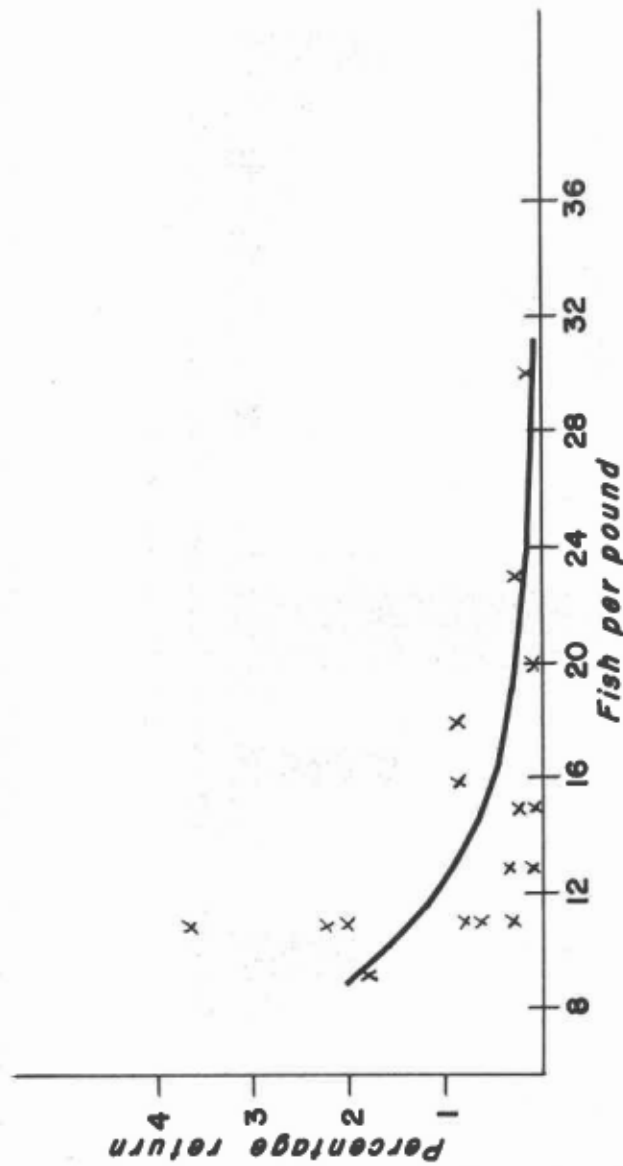
RETURN OF HATCHERY-REARED SPRING CHINOOK SALMON, ROGUE RIVER  
1953 to 1959

Figure 4



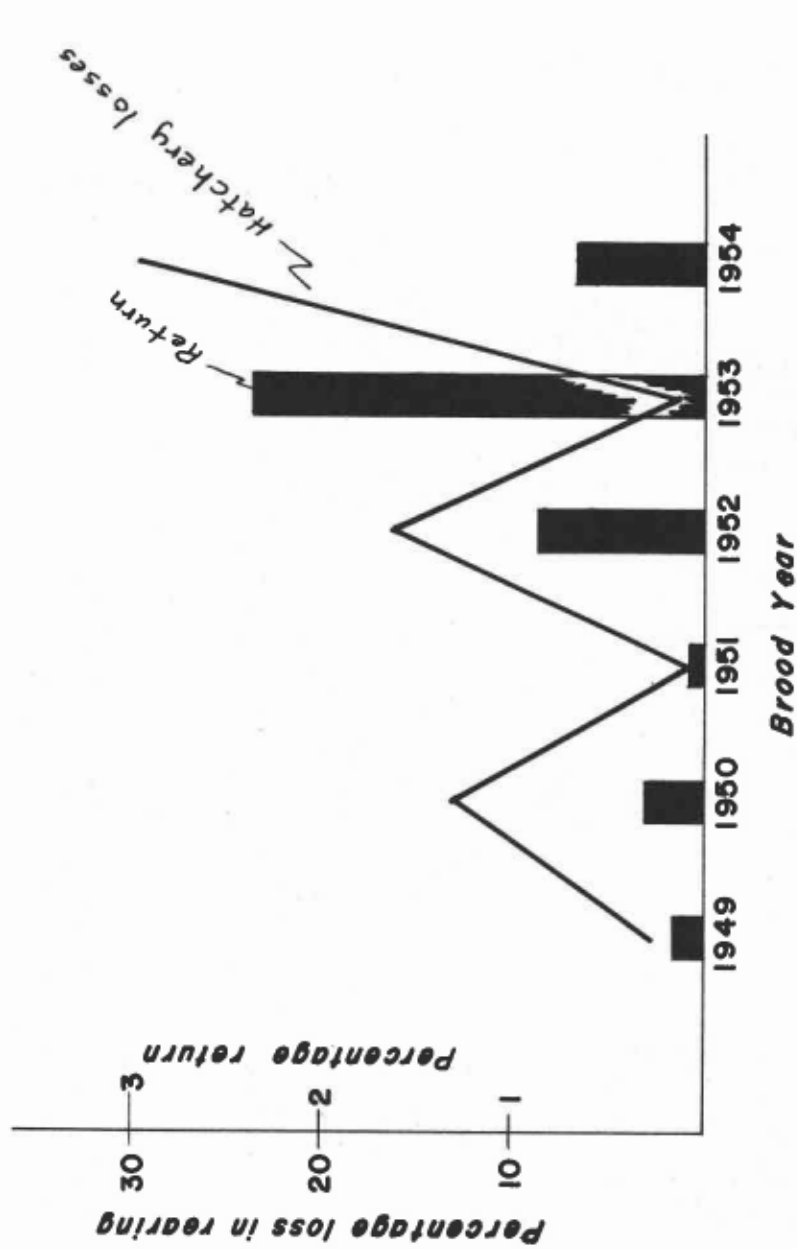
RETURN OF HATCHERY-REARED SPRING CHINOOK COMPARED WITH MONTH  
OF RELEASE, ROGUE RIVER, 1949-'59

Figure 5



SIZE OF SPRING CHINOOK UPON RELEASE COMPARED WITH RETURN AS ADULTS,  
ROGUE RIVER, 1951 to 1959

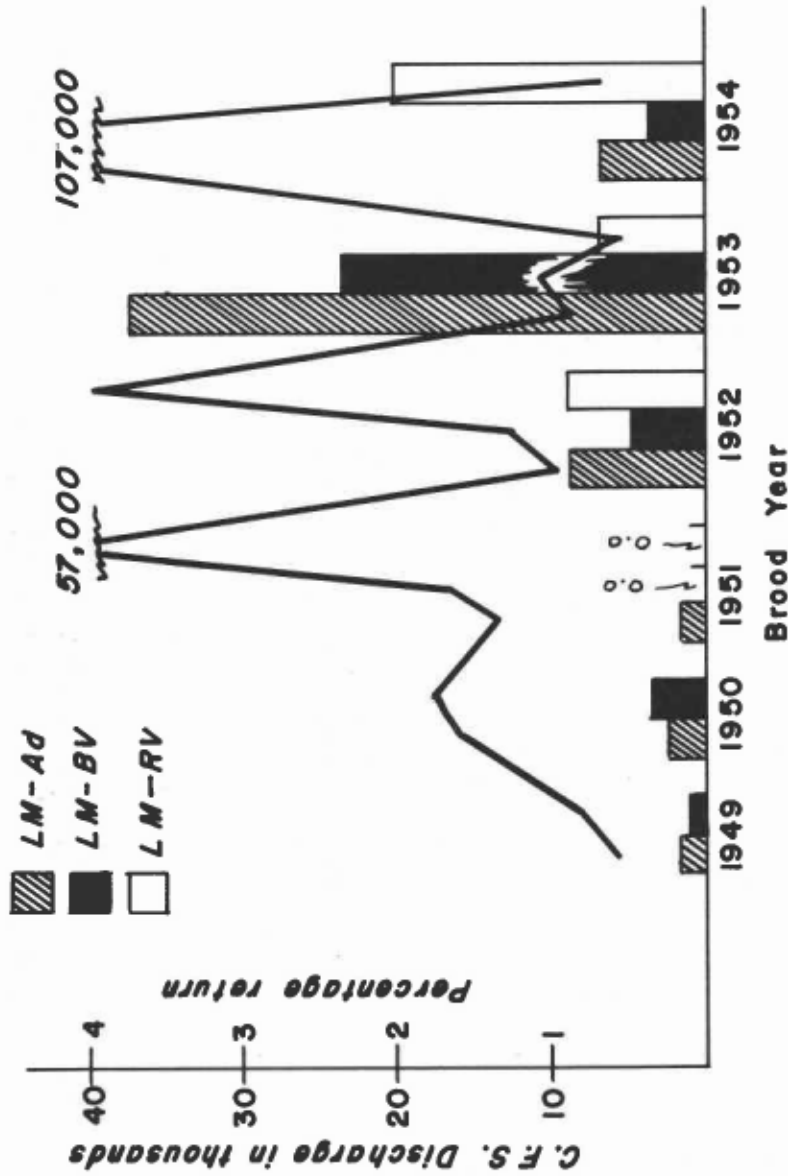
Figure 6



SPRING CHINOOK HATCHERY LOSSES COMPARED WITH RETURN AS  
ADULTS, ROGUE RIVER, 1949-'59



Figure 7



RETURN OF HATCHERY SPRING CHINOOK COMPARED WITH MAXIMAL DISCHARGE  
OF ROGUE RIVER AFTER RELEASE, 1949 to 1959

Much thought has been devoted to the exceptionally good return of the fish from the 1953 brood year. This group of fish was released in December, 1954, in cold, low water. River temperatures below 40° F. prevailed more than sixty days following release. No high waters occurred at any time through the following winter and spring months. They were raised at the hatchery with small loss and, so far as known, were released as clean, healthy fish. Either these migrants made a rapid downstream migration in the spring or they were resistant to Chondrococcus columnaris because wild migrants suffered heavy losses from the bacterium in July and August, 1955.

The salmon study on the Rogue to date indicates that best returns result from (1) groups of fish that have been free of disease losses in the hatchery before release, (2) fish raised to eight or nine to the pound, (3) fish released in the middle or upper parts of the basin, and (4) from releases that have been made after the danger of scouring high waters.

Artificial propagation has not greatly altered the pattern of returning age classes. Scale studies have shown that 10.4 per cent of the marked fish are returning as three-year fish, 67.3 per cent as four-year fish and 22.3 per cent as five-year fish. Average weight has been fourteen pounds per fish as compared to an average of eighteen to twenty pounds for wild fish. All marked fish have been found returning with the spring run.

The marked fish taken by anglers on the lower river represent a small contribution to the fishery, but the limited number being used in the study should not be expected to make a dramatic showing in the total catch, particularly when they are accompanying a comparatively large run of wild fish.

The cost of rearing and releasing Rogue River spring chinook salmon has been apportioned to the marked fish returning as adults. The monetary value of each returning salmon is unreasonably high for some of the brood year classes, e.g., those fish returning from the 1951 brood year at \$79.58 per fish or \$6.36 per pound. Other groups are within an acceptable economic limit such as those from the 1952 and 1953 brood classes at \$6.58 per fish, \$0.53 per pound and \$3.31 per fish or \$0.26 per pound, respectively.

Cost of returning Rogue River spring chinook is presented in Table 32. The average annual cost of returning adults found in this study to date are too high for practical application, but these costs can be greatly reduced by improving the patterns of rearing and releasing as guided by the knowledge gained in this study.

The data from the 1959 return became available after the above material on hatchery evaluation was compiled. Through the 1959 season 1,038 chinooks were examined at the canneries near Gold Beach, and only four marks were found. This represents the lowest recovery of hatchery salmon since the study began. The recovered marks were from spring chinook releases in the middle section of the Rogue. The data are presented in Table 33.

An estimated 135 silver salmon were taken in the sport fishery at the mouth of the Rogue representing one of the lowest catches recorded for the lower river. Examination of 108 silvers at the canneries failed to reveal any marks. This is the first year hatchery-reared silver salmon did not enter the sport catch; however, no yearling fish were stocked in the Rogue drainage in 1957.

Table 32

## Cost of returning Rogue River hatchery spring chinook

Brood year	Cost of stocked fish	Marked fish	Return to lower river catch		Return to river /1		
			Cost per fish	Cost per pound	Marked fish	Cost per fish	Cost per pound
1949	\$ 1,343.01	8	\$167.88	\$13.41	45	\$29.84	\$2.38
1950	1,806.70	14	129.05	10.31	86	21.01	1.68
1951	4,058.40	6	676.40	54.02	51	79.58	6.36
1952	2,783.92	43	64.74	5.17	423	6.58	0.53
1953	6,011.06	227	26.48	2.12	1,814	3.31	0.26
1954	4,741.50	41	115.65	9.24	305	15.55	1.24
	\$20,744.59	339	\$ 61.19	\$ 4.89	2,724	\$ 7.62	\$0.61

/1 - From total known catch plus Gold Ray escapement

Table 33

## Marked salmon returns, Rogue River, 1959

Species Month	Number salmon examined	Marked fish returned /1					Total return	Ratio of return	Percentage of marked salmon
		LM-Ad	LM-BV	LM-RV	LM-?	BV			
<u>Chinook</u>									
April	388	1	0	0	1		2	1 to 193.0	0.52
May	477	2	0	0	0		2	1 to 238.5	0.42
June	173	0	0	0	0		0	0 to 173.0	0.00
Total	1,038	3	0	0	1		4	1 to 258.5	0.38
<u>Silvers</u>									
Sept.	52	-	-	-	-	0	0	0 to 52.0	0.00
Oct.	56	-	-	-	-	0	0	0 to 56.0	0.00
Total	108	-	-	-	-	0	0	0 to 108.0	0.00

## Steelhead fishery

Few steelhead were observed spawning in Rogue tributaries in the spring of 1959 apparently the result of low winter flows. Some tributaries were unused, particularly those to the Applegate River and middle section of the Rogue. The fish used the main river channels adjacent to the mouths of the tributaries instead.

The delayed opening of trout season reduced the catch of spawned-out steelhead and two and three-year-old steelhead migrants.

## Winter steelhead

Good weather and water conditions prevailed during the 1958-59 winter steelhead season. Table 34 shows creel census data obtained on the middle Rogue, Applegate and Illinois Rivers. Guided parties on the middle section of the Rogue had an average of 1.17 fish per angler as compared to the 0.16 fish per angler of non-guided parties.

Table 34

Creel census data, winter steelhead seasons,  
Rogue district, 1959

Stream	Anglers	Hours	Fish	Fish per angler	Fish per hour	Hours per fish
Middle Rogue	50	186	10	0.20	0.05	18.6
Applegate	205	454	23	0.11	0.06	19.7
Illinois	154	622	33	0.21	0.05	18.8
Total	409	1,262	66	0.16	0.05	19.1

## Spring steelhead

The 1959 spring run was weak and the sport catch was light. Along with spring chinook, the spring run held over at points high on the main river.

The 1959 creel census study showed that 395 spring-run steelhead were taken by anglers from the river above Gold Hill between May 24 and September 18. Of the 837 steelhead counted over Gold Ray up to September 18, 315, or 37.6 per cent, were taken by sport fishermen. (See upper Rogue census study, page 42.)

Few spring-run steelhead reared at the Butte Falls and Bandon Hatcheries and released as marked fish in March, 1958, were found returning in the 1959 season. Ninety-three spring steelhead were examined at Gold Ray in July, and no marks were found; however, ten, or 10.7 per cent, had left maxillaries missing, but had no accompanying fin clip.

To check the possibility that the hatchery fish were returning with the fall-run steelhead, 235 angler-caught fish were examined in September and October, but still no marks were found. While salvaging fish from the ladders at Savage Rapids in September and October, 185 steelhead were checked, and one 3-pound fish with a left maxillary-right ventral mark (Butte Falls two-year-old release) was found along with four with only the left maxillary clip. All maxillary clips were good and not like those with hooking injuries.

Hatchery-reared steelhead that were released in March, 1958, were being taken by trout anglers through the opening months of trout season that year. The 1959 steelhead were distributed over an eleven mile section of the Rogue by a planting boat in an effort to improve their chances for a successful downstream migration. Creel census studies in the early parts of the trout season indicated that the efforts were not too successful because 1.8 per cent of the trout catch was made up of hatchery fish.

Table 35 compares the various groups of wild and hatchery fish taken by trout anglers from Savage Rapids Dam to Graves Creek between May 30 and June 11.

Table 35

Opening season catch by trout anglers,  
Savage Rapids to Graves Creek, Rogue River, 1959

Anglers interviewed	Catch				
	Wild migrants			Hatchery-released fish	
	Steelhead	Cutthroat	Chinook	Steelhead	Rainbow
227	411	8	2	8	26
Percentage	90.3	1.8	0.4	1.8	5.7

#### Fall steelhead

The fall steelhead run was one of the largest known in the past ten years. Catches between lower Rogue canyon and Robertson Bridge were phenomenal. Many of the fish were the typical Rogue River "half-pounders", but in the Marial and Galice sections, two to four pounders appeared in the catch in fair numbers.

The highest rate of catch, 1.35 fish per hour, was recorded in the Agness-Illahe area on September 9. Average catch success in the Agness-Illahe area and Galice section is compared in Table 36. Half of the census data were collected when the five-per-day bag limit was in effect and the other half with the two-per-day limit.

Table 36

Catch success of fall-run steelhead,  
Rogue River, 1959

	Agness-Illahe area	Galice area
Anglers interviewed	75	96
Hours fished	236	190
Catch - under 20 inches	200 (100%)	46 (88.5%)
- over 20 inches	0	6 (11.5%)
Total	200	52
Fish per angler,		
- as interviewed	2.67	0.54
- projected to completed trip	3.04	1.06
Fish per hour	0.85	0.27
Hours per fish	1.18	3.65

A conservative estimate of the lower river catch of steelhead derived from the numbers of fish brought to the canneries would be 9,853 fish. That catch could have been duplicated in the Agness-Illahe area, for a total of nearly 20,000 fish from the lower canyon to Gold Beach.

The large fall run of steelhead could have resulted from one of two factors, or a combination thereof; (1) the new screens that operated for the first time at Savage Rapids Dam through 1958, and (2) two consecutive mild winters without a severe high water. The Savage Rapids screens could have been the reason for many fish of the 1959 run being in the 14 to 18 inch size group.

### Trout fishery

In the special early trout season in headwaters of the Rogue watershed, good water conditions existed but the success of anglers was not spectacular. Fishing pressure was light. Anglers averaged 1.46 fish per day. Out of 268 anglers interviewed, only one party was found with a limit catch. Sixty-two per cent of the catch was of legal rainbow that were liberated especially for the special early opening, but the return to the angler was lower than that of those fish stocked later in the season.

Good progress is being made toward enticing trout anglers away from the stream sections in the middle Rogue basin where a major part of the trout fishery is supported by downstream migrant steelhead. The excellent trout fishery in lakes has been widely publicized.

Low stream flows afforded good trout fishing in the early summer in headwater portions of the Rogue and Applegate, but extreme hot weather and high water temperatures had an adverse effect on fishing success from mid-July to the end of September. Hatchery rainbow released in early season were well harvested but those liberated in July were taken in limited numbers.

Until recent years, angling pressure for downstream migrant steelhead in the lower Rogue canyon has not been considered important. The major interest has always been for adult salmon and steelhead. Increased use of the lower Rogue canyon has resulted in more pressure being put on steelhead migrants.

### Lakes and reservoirs

All trout lakes in the Rogue district are showing excellent yields. Good growth and return to the angler is being experienced in most lakes and impoundments.

### Fish Lake

Fish Lake was chemically treated in early October, 1958, and restocked with 102,000 rainbow averaging 4.75 and 5.75 inches in length. The fish had grown to an average of 8.4 inches in length by May 30 and 11.75 inches by September. Limit catches were the rule rather than the exception throughout most of the season. The lake produced a catch success of 0.81 fish per angler in 1958 before treatment and 5.50 fish per angler after being rehabilitated. See Tables 37 and 38 for annual catch success comparisons with other lakes in the Rogue district.

No roach have been found since the lake was rehabilitated but several eastern brook were taken by anglers in June, 1959. The fish were two and three years old, evidence that adult eastern brook escaped the treatment. Escapement of brook trout is believed to have occurred in lava recesses.

Table 37

Creel census from Rogue district lakes, 1959

Lake or reservoir	Species	Size groups in inches							Over 16	Total fish	Total anglers	Hours fished	Fish per angler	Hours per fish	Fish per hour
		Under 6	6-8	8-10	10-12	12-14	14-16	16							
Fish Lake	Rb EB		666	886	4		2		1,556 2 1,558	282	914	5.52	0.59	1.71	
Howard Prairie Reservoir	Rb			6	19	55	7		87	80	343	1.08	3.94	0.25	
Hyatt Reservoir	C	142	127	132	7				408						
	LB		54	13	14	2	1	1	85						
	PK	7							7						
	BG	330	25						355						
	B		47	80	2	14			143 998	193	603	5.16	0.60	1.66	
Squaw Lakes /1	Rb		19	361	79	4			463						
				1	13	5			19						
				6					6 488	78	296	6.25	0.61	1.64	
Willow Creek Reservoir /1	Rb		3	488	1,519	132	38	1	2,181	453	1,867	4.82	0.85	1.17	
/1 First 45 days of season only															

Table 38

Annual early season catch  
from Fish Lake, Willow Creek Reservoir, and Squaw Lakes,  
Rogue district, 1953 to 1959

Year	Fish Lake		Willow Creek Reservoir		Squaw Lakes	
	Fish per angler	Fish per hour	Fish per angler	Fish per hour	Fish per angler	Fish per hour
1953	1.76					
1956	1.51		4.30		2.32	
1957	4.84 /1		5.10			
1958	1.69	0.29 /2	1.24	0.28	3.78	0.97
1959	5.20	1.60 /3	4.82	1.17	7.24	1.85

/1 Results of heavy catch of 6 to 6½ inch rainbow

/2 Season preceding treatment

/3 Season following treatment

Seventeen per cent of the angler-caught fish were found with Myxosporidia infestations in June, but the incidence of the parasite had declined to nine per cent in July and much less than that in August.

#### Willow Creek Reservoir

Willow Creek Reservoir continues to be the most heavily fished body of water in the Rogue Basin. Stocking of fingerling rainbow in early summer has greatly improved survival and return to the angler. For creel census data, see Tables 37 and 38.

Kokanee were planted in 1959 in order to establish a supplementary fishery. A kokanee egg-take is planned should the introduction be successful.

Myxosporidia infestations were found on eight per cent of angler-caught rainbow trout in June and on four per cent in July. As at Fish Lake, the parasite probably originated with hatchery-planted fish.

#### Howard Prairie Reservoir

Because of a light runoff, only four feet over the dead-storage level was impounded in 1958-59. Water shortages through the summer required a draw-down to dead storage. The angler use was light in 1959 owing to the low water and absence of recreational facilities.

Rainbow trout fingerlings placed in Howard Prairie in September, 1958, at 2.5 and 4.5 inches in length grew to an average of 9.5 inches in length by May of 1959 and 14 inches by September. Crustaceans are abundant and the fish have developed a bright, red flesh as well as an excellent condition factor.



## Squaw Lakes

The policy of stocking Squaw Lakes with large numbers of fingerling rainbow in summer instead of fall months has resulted in extending good trout fishing throughout the entire season.

On the opening weekend of 1959, the highest catch success recorded in the Rogue Basin was found at Squaw Lakes with an average of 7.2 fish per angler. See Tables 37 and 38 for the results of creel census studies.

Fingerling crappie and bluegill were found in the lower lake in September. It is anticipated that the illegal introduction of warm-water species will, in time, seriously reduce trout production.

## Warm-water fishery

Hyatt Reservoir will continue to be used as a major source of water for the Talent Project owing to water shortages accompanying the Bureau of Reclamation's construction schedule. The majority of the catch at Hyatt Reservoir is made up of crappie and bluegill under six inches in length, sunfish under four inches in length, and largemouth bass between six and eight inches in length. A few eight to ten inch crappie are available. The reservoir continues to produce three to four pound catfish. See Table 37 for creel census data.

Waterfowl resting ponds on the Camp White Management Area are starting to produce fair to good catfishing. Largemouth bass were salvaged from Emigrant Reservoir and placed in two of the ponds. Bluegills will be added in 1960.

## Upper Rogue census study, 1958

A random creel census study was completed on the upper Rogue in 1958. A sampling schedule was followed from May 24 to September 18, 1958, between Gold Hill and Laurelhurst Bridge. The resulting data were used to compute total catch and angler use by sections, areas and seasons.

The program was outlined and the data analyzed by Dr. Lyle D. Calvin, Oregon State College Statistician. Information will be used to formulate angling regulations and as a guide to fishery interests in river basin development.

Table 39 presents the data from the 1958 creel census study. Figure 8 illustrates the general distribution of angler use and catch of trout-steelhead and salmon in specific sections of the upper Rogue.

## River basin development

## Rogue flood control

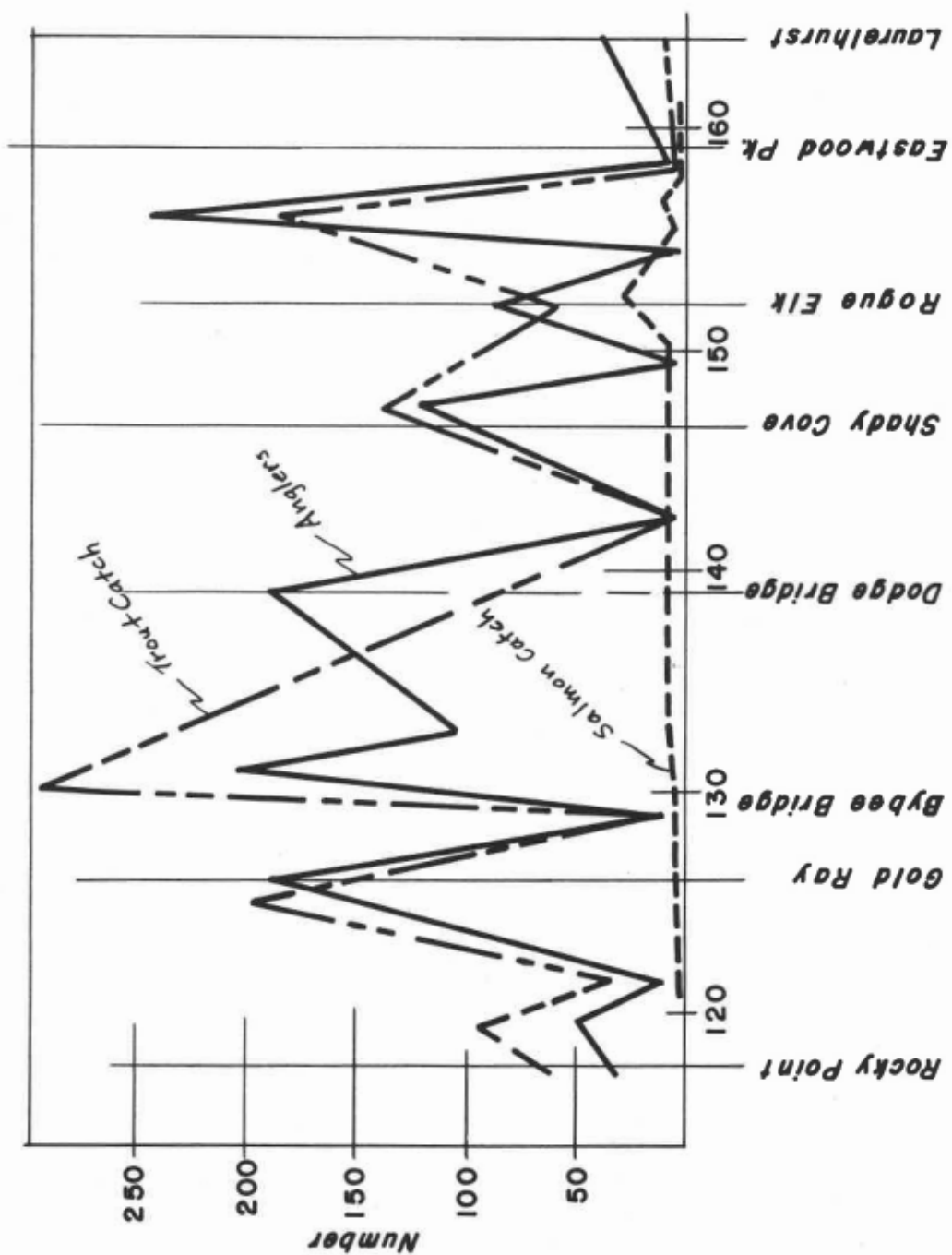
In June, the Corps of Engineers summarized their findings on multiple-purpose development on the Rogue River Basin Project. A public hearing on the plans for development was to be held in September, 1959, but as a result of the adverse water temperatures predicted for Lost Creek releases, a two-year postponement has been granted to make further studies of the relationships between

Table 39

Computed total angler use and catch,  
Upper Rogue, May 24 to September 18, 1958

	Rocky Point to Gold Ray	Gold Ray to Dodge Bridge	Dodge Bridge to Rogue Elk	Rogue Elk to Laurelhurst Bridge	Total
Trout and steelhead					
Angler days	6,650	6,715	2,920	6,125	22,410
Hours fished	45,945	45,110	16,730	39,525	147,310
Total catch	16,570	20,880	14,865	20,115	72,430
Fish per hour $\frac{1}{1}$	0.45	0.62	1.09	0.71	0.63
Hours per fish $\frac{1}{1}$	2.21	1.63	0.91	1.40	1.58
Fish per angler-day	2.49	3.11	5.09	3.28	3.23
Salmon (to July 15)					
Angler days	295	1,015	1,240	3,340	5,890
Hours fished	1,795	12,580	9,555	35,010	58,940
Total catch	100	160	265	1,300	1,825
Fish per hour $\frac{1}{1}$	0.06	0.01	0.03	0.04	0.03
Hours per fish $\frac{1}{1}$	17.95	78.63	36.06	26.93	32.30
Fish per angler-day	0.34	0.16	0.21	0.39	0.31
Total					
Angler days	6,945	7,730	4,160	9,465	28,300
Hours fished	47,740	57,690	26,285	74,535	206,250
$\frac{1}{1}$ Using unprojected census data					

Figure 8



ANGLER-USE AND CATCH DISTRIBUTION , UPPER ROGUE , 1958

flow, storage and temperature. A cooperative study has been started by the U. S. Fish and Wildlife Service, Oregon Game Commission, Oregon Fish Commission, and State Water Resources Board. Twenty-five thermographs and twelve additional gauging stations are being installed. The data will be presented to the Corps with recommendations as to the type and quantity of releases needed from upriver impoundments to protect or enhance the Rogue fishery.

### Oregon Water Resources Board

The Oregon Water Resources Board completed its evaluation of the water-use program of the Rogue Basin. Its findings were published in January. The report is an outstanding compilation of sources and complex uses of water in the Rogue watershed.

### Guide catch success

Fifty-six licensed guides operated on Rogue River in 1959. Catch reports were submitted on 304 trips which were made with 656 people, 62.9 per cent of which were nonresident anglers. The reports acknowledged the catch of 430 salmon, 1,233 steelhead and 850 trout.

### Screening and ladders

### Savage Rapids

The fish loss on the face of the new Link-Belt screens was measured and studied. The 1959 irrigation season was the structure's second year of operation. Up to ten per cent of the migrants, mostly chinooks, were being impinged upon the upstream face of the screen. An estimated 38,000 fish were lost during July, 1959.

The approach velocities to the screens were found to be greater than flows into the bypass ports. The difference in velocities is believed to be responsible for fish being impinged on the surfaces of the screens.

A report was submitted on the results of the study and recommendations for correction were included.

Irrigation district personnel used improved methods to clean the trash racks, and they were successful in preventing the accumulation of debris on lower surfaces of the trash racks.

### Gold Hill

Hydro-wedges were installed at the entrances of the bypass columns in the Gold Hill louvers. The improved patterns of approach velocity are believed to have greatly increased the efficiency of the bypass system. All restrictive flow devices were removed and approximately 116 c.f.s. of water flowed through the bypass system during most of the downstream migration season.

### Gold Ray

A detailed study of the downstream migration is being made at Gold Ray in order to determine an optimum shut-down period for the power plant of

the California-Oregon Power Company. The trapping study was started in March and will continue into May, 1960. The data will be used to set a period of weeks and hours of the day which will be required to save all but two per cent of the total annual downstream migration. Copco's analysis of consumptive power peaks, loads and personnel distribution shows that a shut-down between 5 p.m. and 8 a.m. would be the most economical period.

### Illinois Falls

Adult chinook, silvers and fall steelhead were blocked at the Illinois Falls from October through most of January because of low water flows in the ladder channel.

### Stream flows and water temperatures

The 1958-59 snow pack in all sections of the Rogue watershed was below average, and water content ranged from 50 to 95 per cent of normal. Stream flows through summer and early fall were near those recorded for the drought years of 1930 and 1931.

With the low stream flows were record-high water temperatures in Rogue River. Maximum daily water temperatures of 70° F. or more prevailed at Gold Ray from July 16 to 27, and 73° F. was reached on three separate days. Warmest waters were found in the lower canyon with 74° to 80° F. commonly recorded through July and August. A record high temperature of 85° F. was taken at Illahe on July 21.

Large concentrations of both downstream migrant and adult salmon and steelhead were present at the mouths of cooler tributaries. Heaviest concentrations were found at the mouths of Rum, Mule, Stairs, Foster, and Two Mile Creeks.

The Applegate was dry throughout most of its main channel below Williams after July 15. Most tributaries in the middle section of the basin became intermittent before the end of summer. Fish loss was heavy to moderate on many mid-basin tributaries.

### Disease

The losses of downstream migrant salmon and steelhead from infections of Chondrococcus columnaris equalled, or exceeded, levels suffered in years of heavy loss, namely 1947, 1949 and 1955. Migrants succumbed to the bacterium as high up on the river as Savage Rapids. Peak loss occurred on Sunday, July 19. The heaviest rate of loss was found at the mouth of Mule Creek on the evening of July 29 when chinook fingerlings were dying at the rate of 1.25 per minute.

### Exotic fishes

The top minnow, Gambusia affinis, has become abundant in the canal systems of the Grants Pass Irrigation District.

The reidsided shiner, Richardsonius balteatus, has multiplied to a high population level in the middle section of the Rogue and in the lower Applegate River. The first few specimens were found near the mouth of Jump-off Joe Creek in July of 1957.

## SOUTH COAST

### Trout fishery

A total of 271 trout anglers was interviewed on the south coastal streams and lakes. A catch of 1,013 trout was tallied for an average of 3.73 fish per angler, or 1.30 fish per hour of fishing effort.

Ninety-one per cent of the catch was hatchery fish, with 2 per cent fish from 1958 releases. All of the trout surviving from the 1958 releases were observed in the catch of anglers fishing Garrison and Floras Lakes.

In addition to the trout catch the anglers interviewed on Floras and Garrison Lakes had taken 8 bass and 11 perch. There was more interest in bass fishing on Floras Lake than has been evident in previous years. The perch in Garrison Lake (illegally planted in 1953) are increasing in size and number and are becoming common in the catch. The results of the creel census work are summarized in Table 40.

Table 40

Trout creel census, South Coast District

Water	Number of fish	Number of anglers	Fish per angler	Hours fished	Fish per hour	Marked trout
Floras Lake	420	99	4.24	347	1.21	375
Garrison Lake	103	59	1.75	149	0.69	77
Chetco River	382	91	4.19	214	1.79	371
Winchuck River	108	22	4.90	69	1.56	101
Total	1,013	271	3.73	779	1.30	924

### Population study

Two net sets in Floras Lake in late August were made to determine the presence of marked trout and the composition of the population. The catch included 22 suckers, 2 black bass, 1 silver salmon smolt, 3 marked rainbow and 6 unmarked cutthroat. All of the marked rainbow were of the 1959 releases. The two black bass were the first bass taken in net sets from the lake. The bass measured 18 and 19 inches in length and weighed 4.25 and 6.5 pounds respectively.

### Steelhead fishery

High stream levels hampered steelhead anglers on the south coastal streams through the 1958-59 season. There were 48.9 inches of rainfall through the months of December, January and February. The success of steelhead fishermen interviewed is summarized in Table 41.

### Extended steelhead season, Sixes River

The steelhead season was extended through March on the Sixes River. This extension was one of several to determine the extent that bright, unspent fish were available to the angler.

Table 41

## Steelhead angling success, south coastal streams, 1959

Stream	Number of fish	Number of anglers	Fish per angler	Hours fished	Fish per hour
Sixes River	6	19	0.32	36	0.15
Elk River	5	11	0.45	19	0.26
Chetco River	33	73	0.45	218	0.15
Winchuck River	2	8	0.25	8	0.25
Totals	46	111	0.41	281	0.16

Seventy-three anglers were interviewed who had spent 243 hours fishing. The fishing intensity was considered very light for an extended season. Of the 8 steelhead retained by anglers, three were bright and three were dark. Two bright spent fish were kept. In addition there were 15 spent fish hooked and released. Most of the spent fish released were bright. Table 42 presents the results of the extended season creel census.

Table 42

## Extended steelhead season, Sixes River

Stream	Number of fish	Number of anglers	Fish per angler	Hours fished	Fish per hour	Spent fish
Sixes River	8	73	0.11	243	0.03	17

Spawning ground surveys

Spawning ground survey areas were established for five south coast watersheds. As the result of low waters the spawning activity on all streams did not reach its peak until late December. There was not sufficient water for salmon to enter many of the tributary streams. As a result some of the spawning areas did not have the expected spawning activity. Spot surveys through other parts of the streams indicated good to excellent spawning for all south coastal streams. The established winter deadlines were effective in protecting spawning salmon. Results of the spawning survey in the established areas are presented in Table 43.

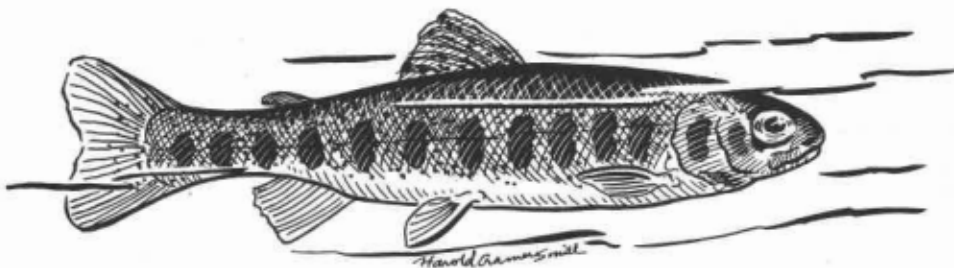


Table 43

Spawning ground surveys, South Coast, chinook salmon, fall and winter, 1959

Stream	Miles	Water	Redds	Adults	Jacks	Total	Fish per mile	Redds per mile
Floras Creek	0.5	Murky	82	20	0	20	40	164
Willow Creek	0.5	Murky	47	5	1	6	12	94
Sixes River								
Crystal Creek	1.0	Murky	118	8	1	9	9	118
Edson Creek	1.0	Milky	210	73	2	75	75	210
Dry Creek	2.0	Clear	311	270	5	275	137	155
Elk River								
Anvil Creek	0.25	Clear	26	4	2	6	24	104
Bob Creek	0.5	Clear	0	0	0	0	0	0
Elk River #1	2.0	Clear	125	20	0	20	10	64
Elk River #2	2.5	Clear	81	15	0	15	6	32
Chetco River								
Jack Creek	0.5	Milky	79	2	1	3	6	158
Nook Creek	0.5	Clear	17	2	0	2	4	34
South Fork Chetco	1.0	Clear	49	5	0	5	5	49
Winchuck River								
Wheeler Creek	1.0	Clear	4	0	0	0	0	4
East Fork Winchuck	1.5	Clear	29	7	3	10	7	19
<u>/1 Silver salmon</u>								



## UPPER WILLAMETTE

Ralph L. Swan

### General creel census studies

Most of the creel census data were gathered from the McKenzie River, Willamette River, and other popular fishing areas such as Clear and Gold Lakes. Little angling pressure was noted on Lookout Point and Dexter Reservoirs. Dorena Reservoir provided good angling but pressure was light. Anglers from several of the high Cascade lakes were interviewed and most of them reported good catches of fish. Little angling pressure resulted from the opening of the Long Tom River to winter angling; however, the main part of the cutthroat run in the stream may have been over by the time it was opened.

A summary of 4,176 creels checked in the field by Game Commission and State Police personnel will be found in Table 44.

### McKenzie River and tributaries

Water conditions were ideal when the trout season opened and the rate of catch was good. Larger percentages of fish in the eight to ten and ten to twelve inch groups were taken from the McKenzie than in 1958 and the rate of catch was higher.

Reports were received from eight guides who reported making 213 trips. Guided anglers fished 2,763 hours and caught 2,538 trout at a rate of .92 fish per hour or 6.5 fish per angler as compared to .77 fish per hour and 1.81 fish per angler for each non-guided angler.

Salmon anglers were also favored with good water conditions and their rate of catch rose from .07 in 1958 to .10 in 1959. Most of the angling took place below the Leaburg dam and in the tailrace below the Leaburg powerhouse.

### Clear Lake

The total catch as calculated from boat rentals and creel census data was 19,779, which was little different from 1958 when 19,928 fish were taken. Approximately 87 per cent of the rainbow and 85 per cent of the cutthroat were eight inches and over in length. This was a rise of 12 per cent for the rainbow and a drop of 5 per cent for the cutthroat as compared to the 1958 catch. Myxosporidia was present but did not seem to be any more prevalent than in 1958. Marked fish were virtually non-existent, with only two left ventral clipped rainbow being checked. A summary of monthly creel records is shown in Table 45.

### Willamette River

The rate of catch improved in the upper Willamette River and most of its tributaries over 1958. Water conditions were good and yearling trout were stocked at regular intervals.

Table 44

Creel census results on lakes, streams, and reservoirs in the upper Willamette area

Water	Anglers checked	Hours	Species	Length in inches shown in percentages						Total fish	Fish per angler	Fish per hour
				6-8	8-10	10-12	12-14	14-16	Over 16			
Beaver Creek	2	6	Ct	100						3	1.50	0.50
Blue River	22	110	Rb	35	55	10				65	2.95	0.59
Calapooya River	175	398	Rb	51	44	5				156		
			Ct	61	26	13				74	1.32	0.58
Fall Creek	97	272	Rb	65	29	5	1			78		
			Ct	50	42	8				12	0.93	0.32
Hills Creek	3	7	Rb	45	55					22	7.33	3.14
Horse Creek	11	44	Rb	50	50					2		
			Ct	86		14				7	0.82	0.20
Hult Mill Pond	18	62	Ct	2	88	10				62		
			B		78	22				9	3.95	1.15
Lake Creek	21	63	Rb		60	40				10		
			Ct		65	35				15	1.19	0.40
Long Tom River	53	88	C	72	22	6				82		
			LB	50	50					2		
			BG	100						2	1.61	0.98
Lost Creek	2	1	Rb	33	67					3	1.50	3.00
McKenzie River	524	1,232	Rb	27	53	18	2			907		
			Ct	49	35	14	2			43	1.81	0.77
	205	440	Ch		(adults)					44	0.21	0.10

Table 44 (continued)

Water	Anglers checked	Hours	Species	Length in inches shown in percentages							Total fish	Fish per angler	Fish per hour
				6-8	8-10	10-12	12-14	14-16	Over 16				
McKenzie River, South Fork	166	405	Rb	47	50	2	1			268			
			Ct	30	60	10			10				
			Wf		33	34	33		3	281	1.69	0.69	
Mosby Creek	32	85	Rb	27	51	22			67	78	2.44	0.91	
			Ct	27	73				11				
Muddy Creek	4	5	B	100						3	0.75	0.60	
Quartz Creek	24	86	Rb	24	55	21			53	99	4.13	1.15	
			Ct	76	24				46				
Roaring River	2	5	Ct	100						9	4.50	1.80	
Salmon Creek	27	54	Rb	38	57			5	28	30	1.11	0.55	
			Ct	100					2				
Row River	36	93	Rb	31	66	3				69	1.91	0.74	
Sharps Creek	48	97	Rb	50	45	4	1		106	149	3.10	1.54	
			Ct	63	30	7			43				
Siuslaw River	31	107	Ct		21	61	18			49	1.58	0.47	
Triangle Lake	24	73	Rb		93	7			24				
			Ct		73	27			15				
			BG	100					1				
			P		100				1	41	1.70	0.56	
Willamette River	26	46	Rb	54	37	9			41				
			Ct		86	12	2		29				
			Ch		100				4	74	2.85	1.60	
Willamette River, Coast Fork	37	39	Rb	47	44	9			34	52	1.40	1.32	
			Ct	38	50	12			18				

Table 44 (continued)

Water	Anglers checked	Hours	Species	Length in inches shown in percentages						Total fish	Fish per angler	Fish per hour
				6-8	8-10	10-12	12-14	14-16	Over 16			
Willamette River, Middle Fork	302	926	Rb	27	62	10	.4	.4	.2	977		
			Ct	25	50	25			8			
			Wf			50	50		4	989	3.27	1.07
Willamette River, North Fork	37	153	Rb	36	58	5	1			64		
			Ct	88	12				9	73	1.98	0.48
Winberry Creek	11	34	Ct	60	30	10				10	0.91	0.29
Reservoirs												
Cottage Grove	80	188	Rb	24	44	32				54		
			Ct	20	80				5			
			B		100				4			
			LB	24	73	3			74			
			BG	72	28				36	173	2.16	0.92
Dexter	162	353	Rb	41	47	9	3			127		
			SS		100				2	129	0.80	0.37
Dorena	578	1,790	Rb	11.9	58.5	29	.6			1,404		
			Ch		100				8			
			LB			100			1	1,413	2.44	0.79
Fern Ridge Borrow Pit	201	495	Rb	2.5		2.5			95	40		
			Ct		80	20			5			
			B	47	47	6			19			
			C	77	15	8			13			
			BG	100					1			
			LB	100					1	79	0.39	0.16
Lookout Point	93	258	Rb	24	67	9				46		
			SS	63	19	5	13		16	62	0.67	0.24

Table 44 (continued)

Water	Anglers checked	Hours	Species	Length in inches shown in percentages						Total fish	Fish per angler	Fish per hour	
				6-8	8-10	10-12	12-14	14-16	Over 16				
Cascade lakes													
Betty	7	13	EB					100			5	0.72	0.38
Bongo	2	30	EB			31	31	21	17		19	9.50	0.63
Campers	6	14	EB		94	6					15	2.50	1.07
Clear	822	3,643	Rb	13	58	25	3	1	1,539	3	1,566	1.91	0.43
			Ct	15	41	22	15	4					
Eastern Brook	11	46	EB	2	64	32	2				50	4.55	1.08
Edna	5	17	Rb	23	62	15					13	2.60	0.76
Eddaleo	4	40	EB			100					15	3.75	0.37
Ernabelle	25	185	Rb		28	41	22	6	3		110	4.40	0.59
Fish	24	52	Ct	52	36	12					23	0.96	0.44
Gander	3	9	EB			100					30	10.00	3.33
Gold	215	1,123	Rb	1	18	27	30	18	6		385	1.78	0.34
Hand	7	33	EB	8	51	41					37	5.30	1.11
Hidden	64	131	Ct		75	20	5				100	1.56	0.77
Horsefly	8	11	EB	36	56	8					11	1.38	1.00
Island	4	14	EB	60	30	10					10	2.50	0.72
Kiwa	2	5	Rb	33	67						3	1.50	0.60

Table 44 (continued)

Water	Anglers checked	Hours	Species	Length in inches shown in percentages							Total fish	Fish per angler	Fish per hour
				6-8	8-10	10-12	12-14	14-16	Over 16				
Linton	9	39	Rb EB Br	66		100 34 40	44	16		1 3 25	29	3.22	0.74
Long	7	34	EB		6	14	38	28	14		21	3.00	0.62
Marylin (lower)	15	54	EB		30	33	33	4			33	2.20	0.61
Marylin (upper)	6	7	EB				50	50			2	0.33	0.28
McFarland	4	32	Rb				100				2	0.50	0.06
McFarland (east)	4	20	Rb	52	48						18	4.50	0.90
Otter	11	72	EB				27	36	37		22	2.00	0.31
Rigdon (lower)	2	6	EB				100				3	1.50	0.50
Robinson	1	5	EB			100					1	1.00	0.20
Round	6	30	Rb EB			44 100	30	13	13	30 2	32	5.33	1.07
Salmon	13	60	EB	20	44	30	6				78	6.00	1.30
Separation	5	30	Rb		16	32	16	16	20		12	2.40	0.40
Torrey	2	20	EB	17	27	27	17	12			18	9.00	0.90
Wahana	7	106	Rb EB	4	45	36	11	4 100		66 1	67	9.57	0.63
Waldo	16	104	Rb EB		33 25	56 75	8	3		39 4	43	2.70	0.41

Table 44 (continued)

Water	Anglers checked	Hours	Species	Length in inches shown in percentages					Total fish	Fish per angler	Fish per hour
				6-8	8-10	10-12	12-14	14-16			
Whig	10	38	Rb		77	13	7	3	30	3.00	0.78
Totals	4,381	14,038							8,263	1.89	0.59

Table 45

Monthly catches of trout in Clear Lake - 1959

Month	Moorage boats rented	Calculated total boats	Calculated total anglers	Average catch	Total catch
May	74	141	409	4.10	1,800
June	538	755	2,273	4.30	9,774
July	690	960	2,208	2.17	4,791
August	597	830	1,828	1.23	2,248
September	173	245	613	1.51	926
October	35	48	120	2.00	240
Totals	2,107	2,979	7,451	2.65	19,779

## Reservoirs

Little angling pressure was noted on Lookout Point and Dexter Reservoirs after the opening weekend of trout season. Regular creel checks were not made at either reservoir because of the lack of anglers. It is estimated that less than 2,000 fish were taken from Dexter and less than 1,500 were taken from Lookout Point Reservoirs throughout the fishing season.

Dorena Reservoir contained a good population of rainbow but angling pressure was lighter than expected, particularly in July and August. Pressure increased in September and October when the reservoir reached minimum pool. Most of the trout taken were from fingerling plants made in 1958 following chemical treatment. Growth of the fingerlings was good through the winter months with many fish reaching ten inches by the opening of trout season. Growth through the summer months, however, was slow and few fish over twelve inches in length were taken by the end of the season. See Table 46 for creel records obtained on Dorena Reservoir.

Rainbow fingerlings stocked in Row River above the reservoir ranged up to eight inches in length at the beginning of the trout season. Fingerlings released in Sharps Creek, however, had barely reached the minimum length of six inches.

Table 46

Monthly catches of trout in Dorena Reservoir  
1959

Month	Anglers	Hours	Rainbow	Fish per angler	Fish per hour
April	1,981	9,905	9,508	4.80	0.96
May	5,670	18,731	26,650	4.70	1.45
June	1,128	7,388	6,206	5.50	0.84
July	1,782	6,148	5,190	2.90	0.84
August	1,332	10,213	7,660	5.75	0.75
September	2,749	11,043	9,472	3.45	0.85
October	1,653	8,040	11,407	6.90	1.42
Totals	16,295	71,468	76,093	4.67	1.06

Except for the early part of the trout season, angling pressure for trout was light on Cottage Grove Reservoir. Most of the angling in the summer months was for bass and catfish. Small bass were taken in substantial numbers.

Little activity was noted on Fern Ridge Reservoir but the borrow pit below the dam received heavy angling pressure when excess rainbow brood trout from the Leaburg hatchery were released there. Anglers caught a large percentage of the brood fish released.

## Cascade lakes

The rate of success was high in most of the Cascade lakes according to the anglers interviewed. Gold Lake was exceptionally good for large rainbow



at the beginning of the season. Fish Lake, in Linn County, provided little angling although anglers reported seeing good numbers of fish in the lake.

Through road blocks on the Taylor Burn road it was possible to obtain information on several lakes not covered in routine investigations. All fish examined were in good condition and the percentage of large fish was high on the more inaccessible lakes.

The prolonged dry summer caused the levels of many of the lakes to drop far below normal. Hand Lake, on the McKenzie Pass, dropped to a record low and no signs of fish could be found. Campers Lake nearby also became very low.

#### Anadromous fish

As in previous years, the large volume of water in the Walterville and Leaburg powerhouse tailraces attracted large numbers of spring chinook salmon. The number of fish entering the tailraces was apparently greater in 1959 than in previous years because of the low flow in the McKenzie River. Flows were reduced in the powerhouse tailraces by the Eugene Water and Electric Board in order to encourage fish into the main flow of the McKenzie River.

The Oregon Fish Commission estimated over 5,000 spring chinook passed over the Leaburg dam. Both visual and electronic counts were used to make the estimate.

State Police game officers checked 43 steelhead anglers on the Calapooya River with 7 steelhead and 1 cutthroat which were taken at a rate of .064 fish per hour or .18 fish per angler.

#### Population of fourteen-inch length trout

Reports were received from eight guides whose parties released 74 rainbow over fourteen inches in length. The proportion of large fish released was one for every 34 under fourteen inches kept as compared to one for every 116 kept in 1958.

Traps were installed in the ladders at the Leaburg dam in the first week of April and removed on May 18 in order to permit the Fish Commission to install electronic counting devices for spring chinook salmon enumeration. The traps took 46 rainbow over fourteen inches and 97 under. Of the 97 under fourteen inches, approximately half were mature. In addition the traps took 3 steelhead, 2 cutthroat, and 1 Dolly Varden trout. The Oregon Fish Commission counted 143 trout of all sizes between May 18 and July 16.

#### Gill net sets

Annual gill net sets were made in the following waters; Lookout Point Reservoir, Dexter Reservoir, Dorena Reservoir, and Triangle Lake. Nets were also set in the millrace at the University of Oregon, several dredge ponds at the mouth of the Coast Fork of the Willamette River, and Waldo Lake. Results of the sets will be found in Table 47.

Table 47  
Gill net set results

Date	Water	Species	Number	Average length (inches)
February 10	Dorena	Rainbow	5	7.5
September 4	Dorena	Rainbow	13	9.6
		Catfish	19	6.3
April 30	Coast Fork	Sucker	23	13.9
	Willamette	Squawfish	1	13.0
	borrow pits	Redsided shiner	5	5.0
		Chiselmouth	7	9.8
		Columbia River chub	3	9.1
		Bluegill	9	4.9
April 30	Goodpasture	Sucker	19	15.7
	borrow pit	Chiselmouth	9	10.7
		Squawfish	4	10.0
		Black crappie	2	5.9
		Bluegill	9	4.9
April 30	University of Oregon millrace	Sucker	1	6.0
August 20	Dexter Reservoir	Squawfish	1	7.0
September 14	Dexter Reservoir	Rainbow	1	9.0
		Sucker	3	11.3
		Squawfish	4	8.0
August 20	Lookout Point Reservoir	Squawfish	35	9.4
		Sucker	3	10.3
		Rainbow	1	8.0
		Kokanee	1	9.0
September 17	Triangle Lake	Sucker	4	15.6
		Squawfish	3	12.8
		Catfish	19	8.3
		Bass	3	7.8
		Bluegill	16	5.5
		Cutthroat	9	9.3
August 19	Gold Lake	Rainbow	12	10.4
September 8-11	Waldo Lake	Rainbow	55	9.5
		Eastern brook	44	12.3

Nets set in Dorena Reservoir took catfish for the first time since its rehabilitation in 1958. Several of the cutthroat taken from Triangle Lake had lamprey scars but were in good condition otherwise. Several trout taken September 4 were in spawning condition.

Over twenty lakes in the high Cascades were surveyed for the first time by the lake survey crew and the data regarding length frequencies and length at maturity may be found in Tables 48 and 49.

A gill net set in the millrace at the University of Oregon took only one small sucker, but a subsequent treatment with rotenone revealed a heavy population of rough fish. Suckers, squawfish, Columbia River chub, carp, catfish, bass, and bluegill were killed.

#### Barriers and pollution

The most serious barrier to fish migration, other than the tailraces of the Eugene Water and Electric Board, was the Georgia-Pacific mill dam in Springfield. On June 15, a thirty-minute count was made at the dam and spring chinook were jumping at the rate of one a minute. No fish were observed passing the barrier.

A portion of the new road around Cougar Reservoir slid into the stream and it was thought for a time that it would be a barrier to the spring chinook runs at low water levels. However, redd counts made above the slide by the Fish and Wildlife Service indicated that more than 1,500 fish passed over the barrier.

At times a considerable amount of muddy water was noted in the Willamette River below Hills Creek dam and in the McKenzie River below Cougar dam. The Hills Creek contractor was served notice by the State Sanitary Authority to reduce the amount of sediment entering the river. Little muddy water entered the McKenzie River during the trout season and what entered at other times was of short duration.

#### Reservoir investigations

Close contact was maintained with the U. S. Fish and Wildlife personnel stationed in Eugene on developments concerning Hills Creek and Cougar Reservoirs. Some work was done on the tributaries of the Willamette River above the Hills Creek dam site in an attempt to determine the range of rough fish in the watershed. Cresol was used as a means of sampling the composition of the fish populations but the results were not satisfactory. The chemical was effective for short distances in low volume streams but it would not penetrate the deeper pools.

Temperature records at the Cougar dam site revealed that there was an eight degree rise in the average daily temperature of the water passing through the cleared impoundment area during the summer months.

#### Road construction

Plans for a timber access road up the Coast Fork of the Willamette River were checked with the logging engineer for the Weyerhaeuser Company.

Table 48

Composition and length frequency table of gill net catches  
in Willamette National Forest lakes, 1959

Lake	Number of sets	Species	Number taken	Number in one inch size groups (fork length)											
				3	4	5	6	7	8	9	10	11	12	13	14 15 Over 15
Abernethy (lower)	1	Rb	1						1						
Abernethy (upper)	2	Rb	5					4		1					
Blair	2	EB	30					14	4	8	2		2		
Devils	2	EB	10										5	4	1
Eileen	1	EB	7			1	1	2	2			1			
Elf	1	EB Rb	5 8						3	2					
Ernie	2	EB	35				10	7	2	8	5	2	1		
Glaze	1	EB	15				11	4							
Heart	2	EB	49	1		2	6	6	23	4	5	2			
Hidden	2	Ct	61				10	5	7	8	9	11	6	5	
Huckleberry	2	EB	4						2					1	1
North Torrey	2	EB	22					5	8	2	1	2	3	1	
Notch	2	EB	5					1	2	2					
Waldo	6	EB Rb	45 55				1 4	4	1 13	1 11	6 4	6 6	6 7	10 4	8 2

Table 49

Average length of female fish in each stage of maturity collected in gill nets in Willamette National Forest lakes, 1959

Lake	Species	Immature		Maturing		Mature	
		Number in sample	Average length, inches	Number in sample	Average length, inches	Number in sample	Average length, inches
Abernethy (lower)	Rb			1	9.0		
Abernethy (upper)	Rb			2	9.1		
Blair	EB			16	9.6		
Devils	EB			3	12.6		
Elleen	EB			2	7.8	2	8.5
Elf	EB			4	8.8		
	Rb	1	6.2				
Ernie	EB			9	7.7	2	9.4
Glaze	EB			10	6.7		
Heart	EB			22	8.4		
Hidden	Ct	2	7.4	19	10.2	1	13.1
Huckleberry	EB			2	8.5	2	15.5
North Torrey	EB			6	7.9		
Notch	EB					5	12.2
Waldo	EB	1	11.5	20	12.7	4	13.2
	Rb	14	8.9				
Williams	Rb			2	8.8		

/1 Males - no females taken

A trip was made to the site to determine the road's effect on the stream. A small amount of rock rip-rapping was planned along with a minor channel change in a sharp bend in the stream. Neither was deemed to be a serious threat to fish life.

Plans for a Bureau of Land Management timber access road up Greenleaf Creek in the Siuslaw watershed were studied with representatives of the Bureau of Land Management and Bureau of Public Roads. Sections of the road where it would be near the stream were visited and the need for keeping a clear channel was stressed. Both agreed to do everything possible to leave the stream in its natural state and to let the contract in the summer to further minimize damage to the fishery.

#### Diseases and parasites

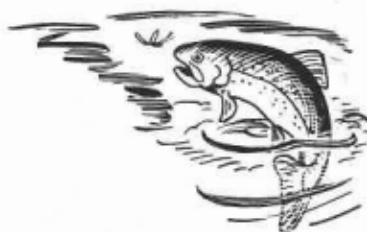
Trout held in the hatcheries in the district were examined periodically for the presence of diseases and parasites. Gyrodactylus and Trichodina were found present on rainbow at the Willamette Hatchery and were subsequently treated with formalin. Assistance was given to the superintendent at the McKenzie Hatchery in an attempt to save the channel catfish scheduled for release in Devils Lake. Several types of treatments were tried but none were successful in ridding the fish of the infestation of Ichthyophthirius.

Both the rainbow and cutthroat in Cottage Grove Reservoir were heavily infected with copepods in the summer months. Dead fish were observed on several occasions.

Heavy fungus infections developed on some of the rainbow brood fish released in the borrow pit below Fern Ridge Reservoir.

Tapeworm cysts continued to be found in varying numbers in the trout examined from the high Cascade lakes. Of sixty fish examined from Waldo Lake, forty-eight contained tapeworm cysts.

Several Myxosporidia infected rainbow from Clear Lake were sent to the Western Fish Disease Laboratory at Seattle, Washington, for species identification. A tentative identification of Myxosoma sp. was given. Some of the fish were frozen at the lab for further study but no report has been received. Cutthroat trout from Triangle Lake were examined for the presence of Myxosporidia but none were found.



## CENTRAL WILLAMETTE

J. J. Wetherbee

### Steelhead

Steelhead were first observed in the Santiam River system the last week in March. From all indications, the 1959 steelhead run was comparatively low. The delay of migrants at the various barriers was again observed.

Table 50 discloses that 163 anglers fished 299 hours to catch five steelhead and four trout. Quartzville Creek has become a popular steelhead stream as an access road paralleling the creek enables anglers to locate fish readily. As in past years, the bulk of the steelhead are caught during the first part of trout season.

Table 50

Creel census, steelhead, Middle Willamette tributaries  
1959

Water	Number anglers	Hours fished	Rainbow	Cutthroat	Steelhead	Total fish
North Santiam	82	128	1	3	0	4
South Santiam	40	94	0	0	3	3
Middle Santiam	19	48	0	0	2	2
Santiam River	13	18	0	0	0	0
Thomas Creek	9	11	0	0	0	0
Totals	163	299	1	3	5	9

### Spring chinook

The main run of spring chinook bypassed the Stayton power canal although a few salmon were still attracted into the tailwaters of the spill dam off the canal. The Fish Commission installed a temporary fish ladder over the dam which provided some passage. Chinook were not concentrated behind the various dams as in past years, although the 1959 run was relatively low. Creel census data for salmon anglers checked are included with other such data in Table 53.

### Detroit Reservoir

The estimated total catch and effort for Detroit Reservoir was 259,847 fish taken by 108,753 anglers. An additional 65,000 people were classed as boaters and onlookers and were not included in the estimates. A six-year comparison of creel check data may be seen in Table 51.

Bi-monthly catch records for Detroit are presented in Table 52. Angling success for the season was 0.69 fish per hour, the highest on record for the reservoir. Hatchery rainbow were heavily utilized in the upper arms.

When stocking terminated in July, a good fishery was maintained on fish reared in the reservoir. Rainbow in the catch again ranged from 8 to 12 inches in length.

Table 51

Catch, Detroit Reservoir  
1954-1959

	1954	1955	1956	1957	1958	1959
Anglers checked	3,559	4,022	2,446	2,029	1,452	2,514
Total fish caught	9,868	5,689	3,381	4,254	2,546	6,157
Fish per angler	2.74	1.41	1.38	2.09	1.75	2.45
Fish per hour	0.54	0.54	0.39	0.44	0.42	0.69
Estimated anglers	49,062	61,738	64,787	91,660	97,950	108,753
Estimated catch	131,796	87,050	89,406	147,332	171,412	259,847

An initial stocking of 500,000 kokanee fry was made in April.

A total of 20,000 marked rainbow fingerlings was released among the annual fingerling allotment in order to determine the contribution of fingerling plants to the catch in 1960.

The catfish population in the reservoir was sampled by fishing catfish hoop nets. An overnight set produced 24 bullhead catfish, ranging in size from 7.2 to 10.6 inches in length. There is some question as to whether this species can reproduce in the reservoir to the extent of endangering the trout population.

#### Creel census

Excellent creel census coverage of streams and lakes was obtained through efforts of State Police game officers. The officers and Game Commission personnel interviewed 3,261 anglers on high lakes and the various stream systems in the district. An additional 2,514 anglers were checked on Detroit Reservoir.

Creel census totals are analyzed by stream system. Cascade lakes are tabled separately.

