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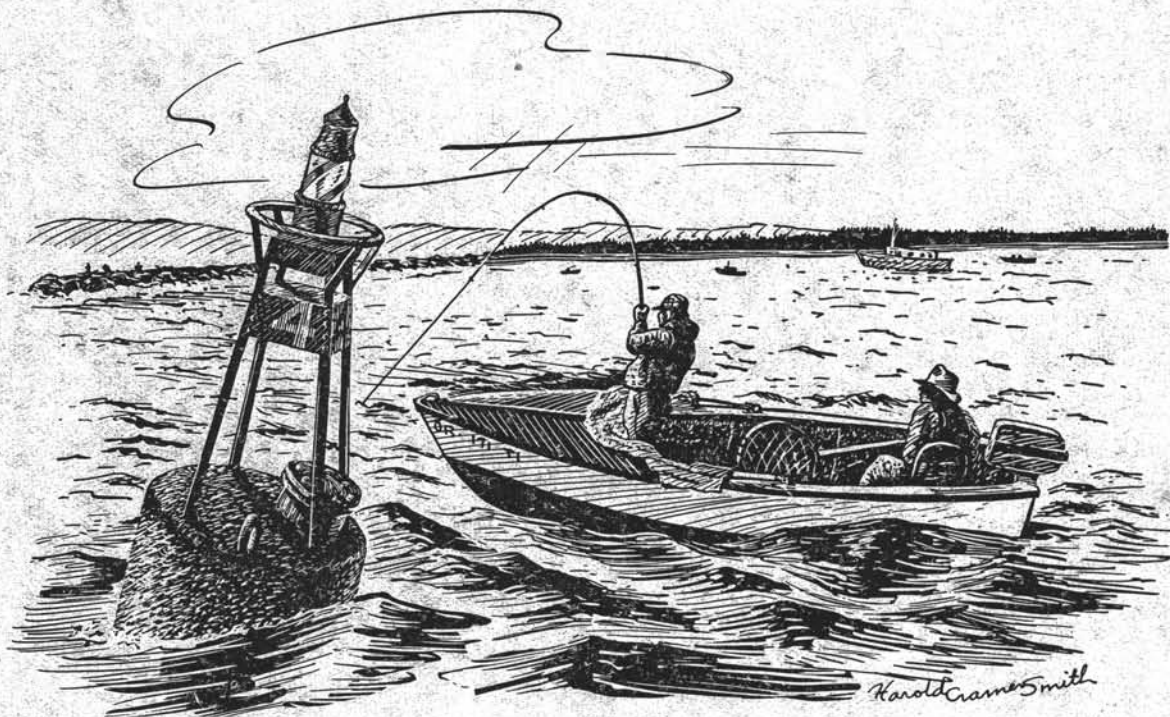
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Annual Report



OREGON STATE GAME COMMISSION
FISHERY DIVISION



1961 ANNUAL REPORT

FISHERY DIVISION

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Editors



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INTRODUCTION

An evaluation of returns of hatchery reared anadromous species in Oregon streams was continued in 1961. In some instances, the return of marked hatchery fish was encouraging. On the North Umpqua River, 24 per cent of the summer steelhead examined at the Winchester counting station were marked fish. Divers using underwater breathing gear found that 81 per cent of adult steelhead in the North Fork of Siletz River were marked fish reared to migrant size at Roaring River Hatchery. Approximately 40 per cent of the steelhead examined in the Wilson River sport fishery were marked.

Improvements in habitat appear to have resulted in a good return of naturally reared spring chinook salmon in the Rogue River. The run counted at Gold Ray Dam was calculated to be 176 per cent of the parent run. The good returns of adult spring chinook coincide with the operation of Savage Rapids screen. Adults returning in 1961 were the first spring chinook to benefit from the screen at Savage Rapids in their downstream migration.

The sport catch of salmon at the mouth of the Columbia, determined by the Washington Department of Fisheries and Oregon State Game Commission, was one of the largest on record. In the period June 24 to September 16, 1961, the catch was estimated to be 20,500 chinook salmon and 85,500 silver salmon.

Projects to improve the habitat for trout and salmon were undertaken in 1961. Two rearing ponds were planted with steelhead fingerlings. Medco Pond, a 71-acre impoundment on the upper Rogue system, was planted with steelhead in 1961. Whistlers Bend, a 35-acre impoundment on the North Umpqua system, was also stocked with steelhead in 1961. Two hundred cubic yards of graded gravel were distributed over shoal areas of Woahink Lake in order to enhance natural reproduction of kokanee. In cooperation with the U. S. Forest Service, several fissures in the lava at Sparks Lake were sealed with concrete. By decreasing the amount of water escaping through the lava, it is hoped that the water level of this lake can be stabilized. Several impoundments for resident trout were completed and are expected to provide a trout fishery in 1962.

Much of the time of the fishery biologists and wildlife conservation aides has been devoted to game fish inventory. High lake survey crews worked on the east and west sides of the Cascade Mountains in order to complete an inventory of the Cascade pack lakes. Completion of the high lake survey will enable fishery biologists to make detailed physical, chemical, and biological surveys on some of the larger, more accessible trout lakes and reservoirs in subsequent years. Actual returns of tagged trout in the Metolius River study ranged from 27 per cent for trout planted at five to the pound to 41 per cent of the fish released at three to the pound. In the second year after release, 3.4 per cent of the tags from smaller fish were returned and 2.9 per cent of the tags from three-to-the-pound fish were returned.

A number of lakes and reservoirs were chemically treated in 1961, including a 3,000-acre lake in the Central Region. Chemical treatment was completed in November following exhaustive tests with Rhodamine-B dye to determine whether the water escaping from the submerged outlet of Davis Lake entered the Deschutes River system. Davis Lake, considered one of the most productive natural lakes in the State, had been supporting large numbers of roach with a very limited trout fishery.

A life-history study of the kokanee was undertaken by several fishery biologists in order to increase the distribution and production of this species in the State of Oregon. The hatchery program for kokanee was modified in order to plant fingerling in place of unfed fry, as had been the custom in past years.

Changes in angling regulations included the all-year fishery in a number of coast lakes, and a closure of the trout fishery in the lower Sandy River in order to protect downstream migrant steelhead and salmon. A move was made to promote quality fishing and fishing for fun through the Mud Lake Atlantic salmon regulation in which all fish would be released and the angler would be required to use barbless flies.

A 35-acre tract of land in the Willamette Valley was purchased for rearing warm-water game fish. Funds for well drilling and pond construction are in the 1962 budget.

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

AS	Atlantic salmon	K	Kokanee
B	Bullhead catfish	LB	Largemouth bass
BC	Black crappie	LT	Lake trout
BG	Bluegill sunfish	Mu	Mullet
BlB	Black bullhead	P	Perch
BLC	Blue catfish	PK	Pumpkinseed sunfish
Br	Brown trout	PS	Pink salmon
BrB	Brown bullhead	Rb	Rainbow trout
C	Crappie	Ro	Roach
CC	Channel catfish	RsS	Redsided shiner
Ch	Chinook salmon	SB	Smallmouth bass
ChF	Chinook salmon (fall)	SCT	Blackspotted cutthroat
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	Coarsescaled 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	Finescaled sucker	Wm	Warmouth bass
GS	Green sunfish	YB	Yellow bullhead
GT	Golden trout	YP	Yellow perch

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UMPQUA RIVER DISTRICT

Jerry A. Bauer and Ron L. McDivitt

Fish Culture

The highest egg production ever realized in the summer steelhead program was obtained in 1961. One hundred and five females produced 297,500 green eggs. Six per cent of the adults were lost in the seven weeks of spawning. Table 1 presents a history of summer steelhead spawning since the program started in 1955.

Table 1

North Umpqua Summer Steelhead Egg-Takes, 1956 - 1961

Number Brood Fish Captured	Period Fish Captured	Period Spawned	Number of Females Spawned	Number of Green Eggs	Eggs per Female	Loss to Eyed-Egg (Per Cent)
100	9/13/55	3/9 -4/23/56	45	104,000	2,310	8
128	7/30-8/13/56	2/25-4/3 /57	46	122,000	2,650	18
133	7/15/57	2/11-3/20/58	46	99,500	2,165	18
73	7/7 /58	2/4 -4/20/59	18	47,500	2,640	19
88	7/9 /59	2/26-4/11/60	49	118,600	2,420	17
170	7/7 -8/8 /60	2/17-4/5 /61	105 <u>/1</u>	297,500	2,835	13

/1 In addition, 10 females were released unspawned.

Thirty-seven winter steelhead females taken and spawned below Soda Springs Dam produced 115,300 green eggs. The first of the 1961 brood-year eggs were taken April 21 and the last eggs on May 4.

Only 113,100 spring chinook eggs were taken in 1961. The number of fish below Soda Springs was so small that 25,000 eggs were taken from fish on Hatchery Ford. A larger number of eggs could have been obtained at Hatchery Ford two weeks earlier.

There were 225 adult summer steelhead, 45 more than in 1960, transported to Rock Creek Hatchery from the Winchester ladder. Heavier than normal delayed mortality following the transfer made the increase necessary. There are enough fish on hand to supply approximately 300,000 green eggs.

Mature rainbow were observed along the east shore of Diamond Lake on April 25. The traps were set May 1, and the first fish spawned on May 10. The total of 15,500,000 green eggs was the largest egg-take in recent years. Table 2 gives a comparison of the size of females spawned the last three years.

Table 2

Length Frequencies of Spawning Females at Diamond Lake,
1959 - 1961

Year	Per Cent of Females in One-Inch Size Groups									
	15	16	17	18	19	20	21	22	23	24+
1959	1.4	12.6	37.1	24.5	14.0	3.5	2.1	1.4	0.7	2.7
1960		0.9	3.8	13.5	30.8	21.2	19.2	7.7	2.9	
1961	2.0	7.5	24.8	38.5	20.7	3.5	1.8	0.8	0.2	0.2

Trap nets were used in Diamond Lake for the first time in 1961. Nets were a definite aid in egg-taking operations. The Silent Creek trap produced the largest number of spawning females as is illustrated in Table 3.

Table 3

Areas of Brood Fish Capture at Diamond Lake, 1961

Area	Trap Set	Trap Closed	Number of Days Trap Fished	Number of Female Spawners Trapped
Silent Creek	May 16	June 13	30	2,240
Lake Creek	May 3	May 31	26	940
Short Creek	May 16	June 13	30	1,280
Trap nets	May 3	June 13	23	1,840

The Whistlers Bend rearing pond was put into production in 1961. Observations in April showed a temperature range from 51.5° C. on the bottom to 59.0° C. at the surface, and indicated that plankton organisms and higher forms of fish-food organisms were well established. The 35-acre pond was stocked the second week of May at the rate of 2,000 fry per acre. The unfed fry were 2,432 fish per pound when released. A one per cent delayed mortality was experienced after 144 hours. Fingerlings from the pond and Bandon Hatchery were marked and released into the pond in August and November to determine mortality. Tentative release period is late March 1962.

The second stocking in the experimental Strader Pond was unsuccessful. These unfed fry were apparently preyed upon by a small number of yearlings that had not been removed the previous spring.

Considerable time was spent in following the progress of logging and construction at the Hemlock Meadows site. Construction should be complete in 1962.

Seven potential rearing-pond sites were surveyed. Two sites that would impound between 75 and 200 acres of water are to be investigated further.

Fish Distribution

The largest single plant of summer steelhead was made in 1961, as shown in Table 4. The release of 83,600 yearlings was made below Winchester. Approximately 3 per cent of the migrants released since the program began in 1956 have returned as adults. Seventy per cent of these returned in the summer run, but 30 per cent returned as winter-run fish.

Table 4

Umpqua Summer Steelhead Stocking and Percentage of Return,
1958 - 1961

Number Stocked	Date Stocked	Mark	Number Adults Recovered	Per Cent Returned
19,100	March 1958	Ad-RV	335	1.8
49,000	March 1958	Ad-RM	1,423	2.9
34,900	March 1959	Ad-RM	1,313	3.8
16,900	March and April 1960	Ad-RM	475	2.8
83,600	March 1961	Ad-RM	(will return 1962)	

Winter steelhead were released into the North Umpqua for the first time in more than 15 years. The 10,700 yearlings, averaging 14.6 per pound, were stocked below Winchester in March 1961.

In late August, 46,900 excess marked summer steelhead at 100 per pound were released in Steelhead Creek, a tributary of Steamboat Creek. Earlier, an excess of 12,500 summer steelhead advanced fry were stocked in Little Rock Creek, another tributary of Steamboat Creek.

There was also an excess of 46,000 winter steelhead advanced fry which were stocked into French Creek, a tributary to the North Umpqua above Glide. An initial plant of 46,000 kokanee fry was made in Eel Lake in the spring of 1961.

A total of 1,200,000 Kamloops fry was stocked into Diamond Lake between June 28 and July 21. Fry were first observed in the outlet July 2 and the first taken in the trap on July 8. Screens were installed at the egg-taking facilities in Lake Creek. Table 5 shows that 43,400 fry were seined in front of the screens and returned to the lake between July 8 and August 15.

Table 5

Fry Trapped in Outlet of Diamond Lake,
July 8 - August 15, 1961

Fry Taken in Downstream Trap	Mortality on Screens	Fry Seined and Returned to Lake	Total Fry Handled
2,300	6,800	43,400	52,500

Approximately 20,000 cutthroat fry were stocked into Beale Lake, a sand dune lake west of Hauser. The lake has public access and did not contain trout prior to the stocking.

Fish Inventory

Anadromous

In 1961, spring chinook and summer steelhead made good gains, fall salmon saw slight increases, and winter steelhead had a heavy decline. Fish counts over Winchester Dam on the North Umpqua River for the past 11 years are shown in Table 6.

The spring chinook run was 30 per cent larger than the 1960 run, but was 56 per cent of its parent run. Jacks made up 10.3 per cent of the run. Fall chinook and silver salmon exhibited 27 and 44 per cent increases, respectively, over 1960 runs, but still are small numerically. Jacks made up 29 per cent of the silver run.

The summer steelhead run was almost 40 per cent greater than the average for the previous four years. The winter steelhead run was 25 per cent smaller than the average for the previous four years and the smallest run recorded since 1955.

The arbitrary starting date for summer steelhead was changed from June 1 to May 1 after three years of study. The study indicated that between 85 and 100 per cent of the steelhead crossing the dam in May were summer fish.

The station was closed seven days because of high water.

Spring chinook were counted in the resting holes of the South Umpqua between Castle Rock and Zinc Creek for the 16th year. The 104 adults and 43 jacks observed are an increase of 197 per cent over 1960. SCUBA gear was used for the first time in enumerating salmon in resting holes. Fewer salmon would have been counted had conventional methods been used. Table 7 presents the counts for the past 12 years.

A five-mile section of Rock Creek upstream from the hatchery dam was examined for spring chinook for the third consecutive year. Fourteen were observed in the resting holes compared to 25 in 1960 and 69 in 1959.

Silver salmon spawning ground counts for lower Umpqua and Smith River tributaries increased from an all-time low of 2.9 salmon per mile in 1960-61 to 7.6 salmon per mile in 1961-62. The 1961-62 count per mile is still relatively low as compared to previous counts. Results of the lower Umpqua and Smith River counts are presented in Table 8.

Table 9 presents a comparison of the counts of selected lower Umpqua and Smith River tributaries for the 17 consecutive years that such counts have been made.

Counts of spawning fall chinook were made for the fifth consecutive year on the North Fork of Smith River. Mill Creek was counted for the third consecutive year, but murky water again hampered an accurate count. Over-all, fall chinook counts reveal a decrease of 21 per cent over 1960. Only the North

Table 6

Winchester Dam Fish Counts, 1959-1961

Species	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
<u>Spring Chinook</u>											
Adults	2,940	4,702	4,310	6,613	6,266	7,881	4,285	3,856	3,460	3,594	4,711
Jacks	677	559	521	1,576	1,378	1,433	943	542	327	456	542
Totals	3,617	5,261	4,831	8,189	7,644	9,314	5,228	4,398	3,787	4,050	5,253
<u>Fall Chinook</u>											
Adults	13	12	86	1	656	181	14	61	108	70	72
Jacks			2		36	3	1		3	1	18
Totals	13	12	88	1	692	184	15	61	111	71	90
<u>Silver Salmon</u>											
Adults	2,098	2,761	1,652	325	2,475	2,303	952	492	768	215	389
Jacks	161	305	704	64	222	457	111	81	50	131	142
Totals	2,259	3,066	2,356	389	2,697	2,760	1,063	573	818	346	531
Summer Steelhead	3,361	4,443	2,844	3,117	3,430	2,927	2,228	2,041	2,049	2,732	3,141
Winter Steelhead	4,188	10,635	5,094	9,124	4,755	10,211	8,923	6,350	6,372	6,138	5,192
Coastal Cutthroat	1,508	755	1,838	706	960	982	87	108	48	106	306
Other Trout	266	390	240	64	47	269	25	42	104	98	116
Suckers	972	9,401	265	14,502	11,752	20,924	2,425	7,458	5,248	8,844	8,098

Fork of Smith River revealed an increase in fall chinook. Fall chinook counts for Smith River and lower Umpqua tributaries are presented in Table 10.

Table 7

South Umpqua Spring Chinook Inventory, 1950-1961

Year	Number of Fish Observed			Total Count
	Above Falls	Below Falls	Jackson Creek	
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 <u>/2</u>	200
1958	43	26	26	95
1959	93	20	7	120
1960	57		<u>/3</u>	57
1961 <u>/4</u>	108	39	<u>/3</u>	147

- /1 Incomplete survey made below falls because of unfavorable water conditions.
/2 First year Jackson Creek counted.
/3 Time and water conditions did not allow counts to be made in Jackson Creek.
/4 SCUBA divers used for the first time.

Table 8

Silver Salmon Spawning Ground Counts on Tributaries
of the Lower Umpqua and Smith Rivers, 1961-62

Stream	Miles	Water	Adults	Jacks	Unknown	Total
Scholfield Creek	2.00	clear	35	26	35	96
Miller Creek	0.75	clear	6	2	10	18
Alder Creek	0.25	clear			5	5
Dry Creek	0.25	clear	1	1	4	6
Otter Creek	1.00	clear	9	9		18
Buck Creek	3.50	clear	23	2		25
Mehl Creek	3.00	clear	9	2		11
Beaver Creek	2.00	clear	8	1		9
Johnson Creek	1.25	clear	1	2		3
Dean Creek	1.25	clear	14	4		18
Spencer Creek	4.50	clear			2	2
Little Paradise Creek	2.00	milky	1			1
Big Paradise Creek	3.50	clear				0
Brush Creek	1.50	milky				0
East Weatherly Creek	1.25	clear				0
Totals	28.00		107	49	56	212

Table 9

Comparative Spawning Ground Count Data on Selected
Lower Umpqua and Smith River Tributaries
1945-56 through 1961-62

Year	Miles Surveyed	Number of Adults	Total Salmon	Per Cent 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
1960-61	28.00	51	81	37.0	1.8	2.9
1961-62	28.00	108	213	31.0	3.9	7.6

/1 Observations were hampered on certain streams by high water conditions.

Table 10

Fall Chinook Spawning Counts for 1961-62

Stream	Miles	Water	Adults	Jacks	Unknown	Total
North Fork Smith River	0.50	clear	18	12		30
Big Paradise Creek	3.50	clear				0
Buck Creek	3.50	clear	12	2		14
Mill Creek	1.25	milky			2	2

Tenmile Lake tributary spawning ground counts for silver salmon reveal an increase of 101 per cent over the 1960-61 counts. The total Tenmile Lakes silver salmon run for 1961-62, exclusive of Eel Lake, is calculated to be 18,973 fish of which 44 per cent, or 8,348, were jacks. Fish per mile increased from 174 in 1960-61 to 356 in 1961-62. Tenmile Lake counts are presented in Table 11.

A decrease in salmon numbers was noted in the Eel Lake tributaries over 1960-61. Eel Lake counts are presented in Table 12.

Of the 5,253 spring chinook counted over Winchester Dam, 212 fish were

examined for marks. Between April 17 and September 6, 33 fish, or 15.6 per cent, were marked. Eight and two-tenths per cent of the sport catch were marked.

Table 11

Counts of Silver Salmon on Selected Tributaries
of the Tenmile Lakes System, 1961-62

Stream	Miles	Water	Adults	Jacks	Unknown	Total
Menegat Creek	0.75	clear	2	2	2	6
Murphy Creek	1.50	clear	299	344	35	678
Wilkins Creek	1.00	clear	83	43		126
Noble Creek	1.25	clear	323	203	6	532

Table 12

Eel Lake Tributary Counts for 1961-62

Stream	Miles	Water	Adults	Jacks	Unknown	Total
Main Right Fork	0.50	clear	2	2	2	6
Main Left Fork	0.75	clear	33	21	4	58
Cabin Fork	0.25	clear	51	25	1	77
Swamp Fork	0.25	clear	2			2

Eighteen, or 5.5 per cent, of the 328 winter steelhead examined crossing Winchester were marked summer steelhead. The first mark observed was on November 16, 1960 and the last on February 20, 1961. Marked summer steelhead made up 20.8 per cent of the winter steelhead anglers' creel.

There were 500 summer steelhead examined at Winchester in the period April 17 to October 12, 1961. Of these, 120 fish, or 24 per cent, were marked. Marked fish made up 25 per cent of the summer steelhead anglers' creel.

The winter steelhead season was characterized by poor water conditions, increased angling pressure, and a decline in success. Totals for the upper Umpqua fishery were projected for the second consecutive year and a comparison of the totals given in Table 13. The 7,729 angler trips and 1,009 fish harvested represent an 18 per cent increase in pressure and 24 per cent decrease in catch from 1960. Creel sampling results for the upper and lower areas are presented in Table 14.

Angler success for winter steelhead in Tenmile Creek was slightly lower than that recorded in the Umpqua system. The 34 anglers checked averaged 0.06 fish caught at the rate of 50 hours per fish. A marked Umpqua summer steelhead was observed in a Tenmile Creek angler's creel.

Scale samples from fish in the 1960-61 winter steelhead fishery indicated a lower than normal number of four-year-old adults. Sixty per cent of the fish, as shown in Table 15, were of this age group rather than the average 72 per cent.

Table 13

A Comparison of Calculated Catch for the Upper Umpqua
Winter Steelhead Fishery, 1959-60 and 1960-61

Year	Angler Trips	Steelhead		Total	Hours per Fish
		Unmarked	Marked		
1959-60	6,541	1,187	149	1,336	19.7
1960-61	7,729	788	221	1,009	25.3

Table 14

Creel Sampling Results for Umpqua Winter Steelhead
November 1960 - February 1961

Area	Anglers	Steelhead	Fish per Angler	Hours per Fish
North Umpqua	1,280	112	0.09	25
Upper main Umpqua	672	42	0.06	33
Lower main Umpqua	332	28	0.08	33
Smith River	54	7	0.13	25
Totals and Average	2,338	189	0.08	

Table 15

Winter Steelhead Brood Year Contribution
to Umpqua Fishery, 1956-1961,
Expressed in Percentages

Winter Fishery	Brood Year							
	1951	1952	1953	1954	1955	1956	1957	1958
1955-56	23	77						
1956-57 ^{/1}								
1957-58		5	28	65	2			
1958-59				18	82			
1959-60				3	23	74		
1960-61					6	32	60	2

^{/1} No sample taken.

Repeat spawners made up 22 per cent of the 1960-61 winter steelhead catch as indicated by scale samples. The percentage was approximately the average for the last six seasons as is shown in Table 16.

Table 16

A Comparison by Season of Winter Steelhead Repeat Spawners, 1956-1961

Season	First Time Spawners		Repeat Spawners		Total Fish		Per Cent of Run Repeat Spawners
	Females	Males	Females	Males	Females	Males	
1955-56	18	13	3	1	21	14	11.4
1956-57 ^{/1}							
1957-58	26	20	9	2	35	22	19.3
1958-59	13	14	6		19	14	18.2
1959-60	39	37	17	10	56	47	26.2
1960-61	23	16	8	3	31	19	22.0
Totals	119	100	43	16	162	116	21.2

^{/1} No sample taken.

The number of anglers fishing summer steelhead continues to increase. Table 17 illustrates that adults of hatchery origin made up 24.9 per cent of the total harvest, but nearly 47 per cent of the harvest in the bait area. The hatchery smolts are released in the lower portion of the bait area. The 1961 harvest was slightly over 28 per cent of the run.

Table 17

North Umpqua Summer Steelhead Fishery, 1958-1961

Area	Year	Angler Trips	Steelhead		Fish per Angler	Fish per Hour	Per Cent of Run Harvested
			Number	Per Cent Marked			
<u>Bait</u>							
	1958	363	163		0.45	0.11	7.6
	1959	1,162	308	65.8	0.27	0.07	14.2
	1960	1,727	351	72.9	0.20	0.07	12.3
	1961	1,816	440	46.8	0.24	0.08	13.5

<u>Fly</u>							
	1958	1,847	709		0.38	0.07	33.1
	1959	1,553	374	4.7	0.24	0.05	17.2
	1960	1,639	239	6.3	0.15	0.04	8.4
	1961	2,015	476	4.6	0.24	0.06	14.6

<u>Totals</u>							
	1958	2,210	872		0.39	0.07	40.7
	1959	2,715	682	33.3	0.25	0.05	31.4
	1960	3,366	590	45.9	0.18	0.05	20.7
	1961	3,831	916	24.9	0.24	0.07	28.2

Spring chinook season opened with high and muddy water conditions and fishing pressure was extremely light during the first two weeks of the season. The season ended with no pressure on the lower river and heavy pressure on the North Umpqua. Angler pressure and success were up over 1960, but lower than in 1958 and 1959. The harvest of 547 fish represented approximately 10 per cent of the run, or about the average annual harvest as shown in Table 18.

Table 18

Umpqua Spring Chinook Fishery, 1958-1961

Year	Anglers	Adult Chinook	Jacks	Fish per Angler	Hours per Fish	Per Cent of Run Harvested
1958	6,060	487	28	0.08	71.4	11
1959	6,991	675	83	0.11	52.6	18
1960	4,883	352	56	0.08	58.8	10
1961	5,463	492	55	0.10	45.5	10

Salmon angling success at Winchester Bay during the summer of 1961 increased appreciably over that of 1960. Statistical analysis reveals the total catch to have increased from 9,004 in 1960 to 27,672 in 1961. This is the second highest catch recorded at Winchester Bay, being exceeded only by the 1957 catch of 49,789. Angler trips recorded rose to 34,889, second highest on record. Catch by species increased from 2,414 chinook and 6,590 silvers in 1960 to 3,903 chinook and 23,769 silvers in 1961.

One hundred and fifty-five marked salmon were checked during the summer as compared to 69 in 1960. The marked fish consisted of 48 chinook, of which 13 were of possible Umpqua River origin, and 107 silvers. Several Fish Commission spaghetti-tagged fish were checked.

Statistics for the fishery from 1952 through 1961 are presented in Table 19.

The lower Umpqua River fall salmon fishery was fair. Anglers averaged 0.45 fish per trip at the rate of 58.8 hours per fish. All fish observed were in good condition.

The Tenmile Lakes fall salmon fishery was fair but only about six weeks in duration. The salmon were delayed until high water, then moved through the outlet and lake very rapidly and on to the spawning grounds. Anglers averaged 0.11 fish per trip at the rate of 33.3 hours per fish.

Angler success for striped bass in the lower river increased over 1960. Angling was good in late April, but tapered off through the summer. Table 20 shows that anglers averaged 0.35 fish per trip. Many small fish were taken in late spring, with fewer but larger fish during the summer. A 56-pound striped bass was weighed at Winchester Bay.

Sturgeon was opened to angling in the Umpqua River by legislative action after being closed for 15 years. Considerable angling pressure was observed immediately following the opening, but then declined. Anglers averaged 0.22 fish

Table 19

Winchester Bay Salmon Angling Effort and Catch, 1952-1961

Year	Boat Trips			Angler Trips			Number of Salmon			Average Weight (Pounds)		Pounds of Salmon Harvested	Salmon per Angler	Pounds of Salmon per Angler
	Pleasure Craft	Charter	Total	Pleasure Craft	Charter	Total	Chinook	Silver	Total	Chinook	Silver			
1952	7,324	1,397	8,721	19,189	10,375	29,564	4,124	14,387	18,511	18.0	9.0	203,715	0.63	6.89
1953	3,890	909	4,799	9,531	6,255	15,786	1,517	9,440	10,957	16.0	9.0	107,159	0.69	6.79
1954	4,935	1,282	6,217	12,345	9,515	21,860	6,262	13,913	20,175	14.0	9.0	212,885	0.92	9.74
1955	5,561	906	6,467	14,380	7,003	21,383	7,019	8,194	15,213	13.0	8.0	153,834	0.71	7.19
1956	4,583	1,355	5,938	12,188	10,955	23,143	6,291	17,546	23,837	17.0	8.0	247,315	1.03	10.69
1957	8,471	2,625	11,096	25,104	20,725	45,829	3,440	46,349	49,789	17.0	7.0	384,948	1.09	8.40
1958	5,956	1,619	7,575	8,246	11,625	19,871	4,232	10,779	15,011	13.0	9.0	118,508	0.76	5.96
1959	2,949	1,433	4,382	8,198	9,859	18,057	2,788	8,297	11,085	13.0	7.0	91,084	0.61	5.04
1960	3,581	1,413	4,994	9,705	9,382	19,087	2,414	6,590	9,004	12.1	7.4	78,151	0.47	4.09
1961	6,861	2,181	9,042	19,622	15,267	34,889	3,903	23,769	27,672	17.8	9.0	293,354	0.79	8.41

per trip as shown in Table 21. Most of the green sturgeon measured between 4 and 5 feet, with the largest at 68 inches and 95 pounds.

Table 20

Lower Umpqua Striped Bass Fishery, 1961

Number of Anglers	Striped Bass Caught	Fish per Angler	Hours per Fish
376	130	0.35	10.0

Table 21

Lower Umpqua Sturgeon Fishery, 1961

Number of Anglers	Sturgeon Caught	Fish per Angler	Hours per Fish
154	34	0.22	25

Trout

Bottom samples were taken at Diamond Lake following the procedures established the two preceding years. The samples indicated a production of 114 pounds of fish food per acre as compared to the 171 pounds per acre obtained in 1960. Table 22 compares food production since 1954. It is felt that the 1961 volume of food fish organisms would have been essentially the same as in 1960 if the loss of vascular plants had not been so great, or had taken place at a later time. Table 23 presents a comparison of individual organisms collected in the bottom samples for the last three years.

Table 22

Bottom Food Production at Diamond Lake, 1954-1961

Sample 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
October	1960	170.7
October	1961	113.6

Table 23

Number and Percentage by Number of Animals in Bottom Samples,
Diamond Lake, 1959-1961

Species	Number			Percentage		
	1959	1960	1961	1959	1960	1961
Shrimp	3,338	4,526	1,621	66.3	56.3	53.8
Midge	481	1,635	618	9.5	20.3	20.5
Aquatic Worms	220	243	87	4.4	3.1	2.9
Leeches	571	779	194	11.3	9.7	6.4
Mayflies	265	54	7	5.3	0.7	0.2
Caddis	121	40	17	2.4	0.5	0.6
Snails, damsels, etc.	39	758	469	0.8	9.4	15.6

Gill net samples in Diamond Lake confirmed the observation that the yearling group of fish is not present in numbers to support a good fishery in 1962. Yearlings made up less than 7 per cent of the gill net sample and less than 4 per cent of the anglers' creel. Tables 24 and 25 compare length frequency of fish taken in the gill nets and by the anglers for the last two years. Table 26 illustrates that the average length and weight of 1961 trout were greater than in 1960.

Table 24

Length Frequency of Angler-Caught Rainbow
at Diamond Lake, 1960-1961

Year	Size Groups in Inches Illustrated in Per Cents								
	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22+
1960	3.5	14.5	9.8	13.1	37.6	15.5	3.9	1.4	0.7
1961	0.1	0.5	2.6	19.3	44.8	23.3	7.7	1.5	0.2

Table 25

Length Frequency of Gill Net-Caught Rainbow
at Diamond Lake, 1960-1961

Year	Size Groups in Inches Illustrated in Per Cents							
	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22
1960	1.3	14.7	40.0	29.3	1.3	10.7	2.7	
1961		6.7		6.7	13.3	33.3	33.3	6.7

Table 26

Average Lengths and Weights of Rainbow at Diamond Lake, 1960-61

Year	Method Sample Collected	Average Length (Inches)	Average Weight (Ounces)
1960	Anglers Creel	13.6	20.4
	Gill Net	12.2	14.7
1961	Anglers Creel	15.3	25.5
	Gill Net	16.5	35.5

The opening weekend at Diamond Lake was considered the best since 1956 with anglers averaging almost four fish per trip. Table 27 shows that anglers averaged one fish per trip, or about the average catch in the six years following treatment. Kelts and gravid fish made up less than one per cent of the creel during the first month. Angler success dropped rapidly after the third week in June, and the catch per unit of effort was very poor in the past three weeks in August. Angling conditions suffered from an extreme algae and floating Anacharis problem. Secchi disc readings went from 38 feet on July 18 to less than 6 feet on August 21. Angler success picked up after Labor Day when large fish that had spawned in the spring began entering the creel in greater numbers. Success did not reach normal fall levels owing to the absence of yearlings. Over 51 per cent of the anglers at the lake failed to catch a single fish. The month of October contributed approximately 5 per cent of the effort and harvest.

Table 27

Summary of Diamond Lake Catch Statistics, 1956-1961

Year	Angler Trips	Trout Caught		Catch per Surface Acre (Pounds)	Average Weight of Fish (Pounds)	Hours Angling per Fish	Fish per Angler
		Number	Pounds				
1956	34,706	61,430	60,876	20.0	0.99	2.09	1.77
1957	52,625	55,077	60,578	20.6	1.10	4.89	1.05
1958	42,969	46,883	67,512	23.0	1.44	4.74	1.09
1959	27,834	22,602	38,204	13.2	1.69	5.45	0.81
1960	37,360	33,520	43,241	14.9	1.29	4.82	0.90
1961	39,270	35,177	55,931	19.3	1.59	5.65	0.90

Trotting was by far the most popular and successful method employed at the lake in 1961. Table 28 illustrates that almost 76 per cent of the effort and over 83 per cent of the harvest was achieved by trotting.

Use of the U. S. Forest Service camps at Diamond Lake was down from the record year of 1960. The campgrounds were opened to free use late in September. Table 29 lists the public use of the campgrounds since 1956.

Four gill nets set in Lemolo Reservoir caught 54 rainbow, 42 brown, 2 brook trout, and 6 roach. The 11 rainbow from the 1960 plant averaged 13.0 inches

in length, while the 43 rainbow from the 1961 fingerling plant averaged 8.4 inches. The fact that roach made up 6 per cent of the catch in 1961 compared to 60 per cent in 1960 is thought to be due to the time of sampling. The 1961 sample was taken in November and the 1960 sample in August. The gill net samples for the last five years shown in Table 30 indicate a rise in roach and a decline in brook trout.

Table 28

Methods of Fishing at Diamond Lake, 1961

Method	Number of Anglers in Sample	Fish per Angler	Per Cent of Effort in Lake	Per Cent of Harvest from Lake
Troll	4,594	1.2	75.9	83.1
Combination	857	0.5	14.2	7.0
Bait	502	1.1	8.3	8.4
Fly	82	1.0	1.4	1.2
Bank	15	1.0	0.2	0.3

Table 29

Public Use, Diamond Lake Pay Camps, 1956-1961

Year	Number of People
1956	29,775
1957	40,616
1958	38,729
1959	31,173
1960	96,770
1961	79,806

Table 30

Gill Net Samples from Lemolo Reservoir, 1957-1961

Year	Total Fish	Per Cent of Sample				Average Length in Inches		
		Br	Rb	EB	Roach	Br	Rb	EB
1957	263	31	4	51	14	13.9	11.9	9.6
1958	108	25	17	57	1	14.0	16.8	10.6
1959	60	63	2	15	20	12.6	8.0	7.9
1960	241	20	19	1	60	14.2	6.1	7.8
1961	104	40	52	2	6	13.0	9.3	9.3

Two gill nets in Toketee Reservoir caught 34 brown and 11 rainbow trout. The browns averaged 11.7 inches in length. The rainbows were from the 1961 fingerling plant and averaged 6.6 inches in length. Table 31 shows the average length of the brown and rainbow trout over the past five years.

Table 31

Gill Net Samples from Toketee Reservoir, 1957-1961

Year	Total Fish	Per Cent of Sample				Average Length in Inches		
		Br	Rb	EB	Roach	Br	Rb	EB
1957	44	100				12.7		
1958	69	65	33	2		12.7	8.5	10.0
1959 ^{/1}								
1960	60	93	2		5	11.0	16.0	
1961	45	76	24			11.7	6.6	

^{/1} No sample taken.

Gill nets were set in Mill Creek in an attempt to determine the migration of planted rainbow from Loon Lake. Three marked rainbow were taken plus 48 other fish. The remaining fish were 26 squawfish, 13 suckers, 4 cutthroat, 2 largemouth bass, 1 spent steelhead, 1 brown trout, and 1 dace.

The fish population of Wasson Lake, a five-acre lake north of Scottsburg, was sampled. A good population of cutthroats in excellent condition was found in the lake.

Two attempts were made to collect perch in the inlets to North and South Tenmile Lakes to determine their predation on young salmon. A young-of-the-year salmonid had been consumed by one of the 25 perch captured.

Trout angling pressure on the North Umpqua was down on opening weekend, but the total pressure for the season showed an increase over previous years. The completed angler averaged 2.69 fish per trip and trout were caught at a rate of 0.83 fish per hour. Table 32 shows that the 1961 season yielded more trout than was harvested in any of the previous four years.

Table 32

Trout Angling Pressure and Success on the North Umpqua, 1958-1961

Year	Angler Trips	Total Fish Harvested	Fish per Angler	Fish per Hour
1958	11,112	30,200	2.72	0.75
1959	10,169	32,361	3.18	0.86
1960	15,362	43,784	2.85	0.78
1961	16,617	44,699	2.69	0.83

The anglers on the North Umpqua harvested almost 39,000 hatchery rainbow, or 47 per cent of the number stocked in 1961. The anglers' creel was made up of 87 per cent hatchery rainbow, 12 per cent 6 to 8-inch steelhead, and 1 per cent native trout. Table 33 gives the composition of the anglers' harvest for the last four years.

Table 33

Composition of North Umpqua Trout Anglers' Creel, 1958-1961

Year	Total Harvest	Hatchery Rainbow	Steelhead (6-8 Inches)	Migrant Chinook	Native Trout		
					Ct	Rb	Br
1958	30,200	19,450	9,242		551	870	87
1959	32,361	24,253	7,566	93	279	153	17
1960	43,784	36,878	6,106	40	447	299	14
1961	44,699	38,964	5,306		243	93	93

Opening weekend success was good to excellent in the three major North Umpqua reservoirs. Rainbow from the 1960 fingerling plants were present in all three reservoirs in higher numbers than in 1960. Rainbows made up almost 71 per cent of the Lemolo creel compared to 28 per cent in 1960. Rainbow fingerling from 1961 summer plants began entering the creel in September. Creel sampling results for the reservoirs are presented in Table 34.

Table 34

Creel Sampling Results for Trout in North Umpqua Reservoirs, 1961

Impoundment	Anglers	Rb	EB	Br	Fish per Angler	Fish per Hour
Lemolo #2 Forebay	12			4	0.33	0.12
Soda Springs	72	76		86	2.25	0.63
Toketee	208	45		263	1.48	0.44
Lemolo	585	700	15	276	1.69	0.59
Totals and Averages	877	821	15	629	1.67	0.51

The coastal lake opening was highly successful. Loon Lake produced a calculated harvest of 5,542 trout by 1,005 anglers on opening weekend. The catch was 80 per cent hatchery rainbow and 20 per cent native cutthroat. Heavy angling pressure was present at Eel Lake with good success. The improved success was the result of a plant of 5,000 legal cutthroat. Anglers made good catches at Tenmile Lakes and Saunders Lake early in the season, but success declined sharply as summer progressed. Creel sampling results for the lower Umpqua are presented in Table 35.

Warm-Water Game Fish

Two gill nets set in North and South Tenmile Lakes in March caught 66 yellow perch, 8 brown bullhead, 3 silver salmon, 2 cutthroat, and 1 migrant steelhead. The perch were all about to spawn and averaged 6.75 inches fork length. The bullheads averaged 9 inches and were in the III to V age classes.

Table 35

Trout Angling Effort and Catch for Lower Umpqua District, 1961

Lakes and Streams	Anglers	Species			Total Fish	Per Cent Marked	Fish per Angler	Fish per Hour
		Rb	Ct	Sil				
<u>Lakes</u>								
Tenmile	186	273	59	7	339	98	1.82	0.55
Loon	326	777	355		1,132	68	3.47	1.07
Eel	235		598	2	600	63	2.55	0.83
Saunders	18		46		46	100	2.56	0.70
Marie	35		190		190	100	5.43	1.76
Hall	12		12		12		1.00	0.48
Edna	4		1		1		0.25	0.10
Wasson	1		2		2		2.00	1.00
Lake Totals and Averages	817	1,050	1,263	9	2,322	74	2.84	0.89

<u>Streams</u>								
Smith River	88		247		247		2.81	0.75
Mill Creek	14	4	1		5	80	0.36	0.31
Tenmile Creek	8	2	3		5	100	0.63	0.63
Yellow Creek	2		8		8		4.00	1.33
Stream Totals and Averages	112	6	259		265	3	2.37	0.74

Two gill nets in Beale Lake, a sand dune lake near Hauser, caught 94 yellow perch, 21 bluegill, 3 black crappie, 2 warmouth bass, and 1 largemouth bass. Bullheads have been reported by anglers but none were taken in the nets. The yellow perch were all mature and ranged between 5 and 7 inches in length. Length frequency of fish taken in the gill nets is presented in Table 36.

Non-Game Marine Species

The pursuit of non-game marine species is increasing each year at Winchester Bay and has become an integral part of the summer salmon fishery. Many anglers failed to bring in a salmon but landed some form of bottom fish. A minimum number of fish appear to be wasted. Table 37 illustrates the tremendous increase in fish checked between 1960 and 1961.

Habitat Improvement

The North Umpqua was mapped after traveling between Winchester and Soda Springs by car, boat, and on foot in order to designate possible areas of fish mortality from fluctuations caused by COPCO power plant operations. The sampling program was initiated June 30. The study area was 65 miles in length and contained 58 sample sections. Table 38 gives a description of the six basic areas of loss.

Table 36

Composition of Length Frequencies of Catch by Gill Nets in Lakes and Streams
of the Lower Umpqua District, 1961

Water	Species	Total Fish	Per Cent of Total	Average Length (Inches)	Number in Two-Inch Size Groups					
					4-6	6-8	8-10	10-12	12-14	Over 14
Tenmile Lakes	YP	66	82.5	6.8	1	65				
	St	1	1.3	9.0			1			
	BrB	8	10.0	9.0			8			
	Sl	3	3.7	6.5		3				
	Ct	2	2.5	10.0			1	1		
Beale Lake	YP	94	77.7	5.7		34				
	BG	21	17.4	6.0	60		1			
	BC	3	2.5	8.0	14		2			
	Wm	2	1.6	7.0		2				
	LB	1	0.8	14.0					1	
Mill Creek	Sg	33	55.9	9.5		4	11	8	7	3
	Su	13	22.0	13.7			1	3	3	6
	LB	4	6.8	8.8			4			
	Ct	3	5.1	10.0			2	1		
	Rb	3	5.1	10.0				3		
	St	1	1.7	25.0						1
	Br	1	1.7	8.0			1			
	D	1	1.7	6.0		1				

Table 37

Non-Game Marine Fishery, Winchester Bay, 1960-61

Year	Total Fish	Species				
		Rockfish	Lingcod	Flounder	Halibut	Others
1960	95	48	9	30	5	3
1961	2,320	1,603	443	251	10	13

Table 38

Basic Loss Areas in North Umpqua Fluctuation Studies, 1961

Area	Miles of River	Number of Sample Sections	Miles per Sample
(A) Winchester-Whistlers Bend	10	14	1.5
(B) Whistlers Bend-Freer Bridge	5	9	1.5
(C) Freer Bridge-Clay Creek	15	9	1.5
(D) Clay Creek-Archie Creek	15	8	0.5
(E) Archie Creek-Steamboat	2	2	4.0
(F) Steamboat-Soda Springs	18	16	2.0
Totals	65	58	11.0

Table 39 illustrates the mortality observed in the sampling period.

Table 39

Fish Mortality Observed in North Umpqua Fluctuation Study
June 30 - September 19, 1961

Family/Area	A	B	C	D	E	F	Total Fish
Salmonidae	13	20	11	14	232	24	314
Cyprinidae	31	7	10	1			49
Catostomidae	11	4	23	6	4		48
Gasterosteidae	13	5					18
Cottidae		1	1	1	2	5	10

Thermographs were installed on upper Umpqua tributaries in cooperation with the U. S. Fish and Wildlife Service and Douglas County Water Resources engineer. The data will be used to evaluate influences on water quality by proposed dams in the upper Umpqua drainage. The stations are located as follows:

1. South Umpqua above Jackson Creek
2. South Umpqua near Tiller
3. South Umpqua at Winston
4. Jackson Creek above mouth
5. Elk Creek near Drew
6. Cow Creek near Azalea
7. Cow Creek below Riddle
8. Myrtle Creek above mouth
9. Olalla Creek near dam site
10. Calapooya Creek near Hinkel dam site

The charts were removed once a week and sent to the Fish and Wildlife Service.

Considerable time was spent checking on logging activities, road construction, and bridge construction. Twelve road and bridge construction projects were investigated. Governmental agencies concerned with timber sales and road construction continue to improve their assistance in safeguarding the fishery resource. A summary of stream clearance activities is presented in Table 40.

Table 40

Stream Clearance Activity in the Umpqua River Basin, 1961

Stream	Tributary to	Problem and Corrective Measures Taken
Big Paradise Creek	Umpqua River	Log jam removed by Game Commission personnel
Herb Creek	Smith River	I. P. logging debris removed before release from BLM timber sale contract
Russell Creek	Smith River	I. P. logging debris removed before release from BLM timber sale contract
Sweden Creek	Smith River	Logging debris removed before release from BLM timber sale contract
Oar Creek	Schofield Creek	Cascade Plywood logging debris removed upon notification from Game Commission
Pass Creek	Steamboat Creek	Decking logs in stream removed upon notification to BLM by Game Commission
Waggoner Creek	Umpqua River	I. P. logging debris removed upon notification from Game Commission
Yellow Creek	Smith River	Logging debris removed upon notification to BLM by Game Commission

ROGUE RIVER AND SOUTH COASTAL DISTRICT

Cole M. Rivers and Arvo G. Riikula

Fish Culture

The Medco rearing reservoir near Butte Falls was drained and equipped with regulatory structures. Dead storage, potholes, and tributary systems were chemically treated to rid the waters of native trout and bullheads. The 70.5 surface-acre impoundment reached normal pool level in early February, and 114,000 unfed summer steelhead fry were stocked in May. Satisfactory growth was recorded through the summer and fall. Many of the bullheads apparently escaped the treatment because by midsummer they appeared in abundance. Competition from the catfish reduced the growth rate of steelhead. Predation losses from mergansers, grebes, and kingfishers lowered the population of steelhead. Facilities have been completed to collect the steelhead when they become ready for seaward migration.

Two hundred adult spring-run steelhead were successfully trapped from the Gold Ray ladder and transferred to the Butte Falls holding pond in July and August. These fish will provide fry for the 1962 stocking of Medco Pond. Thirty-two adult steelhead were lost through handling and hauling in July. Columnaris and shock are suspected as the causes.

Salmon Unlimited's Libby Creek Pond near Gold Beach was stocked with 50,000 silver salmon fry by the Fish Commission. Personnel from the Fish and Game Department of Oregon State University conducted periodic limnological and growth rate studies. Their investigations indicated that the physical conditions of the pond are adequate for rearing silvers or fall chinook. A shortage of larger food organisms did not appear to materially limit growth. Significant losses from large cutthroat trout were thought to occur as they did in 1960. A leak in the dam lowered the surface level below that of full capacity, and an increase in water temperature resulted. The low storage could also have increased the losses from predatory birds.

Fish Distribution

Streams of the Rogue basin received 130,000 legal-size and 11,000 fingerling rainbow. Lakes and reservoirs were stocked with 964,000 fingerling rainbow, 46,000 yearling rainbow, 57,000 brook trout fingerlings, and 100,000 kokanee fry. Warm-water reservoirs were planted with 43 pre-spawning adult and 15,300 fingerling largemouth black bass. Marking studies were continued with the release of 56,000 spring chinook salmon and 58,000 summer steelhead.

South coastal streams received 11,500 yearling rainbow and 1,000 yearling cutthroat. Lakes in this area were planted with 29,500 rainbow and 2,000 cutthroat.

A few heavy losses occurred during attempts to plant rainbow fingerlings in some of the lower lakes of the Rogue district in July and August while surface water temperatures were over 80° F. Tempering techniques were developed to reduce the losses.

Legal-size rainbow were not adequately distributed throughout some of the stream sections of the upper Rogue, particularly in June when liberation schedules became overcrowded. A good return was obtained, but by a limited number of anglers.

Fish Inventory

Anadromous

Various factors have resulted in the good runs of steelhead that have been enjoyed on the Rogue in recent years. A few important ones are: (1) tributary recovery from damaging logging, (2) ideal stream flows for hatching and rearing through a series of mild winters, (3) a screening program at Savage Rapids Dam in 1958, and (4) the cumulative effect of an aggressive stream protection program throughout the watershed since 1948.

The unusually high return of "half-pounder" steelhead in 1959 suggested that the Savage Rapids screens might be paramount among the suspected factors because the fish in this run would have been the first group to have benefited from their protection. The 1961 spring chinook appeared in unexpected numbers, and they were the first group of chinook that received protection from the turbines at Savage Rapids.

Counts at Gold Ray Dam

Good numbers of all runs of salmon and steelhead were counted at the Gold Ray station. The spring chinook run was 176 per cent of its parent run.

The count of winter steelhead of the 1960-61 run was 132 per cent of the previous ten-year average and 156 per cent of the previous five-year average. The 1961 summer-run count was 34 per cent and 101 per cent of the average counts for the ten and five-year averages.

The 1960 run of silver salmon over Gold Ray was 172.2 per cent of its 1958 parent run.

Table 41 presents the annual counts of anadromous fish over Gold Ray since 1942. Table 42 compares the chinook and silver salmon with their respective parent runs.

Spawning Bed Surveys

No redd count surveys were made on the Rogue, but observations of preferred spawning bars indicated that the spring chinook used areas higher in the watershed than usual, and the fall chinook run appeared to be weak.

Spawning Ground Survey, South Coast Streams

The total count of fall chinook and chinook redds indicated an improvement over that of 1960 and similar to the initial survey in 1959. An average of 71.3 redds per mile indicated a 47.1 per cent increase over 1960 but a 9.5 per cent decrease as compared to 1959. The average tally of 28.0 fish per mile showed an increase of 11 per cent over 1960 and 14.6 per cent over 1959.

A large run of chinook in the Floras Creek drainage resulted in a shortage of spawning area. On the preferred bars, superimposition of redds was quite common. In addition to the number of redds counted, 35 redds were observed on bars not covered during normal winter flows.

Table 41

Counts of Anadromous Fish Runs Over Gold Ray Dam

Year	Spring Chinook		Silvers		Steelhead	
	Number	Percentage of Jacks	Number	Percentage of Jacks	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	371	4.8	905	4,755
1960	26,217	23.8	1,851	5.1	1,223	7,535
1961	33,035	17.2	232 <u>/1</u>	0.8 <u>/1</u>	1,391	9,604

/1 Incomplete.

Table 42

Percentage 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	1956	88.4
1960	1956	87.5	1957	172.2
1961	1957	176.0	1958	^{/1}

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

^{/1} Incomplete.

The Chetco River and tributaries appear to have suffered a sharp decline in the spawning chinook migration. The total count of redds on the Chetco sample areas fell 43 per cent below the three-year average, while the total count of fish was 36 per cent below. A three-year comparison of fish and redds per mile is presented by stream in Table 43.

Salmon Catch

Sport anglers spent 28,106 angler-days on the lower Rogue to catch 8,351 salmon. Catch success averaged 0.30 fish per angler-day for the season which extended from March 25 to November 30. Angler-day effort and catch success are compared with previous data by months in Table 44.

The total catch of spring chinook from the lower Rogue was 17 per cent over that of 1960, 32 per cent above that of the 1957 parent run, and 3 per cent above the 12-year average. The catch peaked on May 7 with a take of 210 fish. Figures 1 and 2 compare the daily catch through March, April, and May with that of the 1957 parent run and the average for the previous ten years.

Table 43

Fall Chinook Spawning Survey

Stream	Redds per Mile			Fish per Mile		
	1959	1960	1961	1959	1960	1961
<u>Floras Creek</u>						
Floras Creek	164.0	34.0	292.0	40.0	18.0	32.0
Willow Creek	94.0		142.0	12.0		50.0
<u>Sixes River</u>						
Crystal Creek	118.0	22.0	42.0	9.0	1.0	8.0
Edson Creek	210.0	67.0	79.0	75.0	26.0	13.0
Dry Creek	155.0	84.5	218.0	137.0	209.5	190.0
<u>Elk River</u>						
Anvil Creek	104.0	34.0	106.0	24.0	10.0	100.0
Elk River No. 1	64.0	13.5	8.5	10.0	0.5	2.0
Elk River No. 2	32.0	4.0	2.4	6.0	2.4	2.4
Elk River No. 3		0.0	0.0		1.0	0.0
<u>Pistol River</u>						
Deep Creek	0.0	28.0	36.0	0.0	4.0	10.0
<u>Chetco River</u>						
Jack Creek	158.0	108.0	57.0	6.0	16.0	5.0
Quail Prairie Creek	34.0		0.0	4.0		0.0
South Fork Chetco	49.0	20.0	5.0	5.0	7.0	0.0
<u>Winchuck River</u>						
East Fork Winchuck	19.0	63.0	76.0	7.0	26.0	7.0
Wheeler Creek	4.0	15.0	5.0	0.0	3.0	0.0
Totals	1,205.0	493.0	1,068.9	335.0	324.4	419.4

Fewer salmon boards were used for spring chinook salmon fishing in the Savage Rapids to Grave Creek section of the Rogue, but because of good angling, the available boards were heavily used. A total of 43 boards was inventoried as compared to an average of 72 since 1948. A record for 9 salmon boards shows that anglers caught 223 salmon. Shore casters took 174 from the section of stream between the Savage Rapids deadline and Pierce Riffle.

The catch of spring chinook from the upper Rogue above Gold Ray was exceptionally high. The 1961 catch may have been between 30 and 40 per cent greater than the accurately computed catch of 1,825 fish made in 1958. The increased use of salmon eggs for catching spring chinook in this area is creating a sharp rise in annual harvest.

The catch of fall salmon on the lower Rogue was 7 per cent above that of 1960 but 42 per cent below the 1957 parent run and 27 per cent below the 12-year average. The change in the physical features of the mouth of the river from harbor improvements did not appear to alter the ratio of catch, but the manner in which the fishery was pursued changed in that most fishing was done by trolling in the bay instead of from "hog lines".

Table 44

Lower Rogue River Salmon Catch and Angler Success by Months, 1957 to 1961,
With 12-Year Averages (1950-1961)

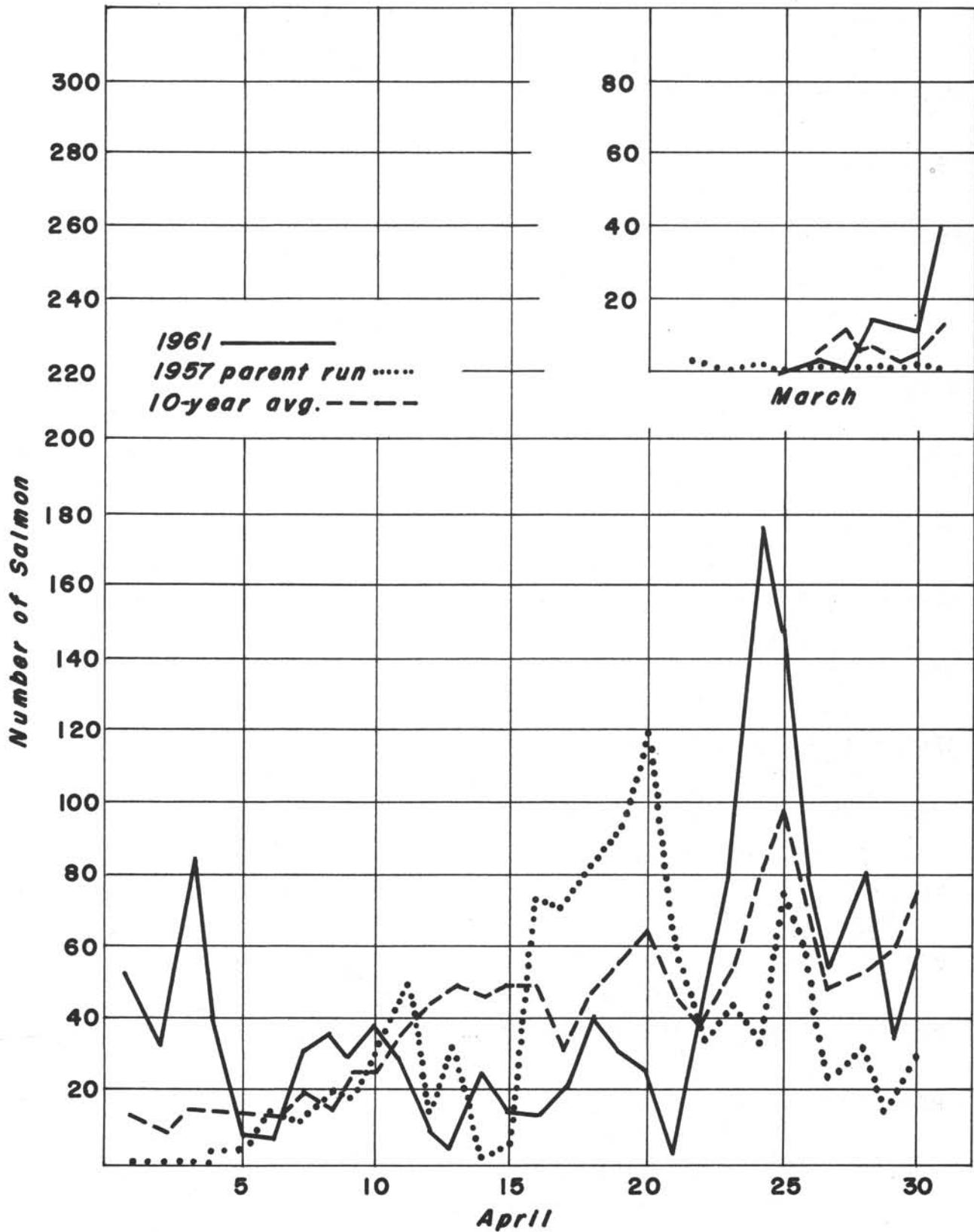
Month	Catch			Angler-Days		Fish per Angler-Day	
	1957	1960	1961	1961	12-Year Average	1961	12-Year Average
<u>Spring Season</u>							
March	2	35	83	135	331 <u>1</u>	0.62	0.13 <u>1</u>
April	1,083	1,313	1,380	5,816	5,455	0.24	0.24
May	1,366	1,363	2,258	8,215	6,132	0.28	0.28
June	142	159	142	590	1,522	0.24	0.28
July	686	603	575	2,337	2,725	0.25	0.25
August <u>2</u>	534	828	578	2,161	2,144	0.27	0.31
Spring Totals and Averages	3,813	4,301	5,016	19,254	18,309	0.26	0.27
<u>Fall Season</u>							
August <u>3</u>	1,224	647	849	2,663	3,087	0.32	0.30
September	3,103	1,236	1,431	4,667	5,782	0.30	0.42
October	1,442	1,151	995	1,426	1,821	0.70	0.64
November	10	89	60	126	142 <u>1</u>	0.48	0.37 <u>1</u>
Fall Totals and Averages	5,779	3,123	3,335	8,882	10,832	0.38	0.42
Season Totals and Averages	9,592	7,424	8,351	28,136	29,141	0.30	0.33

1 Ten-year average -- 1952 to 1961, inclusive.

2 August 1 to 15.

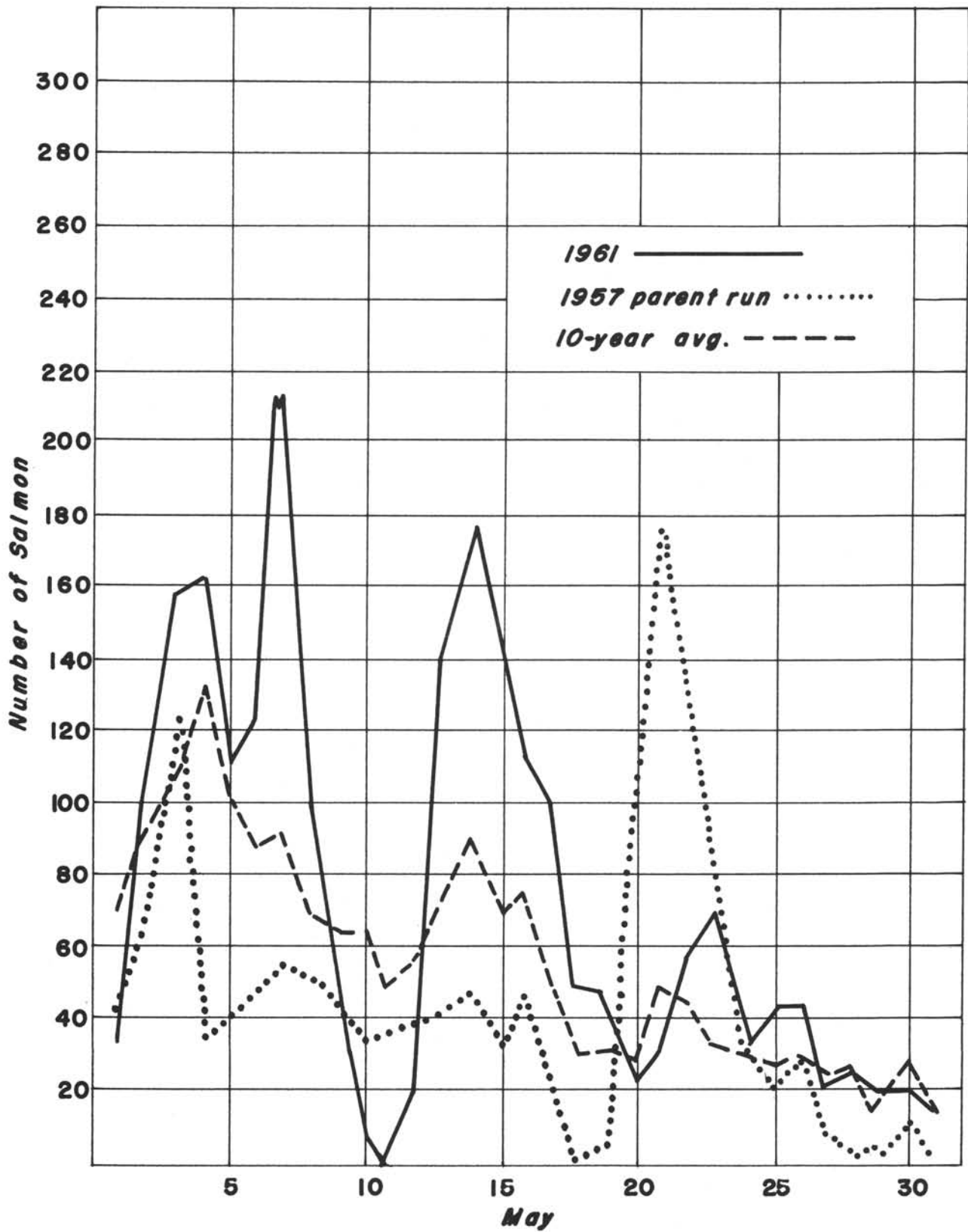
3 August 16 to 31.

Figure 1



DAILY SPRING CHINOOK SALMON
CATCH, LOWER ROGUE RIVER

Figure 2



DAILY SPRING CHINOOK SALMON
CATCH, LOWER ROGUE RIVER

Weight of Salmon Catch

The total weight of angler-caught salmon from the lower Rogue was 121,693 pounds. This figure falls below the 1960 weight of 123,423 pounds and that of the 12-year average of 165,766 pounds. Average weight of salmon through the spring season was 17.5 pounds and for the fall season 12.1 pounds, with an over-all average of 14.5 pounds. The large number of jacks that appeared in the combined salmon-steelhead fishery from August through November resulted in a small average weight for the fall season. Table 45 presents a monthly tabulation of the lower river salmon catch.

Table 45

Average Weight and Pounds of Salmon Caught by Month,
Lower Rogue River, 1961

Month	Fish	Sample		Computed Total Pounds ^{/1}
		Weight in Pounds	Average Weight per Fish (Pounds)	
March	31	614	19.8	1,643
April	854	15,617	18.3	25,254
May	1,370	20,991	15.3	34,522
June	79	1,318	16.7	2,371
July	345	6,058	17.6	10,120
August	912	12,957	14.2	20,263
September	285	3,897	13.7	18,746
October	632	5,338	8.4	8,348
November	26	184	7.1	426
Totals and Average	4,534	66,974	14.8	121,693

^{/1} Based upon total computed fish from cannery data times average weight per fish.

Catch Census Evaluation

An angler interview program was started in August to determine the accuracy of using cannery data to compute the total salmon catch on the lower Rogue. The method currently in use is based upon a survey made by the U. S. Fish and Wildlife Service in 1951 in which 80 per cent of the catch was found to appear at the canneries for canning, shipping, or storage. Approximately 10 per cent of the total catch was sampled in the recent study to recheck the rates at which fish are taken to the canneries. The data indicates that catches calculated from the old rates in recent years are low. The results of the recent survey and their application to the cannery data are compared in Table 46 with total catch figures that were obtained with the old method. The actual catch of salmon made on the lower Rogue in August through November could have been 16.4 per cent greater than reported.

Hatchery Salmon Study

An evaluation of hatchery-reared salmon on the Rogue was continued in 1961. Best adult returns continue to be from those releases made (1) in the middle and

upper sections of the basin, (2) after the last high water, and (3) from groups of fish that have been comparatively free of disease at the hatchery.

Table 46

Salmon Catch Destination

Month	Recent Survey		Computed Total Catch	Computed Total Catch by Present Method ^{/1}
	Catch Interviews	Percentage to Canneries		
August	154	72.5	1,561	1,427
September	128	74.2	1,522	1,431
October	132	66.6	1,188	995
November	8	37.5	126	60
Totals and Average	422	62.7	4,397	3,913

^{/1} 80 per cent of total catch appearing at canneries. Method used from 1951 to and including 1961.

Forty-two marked spring chinook adults were found at the canneries on the lower Rogue up to June 1. The hatchery fish were 2.44 per cent of the total catch. Total computed hatchery fish in the total known spring run was 896, which is the second largest return that has been recorded since this study was started in 1949.

In addition, seven marked spring chinook were found in the catch between June and September. Five of these were two-year-old jacks which did not appear to be immature feeders because they showed advanced sexual development.

The 1961 releases of the marked chinook were made in Big Butte Creek in December and March to continue the evaluation of the effects of high water upon the rate of survival. A small group of chinooks that was released here in December 1953 gave unusually high returns.

Steelhead Catch

Catches of the various runs of steelhead from the Rogue ranged from low to high. The 1960-61 winter runs in the Applegate and Illinois Rivers produced only a fair fishery while those in the Rogue offered some excellent angling. Little angler effort was expended for the 1961 spring-run steelhead on the upper Rogue.

The fall run has produced four consecutive years of good to excellent angling, but the total fish taken in 1961 did not equal those catches made in 1959 or 1960. For reasons unknown, the fish passing through the lower river were reluctant to take flies. Best catches were made on worms or eggs. Because of the escapement of fairly large numbers of fish from this run through the lower river, excellent catches were made in the Galice to Grants Pass area.

Various census studies were made throughout parts of the Rogue basin. Table 47 compiles the assorted information on steelhead catch through the 1961 seasons.

Table 47

Steelhead Catch Studies, Rogue River, 1960-61 Season

Run	Stream and Area	Month	Anglers Interviewed	Fish per Hour	Fish per Angler	Hours per Fish	Computed Angler- Days	Computed Total Catch
<u>Winter</u> <u>Steelhead</u>	Rogue River							
	Hellsgate to Grave Creek	December to February	825		0.18		8,443	1,521
	Applegate River							
	Mouth to Little Applegate	February	787	0.04	0.24	27.1	3,528	464
	Rogue River							
<u>Fall</u> <u>Steelhead</u>	Agness to Illahe	January February	54 14	0.21 0.17	0.68 0.93	4.8 5.9		
	Illinois River							
	Illinois Falls area	January February	17 91	0.07 0.09	0.35 0.31	14.2 11.8		
	Rogue River							
	Agness to Illahe	September ¹ / ₁ October ¹ / ₁ November	67 139 66	0.33 0.18 0.07	0.92 0.55 0.26	3.0 5.4 13.8		
<u>Fall</u> <u>Steelhead</u>	Rogue River							
	Gold Beach to Agness	August ¹ / ₁ September ¹ / ₁ October ² / ₂ November ¹ / ₁	198 529 223 131	0.18 0.26 0.19 0.13	0.50 1.08 0.61 0.51	5.6 3.8 5.2 7.8		

¹/₁ Includes incidental catch of salmon.
²/₂ Includes 21 per cent catch of salmon.

Based upon the occurrence of fish found at the canneries, the total catch of fall steelhead from the lower Rogue was estimated to be 5,693. This figure is below the catch of the previous three years, but it compares favorably with the nine-year average of 5,564 fish. Annual computed total catches since 1952 are compared in Table 48.

Table 48

Fall Steelhead Catch, Lower Rogue River

Year	Catch ^{/1}
1952	4,764
1953	- - -
1954	5,069
1955	3,074
1956	4,175
1957	3,112
1958	7,200
1959	9,853
1960	7,133
1961	5,693

^{/1} Total catch from cannery data which is estimated to represent 60 per cent of total catch.

A special creel census on fall and winter runs of steelhead was started in September on the lower Rogue from Illahe to Gold Beach. Largest catches of steelhead in the basin are made from this section of the river and little is known of the fishery. Total angler-days and total catch of steelhead will be computed from the study which will continue through February 1963.

Hatchery Spring-Run Steelhead

Four hundred and ninety-three Rogue steelhead were examined for marks that identify hatchery-released spring-run steelhead. Marked fish were found returning as adults at various times of the year. Most of them were returning with the fall run in September and October as "half-pounders". Only one was found with the main spring run. This fish, a 20 $\frac{1}{4}$ -inch specimen, appeared at Gold Ray in July on its second spawning run. Its first return to the river appeared to have been made with the fall run as a "half-pounder".

Table 49 lists the groups of steelhead that were examined for marks during the various studies on the Rogue. The over-all ratio of hatchery stock to wild fish was 1:60.6. The hatchery fish averaged 16.3 inches in length with a range from 12.0 to 20.3 inches. Scale studies showed that the 12 to 15-inch fish were generally following a life history pattern in which the first year is spent in fresh water (hatchery growth); entrance to salt water occurs in spring of its second year followed by four to five months at sea before returning in September or October on its first spawning run. All but one of the 17 to 21-inch specimens were found to be of the same pattern, but they were returning to spawn the second time in their third year of life. The one exception was an 18 $\frac{1}{2}$ -inch female which had spent two years in fresh water (one in the hatchery), and one full year at sea before returning to spawn the first time.

Table 49

Return of Marked Hatchery-Released
Spring-Run Steelhead, Rogue River

Month	Location	Fish Examined		Ratio of Hatchery to Wild
		Marked	Total	
April	Savage Rapids	0	22	0 : 22
July	Gold Ray	1	185	1 : 184
August	Gold Ray	0	57	0 : 57
September	Lower canyon	2	44	1 : 21
	Galice	0	6	0 : 6
	Agness	1	29	1 : 28
October	Lower canyon	1	41	1 : 40
	Agness	2	45	1 : 21.5
November	Galice	1	42	1 : 41
	Agness	0	22	0 : 22
Totals and Average		8	493	1 : 60.6

Wild Spring-Run Steelhead

The group of spring-run steelhead examined at Gold Ray was made up of 78 males and 121 females. The males averaged 20.02 inches in length and the females 20.09 inches.

Catch of Downstream Migrant Steelhead

When the trout season opened, from three to four thousand juvenile steelhead from 7 to 10 inches in length were being counted through a trap at Gold Hill each day. Through the first week, creels of anglers fishing the sections of the Rogue below Gold Hill were found to contain only 2.6 per cent of these wild migrants.

Trout

Angler use of the trout seasons followed the usual pattern for the coastal district. Angling pressure was heavy during the first few days but tapered off to a negligible level throughout the summer and fall. Table 50 illustrates angling pressure and catch success for that early part of the coastal trout fishery. Good runs of sea-run cutthroats in the fall months were virtually untouched in most of the small streams.

All lakes of major importance in the Rogue district are producing fish at good levels. Objectives of the program are to help meet the problem of increased numbers of fishermen and to divert angler pressure away from the

streams, particularly those with anadromous fish. Much progress can be reported in this direction. In 1950 about 20 per cent of the basin's annual expenditure of angler-days effort was on lakes and reservoirs and 80 per cent on the streams. In 1960 the distribution of total angler pressure was conservatively estimated to be about fifty-fifty.

Table 50

Trout Creel Census, South Coast District

Water	Number of Anglers	Hours Fished	Number of Fish	Fish per Hour	Marked Hatchery Fish
Bradley Lake	2	3	3	1.00	3
Floras Lake	37	83	78	0.94	73
Garrison Lake	54	156	191	1.22	173
Brush Creek	35	112	122	1.09	122
Chetco River	77	158	213	1.35	188
Elk River	31	86	33	0.38	0
Euchre Creek	9	29	2	0.07	0
Floras Creek	14	23	14	0.61	13
Hunter Creek	16	20	11	0.55	11
Sixes River	4	6	2	0.33	0
Winchuck River	10	46	24	0.52	21
Totals and Average	289	722	693	0.96	604

Rogue basin lakes and reservoirs produce high catch ratios in late April, through May, and into early June. General slumps occur in late July and August. The catch rates that prevailed in September and October 1961 equalled, and at some lakes excelled, those levels established in the spring peak of angling.

Table 51 presents the results of creel census work on various lakes and streams. Particular attention is focused on a comparison of angler success in the spring months with that of the midsummer slump.

Table 52 shows the results of population sampling with gill nets at some of the lakes in the Rogue district.

Howard Prairie Reservoir is proving to be one of the outstanding bodies of water for fishing in the district. The major attraction in 1961 was the unusually high rate of catch of large, fast-growing rainbow trout. Rainbow that were stocked as 2-inch fingerlings in 1960 were being found in the early 1961 catch as 9 to 11-inch fish. Fingerlings planted in 1959 were being taken this season as 14 to 18-inch fish. Five and seven-pound trout could have been those of the initial 1957 and 1958 plants or from wild fish indigenous to the area before impoundment. Only about 20 per cent of the dam's potential storage was reached this season. At the present rate of impounding, the present high level of fish production can be expected to continue for at least another ten years.

Table 51

Creel Census of the Trout Fishery, Rogue Basin Lakes and Streams, 1961

Water	Month	Anglers	Hours Fished	Catch		Fish per Hour	Fish per Angler	Hours per Fish
				Number Fish	Percentage Over 12"			
<u>Lakes and Reservoirs</u>								
Howard Prairie Reservoir	April	202	876	1,061	16.3	1.21	5.3	0.8
	May	105	282	567	28.1	2.01	5.4	0.5
	July	60	148	29	25.0	0.20	0.5	5.1
Fish Lake	April	219	640	1,017	8.3	1.59	4.6	0.6
	July	57	152	80	9.0	0.53	1.4	1.9
Willow Creek Reservoir	April	83	267	250 <u>1</u>	1.6	0.94	3.0	1.1
	May	92	235	163 <u>2</u>		0.69	1.8	1.5
	July	58	170	28 <u>3</u>		0.16	0.5	6.1
Selmac Lake	May	35		191	0.7		5.5	
	June	31	90	21	0.0	0.23	0.7	4.3
<u>Streams</u>								
North Fork Rogue	July	20	26	19	0.0	0.73	1.0	1.4
Rogue -- Gold Hill to Grants Pass	May	54	160	70	0.0	0.44	1.3	2.3
Applegate River	June	36	142	64	0.0	0.45	1.8	2.2

¹/₁ Kokanee represented 0.08 per cent of catch.²/₂ Kokanee represented 11.0 per cent of catch.³/₃ Kokanee represented 21.4 per cent of catch.

Table 52

Composition and Length Frequency of Game Fish Taken by Gill Nets,
Lakes, Rogue District, 1961

Lake or Reservoir	Month	Number of Sets	Species	Number Fish Taken	Length in Inches															
					5	6	7	8	9	10	11	12	13	14	15	16	17	18	20 & Over	
Howard Prairie Reservoir	August	1	Rb	9						1	1	1	1	4				1	1	
Willow Creek Reservoir	April	5	Rb K	101 43	4	34 1	45	8	2	4	3							1		
Big Squaw Lake	August	4	Rb Ct BrB BG	15 32 33 8 <u>1</u>				1 4 2 1	3 2 1	4 7		7								
Tannen Lake	August	2	EB	27				4	7	2	10	3	1							
East Tannen Lake	August	1	EB	12			1	2	1	4	3	1								
Selmac Lake	April	2	Rb Ct St Sil BrB	53 3 1 3 1	1	8	8	16	17	3										
						2	1	1												

¹ Two fish 3 inches and six fish 4 inches.

Kokanee salmon began entering the catch at Willow Creek Reservoir in 1961. Percentage of kokanee in creels increased from 0.08 per cent in April to 34.0 per cent in September. They made up 30.1 per cent of the catch of gill nets in April at which time they averaged 8.8 inches in length and ranged from 6.25 to 9.5 inches. A spawning run of three-year-old fish appeared in Willow and Bieberstedt Creeks, tributaries to the reservoir. The run started on a high runoff period in late November. The spawners averaged 12.2 inches in length with a range from 11.0 to 13.2 inches. Total spawning population was estimated to be 700 fish. There is a shortage of gravel because most of the suitable material is either sealed in a clay bottom or too shallow. Beaver dams limited upstream migration in one tributary and efforts to clear them for fish passage were futile.

McMullen Creek Dam was completed by Josephine County in the late fall of 1960. When filled, the impoundment contained 146 surface acres. It was dedicated in late June and named Selmac Lake. Twenty thousand legal-size rainbow were stocked in December. Catches on the opening of the 1961 season were good but declined to a mediocre level soon after. Surface water temperatures remained near 80° F. through most of June, July, and August. Catches improved measurably in late September and October. Rainbow trout will be planted to provide angling through the next few seasons until a warm-water fishery can be established. An initial stock of largemouth black bass has been introduced.

The development of a warm-water fish population in Squaw Lake was studied to determine if the trout fishery is in jeopardy. Bluegills and crappies were illegally introduced in 1957 or 1958. Gill net catches in August were made up of 8.8 per cent bluegills and 35.5 per cent bullheads. The remaining catch was of rainbow and cutthroat trout. All rainbow and some of the cutthroat were found with large numbers of bluegill and crappie fry in their stomachs. The trout were in excellent condition.

Warm-Water Game Fish

Good warm-water fishing is being enjoyed in a number of ponds and reservoirs throughout the Rogue basin. In order to divert angler pressure from streams containing juvenile anadromous fish, warm-water fish will play an increasingly important part in the Rogue's management program.

The ponds on the Camp White Management Area are providing a fairly large number of angler-days of warm-water fishing. However, they are used most heavily when trout fishing is closed or unproductive.

Selmack Lake, Hyatt Reservoir, and Emigrant Lake were provided with initial stocking of largemouth black bass. Bluegills will be introduced later. Trout are being used in the three impoundments to provide angling through the period that will be required for the warm-water fish populations to assume the fishing load.

Marine Fishes

The new jetties at the mouth of the Rogue have proved to be a boon to bank anglers. Even though most attraction is to salmon fishing from the north jetty, anglers through the summer months enjoyed excellent catches of surf perch from both jetties. Fishes observed in the creels included chinook salmon, cutthroat trout, green sturgeon, lingcod, two species of surf perch, tomcod, herring, surf smelt, rockfish (black snapper), the ever-present marine cottids, and three striped bass.

Habitat Improvement

Fish Passage

Salmon and steelhead utilized the new side-lateral to the Gold Ray fishway over all other entrances that were available at various water elevations. For the first time since the new dam was completed in 1941, few, if any, fish accumulated below the fishways.

The Illinois Falls fish ladder was not completed. The contractor was still working on some of the final stages of the project when the first high water occurred. A misunderstanding caused a delay in the removal of the stop logs to activate the ladder, and fall steelhead, fall chinook, and silvers were largely blocked from passing over the Illinois Falls.

The renovated Oak Street diversion dam on Bear Creek near Ashland created a block to steelhead. The new dam had been completed under provisions of the Talent Project of the Bureau of Reclamation without plans or appropriations for a ladder. Federal obstacles were overcome, plans were prepared, and the ladder was rushed to completion before the winter runs of steelhead arrived.

After four years of negotiation, a fish ladder was finally obtained over the Farmers Ditch Company diversion dam on the Little Applegate River. The structure was completed in October.

A fish ladder was ordered for the Santella Trout Farm diversion dam on Slate Creek near Wilderville. It was also completed in October.

The Oregon Highway Commission was urged to install baffles in their concrete box culverts on Jones, Galls, and Kane Creeks near Grants Pass and Gold Hill. No progress has been made to correct the existing fish passage problems.

A stream barrier was placed by landowners in Sixes River to divert the river into its original channel. Blockage to fish was alleviated when heavy rains returned the river to its original bed.

A barrier to fish was formed on Elk River in the winter of 1960-61 when a recently constructed timber-sale access road slid into the river. The removal of the slide in October improved fish habitat.

Twenty-eight adult unspawned steelhead were removed from the Rogue above Grants Pass by buckets of the Grants Pass Sand and Gravel Company. The investigation indicated that the fish were probably "caught by the buckets" after being buried by cave-ins of the borrow trench on the bottom of the river.

Screens and Turbines

The screen guides of the Link-Belt screens at Savage Rapids were enclosed in an attempt to encourage more seaward migrants to accept and enter the bypass ports. The possible escapement of fish past the screens through bolt holes was also eliminated. Reduced numbers of fish appeared in the high-line ditches after the work, but the losses suffered by chinook migrants through impingement seemed to have continued at the same rates as those measured in the 1959 and 1960 studies.

The California-Oregon Power Company, now a division of the Pacific

Power and Light Company, shut down its plant at Gold Ray through the prescribed five-week period between May 10 and June 13 to reduce the loss of downstream migrants.

The louvers at the Gold Hill plant of the Ideal Cement Company were again found only partially effective for bypassing seaward migrants from the turbine system. In May the structure was found to be diverting 52.2 per cent of the steelhead migrants, and in June 71.3 per cent of the chinook migrants. The Company was ordered to drastically alter or completely replace the louvers with a more acceptable protective device.

Silt Control

Unusually heavy loads of silt were released regularly through the winter and spring months to the Rogue near the town of Rogue River from a gravel borrow crushing and washing operation by the Peter Kiewit and Sons Construction Company. Large settling basins were ordered and obtained by the State Sanitary Authority, but draining and spilling of the ponded waters continued at night. At one time the Oregon Highway Commission was requested to have the plant shut down. The damage to fish life could not be accurately assessed, but the gravel bars located downstream to Robertson Bridge were accumulating moderately heavy amounts of the silt. Fishing for winter steelhead and spring salmon was seriously handicapped by the turbid water.

The effects of another gravel washing plant operated by the Roy Houck and Sons Construction Company on Footh Creek near the town of Rogue River was kept to a minimum with the use of a partially effective settling basin. Silt deposits in the channel of Footh Creek were moderately heavy, but the Rogue below the confluence of the creek was not damaged.

Increased placer mining activity on Grave and Galice Creeks seriously reduced angler use of the winter steelhead fishing in the middle and lower sections of the Rogue. Sportsmen were successful in their efforts to seek an appropriation from the 1961 legislature which would permit the Governor to reactivate the Rogue River Coordination Board.

A section of the new Gold Beach-Agness road caused a large dirt and rock slide into the Rogue River. The road had been surveyed across a near-vertical rock face. Heavy silt loads occurred in the Rogue River until the slide became stabilized.

Chemical Treatment

Rehabilitation of Hyatt and Emigrant Reservoirs was started as a part of the over-all fishery development of the Talent Project of the Bureau of Reclamation. Drainage work afforded the opportunity to reduce overcrowded populations of warm-water game fish.

A large, stunted population of warm-water fish was eliminated from Hyatt Reservoir. White crappies predominated. After draining reduced the impoundment to 100 acre-feet of dead storage, 22 gallons of liquid rotenone were used to kill the remaining fish. Numerous potholes and mud flats were sprayed with the toxicant.

Chemical treatment of Emigrant Reservoir was not necessary in view of the fact that most warm-water species died in potholes.

Largemouth black bass and crappies escaped into Little Hyatt Reservoir when the main basin above was drained. To prevent reinfestation of the main reservoir with undesirable species, the 13.1-acre impoundment was chemically treated with 100 gallons of liquid rotenone in January. The kill was fairly complete with the exception of bullheads.

Pollution

Western States Plywood Corporation was suspected to have disposed of glue wastes in Elk River as it did in 1960. Investigation revealed a definite evidence of fish kill but to a lesser degree than previously. The Curry County Sanitary Engineer is continuing negotiations to eliminate this source of pollution.

Periodic kills of game fish occurred in the ponds on the Camp White Management Area and in Jones and Skunk Creeks near Grants Pass from releases of glue wastes from plywood plants.

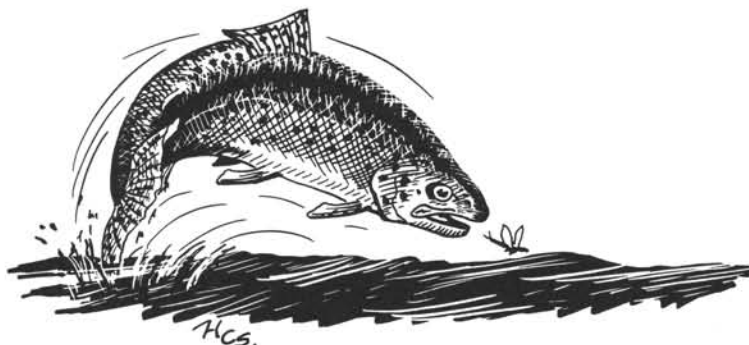
Miscellaneous

Disease and Parasites

Two short periods of fish loss from Chondrococcus columnaris infections were noticed in the main channel of the Rogue. There was a light mortality of adult chinook in the middle river in May and a moderate loss of both juvenile and adult salmon and steelhead in the lower river in July and early August.

A nematode which is believed to be Philametra was present in the flesh of adult salmon and steelhead on the Rogue in above normal abundance through most of the season from May through October.

A moderate infestation of tapeworms has been found in rainbow and cutthroat trout at Squaw Lake.



UPPER WILLAMETTE DISTRICT

Ralph L. Swan

Fish Distribution

The 1961 allocation of rainbow for the McKenzie River was divided into three releases rather than two as in the past. As a result, better catches were made in the late summer months than in previous seasons.

Because of the lack of wild fish in the Middle Fork of the Willamette, liberations were made at two-week intervals throughout the fishing season.

The annual stocking of fingerling rainbow in Dorena Reservoir was discontinued because of the growing bass population.

Fish Inventory

Anadromous

McKenzie River

Spring chinook arrived earlier, and in larger numbers, than they did in 1960. State Police reported checking 150 anglers who had taken 53 salmon.

As in previous years, spring chinook gathered in the Leaburg and Walterville powerhouse tailraces. Water manipulation served to move some of them out into the river but many of the fish remained in or near the tailraces throughout the summer.

An unscheduled repair project on the Leaburg power canal necessitated the diversion of 1,500 c.f.s. of water into the McKenzie River between Leaburg Dam and the Leaburg powerhouse at the height of the spring chinook spawning season. Over 100 salmon were observed in the affected area but none of the redds were left above the river when the water was turned back into the canal.

Water was not turned into the Cedar Flat or Coburg irrigation ditches until mid-June, thus avoiding the possible loss of downstream migrant chinook earlier in the season.

A spawning survey was conducted on the South Fork of the McKenzie River with personnel of the U. S. Fish and Wildlife Service to determine the amount of spawning that occurred in the section of the river between Cougar Dam and the proposed regulating dam at the Strube site. Little spawning gravel was observed in the area and only 30 redds were found, most of them in the vicinity of the trapping facility.

Calapooya River

A February freshet caused the loss of the lower portion of the fish ladder over the Thompson Flour Mill dam on the Calapooya River. The ladder was temporarily repaired with sand bags and large rocks to allow an estimated 1,500 steelhead to pass over the dam.

In accordance with his water right, the owner diverted the entire flow

of the Calapooya River into his power canal early in June. SCUBA divers were instrumental in the salvage of 13 chinook and 2 steelhead that were left in the pool below the dam.

The old, narrow, two-step ladder was replaced with a wider, four-step structure in August by the owner.

Trout

Creel census data gathered in the district will be found in Table 53. It was noted that angling pressure was heavier on the high Cascade lakes than in the past. Many of the more remote lakes that had been lightly fished before were fished regularly in 1961.

A high lakes survey crew spent two months in the district visiting the remaining unsurveyed lakes. Few lakes suitable for stocking were found.

Although Dorena Reservoir was opened to year-around angling in February, fewer fish were taken there than in 1960. Most of the trout taken were over ten inches in length, indicating a poor survival of the 1960 fingerling plant. It is believed that the large number of largemouth bass in the reservoir accounted for the loss of the fingerlings. As in other years, little angling took place on the reservoir in the summer months. See Table 54.

In addition to the total trout catch, it is estimated that 7,000 largemouth bass and 3,000 brown bullhead were taken.

A few large rainbow were taken from Lookout Point Reservoir early in the season but the catch rate dropped as the reservoir filled. The trout catch was also light at Dexter Reservoir in spite of a plant of 6,000 legal rainbow. Of interest was a landlocked chinook salmon weighing seven pounds that was taken from Dexter Reservoir. An examination of a scale sample revealed that the fish was four years old. There was little difference in the growth rate from one season to another. The salmon is believed to be one used by the Oregon Fish Commission several years ago in fish passage experiments at Lookout Point Reservoir.

The Long Tom River below Fern Ridge Dam provided some good trout angling but was out of condition most of the winter because of storms and high discharges from Fern Ridge Reservoir.

The McKenzie River provided good angling throughout the season. See Table 55. Anglers reported releasing many undersized rainbow, indicating good natural reproduction. Some muddy water occurred as a result of dam construction but not to the extent it did in 1960. Reports were received from seven McKenzie River guides whose patrons released 98 rainbow over 14 inches in length, or one for every 32 fish kept.

Traps were installed in the ladders on the Leaburg Dam the last week in March and removed the second week in May. They took 97 rainbow over 14 inches in length and 113 under 14 inches. Of the 97 rainbow over 14 inches, 94.8 per cent were mature. Of the 113 rainbow under 14 inches, 37.2 per cent were mature. The only other fish taken were 4 cutthroat.

Table 53

Creel Census, Upper Willamette District, 1961 Season

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Lakes																
Aerial	EB		5										5	4	6	0.83
Benson	Rb		5										5			
	EB	6	11										17 22	4	16	1.38
Betty	Rb	1	6	7	2								16	5	28	0.57
Blair	EB			1									1	4	3	0.33
Blue	Rb		5	3	1	1							10	4	20	0.50
Bongo	EB		2	2	9	1							14	11	32	0.44
Burnt Top	EB	1	13										14	6	12	1.17
Clear	Rb	91	931	526	52	7							1,607			
	Ct		2	1		1							4			
	EB	12	13	1									26 1,637	810	3,523	0.47
Demude	EB			1									1	2	2	0.50
Easternbrook	EB	4	29		2								35	9	43	0.81
Eddeeleo (Lower)	Rb	3	4		5	2						1	15			
	EB		50										50 65	8	18	3.61
Eddeeleo (Upper)	Rb	3	13	25	8								49	18	82	0.60

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Edna	Rb	10										10	5	17	0.59	
Elbow	EB	2										2	3	2	1.00	
Emma	Rb		7									7	2	16	0.44	
Ermabelle (Lower)	Rb	11	32	51	4	1	1					100	103	469	0.21	
Ermabelle (Middle)	Rb	2	38	50	11							101				
	EB			2								$\frac{2}{103}$	70	236	0.44	
Ermabelle (Upper)	Rb	20	11									31	10	45	0.69	
Fir	EB			1								1	2	2	0.50	
Fisher	EB	7										7	2	2	3.50	
Gander	Rb		2									2	6	12	0.17	
Gold	Rb	5	42	97	36	31	9	5				225	210	907	0.25	
Hand	EB		3	2	1	2	2					10	13	25	0.40	
Hart	EB	30	10	2								42	6	80	0.53	
Harvey	-											0	5	5	0.00	
Hemlock	-											0	1	1	0.00	
Herb	EB						1					1	2	1	1.00	
Hidden	Ct	26	34	8								68	24	92	0.74	

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Horse (Lower)	Ct	9	6									15	2	5	3.00	
Horse (Upper)	EB	101	134	28	3							266				
	Rb		1			1						<u>2</u> 268	73	203	1.32	
Huckleberry	EB		2	5	2	3						12	9	46	0.26	
Indigo	Rb		2	23	20							45	6	39	1.15	
Kiwa	Rb	3	14	6	6	1						30	20	34	0.88	
Linton	EB	2	27	5	1							35				
	Br		1		12							<u>13</u> 48	57	259	0.20	
Marylin (Lower)	EB	1	1		1							3	14	53	0.06	
Marylin (Upper)	EB	2	5	10	13	24						54				
	Rb			1								<u>1</u> 55	61	318	0.17	
Mickey	Rb	3	3									6	1	2	3.00	
Midnight	Rb	6	6									12	3	17	0.71	
Mink	EB	10	14	6								30	6	48	0.63	
Mud	Rb	9										9				
	EB	5	4									<u>9</u> 18	5	12	1.50	
Opal	EB	4	15	9	8							36	25	72	0.50	

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Otter	EB	1	8	5	2	8							24	15	62	0.39
Platt	Rb		1	3	2								6	10	19	0.32
Porky	Rb		2										2	2	2	1.00
Quinn (Upper)	EB		4	10									14	3	6	2.33
Reflection	EB											1	1	2	2	0.50
Rigdon (Lower)	Rb		12	1	4	9	1	2					31			
	EB					8	1						9	17	67	0.60
Round	Rb			7									8			
	EB		8	4	3								15	11	27	0.85
Ruth	EB	4	4	5									13	16	24	0.54
Salmon (Lower)	Rb					2							2	6	10	0.20
Salmon (Upper)	EB	3	39	123	80	30	13	1					289	52	233	1.24
Scott	EB	3	2										5	4	10	0.50
Separation	Rb				3								3	3	9	0.33
Skookum	EB	2											2	4	11	0.18
Spirit	EB	1	51	9	2								63	9	22	2.86
Spring	Rb	10	1										11	2	4	2.75
Spy	-												0	2	3	0.00

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Sunrise	Rb	1											1			
	EB			2									2			
Sunset	-												3	5	6	0.50
													0	3	4	0.00
Timpanogas (Lower)	Rb	9	22	18	4								53			
	EB	12	22	13	5								52			
													105	45	170	0.62
Timpanogas (Upper)	Rb	5	1	1	1								8			
	EB	2	1		1								4			
													12	8	44	0.27
Wahana	Rb		15	3	3	2		2					25	18	42	0.60
Waldo	Rb	2	2	15	41	37	13	1					111			
	EB				5	3							8			
													119	200	1,109	0.11
Whig	Rb		2										2			
	EB					4		1					5			
													7	2	6	1.17
<u>Reservoirs</u>																
Cottage Grove	Rb	1	1	3	7	2							14			
	Ct			1									1			
	LB	3	11	3		1							18			
	BG		7										7			
	BLB		1	8	2								11			
													51	71	209	0.24

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Dexter	Rb Ch		3 2	7	4	1						14 <u>3</u> 17	67	145	0.12	
Dorena	Rb Ct Ch LB BLB	23 1 20 17	518 1 230 67	490 32 16	344 7	30	13					1,418 1 1 282 <u>107</u> 1,809	603	2,167	0.84	
Fern Ridge	Rb Ct BG LB WC BLB															

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Camp Creek	Rb		1										1	5	16	0.06
Coyote Creek	Ct	6	5	1									12	3	11	1.09
Fall Creek (Big)	Rb	9	116	66	7								198			
	Ct	5	4		2								<u>11</u>			
													209	119	393	0.53
Fall Creek (Little)	Rb	14	6	1									21			
	Ct	1											<u>1</u>			
													22	9	27	0.82
Ferguson Creek	Rb	1											1			
	Ct	5	2										7			
													<u>8</u>	8	24	0.33
French Pete Creek	Rb		1										1			
	Ct	5	4										<u>9</u>			
													<u>10</u>	3	12	0.83
Hills Creek	Rb	8	31	29	2								70	27	57	1.23
Horse Creek	Rb	6	14	2									22			
	Ct	11	7										<u>18</u>			
													<u>40</u>	17	77	0.52
Laying Creek	Rb	5	23	11									39			
	Ct	5											<u>5</u>			
													<u>44</u>	17	36	1.22
Leaburg Canal	Rb	2		1									3	4	7	0.43
Long Tom River	Rb	6	5	6	4								21			
	Ct		17	4	2								26			
	LB	2	14	24	7								50			
	BC	11	2										13			
	WC	89	117	64	5								275			
	BLB	9	50	11	1								<u>71</u>			
													<u>456</u>	183	438	1.04

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish Per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Lost Creek	Rb	40	31									71				
	Ct	35	15	2								52	48	124	0.99	
												123				
McKenzie River	Rb	513	1,392	610	42							2,557				
	Ct	13	4	4	1	1						23				
	ChS										6	6				
	Wf			1								1				
												2,587	717	3,081	0.84	
McKenzie River (South Fork)	Rb	39	168	50	2							259				
	Ct	12	1									13				
												272	122	356	0.76	
Mohawk River	Rb	4										4				
	Ct	3	4									7	29	64	0.17	
												11				
Mosby Creek	Rb		13		1							14	3	12	1.17	
Parsons Creek	Ct	2	2									4	2	2	2.00	
Portland Creek	Ct	9										9	6	22	0.41	
Roaring River	Ct	18	2									20	4	12	1.67	
Row River	Rb	26	32	8	17	1						84				
	Ct	1										1				
												85	42	195	0.44	
Salmon Creek	Rb	44	71	50	2							167				
	Ct	18	4									22				
	Wf		1									1				
												190	89	220	0.86	

Table 53 (continued)

Lake or Stream	Species	Number of Fish by Two-Inch Size Groups										20 & Over	Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Salt Creek	Rb	32	181	89	6							308				
	Ct	3	8									<u>11</u> 319	141	288	1.11	
Sharps Creek	Rb	12	78	12								102				
	Ct	3	2	1								<u>6</u> 108	40	84	1.29	
Shotgun Creek	Rb	4										4	3	6	0.67	
Staley Creek	Rb	10	68	10	1							89				
	Ct	1										<u>1</u> 90	21	78	1.15	
Swift Creek	Rb	6	12	6								24	4	12	2.00	
Willamette River (Coast Fork)	Rb	9	9	11	38	8	1					76				
	Ct	15	8	4	3							<u>30</u> 106	61	218	0.49	
Willamette River (Middle Fork)	Rb	199	1,176	441	15							1,831				
	Ct	2	6	2		1						<u>11</u> 1,843	620	1,739	1.06	
	Ch		1									<u>1</u>				
Willamette River (North Fork)	Rb	44	200	66	9	1						321				
	Ct	18	22									<u>40</u> 361	178	495	0.73	
Winberry Creek	Rb	38	47	16								101				
	Ct	34	3									<u>37</u> 138	75	212	0.65	

Table 54

Calculated Monthly Catches of Trout in Dorena Reservoir, 1961

Month	Anglers	Hours	Trout	Fish per Angler	Fish per Hour
February	600	2,700	3,000	5.00	1.11
March	1,950	7,850	3,900	2.00	0.50
April	975	2,925	1,950	2.00	0.67
May	750	3,075	750	1.00	0.24
June	200	650	150	0.75	0.23
July	500	2,300	875	1.75	0.38
August	600	1,850	1,380	2.30	0.75
September	1,316	6,843	7,369	5.60	1.08
October	1,550	7,750	8,525	5.50	0.10
November	1,500	6,300	5,040	3.36	0.80
Totals and Averages	9,941	42,243	32,939	3.31	0.78

Table 55

McKenzie River Guides' Catch Reports by Month, 1961

Month	Trips	Anglers	Hours	Trout	14-Inch Rainbow	Fish per Angler	Fish per Hour
April	36	60	389	386	3	6.5	1.0
May	63	118	822	767	27	6.7	1.0
June	52	99	829	590	29	6.3	0.7
July	40	79	531	625	3	7.9	1.2
August	19	37	264	258	1	7.0	1.0
September	38	65	492	372	23	6.1	0.8
October	13	25	169	96	12	4.3	0.6
Totals and Averages	261	483	3,496	3,094	98	6.6	0.9

Clear Lake provided good catches throughout the season as shown in Table 56. Brook trout stocked in the lake as fingerlings in 1960 entered the catch late in the season as 8 to 10-inch fish.

Warm-Water Game Fish

Little angling pressure occurred on Cottage Grove and Fern Ridge Reservoirs although good populations of warm-water species existed in both bodies of water. Most of the warm-water fish checked in anglers' creels were taken from the Long Tom River below Fern Ridge Dam and the Fern Ridge Borrow Pit. Gill nets were set in all of the U. S. Corps of Engineer reservoirs in the district and the results are shown in Table 57. Temperature readings taken at the same time will be found in Table 58.