#### North Santiam System

Better utilization of hatchery releases in 1959 accounted for a pronounced increase in angling success on North Santiam streams. All major tributaries exceeded one fish per hour. The upper North Santiam and Breitenbush Rivers received heavy angling pressure in June and July.

An intensive creel check was conducted on Mill Creek to determine its use as a juvenile stream. The creek received considerable pressure on the first two weekends only. Hatchery released rainbow constituted 89 per cent of the recorded catch. Other details concerning Mill Creek were covered in a special report.



Table 52

## Creel census, Detroit Reservoir, 1959

Period	Number of anglers	Hours fished	Rainbow	Chinook	Whitefish	Bullhead catfish	Total fish	Fish per angler	Fish per hour
April 25-30	1,437	5,355	3,547	37	3	1	3,588	2.49	0.67
May 1-15	195	602	199	1			200	1.03	0.33
May 16-31	70	171	174	2			176	2.51	1.03
June 1-15	12	15	14				14	1.16	0.93
June 16-30	106	335	478	1	2		481	4.54	1.43
July 1-15	90	330	273	8			281	3.11	0.85
July 16-August 15	406	1,424	929	7	1		937	2.31	0.66
August 16-31	186	619	396	2			398	2.14	0.64
September, October	12	41	84				84	7.00	2.05
Totals	2,514	8,892	6,094	58	6	1	6,159	2.45	0.69

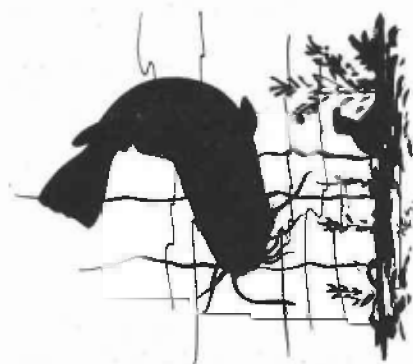


Table 53 gives the creel census data for the various streams in the system.

#### South Santiam System

The release of hatchery rainbow accounted for an increase in angling success on most South Santiam streams. Anglers on the South Santiam River caught trout at a rate of 0.98 fish per hour. Creel census records are given in Table 54.

#### West Side Willamette Streams

Anglers enjoyed a success of 1.43 fish per hour on the Little Luckiamute River and 0.79 fish per hour on the Big Luckiamute. Native cutthroat made up 35 per cent of the catch for all streams on the west side. Results of creel census on west side streams are shown in Table 55.

#### Pudding River System

The average success on Abiqua Creek was 0.67 fish per hour, which was similar to that of 1958. Butte Creek anglers enjoyed a catch rate of 1.19 fish per hour, half of which were native cutthroat. Smaller tributaries in the system provided good fishing on native cutthroats early in the season. (See Table 56)

#### Cascade Lakes

##### Creel census

For the third successive year, most of the popular Cascade lakes were accessible opening day. Marion, Ann, and Lost Lakes produced mediocre catches compared to the 1958 opening. Pamela and Daly Lakes again provided good angling on cutthroat six to ten inches in length.

Elk Lake, which has provided poor angling since chemical treatment in 1953 improved in 1959. Cutthroat, stocked in 1958, provided the bulk of the catch. A good number of rainbow over twelve inches were caught during the opening weekend. Angler success at Lost Lake was extremely low compared to past years; however, gill net samples indicated that a satisfactory trout population was present in 1959. The lake is exceptionally productive in fish food organisms. The catch records for the various lakes are presented in Table 57.

##### Lake surveys

Sixteen Cascade lakes were surveyed by the district agent and the high lake survey crew. Parrish, Daly, and the two Gordon Lakes were surveyed for the first time.

An excellent cutthroat population exists in both Gordon Lakes. Gill net samples produced 105 fish of which 45 were over ten inches in length.

Table 53

## Creel census, North Santiam system, 1959

Water	Number anglers	Hours fished	Rain- bow	Out- throat	Eastern brook	Chinook	White- fish	Steel- head	Total fish	Fish per angler	Fish per hour
North Santiam	244	500	484	7	5	5	3	2	506	2.08	1.01
Breitenbush River	259	516	641				1		642	2.48	1.24
Little North Fork	194	392	423				1		424	2.18	1.08
Santiam River	37	67	2						2	0.05	0.03
Mill Creek	485	527	133	16					149	0.31	1
Blowout Creek	47	109	229	11					240	5.11	2.20
Marion Creek	27	75	78						78	2.89	1.04
Parks Creek	13	39		27	47				74	5.70	1.90
French Creek	6	6	8						8	1.33	1.33
Pamelia Creek	3	4		4					4	1.33	1.00

/1 Total hours not recorded

Table 54

## Creel census, South Santiam system, 1959

Water	Number anglers	Hours fished	Rain- bow	Out- throat	Eastern brook	Chinook	White- fish	Steel- head	Total fish	Fish per angler	Fish per hour
South Santiam	175	567	483	73		2		1	559	3.19	0.98
Quartzville Creek	106	241	90	11				4	105	0.99	0.44
Middle Santiam	42	108	47	1					48	1.14	0.44
Crabtree Creek	101	249	147	19			1	1	168	1.66	0.68
Roaring River Creek	56	108	53	16					69	1.23	0.64
Wiley Creek	48	84	9	40					49	1.02	0.58
Hamilton Creek	22	28	12	2					14	0.64	0.50
Thomas Creek	20	53	2	9					11	0.55	0.21
Bilyeu Creek	21	24	7	2					9	0.43	0.38
McDowell Creek	10	17	4	14					18	1.80	1.05
Moose Creek	7	21	6	5					11	1.57	0.52
Canal Creek	5	7		6					6	1.20	0.85
Indian Prairie Lake	6	29	2		2				4	0.67	0.14
Moose Lake	4	24		44					44	11.00	1.83

Table 55

Creel census, West Side Willamette streams, 1959

Water	Number anglers	Hours fished	Rainbow	Cutthroat	Total fish	Fish per angler	Fish per hour
Big Luckiamute	138	486	235	148	383	2.78	0.79
Little Luckiamute	155	281	295	104	399	2.57	1.43
Rickreall Creek	41	112	2	70	72	1.75	0.64
Mary's River	12	23	3	7	10	0.83	0.44
Teal Creek	4	5		3	3	0.75	0.60
Pedee Creek	2	6		2	2	1.00	0.33

Table 56

Creel census, Pudding River system, 1959

Water	Number anglers	Hours fished	Rainbow	Cutthroat	Steelhead	Total fish	Fish per angler	Fish per hour
Abiqua Creek	297	587	296	94	1	391	1.32	0.67
Butte Creek	71	121	60	84		144	2.03	1.19
Silver Creek	9	27	5	39		44	4.90	1.63
North Fork Silver Creek	5	9		8		8	1.60	0.88
South Fork Silver Creek	1	2		10		10	10.00	5.00
Coal Creek	11	15		14		14	1.27	0.93
Powers Creek	8	9		10		10	1.25	1.11
Drift Creek	1	2		2		2	2.00	1.00
Butte Lake	11	26	21			21	1.91	0.81

Table 57

## Creel census, Cascade lakes, 1959

Lake	Number of anglers	Hours fished	Species	6-8	8-10	10-12	12-14	14-16	16 and over	Total fish	Fish per angler	Fish per hour
Marion	108	882	Rb Ct	7 1	19 1	55 2	126 1	31	17	255 5 260	2.40	0.29
Ann	77	458	EB		50	46	88	14		198	2.58	0.43
Daly	96	445	Ct EB	386 27	108 23	11 4				505 54 559	5.82	1.25
Pamelia	64	304	Ct	391	79	1				471	7.37	1.55
Lost	44	137	Rb EB	10 2	4 2	1 2	1 3			16 9 25	0.57	0.18
Parrish	33	112	EB	7	20	35				62	1.88	0.55
Elk	50	212	Rb Ct EB	3 13 11	8 44 1	4 3	11 2			26 60 14 100		0.47
Dunlap	13	33	Rb		1	4	5			10	0.77	0.30
Opal	15	102	EB	86	22					108	7.20	1.06
Don	10	66	EB Ct	140	9	2	1 4	1 1		151 7 158	15.80	2.40
Breitenbush	8	10	EB		1					1	0.13	0.10

Table 57 (continued)

Lake	Number of anglers	Hours fished	Species	6-8	8-10	10-12	12-14	14-16	16 and over	Total fish	Fish per angler	Fish per hour
Teto	7	41	EB Rb	12	74	10				96 2		
										98	14.00	2.39
Fir	5	38	EB		41	24	1			66	13.20	1.74
Jorn	3	10	EB		5	5	1			11	3.67	1.10
Red Butte	3	3	EB	5	2					7	2.33	2.33
Johnny	4	8	Rb		3					3	0.75	0.37
Bruno	2	4	EB	5		1				6	3.00	1.50
Spinning	2	4	EB	3	2			1		6	3.00	1.50
Jenny	4	16	EB		1					1	0.25	0.05
Craig	2	10	--							0	0.00	0.00
Bowerman	2	8	EB	3						3	1.50	0.37
Tumble	2	4	--							0	0.00	0.00
Mowich	1	5	EB		2	8				10	10.00	2.00
Hunt's	1	6	Rb			4				4	4.00	0.67
Fay	1	8	--							0	0.00	0.00

Thirteen kokanee were taken in gill net samples in Big Lake. Planted as fingerlings in the fall of 1958, the kokanee ranged from six to eight inches in length. A six-pound lake trout was also collected.

Two gill net sets in Lost Lake produced 22 rainbow and 16 eastern brook. Apparently low water levels of the last two years have not been too detrimental on the fish population. An attempt to reduce underground drainage from the lake was temporarily successful and the lake was restored in September to a low summer water level.

Fir, Fay, and Pika Lakes were gill netted to check results of changes in stocking rates. Excellent growth in eastern brook was observed in Fay Lake as a result of reducing stocking.

Size ranges and stages of maturity of trout may be seen in Tables 58 and 59.

#### Siletz summer steelhead

Trapping operations were handled by personnel from Roaring River Hatchery. Thirty adult fish from the Siletz River are being held. The first summer steelhead releases from the 1957 initial egg take were made into the North Fork of the Siletz in 1959.

#### Luckiamute silver salmon run

Several unsuccessful attempts were made to locate spawning silvers in December of 1958 in Pedee Creek, a tributary of the Big Luckiamute River.



Table 58

Composition and length frequency of catch by gill net sets  
Cascade lakes, 1959

Lake	Number of sets	Species	Number taken	Percentage of total	Number in one-inch size groups											16 and over
					5	6	7	8	9	10	11	12	13	14	15	
Big	2	LT	1	2	1	7	11	6	1				2	2		1
		EB	30	62		2										
		Rb	4	8		2		2								
		K	13	28		5	6	2								
Dunlap	1	Rb	2	100							1	1				
Daly	1	Ct	47	77	6	10	17	13	1							
		EB	14	23	4	4		4				1				
Elk	2	Rb	1	25							1	1				
		Ct	3	75								1				
Cleo	1	EB	5	71	3				4	1						
		Rb	2	29								1				
Pika	1	EB	5	100								1				
Gordon (Lower)	2	Ct	52	100	2	4	2	6	12	11	3	2	2	1		
Gordon (Upper)	2	Ct	53	100	2	11	11	5	5	5	8	4	1	1	1	
Parrish	2	EB	29	100			2	5	4	7	3	8	1			
Fir	1	EB	17	100			1	4	11							1
Patjens (Middle)	1	EB	4	100							4					
Patjens (Upper)	1	EB	2	100					1				1			
Turpentine	1	EB	21	100												
Pine Ridge	2	EB	35	100	3	18		8	1	1	1					
Fay	1	EB	28	100		6	18			2	8	12	6			
Lost	2	EB	16	42	1	1	1	1	1	4	4	3				
		Rb	22	58		1	6	3	2		5	2	2	1		

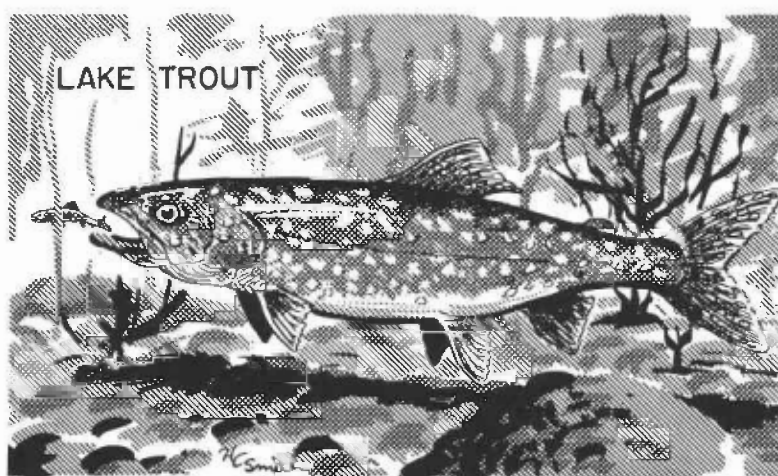
/1 Eleven trout were mutilated by crayfish and are not included in size groups.



Table 59

Average length of female fish in each stage of maturity  
Cascade lakes, 1959

Lake	Species	Immature		Maturing		Mature	
		Number	Average length (inches)	Number	Average length (inches)	Number	Average length (inches)
Big	LT	--	--	1	24.0	--	--
	EB	--	--	11	8.1	2	13.7
	Rb	--	--	--	--	--	--
	K	2	6.5	--	--	--	--
Elk	Rb	--	--	1	12.0	--	--
Cleo	Rb	--	--	1	13.3	--	--
	EB	--	--	2	9.5	--	--
Daly	Ct	--	--	14	7.5	--	--
	EB	--	--	4	7.4	2	10.4
Gordon (Lower)	Ct	--	--	15	8.4	11	11.4
Gordon (Upper)	Ct	--	--	12	7.0	17	11.6
Parrish	EB	--	--	8	9.2	6	10.1
Patjens (Middle)	EB	--	--	2	11.2	--	--
Pika	EB	--	--	--	--	3	11.3
Turpentine	EB	--	--	8	6.3	--	--
Pine Ridge	EB	--	--	12	7.5	--	--
Fay	EB	--	--	--	--	18	12.2
Lost	EB	--	--	2	7.9	10	12.2
	Rb	4	7.6	10	11.9	--	--
Fir	EB	--	--	7	9.2	4	10.7



## LOWER WILLAMETTE

Kenneth Cochran

### The Willamette spring chinook sport fishery

The Willamette spring chinook sport fishery was analyzed for the sixteenth year in 1959. The study was carried on by the same methods initiated by Craig and Townsend in 1941 and 1942 and described in U. S. Fish and Wildlife Service Special Scientific Report Number 33. The study and reports of the enumeration of the Willamette spring chinook salmon for each year have been prepared jointly by personnel of the Fish Commission of Oregon and the Oregon Game Commission.

The study area comprises the Willamette River from Oregon City Falls to the mouth of Multnomah Slough at St. Helens and is divided into two sections designated as the upper river and lower river. The Port of Portland is the division point.

This is primarily a boat fishery, but some bank angling takes place at Black Point and at the mouth of the Clackamas River in the upper river section.

The total sport catch of spring chinook salmon below Oregon City Falls was calculated to be 18,500 fish in 1959. The division of the catch between sections was 10,300 fish in the lower and 8,200 fish in the upper river section. The upper river catch includes 1,500 salmon estimated in the bank fishery at Black Point and the bank and boat fishery at the mouth of the Clackamas River. Table 60 shows the catch in each area by weekly intervals.

Table 60

Willamette River spring chinook salmon catch by weekly intervals  
as calculated from moorage reports, 1959

Date	Below Portland	Portland to Oregon City	Total
February 23 to March 1	13	---	13
March 2 to 8	226	203	429
March 9 to 15	558	206	764
March 16 to 22	548	195	743
March 23 to 29	263	112	375
March 30 to April 5	211	258	469
April 6 to 12	2,686	932	3,618
April 13 to 19	2,514	1,355	3,869
April 20 to 26	2,653	1,591	4,244
April 27 to May 3	591	1,196	1,787
May 4 to 10	30	386	416
May 11 to 17	---	300	300
May 18 to 24	---	17	17
Total	10,293	6,751	17,044 /1

/1 This figure does not include an estimated 1,500 salmon taken by bank anglers during the season, boat anglers after the moorage books were taken up, and anglers in the Clackamas River.

Individual weights for 3,255 sport-caught salmon averaged 19.1 pounds per fish. The weights ranged from 2 pounds to 51 pounds. Based on the average weight of 19.1 pounds per fish, the calculated catch of 18,500 fish weighed 353,350 pounds or 177 tons.

Age computation was made from a sample of scales taken when the fish were weighed. Approximately 64 per cent of the fish were five-year-olds. The age composition of the sample is presented in Table 61.

Table 61

Age composition, Willamette River spring chinook sport fishery  
1958 and 1959

Age in years	1958		1959	
	Number of fish	Per cent	Number of fish	Per cent
2	0	0	1	0.9
3	3	2.3	3	2.6
4	33	25.6	36	31.3
5	92	71.3	74	64.3
6	1	0.8	1	0.9

The 1959 angling intensity of 134,089 man days was exceeded only by the 137,875 man days recorded in 1958. An average of 7.2 man days was expended to catch a salmon. The 14-year average is 7.3 man days per salmon. A comparison of the angling intensity, angler success, angler effort per salmon, and average weight of the fish for the years 1946 to 1959 is presented in Table 62.

Table 62

Comparison of the Willamette River chinook salmon sport fishery  
1946 to 1959

Year	Angling intensity in man days	Average catch per day	Angling effort per salmon in days	Average weight in pounds
1946	61,900	0.20	5.0	17.0
1947	91,900	0.12	8.3	16.3
1948	86,600	0.10	10.0	16.5
1949	85,500	0.11	9.4	18.2
1950	73,400	0.12	8.3	16.6
1951	92,600	0.14	7.0	17.2
1952	91,100	0.13	7.7	16.8
1953	102,805	0.16	6.3	18.6
1954	104,061	0.11	9.2	18.6
1955	77,656	0.12	8.6	15.9
1956	84,100	0.19	5.3	18.4
1957	95,458	0.12	8.3	16.1
1958	137,875	0.11	8.9	18.2
1959	134,089	0.14	7.2	19.1

The total run of spring chinook salmon in the Willamette River in 1959 was calculated to be 53,400 fish. This figure was derived by adding the Oregon City Falls fishway counts calculated at 31,900 fish, the Clackamas River escapement estimated at 3,000 fish, and 18,500 fish calculated for the sport catch. Approximately 35 per cent of the run was taken in the sport catch. Table 63 compares data for the years 1941 to 1959.

Table 63

Escapement and sport catch of Willamette River spring chinook salmon  
1941 to 1959

Year	Willamette Falls fishway counts calculated	Clackamas River escapement estimated	Willamette sport catch calculated	Total run	Sport catch percentage of run
1941			30,000		
1942			12,000		
1946	53,000	3,000	12,600	68,600	18
1947	45,000	2,000	12,000	59,000	20
1948	30,000	1,800	8,300	40,100	21
1949	27,000	1,800	9,100	37,900	24
1950	14,500	1,500	8,800	24,800	35
1951	34,300	2,000	13,300	49,600	27
1952	52,200	2,800	12,500	67,500	19
1953	76,400	4,000	16,400	96,800	17
1954	31,100	1,800	11,500	44,400	26
1955	22,000	1,500	9,000	32,500	28
1956	58,600	3,000	16,000	77,600	21
1957	39,300	2,000	11,500	52,800	22
1958	45,200	2,100	15,500	62,800	25
1959	31,900	3,000	18,500	53,400	35

#### Sandy River steelhead

The Sandy River steelhead study was carried out for the fifth consecutive year. The study consists of sampling angling intensity, angler success, return of marked fish and upstream steelhead migration. From the samples, total number of anglers, total number of fish in catch, and total number of steelhead passing above Marmot are calculated.

Angling intensity has increased each year since the study began. In 1959, a total of 27,943 angler days was computed, compared to 24,485 angler days calculated in 1958. Table 64 summarizes the angling intensity for 1959 by weekday and weekend periods.

Table 64

Computed Sandy River steelhead fishery and angler success  
December 1958 to March 1959

Period	Number of cars	Number of angler days	Number of steelhead
Weekends	9,120	15,139	702
Weekdays	8,645	12,795	604
Totals	17,765	27,934	1,306

The number of angler days required to catch a steelhead was the highest since the study began. In 1955 an average of 16.7 angler days per steelhead was recorded and in 1959 an average of 21.4 angler days was expended per fish. Table 65 compares the angler success for the five-year period.

Table 65

Sandy River steelhead study, comparison of angler success  
1955 to 1959

Year	Number of angler days	Number of steelhead	Steelhead per angler day	Angler days per steelhead
1955	16,000	958	0.059	16.7
1956	10,413	1,157	0.111	9.0
1957	17,027	972	0.057	17.4
1958	24,485	1,893	0.077	12.9
1959	27,934	1,306	0.046	21.4

To determine the contribution of hatchery-reared fish to the steelhead runs, all of the fish stocked were marked. Angler bag checks in 1959 indicated that 7.1 per cent of the catch was marked fish. In 1957 when the first marked fish returned to the Sandy River, 19.2 per cent of the fish recorded in the catch were marked and in 1958, 14.7 per cent of the catch was marked. Table 66 presents the creel sample data from 1957 to 1959.

Table 66

Sandy River steelhead study, creel sample  
1957 to 1959

Year	Number of anglers	Number of hours	Number of fish	Fish per angler	Hours per fish	Marked fish	Unmarked fish
1957	927	2,647	52	0.06	51.0	10	42
1958	2,144	6,478	176	0.08	36.8	25	151
1959	1,165	3,385	56	0.05	60.4	4	52

The number of hatchery-reared steelhead marked and released in the Sandy River since 1955 is presented in Table 67.

Table 67

Sandy River steelhead stocking records  
1955 to 1959

Year	Number stocked	Size in inches	Total weight in pounds
1955	19,720	4 to 6	850
	55,257	6 and over	5,887
1956	77,194	6 and over	8,503
1957	7,530	4 to 6	535
	64,248	6 and over	5,540
1958	57,623	4 to 6	1,993
1959	83,462	4 to 8	7,995

At the Marmot fishway, mature migrating steelhead were recorded by an electronic counter. The number of marked fish going through the fishway was calculated from the ratio of marked to unmarked fish determined by periodically sampling by means of a trap. The number of steelhead migrating through Marmot fishway in 1959 was slightly lower than in 1958 with the calculated number of marked fish considerably lower. Table 68 compares the counts at Marmot fishway from 1954 to 1959.

Table 68

Sandy River steelhead counts at Marmot fishway  
1954 to 1959

Year	Number of fish		Per cent marked	Total fish
	Unmarked	Marked		
1954	2,200			2,200
1955	1,581			1,581
1956	2,240			2,240
1957	1,975	79	3.8	2,054
1958	2,917	249	7.9	3,166
1959	2,290	69	2.9	2,359

Sandy River chinook salmon

A total of 304 spring chinook salmon was recorded through the Marmot fishway in 1959. The spring chinook salmon runs have been quite low since 1955. Table 69 shows the magnitude of the runs recorded through the fishway since 1955.

Table 69

Sandy River spring chinook salmon counts over Marmot fishway  
1954 to 1959

Year	Number of fish
1954	400
1955	5
1956	0
1957	10
1958	78
1959	304

North Fork fishway, Clackamas River

The evaluation of the North Fork fishway is being carried on in cooperation with Portland General Electric Company. During construction of the fishway, the fish were trapped and hauled above the dam site. Since completion of the fishway, counts of both upstream and downstream migrant fish have been tabulated. Table 70 gives the number of upstream migrant fish by species for 1958 and 1959.

Table 70

Upstream migrant fish counts, North Fork fishway  
1958 and 1959

Species	Number	
	1958 run	1959 run
Steelhead	1,672	554
Chinook salmon	506	509
Silver salmon	617	419
Trout	124	73
Whitefish	1,309	19
Coarse fish	72	18

The present pattern of the upstream runs has been determined through daily tabulations. Chinook salmon runs appear to start in May, reach their peak in late September and complete their run by early December. Silver salmon start entering the fishway in September and reach their peak in late November and complete their run by late February. Although steelhead have been recorded for every month of the year, the bulk of the run enters in April and May and is about completed by late June. Figure 9 depicts the pattern of migration of salmon and steelhead at the North Fork fishway.

The number of fish of all species except chinook salmon passing upstream in 1959 was considerably lower than in 1958.

The facilities for passing downstream migrant fish were not completed until March 1959. Table 71 shows the number of fish tabulated from March to November 1959.

Table 71

Downstream migrant fish counts, North Fork fishway  
for the period March to November 1959

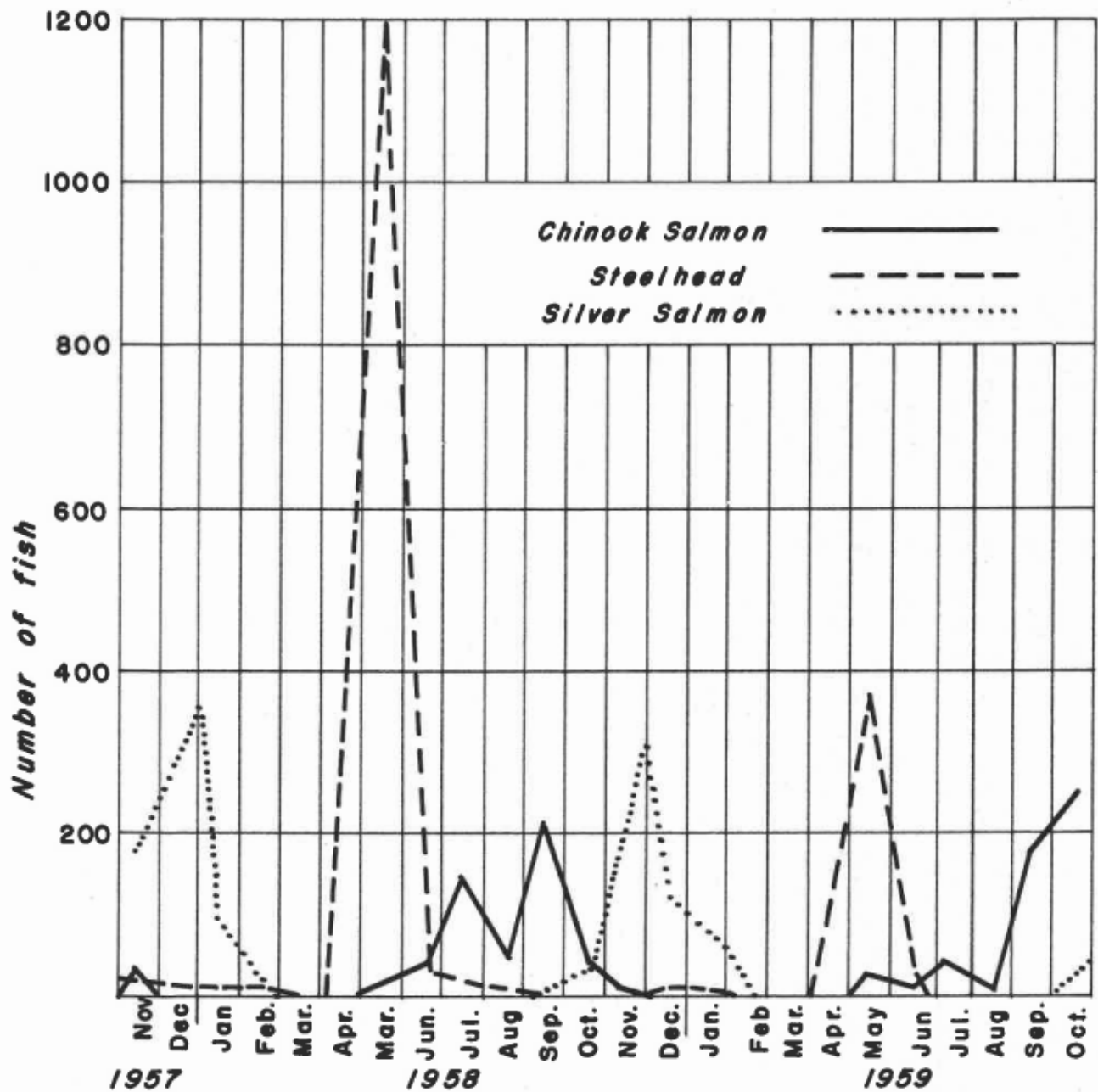
Species	Number
Steelhead	37,244
Chinook salmon	4,985
Silver salmon	15,640
Trout	822

Timothy Meadows Reservoir

An intensive creel census was made at Timothy Meadows Reservoir during the 1959 angling season. A total of 723 anglers was checked with 2,827 fish, an average of 3.9 fish per angler. The average length of the fish was 9.8 inches as compared to 9.0 inches in 1958. A very limited number of eastern brook and cutthroat trout was recorded in the catch. Table 72 presents summarized data on the creel checks.

In late June and early July, Myxosporidia or similar organisms were noted on several fish in the catch. The infection was not apparent after July.

Figure 9



**NORTH FORK FISHWAY, UPSTREAM MIGRANTS**



Table 72

## Creel census, Lower Willamette District, 1959

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	Number of anglers	Number of hours	Number of fish	Fish per angler	Fish per hour	Hours per fish
Camp Creek	Rb	4	1				6	7	5	0.8	0.7	1.4
Clackamas River	Rb	85	28	1	41		66	216	155	2.3	0.7	1.4
Columbia River	Sg			(40 to 48 inches)			15	44	3	0.2	0.07	14.7
Cripple Creek Lake	EB		10	10			2	12	20	10.0	1.7	0.6
Harriet Lake	Rb		15	17	4		18	85	36	2.0	0.4	2.4
Middle Rock Lake	EB	4					3	9	4	1.3	0.4	2.2
Mill Creek	Ct	14	5				12	28	19	1.6	0.7	1.5
North Fork Reservoir	Rb	66	23	1			59	227	95	1.6	0.4	2.4
	Sil	5										
Oak Grove Fork	Ct	7					2	10	7	3.5	0.7	1.4
Rock Creek	Ct	26	4				6	12	30	5.0	2.5	0.4
Sandy River	Rb	38					22	40	38	1.7	0.9	1.0
Shining Lake	EB	2	6	2			2	16	10	5.0	0.6	1.6
Still Creek	Rb	9					7	16	9	1.3	0.6	1.8
Timothy Meadows Reservoir	Rb	20	1,657	1,047	41	2	723	3,042	2,827	3.9	0.9	1.0
	EB	8	7		10							
	Ct		23	12								
Yamhill River	Rb	6	13	5	1		12	28	27	2.3	0.9	1.0
	Ct	2										
Zig Zag River	Rb	14	10	1			11	30	25	2.3	0.8	1.2

### High lakes

A total of twelve high lakes was surveyed in 1959. Of this number six had been surveyed in 1955 and two in 1957.

A comparison of the average length of fish taken in 1959 is made with the fish taken in 1955 and 1957 in Table 73.

Table 73

Comparison of average length of fish in some lakes in the  
Mount Hood National Forest, 1955 to 1959

Lake	1955	1957	1959
Brooks Lake	9.1		14.5
Burnt Lake		7.5	9.2
Cast Lake		7.7	9.0
Jude Lake	11.8		11.5
Lower Lake	9.5		11.0
Middle Lake (Gifford)	7.0		10.0
Russ Lake	No fish		16.2
Si Lake	No fish		17.2

Stocking in the eight lakes was reduced after the first survey from an annual basis to biennially and, in some lakes, to triennially. Numbers of fish stocked had also been reduced in most of the lakes because earlier surveys indicated excessive populations. Emerald, Cougar and Williams Lakes have not been stocked for many years. Populations were sustained by natural propagation. Tables 74 and 75 summarize the 1959 high lake survey data.

### Crystal Springs Creek

In 1955, approximately 10,000 summer and 10,000 winter-run marked steelhead were released in Crystal Springs Creek. A small run of winter-run fish used the creek and supplemental stock was planned to provide a spawning run of sufficient magnitude to provide eggs for one or more hatcheries. The first return of marked winter fish was observed in February 1957 when a total of 156 marked and unmarked fish was tabulated at the dam in Eastmoreland Golf Course. Winter fish were released in the creek in 1956 and 1958, but only summer-run fish were released in 1957.

In 1958, a trap was placed in the creek near the dam where 59 female winter steelhead produced 165,000 eggs. Only four of the fish were unmarked and only one marked summer-run fish was observed.

The trap was again placed in the creek in 1959. Only five winter-run females were taken. All were marked fish. No summer-run steelhead were observed in the creek.

Table 74

Composition and length frequency of catch by gill nets in some lakes  
in the Mount Hood National Forest in one-inch size groups, fork length measurements

Lake	Number of sets	Species	Number taken	6	7	8	9	10	11	12	13	14	15	16	17
Brook Lake	1	EB	7						1		1	1	1	2	1
Burnt Lake	2	EB	19		3	5	2	6	3						
Cast Lake	1	EB	4			1	3								
Cougar Lake	1	EB	14		1	2		2	9						
Emerald Lake	1	Ct	9	1	1			1	3	3					
Jude Lake	1	EB	1						1						
Lower Middle Lake	2	EB	3											1	2
Lower Lake	1	EB	9				1	2	4	2					
Middle Lake (Gifford)	1	EB	8			1	1	3	3						
Russ Lake	2	EB	10										3	4	3
Si Lake	1	EB	5											1	4
Williams Lake	1	Ct	6	2	2		1				1				

Table 75

Average length of female fish in each stage of maturity collected in gill nets in some Mount Hood National Forest lakes, 1959

Lake	Species	Immature		Maturing		Mature	
		Number in sample	Average length (inches)	Number in sample	Average length (inches)	Number in sample	Average length (inches)
Brook Lake	EB					4	13.3
Burnt Lake	EB			5	7.9	6	10.2
Cast Lake	EB	(no females in sample)					
Cougar Lake	Ct	1	7.0	2	8.0	10	10.9
Emerald Lake	EB	(no females in sample)				4	11.6
Jude Lake	EB						
Lower Middle Lake	EB			2	11.0	2	16.6
Lower Lake	EB					1	10.6
Middle Lake	EB						
(Gifford)	EB			2	8.8	2	10.4
Russ Lake	EB					6	16.0
Si Lake	EB					4	16.8
Williams Lake	Ct			2	7.1	1	12.6

# NORTHEASTERN OREGON

Robert C. Sayre

## The lakes of northeast Oregon

### Wallowa Lake

The ten-day randomized creel check was used for an 81-day period in 1959. Analysis of comparative data for 1958 indicates a reduction in angling pressure and in angling success. Table 76 shows a comparison of seasonal averages for angler effort during the past two years. Table 77 is a comparison of total effort and success by anglers for 1958 and 1959 during an 81-day period. Table 78 is a comparison of five years of effort and success. The 1959 data have been expanded to fit the 133-day period of previous years for comparative purposes.

Table 76

Calculated seasonal averages  
from the Wallowa Lake creel check

	1958		1959	
	Boat	Bank	Boat	Bank
Average hours per angler trip	3.8	3.3	2.9	2.0
Average number of fish per angler trip	3.2	3.5	2.1	3.3
Average number of fish per hour	0.8	1.1	0.7	1.7
Average number of anglers per boat	2.4	-	2.3	-
Average number of possible trips per twelve-hour sampling day	3.1	3.6	4.1	6.0

Table 77

A comparison of two years of creel check  
at Wallowa Lake for an 81-day random sampling period

Year		Total angler trips	Total catch	Rainbow	Kokanee	Lake trout	Dolly Varden
1958	Boat	8,997	26,989	22,671	4,048	270	0
	Bank	<u>1,847</u>	<u>1,662</u>	<u>1,303</u>	<u>246</u>	<u>113</u>	<u>0</u>
		10,844	28,651	23,974	4,294	383	0
1959	Boat	5,812	12,205	9,887	1,952	244	122
	Bank	<u>1,895</u>	<u>6,253</u>	<u>5,815</u>	<u>375</u>	<u>63</u>	<u>0</u>
		7,707	18,458	15,702	2,327	307	122

The average number of angler boats at any one time on Wallowa Lake decreased from 12.1 in 1958 to 7.6 in 1959. There were periods during the mid and late season when angling pressure was extremely low for this lake.

Table 78

A calculated comparison of effort and success  
at Wallowa Lake for a 133-day random sampling period for five years

		Total angler trips	Total catch	Rainbow	Kokanee	Lake trout	Dolly Varden
Boat		9,543	20,065	16,259	3,205	401	200
Bank		<u>3,112</u>	<u>10,230</u>	<u>9,511</u>	<u>616</u>	<u>103</u>	<u>0</u>
Totals	1959	12,655	30,295	25,770	3,821	504	200
	1958	13,103	42,862	32,263	9,843	756	0
	1956	14,846	46,020	32,356	13,190	0	474
	1955	13,298	27,417	23,347	3,695	0	375
	1954	14,000	42,770	39,200	3,145	0	425

Of particular interest from the creel check is the comparable kokanee take of 1955 and 1959. Creel census records indicate that kokanee planted as fry have not yet entered the creel, at least in appreciable numbers. Table 79 is a stocking record of lake trout and kokanee since 1955.

Table 79

Stocking record of lake trout and kokanee  
in Wallowa Lake from 1955 to 1959

Year	Species	Number	Size in inches
1955	Kokanee	135,000	0-2
1956	Kokanee	92,920	0-1
	Lake trout	9,079	5.0
1957	Kokanee	664,778	0-2
	Lake trout	2,424	6.0
1958	Kokanee	495,000	0-2
	Lake trout	64,425	4.0
1959	Kokanee <sup>/1</sup>	411,900	0-2
	Lake trout	65,788	4.0
Total Kokanee		1,799,598	
Total Lake trout		141,706	

<sup>/1</sup> The 1959 kokanee were released on December 3, 1958

Two additional spawning channels have been developed off of the original channels re-established by the Parks Division of the Highway Commission. The gravel in the bed of the channel was raked to a depth of six inches and rocks greater than one inch in diameter were removed. Eight pair of kokanee are known to have used this channel in 1959. Most kokanee spawning has occurred in the main river above the old site of the water gauging station. Kokanee were not observed here until the first week of December.

Table 80 is a summary of Fish Commission trapping on two diversions below Wallowa Lake from May 26 to August 16, 1959. The mackinaw trout taken in these traps had been released as 4.0-inch fingerlings on February 5, 1959.

Table 80

A summary of Fish Commission trapping on two diversions below Wallowa Lake from May 26 to August 16, 1959

Diversions	Fish		Length variation (inches)	Average length, game fish (inches)
	Species	Number		
Farmer's	Mackinaw	27 <u>/1</u>	4.0 to 5.3	4.7
	Rainbow	2 <u>/2</u>	1.8 to 6.8	-
	Kokanee	1	8.4	-
	Sucker	25	1.9 to 9.8	-
	Dace	83	1.6 to 5.0	-
	Sculpin	15	2.0 to 5.0	-
Silver Lake	Mackinaw	29 <u>/3</u>	3.9 to 5.9	4.6
	Rainbow	20 <u>/4</u>	1.6 to 4.4	3.1
	Whitefish	1	7.1	-
	Sucker	24	2.0 to 7.1	-
	Dace	9	1.5 to 3.2	-
	Sculpin	5	2.0 to 4.1	-
Total fish				
Game		Rough		
Mackinaw		56	Suckers	49
Rainbow		22	Dace	92
Kokanee		1	Sculpins	20
Whitefish		1		

/1 Last record July 26

/2 Taken June 4 and August 12

/3 Last record July 18

/4 One rainbow recorded after June 17

#### High mountain lakes

#### Wallowa Mountains

A survey of upper Hurricane Creek revealed that golden trout reproduction exists in the lower meadows near the head of this stream. One 10-inch, six 7-inch, three 2.5-inch yearlings, and seven 1.5-inch zeros were observed in approximately two miles of stream. The 10-inch golden was vividly colored and the 7-inch fish were bright.

The upper portion of the meadows does not contain good fish habitat. The stream bed consists of unstable decomposed granite and there is no adjacent cover.

Table 81 illustrates the condition of female trout and length range of the population recovered in gill nets in six Wallowa Mountain lakes.

Table 81

A comparison of condition of female trout and total population in six high Wallowa Mountain lakes as seen from gill net sampling

Lake	Date	Species	Number	Average length (inches)		Length variation, inches
				Females at maturity	All fish	
Ice	8/24/50	EB	17	8.5	7.7	5.8 to 9.8
	9/ 9/59	EB	33	7.6	7.9	6.0 to 10.0
Razz	7/16/52	EB	35	-	6.5	5.5 to 8.5
	9/10/59	GT	33	-	7.1	6.0 to 8.8
Prospect	9/11/58	Rb	3 <u>/1</u>	-	17.1	14.5 to 19.0
	9/11/59	Rb	17 <u>/2</u>	-	7.6	6.0 to 9.0
Frazier	9/10/59	EB	12 <u>/1</u>	6.8	6.4	5.7 to 7.5
Fish	9/15/56	EB	51	8.3	8.2	5.9 to 11.3
	8/15/59	EB	45	7.7	7.9	4.2 to 12.2
Duck	7/10/57	EB	59	13.5	7.9	5.4 to 16.5
	7/31/59	EB	23	10.1	10.7	9.5 to 17.5
		Rb	1	-	-	12.0 <u>/3</u>

/1 Rod sample

/2 Gill net sample

/3 Introduced as fry in July, 1957

Results of this survey suggest that the 30-fish bag limit has not appreciably reduced the trout population in Ice Lake.

The golden trout population of Razz Lake appears large enough to warrant a reduction in the stocking rate to 200 fish per acre biennially.

The 1959 sample from Prospect Lake appears to be rainbow of the 1957 release. Prospect Lake will be placed on a biennial stocking program in an attempt to provide good angling. Golden trout from the 1954 release have never been observed.

Rainbow fingerlings were released in Fish Lake on an experimental basis in an attempt to provide a few larger fish in the presence of an existing eastern brook trout population.

Rainbow fingerlings were released in Duck Lake in an attempt to provide better angling as predation on past fry releases in this water was extensive.

Table 82 lists the fish release in high mountain lakes for 1959.



Table 82

Fish release in northeast Oregon  
high mountain lakes in 1959

Lake	Species	Number	Size (inches)	Method of release
Frances	EB	20,072	2.0	Airplane
	Ct	21,050	1.5	Airplane
Mirror	Rb	28,000	1.0	Airplane
Fish	Rb	16,250	4.5	Truck
Twin	Rb	9,900	4.5	Truck
Duck	Rb	9,960	3.0	Truck
	EB	17,926	2.0	Airplane
Bear	Ct	9,800	1.5	Airplane
Lookingglass	Ct	29,950	1.5	Airplane
Rock Creek Reservoir	EB	19,726	2.0	Airplane
Total all species		182,634		

Rainbow fry were released in Mirror Lake in order to determine if large rainbow could be produced in the high lake basin without further stunting of the present eastern brook population. Cutthroat trout have proven satisfactory in other overpopulated brook trout lakes of the region.

The impounded waters of northeast Oregon

Brownlee Reservoir

A loss of downstream migrating salmon and steelhead occurred through, around, or under the skimmer device this spring. Surface, bottom, and shoreline gill net sets were made in an attempt to learn where the fish were passing the skimmer. Only warm-water game fish and rough fish were netted.

Large numbers of downstream migrants were present around the mouths of all streams tributary to the Brownlee Pool in the spring and early summer of 1959. Anglers took large numbers of the 7 to 9-inch rainbow.

Table 83 indicates the percentages of various species of fish taken in two gill net surveys made in 1959. Table 84 indicates length range and average length of fish gill netted in two surveys at Brownlee Pool.

Cold Springs Reservoir

Table 85 indicates angler success and effort for warm-water species at Cold Springs Reservoir. Largemouth bass released in 1958 appeared as fish 6 to 8 inches in length. Continued transfer of bass fry from the Spence Pond at La Grande will be pursued in order to provide better angling in the Cold Springs impoundment.

Table 83

Percentage of fish by species appearing in  
two gill net surveys of Brownlee Pool in 1959

Date	Number of sets	Game fish			Coarse fish		
		Species	Number	Per cent	Species	Number	Per cent
6/4/59	2	C	43	16.9	Clm	32	12.5
		YP	18	7.1	Cp	108	42.2
		CC	6	2.4	Su	33	13.0
					Sq	14	5.5
					RsS	1	0.4
			<u>67</u>	<u>26.4</u>		<u>188</u>	<u>73.6</u>
7/20/59	3	C	10	5.3	Clm	23	12.2
		YP	5	2.7	Cp	13	6.8
		SB	5	2.7	Su	51	26.9
		CC	1	0.5	Sq	69	36.5
		B	<u>12</u>	<u>6.4</u>			
			<u>33</u>	<u>17.6</u>		<u>156</u>	<u>82.4</u>

#### McKay Reservoir

Table 86 summarizes angler success during the early season at McKay Reservoir. Angling pressure and success were fair during the early season. After May 15, virtually all angler use stopped at this impoundment.

Table 87 lists data from a mid-summer gill net survey. No trout were released at McKay in 1959. Only 95,000 were released in 1958.

Table 88 presents data resulting from creel checks of warm-water species in several waters.

#### Morgan Lake

Table 86 indicates angler success during the last two months of the season at Morgan Lake.

Table 89 shows fish populations in Morgan Lake as determined by gill net surveys in 1959. The first survey was before chemical treatment and the second following rehabilitation. No perch or catfish have been observed since the lake was rehabilitated. Growth of the rainbow fingerling appears to be satisfactory although the reservoir was stocked at the rate of 1,547 fish per surface acre. None of the yearling rainbow are believed to have been taken in the November sample.

Figure 10 presents dissolved oxygen patterns recorded at Morgan Lake in 1959. Figure 11 presents recorded water temperatures at Morgan Lake in 1959.

Table 84

Average length and weight of fish obtained in  
gill net sets in Brownlee Reservoir, 1959

Date	Location along west shore	Number of sets	Species	Number	Length variation (inches)	Average length (inches)	Average weight (pounds)
1/6/59	3 miles above skimmer	1	Clm	2	7.0	-	0.09
	North bank at mouth of Powder River	1	DV	1	12.0	-	0.7
			SB /1	1	11.0	-	0.9
			LB	4	8.0 to 9.0	8.5	0.15
			B	2	4.0	-	0.09
			Cp	2	-	-	-
			Su	1	-	-	-
			Sq	2	-	-	-
6/4/59	North and south banks at mouth of Burnt River	2	C	43	3.6 to 4.8	4.2	0.17
			YP	18	4.8 to 6.0	5.4	0.09
			CC	2	18.8 to 20.7	-	4.8
			CC	4	3.2 to 3.8	3.5	0.06
			Clm	32	5.5 to 9.0	7.3	0.12
			Cp	108	3.8 to 8.0	5.9	0.09
			Su	33	5.5 to 18.5	12.0	0.8
			Sq	14	6.0 to 15.5	10.8	0.6
			Rss	1	4.5	-	-

/1 Scale reading indicates this fish was in its second year

Table 85

Cold Springs Reservoir creel check  
from March 1 to June 29, 1959

Number of anglers	Total hours angling	Fish per angler				Hours per fish			
		Bass	Catfish	Crappie	Total catch	Bass	Catfish	Crappie	All fish
604	1,908	0.7	0.5	1.3	2.5	4.4	6.3	2.5	1.3

#### Unity Reservoir

Table 86 compares angler success at Unity Reservoir with other impounded trout waters of northeast Oregon. Table 87 includes a two-year comparison of fish production as determined by gill net surveys. A planting boat was used for the first time in 1959 to release fingerlings at Unity Reservoir. Fish two inches in length were released in 1959 and growth was comparable to 1958. Fingerling released in 1958 were approximately three inches in length.

A four-year comparison of angler effort and success at Unity Reservoir is shown in Table 90.

#### Higgins Reservoir

Table 86 indicates angler success at Higgins Reservoir. Table 87 is a two-year comparison of fish production according to gill net surveys. Growth of fingerling rainbow trout appears similar to that of past years. Brook trout released as 2.25 inch fingerling in August 1958 appeared one year later as 8.4 inch fish. Two-inch rainbow released in April 1959 were 6.5 inches in length when taken in gill net samples in August.

Cutthroat trout released in this impoundment between 1948 and 1950 have apparently become adapted to the reservoir and stream system. A fair population of large fish was present in the reservoir in 1959. Earlier gill net surveys revealed rainbow and cutthroat crossing to be common. Pure cutthroat again appeared in nets in 1959. Table 91 is a comparison of cutthroat trout taken in gill nets over a nine-year period at Higgins Reservoir.

An experimental plant of kokanee salmon released in April 1959 did not appear in the August survey at Higgins Reservoir.

#### Murray Reservoir

Good angling was enjoyed by anglers fishing Murray Reservoir. The catch per unit of effort is presented in Table 86. Good trout growth is indicated by the size of fish taken by anglers.

Table 86

A summary of creel census data from northeast Oregon impounded waters, 1959

Water	Watershed	Anglers	Hours angling	Fish caught		Fish per angler	Fish per hour	Hours per fish
				Species	Number			
<u>Ponds</u>								
Haines	9	14	25	Rb	33	2.6	1.5	0.7
				LB	4			
Highway 203	9	90	88	Rb	67	0.7	0.8	1.3
Roulet	8	8	12	Rb	10	2.0	1.3	0.8
				B	6			
Sparta	9	75	140	Rb	170	2.3	1.2	0.8
North Powder	9	6	10	Rb	19	3.2	1.9	0.5
Vogel	8	40	75	Rb	68	1.7	0.9	1.1
<u>Impoundments</u>								
Higgins Reservoir	9	96	338	Rb	494	5.2	1.5	0.7
				Ct	6			
				EB	2			
McKay Reservoir	7	483	2,631	Rb	1,257	2.6	0.5	2.1
Morgan Lake	8	30	50	Rb	120	4.0	2.4	0.4
Murray Reservoir	9	250	616	Rb	441	1.8	0.7	1.4
				Ct	1			
Unity Reservoir	9	441	1,534	Rb	1,077	2.4	0.7	1.4

Table 87

Composition and length frequency of catch by gill nets  
in northeast Oregon reservoirs during mid-summer of 1959 and comparative surveys

Reservoir	Year	Number of sets	Species	Number taken	Trout		Coarse fish			
					Fork length variation	Average length (inches)	Sucker	Squaw- fish	Chisel- mouth	Red- sided shiner
Unity	1959	3	Rb	202	5.5 to 13.5	8.0	70			8
										261
McKay	1958	3	Rb	88	6.0 to 13.0	7.8	36			2
										384
McKay	1959	3	Rb	8/1	10.3 to 13.0	11.4	140	30	3	4
Higgins	1958	3	Rb	0	--	-	128	92	6	2
Higgins	1959	3	Rb	213	6.0 to 13.0	8.0				
			Ct	6	11.0 to 22.7	14.0				
Higgins			EB	15	7.5 to 9.3	8.3	427			
Higgins	1958	3	Rb	45	7.0 to 12.5	9.0	236			

/1 Three females measuring 11.5, 12.5, and 13 inches would have matured this fall.

Table 88

## Creel check warm-water species

Water	Watershed	Species	Total fish	Total anglers	Total hours	Fish per angler	Fish per hour	Hours per fish
Cold Springs Reservoir	7	LB	428	604	1,908	2.5	0.8	1.3
		C	774					
		B	305					
		Rb	6					
Columbia River <u>/1</u>	7	LB	47	55	196	1.3	0.4	2.6
		Sg	2					
		C	21					
		BG	4					
Dodd Pond	7	LB	2	5	10	0.4	0.2	5.0
Irrigon Slough	7	LB	6	30	122	0.2	0.05	20.3
Baldock Slough	9	LB	23	3	4	7.7	5.8	0.2

/1 Includes Columbia River, McNary Pool, and Juniper Canyon water

Table 89

Experimental gill net data  
Morgan Lake, 1959

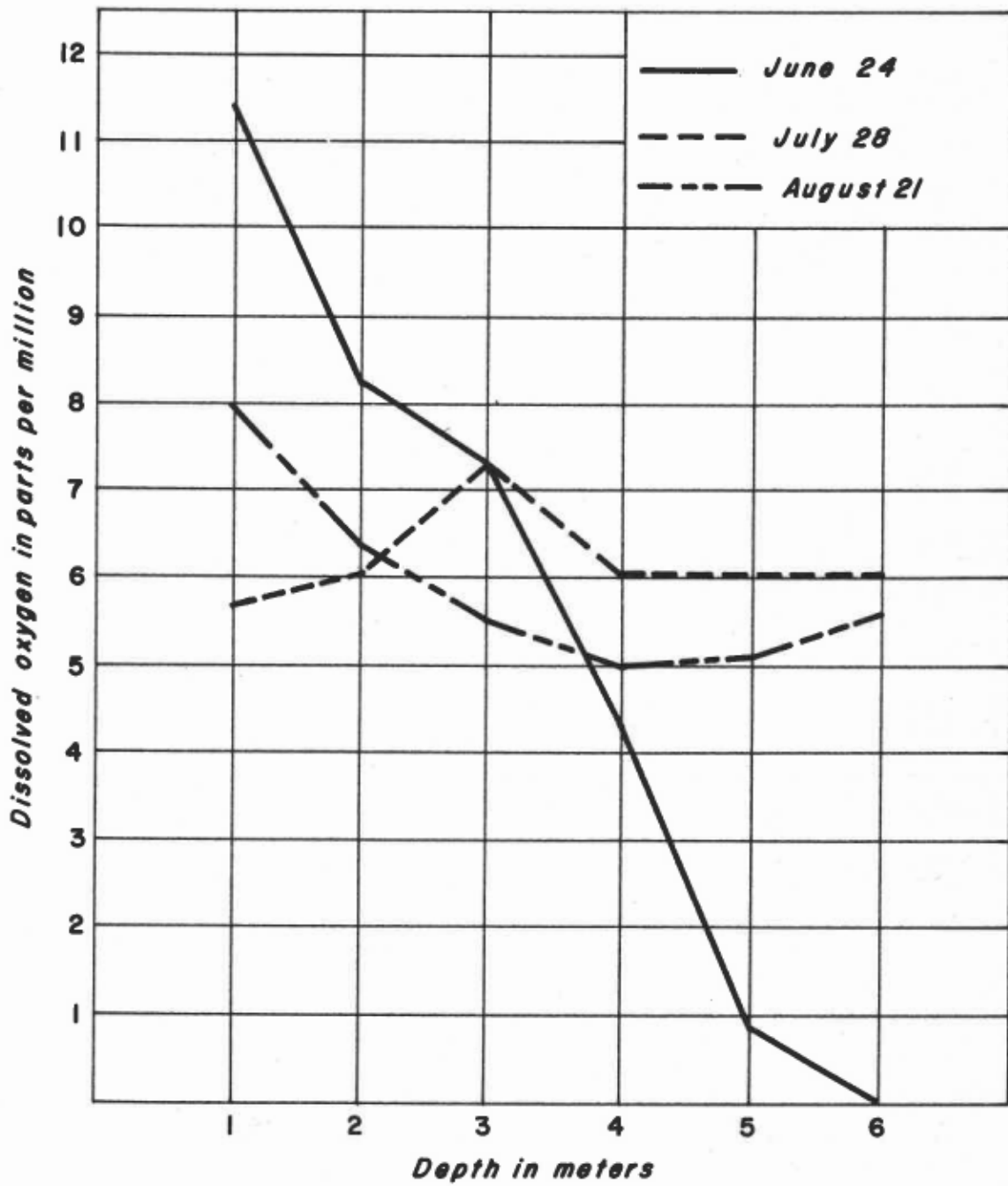
Date	Number of nets	Fish		Length variation (inches)	Average length (inches)	Released		
		Species	Number			Date	Number	Average length
4/22/59	1	YP	99	4.8 to 8.8	6.9			
11/10/59	1	Rb	35	6.0 to 8.5	7.6	7/8/59	86,600	4.4
						to 7/24/59	10,880	7.2

Pond management

Experimental gill net sets were made in three gravel pit ponds in order to learn the growth of sublegal rainbow trout released in August of 1958. Table 92 lists the data obtained from this investigation.

Greater growth at the Haines Pond is thought to be the result of a heavy loss of trout fingerlings through predation by largemouth bass. Bass of several age classes were observed in this pond in 1959, and a few three and four pound bass were taken by anglers. Rainbow will not be released in this pond until bass have been removed.

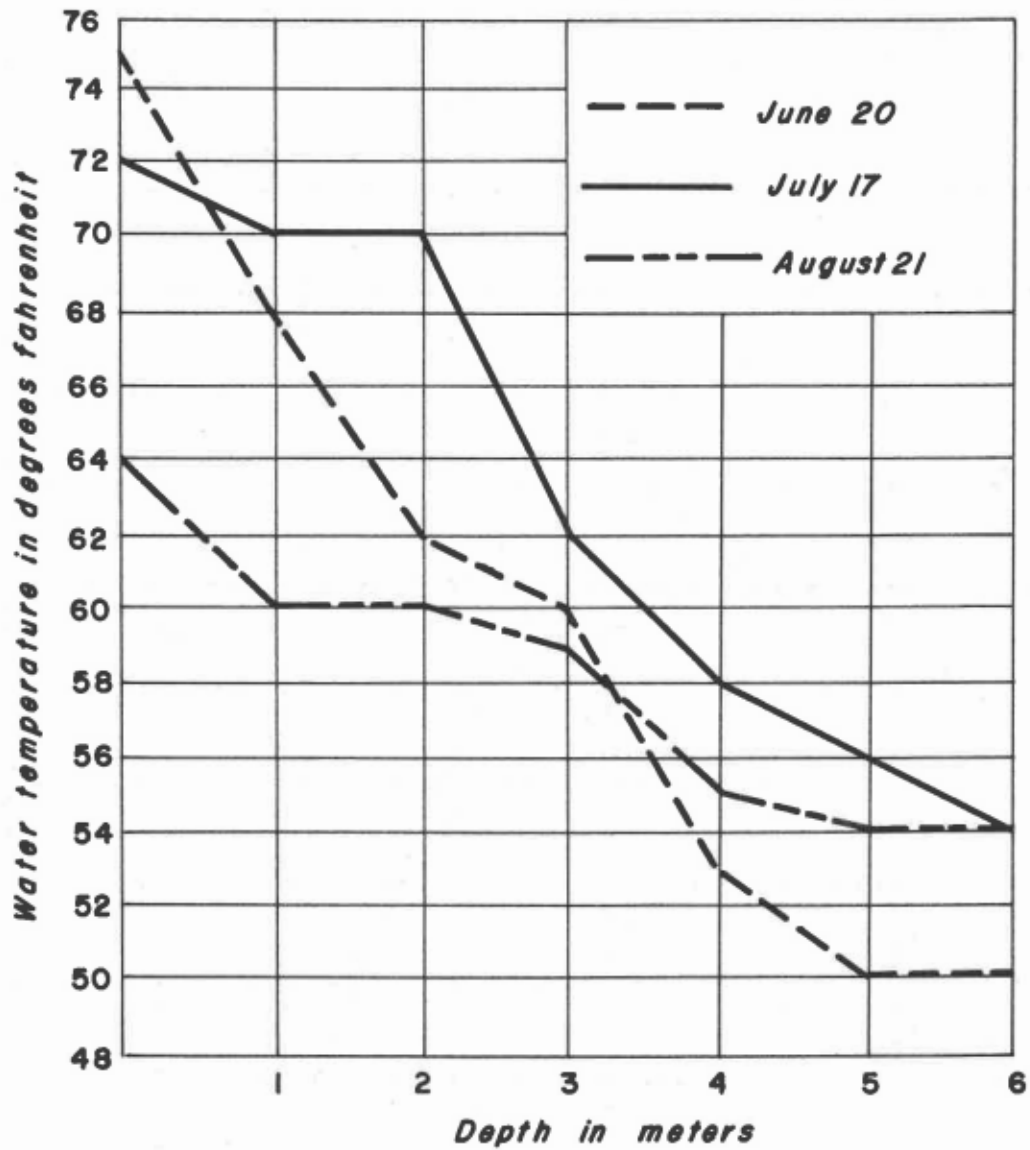
Figure 10



**DISSOLVED OXYGEN ANALYSIS AT MORGAN LAKE, 1959**



Figure 11



**SUMMER WATER TEMPERATURES AT MORGAN LAKE  
1959**

Table 90

A four-year comparison of angler effort  
and success for rainbow trout at Unity Reservoir

Year	Fish caught	Number of anglers	Hours angling	Fish per angler	Fish per hour	Hours per fish
1959	1,077	441	1,534	2.4	0.7	1.4
1958	302	118	419	2.5	0.7	1.4
1957	1,045	221 <sup>/1</sup>	-	4.5	-	-
1956	552	120 <sup>/2</sup>	607	4.6	1.1	0.9

<sup>/1</sup> Incomplete data available

<sup>/2</sup> From 1956 annual report

Table 91

A comparison of cutthroat trout numbers in gill net  
samples over a nine-year period at Higgins Reservoir, Baker County

Year	Number of nets	Number of fish	Average length of females at maturity	All fish	
				Length range (inches)	Average length (inches)
1951	2	19	--	8.5 to 16.8	10.8
1952	4	13	13.0	12.3 to 14.0	13.2
1953	3	4	--	6.4 to 7.1	6.7
1956	2	1	--	16.5	--
1957	3	22 <sup>/1</sup>	--	8.5 to 12.1	10.3
1958	3	0	--	--	--
1959	6 <sup>/2</sup>	14	11.0	10.5 to 25.5	14.1

<sup>/1</sup> All of these fish were rainbow-cutthroat crosses

<sup>/2</sup> Three nets each on an April and an August survey

Table 92

Rainbow trout growth in Union  
and Baker County gravel pit ponds, 1959

Pond	Date	Release data		Number	Date	Sampling data		
		Number per pound	Average length (inches)			Number per pound	Average length (inches)	Length gained (inches)
Vogel	7/25/58	14	5.5	1,008	3/17/59	4.1	8.0	2.5
N. Powder	7/25/58	14	5.5	994	3/19/59	3.1	9.0	3.5
Haines	7/25/58	14	5.5	868	3/19/59	2.6	10.0	4.5

## The streams of northeast Oregon

### Rotary fish screens

Early irrigation resulted in the collection of large numbers of downstream migrants at most rotary fish screen bypass traps. Table 93 summarizes the partial sampling of downstream migrants trapped at twenty-eight rotary screen bypass traps on seventeen streams in Watersheds 7, 8, and 9.

Table 94 lists the number of salmon and steelhead migrants trapped at seventeen rotary screen bypasses on eight streams. Spent adult steelhead are common on the Umatilla River because of complete diversion at the Echo Ditch. The 1959 total is the largest number of fish salvaged on record in the northeast region. The condition of spent steelhead recovered suggests main channel spawning either in the Umatilla River or in Meacham Creek. Although silver salmon migrants in the Wallowa River system have been incidental in screen bypass traps in past years, this species made up 51.5 per cent of the salmon observed at trap boxes in 1959. The downstream migration of chinook salmon fingerlings was similar to that of 1958.

### Non-screened diversion loss

Fish loss in the small ditches on the main Walla Walla River were again sampled in order to determine the need for screening. No salmonids were observed in ditches below spillways before May 5. Large numbers of small fry were present in all ditches by June 26. Table 95 shows results of fish loss investigations on main Walla Walla River diversions.

The presence of steelhead fry in upriver ditches prompted fyke netting at screen 7-100 of the Little Walla Walla River since fry and small fingerlings have never been observed in this bypass trap. One 1.5-inch steelhead was taken in a fyke net fishing one-eighth of the diversion. Improved screen efficiency is planned at this unit.

### Spawning ground survey

Table 96 presents silver salmon spawning ground counts made on the Wallowa River and tributaries in 1959. It appeared as though the silver salmon spawning was about completed when this survey was made. Observed fish were spent and six spent fish had been picked up at the Wallowa Hatchery water intake prior to the time these counts were made.

### Creel census

Table 97 shows creel census data on anadromous species from five northeast Oregon streams. Drift anglers on the Columbia River in December made excellent catches when water conditions were right.

Table 98 summarizes trout creel census of nineteen waters of northeast Oregon.

Table 93

A partial sampling of downstream migrants trapped  
at 28 rotary screen bypasses in Watersheds 7, 8, and 9 during 1959

Stream	Total traps	April	May	June	July	August	September	October	Total fish
Little Walla Walla River	1	88	219	27					334
Umatilla River	1	317	21,468	5,633					27,418
Catharine Creek	2	11	336	268	44	15	126		800
Indian Creek	1	35	35	7	199	57			333
Big Creek	1	37	85	342	110				574
Bear Creek	2		46	99	197	166	808		1,316
Lostine River	2	606	378	87	117	807	484		2,479
Wallowa River	3	1,094	1,872	298	118	41	16		3,439
Imnaha River	3			168	1,327	10,720	13,183		25,398
Freezeout Creek	2			3	534	610	176		1,323
Summit Creek	1				240	125	937		1,302
Big Sheep Creek	1				19	228	285		532
Eagle Creek	3		979	0	1	1,909	14,345	274	17,907
Pine Creek	2		263	29	51	45	158	12	558
East Pine Creek	1		24	0	56	69	906	89	1,144
Dry Creek	1		318	173	60	190	503		1,244
Clear Creek	1				10	46	58		114
Totals	28	2,188	26,023	7,134	3,482	15,028	31,985	375	86,215

/1 Screen pulled in June because of high water

Table 94

A tabulation of species observed at seventeen rotary fish screen bypass trap boxes on eight streams in 1959

Stream	Watershed	Total traps	Steelhead		Chinook salmon	Silver salmon	Observed migrants
			Adult	Immature			
Little Walla Walla River	7	1	12	322			334
Umatilla River	7	1	462	26,956			27,418
Catherine Creek	8	2		55	751		806
Bear Creek	8	2		1,225	91		1,316
Lostine River	8	2		551	1,819	109	2,479
Wallowa River	8	3		470	1,439	1,530	3,439
Imnaha River	8	3		214	25,184		25,398
Eagle Creek	9	3		7,426	10,481		17,907
Totals		17	474	37,219	39,765	1,639	79,097



Table 95

A summary of diversion fish loss investigation on the North Fork, South Fork, and main Walla Walla Rivers, 1959

Date	Ditch sampled	Method	Length of sample (feet)	Number	Species	Length (inches)
5/ 5/59	Freewater Ditch	Shocker	150	1	St	6.0
6/26/59	Freewater Ditch	Sight	200	4	St	1.5
				2	St	5.0
	Upper bridge, main Walla Walla River	Sight	300	55	St	1.0 to 1.5
	Lowest ditch, South Fork Walla Walla River	Shocker	200	16	St	1.2 to 2.2
	J. T. Norris ditch, North Fork Walla Walla River	Sight	400	7	St	1.5
	Uppermost ditch, North Fork Walla Walla River	Sight	600	24	St	1.0 to 1.5

Table 96

A summary of silver salmon spawning ground counts on the Wallowa River and tributaries, 1959

Stream	Miles checked	Date	Salmon observed	Redds observed
Wallowa River	7	10/10/59	18	70
Spring Creek	1	10/10/59	2	4
Lostine River	8	10/ 9/59	No fish or redds observed. River high and murky.	
Hurricane Creek	5	10/ 9/59	No fish or redds found.	

Table 99 shows 1959 creel census data for the Imnaha River. Table 100 presents species composition of estimated catch and estimated return of hatchery fish to the angler. A statistical creel check was designed for the Imnaha River in order to determine angling pressure, total catch, and return of hatchery fish. One marked rainbow seven inches in length was recorded. All others observed were in the eight to ten inch length group.

Stomach analyses of seventeen rainbow revealed that six contained fish. Eight out of nine Dolly Varden stomachs contained fish. Rainbow approximately  $12\frac{1}{2}$  inches in length were taking sculpins and rainbow fingerlings at about the same rate. Dolly Varden with an average length of  $14\frac{1}{2}$  inches had consumed only salmonid fingerlings.

Table 97

Creel census of anadromous species  
from five streams of northeast Oregon in 1959

Stream	Check period	Anglers interviewed	Hours angling	Catch		Fish per angler	Fish per hour	Hours per fish
				Steelhead	Salmon			
Catherine Creek	May 28 to June 6	36	121		8	0.2	0.07	15.1
Columbia River	September 1 to 24	195	964	75	6	0.4	0.08	11.9
Imnaha River	June 27 to July 22	80	304		29	0.4	0.09	10.5
	September 10 to 29	28	67	13		0.5	0.20	5.2
Snake River	December 1 to 8	187 <sup>1</sup> / <sub>1</sub>	1,264	173		0.9	0.14	7.3
Umatilla River	March 8 to April 21	55	143	2		0.04	0.01	71.5
<sup>1</sup> / <sub>1</sub> Completed anglers								



Table 98

A summary of trout creel census  
from nineteen waters in northeast Oregon, 1959

Water	Anglers	Hours angling	Fish caught	Fish per angler	Fish per hour	Hours per fish
Anthony Lake	18	64	90	5.0	1.3	0.7
Burnt River, Upper	22	53	72	3.3	1.4	0.7
Burnt River, South Fork	32	68	103	3.2	1.5	0.7
Burnt River, North Fork	23	80	67	2.9	0.8	1.2
Birch Creek	3	14	18	6.0	1.2	0.8
Birch Creek, West Fork	10	18	18	1.8	1.0	1.0
Birch Creek, East Fork	14	41	47	3.4	1.1	0.9
Catherine Creek	55	94	80	1.5	0.8	1.2
Catherine Creek, North Fork	3	6	8	2.7	1.3	0.8
Grande Ronde River	105	175	170	1.6	1.0	1.0
McKay Creek	153	467	339	2.2	0.7	1.4
Powder River	25	35	27	1.1	0.8	1.3
Rhea Creek	60	196	292	4.9	1.5	0.7
Umatilla River	94	258	116	1.2	0.4	2.2
Walla Walla River	30	69	75	2.5	1.1	0.9
Walla Walla River, North Fork	101	362	338	3.4	0.9	1.1
Walla Walla River, South Fork	158	357	438	2.8	1.2	0.8
Wenaha River	18	59	95 Rb 71 DV	9.2	2.8	0.3
Willow Creek	18	56	55	3.1	1.0	1.0

Table 99

A summary of trout angling effort and success  
on the Imnaha River, 1959

Completed anglers checked	Total hours	Marked fish	Wild fish	Total fish	Fish per angler	Hours per fish
675	2,231	989	1,150	2,139	3.16	1.04

Calculated total catch, Imnaha River, 1959

Estimated anglers = checked completed anglers x  $\frac{\text{weeks of census}}{\text{days per week checked}}$

Estimated anglers =  $675 \times \frac{7}{3} = 1,575$

Estimated catch = estimated anglers x observed fish per angler

Estimated catch =  $1,575 \times 3.16$

Estimated catch = 4,977



Table 100

A list of fish observed with estimated catch and percentage return of hatchery trout from the Imnaha River creel check, 1959

Observed fish	Number	Percentage of catch	Estimated total catch	Marked trout released
Wild rainbow	1,056	49.4	2,459	10,116
Marked rainbow	989	46.2	2,299	
Dolly Varden	73	3.4	169	
Whitefish	17	0.8	40	
Chinook jacks	4	0.2	10	
Totals	2,139	100.0	4,977	

Estimated total catch of marked rainbow

Completed anglers at 3.16 fish per angler = 2,299

Incomplete anglers at 2.4 fish per angler = 246

Total of 2,545

10,116 marked rainbow released; 2,545 caught = 25.2%

Fish habitat improvement

Chemical rehabilitation

Morgan Lake was treated with 5 per cent powdered rotenone to remove a stunted population of yellow perch. Soon after rotenone began to disperse a dissolved oxygen deficiency developed. Analysis on June 24 revealed dissolved oxygen levels of 4 parts per million in thirteen feet of water and 0.0 parts per million in nineteen to twenty-one feet of water. By early July satisfactory levels were found at all depths. Rainbow trout were released in Morgan Lake between July 8 and July 24, 1959.

The North Powder Pond was treated with fifty pounds of 5 per cent powdered rotenone on August 17. Rough fish entered this pond during flood periods of 1958 and 1959. In September 1,060 eight-inch rainbow were released. A low area in the vicinity of the pond was diked to prevent flooding.

Rehabilitation of McKay Creek and tributaries began on August 10. Two hundred gallons of liquid rotenone were used in the initial treatment to remove undesirable fish. An additional 380 gallons of rotenone were used in drip cans and for re-treatment of springs on the lower five miles of stream. Application of 75 gallons of toxaphene to McKay Reservoir was accomplished on October 1. The toxaphene was applied at the rate of 0.03 parts per million.

Fish in liveboxes located randomly in the impoundment indicated all fish were dead nine days after treatment. On November 9, rainbow trout were placed in liveboxes at 6, 13, and 36-foot levels. All trout were dead after 115 hours.

## Weed control

Application of Chem-Pels 2,4-D on August 13, 1958, had no adverse effect on weed growth in the North Powder Pond.

Sodium arsenite was applied to a private pond to learn if this chemical could be used on waters open to public angling. The chemical was introduced into the Leonard Pond, Union County, on September 25. Two-thirds of the area of this small pond were treated at a concentration of 6 parts per million. One week after treatment the upper water of the entire pond was free of weeds. No fish loss has been observed.

## Impoundment program

Table 101 is a list of the most favorable impoundment sites for resident fish production now known.

A survey in the Pine District of the Wallowa-Whitman Forest revealed three excellent sites.

Inspection in the Anthony Lake area revealed two impoundment sites. The Mud Lake site, a marsh, could be made into a 20-acre lake with a dam 20 feet in elevation and 200 feet in length. Hoffer Lakes could also be impounded to provide good trout water. The reservoir sites in both of these forest districts are at high elevations. Because fish production can be expected to be only fair at these sites it would seem wise to develop low elevation impoundments first.



Table 101  
Reservoir sites  
for resident fish, Northeast Oregon

Priority	Watershed	Location	Tributary of	Elevation	Height of dam in feet	Surface acres (approximate)
1	6	Canyon Creek Meadows	John Day River	4,700	40	20
2	9	Balm Creek	Powder River	4,000	<u>1</u>	
3	9	West Eagle Meadows	Eagle Creek	5,000	<u>2</u>	
4	6	Howard Meadows	North Fork John Day River	3,650	25	15
5	7	Dry Swale Creek	North Fork John Day River	4,000	40	41
6	7	Target Meadows	Walla Walla River	4,500	20	20
7	8	Little Morgan Lake	Grande Ronde River	3,500	20	20

1 Increase in elevation to develop minimum pool at Balm Creek Reservoir

2 Guaranteed minimum pool if developed for irrigation

## SOUTHEAST OREGON

Lawrence Bisbee

### Creel census

Creel census information for the Southeast Region indicated that anglers enjoyed excellent success on most waters. An average of 4.96 fish per angler at a rate of 1.12 fish per hour was attained.

Census information for all waters checked during this period is given in Table 102.

Good angling on many of the smaller streams in southeastern Oregon covered a much shorter period than usual due to an abnormally dry spring and summer. The bulk of the fishing pressure was absorbed by the reservoirs and lakes in the region.

Fish Lake continued to provide excellent returns throughout the season. The majority of the fish taken were rainbow as is shown in Table 103.

Beulah, Chickahominy and Warm Springs Reservoirs were open to year-around trout angling, were fished consistently, and provided good returns to anglers from all parts of the state of Oregon and southwestern Idaho.

Beulah Reservoir received moderately heavy fishing pressure all year long. An estimated 25 per cent of the anglers checked were from Idaho. The majority of the trout taken ranged from ten to fourteen inches in length. During the latter part of the summer, the bag limit on Beulah Reservoir was increased from 10 to 30 fish per day with 60 in possession because of the probability of the reservoir's going dry by mid-September. However, the fish population in the reservoir was spared when abundant early fall rains arrived, reducing the heavy demand for irrigation water. The bag limit was reduced to 10 fish a day on October 26 when it was certain the reservoir would not be drained. Census information concerning Beulah Reservoir is given in Table 104.

Chickahominy Reservoir provided good early and late season angling. Angler success dropped considerably during the hottest period of the summer. Some trout were lost at certain periods due to an oxygen deficiency. The majority of the trout taken at Chickahominy Reservoir ranged from 14 to 18 inches in length.

Angling at Warm Springs Reservoir was good throughout the summer. The majority of the fish taken were bullhead catfish and largemouth bass. Trout were taken early in the season and some channel catfish were caught.

The good angling success in the reservoirs opened to year-around angling had a very distinct effect upon fishing pressure on many streams, particularly in Harney County. During the opening weeks of the trout season, anglers were noticeably scarce on the streams as compared to past seasons.

Table 102

Summary, creel census data, Southeast Region  
November 15, 1958 - November 15, 1959

Water	Water-shed	Species	Size groups										Total fish	Total anglers	Total hours	Fish per angler	Fish per hour	Hours per fish
			6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20								
Altnow Pond	10	Rb	5	31	38	11	1					1	495	61	138	8.11	3.58	0.2
		LB																
		EG	395	13														
Ana Reservoir	13	Rb	8	27		8	12	1					70	77	282	0.90	0.24	4.0
Ana River	13	Rb	21	117	11	6	11	1					167	51	136	3.27	1.22	0.8
Auger Creek	13	EB		10	1	1							12	5	20	2.40	0.60	1.6
Bear Creek	12	Rb	23	2									25	6	10	4.16	2.50	0.4
Bear Creek	13	Rb	5	2	1								8	2	5	4.00	1.60	0.6
Bendire Creek	10	Rb	9	33	5		6						53	9	41	5.88	1.29	0.7
Beulah Reservoir	10	Rb	300	777	770	448	93	9	5				2,404	669	2,912	3.59	0.82	1.2
		DV				2												
Big Creek	10	Rb	11	10									21	4	20	5.25	1.05	0.9
Blitzen River	12	Rb	75	57	19	19	9	10	3	1			194	63	392	3.07	0.49	2.0
		WF																
Blue Creek	13	Rb	2	3									5	1	2	5.00	2.50	0.4
Blue Lake	13	Rb	157	458	320	67	5						1,007	182	896	5.53	1.12	0.8
Bridge Creek	12	Rb	50	42	6	10			1	9			120	30	136	4.00	0.88	1.1
Burns Gravel Pond	12	LB	1	13									11	2	4	7.00	3.50	0.2
Camas Creek	13	Rb	229	108	13	4	1						355	57	150	6.23	2.36	0.4
Camp Creek	12	Rb	22	13	8	1							44	13	37	3.38	1.18	0.8
Camp Creek	13	Rb	9										9	2	3	4.50	3.00	0.3
Campbell Lake	13	Rb	90	207	114	21	1	2					432	80	322	5.40	1.34	0.7
Chevaucan River	13	Rb	72	114	24	3							239	38	114	6.29	2.09	0.4
		B	11	10	1	1												
Chickahominy Reservoir	12	Rb	8	67	54	122	505	176					932	344	1,668	2.71	0.55	1.7
Calamity Creek	10	Rb	11	1									12	4	3	3.00	4.00	0.2
Coffee Pot Creek	13	Rb	10	3	4								17	2	16	8.50	1.06	0.8
Cottonwood Creek	10	Rb	15	20	4				1				40	4	32	10.00	1.25	0.8
Crump Lake	13	B	6	11	4	2							19	3	6	6.33	3.16	0.3
Dairy Creek	13	Rb	212	83	18	1							331	56	282	5.92	1.17	0.8
		EB	5	9	3													
Deadhorse Lake	13	Rb	58	250	144	21							547	125	517	4.37	1.05	0.9
		EB	7	30	27	7	3											
Deep Creek	13	Rb	83	82	34	22	4	1					226	39	113	5.78	2.00	0.5
Delintment Lake	12	Rb	16	19	3	4	17	13	4				76	87	245	0.87	0.31	3.2
Dog Lake	13	--											0	6	8	0.00	0.00	0.0
Drakes Creek	13	Rb	8	9	1	1							19	4	7	4.75	2.71	0.3
Drews Reservoir	13	Rb	2	5	4	1	5	6	1	3			35	112	351	0.24	0.09	10.0
		B	1	4														
		P	2	1														
Drews Creek, Lower	13	Rb	4										4	3	3	1.33	1.33	0.7
Elder Creek	13	Rb	4	3									7	2	10	3.50	0.70	1.4
Emigrant Creek	12	Rb	57	44	9	5							115	41	73	2.80	1.57	0.6
Fish Lake	12	Rb	1,241	2,763	592	99							4,767	549	2,763	8.68	1.72	0.5
		EB		10	41	19	2											
Hart Lake	13	B	3	20	47	48	7						125	14	57	8.92	2.20	0.4
High Lake	10	EB	272										272	38	228	7.15	1.19	0.8
Honey Creek	13	Rb	76	110	21	4	1						212	25	82	8.48	2.58	0.3
Krumbo Reservoir	12	Rb	1	91	652	96	2						842	194	654	4.34	1.28	0.7

Table 102(continued)

Water-shed	Species	Size groups										Total fish	Total anglers	Total hours	Fish per angler	Fish per hour	Hours per fish
		6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20								
Little Malheur	Rb	194	53	5								252	35	126	7.20	2.00	0.5
Lost Creek	Rb	15	50									65	3	8	21.66	8.12	0.1
Malheur River, Middle Fork	Rb	68	91	48	22	7	4					240	44	135	5.45	1.77	0.5
Malheur River, North Fork	Rb	79	153	35	20							287	77	357	3.72	0.80	1.2
Malheur Reservoir	Rb	8	38	165	980	808	184	45				2,228	1,141	6,995	1.95	0.31	3.0
Mann Lake	Ct		6			15	145	31				197	51	320	3.86	0.61	1.6
McDowell Creek	Rb	10										10	1	2	10.00	5.00	0.2
Moon Reservoir	--											0	3	3	0.00	0.00	0.0
Mud Creek	Rb	40	28	2								95	17	38	5.58	2.50	0.3
	EB		25														
Myrtle Creek	Rb	21	2									23	7	30	3.28	0.76	1.3
Owyhee Reservoir	C	13	3,647	2,142	58							6,533	1442	2,317	14.78	2.82	0.3
	LB		15	182	256	144	54	20									
	P	1		1													
Owyhee River	Rb											0	5	5	0.00	0.00	0.0
Rock Creek	Rb	16		4								20	2	2	10.00	10.00	0.1
Rock Creek Reservoir	LB			145								145	3	18	48.33	8.05	0.1
Porcupine Creek	EB	5	7									12	2	4	6.00	3.00	0.3
Sawmill Creek	Rb	6	12	4								22	5	16	4.40	1.37	0.7
Sawtooth Creek	Rb	80	7									87	15	67	5.80	1.30	0.7
Sid's Reservoir	Rb		2	18	9	16	4					49	25	117	1.96	0.41	2.3
Silver Creek	Rb	30	47	5	1							83	20	43	4.15	1.93	0.5
Silver Creek	Rb	6	6	4	1							20	7	23	2.85	0.86	1.1
	Ct	1	1	1													
Silvies River	Rb	30	1			1						33	27	48	1.22	0.68	1.4
	P	2															
Slide Lake	Rb	1	1		1							3	2	2	1.50	1.50	0.6
Snake River	CC			1	6	6		4	1			18	13	50	1.38	0.36	2.7
Thomas Creek	Rb	15	5	1	1	3		2				27	6	11	4.50	2.45	0.4
Thompson Reservoir	Rb		1									20	32	139	0.62	0.44	6.9
	Ct			4	3		1	4	2								
Three Mile Creek	Rb	3	10									13	3	3	4.33	4.33	0.2
Trout Creek	Rb	108	91	60	2		1					306	29	93	10.55	3.28	0.3
	Ct	22	22														
Twenty Mile Creek	Rb	25	36	25	18							86	12	34	7.16	2.60	0.3
Warm Springs Reservoir	Rb			3	40							275	55	225	5.00	1.22	0.8
	LB	1	27	61	19	4											
	CC			1													
	B	10	37	42	19												
Willow Creek	Rb	42	125	19	6	6	2					200	42	224	4.76	0.89	1.1
Willow Creek	Ct	59	25	14		1						99	11	66	9.00	1.50	0.6
Willow Creek, South Fork	Rb																
Totals		4,648	10,374	5,990	2,498	1,709	629	122	22			25,992	5,237	24,364	4.96	1.06	0.9

Table 103

Summary of creel census data by periods for Fish Lake /1  
April 25 to October 31, 1959

Period	Size groups							Total fish	Total anglers	Total angler days	Total hours	Fish per angler	Fish per angler per day	Hours per fish
	6-8	8-10	10-12	12-14	14-16	16-18	18-20							
April 16-30			23	6	1			30	3	6	12	10.00	5.00	2.50
May 1-15		29	7	1				37	4	4	5	9.25	9.25	7.40
May 16-30														
June 1-15	2	6	11		1			20	2	2	14	10.00	10.00	1.42
June 16-30	3	4	42	42				91	36	36	148	2.52	2.52	0.61
July 1-15	423	811	184	37				1,455	161	218	911	9.03	6.67	1.59
July 16-31	347	719	133	6				1,205	123	189	505	9.79	6.37	2.38
August 1-15	252	548	69	7				876	93	146	479	9.41	6.00	1.82
August 16-31	180	414	108	7				709	74	116	473	9.58	6.11	1.49
September 1-15	26	212	33	10				281	36	46	156	7.81	6.11	1.80
September 16-30	8	9	8					25	7	7	24	3.57	3.57	1.04
October 1-15		21	4	1				26	8	8	34	3.25	3.25	0.76
October 16-30			11	1				12	2	2	2	6.00	6.00	0.2
Totals for 1959	1,241	2,773	633	118	2			4,767	549	780	2,763	8.68	6.11	1.72
Totals for 1958	285	2,006	939	86	2	1		3,319	501	567	2,972	6.62	5.85	1.12
Totals for 1957	2,100	1,691	1,206	384	40	18	7	5,446	835		4,007	6.52		1.35
Totals for 1956	716	2,342	5,601	454	28	1		9,142	1,517	2,361	10,836	6.02	3.87	0.84
Totals for 1955	358	2,920	4,184	408	26	3		7,899	1,246	1,961	7,917	6.33	4.02	1.00

/1 Rainbow-eastern brook combined

Table 104

Summary of creel census data by periods for Beulah Reservoir  
January 16 - October 31, 1959

Period	Species	Size groups										Total fish	Total anglers	Total hours	Fish per angler	Fish per hour	Hours per fish
		6-8	8-10	10-12	12-14	14-16	16-18	18-20									
January 16-31	Rb	33	2			1					36	16	117	2.25	0.31	3.2	
February 1-15	Rb		20	1	1						22	4	12	5.50	1.83	0.5	
February 16-28	Rb	18	36	13	72	17	2				159	76	313	2.09	0.51	1.9	
	DV				1												
March 1-15	Rb	5	96	20	44	10		1			176	71	309	2.47	0.56	1.8	
March 16-31	Rb	42	24	20	20	4					110	27	81	4.07	1.35	0.7	
April 1-15	Rb	131	127	100	44	23	2	4			431	90	315	4.78	1.36	0.7	
April 16-30	Rb	12	174	32	45						264	103	437	2.56	0.60	1.6	
	DV				1												
May 1-15																	
May 16-31	Rb	20	45	60	19	19					163	42	155	3.88	1.05	0.9	
June 1-15	Rb	3	118	162	61	2					346	60	304	5.76	1.13	0.8	
June 16-30	Rb		56	89	9						154	39	171	3.94	0.90	1.1	
July 1-15	Rb	29	47	91	52	10	5				234	61	298	3.83	0.78	1.2	
July 16-31																	
August 1-15	Rb			19	14						33	10	72	3.30	0.45	2.1	
August 15-31	Rb	1	7	33	42	4					87	15	102	5.80	0.85	1.1	
September 1-15	Rb	6	25	130	23	3					187	55	226	3.40	0.82	1.2	
Totals	Rb	300	777	770	446	93	9	5			2,402	669	2,912	3.59	0.82	1.2	
	DV				2												



Krumbo Reservoir which opened to angling for the first time on July 1 yielded excellent returns. Trout were averaging approximately 13 inches by the close of the season on September 30. The opening of this reservoir to angling appeared to have little effect upon the fishing pressure at Fish Lake.

Malheur Reservoir continued to be a favorite fishing area for many anglers. Success during the early part of the season was only fair but improved greatly during the latter part of the summer. On opening weekend, it was estimated that 2,200 anglers visited Malheur Reservoir and harvested 5,000 trout. An estimated 25 per cent of the anglers were Idaho residents.

The Owyhee Reservoir continued to yield the highest returns as anglers averaged 14.78 fish during the year. The catch was composed of 89.7 per cent black crappie, 10.2 per cent largemouth bass, and 0.03 per cent yellow perch.

A check on the type of angling licenses used at the Owyhee during 1959 indicated a continued majority of Idaho anglers using the daily angler license. Of the anglers checked, approximately 65 per cent are nonresident and 35 per cent resident anglers. Information concerning the number and types of licenses used on the Owyhee Reservoir in 1959 is given in Table 105.

#### Liberations

In conjunction with liberations made in the Southeast Region, a series of livebox checks was made on three loads of trout hauled by the newly designed refrigerated tank units. The purpose was to determine the maximum load which could be hauled with the least mortality. It was found that the total poundage of legal size trout being hauled could be greatly increased by use of the refrigerator unit attached to the aeration system of the tanks. Only a slight loss of fish occurred in the loads checked. Information concerning the individual hauls is given in Table 106.

#### Habitat improvement

##### Antelope Reservoir

Antelope Reservoir was chemically treated on November 21, 1958, to eliminate a large population of coarse and fine-scaled suckers, squawfish, yellow perch, and shiners. No work was done on the tributary streams since it is impossible to eliminate trash fish in them.

##### Ana Reservoir

Periodic spot poisoning of the shoreline was done to control roach fry and fingerling. Thousands of small roach were eliminated in this manner.

##### Lofton Reservoir

A cooperative agreement for the improvement of Lofton Reservoir is being drawn up among the U. S. Forest Service, the Oregon State Game Commission, and a Klamath County rancher. Under the agreement, the reservoir surface area will be increased from 33 acres to 48 acres and the depth increased to 19 feet.

Table 105

Angling license survey, Owyhee Reservoir  
1959

Month	Type of license used				Seasonal angler's license (\$10.00)	
	Daily angler's license (\$1.00)		Special 7-day vacation angler's license (\$5.00)		Resident	Non-resident
	Resident	Non-resident	Non-resident	Non-resident		
March	8	5	0	0	6	9
April	13	41	0	0	10	36
May	3	31	0	0	15	6
June	2	11			13	8
July	-	-	-	-	-	-
August	0	4	0	0	15	5
Total	26	92	0	0	59	64
Percentage of resident and non-resident	10.8	38.2	0	0	24.5	26.5
Percentage of license types used	48.9		0	0	51.1	

Table 106

Results of livebox tests for delayed mortality on hauls  
by a new 1,000-gallon tanker equipped with a refrigerator unit

	Split load to Big, Bosenberg and Lake Creeks		Split load to Silver and Emigrant Creeks		Fish Lake
	May 3, 1959		May 6, 1959		
Date of haul	Rainbow		Rainbow		July 1, 1959
Species hauled	5,500		5,410		Rainbow
Total number loaded	8 inches		8 inches		6,497
Average length of fish	5.1		4.5		8 inches
Number per pound	1,087		1,200		4.9
Total pounds loaded	9½		7		1,326
Maximum hours hauled	357 miles		380 miles		8
Approximate distance hauled	Hagerman, Idaho		Wizard Falls, Oregon		257 miles
Hatchery	48		52		Wizard Falls, Oregon
Number fish held in livebox	6		6½		58
Number days held	3		0		7
Mortality	Cool and stormy		Cool - rainy		3
Weather conditions	59°		50°		Hot and clear
Hatchery temperatures	400 pounds		None		50°
Ice used	49° to 44°		49° to 46°		300 pounds
Truck temperatures during haul	Big Creek - 40°		Silver Creek - 47°		50° to 43° to 48°
Temperatures at release point	Bosenberg Creek - 47°		Emigrant Creek - 49°		Fish Lake - 62°
Remarks	Lake Creek - 49°		Same		Same
	All trout released from livebox				
	appeared very normal and in good				
	condition.				

The Game Commission will retain 300 acre feet of dead storage water with a maximum depth of 12 feet for fish life. The rancher will have 250 acre feet of water for irrigation purposes.

### Thompson Valley Reservoir

Chemical treatment of Thompson Reservoir to eliminate a tremendous population of roach commenced on September 15, 1959. The volume and area of the reservoir were computed to be 7,294.5 acre feet and 1,518.1 surface acres. Chemical data obtained from water samples is given in Table 107.

Table 107

Chemical analysis of water samples from Thompson Reservoir  
August 20, 1959

Depth	Temperature	pH	T.D.S. Mg/liter	Alkalinity - Mg/liter	
				CaCo <sub>3</sub>	H Co <sub>3</sub>
Surface	71°	7.8	441	37.3	45.5
11½ feet	67°	7.75	585	33.7	41.1
Bottom - 23 feet	66°	7.1	584	34.7	42.3

Toxaphene was used in the reservoir at the rate of 1:25,000,000. The toxicity was increased to 1:20,000,000 a month later when areas containing seemingly unaffected roach were located. Some difficulty was experienced in completely treating the vast shallow areas and as a result three main shallow areas were sprayed by plane on October 16.

Gill nets were set in Thompson Reservoir on November 12, 1959, to check for a complete kill of trash fish. No fish were taken.

Prior to the treatment of Thompson Reservoir, all tributary streams were treated with liquid rotenone.

In conjunction with the Thompson Reservoir treatment the Silver Creek Diversion impoundment located nine miles below the reservoir and the main stem of Silver Creek lying between the two reservoirs were also treated. Three drip stations were set up on Silver Creek while the entire length of stream was covered by crews to treat any isolated pockets. Few large trout were seen in the nine miles of stream, but dace were abundant. Roach were abundant only in the beaver ponds found on the stream. Large numbers of stonefly larvae were killed by the rotenone throughout the entire length of stream.

### Delintment Lake

A weed removal program was carried out at Delintment Lake in October, 1959, by Forest Service and Game Commission personnel. A similar project in the fall of 1958 removed tons of aquatic vegetation from the lake. The removal of the vegetation combined with a mild winter apparently prevented the usual total winterkill of trout. In 1958 there was an estimated 95 per cent survival of trout.

### Chickahominy Reservoir

An abundant roach, shiner, and fine-scaled sucker population was destroyed in Chickahominy Reservoir on November 10, 1959, with powdered rotenone. The roach, shiners, and suckers were introduced by individuals intent upon salvaging and transplanting trout fingerling without a permit. Several hundred large trout were also destroyed at the time the reservoir was treated.

### Public fishing lake projects

A series of impoundment sites have been located throughout the region which may be developed for public fishing lakes.

#### Roaring Springs site

This site is located in Lake County and would form an impoundment of 100 surface acres with a volume of 800-1,000 acre feet. It would require a dam estimated to be 225 to 230 feet long and 15 to 20 feet high. The source of water would be a large spring flowing approximately 4.6 c.f.s. The site is located on private lands.

#### Calamity Creek site

This site is located in Harney County on Malheur National Forest lands. A dam estimated to be 250 feet long and 30-35 feet high would form an impoundment between 50-60 acres with a volume of 385 acre feet and an average depth of 7-10 feet. Minimum flow for the creek was 31.6 gallons per minute. The site is accessible by good Forest Service and County roads.

#### Cottonwood Meadows site

This impoundment site is located in Lake County on U. S. Forest Service property. A dam estimated to be 200 feet long and 10 feet high would form an impoundment of 25 surface acres with a volume of 125 acre feet and an average depth of 4 to 5 feet. Access would be over Forest Service roads. Sufficient water would be supplied by springs and surface runoff.

#### Pine Creek site

This site is located in Harney County on U. S. Forest Service and Edward Hines Lumber Company lands. A dam estimated to be 350 to 370 feet long and 30 to 35 feet high would form an impoundment of 50 to 75 acres with a volume of 650 acre feet and an average depth of 10 feet. The estimated minimum flow of the creek is 22.5 gallons per minute. The site is accessible by Forest Service roads.

### Growth rate studies

In 1958, Friday Reservoir was stocked with equal numbers of rainbow and two strains of cutthroat trout fingerling to determine which species would best be suited for alkaline waters such as are found in Warner Valley. All trout were stocked as near the same size as possible.

After a period of  $11\frac{1}{2}$  months, the reservoir was sampled by gill nets. It was found that the rainbow and Summit Lake cutthroat trout had made approximately the same rate of growth while the Heenan Lake cutthroat made slightly slower growth. In general appearance, both strains of cutthroat were thin and in poor condition while the rainbow were heavy bodied and in good condition. The average weight of the rainbows was approximately double that of the cutthroat.

Information concerning fingerling growth in Southeast Oregon reservoirs is given in Table 108.

#### Wildhorse Lake

Heenan Lake cutthroat fingerling were stocked in Wildhorse Lake which lies at an elevation of approximately 8,000 feet. After a period of 12 months the trout had made a good increase in length and weight. The fish were thick bodied and in good condition.

Further information is included in Table 109.

#### Malheur Reservoir

Rainbow fingerling growth rates in Malheur Reservoir have been excellent. Rainbow stocked at 2.75 inches in length July, 1959, began entering the creels in late September. In a fish population sample made on October 27, fish had an average fork length of 8.11 inches. Further information on stocking and growth rates is given in Table 109.

#### Warm Springs Reservoir

Information concerning channel catfish stocked in Warm Springs Reservoir in 1956 and 1957 indicated that their growth rate has been quite slow. Channel catfish planted in 1956 were about 12.5 inches in length while those planted in 1957 were approximately 6.7 inches in length by mid-July 1959. On October 20, 1959, trap nets, gill nets, and set lines were used to obtain channel catfish for transplanting to Devils Lake. Fish originating from the 1956 plant were approximately 17 inches fork length while fish from the 1957 plant were about 10 inches fork length. Further information is given in Table 109.

#### Owyhee Reservoir

Age and growth studies for largemouth bass and black crappie have been conducted on the Owyhee Reservoir by scale sampling. The results are given in Table 110.

#### Fish population studies

Population studies were undertaken in a number of reservoirs and lakes in order to determine the rate of growth of various species of trout and at the same time check upon the influx and abundance of trash fish. Results of population studies in the Southeast Region are given in Table 111.

Roach have made a substantial increase in Ana Reservoir in spite of spot poisoning operations along the shoreline.

Table 108

Growth data of fry and fingerling trout stocked in  
reservoirs, Southeast Region, 1959

Water	Priddy Reservoir	Priddy Reservoir	Priddy Reservoir	Wildhorse Lake
Species stocked	Rainbow	Heenan Lake cutthroat	Summit Lake cutthroat <sup>/1</sup>	Heenan Lake cutthroat
Date stocked	8-25-58	8-25-58	8-25-58	8-20-58
Number stocked	5,005	5,066	5,000	1,500
Size stocked	3"	2-1/4"	2-1/4"	2"
Number per pound	55	298	200	272.2
Date sampled	8-10-59	8-10-59	8-10-59	9-3-59
Method	Gill net	Gill net	Gill net	Gill net
Growth period	11 1/2 months	11 1/2 months	11 1/2 months	12 1/2 months
Number of fish in sample	86 (83.5%)	5 (4.9%)	12 (11.6%)	50
Maximal length (fork)	10"	7-3/8"	7-1/2"	9-1/2"
Minimal length (fork)	6"	6"	6"	6-1/4"
Average length (fork)	8.43"	7.07"	7.55"	7.06"
Maximal weight (oz.)	6-1/2	2-1/2	2-1/2	5-3/4
Minimal weight (oz.)	1-1/2	1-1/4	1-1/4	1-3/4
Average weight (oz.)	3.4	1.90	1.65	3.44
Growth increase	5.43"	4.82"	5.40"	5.06"
Growth rate per month	0.472"	0.419"	0.469"	0.405"

<sup>/1</sup> Marked ad. clipped

Table 109

Growth data of fry and fingerling trout stocked in  
reservoirs, Southeast Region, 1959

Water	Malheur Reservoir	Warm Springs Reservoir	Warm Springs Reservoir
Species stocked	Rainbow	Channel catfish	Channel catfish
Date stocked	July 15, 1959	October 11, 1956	October 5, 1957
Number stocked	35,002	10,946	30,000
Size stocked	2.75"	2.50"	2.50"
Number per pound	86	90	90
Date sampled	October 27, 1959	July 15, 1959	July 15, 1959
Method	Gill net	Gill net	Gill net
Growth period	3.5 months	33 months	21 months
Number of fish in sample	75 / 1	8	51
Maximal length (fork)	9.75"	14.3"	8.5"
Minimal length (fork)	5.25"	11.9"	5.0"
Average length (fork)	8.11"	12.5"	6.7"
Maximal weight (ounces)	7.25	18.0	5.3
Minimal weight (ounces)	2.25	11.0	0.75
Average weight (ounces)	4.61	13.4	2.3
Growth increase	3.79"	10.0"	4.2"
Growth rate per month	1.08"	0.3"	0.2"

/1 Six trout fin clipped. 250 additional trout of same size and age group taken.



Table 110

Age and length determinations from scale samples for largemouth bass and black crappie  
in the Owyhee Reservoir, 1947 - 1958

Year	Completed annuli (fork length averages)						
	I	II	III	IV	V	VI	VII
	<u>Black crappie</u>						
1947	2.2"(7)	6.3"(1)	8.8"(1)				
1953	2.1"(20)	5.1"(18)	7.3"(17)	9.0"(17)	10.3"(12)	12"(3)	
1956	2.2"(5)	4.5"(5)	6.9"(5)	8.6"(4)	11.0"(2)		
1957	2.5"(74)	4.9"(51)	6.2"(40)	7.5"(19)			
1958	2.2"(89)	5.3"(70)	7.4"(42)	9.2"(19)	10.1"(5)	11.3"(2)	
1959	Not completed						
	<u>Largemouth black bass</u>						
1953	3.1"(16)	8.3"(13)	11.9"(9)	12.0"(5)			
1956	3.1"(5)	7.4"(5)	11.3"(5)	15.3"(4)	17.2"(3)		
1957	5.0"(12)	10.4"(8)	13.1"(8)	14.2"(6)	15.4"(2)		
1958	4.6"(75)	9.3"(58)	12.5"(25)	14.4"(21)	15.4"(10)	15.8"(3)	16.7"(3)
1959	Not completed						

Table 111

Fish population studies for some important waters of Southeastern Oregon  
November 15, 1958 to November 15, 1959

Water	Species	Number in sample	Percentage of total	Length in inches (total length)																	Number nets set
				4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 and over	
Ana Reservoir	Rb	23	15.3	1								1	10	4	3	2	2			7	
	Ro	128	84.7	34	27	38	23	5	1	3	9	13	5							2	
	Rb	30	65.3		2	2															
	FSu	4	8.6																		
Antelope Reservoir	CSu	7	15.3				1														
	Sq	5	10.8		1																
	Rb	33	17.5					2	2	6	12	10		1						4	
	Wf	32	17.0					12	15	2	1	2									
Benlah Reservoir	RS	2	1.1																		
	CSu	69	36.7																		
	FSu	44	23.4																		
	CLm	3	1.6																		
Chickahominy Reservoir	Sq	5	2.7																		
	Rb	35	24.5																		
	Ro	107	74.8																		
	FSu	1	0.7																		
Crump Lake	B	50	86.2																		
	Ro	8	13.8																		
	Rb	49	100																		
	P	986	76.2																		
Delintment Lake	Ro	298	23.0																		
	C	3	0.2																		
	Su	1	0.1																		
	Rb	4	0.3																		
Goose Lake	PK	2	0.2																		
	Rb	1	4.3																		
	FSu	1	4.3																		
	Ro	21	91.4																		
Hart Lake	BrB	41	87.2																		
	Ro	5	10.6																		
	FSu	1	2.2																		
	Rb	378	98.2																		
Malheur Reservoir	FSu	5	1.3																		
	C	2	0.5																		
	Sq	13	100																		
	Cp	26	41.9																		
Mann Lake (Summit Lake cutthroat)	FSu	13	20.9																		
	CLm	6	9.7																		
	BrB	2	3.3																		
	P	4	6.5																		
Mann Lake (Summit Lake cutthroat)	C	9	14.5																		
	CSu	1	1.6																		
	Rb	90	84.1																		
	Br	12	11.2																		
Friday Reservoir (Summit Lake cutthroat)	Br	5	4.7																		
	Br	12	11.2																		
	Br	12	11.2																		
	Br	5	4.7																		

Table 111(continued)

Water	Species	Number in sample	Percentage of total	Length in inches (total length)																	Number 20 and over		Number nets set
				4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Sid's Reservoir Silver Creek Diversion (Summit Lake cutthroat)	Rb	10	100			1	1	4	3	2		2	2	4			1				2		
	Rb	10	4.6					1													3		
	Ro	208	94.9	102	83	22	1	1															
Thompson Reservoir (Summit Lake cutthroat)	Rb	3	0.3												1						7		
	Ro	1,195	1.0	668	147	288	90	2	1	2	4	2					1	1	1				
	Rb	27	98.7			1	3	1	1														
Warm Springs Reservoir	P	6	1.9			2	3														7		
	CC	140	43.6		2	12	20	13	3	1					1								
	CSu	74	23.1					4	7	9	10	13	8	10	10	1	2						
	FSu	46	14.3			14	14	3	7	4	3	1											
	Sq	17	5.3			1	2	2			6	4	2										
	Clm	6	1.9		4				2														
	LB	5	1.5						1	1	3												
Wildhorse Lake (Heenan Lake cutthroat)		50	100	3	17	21	9																

/1 Only 128 weighed and measured. Remainder ranged from 7 to 10 inches.

/2 81 channel catfish marked and released. No measurements or weights taken.



Small numbers of rough fish have returned to Antelope Reservoir by way of the diversion canal from Jordan Creek.

Population trends in Dog Lake indicate that perch and roach populations have increased materially. A comparison of population trends in Dog Lake in 1952 and 1959 is given in Table 112.

Table 112

A comparison of species taken in gill nets from  
Dog Lake in 1952 and 1959

Species	1952 (9 net sets)		1959 (7 net sets)	
	Number	Percentage of total	Number	Percentage of total
Perch	103	44.8	986	76.2
Roach	74	32.2	298	23.0
Crappie	6	2.6	3	0.2
Bluegill	6	2.6	<u>1</u>	-
Bullheads	32	13.9	<u>1</u>	-
Suckers	3	1.3	1	0.1
Rainbow	<u>1</u>	-	4	0.3
Pumpkinseed	6	2.6	2	0.2
Largemouth bass	<u>1</u>	-	<u>1</u>	-

1 None taken in nets but known to be present

Information concerning the maturity and sex ratio of perch taken from Dog Lake is given in Table 113. Approximately 99 per cent of all the perch taken were mature and about to spawn. Male perch appeared to be maturing at a smaller size than females.

Table 113

A distribution of perch from Dog Lake by sex and size groups  
April 3, 1959

Sex	5	6	7	8	9	10	11	12	Totals
Male	139	352	55	2		1			549
Female	13	217	156	42	5	2	1	1	437

Population studies in Hart and Crump Lakes failed to produce any indications of survival of the Heenan Lake cutthroat fry which have been stocked in Hart Lake during the past three years. Results of the experiments made in nearby Friday Reservoir indicate that the Summit Lake or Heenan Lake cutthroat may not be desirable species to stock in this lake.

Gill net sets made in Malheur Reservoir indicate the presence of a large rainbow population. They also revealed that black crappie have been introduced into the reservoir by anglers and that rough fish have again made their appearance. Only fine-scaled suckers have been taken.

The possibility of a lamprey population existing in Warm Springs Reservoir was discovered for the first time when trout taken in gill nets in October had lamprey scars. Other species taken in the nets were not affected and no lamprey were seen or collected.

Average lengths and weights of female fish at various stages of maturity were determined. This information is included in Table 114.

The composition and length frequency of game fish in Southeast Oregon waters is given in Table 115.

#### Silver Creek study

A stream habitat improvement study has been initiated by the Snow Mountain district of the Ochoco National Forest to determine what measures can be taken to rehabilitate streams where excessive grazing has destroyed stream side cover and caused erosion of the stream banks. A section of Silver Creek 300 feet wide and 1,000 feet long was fenced to prevent cattle grazing by the Forest Service in the habitat improvement study.

Existing fish populations were checked with an electric shocker. The entire stream section produced only nine small trout and numerous trash fish including shiners, dace, sculpins and fine-scaled suckers.

Temperature recording stations were established above and below the plot to determine what effect the return of stream bank cover would have on stream temperatures.

The estimated flow was recorded below the plot at periodic intervals. Stream temperatures in the vicinity of the study plot are given in Table 116.

For comparison, a section of Allison Creek, a tributary of Silver Creek, which has excellent stream bank vegetation and cover was surveyed. This section of stream shows little evidence of over-grazing or destruction of the stream banks by livestock.

Water temperatures were taken above and below this stream section and are listed in Table 117.

Fish populations were difficult to check, but a substantially larger number of trout was seen in Allison Creek where cover was good. The number of trout observed in a 125-foot section of the creek each time temperatures were recorded is given in Table 117. Trash fish were also present.

Bottom samples were taken to determine the volume and the kind of aquatic organisms in both areas. Silver Creek supported a low volume of trout food while Allison Creek had a much larger volume of food available and a greater number and variety of organisms present.

Table 114

Average lengths and weights of female fish  
at various stages of maturity, Southeast Region,  
November 16, 1958 to November 15, 1959

Water	Species	Immature			Maturing			Mature		
		Number	Fork length, inches	Weight in ounces	Number	Fork length, inches	Weight in ounces	Number	Fork length, inches	Weight in ounces
Altnow Pond	BG				2	8.9	6.1	8	6.5	5.1
	LB				1	14.2	21.0	1	14.0	24.0
Ana Reservoir	Rb	7	13.2	17.1						
Antelope Reservoir	Rb	15	10.9	8.9	1	11.7	11.0			
Beulah Reservoir	Rb	17	10.3	6.9						
	Wf	18	8.3	3.4				6	9.9	6.3
Burns Gravel Pond	LB				2	8.4	5.5			
Chickahominy Reservoir	Rb	29	11.2	11.4	30	15.3	21.7			
Delintment Lake	Rb	3	15.2	26.6				3	14.6	29.3
Dog Lake	P	1	12.5	12.0	1	11.5	16.0	1	19.2	46.0
Guyer Creek	Rb				5	7.7	3.2	5	15.7	26.1
	EB				2	17.5	43.0	1	8.0	3.5
Malheur Reservoir	Rb	43	10.5	10.5				4	17.4	41.1
	C	1	5.7	2.3						
Mann Lake (Summit Lake cutthroat)	C	2	6.4	1.4	3	17.1	26.0	3	16.2	21.0
Owyhee Reservoir	C	1	5.0	1.0				15	9.6	9.4
	LB							16	15.6	50.9
Priday Reservoir	Rb	40	7.9	3.5						
(Summit Lake cutthroat)		1	6.3	1.7						
(Heenan Lake cutthroat)		1	7.0	2.3						
Sid's Reservoir	Rb	1	10.2	7.0				6	13.3	14.2
Thompson Reservoir	Rb	2	15.1	28.0				1	23.2	87.0
(Summit Lake cutthroat)		5	11.8	10.5				4	20.1	53.7
Warm Springs Reservoir	P							6	7.7	3.8
	LB				9	11.0	12.2			
	Rb	30	11.5	10.3	6	14.5	16.5	12	12.9	14.5
	CC				1	18.0	42.5			
Wildhorse Lake										
(Heenan Lake cutthroat)		17	7.7	3.1						

Table 115

Composition and length frequency of game fish taken in  
some Southeastern Oregon waters  
November 16, 1958 - November 15, 1959

Water	Species	Number in sample	Percentage of total	Number in one-inch size groups (fork lengths)																			
				4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Altnow Pond	BG	28	71.8	1	2	10	13	2															
	LB	11	28.2	1			1		1	2			1	1	2	1	1						
Ana Reservoir	Rb	23	100		1								6	3	2	2							
Antelope Reservoir	Rb	30	100						1	9	13	7											
Beulah Reservoir	Rb	33	50.8				1	3	5	11	12		1										
	Wf	32	49.2				8	16	5	1	2												
Burns Gravel Pond	LB	7	100				1	6															
Chickahominy Reservoir	Rb	134	100					2	10	13	26	16	3	21	29	13	1						
Crump Lake	B	50	100					13	10	7	2		1										
Delintment Lake	Rb	52	100								5	3	9	5	17	4	5	1	3				
Dog Lake	P	48	87.3						5	3	1	2											
	Rb	4	7.3																				
	C	3	5.4				2	1															
Guyer Creek	Rb	8	40.0				1		1				1				1	1	1	1	1	1	
(Summit Lake cutthroat)	EB	3	15.0														1	2					
Hart Lake	B	41	45.0				3	1	4	1													
Malheur Reservoir	Rb	128	98.4	4	1	6	15	6	5		1	2	1										
	C	2	1.6			1	1																
Mann Lake (Summit Lake cutthroat)		13	100																				
Owyhee Reservoir	C	36	50.0																				
	LB	32	44.4																				
	P	4	5.6																				
Friday Reservoir	Rb	86	83.5																				
(Summit Lake cutthroat)		12	11.6																				
(Heenan Lake cutthroat)		5	4.9																				
Sid's Reservoir	Rb	10	100																				
Silver Creek Diversion	Rb	10	90.9																				
	Ct	1	9.1																				
Thompson Reservoir	Rb	4	13.7																				
(Summit Lake cutthroat)		25	86.3																				
Warm Springs Reservoir	LB	13	5.6																				
	Rb	117	49.5																				
	B	26	11.1																				
	CC	68	28.8																				
	P	12	5.0																				
Wildhorse Lake																							
(Heenan Lake cutthroat)		50	100																				

Table 116

Water temperature recordings, Silver Creek (study plot  
above upper crossing), Watershed 12, 1959

Station	Date	Time	Temperatures		Estimated flow in c.f.s.	Weather
			Air	Surface		
1. Lower end of study plot, Ochoco National Forest	4/8/59	12:30 p.m.	-	44		Sunny and clear
	5/4/59	2:40 p.m.	-	54		Partially cloudy 50%, breezy
	5/26/59	1:30 p.m.	54	58	5.7	Cloudy, cold
	6/12/59	2:45 p.m.	84	79	2.2	Hot, partially cloudy 70%
	6/24/59	2:20 p.m.	72	71	1.75	Overcast 80%
	7/7/59	3:15 p.m.	60	70	0.79	Breezy, partially cloudy 5%
	7/20/59	2:10 p.m.	91	84.5		Hot and clear
	8/3/59	2:45 p.m.	79	80	0.25	Partially cloudy 10%
	8/19/59	2:45 p.m.	59	65	28 gal. per min.	Cloudy 75%
	9/1/59	1:30 p.m.	72	70	35.1 gal. per min.	Clear
2. Above the upper end of the study plot, Ochoco National Forest	4/8/59	12:30 p.m.	-	44		Sunny and clear
	5/4/59	2:40 p.m.	-	54		Partially cloudy 50%, breezy
	5/26/59	1:30 p.m.	54	58		Cloudy, cold
	6/12/59	2:50 p.m.	80	79		Hot, partially cloudy 70%
	6/23/59	2:30 p.m.	72	71		Overcast 80%
	7/7/59	3:20 p.m.	62	70		Breezy-partially cloudy 5%
	7/20/59	2:00 p.m.	91	83.5		Hot and clear
	8/3/59	2:45 p.m.	79	80		Partially cloudy 10%
	8/19/59	2:45 p.m.	59	65		Cloudy 75%
	9/1/59	1:15 p.m.	70	67		Clear



Table 117

Water temperature recordings  
Allison Creek, Watershed 12, 1959

Station	Date	Temperatures		Estimated flow in c.f.s.	Number trout seen (125')	Weather
		Air	Surface			
1. One-half mile above guard station at upper end of pasture	5/27/59	46	40			Cloudy, cool
	6/23/59	74	60			Sunny, warm, partially cloudy 5%
	7/7/59	64	57	0.27		Cool, breezy, partially cloudy 25%
	7/20/59	90	68			Hot and clear
	8/3/59	72	64			Partially cloudy 10%
	8/19/59	61	53.5			Overcast - drizzle
	9/1/59	65.5	55			Clear
	5/27/59	56	51	2		Cloudy, cold
	6/23/59	72	67			Sunny, breezy, partially cloudy 10%
2. Allison Guard Station crossing	7/7/59	59	63			Breezy, partially cloudy 25%
	7/20/59	80	68			Clear and hot
	8/3/59	74	70			Partially cloudy, 10%
	8/19/59	61	61.5			Overcast, drizzle
	9/1/59	65.5	61			Clear
	5/27/59	56	51	2		Cloudy, cold
	6/23/59	72	67			Sunny, breezy, partially cloudy 10%
	7/7/59	59	63			Breezy, partially cloudy 25%
	7/20/59	80	68			Clear and hot
3. Allison Guard Station pasture (lower end)	8/3/59	74	70			Partially cloudy, 10%
	8/19/59	61	61.5			Overcast, drizzle
	9/1/59	65.5	61			Clear
	6/23/59	78	70		19 (3" to 7")	Breezy, 90% overcast
	7/7/59	60	62		17 (3" to 7")	Breezy, partially cloudy 10%
	7/20/59	90	68		7 (3" to 7")	Clear and hot
	8/3/59	74	68		13 (3" to 7")	Partially cloudy 10%
	8/19/59	61	59		11 (3" to 7")	Overcast, drizzle
	9/1/59	65.5	65		9 (3" to 7")	Clear

### Lake survey

Physical surveys were conducted on several lakes and impoundments to determine areas, volume and depths for future management.

Lake survey information is given in Table 118.

Table 118

Hydrographic data for four southeastern Oregon lakes  
1959

Lake	Surface acres (high water line)	Acre feet	Depths		Remarks
			Maximum	Average	
Sid's Reservoir	43.0	830.0	27'	19.3'	
Mann Lake	275.0	2,370.5	14'	8.62'	
Fish Lake	16.2	282.0	30'	17.4'	
Silver Lake diversion	26.3	287.0	25'	10.9'	Area and depth could be increased if leakage through dam were stopped.



## CENTRAL OREGON - COLUMBIA DISTRICT

Allan B. Lichens

### Creel census

Creels were checked at lakes and streams during the fishing season as the work schedule permitted. Table 119 depicts data collected from December 1, 1958 to November 30, 1959.

### Key stream program

The key stream stocking program on Hood River appears to be successful and should be continued.

Advantages of key stream management in which fish plantings are concentrated in certain streams is demonstrated by the results on the East Fork Hood River. Many anglers again fished the area in 1959. Success was determined to be 2.8 fish per angler interviewed, the same as in the previous season.

Table 120 summarizes the creel census collected on the East Fork of Hood River since 1954. The table demonstrates the increased effort and success from the key stream system that was inaugurated in the spring of 1957.

### Olallie Lake

The angler success at Olallie Lake continued to improve from the low point of 0.7 fish per angler recorded in 1957 to 2.8 fish per angler in 1959.

Tables 121 and 122 tabulate the stocking and creel returns from 1951 through 1959. The present stocking policy of 10,000 rainbow yearlings and 30,000 eastern brook fingerling is providing good returns to the angler.

Table 123 depicts the size group composition of the Olallie Lake catch expressed in percentages. The percentage in the six to eight inch size class is nearly double that of the 1958 catch. About 84 per cent of the fish were under 10 inches.

Table 124 compares the catch by species at Olallie Lake from 1951 through 1959.

### Lost Lake

The number of anglers fishing Lost Lake and the rate of catch have increased during the past two years. Although no increase in the stocking rate of legal rainbow has been made, rainbow comprised 94 per cent of the catch in 1959. It is believed that the increased pressure is the result of angler effort expended on kokanee that are about twelve to fourteen inches in length. In the 1959 season kokanee comprised 2.6 per cent of the total catch.

Table 119

Creel census data for lakes and streams in the Columbia District,  
Central Region, 1959 season

Lake or stream	Species	6-8	8-10	10-12	12-14	14 and over	Unclas- sified	Total fish	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
<u>Streams</u>													
Columbia River	St Salmon					2		2					
						6		6					
	Sg					3		<u>3</u>					
Deschutes River, Section 1	Rb	449	1,114	347	133	40	60	11	91	303	0.12	27.55	0.04
	Br		1			2		2,143					
	DV	4	3	4	1			3					
	St					10		12					
	Ch					42		<u>10</u>					
Deschutes River, Mouth								42					
	St					808		<u>2,210</u>	1,410	6,607	1.57	2.99	0.33
								808	1,464	8,698	0.55	10.76	0.09
Fifteenmile	Rb	36	16					52					
	St					1		<u>1</u>					
								53	41	76	1.29	1.43	0.70
Hood River	Rb	9	1	1			5	16					
	St					43		43					
	DV					2		<u>2</u>					
								61	378	685	0.16	11.23	0.09
Hood River, East Fork													
	Rb	411	774	101	5	2		1,293	460	1,254	2.81	0.97	1.03

Table 119 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14 and over	Unclassified	Total fish	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
Mosier	Rb	3	8					11					
	Ct	18	2				181	201 212					
									48	86	4.42	0.40	2.46
Neal	Rb	8						8					
	Ct	3					122	125 133	27	69	4.92	0.52	1.93
Tanner	St							3					
	Salmon							3 6	34	74	0.18	12.33	0.08
White River	Rb	13		1				14	2	6	7.00	0.43	2.33
Lakes													
Badger	Rb	18	9					27	7	41	3.86	1.52	0.66
Black	Rb	3						3					
	EB	10						10 13	7	45	1.86	3.46	0.29
Boulder	EB	19	69	2				90	11	36	8.18	0.40	2.50
Clear	Rb	15	44	10	5			74					
	EB	34	17	13	1			65 139	30	150	4.63	1.08	0.93
Fish	Ct		67	18				85					
	EB	1	4					5 90	13	48	6.92	0.53	1.88

Table 119 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14 and over	Unclas- sified	Total fish	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
Frog	Rb	288	213	28	9	2		540					
	EB		6	2				8					
								548	291	849	1.88	1.55	0.65
Kingsley Reservoir	Rb	30	110	30	3			173					
	EB	3		3				6					
	Ct	9			2			11					
								190	55	130	3.45	0.68	1.46
Lost	Rb	80	313	65	3	1		462					
	K			3	10			13					
	Br	2	1	1	3	3		10					
	EB		2					2					
	Ct			2				2					
								489	237	990	2.06	2.02	0.49
Lower	EB			4	3			7	11	58	0.64	8.29	0.12
McClure	Rb	97	93	6	1			197					
	C	5	6	2				13					
								210	87	187	2.41	0.89	1.12
Monon	Rb	2	83	7				92					
	EB	1	3	1				5					
								97	37	100	2.62	1.03	0.97
Olallie	Rb	113	231	88	4	1		437					
	EB	93	96	3		1		193					
	Ct		3	4				7					
								637	223	1,051	2.85	1.65	0.61

Table 119 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14 and over	Unclas-sified	Total fish	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
Rock Creek Reservoir	Rb	33	112	33	4	1		183	104	356	1.76	1.95	0.51
Twin, Lower	EB		5					5	7	23	0.71	4.60	0.22
Wahtum	EB	17	16	1				34	11	45	3.09	1.32	0.76
Warren	EB	61	37	5	2			105	17	37	6.18	0.35	2.84

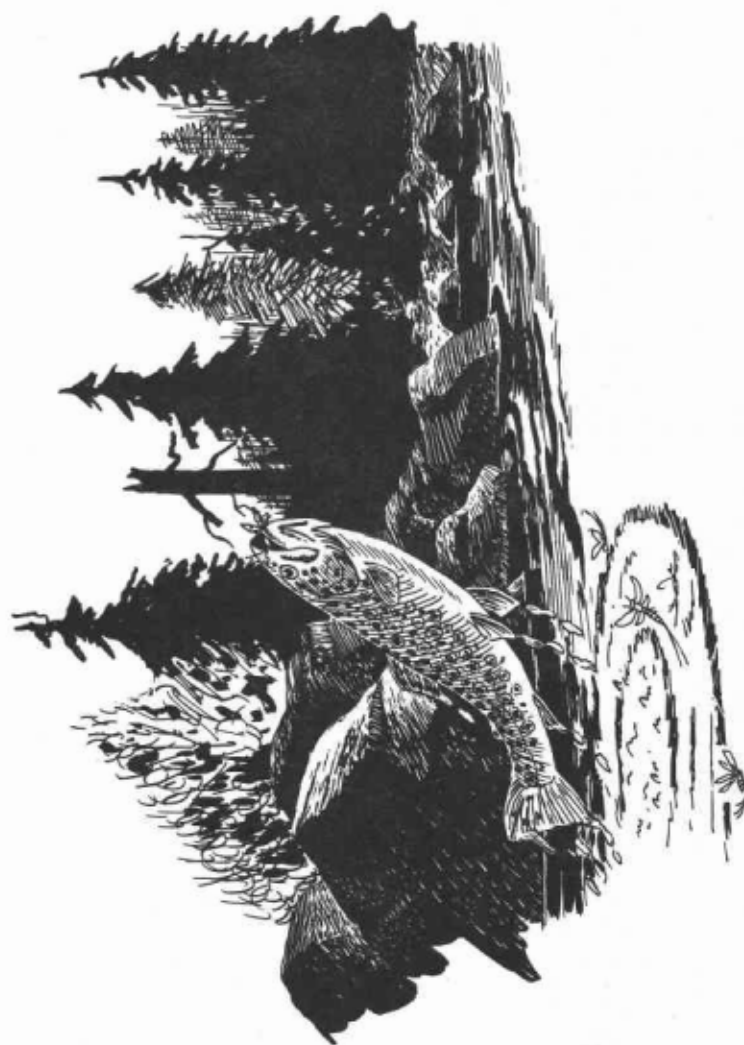


Table 120

Catch statistics on East Fork, Hood River  
1954-1959

Year	Fish caught	Anglers checked	Hours fished	Hours per fish	Fish per angler
1954	283	126	317	1.12	2.25
1955	146	109	233	1.59	1.33
1956	112	116	280	2.50	0.97
1957	706	276	669	0.94	2.55
1958	523	185	558	1.07	2.82
1959	1,293	460	1,254	0.96	2.81

Table 121

Species, numbers and pounds liberated at  
Olallie Lake, 1951-1959

Year	Species	Number	Pounds	Size in inches	Total number	Total weight
1951	Rb	9,480	600	4 - 6	35,344	6,520
	Rb	25,864	5,920	6 plus		
1952	Rb	33,505	8,045	6 plus	33,505	8,045
1953	Rb	42,000	13	0 - 2	46,020	613
	Rb	4,020	600	6 plus		
1954	Rb	29,173	1,804	3 - 7	38,825	3,571
	Rb	9,652	1,767	6 plus		
1955	Rb	10,256	3,870	6 plus	25,280	4,407
	EB	15,024	537	4 - 7		
1956	Rb	9,969	2,060	6 plus	30,539	2,120
	EB	20,570	60	2 - 4		
1957	Rb	5,019	1,130	6 plus	60,264	1,766
	Rb	5,000	500	6		
	EB	50,245	136	2 - 4		
1958	Rb	10,033	2,200	6 plus	40,084	2,677
	EB	30,051	477	3 - 5		
1959	Rb	10,051	2,328	6 plus	40,127	2,670
	EB	30,076	342	3		



Table 122

Catch statistics at Olallie Lake,  
1951-1959

Item	1951	1952	1953	1954	1955	1956	1957	1958	1959
Fish checked	377	139	892	765	357	229	68	627	637
Anglers checked	164	77	367	384	194	74	95	300	223
Fish per angler	2.3	1.8	2.4	2.0	1.8	3.1	0.7	2.1	2.8
Hours fished	797	387	1,952	2,032	741	364	254	1,230	1,051
Hours per fish	2.1	2.8	2.2	2.7	2.0	1.5	3.7	2.0	1.6
Fish per hour	0.47	0.36	0.46	0.38	0.48	0.63	0.27	0.51	0.61

Table 123

Size composition of the catch expressed in percentages,  
Olallie Lake, 1951-1959

Size group	1951	1952	1953	1954	1955	1956	1957	1958	1959
6- 8	29	23	25	32.9	20.7	41.7	22.0	16.9	32.3
8-10	35	24	66	44.4	33.8	55.1	28.0	62.3	51.9
10-12	24	26	8	20.0	36.9	2.6	48.0	18.9	14.9
12-14	11	21	0.8	2.7	8.3	0.6	2.0	1.7	0.6
14-16	1	6	0.2	0.0	0.3	0.0	0.0	0.2	0.3

Substantial losses, attributed to a parasitic tapeworm, were recorded in 1957. Minor losses were sustained in 1958. No losses were observed in 1959, but gill net samples revealed 38 per cent of the brown and rainbow trout contained tapeworms. The parasite was not present in the kokanee and eastern brook examined.

Tables 125 and 126 summarize the catch statistics and size composition of the catch at Lost Lake from 1953 through 1959.

Table 127 shows catch data at Lost Lake by species from 1953 through 1959.

Examination of stomach contents of seven kokanee taken in early July revealed that approximately ten to fifteen per cent of the kokanee diet was aquatic insect larvae. The information collected by eight gill net sets in Lost Lake is presented in Table 128.