Table 56

Calculated Monthly Catches of Trout at Clear Lake, 1961

Month	Moorage Boats Rented	Total Boats	Total Anglers	Total Catch	Average Catch per Angler
May	139	230	529	2,380	4.5
June	631	883	2,207	6,621	3.0
July	982	1,277	2,682	8,046	3.0
August	727	872	2,180	4,360	2.0
September	314	440	880	2,640	3.0
October	81	105	242	871	3.6
Totals and Average	2,874	3,807	8,720	24,918	2.9

Table 57

Upper Willamette Reservoir Gill Net Set Results

Water	Date	Species	Number	Fork Length Size Range (Inches)	Average Fork Length (Inches)
Dexter Reservoir	8/28/61	Sq	46	9 to 17	9.6
		CSu	9	12 to 16	13.8
		Clm	7	10 to 11	10.7
		Rb	2	9 to 10	9.5
Lookout Point Reservoir	8/ 9/61	Sq	27	8 to 14	10.7
		CSu	14	8 to 16	11.4
		Rb	2	9 to 10	9.5
Fern Ridge Reservoir	9/ 6/61	Sq	1		13.0
		CSu	36	8 to 15	12.2
		Cp	35	4 to 16	11.5
		LB	5	5 to 10	8.0
		BG	1		4.0
		WC	27	6 to 11	7.6
		BrB	12	8 to 13	11.6
Cottage Grove Reservoir	9/ 7/61	CSu	38	13 to 17	15.2
		BG	6	4 to 7	5.8
		LB	3	7 to 11	9.0
Dorena Reservoir	6/ 4/61	CSu	1		16.0
		LB	32	6 to 8	7.2
		BlB	4	5 to 12	8.5
		Rb	16	8 to 15	10.0
	9/12/61	LB	15	7 to 12	8.7
		BlB	44	8 to 14	9.9
		Rb	17	8 to 11	9.5
Hills Creek Reservoir	9/30/61	Rb	18	6 to 11	8.0

Table 58

Upper Willamette Reservoir Temperature Readings

Reservoir	Date	Temperature (Degrees)										
		Depth in Feet										
		0	5	10	15	20	25	30	35	40	45	50
Cottage Grove	9/ 7/61	69	69	69	69	69	69	69	69	68	68	68
Dexter	8/28/61	67	66	63	61	60	60	60	58	58	59	59
Dorena	9/12/61	69	68	68	68	68	68	68	68	68	68	68
Fern Ridge	9/ 6/61	68	67	67	67	67	67					
Lookout Point	8/ 9/61	78	78	75	75	75	75	74	74	73	73	72

Habitat Improvement

Hills Creek Reservoir

Waters of the upper Willamette River watershed above Hills Creek Reservoir were checked for the presence of rough fish with gill nets, rotenone, and SCUBA divers. The only non-game fish found were dace. Algae and plankton growths were much heavier in the lower tributaries and Willamette River in the reservoir area than they were in 1960 prior to treatment with rotenone.

Unfed fall rainbow fry were stocked in the Middle Fork of the Willamette River and tributaries in and above Hills Creek Reservoir in March. Good growth and survival of these fish were noted. Some of them reached eight inches in length by September 1.

The reservoir began filling on August 30 when stop logs were placed in the diversion tunnel. The entire flow of the Willamette River and Hills Creek was stopped at the dam, leaving nearly a mile of dry river channel between the dam and the mouth of Salt Creek. Repeated visits to the stilling basin pool below the tunnel and the dewatered section of the river below failed to locate any stranded trout. No trout were stocked in that section of the river and whitefish were the predominant species found.

Gold Lake

A series of 33 beaver dams were removed from Salt Creek above Gold Lake to permit passage of spawning rainbow. Little rebuilding was done on the dams before the winter snows blocked the Gold Lake Road. Several trappers indicated interest in trapping the beaver at Gold Lake if sufficient numbers were available.

Lookout Point Reservoir

Preliminary surveys were made to determine the upstream limits of rough

fish in the streams above Lookout Point Reservoir. Coarsescaled suckers were found in the North Fork of the Willamette River up to Christie Creek, 15 miles above the mouth. Whitefish were found up to Puma Creek, 20 miles above the mouth. No suckers or squawfish were found in Salt Creek although whitefish were found at the Big Pool Forest Camp about 8 miles above the mouth. Squawfish and suckers were known to exist in Salmon Creek above the Willamette Hatchery but their upstream limits were not determined.

Fish Lake

The Fish Lake basin was surveyed to determine if it could be made watertight. Heckleman Creek, the major tributary, gradually disappeared in the upper one-half mile of the lake and no individual water escapement areas could be located.

Road Construction

The channel of Lost Creek, a tributary of the upper McKenzie River, was changed by the Bureau of Public Roads to allow the construction of a bridge on the new Clear Lake Road. Large boulders were placed at strategic locations in the new channel to facilitate fish passage.

The channel of the McKenzie River, immediately below Clear Lake, was also changed to allow the construction of a bridge on the Clear Lake Road. Only three trout were observed in the old stream channel when the water was diverted. They were captured and released in the McKenzie River below the new bridge.

The lower portions of Row River and the Coast Fork of the Willamette River were subjected to heavy silt loads by the removal of gravel from Row River for a highway project in the Cottage Grove area. The Oregon State Highway project engineer and the construction company foreman were contacted and the situation was corrected.

Personnel of the Oregon State Highway Department moved the large boulders in Salt Creek to one side of the stream to halt a slide on Highway 58 above Oakridge. Little siltation occurred because of the small amount of sediment in the stream at that point. A considerable amount of spawning gravel was uncovered in the operation that should be of benefit to the trout in the stream.

Log Jams

The Bureau of Land Management instituted a log jam removal program on streams on their lands in Lane County. Several streams were visited with their representatives to determine where such work was needed.

The Murphy Logging Company, operating on Teeters Creek, a tributary of Dorena Reservoir, cleared approximately one mile of stream and removed two old log bridges when they completed their logging operation in that area.

A large log jam on the McKenzie River was visited with the Blue River District Ranger to determine if its removal would have adverse effects on the fishery in the area. It had been classified as a hazard to a nearby park under development by the U. S. Forest Service. Removal of the jam would be done by the U. S. Forest Service and no damage to the fishery in the area is expected.

Pollution

A heavy kill of rough fish occurred in a slough of the lower McKenzie River near Thurston when a county weed-spraying crew killed the blackberry vines along the bank at a bridge crossing. No game fish were found.

An abatement order was issued by Lane County to the Hines Lumber Company at Westfir to cease the release of bark, sawdust, and other mill wastes into the North Fork of the Willamette River. However, little change in the amount of debris entering the river was noted.

A complaint of sawmill pollution on Noti Creek was investigated with a representative of the State Sanitary Authority. Tests for pH were taken above and below the International Paper Company mill but there was little difference in the readings. A new type of refuse burner had been installed and amount of mill waste entering the stream was negligible.

Disease and Parasites

Myxosporidia infected trout were observed in the catches at Dorena Reservoir and Clear Lake early in the season. The infection was found only on the larger fish.

Reports were received on dead fish in Vivian and Waldo Lakes. Investigation revealed that the dead trout in both lakes were infected with tapeworm cysts.



CENTRAL WILLAMETTE DISTRICT

J. J. Wetherbee

Fish Inventory

A small run of steelhead was observed at the upper Stayton Dam the first week in February. As flood conditions soon prevailed there was little angling on these fish. Opening of the Little North Fork of the Santiam proved popular with anglers as the North Santiam was usually too high.

Seven steelhead were taken by 124 anglers interviewed on the various streams open to winter angling as shown in Table 59.

Table 59

Creel Census, Steelhead Angling Central Willamette District, Spring 1961

Stream	Number Anglers	Hours Fished	Steelhead	Trout	Total Fish
North Santiam River	28	42	1	2	3
Little North Fork	69	160	4	0	4
Santiam River	4	2	0	0	0
South Santiam River	18	42	2	0	2
Abiqua Creek	3	16	0	1	1
Moose Creek	2	2	0	0	0
Totals	124	264	7	3	10

Another low run of spring chinook was experienced in the Willamette River tributaries. The usual concentration of salmon in the Stayton area did not occur. Spawning concentrations of chinook appeared good in the Little North Fork and Quartzville Creek.

Remnant runs of chinook were observed in Crabtree, Thomas, and Abiqua Creeks.

The first returns of a silver salmon plant in the Marys River were observed in November 1960. Thirty silver jacks were netted in the fishway of the Mill Race Dam above Corvallis. Silvers were introduced by the Fish Commission into several key tributary streams of the Marys River.

Detroit Reservoir

Estimated Anglers and Catch

The total anglers and catch were estimated for the eighth consecutive year at Detroit Reservoir. The estimate indicated that 246,881 fish were harvested by 137,186 anglers in 1961. Angling success in October was considerably lower than normal. Table 60 compares estimates for the last eight years.

Table 60

Catch, Detroit Reservoir
1954-1961

Year	Anglers Checked	Total Fish Caught	Fish per Angler	Fish per Hour	Estimated Anglers	Estimated Catch
1954	3,559	9,868	2.77	0.54	49,062	131,796
1955	4,022	5,689	1.41	0.39	61,738	87,050
1956	2,446	3,381	1.38	0.39	64,787	89,406
1957	2,029	4,254	2.10	0.44	91,660	147,332
1958	1,452	2,546	1.75	0.42	97,950	171,412
1959	2,514	6,157	2.45	0.69	108,753	259,847
1960	2,808	3,817	1.36	0.39	134,331	227,639
1961	1,332	2,269	1.70	0.51	137,186	246,881
Totals					745,467	1,361,363

Creel Census

Bimonthly catch records for Detroit Reservoir are presented in Table 61. Anglers averaged 0.52 fish per hour for the season which is better than most other years. A steady snowfall on opening day of the trout season was responsible for a small turnout of 3,500 anglers. In 1960 the opening day estimate was 8,000 anglers.

Table 61

Creel Census, Detroit Reservoir, 1961

Date	Anglers	Hours	Species					Total Fish	Fish per Angler	Fish per Hour
			Rb	K	Ch	BrB	Wf			
April 22-30	464	1,745	628	7	5		1	641	1.38	0.37
May 1-15	70	225	142	13	1			156	2.23	0.69
May 16-31	18	44	32					32	1.78	0.73
June 1-15	62	155	74	1		1	2	78	1.26	0.50
June 16-30	230	709	511	2				513	2.23	0.72
July 1-15	143	424	279	1		14		294	2.06	0.69
July 16-31	166	439	96	2		39		137	0.83	0.31
August 1-15	16	58	22					22	1.38	0.38
August 16-31	35	127	102	4				106	3.03	0.83
September	104	418	263	7				270	2.60	0.65
October	24	58	20					20	0.83	0.34
Totals and Averages	1,332	4,402	2,169	37	6	54	3	2,269	1.70	0.52

The majority of rainbow in the catch ranged from 8 to 12 inches in length. Length frequencies are listed by months in Table 62.

Table 62

Length Frequencies of Rainbow Trout,
Detroit Reservoir, 1961

Period	Size Groups in Inches					Total Fish
	6-8	8-10	10-12	12-14	14-16	
April-May	53	253	384	95	5	790
June	65	403	117			585
July	15	280	85			380
August	1	38	74	11		124
September	4	115	127	16		262
October		15	4	1		20
Totals	138	1,104	791	123	5	2,161

Kokanee up to 14 inches were taken in September after their third summer in the reservoir. Although only 37 kokanee were actually examined during the season, these fish were reported taken in fair numbers primarily in May. The true picture of the kokanee fishery will probably not emerge until the spring of 1962 when the original plant will enter its fourth year. In 1962, three age classes will be available to the creel. Two females were examined in September with maturing eggs. Likely spawning areas were examined in October and November, however, no evidence was observed of any spawning activity. A plankton sample in September revealed that a fair number of *Daphnia* and *Cyclops* was available, and one kokanee stomach contained these organisms.

Population Study

Eight gill nets were set overnight March 29, 1961. The catch included 46 rainbow trout and 6 whitefish. Rainbow ranged in size from 5.6 to 12.5 inches in fork length, while whitefish ranged from 8.2 to 17.1 inches in fork length. Twelve female rainbows examined were maturing at 11.3 inches. No mature females were taken. Ten immature female rainbows averaged 7.5 inches in fork length. Water temperature at the time of the sample was 46° F. at the surface and 41° F. at 100 feet in depth.

Of the 46 rainbow examined in the gill net sample, 7 showed definite signs of *Mxyosporidia*, which occurred only on fish in the 11 and 12-inch size groups. Larval tapeworm cysts were present in 23, or one-half, of the rainbow while only four fish contained a minor infestation of *Nematodes*. Whitefish collected were relatively free of parasites.

Stocking

Approximately 100,000 legal rainbows were stocked in the reservoir. The fingerling rainbow program was increased to 400,000 fish in 1961. Fingerling plants have varied from 182,000 to 257,000 during the last five years. An additional increase in fingerling stocking is being recommended for 1962 to meet

the demands of a continuous increase in angling pressure. Nearly one-half million kokanee fry were also stocked in 1961.

Temperature

Temperature series taken with a 100-foot-line electric thermometer could not locate a thermocline during the summer. In a June series, temperatures ranged from 69° F. at the surface to 47° F. at 100 feet. A late July series ranged gradually from a surface temperature of 71° F. to 49° F. at 100 feet. A September 22 series varied only four degrees - 63° F. to 59° F. in 100 feet of water.

Miscellaneous

Boating regulations became effective in 1961 to control water skiing activities. Boat speeds were restricted to five miles per hour in the Breitenbush Arm and the upper end of the North Santiam Arm. These are key still-fishing areas. Anglers also are given some protection by a similar speed limit within 200 feet of shore.

Creel Census on Streams

West Side Tributaries

Many west side drainages provided a good early season fishery on native cutthroat. Larger tributaries were supplemented with hatchery rainbow, and in such streams as the Little Luckiamute these were well utilized. Anglers averaged nearly two fish per hour on this stream. Mill Creek of the Yamhill system provided a fair fishery with about 70 per cent of the catch being native cutthroat. Creel census totals for these streams are shown in Table 63.

East Side Tributaries

Streams draining the eastern half of the district were more dependent on hatchery-reared trout. Considerable pressure is usually experienced on the larger streams and hatchery rainbow are well utilized in most cases. With the exception of the Little North Fork, hatchery fish provided a success of over one fish per hour on all streams stocked in the North Santiam system.

In the South Santiam system, Quartzville Creek and the upper South Santiam River were producing hatchery rainbow to the creel at a rate of nearly one fish per hour. Success was poor on other tributaries such as Crabtree Creek where only 2 trout were caught by 32 anglers checked. Pudding River tributaries were only mediocre for the most part. Creel census totals for the various streams are listed in Table 64.

Cascade Lakes

The high lakes continue to be an important and popular segment of the central Willamette district fishery. The variety in species and size of trout in the lakes is usually a welcome change to anglers having caught their share of uniform-size rainbow.

Table 63

Creel Census, West Side Willamette Streams, 1961

Water	Number Anglers	Hours Fished	Species		Total Fish	Fish per Angler	Fish per Hour
			Rainbow	Cutthroat			
Yamhill System							
North Yamhill River	15	36	22	1	23	1.53	0.64
South Yamhill River	19	27	21	12	33	1.74	1.22
Mill Creek	56	198	51	110	161	2.88	0.81
Salt Creek	21	31	10	30	40	1.90	1.29
Willamina Creek	12	34	22	6	28	2.33	0.82
Rock Creek	13	23	5	23	28	2.15	1.22
Grand Ronde Creek	1	1		2	2	2.00	2.00
Gold Creek	1	4		5	5	5.00	1.25
Rickreall Creek	85	164	95	89	184	2.16	1.12
Ellendale Creek	1	2	11		11	11.00	5.50
Luckiamute River	98	336	182	87	269	2.74	0.80
Little Luckiamute River	106	185	312	46	358	3.38	1.94
Marys River	17	34	7	15	22	1.29	0.65
Woods Creek	11	15		8	8	0.73	0.53

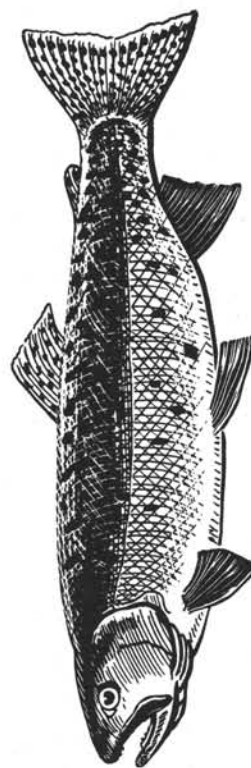


Table 64

Creel Census, East Side Willamette Streams, 1961

Water	Number Anglers	Hours Fished	Species				Total Fish	Fish per Angler	Fish per Hour	
			Rb	Ct	EB	St				Wf
North Santiam River	317	541	833	8		1	4	846	2.67	1.56
Little North Fork	166	437	175	1			4	180	1.08	0.41
Breitenbush River	105	198	257	3				260	2.48	1.31
Blowout Creek	86	221	285	1				286	3.33	1.29
Marion Creek	42	84	89	31				120	2.86	1.43
Tumble Creek	7	17	26					26	3.71	1.53
Pamelia Creek	5	25		20				20	4.00	0.80
French Creek	4	12	15	5				20	5.00	1.67
Mill Creek	30	37	55					55	1.83	1.49
Parks Creek	11	27		33	28			61	5.55	2.26
South Santiam River	76	97	111	1				112	1.47	1.15
Roaring River Creek	61	69	45	2				47	0.77	0.68
Crabtree Creek	32	29	2					2	0.06	0.07
Thomas Creek	25	33	10	4			3	17	0.68	0.52
Bilyeu Creek	7	9	1					1	0.14	0.11
Wiley Creek	45	103	14	29				43	0.96	0.42

Table 64 (continued)

Water	Number Anglers	Hours Fished	Species			Total Fish	Fish per Angler	Fish per Hour
			Rb	Ct	EB St Wf			
Little Wiley Creek	2	4				0	0.00	0.00
Hamilton Creek	6	13	8	1		9	1.50	0.69
Scott Creek	7	17	18			18	2.57	1.06
McDowell Creek	5	6	2			2	0.40	0.33
Canyon Creek	4	8				0	0.00	0.00
Timber Linn Lake	12	28	14			14	1.17	0.50
Middle Santiam River	8	8				0	0.00	0.00
Quartzville Creek	172	372	330	3	6 2	341	1.98	0.92
Canal Fork Creek	9	18	2	3	1	6	0.67	0.33
Pudding River System								
Abiqua Creek	230	509	292	22	1	315	1.37	0.62
Butte Creek	30	71	49	10		59	1.97	0.83
North Fork Silver Creek	24	73	16	7		23	0.96	0.32
South Fork Silver Creek	20	44		26		26	1.30	0.59
Coal Creek	2	10		12		12	6.00	1.20
Little Abiqua Creek	2	9	3			3	1.50	0.33

Creel Census

Over 1,700 anglers were checked on 60 different lakes, access to many of which is by trail only. An effort to obtain more creel census data was continued as this is the only source of material upon which to base stocking recommendations for the majority of the pack-in lakes. A post card questionnaire was distributed at access points to the various lakes on a trial basis. Cards were left on cars where it was not feasible to contact anglers personally. A 44 per cent return was realized from 126 cards. Anglers did well in recording hours fished, species, and size of fish. Only two cards were nonfishermen. An expanded program is planned for 1962 with the co-operation of key personnel of the U. S. Forest Service and State Police.

Marion Lake, the largest natural lake in the district, provided anglers with some excellent rainbow catches throughout the season. Approximately 40 per cent of the rainbow taken in Marion Lake were over 12 inches in length. Nearby Ann Lake, although only 15 acres, usually attracts as many anglers as Marion on opening day. Reproduction in the lake supports a brook trout fishery. Many excellent brook trout are taken each year. An experimental plant of 2,000 rainbow in 1960 made excellent growth. The rainbow were planted to test the need of supplemental stocking. Rainbow had reached 12 inches by July and several were reported around 15 inches in length in September. These fish apparently contributed little to the catch as only 18 rainbow were checked out of 546 total fish.

At Pamela Lake, 306 anglers interviewed had harvested 2,813 cutthroat for a success of 9.2 fish per angler and 1.76 fish per hour. Success was somewhat lower than the 2.38 fish per hour in 1960, however, this year's angling was still good considering that nearly 25,000 fish had been harvested from the 50-acre lake in 1960. The 30-fish-per-day bag limit will be retained in 1962. Although no major effect from the increased bag limit has been noted, some increase was apparent in the size of the fish in 1961.

Angling success at Lost Lake also dropped from the previous year, however, the majority of the 1961 trout were larger. A good holdover of yearling fish, protected by a mid-July closure, provided excellent angling in May after the lake thawed. Considerable angling pressure occurred on the lake for at least two weeks prior to the regular high lake opening. A heavy fingerling plant, in conjunction with the early closure and the attempt to fill underground outlets, has brought the lake into excellent production for the past two seasons. Although rainbow and brook trout have been stocked in nearly equal numbers, rainbow have been more readily caught.

Eight to ten-inch cutthroat provided a success of almost one fish per hour at Elk Lake. Rainbow from the 1960 fingerling plant appeared in the catch at 6 to 9 inches in length. Only three brook trout were checked in the 1961 season, however, one-third of the gill net sample was brook trout. An experimental plant of 20,000 kokanee averaging 70 per pound was made in Elk Lake. It is hoped considerable knowledge of the kokanee can be gained in a lake of smaller size. Elk Lake has an area of 63 acres. Excellent spawning facilities are also present.

The fishery at Big Lake consisted primarily of kokanee ranging from 8 to 10 inches in length. A fair population of brook trout in the lake is not utilized. Success was quite variable in other lakes as may be seen in Table 65.

Table 65

Creel Census, Cascade Lakes, 1961

Lake	Number of Anglers	Hours Fished	Species	Size Groups in Inches							Total Fish	Fish per Angler	Fish per Hour
				6-8	8-10	10-12	12-14	14-16	16 & Over				
Marion	227	1,640	Rb Ct EB	54 1 8	161 5 15	254 2 5	250 2	52	23	794 8 30 832	3.67	0.51	
Lost	226	679	Rb EB	108 31	215 72	58 11	1			382 114 496	2.19	0.73	
Pamelia	306	1,599	Ct	2,680	132	1				2,813	9.19	1.76	
Ann	185	907	EB Rb	23	135 15	158 2	189	22 1	1	528 18 546	2.95	0.60	
Jorn	59	160	EB Rb	24	33 2	6 1	1 2			64 5 69	1.17	0.43	
Daly	49	225	Ct EB	177 31	5					182 31 213	4.35	0.95	
Parrish	41	198	EB	73	63	5	1			142	3.46	0.72	
Tumble	46	230	EB	312	16	4	1			333	7.24	1.45	
Big	41	305	K Rb EB	4 2 1	247 1	3 6	1 1			251 7 8 266	6.49	0.87	

Table 65 (continued)

Lake	Number of Anglers	Hours Fished	Species	Size Groups in Inches							Total Fish	Fish per Angler	Fish per Hour
				6-8	8-10	10-12	12-14	14-16	16 & Over				
Elk	38	105	Rb Ct EB	5 1	15 77 1	9 2			1	21 87 <u>3</u> 111	2.92	1.06	
Red Butte	43	93	EB	16	40	5	5			66	1.53	0.71	
Mowich	32	250	EB Rb	6	16 2	50 25	6 7	1		79 <u>34</u> 113	3.53	0.45	
Santiam	32	127	EB	36	31	49	20	6		142	4.44	1.12	
Duffy	32	135	EB Rb	14 1	21 8	8 17	6 5			49 31 80	2.50	0.59	
Leone	22	89	EB Br	2	25	30	13	1	2	71 <u>2</u> 73	3.32	0.82	
Indian Prairie	28	129	EB Rb	4 1	2	1				7 1 <u>8</u>	0.29	0.06	
Hanks	24	110	Rb	26	47	23	7			103	4.29	0.94	
Alice	24	25	EB	5	4					9	0.38	0.36	
Little Duffy	23	23	EB	6						6	0.26	0.26	
Teto	17	102	EB Rb	16	91	38 1	5			150 <u>1</u> 151	8.88	1.48	

Table 65 (continued)

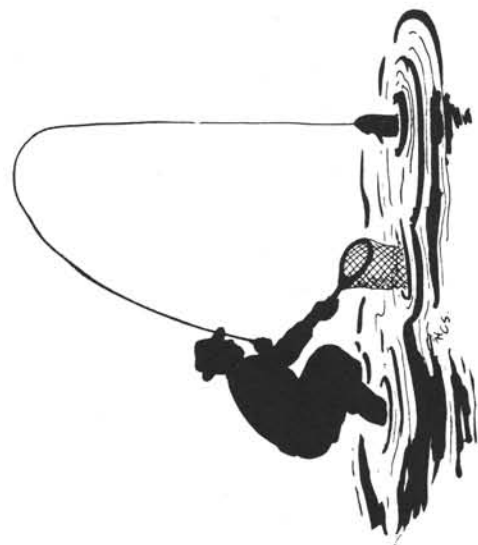
Lake	Number of Anglers	Hours Fished	Species	Size Groups in Inches						Total Fish	Fish per Angler	Fish per Hour
				6-8	8-10	10-12	12-14	14-16	16 & Over			
Lower Berley	18	63	EB	36	5					41	2.28	0.65
Hunts	13	55	Rb	10	7	1	1	3		22		
			Ct	1	13	1				15		
										37	2.85	0.67
Fay	13	71	EB			12	27	8		47	3.62	0.66
Jo Jo	13	16	Rb				3	4		7	0.54	0.44
Blue	12	58	EB	2	26	11				39	3.25	0.67
Grenet	11	17	Rb				1			1	0.09	0.06
Bruno	11	26	EB	2	11	3				16	1.45	0.62
Breitenbush	10	34	EB		1			1		2		
			Rb	2	1					3		
										5	0.50	0.15
Fir	9	41	EB			9	3	2		14	1.56	0.34
Upper Don	9	69	EB	26	69	7				102	11.33	1.48
Green Peak	10	25	Rb			2	3			5	0.50	0.20
Prill	7	33	EB	8	19	2				29	4.15	0.88
Crescent	8	44	EB		4	2	3			9	1.13	0.20
Spinning	6	9	EB	1		2				3	0.50	0.33
Dunlap	6	9	EB		1					1	0.17	0.11
Chiquito	5	24	EB	4	18	6	3			31	6.20	1.29

Table 65 (continued)

Lake	Number of Anglers	Hours Fished	Species	Size Groups in Inches						Total Fish	Fish per Angler	Fish per Hour
				6-8	8-10	10-12	12-14	14-16	16 & Over			
Lake of Woods	5	17	Rb	15	19		1			35	7.00	2.06
Jenny	6	16	EB		28					28	4.67	1.75
Bingham	10	31	Ct	1	4	2				7	0.70	0.23
Craig	5	19	EB	1	4	1				6	1.20	0.32
Temple	4	20	Rb					2	2	4	1.00	0.20
Dixie	4	24	EB			16	2			18	4.50	0.75
Moose	5	25	Ct	44	4					48	9.60	1.92
Lower Don	3	24	EB Ct	14 1	8 5	3				25 6 31	10.33	1.29
Upper Berley	3	6	EB		11					11	3.67	1.83
Mudpuppy	3	12	EB		2	11				13	4.33	1.08
Bowerman	3	15	EB	1						1	0.33	0.07
Rainbow	3	1								0	0.00	0.00
Melis	4	2								0	0.00	0.00
Cincha	3	6								0	0.00	0.00
Little Cincha	3	6	EB		2					2	0.67	0.33
Pineridge	2	8	EB		8					8	4.00	1.00

Table 65 (continued)

Lake	Number of Anglers	Hours Fished	Species	Size Groups in Inches						Total Fish	Fish per Angler	Fish per Hour
				6-8	8-10	10-12	12-14	14-16	16 & Over			
Johnny	2	6	Ct	4	2					6	3.00	1.00
Chris	2	5	EB	3	17					20	10.00	4.00
Pinet	2	8	EB		1	2	4			7	3.50	0.88
Bradley	2	2								0	0.00	0.00
Widgeon	2	10	EB	2	2					4	2.00	0.40
Cleo	2	3	Rb						1	1	0.50	0.33
Maude	2	1								0	0.00	0.00
Davis	2	8								0	0.00	0.00



Lake Survey

Twenty-one lakes were surveyed in 1961. The high lake survey crew worked in the district for a month with the major effort directed to lakes not previously surveyed. The summer assistant was able to survey seven lakes which had never been surveyed. All but eight lakes had fish populations. The barren waters were all stocked in 1961 in addition to three lakes observed from the air that have not been surveyed.

Only ten lakes were gill-netted by the survey crew and district personnel during 1961. Results of gill net sets are given in Table 66.

Stocking

An initial plant of golden trout was made in the Jefferson Park lakes in August. Russell Lake received 400 fish averaging six inches while Scout and Bays Lakes received approximately 600 fingerlings each.

Allocations on many pack lakes have received last minute changes as information on fish populations became available during the summer. Rainbow and brook trout have been combined in some lakes to produce a better all-around fishery.

In view of the limited time and personnel, creel census data has been used as criteria for determining stocking rates.

Habitat Improvement

The Detroit Ranger District of the U. S. Forest Service negotiated a timber sale which involves making a road fill across the outlet of Tule Lake. The fill will raise the lake from 6 feet to nearly 18 feet in depth and increase the surface area from 3.5 to 8.5 acres. The Game Commission authorized an expenditure up to \$1,200 to provide rock riprap on the road fill. When completed, the lake will be accessible from two timber access roads.



Table 66

Composition and Length Frequency of Catch by Gill Net Sets,
Cascade Lakes, 1961

Lake	Number of Sets	Species	Number Taken	Per Cent of Total	Number in Size Groups in Inches											
					5	6	7	8	9	10	11	12	13	14	15	16
Elk	4	Cutthroat	38	52		1	11	16	6	2	2					
		Brook Trout	24	33	1	5	10	7	1							
		Rainbow	11	15	2	2	4	2					1			
Crescent	2	Brook Trout	26	100	1	5	6	1	2	1	5	1	3	1		
Bingham	2	Cutthroat	20	100	1	5	4	3	5	1	1					
Hunts	1	Cutthroat	2	33					1							
		Rainbow	4	67	1	2		1								
Hanks	1	Rainbow	3	100		1	1		1							
Monument	1	Cutthroat	4	100		1			2	1						
Mudpuppy	1	Brook Trout	8	36					2						1	
		Shiners	14	64	14			5	2							
Rainbow	1	Brook Trout	2	100												2
Jo Jo	1	Rainbow	2	100			1	1								
Breitenbush Creel		Brook Trout	2	40				1					1			
		Rainbow	3	60		1	2									

LOWER WILLAMETTE DISTRICT

Wendell H. Stout

Fish Culture

Crystal Springs Creek

The steelhead egg-take at Crystal Springs Creek failed. Only four adults, three of which were females, were captured in the fish trap from February 9 to the end of March. All four of the returning fish were marked Ad-BV. Table 67 shows the numbers of steelhead stocked in Crystal Springs Creek and the return of adults to the stream.

Table 67

Steelhead Releases and Recoveries, Crystal Springs Creek

Year	Number Stocked	Mark	Number Adults Returned
1955	10,000 (summer) 9,367 (winter)	Ad-RM	
1956	9,972 (summer) 10,000 (winter)	DLV Ad-BV	
1957	10,000 (summer)	Ad-LM	156
1958	20,000 (winter)	Ad-BV	59 females
1959	10,000 (winter)	Ad-BV	5 females
1960	10,945 (winter)	Ad-BV	13
1961	11,085 (winter)	Ad-BV	4

Sandy River

Steelhead eggs were taken from the spawning run of the Sandy River to augment the supply for the Gnat Creek station. Trapping devices in the Marmot Dam fishway were used to capture and hold the steelhead. About 223,000 eggs were taken between February 11 and April 20 at an average rate of 3,200 per female.

Fish Distribution

Salmonids

More than 235,000 legal-sized rainbow and cutthroat trout weighing in excess of 70,000 pounds were distributed in the streams, lakes, and reservoirs of the lower Willamette district during the year. The trout averaged 3.36 per pound, or larger than 9 inches in length.

There were 151,000 brook trout and 453,000 rainbow fingerlings released into the reservoirs and lakes.

In addition, 181,000 migratory-sized steelhead were liberated.

Warm-Water Fish

Upon completion of the rehabilitation of Blue Lake, Multnomah County, 4,326 largemouth bass including 45 adults, and 102 adult black crappie were stocked.

Fish Inventory

Anadromous

Clackamas River

The enumeration of the adult anadromous fish runs at the North Fork Dam fish facilities on the Clackamas River revealed that the steelhead migration was almost double the run of the previous year. The silver salmon run completed in 1961 was also considerably larger than the previous year's migration. This run is the return of the first juvenile silvers to pass through the North Fork Reservoir fish facilities. The spring chinook salmon run was about average. Table 68 lists the upstream migrant fish counts at North Fork Dam for 1958 through 1961.

Table 68

Upstream Migrant Fish Counts, North Fork Dam, Clackamas River,
1958-1961

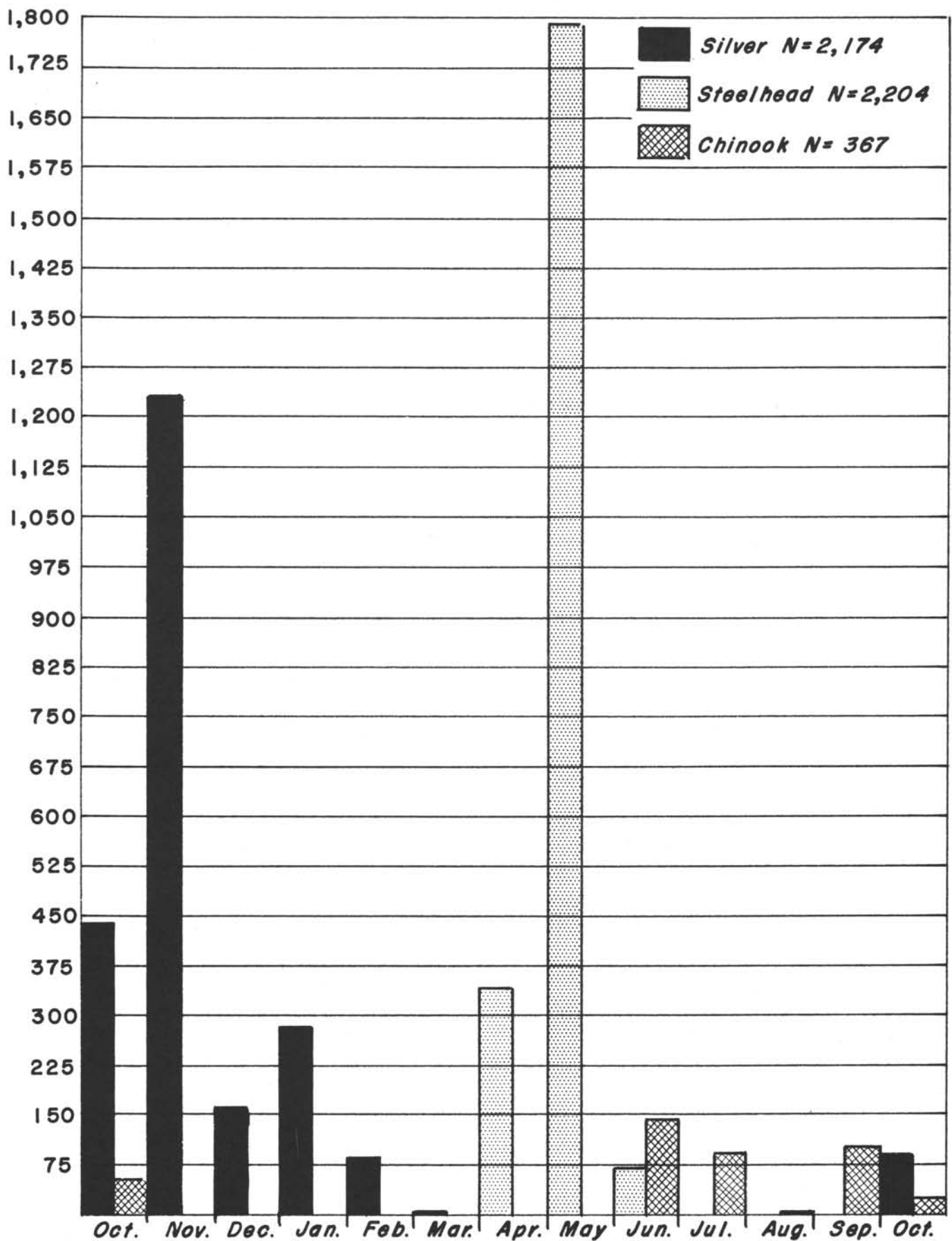
Year	Species		
	Silver Salmon	Chinook Salmon	Steelhead
1958	614	460	1,636
1959	555	578	525
1960	1,331	288	1,119
1961	2,174	367	2,204

The timing of the Clackamas River anadromous runs is illustrated graphically in Figure 3. The interruption of the chinook run in August was due to a shutdown of the fish facilities for repairs to the ladder.

The movement of smolts shows some variations from the previous annual patterns although the 1961 figures are complete only through November. The steelhead migration is approximately half of the 1960 number, while the juvenile silver salmon run is considerably larger. The downstream chinook run will probably be comparable with that of 1960. It is of interest that 828 spent steelhead kelts were counted downstream through the facilities. This is 37.6 per cent of the number counted in the upstream migration. The annual downstream fish counts at North Fork Dam are presented in Table 69.

A flood in the Clackamas River on November 25, 1960 resulted in a flow of approximately 60,000 c.f.s., which is very close to the record volume recorded in 1931. The lower end of the North Fork fish ladder was filled with gravel and

Figure 3



TIMING OF UPSTREAM MIGRANT ANADROMOUS FISH RUNS,
NORTH FORK DAM, CLACKAMAS RIVER 1960-61.

debris and entrance gates were damaged. Although all of the gravel was not removed until late in the summer, upstream passage was blocked only during the latter half of December. Another flood in February 1961, only slightly less than the one of Thanksgiving Day 1960, damaged the downstream migrant facilities when a section of the highway washed out severing the downstream migrant pipeline. During the period of repairs, the fingerlings were trapped near the ladder entrance and hauled below River Mill Dam by tank truck.

Table 69

Downstream Migrant Fish Counts, North Fork Dam, Clackamas River,
1959-1961

Year	Species		
	Silver Salmon	Chinook Salmon	Steelhead
1959	15,640	4,985	37,244
1960	26,167	21,845	38,893
1961 /1	39,162	14,429	17,717

/1 1961 counts complete only through November.

Sandy River Steelhead Study, 1960-61

The research program to evaluate the Sandy River steelhead sport fishery was conducted for the seventh consecutive year during the 1960-61 season. The collection of data in the field commenced December 1, 1960, and was completed on March 31, 1961.

The sampling area extended from the Highway 30 bridge crossing near Troutdale approximately 27 miles to Marmot Dam. The sampling procedure required six days of effort each week, half of which was devoted to creel census and half to automobile counts. Two car counts daily were made along the sampling area at selected locations and a representative sample of the angler success was obtained. The size, timing, and composition of the steelhead run was measured at the Marmot Dam fishway. An electronic counter and a fish trap were used to enumerate the fish. The sex ratio and the percentage of marked fish were recorded at the fish trap. The analysis of the statistical data collected in the field was made by the Research Division.

During the 1960-61 steelhead season, the angling intensity increased by 1,870 angler-days over the 1959-60 season. The data for the current season are in Table 70. The average angler-day was 3.88 hours.

Table 70

Angling Intensity, Sandy River Steelhead Sport Fishery,
1960-61

Type of Angler	Number of Cars	Number of Angler-Days	Number of Steelhead
Weekend	4,236	7,116	359
Weekday	4,838	8,128	306
Totals	9,074	15,244	665

Angler success decreased in 1961, although the run indicated by the Marmot Dam counts was almost twice as great as the 1960 count. The comparative angler success for the seven years is presented in Table 71.

Table 71

Angler Success, Sandy River Steelhead Fishery
1955 - 1961

Year	Number of Angler-Days	Number of Steelhead	Fish per Angler	Hours per Fish
1955	16,000	958	0.06	
1956	10,413	1,157	0.07	39.5
1957	17,027	972	0.05	51.0
1958	24,485	1,893	0.08	36.8
1959	27,934	1,306	0.05	62.0
1960	13,374	899	0.06	45.3
1961	15,244	665	0.04	88.9

The first marked steelhead stocked for the research program returned to spawn in 1957. The 1961 creel samples show an increase in the number of hatchery fish entering the sport catch over the 1959 and 1960 catches. Table 72 shows the contribution of hatchery steelhead to the sport fishery for each year of the study. The examination of scales from 15 Ad-BV marked steelhead caught in 1961 revealed that 3 fish were from the 1958 release and 12 fish were from the 1959 plant.

Table 72

Contribution of Hatchery Steelhead to the
Sandy River Sport Fishery

Year	Number of Fish in Catch	Number of Marked Fish in Angler Catch	Per Cent of Angler Catch Marked
1955	958		
1956	1,157		
1957	972	52	5.3
1958	1,893	176	14.2
1959	1,306	56	7.1
1960	899	68	7.6
1961	665	73	10.9

The numbers of yearling steelhead stocked in the Sandy River during the years of the research program and the marks used are listed in Table 73. The increase in 1961 was from the new Gnat Creek station.

The 1960-61 migration of steelhead over Marmot Dam almost doubled that of the previous season. Also, the percentage of hatchery fish reaching the counting station at the dam was the largest since the first marked steelhead returned in 1957. Table 74 shows the magnitude of the annual migration and the percentage of hatchery fish in the runs.

Table 73

Yearling Steelhead Stocking in Sandy River
1955 to 1961

Year	Number Stocked	Marks Used
1955	74,977	Ad-RV and Ad-BV
1956	77,194	Ad-BV
1957	71,778	Ad-RM and Ad-BV
1958	57,623	Ad-BV
1959	83,462	DLV and Ad-BV
1960	78,621	Ad-BV
1961	164,102	Ad-RM, Ad-LM, Ad-BV

Table 74

Steelhead Migration at Marmot Dam, Sandy River,
1955 to 1961

Year	Number of Fish		Total Fish	Per Cent Marked
	Wild	Marked		
1955	1,581		1,581	
1956	2,240		2,240	
1957	1,975	79	2,054	4.0
1958	2,917	249	3,166	7.9
1959	2,290	69	2,359	2.9
1960	1,578	34	1,612	2.1
1961	2,759	375	3,134	12.0

Sampling of the run at the Marmot Dam fishway in 1961 revealed that 39 per cent of the steelhead were males and 61 per cent were females.

The 1960-61 silver salmon spawning migration in the Sandy River, enumerated at Marmot Dam, represents a considerable increase over any previously recorded run. The run normally reaches Marmot in October and terminates in January of the following year. Table 75 shows silver salmon runs tabulated at Marmot Dam since 1958.

Table 75

Silver Salmon, Marmot Dam, Sandy River

Year ^{/1}	Adults	Jacks	Total
1958	42	222	264
1959	83	247	330
1960	34	34	68
1961	1,102	568	1,670

^{/1} The runs are listed in the year they terminate.

The run commenced approximately September 15 and was completed by January 7. The composition of the silver run was 31 per cent males, 35 per cent females, and 34 per cent jacks.

The spring chinook salmon spawning run over Marmot Dam was slightly larger than the number recorded in 1960. Table 76 lists the runs counted at the dam since 1954.

Table 76

Spring Chinook Salmon, Marmot Dam, Sandy River

<u>Year</u>	<u>Number</u>
1954	400
1955	5
1956	0
1957	10
1958	78
1959	304
1960	23
1961	37

The timing of the upstream migrant anadromous fish runs in the Sandy River is depicted in Figure 4.

Shad entered the backwaters at the mouth of the Sandy River in considerable numbers during the Columbia River high water period in late June. An active sport fishery was noted on the river in the area from the mouth to the Columbia River Highway bridge. Sampling of the angler catch revealed that the average sport-caught shad was 16.4 inches long and weighed 2.1 pounds. The range was from 14 to 19.25 inches in length and from 1.5 to 3.9 pounds in weight.

The smelt run of the Sandy River failed to materialize for the fourth consecutive year.

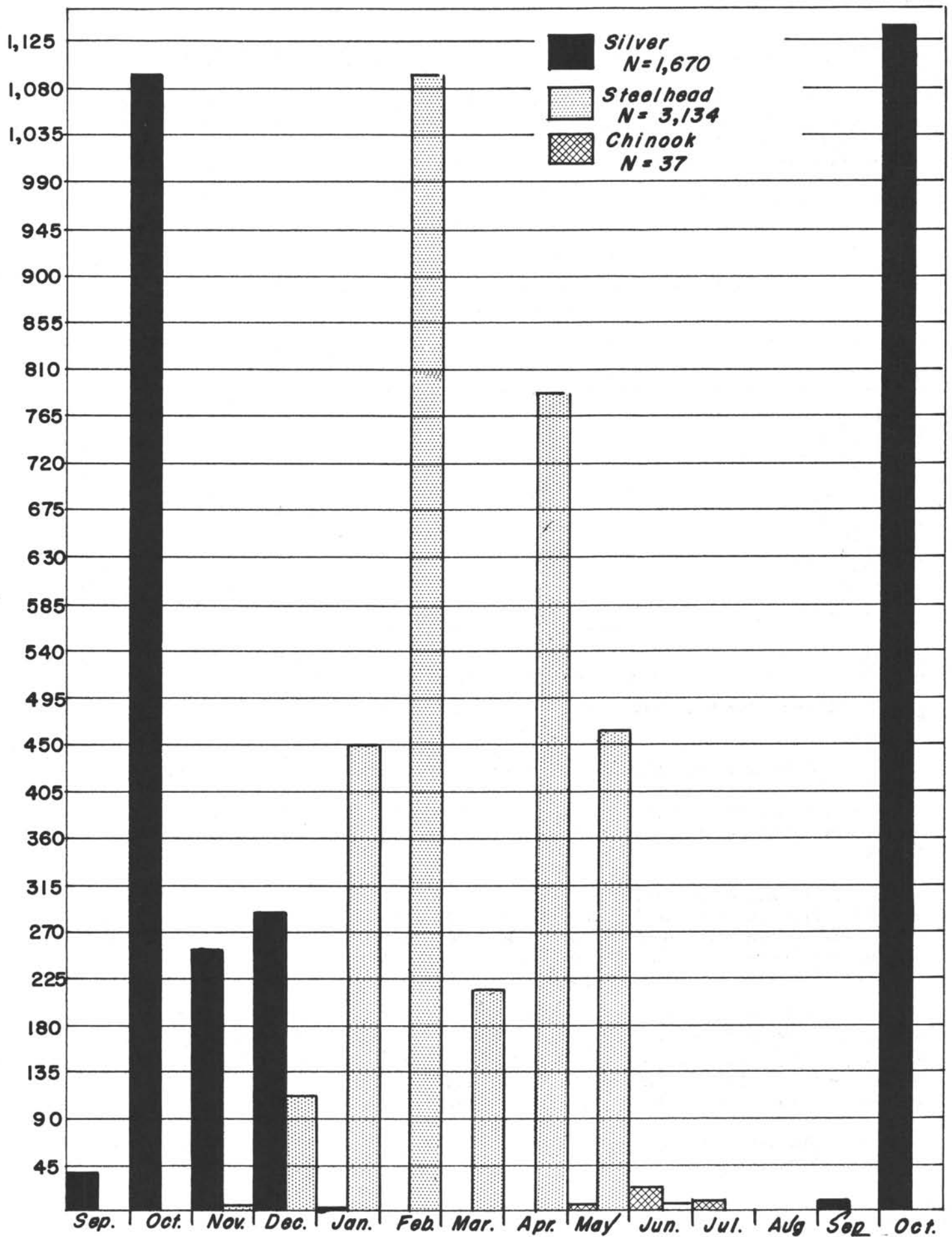
The Willamette River Spring Chinook Sport Fishery

The Willamette River spring chinook sport fishery was enumerated and analyzed for the eighteenth consecutive year in 1961. The survey of the fishery is a cooperative effort by the Fish Commission of Oregon and the Oregon Game Commission. The research method is consistent with the pattern developed by Craig and Townsend of the U. S. Fish and Wildlife Service in 1941 and 1942, which is presented in U. S. Fish and Wildlife Service Special Scientific Report Number 33. Basically, the method consists of obtaining an estimate of the average salmon catch per boat and the number of boats fishing each day during the season.

The study area of the sport chinook fishery on the Willamette River extends from Willamette Falls at Oregon City to the confluence of Multnomah Channel and the Columbia River at St. Helens. The area is separated into the upper and lower river sections with the dividing line at the Ross Island Bridge in the Portland harbor area.

This is primarily a boat fishery although some bank angling is conducted

Figure 4



TIMING OF UPSTREAM MIGRANT ANADROMOUS FISH RUNS,
MARMOT DAM, SANDY RIVER 1960 - 61.

from Black Point at Willamette Falls and at the mouth of the Clackamas River.

The 1961 sport catch of chinook salmon below Oregon City was calculated to be 6,400 fish. Of the total, 2,800 salmon were caught in the area below the Ross Island Bridge and 3,600 fish between Ross Island and Oregon City. The upper river catch includes an estimated 800 chinook taken by bank anglers at Black Point and the mouth of the Clackamas River. The catch is delineated by area and weekly intervals in Table 77.

Table 77
Willamette River Spring Chinook Salmon Catch
by Weekly Intervals, 1961

Date	Below Portland	Portland to Oregon City	Total
March 13-19	0	0	0
March 20-26	113	330	443
March 27 - April 2	212	518	730
April 3-9	771	737	1,508
April 10-16	895	511	1,406
April 17-23	590	244	834
April 24-30	216	283	499
May 1-7	0	189	189
May 8-14	0	15	15
Miscellaneous ^{/1}	0	800	800
Totals	2,797	3,627	6,424

^{/1} Estimated Clackamas River and bank anglers' catch.

Individual weights were obtained from 1,529 salmon and the average was 15.6 pounds. The average weight over a 16-year period is 17.2 pounds. Individual weights ranged from 1 to 36 pounds. Based on the average weight of 15.6 pounds, the entire sport catch of 6,424 salmon had a total weight of 100,214 pounds, or 50 tons.

The age composition of the Willamette River spring chinook sport catch was determined for the fourth year from scales taken from a sample of 96 salmon. Five-year-old fish were predominant in the 1961 catch, although only slightly more so than the four-year fish. The numbers and per cent of fish in each age group are presented for the past four years in Table 78.

The angling intensity in 1961 was calculated to be 75,083 angler-days compared to 137,875 in the peak year (1958). The average catch per angler-day was 0.09 fish, which represents an average catch of 1 salmon in 11.7 days of angling effort. This is the lowest catch rate recorded to date. The 16-year average is 8.3 angler-days to catch 1 chinook.

Statistics of the fishery including angler effort, catch per day, and average weight are presented in Table 79.