Table 124

Composition of the catch by species,  
Olallie Lake, 1951-1959

Year	Percentages		
	Rainbow	Eastern brook	Cutthroat
1951	60.0	40.0	
1952	95.0	5.0	
1953	99.8	0.2	
1954	99.4	0.6	
1955	95.2	4.8	
1956	67.7	32.3	
1957	86.0	14.0	
1958	79.6	20.4	
1959	68.6	30.2	1.2

Table 125

Catch statistics at Lost Lake,  
1953-1959

Item	1953	1954	1955	1956	1957	1958	1959
Fish checked	142	127	145	70	24	337	489
Anglers checked	42	72	90	73	23	155	237
Fish per angler	3.38	1.76	1.61	0.96	1.04	2.17	2.06
Hours fished	210	310	291	186	75	522	990
Hours per fish	1.48	2.44	2.01	2.66	3.12	1.55	2.02
Fish per hour	0.68	0.41	0.50	0.38	0.32	0.65	0.49

Table 126

Size composition of the catch expressed in percentages,  
Lost Lake, 1953-1959

Size groups	1953	1954	1955	1956	1957	1958	1959
6- 8	12.6	10.6	16.5	3.2	45.3	19.3	16.7
8-10	28.2	57.5	62.2	25.9	50.6	58.2	64.9
10-12	48.7	19.2	17.9	70.9	4.1	20.5	14.4
12-14	9.8	12.7	3.4			1.4	3.2
14 and over	0.7					0.6	0.8

Table 127

Composition of the catch by species,  
Lost Lake, 1953-1959

Year	Percentage				
	Rainbow	Eastern brook	Brown	Kokanee	Cutthroat
1953	90.2	8.4	1.4		
1954	95.8	2.1	2.1		
1955	95.9	2.8	1.3		
1956	96.8	3.2			
1957	37.5	62.5			
1958	77.8	6.5	7.8	7.7	0.2
1959	94.6	0.4	2.0	2.6	0.4

Steelhead

Hood River

Creel records from Hood River revealed that 367 anglers caught 45 steelhead, or 0.12 fish per angler. The 1959 average catch decreased from the two previous years, but compares very closely to the 1954 and 1955 seasons.

The reduction in the steelhead bag limit in Hood River appears to have had only a minor influence in the over-all statistics of the total catch, as shown by Table 129 and Figure 12.

Figure 12 illustrates the catch of steelhead by month in Hood River as tabulated from a sample of steelhead punch cards for the years 1954 through 1958.

Summer steelhead propagation program

The adult summer steelhead trapping program was augmented in 1959 with the installation of a second trap located at the Punchbowl Falls fishway on the West Fork of Hood River.

The Powerdale trap was placed in operation late in March and operated for a short time, but was removed as only winter steelhead were taken. The trap was replaced on April 13 and operated continually through June 20, 1959. The Punchbowl trap was operated from May 12 through June 20, 1959.

A total of ninety-six summer steelhead was transported to the Hood River Hatchery, of which two died prior to December 1, 1959.

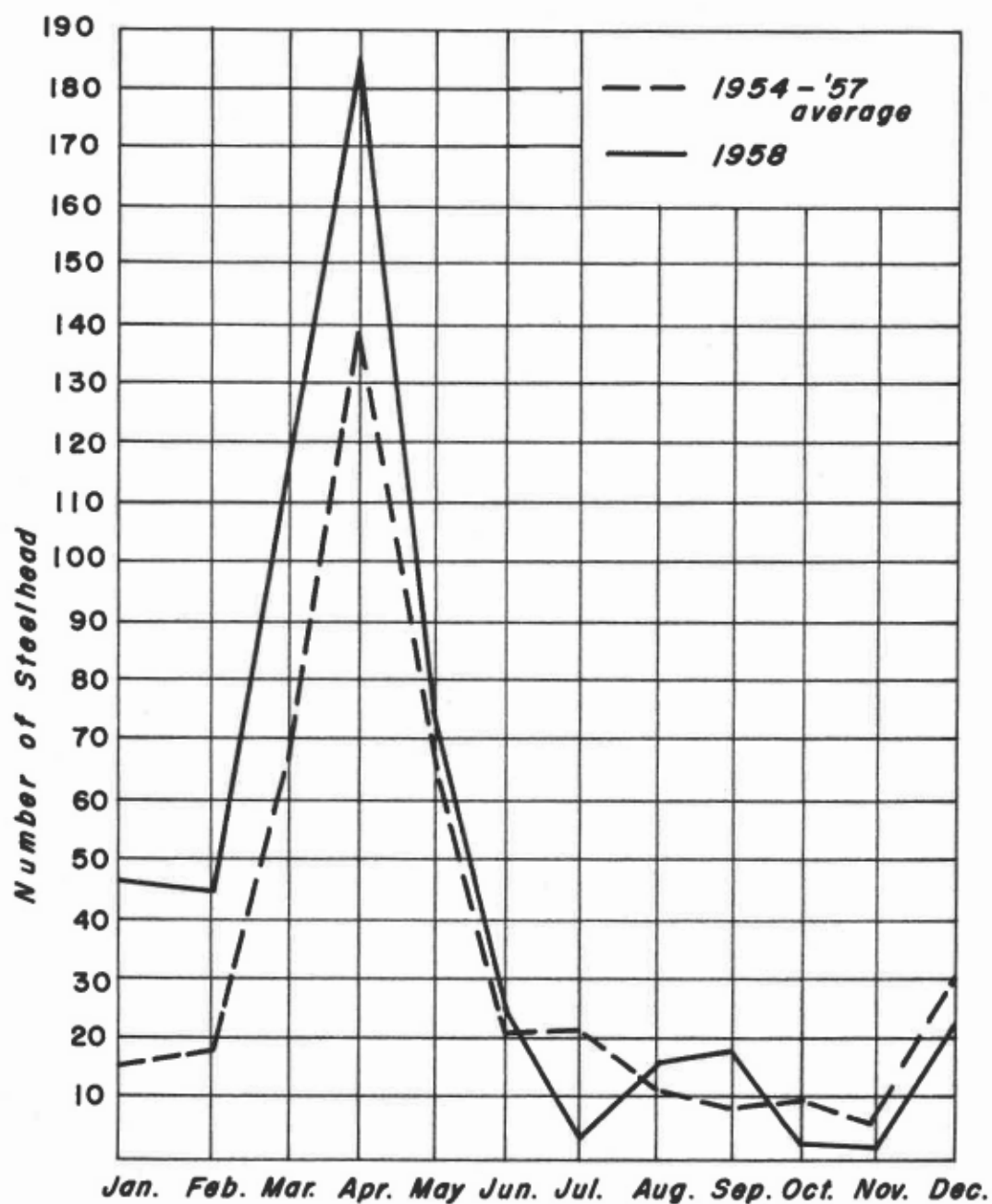
Table 130 is a summary of fish captured at the Powerdale and Punchbowl traps and the number transported to the hatchery by months.

Table 128

Composition and length frequency of catch by gill nets in Lost Lake, represented in one-inch size groups, fork length measurements, 1959

Lake	Number of sets	Species	Number of fish	Percentage of total	Fork length in inches												
					6	7	8	9	10	11	12	13	14	15	16	17	
Lost	8	Rb	40	72.8		8	18	10	1	2				1			
		EB	2	3.6	1		1										
		Br	6	10.9			1			1			1	1		2	
		K	7	12.7								2	4	1			

Figure 12



STEELHEAD CATCH IN HOOD RIVER BY MONTH  
1954 through 1958

Table 129

Steelhead creel census by year,  
Hood River, 1952 to 1959

Item	1952	1953	1954	1955	1956	1957	1958	1959
Anglers checked	97	85	357	353	204	165	120	367
Fish caught	27	22	42	38	17	41	22	45
Fish per angler	0.27	0.25	0.11	0.10	0.08	0.24	0.18	0.12
Hours fished	215	176	560	488	256	669	123	666
Hours per fish	7.9	8.0	13.3	12.8	15.0	16.3	5.5	14.8

Table 130

Results of adult summer steelhead trapping  
Hood River, 1959

Date	Species				Summer steelhead transported to hatchery
	Winter steelhead	Summer steelhead	Whitefish	Spring chinook	
March	4				
April	54	6			6
May	32	41	15		41
June	11	57	4	1	49
Total	101	104	19	1	96

On April 1, 1959, 2,454 seven-inch hatchery-reared summer steelhead were liberated near the mouth of Hood River. These fish were marked by the removal of the adipose fin and the left maxillary.

Twelve adult female summer steelhead spawned at Hood River in 1959 produced an estimated 20,000 eggs which were transferred to Oak Springs Hatchery.

### Deschutes

A greater number of steelhead anglers than usual enjoyed a successful year on the lower 7.5 miles of the Deschutes River. Creel records reveal that 1,464 anglers required 8,698 hours to catch 808 fish, or 0.55 fish per angler.

Table 131 summarizes data collected for the area from 1951 through 1959.

Table 131

Summer steelhead, sport catch,  
lower Deschutes River, 1951-1959

Year	Anglers checked	Fish caught	Hours fished	Fish per angler	Fish per hour	Hours per fish	Estimated anglers
1951	562	362	2,395	0.6	0.15	6.6	2,450
1952	1,054	443	4,276	0.4	0.10	9.7	3,190
1953	882	375	3,578	0.4	0.10	9.5	3,740
1954	1,070	384	4,533	0.4	0.08	11.8	2,800
1955	843	253	2,771	0.3	0.09	11.0	2,700
1956	633	207	2,289	0.3	0.09	11.1	1,865
1957	888	480	3,798	0.5	0.12	7.9	2,268
1958	1,168	281	5,405	0.2	0.05	19.2	3,030
1959	1,464	808	8,698	0.5	0.09	10.7	4,662

A survey of the lower Deschutes River was initiated in 1959. The survey is being conducted to determine the available gravel areas, size of gravel, and depths and velocities of water over the gravel. Stations will be established along this section of the Deschutes River to determine desirable minimum flows for maintenance of fish production at different periods of the year.

The area included in the survey covers 101 miles of river extending from the Columbia to the Pelton re-regulating dam. Seventy-four miles of river have been covered to date.

#### Fishways and screens

##### Columbia District screens

During the 1959 season thirteen rotary fish screens were operated on diversions from Fifteenmile Creek, Ramsey Creek and on tributaries of Hood River. Two additional screens were installed, one on Fifteenmile Creek in March, and the other on Neal Creek on June 4, 1959. Another screen was installed on Mill Creek and operated only from June 24 to July 13, 1959.

Bypass traps were constructed and installed at twelve rotary screen sites.

Table 132 summarizes screen and bypass trap records for the 1959 season.

##### Pacific Power and Light Company

The Pacific Power and Light Company fish screen was nonoperative for several months during the winter of 1958 and 1959. At least two screen units were out of the water most of this time. The screens were placed in operation in February, but the washers did not function.

Table 132

Rotary fish screen operation  
Columbia District, 1959

Stream	Screens in operation	Total traps	Species	Month /1							1959 Total
				April- May	May- June	June- July	July- August	August- September	September- October	October- November	
Fifteenmile	7	6	Rainbow Non-game	26 6	43 33	231 125	434 161	193 29	6		933 354
Ramsey	2	2	Rainbow Non-game	33	68 2	34	12	29	66		242 2
East Fork Hood River	1	1	Rainbow Silvers Chinook Non-game	8 3 2	9 57 1	4 53	4 27	17 24			42 164 2 1
Mill Creek	1										
Evans	3	1	Cutthroat	5	4						9
West Fork Hood River	1	1	Rainbow /2 Silvers			2 3	3 22	82 2	4		91 64
Neal	1	1	Rainbow /3 Silvers		4 7	36 2	3 131				43 335
Totals		12	Game species Non-game	77 6	229 36	365 125	636 161	542 29	76		1,925 357
			Total	83	265	490	797	571	76		2,282

/1 Bypass trapping data were collected from the 15th of one month to the 15th of the next month indicated.

/2 Bypass trap was installed May 22.

/3 Rotary screen was installed June 2; bypass trap was installed June 4.



On each visit to the screen during the months of March, April and May as many as 20 one to four-inch silver salmon were observed on the screen apron.

The superintendent of the Powerdale plant stated that a larger pump would be installed for the washers and the present pump retained as an auxiliary.

#### Oregon Lumber Company

The Oregon Lumber Company ladder was either nonoperative or operating inefficiently many times during 1959. The problems encountered included steps plugged with debris, forebay drawn below the top weir and leaks resulting in complete loss of water before it reached the bottom of the ladder.

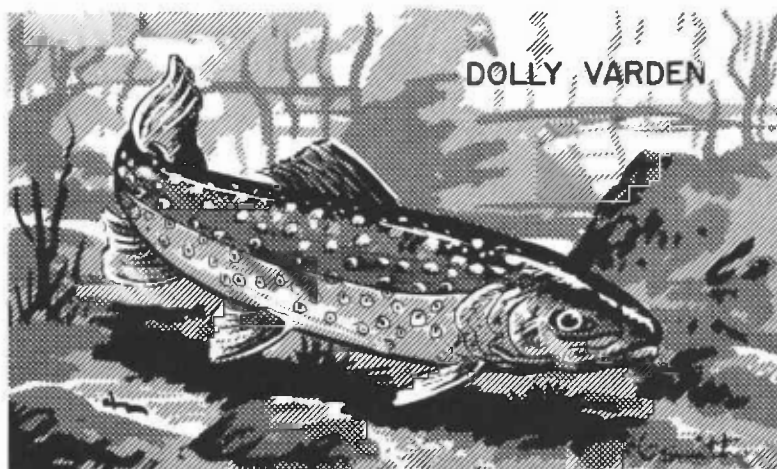
The runs of anadromous species are of sufficient magnitude to warrant more efficient fish passage facilities.

#### East Fork Irrigation District

A request for screen facilities on the main diversion canal of the East Fork of Hood River has been approved by the East Fork Irrigation District Board of Directors. The screen has been ordered and preliminary construction has been started on the foundations.

#### Farmers Irrigation District

Three different methods of collecting fish from the Farmers ditch were tried during the 1959 irrigation season. Rotenone and Cresol were used with a four-foot fyke net to recover fish. No fish were collected although fish were known to be in the ditch. An electric shocker was used on two occasions. Downstream silver salmon, steelhead, and cutthroat were collected with little effort in the Farmers ditch during the 1959 irrigation season with an electric shocker.



## BEND DISTRICT

M. L. Montgomery

### Fishery inventory

#### Composition and length frequency of fish populations

The composition and length frequency of fish populations in the major waters of the district are presented in Table 133. Numbers of fish are presented in one-inch size groups as collected by graduated mesh gill nets.

#### Maturity

Maturity data were recorded for all fish in the sample. The degree of maturity is denoted as immature, maturing, and mature. Table 134 depicts the female fish in each stage of maturity.

#### Length at maturity

The average length at maturity of female fish by species for eight years of record is listed in Table 135.

### Management

#### General

Fry and fingerling trout releases are providing good to excellent fishing in most of the lakes and reservoirs in the district. The fishery in some waters inhabited by rough fish cannot be maintained by stocking trout fry or fingerling. Kokanee fry stocked in these waters are providing good results in competition with rough fish. Some small, easily accessible lakes receiving supplemental plants of legal rainbow trout are designated as key lakes.

#### Big Cultus Lake

Lake trout introduced into Big Cultus Lake in 1956 have exhibited remarkable growth. Gill net sets in September 1959 caught 33 lake trout, of which 23 were released. Of the ten retained for examination, two were approximately 8.4 inches in length. These fish were stocked in February 1959. Of the remaining lake trout, the smallest fish was  $20\frac{1}{2}$  inches; the largest was 28 inches, fork length measurement. The largest fish weighed  $10\frac{1}{4}$  pounds, and the eight averaged  $8\frac{1}{2}$  pounds round weight.

Four gravid lake trout, two males and two females, were captured at a depth of 85 feet. The remaining large trout taken in shore sets were approaching maturation. The fish were of the 1954 brood year released as eight inch fish in June 1956.

The main source of lake trout food in Big Cultus is whitefish and kokanee. These fish are 8 to 10 inches long and are readily taken by the lake trout.

Table 133

Composition and length frequency of catch by gill nets in some Central Oregon lakes represented in one-inch size groups, fork length measurements, 1959

Lake	Number of sets	Species	Number taken	Percentage of total	Number in one-inch size groups																
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 and over
Big Cultus	9	LT	33	26					2												
		Rb	33	26		1	3	7	11	5	3	1	1		1						
		EB	2	2		1							1								
		K	11	9					7	7	4										
		Wf	46	37			3	17	11	5	6	1	1	1		1					31
Big Lava	2	EB	175	64		3	24	58	26	7	10	20	21	5	1						
		Wf	3	1										3							
		Ro	95	35	1	65	22	7													
Crana Prairie Reservoir	8	Rb	48	2.5		7	8	2	5	3	2	3	4	5	4	2	3				
		EB	49	2.5		1	1	2	8	8	14	5	6	1	2	1					
		K	50	3			7	22			3	11	6	1							
		Wf	103	5				3	1	3	14	26	36	13	5	2					
		Ro	1,740	87	221	1,109	410														
Davis (8/9)	8	Rb	44	3					2	1	6	9	14	1	3	2	2		3		1
		K	9	0.5						2		1	2	3	1						
		Wf	11	0.5				1	1		1	2	5	1							
		Ro	1,611	96	350			1	200	60	20	7	6	4	2	3	3				
		Rb	44	11				1	1	7	9	1	3	1	2	3	1				
East (5/8)	3	K	5	1			1		4	5	6	15	11	8	5	3	1				
		Wf	59	16		46	127	92	7												
		Ro	272	72																	
		Rb	131	83		3	15	21	26	25	18	8	8	4	1	2	2				
		EB	20	13						5	4	3	1	2	2	2	1				
(9/24)	4	Br	3	2														1		1	
		Ro	4	2						1											
		Rb	63	51			13	12	14	3	3	7	2	5		1					
		EB	53	43		3			12	20	7	1	5	5		3					
		Br	3	2					1												
Elk	4	Ro	5	4		3	1		1												
		EB	98	80			12	27	35	12	3	7	1	1							
		Rb	2	2								1	1								
Haystack Reservoir (1/29)	4	K	22	18		11			10	1											
Irish	2	EB	34	100				6	22	5											1
Little Cultus	4	Rb	40	41	1-3"		8	4	7	7	2	3	4	2	4						
		EB	57	59		11	21	11	6	2	3										
						3															

Table 133 (continued)

Lake	Number of sets	Species	Number taken	Percentage of total	Number in one-inch size groups																
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 and over
Little Lava	4	Rb	13	3				2	2	8	1							1			
		EB	26	6				5	7	1	2		1								
		Wf	77	17		9		15	27	13	8	3	5		1						
		Ro	325	74	11	262	50	2	2												
North Twin	4	Rb	63	100	6	33	3	3	9	8	3	1									
Ochoco Reservoir (4/7)	4	Rb	254	99	2	3	44	70		94	35	6		1							
		Su	3	1			1			1											
		Rb	23	40			1	1	5	7	8	2									
		Su	35	60		16	16	3													
Paulina (5/8)	3	Rb	116	85	6	12	15	15	23	15	13	9	5	1	1					1	
		Ro	20	15	1	1	5	10	3												
		Rb	168	97	19	20	27	19	12	21	27	18	4	1							
		EB	3	1.5									1								
		Ro	3	1.5		2	1											1			
Pelton Reservoir	24	Rb	75	9	1	11	16	21	13	6	2	2	2	2		1	1	1	3		4
		Br	62	8		1	2	11	11	7	8	4	4	4	3	6	1	1			
		DV	47	6		4	1	1	6	7	8							1			
		St	3	0.5			1	1	1												
		Wf	69	9		2	1	6	18	17	20	4	1			1	1				1
		Su	391	48	12	88	67	48	68	47	35	19	4								
		Clm	126	15	24	54	44	1	1	2											
		Sq	35	4		13	11	2	2	4	1	2									
		B	1	0.5	1																
Peterson Creek Reservoir	2	Rb	29	100	1	10	10	2	3	1	1					1					
South Twin	3	Rb	188	100			1	28	111	36	10	2									
Sparks	4	EB	153	97	6	23	35	16	30	18	20	3	1	1							
		Rb	4	3	2	2															
Suttle	4	Rb	2	2				1		1											
		Br	11	12				1	1	1	2	3	1	1	1	3	1	1	1		1
		Wf	82	86		1	9	25	14	17	9										
Taylor	2	EB	25	100			4	12	5	1					1		1	1			
Todd	4	EB	144	100	16	27	13	41	30	10	7										
Walton	1	Rb	94	100	9	49	25	5	5	1											
Wickup Reservoir	4	Rb	24	4		1	4	9	3	4	1					2					
		EB	1	0.5					1												
		Br	30	5	1	10	1		1	1	3		1			1	2	1	1	1	8
		K	12	2					4	4	2						1				
		Wf	29	4.5		1	1	1	1	7	6	12	1								
		Ro	513	84	159	180	128	43													

Table 134

Average fork length of female fish in each stage of maturity as collected  
in gill net sets in some Central Oregon lakes, 1959

Lake	Species	Immature		Maturing		Mature	
		Number in sample	Average length, inches	Number in sample	Average length, inches	Number in sample	Average length, inches
Big Cultus	Rb	11	9.0	2	9.4	1	14.0
	LT			3	26.0		
	K			5	9.8		
	EB	1	6.1				
	Wf			16	8.1	3	11.9
Big Lava	EB	28	7.5	19	11.3	16	11.7
	Wf			3	13.4		
Crane Prairie Reservoir	Rb	9	8.2	2	13.7	5	14.5
	EB	19	9.3	14	11.4	3	13.7
	K	10	9.5	6	11.8		
	Wf	2	8.0	14	11.9	12	13.5
Davis	Rb	34	11.0	5	13.3	13	15.7
	K			4	13.0		
	Wf	6	8.6	3	10.6	46	12.7
East	Rb	30	8.6				
	EB	2	8.5	10	11.2	1	15.0
Elk	Rb	1	12.7				
	EB	14	7.3	30	8.8	6	11.6
	K	6	6.4				
Haystack Reservoir	Rb	41	10.1				
Irish	EB	3	8.3	14	8.2		
Little Cultus	Rb	20	7.7				
	EB	13	7.2	7	10.6	4	11.9
Little Lava	Rb	8	8.6				
	EB	6	7.0	7	8.7	1	17.9
	Wf	5	7.6	13	9.2	4	12.7
North Twin	Rb	19	6.6	4	10.4	6	8.9
Ochoco Reservoir	Rb	8	10.4	1	11.9		

Table 134 (continued)

Lake	Species	Immature		Maturing		Mature	
		Number in sample	Average length, inches	Number in sample	Average length, inches	Number in sample	Average length, inches
Paulina	Rb	65	9.2	8	12.6		
	EB					3	15.5
Pelton Reservoir	Rb	32	8.4	5	12.2	1	13.4
	Br	17	9.7	8	11.6	8	16.2
	DV	11	9.8	1	13.3	2	24.3
	Wf	8	9.1	16	10.7	11	11.8
Peterson Creek Reservoir	Rb	6	6.7	9	7.5	3	10.3
South Twin	Rb	32	9.7	10	10.6		
Sparks	EB	47	7.8	46	10.0	6	11.9
Suttle	Br			1	12.3	1	18.8
	Wf	1	7.1	15	9.2	6	13.5
Taylor	EB			9	8.4	1	14.4
Todd	EB	10	6.4	42	8.8	11	10.8
Walton	Rb	7	7.1				
Wickiup Reservoir	Rb	13	8.8				
	EB					1	9.6
	Br	6	8.2	2	15.6	2	19.2
	K	4	9.9				
	Wf	1	10.0	6	11.4	5	12.3

Table 135

Average length of maturing female fish in some  
Central Oregon lakes, 1952-1959

Lake	Species	Fork lengths in inches by year							
		1952	1953	1954	1955	1956	1957	1958	1959
Big Cultus	Rb	14.9	8.9	8.3	9.2	11.3	10.3	11.5*	9.4
	Wf	8.1	8.9	9.6	7.5	8.3	8.8	11.3	8.1
	LT								26.0
	K								9.8

Table 135 (continued)

Lake	Species	Fork lengths in inches by year							
		1952	1953	1954	1955	1956	1957	1958	1959
Big Lava	EB	12.8	8.4	12.5	12.3	10.3	10.9	11.0	11.3
	Wf								13.4
Crane Prairie Reservoir	Rb	15.1	13.9	13.7	10.7	12.5	13.4		13.7
	EB	11.8	9.6	9.8	8.5	8.4	8.8	10.3	11.4
	Wf	11.2	12.1	12.2	10.9	11.7	10.8	11.9	11.9
	K					12.7	14.1	14.6	11.8
Davis	Rb			19.4		16.2	17.7	14.5	13.3
	K			13.5	14.8	13.8		10.4*	13.0
	Wf			13.9			10.8*		10.6
East	Rb	13.5	12.7	13.9	13.6	15.2	12.1	12.6*	13.2*
	EB	13.9		12.3	12.8	12.4	11.9	12.2	11.2
Elk	Rb	12.0*	11.4	15.0	10.9				
	EB	12.8	8.5	11.3	8.8	10.8	11.2	9.7	8.8
Irish	EB	8.0	11.5	7.9	7.7	8.2	10.2		8.2
Little Cultus	Rb	12.4	11.2*	12.0	11.5			12.5*	
	EB	11.3	10.3	8.2	9.0	9.6	9.2	11.1	10.6
Little Lava	Rb	10.0*	10.3	8.0					
	EB	10.7	8.8	8.5		7.5	9.5*	8.7	8.7
	Wf	9.1	9.9	8.4		8.9	8.2	9.8	9.2
North Twin	Rb	12.6	11.7	8.8	10.9	10.6		9.4*	10.4
	EB	10.0							
Ochoco Reservoir	Rb		11.0	10.8	11.1				11.9
Paulina	Rb	13.5	14.9	14.7*	14.0	14.0*	11.4	13.4	12.6
	EB	10.2			9.3	10.5			
Peterson Creek Reservoir	Rb								7.5
Pelton Reservoir	Rb								12.2
	Br								11.6
	DV								13.3
	Wf								10.7
Sparks	EB		9.8	9.3	9.0	8.8	10.2	9.0	10.0

Table 135 (continued)

Lake	Species	Fork lengths in inches by year							
		1952	1953	1954	1955	1956	1957	1958	1959
Suttle	Br						17.1	11.1	12.3
	K						9.5		
	Wf						9.6	9.9	9.2
Taylor	EB	7.8	10.0*	8.9	7.5	9.0	11.5		8.4
Three Creeks	Rb						9.9	10.4	
	EB						9.3	11.4	
Todd	Rb	8.0*	8.1	8.5			10.3*		
	EB	8.8	8.4	10.5		8.5	9.0	8.8	8.8
Walton	Rb						10.7		
Wickiup Reservoir	Rb	16.4			14.1			14.0*	
	Br	15.4		16.0	15.2	15.0*	16.6	16.5	15.6
	EB	12.0		13.0		12.3	11.6*		
	Wf			12.4	12.6	12.4	11.1	12.4	11.4
	Ro			6.8					
	K				12.6	14.4			

\* Indication

The stocking of rainbow has never produced a good return and should be discontinued provided the kokanee-lake trout combination continues to provide results.

#### Big Lava Lake

The percentage of rough fish in the gill net samples at Big Lava Lake has revealed a steady decline from the 65 per cent recorded in 1955 to 35 per cent in 1959. Rough fish control work has been accomplished with trap nets and partial treatment with rotenone along the lake shore.

In 1959 three maturing female whitefish were collected by gill net. An increased competition from whitefish in the lake is anticipated.

The length at maturity of female eastern brook has increased from 10.3 in 1956 to 11.3 in 1959.

#### Crane Prairie Reservoir

In 1959 rough fish (roach) comprised 87 per cent of the fish obtained in the gill net samples. Rainbow and eastern brook, after they have attained a length of eight inches frequently feed on roach. The average length of maturing female rainbow, eastern brook, and whitefish has not decreased. The length at maturity of kokanee decreased from 14.6 inches in 1958 to 11.8 inches in 1959.



Lake trout that have migrated from Big Cultus Lake into Crane Prairie Reservoir have made remarkable growth. One lake trout caught in Crane Prairie Reservoir in July 1959 weighed  $4\frac{1}{2}$  pounds and was  $20\frac{1}{4}$  inches in length. The fish was of a group stocked in June 1957 at an average length of seven inches.

Two marked lake trout stocked in June 1958 as 7-inch fish had attained a length of  $14\frac{1}{2}$  inches by June 1959.

The stocking of kokanee fry in Crane Prairie Reservoir can be discontinued after the 1960 season as conditions for natural reproduction seem adequate.

#### Davis Lake

The fly fishing only restriction was removed from Davis Lake on August 5, 1959. On this date 150 boats were recorded at the lake, the largest group of anglers to utilize the lake on a given day in the past several years. On August 8 and 9, the first weekend after the lake was opened to all types of angling, 82 boats were recorded on the lake on Saturday and 43 on Sunday. Boat counts conducted on three of the four weekends (including Labor Day weekend) after the regulation change revealed an average of eight boats on Saturday and eleven boats on Sunday. Weekday counts from August 10 through late September varied from no boaters to eight on Labor Day. The average was 2.5 boats per weekday.

A comparison of boat and car counts on Davis Lake and other district waters is presented in Table 136.

Most anglers were disappointed because of their inability to catch fish by trolling and bait fishing. The shallow water and aquatic vegetation hinder most types of angling other than fly fishing.

#### Creel census

In the 1959 season 994 anglers interviewed fished a total of 4,541 hours to catch 701 fish. The rate of return to the creel was the lowest of all district waters.

#### Rough fish control

Extensive partial control measures were used at Davis Lake in an attempt to reduce the roach population for the years 1952 through 1955. The kill of roach for this period is listed in Table 137. Fish of all ages were included but fry and fingerling predominated.

The percentage of rough fish in total catch of gill nets was 87 per cent in 1954. It has increased to over 92 per cent through 1959. Partial control measures were not satisfactory in controlling roach at Davis Lake.

#### Population inventory

The average length of maturing female rainbow, kokanee, and whitefish has continued to decrease since 1954. Rainbow have declined from an average of 19.4 inches in 1954 to 13.3 inches in 1959.

Table 136

A comparison of boat and car counts on some  
Central Oregon waters, 1959

Date, 1959	Davis		East		Paulina		South Twin		Wickiup	
	Boats	Cars	Boats	Cars	Boats	Cars	Boats	Cars	Boats	Cars
5-30	29		748	798	709	1,120	87			
5-31	25	45			353		90	124	29	93
6-29	4	8								
7-4	48	63	200	381			21	115	72	226
7-30	10	30	48							
8-1	18	30								
8-5	150	178								
8-7	17				55					
8-8	82	107	105							
8-9	43				71					
8-18	2	5								
8-22	12	14	63							
8-23	11	24								
8-24	3				22					
8-25	2									
8-29	6	10								
8-30	11	19	66							
9-1	3									
9-2	4	4			28					
9-3	0		32							
9-5	7	21	77		43		8	33	50	123
9-6	10	25	89		76		25	33	80	233
9-7	8	19	16	22	13	10				
9-16	2									

Table 137

Rough fish control, Davis Lake, 1952-1955

Year	Pounds of rotenone used	Numbers of fish	Pounds of fish
1952	1,000	50,000,000	
1953	2,300	46,800,000	
1954		1,500,000	100,000
1955		4,240,000	43,000

#### Bottom samples

In 1940 six bottom samples were obtained by Ekman dredge in Davis Lake. The six samples averaged 1.01 c.c. of aquatic organisms per square foot. A relatively high food grade of one was assigned to the lake by the survey crew.

In 1959, thirty-five bottom samples yielded a total of 2.3 grams or about 0.07 grams per square foot. The 1959 data would indicate that a marked reduction in trout food production occurred since 1940.

#### Rehabilitation investigations

Investigations were initiated in 1958 in order to determine the feasibility of rehabilitating Davis Lake. Tributary streams were checked for the distribution and presence of roach. An attempt was made to determine if the source of the large springs flowing into Wickiup Reservoir were from the Davis Lake sump.

The trapping of downstream migrant fish was inaugurated in Odell Creek, a tributary to Davis Lake. We need to ascertain the recruitment of rough fish that would enter Davis Lake from Odell Lake. If the project is found feasible, Davis Lake should be chemically treated in the fall of 1960.

#### Elk Lake

The history of the Elk Lake fishery has been that of continual heavy stocking of eastern brook, rainbow, and kokanee while the lake has received little angling pressure. The average length at maturity of female eastern brook has revealed a steady decline since 1956.

Elk Lake received greater angler use in the 1959 season than in the past several years. The kokanee and eastern brook, although small in size, were readily caught by anglers. The kokanee were two-year-old fish resulting from the fry plant made in 1957. Most kokanee appearing in angler creels in the 1959 season were in the eight to ten inch class.

The stocking of rainbow fingerling was discontinued in 1958 because of poor returns.

#### Haystack Reservoir

Haystack Reservoir was opened to year-around angling on February 7, 1959. On opening day an estimated 450 anglers were present at the reservoir. In 1959, 994 anglers checked caught fish at the rate of 0.37 fish per hour and 1.24 fish per angler. Although the return to the creel was not exceptional, it was of interest that many anglers from distant parts of the state participated in this winter fishery.

A mortality from undetermined causes occurred on all age groups of rainbow trout in the reservoir in the summer of 1959.

Stocking of fingerling rainbow in early spring and early fall is recommended. The reservoir should remain open to angling the entire year to evaluate further the effects of this type of management.

#### Little Lava Lake

Little Lava Lake's fish population has contributed little toward the fishery in the district. Roach comprised 74 per cent of the fish obtained

in the 1959 gill net samples and whitefish 17 per cent. Roach have been a problem for over 20 years in this lake.

The trout fishery has existed on naturally produced brook and a token plant of legal rainbow trout. Angler use in 1959 does not warrant stocking the lake with rainbow of legal length.

Feasibility of constructing a dam at the outlet which is the source of the Deschutes River and chemically treating the lake should be determined.

#### Mud Lake

The first experimental plant of 15,000 Atlantic salmon was made in Mud Lake in August 1958. Of these fish, 6,015 averaged six inches in length when planted. Test angling in August 1959 revealed that the fish had gained about 10 inches in length in one year.

Frequent observations throughout the summer disclosed the Atlantic salmon to be dispersed throughout the lake. In November 1959, seventy-nine Atlantic salmon were observed below the falls in Quinn Creek, tributary of Mud Lake. It is expected that some of these fish will mature and spawn in the fall of 1960 when four years of age.

Seven brook were observed in Quinn Creek in November 1959. Some brook were not destroyed when the lake was rehabilitated in September 1957.

Mud Lake should remain closed to angling until such time as natural reproduction takes place or it is obvious that these fish will not spawn in Quinn Creek. Should the eastern brook increase, it may be desirable to initiate a fall trapping program in order to hold their numbers in check.

#### North Twin Lake

The condition and size of trout in North Twin Lake were disappointing in 1959. The rainbow fingerling planted in 1958 failed to grow as anticipated. Although it was overstocked in 1959, anglers removed enough trout to permit satisfactory growth of the remaining fish by late August.

It is possible that fingerling plants alone will not sustain a high level trout fishery here. Population samples will be made in April 1960 and again prior to stocking in order to determine the extent of cropping by anglers. The lake is in a key recreational area; consequently, the fishery may require a supplemental stocking of legal-sized rainbows during the season.

#### Ochoco Reservoir

Ochoco Reservoir, open to angling the entire year, provided excellent angling. The impoundment was drawn down to minimum pool in the fall of 1959 and, as a result, no fish were planted.

Management of the reservoir is further complicated by the increase in number of suckers. A gill net fished overnight caught 58 fish, 35 of which

were suckers. Future trout stocking will depend upon the increment of spring runoff. If fingerling plants can be made in early April, it is anticipated the reservoir should provide good angling by August 1960.

### Pelton Reservoir

The catch of immature steelhead in the trout fishery and an increase of rough fish are two major problems in the management of Pelton Reservoir. On opening weekend of the angling season 498 anglers were checked with 2,640 fish of which 22 per cent were immature steelhead. It is estimated that over 1,000 young steelhead were taken by anglers opening weekend. Creel data revealed that immature steelhead comprised 11 per cent of the catch on May 2 and 3, the second weekend of the season.

Downstream migrant steelhead counts indicate that approximately 9,000 immature steelhead passed through the reservoir in 1959. In order to protect downstream migrants, it is recommended that the angling season on Pelton Reservoir be postponed until late May. The Pelton downstream migrant counts for 1958 and 1959 are listed in Table 138.

Upstream fish counts were initiated at Pelton on August 15, 1956. The fishways at the re-regulating dam were placed in operation about October 1, 1957, and the main fishway extending above Pelton dam was not completed until early in 1958. Prior to the completion of the fishways the barrier was breached on several occasions permitting fish to move upstream to the diversion tunnel. The upstream migrant counts, representing fish that were trapped and hauled plus the fish ascending the ladder after completion in 1958 are presented in Table 139.

Forty to fifty per cent of the rainbow caught by anglers were of hatchery origin. These fish were planted by the U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife.

Gill nets were set in Pelton Reservoir in February, April, June, August, and November. The composition and length frequency of catch by gill nets is presented in Table 140.

Suckers, chiselmouth, and squawfish were the predominant nongame species appearing in the gill nets. They comprised 67.5 per cent of the total fish collected.

It has been suggested to the U. S. Fish and Wildlife Service that kokanee be planted in the reservoir. Experience gained from other district waters indicates that kokanee would offer a partial solution to the problem. Kokanee appear to meet the competition of rough fish better than trout.

### Sparks Lake

Surveys revealed an excellent population of brook in Sparks Lake. Length at maturity for females increased from 9.0 inches in 1958 to 9.9 inches in 1959. Angler success was excellent through July 4 with the average length of trout being larger than in the 1958 season.

Table 138

Counts of downstream migrants,  
1958 and 1959, Pelton Dam

Month	1958					1959				
	Chinook	Steelhead	Trout	Other game fish	Coarse fish	Chinook	Steelhead	Blueback Trout	Other game fish	Coarse fish
January						321	1	262	7	4
February						548	2	264	4	10
March						575	37	285	21	18
April						25,315	644 (121)	12	1,108	27
May						24,107	4,011 (29)	16	3,311	13
June						3,219	3,509 (14)	28	1,453	8
July						516	826 (4)	1	448	2
August						5	0	1	0	4
September	9		2	1	37		15	3	8	72
October	14	4	6	1	14	1 (1)	8		21	9
November	264	4	193	9	10	604 (2)	18		207	77
December	1,380	(2)	662	47	13	107	2 (1)		47	7
Totals	1,667	8 (2)	863	58	74	55,319 (3)	9,073 (169)	60	7,415	933

Note: Figures in parentheses denote adult fish.

Table 139

Upstream migrant counts,  
Pelton Dam, 1956-1959

Month	Chinook			Steelhead			Sockeye		
	1956	1957	1958	1959	1956	1957	1958	1959	1959
January			3		3		100	39	
February			1		33		249	39	
March			1		23		203	95	
April			7 (1)	22 (1)	51		102	60	
May		89	189 (7)	274 (37)	27		61	17	
June		157	178	71 (33)	42		236	13	
July		97	24	111 (22)	108		118	142	5 1 18
August	15	166	8	20 (5)	17	26	33	23	1 10 51 57
September	28	78	9	20 (1)	59	55	14	47	1 12 4 22
October	71	17	3 (1)	3 (2)	63	163	53	19	0 3 0 2
November	0	4	1	0	21	64	307	30	0 1 0 0
December	0	2	0	1	18	427	11	10	0 0 0 0
Totals	114	610	424 (9)	522 (101)	178	1,022	1,487	534	2 31 56 99

Note: Figures in parentheses denote jack salmon.

Table 140

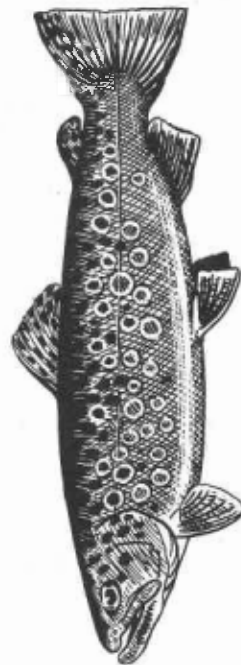
Composition and length frequency of catch by gill nets in Pelton Reservoir  
represented in one-inch size groups, fork length measurements, 1959

Date	Number of sets	Species	Number taken	Percentage of total	Number in one-inch size groups																20 and over
					5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
2-6-59	5	Rb	11	11	2	3	2	2		1		1									
		Br	12	16		1	4	2	2	1	1		1		1		1				
		DV	21	27	1	1	3	2	2	6		1	3	1							
		Wf	9	12			3	2	2		4									3	
		Su	16	21		1	5	3	3	4	1				1	1					
		Clm	6	8	4	1				1											
		Sq	2	2				1				1									
4-2-59	5	Rb	23	16	6	7	6	2				1	1								
		Br	17	12			4	3	3	2			3	1	3						
		DV	6	4			1	1	1	1	2	1									
		Wf	17	12	1			7	6	3											
		Su	73	50	2	7	9	18	10	12	12	2								1	
		Sq	6	4				1	4			1									
		Clm	4	2	2	1				1											
6-5-59	4	Rb	21	9	1	2	4	8	4	2											
		St	3	1			1	1	1												
		Br	6	3		1	1						2	1							
		DV	5	2	2				2												
		Wf	10	5	1	1	2	1	1		5										
		Su	124	56	11	49	32	14	12	5	1										
		Clm	53	24	17	30	6														
8-19-59	5	Rb	13	5.5	1		3	5	5	1	1	1			1						
		Br	10	5			1	2	1	1	3							2			
		DV	10	5	1			1	1	1	2	2			1						
		Wf	16	7			1	4	4	4	6	1									
		Su	95	43	1	28	18	15	15	12	5										



Table 140(continued)

Date	Number of sets	Species	Number taken	Percentage of total	Number in one-inch size groups																20 and over
					5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
8-19-59 (continued)		Sq	22	10		10	10	2													
		Clm	53	24	5	18	28	1	1												
		B	1	0.5	1																
11-17-59		Rb	7	5			2	2		3											
		Br	17	12				2	4	3	1	2		1		1					
		DV	5	3				1	1											1	
		Wf	17	12					4	7	2	3	1								
		Su	83	58		9	9	5	20	16	16	7	1								
		Sq	5	3		3	1														
		Clm	10	7		1	9														
/1 Includes 1 immature steelhead																					
/2 Includes 2 immature steelhead																					



An experimental plant of 10,000 fall rainbow fingerling was made in 1959.

The normal low water level usually present by late September was reached by mid-July. The amount of water continued to decline, resulting in the lowest level observed in the past ten years.

A cooperative study between the U. S. Forest Service and the Oregon State Game Commission will be initiated at Sparks Lake to determine the feasibility of maintaining a uniform water level by grouting lava holes on the southeast side of the lake. Should it be possible to maintain the water level of Sparks Lake at the normal June level, the fishery would be enhanced.

#### Creel census

District personnel and State Police game officers assisted in obtaining creel records. Table 141 is a compilation of creel data from the major lakes and streams within the district.

Angler success on most waters varied from fair to excellent throughout the season. Angling pressure declined rapidly after the middle of August. Car counts were below normal in late August, September, and early October. The one exception was Wickiup Reservoir where many anglers fished for trout concentrated at the low water level.

#### East and Paulina Lakes

The work schedule at East and Paulina Lakes consists of rough fish control, distribution of fish by planting boat, and creel census.

#### East Lake

The catch of 65,700 trout in East Lake in 1959 was a 41.5 per cent reduction from the 112,100 fish removed in 1958. A decrease of 8,000 angler trips was recorded in the 1959 season, and the rate of catch dropped from 3.3 fish per angler in 1958 to 2.5 fish per angler in 1959. The East Lake catch data are recorded in Table 142.

Table 143 designates size groups of all species of fish appearing in the East Lake catch from 1949 to 1959. Fish exceeding 10 inches in length increased 10.7 per cent over the 1958 season.

#### Paulina Lake

Angler use at Paulina Lake was the fourth highest ever recorded in the fourteen years of record; however, the trout catch decreased from 87,500 fish in 1958 to 57,700 in 1959. The 1959 catch is the fourth highest recorded in the study period. The increased use occurred in the first month of the season. Angler success was calculated at 3.0 fish per angler in 1959 and 4.1 in 1958. The Paulina Lake catch statistics for the years 1949 to 1959 are presented in Table 144.

The percentage of fish in the 6 to 8-inch class increased from 12.2 in 1958 to 21.4 in 1959. Of the total catch, 42.1 per cent exceeded 10 inches in length.

Table 1141

Creel census, Bend District, 1959 season

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 and over	Total fish	Total anglers	Hours fished	Fish per angler	Hours per fish	Fish per hour
<u>Lakes</u>															
Big Cultus	Rb	6	3	4	2					15					
	LT	1								<u>1</u>					
										16	8	27	2.00	1.69	0.59
Big Lava	Rb				16	3	1			20					
	EB	3	40	175	185	9				<u>412</u>					
										432	183	800	2.36	1.85	0.54
Crane Prairie Reservoir	Rb	15	91	94	33	5	4	3		245					
	EB	12	63	40	22	4				<u>141</u>					
	K	2	5	69	117	139	8			340					
	LT					1				<u>1</u>					
	Wf					1				<u>1</u>					
										728	245	1,261	2.97	1.74	0.58
Davis	Rb	27	84	190	182	94	22	9	5	613					
	K			11	43	17				<u>71</u>					
	Wf			5	1	11				<u>17</u>					
										701	994	4,541	0.71	6.48	0.15
Elk	Rb	2	2		3	3				10					
	EB	12	23	20	19					<u>74</u>					
	K	72	174	1						<u>247</u>					
										331	69	275	4.80	0.83	1.20
Haystack Reservoir	Rb	29	313	643	115	19	19			1,138	920	3,095	1.24	2.72	0.37
Little Cultus	Rb	18	14	6	15	1				54					
	EB	13	11	6	5	1				<u>36</u>					
										90	16	65	5.63	0.73	1.38
Little Huston	B	14	17	5	1					37	5	29	4.63	0.78	1.28
Little Lava	Rb		1	4						5					
	EB	3	7	2						<u>12</u>					
										17	9	33	1.89	1.94	0.52
North Twin	Rb	38	91	9	1					139	26	101	5.35	0.73	1.38
Ochoco Reservoir	Rb	180	1,073	590	112	5				1,960	742	2,387	2.64	1.22	0.82
Pelton Reservoir	Rb	1,007	1,521	424	56	11				3,019					
	Br	27	107	30	9	8	4			185					
	DV	49	41	16	12	8	2		1	129					
	Blueback	1	4	9						14					

Table 14.1 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 and over	Total fish	Total anglers	Hours fished	Fish per angler	Hours per fish	Fish per hour
Pelton Reservoir (continued)	St	198	452	85	2				6	743					
	Ch	22	17	1					1	41					
	Wf			2		1				3					
	B		3							3					
	Bg	1 1/2								1					
										<u>4,138</u>					
South Twin	Rb		92	851	59	5				1,007	803	4,559	5.15	1.10	0.91
Suttle	Rb	317	562	7	1		1			888					
	Br	3	15	3	11	12	9	8	32	93					
	K	176	623	94	7					900					
	Wf	2	6	7	1					<u>16</u>					
										<u>1,897</u>	908	3,992	2.09	2.11	0.48
Walton	Rb	19	62	11	11	6	2			111	59	203	1.88	1.83	0.50
Wickiup Reservoir	Rb	15	126	251	205	92	28	19	2	738					
	EB		3	4	4	1				12					
	Br	3	35	29	32	46	37	22	22	226					
	K		1	8	29	53	16	2		109					
	Wf		1		2	6	1			<u>10</u>					
										<u>1,095</u>	617	2,896	1.77	2.64	0.38
<u>Streams</u>															
Crooked River, Section 1 (Cove)	Rb	53	64	17						134					
	Br	1	1	1						3					
	DV	1	6							<u>7</u>					
										<u>144</u>	22	217	6.55	1.51	0.66
Crooked River, Section 2: Beaver Creek Deep Creek	Rb	34	46	32						112	17	52	6.59	0.46	2.15
	Rb	61	58	16						135	25	62	5.40	0.46	2.18
	Rb	5	11	5	1					22					
	Br	4	8	2						<u>14</u>					
Deschutes River, Section 2	DV	2								2					
	Ch	1								1					
	Wf		1	1						<u>2</u>					
										<u>41</u>	34	203	1.21	4.95	0.20
Deschutes River, Section 3	Rb	149	54	12						216					
	Br	9	8	21	6				1 1/3	45					
	EB		1					1		1					
	DV		2	3	1					6					
	Wf		2	6						8					
	B	3								<u>3</u>	81	422	3.44	1.51	0.66

Table 11.1 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 and over	Total fish	Total anglers	Hours fished	Fish per angler	Hours per fish	Fish per hour
Deschutes River, Section 4	Rb	20	37	26	5	1				89					
	EB	15	15	9	1					40					
	Br	2	14	21	18	5	2			62					
										191	51	199	3.75	1.04	0.96
Little Deschutes River	Rb	19	22	4						45					
	Br		2		1					3					
	B			6						6					
										54	29	69	1.86	1.28	0.78
Metolius River	Rb	10	10	4		3				27					
	Br	1	1							2					
	DV	1	1	2		1				5					
	Wf	2	18	6						26					
										60	43	114	1.40	1.90	0.53

/1 All marked fish - dorsal fin removed

/2 Four inches in length

/3 Spent steelhead

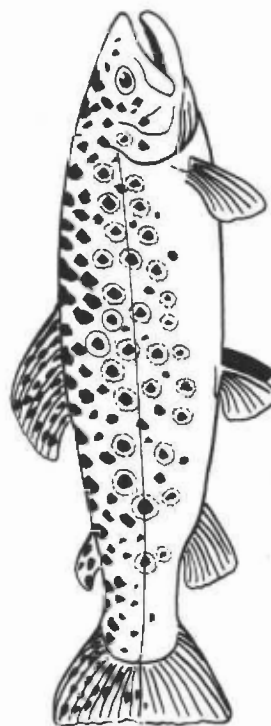


Table 142

## East Lake catch statistics, 1949 through 1959

Item	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Angler trips	26,000	28,000	38,500	28,000	29,500	27,500	29,500	33,000	34,400	34,200	26,200
Total trout caught (calculated)	50,000	53,300	109,000	41,000	87,000	51,500	72,000	88,800	98,400	112,100	65,700
Poundage	37,569	35,645	65,083	30,490	49,461	29,302	37,700	44,392	57,500	55,200	37,200
Average weight of fish, pounds	0.75	0.67	0.60	0.74	0.56	0.57	0.52	0.50	0.58	0.49	0.57
Catch per surface acre, pounds	38.7	36.7	67.1	31.8	51.0	30.5	39.0	45.8	59.3	56.9	38.4
Hours angling per fish	2.5	2.4	1.7	2.5	2.2	2.4	1.8	1.8	1.8	1.5	2.1
Fish per angler	1.9	1.9	2.5	1.5	3.0	1.9	2.4	2.7	2.9	3.3	2.5
Percentage catch, rainbow	53.0	58.2	70.1	87.0	80.0	70.0	76.7	85.5	84.9	94.2	95.7
Percentage catch, brook	46.4	41.2	29.4	12.5	19.1	29.0	22.7	14.3	14.9	5.4	3.9
Percentage catch, brown	0.6	0.6	0.5	0.5	0.9	1.0	0.6	0.2	0.2	0.4	0.4

Table 143

Comparison of size groups in sport catch, 1949-1959, East Lake,  
all species, expressed in percentage

Size groups	1949 per cent	1950 /1 per cent	1951 per cent	1952 per cent	1953 per cent	1954 per cent	1955 per cent	1956 per cent	1957 per cent	1958 per cent	1959 per cent
6-8	3.3	0.3	4.0	4.0	6.8	6.2	10.8	11.2	9.3	9.6	10.5
8-10	14.3	30.0	22.6	19.0	30.0	31.4	36.7	46.5	30.3	37.8	26.2
10-12	38.3	33.4	45.0	31.0	39.3	40.2	32.6	23.0	39.0	40.0	40.8
12-14	28.5	23.6	21.8	35.5	15.0	16.5	15.8	15.3	16.3	9.2	17.3
14-16	11.4	10.0	5.3	9.0	5.8	4.8	3.3	3.2	4.2	2.7	4.4
16-18	3.2	2.2	1.0	1.0	2.2	0.6	0.4	0.5	0.7	0.5	0.6
18-20	0.4	0.2	0.2	0.3	0.6	0.1	0.2	0.1	0.1	0.1	0.1
20 and over	0.6	0.3	0.1	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1

/1 Nine-inch minimal size limit

Table 1144

Paulina Lake catch statistics, 1949 through 1959

Item	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Angler trips	13,200	10,720	15,000	17,000	16,500	13,000	16,500	21,500	21,600	21,300	19,600
Total trout caught	21,120	15,330	29,400	25,000	36,400	27,000	55,000	72,700	71,800	87,500	59,700
Poundage	10,857	8,050	15,504	15,673	21,541	9,866	17,740	23,870	28,000	34,500	23,300
Average weight of fish, pounds	0.51	0.53	0.53	0.63	0.59	0.37	0.32	0.33	0.39	0.39	0.39
Catch per surface acre, pounds	8.4	6.2	11.9	12.1	16.6	7.6	13.7	18.3	21.6	26.5	17.9
Hours angling per fish	2.8	3.2	2.7	2.6	2.7	2.3	1.9	1.3	1.4	1.1	1.5
Fish per angler	1.6	1.4	2.0	1.5	2.2	2.0	2.3	3.4	3.3	4.1	3.0
Percentage catch, rainbow	77.1	76.1	70.8	97.5	83.2	89.0	86.9	97.1	99.5	100.0	99.9
Percentage catch, brook	21.0	22.0	28.1	2.4	16.4	10.3	12.9	2.8	0.5	trace	0.1
Percentage catch, brown	1.9	1.9	1.1	0.1	0.4	0.7	0.2	0.1	trace	trace	trace



A comparison of size groups of fish entering the Paulina Lake catch from 1949 through 1959 is tabulated in Table 145.

### Management

Losses of rainbow trout as the result of tapeworm infestation in 1958 and 1959 seriously affected the angler success and use of East and Paulina Lakes. The 1959 fishery was largely dependent upon the fingerling rainbow stocked in 1958. The mortality declined in 1959 although an estimated 10,000 fish were lost. Losses of fish first appeared in mid-August and practically ceased in early October.

Angler use in the early season was heavy but rapidly diminished as the season progressed. The presence of tapeworm discouraged many avid East and Paulina Lake anglers.

The numbers of brook appearing in the catch at East Lake continued to decline in 1959. Brook comprised 3.9 per cent of the total catch in 1959. Some brook were lost at East Lake because of tapeworms in 1959, but losses were not observed in 1958.

### Spawning ground surveys

#### Spring chinook

A substantial increase in the spring chinook spawning escapement in Squaw Creek and Metolius River was noted in 1959.

Census areas revealed 90 spring chinook and 107 redds in 1959 where earlier records showed 17 fish and 21 redds for the 1955 brood year. The spawning ground counts for Squaw Creek, Metolius River and tributaries are presented in Table 146.

#### Steelhead

A log jam located approximately three miles above the mouth of Squaw Creek prevented spawning fish from utilizing the upper section of stream. The barrier was removed prior to the 1960 spawning run. Examination of the stream below the barrier revealed 116 steelhead and 60 redds.

The log jam was not removed in March 1959 for fear of destroying eggs already in the gravel downstream from the barrier.

#### Kokanee

An extreme variation occurs in the time of peak kokanee spawning activity in district waters. Kokanee first appeared in Odell Creek, tributary of Davis Lake, in late August, with fish present on the gravel bars in early November. Maximum numbers of kokanee were present in the stream in mid-September.

Peak spawning activity occurs in mid-September in the Sheep Springs area of Wickiup Reservoir; late September in Link Creek, tributary of Suttle Lake; and mid-November to late December in Cultus River. In Cultus Creek, outlet of Big Cultus Lake, the peak does not occur until early December.

Table 145

Comparison of size groups in sport catch, 1949-1959, Paulina Lake,  
all species, expressed in percentage

Size groups	<u>1949</u> per cent	<u>1950 /1</u> per cent	<u>1951</u> per cent	<u>1952</u> per cent	<u>1953</u> per cent	<u>1954</u> per cent	<u>1955</u> per cent	<u>1956</u> per cent	<u>1957</u> per cent	<u>1958</u> per cent	<u>1959</u> per cent
6-8	17.6	0.4	13.2	12.4	7.6	38.5	39.2	18.8	26.1	12.2	21.4
8-10	28.2	48.4	30.7	26.4	30.8	41.2	30.0	62.7	40.9	39.4	36.5
10-12	26.9	30.4	31.0	30.0	42.0	12.3	19.8	15.5	25.5	43.3	31.9
12-14	20.4	13.7	20.8	19.6	14.5	3.2	9.2	2.5	6.9	4.5	8.8
14-16	4.7	5.0	3.5	9.1	3.4	3.9	1.3	0.2	0.4	0.4	1.2
16-18	1.2	1.5	0.5	2.2	1.2	0.6	0.3	0.1	0.1	0.1	0.2
18-20	0.7	0.4	0.1	0.2	0.4	0.2	0.1	0.1	0.05	0.05	trace
20 and over	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.05	0.05	trace
<u>/1</u> Nine-inch minimal size limit											

Table 146

Spring chinook spawning ground survey, Squaw Creek,  
Metolius River and tributaries, 1953-1959

Location	Spawning salmon observed										Redds							
	1953	1954	1954	1955	1956	1957	1957	1958	1959	1953	1954	1954	1955	1955	1956	1957	1958	1959
Head of Metolius River to Fish Commission's rack	21	0	1	0	1	11	23	2	45	24	0	1	0	1	27	21	2	52
Fish Commission rack to Canyon Creek	60	5	1	0	0	6		10	3	51	11		4		1	2	18	2
Wizard Falls Hatchery to Bridge 99	52	55	5	41	15			1	19	87	66		9		25	12	7	33
Bridge 99 downstream one mile	10	0	0	0	0	2		2	2	18	3		2		2	2	2	2
Lake Creek (tributary to Metolius River)	0	0	1	0	1	2	2	2	0	6	0	1	0	1	2	2	2	0
Spring Creek (tributary to Metolius River)	0	0	1	0	1	2	2	3	17	3	0	1	0	1	2	0	4	16
Jack Creek (tributary to Metolius River)	6	0	0	0	0	0	0	0	0	11	3		0	0	0	0	0	0
Squaw Creek (tributary to Deschutes River)	3	10	11	12	0	0	0	0	4	14	6		6		15	0	0	2
Totals	152	70	17	64	46			14	90	214	89		21		70	35	29	107

1 No salmon allowed to move above Fish Commission rack

2 Not surveyed

3 Information obtained from Fish Commission

A good spawning population of kokanee utilized the available spawning areas in Wickiup and Crane Prairie Reservoirs and Suttle Lake. A fair kokanee spawning escapement from Davis Lake into Odell Creek was observed. Table 147 contains the kokanee spawning ground data.

Table 147

Kokanee spawning ground data, 1959

Stream	Tributary to	Spawning kokanee		Redds	
		1958	1959	1958	1959
Cultus River	Crane Prairie Reservoir	78	850	42	400
Quinn River	Crane Prairie Reservoir	0	0	10	3
Deschutes River, Sheep Bridge area	Wickiup Reservoir	48	450	26	-
Link Creek	Suttle Lake	105	419	143	387
Odell Creek	Davis Lake	143	200	140	257
Cultus Creek	Crane Prairie Reservoir	1,000	/1		

/1 Cultus Creek, outlet of Big Cultus Lake, was dry in the fall of 1959.

#### Rough fish control

Rough fish control by gill nets, trap nets, and partial treatment with rotenone was accomplished on East, Paulina, and Big Lava Lakes. Table 148 represents the estimated numbers and approximate weight of roach killed in 1959.

Table 148

Rough fish control by gill nets, trap nets, and rotenone,  
Bend District, 1959

Lake	Species	Approximate number destroyed	Weight, pounds	Method
Big Lava	Roach	77,500	2,340	Trap nets, rotenone
East	Roach	227,100	825	Gill and trap nets, rotenone
Paulina	Roach	141,000	2,000	Gill and trap nets, rotenone
Totals		445,600	5,165	

The total kill of roach obtained in 1959 exceeded the 1958 kill on East and Paulina Lakes but decreased at Big Lava.

The habits of roach in Paulina Lake make it difficult to employ efficient control measures. The adult roach concentrate in ledge areas of the lake at an average depth of eight feet. Because of the depth of water beyond the ledges, roach cannot be effectively destroyed without killing large numbers of trout.

Table 149 denotes the percentage of rough fish in the district lakes, determined by gill net samples.

Table 149

Percentage of rough fish in total catch of gill nets in some  
Central Oregon lakes and reservoirs, 1949-1959

Year	Davis Lake	Big Lava Lake	Little Lava Lake	Crane Prairie Reservoir	Wickiup Reservoir	Ochoco Reservoir	Pelton Reservoir
1949	92	100 <u>/1</u>	98	0		100 <u>/1</u>	
1950		0			96	10	
1951	86	28	97		95	71	
1952		6	82	0	96		
1953		9	92	2		83	
1954	87	51	82	6	87	95	
1955	98	65	99	77	89	61	
1956	98	61	76	64	<u>/2</u>	95	
1957	98	55	93	84	<u>12</u> <u>/2</u>	100 <u>/1</u>	
1958	97	50	87	87	92	<u>/3</u>	
1959	92	35	74	87	84	<u>12</u>	67

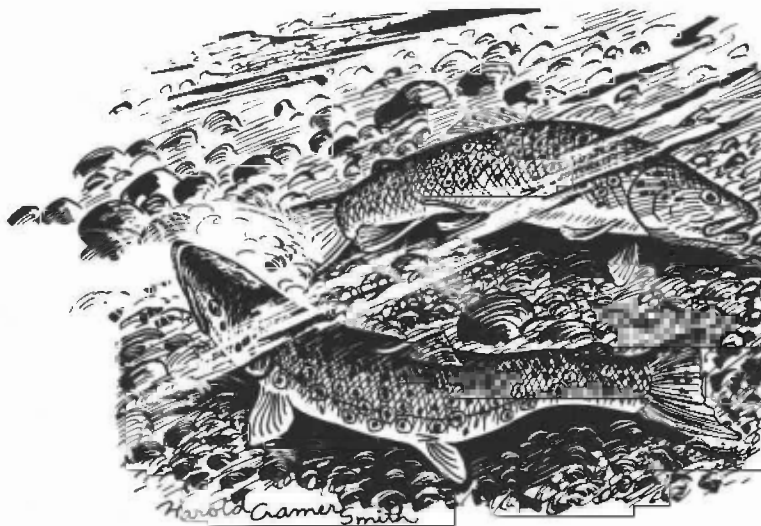
/1 Chemically treated

/2 Sets made in upper portions of reservoir in roach-free areas

/3 Inadequate sample obtained; there is evidence of the presence of rough fish.

Because of the rough fish inhabiting Crane Prairie Reservoir, successful angling for game fish is primarily limited to the Deschutes, Cultus, and Quinn River channels.

Stocking of fish in Davis and Little Lava is not advisable because of the competition of rough fish.



## KLAMATH DISTRICT

Arthur Gerlach

### Diamond Lake

#### Creel census

The Diamond Lake fishery in 1959 resulted in the lowest success per angler since the lake was opened to fishing in 1956. The average was 0.85 fish per angler as compared to 1.03 fish in 1958. On opening day 726 boats were counted on the lake, but only 1.18 fish per angler were taken compared to 4.23 caught in 1958. The creel census data for Diamond Lake are presented in Table 150 and the calculated catch statistics for 1956-1959 are depicted in Table 158.

The thirteen day extended season at Diamond Lake in 1959 did not produce the fishing pressure expected. Few anglers were present on the lake at the end of the season. Angling success was slow except for the last week when limits of fish averaging from three to five pounds were taken. Fish to eight pounds were reported.

#### Production

Sixty per cent of the 1959 sport catch consisted of fish that were released as fry in 1958. The two-year fish, from a release of 300,000 trout obtained as eggs from Canada, accounted for only 18 per cent of the catch.

A comparison of the numbers of fish stocked in Diamond Lake since the rehabilitation of the lake and percentage of total catch by anglers for each year class for 1956 through 1958 is presented in Table 151.