Table 78

Age Composition of the Willamette River
Spring Chinook Salmon Sport Catch,
1958 - 1961

Age in Years	1958		1959		1960		1961	
	Number of Fish	Per Cent of Total	Number of Fish	Per Cent of Total	Number of Fish	Per Cent of Total	Number of Fish	Per Cent of Total
2	0	0.0	1	0.8	5	3.3	0	0.0
3	4	2.5	6	4.5	8	5.3	9	9.4
4	42	26.1	41	30.7	73	48.3	40	41.7
5	114	70.8	84	63.2	64	42.4	44	45.8
6	1	0.6	1	0.8	1	0.7	3	3.1
Totals	161	100.0	133	100.0	151	100.0	96	100.0

Table 79

A Comparison of Willamette River Spring Chinook Sport Fishery Data,
1946 - 1961

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	83,600	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
1960	92,278	0.09	11.6	16.4
1961	75,083	0.09	11.7	15.6
Averages	88,020	0.13	8.3	17.2

Escapement over Willamette Falls in 1961 was 18,900 fish. Table 80 presents the catch and escapement records for the period 1946 to 1961. The total chinook salmon run in the Willamette River for 1961 was calculated to be 27,500 fish. The total run is obtained by adding the Willamette Falls fishway counts to the sport catch and the estimated Clackamas River escapement. In 1961, 23 per cent of the total run was taken by the sport fishery.

Table 80

Escapement and Sport Catch of Willamette River
Spring Chinook Salmon, 1941 - 1961

Year	Willamette Falls Escapement (Calculated)	Clackamas River Escapement (Estimated)	Sport Catch Below Willamette Falls	Total Run (Calculated)	Sport Catch as Per Cent 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
1960	14,400	1,800	8,000	24,200	33
1961	18,900	2,200	6,400	27,500	23
Averages	37,100	2,300	11,800	51,200	23

Molalla River

A survey of the Molalla River was initiated to enumerate the spring chinook salmon escapement. SCUBA and free-diving were used to make the counts. The majority of the fish were found concentrated in resting holes between the confluence of Table Rock or Middle Fork and the mouth of Trout Creek, a distance of 11 miles. A total of 238 adult chinook was counted. No trash fish were observed above the mouth of Table Rock Fork. The techniques used appeared to be satisfactory in making the enumeration and it is planned to conduct an annual census of the chinook run in the river.

Trout

North Fork Reservoir

A fish population survey of North Fork Reservoir on the Clackamas River

made with experimental gill nets prior to angling season indicated a fair holdover of moderate-sized rainbow trout. The trash fish population consisting of suckers and cottids doubled, as compared with the net samples taken at the same period in 1960. Table 81 records the results of the net samples in this and other waters.

Angling in the reservoir was generally fair, although the fingerling plant apparently contributed very little to the catch. Some legal trout liberated into the upper portions of the lake contributed substantially to the anglers' bags. Angling success in the reservoir in 1961 is shown in Table 82.

Timothy Reservoir

Anglers found good fishing in Timothy Lake during the first few weeks after the opening of the high lakes. However, angling success declined rapidly as the season progressed. Population surveys and creel checks showed the majority of the fish population to be rainbow trout, as indicated in Table 81. Surface observations and SCUBA diving were utilized to locate and evaluate the moderate mortality due to parasitism.

High Lakes

The high lake survey crew conducted fish inventories and physical lake surveys in the district during the summer. The surveys were made primarily on lakes not previously examined, although some population rechecks were made. The results of the population surveys made by both the high lake survey crew and district personnel are shown in Table 81. The average lengths of maturing female trout are listed in Table 83.

Little Sandy River

A physical and biological survey was conducted on the Little Sandy River, tributary to Bull Run River. The population of the stream above the Portland General Electric Company diversion dam was found to consist entirely of rainbow trout. A section of the stream below the headwaters was treated with liquid rotenone to obtain a fish population sample. Table 84 lists the size range of the trout recovered.

Maturing female rainbow trout were between 6 and 7 inches in length.

Creel Census

Creel census data for district streams, lakes, and reservoirs are presented in Table 82.

Habitat Improvement

Blue Lake

The fish population of Blue Lake, Multnomah County, was destroyed with rotenone and planted with warm-water game fish. Approximately 6,000 pounds of powdered and 100 gallons of liquid rotenone were used to eradicate the fish population.

Table 81

Composition and Length Frequency of Catch by Gill Nets in Some Lakes and Reservoirs in Mount Hood National Forest and Adjacent Areas, Represented by One-Inch Size Groups, 1961

Lake	Number of Nets	Species	Number Caught	Per Cent 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	21	22
Cougar		brook trout	18 / 1	100			7	1				1			1								
Emerald		cutthroat	12	100		1	2	2	5	2													
Fish		brook trout	14	41	1	2	3	2	1	2	1	1		1									
		cutthroat	20	59		11	6	3															
Harriet	4	rainbow	9	29	1	2	1	2	3														
		brown trout	22	71	1	2	2		1	3	1	2	2	3	2	3	1					1	
Hideaway	2	brook trout	23	100			5	15		2	1												
Lower		brook trout	39	100	1	5	4	14	9	3	1	2											
Mirror	2	brook trout	6	100		2	1			2	1												
North Fork Reservoir	4	rainbow	14	34			1	4	6	2	1												
		steelhead	13	32	5	7	1																
		whitefish	5	12				2	1	1			1		1								
		sucker	7	17	1	3			1	1						1							
		cottid	2	5	2																		
Pyramid	2	brook trout	24	100			1	8	7	5		3											
Sheep	2	brook trout	16	100		2	12			2													
Shellrock	2	brook trout	32	100		3	19	3	3	4													
Timothy	4	rainbow	26	82	2	1	5	4	11	2	1												
		cutthroat	3	9			2	1															
		brook trout	3	9	1	1	1																
Williams		cutthroat	8	100		2				2	2	1										1	

/1 Eight specimens destroyed by crayfish.

Table 82

Creel Census Summary, Lower Willamette District, 1961

Lake or Stream	Species	Size Groups in Inches								20 & Over	Total Fish	Total Anglers	Total Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Buck Lake	EB	7	20							27	4	20	6.8	0.7	1.35	
Camp Creek	Rb		1							1	5	16	0.2	16.0	0.06	
Clackamas River	Rb	159	253	86	3					501						
	Ct	2								2						
	Ch							3		3						
	Sil	4					1	1		9						
	Wf			1						1						
	B		1							1						
										517	381	1,220	1.4	2.4	0.42	
Collawash River	Rb	2	4	4						10	11	34	0.9	3.4	0.29	
Collins Lake	Rb	3	3	2						8	11	19	0.7	2.4	0.42	
Columbia River (Section 1)	Rb		1							1						
	Ct						1			1						
	St									17						
	Ch						7	9		39						
	Sil					1	1			1						
	Sg									1						
	LB			1						1						
	WC		4							4						
	YP		1							1						
											83	608	3,194	0.1	38.4	0.03
Dairy Creek, East Fork	Ct	20	49	3						72	47	114	1.5	1.6	0.63	
Dairy Creek, West Fork	Ct	9	6	3	1					19	9	27	2.1	1.4	0.70	
Dinger Lake	EB	1	2							3						
	Rb		2							2						
										5	5	28	1.0	5.6	0.18	
Eagle Creek (Columbia)	Rb	15	67	4						86	34	173	2.5	0.5	2.01	
Eagle Creek (Clackamas)	Rb	5	20							25						
	St							17		17						
										42	120	314	0.4	7.5	0.13	
Fish Lake	Rb	2	6	1						9						
	Ct	12								12						
	EB		2	1						3	5	46	4.8	1.9	0.52	

Table 82 (continued)

Lake or Stream	Species	Size Groups in Inches										20 & Over	Total Fish	Total Anglers	Total Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20										
Gales Creek	Rb			1									1					
	Ct	9	20	4	1								34					
	St	3											3					
													38	23	98	1.7	2.6	0.39
Harriet Lake	Rb	9	20	64	3	1							97					
	Br				2								2					
													99	66	271	1.5	2.7	0.37
Lower Lake	EB		13	12									25	4	13	6.3	0.5	1.92
Middle Rock Lake	EB	39	24	7									70	16	95	4.4	1.4	0.74
Molalla River	Rb	8	29	13								1	50					
	St	2		2									3					
	Wf				1								3					
													56	85	204	0.6	3.6	0.27
North Fork Reservoir	Rb	16	68	28			2						114					
	St								1				1					
													115	61	207	1.9	1.8	0.56
Oak Grove Fork	Ct	36	3										39	10	37	3.9	0.9	1.05
Pansy Lake	EB	7	7	2									16	5	27	3.2	1.7	0.59
Pyramid Lake	EB	3	10	12									25	5	15	5.0	0.6	1.67
Rock Lake, Upper	EB			2									2	4	21	0.5	10.5	0.10
Roslyn Lake	Rb	28	122	30	1								181					
	St	8	1										9					
													190	152	478	1.3	2.5	0.40
Round Lake	Rb			7			1						8					
	EB		7	1									8					
	Br				3								3					
													19	5	19	3.8	1.0	1.00
Salmon River	Rb	12	6	10									28					
	Ct	1											1					
	Wf				1								1					
													30	51	112	0.6	3.7	0.27
Sandy River	Rb	13	10	18	1								42					
	Ct				1								1					
	St	17	4				1	1				79	102					
	Ch											1	1					

Table 82 (continued)

Lake or Stream	Species	Size Groups in Inches										20 & Over	Total Fish	Total Anglers	Total Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20										
Sandy River (continued)	Sil										1	1						
	Sh					27	27	8				62 209	1,992	5,287	0.1	25.2	0.04	
Sauvies Island	Ct	8	19	5								32						
	St										19	19						
	Ch										2	2						
	LB	5	18									23						
	SB	21	10									31						
	BC	194	36		1							231						
	WC	305	37	1								343						
	RG	23	8									31						
	YP	68										68						
	B	290	44	15	4	2						355						
	Sq										1	1						
												1,136	470	1,723	2.4	1.5	0.66	
	Shining Lake	EB		10		1							11	4	16	2.8	1.4	0.69
	Skookum Lake	EB	2										2	4	11	0.5	5.5	0.18
Still Creek	Rb	13	25	22	1							61						
	Ct		2								2	63	27	50	2.3	0.8	1.25	
Sturgeon Lake	LB		1									1						
	BC		14									14						
	WC	10	18									28						
	RG	3										3						
	BrB	3										3						
	B	1	1									2						
												51	41	92	1.2	1.8	0.55	
Timothy Lake	Rb	29	233	211	7	1						491						
	Ct		2								2	2						
	EB	8	4	2	4							18 511	300	1,119	1.7	2.2	0.45	
Trillium Lake	Rb	9	79	66								154	117	290	1.3	1.9	0.53	
Tualatin River	Rb	1	10	9	2				17			39						
	Ct	3	4						7			14 53						
Williams Lake	Rb	3	6									9	6	9	1.5	1.0	1.00	

Table 83

Average Length on Maturing Female Trout in Certain Lakes in the
Mount Hood National Forest and Adjacent Areas, 1961

Lake	Species	Maturing Females Average Length (Inches)	Previous Average Length	
			Year	Inches
Cougar	EB	7.0 <u>/1</u>	1959	8.0 <u>/1</u>
Emerald	Ct	8.5		
Fish	EB	8.6	1959	8.9
	Ct	8.2 <u>/1</u>		
Harriet	Br	14.7		
Hideaway	EB	8.2		
Lower	EB	9.0	1959	11.0 <u>/1</u>
Mirror	EB	10.3 <u>/1</u>	1957	6.3
Pyramid	EB	9.9	1957	8.3
Sheep	EB	6.5	1959	10.1
Shellrock	EB	7.6	1957	7.3
Williams	Ct	10.9 <u>/1</u>	1959	7.1 <u>/1</u>

/1 Questionable maturation.

Table 84

Fish Population Check, Little Sandy River /1
August 30, 1961

Species	Number	Per Cent of Population	Length in One-Inch Size Groups							
			1	2	3	4	5	6	7	8
Rb	75	100	13	10	10	15	9	12	5	1

/1 Made 1/4 mile below Goodfellow Road crossing.

Extensive test netting was used in order to determine the fish population composition. Sampling of the fish kill after the chemical treatment was used to measure the actual population composition and production of the lake. Table 85 illustrates the lake population as indicated by test netting.

Table 85

Blue Lake Fish Population Composition
Test Netting

Species	Number
Black crappie	115
Squawfish	85
Sucker	29
Bluegill	26
Carp	13
Chiselmouth	1
Cutthroat	1

It was evident immediately after treatment that net sampling had not given a true picture of the lake population. Carp were the most abundant species. Other species were almost negligible by comparison. The fish kill on the day of treatment is illustrated in Table 86.

Table 86

Blue Lake Fish Population After Chemical Treatment
May 2, 1961

Species	Number	Weight (Pounds)
Carp	587	2,320.0
Black crappie	48	15.0
Bluegill	38	9.5
Sucker	5	3.0
Goldfish	1	

Net sampling prior to treatment had apparently under-sampled the carp and had not indicated the presence of either sturgeon or goldfish.

The total production of the lake was indicated by the number and pounds of fish (largely carp) removed from the lake after the treatment. Three weeks after the chemical treatment, a total of 11.4 tons of fish had been removed from the 64-acre lake. It is unlikely that all fish were recovered after chemical treatment.

The warm-water game fish did not appear in the sample after the treatment in the percentages that gill-netting had indicated. Apparently, these fish did not come to the surface during the treatment in sufficient numbers to be available for accurate sampling. Underwater transect observations were planned but turbidity impaired visibility.

LA GRANDE DISTRICT, NORTHEASTERN OREGON

Robert C. Sayre

Fish Culture

Kokanee Rearing Program

A program to rear kokanee salmon to fingerling size was initiated at the Wallowa station in 1961. Clark's Pellet Dust and automatic fry feeders were used for this program. Table 87 lists the results. It is obvious that kokanee salmon are more delicate than rainbow trout. It is believed the main reasons for the large losses of kokanee were the continued handling while cleaning the fry pens, and crowding. It appears that kokanee cannot survive at the Wallowa station if they are subjected to the same crowded conditions under which rainbow are raised.

Table 88 lists the kokanee salmon released in Wallowa Lake from 1955 to 1961.

Lake Trout Rearing Program

Table 88 summarizes the lake trout releases into Wallowa Lake. The 1961 release is the final scheduled liberation of this species in Wallowa Lake.

Fish Distribution

Because of shortages at all hatcheries, more fish re-allocation was required in 1961 than in the past. The greatest shortage was experienced at the Wallowa station. Table 89 shows trout allocations and distribution in the La Grande district in 1961.

Fish Inventory

Anadromous Species

Table 90 lists the creel census of anadromous species from six streams of northeast district in 1961. Table 91 shows the length and sex of 164 steelhead observed in anglers' creels from five rivers of the La Grande district. The average lengths of these fish are similar to those observed in 1960.

The steelhead redd count of East Pine Creek revealed the greatest number of redds per mile of any stream examined in northeast Oregon. It is believed that a high percentage of fish spawning on East Pine Creek had strayed from the Snake River below Oxbow Dam.

Table 92 lists the results of steelhead spawning ground counts made on streams of the La Grande district in 1961. Steelhead spawning had apparently peaked from two to three weeks ahead of the normal dates.

On June 5, 1961, a steelhead redd in West Spring Creek, that was buried by one inch of fine sediment, was excavated to determine the effects of this sedimentation on egg or fry survival. No definite evidence of egg smothering was found and only two live sac fry were located. Other fry had apparently left the redd.

Table 87

Kokanee Rearing Data, Wallowa Station, 1961

Date	Pond	Water Temperature	Pounds of Feed	Fish per Pound	Number of Fish	Approximate Total Pounds	Pounds of Gain	Fish Loss
3/27 to 3/28	Hatching Troughs	42° F.	0.50	4,000	124,211	31.1		
3/29 to 3/30	Inside Tank Pond 5	42° F.	0.17 0.33	4,000 4,000	41,403 82,808			655
4/1 to 5/9	Inside Tank Pond 5	42° F.	16.00 33.00	3,787 3,447	41,303 82,253	10.9 23.9	0.6 3.1	1,088
5/10 to 5/31	Pond 5	44° F.	76.00	2,281	122,468	53.7	22.6	912
6/1 to 6/15	Pond 5	46° F.	58.00	1,296	121,556	93.7	62.6	23,671
6/16 to 7/15	Pond 5	48° F.	105.00	1,548	97,885	63.2	32.1	12,885
7/16 to 8/17	Pond 5	50° F.	88.00	391	85,000	217.4	186.3	71,740
8/18 to 8/29	Pond 5	50° F.	42.00	332	13,260	39.9	8.8	0
Totals			419.00					110,951

Note: On November 29, kokanee were approximately 3 inches in length and 100 fish per pound.
Water temperature was 46° F.



Table 88

Stocking Record of Kokanee and Lake Trout
in Wallowa Lake from 1955 to 1961

Year	Kokanee	Size in Inches	Lake Trout	Size in Inches
1955	135,000	1.0		
1956	92,920	1.0	9,079	5.0
1957	664,778	1.0	2,424	6.0
1958	495,000	1.0	64,425	4.0
1959	411,900	1.0	65,788	4.0
1960	520,000	1.0	33,897	4.0
1961	13,260	2.0	32,620	4.0
Totals	2,332,858		208,233	

Table 89

Trout Allocations and Distribution in the La Grande District,
Northeast Region, 1961

Hatchery	Species	Size	Allocation	Release
Wallowa	rainbow	legal	127,000	109,511
Oak Springs	rainbow	legal	26,000	24,780
Hagerman	rainbow	legal	20,000	18,742
Hood River	rainbow	legal	0	4,009
Total rainbow			173,000	157,042
Wallowa	fall rainbow	fingerling	0	13,640
Oak Springs	fall rainbow	fingerling	116,000	105,581
Hagerman	fall rainbow	fingerling	100,000	99,875
Total fall rainbow			216,000	219,096
Wallowa	spring rainbow	fingerling	100,000	81,039
Wallowa	kokanee	fingerling	124,211	13,260
Wallowa	lake trout	fingerling	37,200	32,620
Fall River	brook trout	fingerling	53,000	52,684
Hood River	cutthroat	fingerling	125,000	17,110

Table 90

Creel Census of Anadromous Species from Six Streams of Northeast Oregon in 1961

Stream	Check Period	Anglers Interviewed	Hours Angling	Catch		Fish per Angler	Hours per Fish
				Steelhead	Salmon		
Grande Ronde River	February to April 10 and October	203	780	69	0	0.3	11.3
Imnaha River	January to April 10	241	1,307	108	0	0.4	12.1
Pine Creek	January	14	27	3	0	0.2	9.0
Snake River	January through April December 4 to 10	128 28	558 104	47 16	0 0	0.4 0.6	11.9 6.5
Wallowa River	April	41	120	6	0	0.1	20.0
Wenaha River	March and April June	27 40	154 186	3 0	0 9	0.1 0.2	51.3 20.7

85

Table 91

The Length and Sex of 164 Steelhead Taken By
Anglers from Five La Grande District Rivers in 1961

Stream	Number Caught		Maximum Length (Inches)	Average Length (Inches)
	Male	Female		
Grande Ronde River	9	15	32	24.8
Imnaha River	33	73	31	24.5
Snake River	9	16	30	24.9
Wallowa River	4	2	28	
Wenaha River	1	2	30	
Totals	56	108		

Table 92

Steelhead Spawning Ground Counts,
La Grande District, 1961

Stream	Date	Miles Checked	Steelhead	Redds	Redds per Mile
Chesnimnus Creek	5/18	3.0	2	17	5.7
North Fork Chesnimnus Creek	5/19	3.0	1	24	8.0
Peavine Creek <u>/1</u>	5/19				
East Peavine Creek	5/19	3.0	1	14	4.7
Devils Run Creek	5/19	5.0	7	34	6.8
Randall Fork Devils Run Creek	5/19	0.5	0	5	10.0
Summit Creek <u>/1</u>	5/19				
Tope Creek	5/23	1.0	0	12	12.0
Chicken Creek <u>/1</u>	5/25	1.0	0	2	2.0
Sheep Creek (Grande Ronde)	5/31	3.0	2	21	7.0
North Fork Limber Jim Creek <u>/1</u>	5/25	1.0	0	2	2.0
Dark Canyon Creek	5/26	2.5	0	18	7.2
Spring Creek <u>/2</u> (Grande Ronde)	6/5				
West Fork Spring Creek	6/5	3.0	0	20	6.7
McCoy Creek	6/4	1.3	0	23	17.7
East Pine Creek	6/30 to 7/5	11.15	1	389	34.9

/1 Stream high and too murky./2 Muddy because of logging. No counts made.

Table 93 is a summary of the spring chinook spawning ground counts made on streams in the La Grande district in 1961. As indicated in the table, the data for five of these streams came from the Oregon Fish Commission's annual salmon spawning survey.

Table 93

Spring Chinook Spawning Ground Counts on Streams
of the La Grande District, 1961

Stream	Date	Live	Chinook		Jacks	Total	Redds
			Dead				
			Male	Female			
Minam River	8/25	78	1	2	1	82	1
Little Minam River	8/22	6	0	0	3	9	3
Grande Ronde River	9/19	9	7	6	10	32	122
Sheep Creek	9/19	0	0	0	0	0	4
Eagle Creek	9/25	4	5	3	0	12	69
East Eagle Creek	9/11	4	11	9	0	24	32
Pine Creek	9/8	7	0	0	0	7	1
North Pine Creek	9/7	50	7	2		57	25
Imnaha River 1	8/30	150	49	2	83	282	221
Lostine River 1	8/28	19	7	2	17	43	44
Minam River 1	9/2	52	5	2	18	75	37
Lockingglass Creek 1	8/31	53	9	2	12	74	82
Catherine Creek 1	9/3	23	3	2	5	31	20

/1 Oregon Fish Commission data.

/2 No sex determined or indicated.

Table 94 is a summary of the stream habitat survey conducted in the La Grande district in 1961. The streams surveyed to date reveal that these waters are better suited for the production of anadromous species than resident trout. None of these streams contain a high percentage of pool area. The non-spawning gravel, which is actually rearing area for small fish, makes up the greatest percentage of all habitat.

Table 95 is a summary of the smolt marking program conducted on Eagle Creek, Baker County, 1961. This marking program revealed that approximately 20 per cent of the smolts leaving Eagle Creek were being rediverted in lower trap boxes. This project was done in conjunction with the Idaho Fish and Game Department's salmonid investigations of Brownlee Reservoir.

Table 96 is a comparison of the migratory fish counted at fish passage facilities of Brownlee and Oxbow Dams from 1958 to 1961. These data were taken from the Idaho Power Company's monthly reports.

Table 94

A Summary of Stream Habitat Survey, La Grande District, 1961

Stream	Date	Total Miles Surveyed	Total Square Yards	Stream Habitat					
				Spawning Gravel			Non-Spawning Gravel		
				Square Yards	Per Cent	Per Cent	Square Yards	Per Cent	Pool Square Yards
East Pine Creek	6/30 to 7/5	11.15	76,340	4,650	6.2		55,252	72.4	16,438
Minam River	8/22 to 8/25	41.10	1,381,560	105,930	7.7		1,196,659	87.0	78,971
Grande Ronde River <u>1</u>	9/27	3.00	17,424	102	0.6		16,165	92.8	1,157
East Fork Grande Ronde River	9/15	2.10	10,768	537	5.0		8,058	76.8	2,173
Muir Creek	10/24	1.50	6,556	167	2.7		6,081	92.8	308
Meadow Brook Creek	10/26	2.30	4,936	22	0.7		4,644	93.8	270

1 Started at river milepost 204 and stopped at 207. This appears to be the upper limits of use for anadromous species. Milepost taken from Water Resources Board, Grande Ronde Basin map, file number 8.70146.

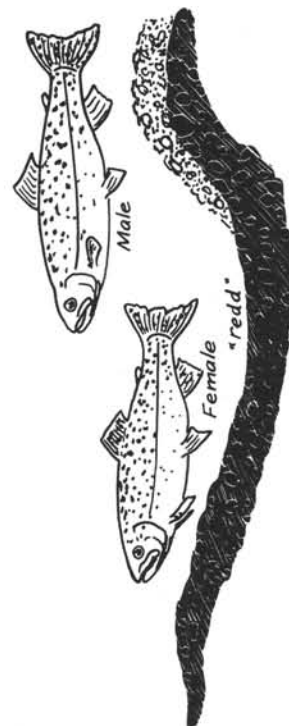


Table 95

A Summary of the Smolt Marking, Eagle Creek, Baker County, 1961

Date		Salmon		Steelhead			
		Brood Year		Brood Year			
		1959	1960	1957	1958	1959	1960
October	1 to 7	489	48	59	276	161	53
	8 to 14	1,434	64	18	23	622	163
	15 to 22	1,190	73	65	168	98	29
	23 to 28	1,685	15	11	10	134	26
October	29 to						
November	4	2,151	11	0	5	69	19
November	5 to 11	1,814	33	0	4	48	18
	12 to 15	472	0	0	0	17	0
Totals		9,235	244	153	486	1,149	308

Note: Smolts were marked as follows:

- Year Class 0 - both ventral fins clipped.
- Year Class 1 - left ventral fin and adipose clipped.
- Year Class 2 - right ventral fin and adipose clipped.
- Year Class 3 - both pectorals clipped.

Table 96

A Comparison of Migratory Fish Counted at Fish Passage Facilities
of Brownlee and Oxbow Dams, 1958 to 1961

Species	Upstream Migrants				Downstream Migrants			
	1958	1959	1960 /1	1961 /2	1959	1960 /1	1961 /2	
Chinook	14,329	13,285	7,499	8,692	129,572	43,803	19,767	
Steelhead	3,688	4,760	1,729	1,568	18,247	2,490	2,143	
Trout	67	1	75	0	2	24	0	
Other								
Game Fish	454	941	806	1,247	92,757	63,380	56,495	
Total								
Game Fish	18,538	18,987	10,109	11,507	240,578	109,697	78,405	
Coarse Fish	5,158	1,158,357	1,238,656	906,001			2,684	

/1 Totaled to mid-October.

/2 Totaled to mid-November.

Resident Species

Angling pressure at Wallowa Lake dropped approximately 50 per cent in 1961 from the preceding year. The low catch of kokanee is indicative of the low population of this species in Wallowa Lake. Table 97 shows the calculated catch rate from the 133-day random sampling period at Wallowa Lake in 1961. Table 98 is a comparison of the calculated trout catch from a 133-day random sampling period at Wallowa Lake from 1954 to 1961.

Table 97

Calculated Catch Rate of Trout from a 133-Day Random
Sampling Period, Wallowa Lake, 1961

	Boat			Bank		
	1958	1959	1961	1958	1959	1961
Average hours per angler trip	3.8	2.9	3.2	3.3	2.0	2.2
Average number of fish per angler trip	3.2	2.1	1.4	3.5	3.3	1.5
Average number of fish per hour	0.8	0.7	0.5	1.1	1.7	0.6
Average number of anglers per boat	2.4	2.3	2.1			

Table 98

Calculated Total Season Catch of Trout from a 133-Day Random
Sampling Period, Wallowa Lake, 1954-1961

Year	Total Angler Trips	Total Catch	Rainbow	Kokanee	Lake Trout	Dolly Varden
1954	14,000	42,810	39,200	3,145	0	425
1955	13,298	27,420	23,347	3,695	0	375
1956	14,846	46,222	32,356	13,190	0	474
1958	13,103	40,253	32,263	9,843	756	0
1959	12,655	30,307	25,770	3,821	504	200
1961	7,376	16,506	15,282	934	285	0

Table 99 is a summary of the general trout creel census data collected in the La Grande district of the Northeast Region in 1961. Angling pressure on the streams of the La Grande district in 1961 was extremely light. Anglers prefer to fish impoundments.

The angler success shown in the general creel census summary at Unity Reservoir is not representative of the entire angling season. On the opening weekend of trout season, many anglers moved from Malheur Reservoir to Unity and made good catches of rainbow. Angling success was again good at Unity after the impoundment had reached minimum pool in the fall. The creel data came from these two periods.

Table 99

A Summary of Trout Creel Census Data, La Grande District, Northeast Region, 1961

Water	Species	Size Groups in Inches				Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14 14 and Over					
Beaver Creek	Rb	13	3			16	3	9	5.3	1.8
Burnt River	Rb <u>1</u>	3				3	2	4	1.5	0.8
Crow Creek	Rb <u>1</u>	39	1			40	7	19	5.7	2.1
Grande Ronde River	Rb	1	1			2	9	11	0.2	0.2
Higgins Reservoir	Rb	8	178	51	1	243	66	215	3.7	1.1
	EB			1		41	16	33	2.6	1.2
Highway 203 Pond	Rb		35	6		33	4	23	8.2	1.4
Imnaha River	Rb <u>1</u>	33								
Kinney Lake	Rb			13		14	3	10	4.7	1.4
	IV	1								
Ladd Creek	Rb	2				2	1	1	2.0	2.0
Limber Jim Creek	Rb	6				6	4	8	1.5	0.8
Lockingglass Creek	Rb	2	15	1		18	7	22	2.6	0.8
Meadow Creek	Rb		8			8	2	10	4.0	0.8
Mill Creek	Rb	3	1			5	4	2	1.3	2.5
	EB		1							
Morgan Lake	Rb	201	1,331	336	49	1,919	319	1,178	6.0	1.6
Mottet Creek	Rb <u>1</u>	13				13	4	13	3.3	1.0
Murray Reservoir	Rb	6	155	29	1	192	40	218	4.8	0.9
North Powder Pond	Rb			5		5	2	2	2.5	2.5
Phillips Creek	Rb	2	3	1		6	3	3	2.0	2.0
Roulet Pond	Rb	31	207	25		263				
Unity Reservoir	Rb	4	272	121	4	414	88	386	4.7	1.1
Vogel Pond	Rb	2	160	13		175	57	94	3.1	1.9
Wallowa Lake	Rb	124	481	186	46					
	K	2	14	33	3					
	LT		3	8	2					
	Wf		1							
						906	567	1,632	1.6	0.6
Wallowa River	Rb	16	25	1						
	EB	6	2			50	33	67	1.5	0.7
Wenaha River	Rb		48							
	IV	3				55	14	62	3.9	0.9

1 These fish were checked in the early spring and appeared to be steelhead smolts.

Table 100 shows the composition and length frequency of catch by gill nets in two lowland lakes of northeast Oregon in 1961. There appears to have been a very poor survival of both the brook and rainbow trout released in Morgan Lake in 1960. A planting boat was used to release rainbow and brook trout in 1961, and according to the gill net surveys there appears to be a much better survival.

Gill net sampling of Wallowa Lake in 1961 revealed a larger average length of mature kokanee. All rainbow in this year's sampling were of hatchery origin.

Table 101 shows a comparison of the condition of female trout and length of fish in six high lakes of the northeast region as determined from gill net and rod samplings.

Cutthroat trout scheduled for release in other waters were mistakenly air-dropped into Minam Lake. The Minam Lake survey was conducted in order to determine the effects of this introduction on the brook trout population. Minam Lake apparently has an annual partial winterkill and as a result the average length of maturing female trout is good. Gill-netting at Rock Creek Lake in the Elkhorn Mountains was conducted in order to determine if brook trout had become established in this water. Brook trout have been air-dropped to this lake mainly to provide forage fish for a lake trout population.

Table 102 lists the composition and length frequency of catch by gill nets in the reservoirs of the La Grande district with comparisons for 1960 and 1961. The fish salvaged from Balm Creek Reservoir were released in Catherine and Eagle Creeks.

Gill-netting at Higgins Reservoir indicates better survival of the kokanee than was apparent in 1960. One mature 13-inch female and 3 mature 11 to 13-inch male kokanee were netted in the fall of 1961. Cutthroat reproduction continues in West Camp Creek Reservoir and the growth of rainbow trout continues to be good in this impoundment.

Gill-netting at Unity Reservoir revealed a little less growth on the spring-released fall rainbow and in 2-year-old rainbow. A large population of roach are now inhabiting this impoundment.

Table 103 is a summary of the kokanee spawning surveys conducted at the head of Wallowa Lake in 1961. Few fish were observed before November 8. On December 21, a check was made of the Wallowa River and all spawning channels at the head of Wallowa Lake. Only one dead kokanee was observed in the long spawning channel.

A survey for golden trout was conducted on upper Hurricane Creek. No fish were observed in the uppermost meadow on this stream. In the lower two meadows, 7 golden trout and 40 brook trout were observed.

Table 104 summarizes the introduction of warm-water game fish to the Grande Ronde River slough system in 1961. These fish, taken by hook and line, were transported from Brownlee Reservoir by a portable fish tank.

Table 105 is a summary of the warm-water game fish catch in the Grande Ronde Valley in 1961. No creel data are available for the warm-water fishery of Brownlee Reservoir in 1961.

Table 100

Composition and Length Frequency of Catch by Gill Nets
in Lowland Lakes of the La Grande District, Northeast Oregon, 1961

Lake	Date	Number of Sets	Game Fish				Coarse Fish		
			Species	Number	Fork Length Variation (Inches)	Average Length (Inches)	Species	Number	Average Length (Inches)
Morgan	11/-6/61	2	Rb	233	5.6 to 15.5	8.3			
			EB	4	9.5 to 11.0	10.0			
	11/-3/60	1	Rb	70	7.3 to 12.5	9.2			
			EB	1	5.5				
Wallowa	11/14/61	5	Rb	10	8.2 to 11.5	10.0	CSu	5	8.0
			DV	2	8.0 and 30.0				
			LT	7	7.5 to 22.8	14.2			
			K	13	12.0 to 14.2	13.2			
			Wf	154	6.2 to 8.3	7.3			
	12/13/60	5	Rb	60	7.0 to 15.5	9.1	CSu	6	9.5
			LT	4	5.5 to 23.5	14.5	FSu	9	7.2
			K	3	11.5 to 12.2	11.9			
			Wf	29	6.5 to 8.2	7.0			



Table 101

A Comparison of Condition of Female Trout
and the Length of Fish in Six High Lakes of
Northeast Oregon as Determined from Gill Net and Rod Samplings

Lake	Date	Species	Number	Average Length (Inches)		Length Variation (Inches)
				Females At Maturity	All Fish	
<u>Wallowas</u>						
Blue <u>/1</u>	10/-4/61	EB	55	8.8	8.10	5.9 to 10.0
Minam <u>/1</u>	10/-3/61	EB	61	10.6	8.50	6.0 to 13.8
Tombstone <u>/2</u>	8/26/61	EB	65	6.5	7.50	5.0 to 9.0
<u>Elkhorns</u>						
Bucket <u>/2</u>	7/-3/61	EB	50		7.50	6.0 to 9.0
Rock Creek	7/-3/61	EB	4	12.0 <u>/3</u>	9.30	5.4 to 12.0
	7/-3/61	LT	7	13.0 <u>/4</u>	10.30	8.3 to 13.0
	9/17/56	LT	10		10.50	7.0 to 16.0
Van Patten	7/-3/61	Rb	15		7.42	5.2 to 10.7
	7/10/56	Rb	4		8.20	6.5 to 10.0

/1 First gill net samples in these waters.

/2 Rod sample only.

/3 Only one maturing female brook trout.

/4 Only one maturing female lake trout.

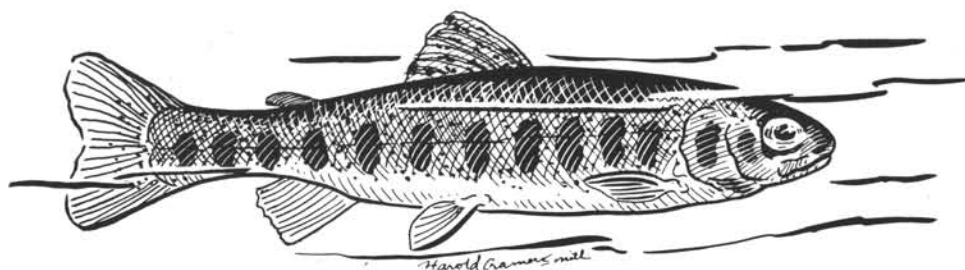


Table 102

Composition and Length Frequency of Catch of Gill Nets and Seines
in Reservoirs of the La Grande District, 1961

Reservoir	Date	Number of Sets	Species	Number	Trout		Coarse Fish			
					Fork Length Variation (Inches)	Average Length (Inches)	Sucker	Roach	Redsided Shiner	
Balm Creek	9/-4/61	1 seine (salvage)	Rb	4,000	6.0 to 14.0	7.0				
	10/-6/60	1 seine (salvage)	Rb	2,000	6.0 to 14.0	7.5				
Higgins	9/-8/61	2	Rb EB Ct K	173 1 13 16	5.5 to 12.8 10.0 6.6 to 17.5 7.5 to 13.0	8.9 9.4 10.2	114			
	9/21/60	2	Rb EB Ct RbxCt K	329 3 4 2 2	6.0 to 13.0 8.5 to 12.0 8.5 to 11.0 11.5 to 13.5 7.2 to 8.2	10.5 10.5 10.2 12.5 7.7	107			
Unity	9/-8/61	2	Rb	118	5.5 to 12.0	8.9	17	161	1	2
	9/20/60	2	Rb	247	6.0 to 13.0	8.2	3	18		2

/1 One gill net was set with the small mesh in 30 feet of water. This net caught most of the roach in 1961.
This type of set had not been used at Unity before.

Table 103

Kokanee Spawning Surveys, Wallowa Lake, 1961

Date	Spawning Area	Kokanee	Redds
9/17 <u>/1</u>	Wallowa River	60	0
9/20	short channel	0	1
11/ 8	Indian Creek	70	0
	long channel	59	30
	short channel	2	4
12/21	River and all channels	1 <u>/2</u>	0

/1 Reported by State Park personnel. No redds could be identified on a later inspection of the area.

/2 One dead spent female kokanee in Indian Creek.

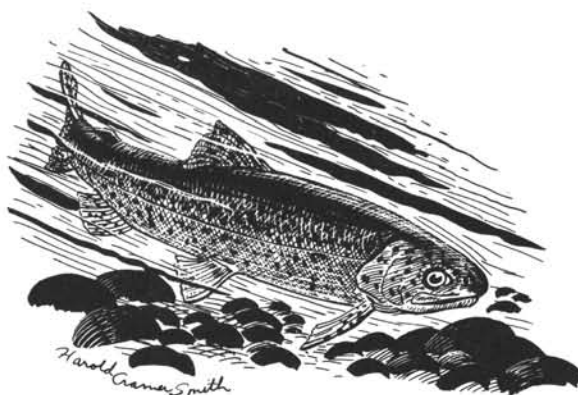


Table 104

Warm-Water Game Fish Transfer, La Grande District, 1961

Date	Source	Release Area	Transplanted		Length Variation (Inches)
			Species	Number	
July 21	Brownlee Reservoir	Grande Ronde Sloughs Cove highway crossing	CC	121	7.0 to 21.0
			SB	4	7.0 to 12.0
August 8	Brownlee Reservoir	Grande Ronde Sloughs Rinehart road crossing	CC	86	7.0 to 11.0

Table 105

A Summary of Warm-Water Game Fish Creel Sampling in the Grande Ronde Valley, 1961

Water	Species	Length Groups in Inches					Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14+					
Catherine Slough	LB			1	3	4					
	B	32	42			74					
						78		22	76	3.5	1.03
Grande Ronde River Slough	LB			2	3	5					
	YP	16	8			24					
	B	68	63	13		144					
						173		43	139	4.0	1.24

Fish Habitat Improvement

Anadromous Species

Table 106 is a summary of the partial sampling of downstream migrants trapped at 27 rotary fish screen bypasses in Watersheds 8 and 9. Because of the Eagle Creek marking program, 4 units operated until November 14. The number of migrants trapped from November 1 to November 14 and the 1961 total for Eagle Creek appear under Table 106.

Table 107 is a tabulation of species observed at 17 rotary fish screen bypass trap boxes on seven streams in 1961, with two years of comparison. The low numbers of fish salvaged on the Wallowa River and tributaries in 1961 resulted from a later starting date for the use of irrigation water. Irrigation also began later on the Imnaha River in 1961.

Table 108 is a summary of the non-screened diversion sampling for smolt loss conducted in the La Grande district in 1961. The sampling of all non-screened diversions was not completed in 1961.

Stream Damage Investigations

Table 109 shows results of a shocker survey of the upper Wallowa River following pea-vine liquor pollution in mid-August of 1961. The survey was made one month after the pollution caused a fish mortality. It was estimated that between 2,100 and 2,500 fish were killed by the release of pea-vine liquor. The primary group involved in this loss was salmonids.

Table 110 shows the results of siltation studies on Clear Creek, Union County, in 1961. This siltation resulted from logs being skidded in the upper main channel of this stream.

Table 111 is a list of stream disturbances checked in the La Grande district in 1961.

Chemical Rehabilitation

On March 3, Haines Pond, Baker County, was treated with 100 pounds of rotenone in order to remove a small nonproductive population of largemouth black bass. This pond remained toxic to rainbow trout until the last week of April. On May 1, the first catchable-size rainbow were released in this water.

Chemical Weed Control

The Leonard Pond, Union County, was treated with sodium arsenite on September 25, 1959, in an attempt to remove Brazilian waterweed, Anacharis densa. The waterweed was absent in 1960 but reappeared in 1961. The heavy plant growth was confined to areas having less than three feet of water.

A Partial Sampling of Downstream Migrants Trapped at 27 Rotary Screen Bypasses in Watersheds 8 and 9

Stream	Total Traps	April	May	June	July	August	September	October	Total	
									1961	1960
Catherine Creek	2	80	195	53	137	3	116	0	584	435
Indian Creek	1	0	16	17	9	30	46	0	118	314
Bear Creek	2	0	0	127	103	13	269	0	512	884
Lostine River	2	0	0	70	770	3,773	1,291	150	6,054	3,211
Wallowa River	3	0	166	540	37	19	4	0	766	631
Imnaha River	3	0	0	0	1,682	8,604	4,756	0	15,042	35,936
Summit Creek	1	0	0	283	89	0	0	0	372	464
Pine Creek	1	0	21	59	122	118	131	156	607	779
East Pine Creek	1	0	65	256	214	173	873	1,492	3,073	3,689
Clear Creek	3	0	0	0	16	7	90	7	120	122
Dry Creek	1	0	18	65	71	88	181	460	883	286
Eagle Creek /1	4	0	140	3	229	470	1,761	9,594	12,197	9,614
Big Creek /2	3	145	189	161	96	0	0	0	591	748
Totals	27	225	810	1,634	3,575	13,298	9,518	11,859	40,919	57,113

/1 November 1 to 7 - 102 St and 2,657 Ch; November 8 to 14 - 47 St and 1,594 Ch = 1961 total of 16,597.

2/26 migrants trapped in March, for a grand total of 617 steelhead smolts.

Table 107

A Tabulation of Species Observed at 17 Rotary Fish Screen
Bypass Trap Boxes on Seven Streams in 1961 with Two Years of Comparison

Stream	Watershed	Total Traps	Steelhead	Chinook Salmon	Silver Salmon	Per Cent Chinook Salmon		
						1959	1960	1961
Catherine Creek	8	2	58	526	0	93.2	86.7	90.1
Bear Creek	8	2	217	293	2	6.9	34.9	57.2
Lostine River	8	2	546	5,417	91	73.3	85.7	89.5
Wallowa River	8	3	284	179	303	41.3	16.7	23.4
Imnaha River	8	3	167	14,875	0	99.1	99.4	98.8
Eagle Creek	9	4	4,587	12,010	0	58.4	35.1	72.4
Pine Creek	9	1	571	36	0	0.0	7.1	5.9

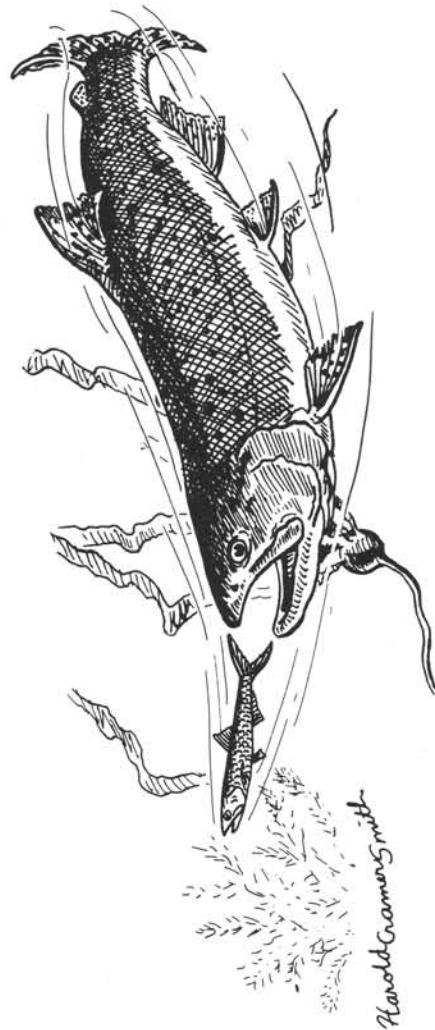


Table 108

Non-screened Diversion Sampling, La Grande District, 1961

Stream	Diversion Sampled	Need Screening	Fish Observed		Sampling Method
			Species	Number	
<u>Watershed 8</u>					
Wallowa River	11	9	Ch, Sil, St, Rb, EB	numerous	Sight and rotenone
Prairie Creek	3 <u>1</u>	0	Rb EB	7 73	Rotenone and shocker
Chesnimus Creek	1 <u>1</u>	1	St	4	Rotenone
Elk Creek	1	1	St	91	Rotenone
Catherine Creek	5 <u>1</u>	0	Ch	1	Rotenone and shocker
<u>Watershed 9</u>					
Powder River	2	0		0	Rotenone and shocker
Big Creek	3	3	St	21	Rotenone
Beagle Creek	5	5	St Rb	170 17	Rotenone
West Eagle Creek	1	1	St Rb	15 10	Rotenone
East Pine Creek	2	1	St	4	Rotenone
Pine Creek	1	0		0	Rotenone
Totals	35	21			

1 Need further sampling information.

Table 109

Shocker Survey of the Wallowa River, September 13, 1961

Location	Species Present <u>/1</u>	Fish per 100-Foot Section
0.25 of a mile above point of pollution	St, EB, Wf, Cottid	42
500 feet below point of pollution	St, Sil, Cottid	23
1 mile below point of pollution	St, Ch, Sil, Wf, Cottid	47

/1 All anadromous species observed were juveniles.

Table 110

Logging Siltation of Clear Creek, Tributary of Wolf Creek, Union County, as Sampled on May 29, 1961

Stream	Temperature Fahrenheit	Flow in c.f.s.	Settable Solids per Liter <u>/1</u>	Turbidity <u>/2</u>	Location of Sample
Wolf Creek	54°	33.3	0.05	Less than 25 p.p.m.	20 feet above mouth of Clear Creek
West Fork of Clear Creek	45°	7.0	no sample	Less than 25 p.p.m.	300 feet above mouth
Clear Creek	55°	11.0	5.70	4,000 p.p.m.	2.7 miles above mouth <u>/3</u>
Clear Creek	55°	11.0	2.52	1,450 p.p.m.	At mouth
Wolf Creek	54°	44.0		268 p.p.m.	0.5 mile below mouth of Clear Creek

/1 Imhoff Cone, 14-hour settling periods, no agitation./2 Jackson Turbidimeter./3 Sample taken 300 feet below lowest point of stream disturbance.

Table 111

A List of Stream Disturbances in the La Grande District
of Northeast Oregon with Requested Corrective Measures, 1961

Stream	County	Nature of Disturbance	Improvements Requested or Corrective Measures Taken
Clear Creek	Union	Logging siltation and debris.	Logging contractors removed debris from channel.
Cow Creek	Wallowa	Old windfall debris.	Removed by Oregon Game Commission.
Cow Creek	Wallowa	Boulder obstructions.	Removed by Boise-Cascade Lumber Co.
Devils Run Creek	Wallowa	Logging debris.	Removed by Boise-Cascade Lumber Co.
East Peavine Creek	Wallowa	Windfall and logging debris.	Partially removed by Game Commission.
Ladd Creek	Union	Logging road siltation.	Trucks re-routed.
Little Sheep Creek	Wallowa	Windfall and logging debris.	Cleared by logging contractor.
Little Sheep Creek (Highway Extension 1)	Wallowa	Road construction, Highway Commission.	Widened three stream restrictions caused by channel change.
Little Sheep Creek (Highway Extension 2)	Wallowa	Road construction, Highway Commission.	Project in planning stages. Requested boulder placement in channel changes.
North Fork, Burnt River	Baker	Gravel removal for forest road surfacing.	Gravel removed to develop pools. Results satisfactory.
Wallowa River	Wallowa	Pea-vine liquor pollution by Lamb-Weston.	Company will relocate viners in 1962.
Wildcat Creek	Wallowa	Old logging debris.	Removed by Oregon Game Commission.

HARNEY AND MALHEUR DISTRICTS

Lawrence E. Bisbee

Fish Inventory

Trout

The 1961 angling season for the Harney-Malheur district was considered fair in spite of near-drought conditions which prevailed throughout the summer and fall. Most streams provided good early season angling. However, early in the year, stream flows decreased and water temperatures rose rapidly causing much reduced angling pressure earlier than normal on all the smaller streams.

Early season angling was good on many of the reservoirs. However, since most of them did not fill, the annual drawdown was rapid and a number of the reservoirs reached dead storage or were dry by early August. Several of the natural lakes in the district provided good angling throughout the season.

Creel census data for the district is presented in Table 112.

Fish Lake

The most consistent fishing pressure was at Fish Lake where the average catch was 7.2 fish per angler. The number of anglers visiting the lake and the catch were almost double that of past years. The catch was 99.4 per cent rainbow and 0.6 per cent brook trout. The rainbow originated almost entirely from a heavy plant of legal-size hatchery fish.

Creel data for Fish Lake compared with past years is given in Table 113.

Delintment Lake

Angling at Delintment Lake was fair early and late in the season but poor during the middle of the summer. Extremely low water levels caused excessive aquatic weed growth to take over almost the entire body of water, thus making it difficult for anglers to fish. Trout taken during the hottest part of the summer were unpalatable. By October anglers were taking rainbow averaging 14.36 inches in fork length and 1.7 pounds in weight. Some summer-kill occurred.

A stomach analysis was run on 15 trout from Delintment Lake. The results are presented in Table 114.

Mann Lake

The water level at Mann Lake dropped considerably during the summer since there was very little spring runoff to supplement the last year's holdover. Angling was good throughout most of the season. The majority of the cutthroat ranged from 12 to 16 inches in length.

Krumbo Reservoir

Krumbo Reservoir provided good angling during the early season, however, a severe mortality of the trout during July and August and an increasing abundance of rough fish caused a rapid decline in the late season fishery.