Sixty fish from five to nineteen inches were taken in gill nets set at Diamond Lake in the same areas as in 1957 and 1958. The average size of the yearling rainbow trout in the 1959 net samples was  $11\frac{1}{2}$  inches in contrast to a 9-inch average in 1958. The 1959 yearlings were fish which originated at Diamond Lake and were released approximately one month earlier than previous yearly plantings of rainbow stock received from Canada. Length frequencies of fish taken by gill nets in 1957, 1958 and 1959 are compared in Figure 13.

Growth rates from scale readings of 114 Diamond Lake rainbow trout caught in 1959 are presented in Figure 14. Fork length of yearling rainbow ranged from 6.3 to 15.6 inches; two-year-olds from 13.8 to 18.7; three-year trout from 18.2 to 19.9; and one four-year fish measured 21.8 inches.

In Table 152 measurements of sport-caught trout made in 1959 are compared with measurements taken in the 1956 to 1958 period. The largest fish recorded from Diamond Lake in 1959 was one that weighed 9 pounds 2 ounces and measured 28 inches.

Table 150

Creel census, lakes and streams,  
Klamath District, 1959

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20	Total	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
<u>Lakes</u>															
<u>Algoma Pond</u>															
Bobby	EB				2		1			0	5	8	0	0	0
Crescent	Rb	48	55	18	3					124					
	K	13	144	266	40	4	1			468					
	Br	3	3	6	1	1				14					
	LT	5	16	6						28					
	DV	4			1					5					
										639	842	2,738	0.8	4.3	0.2
Devils	Rb	3	3	30	12	14				62	17	74	3.7	1.2	0.8
Diamond	Rb	41	977	1,084	362	251	485	637	133	3,970	4,655	23,882	0.9	6.0	0.2
Fawn	Rb		1		1					1					
	EB		1							2	3	6	1.0	2.0	0.5
										3					
Fourmile	Rb	188	231	27	2					448					
	EB	30	110	38	3					181					
	K	23	168	44						235					
										864	394	1,834	2.2	2.1	0.5
Klamath	Rb		3	10	80	39	73	41	106	352	648	3,150	0.5	9.1	0.1
Lake of the Woods	Rb	69	17	1	1	9				97	42	169	2.3	1.7	0.6
Marilyn, Upper	EB		5	12	7					24	9	26	2.7	1.1	0.9
Meek	EB				1					1	5	6	0.2	6.0	0.2
Odell	Rb	62	46	41	20	9	10	2	5	195					
	K		1	20	79	150	107	12		369					
	LT	7	6	6	2	22	29	27	101	200					
	Wf		2	24						26					
										790	827	3,177	1.0	4.0	0.3
Opal										0	2	6	0	0	0
Rosary	EB		1	6						7	6	26	1.2	3.7	0.3
Summit										0	25	86	0	0	0

Table 150 (continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20	Total	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
Timpanogas	Rb		9							9	11	22	0.8	2.4	0.4
Windy										0	4	16	0	0	0
<u>Streams</u>															
Big Marsh Creek										0	1	1	0	0	0
Boulder Creek	Br DV	7	1							1 7 8					
Crazy Creek	Rb	10	10							20	2	6	10.0	0.3	3.3
Deep Creek	EB	18	1							19	3	14	6.3	0.7	1.4
Fishhole Creek	Rb	2	2	2	1					7	1	4	7.0	0.6	1.8
Fivemile Creek	Rb Br	8 1	10 3	14	6 3	2	1			38 10 48	7	46	6.9	1.0	1.0
Klamath River	Rb	64	156	24	10	10	14			278	171	688	1.6	2.5	0.4
Leonard Creek	Rb	15	5							20	3	9	6.7	0.5	2.2
Link River	Rb	3				1		1	1	5	13	29	0.4	5.8	0.2
Meryl Creek	Rb Br	4	3			1				4 4 8					
Sevenmile Creek	Rb EB Br	31 6 5	22 7 3	13		2		4		72 13 13 98	4	18	2.0	2.3	0.4
Sprague River	Rb EB Br DV	30 32 11 4	48 4 15	12 2 5	5 7	3 6	5 1	1		104 38 45 4 191	62	260	1.6	2.6	0.4
Spring Creek	Rb EB Br	377 14 6	205 3 9	81 2	32					695 17 17 729	87	366	2.2	1.9	0.5
											327	479	2.2	0.7	1.5



Table 150(continued)

Lake or stream	Species	6-8	8-10	10-12	12-14	14-16	16-18	18-20	Over 20	Total	Anglers checked	Hours fished	Fish per angler	Hours per fish	Fish per hour
Sycan River	Rb	15	15	32	13	5	3	2	85						
	EB	4							4						
	Br						1		1		17	99	5.3	1.1	0.9
									<u>90</u>						
Williamson River	Rb				4	10	15	8	26	63					
	Br	1	2	6					9	<u>72</u>	36	91	2.0	1.3	0.8
Whitworth Creek	Rb			1						1	2	1	0.5	1.0	1.0



Table 151

A comparison of numbers of fish stocked at Diamond Lake and percentage of each year class in the catch, 1955-1959

Year stocked	Number stocked	Year caught	Per cent of total catch by angler in each year class			
			I	II	III	IV
1955	531,383 <sup>/1</sup>	1956	76	24		
1956	489,400	1957	69	16	15	
1957	306,938	1958	50	43	5	2
1958	1,013,664	1959	60	18	13	9

<sup>/1</sup> 384,992 - 0-2 inches  
146,391 - 4-6 inches

Table 152

Comparison of length frequencies in sport catch expressed in percentage, Diamond Lake, 1956-1959

Size groups	1956	1957	1958	1959
6-8	0.1	1.3	0.1	0.10
8-10	1.9	20.7	1.1	24.73
10-12	25.0	41.1	9.3	27.40
12-14	46.7	6.8	39.5	9.32
14-16	20.2	4.3	34.7	6.32
16-18	5.8	12.1	8.6	12.32
18-20	0.3	12.7	4.1	16.26
20 and over	-	1.0	2.6	3.55

#### Forest camp use

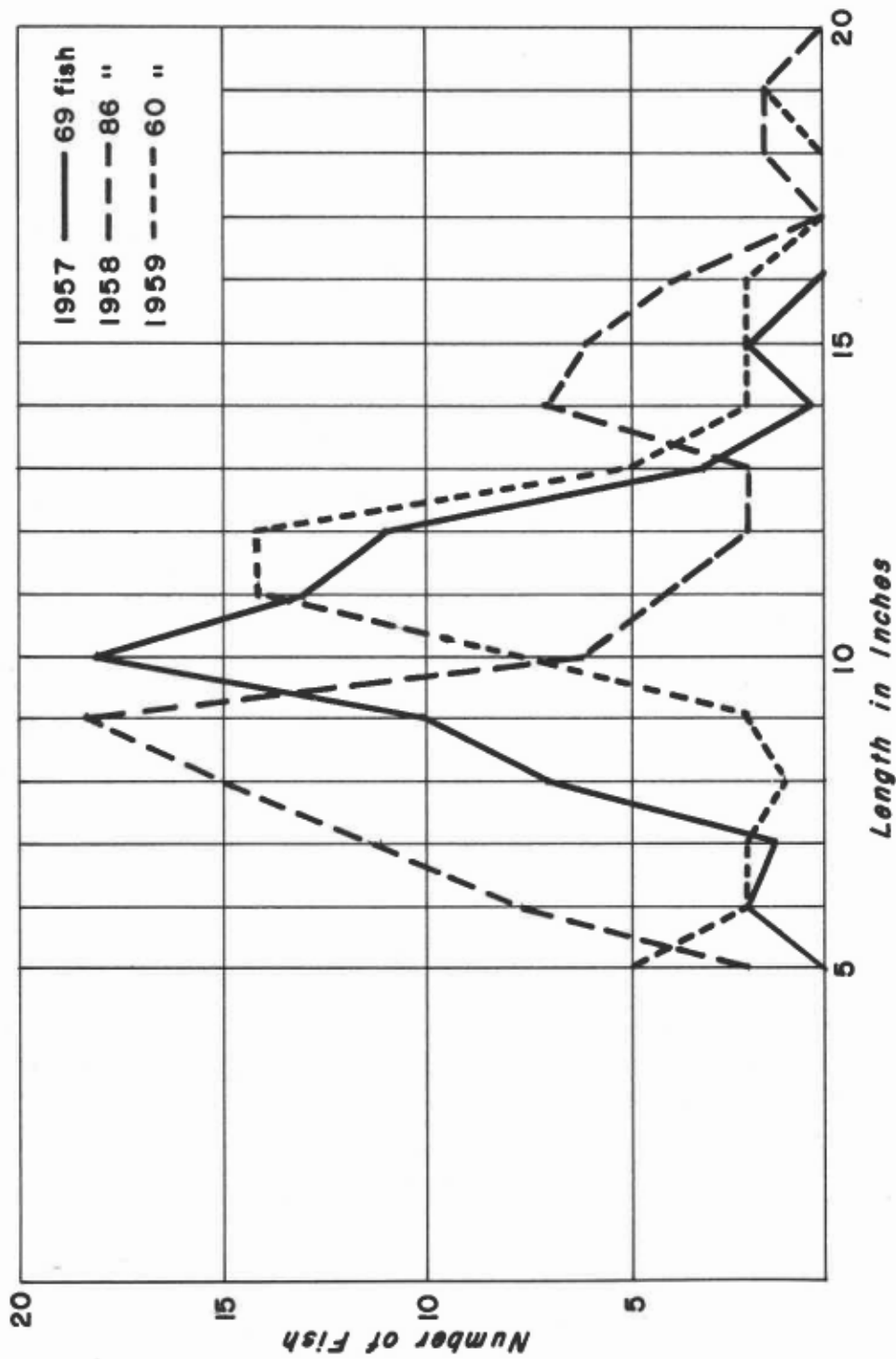
The U. S. Forest Service camps at Diamond Lake are under private operation and a fee is charged. In 1959 a lack of facilities to handle large crowds caused the Forest Service to block all entrances to the camps with the exception of the main gate. By this means the number of camps in the area was limited to 320. Overflow crowds on opening weekend were directed to the picnic area after the regular campground quota was reached.

The use of the forest camps was light after Labor Day weekend and the operators of the campgrounds opened the camps to free use. Table 153 lists the public use of the campgrounds from 1956 through 1959.

#### Egg-take

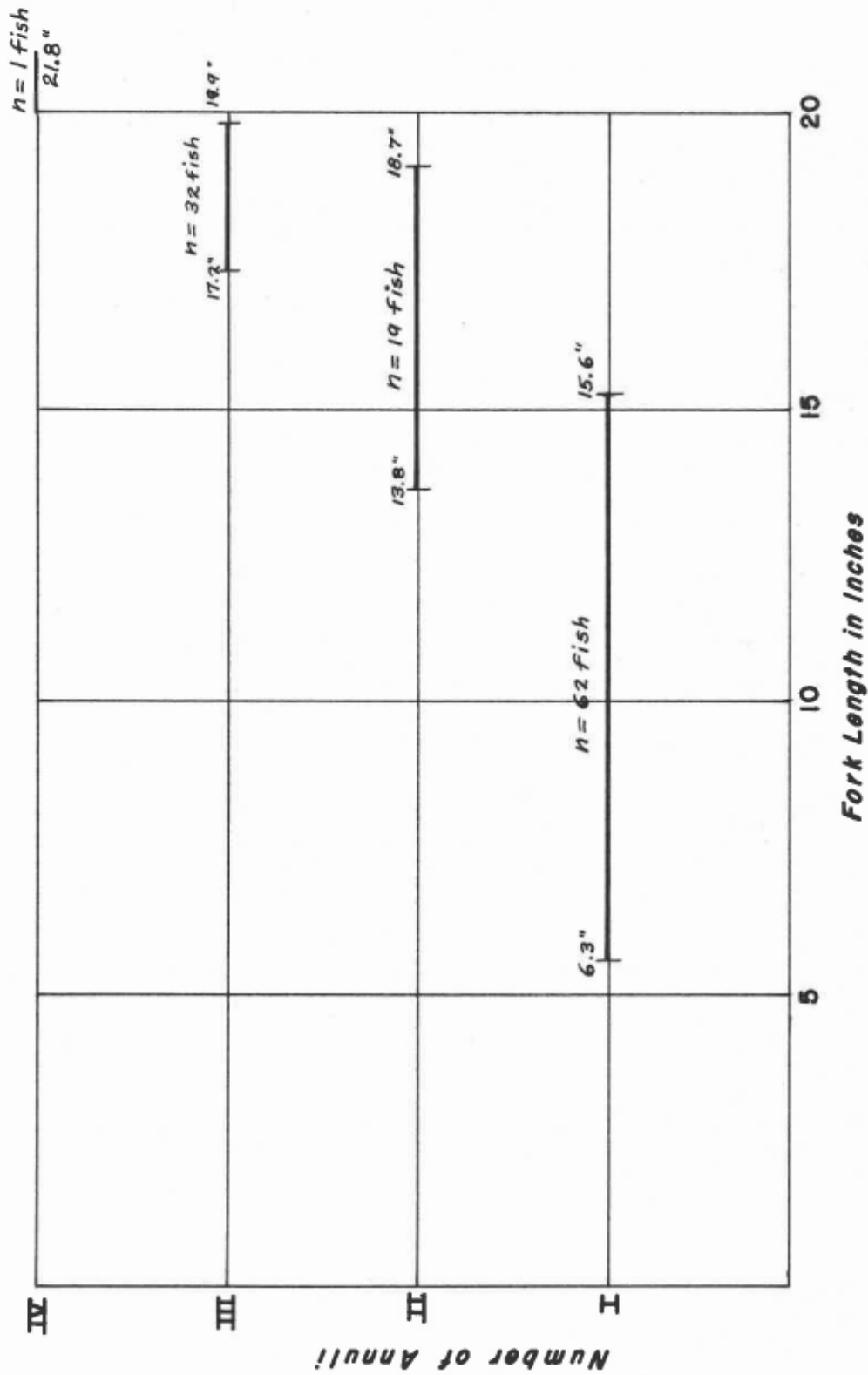
The ice on Diamond Lake started breaking on April 17, 1959, and was gone by April 21. Spawning operations began May 4 and were completed in late May, with 2,556 female trout being spawned to obtain 5,400,000 eggs. From

Figure 13



COMPARISON OF LENGTH FREQUENCIES OF FISH TAKEN BY GILL NET FROM  
DIAMOND LAKE

Figure 11.



GROWTH RATE OF RAINBOW TROUT FROM DIAMOND LAKE, 1959

these eggs 1,000,000 fry were placed into Diamond Lake between June 13 and 19, 1959; 1,000,000 fry were released into Klamath Lake from the Klamath Hatchery; the Fish and Wildlife Service took 2,100,000 eggs and eyed them at the Diamond Lake station before shipping them to its hatchery; and 700,000 fry were placed into Odell and Crescent Lakes from the Diamond Lake station.

All of the small tributaries were blocked by barriers as in 1958, and all of the eggs were taken from Short, Silent and Lake Creeks. Some natural spawning occurred in Silent Creek after pickets were removed by unauthorized persons allowing gravid fish to move upstream during the last of the spawning run. Length frequencies of spawning female trout from Diamond Lake are presented in Table 154.

Table 153

Public use, Diamond Lake pay camps,  
1956-1959

Year	Number of people	Number of camps	Number of trailers
1956	29,775	6,559	1,478
1957	40,616	8,714	2,808
1958	38,729	7,490	2,646
1959	31,173	7,205	- /1
Totals	140,293	29,968	6,932

/1 No data available

Table 154

Length frequencies of a sample of spawning rainbows,  
Diamond Lake, 1959

Length in inches	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Number of trout	2	18	53	35	20	5	3	2	1	1	1	1		1

The fry released in June made excellent growth during the summer. The percentage of crippled fish that was present in 1958 was not found in the fry released in 1959.

An inclined plane trap in Lake Creek, outlet of Diamond Lake, was fished twenty-three days during August and September, and forty-seven fish approximately two inches long were taken.

#### Bottom samples

Bottom sampling procedures at Diamond Lake were changed in 1959 to conform to a statistical sampling program suggested by the experiment station at Oregon State College.

The various bottom types were located in the lake and random samples were taken in each area. Weight of fish food per surface acre was then calculated for each type of sample. With these data, the average number of pounds per acre for the total lake was determined. Table 155 presents the amount of fish food per surface acre for Diamond Lake for 1956 through 1959.

Table 155

Comparison of bottom food samples,  
Diamond Lake, 1954-1959

Month	Year	Pounds per acre
October	1954	2.6
July	1955	3.2
October	1955	92.8
October	1956	145.2
October	1957	169.1
October	1958	109.9
October	1959	69.2

Thirty-six samples were taken in 1959, and the amount of fish food per surface acre was calculated to have decreased 40.88 pounds from 1958. This apparent weight loss was attributed to the change in sampling procedures since the chironomids and oligochaets were the only animal species to decrease. The areas where these species are found were the only areas affected by the change in sampling methods. An increase in numbers of all other types was found in the samples as presented in Table 156.

Table 156

Number and percentage by number of animals in bottom food samples,  
Diamond Lake, 1959

Species	Number	Percentage
Shrimp	3,338	66.29
Midge	481	9.55
Aquatic worms	220	4.37
Leeches	571	11.35
Mayflies	265	5.26
Caddis	121	2.40
Snails, damsel	39	0.78

#### Summary of catch statistics

The 1959 calculated catch statistics that were obtained from data collected at Diamond Lake by the sampling program, proposed by the Oregon State College statistician, are presented in Table 157. A comparison is also made with the data obtained in 1956-1958.

Table 157

Summary of Diamond Lake catch statistics,  
1956-1959

Item	1956	1957	1958	1959
Angler trips	34,706	52,625	42,969	27,834
Total trout caught	61,430	55,077	46,883	22,602
Poundage	60,876	60,578	67,512	38,204
Catch per surface acre, pounds	20.0	20.6	23.0	13.2
Average weight of fish, pounds	0.99	1.10	1.44	1.69
Hours angling per fish	2.09	4.89	4.74	5.45
Fish per angler	1.77	1.05	1.09	0.81

#### Devils Lake

Angler success at Devils Lake in 1959 was limited by extremely low water levels. Only the flow of springs prevented this lake from going completely dry.

#### Crescent Lake

##### Creel census

The kokanee fishery at Crescent Lake in 1959 was poor with only 0.55 kokanee per angler taken as compared to 1.97 in 1958 and 3.27 in 1957. Few of the landlocked salmon were caught after the middle of July.

A few lake trout that had been released in Crescent Lake in 1957 were taken by anglers. The condition of the fish was fair to good but showed erratic growth as lake trout from six to fifteen inches in length were found in the creel. Creel census data for Crescent Lake are listed in Table 150.

##### Kokanee egg-take

Trap nets were set in Crescent Lake November 2, 1959, to start a kokanee egg-take. Kokanee started entering the traps immediately and the first were spawned November 9, 1959. Best success was found along the shore by the lodge.

#### Fourmile Lake

Rainbow fingerling that were released into Fourmile Lake for the first time in 1957 have started to appear in numbers in the creel. Kokanee maintained the same level as in the 1958 catch. Eastern brook declined in numbers in the catch but this could be caused by the lack of stocking of these fish in 1958. Creel census data for Fourmile Lake are contained in Table 150.

#### Klamath Lake

The winter trout fishery has increased on Klamath Lake because of the mild winters the past two years and because the lake did not freeze over during the winter of 1958-1959.

The summer fishery was limited in 1959 because of the extreme drawdown of the lake for irrigation and power. Many of the areas that are normally fished during the summer were dry or were too shallow to fish by boat.

#### Lake of the Woods

##### Creel census

Water skiing and speedboat activities increased on Lake of the Woods in 1959 to the extent that many anglers refused to fish the lake. Angling was limited to early morning fishing during the summer. Creel census data for Lake of the Woods are found in Table 150.

##### Parasite, Schistocephalus

The tapeworm Schistocephalus is still present in the trout at Lake of the Woods. Fifty per cent of the fish taken in gill nets set in October, 1959, had the parasite present in the body cavity or tissue of the liver, kidney or stomach. The worm was not as prevalent in the fish in 1959 as those examined from nets set in 1958, but the visible loss caused by the tapeworm was apparently greater this year.

Kokanee that were released into Lake of the Woods as fingerling in August, 1958, entered the catch in 1959 at nine to ten inches in length.

##### Bottom samples

Thirty-three bottom samples were taken at Lake of the Woods under a random sampling program.

The calculated amount of fish food per surface acre at Lake of the Woods was 42.3 pounds in 1959, a decrease of 64.2 pounds from 1958. It is believed that the change in sampling practices caused this large variation. A comparison with past years' samples is presented in Table 158.

Table 158

Bottom samples, Lake of the Woods  
1941-1959

Year	Number of samples	Pounds per acre
1941	10	36.0
1947	27	53.4
1955	35	17.2
1956	20	3.0
1957	25	35.5
1958	25	106.5
1959	33	42.3

The numbers and types of animal species present in the bottom samples from Lake of the Woods are shown in Table 159.



Table 159

Number and percentage of bottom food organisms,  
Lake of the Woods, 1959

Species	Number	Percentage
Midge	209	38.63
Aquatic worms	133	24.58
Mayflies	80	14.79
Dragonflies	34	6.28
Shrimp	39	7.21
Leeches	18	3.33
Alder, damsel	28	5.18

Odell Lake

Creel census

Angling at Odell Lake was slow in 1959 with a catch per angler of 1.05 fish. The lake trout catch decreased with only 0.23 fish per angler as compared to 0.35 fish in 1958. Fifty per cent of the trout were under twenty inches, and, of those, twenty-two per cent were from the 1951 plant and five per cent were from the 1952 release.

The kokanee fishery remained approximately the same with a catch of 0.44 fish per angler in 1959 compared to 0.49 fish in 1958. The size of the landlocked sockeye increased in 1959 to an average of fifteen inches as compared to thirteen inches in 1958. Creel data for Odell Lake are found in Table 150.

Length and weight frequencies of lake trout

Length frequencies of the lake trout catch from the 1951 releases into Odell Lake are compared in Table 160 for the years 1955-1959. Marked fish over twenty-two inches in length decreased in the catch. Thirty-seven per cent of the fish caught by anglers in 1959, as compared to forty-four per cent in 1958, were from this size group. The smallest 1951 lake trout taken was 14.7 inches long and weighed 1 pound 8 ounces.

Table 160

Length frequency of a sample of lake trout in the sport catch  
from a stocking of yearling fish in 1951 in Odell Lake, 1955-1959

Size, inches	Percentage of 1951 stocking of fish in each size group				
	1955	1956	1957	1958	1959
10-12	8	2	3	-	-
12-14	34	13	11	9	-
14-16	36	43	32	21	4
16-18	16	23	8	15	18
18-20	2	11	1	-	18
20-22	3	2	14	11	23
Over 22	1	6	31	44	37

Length and weight frequencies for sport-caught lake trout from Odell Lake are shown in Tables 161 and 162. The number of fish under twenty inches remained approximately the same as in 1958.

Table 161

Length frequency of a sample of sport-caught lake trout in Odell Lake, represented by percentage in two-inch size groups, 1952-1959

Size, inches	Percentage in each size group by year							
	1952	1953	1954	1955	1956	1957	1958	1959
Under 20	0	0	0	70	84.7	54.7	32.6	33.3
20-22	0	4	11	1	5.3	2.8	12.1	17.9
22-24	1	6	6	2	1.4	7.5	10.8	16.7
24-26	9	6	22	4	1.0	11.4	15.6	17.9
26-28	19	12	11	5	1.4	6.6	2.4	5.2
28-30	22	22	11	3	1.4	7.5	12.1	1.3
30-32	15	22	16	5	2.0	5.8	6.0	5.2
32-34	18	16	11	7	1.4	1.9	6.0	2.5
34-36	14	4	0	3	0.5	0.9	2.4	0
36-38	2	6	6	0	0.5	0.9	0	0
38-40	0	2	6	0	0.4	0	0	0

Table 162

Weight frequency of a sample of sport-caught lake trout, represented by percentage in two-pound weight classes, Odell Lake, 1952-1959

Pounds	1952	1953	1954	1955	1956	1957	1958	1959
0-2	-	-	-	57	47	7	17	17
2-4	-	-	-	13	12	5	8	27
4-6	3	8	11	4	9	18	11	24
6-8	11	4	27	6	6	20	24	20
8-10	21	28	6	5	3	14	11	4
10-12	19	10	16	3	8	14	10	3
12-14	15	26	16	7	5	7	10	4
14-16	10	8	6	4	5	7	1	1
16-18	9	2	0	1	2	5	7	0
18-20	6	8	6	0	1	3	1	0
20-22	4	2	0	0	1	0	0	0
22-24	2	2	6	0	0	0	0	0
24 and over	0	2	6	0	1	0	0	0

#### Stomach analysis

Stomach analyses were made on thirty-two lake trout from Odell Lake. Twenty-eight per cent of the stomachs were empty and nine per cent contained trout. Table 163 lists the data obtained from the lake trout in 1959.

Table 163

Stomach analysis of lake trout taken,  
Odell Lake, 1959  
June through September

Size of specimen	Specimen number	Fish			Digested	Empty	Insects
		Whitefish	Trout	Roach			
Large	1				3		
	2	3					
	3	6	2 Rb				
	4				2		
	5	1					
Medium	1			1			
	2				1		
	3		2 LT				
	4			2			
	5	1					
	6	1					
	7				5		
	8	1					
	9			1			
	10			1			
	11						
	12	1			1		
Small	1						X
	2					X	
	3					X	
	4					X	
	5					X	
	6						X
	7					X	
	8		8 Rb				
	9					X	
	10					X	
	11					X	
	12				2		
	13					X	
	14				1		
	15	1					

#### Roach control

Partial roach control was continued at Odell Lake during the months of June and July, 1959. One small mesh trap was set in areas of known concentrations of spawning roach by the guide at Summit Lodge. Excellent results were had this year with the trapping of 4,500 pounds of fish, or an estimated 36,000 roach.

### Roach migration

An inclined plane trap was installed in Odell Creek approximately one-half mile from Odell Lake to determine the extent of downstream roach migration. The trap was fished fifteen days, and 5 one-inch roach were taken. Two rainbows, one whitefish, and one lake trout seven inches long were also captured.

### Lake trout marking

Forty yearling lake trout were marked to check the extent of fin regeneration. The fish were divided into four groups and either the dorsal, ventral or pectoral fin or the maxillary bone was removed. The fish have been retained in a holding tank at the Klamath Trout Hatchery, and the results of the tests for the period from January 1959 to November 1959 are presented in Table 164.

Table 164

Results of marking experiment of lake trout to check  
for fin regeneration, 1959

Mark	Number of fish	Condition of mark
Pectoral	10	Excellent
Pelvic	10	Good
Dorsal	10	Good
Maxillary	10	Fair

Pelvic and dorsal marks on the lake trout are in good condition, but three fish that were not marked close have fin ray stubs evident. There are no signs of growth from these stubs. The maxillary mark is fair as it was impossible at a glance to see the mark on two fish because of the covering of the marked area with skin coloration of the head.

### Miller Lake

#### Toxicity

Livebox tests using rainbow trout, made in Miller Lake in June and September 1959 to check the toxicity of the lake, showed the water to be still toxic. Water was obtained from Miller Lake and test lamprey obtained from the lake before it was poisoned in September 1958 were placed in it at Klamath Hatchery. The lamprey were all dead at the end of two weeks.

#### Lamprey

Lamprey larvae were observed dead and dying in Miller Creek, outlet of Miller Lake, in March 1959, approximately six months after the lake was poisoned. A few dead larvae were observed along the shoreline of Miller Lake the last part of May.

The test lamprey that were obtained from Miller Lake in September 1958 and kept at the Klamath Hatchery as test animals started dying during the month of June 1959 and were all dead by August 1959. It was believed that they had reached the end of their normal life cycle.

#### Lamprey barrier

A barrier was constructed at the falls on Miller Creek, approximately one mile downstream from Miller Lake to prevent reinfestation of the lake by lamprey that may have survived in swamps or small feeder streams below the falls. The installation consists of rock and mortar construction, thirty-six feet long and forty-four inches high at the spillway. A metal lip was imbedded in a waterproof plastic compound to prevent the lamprey from going over the dam.

### Klamath River

#### Creel census

Klamath River above and below Big Bend power project produced excellent angling in 1959. After the completion of the power project, sections of Klamath River that were inaccessible became available to the public by the construction of a road along the river by the California-Oregon Power Company. Creel census data for Klamath River are listed in Table 150.

#### River flow

Fluctuations of Klamath River below Big Bend power house were followed by the use of flow charts received from U. S. Geological Survey. During a twenty-four hour operation of the plant the river may fluctuate from a low of 490 c.f.s. to a maximum of 2,200 c.f.s. The plant is used for peak power, and the flow of the river will fluctuate with the demand. The rate of change of the flow is a maximum of 0.9 foot per hour, but during emergencies the total flow of the canal is placed into the river immediately, either at the dam or the forebay of the tunnel.

#### Big Bend screen and ladder investigation

Little information as to the time of movements of a resident population of rainbow trout was available for Klamath River when the Big Bend power project was constructed. This information is necessary to determine the length of time during the winter that the screens on the canal to the power house should be operated. A three-year trapping program was begun in cooperation with the California-Oregon Power Company.

A floating inclined plane trap was used to check the downstream migration that was bypassed over the screen through a free fall that spilled into the river below the dam. The upstream migration was surveyed by the use of a trap with a submerged entrance in the bottom pool of the fish ladder.

Fish migrations upstream and downstream were apparently controlled by water temperatures. When temperatures of Klamath River increased the runs

of trash fish were large and during temperature decreases trout were taken in large numbers. The total number of fish taken in the upstream and downstream traps during forty-seven days of trapping in 1959 is listed in Table 165. The size of trout taken in the upstream trap was from three to eighteen inches and, in the downstream trap, one to nine inches.

Table 165

Number of fish taken in upstream and downstream traps at  
Big Bend Dam, Klamath River, 1959

Species	Upstream trap	Downstream trap
Rainbow	958	244
Dace	7,322	1,118
Suckers	2,380	151
Roach	516	495
Bluegill	47	12
Bass	1	4
Crappies	7	-
Cottids	2	41
Lamprey	3	25
Tadpoles (bullfrogs)	-	401
Bullfrogs	-	14

Ten thousand marked rainbows were released at the head of the reservoir to determine the extent of migration downstream. During the periods of trapping, thirty-seven marked trout were taken in the upstream trap and two in the downstream trap. Reports have been received that a number of marked fish have been taken by anglers as far downstream as the state line.

#### Williamson River

Report of dead fish below the effluent outlet of the Johns-Manville fiber board plant on the Williamson River were received in March 1959. No definite evidence as to numbers, species or size of fish was obtained.

A cooperative test was made with Johns-Manville to check the toxicity of the mill waste entering the river from the settling lagoon. The waste was pumped from the lagoon into Williamson River at approximate eight-hour intervals. Liveboxes were placed in the stream above the outlet as a control, at the outlet, fifty yards below, and two hundred yards below. Test trout in the liveboxes located away from the outlet remained in excellent condition during two weeks of testing. Fish in the livebox at the outlet were killed within twelve hours when placed in slightly diluted effluent and forty-eight hours in a greater dilution.

All processes of the plant were checked to find the place of entry into waste water of a toxic material. A fungicide, sodium pentachlorophenate, that is quite toxic to fish, was in casein paint used to coat the insulation board. Large quantities of spoiled paint containing the chemical had been

placed into the settling basin. All precautions possible are being taken by Johns-Manville to prevent further entry of paint into the waste water.

#### Fish population studies

Fish population studies were made on six lakes in the Klamath District. Collections were made with graduated mesh gill nets and length frequency data are presented in Table 166.

The degree of maturity was recorded for females in each sample, and the data are listed in Table 167.

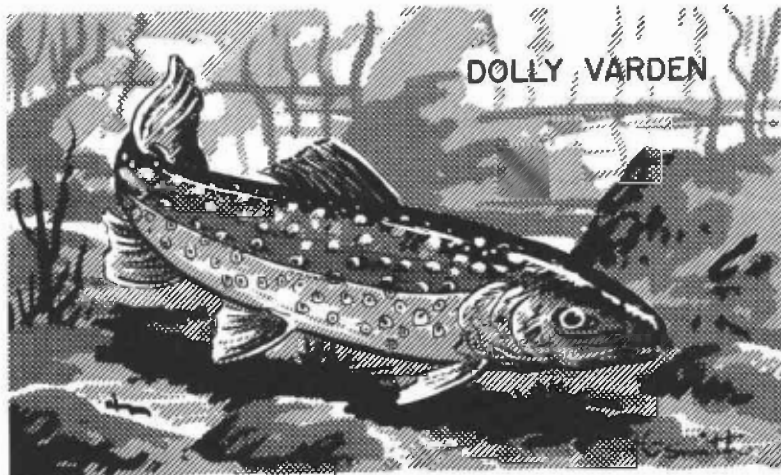


Table 166

Composition and length frequency of catch by gill nets in six Klamath District lakes, represented by one-inch size groups, 1959

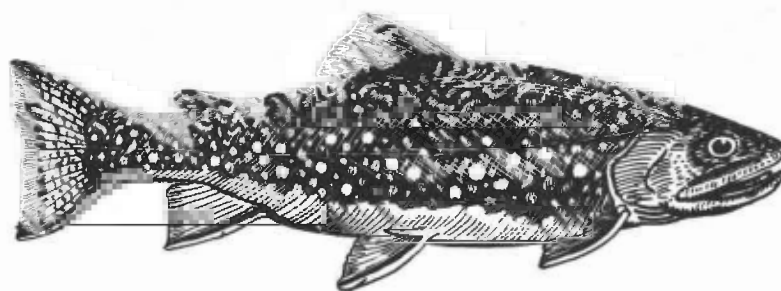
Lake	Number of sets	Species	Number taken	Percentage of catch	Fork length in inches																20 and over
					5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
Crescent	8	Rb	15	2.08	2		1	3	1	7	1										
		LT	2	0.28					1	1											
		Wf	13	1.80		1		3	2	2		2		2	1						
		Ro	691	95.84																	
Diamond	4	Rb	60	100.00	5	2	2	1	2	7	14	14	6	2	2	2			1		
Fourmile	4	Rb	15	22.06	6	3	2	3	1												
		EB	45	66.18	1		1	12	21	7	3										
		K	8	11.76				3	4	1											
Lake of the Woods	4	Rb	34	70.83	9	9	15								1						
		EB	9	18.75				2	6	1											
		K	5	10.42				1	2	2											
Odell	8	Rb	4	0.61		1	1			2											
		K	2	0.31												1	1				
		Wf	147	22.48		22	19	25	18	20	19	16	5	2							
		LT	3	0.46														1			
		DV	1	0.15								1									
		Ro	497	75.99																	
Summit	4	K	6	85.72		1	4											1			
		LT	1	14.28			1														



Table 167

Average length of female fish in each stage of maturity  
as collected in gill net sets in Klamath District, 1959

Lake	Species	Immature		Maturing		Mature	
		Number in sample	Average length, inches	Number in sample	Average length, inches	Number in sample	Average length, inches
Crescent	Rb	9	8.8	-	-	-	-
	LT	1	9.0	-	-	-	-
	Wf	2	8.2	1	8.3	5	13.9
Diamond	Rb	20	11.7	4	16.3	-	-
Fourmile	Rb	6	7.1	-	-	-	-
	EB	-	-	19	9.1	6	9.4
	K	-	-	1	10.2	-	-
Lake of the Woods	Rb	12	6.8	1	7.5	-	-
	EB	-	-	3	9.0	-	-
Odell	Rb	2	10.5	-	-	-	-
	LT	1	18.1	-	-	-	-
	K	-	-	1	17.1	-	-
Summit	K	3	7.1	-	-	-	-



# JOHN DAY

J. A. Hewkin

## Anadromous species

### Creel check

Steelhead anglers were present in greater numbers and spent more time to catch a fish than during the 1958 season. Creel census data collected by State Police personnel and Game Commission employees indicate that 375 anglers caught 89 steelhead in 1,499 hours of effort. This represents 0.165 fish per angler caught at the rate of 14.98 hours per fish. Creel check figures are presented in Table 168.

Table 168

Steelhead creel check, John Day drainage, 1959

Stream	Month	Number of anglers	Hours of angling	Number of fish	Hours per fish	Fish per angler
North Fork John Day	January	9	38	1	38.00	0.111
	February	85	335	21	15.95	0.247
	March	135	560	44	12.72	0.326
John Day River	December	21	120	6	20.00	0.285
	January	13	71	0	-	-
	February	22	65	0	-	-
	March	90	310	17	18.23	0.188
Totals 1959		375	1,499	89	16.84	0.237
1958		197	457	72	6.34	0.365
1956		309	831	95	8.75	0.307

The average length of 71 steelhead was 24.7 inches fork length. Sixty-three per cent of the catch was comprised of female fish during 1958 and 1959. Table 169 presents steelhead data as recorded in 1958 and 1959.

Table 169

Average fork length of steelhead in angler take and percentage of females, John Day system, 1959-58

Year	Sex	Number measured	Average fork length	Percentage of catch	Maximum length	Minimum length
1959	Male	30	24.5	42.3	28.5	20.5
	Female	41	25.0	57.7	30.0	22.0
1958	Male	25	25.4	36.8	28.0	22.0
	Female	43	23.8	63.2	30.0	21.0

The main stem of the John Day River produced best angling results in February. The North Fork of the John Day showed best returns in March and the John Day and Mt. Vernon area did not produce until late March and early April.

Water conditions were generally low and quite clear throughout the winter angling season enabling anglers to have considerable success with spinners and various lures. During the previous season, bait was primarily used. All fish checked in 1958 were taken on either cluster eggs or worms.

#### Steelhead spawning ground survey

Low and clear water conditions enhanced the observation of spawning activity in streams of the John Day drainage resulting in the detection of a higher number of redds than usual. The actual number of steelhead observed per mile of stream is comparable to previous counts. Table 170 is a tabulation of spawning ground counts of 1959, 1958, and 1956.

Table 170

#### Steelhead spawning ground survey

Stream	Number of steelhead	Miles checked	Number of redds	Fish per mile	Fish per mile	
					1958	1956
Parrish	5	2.0	21	2.5	4	10
Bear Creek	12	3.0	27	4.0	2	no count
Cottonwood (Dayville)	0	2.0	6	-	2.5	no count
Fields Creek	0	2.5	29	-	2.4	4.8
Riley Creek	3	1.0	9	3.0	0.0	6.0
Canyon Creek	10	4.0	16	2.5	no count	
Totals	30	14.5	108	2.0	2.4	3.6

The spawning period in the drainage commenced in early April in streams of lower elevations and progressed slowly into streams of the upper drainage where spawning steelhead were observed into the month of May.

#### Chinook salmon spawning survey

No spawning chinook were found in the Middle Fork of the John Day or in the upper John Day River in 1959. In 1958 five spent adult salmon were noted in the upper river.

Spawning grounds in Clear Creek and Granite Creek of the North Fork of the John Day drainage contained spawning chinook during the first week of September. By September 8 most salmon were spent. Temperature of Granite Creek was 68° and that of Clear Creek was 56° on September 8. Spawning activity in the warmer waters of Granite Creek appeared to have terminated about a week earlier than spawning in Clear Creek. Table 171 is a tabulation of spawning ground data for 1959, 1958, and 1957.

Table 171

## Salmon spawning survey in Watershed 6, 1959

Stream	Miles surveyed	Salmon	Jacks	Redds	Salmon count		Remarks
					1958	1957	
Clear Creek	3.0	26	15	13	4	35	Mount to second bridge
Granite Creek	4.5	14	0	27	16	81	Buck to Bull Run Creek
John Day, Middle Fork	12.0	0	0	0	3	50	Vinegar to Coyote Creek
John Day, Upper	3.0	0	0	1	4	No count.	Reynolds to Tuttles

Fish salvage, Dad's Creek

Irrigation water from Dad's Creek is available only during the spring runoff period. Livetrapping studies and fish salvage work conducted in 1957, 1958 and 1959 show that the ditch diverts water on an average of 31 days each season. During the three-year period of trapping, 915 steelhead migrants were salvaged. Information obtained from the trapping data will be useful in determining if rotary screens should be installed in ditches of this stream. Trapping results are presented in Table 172.

Table 172

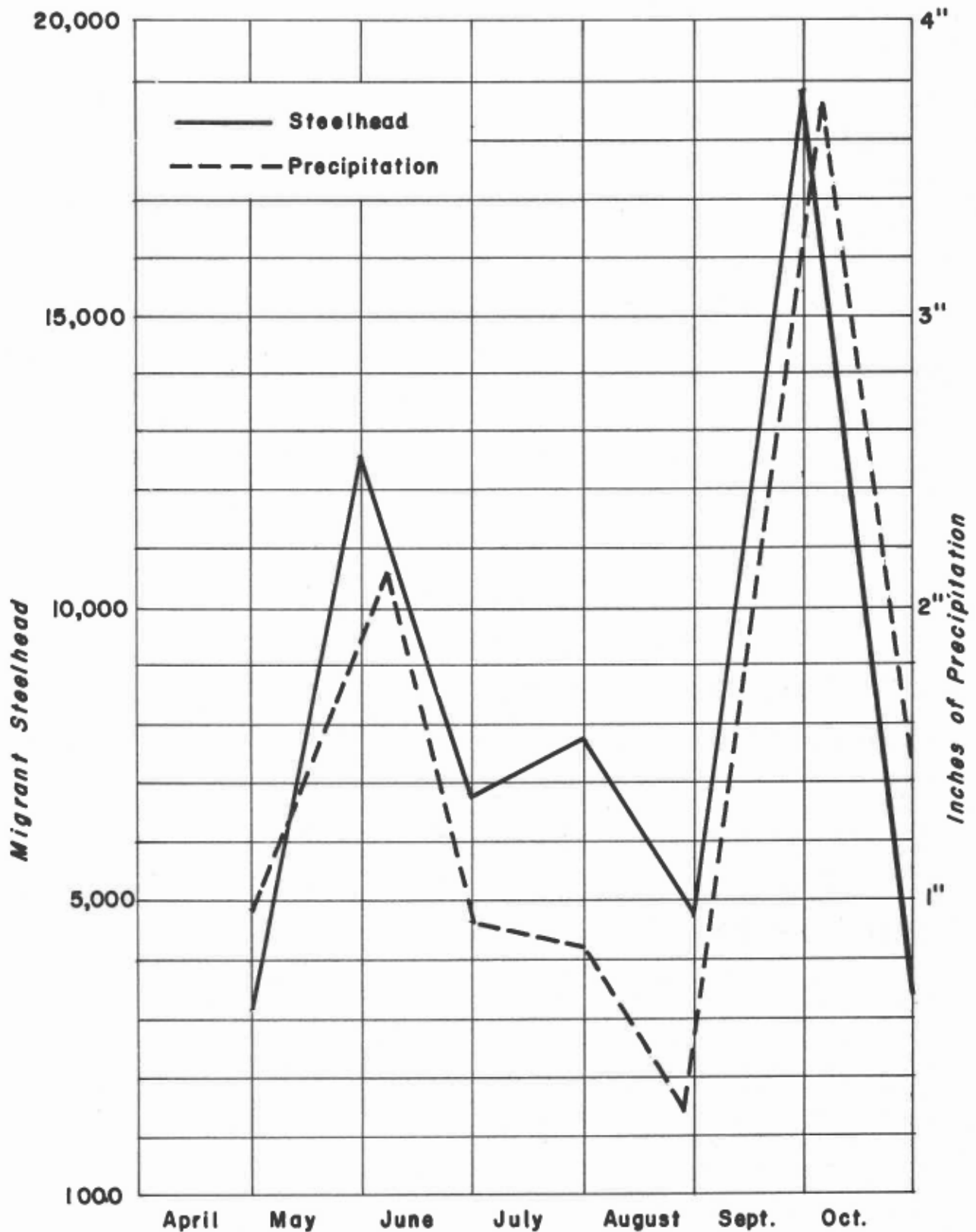
Live trap fish salvage at Dad's Creek, Grant County  
 April 26 to June 3, 1959  
 with comparison of years 1958 and 1957

Year	Days of trap operation	Steelhead in 2-inch size groups					Total
		0-2	2-4	4-6	6-8	8-10	
1959	36	18	188	71	133	0	410
1958	30	43	2	4	0	0	49
1957	27	0	371	69	14	2	456
Totals		61	561	144	147	2	915
Percentage		7	60	17	16	trace	

Rotary fish screens

A considerable increase in number of steelhead and salmon migrants was recorded at rotary screen bypass traps in the John Day drainage during 1959. It is believed the increase was largely due to low water conditions and early irrigation activity. The snow pack in Watershed 6 was very light and the spring and summer were notably dry. Early fall rains occurring in September bolstered stream flow throughout the drainage and was an apparent influence in starting a heavy migration of steelhead downstream. Figure 15 charts the monthly migration pattern of steelhead in the John Day drainage as recorded at rotary screen bypass traps and compares the migration with the rainfall. The precipitation data used in Figure 15 was obtained from the records kept at the John Day City Maintenance Department.

Figure 15



DOWNSTREAM STEELHEAD MIGRATION PATTERN SHOWING MONTHLY TOTALS AS RECORDED IN JOHN DAY SYSTEM OF ROTARY SCREEN BY PASS TRAPS 1959 WITH MONTHLY RAINFALL COMPARISON

From March 23 to November 13, 1959, rotary screen bypass traps salvaged 56,094 steelhead trout and 403 chinook salmon migrants. Other species salvaged include 16 Dolly Varden, 272 cutthroat, 408 whitefish, 43 catfish (bullhead) and 950 squawfish (destroyed). A few carp were also taken from the lower portion of the South Fork of the John Day River and the main river below Dayville. Previously carp had not been detected at bypass traps. A weekly tabulation of the rotary screen bypass trapping in the John Day drainage is presented in Table 173.

The size distribution of steelhead migrations is presented in Table 174 with 1958 and 1957 data for comparison. The 0 to 2 inch size group and the 6 inch plus group show a decided increase in 1959. Table 175 is a summary of partial sampling of downstream migrant trapping on streams in the drainage over a three-year period. A four-year migration pattern is presented in Figure 16 as recorded from rotary screen bypass traps.

Thirty-four per cent of the steelhead taken at bypass traps were in the 0 to 2 inch size group, twenty-three per cent in the 2 to 4 inch group, twenty-four per cent in the 4 to 6 inch group, and eighteen per cent were over 6 inches. These figures suggest a 13 to 15 per cent increase in the 6 plus size group as compared to the previous two years of trapping. Low water conditions this year probably caused a greater diversion of the total migration into irrigation systems providing bypass trap counts with a more exacting picture of the migration size pattern.

#### Resident fish

##### Creel check

At the opening of the trout season streams in the John Day system were in excellent angling condition and angling pressure was scattered. No heavy runoff occurred this spring because of lack of snow pack in the mountains.

The John Day dredge ponds received heavy angling use the first week with the majority of the catch consisting of recently planted trout. A number of 12 to 15 inch rainbow were also taken.

The John Day River produced some good trout angling during the spring but was poor angling during the summer period while temperatures were high. In the fall angling improved considerably throughout the drainage. Rainbow fingerling were released in the dredge ponds in May and these fish grew rapidly, producing returns to the angler in the fall.

The stocking of 2,286 catchable rainbow in the South Fork of the John Day River appeared to provide substantial returns to anglers throughout the season. There is a large population of undesirable species in the South Fork; however, the large hatchery trout seem to compete satisfactorily and maintained good condition.

Table 176 summarizes creel census data gathered by State Police and Game Commission employees.

Table 173

Weekly rotary screen bypass trap results  
John Day system - March 19 to November 13, 1959

Month	Week	Number of traps	Steelhead	Salmon	Dolly Varden	Cutthroat	Other species			
							Squawfish	Catfish	Whitefish	
March	3	2	5							
	4	3	5							
April	1	7	403				13			
	2	13	304				1			
	3	20	581 (8 adult steelhead)							
	4	27	1,777 (4 adult steelhead)							
May	1	26	1,428					1		
	2	31	4,289		2		2			
	3	33	4,106	5			4			
	4	36	2,967	5		3				
June	1	37	1,918	17		8	19	1		20
	2	40	1,704	15	5	2	15			16
	3	47	1,393	8		2	108	3		30
	4	49	1,940	14		3	67			3
July	1	49	2,600	22		4	58	7		6
	2	46	2,443	9	4	4	68	13		18
	3	46	1,651	7		1	73	6		33
	4	44	988	20	2	1	78	4		75
August	1	28	675	27		1	33	1		21
	2	26	1,487	10		1	40			9
	3	24	1,019	11		6	43			25
	4	27	1,496	4		130	49			101
September	1	25	276	5		15	145	1		15
	2	28	1,211	54		12	66	1		20
	3	31	11,379	82	1	49	42	4		12
	4	28	4,830	40	1	28	14			1

Table 173 (continued)

Month	Week	Number of traps	Steelhead	Salmon	Dolly Varden	Cutthroat	Other species		
							Squawfish	Catfish	Whitefish
October	1	20	720	24	1	1		1	
	2	14	858	15					
	3	14	707	3		1			3
	4	8	725	6					
November	1	4	135						
	2	3	74						
1959 totals			56,094 (12 adult steelhead)	403	16	272	938	43	408
1958			11,574	39	289	96	518	22	46
1957			11,806						
1956			28,055						

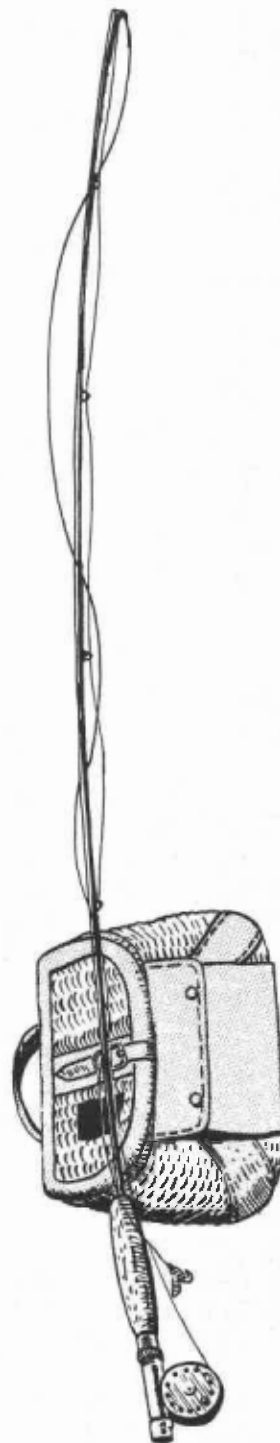




Table 174

Distribution of steelhead trout in 2-inch size groups as recorded at rotary screen bypass trap boxes in John Day system

Year	Number of traps	Size in inches				Total fish measured
		0-2	2-4	4-6	6 plus	
1959	49	18,516 34%	12,871 23%	13,509 24%	10,302 19%	55,198
1958	46	2,070 18%	5,812 51%	2,852 25%	736 6%	11,470
1957	35	752 18%	2,096 49%	1,218 29%	191 4%	4,257

#### Olive Lake

Olive Lake received slight angling use through the season and creel census data are meager for analytical value. Gill net sampling indicates the population of kokanee is continuing on a stable level. Mature female kokanee average 9.6 inches fork length measurement. Previous averages of fork length have not deviated over 0.2 inch. Table 177 is a tabulation of the population composition in Olive Lake as sampled by gill net in 1959 and compared with the 1958 and 1957 data.

Large rainbow fingerlings were released in Olive Lake this year. This is a departure from the fry plants of the previous twelve years. It is believed that large fingerlings will fare better in competition with the existing population of reidsided shiner. Forty-five thousand rainbow fry were released this year in addition to 70,000 large fingerling rainbow.

The spillway washout at Olive Lake which occurred in 1958 was repaired by the California Pacific Utilities Company under direction of the State Engineer. The new spillway consists of hand-placed boulders. Maximum level of the lake has been lowered seven feet.

#### Strawberry Lake

Early season angling was slow. Some good catches of rainbow and brook trout were reported taken in mid-summer and in the fall. Creel census data is scanty.

Gill net samples suggest that a well balanced population of fish exists. Brook trout are maturing at 11.8 and rainbow at 11.1 average fork length. The lake level dropped considerably this summer and a dense mass of aquatic vegetation, mostly buttercup, crowded the greater portion of the water area.

Composition and growth data taken from gill net samples at Strawberry Lake are shown in Table 178.

Table 175

A partial sampling of downstream steelhead migrants trapped at rotary screen bypasses in Watershed 6 during 1959 with comparison of numbers in 1957 and 1958

Stream	April	May	June	July	August	September	October	November	Total fish		
									1959	1958	1957
Roberts Creek		5	9	10	138	7	3		172	26	26
Rail Creek			1				1		2	11	
Laycock Creek	41	990	240	13		257	387	2	1,930	725	496
Deardorff Creek			1	1	8				10	532	143
John Day River	13	13	6	16	24	19			91	277	769
Reynolds Creek	29	9	1	56	186	652	39		972	155	188
Indian Creek	16	18	11	121	1,293	239	132		1,830	325	1,011
Little Indian Creek	56	164	49	18		14	33		334	492	
E. Fork Canyon Creek				270	651	3,150	806		4,877	115	203
Canyon Creek		8	38	392	70	1,209			1,717	272	286
M. Fork Canyon Creek			24	12	15	8			59	350	378
Big Boulder Creek			252	155	53	1,113	333		1,906	397	784
Elk Creek	4	263	1,016	957		16	7		2,263	294	73
N. Fork John Day			5	34	5				44	20	
S. Fork John Day	5	18	8	9	1	3			44	2	2
Davis Creek			59	781	1,000	31			1,871	1,104	940
Clear Creek			100	1,938	360	157			2,555	282	80
Beaver Creek		4	21	189	95	209	41		559	277	1,061
Camp Creek			1,137	4					1,141	106	131
S. Fork Long Creek			95	92	413	1,441			2,041		
Dixie Creek		4	1,166	1,556					2,726	123	380
Granite Boulder Creek		21	28	159	20	289	13		530	187	153
Beech Creek	223	6,290	458	11					6,982	885	73
Big Creek			1		49	135			185	26	
Butte Creek	2	11	22	1					36	161	24
Rudio Creek	1	737	143	6	6	74			967	306	13
Long Creek			126	61					187	192	29
Riley Creek	5	167	77	137					386	222	146
Cottonwood Creek											
(Monument)		106	51	55	76				288	2	

Table 175 (continued)

Stream	Total fish									
	April	May	June	July	August	September	October	November	1959	1958 1957
Cottonwood Creek (Dayville)	62	63	23	12		171	<u>350</u>		681	206
Squaw Creek	98	66							164	295
Service Creek	<u>173</u>	360	66	7	2				608	30
Alder Creek	127	<u>472</u>	94	2					695	156
Engle Creek	11	<u>4</u>	9						24	18
Vinegar Creek				93	51	99			243	430
Fields Creek	15	14	12	39					80	200
Widows Creek	103	126	89	<u>258</u>		131	137		844	292
Cummings Creek	159	98	16	<u>13</u>	23	862	533		1,704	907
Belshaw Creek	202	121	21	17		<u>417</u>			778	23
Moon Creek	23	56	33	44	65	<u>40</u>	18		279	36
Murderer's Creek		104	29	11		48	9		201	436
Rock Creek	3	<u>137</u>	879	74	125	<u>6,596</u>			7,814	21
Mountain Creek	294	<u>1,103</u>	46	1					1,444	17
West Branch Creek	17	3							20	5
Bridge Creek	3		1						4	
Bear Creek		1,023	163	30					2,538	40
Bear Creek (Galena)	<u>1,322</u>	67	150	62	14	88			381	
Totals									55,207	11,191 10,997

Note: Underscored figures denote peak of migration.

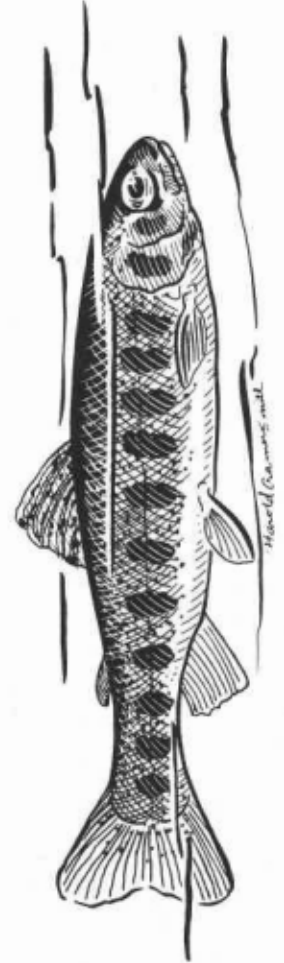
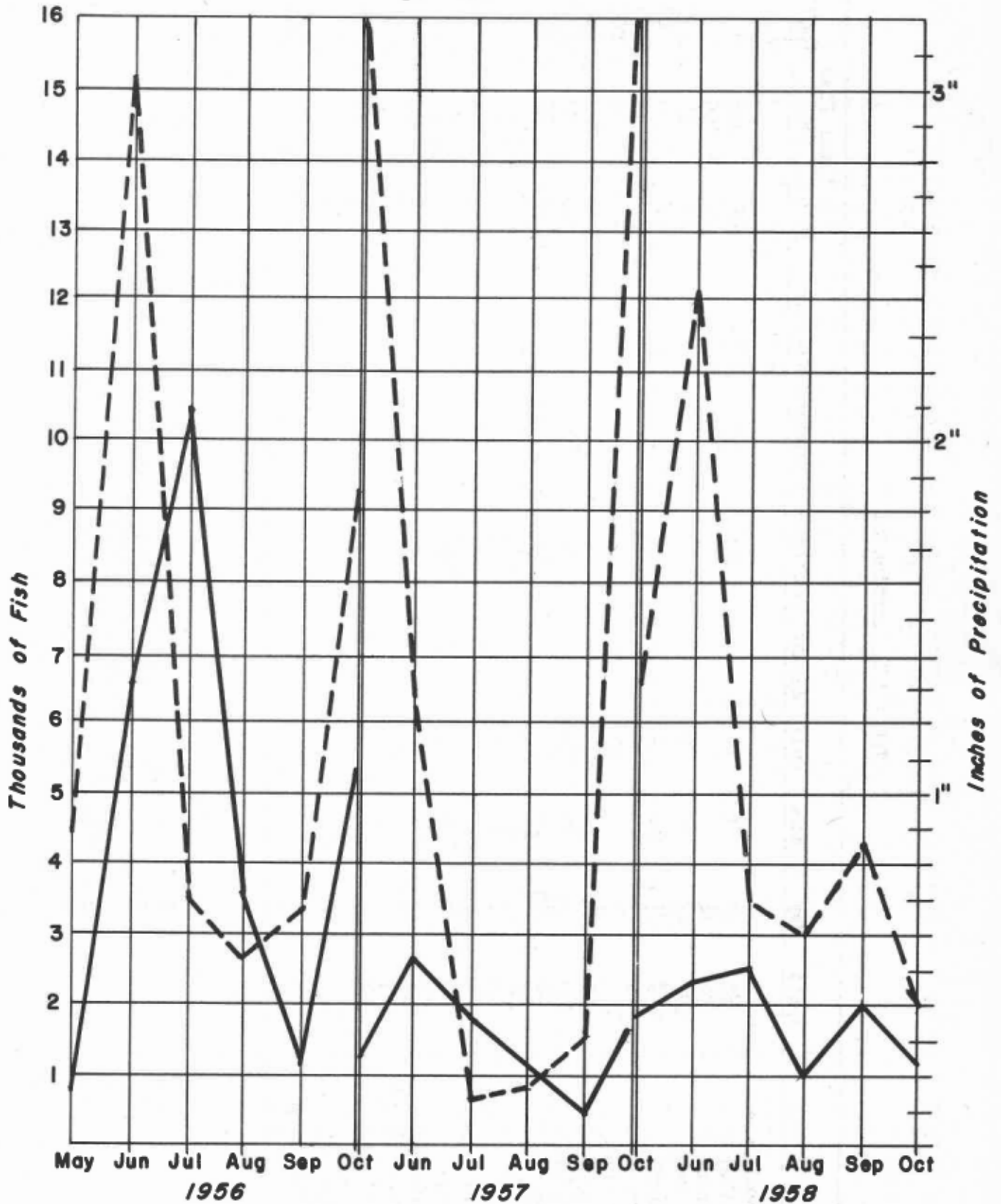


Figure 16



MONTHLY PATTERNS OF DOWNSTREAM MIGRANT STEELHEAD AT ROTARY SCREEN BY PASS TRAPS AND RAINFALL IN 1956-57-58 IRRIGATION PERIODS, JOHN DAY SYSTEM

Table 176

Summary of trout creel census data from some angling waters  
of Watershed 6 in 1959

Water	Species	Fish caught	Number of anglers	Hours angling	Fish per angler	Fish per hour
Patterson Pond	Rb	146	38	81	3.84	1.80
Oliver Ponds	Rb	450	88	293	5.12	1.53
Retherford Pond	Rb	58	18	39	3.22	1.48
Dove Ponds	Rb	32	6	11	5.33	2.90
Trowbridge Pond	Rb	77	16	41	4.81	1.87
Dollarhide Pond	Rb	50	5	11	10.00	4.55
Hubble Lake	Rb	9	2	5	4.50	1.80
South Fork John Day	Rb	17	3	5	5.66	3.40
Rowe Creek Reservoir	Rb	82	26	109	3.15	0.75
Owing Creek	Rb	34	9	18	3.77	1.88
Deer Creek	Rb	16	3	3	5.33	5.33
Trout Meadows	Rb	2				
	EB	18	5	25	4.00	0.80
Butte Creek	Rb	11	7	23	1.57	0.48
Thirty Mile Creek	Rb	12	5	16	2.40	0.75
Canas Creek	Rb	0	4	4	-	-
Long Creek	Rb	30	3	21	10.00	1.43
Trout Farm Pond	Rb	32				
	EB	21	13	15	4.08	3.53
Pole Creek	Rb	31	5	15	6.20	2.07
Meadows Creek	Rb	12	2	6	6.00	2.00
Rock Creek	Rb	4	2	2	2.00	2.00
North Fork John Day	Rb	2				
	EB	1	1	1	3.00	3.00
Desolation Creek	Rb	186	51	195	3.64	0.95
John Day River	Rb	32	3	18	10.67	1.77
Canyon Creek	Rb	115				
	EB	2	29	56	4.03	2.08
Strawberry Lake	Rb	28				
	EB	56	47	267	1.78	0.31
Magone Lake	EB	165	39	245	4.23	0.67

Table 177

Composition and length frequency of  
catch in gill nets at Olive Lake

Species	Number of fish taken	Fork length variation	Average length	Average length of maturing females	Previous average maturing size	
					1958	1957
Kokanee	10	9.1 to 10.0	9.5	9.6	9.8	9.6
Rainbow	64	5.4 to 15.0	7.5	10.0	10.0	9.7
Cutthroat	2	6.0 to 6.4	6.2	-	none	none

Table 178

Composition and length frequency of catch  
in gill nets at Strawberry Lake - September 1959

Species	Number of fish	Fork length variation	Average length	Average length of maturing females	Previous average length of maturing females		
					1958	1956	1954
EB	45	8.5 to 14.3	11.9	11.8	8.8	9.5	11.6
Rb	22	6.0 to 12.0	9.0	11.1	12.1		

#### Magone Lake

Angling was good throughout the season. Mid-summer anglers had best success stillfishing near the bottom with worms or dragonfly nymphs. Slow trolling with spoons also produced good results.

Magone has been stocked annually with small fingerling brook trout and since 1950, 202,936 have been released. Stocking of fingerling has been increased each year in an attempt to produce greater returns to the angler. Also this year in addition to a release of 50,274 brook trout, an initial stocking of kokanee was made. The abundant plankton of the lake may support a valuable kokanee fishery without unbalancing the existing fishery. Natural reproduction is not evident among the brook trout in Magone and it is probable there will be no kokanee reproduction. A small number of rainbow continues to maintain itself by spawning in a small tributary which feeds into the lake providing some limited gravel in the spring.

Species and size frequencies of trout taken by gill net in Magone Lake in 1959 are shown in Table 179. Fish condition and growth appear good; however, some small female brooks maturing at 6.6 inches appeared in the October gill net sample. Also a phenomenal 589 fish were taken in the sample. The previous high number taken was 69 fish in a gill sample last spring.

Table 180 presents length frequency data for gill net samples of brook trout from Magone Lake for ten years.

#### Additional angling water - Jump Off Joe

Six thousand rainbow fry, an initial release, were introduced into this three-acre lake in the Desolation area of the Umatilla National Forest on July 24, 1959. The lake contains a few large fish which have persisted from previous releases probably made by anglers. Natural reproduction is not known to occur.