Table 112

Summary, Creel Census Data, Southeast Region, Harney and Malheur Counties, 1960-61

Water	Species	Size Groups in Inches										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	20 & Over								
Altrow Pond	LB BG	4 27	3 14	6	9							22 41 63	35	120	1.8	0.53	1.9
Antelope Reservoir	Rb			1		7	45	2				55	52	236	1.1	0.23	4.3
Bear Creek	Rb	8	57	9								74	13	20	5.7	3.70	0.3
Bendler Creek	Rb		14									14	3	12	4.7	1.17	0.9
Beulah Reservoir	Rb BrB	64	284	325 1	385	117	22		1			1,198 1 1,199	489	2,422	2.5	0.50	2.0
Big Creek	-											0	2	3	0.0	0.00	0.0
Blitzen River	Rb	82	144	93	6	2	1					328	43	192	7.6	1.71	0.6
Bosenberg Creek	Rb EB	6 9	2									8 9 17					
Burns Gravel Pond	Rb					1						1	9	17	0.1	0.06	17.0
Calamity Creek	Rb	9										9	1	2	9.0	4.50	0.2
Chickahominy Reservoir	Rb	3	17	4								24	8	33	3.0	0.73	1.4
Delintment Lake	Rb		12	24	69	10						115	36	128	3.2	0.90	1.1
Dunaway Pond	LB BG ElB	1 2 1	17									18 2 1 21					
Emigrant Creek	Rb	48	110	16	1							175	11	17	1.9	1.24	0.8
Fish Creek	Rb EB	76	43 22	5								124 22 146	58	133	3.0	1.32	0.8
Fish Lake	Rb EB	443	2,615 7	3,978 6	615 21	8 11	1					7,659 46 7,705	19	59	7.7	2.47	0.4
High Lake	EB	341	2									343	42	195	7.2	1.57	0.6
Home Creek	Rb	45										45	5	8	8.2	1.76	0.6
Indian Creek	Rb	24	9		2							35	7	16	9.0	5.63	0.2

Table 112 (continued)

Water	Species	Size Groups in Inches										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	20 & Over								
Indian Creek Reservoir	Rb			1	3					4	3	6	1.3	0.67	1.5		
Kecks Slough	BC	4								4							
	BC	2								2							
	ELB	4								4							
										10							
Kiger Creek	Rb			60						60	7	15	1.4	0.67	1.5		
Krumbo Reservoir	Rb		5	124	81	22	18	33	4	287	93	526	3.1	0.55	1.8		
Little Blitzen River	Rb			20						20	1	5	20.0	4.00	0.3		
Little Emigrant Creek	Rb	35	6	1						42	16	44	2.6	0.95	1.0		
Little Malheur River	Rb	55	35	4	5	1				100	14	50	7.1	2.00	0.5		
Lost Creek	Rb	7	10	2						19	3	3	6.3	6.33	0.2		
Malheur Reservoir	Rb	191	547	408	1,063	227	91	20	6	2,553	1,723	11,475	1.5	0.22	4.5		
	BC	1	2							3							
										2,556							
Malheur River	OC		2							2							
Malheur River, Middle Fork	Rb	71	68	32						171	28	94	6.1	1.82	0.5		
Malheur River, North Fork	Rb	77	324	13	10	117				541							
	Wf		1							1							
	OC		8							8							
										550	115	445	4.8	1.24	0.8		
Mann Lake	Ct	2	41	8	171	301	62	48	18	651	202	1,000	3.2	0.55	1.5		
McCoy Creek	Rb	40	12							52	7	21	7.4	2.48	0.4		
McDermitt Creek	Rb	12	4	1						17							
	EB	40	12							52							
Miller Reservoir	Rb					5				5	5	15	13.8	4.60	0.2		
Murphy Reservoir	-									17	17	79	0.3	0.06	15.8		
Myrtle Creek	-									0	3	15	0.0	0.00	0.0		
										0	1	1	0.0	0.00	0.0		
Owyhee Reservoir	LB	4	31	74	104	31	9	2		255							
	BC	523	1,129	631	36					2,319							
	BC	6								6							
	YP	1								1							
	ELB		2	33	36	1				72	530	2,079	5.0	1.28	0.8		
										2,653							

Table 112 (continued)

Water	Species	Size Groups in Inches											20 & Over	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											
Owyhee River	Rb	19	184	13	3	2	1	1					223						
	BC	3											3						
	YP	1											1						
	BG	6											6						
	HLB		1										1						
													234						
Pine Creek (Watershed 10)	Rb	20	4										24	48	100	4.9	2.34	0.4	
Pine Creek, West Fork	-													5	25	4.8	0.96	1.0	
Potts Lake	EB	1	2	1									0	2	2	0.0	0.00	0.0	
Silver Creek (Watershed 12)	Rb	31	41	4									4	3	6	1.3	0.67	1.5	
Silvies River	Rb		6	1									76	19	66	4.0	1.15	0.9	
	BrB	1											7						
													1						
													8						
Slide Lake	Rb	4	7	2									13	6	18	2.2	0.72	1.4	
Snake River	Rb													10	14	0.8	0.57	1.8	
	LB			2									2						
	SB			5									14						
	BC	21	16	10			1						58						
	BG	22			9	1							22						
	CC	36											36						
	YP	1											1						
	CC	43	234	39	5	7	9	2	9				348						
	BLB	16	11	16									43						
													524	259	767	2.0	0.68	1.5	
Spring Creek	Rb	48	3	1	4	5							61	8	52	7.6	1.17	0.9	
Summit Creek	Rb	8	1										9	3	6	3.0	1.50	0.7	
Trout Creek	Rb	33	34	30	18								115	30	89	3.8	1.29	0.8	
Warm Springs Reservoir	Rb		2										38						
	LB		6	57	25	8	3						81						
	BG	2			18								2						
	YP	3											3						
	CC				2		1	1	4				8						
	BrB	6	9	5									20						
													152	49	207	3.1	0.73	1.4	
Wildhorse Lake	Et																		
Willow Creek (Watershed 10)	Rb	8			18	3							21	5	10	4.2	2.10	0.5	
Willow Creek, South Fork (Watershed 10)	Rb	104											8	3	6	2.7	1.33	0.8	
	EB	1											104						
													1						
													105	20	47	5.3	2.23	0.4	

Table 113

Fish Lake Catch Data, 1958-1961

Year	Anglers Checked	Hours Fished	Number of Fish in Two-Inch Size Groups							Total Fish	Fish per Angler	Fish per Hour	Hours per Fish
			6-8	8-10	10-12	12-14	14-16	16-18	18-20				
1958	501	2,972	285	2,006	939	86	2	1		3,319	6.6	1.12	0.9
1959	549	2,763	1,241	2,773	633	118	2			4,767	8.7	1.73	0.6
1960	507	2,207	446	2,215	1,582	70	6		1	4,320	8.5	1.96	0.5
1961	1,072	4,914	443	2,622	3,984	636	19	1		7,705	7.2	1.57	0.6



Table 114

Food Analysis for Fifteen Trout Taken in Delintment Lake,
November 9, 1961

Organism	Number	Per Cent of Total
Damselfly larvae	1,004	56.44
Snails	568	31.93
Diptera larvae	97	5.45
Water boatmen	45	2.53
Back swimmers	33	1.85
Shrimp	25	1.41
May fly larvae	4	0.22
Caddis fly larvae	1	0.05
Dragonfly larvae	1	0.05
Clam	1	0.05
Daphnia	<u>1</u>	0.05

1 Occurred in three samples in small numbers.

Beulah Reservoir

Excellent angling was provided by Beulah Reservoir in February and March, however, it gradually declined to a poor status as the water level was lowered for irrigation. An emergency bag limit of 30 fish per day and 60 in possession with no length limit went into effect June 30, 1961 for the reservoir and a 300-yard section of the stream immediately below the dam. By August 7, the reservoir was completely dry except for the flow in the stream channel.

Gill nets were set in Beulah Reservoir prior to the time when it was drained. Results indicated a rough fish population of 89 per cent and a trout population of 11 per cent as shown in Table 115.

Malheur Reservoir

The opening weekend of trout season at Malheur Reservoir attracted one of the largest crowds of fishermen ever to visit the impoundment. An estimated 2,700 anglers were in the area on the first weekend. An estimated 9,300 anglers visited the reservoir during the season. Angling at Malheur Reservoir was generally poor but picked up as the 1961 fingerling stock began entering the catch as legal fish about mid-June. An exceptionally heavy harvest of the 1960 fingerling stocked as legal-sized fish that same year is responsible for the poor angling throughout the early part of the 1961 season.

Plants of fingerling rainbow in Malheur Reservoir continued to make rapid growth during the season. By July 1, fingerling stocked on March 15, 1961 at 3.25 inches were 8.1 inches long (fork length) and weighed 5.03 ounces.

Fish populations in the reservoir were checked on November 11, 1961. The catch was 89.9 per cent rainbow, 7.8 per cent black crappie, and 2.3 per cent finescale suckers. Eighty-five per cent of the rainbow taken were from the 1961 fingerling plants. A breakdown of the catch by species and size groups is presented in Table 115.

Table 115

Fish Population Studies for Some Important Waters of Southeastern Oregon, 1961

Water	Number Nets Set	Number in Sample	Species	Per Cent of Total	Number in One-Inch Size Groups																20 & Over
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Antelope Reservoir	2	55 20 11 4 1 1	CSu Rb FSu BlB Clm Sq	59.8 21.7 12.0 4.3 1.1 1.1		7	14	7	2	1	2	20	2		2	4	7	4	1	2	
Beulah Reservoir	4	178 25 11 11 8 6 1	CSu Rb Clm Sq FSu Shiners K	74.2 10.4 4.6 4.6 3.3 2.5 0.4		9	6	22	24	16	37	12	25	15	3	7	2				
Delintment Lake	5	32	Rb	100.0							1		1	7	15	7	1				
Indian Creek Res.	2	17	Rb	100.0		2	7	4	1			1	2								
Malheur Reservoir	9	161 14 4	Rb BC FSu	89.9 7.8 2.3		111 5		2	1	3	7	9	5	3	1	6	10	3	2	1	
Murphy Reservoir	3	26	Rb	100.0		5	12	3	3	1				2							
Silvies River	8	87 70 60 18 6 5 1 1	CSu YP Sq Op FSu WC PK BrB	35.2 28.4 24.0 7.2 2.4 2.0 0.4 0.4			2	2	15	33	27	5	2	1							
Warm Springs Res.	3	287 40 29 7 6 3	CSu CC Sq FSu YP BrB	77.2 10.7 7.8 1.9 1.6 0.8		14	4	13	59	30	12	7	12	34	42	36	14	8	2	2	
Wildhorse Lake	2	5	Ct	100.0										2	1	2					

The average lengths and weights of female fish in various stages of maturity are presented in Table 116.

Warm Springs Reservoir

Warm Springs Reservoir provided good angling for rainbow, largemouth bass, and channel catfish throughout most of the season; however, a rapid drawdown lowered the reservoir to dead storage on August 5, and after that date angling was confined to the pool immediately above the dam and the river below. The catch was composed mainly of bass, channel catfish, and small numbers of brown bullhead, yellow perch, and bluegill after dead storage was reached. Rainbow had almost disappeared.

Fish populations were checked in Warm Springs Reservoir on October 5 and the information is presented in Table 115. The majority of the catch was composed of various species of trash fish.

Antelope Reservoir

Angling was generally poor in the reservoir throughout the season although good catches were made frequently below the outlet and at the mouth of the intake canal. Demands for irrigation water lowered the reservoir to dead storage by mid-August.

Fish populations checked by gill nets on November 8 showed a decline in numbers of most species and quite an increase in the coarsescale sucker population as compared to the 1960 population. A summary of the catch by species and length groups is given in Table 115.

Rainbow taken in the catch were all large maturing or mature fish and comprised 21.7 per cent of the 1961 catch. Length, weight, and maturity data are given in Table 116. No indications of survival of the 1961 fingerling stocking were observed.

Silvies River

Investigations were made in the Silvies River in the vicinity of the Fivemile Dam to determine whether or not channel catfish and smallmouth bass transplantings made in 1956 had been successful. No indications of survival or reproduction were observed. Results of the investigations are presented in Table 115.

Silver Creek

Data on the Silver Creek study plot was collected throughout the summer. The plot was set up by the Snow Mountain District of the Ochoco National Forest in 1959 to determine what effects stream stream bank stabilization and the re-establishment of streamside cover would have on the improvement of the stream as game fish habitat. The plot contains an area 3 chains wide and 20 chains long.

To date, little change has been observed in stream conditions since little change has occurred in streamside cover conditions. Water flows were considerably less because of the dry season. Stream temperatures remained approximately the same as in past years and are presented in Table 117.

Table 116

Average Lengths and Weights of Female Fish at Various Stages of Maturity,
Southeast Region, 1961

Water	Species	Immature			Maturing			Mature		
		Number	Length in Inches	Weight in Ounces	Number	Length in Inches	Weight in Ounces	Number	Length in Inches	Weight in Ounces
Antelope Reservoir	Rb				2	16.9	37.5	5	15.9	33.5
Beulah Reservoir	Rb	9	10.1	7.9	1	16.0	36.5			
Delintment Lake	Rb				24	14.3	27.4			
Indian Creek Reservoir	Rb	7	7.4	3.3				2	11.3	12.6
Malheur Reservoir	Rb	13	11.3	10.9				14	15.9	29.4
	BC	3	5.6	1.9				3	8.2	7.2
Murphy Reservoir	Rb	11	7.2	2.6	3	14.4	11.9			

Table 117

Water Temperature Recordings, Silver Creek Study Plot, 1961

Station	Date	Time (p.m.)	Temperatures (Degrees)		pH	O ₂ (p.p.m.)	Flow		Weather
			Air	Surface			(c.f.s.)	(g.p.m.)	
I - Lower end of plot	5/18/61	1:00	72	62	8.0	8.2	12.90		Clear, warm
	5/24/61	3:00	78	68					Clear, warm
	6/18/61	3:15	88	84			4.90		Clear, clouds 10%
	6/28/61	3:15	76	78					Warm, clouds 50%
	7/10/61	3:15	87	84			0.86		Clear, hot
	7/22/61	3:20	90	83				14.0	Clouds 40%, breezy
	8/10/61	3:35	85	82					Clear, breezy
	8/21/61	3:15	84	76				12.2	Overcast
	9/15/61	3:00	73	68					Overcast 90%, breezy
II - Upper end of plot	5/18/61	1:00	72	62					Clear, warm
	5/24/61	3:00	78	68					Clear, warm
	6/18/61	3:20	88	83					Clear, clouds 10%
	6/28/61	3:20	74	78					Warm, clouds 50%
	7/10/61	3:20	87	84					Clear, hot
	7/22/61	3:30	90	84					Clouds 40%, breezy
	8/10/61	3:30	86	84					Clear, warm
	8/21/61	3:00	84	76					Overcast
	9/ 5/61	3:00	73	69					Overcast 90%

Stream bottom food organisms were sampled in May and although a good variety of organisms was present, the food grade of the stream in most instances would be classed as poor. In stream samples where submerged vegetation or fibrous root material was present, the food grade was considered good.

Fish populations in the stream section within the enclosure were checked on May 26, 1961. The fish population of the plot was sampled with an electric shocker. Although a few white trout were found, the most abundant species was the spotted dace. Later in the season when water temperatures increased, only trash fish were seen in the area.

Data on fish populations in the study plot area is presented in Table 118.

Table 118

Fish Population Data for the Silver Creek Study Plot
as Determined by Electrical Shockers, May 26, 1961

Species	Number	Size Range (Inches)	Per Cent of Total
Speckled dace	2,000 ^{/1}	1.5 - 3.1	98.38
Redsided shiners	19	2.6 - 3.9	0.93
Rainbow	7	3.2 - 7.2	0.34
Finescale suckers	6	2.9 - 6.4	0.30
Longnosed dace	1	2.7	0.05

^{/1} Estimate.

Bully Creek Survey

A stream survey was conducted on Bully Creek and its tributaries above the proposed site of the new Bully Creek Reservoir which will be located in Township 18 South, Range 43 East, Section 12. The purpose of the survey was to determine the abundance and the range of trash fish and the suitability of the drainage for a trout fishery.

Rough fish were confined chiefly to the main stem of Bully Creek, the lower areas of Indian Creek, and Cottonwood Creeks Numbers 1 and 2. Species of rough fish involved included squawfish, coarsescaled suckers, finescaled suckers, and redsided shiners.

A great majority of the Bully Creek drainage appeared to be unsuitable for trout. Many of the smaller tributaries were completely dry. Considerable portions of the larger streams were either dry or contained water flows too shallow and warm for trout. Some stream sections contained suitable flows to sustain a small trout population or sufficient water in potholes to hold trout over winter.

Warm-Water Game Fish

Owyhee Reservoir

Angling pressure at Owyhee Reservoir was considerably lighter than normal during the 1961 season. There was a noticeable decline in the number of

nonresident anglers visiting the area and in the number of one day angling licenses being used. Factors contributing to the marked decrease in angling pressure and angler catch at the Owyhee Reservoir were extremely warm weather conditions earlier than normal and low water conditions which made boat launching impossible at most access sites.

Data concerning water fluctuations of Owyhee Reservoir is given in Table 119.

Data concerning the estimated numbers of visitors and anglers at Owyhee Reservoir is given in Table 120.

The catch was 91 per cent black crappie, 8 per cent largemouth bass, and 1 per cent brown bullheads. A sharp decline in the numbers of bass taken in all size groups over 10 inches occurred. All size groups of crappie taken showed an increase over 1960 except the 8 to 10-inch size group which showed a 50 per cent decline.

Snake River

Anglers experienced some good smallmouth bass and channel catfish angling on the Snake River throughout most of the early spring and summer. Channel catfish, 6 to 10 inches in length, were very abundant and at times were considered by anglers as a hindrance to catching the larger catfish. The catch of smallmouth bass was only average and the majority of the bass taken were under 12 inches in length.

Habitat Improvement

Beulah Reservoir and Tributaries

The tributaries of the North Fork of the Malheur River above Beulah Dam were chemically treated with 380 gallons of Pro-Noxfish on September 17 through 25, 1961, in order to remove a large population of coarse and finescale suckers, squawfish, and chiselmouth. An estimated 60 miles of tributary streams were treated. Beulah Reservoir itself went completely dry about August 7.

Delintment Lake

An experiment using granular 2,4-D (R-H weed RHAP-20) was tried in Delintment Lake in an effort to control several species of Potamogeton and Myriophyllum which were causing severe winterkills of trout each year. The chemical was applied at the rate of 100 pounds per surface acre on August 7. By November, very little effect was visible.

Krumbo Reservoir

Krumbo Reservoir was chemically treated by the U. S. Fish and Wildlife Service to remove an abundant population of roach.

Table 119

Owyhee Reservoir Water Storage and Fluctuation Data as Determined
by the Bureau of Reclamation, 1950-1961

Year	Maximum Fill for Year Peak (Acre-Feet)	Date of Peak	Overflow		Feet of Water Used in Irrigation Season	Storage at Completion of Irrigation Season	
			Acre-Feet	Duration of Overflow		Acre-Feet Remaining	Date Drawdown Ceased
1950	1,061,170	5/25	0		30	741,880	10/ 9
1951	1,120,000	4/ 1 to 5/22	341,070	2/20 to 5/18	30	787,600	10/ 8
1952	1,120,000	4/ 2 to 6/16	1,305,500	3/18 to 6/16	25	839,310	10/15
1953	1,066,810	6/21	0		27	767,890	10/15
1954	942,020	4/ 6	0		46	530,220	10/16
1955	762,730	5/14	0		38	460,830	10/10
1956	1,109,590	6/ 4	0		28	798,150	10/10
1957	1,120,000	4/23 to 6/12	468,500	3/ 4 to 6/10	28	807,840	10/10
1958	1,120,000	5/12 to 6/18	451,000	3/ 2 to 6/ 1	26	831,730	10/15
1959	937,570	4/ 6	0		40	570,550	9/19
1960	942,020	4/19	0		42	562,100	10/11
1961	766,950	4/18	0		43	435,140	10/ 1

Note: Maximum storage in reservoir - 1,120,000 acre-feet. (Elevation 2,670.0)
Dead storage in reservoir - 405,000 acre-feet. (Elevation 2,590.2)
0.0 storage in reservoir - (Elevation 2,367.5)

Table 120

Estimated Number of Vehicles and Visitor and Angler-Days at the Owyhee Reservoir
as Determined by the Bureau of Reclamation
1957-1961

Year	Estimated Number of Cars Using all Access Points to the Reservoir	Estimated Number of Cars Visiting the Dam but not Crossing the Counter	Total Estimated Number of Nonangler Visitor Days	Total Estimated Number of Angler-Days
1957	14,000			
1958	29,956	31,000	92,000	30,000
1959	28,425	36,250	109,000	55,000
1960	28,313	40,000	120,000	60,000
1961	30,000	45,000	135,000	65,000



LAKE COUNTY DISTRICT

Henry E. Mastin

Fish Inventory

Trout

Anglers fishing Lake County streams and lakes enjoyed a successful season as indicated by creel census data. A total of 3,529 fish was taken by 839 anglers interviewed who fished 3,728 hours. There was an average catch for the season of 4.2 fish per angler. The average catch rate was just under one fish per hour.

Creel census data from individual waters are presented in Table 121.

Stream fishing was best early in the season. As the result of low precipitation, the streams had small flows and high water temperatures early in the season. The lakes and reservoirs had moderately heavy fishing pressure throughout the season.

The catch rate for Ana Reservoir was considerably reduced in 1961 because of a heavy roach population.

Ana River provided fair fishing early in the season. A heavy mortality was experienced in late May. The loss was thought to have been caused by a heavy rain (May 20) which washed considerable amounts of alkali into the stream.

Campbell and Deadhorse Lakes are two of the most popular fishing waters in the area. Heavy angler use was maintained throughout most of the season. Early in July a summer-kill was noted in Campbell Lake. No corresponding fish loss was noted in Deadhorse Lake. A series of water temperatures was taken of the two lakes to determine if there was a temperature difference which would cause a fish loss in one lake and not the other. However, no significant differences were noted. The water temperatures are listed in Table 122.

Early season fishing success at Thompson Valley Reservoir was poor. Throughout the summer months fishing activity became very slow. The best fishing occurred in the late fall months as the lake waters cooled. At this time, rainbow trout up to 22 inches in length and weighing 4.5 pounds were taken.

Losses of fingerling rainbow trout have been experienced from summer releases. These losses point out the need of stocking the reservoir earlier in the year. Water temperatures recorded for the reservoir are shown in Table 123.

The Chewaucan River provided good angling through the early season. Later high water temperatures resulted in decreased angler success and heavy losses of stocked trout. A loss estimated at 50 per cent was experienced in early July. The stocking of trout in this river should be completed early to prevent continued losses from high water temperatures.

Dairy Creek also provided good fishing early in the season. As the season progressed, the majority of the trout caught were of the 6 to 7-inch size group. It is also necessary to stock this stream early to prevent possible losses from high water temperatures.

Table 121

Summary, Creel Census Data, Southeast Region
Lake County, 1961

Water	Watershed	Species	Size Groups in Inches										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	20 & over								
Ana Reservoir	13	Rb	6	110	66	8						190	113	373	1.7	0.51	2.0	
Ana River	13	Rb	10	186	69	16	12	2				295	109	324	2.7	0.91	1.1	
Blue Lake	14	Rb	47	42	130	70	4	5			6	304	73	389	4.2	0.78	1.3	
Campbell Lake	13	Rb		353	94	25						472	94	570	5.0	0.83	1.2	
Chewanac River	13	Rb BrB	45	374	103 6	1						529	85	434	6.2	1.22	0.8	
Cottonwood Creek	13	Rb	7	9	1	1						18	2	4	9.0	4.50	0.2	
Crump Lake	13	BrB	2	6	1							9	2	5	4.5	1.80	0.6	
Dairy Creek	13	Rb EB Br	55 58 1	24	10													
Deadhorse Lake	13	Rb	45	603	88	8						148	33	74	4.5	2.00	0.5	
Deep Creek	13	Rb	5	3	2							744	138	930	5.4	0.80	1.3	
Dog Lake	13	LB YP	3	8	1	2	1					10	2	4	5.0	2.50	0.4	
Duncan Reservoir	13	Rb		8	22							15	6	18	2.5	0.83	1.2	
Elder Creek	13	Rb		9		1						30	12	36	2.5	0.83	1.2	
Heart Lake	14	Rb		62	31							10	4	6	2.5	1.67	0.6	
Silver Creek	13	Rb EB	12 11	190	43	4						93	7	20	13.3	4.65	0.2	
Slide Lake	13	Rb	4	7	2							260	47	110	5.5	2.36	0.4	
Thompson Reservoir	13	Rb		137	26	15	26	26	10	3		243	93	364	2.6	0.67	1.5	
Totals and Averages			311	2,131	695	149	44	34	10	9		3,383	826	3,679	4.1	0.92	1.1	

Note: Extra creel slips showed only total catch without breaking down into size groups.

Table 122

Comparative Water Temperatures Between
Campbell and Deadhorse Lakes, July 20, 1961

Campbell Lake		Deadhorse Lake	
Depth in Feet	Degrees F.	Depth in Feet	Degrees F.
Surface	68	Surface	70
1	68	1	69
2	68	2	68
3	68	3	68
4	67	4	68
5	67	5	68
6	66	6	68
7	66	7	67
8	66	8	67
Bottom	66	9	67
		10	67
		11	67
		12	67
		Bottom	67

Table 123

Thompson Valley Reservoir Water
Temperatures, June 25, 1961

Depth in Feet	Degrees F.
Surface	79
1	79
2	79
3	78
4	78
5	77
6	77
7	77
8	76
9	76
10	71
11	65
12	63
13	61
14	60
15	59
16	59
17	59
18	58
19	58
20	58
21	57
22	57
23	57
24	56
To Bottom	56

Draws Creek was opened to angling on June 1st for the first time since 1954. The best fishing success was immediately after the opening. The trout caught averaged from 6 to 9 inches in length. Fishing success and angling pressure dropped off rapidly soon after the opening date. A total of 44 anglers was interviewed who had fished for 168 hours and caught 308 trout. The average catch was 7.0 fish per angler. The catch rate was 1.83 fish per hour.

A population study of Ana Reservoir showed an increase in the roach and a decrease in the trout populations. Four gill net sets made early in April took 27 trout and 526 roach. As a result of this heavy roach population, plans were made for chemical treatment of the lake in the fall of 1961.

Results of fish population studies for individual streams are presented in Table 124.

The results of three gill net sets in Crump Lake indicate a moderate population of brown bullhead and a low population of roach.

Net sets were made in Holbrook Reservoir to determine if roach were present. It was believed roach could have entered the reservoir when Lofton Reservoir was drawn down to rebuild the dam. No roach were taken in three gill net sets but a good population of brown bullhead was present.

Friday Reservoir was stocked with near equal numbers of fingerling rainbow, Summit Lake cutthroat, and Heenan Lake cutthroat. The purpose of this was to determine which species would be best suited for the alkaline waters found in southeastern Oregon. This is the third year the reservoir has been sampled by gill net to determine the growth rate by species. For the past two years the rainbow has had the lowest growth rate and the Heenan Lake cutthroat has had the highest rate of growth. There appears to be no significant difference in the growth rate of the three races of trout.

Silver Creek and the Silver Creek diversion were chemically treated in conjunction with Thompson Valley Reservoir in 1959. In July 1960, Kamloops rainbow fry were stocked in the water impounded by the diversion dam. Four gill net sets in early August 1961 took 137 rainbow and 4 brook trout. The trout ranged in size from 6 to 13 inches.

Table 125 shows the length and weight of trout at the various stages of maturity for the various waters tested.

In mid-April, four gill nets caught 13 trout in Thompson Valley Reservoir. The trout ranged in size from 6 to 13 inches in length. In early August, five gill net sets took 239 trout. These trout ranged in size from 4 to 19 inches in length. There was a good population of trout representing all size groups. The rainbow 12 inches and over in length weighed from 1 pound to 3 pounds 9 ounces. This excellent growth was obtained from fish stocked in June 1960.

Nine trout were taken from Sids Reservoir in three gill net sets. The fish averaged slightly over 9 inches in length. Two roach 5 inches in length were also taken. It is anticipated chemical treatment of the reservoir will be necessary within the next few years.

Table 124

Composition and Length Frequency of Catch by Gill Nets in Lake County District
Represented in One-inch Size Groups Fork Length Measurement, 1961

Date	Water	Number of Sets	Species	Number in Sample	Per cent of Total	Size Groups in Inches																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
4/13/61	Ana Reservoir	4	Rb Ro	27 526	4.9 95.1					135	327	56	6	2	1	1	5	11	7	1	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</

¹/ Heenan Lake cutthroat.

²/ Summit Lake cutthroat.

Table 125

Average Lengths and Weights of Female Fish at
Various Stages of Maturity, Southeast Region,
Lake County, 1961

Water	Species	Immature			Maturing			Mature		
		Number	Fork Length in Inches	Weight in Ounces	Number	Fork Length in Inches	Weight in Ounces	Number	Fork Length in Inches	Weight in Ounces
Ana Reservoir	Rb	20	10.85	8.82	-	-	-	-	-	-
Friday Reservoir	Rb	1	12.60	15.30	3	13.1	16.9	2	12.1	13.5
	Ct ¹	3	12.60	13.40	4	12.4	12.6	-	-	-
	Ct ²	3	12.50	12.90	4	12.6	12.9	-	-	-
Sids Reservoir	Rb	5	9.20	4.40	-	-	-	-	-	-
Sids Creek diversion	Rb	44	9.80	7.30	16	11.3	11.2	-	-	-
Thompson Reservoir	Rb	36	11.00	12.50	16	15.2	34.0	1	11.3	11.0

¹ Summit Lake cutthroat.

² Heenan Lake cutthroat.

Construction of two new impoundments has been completed in 1961. They are Lofton Reservoir and Cottonwood Meadows Lake, each of which will cover approximately 40 surface acres when full. Lofton does not have an inlet stream and is dependent on the snow pack to fill the basin. Initial stocking of this impoundment will be in the spring of 1962. Cottonwood Meadows Lake has good inlet streams. Sufficient water was stored by late November for an initial plant of 14,000 brook trout.

Development of another impoundment is proposed at Roaring Springs. The proposed basin would store 881.85 acre-feet of water and have a surface area of 73.34 acres when full. The survey for the impoundment was completed in December 1960. The survey of the proposed access road was completed in the fall of 1961. Negotiations for land acquisition are now in progress.

Two other small impoundments have been suggested for development. One would be located on Stephens Creek and would store 283 acre-feet of water and cover 29.5 surface acres when full. The other development would be located in Secret Valley on Dent Creek. With a full basin, this impoundment would cover about 90 surface acres.

New proposed impoundments, with the exception of Roaring Springs, have been in cooperation with the U. S. Forest Service.

Early in June, 1,325 bluegill averaging three inches in length were stocked in Big Swamp Reservoir. By August, these fish had grown to an average length of 4.5 inches and had reproduced. Many young bluegill were observed in the reservoir. In August, 235 largemouth bass and 34 channel catfish were also stocked in the reservoir.

Habitat Improvement

Three waters were chemically treated in the fall of 1961. The treatment of these waters will greatly improve the fishing of the area.

The Taft Miller Reservoir was dry as the result of a low-water year. The rehabilitation of this reservoir consisted of chemically treating potholes along the inlet stream. The inlet stream, Rock Creek, was dry below the Antelope Refuge with the exception of a series of potholes in a three-mile area near the Flook ranch.

Prior to the chemical treatment of Drews Reservoir, the upper tributary systems were treated to eliminate rough fish. The tributaries treated included Chandler, Howard, Dent, and Hay Creeks. Use of a 200-gallon capacity pressure spray aided considerably in the treatment of the tributaries.

South Arm Reservoir, a private impoundment in the headwaters of Hay Creek, was also treated. A heavy aquatic weed growth in the reservoir prevented a complete distribution of the chemical. It was necessary to re-treat the reservoir and increase the concentration of the chemical.

Chemically treated Drews Reservoir was drawn down to its minimum pool level of between 400 to 450 acre-feet. Four men using two boats completed the treatment in one day.

An excess of approximately 2,000,000 rough fish was destroyed. More than 95 per cent of the fish killed were roach and coarsescaled suckers.

Drews Creek was chemically treated immediately after the reservoir was treated. Approximately two months after treatment of the reservoir, three large rough fish were taken from the reservoir by gill net sets. It was necessary to re-treat the reservoir to increase the toxaphene concentration.

SCUBA divers located and buoyed all springs prior to treatment of Ana Reservoir. Some of the larger springs had formed subterranean tunnels and chambers. Many roach were found present in the tunnels and chambers. Drip stations were used to introduce rotenone into the springs. The main body of water was treated with toxaphene.

Two months later SCUBA divers again surveyed the spring areas. At this time, no roach were found either in the tunnels or spring outlets. No roach were caught in gill nets over a period of 16 hours.



CENTRAL REGION - COLUMBIA DISTRICT

Allan B. Lichens

Fish Culture

Summer Steelhead

The summer steelhead trapping program continued in 1961. Two traps were operated until June 1, when the Powerdale trap was removed. On June 19, the required number of steelhead had been transported to the hatchery. The Punchbowl trap near the mouth of West Fork of Hood River was left in operation until August 22 to determine the number of summer steelhead moving through the fish ladder. A total of 106 summer steelhead was captured in the trap from April 17 through August 22, indicating enough fish for hatchery propagation purposes can be trapped in the future by the operation of the one trap. The Powerdale trap will be discontinued in 1962.

Table 126 is a summary of the steelhead captured at the Powerdale and Punchbowl traps and the number of fish transported to the hatchery by months for 1959 through 1961.

Table 126

Results of Adult Summer Steelhead Trapping,
Hood River, 1959-1961

Month	Winter Steelhead			Summer Steelhead			Summer Steelhead Transported to Hatchery		
	1959	1960	1961	1959	1960	1961	1959	1960	1961
March	4								
April	54	66	25	6	1		6	1	
May	32	99	44	41	38	35	41	37	33
June	11	9	17	57	77	72	49	47	39
July						30			
August						4			
Totals	101	174	86	104	116	141	96	85	72

Forty-seven adult female summer steelhead were spawned at Hood River in 1961, producing 79,736 eggs. A total of 5,745 green eggs was lost, 67,392 were transferred to Gnat Creek Hatchery, and the remaining 6,599 were retained at the Hood River Hatchery. These fish will be released in Hood River in 1962.

Fish Distribution

Summer Steelhead

In May 1961, 39,972 summer steelhead of the 1960 brood, averaging 9.4 per pound, were liberated at Sandy Flat on the West Fork of Hood River. Approximately 23,000 additional steelhead of this brood were held at the Hood River Hatchery until December 13, 1961, at which time they were liberated above Sandy Flat on the West Fork of Hood River.

All of the steelhead were marked by the removal of the left pectoral fin, and a right maxillary mark was added to the 23,000 liberated in December at 9 per pound.

Within five days after the May liberation, the marked fish released on the West Fork of Hood River entered the sport catch in the main river below the Punchbowl, a distance of six miles below the liberation site. Some of these fish were also known to have remained in the vicinity of liberation point until at least September. Considerable numbers of these fish were killed in a September flash flood.

Fish Inventory

Anadromous

Salmon

As part of the lower Deschutes River stream flow evaluation survey, several flights were made to count spawning chinook salmon and redds. A Portland General Electric Company fishery biologist was accompanied on a helicopter flight September 28 covering a 68-mile river section between the Pelton reregulating dam and Cedar Island. The writer made two additional flights in a commercial Taylorcraft on October 13 and November 15, 1961.

Only five redds and three salmon were counted during the September flight although the trip occurred at a time when spring chinook salmon spawning activity normally should have been in progress or nearly completed.

The two flights in October and November indicated that the fall chinook salmon spawning peaked about the first week in November and extended throughout the 100-mile river section from the reregulating dam to the river mouth. Although weather and water conditions hindered observations on both flights, counts of 73 redds on October 13 and 254 redds on November 15 were made. Table 127 summarizes the lower Deschutes River chinook salmon redd counts.

Steelhead - Deschutes River

The average success per angler from the lower 7.5 miles of river indicates returns comparable to the 1960 season. Creel records reveal that 1,186 anglers required 6,111 hours to catch 300 fish, or 0.25 fish per angler. An estimated 2,893 anglers fished the west shore in this section of the river during a 44-day period beginning July 28 and ending September 10, 1961.

Table 128 summarizes data collected in the area from 1952 through 1961.

Table 127

Lower Deschutes River Chinook Salmon Spawning Ground Survey

Area	Number Salmon Redds	
	Oct. 13, 1961	Nov. 15, 1961
Pelton reregulating dam to South Junction	8	11
South Junction to four miles above Maupin	41	148
Four miles above Maupin to Twin Tunnels	10 <u>/1</u>	50 <u>/2</u>
Twin Tunnels to four miles below Mack Canyon	<u>/1</u>	45 <u>/3</u>
Four miles below Mack Canyon to mouth	14	<u>/3</u>
Totals	73	254

- /1 Visibility poor for 26 miles below mouth of White River and fair for the remaining 21 miles to the river mouth.
/2 Visibility poor White River to Twin Tunnels.
/3 Flight and counts discontinued 8 miles above Mack Canyon due to weather conditions.

Table 128

Summer Steelhead, Sport Catch, Lower Deschutes River, 1952-1961

Year	Anglers Checked	Fish Caught	Hours Fished	Fish per Angler	Hours per Fish	Estimated Anglers
1952	1,054	443	4,276	0.42	9.7	3,190
1953	882	375	3,578	0.43	9.5	3,740
1954	1,070	384	4,533	0.36	11.8	2,800
1955	843	253	2,771	0.30	11.0	2,700
1956	633	207	2,289	0.33	11.1	1,865
1957	888	480	3,798	0.54	7.9	2,268
1958	1,168	281	5,405	0.24	19.2	3,030
1959	1,464	808	8,698	0.55	10.8	4,662
1960	1,218	218	4,438	0.18	20.4	3,590
1961	1,186	300	6,111	0.25	20.4	2,893

Steelhead - Hood River

Hood River creel records indicate an improved steelhead angler success which is again comparable to years prior to 1960. A total of 169 anglers expended 334 hours to catch 27 steelhead, or 0.16 fish per angler.

Table 129 is a comparison of the steelhead catch in Hood River from 1952 through 1961.

Table 129

Steelhead Creel Census by Year, Hood River, 1952-1961

Year	Anglers Checked	Fish Caught	Hours Fished	Fish per Angler	Hours per Fish
1952	97	27	215	0.28	8.0
1953	85	22	176	0.26	8.0
1954	357	42	560	0.12	13.3
1955	353	38	488	0.11	12.8
1956	204	17	256	0.08	15.1
1957	165	41	669	0.25	16.3
1958	120	22	123	0.18	5.6
1959	367	45	666	0.12	14.8
1960	187	10	379	0.05	37.9
1961	169	27	334	0.16	12.4

Figure 5 illustrates the comparative catch of steelhead by month in Hood River as tabulated from a sample of steelhead punch cards for the years 1954 through 1960.

TroutLost Lake

The improved angler success at Lost Lake has continued to attract more anglers each year. During the 1961 season the success averaged 2.7 fish per interviewed angler, an increase from 2.2 in 1960.

Tables 130 and 131 summarize the catch statistics and size comparison of the catch at Lost Lake from 1953 through 1961.

The proportion of kokanee in the catch continued to increase, making 31 per cent of the angler-take in 1961. The fish were in the 8 to 10-inch size group and matured in 1961, probably originating from the 70,000 kokanee fry released in 1958.

Table 132 provides the composition of the catch at Lost Lake by species and percentages from 1953 through 1961.

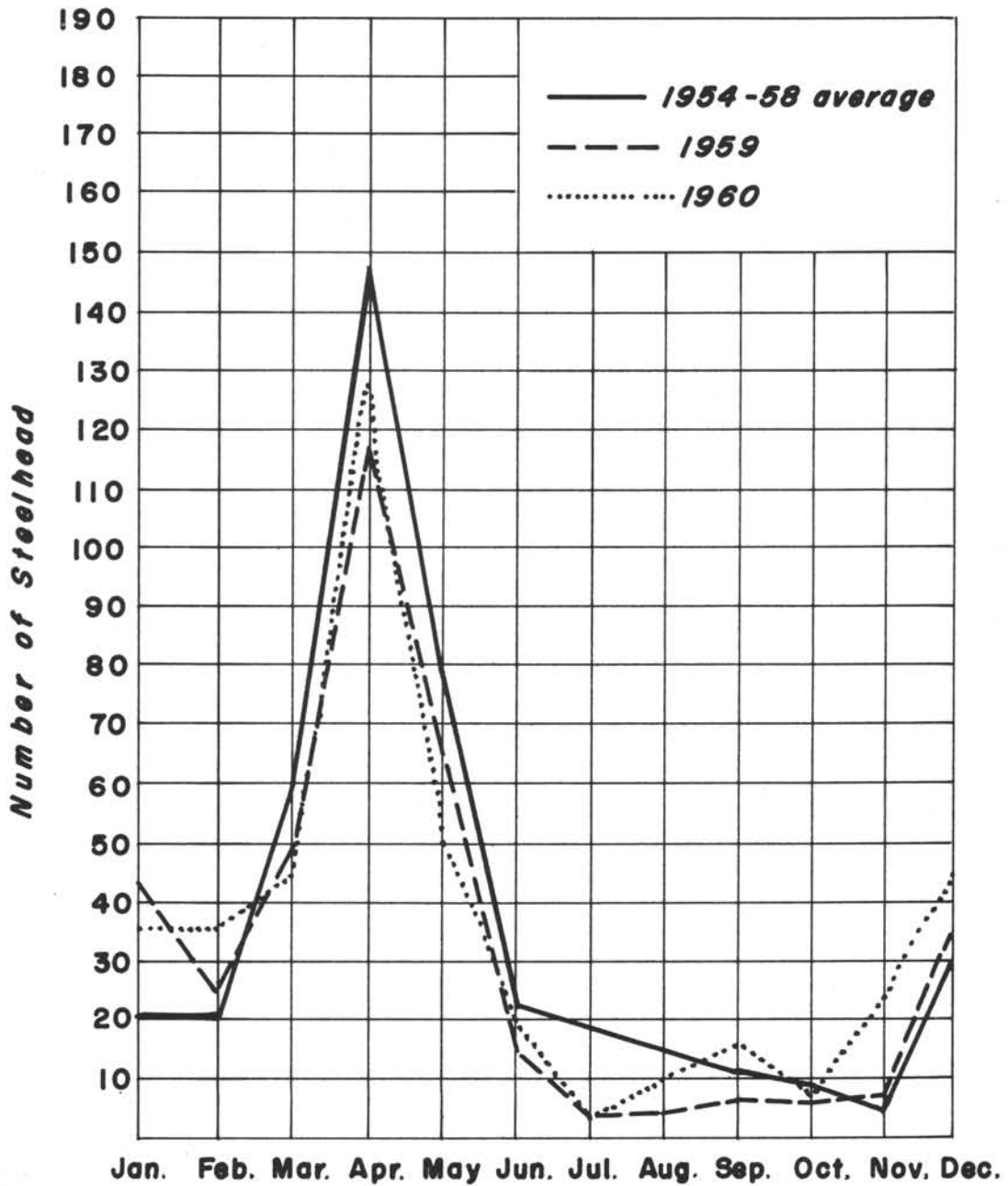
Olallie Lake

A success of 1.5 fish per angler at Olallie Lake indicated a marked decrease from the past three-year average when the return was 2.3 fish per angler.

The contribution to the fishery from the annual plant of brook trout increased to 20.2 per cent during the 1961 season, but 87 per cent of these fish were under 8 inches in length.

Tables 133 and 134 tabulate the stocking and creel returns from 1952 to 1961.

Figure 5



STEELHEAD CATCH IN HOOD RIVER, 1954-60

Table 130

Catch Statistics at Lost Lake, 1953-1961

Year	Fish Checked	Anglers Interviewed	Hours Fished	Fish per Angler	Fish per Hour
1953	142	42	210	3.38	0.68
1954	127	72	310	1.76	0.41
1955	145	90	291	1.61	0.50
1956	70	73	186	0.95	0.38
1957	24	23	75	1.04	0.32
1958	337	155	522	2.17	0.65
1959	489	237	990	2.06	0.49
1960	477	215	924	2.22	0.52
1961	1,269	477	1,604	2.66	0.79

Table 131

Size Composition of the Catch Expressed in Percentages,
Lost Lake, 1953-1961

Year	Size Groups in Inches				
	6-8	8-10	10-12	12-14	14 and Over
1953	12.6	28.2	48.7	9.8	0.7
1954	10.6	57.5	19.2	12.7	
1955	16.5	62.2	17.9	3.4	
1956	3.2	25.9	70.9		
1957	45.3	50.6	4.1		
1958	19.3	58.2	20.5	1.4	0.6
1959	16.3	65.5	14.3	3.2	0.7
1960	25.9	51.6	21.2	1.3	
1961	10.9	69.6	18.7	0.8	

Table 132

Composition of the Catch by Species, Lost Lake, 1953-1961

Year	Percentages by Species				
	Rainbow	Brook Trout	Brown Trout	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	94.5	0.5	2.0	2.6	0.4
1960	92.0	0.5	0.6	6.9	
1961	68.5	0.5	0.2	30.8	

Table 133

Species, Numbers, and Pounds Liberated at Olallie Lake, 1952-1961

Year	Species	Number	Pounds	Size (Inches)	Total Number	Total Weight
1952	Rainbow	33,505	8,045	6+	33,505	8,045
1953	Rainbow	42,000	13	0 - 2	46,020	613
	Rainbow	4,020	600	6+		
1954	Rainbow	29,173	1,804	3 - 7	38,825	3,571
	Rainbow	9,652	1,767	6+		
1955	Rainbow	10,256	3,870	6+	25,280	4,407
	Brook Trout	15,024	537	4 - 7		
1956	Rainbow	9,969	2,060	6+	30,539	2,120
	Brook Trout	20,570	60	2 - 4		
1957	Rainbow	5,019	1,130	6+	60,264	1,766
	Rainbow	5,000	500	6		
	Brook Trout	50,245	136	2 - 4		
1958	Rainbow	10,033	2,200	6+	40,084	2,677
	Brook Trout	30,051	477	3 - 5		
1959	Rainbow	10,051	2,328	6+	40,127	2,670
	Brook Trout	30,076	342	3		
1960	Rainbow	9,597	2,984	8+	47,097	3,484
	Brook Trout	37,500	500	3 - 5		
1961	Rainbow	12,162	4,616	9 - 10	42,692	5,046
	Brook Trout	30,530	430	3		

Table 134

Catch Statistics at Olallie Lake, 1952-1961

Year	Fish Checked	Anglers Checked	Hours Fished	Fish per Angler	Fish per Hour
1952	139	77	387	1.8	0.36
1953	892	367	1,952	2.4	0.46
1954	765	384	2,032	2.0	0.38
1955	357	194	741	1.8	0.48
1956	229	74	364	3.1	0.63
1957	68	95	254	0.7	0.27
1958	627	300	1,230	2.1	0.51
1959	637	223	1,051	2.9	0.61
1960	497	232	954	2.1	0.52
1961	227	156	623	1.5	0.36

Table 135 depicts the composition of the Olallie Lake catch expressed in percentages of size groups.

Table 135

Size Composition of the Catch Expressed in Percentages,
Olallie Lake, 1952-1961

Year	Size Groups in Inches				
	6-8	8-10	10-12	12-14	14-16
1952	23.0	24.0	26.0	21.0	6.0
1953	25.0	66.0	8.0	0.8	0.2
1954	32.9	44.4	20.0	2.7	0.0
1955	20.7	33.8	36.9	8.3	0.3
1956	41.7	55.1	2.6	0.6	0.0
1957	22.0	28.0	48.0	2.0	0.0
1958	16.9	62.3	18.9	1.7	0.2
1959	32.3	51.9	14.9	0.6	0.3
1960	8.6	56.5	33.5	1.2	0.2
1961	22.9	34.4	37.9	4.8	0.0

Table 136 compares the catch by species at Olallie Lake from 1952 through 1961.

Table 136

Composition of the Catch by Species, Olallie Lake, 1952-1961

Year	Percentages by Species		
	Rainbow	Brook Trout	Cutthroat
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	68.7	30.2	1.1
1960	86.7	13.3	
1961	79.8	20.2	

It is obvious that the annual release of about 30,000 brook trout averaging about 75 per pound in each of the three previous years has not produced substantial numbers in the creel.

The stocking of kokanee in Olallie Lake in place of the brook trout is being considered.

Other Lakes

Creels were checked at various district lakes and reservoirs as the work schedule permitted. Table 137 depicts the data collected during the 1961 fishing season.

Table 137

Creel Census Data for Lakes and Streams in the Columbia District,
Central Region, 1961 Season

Lake or Stream	Species	Size Groups in Inches					Total Fish	Anglers Checked	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14 & Over						
Streams												
Badger Creek	Rb	6	8				14	14	25	1.00	1.8	0.56
Deschutes River, Section 1	Rb	348	963	321	85	46	1,763					
	St					15	15					
	Br	2	2	7	4	2	17					
	DV	1					1					
	Ch	1					1					
	Wf		1	3	6		10					
	Sq		1		1		2	1,063	4,862	1.70	2.7	0.37
Deschutes River, Lower River	Rb	5	10	5	6	1	27					
	St					300	300					
	Ch					8	8					
	Sg					3	3	1,186	6,111	0.29	18.1	0.06
Deschutes River, Sherars Bridge	Ch					33	33	87	430	0.38	13.0	0.08
	Rb	36	60				96	42	81	2.29	0.8	1.19
Fifteenmile Creek	Rb	2	6	12		3	23	4	24	5.75	1.0	0.96
Fivemile Creek	Rb											
Hood River	St					27	27	169	334	0.16	12.4	0.08
Hood River, East Fork	Rb	188	659	187	5		1,039					
	Ct	27					27					
	EB	2					2	437	1,172	2.44	1.1	0.91
							1,068					

Table 137 (continued)

Lake or Stream	Species	Size Groups in Inches					Total Fish	Anglers Checked	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14 & Over						
Neal Creek	Rb	5	20	3			28					
	Ct	13					13 41	14	25	2.93	0.6	1.64
White River	Rb	17	35				52	30	117	1.73	2.3	0.44
<u>Lakes</u>												
Badger	Rb	28	12	3			43					
	EB			21	16		37 80	27	101	2.96	1.3	0.79
Clear	Rb	181	570	465	51	9	1,276					
	EB	4	26	12	2		44					
	Br		1	7			8 1,328	382	1,763	3.48	1.3	0.75
Frog	Rb	9	102	47			158	122	357	1.30	2.3	0.44
Island	EB	10	3	2			15	3	21	5.00	1.4	0.71
Kingsley Reservoir	Rb	8	211	20			239					
	EB		6				6 245	62	238	3.95	1.0	1.03
Lost	Rb	107	548	203	10		868					
	EB	1	5	1			7					
	K	29	329	33			391					
	Br	2	1				3 1,269	477	1,604	2.66	1.3	0.79
McClure	Rb	4	164	9			177					
	BC	3					3					
	B			1			1 181	62	196	2.92	1.1	0.92

Table 137 (continued)

Lake or Stream	Species	Size Groups in Inches					Total Fish	Anglers Checked	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14 & Over						
Monon	Rb	9	97	58	4		168	39	153	4.31	0.9	1.10
Olallie	Rb	12	75	83	11		181					
	EB	40	3	3			46					
							227	156	623	1.46	2.7	0.36
Rock Creek Reservoir	Rb	14	89	10	2		115					
	B	9					9	143	561	0.87	4.5	0.22
							124					
Warren	EB	28	3				31	15	33	2.07	1.1	0.94



DOLLY VARDEN

Fish populations in six district lakes were sampled by experimental gill nets. Results are reported in Tables 138 and 139. In addition, physical surveys including depth, temperature series, and general observations were conducted on Teacup Lake and on two small unnamed lakes in the Olallie area. All three are shallow lakes which are subject to winterkills and not recommended for stocking. Survival of brook trout in the unnamed lakes through two winters indicates that release of trout from hand-carried plastic bags can be practical and worthwhile.

The length at maturity of female rainbow trout captured from Clear Lake increased from 10.2 inches in 1960 to 16.9 inches in 1961. The enormous growth increase portrays the expanded fish food production resulting from the newly impounded waters and increased surface acreage of Clear Lake since completion of the new dam in late 1959. Plants of 35,000 fingerling rainbow and 50,000 brook trout were made in 1961.

East Fork Hood River

The returns to the angler from the East Fork of Hood River during the 1961 season were comparable to seasons since 1957 when the present method of management was inaugurated. There was an average success of 2.4 fish per interviewed angler. This was a slight increase from 1960.

Table 140 summarizes the creel census collected on the East Fork of Hood River since 1954.

Creel census records collected from other district streams in 1961 are tabulated in Table 137.

Stream Surveys

Stream surveys and steelhead spawning counts were made on three Sherman County streams during 1961. The streams surveyed were Buckhollow, Bakeoven, and Deep Creeks, all tributaries to the Deschutes River in the vicinity of Sherars Bridge and Maupin.

The general limiting factors for all of these streams were the extreme low water flows during the late summer months. With this in mind, location of possible dam sites was of importance during the surveys. Several excellent reservoir sites were located in the headwaters of these streams. Water storage developments and controlled releases would provide better spawning and rearing facilities in downstream areas. All information is recorded in a special stream survey report.

The four redds observed in Finnegan Creek were in the first one-half mile of the stream. The area above this point was not checked; however, there was no indication that steelhead were not going beyond this point. No survey was made on Cottonwood Creek; the one redd was a spot observation approximately one-fourth mile above its confluence with Bakeoven.

Habitat Improvement

Log Jams

A log jam in the Lake Branch was removed, upon request, by the Neal Creek Lumber Company.

Table 138

Composition and Length Frequency of Catch by Gill Nets in Six Columbia District Lakes,
Represented in One-Inch Size Groups, Fork Length Measurements, 1961

Lake	Date	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	18 & Over
Badger	9/ 1/61	3	Rb	8	100.0	2	2	2	1	3								
Clear	8/31/61	4	Rb EB	25 1	96.3 3.7	3	1	2	8	2	4	2				2	1	
Horseshoe	9/ 5/61	2	EB	1	100.0												1	
"L"	9/ 5/61	1	EB	10	100.0	1	9											
Teacup	7/12/61	3		0														
Tub	9/ 5/61	1	EB	5	100.0	5												



Table 139

Average Length of Female Trout in Each Stage of Maturity as Collected in Gill Nets
in Five Columbia District Lakes, 1961

Lake	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length in Inches	Number in Sample	Average Length in Inches	Number in Sample	Average Length in Inches
Badger	Rb	5	8.8				
Clear	Rb	9	10.2	2	16.9		
	EB	1	8.0				
Horseshoe	EB					1	17.3
"L"	EB			4	7.3		
Tub	EB			2	6.2	1	6.0



Table 140

Trout Catch Statistics on East Fork, Hood River, 1954-1961

Year	Fish Caught	Anglers Checked	Hours Fished	Fish per Hour	Fish per Angler
1954	283	126	317	0.89	2.25
1955	146	109	233	0.63	1.34
1956	112	116	280	0.40	0.97
1957	706	276	669	1.06	2.56
1958	523	185	558	0.94	2.83
1959	1,293	460	1,254	1.03	2.81
1960	801	375	941	0.85	2.14
1961	1,068	437	1,172	0.91	2.44

A log jam was formed on the West Fork of Hood River as the result of high water in September of 1961. This jam is approximately 100 yards in length and 8 to 10 feet high. It has completely blocked the channel, forcing the stream through a timbered area and creating an impassable barrier.

From all indications, it appears that it would be more feasible to improve the newly formed channel instead of attempting to remove the log jam.

Reservoir Rehabilitation

Rock Creek Reservoir was chemically treated in October of 1961 with 2.5 per cent synergized rotenone.

The impoundment contained ten acre-feet of water with only one stream flowing two cubic feet per second contributing to the storage. The fish population consisted of rainbow trout, bullhead catfish, and goldfish. Only 10 trout were observed. The size of these trout ranged from 8 to 16 inches in length. The catfish and goldfish population was estimated to exceed 100,000 fish. The range in size was 2 to 4 inches for catfish and 1 to 10 inches for the goldfish.

Channel Improvement

Arrangements were made with the Hood River County Court for clearing the channel of Lost Lake Creek and providing two new side channels for the purpose of diverting additional water into Lost Lake Creek.

Approximately one mile of the main stream was cleared of log jams and debris. Several hundred feet of additional channel were provided for drainage. The purpose of this project was to provide better access into the stream for spawning kokanee. Approximately 25 mature kokanee were observed at the mouth of the stream during this operation.

Reservoir Construction

An access agreement between the Game Commission and Joe Bibby, Sherman County, provides public fishing and a minimum pool in a pond located six miles west of Kent. A minimum depth of 16 feet and 50 acre-feet of storage are stipulated.

Construction has been completed and water will be stored during the spring of 1962.

Stream Pollution

Oregon Lumber Company

The Oregon Lumber Company dam was flushed on at least three occasions during the month of January 1961, each time on a weekend during low stream flows. The silt and debris load in the water was so great that it was impossible to fish on the day that the ponds were flushed.

No notification was given in advance of the pond being flushed and, as a result, the screens at the Powerdale Dam were plugged with debris and had to be removed. On February 9, the dike holding the dry storage pond for fiber at Oregon Lumber Company was breached by high water and a channel washed through the bottom of the pond about 25 feet wide by 6 feet deep in solid fiber. This channel was approximately 375 feet in length. It was estimated that in excess of 2,000 cubic yards of fiber were washed into the river. Resulting damage to Pacific Power and Light Company screens at Powerdale Dam caused them to be inoperative for a considerable time.

The waste fiber pipeline leading from the hardboard plant was left open after resuming operations Monday morning, June 19. In this short period of time fiber entered the river in large enough quantities to plug and damage the Farmers' fish screen, causing the ditch to overflow. The fiber on the screen also contained a considerable number of small (approximately three-inch) rainbow.

Fishways and Screens

Severe winter flooding and an exceptionally wet spring disrupted irrigation activities during the 1961 season in Hood River and Wasco Counties. A total of 13 rotary fish screens was in operation during the season on diversions in Watershed 4.

Data on downstream migrants were obtained at five traps in screen bypasses plus an additional trap operating briefly on a newly-installed traveling belt screen operated by the East Side Irrigation District.

Table 141 summarizes screen and bypass trap records for seasons 1959 through 1961. Tables 142 and 143 summarize length distribution records for migrant trout and salmon trapped in Fifteenmile Creek and Hood River watersheds.

The bypass trap for the traveling belt screen on the East Fork irrigation canal was not effective this year due to the fluctuating flows from the bypass as a result of debris. A new type of trap will be designed for use in the 1962 irrigation season to better evaluate efficiency of this screen.

The fish passage facilities continue to be a major problem to migrating fish throughout the Columbia district.

On numerous occasions during 1961, the Oregon Lumber Company ladder was out of operation due to either damage at the lower sections of the ladder or from debris from the log pond.

Table 141

Rotary Fish Screen and Bypass Trap Records, 1959 through 1961

Stream	Screens in Operation			Bypass Traps			Downstream Migrants Trapped		
	1959	1960	1961	1959	1960	1961	1959	1960	1961
Fifteenmile Creek	7	7	5	6	6	1	933	1,093	85
Ramsay Creek	2	2	2	2	1	1	242	101	91
Eightmile Creek	0	1	0	0	0	0			
Mill Creek	1	0	0	0	0	0			
Evans Creek	3	3	3	1	1	1	9	31	55
East Fork Hood River	1	1	1	1	1	2 ^{/1}	208	18	72
West Fork Hood River	1	1	1	1	1	1	155	5	2
Neal Creek	1	1	1	1	1	0	378	884	
Totals	16	16	13	12	11	6	1,925	2,132	305

Note: Non-game species excluded from above figures on migrants.

^{/1} A bypass trap was installed and briefly operated on a screen installed and operated by the East Side Irrigation District.

Table 142

Length Distribution of Downstream Migrant Rainbow Trout
Trapped at Two Rotary Screen Bypasses on
Fifteenmile and Ramsay Creeks, 1961

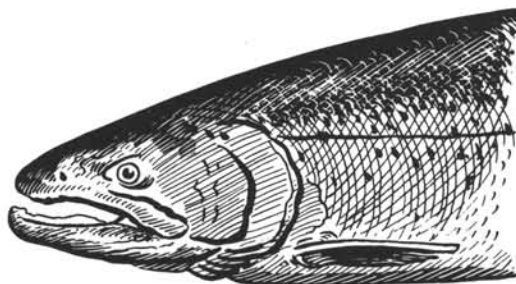
Date	Size Groups in Inches						Total
	1-2	2-3	3-4	4-5	5-6	6-8	
May 15 - June 15					1		1
June 15 - July 15							0
July 15 - Aug. 15	1	18	6			1	26
Aug. 15 - Sept. 15	20	26	12	6	2	3	69
Sept. 15 - Oct. 15	4	33	34	4			75
Oct. 15 - Nov. 15		3	1	1			5
Totals	25	80	53	11	3	4	176

The Pacific Power and Light Company fish ladder continues to be ineffective due to its location and the many false attractions near the base of the dam. Methods of improving Hood River fish passage facilities are being studied with representatives of the Oregon Fish Commission.

Table 143

Length Distribution of Downstream Migrant Trout
Trapped at Four Rotary and Traveling Belt
Screen Bypasses on Hood River
and its Tributaries, 1961

Date	Size Groups in Inches								Total
	0-1	1-2	2-3	3-4	4-5	5-6	6-8	8-10	
Mar. 15 - Apr. 15						8	7		15
Apr. 15 - May 15				2		17	12		31
May 15 - June 15					1	5	9	1	16
June 15 - July 15				1	4			2	7
July 15 - Aug. 15	1			1	4			2	8
Aug. 15 - Sept. 15			4		2	1	1		8
Sept. 15 - Oct. 15			2	1		1	1		5
Oct. 15 - Nov. 15			36	5	5	2			48
Totals	1	0	42	10	16	34	30	5	138



BEND DISTRICT

M. L. Montgomery

Fish Inventory

Anadromous

Spring Chinook

Spring chinook spawning ground surveys on Squaw Creek, the Metolius River, and tributaries revealed a slight increase in use over the 1957 parent run although incomplete counts in 1957 revealed 623 chinook moving over Pelton Dam and 584 were tabulated in 1961. In 1961, 30 spawning chinooks and 58 redds were observed while 46 chinooks but only 35 redds were tabulated in 1957. Table 144 shows spring chinook spawning ground data for Squaw Creek, the Metolius River, and tributaries.

The Metolius River supports the bulk of the spawning chinooks moving above Pelton Dam.

Additional time and effort should be devoted to correlate spawning ground counts with the upstream Pelton enumeration.

The upstream counts of chinook salmon at Pelton are tabulated in Table 145.

The angler take of downstream migrant chinooks in Pelton Reservoir is not a problem. Examination of the downstream migrant counts at Pelton (Table 146) indicates the following percentages of escapement prior to June 1: 1949, ninety per cent; 1960, eighty-two per cent; and 1961, eighty-five per cent.

Young chinook examined in angler creels in late May, June, and early July comprised less than one per cent of the recorded catch. Some immature chinook were taken in late September and October. However, the angler use of the reservoir in the late season has been of limited extent.

Steelhead

The steelhead spawning escapement into Squaw Creek was the third lowest recorded since the counts were initiated in 1951. Steelhead redds observed in 1957 were 57, while 25 redds were recorded in 1961. The Squaw Creek spawning ground data for the years 1954 through 1961 are listed in Table 147.

Steelhead moving above the Squaw Creek weir have been tabulated since 1951. The trap counts are delineated by year in Table 148.

The 1961 Squaw Creek trap counts revealed 85 steelhead moving above the weir, while the parent run in 1957 contained 117 fish.

A summary of upstream steelhead counts at Pelton Dam is contained in Table 145. Examination of the data indicates a substantial reduction in numbers of adult fish moving above the dam in the years of record.

Table 144

Spring Chinook Spawning Ground Survey, Squaw Creek, Metolius River, and Tributaries, 1955-1961

Location	Spawning Salmon Observed										Redds			
	1955	1956	1957 /3	1958	1959	1960	1961	1955	1956	1957 /3	1958	1959	1960	1961
Head of Metolius River to Fish Commission's rack	0 /1	11	23	/2	45	24	3	0 /1	27	21	/2	52	20	10
Camp Sherman to Canyon Creek	1	0	6	10	3	2	20	4	1	2	18	2	1	28
Wizard Falls Hatchery to Bridge 99	5	41	15	1	19	23	3	9	25	12	7	33	7	7
Bridge 99 downstream one mile	0	0	/2	/2	2	/2	/2	2	2	/2	/2	2	/2	/2
Lake Creek (tributary to Metolius River)	0 /1	/2	/2	/2	0	/2	/2	0 /1	/2	/2	/2	0	/2	/2
Spring Creek (tributary to Metolius River)	0 /1	/2	2	3	17	5	4	0 /1	/2	0	4	16	8	9
Jack Creek (tributary to Metolius River)	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Squaw Creek (tributary to Deschutes River)	11	12	0	0	4	0	0	6	15	0	0	2	0	0
Totals	17	64	46	14	90	54	30	21	70	35	29	107	37	58

/1 No salmon allowed to move above Fish Commission rack.

/2 Not surveyed.

/3 Information obtained from Fish Commission.

Table 145

Summary of Upstream Migrant Counts, Pelton Dam, 1956-1961

Species	Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Chinook	1956								15	28	69	0	0	112
	1957	0	0	0	0	95	168	97	166	78	17	4	2	627
	1958	0	0	0	7	198	229	29	8	9	4	1	0	485
	1959	0	0	0	13	274	71	111	20	19	3	0	0	511
	1960	0	0	0	0	379	168	18	3	43	105	24	0	740
	1961	0	1	0	14	204	293	23	14	11	21	1	0	582
Steelhead	1956								17	59	69	21	20	186
	1957	3	33	23	51	27	49	108	26	55	163	64	427	1,029
	1958	103	250	210	102	62	251	118	33	14	53	307	11	1,514
	1959	39	39	205	55	17	13	142	23	40	19	30	13	635
	1960	27	134	73	0	7	64	53	12	18	20	68	53	529
	1961	41	119	10	18	4	38	53	15	10	30	39	55	432
Blueback	1956								1	1	0	0	0	2
	1957							4	10	12	3	1	0	30
	1958							1	51	4	0	0	0	56
	1959							18	57	22	2	0	0	99
	1960	0	1	0	0	1	2	5	8	4	3	0	6	30
	1961	0	2	5	4	2	1	18	33	14	1	0	0	80
Silvers	1960									1				1
	1961										1			1

Table 146

Summary of Downstream Migrant Counts, Pelton Reservoir, 1958-1960

Species	Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
Chinook	1958	320	550	575	25,313	24,105	3,225	516	0	0	0	627	1,174	1,174
Wild	1959	137	84	2,733	14,801	3,497	1,873	116	0	7	751	1,576	170	55,401
Hatchery	1960				11,301	2,774	796	60				3	660	26,035
Wild	1961	228	1,567	1,193	9,610	5,487	944	140	2	46	93	614	8	14,942
Hatchery	1961	2	7	3,545	4,528	2,041	1,130	318	5	7	4	1	1,270	21,194
													2	11,590
Steelhead	1958													8
Wild	1959	0	0	6	644	4,010	3,509	826			4	4	2	9,015
Hatchery	1960	1	2	153	2,004	3,813	4,311	116	4	1	3	18	2	10,427
Wild	1961	1	19	106	845	94	602	1	0	0	0	0	0	1,507
Hatchery	1961	0	0	2	385	2,011	2,080	133	47	164	273	91	74	5,844 ^{/2}
						475	701	144	1	1	0	0	0	1,709
Blueback	1959	0	0	0	12	16	28	1					0	57
Wild	1960			48	126	20	6	0	0	2	1	0	0	203
Hatchery	1960				10,553	1,109	269	1	0	0	0	0	0	11,932
Suttle L.	1960				13 ^{/1}									13
Wild	1961	0	2	11	4	11	2	0	0	0	0	0	0	30
Hatchery	1961	1	39	162	318	494	282	5	0	1	20	0	2	1,324
Trout	1958													863
1959	262	264	285	1,108	3,311	3,453	1,453	448	1	2	6	193	662	7,415
1960	46	128	963	1,700	2,345	870	870	42	15	151	21	207	47	7,160
1961	103	995	114	284	224	69	69	22	3	42	310	455	135	2,009
											46	78	29	
Other Game	1958													58
Fish	1959	7	4	21	27	13	8	2	0	1	1	9	47	1,014
1960	12	7	70	93	12	14	14	-	0	784	24	98	26	243
1961	21	62	5	23	35	15	15	1		9	11	46	16	244
Coarse Fish	1958													74
1959	4	10	18	38	27	179	179	488	4	37	14	10	13	933
1960	1	9	120	464	202	165	165	59		72	9	77	7	1,045
1961	3	93	22	64	75	111	111	102	6	17	34	8	9	544

^{/1} Left ventral marked blueback from Suttle Lake.^{/2} Includes an estimated 1,500 hatchery rainbow trout that should be tabulated in 1961 trout count.

Table 147

Steelhead Spawning Ground Survey, Squaw Creek, 1954-1961

Location	Spawning Steelhead							Redds								
	1954	1955	1956	1957	1958	1959	1960	1961	1954	1955	1956	1957	1958	1959	1960	1961
Mouth to condemned bridge	1	35	12	4 <u>1</u>	2	19	0	0	22	107	58	15	9	13	0	0
Condemned bridge to corral	5	3 <u>1</u>	21	1 <u>1</u>	8	97	0	1	22	20	15	1	11	47	0	5
Corral to Rim Rock Ranch	7	7 <u>1</u>	5	2 <u>1</u>	4	<u>2</u>	1	5	30	73	39	4	34	<u>2</u>	0	11
Rim Rock Ranch to Stevens Ranch	10	4 <u>1</u>	6	0 <u>1</u>	14	<u>2</u>	1	2	27	44	25	7	82	<u>2</u>	0	8
Stevens Ranch to upper steelhead trap	15	9 <u>1</u>	28	5 <u>1</u>	8	<u>2</u>	10	4	57	77	78	30	93	<u>2</u>	13	1
Totals	38	58	72	12	36	116	12	12	158	321	215	57	229	60	13	25

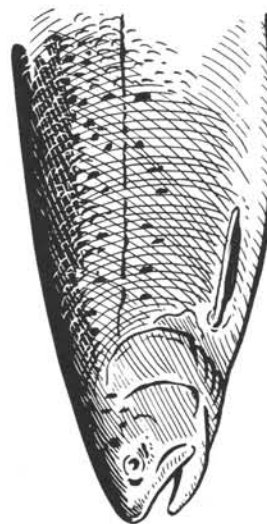
1 Spawning survey conducted too late to observe maximal numbers of steelhead.2 Log jam prevented steelhead from moving into upper reaches of stream.

Table 148

Steelhead Trapped at the Squaw Creek Weir,
1951 through 1961

Year	Steelhead
1951	21
1952	248
1953	166
1954	84
1955	55
1956	180
1957	117
1958	317
1959	<u>1</u>
1960	89
1961	85

1 Steelhead blocked 16 miles below weir by log jam.

In comparing brood year escapement to downstream migrant counts obtained at the Pelton fish passage facilities, the status of the steelhead runs utilizing areas above the dam is readily apparent. Brood year of the steelhead includes the counts at Pelton through April of the year the fish spawn and beginning May 1 of the previous year.

Incomplete counts of steelhead comprising the 1958 brood year (May 1957 through April 30, 1958) over Pelton were 1,577 fish, resulting in the downstream escapement of 10,427 immature wild steelhead in 1960. In the 1959 brood year, 1,066 fish moved above Pelton, supplying 5,844 downstream migrants in 1961, of which an estimated 1,500 were hatchery rainbow stocked in the reservoir by the U. S. Fish and Wildlife Service. Consequently, it is estimated less than 4,400 wild and 1,709 hatchery steelhead migrated from the reservoir.

Since the 1960 brood year escapement totaled 535 fish, it appears likely that the 1962 count of downstream migrants at Pelton will be low. The Pelton downstream migrant counts for the years 1958 through 1961 are shown in Table 146.

The sport catch of immature steelhead in Pelton Reservoir is of importance. In 1959, the anglers caught approximately 4,148 young steelhead while 9,015 fish escaped from the reservoir. Starting in 1960, the angling season was opened one month later. The estimated angler catch was 3,390 immature steelhead and there was an escapement of 10,427 from the reservoir.

Although the estimated total catch at Pelton Reservoir is not available for 1961, it is believed fewer steelhead will be taken than in 1959 and 1960. From angler creel records, the incidence of small steelhead in the catch decreased from 15 per cent in 1960 to 9 per cent in 1961.

At least 50 per cent of the downstream migrant steelhead escape the reservoir before the late season opens. The delayed season should be continued on

on the impoundment.

Creel census on the Deschutes River in the Warm Springs area revealed less than one per cent of 538 game fish checked in 1961 were immature steelhead.

Lack of available time and turbid water conditions were deterrents in obtaining adequate steelhead spawning ground counts for Trout Creek and tributaries in 1961. The steelhead data for Trout Creek and tributaries for 1960 and 1961 are presented in Table 149.

Table 149

Steelhead Spawning Ground Counts, Trout Creek and
Tributaries, 1960 and 1961

Stream	Miles		Steelhead		Redds	
	1960	1961	1960	1961	1960	1961
Trout	18.00	2.00	24	12	49	39
Potlid	0.75	0.75	5	2	2	6
Auger	1.00	1.00	1	0	4	0
Opal	2.00	2.00	6	1	12	9
Foley	3.00	3.00	3	0	3	9
Dutchman	<u>1</u>	0.50	<u>1</u>	1	<u>1</u>	17
Big Log	<u>1</u>	1.00	<u>1</u>	0	<u>1</u>	10
Totals	24.75	10.25	39	16	70	90

1 Not checked in 1960.

In 1961, steelhead redds were recorded at the rate of 8.7 per mile, and in 1960, 2.8 redds per mile were checked. Further field work should be expended on Trout Creek and tributaries to determine the number of unscreened irrigation diversions, barriers, available spawning gravel, and, most important, the development of upstream storage sites to provide water for minimum flows in the summer months. All available data would indicate a good potential for steelhead production in the Trout Creek drainage.

Trout

Composition and Length Frequency of Fish Populations

The composition and length frequency of fish populations as obtained by graduated mesh gill nets in some central Oregon lakes are summarized in Table 150. The length frequencies are in one-inch size groups.

Maturity

Maturity was determined for each female fish obtained in the samples and denoted as immature, maturing, or mature. Table 151 contains the maturity data for all district waters sampled in 1961.

Table 150

Composition and Length Frequency of Catch by Gill Nets in Some Central Oregon Lakes,
Represented in One-Inch Size Groups, Fork Length Measurements, 1961

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 & Over
Big Lava	2	EB Wf Ro	59 13 229	20.00 4.00 76.00		107	70	46	6				1 4								
Crane Prairie Reservoir	8	EB Rb K Wf Ro	27 32 52 59 773	3.00 3.00 6.00 6.00 82.00		1 4 2	1 4 15 1	3 3 8	1 2 2	1 2 3	6 5 5 17	6 2 1 12	5 2 1 16	1 1 2 6	3 3 1	3 1		2			
Davis	8	Rb K Wf Ro	16 1 1 1,713	0.90 0.05 0.05 99.00						5	4	2		1 1	1 1	1 1	1 1				
Deer	3	EB Rb	126 1	99.00 1.00			6	28	42	38	9			1		1		1			
East (6/28)	2	EB Rb Br Ro	35 22 3 226	12.00 8.00 1.00 79.00			3 3	2		1 4	10 3 1	12 2 1	3 1 1	1 2 1	1 1 1	1 1		1			
(10/2)	4	EB Rb Br Ro	89 119 9 29	36.00 48.00 4.00 12.00			8 15	3 21	9 27	13 27	12 7	18 7	13 6	14 1	4 2	3 1		1	3	2	1
Elk (6/14)	4	EB Rb K	72 7 35	63.00 6.00 31.00		1	12	9	10	5	16	12	3 5	3 1	1						
(8/24)	1	EB K	32 2	94.00 6.00		2 2	3	5	10	3	1	4	4								
Haystack Reservoir.	1	Rb Br	9 1	90.00 10.00		1	4			1		2	1								
Irish	2	EB	18	100.00				8	7	1	1			1							

Table 150 (continued)

Lake	Number of Sets	Species	Number Taken	Percentage of Total	Number in One-Inch Size Groups																			20 & Over
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Little Cultus	4	EB Rb	85 30	74.00 26.00		2 1	16 3	34 6	9 12	6 7	4 1	2	5	2	2	3								
Little Lava	4	EB Wf Ro	4 16 217	1.00 7.00 92.00			3 8	2 2	4	1 3	1 1	1 2				1								
North Twin	4	Rb	112	100.00				1	29	62	11	1	2	1	4	1								
Paulina	5	Rb Ro	282 83	77.00 23.00		16 2	61 22	55 43	45 13	33 2	12	26	19	5	4	3	2	1						
Pelton Reservoir	18	Rb Br Wf Su Sq Clim Cottid Other	39 34 26 46 403 97 236 3 13	4.40 3.80 2.90 5.20 44.90 10.80 26.30 0.30 1.40		1		9	11	8	7	2			1	1	2	2	1	7				
Prineville Reservoir	2	Rb Sq	22 1	96.00 4.00		1	3	5	5	4	3	1												
South Twin	1	Rb	85	100.00					1	26	45	9	3	1										
Sparks	4	EB Rb	152 12	93.00 7.00		2	7	24 5	69 1	32 1	9 5	2	1	1	2	2								
Taylor	2	EB	73	100.00			13	30	12	1	2	5	5	2	2	1								
Three Creeks	4	Rb EB	91 2	98.00 2.00		12	39	17	5	12	6 1			1										
Todd	4	EB	113	100.00		5	23	15	49	7	7	6	1											

1 Unidentified rough fish. Damaged by crayfish.

Table 151

Average Fork Length of Female Fish in Each Stage of Maturity as Collected
in Gill Net Sets in Some Central Oregon Lakes, 1961

Lake	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Big Lava	EB	11	7.8	2	10.3	8	11.0
	Wf	1	10.5	6	12.0	-	-
Crane Prairie Reservoir	Rb	14	9.5	5	15.1	1	18.3
	EB	8	9.6	14	11.1	-	-
	Wf	-	-	9	11.6	8	12.9
	K	15	8.5	2	12.5	-	-
Davis	Rb	6	9.9	4	15.2	1	15.0
Deer	EB	18	7.4	29	9.2	2	16.2
East	Rb	44	8.9	4	14.5	2	12.1
	EB	6	7.3	35	11.3	12	12.8
	Br	-	-	1	14.4	1	14.6
Elk	Rb	1	12.2	4	12.4	1	10.9
	EB	13	7.3	18	10.2	27	11.2
	K	17	8.1	1	9.4	-	-
Haystack Reservoir	Rb	1	11.9	1	10.9	-	-
Irish	EB	10	7.7	-	-	2	11.8
Little Cultus	Rb	2	8.0	3	9.8	-	-
	EB	14	7.5	15	10.2	6	14.2
Little Lava	EB	1	7.4	2	8.1	1	15.3
	Wf	1	6.5	3	8.9	3	12.0
North Twin	Rb	36	9.5	3	13.3	1	14.7
Paulina	Rb	66	10.0	2	14.3	3	16.5
Pelton Reservoir	Rb	9	9.5	4	9.8	2	13.1
	Br	2	9.5	7	11.5	8	16.4
	DV	1	7.8	1	13.8	6	23.6
	Wf	-	-	9	10.2	7	11.8
Prineville Reservoir	Rb	12	8.9	-	-	-	-
South Twin	Rb	12	10.2	3	12.1	1	12.0

Table 151 (continued)

Lake	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Sparks	Rb	3	7.2	4	13.4	-	-
	EB	13	7.7	25	8.4	7	10.9
Taylor	EB	6	7.1	4	11.0	4	12.3
Three Creeks	Rb	25	8.2	2	10.3	-	-
	EB	-	-	-	-	1	10.5
Todd	EB	2	6.8	16	8.9	3	10.5

Length at Maturity

The average length at maturity for female fish is an important index in the trend of the fisheries in central Oregon waters. The lengths at maturity for the years 1954 through 1961 are listed in Table 152.

Big Cultus Lake

The earlier opening date on Big Cultus has permitted anglers to harvest lake trout in greater numbers than occurred with the late high lakes opening. Nearly all of the lake trout taken are the result of the initial stocking in 1956 and were predominately in the 8 to 10-pound class in 1961. However, lake trout are reproducing successfully to some extent, as evidenced by a large school of fingerling observed along the north shore in mid-June 1961.

Angler use of the lake from mid-June through early September is hampered by water skiing activities.

Big Lava Lake

Partial rough fish control by trap netting and rotenone application in the shallows has not been effective in reducing the roach population in this lake. The rough fish comprised 76 per cent of all fish obtained in the gill net samples in 1961. This figure is the highest recorded since rehabilitation of the lake in 1949. The relative number of whitefish in the gill net samples increased from 2.5 per cent in 1960 to 4 per cent in 1961.

It would appear that the adult roach inhabiting the lake are utilizing deeper sections of the lake for spawning purposes. Trap nets are not effective nor can rotenone be used for partial control under such circumstances.

The average length of maturing brook trout females declined from 11.3 inches in 1960 to 10.3 inches in 1961. In view of the increased roach population and decline in the average size of maturing females, the annual stocking of brook trout fingerling was reduced from 250,000 to 200,000 fish in 1961. The reduction in the stocking rate was attempted in an effort to maintain the existing average size of the brook trout entering the catch.

Table 152

Average Length of Maturing Female Fish in Some Central Oregon Lakes, 1954-1961

Lake	Species	Fork Lengths in Inches by Year							
		1954	1955	1956	1957	1958	1959	1960	1961
Big Lava	EB	12.5	12.3	10.3	10.9	11.0	11.3	11.3	10.3
	Wf	--	--	--	--	--	13.4	--	12.0
Crane Prairie Reservoir	Rb	13.7	10.7	12.5	13.4	--	13.7	11.8	15.1
	EB	9.8	8.5	8.4	8.8	10.3	11.4	9.6	11.1
	Wf	12.2	10.9	11.7	10.8	11.9	11.9	12.1	11.6
	K	--	--	12.7	14.1	14.6	11.8	10.6	12.5
Davis	Rb	19.4	--	16.2	17.7	14.5	13.3	12.4	15.2
Deer	EB	--	--	--	--	--	--	9.3	9.2
East	Rb	13.9	13.6	15.2	12.1	12.6 /1	13.2 /1	--	14.5
	EB	--	--	--	--	--	11.2	12.2	11.3
Elk	Rb	15.0	10.9	--	--	--	--	--	12.4
	EB	11.3	8.8	10.8	11.2	9.7	8.8	9.4	10.2
	K	--	--	--	--	--	--	--	9.4 /1
Little Cultus	Rb	12.0	11.5	--	--	12.5 /1	--	11.0 /1	9.8
	EB	8.2	9.0	9.6	9.2	11.1	10.6	10.0	10.2
Little Lava	Rb	8.0	--	--	--	--	--	10.4	10.4
	EB	8.5	--	7.5	9.5 /1	8.7	8.7	9.6	8.1
	Wf	8.4	--	8.9	8.2	9.8	9.2	9.4	8.9

Table 152 (continued)

Lake	Species	Fork Lengths in Inches by Year							
		1954	1955	1956	1957	1958	1959	1960	1961
North Twin	Rb	8.8	10.9	10.6	--	9.4 <u>/</u>	10.4	11.0	13.3
Paulina	Rb	14.7 <u>/</u>	14.0	14.0 <u>/</u>	11.4	13.4	12.6	12.6	14.3
Pelton Reservoir	Rb						12.2	--	9.7
	Br						11.6	10.7	11.5
	DV						13.3	12.8	13.8
	Wf						10.7	10.0	10.2
South Twin	Rb						10.6	10.5	12.1
Sparks	Rb	--	--	--	--	--	--	11.4	13.4
	EB	9.3	9.0	8.8	10.2	9.0	10.0	9.6	8.4
Taylor	EB	8.9	7.5	9.0	11.5	--	8.4	8.2	11.0
Three Creeks	Rb								10.3
Todd	EB	10.5	--	8.5	9.0	8.8	8.8	8.9	8.9
<u>/</u> Indication.									

If data in 1962 substantiates the findings of 1961, consideration should be given to the treatment of Big Lava Lake in 1963.

Crane Prairie Reservoir

The population data from gill net sets reveal a relative decrease of roach from 89 per cent in 1960 to 82 per cent of the catch in 1961. The drop is possibly attributable to extensive losses of roach in 1960 and 1961 from a bacterial disease. Even though the roach population in Crane Prairie Reservoir has declined, their presence apparently limits game fish production.

Cultus River, Deschutes River, and Snow Creek, tributaries of Crane Prairie, have been examined for spawning rainbow trout in April and May of 1960 and 1961. Examination of the streams revealed 11 redds in Cultus River, 111 in the Deschutes, and 6 in Snow Creek in 1961. The rainbow spawning activity appeared to have been nearly completed by May 1.

Due to the large population of kokanee in the reservoir and early spawning of the rainbow, it would be desirable to open the reservoir on April 21, rather than the late May opening. The earlier season should permit more cropping of kokanee without detriment to the fishery.

Elk Lake

Kokanee were readily taken throughout the season in Elk Lake. The fish were predominately in the 8 to 10-inch class. Angler use of the lake in 1961 was the highest on record.

The average length of maturing brook trout females increased from 9.4 inches in 1960 to 10.2 inches in 1961, the greatest length at maturity since 1957. Elk Lake anglers caught fish at the rate of 2.8 fish per angler, requiring 1.47 hours of effort per fish.

Although kokanee are maturing at 9.4 inches, these fish have proved to be very popular to the public and are undoubtedly instrumental in the increased angler use of the lake.

Evidence of kokanee spawning in Elk Lake was noted for the first time in late October.

Haystack Reservoir

An inadequate gill net sample was obtained in Haystack Reservoir in 1961.

Creel records, secured primarily in the winter and spring months, indicate angler success of one fish per angler.

Roach first appeared in the gill nets in the spring of 1960. Thousands of roach fingerling were observed in the shoal areas of the reservoir in the summer of 1961. Anglers reported taking many catfish up to ten inches in length throughout the summer.

Haystack Reservoir will require several gill net checks in 1962 to determine the status of the rough fish population.

From past experience, a rapid degeneration of the trout fishery is expected in view of the existing roach population. The reservoir would readily lend itself to rehabilitation since the impounded waters can be easily drawn down. It will be necessary to coordinate any proposed rehabilitation project with the North Unit Irrigation District. The District has indicated it will cooperate in lowering the reservoir for chemical treatment.

Mud Lake

Mud Lake was opened to angling in 1961 for the first time since the lake was treated in September 1957 and restocked in August 1958. Creel records obtained for the most part through late May and June indicate the rate of return to the angler was 0.4 fish per angler and required 7.8 hours of angler effort per fish.

The largest fish recorded in the catch by district personnel was 27.5 inches in length, weighing 6.25 pounds. An Atlantic salmon weighing 6.75 pounds was reported caught by a local angler. The size distribution of angler-caught Atlantic salmon is presented in Table 153.

Table 153

Size Distribution of Angler-Caught
Atlantic Salmon, Mud Lake, 1961

Size (Inches)	Number	Per Cent
14-16	10	2
16-18	42	10
18-20	119	28
20-22	134	31
22 & Over	128	29
Totals	433	100

In addition to the salmon removed from the lake, 9 brook trout from 14 to 18 inches in length were caught.

An estimated 30 per cent of the salmon caught in late May and early June were in poor condition. By July 1, most of the fish had regained their weight and were considered prime fish.

Twenty-one of the female salmon examined in the catch were heavy with retained eggs that should have been deposited in November of 1960.

Examination of Quinn Creek, tributary of Mud Lake, in early November 1960, revealed 280 salmon present in the stream. On October 26, 1961, 28 Atlantic salmon were observed, with two pairs of fish actively digging at the time of survey.

Evaluation of the Quinn Creek spawning area indicated little, if any, natural reproduction in 1960. The October 1961 examination of the stream was too early to reveal the true magnitude of the salmon spawning population. A

mid-November check of Quinn Creek would probably have provided a more representative count of the spawning migrants in 1961.

The 1962 Atlantic salmon egg-take at the Wizard Falls Hatchery is in jeopardy due to the lack of males for spawning purposes. Because of the egg procurement problem at the Wizard Falls station and the lack of evidence that the Atlantic salmon are successfully propagating in Mud Lake, it would appear advisable to live trap and transport adults from the lake to the hatchery for propagation purposes in 1962.

Although it is doubtful that the brood fish could be caught out at Mud Lake with the existing angling regulations, it may be desirable to eliminate the one-fish bag limit to assure enough adult fish for the 1962 egg-take.

The stocking record for Mud Lake is delineated in Table 154.

Table 154

Mud Lake Stocking Record, 1958 through 1961

Year	Month Stocked	Number	Pounds Stocked	Average Size in Inches	Brood Year
1958	August	6,015	489	6	1956
1958	August	9,014	37	3	1957
1959	July	1,094	4	2	1958
1960	August	49,605	540	3	1959
1961	October	20,010	235	3	1960

The 1962 fishery at Mud Lake will be primarily dependent upon the 49,605 fish liberated in 1960 which should range from 13 to 17 inches by August.

Pelton Reservoir

The sport fishery at Pelton Reservoir is largely dependent upon legal rainbow trout supplied by the Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service. The remaining portion of the catch consists of immature chinook and steelhead, blueback or kokanee, Dolly Varden, and brown trout.

Anglers removed fish at the rate of 4.12 fish per angler and 0.75 fish per hour. The tabulation of Pelton creel census data is depicted in Table 155. Marked blueback (adipose fin excised) stocked in the spring of 1960 as part of the Pelton fishway evaluation study contributed substantially to the sport catch. Many of the wild and hatchery blueback failed to leave the reservoir and entered the sport fishery in 1961.

The fish were tabulated as kokanee in the angler creel and comprised 14 per cent of the recorded catch. The kokanee were predominately in the 10 to 12-inch class and averaged approximately 11 inches in length. U. S. Fish and Wildlife Service stocked kokanee in 1960 and 1961.

Table 155

Creel Census, Bend District, 1961 Season

Lake or Stream	Species	Size Groups in Inches									20 & Over	Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20							
Lakes																
Big Cultus	LT		2					1		20	23					
	Rb K		26		1						26		49	262	1.02	0.19
Big Lava	EB	19		83	297	16	1				416					
	Wf				1						1		237	1,052	1.77	0.39
Blue	Rb	1		17	6						24		13	57	1.90	0.44
	K				1						1					
Crane Prairie Reservoir	Rb	9		60	109	73	23	12	2		288					
	EB	2		30	68	54	13	1			168					
	K	4		40	63	26					133					
	Wf					7					7		257	1,160	2.30	0.51
											596					
Davis	Rb			6	7	8	8	8	2	1	40					
	K Wf				3	1					1					
Deer	Rb			1	3	1	2		1		5		8	37	1.00	0.22
	EB										3					
Devils	EB	5		1							6					
	Rb	2		47	10						59		19	52	3.42	1.25
Elk	Rb			8	28	3	2				41					
	EB	2		28	27	3					60					
	K			450	5						455		201	819	2.77	0.67
Haystack Reservoir											556					
	Rb		21	8	3	6	2				40		40	122	1.00	0.32
Little Cultus	Rb		20	14	7	5	1				47		43	171	2.32	0.58
	EB		21	20	7	5					53					
											100					

Table 155 (continued)

Lake or Stream	Species	Size Groups in Inches										Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over						
Lakes (continued)																
Little Huston	B	8	8		1	1						18				
	LB	1	3	2	1							7				
	BG	11	4									15	14	49	2.85	0.82
Mud	EB						1	8				9				
	AS			1			10	42	119	260		432	1,063	3,454		0.13
North Twin												441				
	Rb		17	137	270	48	25	6				503	150	630	3.40	0.80
Ochoco Reservoir	Rb		33	151	87	5	2					278	129	388	2.15	0.72
	Rb															
	Rb															
	St															
	Ch															
	K															
	Br															
	DV															
	Wf															
	BG															
	BrB															
	SS															
Prineville Reservoir	Rb															
	LB															
South Twin	Rb															
	Rb															
	EB															
Sparks	Rb															
	Rb															
	EB															
Suttle	Rb															
	K															
	Br															
	DV															
	Wf															
Todd	Rb															
	EB															
Walton	Rb															

Table 155 (continued)

Lake or Stream	Species	Size Groups in Inches										20 & Over	Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Lakes (continued)																	
Wickiup Reservoir	Rb		9	6	4	5	2					1	27				
	EB			1									1				
	K			25	40	460	52	1					578				
	Br		1	8	6	5	5					25	55				
	Wf		5			2	1						8				
													669	560	2,528	1.19	0.27
Streams																	
Crooked River, Sec. 1	Rb	94		477	16	4	1						592				
	St			3									3				
	Br	2		3	2	1	1						9				
	Wf	2		6	3	3	1						18				
				3	1			3					4	154	1,103	4.10	0.57
Crooked River, Sec. 2	Rb	25		57	7	1							90	32	50	2.80	1.80
	Mill Creek	12		14	5	9							40	14	19	2.86	2.10
	Ochocho Creek	16		27	6	2							51	45	55	1.10	0.93
		20		14	7	1							42	12	38	3.50	1.11
Crooked River, North Fork	Rb	35		41	26	5	1						108	16	144	6.75	0.75
	Deep Creek																
Deschutes River, Sec. 2	Rb	113		229	119	34	6	3	1				505				
	St	1		2	1								4				
	Br						1						1				
	Wf	2		6	3		1						12				
				1	1	6	8						16				
													538	275	1,209	1.96	0.47
Deschutes River, Sec. 3	Rb	183		509	39	5							736				
	EB	1											1				
	St	1											1				
	Br	66		143	51	11	4		1			1	277				
	Wf			14	9	1							24				
													1,010	438	1,476	2.37	0.72
Deschutes River, Sec. 4	Rb	6		10	22								38				
	EB	14		3	4	1							22				
	Br				1	2	1						4				
													4				
													64	34	83	1.88	0.76

Table 155 (continued)

Lake or Stream	Species	Size Groups in Inches										20 & Over	Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20								
Streams (continued)																	
Little Deschutes River	Rb	19		20	3	1							43				
	Br	16		4	2								22				
													65	36	93	1.80	0.70
Metolius River	Rb	38		188	100	18	9	1	1				355				
	St	30		4									34				
	Br	2		4	4	2	2						14				
	Wf	2		7	6	3	3	1				1	23				
				3	35	33							71				
													197	249	956	1.99	0.52



Population studies show an increase of rough fish in gill nets from 80 per cent in 1960 to 84 per cent in 1961. Trash fish increased in numbers from 31 per gill net set in 1960 to 41 per net in 1961. Population samples in 1959 and 1960 were obtained by gill net in February, April, June, August, and November, and the 1961 data were secured in February, April, July, and November. The composition and length frequency of the gill net catch is shown in Table 156.

The management of the water for trout production is further impaired by the presence of warm-water game fish. The following numbers and species of warm-water game fish were tabulated at the downstream fish facilities in 1961: 28 largemouth bass, 31 bluegill, 2 bullhead catfish, and 2 pumpkinseed.

Prineville Reservoir

Impounding of water in the new Prineville Reservoir commenced on December 12, 1960. Prior to storage of water, 91 miles of Crooked River and tributaries above the dam site were chemically treated to remove large populations of suckers, chiselmouth, squawfish, and bullhead catfish.

An initial plant of 76,000 spring rainbow fingerling averaging 4.5 inches was made in January 1961. Subsequent stockings brought the total to 514,000 rainbow fingerling weighing 10,579 pounds in 1961.

Growth rate of the planted fish was followed by periodic gill net sets in the reservoir. In April, the rainbow had an average length of 6.3 inches and reached 7.0 inches by May 16. By mid-August and early September, the reservoir was contributing outstanding catches to the angler. Creel data obtained in early September indicated a catch in excess of 4 fish per angler at the rate of 1.61 fish per hour. Rainbow 14 inches in length were entering the creel, however, the majority of fish were in the 10 to 12-inch class. The Prineville Reservoir creel data may be found in Table 155. Angler use of the impoundment in the winter months has been good.

Camping areas and boat launching sites have been installed by the Oregon State Parks Department and Crook County Park Commission.

East and Paulina Lakes

The 1961 angler use at East Lake was the lowest recorded since 1947. The sport catch of 45,000 trout is the smallest amount since 1952. See Table 157.

The average size of fish caught declined sharply in 1961 as seen in the increased take of fish in the 6 to 8-inch and 8 to 10-inch classes. In 1960, 8.2 per cent of the trout caught were in the 6 to 8-inch class, with 22.2 per cent taken in 1961. The percentage of trout removed in the 8 to 10-inch class increased from 28.3 per cent in 1960 to 43.4 per cent in 1961. Table 158 shows percentage of size groups for an 11-year period.

The lack of angler success in the early season followed by the increased take of fish of the year strongly indicates a heavy mortality occurred in the winter of 1960-61. Examination of the entire shore of East Lake was completed immediately after the ice cover left the lake in the spring of 1961, however, only three dead fish were observed.

Table 156

Composition and Length Frequency of Catch by Gill Nets in Pelton Reservoir,
Represented in One-Inch Size Groups, Fork Length Measurements, 1961

Date	Number of Sets	Species	Number Taken	Percentage of Total	Number in One-Inch Size Groups																			20 & Over
					3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
2/27/61	5	Suckers	83	40.0			1	10	9	8	16	20	21	13	2	1	1	1						
		Chiselmouth	71	34.1						47	3	1												
		Squawfish	16	7.7			1	1	1	1	2	10	1											
		Whitefish	12	5.8			1			3	4	2	2											
		Dolly Varden	4	1.9					1			1												2
		Brown trout	13	6.2							4	1	4	2	1					1				
		Rainbow	9	4.3			1	1	1	2	1	2	2											
			208																					
4/27/61	5	Suckers	160	38.6			2	18	24	24	40	37	27	11	1									
		Chiselmouth	150	36.3			34	67	30	1	22	14	8											
		Squawfish	59	14.2			4	7	4	3	1	6	3	1										
		Whitefish	15	3.6			1		3	1	2	3	1	1										
		Dolly Varden	17	4.1				5	1	1	2	3	1	2										3
		Brown trout	8	1.9					1	1	3	1	2											1
		Rainbow	5	1.3					1	1		2												
			714																					
7/ 6/61	5	Suckers	107	53.0			16	13	28	17	18	9	6											
		Chiselmouth	15	7.4			4	4	4	1	5	3												
		Squawfish	21	10.4			3	4	2	4	7	3	3	1										
		Whitefish	19	9.4			1	2	2	2	7	3												
		Dolly Varden	2	1.0							2	2	2	1	1	1	1	1						
		Brown trout	13	6.4						1	2	3												
		Rainbow	21	10.4					8	6	3													
		Cottid	4	2.0			2	1	1															
			202																					
11/20/61	3	Suckers	44	71.1			1	2	4	9	8	12				1								
		Chiselmouth	4	6.4					2															
		Squawfish	6	9.7								2	3	1										
		Dolly Varden	3	4.8																				
		Brown trout	4	6.4						1	1		1											
		Rainbow	1	1.6																				
			62																					

Table 157

East Lake Catch Statistics, 1951 through 1961

Year	Angler Trips	Total Trout Caught (Calculated)	Poundage	Average Weight of Fish (Pounds)	Catch per Surface Acre (Pounds)	Hours Angling per Fish	Fish per Angler	Percentage Catch		
								Rainbow	Brook	Brown
1951	38,500	109,000	65,083	0.60	67.1	1.7	2.6	70.1	29.4	0.5
1952	28,000	41,000	30,490	0.74	31.8	2.5	1.8	87.0	12.5	0.5
1953	29,500	87,000	49,461	0.56	51.0	2.2	3.0	80.0	19.1	0.9
1954	27,500	51,500	29,302	0.57	30.5	2.4	1.9	70.0	29.0	1.0
1955	29,500	72,000	37,700	0.52	39.0	1.8	2.6	76.7	22.7	0.6
1956	33,000	88,800	44,392	0.50	45.8	1.8	2.7	85.5	14.3	0.2
1957	34,400	98,400	57,500	0.58	59.3	1.8	2.9	84.9	14.9	0.2
1958	34,200	112,100	55,200	0.49	56.9	1.5	3.3	94.2	5.4	0.4
1959	26,200	65,700	37,200	0.57	38.4	2.1	2.5	95.7	3.9	0.4
1960	34,200	101,300	51,700	0.51	53.3	1.8	3.0	92.6	7.0	0.4
1961	22,700	45,500	21,700	0.48	22.4	2.6	2.0	89.3	9.5	1.2

Table 158

Comparison of Size Groups in Sport Catch, 1951-1961, East Lake,
All Species, Expressed in Percentages

Year	Percentages in Size Groups							
	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 and Over
1951	4.0	22.6	45.0	21.8	5.3	1.0	0.2	0.1
1952	4.0	19.0	31.0	35.5	9.0	1.0	0.3	0.2
1953	6.8	30.0	39.3	15.0	5.8	2.2	0.6	0.3
1954	6.2	31.4	40.2	16.5	4.8	0.6	0.1	0.2
1955	10.8	36.7	32.6	15.8	3.3	0.4	0.2	0.2
1956	11.2	46.5	23.0	15.3	3.2	0.5	0.1	0.2
1957	9.3	30.3	39.0	16.3	4.2	0.7	0.1	0.1
1958	9.6	37.8	40.0	9.2	2.7	0.5	0.1	0.1
1959	10.5	26.2	40.8	17.3	4.4	0.6	0.1	0.1
1960	8.2	28.3	44.6	15.2	3.3	0.3	0.1	trace
1961	22.2	43.4	22.2	8.4	3.1	0.4	0.2	0.1

A plant of fall rainbow fingerling in June 1961 which reached legal size by late July, entered the creel in August and helped to give a disproportionate number of small fish in the season catch.

Sampling of the fish population by gill net in September 1961 indicated an excellent population of fish entering the winter of 1961-62.

Losses of fish attributed to the tapeworm Proteocephalus sp. has occurred in the lake since 1958. The mortality appeared to be decreasing until 1960-61. In the past years the loss of fish commenced in early July continuing through early October.