The lake is accessible by trail in fifteen minutes from a Forest Service road which is generally open after mid-July.

#### Dayville Pond

A public access agreement for angling purposes was procured from the State Highway Department for a small gravel pit pond near Dayville. The pond

Table 179  
Composition and length frequency of catch by gill net  
in Magone Lake in 1959

Date	Species	Number of fish taken	Fork length variation	Average length	Average length of immature females	Average length of maturing females	Average length of mature females
4-21-59	EB Rb	69 2	5.7 to 16.7 14.8 to 15.0	10.5 14.9	11.0 none	none none	12.1 14.8
10-27-59	EB	589	5.5 to 17.0	8.69	none	none	9.1 (All females were ripe - No previous egg retention detected)



was stocked with over 700 catchable rainbow and according to reports from local citizens, angling was good.

Table 180

Size frequency of eastern brook taken by gill net from Magone Lake  
over a 10-year period

Year	Sizes in 2-inch size groups						Total fish	Fingerling stocked
	4-6	6-8	8-10	10-12	12-14	14-16		
1959								
(fall)	1	39	509	21	12	7	589	50,274
(spring)	9	4	4	46	3	3	69	
1958	0	5	1	7	2	0	15	28,347
1957	17	7	0	2	1	0	27	37,121
1955	2	21	12	0	0	2	37	16,955
1954	0	0	0	0	9	5	14	none
1953	0	12	0	3	0	0	15	none
1949	0	0	0	0	17	2	19	25,200 (1952) 20,000 (1950)

#### Barriers and pollution

Known instances of mining pollution occurred on Davis and Vincent Creeks which enter the Middle Fork of the John Day River. Sediment reservoirs constructed by the Hilltop Exploration Company at its mine on Davis Creek, with one exception, prevented excessive siltation this year. Previous mine siltation in Davis Creek has reduced the stream fertility considerably.

Logging continues to be a problem along small streams throughout the drainage. Most stream damage occurs where private land is involved. Table 181 is a list of streams in the John Day system having logging activity in 1959 as determined from logging permits filed in the County Assessor's office.

Pollution from the town of Bates and from the Oregon Lumber Company mill there continues to enter the Middle Fork of the John Day River. Investigations have been conducted by the Oregon State Board of Health, but measures to abate the pollution have not been employed as yet and do not appear imminent.

Officials of the Oregon Lumber Company were contacted regarding the need for an adequate fishway facility at a log pond dam on Bridge Creek, a tributary of the South Fork of the John Day River. Investigation of the situation to determine fishway design is not completed.

#### Public fishing lake site investigation

##### Canyon Creek Meadows site

Preliminary biological investigation made during the summer indicates the meadow site has excellent potential for a public fishing lake development.



The existing fish population consists of cutthroat and eastern brook trout. The meadows are fed by a small stream which contains over two miles of excellent spawning gravels utilized by these fish.

The Forest Service has drawn up plans to develop the area for recreation and has conducted a survey of the dam site which indicates that a dam 90 feet across and 40 feet high requiring 5,000 cubic yards of fill material would form a lake of approximately 30 acres.

Table 181

Streams in Grant County where logging operations are active or scheduled\*

Stream	Drainage	Estimated probable extent of stream disturbance (miles)	Land ownership
Rudio Creek	North Fork John Day	2	Private
Desolation Creek	North Fork John Day	2	Forest Service and private
Cottonwood Creek	Middle Fork John Day	2	Private
Wall Creek	North Fork John Day	1	Forest Service
Wilson Creek	North Fork John Day	1	Forest Service
Willow Creek	North Fork John Day	1	Forest Service
Grassy Butte Creek	North Fork John Day	1	Forest Service
Camp Creek	Middle Fork John Day	2	Private
Cougar Creek	Middle Fork John Day	2	Private
Ditch Creek	North Fork John Day	1	Private
Graves Creek	North Fork John Day	1	Private

\* From logging permits on file in the County Assessor's office

#### Effects of DDT spray on fish

Studies conducted on Reynolds Creek and Deardorff Creek with the shocker indicate that the lower two miles of Reynolds Creek and the lower five miles of Deardorff Creek suffered nearly a total loss of fish life as a result of the spruce budworm spray operation of 1958. Some species of aquatic insects recovered substantially. Table 182 presents the results of the shocker studies made on Reynolds and Deardorff Creeks. Table 183 is a record of electrofishing and bottom sampling in Deardorff Creek above the spray area.

During July the only fish observed in the spray affected sections of Reynolds and Deardorff Creeks were steelhead fry which had emerged from the gravel during late June and July.

#### Stream habitat improvement

Spawning gravel was restored to 300 feet of Clear Creek, tributary of Granite Creek in Grant County. The work was accomplished by a D7 bulldozer hired from the Hopkins and Mason Logging Company of Baker. An estimated 750

Table 182

Results of budworm spray investigation on Deardorff, Reynolds, and Fields Creeks, Grant County  
electrofishing method, 1958-59

Stream	Number of fish recovered in 200-foot section of stream			Per cent of reduction	Number of bottom insects in in $\frac{1}{2}$ square yard sample			
	Before spray	After spray	One year later		Before spray	After spray	One year later	Per cent of recovery
Reynolds Creek	<u>6-5-58</u>	<u>8-5-58</u>	<u>6-23-59</u>					
	24 Rb-Ct	21 Rb	1 Rb	97.9	28	4	46	164.3
	21 Cottid	9 Cottid	0 Cottid	100.0				
Deardorff Creek	<u>6-6-58</u>	<u>8-6-58</u>	<u>6-23-59</u>					
	17 Rb-Ct	5 Rb	1 Rb	94.2	15	0	34	226.7
	2 Cottid	0 Cottid	0 Cottid	100.0				
Fields Creek (lower)	<u>6-5-58</u>	<u>8-1-58</u>	<u>6-23-59</u>					
	40 Rb	62 Rb	37 Rb	7.5	70	3	63	90.0
	27 Cottid	0 Cottid	3 Cottid	88.9				
Fields Creek (upper)	29 Rb-Ct	23 Rb-Ct	19 Rb-Ct	34.5	59	0	29	49.2

Table 183

Results of electrofishing in Deardorff Creek above spruce budworm spray area

Number of fish recovered in 200-foot section		Number of bottom insects in $\frac{1}{2}$ square yard samples			
16 cutthroat - 2 to 9 inches		(1)	(2)	(3)	(4)
6-24-59		31	34	27	106

cubic yards were spread in the channel. Observations made on September 8, 1959, revealed that two pair of chinook spawned on the restored area.

#### Deer Creek - barrier removal

A fishway was blasted around a series of natural rock barriers located one-half mile from the mouth of Deer Creek. The removal of the barrier provides access for steelhead to approximately sixteen miles of good spawning gravel.

#### Stream survey - anadromous

During the summer, stream surveys for the purposes of determining extent of steelhead spawning waters and recording physical and biological features were made.

The results of the summer survey indicate that 22 streams contained 87.5 miles of spawning water. Spawning areas were determined by the presence of fry. Upper limits of spawning were determined by presence of barriers or absence of fry. Table 184 is a tabulation of stream survey spawning water data taken in the summer of 1959.

#### Parasites and disease

An external parasitic infestation was noted on many of the downstream migrant steelhead taken at a rotary screen bypass trap on Mountain Creek in Wheeler County and a trap in Beech Creek in Grant County. Some specimens were sent to Portland for examination and it was concluded the parasite is a trematode of the family Strigeidae. No fatalities were observed from the infestation.

#### John Day River - shocker studies

Electrofishing was conducted at two locations in the John Day River between Dayville and John Day during the summer period when water flow was very low and warm. Purpose of the sampling was to obtain information on the fish population and its composition at this season. Results of the sampling indicate the river is heavily populated with nongame species and trout are scarce. Table 185 is a tabulation of electrofishing results in the John Day River.

#### Downstream drifting of hatchery rainbow

On the upper John Day River hatchery released rainbow were found approximately six miles downstream from the nearest release station after 18 days in the stream. Hatchery rainbow in Rock Creek, Morrow County, were found approximately 35 miles downstream 30 days following liberation.

Table 184

Some biological and physical data taken of steelhead spawning areas  
from some streams in John Day drainage

Stream	Tributary of	Date of survey	Water temperature	Estimated miles of spawning	Gradient	Type of stream bottom	Habitat	Fry abundance
Deardorff	John Day	7-20-59	54	5	Fast	Gravel	Timber	Good
Reynolds	John Day	7-17-59	56	5	Medium	Gravel	Timber	Excellent
Birch	John Day	8-12-59	65	1	Medium	Gravel	Open (south slope)	Fair
Long	Middle Fork John Day	7-28-59	58	8	Medium to fast	Gravel-boulder some bedrock	Timber	Good to excellent
South Fork Long Slide	Long Creek	7-28-59	58	4	Fast	Gravel-boulder and bedrock	Timber	Good to excellent
Indian	Middle Fork John Day	8-13-59	70	5	Fast	Gravel-boulder and bedrock	Timber (logged)	Poor to fair
Clear	Middle Fork John Day	8-13-59	62	7	Fast	Gravel-boulder some bedrock	Timber	Excellent
Squaw	Middle Fork John Day	8-5-59	62	6	Easy to medium	Gravel	Timber	Excellent
Tex	Fox Creek	8-11-59	65	1.5	Fast	Gravel-boulder (recently logged)	Timber	Poor to fair
Berry	Murderer's Creek	7-21-59	62	4	Medium	Gravel (excellent quality)	Timber	Heavy
Eight Mile	Canyon Creek	8-10-59	58	1	Fast	Gravel-boulder	Timber	Good
Kahler	Middle Fork John Day	8-17-59	60-62 (intermittent flow)	4	Medium	Gravel (recently logged)	Timber	Poor to fair
Alder	John Day	8-19-59	60	2	Fast	Gravel	Open timber	Poor
Parish	John Day	8-19-59	62	2	Fast	Gravel-boulder some bedrock	Timber	Fair
Dixie	John Day	8-20-59	62	2	Fast	Gravel-boulder	Open timber	Fair
Davis	Middle Fork John Day	8-24-59	58	7	Fast	Gravel-boulder	Timber	Excellent
Bear	John Day	8-25-59	56	2	Medium	Gravel	Timber	Poor below
	John Day	8-27-59	60	6	Easy	(silted due to mine) Gravel	Good above mine Timber (logged)	Fair to good

Table 184 (continued)

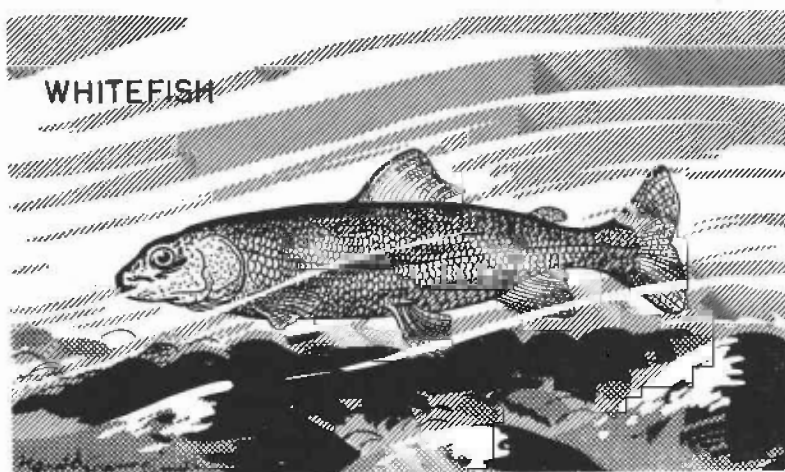
Stream	Tributary of	Date of survey	Water temperature	Estimated miles of spawning	Gradient	Type of stream bottom	Habitat	Fry abundance
Dearborn	Middle Fork John Day	8-28-59	68	1	Medium	Gravel	Timber (logged)	Excellent
Little Butte	Middle Fork John Day	8-28-59	60	1	Fast	Gravel-boulder	Timber	Good
Black Canyon	South Fork John Day	9-1-59	58	6	Fast	Gravel-boulder some bedrock	Timber	Good
Vincent	Middle Fork John Day	9-2-59	54	3	Medium-easy	Gravel (silted from mining)	Timber	Fair to good
East Fork Canyon	John Day	9-4-59	52	6	Fast-medium	Gravel-boulder	Timber	Excellent



Table 185

Composition of fish recorded by shocker sampling  
in John Day River

Date and location	Water temperature	Species	Number of fish	Size	Length of sample area
7-29-59 5 miles below John Day	78	Coarse-scaled sucker	78	8-18"	180 feet
		Squawfish	66	9-16"	
		Whitefish	3	12-13"	
		Chiselmouth	13	6-10"	
		Redsided shiner	numerous		
		Cottids	several		
		Small sucker, shiner, and chiselmouth	abundant		
8-14-59 10 miles below Mt. Vernon	74	Coarse-scaled sucker	42	15-20"	100 feet
		Coarse-scaled sucker	32	5-10"	
		Fine-scaled sucker	44	5-10"	
		Squawfish	7	6-13"	
		Chiselmouth	4	5.5-10.5"	
		Redsided shiner	40		
		Small shiner, sucker, and chiselmouth	abundant		



## NORTH COAST - ASTORIA DISTRICT

### Warren Knispel

#### Trout fishery

The Necanicum River, managed as a key trout stream, produced well throughout most of the stocking period. Liberations were continued at near weekly intervals until the stream temperatures became critical. Success was best with releases made on Thursday or Friday. Table 186 summarizes the trout catch information.

Interviews were conducted in order to determine the geographical distribution of anglers fishing the Necanicum River. Approximately 37 per cent were from areas west of Elsie and considered as local people. These local people were dominant earlier in the season and had a higher catch success.

Good to excellent trout angling was experienced on most streams in the district with best results in the first half of the season.

Fingerling trout plants made in Sunset and Coffenbury Lakes in 1958 produced few returns to the creel in the 1959 season. The bulk of the catch in these lakes was from legal size trout released just prior to the opening. Success on other coastal lakes was only fair. Creel census data for streams and lakes is presented in Table 187.

Catches of sea-run cutthroat entered the creel in late June and July.

#### Columbia River fishery

Data were collected on the sport salmon fishery in and near the Columbia River mouth through a joint effort with the Washington Department of Fisheries. The 1959 information was collected over a longer period than in any previous season. In comparing a similar period of 1958, an increased angling effort and catch existed in 1959, but the fish per angler day remained almost the same. Table 189 shows catch statistics by weekly periods.

Some steelhead and pink salmon appeared in the catch, but neither were present in large numbers.

Information collected on marked hatchery fish, taken in the lower Columbia area, has not been completed and will appear in a later report.

Columbia River sand bar anglers experienced some good fishing on salmon and steelhead in March and April. A creel check in April and May, before and after the commercial season was in progress, is presented in Table 190.

#### Winter fishery

During the extended steelhead season on the Nehalem River a number of prime fish were taken especially in the first half of March. Boat anglers experienced the best success in the area below Cook Creek because of excellent

Table 186

## Necanicum River trout catch

Period	Anglers	Hours	Fish per hour	Species	Size in inches				Total
					8-10	10-12	12-14	14-16	
May 16 to June 15	168	334.5	1.84	Ct	533	12			545
				Rb	56	13		1	70
June 16 to July 15	36	77.5	0.55	Ct	41				41
				Rb	2				2
July 16 to August 15	22	47.5	0.93	Ct	6				6
				Rb	35	3			38
Totals	226	459.5	1.53		673	28		1	702



Table 187

Trout creel census, miscellaneous waters

Water	Anglers	Hours	Fish per hour	Species	Size in inches							Total
					8-10	10-12	12-14	14-16	16-18			
Necanicum River	226	459.5	1.53	Ct	580	12						592
				Rb	93	16		1				110
Nehalem River	217	810.5	0.68	Ct	408	83	19	3				513
				Rb	36							36
North Fork Nehalem River	129	376.5	1.02	Ct	154	17	2					173
				Rb	211							211
Salmonberry River	10	43.0	0.86	Ct	18	7	5	4	2			36
				Rb	1							1
Big Creek	59	191.0	0.95	Rb	181							181
Lewis & Clark River	20	38.0	0.58	Ct	1							1
				Rb	19	2						21
Cook Creek	13	47.0	0.83	Ct	19	12	5	1	2			39
Youngs River	10	25.0	1.16	Rb	28	1						29
Clatskanie River	9	6.5	0.00	--								0
Beaver Creek	24	17.5	0.51	Ct	9							9
Beneke Creek	7	63.0	0.54	Ct	34							34
Cronin Creek	5	13.0	0.85	Ct	11							11
Lost Creek	5	21.0	1.00	Ct	18	2	1					21
Spruce Run Creek	3	12.0	0.50	Ct	4	2						6
Sunset Lake	96	313.5	0.58	Ct		1						1
				Rb	169	9	3					181
Coffenbury Lake	96	330.0	0.28	Ct	5	26	2	1				34
				Rb	54	4						58
Lost Lake	66	313.5	0.24	Rb	44	19	10	2				75
Quartz Lake	22	62.5	0.22	Ct	1			1				2
				Rb	10	1	1					12
Spruce Run Lake	6	19.0	0.16	Ct		2						2
				Rb	1							1
Soapstone Lake	5	22.0	0.04	Rb	1							1
Totals	1,028	3,184.0	0.75		2,110	216	48	13	4			2,391

Table 188

## Nehalem River trout catch

Period	Anglers	Hours	Fish per hour	Species	Size in inches				Total
					8-10	10-12	12-14	14-16	
May 16 to June 15	149	575.0	0.86	Ct Rb	368 34	79	14		461 34
June 16 to July 15	49	161.5	0.32	Ct Rb	38 2	3	5	3	49 2
July 16 to August 15	19	74.0	0.04	Ct	2	1			3
Totals	217	810.5	0.68		444	83	19	3	549

Table 189

## Lower Columbia salmon catch

Period ending	Boats	Anglers	Chinook		Total chinook	Silvers		Total silvers
			per angler	0.02		per angler	0.8	
June	193	1,120	0.02		20	1.8		2,027
July 4	115	500	0.2		86	0.8		397
July 11	116	534	0.1		65	0.9		487
July 18	249	960	0.2		229	0.8		788
July 25	325	1,247	0.2		208	0.8		1,005
August 1	589	2,005	0.2		487	1.3		2,707
August 8	1,366	4,911	0.2		1,171	0.7		3,678
August 15	2,439	9,902	0.5		4,670	0.5		4,771
August 22	3,632	13,156	0.2		3,169	0.6		8,411
August 29	5,055	19,651	0.5		9,782	0.7		14,609
September 5	3,710	14,873	0.2		3,074	0.5		8,048
September 12	1,194	4,578	0.08		347	0.4		1,913
September 19	216	1,181	0.06		76	1.2		1,410
September 26	38	146	0.0		0	1.7		255
Totals	19,237	75,064	0.3		23,384	0.7		50,506

water conditions. In the second part of the March extension, freshets continued, but according to sampling information, less than half of the fish taken were considered prime. Of 78 steelhead retained by anglers, 54 were considered green and bright. An additional 45 fish were released. The Nehalem River catch data is presented in Table 191.

Table 190

Columbia River sand bar catch

Anglers	Hours	Fish per hour	Hours per fish	Chinook	Jacks	Total
67	327	0.06	16.3	14	6	20
80 /1	343.5	0.05	19.0	1	17	18
147	670.5	0.06	17.6	15	23	38
/1 Commercial gill net season						

The Necanicum River and other stream catches are found in Tables 192, 193, and 194.

The rate of catch for the Nehalem was slightly less than in 1958, although anglers during the March extension fared better.

Silver salmon moved into various spawning tributaries when freshets occurred in October. The fish appeared to migrate through lower tidewater areas rapidly.

Marked fish

Marked hatchery fish seemed to contribute little to the steelhead catch in the Necanicum River. More apparent were a few Game Commission returns from the North Fork Nehalem River.

The bulk of the marked fish occurred in the fishery near the mouth of the Columbia River.

Spawning surveys

Visibility was limited at the time spring chinook spawning surveys were made. Water conditions were good, but flows were well above those observed in 1958. A count made October 5 revealed 61 salmon, although in certain sections the presence of redds indicated a large number of fish present. Numbers recorded were considerably below the previous year. Freshets prevented any further observation than that made October 5.

Silver salmon and fall chinook counts remained fairly constant except for a decline noted in the Necanicum River.

Steelhead surveys made on the Salmonberry River disclosed a decline in the number of spawning fish observed, although numbers of redds appeared to be about the same (See Table 195)

Table 191

Nehalem River winter catch  
November 16, 1958 - March 31, 1959

Period	Anglers	Hours	Fish per hour	Hours per fish	Steelhead	Silvers	Chinook	Cutthroat	Total
November 16, 1958 - December 15, 1958	213	854	0.037	26.7	18	11	2	1	32
December 16, 1958 - January 15, 1959	172	732	0.033	30.5	24				24
January 16, 1959 - February 15, 1959	202	866.5	0.051	19.7	44				44
February 16, 1959 - February 28, 1959	35	139	0.029	34.8	4				4
March 1, 1959 - March 31, 1959	327	1,352	0.058	17.1	77 <u>/1</u>			2	79
Totals	949	3,943.5	0.046	21.6	167	11	2	3	183
<u>/1</u> Thirteen spawned out									

Table 192

Necanicum River winter catch  
November 16, 1958 - March 15, 1959

Period	Anglers	Hours	Fish per hour	Hours per fish	Steelhead	Silvers	Cutthroat	Total
November 16, 1958 - December 15, 1958	47	105	0.019	52.5	2			2
December 16, 1958 - January 15, 1959	37	82	0.049	20.5	4			4
January 16, 1959 - February 15, 1959	38	110.5	0.072	13.8	3		5	8
February 16, 1959 - March 15, 1959	12	43	0.023	43.0			1	1
Totals	134	340.5	0.044	22.7	9		6	15

Table 193

North Fork Nehalem winter catch  
December 16, 1958 - March 15, 1959

Period	Anglers	Hours	Fish per hour	Hours per fish	Steelhead	Total
December 16, 1958 - January 15, 1959	18	64.5	0.062	16.1	4	4
January 16, 1959 - February 15, 1959	24	82.5	0.109	9.1	9	9
February 16, 1959 - March 15, 1959	8	33.0	0.090	11.0	3	3
Totals	50	180.0	0.089	11.2	16	16

Table 194

Miscellaneous streams, winter catch  
November 16, 1958 - March 15, 1959

Stream	Anglers	Hours	Fish per hour	Hours per fish	Steelhead	Silvers	Cutthroat	Total
Lewis & Clark River	55	196.0	0.061	16.3	6	1	5	12
Klaskanine River	18	49.5	0.081	12.4	4			4
Clatskanie River	7	17.5	0.114	8.7			2	2
Cook Creek	4	28.0	0.143	7.0		4		4
Totals	84	291.0	0.076	13.2	10	5	7	22

Table 195

Spawning ground counts  
1958-59

Stream	Water	Silvers	Chinook	Steelhead	Jacks	Miles
Cronin Creek	Clear	63	14		6	2.5
Cullaby Creek	Clear	22			3	2.5
Necanicum River	Clear	53				2.5
Nehalem River	Clear		59		2	12.0
Salmonberry River	Clear			70		6.0
Totals		138	73	70	11	25.5

## Lake investigation

Hansen Lake was experimentally treated with toxaphene at a concentration believed between 0.02 p.p.m. and 0.03 p.p.m. Approximately one week after treatment, perch up to 3.5 inches were seen dead and three weeks after treatment, six-inch fish were found.

Perch placed in liveboxes at different levels survived three weeks. Carp survived longer; one near the lake bottom lived for six weeks. Small bass were seen in the lake approximately four months after treatment. Gill nets set for one week took no fish. The lake supports heavy growths of aquatic vegetation.

In an attempt to determine species composition plus survival and growth of fingerling rainbow trout planted in 1958, gill nets were set in Sunset and Coffenbury Lakes. Small rainbow, ranging from five to eight inches, were taken in Sunset, while those in Coffenbury were between ten and twelve inches in length. Each lake contains a dominant perch population. (See Table 196)

Sunset, Coffenbury, Cullaby, Hansen, Slusher, Crabapple in the dune area and Lost Lake near Elsie were examined in late summer to determine maximal water temperatures. In late August, surface temperatures of the dune lakes were near 70° F. with a variation of 65° to 66° F. at the bottom.

## Access

The South Jetty Road was closed for the winter months to prevent a complete breakdown of the road bed. Clatsop County in the summer and fall of 1959 started to improve the road, but ceased near the time hunting seasons started. The road has remained open so far this fall and appears to have been considerably improved.

Table 196

## Gill net catches

Date	Number of sets	Lake	Species	Number of fish	Size range (inches)	Average size (inches)
February 11, 1959	2	Sunset	Perch Catfish	36 1	6-13 11.0	9.5 11.0
April 8, 1959	2	Sunset	Perch Catfish	50 3	5-13 9-12	9.0 10.5
April 15, 1959	2	Sunset	Rainbow Perch Catfish Crappie	8 28 2 1	5-8 5-13 13.0 6.0	6.5 9.0 13.0 6.0
April 9, 1959	2	Coffenbury	Rainbow Cutthroat Perch Catfish	1 3 18 1	12.0 10.0 6-11 9.0	12.0 10.0 8.5 9.0
April 14, 1959	2	Coffenbury	Rainbow Cutthroat Perch	1 1 16	12.0 11.0 6-12	12.0 11.0 9.0
May 26, 1959	2	Cullaby	Crappie Perch Bluegill Catfish	39 5 2 2	6-9 5-7 3.0 6-12	7.5 6.0 3.0 9.0



## NORTH COAST - TILLAMOOK DISTRICT

Francis H. Sumner

### Salmon angling, fall

Salmon angling by bank fishermen is summarized in Table 197. Most of the data for the latter part of the 1958 season were collected on the Nestucca and Little Nestucca tidewaters. The November data are unavoidably incomplete.

In the first half of the 1959 season, early freshets caused salmon to leave tidewater and migrate upstream. Hence a greater proportion of the data than usual were secured above tidewater. Because the best areas, one to two miles above tidewater, were favored in the checking, the figures may be slightly biased for better than average success.

In general, fish per unit of effort the latter part of the 1958 season was not as good as the corresponding period in 1957, while the early period in 1958 and 1959 produced similar results.

Trolling in Nestucca River tidewater is summarized in Table 198. Success for both moorages reporting was down as compared with the results reported for 1957-58. Silver salmon were again in low supply as compared with some past seasons.

Results on the Salmon River (Table 198) indicate better average angling there than in the Nestucca. Notable also is the catch of twelve steelhead by Salmon River boats in November, 1958.

Boat drifting above tidewater on the Nestucca River (Table 199) started earlier in 1959 because of heavy early rains in September. Catch per hour is again better than in tidewater, though it is not superior to Salmon River tidewater.

Three hundred sixty-nine boats were checked from July 1 to October 31 at the Garibaldi public boat landing on north Tillamook Bay (Table 199). Checking was done mostly on weekends when the angling was poorest. Relatively few salmon were caught during July. Best fishing was in the latter half of August when most of the catch consisted of silver salmon taken outside the bar. In that period, the average was slightly over one fish per boat. Next best trolling was in the first half of October with a little over three-fourths fish per boat, the catch being mostly bay-caught chinook salmon.

### Salmon angling, spring chinook

Spring chinook salmon anglers were interviewed largely at the Garibaldi boat landing, with some checks on streams. On the Trask, Wilson, and Kilchis Rivers, 94 bank anglers checked between April 11 and July 4 had taken 2 chinook and 2 steelhead. Rate of catch for the checked salmon was 130 hours per fish, a rate far inferior to the 23 hours per fish found in 1958.

Trolling on Tillamook Bay by 276 anglers (April 25-May 24) resulted in a catch of 27 chinook. The rate of catch was 44 hours per fish, better than the 1959 bank rate, but still below the rate obtained in 1958.

Table 197

## Summary of salmon bank angling results

River	Period	Chinook adults	Silver adults	Chum salmon	Jacks	Steel- head	Total	Anglers	Angler- hours	Fish per hour	Hours per fish
All	<u>1</u> 10/16 - 11/9/58	7	10	1	9	1	28	372	1,049	0.027	37
All	9/1 - 10/15/59	20	12		37		69	500	1,397	0.049	20
<u>1</u> Mostly Nestucca and Little Nestucca tidewater											

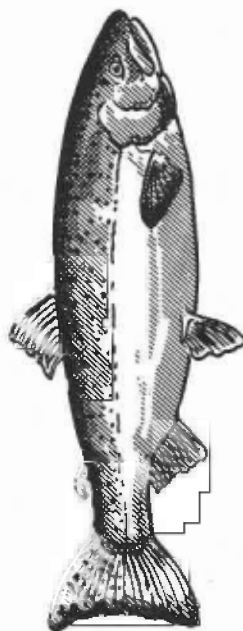


Table 198

Reported tidewater boat catch, Nestucca River  
salmon season, 1958-59

Period	Trout /1	Chinook adults	Silver adults	Chum salmon	Jacks	Steelhead	Total	Anglers	Angler-hours	Average hours angled	Fish per angler	Fish per hour	Hours per fish
<u>Lower moorage</u>													
10/16 - 11/30/58	16	13	18	1	9		41	300	2,156	7.2	0.14	0.019	53
8/16 - 10/15/59	35	11	11		5		27	295	1,325	4.5	0.09	0.020	49
<u>Upper moorage</u>													
10/16 - 11/30/58	22	44	31		36		111	221	1,692	7.7	0.50	0.066	15
8/16 - 10/15/59	44	10	4		60		74	190	1,320	6.9	0.39	0.056	18
<u>Salmon River moorage</u>													
10/16 - 11/30/58	85	54	74		149	12	289	510	1,451	2.8	0.57	0.199	5
8/16 - 10/15/59	273	21	28		93		142	621	1,760	2.9	0.23	0.081	12

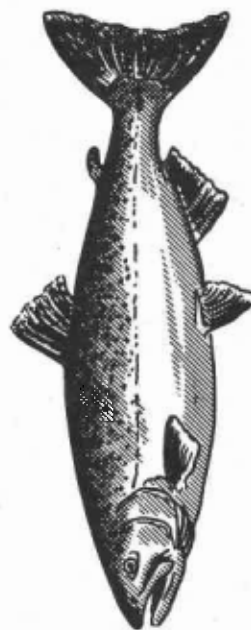
/1 Trout are not counted in totals and averages.

Table 199

Drift boats above tidewater, Nestucca River  
salmon season, 1959

Period	Trout /1	Chinook adults	Silver adults	Jacks	Total	Anglers	Angler- hours	Average hours angled	Fish per angler	Fish per hour	Hours per fish
9/5-30	41	16	4	7	27	40	288	7.2	0.68	0.094	11
10/1-31	9	15	15	3	33	59	431	7.3	0.56	0.077	13
Totals	50	31	19	10	60	99	719	7.3	0.61	0.083	12

/1 Trout are not counted in totals and averages.



### Spawning of spring chinook, 1959

Because of heavy rains and high water in rivers during this period of spring chinook spawning (mid-September - mid-October), observations of spawning were more difficult than usual. Limited surveys of Nestucca River spring chinook indicated that spawning intensity was close to that of former years.

Also because of high water, no eggs could be taken from Nestucca spring chinook as had been planned.

### Size of salmon

In Table 200 are given the average lengths and weights, and their ranges, of several groups of salmon. All lengths are to the fork of the tail. Thus, 19 per cent of the fall chinook jacks were actually salmon for punch-card purposes when measured to total length. But of the 10 silver jacks, only one was 20 inches or over in total length.

The spring chinook were mostly from Tillamook Bay. A large proportion of the silver salmon was taken from the ocean in late August and early September.

### Fish trapped at the Three Rivers rack

At the Cedar Creek Hatchery's Three Rivers rack, counts of upstream migrants were made by hatchery personnel. Results are summarized in Table 201.

The 26 marked silvers, plus the 25 marked jacks trapped in the season of 1957-58, formed 0.22 per cent of the liberation of 22,922 silver fingerlings made in the winter of 1956-57. Approximately 0.26 per cent of the 19,000 fingerling steelhead released in the Nestucca River and Three Rivers in March, 1956, have been observed in or reported caught by anglers or recorded at the Three Rivers rack.

### Marked salmon

Very few reports of marked salmon were received from the Pacific City dory catch. That marks were present in considerable numbers is attested by the one-day catch by five boats of eight marks among 24 fish (Table 202).

### Steelhead bank angling

Checking of steelhead bank anglers was concentrated on the Wilson River which is an experimental stream. Other streams were checked enough for a rough comparison, which indicates that despite the heavy plants of steelhead into the Wilson, that stream was not quite up to the average catch rate of the others, as is shown in Table 203. Still, the average rate is slightly better than the 8-year average of 36 hours per fish.

Of the steelhead checked on the Wilson River, 10.7 per cent of the wild fish and 21.7 per cent of the marked fish were jacks. It is obvious that the 1958 liberation made a substantial contribution of jacks to the fishery. On other streams, jacks formed 9.7 per cent of the steelhead checked.

Table 200

## Size of salmon

Species	Number	Sex	Area	Fork length		Round weight in pounds		Percentage jacks
				Average	Range	Average	Range	
Spring chinook	30	All	(Tillamook Bay, most)	34.1	25.2-39.5	19.3	7.7-27.2	0
	14	Adult males		33.2	25.2-37.5	18.3	7.7-26.8	
	14	Females		35.0	31.8-39.5	20.3	15.0-27.1	
Fall chinook	124	All	(Tillamook Bay and tributaries, Nestucca River)	31.4	15.0-43.5	19.0	1.3-39.0	17
	39	Adult males		31.7	20.0-43.5	17.5	3.8-38.0	
	52	Females		36.5	24.5-42.5	26.7	7.0-39.0	
	21	Jacks		17.6	15.0-19.7	2.8	1.3-3.8	
Silver salmon	82	All	(Ocean, Tillamook Bay, Nestucca River)	25.0	15.0-31.7	7.1	1.5-17.8	12
	34	Adult males		26.0	21.2-31.7	7.7	3.2-17.8	
	37	Females		26.2	23.0-31.0	7.5	4.9-13.0	
	10	Jacks		16.4	15.0-19.5	2.1	1.5-3.3	
<u>Cleaned weight</u>								
Fall chinook	11	All	(Tillamook Bay, tributaries, Nestucca River)	34.7	16.5-42.5	18.9	1.6-30.0	
	5	Males		31.8		16.3		
	6	Females		37.1		21.1		
Silver salmon	7	All	(Tillamook Bay, tributaries, Nestucca River)	26.4	23.0-28.8	6.1	3.8-8.0	

Table 201

Fish trapped at the Three Rivers rack  
1958-59

Month	Silver salmon			Chinook	Chum	Steelhead		Total
	Marked adult	Not marked Jack	Adult			Marked	Not marked	
October <u>/1</u>	2	15	25	5				47
November <u>/2</u>	14	15	64	13	2		12	120
December <u>/3</u>	10	10	113			3	52	188
January <u>/4</u>			5			3	32	40
February						2	4	6
Totals	26	40	207	18	2	8	100	401
Totals by species		273		18	2	108		
Per cent Game Commission		9.5				7.4		

/1 Run started October 18./2 High water over the rack 9 days./3 High water over the rack 2 days./4 High water over the rack 15 days.

Table 202

## Salmon marks, 1959

Date	Place	Species	Number of fish	Weight, pounds	Mark	Sex	Seen or reported
8-30	Pacific City, Ocean	Silver	2	7-8	RV		R
		Chinook	1	10-14	LV		R
		Chinook	1	10	RP		R
		Chinook	4	20-24	Ad-RV		R
9-23		Silver	1	5-6	BV	M	S
8-16	Garibaldi, Ocean	Silver	1	10	LV	M	R
8-23		Silver	1	7	LP	F	S
8-30		Silver	1	7	RV		R
9-12		Silver	1	9	LV		R
9-22		Silver	7	6-7	LV		R
11-4	Tillamook Bay	Chum	1		D		R

Table 203

## Steelhead season bank angling, 1958-59

Month or period	Trout /1	Steelhead	Salmon	Total fish	Number of anglers	Angler- hours	Fish per hour	Steelhead per hour	Hours per steelhead	Percentage marked
<u>Wilson River</u>										
December <u>2</u>	28		3	31	286	993	0.031	0.028	35	42.9
January	44			44	507	1,623	0.027	0.027	37	27.3
February	58			58	533	1,665	0.035	0.035	29	29.3
March	19			19	200	661	0.029	0.029	35	21.1
April <u>3</u>	8			8	65	127	0.063	0.063	16	0
Totals	157		3	160	1,591	5,069	0.032	0.031	32	28.7
<u>Other streams</u>										
December- March	5	31	1	32	328	914	0.035	0.034	29	0

1 Trout are not counted in totals and averages.2 December 12-313 April 1-12; very little angling thereafter.



### Steelhead angling, upstream boats

Some boats fishing steelhead were checked, but most of the boat data were obtained from guide services. Results are summarized in Table 204. Boat drifting in both the Nestucca and Wilson was slightly less successful than in the previous season, though it was still two to three times better than bank angling. Wilson River boat anglers again did slightly better than those on the Nestucca River.

### Steelhead extended season

The March season on the Wilson and Nestucca rivers is summarized in Tables 203 and 204. Boat angling on the Nestucca was a bit less successful than the average for the regular season, while Wilson River success was somewhat above average.

A record was kept of the condition of March-caught steelhead as to sexual maturity and external appearance. Also forms were distributed to Nestucca and Wilson River guides to fill out with the desired information. A comparison of personal estimates with reported data is presented in Table 205. Checked data cover about 450 bank and boat anglers with 70 steelhead from both streams; and the Nestucca reports take in some 600 bank and boat anglers with 249 steelhead. It is immediately noticeable that the reports are optimistic in comparison with data based on checks.

### Marked steelhead

Of all 203 Wilson River steelhead from which lengths and weights were taken (bank and boat catch), 22.7 per cent were marked. Of the 46 marked fish, eleven were anal-left ventral marked jacks from the 1958 liberation and thirty-five were adipose-both ventral marks. The latter include one fish from the 1956 release (by scale reading) and thirty-four from that of 1957.

Reading of the scales from 34 adipose-both ventral marked steelhead of the 1957 liberation revealed that fish averaging 25.5 inches in fork length on capture (range, 22.7-29.0 inches) averaged a calculated 5.2 inches at entrance to salt water (range, 3.3-7.0 inches); 15.3 inches at the first ocean annulus (range, 10.0-21.0 inches); and 22.4 inches at the second ocean annulus (range, 17.3-27.5 inches). Average growth (calculated) from sea entrance to the first ocean annulus was 10.1 inches and from first to second ocean annulus, 7.1 inches. For 10 anal-left ventral marked steelhead of the 1958 plant averaging 18.9 inches in fork length on capture (range, 17.0-20.5 inches), the average calculated length on entrance into the sea was 6.3 inches (range, 5.5-7.7 inches), and at the first ocean annulus, 15.4 inches (range, 12.0-19.0 inches). The average calculated growth from sea entrance to the first ocean annulus was 9.1 inches. Average length at the first sea annulus is close in the two groups, but the greater length of the jacks on entrance into the ocean made their growth less.

By comparison, 25 Sand Creek steelhead of the 1946-47 run averaged a calculated 5.7 inches on entrance into the sea (1-3 annuli) and 16.6 inches at the first ocean annulus for an average calculated growth of 10.9 inches, 0.8-1.8 inches greater than the growth of the present marked steelhead.

Table 204

## Steelhead season, upstream boats, 1958-59

Month	Boats	Number of anglers	Number of hours	Salmon	Steelhead	Total	Hours per steelhead	Percentage marked
<u>Willson River</u>								
December <u>1</u>	4	10	55	1	7	8	8	14
January	9	21	133		13	13	10	46
February	30	76	460		42	42	11	19
March	8	19	120		18	18	7	11
April <u>2</u>	5	15	101		6	6	17	0
Totals	56	141	869	1	86	87	10	20
<u>Nestucca River</u>								
December	13	32	203	1	29	30	7	
January	32	77	548		49	49	11	
February	27	66	410		19	19	21	
March	27	70	414		27	27	15	
Totals	99	245	1,575	1	124	125	13	
<u>1</u> December 15-31								
<u>2</u> April 1-9								

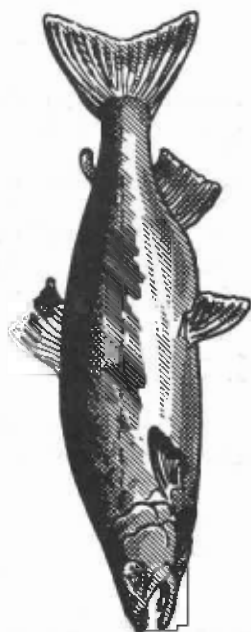


Table 205

1959 late season steelhead report,  
steelhead in the creel expressed as percentages

Top figure - checked  
Bottom figure - reports

Condition	Coloration						Totals
	Bright (silver)		Reddish		Dark		
	Male	Female	Male	Female	Male	Female	
Green	18.6	30.0	1.4				50.0
	23.5	57.3		0.4			81.2
Ripe	7.1	4.3	10.0	8.6	1.4		31.4
	10.5	4.3	1.1	1.8	0.4		18.1
Spent		10.0	2.9	4.3		1.4	18.6
			0.7				0.7
Totals	25.7	44.3	14.3	12.9	1.4	1.4	100.0
	34.0	61.6	1.8	2.2	0.4		100.0

Two steelhead caught from the Wilson and reported as marked both ventral only were 9 and 12 pounds in weight, indicating liberation earlier than the 1957 Wilson River liberation.

#### Size of steelhead

All 157 measured wild steelhead averaged 26.6 inches in fork length. The measurements by sex and condition are given in Table 206.

Table 206

#### Sizes of steelhead

Condition	Wild or hatchery	Number of fish	Sex	Fork length		Weight in pounds	
				Average	Range	Average	Range
Round	W	124	All	26.3	16.6-36.5	7.4	1.5-18.1
		41	Adult males	28.3	22.0-36.5	8.8	3.6-18.1
		18	Jacks	18.3	16.6-19.7	2.3	1.5-3.1
		62	Females	27.4	22.5-33.5	8.0	4.4-14.5
Spent	W & H	17	All	27.4	18.5-36.2	6.9	1.8-14.6
Cleaned	W & H	14	Males	24.5	18.0-29.0	5.1	1.9-9.0
		17	Females	27.2	23.7-33.3	6.4	4.3-10.9
Round	H	31	All	24.1	17.0-29.0	5.5	1.8-9.3
Cleaned	H	13	All	24.4	18.0-27.0	4.7	1.9-6.5

Wild steelhead in the round averaged 1.5 inches longer and 1.7 pounds heavier than the corresponding 1957-58 marked steelhead. Although the 1958-59 marked fish were 0.2 inch shorter than the average for 1957-58 marked steelhead, they averaged 0.6 pound heavier.

Adult marked steelhead in the round averaged 2 inches shorter (7.2 per cent) and 2 pounds lighter (24.0 per cent) than the corresponding wild steelhead, a greater difference than that found for all 1957-58 fish.

Of 200 sexed steelhead there were 99 males and 101 females.

Thirty per cent of the steelhead jacks at fork length were over 20 inches at total length.

#### Steelhead spawning surveys

Surveys for steelhead spawning activity were made in several streams as detailed in Table 207. The Little North Fork of the Wilson River evidenced the most spawning activity. In general, fewer steelhead were present in other streams than in most years.

#### Trout season, bank catch

In Table 208 is summarized the trout bank angling on most of the streams in the district. Excluding the Wilson, a stream not planted with trout, a figure for the season is 69.9 per cent hatchery fish, slightly higher than in the previous two seasons.

Sea-run cutthroat trout comprised 37 per cent of the wild cutthroat catch, a very low proportion when compared with the 53 per cent of 1957 and the 61 per cent of 1958.

The catch rate for wild cutthroat of 0.094 fish per hour is close to the 1957 rate (0.096 fish per hour) but lower than that of 1958 (0.132 fish per hour).

#### Trout angling, boat, tidewater

The tidewater trout catch made by boat anglers is summarized in Tables 209 and 210. The lower moorage on the Nestucca River, which has reported since 1948, is given by month, while the upper moorage is condensed for the season up to September 16 at which time it is assumed that trout are incidental to the salmon catch, in order to separate the trout and salmon anglers.

In comparison of catch success, the Nestucca tidewater as reported by the lower moorage is down slightly in catch per hour relative to 1958, but better than any other year since 1948 except 1958. The writer attributes this result to the liberation of trout directly into tidewater; and his catch figures show that when no trout (cutthroat) were released there, the percentage of hatchery trout caught in tidewater was 0 to 0.3.

At the same time that the catch per hour figure for all trout was up, the catch per hour for wild cutthroat was down to its lowest point since

Table 207

## Steelhead spawning surveys, 1959

Date	Stream	Length of section miles	Visibility	Fish observed	Redds
February 5	North Fork of Little South Fork of Kilchis River	0.8	Good	Sea cutthroat, 3 Steelhead, 3	Few 1
February 24	Peterson Creek, Miami River	0.3	Good	Silver fingerling, 1	4
	Fawcett Creek, Tillamook River	0.5	Poor	Steelhead, 1	1
March 13	Edwards Creek, South Fork Trask River	0.8	Fair	Salmon fry schools	2
March 19	North Fork Wilson River	0.8	Fair	None	3
March 20	Alder Creek, Three Rivers	0.5	Good	None	0
April 7	South Fork Little South Fork Kilchis River	1.0	Good	Steelhead, 1	3
April 8	Fawcett Creek, Tillamook River	0.7	Good	Silver fry common Steelhead, 2	0 3
April 9	North Fork Little South Fork, Kilchis River	0.8	Good	Steelhead, 2	5
	Little North Fork Wilson River	1.3	Fair	Steelhead, 4	13
April 16	Clear Creek, Kilchis River	0.8	Fair	Steelhead, 0	1
May 5	Wolf Creek, Nestucca River	1.7	Fair	Silver O's common	0
	Alder Creek, Three Rivers	1.0	Fair	Steelhead, 2	1
May 6	North Fork Wilson River	0.8	Good	Steelhead, 3	5

Table 208

Trout season, checked bank catch, all streams 1959

Month	Cutthroat		Rainbow	Brown trout	Trout species	Spring chinook	Totals	Number of anglers	Angler-hours	Fish per hour	Hours per fish	Percentage hatchery
	Wild	Hatchery 1958										
June /1	78	1	109	1	20		255	298	775	0.33	3.0	66.4
July	64	46	114	58	55	1	292	254	776	0.38	2.6	72.6
August	7	1	21	1	8	1	38	60	177	0.21	4.7	73.3
September	34	2	1		5		38	86	185	0.21	4.9	10.5
October			1				6	20	37	/2		
Totals	183	2	246	1	88	2	629	718	1,950	0.32	3.1	65.6 (69.9) (less Wilson River)

/1 May 30-June 30.

/2 Insufficient data.

Table 209

Nestucca River trout season, 1959, reported tidewater boat catch

Month	Cutthroat		Rainbow	Totals	Anglers	Angler-hours	Average hours fished	Fish per angler	Fish per hour	Hours per fish	Percentage hatchery
	Wild	Hatchery 1959									
June /1	21	78	8	107	72	329	4.6	1.5	0.33	3.1	80.4
July	29	78	40	147	140	551	3.9	1.1	0.27	3.7	80.3
August	15		33	48	61	249	4.1	0.8	0.19	5.2	68.8
September 1-15 /2	16		6	22	11	40	3.6	2.0	0.55	1.8	27.3
Totals	81	156	87	324	284	1,169	4.1	1.1	0.28	3.6	75.0
<hr/>											
All	208	97	237	542	270	1,672	6.2	2.0	0.32	3.1	61.6

/1 May 30-June 30.

/2 After September 15 all trout are credited to salmon anglers.

1948 (0.07 fish per hour). The lowest previous figure was 0.08 fish per hour in 1956.

Salmon River hatchery trout were not marked in 1959. Therefore, since there was confusion among cutthroats, only rainbows were used in the last column of Table 210 for proportion of hatchery trout. Corresponding proportions of rainbow trout from Nestucca River tidewater are: lower moorage 26.9 per cent; upper moorage, 43.7 per cent.

### Lakes

Coastal lakes in the Barview-Manhattan area were checked several times during the summer. Relatively few anglers were found, except immediately after a stocking of Spring Lake, when anglers crowded the west shore by the highway for a few days. Smith Lake, on which the Methodist camp is situated, was fished more than usual and some good bass angling was enjoyed. Lake Lytle was plagued by waterskiers on weekends, but planted trout and introduced black bass provided good sport.

Checking on six days at the three lakes revealed the presence of 28 anglers who had caught 18 fish (1 hatchery cutthroat, 9 rainbow, 7 bass and 1 juvenile silver salmon) at the rate of 2.6 hours per fish.

Bullhead catfish adults from Siltcoos Lake were planted in Smith Lake and Rockaway Pond.

### Bottom fish

From April 4 to October 11, periodic checks were made of anglers fishing for bottom fish along the coast in the Tillamook District. At times excellent catches were made by shore anglers, but the consistently best fishing was enjoyed by ocean charter boat patrons. For 480 anglers checked, mostly at the Barview jetty and neighboring areas, the catch was 561 fish (253 perch, 122 kelp greenling, 88 rockfish or "bass", 39 lingcod, 43 flatfish, mostly flounder, 12 sculpin, 2 herring and 2 chinook salmon). The over-all rate of catch was 1.9 hours per fish (0.54 fish per hour). Of 346 juvenile and adult anglers, 258 had angling licenses (75 per cent).

### Seine population studies

A one-man seine of nylon bobbinet was used to sample juvenile fish populations in the district. The data gathered is detailed in Table 211.

Wolf Creek on the Nestucca River is partially blocked by a road culvert at its mouth and the bedrock platform below it. Nevertheless it contained a fair population of steelhead and silver zeros when checked in May and August.

Alder Creek on Three Rivers evidenced a reasonably good silver salmon reproduction, though numbers of steelhead were down.

East Creek had been suggested as a potential site for an angling lake. Seining was done to determine fish populations in the area above the

Table 210

Salmon River trout season, 1959, reported tidewater boat catch

Month	Cutthroat		Chinook		Silver		Totals	Anglers	Angler- hours	Average hours angled	Fish per angler	Fish per hour	Hours per fish	Percentage rainbow
	Wild	Hatchery	Adult	Jack	Adult	Jack								
June /1	12	290					774	181	502	2.8	4.3	1.54	0.6	61.0
July	128	12	1	3			247	278	735	2.6	0.9	0.34	3.0	41.8
August	76	8	9	35	6	1	159	411	1,133	2.8	0.4	0.14	7.1	15.1
September	324	14	3	36	13	9	410	446	1,232	2.8	0.9	0.33	3.0	2.7
October	182	22	21	22	28	32	310	402	1,175	2.9	0.8	0.26	3.8	1.0
Totals	722	346	34	96	47	42	1,900	1,718	4,777	2.8	1.1	0.40	2.5	32.3

/1 May 30-June 30.

Table 211

Seine population studies, 1959

Stream	Date	Width /1	Area /2	Fish per 100 square feet	Trout zeros	Cutthroat	Steelhead	Silver salmon
Alder Creek, Three Rivers	7-21	10	430	8.1	6	1 (4.5")		28 (2.5-3.2")
Wolf Creek, Nestucca River	5-5	10	100	44.0	19	1 (3.8")		24 zeros
Wolf Creek, 4 tributaries		5	185	10.8	10			10 zeros
Neskovin Creek tributary	7-28	15	300	9.0	10	3 (1.5-2.6")	4 (1.5-2.5")	
						2 (5.0-5.5")	8 (3.0-5.5")	
Wolf Creek, Nestucca River	8-25	10	460	11.3		3 (3.3-6.0")	13 (1.8-2.8")	24 (2.7-3.5")
							12 (3.0-5.7")	
East Creek, Nestucca River		15	340	9.7		14 (1.4-2.2")	2 (2.3-2.6")	14 zeros
						2 (4.0-7.2")	1 (5.6")	
Fall Creek, Wilson River	8-26	10	370	0.8		3 (2.2-3.8")		
Fox Creek, Wilson River		15	310	23.2	13	16 (1.1-2.8")	31 (1.7-2.8")	
						2 (3.4")	10 (3.0-4.5")	
Jordan Creek, Wilson River								
0-1 mile below falls	9-1	20	150	2.7		4 (2.8-3.0")		
1-2 miles below falls		22	350	6.0	4	2 (1.7-2.2")	15 (1.7-3.2")	

/1 Approximate

/2 Estimated square feet



dam site. It was later learned that the Fish Commission has a silver salmon count section above the potential reservoir.

Fall Creek on the Wilson again revealed a small population of resident cutthroat trout, the mouth being blocked by a cascade.

Fox Creek, from which a log jam had been removed, experienced a good come-back as a steelhead producer, but no silver salmon fingerlings were seen.

Jordan Creek was surveyed to determine the feasibility of taking out jams. Seining revealed that only cutthroat were present in the section extending about one mile below impassable falls, other fish being blocked by a jam. A fair population of steelhead fingerlings was present below the jam, the adult fish evidently being able to pass under the almost solid jams below. The small amount of spawning area above the last jam, plus the fact that lower jams are passable, led to the decision not to recommend removal of the jams at this time.

#### Stream improvement

The removal of a large log jam from the North Fork of the Kilchis River is believed to be one of the most important stream improvement projects in the district. The jam had been in place for many years and almost completely blocked the fine spawning gravel of the upper stream to anadromous species. A very few larger fish had been reported above the jam, but it is quite likely that they were all cutthroat trout. By mid-September, a spring chinook salmon was seen above the jam.

Another jam was removed from Fox Creek on the Wilson River in January. The jam had blocked upstream migration for a few years, since a slide had come down from a side canyon. The day after the jam's removal, a pair of spawning cutthroat trout was seen just above the site.

Table 212

Estimated salmon catch, Tillamook Bay, 1959  
moorage operator, Garibaldi

Month	Number of boats	Number of salmon
June	323	38
July	398	43
August	1,431	1,364
September	1,510	637
October	1,900	1,257
Totals	5,562	3,339

## LINCOLN DISTRICT

Richard Herrig

### Steelhead inventory

The main effort of the fishery agent during the steelhead season was concentrated on the Alsea River. Material from creel samples was sent to the Research Division to be included in its study concerning the contribution of hatchery fish to the creel.

Because of the time required for the Alsea steelhead creel census, it was not possible to obtain an estimate of catch success for the Siletz steelhead fishery.

The fishery agent from Eugene gathered the information for the Siuslaw River given in Table 213.

Table 213

Steelhead creel census, Siuslaw River  
1958-59

River	Anglers	Hours	Steelhead	Fish per hour	Hours per fish
Siuslaw	133	336	13	0.04	25.9

#### Extended steelhead season

The steelhead season again was extended through March on the Alsea River. Tenmile Creek (Lane County) was added to the list of Zone 1 streams opened experimentally to March angling. The purpose was to gather information about the angling intensity, catch, and condition of fish.

#### Alsea River

Steelhead fishing during March was slow on the Alsea River. The run of bright fish, which was so evident in 1958, failed to materialize.

The Research Division's creel data on the Alsea River in March is listed by river section and classified as to condition in Table 214.

In summary, of the 26 steelhead checked in the creel, 17 were green, 2 were ripe, and 7 were spent.

#### Tenmile Creek

On Tenmile Creek, a number of fresh-run steelhead entered the stream on a freshet in the latter part of March. The seven fish checked were classified as follows: 3 bright, green females; 1 reddish, green female; 1 bright, green male; and 2 dark, spent males.

Angling intensity was light on Tenmile Creek except in the last few days of March, when it increased to moderate in the lower one-half mile of the stream.

The peak of steelhead spawning on Tenmile Creek appeared to be March 20-25. Water temperature on March 22 was 45° F.

Table 214

Condition of steelhead checked in creels  
Alsea River, March 1959

Condition of fish	Below Five Rivers		Five Rivers- Fall Creek		Fall Creek- South Fork		North Fork	
	Male	Female	Male	Female	Male	Female	Male	Female
Green	2 W	8 W 1 H	1 W	1 W 1 H	-	1 H 2 W	-	-
Ripe	-	-	-	-	1 H	-	1 W	-
Spent	-	3 W 1 H	-	2 W 1 H	-	-	-	-

W - Wild

H - Hatchery

#### North Fork trap count

Steelhead were counted by hatchery personnel in the fishway at the hatchery diversion dam on the North Fork of the Alsea River. The total wild and marked fish are presented in Table 215. Time of migration into the fishway for wild and hatchery (marked) steelhead is given in Table 216. Other species were not recorded at the trap.

Table 215

Total trap catch, adult steelhead trout  
North Fork Alsea River, 1958-1959

	Female	Male	Jacks	Wild	Marked	Total
Steelhead	316	301	95	190	427	617
Wild	109	81	20			190
BVA	158	140	66			298
BVA-LM	20	28	1			48
BVA-RM	16	27	3			43
BVA-BM	2	5	1			7
BVA- $\frac{1}{2}$ D	11	20	4			31

Table 216

Trap catch by periods,  
wild and marked fish

Date	Wild	Marked
November 16-30	3	0
December 1-15	3	1
December 16-31	16	11
January 1-15	16	37
January 16-31	11	73
February 1-15	9	39
February 16-28	9	45
March 1-15	14	46
March 16-31	60	122
April 1-15	24	45
April 16-30	22	7
May 1-15	3	1

#### Trout inventory

There is a divergence of opinions regarding trout fishing in the coastal streams of this district. Many fishermen and most moorage operators on the Alsea River are in favor of the late opening, and a large proportion of these people would be in favor of even a later opening than is now in effect. It is their opinion that many small anadromous fish are killed during the early part of the season.

In contrast, most of the moorage operators on the Siletz River feel that the late opening is causing them to miss a good early "blueback" fishery. They do not feel the downstream migrant fish loss of the early season is of consequence.

Angling intensity in tidewater for trout was moderate on opening weekend and diminished to almost nothing by mid-June. Angling success figures are not available.

#### Coastal streams

Coastal streams were in excellent condition for the trout opening and produced fair results. Angling intensity was moderate to heavy on the opening weekend, but decreased to light by the second weekend. Table 217 summarizes the creels checked by Oregon State Police game enforcement officers and the Game Commission fishery agent.

All of the marked steelhead taken in the Siletz were checked above the falls. It appears that the majority of the summer steelhead had migrated to the ocean prior to the opening.

Thirty-eight anglers caught and released 132 sub-legals opening day on the Siletz River. The anglers were checked from the forks to Wildcat Creek.

Table 217

Creel census, Lincoln District  
May 30-June 7, 1959

Stream	Anglers	Hours	Cut-throat	Rain-bow	Steel-head	Cat-fish	Fish per hour
Siletz River	67	243	95	--	15 <u>1</u>	1 <u>2</u>	0.5
Alsea River	27	85	41	2	-	-	0.5
Alsea River and Drift Creek tidewater	127	517	237	-	2	-	0.5
North Fork Alsea River	27	51	26	6 <u>3</u>	-	-	0.6
South Fork Alsea River	31	67	43	1 <u>4</u>	-	-	0.7

1 Fourteen were hatchery fish marked Ad-IM.

2 Bullhead catfish checked in creel on Siletz River, 5½ miles above Kernville.

3 Two marked RV and one marked LV; probably steelhead.

4 Marked LV; probably steelhead.

#### Coastal lakes

The opening weekend of trout season saw heavy angling intensity on the lakes in the vicinity of Florence. Generally speaking, catch success was good. As in 1958, angling intensity dropped rapidly on successive weekends.

#### Devils Lake

#### Creel census

Devils Lake offered poor trout fishing opening day. No fishermen could be found when the lake was visited on the second day of the season. Further creel census was not attempted. Table 218 summarizes the creel census data collected opening day.

Table 218

Creel census, Devils Lake  
Watershed 18, April 25, 1959

Boats	Angler hours	Rainbow	Cutthroat	Bullhead catfish	Trout per hour
9	44	1	4	4	0.1

The rainbow was 14 inches in length. The cutthroat were 9 to 14 inches, and the bullhead catfish were 8 to 10 inches.

Fishing has declined the last two years, after having a fair trout fishery in 1957.

## Population inventory

Gill net sampling on Devils Lake recovered few fish. Two experimental nets were fished the nights of April 6-7 and April 7-8. The catch was composed of 20 carp, 8 cutthroat, 1 steelhead, 2 bullhead catfish, and 6 cottids. The cutthroat were 9.6 to 13.1 inches in length.

Five catfish traps were fished the nights of April 6 and 7. About 15 or 20 bullhead catfish and 5 or 6 carp were caught.

Two trot lines with 20-25 hooks each were fished two nights. Liver caught only one cottid. Carp flesh caught two bullhead catfish and one channel catfish. The channel catfish was 16.4 inches in fork length and weighed 3 pounds, 7 ounces.

Gill nets were set in Devils Lake again June 3 for a 12-hour period. The catch is presented in Table 219.

Table 219

Gill net catch, Devils Lake  
June 3, 1959

Species	Number	Size range (inches)
Bullhead catfish	6	6.9-10.4
Carp	47	5.1-14.8
Cottids	4	2.0-4.0
Cutthroat	8	7.2-8.3
Silvers	7	6.0-7.0

An examination of the scales showed Age Class I carp to range from 5.1 to 12.2 inches in length. Only one Age Class II carp was taken. It was 14.8 inches in length.

### Lost, Erhart, and Georgia Lakes

Lost, Erhart, and Georgia Lakes were experimentally treated with toxaphene on February 5 and 6, 1958. Lost Lake received a concentration of 0.01 p.p.m.; Erhart Lake received 0.05 p.p.m.; and Georgia Lake received 0.10 p.p.m.

Fish were periodically liveboxed in the lakes. Ten silver salmon juveniles liveboxed in each lake on December 7, 1958, were still alive on January 16, 1959. It was then concluded that the lakes were no longer toxic, and the testing was terminated.

Within a month after the lakes were found nontoxic, they were planted with equal numbers of cutthroat and rainbow, the purpose being to determine which species gives the greatest return to the creel. Stocking took place at the rate of 100 of each species per surface acre. Both species were approximately five to the pound.

Opening weekend of trout season offered excellent fishing on Lost, Erhart, and Georgia Lakes. Table 220 summarizes the creel census.

Table 220

Creel census, Lost, Erhart, and Georgia Lakes  
Watershed 18, April 25-May 15, 1959

Lake	Anglers	Hours	Rainbow	Cutthroat	Total	Fish per hour
Lost	137	219	298	303	601	2.7
Erhart	36	40	68	73	141	3.5
Georgia	13	35	7	40	47	1.3

In Lost and Erhart Lakes, it can be seen that the cutthroat and rainbow entered the catch in about the same proportion that they were stocked but, in Georgia Lake, significantly more cutthroat than rainbow were checked. However, the sample size is small and may not be representative of the stocks.

#### Woahink Lake

The shore of Woahink Lake was examined to determine the spawning activity of kokanee. On December 17, 1958, about 50 mature fish were seen spawning near the lake outlet. Another 25 were seen in the outlet at the North Beach Road bridge. The two larger inlets were spot checked, but no kokanee were found.

The peak of spawning appeared to occur in mid-December. No dead fish could be found. The water temperature on December 17 was 52° F. All spawning activity had ceased when the outlet was visited on December 31.

Woahink Lake kokanee catch success in 1959 was down from that for the same period of 1958. Kokanee were not taken by the trout anglers as in 1958.

On May 23, twenty-three anglers fished 73 hours to catch 1 kokanee, 19 rainbow, 2 cutthroat, 2 perch, and 1 bass. The kokanee was 11.2 inches fork length and in its third year.

#### Yaquina salmon fishery

Chinook angling in the offshore salmon fishery improved in 1959 to a new high for the past five years. Silver angling success improved over 1958 and was slightly above an average of the last five years. Table 221 gives the creel samples for the last five years.

U. S. Coast Guard boat estimates in previous years are considered quite high and, therefore, have given an exaggerated picture of the salmon fishery at Yaquina Bay. This year, they were furnished with a tally counter. It is felt that the resulting estimate was close to the actual figure.

Table 221

Creel census, Yaquina Bay offshore sport fishery  
1955-1959

Year	Boat trips	Anglers	Chinooks	Silvers	Pinks	Chinook per angler trip	Silvers per angler trip
1955	-	1,274	174	419	-	0.14	0.33
1956	-	1,813	211	1,158	-	0.12	0.64
1957	741	2,000	93	1,014	3	0.05	0.51
1958	205	557	56	129	-	0.10	0.23
1959	847	2,287	348	1,105	-	0.15	0.48

If we were to multiply the Coast Guard boat count by the catch success figures obtained by the creel census, then 10,000 anglers caught 1,800 chinooks and 4,400 silvers during the period, June 16-September 15, 1959.