Paulina Lake angler use revealed a slight increase from the 17,800 angler trips recorded in 1960 to 18,900 in 1961. A winter mortality was also suspected in Paulina Lake since the average weight of the fish caught in 1961 (0.54 pounds) was the heaviest recorded in the past eight years. The pronounced increase in weight was possibly the result of a smaller population of fish, with lessened competition providing for the faster rate of growth. See Table 159 for catch statistics of Paulina Lake. Table 160 shows percentages of size groups for the years 1951 through 1961.

The annual stocking rate for East and Paulina Lakes has not been changed in the past several years.

Creel Census

Creel data on district waters is largely confined to opening weekends, holidays, and weekend periods of the season. The compilation of creel data in all district waters may be found in Table 155.

Lakes in the district producing good catches of fish throughout the season were Elk, South Twin, Sparks, North Twin, and Suttle Lakes. Devils and Blue Lakes provided good angler return on stocked legal rainbow trout. Pelton Reservoir offered good to excellent fishing, primarily on legal rainbow stocked by the U. S. Fish and Wildlife Service. Wickiup, Ochoco, and Crane Prairie Reservoirs were considered as fair to good. Angler success at the new Prineville Reservoir was excellent beginning in late August, through September and October.

Legal rainbow trout stocked in the Metolius, Deschutes, Little Deschutes, and Fall Rivers contributed substantial numbers to the angler creels.

Fall rainbow fingerling stocked in November 1960 in upper Crooked River after chemical eradication of rough fish provided fair to good angling in 1961. Angler use of the area was limited, but greater utilization is expected in 1962 as more people become aware of the trout fishing available in this section of stream. For many years this section of stream supported few trout.

Metolius Jaw-Tagged Rainbow Planting Experiment

Releases of 4,000 jaw-tagged rainbow were made in the Metolius River on April 20 and July 28, 1960. On each occasion 1,000 fish at 3 per pound and 1,000 fish at 5 per pound were stocked. Recovery data of tagged rainbow trout are presented in Tables 161 and 162.

Table 159

Paulina Lake Catch Statistics, 1951 through 1961

Year	Angler Trips	Total Trout Caught (Calculated)	Poundage	Average		Hours Angling per Fish	Fish per Angler	Percentage Catch		
				Weight of Fish (Pounds)	Catch per Surface Acre (Pounds)			Rainbow	Brook	Brown
1951	15,000	29,400	15,504	0.53	11.9	2.7	1.8	70.8	28.1	1.1
1952	17,000	25,000	15,673	0.63	12.1	2.6	1.9	97.5	2.4	0.1
1953	16,500	36,400	21,541	0.59	16.6	2.7	2.2	83.2	16.4	0.4
1954	13,000	27,000	9,866	0.37	7.6	2.3	2.0	89.0	10.3	0.7
1955	16,500	55,000	17,740	0.32	13.7	1.9	2.8	86.9	12.9	0.2
1956	21,500	72,700	23,870	0.33	18.3	1.3	3.4	97.1	2.8	0.1
1957	21,600	71,800	28,000	0.39	21.6	1.4	3.3	99.5	0.5	trace
1958	21,300	87,500	34,500	0.39	26.5	1.1	4.5	100.0	trace	trace
1959	19,600	59,700	23,300	0.39	17.9	1.5	3.0	99.9	0.1	trace
1960	17,800	38,300	16,700	0.44	12.8	2.1	2.2	99.6	0.3	0.1
1961	18,900	41,500	22,800	0.54	17.5	2.1	2.2	100.0	trace	0.0

Table 160

Comparison of Size Groups in Sport Catch, 1951-1961, Paulina Lake,
All Species, Expressed in Percentages

Year	Percentages in Size Groups									
	6-9	8-10	10-12	12-14	14-16	16-18	18-20	20 and Over		
1951	13.2	30.7	31.0	20.8	3.5	0.5	0.10	0.20		
1952	12.4	26.4	30.0	19.6	9.1	2.2	0.20	0.10		
1953	7.6	30.8	42.0	14.5	3.4	1.2	0.40	0.10		
1954	38.5	41.2	12.3	3.2	3.9	0.6	0.20	0.10		
1955	39.2	30.0	19.8	9.2	1.3	0.3	0.10	0.10		
1956	18.8	62.7	15.5	2.5	0.2	0.1	0.10	0.10		
1957	26.1	40.9	25.5	6.9	0.4	0.1	0.05	0.05		
1958	12.2	39.4	43.3	4.5	0.4	0.1	0.05	0.05		
1959	21.4	36.5	31.9	8.8	1.2	0.2	trace	trace		
1960	23.2	32.2	27.0	15.3	2.1	0.2	trace	trace		
1961	23.4	37.5	20.8	12.1	5.1	0.9	0.10	0.10		

Table 161

Tagged Fish Recovery Data, Metolius River, 1960 and 1961

	Released April 20, 1960		Released July 28, 1960	
	"B" Series Fish at 5 per Pound	"G" Series Fish at 3 per Pound	"B" Series Fish at 5 per Pound	"G" Series Fish at 3 per Pound
Year recovered	1960	1961	1960	1961
Number stocked	1,000	1,000	1,000	1,000
Number recovered	269	19	368	16
Per cent recovery	27	37	21	39
Total Recovery (Per Cent)	29	38	26	43

Table 162

Stocking and Return of Metolius Jaw-Tagged Rainbow
by Numbers and Poundage, 1960 and 1961

Size Stocked	Number Stocked	Number Tags Returned		Percentage of Tags Returned		Pounds Stocked	Pounds Caught ¹
		1960	1961	1960	1961		
at 5 per pound	2,000	476	69	24.0	3.4	27.4	109
at 3 per pound	2,000	755	57	38.0	2.9	40.9	271

¹ Based on weight at liberation.

The return of jaw tags was almost entirely on a voluntary basis, limited to angler delivery of tags to Wizard Falls Hatchery personnel, the Camp Sherman store post office, Metolius resorts, area residents, and return by mail.

The greatest return to the angler creel (43 per cent) was achieved from the July 28 release of 1,000 fish at 3 per pound. A 38 per cent return occurred on the larger fish stocked in April, two days prior to opening of the trout season.

Of the 2,000 tagged fish stocked at 5 per pound, 545, or 27 per cent of the fish, were recovered. The fish liberated at 3 per pound contributed 812 fish, or 41 per cent, to the angler creel.

It is of interest that 126 jaw-tagged rainbow, or 4.5 per cent, were recovered in 1961, their second summer in the stream.

Twenty-two recoveries of tagged rainbow were made from 2 to 28 miles below the area of release. Two Metolius rainbow appeared in the downstream fish facilities at Pelton Dam, and one jaw-tagged rainbow was recovered in the Pelton Reservoir sport catch.

The tagging project was initiated to determine the relative return to the angler between rainbow stocked at 5 per pound (8 inches) and at 3 per pound (10 inches) in the Metolius River. Release of legal-size trout at 5 per pound has been the general policy and practice of the Game Commission.

Forty-nine per cent (267 trout) more of the larger trout (3 per pound) were caught; the additional catch of the larger fish represented 162 more pounds of trout (148 per cent) although only 67 per cent more pounds were stocked initially.

It is concluded the Metolius River experimental planting of tagged trout in 1960 resulted in the recovery of substantially more fish when planted at 3 per pound than at 5 per pound. Angler success measured in fish per hour or per angler was increased almost 50 per cent by release of the larger trout.

Kokanee Spawning Escapement

The kokanee spawning escapement or redd counts in all waters examined in 1961, with the exception of Odell Creek, was the highest recorded in the four years escapement has been observed. Table 163 contains kokanee spawning ground counts for the years 1958 through 1961.

Two peak movements of spawning kokanee from Wickiup Reservoir occurred in 1961. Large numbers of mature fish appeared in the Sheep Bridge area of the Deschutes River about September 1, with a second run of an estimated 2,000 fish arriving on the gravel beds November 1.

Again in 1961, few kokanee utilized Odell Creek, tributary of Davis Lake. Prior to 1960, large numbers of the fish could be found in the lower one mile of stream in August and September. Only 6 redds and 3 kokanee were located in 1961.

Kokanee were observed spawning for the first time in a spring area located along the southwest shore of Elk Lake.

Table 163

Kokanee Spawning Ground Data, 1958-1961

Stream	Kokanee				Redds			
	1958	1959	1960	1961	1958	1959	1960	1961
Cultus River	78	850	100	1,534	42	400	190	337
Quinn River	0	0	2	4	10	3	5	7
Deschutes River, Sheep Bridge area	48	450	597	4,000/3	26	0	343	900
Deschutes River, Cow Camp area				200				
Link Creek	105	419	502	486	143	387	507	972
Odell Creek	143	200	0	3	140	257	0	6
Cultus Creek	1,000	/1	/2	/2				

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

/2 Not surveyed.

/3 Estimated.

Lower Deschutes Spawning Ground Survey

A spawning ground survey of major portions of the lower Deschutes River between Warm Springs highway bridge and the river mouth was conducted by boat cooperatively by the Columbia and Bend district agents. The survey made on May 3 through 7, 1961 was too late to obtain a representative count of steelhead spawning redds, and took place a short time after the peak of rainbow trout spawning in the river. Within one or two weeks following completion of spawning activities, redds cannot be readily identified because of algae growth.

Nevertheless, rainbow trout redds were located throughout the 91-mile stretch of river boated. Fifty-seven steelhead and 536 rainbow trout redds were counted in the 80 miles of the river actually covered in the boat survey.

Table 164 presents the data obtained.

Warm-Water Game Fish

Largemouth bass stocked as 3-inch fingerling (57,000) in Prineville Reservoir in November 1960 were averaging 8 inches in length by late August of 1961. The bass were appearing in angler creels in minor numbers in August and September.

Table 164

Lower Deschutes River Spawning Ground Survey,
Rainbow and Steelhead Trout, 1961

Area	Date	Redds		Total
		Steelhead	Rainbow	
Warm Springs to South Junction	5/3	18	183	201
South Junction to North Junction	5/4	30	152	182
North Junction to four miles above Maupin	5/5	5	126	131
Four miles below Sherars Bridge to four miles below Mack Canyon	5/6	4	52	56
Four miles below Mack Canyon to one mile below Kloan	5/7	0	23	23
Totals		57	536	593

Prineville Reservoir received a supplemental plant of 40 largemouth bass from 6 to 14 inches in length.

Smallmouth bass fry were introduced in the Crooked River drainage on June 19, 1961. Releases of 17,500 fry were made in the main Crooked River approximately one mile above the head of the reservoir, and 2,500 in the upper river near the mouth of Camp Creek.

Habitat Improvement

Davis Lake

Before a rehabilitation of Davis Lake waters could be undertaken, it was necessary to determine if adjoining waters would be affected by the toxin. Many observers in the past believed Davis Lake to be the source of large springs found entering Wickiup Reservoir.

It was feared by many interested parties that, should the lake be treated with a fish toxicant, not only would Davis Lake fish be killed, but large losses of fish would occur in Wickiup Reservoir and possibly in the Deschutes River below.

On April 1 and September 5, 1961, Rhodamine-B dye was introduced into Davis Lake. The test on April 1 was preliminary to the final operation September 5. Sampling stations covered all major spring areas bordering Wickiup Reservoir. Twenty sample sites, including Fall River, Spring River, Browns Creek, and the large Sheep Bridge spring area, were covered.

From experience gained on the partial application in the April study, the following procedure was adopted for the September application: apply

sufficient dye to treat entire lake volume; check sampling sites four times per day for six days, two times per day for the next eight days, and once a day during the third week. After 21 days, sampling continued every second or third day as time permitted until November 10, a period of 66 days during which time the spring waters were tested on 30 different days.

The desired concentration, averaging 2.5 to 3.0 parts per billion, was achieved throughout Davis Lake. Surface and bottom water samples in the lake revealed uniform dispersion of the dye. The average concentration in Davis Lake was two parts per billion after two weeks and remained above one part per billion for two months.

All water samples were analyzed with a fluorometer set to detect the dye in amounts of 0.1 part per billion. The dye was not found in measurable quantities at any of the sampling sites. /1

Davis Lake was chemically treated on October 11 with toxaphene at a concentration of 17 parts per billion evenly dispersed by boats using venturi boat bailers.

Prior to the treatment of the lake, roach were secured by trap net and a series of 11 live-boxes, each containing 10 rough fish, were dispersed at various depths around the lake. A few fish in the live-boxes had not succumbed by October 24, fifteen days after the introduction of toxaphene.

After treatment, live roach continued to appear in the expansive reed beds bordering the east and north shores of the lake. Approximately 120 surface acres of the reed beds were sprayed aerially on October 19, again using toxaphene. An immediate die-off of roach was observed in the sprayed areas the following day.

Thirteen gill nets were set in Davis Lake on November 6 and removed on November 8, revealing 151 roach and 1 whitefish. Re-treatment of the lake with toxaphene at a concentration of 20 parts per billion was completed on November 11.

Heavy ice commenced forming on the lake by November 15 with the lake completely frozen over on November 16. The ice cover will prevent checking of the lake for fish kill until the spring of 1962.

Ranger and Odell Creeks, tributaries of Davis, were chemically treated with liquid rotenone. Roach were found only in the lower one-fourth mile of the two streams.

Examination of a two-mile section of Odell Creek resulted in the tabulation of 11 sub-legal brook trout, 50 whitefish, 843 rainbow (48 legal length), and 6 sub-legal Dolly Varden. Ranger Creek contained few legal brook trout at the time of treatment.

It is proposed to restock the lake with rainbow, kokanee, and, when available, Atlantic salmon.

/1 A summary report covering the Davis Lake Rhodamine-B dye tests will be submitted by Dr. Frank Conte, Oregon State University (formerly with Central Oregon College).

Sparks Lake

A water stabilization project was initiated on Sparks Lake. The average depth of the lake, exclusive of channel areas, is approximately five feet. In past years by early August, the lake level has receded from 3 to 4 feet, drastically reducing the fish production potential.

A cooperative agreement with the U. S. Forest Service will permit stabilization of the lake level at 0.7 feet below the high water line.

Water escapes in the lava areas bordering the northeast and east shores of the lake. Fourteen outlets were sealed with cement or by rock masonry construction.

A dam 100 feet in length is scheduled for construction in 1962 to seal the remaining major surface outlet if the 1961 work is successful.

Measurement of the tributary and spring area inflow was accomplished on July 14, 1961. The inflow data are recorded in Table 165.

Table 165

Flow of Water in c.f.s. Entering Sparks Lake,
July 14, 1961

Stream	Flow in c.f.s.
Fall Creek	76.29
Soda Creek	55.13
Goose Creek	16.84
Satan Creek	3.15
Unnamed springs	4.00
Total Inflow	155.41

On July 14, water was escaping the lake through the main surface outlet at the rate of 64.04 c.f.s. The measured loss in this outlet was then 41 per cent of the inflow.

Rough Fish Control

Partial rough fish control in the district is confined to Big Lava, East, and Paulina Lakes. Trap nets, gill nets, and rotenone have been utilized in the shoal areas in the attempt to hold the roach populations at a low level. Table 166 contains the estimated numbers and poundage of roach killed in 1961. The percentage of rough fish in the total catch of gill nets for the years 1949 through 1961 is presented in Table 167.

Explosives were used experimentally at Paulina Lake as a method of roach control. One-half stick of 40 per cent powder was tried. The explosive was detonated at depths of 10 to 15 feet. Effective range of each charge was estimated at 20 to 25 feet. Difficulty was experienced in releasing the charge at the time the schools of adult roach were within effective range of the blast. Numbers of rough fish killed on the individual attempts varied from 200 to 2,000 adults.

Table 166

Estimated Kill of Roach by Gill Net, Trap Net,
and Rotenone, Bend District, 1961

Lake	Species	Approximate Number Killed	Weight (Pounds)	Method
Big Lava	Roach	155,000	5,100	Trap net, rotenone
East	Roach	33,000	100	Rotenone
Paulina	Roach	516,000	1,200	Gill and trap net, rotenone
Totals		704,000	6,400	

Using explosives as an aid in rough fish control appears feasible; however, more experimenting is deemed necessary to perfect the method.

Although the 5,100 pounds of rough fish killed in Big Lava in 1961 exceeded the 1960 kill by 3,140 pounds, the percentage of roach in gill net samples increased to 76 per cent, the highest recorded since the lake was treated in 1949.

Warm-Water Game Fish

Burgher, Hutton, and Goodrich Ponds were chemically treated to eliminate goldfish. The total surface acreage involved was five acres. The goldfish could escape to large irrigation laterals in the area, eventually reaching the Deschutes River.

A section of an old dam across Willow Creek was rebuilt, forming a spring-fed pond covering an estimated 3.5 acres. The pond is located between Madras and Prineville on lands administered by the U. S. Forest Service. The pond filled in December 1961 and, if the water level remains stable, it will be stocked with bass and bluegill in 1962.

Lava rock outcroppings in Reynolds Pond were covered and compacted with clay deposits by bulldozer. Extensive water seepage in the pond resulted in the loss of a good bass and bluegill population. Since the sealing work was completed, the pond was refilled and appears to be holding well. A combination of largemouth bass and bluegill will be restocked in the spring of 1962.

Some 235 fingerling largemouth bass were salvaged from the Brown Pond and transferred to a small pond on the Stuart Ranch. The bass will be used for stocking other waters.

Table 167

Percentage of Rough Fish in Total Catch of Gill Nets
in some Central Oregon Lakes and Reservoirs, 1949-61

Year	Crane								
	Davis Lake	Big Lava Lake	Little Lava Lake	Prairie Reservoir	Wickiup Reservoir	Ochoco Reservoir	Pelton Reservoir	Prineville Reservoir	Haystack 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	12 <u>2</u>	100 <u>1</u>			
1958	97	50	87	87	92	<u>3</u>			
1959	92	35	74	87	84	12	67		
1960	94	56	67	89	87	31	80		2
1961	98 <u>1</u>	76	92	82			84	0.4	0 <u>3</u>

1 Chemically treated.

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

3 Inadequate sample obtained; evidence of rough fish present.

KLAMATH DISTRICT

Arthur H. Gerlach

Fish Culture

Crescent Lake

No attempt was made to take kokanee eggs at Crescent Lake in 1961, since the lack of fish entering the sports catch during the summer and the small number of spawning fish present along the shore of the lake indicated that the number of eggs taken would not warrant the expense of the operation.

Odell Lake

Trap nets were placed in Odell Lake on October 9, 1961 to obtain gravid lake trout. The nets set at the outlet of Odell Lake and in the East Cove next to Chinquapin Point were fished 25 days. Ninety-one lake trout from 13.4 inches to 28 inches were trapped. Table 168 compares length frequencies of female lake trout taken in the spawning operations at Odell Lake from 1953 through 1961. Forty thousand eggs were obtained from 16 female trout for an average of 2,500 eggs per fish.

Partially gravid lake trout females taken the first week were placed in holding pens to ripen but, as in the past, the fish became blind and died within a period of a week. Following these losses, only those fish that were ready to spawn were held longer than one day. It is suggested that consideration be given to transporting the trout to Klamath Hatchery for ripening, spawning, and subsequent return to the lake.

Water temperatures during the trapping period dropped from 54° F. to 52° F.

A comparison of the number of marked to unmarked lake trout in the spawning run at Odell Lake in 1960 and 1961 is presented in Table 169. In 1961, 16.4 per cent of the catch consisting of wild fish compared to 6.7 per cent in 1960.

Kokanee were late in appearing on the spawning grounds at Odell Lake in 1961 and did not start to spawn until the second week of November. It is thought that high water temperatures were the controlling factor since the fish were not found on the spawning beds until the water had dropped below 50° F. At the time the eggs were taken the temperature was 45° F. A trap net was placed in the spawning area, and in a two-week period 69,000 eggs were taken from 59 females for an average of 1,200 eggs per fish. Females averaged 14.9 inches and males 15.2 inches in length.

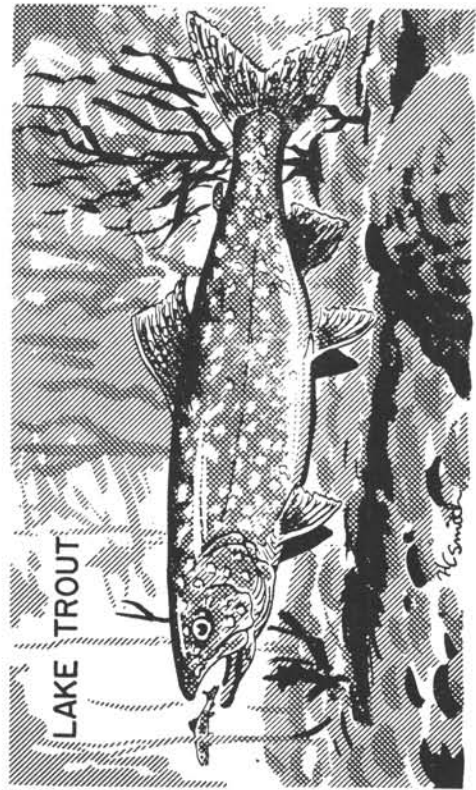
Lake of the Woods

An experimental kokanee egg-take was made at Lake of the Woods in 1961 to determine whether or not a potential source of eggs was available. In the middle of October a trap net was set along the east shore of the lake, and in a two-week period 9,700 eggs were obtained from 23 females. Water temperature at the time of the operation was 53° F. Further checks of the lake failed to produce

Table 168

Length Frequencies of a Sample of Female Lake Trout Taken
During Spawning Operations at Odell Lake, 1953-1961

Year	Length in One-Inch Size Groups																				35 & Over
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	
1953										1	1	1	2	1	2	2	2				
1954											2	2	1	1	1						
1955								1	1	2				2		1		1	1		
1956								1				1					2	1		1	1
1960		1	2	1	1	1		1													
1961	1		3	1	2	4	4	5	3	2	3	4	5	3	1	1					1



evidence of any large numbers of spawning fish.

The average length of the mature females was 12.8 inches and the males 13.1 inches.

Table 169

Numbers of Marked and Unmarked Lake Trout Appearing
in Spawning Runs at Odell Lake, 1960-1961

Mark	Year	
	1960	1961
Adipose (1951 and 1959)	109	51
Left ventral		14
Right ventral	3	7
Left pectoral		
Right pectoral	1	3
Dorsal	1	1
Left pectoral - adipose	1	
Left ventral - adipose	10 ^{/1}	
Wild fish	9	15

/1 Lake trout released in 1960.

Fish Inventory

Trout

Crescent Lake

Failure of kokanee to appear in the sport catch at Crescent Lake in 1961 resulted in the lowest catch per angler in the last five years. In 1961 the rate of catch was 0.52 fish per angler as compared to 3.38 fish per angler in the peak year - 1957. Table 170 lists the creel census data obtained at Crescent Lake in 1961.

Samples were taken at Crescent Lake to obtain data concerning the types of bottom present. Granite and pumice sand and detritus were the major bottom types found. Few aquatic organisms were present in the samples. The extreme drawdown for irrigation in 1961 exposed areas of rock, mud, and vegetated bottom.

Studies conducted at Crescent Lake indicate that the trout population has remained constant. The proportion of roach increased to 93 per cent of the total fish taken in the sample. The number of roach increased 92 per cent per net set over those taken in 1960. Table 171 lists the information obtained from the population studies at Crescent Lake, and Table 172 presents a comparison of length frequencies of maturing female fish from 1952 to 1961.

Devils Lake

Fishing pressure has been light at Devils Lake, and anglers fishing the reservoir have had poor results. Population studies reveal that trout were in fair condition but were heavily infested with a parasitic copepod.

Table 170

Creel Census, Klamath District, 1961 Season

Lake or Stream Lakes	Species	Size Group in Inches							Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20					
Agency	Rb			7		5	6	8	32				
	YP		99	101	37	2			240				
	BrB	1	5						5	31	141	8.94	1.96
<hr/>													
Badger	EB			21	16				37	13	31	2.85	1.19
Crescent	Rb	4	4		2				10				
	K	4	32	22	15	3			76				
	Br	1		1					2				
	LT		4	10	5		1		20				
	Wf			1	1				2				
<hr/>													
Devils	Rb		4	7	1		2		14	6	32	2.33	0.44
Fourmile	Rb	20	32	7	1	1			61				
	EB	37	101	13	3	2	3		159				
	K	308	858	69					1,235				
									1,455	223	1,170	6.52	1.24
<hr/>													
Gerber Reservoir	LB			2		1	1		4				
	EC		12	76	69				157				
	YP		36	1					37				
	BrB		11						11	17	75	12.29	2.79
<hr/>													
Island	EB	10	3	2					15	3	21	5.00	0.71
Klamath	Rb			1	7	3	14	4	48				
	YP		22	1					23				
	BrB			7					7	71	248	1.10	0.31
<hr/>													
Klamath Marsh	BrB	12	17	120	49	6			204	14	55	14.57	3.71
Lake of the Woods	Rb		2	12	25	40			79				
	EB		2	2	4	9	3		20				
	K	10	50	77	23	2			162				
									261	110	517	2.37	0.50
<hr/>													
North Puck	EB		20						20	2	6	10.00	3.33
Odell	Rb	58	27	5	5	5	3	1	105				
	EB		7	3					10				
	K	1	58	118	168	164	73	7	589				
	LT	4	1	2	12	14	24	14	155				
	DW				1	1			2				
	Wf	1	19	22	5	1			48	752	3,105	1.21	0.29
<hr/>													
									909				

Table 170 (continued)

Lake or Stream	Species	Size Groups in Inches								Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over					
<u>Lakes</u>														
Rosary										0	7	9		
Summit	EB			1						1	3	13	0.33	0.08
West Windigo	EB			6				2		8	4	10	2.00	0.80
Zeus	EB			14	1					15	3	9	5.00	1.67
<u>Streams</u>														
Crooked	Rb		4							4	2	4	2.00	1.00
Fivemile	Rb	2	6	12		3				23	4	24	5.75	0.96
Klamath	Rb LB	33	198	165	76	13	12	8		505 508	150	602	3.39	0.84
Lost	LB BC TP HLB B	1	1	3 3	2 8 8	3	2	1		9 14 8 5 24 60	10	40	6.00	1.50
Meryl	Rb Br	8		6 14	3					9 22 31	6	33	5.17	0.94
Odell	Rb	7								7	2	4	3.50	1.75
Sevenmile	Rb Br	79 5		2 6	4 4	2	1	1		87 17 104	40	113	2.60	0.92
Sprague	Rb BrB	46		3	2					5 46 51	6	15	8.50	3.40
Sprague, South Fork	Rb	27		7	3					37	10	34	3.70	1.09
Spring	Rb EB Br	10	217 4 5	94 4 3	14	1	2 1			335 11 9 355	98	292	3.62	1.22
Sycan	Rb EB	8	20 8	25 32	3					56 40 96	22	95	4.36	1.01

Table 170 (continued)

Lake or Stream	Species	Size Groups in Inches								20 & Over	Total Fish	Total Anglers	Hours Fished	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20							
Williamson	Rb		31	2	12	12	20	22	28	127					
	EB		3	7						10					
	Br			2					2	2					
	Sg									<u>141</u>	93	394	1.52	0.36	
Wood	Rb		240	21	21	13	1	9	1	306					
	EB		2	1	1					4					
	Br		1	8	7	18	10	6	4	<u>54</u>	124	505	2.94	0.72	
										<u>364</u>					

Table 171

Composition and Length Frequency of Catch by Gill Nets in Seven Klamath District Lakes, Represented by One-Inch Size Groups, 1961

Lake	Number of Sets	Species	Number Taken	Percentage of Catch	Number in One-Inch Size Groups																20 & Over
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Crescent	8	Rb	3	0.66		1				1	1										
		Br	1	0.22							1										
		Lt	1	0.22																	
		Wf	29	5.87						5	3	10		2	2	1					
		Ro	460	93.03	160	238	55	7													
Devils	2	Rb	9	100.00				1	3	2	1	1	1								
Fourmile	4	Rb	13	10.23			2	4	3												
		EB	34	26.78			1	6	17	4	1	3	2								
		K	80	62.99				9	71												
Klamath	8	Rb	1	0.04							1										
		Br	2	0.08									1					1			
		Yp	10	0.40							3		1		1	2					
		BrB	5	0.20							1				1		1				
		Ro	2,283	99.28	106	177	493	337	419	457	24	31	83	107	24	25					
Lake of the Woods 5/18/61	3	Rb	15	25.00	4	3	6	2													
		EB	2	3.33		2															
		K	43	71.67		32	2	9													
9/29/61	4	Rb	28	36.84	17	1		1	1	1	2	5					1				
		EB	11	14.47				2		7	2										
		K	36	47.36						11	11	8	4	2							
		BrB	1	1.33		1															

Table 171 (continued)

Lake	Number of Sets	Species	Number Taken	Percentage of Catch	Number in One-Inch Size Groups																20 & Over
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Odell	8	Rb Wf Ro	23 78 206	7.50 25.40 67.10		3	1 5 76	1 5 72	2 27 22	9 16	10 12	2	2	1	3	1	1				
Summit	4	LT	5	100.00											1			1			3

Table 172

Average Length of Maturing Female Game Fish in Some Klamath District Lakes, 1952-1961

Lake	Agency	Species	Fork Length in Inches by Year									
			1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Crescent	Br	YP										16.7
	Rb											10.4
	Br		18.7	15.0	14.1							
	K			16.3	12.3	15.9						
Devils	Wf		8.9	12.3	8.4	10.2	11.0	8.7	8.3	9.7	10.2	
	K						8.1					
	Rb											9.5
Fourmile	Rb											8.0
	EB											8.6
	K			12.0					9.1	8.1	9.7	8.5
									10.2	9.9		
Lake of the Woods	Rb											11.5
	EB											9.5
	K								7.5	12.3	11.6	10.6
									9.0			
Odell	Rb											
	LT											
	DV	28.0	25.7		18.8	16.5	13.1	10.9				
	K	27.0					15.3					
Summit	Wf	9.0			9.8	9.2	8.3	8.5	17.1	9.4	8.9	
	K								8.8			
	EB	7.7					8.0	11.1		8.5		
	LT	17.1					13.2	18.9				24.4

Fourmile Lake

This lake provided excellent angling in 1961. The majority of fish taken were kokanee but some brook trout were caught at the end of the season. Table 170 presents the creel census data for Fourmile Lake. Rainbow trout fingerlings stocked in the preceeding five years have not improved the trout fishery. Kokanee were harvested in a localized area of the lake, and attempts by anglers to catch them elsewhere in the lake failed.

As illustrated in Table 172, population studies in the past three years show that the maturing kokanee at Fourmile Lake are decreasing in size. Kokanee taken in experimental gill nets in 1954 averaged 12 inches and those taken in 1961 were 8.5 inches in length. The results of the 1961 population studies are listed in Table 171.

Release of kokanee fry in 1961 was canceled in view of the decrease in length at maturity and also as a result of planned kokanee research studies.

The occurrence of tapeworms in all species of fish found at Fourmile Lake decreased in 1961. Only 30 per cent of the fish examined contained tapeworms as compared with 81 per cent in 1960.

Klamath Lake

The 1960-61 winter fishery on Klamath Lake was fair with a number of rainbow trout over 10 pounds taken. The largest fish caught in the winter was a rainbow 36.9 inches long, weighing 24.8 pounds. Table 170 presents the combined winter and summer creel census for upper Klamath Lake.

The absence of rainbow trout from 20 to 25 inches was apparent in the summer fishery of Klamath Lake in 1961. Comparisons made with past records revealed that the fish were not present or were not being caught. Table 173 illustrates the decline of large fish in the catch.

Table 173

A Comparison of Length Frequencies of a Sample of Rainbows
Taken in the Klamath Lake Sports Fishery, 1956-61

Year	Length in Inches																	
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1956		10	16	18	13	11	3	6	4	4	3	3				1		1
1957	5	16	30	21	20	12	13	8	4	3	2	2	1					
1958	1	2	22	31	27	18	23	11	12	7	4							
1959	6	8	9	20	16	13	16	9	2	4	1		1					
1960	1	5	9	5	6	12	10	8	4	4	4	3	1					
1961	1	4	2	4	2	4	4	3	3	1	2	3	1					

Experimental gill nets were set in Klamath and Agency Lakes in October 1961. Ninety-nine per cent of the fish taken were roach and chubs. The largest concentration of trash fish was found in the Eagle Ridge area, which is the deepest portion of the lake and has a number of hot springs along the shore line. Trout were taken in Agency Lake near the mouth of Wood River. Tables 171 and 174 depict the composition of the catch and the length frequencies of the fish taken.

Table 174

Average Length of Female Game Fish in each Stage of Maturity
as Collected in Gill Net Sets in Klamath District, 1961

Lake	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Crescent	LT	1	11.3				
	Rb	1	9.7				
	Wf	6	7.9	3	10.2	9	12.6
Devils	Rb			3	9.5		
Fourmile	Rb	6	7.2	1	8.0		
	EB	2	8.6	12	8.6		
	K			1	8.5		
Lake of the Woods	5/18/61	Rb	7	6.8			
		EB	2	6.1			
		K	20	6.6			
	9/29/61	Rb	5	7.5	1	11.5	
		EB	1	8.0	5	9.5	
		K		7	10.6		
Klamath	Rb	1	10.1				
	Br			1	16.7		
	YP	2	5.6	2	10.4	2	15.2
	BrB	1	6.1			1	16.3
Odell	Rb	2	9.9				
	Wf	7	8.1	14	8.9	12	12.3
Summit	LT	1	14.0	2	24.4		

Klamath River

The spring fishery on Klamath River was good, and during the salmon fly hatch in May fly fishing was excellent. Fluctuation of the river by Pacific Power and Light Company was thought to have been responsible for a poor fall fishery. Table 170 lists the creel census data for Klamath River in 1960-61.

The trapping program at the Big Bend fish ladder on Klamath River was continued in 1961. The trap was set 36 days in 1960-61 and 1,015 rainbow trout migrating upstream were caught. Table 175 presents the total fish trapped in 1960-61 with those obtained in 1959-60.

Table 175

Number of Fish Taken in Upstream Trap at Big Bend Dam,
Klamath River, 1959-60 and 1960-61

Species	1959-60	1960-61
Rainbow	1,524	1,015
Suckers	3,485	1,296
Roach	597	1,061
Dace	8,371	51
Others <u>/1</u>	73	12

/1 Bass, bluegills, crappies, bullfrog tadpoles, lampreys, cottids.

Water temperatures during the trapping program ranged from 37° F. to 67° F. There was a definite correlation between 1960 and 1961 in the manner in which water temperatures affected migration of the different species of fish. Trout movement was greatest when temperatures ranged between 42° F. and 57° F., while suckers and dace made the largest migrations when the temperature was above 57° F. Roach preferred to move when temperatures were over 60° F.

In 1961 the program of jaw-tagging rainbows over 8 inches was continued in Klamath River. Eleven per cent of the 656 of the 1961 tags were returned by anglers. Figure 6 shows the tag recovery sites. The greatest distance which tagged trout have been recovered is 8 miles upstream and 7 miles downstream. The greatest number of returns have come from an area within 3 miles downstream from the dam. One rainbow trout caught seven months after tagging had grown two inches.

Klamath Basin Streams

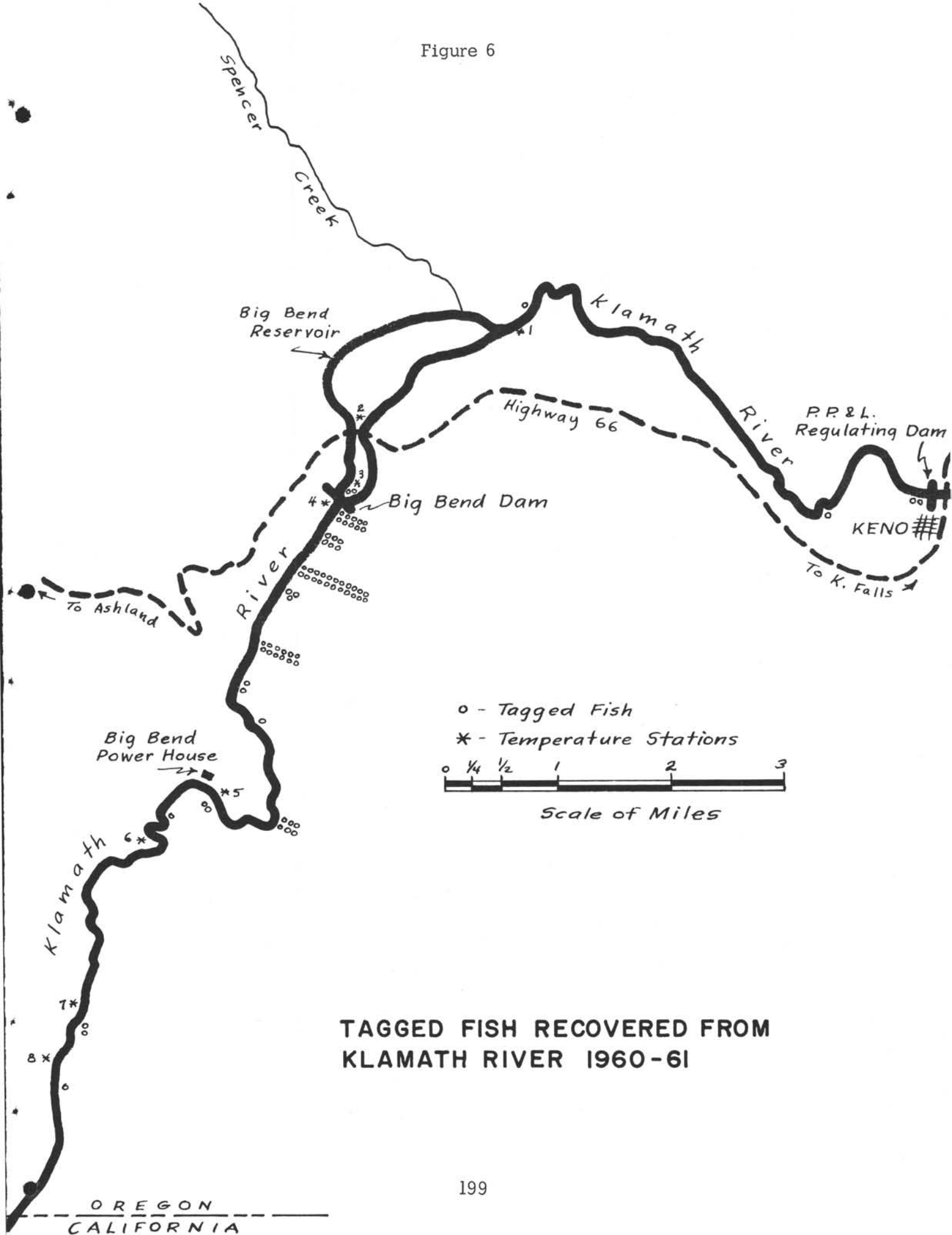
Results of periodic creel census on streams of the Klamath basin are listed in Table 170. Angler success was fair to good on streams in 1961 with Spring Creek and Wood River producing the best fishing. Wood River had an excellent brown trout fishery beginning the last week of July and continuing through the remainder of the season. Williamson River had the poorest catch of the basin streams with only 1.52 fish per angler.

Lake of the Woods

A slight increase in fishing pressure was noted at Lake of the Woods in 1961 with greater interest shown during the first and last weeks of the season. Table 170 lists the creel census data obtained at Lake of the Woods. Kokanee were taken by still fishermen while rainbow and brook trout were all taken by trolling.

In March 1961, a program to determine the correct time, size, and method of stocking kokanee was started with the release of 50,000 unfed fry into Lake of the Woods. In September, an additional 50,000 three-inch kokanee were marked by the removal of the right pectoral fin and released in the same area. The survival

Figure 6



and condition of these fish will be checked through their life cycle by gill nets, creel census, and trapping.

Table 171 shows the fish collected by gill nets in Lake of the Woods in the spring and fall of 1961. The first occurrence of an undesirable species of fish since the 1955 poisoning was recorded in Lake of the Woods this year with the netting of a five-inch bullhead catfish.

Thirty-three random bottom samples were obtained from Lake of the Woods to determine the available fish food. Table 176 presents a comparison of the amount of fish food per surface acre from 1941 through 1961. Table 177 lists the types and quantities of aquatic organisms found in the samples.

Table 176

Bottom Samples, Lake of the Woods, 1941-1961

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
1960	33	52.1
1961	33	61.4

Table 177

Number and Percentage of Bottom Food Organisms,
Lake of the Woods, 1961

Fish Food Organisms	Number	Percentage by Number
Midge	292	59.83
Shrimp	77	15.77
Worms	49	10.04
Dragonflies	30	6.14
May flies	16	3.27
Leech	8	1.68
Caddis, snails, alder, damsel, clams	16	3.27

Examination of trout caught in Lake of the Woods revealed that the heavy tapeworm infestation prevalent in 1958-59 had declined to one of minor significance. The presence of tapeworms in the trout had dropped from 62 per cent in 1958 to 1 per cent in 1961.

Odell Lake

Kokanee angling became an important fishery at Odell Lake with an increase in catch per angler from 0.21 fish in 1960 to 1.31 fish in 1961. Seventy-four per cent of all anglers checked at the lake were fishing for kokanee and the remaining 26 per cent were pursuing lake trout. Creel census obtained at Odell Lake in 1961 is presented in Table 170. The average catch for lake trout in 1961 was 0.86 fish per angler.

Length frequencies obtained from a sample of kokanee in the 1961 Odell Lake sport catch are presented in Table 178. The average length of the fish taken by anglers in 1961 was 13.1 inches.

Table 178

Length Frequencies in One-Inch Groups of a Sample of Kokanee
from Sport Catch, Odell Lake, 1961

Species	Number of Fish by One-Inch Size Groups											
	8	9	10	11	12	13	14	15	16	17	18	19
Kokanee	2	7	9	4	8	12	11	6	4	2	1	1

Marked lake trout again entered the sport catch in larger numbers than native fish, with 65 per cent of the catch originating from hatchery releases. Table 179 depicts the number of fish caught in two-inch size groups and the percentage marked. Table 180 compares the total checked lake trout and the percentage of marked trout from the period 1952 to 1961. The 1951 release is still the predominate mark but has declined from a total of 75.3 per cent of all hatchery fish checked in 1960 to 56.0 per cent in 1961.

Table 179

Length Frequencies of Sport-Caught Lake Trout
Showing Percentage of Marked Fish
in Two-Inch Size Groups,
Odell Lake, 1961

Size (Inches)	Number of Fish in Catch	Percentage Marked
6- 8	4	100
8-10	1	100
10-12	2	50
12-14	12	67
14-16	14	63
16-18	24	54
18-20	14	50
20-22	37	84
22 and Over	47	55

Table 180

Percentage of Marked Lake Trout Appearing in Odell Lake
Sport Catch Samples for the Years 1952-1961

Year	Total Lake Trout Checked	Per Cent of Total Lake Trout Catch Marked
1952	89	4
1953	34	11
1954	84	21
1955	136	74
1956	409	65
1957	162	46
1958	181	41
1959	200	20
1960	142	64
1961	154	65

Table 181 shows year classes of marked fish as they appeared in the sport catch from 1952 to 1961.

Table 181

Marked Fish Appearing in the Odell Lake Catch
Expressed in Percentages by Year Class, 1951-1961

Year Caught	Year Released										
	1951 Ad.	1952 LV	1953 HV	1954 LP	1955 RP	1956 Dorsal	1957 None	1958 LP-Ad.	1959 Ad.	1960 LV-Ad.	1961 RP-Ad.
1952	100										
1953	100										
1954	95		5								
1955	93				7						
1956	97				3						
1957	99	1									
1958	94	2	1	1		1		1			
1959	100										
1960	75	7	3	2	1	1		1	3	5	
1961	56	12	11			13			4	1	3

Lengths obtained from lake trout in the sport catch at Odell Lake in 1961 are presented in Table 182 with a comparison of lengths in 1952 through 1961. The average length of the fish is still under 20 inches.

The lake trout fin regeneration study that began in 1959 was continued.

Table 182

Length Frequencies of a Sample of Sport-Caught Lake Trout in Odell Lake,
Represented by Percentage in Two-Inch Size Groups, 1952-1961

Year	Size in Inches										
	Under 20	20-22	22-24	24-26	26-28	28-30	30-32	32-34	34-36	36-38	38-40
1952	0.0	0.0	1.0	9.0	19.0	22.0	15.0	18.0	14.0	2.0	0.0
1953	0.0	4.0	6.0	6.0	12.0	22.0	22.0	16.0	4.0	6.0	2.0
1954	0.0	11.0	6.0	22.0	11.0	11.0	16.0	11.0	0.0	6.0	6.0
1955	70.0	1.0	2.0	4.0	5.0	3.0	5.0	7.0	3.0	0.0	0.0
1956	84.7	5.3	1.4	1.0	1.4	1.4	2.0	1.4	0.5	0.5	0.4
1957	54.7	2.8	7.5	11.4	6.6	7.5	5.8	1.9	0.9	0.9	0.0
1958	32.6	12.1	10.8	15.6	2.4	12.1	6.0	6.0	2.4	0.0	0.0
1959	33.3	17.9	16.7	17.9	5.2	1.3	5.2	2.5	0.0	0.0	0.0
1960	52.1	13.0	8.7	8.7	8.7	0.0	0.0	4.4	4.4	0.0	0.0
1961	50.0	14.8	16.6	3.8	5.5	5.5	1.9	0.0	1.9	0.0	0.0

The fins clipped in that year showed little or no regeneration. The average length of the test fish at the time of marking in January 1959 was 5.9 inches. The average length for these fish in November 1961 was 15.8 inches. Some regeneration of the dorsal and ventral fins occurred but it was still possible for a trained biologist to identify these fish as being marked.

Experimental gill nets were set in Odell Lake in August to make the annual population studies. The results of gill net sets in Odell Lake are listed in Table 171, and a comparison of some length of maturities since 1952 is presented in Table 172. Roach increased 100 per cent per net set over those found in the 1960 sample, and whitefish increased 223 per cent per net set. Crawfish were plentiful with approximately 900 entangled in the nets.

Warm-Water Game Fish

Gerber Reservoir, Lost River, Agency Lake, and Klamath Marsh furnished excellent warm-water game fish angling in 1961. Creel census data recorded from these bodies of water are listed in Table 170. The predominant game fish are black crappie, yellow perch, and bullhead catfish. Largemouth bass are not as plentiful as the other species but have, nevertheless, furnished excellent fishing in certain areas of Lost River and Gerber Reservoir. The largest bass reported in 1961 was taken at Gerber Reservoir and weighed nine pounds.

Population studies made in Agency Lake revealed that yellow perch were from 5 to 15 inches and bullhead catfish ranged from 6 to 16 inches in length.

Warm-water game fish have started to enter the fishery at Big Bend Reservoir on the Klamath River. Several largemouth bass have been taken by anglers fishing the reservoir, and bass, crappies, yellow perch, and bullhead catfish have been removed from the clean-out wells on the traveling screens at the dam.

Kokanee Research

In 1961 a study of the habits of kokanee in four lakes in the Klamath district was started in co-operation with the Research Division of the Oregon Game

Commission. The lakes under observation are Lake of the Woods, Fourmile Lake, Crescent Lake, and Odell Lake.

Kokanee stomach samples from the study lakes were given to the Research Division for identification of fish food organisms. The samples were obtained from anglers at Odell Lake and Crescent Lake, and from experimental gill nets at Fourmile Lake and Lake of the Woods.

Vertical plankton tows to determine the distribution and quantity of zooplankton were made in conjunction with the taking of stomach samples. The tows were taken in the same areas that the kokanee were gilled or hooked. Plankton samples were also taken from Miller Lake to obtain data of the zooplankton population before kokanee are introduced. One species, Daphnia pulex, was found to be distributed throughout the lake.

Predation and competition studies were made in order to determine if these were factors leading to the decline of kokanee in Crescent Lake. Gill nets were set in the areas of hatchery releases for three nights after stocking, and 3 rainbow trout, 1 brown trout, and 2 lake trout were taken. The stomachs contained no fingerling kokanee.

Stocking practices for kokanee will be changed in 1962 in that the releases of fingerlings will be made in sections of lakes and streams that have suitable spawning gravel. It has been found in Washington that an increase in spawning activity occurred in areas of good gravel when the juvenile fish were released in these areas.

Experimental gill nets in Lake of the Woods in 1961 recovered only immature kokanee averaging 6 inches in May, while those in September were mature fish about 11 inches in length. The sex of the fish in May were represented by approximately equal numbers while those taken in the fall were 78 per cent males.

Scale samples were obtained from kokanee in study lakes and from fish held at the Klamath trout hatchery. It is planned in 1962 to obtain weekly scale samples from kokanee raised at the hatchery.

Habitat Improvement

Klamath River

Water temperatures were taken twice monthly on the Klamath River during the summer of 1961 from the head of Big Bend Reservoir downstream to the Salt Caves Dam site, a distance of approximately 15 miles. Temperatures were recorded at seven different sites shown in Figure 6. The highest temperature recorded was 80° F. on the surface of the Big Bend impoundment. The reservoir has proved to be of little benefit in decreasing the stream temperatures below the dam during the summer months. The spring-fed section of Klamath River above Big Bend powerhouse helps lower the temperature of the river, but by the time the water reaches the Salt Cave site the temperature has returned to that recorded below Big Bend Dam. Temperatures taken in the summer of 1961 are listed in Table 183.

Miller Lake

Miller Lake, chemically treated in September 1958, was checked three times in 1961 using trout as test fish to determine the toxicity of the lake. Within

Water Temperatures in Degrees Fahrenheit for Klamath River, 1961

Date	Stations																	
	1		2				3				4		5		6		7	
	Head of Big Bend Reservoir		Highway 66 Bridge		At Big Bend Dam				Bridge Below Dam		Above Powerhouse		Below Powerhouse		Frain Ranch			
	Surface	Feet	Surface	Feet	Surface		Feet		Surface	Feet	Surface	Feet	Surface	Feet	Surface	Feet		
					10	20	30	10									20	30
6/ 5/61	68	67	66	64	58	58	64	64	64	54	62	66						
6/28/61	71	70	68	73	72	70	74	73	74	58	71	73						
7/ 8/61	72	71	69	73	70	70	75	73	72	57	70	71						
7/29/61	70	74	68	72	71	69	76	72	71	57	67	72						
8/10/61	73	76	75	79	76	75	80	79	78	62	73	74						
8/24/61	72	76	74	75	75	74	79	75	78	63	70	73						
9/ 8/61	66	61	60	63	62	62	63	63	63	56	62	64						
10/ 7/61	67	65	64	64	61	61	64	64	63	54	61	63						



three days all trout were dead or dying at all locations in the lake. A similar mortality occurred to test fish in the outlet, Miller Creek. In September 1961, four thousand 4 to 6-inch rainbow trout were released in the lake in view of extremely low toxaphene levels reported by a private laboratory. By the third day after the release, fish were observed swimming erratically on the surface of the lake. Dead fish were found along the entire shore line by the end of the fifth day, and those placed in live-boxes at the time of the release were all dead. Trout that were used as controls in the major tributary were still alive and in good condition. No live fish were seen in the lake at the end of the sixth day.

Water samples taken twice in 1961 from the 5-foot and 50-foot levels were analyzed. Less than 0.001 p.p.m. of toxaphene was found in each sample. Plans called for a third sample to be taken but snows blocked the road to the lake before it could be obtained.