Tidewater sea-run cutthroat and salmon fishery

For the past two years, an estimate of the tidewater fishery has been compiled jointly by biologists of the Fish Commission and Game Commission. The method is described by K. A. Henry, A. R. Morgan, and R. L. Rulifson, "The Salmon Catch of the Sport Fishery in the Coastal Rivers of Oregon in 1949", Fish Commission Research Briefs, Vol. 3, No. 1, September, 1950. This method has been used by the Fish Commission since the late 1940's.

Siletz

An estimate of the silver, chinook and sea-run cutthroat fishery in Siletz tidewater is found in Table 222.

The jack catch was composed of 541 chinook and 479 silvers.

Jack salmon and sea-run cutthroat fishing success was below that recorded for 1958. Chinook fishing showed a substantial gain in the Siletz this year with success more than doubling any of the previous six years. Silver fishing improved greatly over 1958 and was near the average for the past seven years.

Catch per boat for the Siletz River is given in Table 223.

Alsea

Estimates for the silver, chinook and sea-run cutthroat fishery in Alsea tidewater are given in Table 224.

A jack catch of 198 chinooks and 791 silvers was calculated.

As can be seen in Table 225, the catch per boat for all species was below that estimated in 1958.



Table 222

Calculated angling intensity and catch, Siletz River tidewater fishery  
1959

Week	Boat-days	Cutthroats	Chinook	Silvers	Jacks
July 20-26	623	149	0	0	0
July 27-August 2	611	177	24	0	24
August 3-9	661	119	20	0	13
August 10-16	490	73	54	5	0
August 17-23	821	222	49	98	25
August 24-30	1,109	676	166	632	33
August 31-September 6	984	364	108	187	39
September 7-13	1,113	901	223	211	100
September 14-20	1,265	342	152	177	126
September 21-27	1,397	223	293	573	98
September 28-October 4	1,350	256	364	270	216
October 5-11	930	112	186	93	232
October 12-18	1,218	134	195	219	49
October 19-25	708	64	85	135	28
October 26-November 1	704	63	70	155	14
November 2-8	385	0	58	169	23
November 9-15	195	0	22	31	0
Totals	14,564	3,875	2,069	2,955	1,020

Table 223

Catch per boat, Siletz River tidewater fishery  
September 1-October 31, 1953-1959

Year	Cutthroat	Chinook		Silver	
		Adults	Jacks	Adults	Jacks
1953	0.01	0.03	-	0.21	-
1954	0.25	0.03	0.01	0.29	0.06
1955	0.15	0.05	0.23	0.15	0.09
1956	0.34	0.04	0.15	0.27	0.26
1957	0.07	0.08	0.07	0.39	0.10
1958	0.28	0.10	0.06	0.07	0.05
1959	0.25	0.17	0.05	0.21	0.04

### Siuslaw

The Siuslaw calculated catch is found in Table 226. Cutthroat and chinook fishing was good in 1959. Estimated figures show an approximate four-fold increase in the take of adult chinook over 1958. Although figures in Table 227 show a slight drop in catch per boat for silvers in 1959 as compared to 1958, the estimated total catch for the 1959 season was slightly higher because of the relatively good fishing in November.

The calculated jack catch consisted of 1,535 chinooks and 3,789 silvers.

Table 224

Calculated angling intensity and catch  
Alsea River tidewater fishery, 1959

Week	Boat-days	Cutthroat	Chinooks	Silvers	Jacks
July 6-12	97	81	0	0	0
July 13-19	170	51	0	0	0
July 20-26	135	36	0	0	0
July 27-August 2	102	5	3	0	0
August 3-9	196	80	18	0	0
August 10-16	272	177	41	5	0
August 17-23	501	391	20	45	20
August 24-30	693	430	35	942	21
August 31-September 6	707	396	7	134	42
September 7-13	827	744	17	306	132
September 14-20	608	426	18	134	122
September 21-27	688	296	21	206	172
September 28-October 4	693	256	28	173	146
October 5-11	409	221	12	110	160
October 12-18	589	124	59	153	94
October 19-25	246	48	2	54	52
October 26-November 1	255	10	5	69	15
November 2-8	203	0	0	87	10
November 9-15	267	0	0	152	3
Totals	7,658	3,772	286	2,570	989

Table 225

Catch per boat, Alsea River tidewater fishery  
September 1-October 31, 1953-1959

Year	Cutthroats	Chinook		Silver	
		Adults	Jacks	Adults	Jacks
1953	0.06	0.04	-	0.46	-
1954	0.19	0.03	0.04	0.39	0.95
1955	0.45	0.02	0.09	0.27	0.81
1956	0.26	0.02	0.08	0.45	0.44
1957	0.11	0.06	0.11	0.34	0.17
1958	0.57	0.07	0.14	0.30	0.35
1959	0.50	0.03	0.04	0.27	0.15

#### Devils Lake

Chemical rehabilitation of Devils Lake was deemed necessary after fish population studies and analysis of creel data showed the lake to be overrun with carp.

Preparations were made for rehabilitation of the lake by checking previous soundings, analyzing water samples, and surveying the lake by air. Table 228 summarizes the water analysis.

Table 226

Calculated angling intensity and catch,  
Siuslaw River tidewater fishery, 1959

Week	Boat-days	Cutthroat	Chinooks	Silvers	Jacks
August 10-16	24	24	0	0	0
August 17-23	166	315	0	0	10
August 24-30	595	2,410	0	12	12
August 31-September 6	888	2,344	9	0	36
September 7-13	1,126	2,725	11	11	304
September 14-20	815	1,785	82	49	358
September 21-27	1,074	1,751	150	183	376
September 28-October 4	1,340	871	255	509	536
October 5-11	800	200	384	336	560
October 12-18	1,822	510	346	1,184	1,020
October 19-25	2,422	314	194	1,332	1,090
October 26-November 1	1,896	76	57	1,270	569
November 2-8	1,378	14	83	1,461	345
November 9-15	322	0	39	270	90
November 16-22	62	0	4	160	18
Totals	14,730	13,339	1,614	6,777	5,324

Table 227

Catch per boat, Siuslaw River tidewater fishery  
September 1-October 31, 1956-1959

Year	Cutthroat	Chinook		Silver	
		Adults	Jacks	Adults	Jacks
1956	-	0.01	-	0.19	-
1957	0.32	0.05	0.05	0.52	0.66
1958	0.65	0.04	0.02	0.44	0.70
1959	0.87	0.12	0.11	0.40	0.28

Table 228

Analysis of water sample, Devils Lake, Lincoln County  
June 11, 1959

Water temperature ° F.	pH	Dissolved oxygen (p.p.m.)	Alkalinity (as p.p.m. CaCO <sub>3</sub> )	Total dissolved solids (p.p.m.)
5 feet - 62	7.4	9.6	21	77
15 feet - 62	7.2	9.2	21	77

Treatment of the lake got under way June 16 with the spraying of the vegetated areas at the south end of the lake. Liquid rotenone was dispersed with a gasoline-powered pump.

Toxaphene was applied on June 17. Two aluminum barges dispersed the chemical in about six hours of operation. Liquid toxaphene was siphoned into the propwash. The concentration of toxaphene in the lake was approximately 0.03 p.p.m.

Fish were dying by the morning of June 18. The last live fish was observed on June 25, eight days after toxaphene was applied, but a live fish was reported on June 27.

Treatment of the tributaries began June 17 by placing drip barrels on the five larger streams. The barrels dripped liquid rotenone until June 30. The smaller tributaries were treated with liquid rotenone. All tributaries had been treated by June 26. Marshy areas along the shore were treated by backpack cans.

Cleanup operations took many man hours. From June 18 to June 29, an estimated 20 tons of fish, about 75 per cent of those killed, were picked up. Carp outnumbered and outweighed all other species combined by a wide margin.

Species which were found in the lake were carp, bullhead catfish, channel catfish, silvers, steelhead, cutthroat, rainbow, sculpin, and stickleback.

Species which were present in the lake in 1956, but which were absent in 1959, were bass, perch, bluegill, pumpkinseed, and warmouth.

Five groups of 20 cutthroat trout, about three inches in length, were liveboxed in Devils Lake on July 8. Controls were liveboxed in the old Rock Creek channel. At the end of five days, only one fish was alive in each of three groups. In the other two groups, all the fish were dead. The controls were all alive. The lake was considered to be toxic July 13.

Reports of fish being seen in Devils Lake the first part of August provoked gill netting, spot poisoning, and careful visual observation in an effort to confirm the reports. Two gill nets fished 48 hours failed to catch anything. Treatment of three small areas with liquid Noxfish killed only three cutthroat at the mouth of a tributary.

Gill nets set in Kangas' pond and the pond near the regatta grounds did not turn up any warm-water species.

On September 26, a skin diver from Toledo made six dives in the lake. In the northwest bay, he reported seeing one "brown-colored perch" about  $1\frac{1}{2}$  inches long. No other fish were seen.

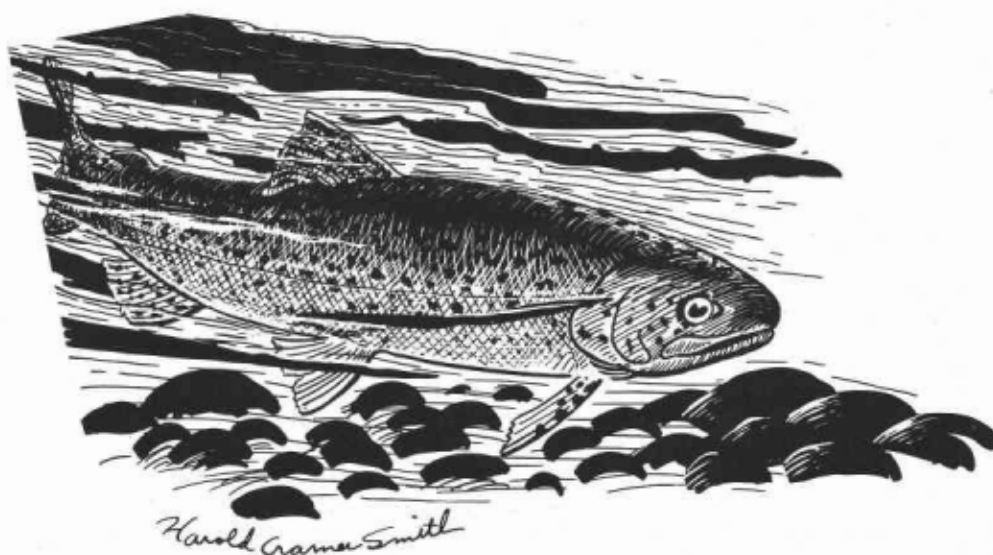
Seven gill nets were fished the night of September 30. They yielded one jack salmon 12-14 inches, and one cutthroat, 12-14 inches. On October 1, the same nets caught one 7-inch cutthroat and three channel catfish 16-18 inches. The channel catfish were apparently resistant to toxaphene at a concentration of 0.03 p.p.m.

A 21-acre section of the upper end of the northwest bay was treated with rotenone on October 7. At the same time, two skin divers searched the depths while two boats covered the surface. No fish were found.

Eleven gill nets were fished the night of October 7 and caught two jack salmon, 14 and 18 inches; two cutthroat, 10 and 14 inches; and several crayfish and newts.

Cutthroat trout were liveboxed in Devils Lake October 16. Periodic checking found no dead fish until November 4 when one fish had died. Continued checking through November 20 showed no additional loss.

Restocking of the lake with cutthroat trout began November 3.



# COOS-COQUILLE DISTRICT

R. A. Corthell

## Fishery resource inventory

### Spawning ground counts

Silver salmon spawning ground counts on the Coquille River system in 1958-59 were below average. Only 15 fish per mile was computed for 1958-59 as compared to the 54 fish per mile of stream the preceding year. The 1959-60 counts show an average of 53 fish per mile of stream. Spawning ground surveys in the Coos-Coquille area are made by representatives of the Fish Commission and the Game Commission. The data presented in Tables 229 and 230 are the result of surveys conducted by both agencies.

Table 229

Silver salmon spawning ground counts on  
Coquille River and tributaries, 1958

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
<u>North Fork Coquille River</u>					
Neely-Giles Creek	1.00	17	2	19	
Woodward Creek	.50	2	0	2	
Steinon Creek	.50	8	5	13	
Middle Creek	1.00	20	6	26	
Cherry Creek	1.75	25	7	32	20
<u>Middle Fork Coquille River</u>					
Big Creek	1.00	15	2	17	
Rock Creek	.25	9	2	11	
Rock Creek /1	1.00	20	4	24	
Slater Creek	1.00	23	5	28	
Sandy Creek	1.00	0	0	0	19
<u>East Fork Coquille River</u>					
Hantz Creek	.50	0	0	0	
Steel Creek	1.00	3	2	5	
Elk Creek	.75	0	0	0	2
<u>South Fork Coquille River</u>					
Hayes Creek	.50	0	0	0	
Kelly Creek	.25	0	0	0	
Rock Creek	1.00	0	0	0	
Salmon Creek	.25	17	3	20	10
Totals	13.25	159	38	197	15

/1 Rock Creek, tributary to Myrtle Creek

Coos Bay area streams show an average of 10 silver salmon per mile in 1958. The same area shows an average of 24 silver salmon per mile of stream in 1959. The results of the Coos Bay counts in 1958 and 1959 are given in Tables 231 and 232 respectively.

Table 230

Silver salmon spawning ground counts on  
Coquille River and tributaries, 1959

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
<u>North Fork Coquille River</u>					
Neely-Giles Creek	1.00	190	4	194	
Woodward Creek	.50	11	1	12	
Cherry Creek	1.75	76	3	79	
Middle Creek	1.00	42	3	45	78
<u>Middle Fork Coquille River</u>					
Rock Creek /1	1.00	30	0	30	
Rock Creek	.25	22	2	24	
Slater Creek	1.00	110	8	118	
Sandy Creek	1.00	0	0	0	53
<u>South Fork Coquille River</u>					
Hayes Creek	.50	0	0	0	
Rock Creek	.75	4	0	4	
Salmon Creek	1.25	34	1	35	16
Totals	10.00	519	22	541	54

/1 Rock Creek, tributary to Myrtle Creek

Table 231

Silver salmon spawning ground counts  
Coos Bay area, 1958

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
<u>South Fork Coos River</u>					
Morgan Creek	1.00	2	0	2	
Big Creek	1.00	12	2	14	
Daniels Creek	.75	3	2	5	
Tioga Creek	2.00	0	0	0	4
<u>Milllicoma River</u>					
Deton Creek	.50	1	0	1	2
<u>West Fork Milllicoma River</u>					
Totten Creek	.25	3	0	3	
Vaughns Mill Creek	.25	3	0	3	6
<u>East Fork Milllicoma River</u>					
Matson Creek	.50	3	0	3	
Marlow Creek	.50	0	0	0	3
<u>Coos Bay Tributaries</u>					
Palouse Creek	1.00	28	2	30	
Larson Creek	1.00	14	5	19	
Mettman Creek	.50	5	6	11	
Kentuck Creek	.25	5	0	5	24
Totals	9.50	79	17	96	10

Table 232

Silver salmon spawning ground counts  
Coos Bay area, 1959

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
<u>South Coos River</u>					
Morgan Creek	1.00	10	0	10	
Daniels Creek	1.00	13	0	13	12
<u>West Fork Millicoma River</u>					
Totten Creek	.25	7	1	8	
Vaughns Mill Creek	.25	29	0	29	74
<u>East Fork Millicoma River</u>					
Matson Creek	.80	6	0	6	
Marlow Creek	1.00	3	0	3	5
<u>Coos Bay Tributaries</u>					
Palouse Creek	1.00	25	0	25	
Larson Creek	1.00	56	7	63	
Mettman Creek	.25	4	0	4	
Kentuck Creek	.50	7	0	7	36
Totals	7.05	160	8	168	24

Table 233 presents a comparison of silver salmon counts on a fish per mile basis for the five years that counts have been recorded in the Coos-Coquille District.

Table 233

A comparison of silver salmon spawning ground counts per mile of stream  
in the Coos-Coquille District, 1955-1959

Stream system	1959	1958	1957	1956	1955
Coquille River system	54	15	54	95	35
Coos River system	24	10	27	114	42

Counts on spawning chinook salmon in the Coquille River system for the years 1958 and 1959 are presented in Tables 234 and 235. Although the 1959 count is only 50 per cent of the number recorded in 1958, there has been a significant increase in runs of chinook entering the Coquille system based on cursory observations made in the past eight years.



Table 234

Chinook salmon spawning ground counts  
Coquille River, 1958

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
South Fork Coquille	1.75	19	0	19	10.8
Salmon Creek	1.80	40	0	40	22.2
North Fork Coquille	1.00	18	0	18	18.0
Elk Creek	.75	8	4	12	16.0
Rock Creek (Myrtle Creek)	1.00	48	0	48	48.0
Woodward Creek	.50	12	0	12	24.0
Totals	6.80	145	4	149	22

Table 235

Chinook salmon spawning ground counts  
Coquille River, 1959

Stream	Miles surveyed	Adults	Jacks	Total	Fish per mile
South Fork Coquille	2.50	28	0	28	11.2
Rock Creek (Myrtle Creek)	1.00	0	0	0	0.0
Salmon Creek	.80	7	0	7	8.7
North Fork Coquille	1.00	23	0	23	23.0
Totals	5.30	58	0	58	11

Sport fishing evaluations

Coos Bay Bar salmon fishery

Coos Bay salmon anglers again had a comparatively poor year. The average catch per angler was 0.32 fish as compared to 0.39 fish in 1958 and 1.04 fish in 1956.

An evaluation of the Coos Bay salmon fishery is based on the boat counts obtained by the U. S. Coast Guard from its lookout at Coos Bay Bar. The total season's catch has been computed through a statistical analysis of creel data and boat counts and is correct within a 10 per cent margin of error. For the results of the 1959 angling season on the Coos Bay Bar see Table 236.

Table 236

Calculated sport salmon fishery, Coos Bay  
May 15 - September 30, 1959

Method	Boat trips	Angler trips	Silver	Chinook	Total	Fish per angler
Skiff	6,306	18,224	2,875	1,225	4,100	0.22
Charter	1,467	7,614	3,598	566	4,164	0.55
Totals	7,773	25,838	6,473	1,791	8,264	0.32

Charter boat anglers were more successful than the skiff anglers in 1959. The catch of anglers fishing from charter boats was predominately silver salmon while the skiff anglers caught more chinook. The chinook salmon seem to prefer the jetties and bar, the area fished by anglers in skiffs. Many chinook salmon were taken well inside the bar.

In 1959, a total of 14 marked salmon was checked at Coos Bay. Age of marked salmon determined by Fish Commission personnel is presented in Table 237.

Table 237

Origin and brood year of marked salmon recovered  
at Coos Bay in 1959

Species	Date collected	Brood year	Origin and agency
Silver /1	7-1-59	1956	Hood Canal (WSIF) Klaskanine (OFC)
Silver	7-10-59	1956	Klaskanine (OFC)
Silver	7-12-59	1956	Klaskanine (OFC)
Silver /1	7-24-59	1956	Minter Cr. (WSIF) Sacramento (FWS)
Silver	7-24-59	1956	Klaskanine (OFC)
Silver	8-1-59	1956	Klaskanine (OFC)
Silver	8-1-59	1956	Klaskanine (OFC)
Silver	8-1-59	1956	Umpqua (OGC)
Silver	8-4-59	1956	Umpqua (OGC)
Chinook	8-4-59	1956	Umpqua (OGC)
Silver	8-26-59	1956	Skagit R. (WSDF)
Silver	8-26-59	1956	Umpqua (OGC)
Silver	8-27-59	1956	Umpqua (OGC)
Silver	8-27-59	1956	Mark unknown

/1 Duplicate mark

The average weight of chinook salmon caught in the Coos Bay fishery during the 1959 season was 12.2 pounds. The average weight of silver salmon was 6.7 pounds.

A comparison of fishing effort and catch from 1955 through 1959 is made in Table 238.

#### Coquille fall salmon fishery

Angler success for salmon on the lower Coquille River near Bandon was 0.28 fish per angler in the fall of 1959. A comparison with the success in past years is shown in Table 239.

From a sample of 124 silver salmon checked, 18 or 15 per cent were jacks. From a sample of 14 chinooks checked, 7 were jacks. The largest chinook weighed was 38 pounds and the largest silver salmon weighed was 21 pounds.

Table 238

Calculated summer salmon angling effort and catch  
Goos Bay, 1955-59

	1955	1956	1957	1958	1959
Boat trips					
skiff	5,280	8,355	9,962	5,266	6,306
charter	728	997	1,466	1,052	1,467
total	6,008	9,352	11,428	6,318	7,773
Angler trips					
skiff	15,403	21,689	27,767	14,822	18,224
charter	3,882	5,493	8,640	5,027	7,614
total	19,285	27,182	36,407	19,849	25,838
Number of fish					
chinook	2,789	5,649	1,816	2,269	1,791
silvers	8,964	21,889	30,207	3,482	6,473
jacks		850	599	1,947	
total	11,753	28,388	32,622	7,698	8,264
Fish per angler	0.61	1.04	0.90	0.39	0.32

Total weight of fish caught in 1959

Chinooks - - - - - 21,850 pounds  
Silvers - - - - - 43,370 pounds

Table 239

Coquille River fall chinook catch success by years

	1959	1958	1957	1956	1955
Fish per angler	0.28	0.30	0.33	0.31	0.23

Data concerning the 1959 lower Coquille salmon catch are presented in Table 240.

Table 240

Sport salmon catch, lower Coquille River  
1959

Period	Angler trips	Silver	Chinook	Total	Fish per hour	Fish per angler
September	584	133	18	151	0.08	0.26
October	409	127	0	127		0.30
Totals	993	260	18	278		0.28

### Winter steelhead fishery

Angler success for the district, exclusive of the extended season on the South Fork of the Coquille River, shows that steelhead were caught at a rate of 0.17 fish per person. One steelhead was caught for each 16.7 hours of angling effort.

Results of the 1958-59 steelhead creel sampling is presented in Tables 241 and 242. Table 241 presents the data for the Coquille system while Table 242 shows data for the Coos Bay system.

Table 241

Steelhead creel sampling, Coquille River  
1958-59

Area	Anglers	Steelhead	Fish per angler	Fish per hour
Tidewater	112	27	0.24	0.09
Middle Fork	16	0	0.00	0.00
South Fork	20	3	0.15	0.04
Totals	148	30	0.20	0.08

Table 242

Steelhead creel sampling, Coos Bay area  
1958-59

Area	Anglers	Steelhead	Fish per angler	Fish per hour
Kentuck Inlet	17	2	0.12	0.04
Larson Inlet	8	0	0.00	0.00
Haynes Inlet	2	0	0.00	0.00
South Coos River	58	16	0.28	0.09
East Fork Millicoma	7	1	0.14	0.08
West Fork Millicoma	78	7	0.09	0.03
Totals	170	26	0.15	0.05

### Extended steelhead season

Angling pressure was not heavy during the extended season on the South Fork of the Coquille River. Anglers caught fish at a rate comparable to that of the regular season. Steelhead anglers caught 0.17 fish per angler at a rate of 0.08 fish per hour during the extended season on the Coquille River.

Table 243 presents creel sampling data and Table 244 lists condition of steelhead at time of catch.

Table 243

Creel sampling, extended season, South Fork Coquille  
March 1959

Method	Anglers	Steelhead	Fish per angler	Fish per hour
Boat	9	8	0.88	0.33
Bank	73	6	0.08	0.04
Totals	82	14	0.17	0.08

Table 244

Condition of steelhead caught in  
March 1959

Condition	Bright		Reddish		Dark	
	Male	Female	Male	Female	Male	Female
Green	2	7				
Ripe			2	1		
Spent					1	1

As can be seen from above, the green fish predominated in the catch. Boat anglers were much more successful than bank anglers in both number and condition of fish caught.

#### Trout fishery

Angler success was generally good in the lower reaches of Coos County streams and poor in the upper portions.

Marked planted trout made up 70 per cent of the total catch checked.

Anglers had an average catch of 2.7 trout per person. Trout were taken at a rate of 0.91 fish per hour of effort. In 1958 the average catch was 2.44 trout per angler.

Trout angling intensity declined markedly after the first two week-ends of the season.

Data gathered from checking trout fishermen appears in Table 245.

#### Shad fishery

Anglers caught shad at a rate of 1.84 per angler as compared to 2.17 per angler in 1958.

The success of the shad fishery was hampered by muddy water resulting from several dredging operations. Table 246 presents the catch data obtained on the shad fishery in Coos Bay.

Table 245

Creel sampling, trout, of Coos County  
streams and lakes, 1959

Water	Anglers	Unmarked	Marked	Fish per angler	Fish per hour
Middle Fork Coquille	15	0	25	1.67	0.83
North Fork Coquille	45	28	124	3.38	1.40
South Fork Coquille	75	5	57	0.82	0.35
East Fork Coquille	45	44	40	1.87	0.58
South Fork Coos	98	83	153	2.40	0.78
West Fork Millicoma	15	23	4	1.80	0.43
East Fork Millicoma	62	62	160	3.58	1.04
Squaw Lake	64	0	298	4.66	1.00
Bradley Lake	87	110	0	1.26	
Totals	506	355	861	2.40	0.91

Table 246

Sport catch, shad, Millicoma River  
1959

Method	Anglers	Shad	Fish per angler	Fish per hour
Bank	20	25	1.25	0.44
Boat	78	156	2.00	0.44
Totals	98	181	1.84	0.44

A comparison of the shad angler success for the past few years based on our creel census work appears in Table 247.

Table 247

Sport catch, shad, Coos Bay area for  
recent years

Year	Anglers	Shad	Fish per angler	Fish per hour
1955	218	610	2.80	1.00
1956	289	812	2.81	0.94
1957	376	759	2.02	0.53
1958	209	453	2.17	0.46
1959	98	181	1.84	0.44

The sport shad fishery takes place almost entirely on the Millicoma River between Allegany and the junction of the Millicoma River with South Coos River.

### Striped bass fishery

Coos Bay area striped bass anglers caught 0.43 fish per angler during 1959, as compared to 0.49 fish per angler in 1958.

The striped bass creel sampling data obtained in 1959 are presented in Table 248.

Table 248

Sport catch, striped bass  
Coos Bay area, 1959

Area	Anglers	Striped bass	Fish per angler	Fish per hour
Coos Bay	787	340	0.43	0.08

Several hundred striped bass taken in the Coos Bay sport fishery were measured in order to determine the percentage of fish in three length groups. Table 249 lists the number and percentage of fish in various length groups.

Table 249

Length composition of striped bass in inches  
Coos Bay, 1959

	2-14 inches	15-18 inches	Over 18 inches
Number of bass in group	60	86	146
Percentage in group	20%	30%	50%

Catch data for the Coos Bay striped bass fishery for a seven-year period are shown in Table 250.

Table 250

A comparison of striped bass angler success  
Coos Bay, 1950-1959

Year	Fish per angler	Fish per hour
1950	0.41	0.08
1951	0.53	0.10
1955	0.28	0.07
1956	0.21	0.06
1957	0.48	0.09
1958	0.49	0.09
1959	0.43	0.08

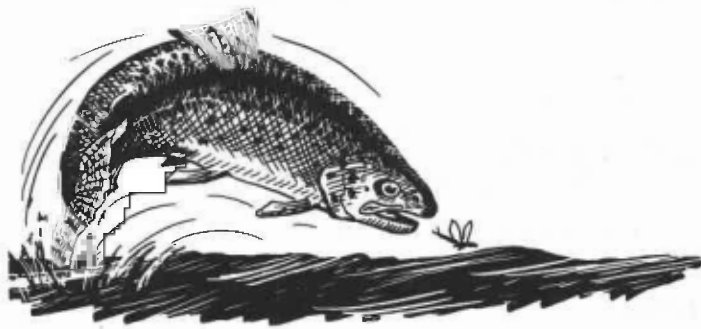
### Lake population investigations

A total of 10 cutthroat trout from 8 to 10 inches in length was obtained by gill net in Bradley Lake. Only one of the ten fish was marked.

Only one 14-inch cutthroat was taken by gill net in Pony Creek Reservoir near Coos Bay. This body of water has approximately 125 surface acres and is the Coos Bay city water supply.

### Steelhead rearing ponds

Several possible locations for rearing ponds have been investigated but no satisfactory site has been located in headwater streams. All of the practical sites seem to be in the tidewater areas where it would be necessary to trap and transplant fish.





## FISH PROPAGATION

C. C. Jensen

### Egg production

Approximately 27.7 million trout, steelhead, and salmon eggs were eyed in the sixteen Game Commission trout hatcheries in 1959. Table 251 tabulates the eggs and indicates that rainbow eggs contributed about 12.9 million; Kamloops numbered in excess of 5.7 million; cutthroat eggs, 1.6 million; eastern brook about 2.7 million; and kokanee about 3.6 million. The remaining number consisted of approximately 294 thousand winter steelhead eggs, 95 thousand summer steelhead, 253 thousand spring chinook, 293 thousand Atlantic salmon eggs, and 200 thousand miscellaneous eggs from trout and other salmon species.

Native wild brood stock contributed about 10.7 million eggs to the hatchery program while domesticated brood fish supplied 14.3 million eggs. Approximately 2.7 million were imported from states of Montana, Washington and California, while exports totalling 5.7 million eggs were shipped to Nebraska, California, U. S. Fish and Wildlife Service, Montana, and British Columbia. Lake trout eggs totalling about 99 thousand were again purchased from the Province of Manitoba. Brood fish on hand at the end of December totalled 31,700. Table 252 indicates the number of eggs by species that were taken at each Game Commission installation.

### Fish production

In the calendar year of 1959, Game Commission hatcheries liberated and/or transferred 15,582,811 fish totalling 685,773 pounds (Table 253). The poundage differs slightly from the liberation department's tallies because adjustments were made for transfers of fish from one station to the other. In 1958, the number released was 15,534,471 fish weighing 706,279 pounds.

### Food fed and conversion rates

Fry, fingerling and yearling fish were fed 2,022,270 pounds of food in 1959, and brood fish consumed 218,896 pounds for a grand total of 2,241,166 pounds (Table 253). In 1958, a total of 3,539,977 pounds was fed to all fish; thus a savings of about 1.3 million pounds of food occurred in 1959. Shrinkage of meat and fish products stored in cold storage amounted to 1.83 per cent or 41,822 pounds in 1959.

In Table 254, a comparison is made of the conversion rates required to change food into fish flesh for the years 1958 and 1959. Pounds of fry, fingerling, and yearlings released in a calendar year were compared to pounds of food consumed by the fish during that same calendar year to arrive at the conversion ratio. Liberations of excess brood fish and poundage of food consumed by brood have been excluded from data shown. It is noted from Table 254 that the average rate of conversion was 3.02 for 1959 as compared

Table 251

Annual egg production including exchanges and purchases  
of trout eggs in 1959

Species	Eggs from wild fish	Eggs from hatchery brood fish	Eggs imported or exchanged	Eggs exported or exchanged	Number eggs purchased	Number brood fish on hand December
Spring rainbow	381,160	2,102,487				1,801
Fall rainbow		10,391,268		3,289,062		20,304
Kamloops	5,711,926			2,122,666		
Cutthroat			150,050	150,096		8,354
Eastern brook	2,702,574			100,000		
Golden trout						575
Brown trout	48,525					
Lake trout					99,374	
Winter steelhead	294,246					
Summer steelhead	94,957					294
Silver salmon	39,450					
Spring chinook	253,081					
Fall chinook			25,380			
Atlantic salmon		293,112				372
Kokanee	1,130,110		2,522,416			
Totals	10,656,029	14,257,663	2,697,846	5,661,824	99,374	31,700

Note: Total eggs handled - 27,710,912

Table 252  
Number of eggs taken at Oregon Game Commission stations - 1959

STATION	Spring Rainbow	Fall Rainbow	Kamloops	Cutthroat	Eastern Brook	Brown Trout	Winter Steelhead	Summer Steelhead	Kokane Salmon	Silver Salmon	Chinook Salmon	Atlantic Salmon	Totals
Alsea Hatchery				1, 116, 114			215, 200						1, 331, 314
Bandon Hatchery				150, 182									150, 182
Butte Falls Hatchery (McCloud Station) Rogue River								23, 710			78, 500		102, 210
Cedar creek Hatchery (Three Rivers)							18, 256			39, 450			57, 706
Diamond Lake			5, 711, 926										5, 711, 926
Fall River Hatchery (East Lake)	381, 160				2, 702, 574	48, 525							3, 132, 259
Hood River Hatchery (Hood River)								20, 151					20, 151
Klamath Hatchery (Crescent-Odell Lake)									1, 130, 110				1, 130, 110
Leaburg Hatchery		1, 843, 158											1, 843, 158
McKenzie Hatchery	204, 740												204, 740
Oak Springs Hatchery		2, 910, 000											2, 910, 000
Roaring River Hatchery		5, 638, 110		69, 880									
Crystal Springs Creek							15, 790						
Siletz River								3, 510					5, 727, 290
Rock Creek Hatchery (Umpqua River)							45, 000	47, 586			174, 581		267, 167
Willamette Hatchery	1, 897, 747												1, 897, 747
Wizard Falls Hatchery				134, 666							293, 112		427, 778
TOTALS	2, 483, 647	10, 391, 268	5, 711, 926	1, 470, 842	2, 702, 574	48, 525	294, 246	94, 957	1, 130, 110	39, 450	253, 081	293, 112	24, 913, 738

Table 253

Summary of annual fish production data for each station  
1959

Station	Total pounds of food fed	Pounds of food fed to brood fish	Pounds of food fed to fry, fingerling and yearling fish	Fish liberated from hatcheries	
				Number	Pounds
Alsea	139,416	22,135	117,281	360,581	51,740
Bandon	66,868	5,300	61,568	215,858	29,015
Butte Falls	186,915		186,915	575,572	48,090
Cedar Creek	183,452		183,452	363,228	42,041
Diamond				1,698,944	602
Fall River	17,281		17,281	2,132,363	5,263
Hood River	98,787	1,439	97,348	226,123	21,286
Klamath	96,888		96,888	2,488,154	39,628
Leaburg	268,226	13,352	254,874	1,704,498	124,873
McKenzie	41,290	360	40,930	707,647	38,678
Oak Springs	373,119	85,110	288,009	2,474,176	90,091
Roaring River	181,605	58,247	123,358	406,231	36,584
Rock Creek	194,384		194,384	404,701	55,603
Wallowa	117,808	70	117,738	420,355	24,900
Willamette	132,982	22,029	110,953	640,913	30,326
Wizard Falls	142,145	10,854	131,291	1,033,467	47,053
Totals	2,241,166	218,896	2,022,270	15,852,811	685,773

to 4.81 for 1958. The 37 per cent increase in efficiency may be attributed to better fish cultural practices including additional grading, a stepped-up pellet feeding program, fish maintenance diets, and weather conditions. The conversion factor at Wallowa Hatchery increased by approximately 51 per cent from 1958 to 1959, possibly because the holdover fish made a tremendous growth during the latter part of the calendar year after most of the liberations had been made for that year. Inasmuch as conversion ratios are computed on a calendar year basis, rather than for each lot of fish, a more accurate conversion figure might be arrived at for each station by averaging the results of the last two years of any period.

Table 254

Comparison of conversion ratios between 1958 and 1959  
calculated from fry, fingerling, and yearling fish  
released from each station

Station	Net pounds fry, fingerling and yearlings released		Conversion ratios		
	1958	1959	1958	1959	Average
Alsea	29,549	48,557	5.32	2.42	3.87
Bandon	21,700	26,120	5.07	2.36	3.72
Butte Falls	38,810	45,518	5.81	4.11	4.96
Cedar Creek	38,276	42,479	7.17	4.32	5.75
Diamond	402	602			
Fall River	5,750	5,131	4.11	3.37	3.74
Hood River	21,283	19,326	5.42	5.04	5.23
Klamath	38,616	39,945	5.06	2.43	3.75
Leaburg	106,006	122,273	5.93	2.08	4.01
McKenzie	32,970	37,632	4.86	1.09	2.98
Oak Springs	159,601	96,816	3.22	2.98	3.10
Roaring River	38,107	32,201	5.76	3.83	4.80
Rock Creek	39,202	55,109	5.07	3.53	4.30
Wallowa	22,279	23,143	3.37	5.09	4.23
Willamette	37,249	28,946	5.13	3.83	4.48
Wizard Falls	56,545	46,916	3.76	2.80	3.28
Totals	686,345	670,714	4.81	3.02	3.92

The amounts and types of fish food fed in 1959 as compared to 1958 are shown in Table 255. Of major interest is the general downward trend in the use of all meat products except beef liver in 1959. Salmon products increased slightly because of a large inventory on hand, meals decreased about two per cent and the use of dry pellets increased from approximately 3 per cent in 1958 to 21 per cent in 1959. The pounds of fish food shown in Table 255 differ from totals in Table 253 because the shrinkage which occurred in cold storage was not deducted from the totals in Table 255.

Table 255

Amounts and types of fish foods used in  
fifteen hatcheries in 1959

Type of food	Pounds	Percentage	
		1959	1958
Beef liver	237,206	10.39	7.40
Beef offal products	314,964	13.80	25.55
Pork offal products	217,291	9.52	16.19
Lamb liver	7,640	0.33	1.40
Salmon viscera, eggs, etc.	726,264	31.81	28.62
Shrimp	26,568	1.16	3.24
Meals (milk, yeast, cottonseed, wheat middlings, herring)	245,084	10.74	12.75
Salt	29,573	1.30	1.67
Pellets	478,398	20.95	3.18
Totals	2,282,988	100.00	100.00

1958 - 3,706,693 total pounds used

#### Fish food costs

Food costs for the calendar year 1959 are shown in Table 256 by six-month periods.

Table 256

Fish food costs, 1959

Period	Pounds	Unit cost	Total cost
January through June	1,254,211	\$0.08967	\$112,468
July through December	1,028,777	0.09764	100,450
Totals	2,282,988	\$0.09326	\$212,918

For the calendar year 1958, the food costs were computed at \$330,833, or \$117,915 more than for 1959. Shrinkage in weight of food stored in the cold storage amounted to \$3,907 in 1959 as compared to \$14,833 in 1958.

At the average conversion rate of 3.02 computed for the hatcheries in 1959, the cost of food required to produce one pound of trout was \$0.28 per pound as compared to \$0.43 in 1958. Using the average conversion of 3.92 (Table 253) for two successive years, 1958 and 1959, the cost is computed at about \$0.36 per pound of fish produced. There is some question as to which above method might be correct for computing a conversion ratio on a calendar year basis.

The 218,896 pounds of food which were fed to brood fish in 1959 at a cost of \$20,357 compare favorably to the costs of \$21,467 for 1958. Approximately 14,258,000 eggs were taken from the brood fish in 1959; thus the cost per thousand eggs for feed was \$1.43 as compared to \$2.24 for 1958.

## Feeding experiments

### Fry

Preliminary pellet feeding experiments using unfed rainbow fry from Oak Springs Hatchery were conducted at four stations starting early in 1959. Table 257 summarizes the results. In the mortality column, fish fed pellet A suffered much less mortality than those fed pellet B and/or the meat control diet at Alsea, Hood River, and Wizard Falls. At Roaring River, where there was a high invisible loss, pellet A proved better than pellet B, but was about equal to the meat diet. In comparison of growth, pellet A proved best at every station except Roaring River where the meat diet was superior. The amount of space available per pound of trout in each pond at Roaring River may have been a contributing factor in this category, however. Conversions were generally good at all stations except Hood River, where water temperatures were found unsuitable for starting fry on pellets in winter and early spring. Pellet A, however, proved superior in conversion to both Pellet B and the meat diet at Hood River.

### Sub-yearlings

Forty-four feeding experiments using large fingerlings and sub-yearling fish were conducted at each of the hatcheries to determine the success of five different commercial pellets. Table 258 summarizes the data and shows comparisons between pellet and regular hatchery control diets.

The percentage of mortality averaged 0.5 per cent in the eight control diets and proved as good or superior to every pellet except C which is now no longer manufactured. Subsequent experiments conducted with pellet C have, however, proved unsuccessful. The eleven experiments using pellet A averaged 1.1 per cent visible mortality while four large experiments using pellet E produced 0.5 per cent mortality. Eight of the experiments using pellets B and D were terminated and changed to a meat diet because heavy mortalities were starting and also because of the poor condition of the fish.

Food conversions averaged 4.1 for the control diets as compared to 1.8 for pellet A and 1.6 for pellet E. Pellet B indicated a conversion of 3.0 as compared to 1.6 and 1.8 for the remaining two pellet groups.

The average cost required to produce one pound of fish in the control diets was \$0.40 as compared to \$0.22 for pellet A, and \$0.15 for pellet E. Computed costs for the other three pellet diets were \$0.36 for pellet B, \$0.19 for pellet C and \$0.20 for pellet D. The last three pellets listed, however, were considered unsuccessful at that time because of severe mortalities.

Pellet feeding is gradually being started on a production basis at each hatchery, and it is anticipated that all hatcheries will be approaching a 100 per cent pellet feeding level in 1961.

Table 257

Preliminary feeding experiments with commercial type pellets vs. regular hatchery diets using unfed rainbow fry averaging 2650 per pound 1959

Hatchery	Days fed	Per cent mortality			Fish per pound			Conversion		
		Commercial pellets		Meat control	Commercial pellets		Meat control	Commercial pellets		Meat control
		A	B		A	B		A	B	
Alsea	219	12.1	48.2	33.2	32.2	38.2	37.2	2.9	4.4	5.3
Hood River	145	34.4	38.2 /1	43.5	453	772	886	7.7	19.5	11.0
Roaring River	278	1.1	8.4	25.6	14.5	11.6	10.0	1.6	1.8	1.9
		23.7 /2	43.0 /3							
Wizard Falls	204	10.1	48.9	28.5	19.3	21.0	25.0	1.2	2.5 /4	3.5

Note: Each experimental trough contained about 5,000 rainbow fry.

/1 Liver added to the diet 3 days per week for 90 days

/2 Invisible loss

/3 Invisible loss

/4 Proper sized pellets may have brought about better conversion



Table 258

Comparison of preliminary pellet and hatchery control diets at various stations using sub-yearling fish  
1959

Diet	Number of feeding experiments	Length of experiments in days	Number of fish	Pounds of fish	Average percentage, visible mortality	Average conversion	Average cost of producing one pound of fish
Control	8	130	128,376	7,489	0.5	4.1	0.40
Pellet A	11	130	174,948	14,201	1.1 <u>1</u>	1.8	0.22
Pellet B	8	130	89,922	7,584	3.8 <u>2</u>	3.0	0.36
Pellet C	2	100	55,272	1,006	0.3	1.6	0.19
Pellet D	11	130	238,090	19,147	3.2 <u>3</u>	1.8	0.20
Pellet E	4	100	374,808	10,541	0.5	1.6	0.15

1 Invisible loss averaged 6 per cent + known loss at three stations where count was made

2 Two experiments stopped because of severe mortality and poor condition of fish

3 Six experiments were changed to meat diet because of severe mortality and poor condition of fish

## Disease control

The most troublesome external fish parasites at the hatcheries in 1959 were Ichthyophthirius, Gyrodactylus and Trichodina. Fungus attacks which generally followed parasitic invasions were equally troublesome to the pond populations. Bandon Hatchery suffered an attack of "Ich" for the first time in decades. Mortality was severe but timely and prolonged treatments with formalin plus water control was effective in preventing a disaster at that station. "Ich" infestations at Rock Creek and Wallowa Hatcheries were successfully treated with PMA and formalin accompanied by lowering the ponds and holding the fish in running water. Trichodina and Gyrodactylus parasites were eradicated in most instances by treating with salt and acetic acid and by the use of formalin. Malachite green proved effective in fungus control and in some instances external parasites were reduced in number by weekly use of the dye material. One lot of malachite green which caused mortality among fish treated at Rock Creek, Butte Falls, and Leaburg, was found to contain small quantities of zinc.

Sulfamethazine and sulfamerazine were used successfully at various stations to control bacterial and related diseases. Calomel was used for controlling Hexamitus.

## Automation

Fifty automatic pellet feeders were constructed and delivered to the hatcheries for trial purposes in the latter part of 1959. From the experience gained by the few feeders that were placed in operation, it was found that moisture caused some clogging of the machines in the more humid sections of the state. It is anticipated, however, that minor modifications will remedy the moisture problem and that automatic feeding will gain in use.

An automatic fry feeding machine was successfully used at Wizard Falls for feeding several troughs of rainbow fry. Up to eight pounds of trout fry per cubic foot of water were held in the troughs. The results of the test indicated that fish grew rapidly in the troughs in concentrations heretofore believed impossible for good growth and health.

An automatic grader, loader, weigher, and general fish moving device was demonstrated at Wizard Falls Hatchery by the Pam Company of Portland, Oregon. The pilot model successfully moved small fish around the hatchery with minimal handling.

A Roberson egg incubator complete with a water heating device was installed and placed in operation at Alsea Hatchery late in 1959. Preliminary results look promising.

## New hatcheries

Gnat Creek Hatchery was officially opened in November of 1959. It is anticipated that approximately 300,000 fish will be reared in 1960.

## ANGLING REGULATIONS 1960

Angling regulation changes for the 1960 season included the elimination of certain sections and consolidation of others in order to reduce the complexity of the angling synopsis. Although special regulations are highly desirable in protecting the fishery resource, they occasionally become too cumbersome for the layman to understand and a re-evaluation of regulatory measures is necessary. In formulating regulations for 1960, a theme of simplification was followed, giving due respect to protection of the fishery resource.

The winter angling season for streams in Zone 1 was extended to March 31. An extension of the winter season was based on creel census data obtained from test streams with one or more extended seasons.

The special state-wide jack salmon season was removed from the regulations. A study conducted over a period of years indicated that anglers seldom caught more than a legal limit of five fish over 12 inches in length.

Further protection was given the Willamette spring chinook through tailrace closures on the McKenzie River and an extension of the deadline below River Mill Dam on the Clackamas River.

Minor adjustments were made in the Rogue and Umpqua River regulations for the protection of salmon and steelhead. Portions of both the Rogue and Umpqua not frequented by anadromous species were opened with the general coast trout angling season May 28.

Pelton Reservoir was opened one month later than other lowland lakes and reservoirs in order to permit a larger number of downstream migrant steelhead and salmon to pass through the impoundment before they were subjected to a fishery.

The bait regulation was modified to the extent that several marine species of fish could be used for bait in angling in Zone 1.

A regulation change was made to permit night fishing for all warm-water game species.

The four-inch minimum body length for bullfrogs was eliminated.

Tillamook and Coos Bays were opened to salmon angling the entire year.

Cottage Grove Reservoir, supporting a population of both warm-water game fish and trout, was opened to trout angling the entire year.

Anglers fishing beyond three miles of the Oregon coast will be required to have an angling license and punch card to land salmon as the result of a law passed by the last legislature.

## WARM-WATER GAME FISH

R. A. Grenfell

Some of the waters mentioned here are sampled regularly, others have been sampled for the first time. Sampling is carried out on familiar waters to determine changes, if any, in population dynamics and growth rates. Sampling on new waters is for purposes of determining distribution of species and population compositions.

### Fern Ridge Reservoir

Periodic examination over a five-year period has revealed no substantial change in the fish population composition in Fern Ridge Reservoir. The population is composed of white crappie, bluegill, brown bullhead, largemouth bass, trout, carp, suckers, and squawfish.

Game fish are of a size desirable to the angler. The spring white crappie fishing is the most intensively pursued facet of the fishery. White crappie up to two pounds are taken quite regularly.

Fishing intensity does not approach the potential of the reservoir.

### Cottage Grove Reservoir

With the exception of a disturbance in the brown bullhead population, there has been no decisive change in the composition of the population in Cottage Grove Reservoir in the last several years. In 1955, there was a severe die-off of the numerous but small brown bullhead. Since that time, the number of these fish taken in sampling studies has been smaller but the fish larger.

The population is composed of bluegill, largemouth bass, rainbow, cutthroat, brown bullhead, suckers, and squawfish.

There is an early summer bass fishery in which bass up to six pounds have been taken.

This water could support a much heavier angling pressure.

### Siltcoos Lake

Experimental gill nets set in Siltcoos Lake in late July 1959 took yellow perch, bluegill, brown bullhead, largemouth bass, black crappie, rainbow, and cutthroat trout. The most numerous fish in the sample were yellow perch, which averaged 8.2 inches fork length. A total of 131 angler-caught perch was measured which averaged 7.6 inches fork length, one-half inch less than those taken in the gill net. This indicates that anglers were keeping even the smaller perch caught.

A bag of 190 brown bullhead (average length of 14 inches) was taken by two anglers in four hours fishing effort.

A July 28th seining showed young-of-the-year largemouth bass to be 1.8 inches; black crappie, 1.6 inches; yellow perch, 1.8 inches; all fork length,

Increased use of the "black eel" lure has resulted in good bass fishing through the winter months. Some very large bass are taken in this fishery.

#### Tahkenitch Lake

Net sampling in Tahkenitch Lake took bluegill, yellow perch, white crappie, and largemouth bass. Bluegill were the most abundant species and they averaged 5.5 inches fork length.

Resort operators reported that excellent fishing for large yellow perch and white crappie took place in the spring. The bass fishery is not exploited nearly as extensively as is the Siltcoos bass fishery.

#### Meridian Lake

Meridian Lake is located along the highway between Jefferson and Talbot in Marion County. It is an oxbow of the Santiam River and is separated into potholes which are connected at extreme high water. Sampling of two of the areas yielded a number of squawfish and suckers with some excellent warm-water game fish. Black crappie ranged in size from 7.3 to 9.2 inches fork length. Bluegill were from 6.2 to 8.7 inches fork length. All species were in very fine condition.

There is easy access to this lake from the highway shoulder.

#### Black Lake

Black Lake is in Benton County, southeast of Corvallis. It is an oxbow of the Willamette River. Access is from the shoulder of a county road.

White crappie were the most numerous fish in the samples. Seventy crappie were taken, which averaged 5.9 inches fork length. A 3.6 pound largemouth bass and one yellow perch, a rarity in the Willamette Valley, were netted.

Bluegill were small and not too numerous. A few suckers, squawfish, and chiselmouth comprised the remainder of the sample.

#### Oak Creek Borrow Pit

A 20-acre borrow pit was excavated by highway construction at the junction of the freeway and Oak Creek, southeast of Albany. An additional 20 acres will be connected when construction is completed. Oak Creek will flow through the borrow area. This is the first summer there has been water in the finished borrow pit. Water depth is about 15 feet normally.

Gill net sets took brown bullhead, cutthroat, suckers, carp, and squawfish.

### Collard Lake

Collard Lake is a four-acre borrow pit, north of Salem. It is privately owned.

Backwaters of the Willamette reach it during high water. Most numerous fish in the gill net samples were white crappie, averaging 6.6 inches fork length. Bluegill, warmouth, largemouth bass, suckers, and carp were taken. The largest fish was a three-pound largemouth bass.

This area could be diked to exclude the floodwaters and enlarge the lake to make an excellent warm-water fishing area.

### Wiley Slough

Wiley Slough is an oxbow of the Pudding River near its junction with the Willamette. An overnight gill net set took white crappie, brown bullhead, warmouth bass, suckers, and a yellow perch.

### Rigdon's Borrow Pit

This borrow pit is near Barlow and is reached occasionally by high water from the Molalla River. One overnight gill net set took 55 suckers and some small white crappie and brown bullhead.

### Experimental lakes

Areas discussed are those to which management practices have been applied wholly or in part.

### Waverly Lake - Cox Creek System

Three lakes were created by highway construction in the channel of Cox Creek near Albany. They are called West Freeway, East Freeway and Timber Lakes, proceeding upstream on Cox Creek from Waverly Lake. Timber Lake is in a 70-acre city park.

The new lakes are separated from Waverly Lake by a check dam so there is no access for the fish from Waverly Lake to the upstream areas. These lakes were sampled and found to have small populations of rough fish and warm-water game fish which had moved down from Cox Creek.

An item of interest was the gill net catch per unit of time at two seasons of the year in one of these lakes. Timber Lake yielded 41 fish in 144 gill net hours in March with the water temperature at 46° F. In August, at a water temperature of 72° F., the same number of fish were taken in 48 gill net hours of fishing.

All four lakes and Cox Creek were chemically treated in August.

Plans for stocking are for the introduction of largemouth bass and rainbow trout in Timber Lake; rainbow only in East and West Freeway Lakes; and a largemouth bass, bluegill, bullhead combination in Waverly Lake.

There is free public access to all four lakes.

#### Withy Lake

An access agreement, to commence in 1960, was given by the landowner if the lake would be chemically treated and restocked. Treatment and restocking took place in 1957. Largemouth bass, bluegill and trout were planted. Brown bullhead survived the treatment. Adequate reproduction and excellent growth have taken place. This lake will furnish some fine warm-water fishing next year.

There are extensive cattail areas on the shoreline of Withy Lake. In an effort to clear areas for angler access to the water, some plots were treated with Amino triazole and Dowpon. In three days, the cattails showed signs of burned leaves and white stems associated with treatment by these compounds. Treatment will be administered again if regrowth occurs.

Aquatic weed growth has been a severe problem. Canadian waterweed (Anacaris canadensis), watershield (Brasenia schreberi), and coontail (Myriophyllum sp.) are the culprits in that order of abundance. Sodium endothal was obtained from the Pennsalt Chemical Company for experimental use. It was applied at the rate of 1/3 p.p.m. to the entire lake. A week after treatment, the watershield was dead. A month after treatment, the coontail was dead and the waterweed showed signs of distress in the lower stems, but the upper tips had new water roots and were growing. Filamentous algae had weighted the waterweed down so the entire lake surface was clear and fishable. Regrowth will be treated in the early spring of 1960.

There was no loss of fish at the time of treatment or from subsequent decomposition of the weeds. The slow kill and resulting extended period of decomposition is an important factor in preventing oxygen depletion and fish loss.

#### Mission Lake

Complete chemical treatment was applied to Mission Lake in 1955. Subsequent flooding has restocked the lake, with the same species as destroyed, to its pre-treatment status.

The lake has been closed to fishing by removal of access. Private enterprise has constructed a park and plans to build a dock and boat livery. The outlet will be deepened and widened to allow year-around access from the Willamette.

White crappie are the most abundant fish in net samples. They average 7.1 inches fork length.

#### Northeast Crossing Borrow Pit

This borrow pit is located at the north edge of Eugene by the Highway 99 overhead crossing. It was treated in 1951 and stocked with bluegill and largemouth bass.

Gill net sets in October 1958 and September 1959 took approximately equal numbers of bluegill, largemouth bass, and brown bullhead. Largemouth bass were 12 inches long and in their third year of life. Bluegill were from 3.6 to 5.7 inches and in their third and fourth years of life. These are expected growth rates for these fish in this area.

#### Jefferson Borrow Pit

The borrow pit is located on Highway 99, north of Albany at the Jefferson turn-off. Seventy-five largemouth bass fry were planted in 1951. In 1954, those fish were 12 inches in length and by 1955, they were 14 inches, fork length. Highway construction in 1956 kept the water muddy for a year and encouraged a heavy growth of filamentous algae in 1957-58. Gill net sets in 1959 yielded three 6 to 7-inch largemouth bass, which were sexually mature, a sign of overpopulation and resultant stunting. Underwater observations did not show a bass population of sufficient magnitude to cause stunting. Fish of the year were present in fair numbers.

#### Haag Pond

This private pond near Tigard was infested with Potamogeton pusillus. Recommendations were given the owner for treatment of the troublesome growth. Hot weather arrived before treatment could be given and the resulting oxygen depletion killed the fish. Rainbow trout, which had been planted as fingerlings in 1957, were up to 20 inches long.

#### Farm ponds

Included in this discussion are the cooperative farm ponds as well as the ponds on the Turner area. It has been necessary to use privately-owned ponds because of lack of funds to build our own.

#### Loe Pond

A total of 150 largemouth bass fry was stocked in this half-acre pond in 1957. These fish had grown to 12 inches and spawning took place this year. This is of interest because these fish spawned when two years old instead of the usual three years.

#### Arboretum Pond

The fishery class from Oregon State College carried out a drawdown and fish recovery program on the Arboretum Pond in February 1959. This pond was stocked with 700 rainbow and 700 Hackleman cutthroat in April 1957. Adult bluegill were planted in hopes that the trout would use the bluegill fry as forage fish. A disease decimated the numbers of trout during the summer of 1958.

At drawdown, 90 rainbow, 80 cutthroat, 6,700 Oregon newts, and 4,700 crayfish were recovered. Also 11 adult bluegill, 183 intermediate bluegill, and 35-40,000 bluegill fry were recovered.



## Waltons Ponds

In 1956, eight ponds near Turner were loaned for experimental use by Mr. Jim Walton of Salem. That year, all ponds were drained, debris removed, the fish salvaged, and the ponds refilled. In 1957, all ponds were stocked with various species and combinations of species of fish. During 1958, fertilization and weed control were carried out.

In 1959, the following was done on the area:

Pond A - The pond was treated with Sodium endothal to remove a heavy growth of coontail. Action of the chemical was slow and two months were required to obtain a complete kill. Decomposition was slow and there was no loss of fish from oxygen depletion.

Pond B - Smallmouth bass reproduction occurred.

Pond C - This was the second year of fertilizer application for this pond. Weeds were controlled by fertilization and a plankton bloom resulted last year. Additional fertilization this year resulted in a phenomenal plankton bloom, composed almost entirely of daphnia.

Pond F - Expected channel catfish spawning did not take place. Adults were observed in the pond.

Pond K - Treated with pelletized 37.5 per cent active Sodium arsenite to kill Canadian waterweed (Anacaris canadensis). In a week, the weeds were gone and the water was clear. This pond contains Gambusia, a surface feeding fish, which took the floating pellets into their mouths and spit them out without any harmful effect.

All ponds were fertilized with two applications of a commercial 10-16-8 fertilizer at the rate of 100 pounds per acre per application. Excellent plankton blooms resulted.

All cattails were treated with Amino triazole at the rate of 18 pounds per 300 gallons of water plus a wetting agent.

## Smith Lake and Rockaway Pond

Brown bullhead, averaging 1 1/4 inches, were trapped in Siltcoos Lake and hauled to the north coast. Seventy-seven were placed in Smith Lake and seventeen in a pond in Rockaway. These fish were moved in the early spring so spawning would occur in their new home.

## Devils Lake, Lincoln County

Forty channel catfish were taken from Warm Springs Reservoir and planted in Devils Lake. There were 12 fish in the 7 to 9-inch group, and 29 in the 13 to 17-inch group. The larger fish will probably reach maturity in 1960. Spawning should not be expected as studies indicate a years acclimatization is required before spawning will occur when channel catfish are moved from one lake to another.

## Growth studies

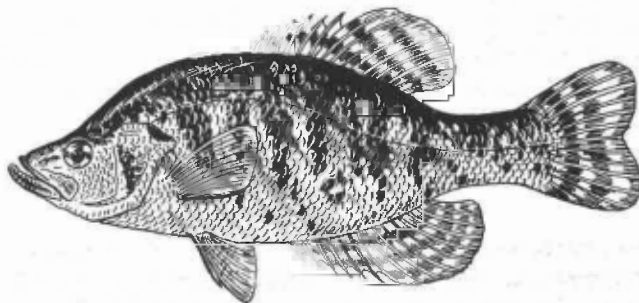
Reading of scale samples collected during 1958 was carried out during the winter. Results of this analysis are given in Table 259.

Scale samples were obtained from largemouth bass at Dorena Reservoir at the time of chemical treatment in late 1958. These fish had attained a length of almost 17 inches fork length by the end of their fourth year. By way of contrast, the largemouth bass from Triangle Lake are only 9 inches fork length at four years.

Table 259

Age and growth of warm-water species from various bodies of water

Species	Number of waters sampled	I	II	III	IV	V	VI	VII	VIII
White crappie	7	2.0	5.7	7.7	8.9	9.9			
Yellow perch	3	3.3	7.2	9.0					
Bluegill	14	1.3	3.3	5.0	5.2	6.0			
Largemouth bass	17	2.9	7.0	10.6	12.2	13.1	16.6	17.8	
Smallmouth bass	1	2.3	5.7	9.0	11.8	12.3			



## STREAM IMPROVEMENT

W. E. Holderman

The following report by counties is a resume' of work completed in removing log jams, old log pond dams, and in providing passage over rock falls and other barriers.

### Benton County

Experimental work was done at the E. E. Wilson Management Area on clearing drainage ditch for cattail control.

### Clatsop County

Two log jams were removed from an unnamed creek, tributary to Lewis and Clark River.

### Columbia County

D. K. Bradley, a logger with equipment, was hired to remove three log jams on the East Fork of the Nehalem River.

### Coos County

Nearly two months were spent on clean-up work on Eel Lake. One hundred feet of ditch was blown out with dynamite on McDonald Creek, tributary to Tenmile Creek. The state crew worked on a clean-up of Saunders Lake access area. A tractor was hired and an old fish rack on the outlet of Bradley Lake was removed. A logger with equipment was hired to assist in removing a log jam on Rock Creek, tributary to Coquille River.

### Curry County

The state crew removed a log jam on Bald Mountain Creek, tributary to Elk River. They also removed a log jam on Anvil Creek, tributary to Elk River. The state crew hired a tractor and removed a log jam on Floras Creek. Brookings Plywood Company removed a log jam on Wheeler Creek, tributary to Winchuck River.

### Deschutes River

The state crew removed a log jam which was a barrier 12 to 15 feet high on Squaw Creek, tributary to Deschutes River.

### Douglas County

The state crew removed log jams on the east and west arms of Eel Lake. More spawning area was made available on the east arm of Eel Lake by clearing with dynamite 900 feet of ditch. A logger with equipment was hired to remove log jams on Spencer Creek, tributary to Smith River. The state crew

worked on Loon Lake access area, felling trees and doing clean-up work. The state crew, in cooperation with California-Oregon Power Company, used saws and dynamite to make a hole in a large log jam at Soda Springs on the North Umpqua River. This jam was holding up spent steelhead from returning downstream and chinook salmon from getting upstream. Late this fall, California-Oregon Power Company burned out most of this jam. The state crew assisted in clean-up work on Deadman Creek, tributary to South Umpqua River.

#### Jackson County

The state crew removed log jams on Willow Creek, tributary to Butte Creek.

#### Josephine County

The state crew removed log jams on Pickett and Limpy Creeks, both tributaries to Rogue River. A barrier was investigated on Taylor Creek, tributary to Rogue River, and was referred to construction company who was responsible for this barrier.

#### Klamath County

The state crew worked on a dam on the outlet of Miller Lake, removing trees and rock.

#### Lane County

The Berry Construction Company was hired to add a one-step jump to Wilhelm Falls, tributary to the North Fork of Siuslaw River.

#### Lincoln County

The state crew assisted Georgia-Pacific Corporation in clean-up work on Gravel Creek, tributary to Siletz River. A logger with equipment was hired to remove a log jam on Yachats River. The Holliday Logging Company was hired to remove a log jam on Bear Creek, tributary to Salmon River. Jones Logging Company has been contacted concerning its road building and logging operations on Sampson Creek, tributary to the South Fork of Drift Creek. These operations have been most harmful to fish life in this stream due to operating equipment used by the loggers in the stream and the destruction of spawning beds. The operation is closed down now but they plan to start operating again this spring. Haseman Logging Company has finished operation on Fall Creek, tributary to Alsea River, and has cleaned up the stream.

#### Tillamook County

J & K Logging Company and equipment was hired to remove log jams on Fox Creek, tributary to Wilson River, which opened up several miles of spawning ground. A log jam on Wolf Creek, tributary to the North Fork of Salmonberry River, was partially removed by the state crew. The Game Commission received permission to remove an old logging bridge and log jam on Sweet Home Creek,

tributary to the North Fork of Nehalem River. This was referred to the Fish Commission because they had equipment in the area. The Game Commission hired the Clinton Logging Company and its equipment to remove an old log jam which was a barrier on the Kilchis River. Removal of this barrier made available several miles of spawning ground.

Approximately 180 miles of stream was made available to fish passage.



# OREGON SALMON AND STEELHEAD SPORT FISHERY

January 1, 1958 to December 31, 1958

The sport fishery for salmon and steelhead in 1958 showed an increased over-all effort in comparison to the previous year. An increase of nearly 18,000 anglers catching fish was estimated, with the steelhead catch showing an increase whereas the total salmon catch remained at about the same level as in 1957.

A substantial increase occurred in the number of people receiving tags. This can be partially explained by increased enforcement measures on the offshore fishery, excellent angling, and good weather conditions on the coast, which may have resulted in a jump in the number of novice anglers. Excellent conditions during the Willamette spring chinook fishery, where the catch doubled the previous year's figure, are also a factor.

The analysis of the punch card returns, as prepared by Dr. Lyle Calvin, Oregon State College Statistician, is presented in Table 260.

Table 260

## 1958 Salmon and Steelhead Catch

	Salmon	Steelhead	Total
Number of anglers receiving tags			215,410
Percentage of tags returned			32.08
Estimated number anglers not fishing			104,172
Estimated number anglers no catch			43,236
Estimated number anglers catching both			11,221
Estimated number anglers catching fish	49,781	29,425	67,983
Estimated number fish caught	127,975 $\pm$ 2,133	90,709 $\pm$ 2,197	218,684 $\pm$ 3,317
Estimated number fish per angler	.5941 $\pm$ .0099	.4211 $\pm$ .0102	1.0152 $\pm$ .0154
Estimated number per angler catching	2.57	3.08	3.22

The estimated catch of salmon and steelhead by stream system is delineated in Table 261.

Improved angling is reflected in the catch of 3.22 fish per reporting angler as compared with 1.9 fish per reporting angler in 1957.

Table 261

## Salmon and steelhead catch by area, 1958

River	Estimated number of salmon caught	Estimated number of steelhead caught	Total
Alsea River and Bay	2,880	3,488	6,368
Applegate River	12	489	501
Beaver Creek	62	112	174
Big Creek	118	414	532
Calapooya River	31	259	290
Catherine Creek	146	31	177
Chetco River and Bay	732	1,003	1,735
Clackamas River/Eagle Creek	835	1,275	2,110
Clatskanie River	50	277	327
Columbia River, excluding tributaries	20,248	7,702	27,950
Coos River and Bay	6,131	1,057	7,188
Coquille River and Bay	1,474	3,089	4,563
Deschutes River	779	5,084	5,863
Devils Lake	6	15	21
Drift Creek	271	1,291	1,562
Elk River	748	1,029	1,777
Floras Creek	78	274	352
Gnat Creek	3	19	22
Grande Ronde River	115	1,577	1,692
Hunter Creek	109	97	206
Hood River	252	1,833	2,085
Illinois River	122	2,201	2,323
Imnaha River	321	1,895	2,216
John Day River	109	3,715	3,824
Kilchis River	440	384	824
Klaskanine River	25	231	256
Lewis and Clark River	81	181	262
Little Nestucca River	162	147	309
McKenzie River	1,515	9	1,524
Miami River	69	240	309
Millicoma River/Middle Fork	165	527	692
Minam River	87	78	165
Molalla River	50	196	246
Necanicum River	234	483	717
Nehalem River and Bay	5,015	4,597	9,612
Neskowin Creek	28	41	69
Nestucca River and Bay	3,142	4,407	7,549
Pacific Ocean	16,305	240	16,545
Pine Creek	31	395	426
Pistol River	159	97	256
Powder River/Eagle Creek	12	47	59
Rock Creek	91	131	222
Rogue River	8,908	5,648	14,556

Table 261 (continued)

River	Estimated number of salmon caught	Estimated number of steelhead caught	Total
Sandy River	882	4,108	4,990
Salmon River	1,349	1,346	2,695
Salmonberry River	9	106	115
Santiam River	920	973	1,893
Scappoose Creek	9	143	152
Siletz River and Bay	2,465	1,671	4,136
Siltcoos River	842	90	932
Sinslaw River and Bay	4,217	2,569	6,786
Sixes River	1,512	695	2,207
Snake River	206	1,530	1,736
Smith River	371	745	1,116
Tahkenitch Lake	94	12	106
Tenmile Lakes	399	284	683
Tenmile River	586	705	1,291
Tillamook Bay	2,229	200	2,429
Tillamook River	165	131	296
Trask River	1,260	1,247	2,507
Umatilla River	131	1,827	1,958
Umpqua River	7,419	7,400	14,819
Umpqua River, North Fork	153	458	611
Walla Walla River	22	446	468
Wallowa River	78	711	789
Wenaha River	19	259	278
Willamette River	21,056	1,845	22,901
Wilson River	1,708	3,747	5,455
Winchester Bay	3,046	115	3,161
Winchuck River	181	171	352
Yachats River	225	162	387
Yaquina River	4,196	115	4,311
Youngs River	3	3	6
Johnson Creek	19	511	530
Sucker Creek	28	56	84
Totals	127,950	90,686	218,636



## FISH STOCKING

R. O. Koski

The fish stocking program in 1959 differed very little from the pattern of the past few years. Distribution has become largely a routine matter with the assimilation into regional control almost complete. Larger tanks and more modern equipment were helpful in maintaining a stable schedule. The planned release time of fingerlings, which in late summer had previously conflicted with yearling stocking, posed no problem, and in most instances there were no delays in stocking all lots at the proper time.

During the year 16,358,041 trout and salmon weighing 703,007 pounds were stocked. A slight increase in numbers over the 1958 total occurred with a slight decrease in total weight. The decrease in weight can be attributed to the feeding reduction in rainbow yearling lots made necessary by budget restrictions. Rainbow trout made up about 78 per cent of the number released, followed by kokanee and brook trout. Distribution by watershed and species is shown in Table 262.

Table 263 delineates the type and amount of fish distributed from each hatchery. Not shown are fish distributed with our equipment from hatcheries of other agencies. The Hagerman national hatchery again supplied fish for eastern Oregon streams and reservoirs. A total of 639,989 fish weighing 13,962 pounds was obtained from the Fish and Wildlife Service. The Oregon Fish Commission hatchery at Bonneville made a gift of 70,715 rainbow fingerlings weighing 1,186 pounds, which were stocked in reservoirs. The fingerling were the offspring of display fish which we had provided the station.

Table 264 shows the distribution load per month, emphasizing the shift from the previous year-long activity to a more seasonal operation.

No great changes have occurred in the distribution of fish to the various watersheds in recent years as is shown in Table 265. Some adjustments within watersheds of each region have been made. Such changes were largely due to lake rehabilitation. Noticeable is the decrease in weight in Watershed 5 as a result of continued de-emphasis on yearling stocking in lakes and size control of legal trout.

Two new refrigerated tankers in service during 1959 performed well. Mechanical difficulties were encountered at first, but by mid-season, both tankers were hauling loads of up to 50 per cent more than conventional equipment. An improved model was designed and will be produced in 1960. The average load hauled for all tankers was 475 pounds in 1959 compared to 444 pounds the previous year. The refrigerated tankers were used for hatchery to hatchery transfers, whenever possible, and results were excellent with little loss sustained. Transfer activity was considerable with 39 transfers completed. The number of fish involved was 1,213,178 with a weight of 12,618 pounds.

Boat planting was again employed as a means of improving distribution. About 5.5 per cent of truck loads were stocked in this manner.

Table 262

## 1959 Fish Stocking

Watershed	Rainbow	Outthroat	Eastern brook	Steelhead	Kokanee	Brown trout	Lake trout	Golden trout	Chinook salmon	Silvers	Atlantic salmon	Totals
1	99,476 13,389.7	60,578 16,870.3		109,135 13,080					36,587 6,804.5			305,776 50,144.5
2	1,871,438 187,315.1	8,156 1,545	408,340 1,424		484,260 126.2			143 32.5				2,772,337 190,442.8
3	616,548 42,628.4	47,465 1,279.5	39,213 115.5	93,492 8,899								796,718 52,922.4
4	80,797 14,227		49,176 508	2,454 303								132,427 15,038
5	2,854,272 85,975.2	370 370	1,071,067 4,749.1		996,095 464.7	174,142 1,258.8	114,665 7,168	813 184.7			1,094 4	5,212,518 100,174.5
6	197,235 13,446.5		50,229 42		50,250 12.5							297,714 13,501
7	51,794 6,231.2											51,794 6,231.2
8	235,535 24,244.1	21,065 73	37,094 150.8				65,788 1,299.8					359,482 25,767.7
9	292,696 11,732.1	39,750 81	45,728 102.1		50,350 12.5							428,524 11,927.7
10	333,889 7,262.3											333,889 7,262.3
11	87,034 3,688.4											87,034 3,688.4
12	33,269 6,687.3	53,360 411.5										86,629 7,098.8
13	227,235 11,938.4	56,907 535.4										284,142 12,473.8
14	1,723,678 18,814.5		121,944 824.6		74,872 47.9							1,920,494 19,687
15	831,684 45,068.8	1,900 528	17,634 56.4	34,838 4,489	201,600 52.5				43,966 5,971.6			1,131,622 56,166.3
16	1,231,766 32,208.6		4,094 13	46,246 4,264.5					105,488 8,878.4			1,387,594 45,364.5
17	49,265 12,296.3	65,710 9,427		21,932 3,193								136,907 24,916.3
18	152,833 14,013.8	381,578 35,925.7		73,468 9,132						21,561 1,129		632,440 69,200.5
Totals	10,970,444 551,167.7	739,839 67,046.4	1,844,519 7,985.5	381,565 43,360.5	1,857,427 716.3	174,142 1,258.8	180,453 8,467.8	956 217.2	186,041 21,654.5	21,561 1,129	1,094 4	16,358,041 703,007.7

Note: Lower figures denote pounds of fish.

Table 263

Total releases of fish from hatcheries  
1959

Hatchery	Species	Number	Pounds
Alsea	Rainbow	48,481	11,125.9
	Cutthroat	141,397	22,530.2
	Steelhead	148,879	16,909.5
	Silver salmon	21,561	1,129
Bandon	Cutthroat	104,111	13,941.5
	Steelhead	111,638	14,956
Butte Falls	Rainbow	527,896	41,640.8
	Chinook	43,966	5,971.6
Cedar Creek	Rainbow	187,329	12,958.4
	Cutthroat	126,413	20,043.3
	Steelhead	12,601	2,185
	Chinook	36,587	6,804.5
Diamond Lake	Rainbow	1,684,944	597.6
Fall River	Rainbow	142,788	513.2
	Eastern brook	1,363,716	4,463.3
	Kokanee	424,277	121.4
Hood River	Rainbow	151,438	22,498.8
	Eastern brook	76,194	249
	Steelhead	2,454	303
Klamath	Rainbow	2,082,145	31,112.1
	Eastern brook	245,927	1,598.3
	Kokanee	36,048	242
	Lake trout	114,665	7,168
McKenzie	Rainbow	198,448	30,632.3
	Cutthroat	150,861	7,961
	Kokanee	350,200	91.5
Oak Springs	Rainbow	2,307,485	87,465.5
	Cutthroat	370	370
	Eastern brook	158,682	1,674.9
Roaring River	Rainbow	345,867	34,520.6
	Cutthroat	45,605	1,099.5
	Steelhead	1,137	100
Rock Creek	Rainbow	287,444	46,672.2
	Steelhead	11,364	8
	Chinook	105,488	8,878.4

Table 263 (continued)

Hatchery	Species	Number	Pounds
Wallowa	Rainbow	249,778	23,512.7
	Cutthroat	15	30
	Kokanee	100,600	25
	Lake trout	65,788	1,299.8
Willamette	Rainbow	115,193	24,600.8
	Steelhead	59,225	5,174
	Kokanee	462,042	110.2
Wizard Falls	Rainbow	685,180	44,478.9
	Cutthroat	171,067	1,070.9
	Brown trout	174,142	1,258.8
	Golden trout	956	217.2
	Atlantic salmon	1,094	4
Leaburg	Rainbow	1,228,322	120,455.7
	Kokanee	484,260	126.2
Totals		15,596,068	680,900.5

Table 264

Distribution load by months  
1959

Period	Pounds released	Number of trips
January	12,619	21
February	16,101.8	33
March	43,242.7	68
April	142,852.7	301
May	163,384.6	356
June	137,875.8	347
July	99,311.3	447
August	41,454.6	103
September	16,590.6	33
October	1,527.5	8
November	16,713.9	27
December	10,883.2	19
Totals /1	702,557.7	1,763

/1 Includes Hagerman Fish and Wildlife Service Hatchery

The airplane stocking program continued in the same pattern as the last few years, with about the same number of lakes stocked. Fifteen days of flying were required for the Cascade lakes and two days were expended in Region 4 on this activity. Number of lakes stocked was 275 with an average cost of \$16.65 per lake. Table 266 depicts the distribution of fish by airplane.

Table 265

Percentage of trout releases by weight  
within each watershed 1955-1959

Watershed	Per cent of total pounds				
	1955	1956	1957	1958	1959
1	4.1	4.7	6.5	5.5	7.1
2	22.6	23.3	25.8	26.4	26.7
3	8.8	8.1	6.2	7.8	7.5
4	2.5	2.9	1.9	2.4	2.1
5	22.9	19.8	20.4	22.0	14.3
6	2.0	2.0	2.6	2.0	1.9
7	2.2	1.2	1.0	1.3	0.8
8	2.4	3.1	3.3	3.2	3.6
9	1.7	1.5	1.8	2.3	1.7
10	0.6	1.4	1.9	1.1	1.0
11	0.2	0.6	0.3	0.3	0.5
12	1.1	1.9	1.3	1.3	1.0
13	1.7	1.4	1.6	1.3	1.7
14	2.7	4.7	3.2	2.4	2.8
15	7.6	7.4	5.7	7.0	8.0
16	7.4	6.0	4.9	4.1	6.4
17	3.5	3.6	4.4	2.9	3.5
18	5.4	5.8	6.4	5.6	8.6

The stocking program should continue in much the same manner in 1960 as few production changes are contemplated. The cessation of silver production and increased fingerling needs will be the only factors affecting the stocking program. The 1960 production schedule for yearling trout is shown in Table 267.

Table 266

Distribution of trout by airplane  
by watershed and species  
1959

Species	Watershed	Number	Pounds
Rainbow	2	122,227	442.5
	5	20,561	70.7
	8	28,000	14
	13	6,000	24
	15	1,500	6
		<u>178,288</u>	<u>557.2</u>
Golden trout	2	143	32.5
	5	813	184.7
		<u>956</u>	<u>217.2</u>
Cutthroat	8	21,050	43
	9	39,750	81
		<u>60,800</u>	<u>124</u>
Eastern brook	2	148,044	380.6
	3	39,213	115.5
	4	20,502	67
	5	202,536	430.6
	8	37,094	150.8
	9	19,726	80.2
	14	28,879	92.6
	15	17,634	56.4
	16	4,094	13
		<u>517,722</u>	<u>1,386.7</u>
Grand totals		757,766	2,285.1

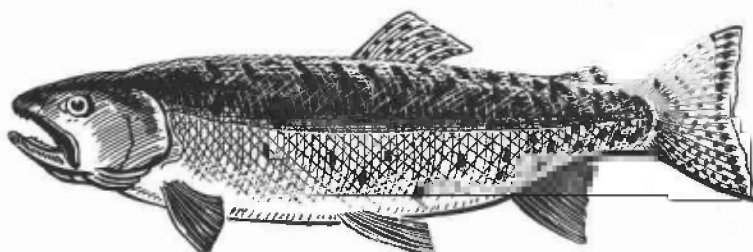


Table 267

## 1960 Yearling Fish Production Program

Hatchery	Cutthroat	Fall rainbow	Spring rainbow	Summer steelhead	Winter steelhead	Spring chinook	Lake trout	Totals
Alsea	55,000	39,000			85,000			179,000
Bandon	49,000			43,000	21,000			113,000
Butte Falls		134,000				21,000		155,000
Cedar Creek	100,000	30,000			91,000			221,000
Hood River		110,000		13,000				123,000
Klamath		120,000					57,000	177,000
Leaburg		503,000						503,000
Oak Springs		80,000	150,000 <sup>1</sup>					230,000
Roaring River		170,000		46,000				216,000
Rock Creek		131,000	43,000			55,000		229,000
Wallowa		126,000					34,000	160,000
Willamette		96,000	94,000					190,000
Wizard Falls			199,000	1,000				200,000
Totals	204,000	1,539,000	486,000	103,000	197,000	76,000	91,000	2,696,000

<sup>1</sup> To be supplemented by 80,000 sub-yearling legal fish from Oak Springs fall rainbow

Note: Fish and Wildlife Service will supply 20,000 rainbow for Region 4 and 40,000 rainbow for Region 5.

Federal Aid expenditures by activity  
January 1 - December 31, 1959

Project No.	Description	<u>Expenditures</u>		
		<u>Federal</u>	<u>State</u>	<u>Total</u>
17-C-13 & 14	Coordination	\$ 20,237.91	\$ 6,745.97	\$ 26,983.88
	<u>Land acquisition access projects</u>			
5-L-3	Deschutes River	1,502.25	500.75	2,003.00
F-16-L-2	Nestucca River	17.44	5.81	23.25
F-38-L-1	Wallowa River	1,109.03	369.67	1,478.70
F-39-L-2	Sandy River	1,875.00	625.00	2,500.00
F-49-L-1	Smith River	875.85	291.95	1,167.80
	<u>Research</u>			
F-51-R-1	Drift Creek	3,009.03	1,003.01	4,012.04
	<u>Development and operation of access projects</u>			
F-18-D-2	Nestucca River	286.31	95.44	381.75
F-24-D-2	South Jetty Road	6,975.00	2,325.00	9,300.00
F-29-D-2 & 3	Statewide access maintenance	1,620.71	540.23	2,160.94
	<u>Fishery rehabilitation projects</u>			
F-20-D-10	Fish Lake	4,110.75	1,370.25	5,481.00
F-20-D-11	Miller Lake	1,909.08	636.36	2,545.44
F-20-D-12	Dorena Reservoir	141.54	47.18	188.72
F-20-D-13	Antelope Reservoir	863.21	287.74	1,150.95
F-20-D-14	Morgan Lake	3,717.00	1,239.00	4,956.00
F-20-D-15	Devils Lake	20,095.67	6,698.56	26,794.23
F-20-D-16	McKay Reservoir	4,652.30	1,550.77	6,203.07
F-20-D-17	Thompson Valley Reservoir	3,220.93	1,073.64	4,294.57
	<u>Fish ladder projects</u>			
F-42-D-1	Steamboat Falls	23,970.68	7,990.23	31,960.91
	<u>Miscellaneous development and operations</u>			
F-40-D-2	Depoe Bay	5,295.12	1,765.04	7,060.16
F-45-D-1	Saunders Lake	582.79	194.26	777.05
F-46-D-1	Wallowa Lake Ramp	882.35	294.12	1,176.47
F-47-D-1	Loon Lake landing	4,004.04	1,334.68	5,338.72
F-48-D-1	Clackamas River Ramp	37.00	12.33	49.33
F-52-D-1	Drift Creek	208.55	69.51	278.06
Total expenditures 1/1/59 to 12/31/59		<u>\$111,199.54</u>	<u>\$37,066.50</u>	<u>\$148,266.04</u>



# LAKE AND STREAM REHABILITATION

R. L. Borovicka

Table 268

Summary of Oregon State Game Commission Fishery Rehabilitation Projects  
1959

Name	Surface acreage <sup>1</sup> / <sub>At treatment capacity</sub>		Water volume acre feet	Location by county	Date of treatment	Miles of tributary streams treated	Quantity of chemical used		Species of undesirable fish removed	Cost of treatment	Restocking
		Normal					Powdered	Rotenone Liquid			
Morgan Lake	65	75	750	Union	May 3	None	3,750 pounds		Bullheads Perch	\$ 2,715.00	Rainbow trout
Devils Lake	684	684	6,800	Lincoln	June 16	15		200 gallons	Carp Bullheads	6,000.00	Cutthroat Silver salmon Channel catfish
Thompson Valley Reservoir	1,500	2,000	7,300	Lake	Sept. 15	35		200 gallons	Roach	4,500.00	Rainbow trout
McKay Reservoir	322	2,500	4,955	Umatilla	Oct. 1	60		250 gallons	Suckers Shiners Squawfish Chiselmouth	5,800.00	Rainbow trout
Cox Creek Reservoirs	35	40	160	Linn	Sept. 8	20	1,750 pounds	40 gallons	Suckers Squawfish Carp	800.00	Warm-water fish
Miscellaneous ponds	20	20	60	Statewide	1959	0	300 pounds		Miscellaneous	300.00	Warm-water fish and trout
Totals	2,626	5,319	20,025			130	5,800 pounds	690 gallons	313 gallons	\$20,115.00	

<sup>1</sup> Irrigation and flood control reservoirs are chemically treated in the late summer or fall, at the time of lowest drawdown following the irrigation season. Normal surface acreage is given to show the amount of fishing area improved by chemical treatment.

Fishery resource expenditures  
fiscal year July 1, 1958 - June 30, 1959

Fishery administration	\$ 60,823.36
Coordination - Federal	13,109.60
Fishery access maintenance	79,372.05
Alsea Hatchery	39,864.53
Bandon Hatchery	68,206.63
Gnat Creek Hatchery	43,754.41
Butte Falls Hatchery	103,656.56
Cedar Creek Hatchery	47,572.72
Diamond Lake Hatchery	4,549.67
Fall River Hatchery	19,033.83
Hood River Hatchery	25,286.94
Klamath Hatchery	53,997.26
McKenzie Hatchery	24,587.59
Oak Springs Hatchery	71,131.30
Roaring River Hatchery	38,142.07
Rock Creek Hatchery	49,206.23
Wallowa Hatchery	28,356.51
Willamette Hatchery	44,865.09
Wizard Falls Hatchery	37,383.85
Leaburg Hatchery	75,048.43
East-Paulina egg-take	2,203.81
Siletz egg-take	1,734.30
Hood River egg-take	342.12
Odell Lake egg-take	302.76
Warm-water fish	625.73
Habitat improvement	45,234.31
Fish resource inventory	127,514.23
Fish stocking	48,428.85
Fish protection	2,021.99
Fishways and screens	73,901.39
Fish food transportation	9,529.73
Maintenance - Federal screens	52,497.52
Basin investigations	13,611.74
Sandy River improvements	14,112.71
Total fish resources	\$1,320,009.82



## CONTRIBUTING PERSONNEL

Bauer, J. A.	Field Agent, Aquatic Biologist	Umpqua River
Bisbee, L. E.	Field Agent, Aquatic Biologist	Southeastern Oregon
Borovicka, R. L.	Aquatic Biologist	Rehabilitation
Cochrun, K. R.	Field Agent, Aquatic Biologist	Lower Willamette
Corthell, R. A.	Field Agent, Aquatic Biologist	Coos-Coquille District
Gerlach, A. H.	Field Agent, Aquatic Biologist	Klamath District
Goin, J. W.	Assistant Controller	Federal Aid Expenditures
Grenfell, R. A.	Field Agent, Aquatic Biologist	Warm-water Game Fish
Herrig, R. G.	Field Agent, Aquatic Biologist	Lincoln District
Hewkin, J. A.	Field Agent, Aquatic Biologist	John Day District
Holderman, W. E.	Stream Clearance Foreman	Stream Improvement
Jensen, C. C.	Fish Culture Supervisor	Fish Propagation
Knispel, W. M.	Field Agent, Aquatic Biologist	Astoria District
Koski, R. O.	Aquatic Biologist	Fish Stocking
Lichens, A. B.	Field Agent, Aquatic Biologist	Columbia District
Locke, F. E.	Chief, Lake and Stream Management	Angling Regulations
Mastin, H. E.	Field Agent, Aquatic Biologist	South Coastal Streams
Montgomery, M. L.	Field Agent, Aquatic Biologist	Bend District
Rivers, C. M.	Field Agent, Aquatic Biologist	Rogue River
Saltzman, W. O.	Field Agent, Aquatic Biologist	Umpqua River
Sayre, R. C.	Field Agent, Aquatic Biologist	Northeastern Oregon
Sumner, F. H.	Field Agent, Aquatic Biologist	Tillamook District
Swan, R. L.	Field Agent, Aquatic Biologist	Upper Willamette
Wetherbee, J. J.	Field Agent, Aquatic Biologist	Central Willamette



Harold C. Smith, Staff Artist, developed the layout of the figures, prepared them in final form, and made the illustrations. Rose Marie Drake typed and proofed the manuscript and prepared the index.

# GAME COMMISSION HATCHERIES

Hatchery	Location	Superintendent
Alsea	Philomath	Paul Vroman
Bandon	Bandon	W. C. Baker
Butte Falls	Butte Falls	Everett Moore
Cedar Creek	Hebo	C. T. Roadarmel
Diamond Lake	Diamond Lake	John Susac
Fall River	Bend	Lloyd Wilson
Gnat Creek	Wauna	Arne Shannon
Hood River	Hood River	Archie McRae
Klamath	Klamath Agency	R. A. Evans
Leaburg	Leaburg	L. W. Webb
Oak Springs	Maupin	A. B. Smith
Roaring River	Scio	P. W. Southwick
Rock Creek	Idleyld Park	Henry Reed
Wallowa	Enterprise	Ralph Kay
Willamette	Oakridge	C. C. Green
Wizard Falls	Camp Sherman	K. E. Morton

# LIST OF TABLES

Table		Page
1	Winchester Dam fish counts, 1946-59 . . . . .	2
2	South Umpqua River spring chinook inventory, 1946-59 . . . . .	3
3	Silver salmon spawning ground counts on tributaries in the lower Umpqua River, 1959-60 . . . . .	3
4	Comparative spawning ground count data on selected tributaries of the lower Umpqua and Smith River areas, 1945-46 through 1959-60 . . . . .	4
5	Counts of silver salmon on selected tributaries of the Tenmile Lakes system, 1959-60 . . . . .	4
6	Eel Lake tributary counts for 1959-60 . . . . .	5
7	Fall chinook spawning counts for 1959-60 . . . . .	5
8	Composition of weights and length frequencies of catch by gill nets in Cascade lakes and reservoirs, 1959 . . . . .	7
9	Umpqua spring chinook fishery, 1958-59 . . . . .	8
10	Winchester Bay salmon angling effort and catch, 1949-1959 . . . .	9
11	Catch records of the salmon fishery kept by dock owners at the Tenmile Lakes in the fall of 1958 . . . . .	10
12	Catch records of the salmon fishery kept by dock owners at the Tenmile Lakes in the fall of 1959 . . . . .	10
13	Creel census records of striped bass anglers fishing from Winchester Bay in the summer of 1959 . . . . .	11
14	North Umpqua summer steelhead fishery, 1958-59 . . . . .	12
15	A comparison of average lengths between marked and unmarked Umpqua summer steelhead by sexes . . . . .	12
16	Creel sampling results for winter steelhead, upper Umpqua District, 1958-59 season . . . . .	12
17	A comparison of angler creels in North Umpqua bait and fly areas 1958 and 1959 seasons . . . . .	13
18	Trout angling effort and catch in the lower Umpqua River area in 1959 . . . . .	14
19	Creel sampling results for North Umpqua reservoirs, 1959 . . . .	14
20	Salmon stocking in the Umpqua basin, 1949-1959 . . . . .	15
21	A comparison of Steamboat Creek migrant trapping results, 1958-59 . . . . .	17
22	Steamboat Creek tributary temperatures, January-August, 1959 . .	17
23	Umpqua River steelhead life history patterns . . . . .	19
24	Calculated fork lengths for Umpqua River steelhead . . . . .	20
25	Marked summer steelhead calculated lengths, 1959 . . . . .	20
26	Results from six bypass traps on Myrtle-Cow Creek areas, 1959 . .	20
27	Counts of anadromous fish runs over Gold Ray Dam . . . . .	22
28	Percentage of return of salmon progeny at Gold Ray . . . . .	23
29	Lower Rogue River salmon catch and angler success . . . . .	27
30	Comparison of the lower Rogue spring chinook catch to the Gold Ray escapement for the years 1950 through 1959 . . . . .	28
31	Hatchery-reared spring chinook salmon study, Rogue River, 1949 to 1959 . . . . .	29
32	Cost of returning Rogue River hatchery spring chinook . . . . .	36

Table	Page
33 Marked salmon returns, Rogue River, 1959 . . . . .	36
34 Creel census data, winter steelhead seasons, Rogue District, 1959. . . . .	37
35 Opening season catch by trout anglers, Savage Rapids to Graves Creek, Rogue River, 1959. . . . .	38
36 Catch success of fall-run steelhead, Rogue River, 1959 . . . . .	38
37 Creel census from Rogue district lakes, 1959 . . . . .	40
38 Annual early season catch from Fish Lake, Willow Creek Reservoir and Squaw Lakes, Rogue district, 1953 to 1959 . . . . .	41
39 Computed total angler use and catch, Upper Rogue, May 24 to September 18, 1958. . . . .	43
40 Trout creel census, South Coast District . . . . .	47
41 Steelhead angling success, south coastal streams, 1959 . . . . .	48
42 Extended steelhead season, Sixes River . . . . .	48
43 Spawning ground surveys, South Coast, chinook salmon, fall and winter, 1959. . . . .	49
44 Creel census results on lakes, streams, and reservoirs in the upper Willamette area . . . . .	51-56
45 Monthly catches of trout in Clear Lake - 1959. . . . .	56
46 Monthly catches of trout in Dorena Reservoir - 1959. . . . .	57
47 Gill net set results . . . . .	59
48 Composition and length frequency table of gill net catches in Willamette National Forest lakes, 1959. . . . .	61
49 Average length of female fish in each stage of maturity collected in gill nets in Willamette National Forest lakes, 1959. . . . .	62
50 Creel census, steelhead, Middle Willamette tributaries, 1959 . . . . .	64
51 Catch, Detroit Reservoir, 1954-1959. . . . .	65
52 Creel census, Detroit Reservoir, 1959. . . . .	66
53 Creel census, North Santiam system, 1959 . . . . .	68
54 Creel census, South Santiam system, 1959 . . . . .	68
55 Creel census, West Side Willamette streams, 1959 . . . . .	69
56 Creel census, Pudding River system, 1959 . . . . .	69
57 Creel census, Cascade lakes, 1959. . . . .	70-71
58 Composition and length frequency of catch by gill net sets Cascade lakes, 1959 . . . . .	73
59 Average length of female fish in each stage of maturity, Cascade lakes, 1959 . . . . .	74
60 Willamette River spring chinook salmon catch by weekly intervals as calculated from moorage reports, 1959. . . . .	75
61 Age composition, Willamette River spring chinook sport fishery 1958 and 1959 . . . . .	76
62 Comparison of the Willamette River chinook salmon sport fishery 1946 to 1959. . . . .	76
63 Escapement and sport catch of Willamette River spring chinook salmon, 1941 to 1959. . . . .	77
64 Computed Sandy River steelhead fishery and angler success December 1958 to March 1959 . . . . .	77
65 Sandy River steelhead study, comparison of angler success, 1955 to 1959 . . . . .	78

Table		Page
66	Sandy River steelhead study, creel sample, 1957 to 1959. . . . .	78
67	Sandy River steelhead stocking records, 1955 to 1959 . . . . .	78
68	Sandy River steelhead counts at Marmot fishway, 1954 to 1959 . .	79
69	Sandy River spring chinook salmon counts over Marmot fishway 1954 to 1959. . . . .	79
70	Upstream migrant fish counts, North Fork fishway, 1958 and 1959.	80
71	Downstream migrant fish counts, North Fork fishway, for the period March to November 1959 . . . . .	80
72	Creel census, Lower Willamette District, 1959. . . . .	82
73	Comparison of average length of fish in some lakes in the Mount Hood National Forest, 1955 to 1959. . . . .	83
74	Composition and length frequency of catch by gill nets in some lakes in the Mount Hood National Forest in one-inch size groups fork length measurements. . . . .	84
75	Average length of female fish in each stage of maturity collected in gill nets in some Mount Hood National Forest lakes, 1959 . .	85
76	Calculated seasonal averages from the Wallowa Lake creel check .	86
77	A comparison of two years of creel check at Wallowa Lake for an 81-day random sampling period . . . . .	86
78	A calculated comparison of effort and success at Wallowa Lake for a 133-day random sampling period for five years . . . . .	87
79	Stocking record of lake trout and kokanee in Wallowa Lake from 1955 to 1959. . . . .	87
80	A summary of Fish Commission trapping on two diversions below Wallowa Lake from May 26 to August 16, 1959 . . . . .	88
81	A comparison of condition of female trout and total population in six high Wallowa Mountain lakes as seen from gill net sampling. . . . .	89
82	Fish release in northeast Oregon high mountain lakes in 1959 . .	90
83	Percentage of fish by species appearing in two gill net surveys of Brownlee Pool in 1959. . . . .	91
84	Average length and weight of fish obtained in gill net sets in Brownlee Reservoir, 1959. . . . .	92
85	Cold Springs Reservoir creel check from March 1 to June 29, 1959. . . . .	93
86	A summary of creel census data from northeast Oregon impounded waters, 1959. . . . .	94
87	Composition and length frequency of catch by gill nets in northeast Oregon reservoirs during mid-summer of 1959 and comparative surveys . . . . .	95
88	Creel check warm-water species . . . . .	96
89	Experimental gill net data, Morgan Lake, 1959. . . . .	96
90	A four-year comparison of angler effort and success for rainbow trout at Unity Reservoir. . . . .	99
91	A comparison of cutthroat trout numbers in gill net samples over a nine-year period at Higgins Reservoir, Baker County . . . . .	99
92	Rainbow trout growth in Union and Baker County gravel pit ponds, 1959. . . . .	99
93	A partial sampling of downstream migrants trapped at 28 rotary screen bypasses in Watersheds 7, 8, and 9 during 1959 . . . . .	101

94	A tabulation of species observed at seventeen rotary fish screen bypass trap boxes on eight streams in 1959. . . . .	102
95	A summary of diversion fish loss investigation on the North Fork, South Fork, and main Walla Walla Rivers, 1959 . . . . .	103
96	A summary of silver salmon spawning ground counts on the Wallowa River and tributaries, 1959 . . . . .	103
97	Creel census of anadromous species from five streams of northeast Oregon in 1959. . . . .	104
98	A summary of trout creel census from nineteen waters in northeast Oregon, 1959. . . . .	105
99	A summary of trout angling effort and success on the Imnaha River, 1959. . . . .	105
100	A list of fish observed with estimated catch and percentage return of hatchery trout from the Imnaha River creel check, 1959. . .	106
101	Reservoir sites for resident fish, Northeast Oregon. . . . .	108
102	Summary, creel census data, Southeast Region, November 15, 1958- November 15, 1959 . . . . .	110-111
103	Summary of creel census data by periods for Fish Lake, April 25 to October 31, 1959 . . . . .	112
104	Summary of creel census data by periods for Beulah Reservoir January 16 - October 31, 1959 . . . . .	113
105	Angling license survey, Owyhee Reservoir, 1959 . . . . .	115
106	Results of livebox tests for delayed mortality on hauls by a new 1,000-gallon tanker equipped with a refrigerator unit . . . . .	116
107	Chemical analysis of water samples from Thompson Reservoir August 20, 1959 . . . . .	117
108	Growth data of fry and fingerling trout stocked in reservoirs, Southeast Region, 1959. . . . .	120
109	Growth data of fry and fingerling trout stocked in reservoirs, Southeast Region, 1959. . . . .	121
110	Age and length determinations from scale samples for largemouth bass and black crappie in the Owyhee Reservoir, 1947 - 1958 . .	122
111	Fish population studies for some important waters of Southeastern Oregon, November 15, 1958 to November 15, 1959. . . . .	123-124
112	A comparison of species taken in gill nets from Dog Lake in 1952 and 1959. . . . .	125
113	A distribution of perch from Dog Lake by sex and size groups April 3, 1959 . . . . .	125
114	Average lengths and weights of female fish at various stages of maturity, Southeast Region, November 16, 1958 to November 15, 1959. . . . .	127
115	Composition and length frequency of game fish taken in some Southeastern Oregon waters, November 16, 1958 - November 15, 1959. . . . .	128
116	Water temperature recordings, Silver Creek (study plot above upper crossing), Watershed 12, 1959 . . . . .	129
117	Water temperature recordings, Allison Creek, Watershed 12, 1959. .	130
118	Hydrographic data for four southeastern Oregon lakes, 1959 . . .	131
119	Creel census data for lakes and streams in the Columbia District, Central Region, 1959 season . . . . .	133-136



Table		Page
120	Catch statistics on East Fork, Hood River, 1954-1959 . . . . .	137
121	Species, numbers and pounds liberated at Olallie Lake, 1951-1959 . . . . .	137
122	Catch statistics at Olallie Lake, 1951-1959 . . . . .	138
123	Size composition of the catch expressed in percentages, Olallie Lake, 1951-1959 . . . . .	138
124	Composition of the catch by species, Olallie Lake, 1951-1959 . .	139
125	Catch statistics at Lost Lake, 1953-1959 . . . . .	139
126	Size composition of the catch expressed in percentages, Lost Lake, 1953-1959 . . . . .	139
127	Composition of the catch by species, Lost Lake, 1953-1959 . . . .	140
128	Composition and length frequency of catch by gill nets in Lost Lake, represented in one-inch size groups, fork length measurements, 1959 . . . . .	141
129	Steelhead creel census by year, Hood River, 1952 to 1959 . . . .	143
130	Results of adult summer steelhead trapping, Hood River, 1959 . .	143
131	Summer steelhead, sport catch, lower Deschutes River, 1951-1959.	144
132	Rotary fish screen operation, Columbia District, 1959 . . . . .	145
133	Composition and length frequency of catch by gill nets in some Central Oregon lakes represented in one-inch size groups, fork length measurements, 1959 . . . . .	148-149
134	Average fork length of female fish in each stage of maturity as collected in gill net sets in some Central Oregon lakes, 1959 .	150-151
135	Average length of maturing female fish in some Central Oregon lakes, 1952-1959 . . . . .	151-153
136	A comparison of boat and car counts on some Central Oregon waters, 1959 . . . . .	155
137	Rough fish control, Davis Lake, 1952-1955 . . . . .	155
138	Counts of downstream migrants, 1958 and 1959, Pelton Dam . . . .	159
139	Upstream migrant counts, Pelton Dam, 1956-1959 . . . . .	160
140	Composition and length frequency of catch by gill nets in Pelton Reservoir represented in one-inch size groups, fork length measurements, 1959 . . . . .	161-162
141	Creel census, Bend District, 1959 season . . . . .	164-166
142	East Lake catch statistics, 1949 through 1959 . . . . .	167
143	Comparison of size groups in sport catch, 1949-1959, East Lake, all species, expressed in percentage . . . . .	168
144	Paulina Lake catch statistics, 1949 through 1959 . . . . .	169
145	Comparison of size groups in sport catch, 1949-1959, Paulina Lake, all species, expressed in percentage . . . . .	171
146	Spring chinook spawning ground survey, Squaw Creek, Metolius River and tributaries, 1953-1959 . . . . .	172
147	Kokanee spawning ground data, 1959 . . . . .	173
148	Rough fish control by gill nets, trap nets, and rotenone, Bend District, 1959 . . . . .	173
149	Percentage of rough fish in total catch of gill nets in some Central Oregon lakes and reservoirs, 1949-1959 . . . . .	174
150	Creel census, lakes and streams, Klamath District, 1959 . . . .	176-178
151	A comparison of numbers of fish stocked at Diamond Lake and percentage of each year class in the catch, 1955-1959 . . . . .	179

Table		Page
152	Comparison of length frequencies in sport catch expressed in percentage, Diamond Lake, 1956-1959 . . . . .	179
153	Public use, Diamond Lake pay camps, 1956-1959 . . . . .	182
154	Length frequencies of a sample of spawning rainbows, Diamond Lake, 1959. . . . .	182
155	Comparison of bottom food samples, Diamond Lake, 1954-1959 . . .	183
156	Number and percentage by number of animals in bottom food samples, Diamond Lake, 1959 . . . . .	183
157	Summary of Diamond Lake catch statistics, 1956-1959 . . . . .	184
158	Bottom samples, Lake of the Woods, 1941-1959 . . . . .	185
159	Number and percentage of bottom food organisms, Lake of the Woods, 1959. . . . .	186
160	Length frequency of a sample of lake trout in the sport catch from a stocking of yearling fish in 1951 in Odell Lake, 1955-1959 . . . . .	186
161	Length frequency of a sample of sport-caught lake trout in Odell Lake, represented by percentage in two-inch size groups, 1952-1959 . . . . .	187
162	Weight frequency of a sample of sport-caught lake trout, represented by percentage in two-pound weight classes, Odell Lake, 1952-1959 . . . . .	187
163	Stomach analysis of lake trout taken, Odell Lake, 1959, June through September . . . . .	188
164	Results of marking experiment of lake trout to check for fin regeneration, 1959. . . . .	189
165	Number of fish taken in upstream and downstream traps at Big Bend Dam, Klamath River, 1959 . . . . .	191
166	Composition and length frequency of catch by gill nets in six Klamath District lakes, represented by one-inch size groups, 1959. . . . .	193
167	Average length of female fish in each stage of maturity as collected in gill net sets in Klamath District, 1959. . . . .	194
168	Steelhead creel check, John Day drainage, 1959 . . . . .	195
169	Average fork length of steelhead in angler take and percentage of females, John Day system, 1959-58. . . . .	195
170	Steelhead spawning ground survey . . . . .	196
171	Salmon spawning survey in Watershed 6, 1959. . . . .	197
172	Live trap fish salvage at Dad's Creek, Grant County, April 26 to June 3, 1959, with comparison of years 1958 and 1957. . . . .	197
173	Weekly rotary screen bypass trap results, John Day system - March 19 to November 13, 1959 . . . . .	200-201
174	Distribution of steelhead trout in 2-inch size groups as recorded at rotary screen bypass trap boxes in John Day system. . . . .	202
175	A partial sampling of downstream steelhead migrants trapped at rotary screen bypasses in Watershed 6 during 1959 with comparison of numbers in 1957 and 1958 . . . . .	203-204
176	Summary of trout creel census data from some angling waters of Watershed 6 in 1959 . . . . .	206
177	Composition and length frequency of catch in gill nets at Olive Lake. . . . .	206

Table		Page
178	Composition and length frequency of catch in gill nets at Strawberry Lake - September 1959. . . . .	207
179	Composition and length frequency of catch by gill net in Magone Lake in 1959. . . . .	208
180	Size frequency of eastern brook taken by gill net from Magone Lake over a 10-year period. . . . .	209
181	Streams in Grant County where logging operations are active or scheduled . . . . .	210
182	Results of budworm spray investigation on Deardorff, Reynolds, and Fields Creeks, Grant County, electrofishing method, 1958-59 . . . . .	211
183	Results of electrofishing in Deardorff Creek above spruce budworm spray area. . . . .	211
184	Some biological and physical data taken of steelhead spawning areas from some streams in John Day drainage. . . . .	213-214
185	Composition of fish recorded by shocker sampling in John Day River . . . . .	215
186	Necanicum River trout catch. . . . .	217
187	Trout creel census, miscellaneous waters . . . . .	218
188	Nehalem River trout catch. . . . .	219
189	Lower Columbia salmon catch. . . . .	219
190	Columbia River sand bar catch. . . . .	220
191	Nehalem River winter catch, November 16, 1958-March 31, 1959 . .	221
192	Necanicum River winter catch, November 16, 1958-March 15, 1959 .	222
193	North Fork Nehalem winter catch, December 16, 1958-March 15, 1959. . . . .	223
194	Miscellaneous streams, winter catch, November 16, 1958-March 15, 1959. . . . .	223
195	Spawning ground counts, 1958-59. . . . .	224
196	Gill net catches . . . . .	225
197	Summary of salmon bank angling results . . . . .	227
198	Reported tidewater boat catch, Nestucca River, salmon season, 1958-59 . . . . .	228
199	Drift boats above tidewater, Nestucca River, salmon season, 1959. . . . .	229
200	Size of salmon . . . . .	231
201	Fish trapped at the Three Rivers rack, 1958-59 . . . . .	232
202	Salmon marks, 1959 . . . . .	232
203	Steelhead season bank angling, 1958-59 . . . . .	233
204	Steelhead season, upstream boats, 1958-59. . . . .	235
205	1959 late season steelhead report, steelhead in the creel expressed as percentages. . . . .	236
206	Sizes of steelhead . . . . .	236
207	Steelhead spawning surveys, 1959 . . . . .	238
208	Trout season, checked bank catch, all streams 1959 . . . . .	239
209	Nestucca River trout season, 1959, reported tidewater boat catch . . . . .	239
210	Salmon River trout season, 1959, reported tidewater boat catch .	241
211	Seine population studies, 1959 . . . . .	241
212	Estimated salmon catch, Tillamook Bay, 1959, moorage operator, Garibaldi . . . . .	242

Table		Page
213	Steelhead creel census, Siuslaw River, 1958-59 . . . . .	243
214	Condition of steelhead checked in creels, Alsea River, March 1959. . . . .	244
215	Total trap catch, adult steelhead trout, North Fork Alsea River, 1958-1959 . . . . .	244
216	Trap catch by periods, wild and marked fish. . . . .	245
217	Creel census, Lincoln District, May 30-June 7, 1959. . . . .	246
218	Creel census, Devils Lake, Watershed 18, April 25, 1959. . . . .	246
219	Gill net catch, Devils Lake, June 3, 1959. . . . .	247
220	Creel census, Lost, Erhart, and Georgia Lakes, Watershed 18, April 25-May 15, 1959 . . . . .	248
221	Creel census, Yaquina Bay offshore sport fishery, 1955-1959. . . . .	249
222	Calculated angling intensity and catch, Siletz River tidewater fishery, 1959 . . . . .	250
223	Catch per boat, Siletz River tidewater fishery, September 1-October 31, 1953-1959 . . . . .	250
224	Calculated angling intensity and catch, Alsea River tidewater fishery, 1959 . . . . .	251
225	Catch per boat, Alsea River tidewater fishery, September 1-October 31, 1953-1959 . . . . .	251
226	Calculated angling intensity and catch, Siuslaw River tidewater fishery, 1959 . . . . .	252
227	Catch per boat, Siuslaw River tidewater fishery, September 1-October 31, 1956-1959 . . . . .	252
228	Analysis of water sample, Devils Lake, Lincoln County, June 11, 1959. . . . .	252
229	Silver salmon spawning ground counts on Coquille River and tributaries, 1958 . . . . .	255
230	Silver salmon spawning ground counts on Coquille River and tributaries, 1959 . . . . .	256
231	Silver salmon spawning ground counts, Coos Bay area, 1958. . . . .	256
232	Silver salmon spawning ground counts, Coos Bay area, 1959. . . . .	257
233	A comparison of silver salmon spawning ground counts per mile of stream in the Coos-Coquille District, 1955-1959 . . . . .	257
234	Chinook salmon spawning ground counts, Coquille River, 1958. . . . .	258
235	Chinook salmon spawning ground counts, Coquille River, 1959. . . . .	258
236	Calculated sport salmon fishery, Coos Bay, May 15-September 30, 1959. . . . .	258
237	Origin and brood year of marked salmon recovered at Coos Bay in 1959. . . . .	259
238	Calculated summer salmon angling effort and catch, Coos Bay, 1955-59 . . . . .	260
239	Coquille River fall chinook catch success by years . . . . .	260
240	Sport salmon catch, lower Coquille River, 1959 . . . . .	260
241	Steelhead creel sampling, Coquille River, 1958-59. . . . .	261
242	Steelhead creel sampling, Coos Bay area, 1958-59 . . . . .	261
243	Creel sampling, extended season, South Fork Coquille, March 1959. . . . .	262
244	Condition of steelhead caught in March 1959. . . . .	262
245	Creel sampling, trout, of Coos County streams and lakes, 1959. . . . .	263
246	Sport catch, shad, Millicoma River, 1959 . . . . .	263

Table		Page
247	Sport catch, shad, Coos Bay area for recent years. . . . .	263
248	Sport catch, striped bass, Coos Bay area, 1959 . . . . .	264
249	Length composition of striped bass in inches, Coos Bay, 1959 . .	264
250	A comparison of striped bass angler success, Coos Bay, 1950-1959 . . . . .	264
251	Annual egg production including exchanges and purchases of trout eggs in 1959. . . . .	267
252	Number of eggs taken at Oregon Game Commission stations - 1959 .	268
253	Summary of annual fish production data for each station - 1959 .	269
254	Comparison of conversion ratios between 1958 and 1959 calculated from fry, fingerling, and yearling fish released from each station . . . . .	270
255	Amounts and types of fish foods used in fifteen hatcheries in 1959. . . . .	271
256	Fish food costs, 1959. . . . .	271
257	Preliminary feeding experiments with commercial type pellets vs. regular hatchery diets using unfed rainbow fry averaging 2650 per pound, 1959 . . . . .	273
258	Comparison of preliminary pellet and hatchery control diets at various stations using sub-yearling fish, 1959. . . . .	274
259	Age and growth of warm-water species from various bodies of water . . . . .	283
260	1958 Salmon and Steelhead Catch. . . . .	287
261	Salmon and steelhead catch by area, 1958 . . . . .	288-289
262	1959 Fish Stocking . . . . .	291
263	Total releases of fish from hatcheries, 1959 . . . . .	292-293
264	Distribution load by months, 1959. . . . .	293
265	Percentage of trout releases by weight within each watershed 1955-1959 . . . . .	294
266	Distribution of trout by airplane by watershed and species 1959. . . . .	295
267	1960 yearling fish production program. . . . .	296
268	Summary of Oregon State Game Commission Fishery Rehabilitation Projects, 1959. . . . .	298

# LIST OF FIGURES

Figure		Page
1	Daily spring chinook salmon catch, Lower Rogue River (April) . .	24
2	Daily spring chinook salmon catch, Lower Rogue River (May) . . .	25
3	Return of hatchery-reared spring chinook salmon, Rogue River 1953 to 1959. . . . .	30
4	Return of hatchery-reared spring chinook compared with month of release, Rogue River, 1949-59 . . . . .	31
5	Size of spring chinook upon release compared with return as adults, Rogue River, 1951 to 1959 . . . . .	32
6	Spring chinook hatchery losses compared with return as adults, Rogue River, 1949-59. . . . .	33
7	Return of hatchery spring chinook compared with maximal discharge of Rogue River after release, 1949 to 1959. . . . .	34
8	Angler-use and catch distribution, Upper Rogue, 1958 . . . . .	44
9	North Fork fishway, upstream migrants. . . . .	81
10	Dissolved oxygen analysis at Morgan Lake, 1959 . . . . .	97
11	Summer water temperatures at Morgan Lake, 1959 . . . . .	98
12	Steelhead catch in Hood River by month, 1954 through 1958. . . .	142
13	Comparison of length frequencies of fish taken by gill net from Diamond Lake. . . . .	180
14	Growth rate of rainbow trout from Diamond Lake, 1959 . . . . .	181
15	Downstream steelhead migration pattern showing monthly totals as recorded in John Day system of rotary screen bypass traps 1959 with monthly rainfall comparison. . . . .	198
16	Monthly patterns of downstream migrant steelhead at rotary screen bypass traps and rainfall in 1956-57-58 irrigation periods, John Day system . . . . .	205

## A

access, public, Astoria District, 224  
                     Dayville Pond, 207  
 ANGLING REGULATIONS, 276  
 ASTORIA DISTRICT, 216-225

## B

barrier removal, 284-286  
 barriers, John Day District, 209, 210, 212  
                     South Coast, 60  
                     Tillamook District, 242  
 BEND DISTRICT, 147-174  
 bottom samples, Davis Lake, 155  
                     Diamond Lake, 182, 183  
                     Lake of the Woods, 185

## C

CENTRAL WILLAMETTE, 64-74  
 COLUMBIA DISTRICT, 132-146  
 COOS-COQUILLE DISTRICT, 255-265  
 counts, chinook, Gold Ray Dam, 22, 23  
                     Umpqua River, 1, 3  
                     Winchester Dam, 1, 2  
                     cutthroat, Winchester Dam, 1, 2  
                     salmon, Three Rivers, 230, 232  
                     silver salmon, Gold Ray Dam, 22, 23  
                     steelhead, Gold Ray Dam, 22  
                             North Fork Alsea, 242  
                             Winchester Dam, 1, 2  
 creel census, see sport catch

## D

disease control, hatcheries, 275  
 disease, John Day District, 212  
                     salmon, Rogue District, 46  
                     steelhead, Rogue District, 46  
                     trout, South Coast, 63

## E

egg production, hatcheries, 266-268  
 egg-take, Diamond Lake, 179  
                     kokanee, Crescent Lake, 184  
 electrofishing studies, John Day District, 212, 215  
 exotic fishes, Rogue District, 46  
 expenditures, fishery resource, 299  
 extended season, steelhead, Alsea River, 243  
                             Nestucca River, 234, 235

extended season, steelhead, Sixes River, 47, 48  
South Fork Coquille River, 261, 262  
Tenmile Creek, 243  
Wilson River, 234, 235

## F

farm ponds, 281, 282  
FEDERAL AID EXPENDITURES, 297  
fish production, hatcheries, 266, 269, 296  
FISH PROPAGATION, 266-275  
FISH STOCKING, 290-296  
FISHERY RESOURCE EXPENDITURES, 299  
fishways, Columbia District, 114, 116  
Rogue District, 45  
Umpqua District, 18  
flood control, Rogue River, 42, 45  
food studies, hatcheries, 266, 270-274  
Forest Camp use, Diamond Lake, 179, 182

## G

GAME COMMISSION HATCHERIES, 301  
growth studies, Southeastern Oregon, 118-122  
warm-water game fish, 283  
guided catch, McKenzie River, 50  
Rogue River, 45  
South Coast, 58

## H

habitat improvement, Astoria District, 224  
Bend District, 173, 174  
Davis Lake, 154  
John Day District, 210  
Northeastern Oregon, 106  
Silver Creek, 126, 129, 130  
Southeastern Oregon, 114, 117  
state-wide, 284-286  
Tillamook District, 242  
Umpqua District, 18  
hatcheries, Game Commission, 301  
hatchery automation, 275

## J

JOHN DAY, 195-215

## K

key stream program, Columbia District, 132, 137  
KLAMATH DISTRICT, 175-194



## L

ladders, Big Bend, 190, 191  
     Illinois Falls, 46  
     Rogue District, 45  
 LAKE AND STREAM REHABILITATION, 298  
 lake improvement, Umpqua District, 21  
 lake surveys, Astoria District, 224, 225  
     Southeastern Oregon, 131  
 license survey, Owyhee Reservoir, 115  
 life history studies, steelhead, 18, 19, 24  
 LINCOLN DISTRICT, 243-254  
 LOWER WILLAMETTE, 75-85

## M

management, Big Cultus Lake, 147  
     Big Lava Lake, 153  
     Crane Prairie Reservoir, 153  
     Crescent Lake, 184  
     Davis Lake, 154  
     Dayville Pond, 207  
     Devils Lake, 184  
     Diamond Lake, 175, 179  
     East Lake, 163, 167, 168  
     Elk Lake, 156  
     Fourmile Lake, 184  
     Haystack Reservoir, 156  
     Jump Off Joe Creek, 207  
     Klamath Lake, 184  
     Klamath River, 190  
     Lake of the Woods, 185  
     Little Lava Lake, 157  
     Miller Lake, 189  
     Mud Lake, 157  
     North Twin Lake, 157  
     Ochoco Reservoir, 157  
     Odell Lake, 186  
     Paulina Lake, 163, 169, 171  
     Pelton Reservoir, 158-162  
     ponds, Northeastern Oregon, 96, 99  
     Sparks Lake, 158  
     steelhead, Siletz River, 72  
     Wallowa Lake, 86-89  
     warm-water game fish waters, 277-283  
     Williamson River, 191  
 marked salmon returns, Coos Bay, 259  
     Rogue River, 26, 29-36  
     Tillamook District, 230, 232  
     Umpqua District, 15  
 marked steelhead returns, Necanicum River, 220  
     Tillamook District, 234  
     Umpqua District, 16

marking, lake trout, Odell Lake, 189  
salmon, Tenmile Lakes, 21  
mortality, stocking, 114, 116  
unscreened diversions, Northeastern Oregon, 100, 103

N

NORTHEASTERN OREGON, 86-108

O

OREGON SALMON AND STEELHEAD SPORT FISHERY, 287-289

P

parasites, East Lake, 170  
John Day District, 212  
Lake of the Woods, 185  
Paulina Lake, 170  
trout, South Coast, 63  
pollution, John Day District, 209-211  
South Coast, 60  
population studies, Astoria District, 224, 225  
Brownlee Reservoir, 90-92  
Cascade lakes, 5, 7, 67, 72-74, 83-85  
Central Willamette District, 65  
chinook, Central Willamette District, 64  
McKenzie River, 58  
Sandy River, 79  
coastal lakes, 6, 58, 59, 61, 62  
Coos-Coquille District, lakes, 265  
Diamond Lake, 175, 180-182  
Klamath District, 192-194  
Magone Lake, 207-209  
North Fork fishway, 80, 81  
Odell Lake, 186, 187  
Olive Lake, 202, 206  
silver salmon, Luckiamute River, 72  
Southeastern Oregon, 119, 123-128  
steelhead, Central Willamette District, 64  
Crystal Springs Creek, 83  
Hood River, 143  
Sandy River, 79  
Strawberry Lake, 202, 207  
Tillamook District, 240, 241  
trout, Bend District, 147-154  
Devils Lake, 247  
Higgins Reservoir, 99  
Lost Lake, 141  
McKay Reservoir, 91  
Morgan Lake, 91, 96  
Northeastern Oregon, 100  
South Coast, 47

population studies, Wallowa Lake, 88  
Wallowa Mountain lakes, 88, 89  
propagation, fish, state-wide, 266-275  
salmon, Hood River, 140  
Umpqua District, 15  
steelhead, Umpqua District, 16  
public fishing lake sites, John Day District, 209, 210  
Southeastern Oregon, 118  
punch card analysis, 287-289

## R

rearing ponds, Northeastern Oregon, 107, 108  
South Coast, 60  
steelhead, Coos-Coquille District, 265  
Umpqua District, 16, 21  
regulations, angling, 276  
rehabilitation, Ana Reservoir, 114  
Antelope Reservoir, 114  
Chickahominy Reservoir, 118  
Devils Lake, 251-254  
Erhart Lake, 247  
Georgia Lake, 247  
Lofton Reservoir, 114  
Lost Lake, 247  
McKay Creek and Reservoir, 106  
Miller Lake, 188, 189  
Morgan Lake, 106  
North Powder Pond, 106  
state-wide, 298  
Thompson Valley Reservoir, 117  
restoration, salmon, Umpqua District, 15  
steelhead, Umpqua District, 16  
river basin development, Rogue, 42, 45  
road construction, South Coast, 60  
ROGUE RIVER AND SOUTH COASTAL STREAMS, 22-49

## S

salvage, steelhead, Dad's Creek, 197  
screen investigations, Big Bend, 190, 191  
screens, Columbia District, 144-148  
Gold Hill, 45  
Gold Ray, 45, 46  
John Day District, 197-205  
Northeastern Oregon, 100-102  
Rogue District, 45  
Savage Rapids, 45  
Umpqua District, 18, 20  
shocker studies, John Day District, 212, 215  
SOUTHEAST OREGON, 109-131

spawning ground counts, Astoria District, 220, 224  
     chinook, Coquille River, 258  
         John Day District, 196, 197  
         Metolius River, 170, 172  
         Squaw Creek, 170, 172  
         Umpqua District, 7  
     Eel Lake, 6  
     kokanee, Bend District, 170, 173  
         Woahink Lake, 248  
     Northeastern Oregon, 100, 103  
     salmon, South Coast, 48, 49  
         Tillamook District, 230  
     silver salmon, Coos Bay area, 256, 257  
         Coos-Coquille District, 257  
         Coquille River, 255, 256  
         Tenmile Lakes, 4  
         Umpqua River, 1, 3  
     Steamboat Creek, 18  
     steelhead, John Day District, 196  
         Squaw Creek, 170  
         Tillamook District, 237, 238  
     Umpqua River, 4, 18  
     Wallowa River, 100, 103  
 sport catch, Bend District, 154, 164-166  
     Beulah Reservoir, 113  
     bottom fish, Tillamook District, 240  
     chinook, Umpqua, 6, 8  
         Willamette River, Lower, 75, 77  
     Diamond Lake, 175, 183, 184  
     East Lake, 167, 168  
     Fish Lake (Harney County), 112  
     Fish Lake (Jackson County), 39, 41  
     Howard Prairie Reservoir, 41  
     Klamath District, lakes and streams, 176-178  
     Klamath River, 190  
     Lake of the Woods, 185  
     Odell Lake, 186  
     Paulina Lake, 169, 171  
     Rogue District, lakes and reservoirs, 39, 40  
     salmon, Alsea River, 249, 251  
         Astoria District, 223  
         Columbia River, 100, 104, 216, 219, 220  
         Coos Bay, 258, 260  
         Coquille River, 259, 260  
         Necanicum River, 222  
         Nehalem River, 221, 223  
         Northeastern Oregon streams, 100, 104  
         Rogue District, 23-29, 38, 40, 41  
         Siletz River, 249, 250  
         Siuslaw River, 250, 252  
         state-wide, 287-289  
         Tillamook District, 226-229

sport catch, salmon, Umpqua District, 8  
     Winchester Bay, 6, 9  
 shad, Coos-Coquille District, 262, 263  
     Millicoma River, 263  
 silver salmon, Tenmile Lakes, 6, 10  
 Southeastern Oregon, lakes and reservoirs, 109-111  
 Squaw Lakes, 41, 42  
 steelhead, Alsea River, 243, 244  
     Columbia River, 100, 104  
     Coos Bay area, 261  
     Coquille River, 261  
     Deschutes River, 143, 144  
     Hood River, 140, 142, 143  
     John Day District, 195, 196  
     Northeastern Oregon streams, 100, 104  
     Rogue District, 36-38, 42, 43  
     Sandy River, 77, 78  
     Siuslaw River, 243  
     South Coast, 47, 48  
     state-wide, 287-289  
     Tenmile Creek, 243  
     Tillamook District, 230, 233, 234, 236  
     Umpqua District, 8, 10, 12, 13  
 striped bass, Coos-Coquille District, 264  
     Umpqua District, 8, 11  
 tidewater fishery, Lincoln District, 249  
 trout, Alsea River, 249, 251  
     Astoria District, 216, 218, 223  
     Cascade lakes, 57, 67, 70, 71  
     Clear Lake, 50, 56  
     coastal lakes, Lincoln District, 246  
         Tillamook District, 240  
     coastal streams, Lincoln District, 245  
     Columbia District, 132-136  
     Coos-Coquille District, 262, 263  
     Detroit Reservoir, 64-66  
     Devils Lake, 246  
     Erhart Lake, 248  
     Georgia Lake, 248  
     Higgins Reservoir, 93, 94  
     Hood River, 137  
     Imnaha River, 105, 106  
     John Day District, 199, 206  
     Lincoln District, 245, 246  
     Lost Lake (Douglas County), 248  
     Lost Lake (Hood River County), 132, 139, 140  
     Lower Willamette District, 82  
     McKay Reservoir, 91, 93  
     McKenzie River, 40  
     Morgan Lake, 91, 93  
     Murray Reservoir, 93, 94  
     Necanicum River, 217, 222

sport catch, trout, Nehalem River, 219, 221, 223  
     Nestucca River, 239  
     North Santiam, 65, 68  
     Northeastern Oregon, 94, 95, 105  
     Olallie Lake, 132, 137-139  
     Pudding River, 67, 69  
     reservoirs, Upper Willamette District, 57  
     Rogue District, 38, 39, 42, 43  
     Salmon River, 241  
     Siletz River, 249, 250  
     Siuslaw River, 250, 252  
     South Coast, 47  
     South Santiam, 66, 68  
     Tillamook District, 237, 239  
     Timothy Meadows Reservoir, 80  
     Umpqua District, 10, 13, 14  
     Unity Reservoir, 93, 94, 99  
     Wallowa Lake, 86, 87  
     west-side Willamette streams, 67, 69  
     Willamette River, upper, 50-56  
     Woahink Lake, 246  
 warm-water game fish, Cold Springs Reservoir, 90, 93, 96  
     Northeastern Oregon, 96  
     Rogue District, 42  
     Willow Creek Reservoir, 41  
     Yaquina Bay, 248, 249  
 spruce budworm spray effects, John Day, 210, 211  
 stocking, salmon, Umpqua District, 15  
     state-wide, 290-296  
     steelhead, Sandy River, 78  
         Umpqua District, 16  
     trout, Wallowa Lake, 87  
         Wallowa Mountain lakes, 90  
 stomach analyses, Odell Lake, 187, 188  
 stream flows, Rogue District, 46  
 STREAM IMPROVEMENT, 284-286  
 stream improvement, Tillamook District, 242  
 stream surveys, John Day District, 212-214

## T

temperature studies, Allison Creek, 130  
     Morgan Lake, 98  
     Rogue District, 46  
     Silver Creek, 129  
     Steamboat Creek, 17

TILLAMOOK, 226-242

trapping, Steamboat Creek, 17

## U

UMPQUA RIVER, 1-21

UPPER WILLAMETTE, 50-63

W

WARM-WATER GAME FISH, 277-283  
weed control, Delintment Lake, 117  
Northeastern Oregon, 107  
ponds, 280, 281