Bottom samples were taken in September 1961 from the same areas in which samples were obtained prior to chemical treatment. The only aquatic organisms found were leeches, snails, clams, and aquatic worms. In August, a large population of Diptera larva was found in the shallow area of the lake but had disappeared by the time the bottom samples were taken. Vertical plankton tows were made twice during the summer, and Daphnia pulex was found in large numbers from a depth of 100 feet to the surface.

The water level at Miller Lake in 1961 was abnormally high because of a beaver dam and log jam at the mouth of the outlet. With the cooperation of the U. S. Forest Service, these barriers were removed and the level of the lake dropped approximately two feet.

Water Storage

The snow pack and water content in the drainage systems of Klamath basin were low in 1961, and the storage of water in the reservoirs and lakes was less than normal. At the end of the irrigation season in September, Gerber, Willow Valley, Threemile Flat, and Bumphead Reservoirs were either dry or at minimum pool levels. As of the first of October, Gerber Reservoir contained 800 acre-feet of water. Fourmile and Crescent Lakes were drawn down to a minimum level, and at Crescent Lake the spawning areas of the kokanee and lake trout were exposed.

Miscellaneous

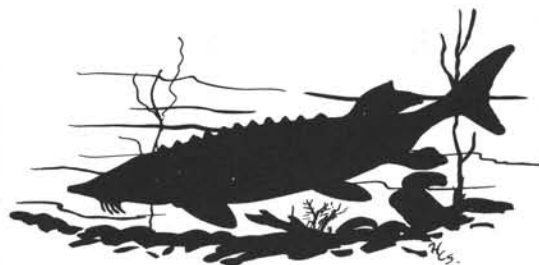
Sturgeon

Since the release of 221 sturgeon into the Williamson River in 1956, 6 have been reported taken by anglers fishing Klamath Lake and streams within the basin, and 6 were removed from ditches or from the screens of the main irrigation canal from Klamath Lake. Table 184 lists location and year the fish were caught or found and also the distance traveled from the release point.

Table 184

Number and Location of Sturgeon Taken from a Release
Made in Williamson River in 1956

Year Caught	Number	Location Sturgeon were Caught or Found	Distance in Miles Sturgeon Traveled from Release Point
1957	2	Harpold Dam, Lost River	47
	1	Klamath River near California line	63
1958	1	Removed from screens on "A" canal on Klamath Lake	20
1959	2	Removed from screens on "A" canal on Klamath Lake	20
1960	2	Removed from screens on "A" canal on Klamath Lake	20
	1	Removed from irrigation ditch near Merrill, Oregon	40
	1	Taken by angler fishing Klamath Lake near mouth of Williamson River	4
1961	2	Taken by anglers fishing Klamath Lake near mouth of Williamson River	4



JOHN DAY DISTRICT

James A. Hewkin

Fish Distribution

Key angling waters in the John Day district received 67,753 rainbow trout from 7.5 to 10 inches in length. Some waters did not receive their full allocation because of low water flow and high water temperatures.

Approximately 97,000 fingerling trout were stocked in ponds and lakes.

Fish Inventory

Anadromous

Steelhead

Spawning ground inventory taken on eight streams involving 24.5 miles of habitat indicated 2.2 fish per mile and 6.7 redds per mile. Counts are comparable to the 1960 inventory on most streams. An increase was noted in the number of redds in Canyon Creek and Parrish Creek. Observations indicated a good spawning escapement of steelhead throughout the drainage. Spawning was noted from late March to late May, and appeared to peak in mid-April. Streams were clear during the spawning count operations except Bear Creek in Wheeler County where there was slight turbidity and high water. A tabulation of steelhead spawning ground counts is given in Table 185. Table 186 presents a 4-year comparison of the spawning inventory made on six streams.

Table 185

Steelhead Spawning Inventory, John Day District, 1961

Stream	Date	Miles Checked	Water Temperature (Degrees F.)	Number of Steelhead	Number of Redds	Fish per Mile
Parrish Creek	March 29	2.0	38	4	31	2.0
Bear Creek	March 31	3.0	46	5	9	1.7
Cottonwood Creek	April 13	2.0	44	5	13	2.5
Fields Creek	April 13	2.5	46	4	6	1.6
Riley Creek	April 14	1.0	44	3	7	3.0
Canyon Creek	April 26	5.5	44	23	35	4.2
Reynolds Creek	April 29	5.0	48	8	48	1.6
Murderers Creek	May 15	3.5	48	4	17	1.1
Totals and Average		24.5		56	166	2.2

Random creel checks conducted by Game Commission personnel and State Patrol indicate that 200 anglers interviewed had caught 29 steelhead at the rate of 0.15 fish per angler and 22.6 hours per fish.

Table 186

Steelhead Spawning Counts on Six Streams in the
John Day District for a 4-Year Period

Stream	1958 /1	1959		1960		1961	
	Steelhead	Steelhead	Redds	Steelhead	Redds	Steelhead	Redds
Parrish Creek	5	5	21	10	8	4	31
Bear Creek	12	12	27	16	10	5	9
Cottonwood Creek	0	0	6	4	12	5	13
Fields Creek	0	0	29	4	7	4	6
Riley Creek	3	3	9	4	16	3	7
Canyon Creek	10	10	16	11	10	23	35
Totals	30	30	108	49	63	44	101

/1 No redd counts in 1958.

The John Day River was low and clear until mid-February when rains occurred. Following the rains, steelhead appeared in the upper portion of the river in the Mount Vernon and John Day area, and angling was excellent through March and April. In the Kimberly and Spray portion of the John Day River, the best angling was during February and March. Creel census information is given in Table 187. A 4-year comparison of creel census data is presented in Table 188.

Table 187

Steelhead Creel Census, John Day District, 1960-61

Stream	Date	Number of Anglers	Number of Steelhead	Hours Fished	Fish per Angler	Hours per Fish
North Fork John Day River	12/15-12/31	0				
	1/ 1- 1/15	0				
	1/17- 2/16	10	1	24.0	0.10	24.0
	2/17- 3/16	21	4	116.0	0.19	29.0
Main John Day River	12/15-12/31	29	3	81.0	0.10	27.0
	1/ 1- 1/15	35	5	86.0	0.14	17.2
	1/17- 2/16	59	8	185.0	0.14	23.1
	2/17- 3/16	24	8	114.5	0.33	14.3
	3/17- 4/15	22	0	48.0		
Totals and Averages		200	29	654.5	0.15	22.6

Table 188

Steelhead Creel Census, John Day District, 1958-1961

Year	Anglers Checked	Number Fish Caught	Hours Fished	Fish per Angler	Hours per Fish
1958	197	72	457.0	0.37	6.30
1959	375	89	1,499.0	0.24	16.84
1960	270	99	993.0	0.37	10.03
1961	200	29	654.5	0.15	22.57
Totals and Averages	1,042	289	3,603.5	0.28	12.47

Spring Chinook Salmon

Chinook salmon spawning counts were conducted on Granite Creek, Clear Creek, Middle Fork John Day River, and the main John Day River. The spawning inventory included 18.5 miles of stream. The peak of spawning occurred during the first week of September following a light rainfall.

For the first time a substantial number of adult chinook salmon was observed in the headwaters of the John Day River. Since previous observations in the area revealed only an occasional fish, we assume that rotary screens placed in the upper river may have provided better escapement of downstream migrants of this particular year class. Chinook salmon were apparently on the verge of extinction in the upper John Day prior to the screening of the irrigation ditches. See Table 189 for spawning ground counts. Table 190 is a 5-year comparison of spawning counts in the district.

Table 189

Chinook Salmon Spawning Inventory, John Day District, 1961

Water	Date	Miles	Water Temperature	Air Temperature	Adult Salmon	Jack Salmon	Redds
John Day River	9/5/61	4.0	64	76	16	16	12
Clear Creek	9/6/61	3.0	57	62	14	23	10
Granite Creek	9/6/61	4.5	62	69	44	23	24
Middle Fork John Day River	9/8/61	7.0	60	58	7	3	8
Totals		18.5			81	65	54

Table 190

Chinook Salmon Spawning Inventory,
John Day District, for a 5-Year Period

Water	1957 /1	1958		1959		1960		1961	
	Salmon	Salmon	Redds	Salmon	Redds	Salmon	Redds	Salmon	Redds
John Day River	0	4	2	0	1	1	3	16	12
Granite Creek	81	16	5	14	27	24	45	44	24
Clear Creek	35	4	10	26	13	47	49	14	10
Middle Fork John Day River	50	3	0	0	0	16	29	7	8
Totals	166	27	17	40	41	88	126	81	54

/1 No redd counts in 1957.

Jack salmon made up 44 per cent of the salmon observed in the drainage.

Creel Census

During the early portion of the 1961 trout season, the waters in the John Day drainage were in excellent condition and angler pressure was scattered lightly throughout the district. Late summer and fall stream flow was below average. Stream flow increased and angling improved in September.

Angler interviews conducted throughout the district indicate that 1,054 anglers reported a catch of 2,545 game fish, which were taken in 3,662 hours of effort for a success ratio of 2.41 fish per angler and 0.69 fish per hour. Table 191 presents a creel census summary.

Olive Lake

Gill net catches at Olive Lake indicate that female rainbow trout are maturing at 9.1 inches. In 1960 the comparable statistic was 8.55 inches. Cut-throat trout released as 2.25-inch fingerling in July 1960 have an average length of 8.5 inches, indicating a growth of approximately 6 inches for the year. A tabulation of gill net catches at Olive Lake is given in Table 192.

Magone Lake

A new regulation providing for year-around angling at Magone Lake was effective in February 1961. A mild winter allowed easy road access to the lake. As a result, ice fishing became quite popular and some excellent catches of brook trout and rainbow were made.

Table 191

Creel Census Summary, John Day District

Water	Species	Number of Fish by Two-Inch Size Groups							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	20 and Over					
Alder Creek	Rb		1						1	2	5	0.5	0.20
Bear Creek	Rb	2							2				
	Ct		10						$\frac{10}{12}$	5	10	2.4	1.20
Beech Creek	Rb	5							5	2	6	2.5	0.83
Bridge Creek	Rb	1							1	1	2	1.0	0.50
Butte Creek	Rb		2		2				4	1	1	4.0	4.00
Camas Creek	Rb	4							4				
	Wf			1					$\frac{1}{5}$	8	8	0.6	0.63
Canyon Creek	Rb	68	36	11					115				
	Ct	2							$\frac{2}{117}$	31	105	3.8	1.11
Clear Creek	Rb	26	1						27	12	35	2.3	0.77
Crane Creek	Rb			13					13				
	EB	23							$\frac{23}{36}$	7	27	5.1	1.33
Crawfish Lake	EB	22	1						23	4	20	5.8	1.15
Dayville Pond	Rb	1	3	1					5	4	3	1.3	1.67
Deardorff Creek	Ct	3							3	1	1	3.0	3.00

Table 191 (continued)

Water	Species	Number of Fish by Two-Inch Size Groups							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	20 and Over					
Desolation Creek	Rb	9							9	14	14	0.6	0.64
Dollarhide Pond	Rb		5						5	1	2	5.0	2.50
Forrest Pond	Rb		9						9	2	1	4.5	9.00
Granite Creek	Rb	2							2	3	3	0.7	0.67
Holmberg Pond	Rb		7						7	6	8	1.2	0.88
Hubble Lake	Rb	10	34	3					47	10	28	4.7	1.68
John Day River	Rb	19	2						21				
	Ct	6							6				
	EB	8							8				
	St								24				
	DV	1							1				
									60	156	492	0.4	0.12
John Day River North Fork	Rb	17							17				
	St							5	5				
									22	39	148	0.6	0.15
Jump Off Joe Lake	Rb				5				5	4	14	1.3	0.36
King Ponds	Rb			3	16	3			22	8	30	2.8	0.73
Little Slide Lake	EB	39	24	8	4				75				
	Rb				1				1				
									76	8	68	9.5	1.12
Little Strawberry Lake	EB	8	1						9	3	9	3.0	1.00

Table 191 (continued)

Water	Species	Number of Fish by Two-Inch Size Groups							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	20 and Over					
Magone Lake	Rb	5	45	254	20	2	1		327				
	EB	291	140	52	15	18	4		520				
	K	36	1						37				
									<u>884</u>	246	1,001	3.6	0.88
Meadow Creek	Rb		8						8	2	10	4.0	0.80
Morris Ponds	Rb	4	39						43	17	49	2.5	0.88
Murderers Creek	Rb	26	7						33	9	16	3.7	2.06
Olive Lake	Rb	59	20	2			1		82				
	Ct	8		5					13				
	K	16	2	1					19				
									<u>114</u>	49	231	2.3	0.49
Oliver Ponds	Rb	8	33	1					42	27	39	1.6	1.08
Owing Creek	Rb		139						139	49	199	2.8	0.70
Patterson Pond	Rb		80	7	13	2			102	50	102	2.0	1.00
Retherford Pond	Rb		72	2					74				
	LB		1	1					2				
									<u>76</u>	26	74	2.9	1.03
Row Creek Reservoir	Rb		8						8	7	21	1.1	0.38
Slide Lake	Rb	4	3		3	2			12				
	EB				1				1				
									<u>13</u>	9	41	1.4	0.32

Table 191 (continued)

Water	Species	Number of Fish by Two-Inch Size Groups							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	20 and Over					
Strawberry Lake	Rb	59	113	128	43	33	1		377				
	EB		13	14	29	14	7		77				
									<u>454</u>	194	778	2.3	0.58
Tex Creek	Rb	1							1	4	2	0.3	0.50
Thirtymile Creek	Rb		3		1	1			5	7	9	0.7	0.56
Trout Farm Pond	Rb		43	10					53				
	EB	18	1						<u>19</u>				
									72	15	35	4.8	2.06
Trout Meadows	Rb	20	17						37	4	4	9.3	9.25
Trowbridge Pond	Rb		2						2	7	11	0.3	0.18
Totals and Averages		831	926	517	153	75	14	29	2,545	1,054	3,662	2.41	0.69



Table 192

Gill Net Results from Lakes in the John Day District, 1961

Lake	Number of Sets	Species Taken						Size Range in Inches (Fork Length)	Average Length (Inches)	Average Length Maturing Females (Inches)
		Rb	EB	K	RsS	Ct				
Olive	3	29						6.25 to 24.0	8.8	9.1
						5		8.00 to 9.5	8.5	
Magone	2	14				4				
								8.50 to 11.7	9.6	
			33					5.90 to 15.0	7.4	
Strawberry	2	14				1		6.20		
								5.7 to 12.8	9.5	9.9
			5					7.0 to 15.0	10.3	8.7

Gill net catches at Magone Lake show that brook trout average 7.4 inches fork length, which is one inch less than for 1960. Rainbow trout have an average length of 9.6 inches fork length. These fish were liberated as yearlings in August of 1960. A single kokanee, 6.2 inches long, was collected in the gill net sample. Kokanee were liberated as fry in 1959 and in 1960. Anglers caught a few kokanee over 10 inches which indicates some of the 1959 release survived. Several kokanee in the 6 to 7-inch size group have been taken by anglers. The growth rate of kokanee in Magone appears very good, but it is believed that natural reproduction of this species will not occur because of inadequate spawning gravel. Table 192 presents gill net catch data from Magone Lake.

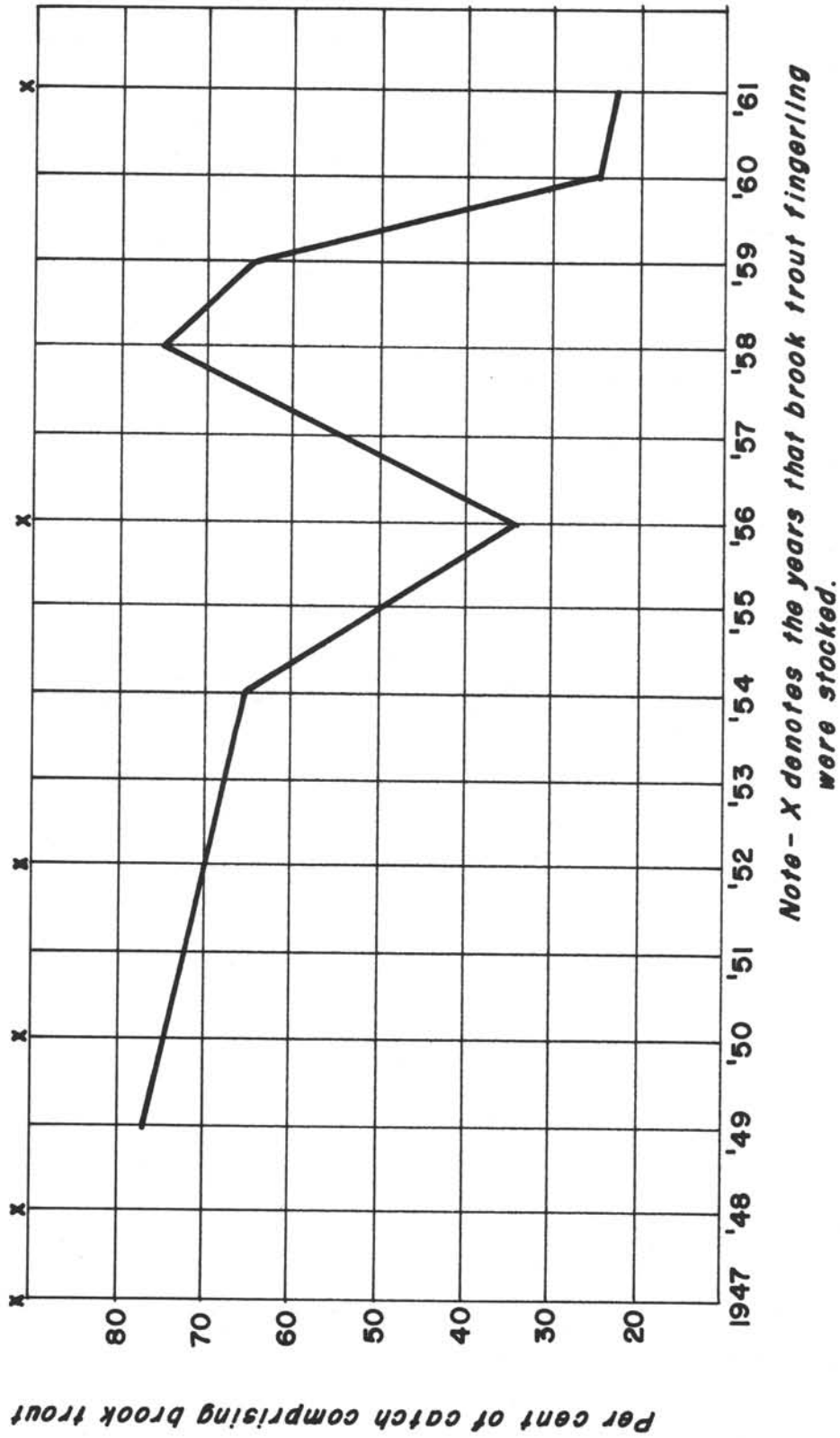
Strawberry Lake

The brook trout population in Strawberry Lake continues to decline as reflected in gill net sampling results and creel reports. Rainbow trout provided 83 per cent of the angler catch this season. The rainbow trout fishery is apparently being maintained by natural reproduction in three tributary streams. The lake level drops approximately eight feet during the summer, and it does not fill again until the spring runoff.

There was a noticeable increase in the abundance of aquatic vegetation in Strawberry Lake in the summer of 1961.

Gill net sampling from Strawberry indicates that rainbow trout have an average length of 9.5 inches and that females are maturing at 9.9 inches. Brook trout had an average length of 10.3 inches and females were maturing at 8.7 inches. See Table 192 for gill net data from Strawberry Lake. Figure 7 shows the abundance of brook trout in Strawberry Lake over a 15-year period as reflected in gill net sampling, and correlates the fluctuation of population densities with the periods of stocking. Studies indicate that periodic stocking of brook trout fingerling every other year is necessary to maintain a substantial population of this species in the lake.

Figure 7



BROOK TROUT ABUNDANCE IN STRAWBERRY LAKE FOLLOWING PERIODS OF STOCKING AS DETERMINED FROM GILL NET SAMPLING.

Jump Off Joe Lake

A gill net sample was taken at Jump Off Joe Lake to determine growth and condition of rainbow trout that were stocked as fry in July 1959. The sample indicates that the lake is supporting a small population of trout but the rainbow present are in excellent condition. Average length of rainbow after one year in the lake was 7.59 inches, and at two years the average length had increased to 11.16 inches. There is no evidence of natural reproduction in Jump Off Joe Lake. Stocking is required every other year in order to maintain a substantial population of fish in the lake.

Warm-Water Game Fish

Largemouth bass were introduced into Retherford dredge pond near John Day in 1957. Observations indicate that water temperatures are too low for this species. No reproduction has occurred and growth rate has been exceptionally slow. At $4\frac{1}{2}$ years of age the bass had an average fork length of 10.2 inches. Weights and measurements were obtained from a gill net sample of 11 fish. Catchable-size rainbow trout have been stocked each spring in Retherford Pond to provide a fishery. The gill net results showing length and weight data of bass in Retherford Pond are tabulated in Table 193.

Table 193

Length and Weight of $4\frac{1}{2}$ -Year-Old Largemouth Bass from
Gill Net Sample at the Retherford Pond, John Day,
January 13, 1961

Sex	Fork Length (Inches)	Weight (Ounces)
F	10.5	9.0
F	9.7	7.5
M	11.0	10.9
M	10.0	8.6
F	10.0	7.5
M	10.2	8.7
M	11.0	11.6
M	10.2	8.4
F	9.7	7.4
F	10.2	8.9
M	10.0	9.1
Averages	10.2	8.9

Habitat Improvement

Rotary Screen Bypass Trapping

In the 1961 season, 74,915 steelhead trout and 500 chinook salmon were prevented from being diverted to irrigation ditches by rotary screens in the John Day system. This is the largest number of both species to be recorded at bypass traps since the screening project has been in operation. Miscellaneous species counted at the traps include 242 cutthroat, 210 Dolly Varden, 1,625 whitefish,

23 bullhead catfish, and 865 squawfish. Table 194 presents trapping data by weekly periods.

Although immature steelhead were recorded in numbers throughout the summer period, the bulk of the downstream migration occurred during the month of May. Many of the fish trapped in July were in the zero-age class and had been spawned in the vicinity of irrigation diversions. Seventeen per cent of the total number of steelhead recorded in the partial sampling operations at bypass traps in the John Day system were zeros, 48 per cent were in the 2 to 4-inch size group, 21 per cent were in the 4 to 6-inch group, and 14 per cent were fish over 6 inches in length. Figure 8 shows a 6-year comparison of the partial sampling of steelhead migrants at rotary screen bypass traps, and Figure 9 presents a 6-year comparison of the numbers of chinook salmon appearing at rotary screen bypass traps in the John Day system. Twenty-six jack salmon were taken at rotary screen trap Number 18 located on the upper John Day River. This is the first year jack salmon have been observed in the upper John Day.

Whitefish were recorded in greater numbers this year at bypass traps in the upper John Day. Also a slight increase was recorded in the count of cutthroat and Dolly Varden. Thirty-five adult spent steelhead were observed at rotary screen unit Number 380 on Rock Creek in Wheeler County. It is doubtful whether any of these spent adults managed to return to the river. Most of these adults were noted in July when water conditions were becoming very low or intermittent in some downstream areas.

Stream Survey

A stream survey was completed in the South Fork John Day River drainage in 1961. These stream survey operations involved 175.75 miles of stream including 24 tributaries. Data pertinent to the fishery is being compiled.

Columbia River Fisheries Development Program

Two fishery habitat improvement projects were initiated in the John Day district in 1961.

Project 470 - Habitat Improvement to Enhance Anadromous Fish Production

Project 470 involved two phases of fish habitat improvement. One phase concerned the introduction of spawning gravel to 3.3 miles of Clear Creek, a tributary of the North Fork John Day River. Mine tailings piled adjacent to the stream channel by previous dredge operations provided a source of gravel for the project. Gravel spreading was accomplished with a D7 bulldozer. Forty-seven spawning plots were developed involving 1,772 yards of stream. An estimated 13,158 cubic yards of gravel were utilized in the project area at a cost of \$1,470 for tractor rental. This is approximately 11 cents per cubic yard.

Following completion of the spawning riffle development, a small run of spring chinook salmon entered Clear Creek. Observations indicated that 60 per cent of the spawning activity occurred on introduced gravel.

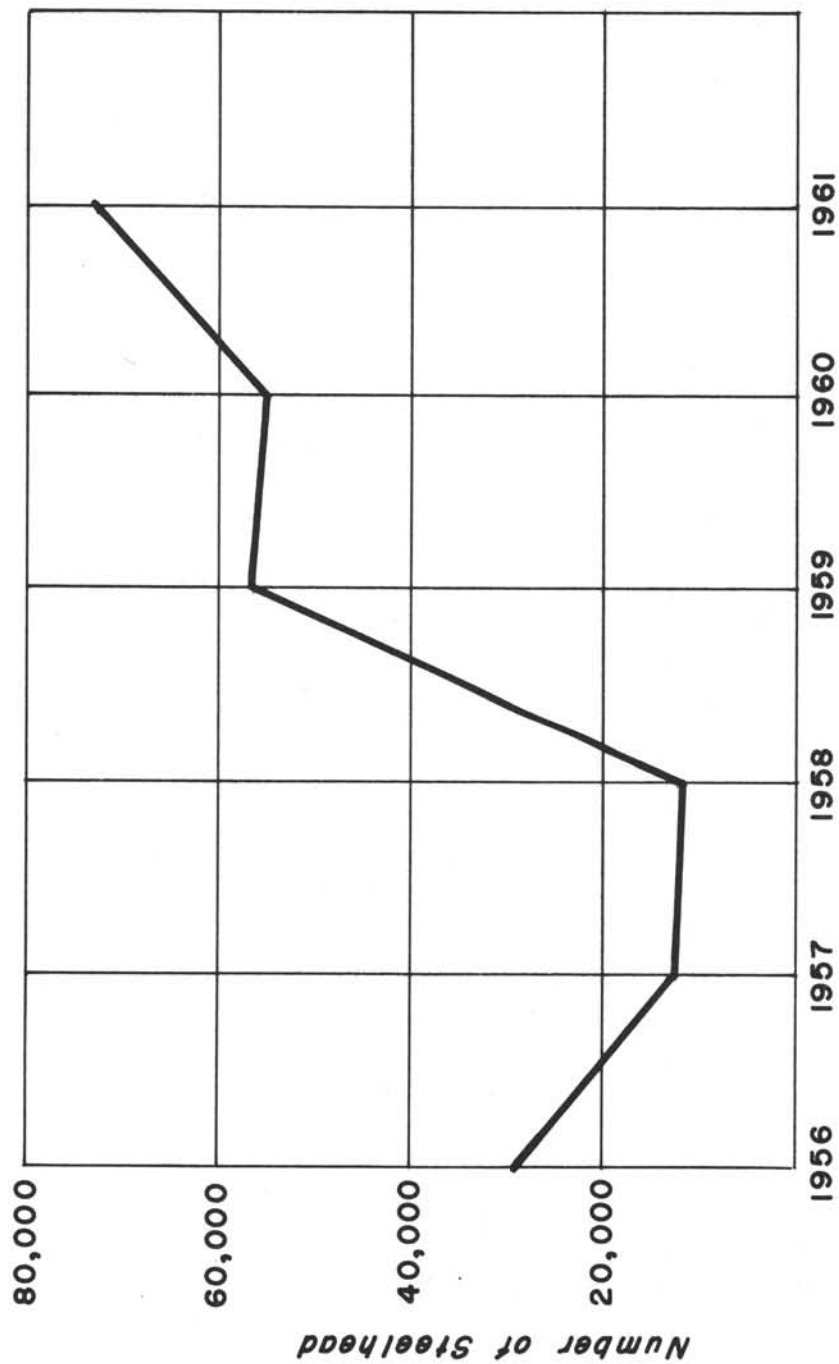
The other phase of Project 470 included the installation and operation of a trapping device on Tex Creek to obtain information on the steelhead spawning population and the downstream movement of migrants.

Table 194
Weekly Rotary Screen Bypass Trap Results,
John Day System, 1961

Month	Week	Number of Traps	Steelhead	Salmon	Other Species				
					Ct	DV	Wf	B	Sq
March	3	3	26						
	4	3	45						
April	1	5	106						
	2	12	213						6
	3	21	1,010						1
	4	28	1,632	2					6
May	1	32	5,398	12	2		1	1	
	2	34	6,641	11	3	9			6
	3	37	6,540	2	33	26	13	1	6
	4	45	4,807		38	38	8	1	6
June	1	42	3,858	1	27	14	42	2	9
	2	48	4,616	2	18	25	88		83
	3	46	4,652	7	21	27	155	5	57
	4	44	4,175	5	9	14	188	2	94
July	1	39	2,381	19	12	13	232	2	62
	2	39	8,906	32	10	4	53		103
	3	35	1,451	63	3	11	145	3	19
	4	34	653	1	7	11	76	1	10
August	1	32	554	5	7	2	95	4	21
	2	27	296		3	2	388		15
	3	25	646		5	1	34		25
	4	23	520	17	1	1	22		7
September	1	27	1,453	35 (3)	9	1	28		11
	2	28	691	27 (21)	3		14		9
	3	30	896	14 (2)	10	1	6		4
	4	26	895	49	7	2			6
October	1	26	5,401	85		4	18	1	162
	2	26	773	82	12	3	15		80
	3	21	2,898	22	2	1	4		37
	4	17	1,563	7					20
November	1	11	699						
	2	6	520						
Totals			74,915	500 (26)	242	210	1,625	23	865

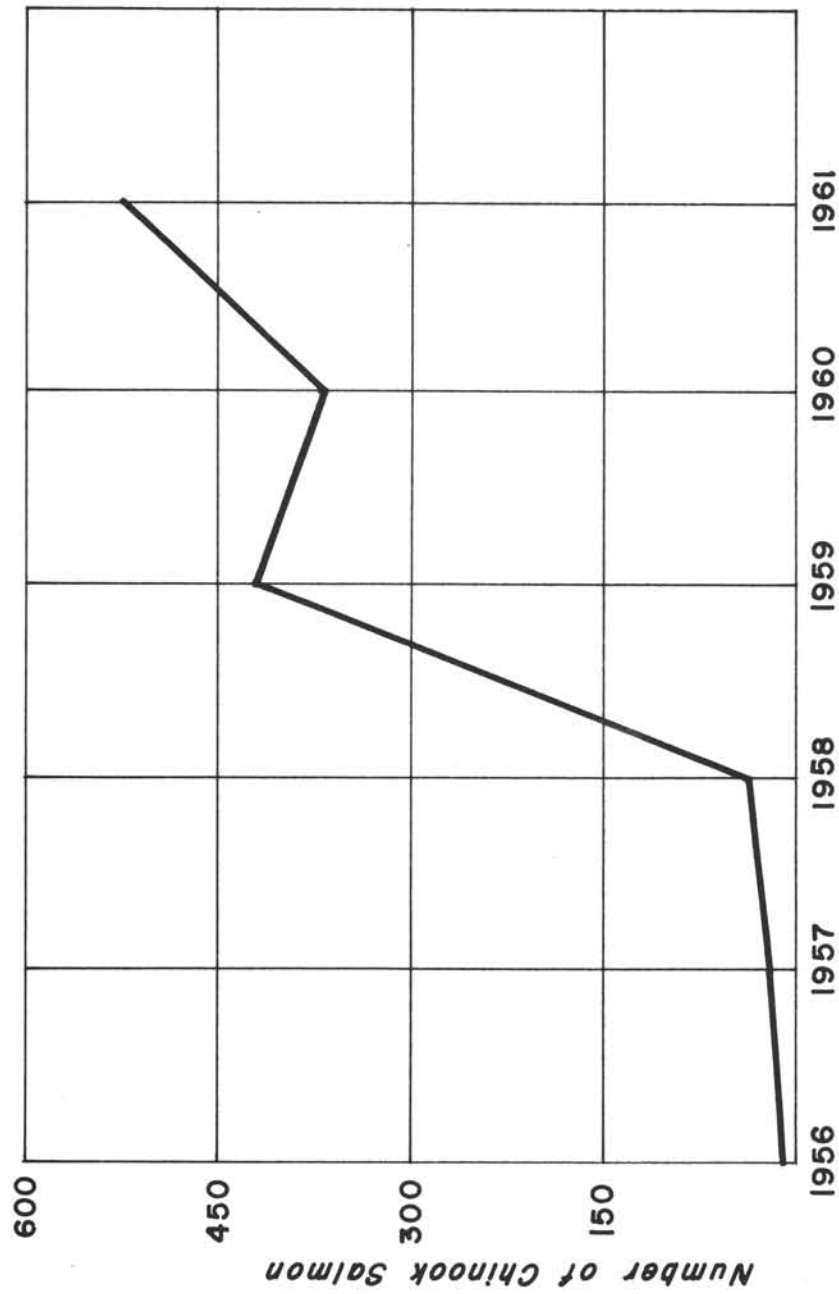
Note: Figures in parenthesis indicate jack salmon.

Figure 8



PARTIAL SAMPLING OF IMMATURE STEELHEAD AT ROTARY SCREEN
BYPASS TRAPS, JOHN DAY RIVER SYSTEM, FOR A 6-YEAR PERIOD

Figure 9



PARTIAL SAMPLING OF IMMATURE CHINOOK SALMON AT ROTARY
SCREEN BYPASS TRAPS, JOHN DAY RIVER SYSTEM, FOR A 6-YEAR PERIOD

A series of experimental subterranean weirs were installed throughout the lower portion of Tex Creek for the purpose of creating a surface flow where intermittent stream conditions occur each summer. Periodic observations are being made on the stream flow developments on the project area. Trapping results on Tex Creek are listed in Table 195.

Table 195

Tex Creek Trapping Results,
May 3 to July 11, 1961

Number of Days	Adult Upstream Trap		Downstream Migrant Trap				Spent Adults	
	Males	Females	Immature Steelhead (Size Groups in Inches)				Males	Females
			0-2	2-4	4-6	6 & Over		
70	23	23	27	1,429	846	219	19	17

Project 367 - Reduction of Salmonid Predators in Streams by Chemical Treatment

During the summer period of 1961, activities on Project 367 consisted of an intensive fish population sampling operation along a 35-mile section of the John Day River between the towns of Dayville and John Day. This sampling was to obtain data on the species composition of the residual population and information on the migration of salmonids through the project area.

Partial sampling of the downstream steelhead migration was obtained at six rotary screen bypass traps that were operated during the migration period. The bypass trapping results indicate the steelhead migration through the test section terminated in early June. Some of the migrants were marked with a partial fin clip in order to trace their movement through the project area. Of 3,004 marked fish, only 14 were recovered at downstream trap locations. Table 196 presents the results of partial sampling at rotary screen bypass traps.

Table 196

Partial Sampling of Downstream Migrant Salmonids
at Rotary Screen Bypass Traps in John Day River
between Dayville and John Day,
April 14 to June 16, 1961

Number of Traps Operated	Species Trapped	Number of Fish Trapped	Number of Fish Marked	Number of Marked Fish Recovered
6	St Ch	3,589 46	2,979 25	13 1
Totals		3,635	3,004	14

Information on the residual fish population was obtained by gill net and electro-fishing throughout the test section of river. Sampling was conducted at 22 shocker stations and 24 gill net stations. A total of 4,305 fish, including 12 species, was collected at these stations. Coarsescaled suckers were the most abundant fish in the samples (36 per cent). Rainbow trout comprised 2 per cent of the sample population. Gill net and electro-fishing results are shown in Table 197.

Table 197

Project 367, Fish Population Sampling,
John Day River Between Dayville and John Day

Method of Sampling	Number of Stations	Species Taken in Samples								Total Number in Samples
		FSu	CSu	Clm	RsS	Sq	Wf	Rb	Other	
Shocker	22	273	1,011	362	794	367	110	67	28	3,012
Gill Nets	24	214	524	230	0	249	48	14	14	1,293
Totals	46	487	1,535	592	794	616	158	81	42	4,305
Percentage by Species		11	36	14	18	14	4	2	1	100

Dredge Pond Rehabilitation

The Morris dredge ponds near John Day were treated with 70 pounds of rotenone powder to eliminate undesirable species of fish. Species noted included coarsescaled sucker, finescaled sucker, squawfish, chiselmouth, redside shiner, bullhead catfish, and dace.

Dissolved Oxygen Determinations - Magone Lake

The dissolved oxygen content of Magone Lake was measured at monthly intervals during the winter stagnation period. The determinations indicated the dissolved oxygen content dropped to critical levels for fish life during late February and March. No fish loss was observed. Table 198 presents the dissolved oxygen readings recorded at Magone Lake.

Table 198

Dissolved Oxygen Determinations, Magone Lake

Depth of Samples in Feet	Dissolved Oxygen in p.p.m.			
	1/25/61	2/23/61	3/24/61	5/10/61
1.5	6.6	4.1	4.3	16.1
5.0	4.2	2.7	3.0	14.6
10.0	3.0	1.5	1.4	12.1
15.0	2.1	0.8	1.2	11.0
30.0	2.1	0.8	0.0	1.0

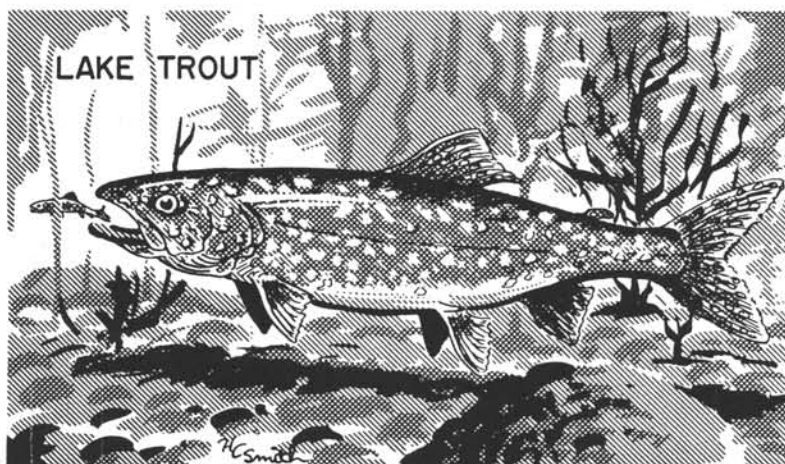
Electro-Fishing

The portable shocker was used on Rail Creek, Engle Creek, and the upper John Day River. The shocker sampling results are given in Table 199.

Table 199

Fish Population Sampling by Shocker Method,
January 23-24, 1961

Stream	Length of Sample Area (Feet)	Species	Number Counted	Length Frequency (Size Groups by Inches)				
				2-4	4-6	6-8	8-10	10-12
Engle Creek, lower	65	St	35	31	4			
Engle Creek, upper	195	Rb	4	3	1			
Rail Creek, lower	200	Rb	15	4	7	3	1	
		Ct	3		2	1		
Rail Creek, upper	270	Rb	3			2	1	
		Ct	18	1	3	8	5	1
		DV	7		5		2	
Upper John Day River	180	St	24	11	3	10		
		DV	1			1		
		EB	2		1		1	



NORTH COAST - ASTORIA DISTRICT

Warren M. Knispel

Fish Distribution

Several small impoundments, one to two acres in size and located in Clatsop and Columbia Counties, were stocked with fingerling cutthroat to provide additional angling. Plastic bags filled with water and oxygen were used to transport the fish. Several hauls were made using varied amounts of water and fish. The rate of one pound of fish to one gallon of water showed the smallest loss of the methods used.

Fish Inventory

The sport salmon fishery at the mouth of the Columbia River has continued to increase in importance. The fishery covers a considerable part of the summer and early fall. An offshore fishery for salmon also exists at the mouth of the Nehalem River, but unpredictable bar conditions confine most of the angling to the bay. Lower Columbia River sand bar fishery continues to increase in popularity. The bars have provided some excellent angling for salmon and steelhead.

A steelhead fishery exists on all open streams of the north coast as does sea-run cutthroat angling to a lesser degree.

Annual inventories for salmon and steelhead are conducted on selected streams to determine the use of available gravel and trends of abundance.

Columbia-Ocean Salmon Fishery

The sport fishery at the mouth of the Columbia River was sampled jointly with personnel from the Washington Department of Fisheries. Calculation of the total salmon catch was made by the Research Division of the Oregon State Game Commission. Sampling of the sport catch began in June and continued through the second week in September.

Angling pressure was greater in 1961 than in any previous season. Good weather conditions and an abundance of silver salmon were probably responsible for much of the increased effort. The three-week period from August 20 through September 9 accounted for 54 per cent of the total catch of 106,000 salmon. See Table 200. Chinook salmon formed approximately 19 per cent of that catch -- a considerable decline from the high of 38,000, or 54 per cent, in 1960.

Mark Analysis

A total of 43 marks was recovered in a sample of 6,514 chinook, and 227 marks from a sample of 25,248 silver salmon. The marked to unmarked ratio for chinook was 1:151 and 1:111 for silvers. See Tables 201 and 202. The calculated contribution of hatchery fish was 941 salmon, or 0.89 per cent of the total catch.

Table 200

Columbia River-Ocean Sport Fishery Catch Estimates,
Oregon and Washington Combined,
June 24 to September 16, 1961

Week Ending	Total Fisherman Trips	Chinook	Silvers	Total Salmon	Catch per Fisherman per Trip		
					Chinook	Silvers	Total
June 24	446	18	301	319	0.04	0.67	0.72
July 1	919	106	605	711	0.12	0.66	0.77
July 8	1,495	414	1,045	1,459	0.28	0.70	0.98
July 15	1,674	605	2,061	2,666	0.36	1.23	1.59
July 22	3,132	1,290	4,517	5,807	0.41	1.44	1.85
July 29	4,403	1,605	6,870	8,475	0.36	1.56	1.92
Aug. 5	8,083	3,254	5,792	9,046	0.40	0.72	1.12
Aug. 12	10,224	1,750	4,089	5,839	0.17	0.40	0.57
Aug. 19	11,380	3,009	7,898	10,907	0.26	0.69	0.96
Aug. 26	18,273	4,227	19,951	24,178	0.23	1.09	1.32
Sept. 2	16,230	1,942	15,875	17,817	0.12	0.98	1.10
Sept. 9	11,122	1,740	13,479	15,219	0.16	1.21	1.37
Sept. 16	2,464	499	3,015	3,514	0.20	1.22	1.43
Totals and Averages	89,845	20,459	85,498	105,957	0.23	0.95	1.18
Rounded Figures	89,800	20,500	85,500	106,000	0.20	1.00	1.20

Incidental Catch

Species other than salmon were also recorded. That information may be seen in Table 203.

Nehalem Bay Salmon Fishery

Some sampling was done on the sport catch in tidewater areas of the Nehalem River. Salmon anglers began fishing early in July at the mouth of the river, and as the weather and bar conditions permitted, fished in the adjacent ocean waters. The peak activity occurred here in August and as the salmon moved upstream in September and October, angling pressure shifted to the vicinity of Wheeler and Nehalem approximately two to four miles upstream. The bulk of the angling for salmon takes place from the confluence of the North Fork to the mouth of the main river, a distance of approximately seven miles. Table 204 presents the census data for river anglers.

The largest number of sport boats recorded in September and October was 125. Higher numbers may have fished in August. One of the largest chinook salmon caught weighed 44 pounds and was entering its fifth year.

Table 201

Chinook Salmon Marks in the 1961 Columbia River-Ocean Sport Fishery,
Washington and Oregon Combined

Chinook Salmon		July		August		September		Total	
Number Sampled		2,897		3,043		569		6,509	
Total Catch		7,274		10,928		2,239		20,441	

Marks	Brood Year	July		August		September		Total	
		Actual /1	Calculated /2	Actual /1	Calculated /2	Actual /1	Calculated /2	Actual /1	Calculated /2
D-Ad-RM	1958	0	0	1	4	0	0	1	4
D-RM	(Reg.)	1	2	0	0	0	0	1	2
Ad	1958	1	2	1	4	0	0	2	6
Ad	1959	2	4	1	4	0	0	3	8
Ad-RP	1958	0	0	1	3	0	0	1	3
Ad-RP	1959	0	0	0	0	1	3	1	3
Ad-LM	1959	0	0	1	5	0	0	1	5
Ad-RM	1958	1	2	0	0	0	0	1	2
Ad-RM	1959	1	3	0	0	1	3	2	6
An-LV	1959	1	2	0	0	0	0	1	2
An-LP	1959	5	12	0	0	0	0	5	12
An-RP	1958	0	0	1	3	1	3	2	6
An-RP	1959	2	4	0	0	1	3	3	7
LV-RV	1957	1	2	0	0	1	4	2	6
LV-RM	1957	0	0	0	0	1	4	1	4
RV	1957	1	2	0	0	0	0	1	2
RV	1959	1	3	0	0	0	0	1	3
LP	(N.S.)	0	0	1	4	0	0	1	4
LP	1958	0	0	1	3	0	0	1	3
RP	1958	0	0	3	9	0	0	3	9
RP	1959	1	3	2	9	0	0	3	12
LV	1957	0	0	1	4	0	0	1	4
LV	1959	1	3	0	0	0	0	1	3
D-Ad	1959	0	0	1	3	0	0	1	3
D-RP	1959	0	0	1	3	0	0	1	3
IM	1957	1	3	0	0	0	0	1	3
LP-RP	1959	1	2	0	0	0	0	1	2
Totals								43	127

Note: Marked to unmarked ratio = 6,509/43, or 1:151.

/1 Actual marks observed.

/2 Calculated number of marks in catch.

Table 202

Silver Salmon Marks in the 1961 Columbia River-Ocean Sport Fishery,
Washington and Oregon Combined

Silver Salmon	July		August		September		Total
	Actual	Calculated	Actual	Calculated	Actual	Calculated	
Number Sampled	8,609		12,279		4,247		25,135
Total Catch	20,890		47,813		16,494		85,197

Marks	July		August		September		Total
	Actual	Calculated	Actual	Calculated	Actual	Calculated	
	/1	/2	/1	/2	/1	/2	
D	0	0	3	13	0	0	3
D-Ad	10	25	23	98	7	28	40
Ad	13	31	29	111	4	15	46
Ad-An	0	0	1	5	0	0	1
Ad-LV	0	0	2	8	0	0	2
Ad-LV-RV	1	2	0	0	0	0	1
Ad-RV	1	2	0	0	0	0	2
Ad-LP	0	0	4	18	0	0	4
Ad-RP	1	2	0	0	0	0	1
Ad-LM	4	8	1	4	0	0	5
Ad-RM	11	25	16	72	2	8	29
An-LV	6	15	4	16	0	0	10
An-RV	0	0	0	0	1	4	1
An-LP	1	3	1	3	0	0	2
An-RP	1	2	0	0	0	0	1
LV	18	44	20	78	2	8	40
LV-LM	0	0	1	5	0	0	1
LV-RM	1	2	0	0	0	0	1
RV	2	4	14	56	2	7	18
LP	1	3	4	17	1	4	6
RP	1	2	7	27	0	0	8
RP-RV	1	2	2	8	0	0	3
RP-LV	0	0	2	9	0	0	2
RP-LM	0	0	0	0	1	3	1
Totals							
					227	797	

Note: Marked to unmarked ratio = 25,135/227, or 1:111.

/1 Actual marks observed.

/2 Calculated number of marks in catch.

Table 203

Columbia River-Ocean Sport Fishery,
Calculated Washington and Oregon Catch of Incidental Species,
June 24 through September 16, 1961

Week Ending	Rockfish	Flounder	Lingcod	Halibut	Steelhead	Sole	Cutthroat	Shark	Miscellaneous
June 24	102	5	40						
July 1	194		121						1
July 8	169	12	48	4			2	1	4
July 15	584	12	31	4					26
July 22	497	127	35	17	18	9	2	1	12
July 29	786	51	183	135	10	2		9	6
Aug. 5	2,887	353	270	186	10	56	2	19	8
Aug. 12	2,340	473	172	52	5	29		10	21
Aug. 19	1,466	229	120	29	15	21	56	6	109
Aug. 26	1,422	223	265	47	24	14			137
Sept. 2	1,223	339	78	41	12	4	8	8	143
Sept. 9	870	357	136	29	104	15			78
Sept. 16	202	123	61	7		1	9		2
Totals	12,742	2,304	1,560	551	198	151	79	54	547

Table 204

Nehalem Bay Salmon Catch

Anglers	Hours	Chinook	Silvers	Jacks	Hours per Fish
216	1,380	2	22	3	51.1

Columbia River Sand Bar Fishery

Limited effort was directed toward a creel census on the lower Columbia River sand bars. Information on the sand bar fishery is presented in Table 205. Increased effort and catch success occurred as the summer season progressed. However, the catch of salmon and steelhead over 20 inches was reduced during the river commercial seasons.

Table 205

Columbia River Sand Bar Catch

Anglers	Hours	Chinook	Steelhead	Jacks	Hours per Fish
68	393	5	2	25	12.3

Winter Fishery

Steelhead creel census data show a decline in catch success for anglers on the Nehalem River. Although an improvement in success was experienced in early December, a decline was noted in late December and early January, indicating that the main steelhead run had passed the Mohler to Cook Creek area where angler pressure is heaviest.

Most of the steelhead recorded from Nehalem River creel checks were weighed. The largest fish for the 1960-61 season was 18.5 pounds and the smallest, excluding jacks, was 6 pounds. Approximately 84 per cent of the catch weighed between 6 and 10 pounds and was evenly distributed within that range. Heavy stream flows continued for long periods on the Nehalem, thus confining much of the steelhead angling to a "plunking" type of fishery. The anglers that "drift" for steelhead had few days of fishable water.

Other north coast streams also reflected a slight decline in the catch as the season progressed.

Creel checks disclosed few silver salmon were caught early in the steelhead season. The catch by stream for the winter season is recorded in Tables 206, 207, 208, and 209.

For the month of March, the condition of the steelhead caught in the Nehalem and lower Columbia River tributaries was of primary concern. Angler interviews were conducted on Nehalem River tributaries, and traps were used for complete counts of upstream migrating fish on Big Creek, Gnat Creek, and the Klaskanine North Fork.

Table 206

Nehalem River Winter Catch,
November 16, 1960 - February 28, 1961

Period	Anglers	Hours	Hours per Fish	Species			Total
				Steelhead	Silvers	Cutthroat	
11/16/60 to 12/15/60	155	542.5	19.4	26 <u>1</u>		2	28
12/16/60 to 1/15/61	208	639.5	32.0	20 <u>2</u>			20
1/16/61 to 2/15/61	124	400.0	50.0	8 <u>3</u>			8
2/16/61 to 2/28/61	42	135.0	27.0	5 <u>3</u>			5
Totals and Average	529	1,717.0	28.1	59		2	61

1 3 under 20 inches.
2 6 under 20 inches.
3 1 under 20 inches.

Table 207

Necanicum River Winter Catch,
November 16, 1960 - February 28, 1961

Period	Anglers	Hours	Hours per Fish	Species			Total
				Steelhead	Silvers	Cutthroat	
11/16/60 to 12/15/60	26	56	18.7	0	1	2	3
12/16/60 to 1/15/61	36	98	16.3	5	0	1	6
1/16/61 to 2/15/61	30	64	-	0	0	0	0
2/16/61 to 2/28/61	38	115	16.4	5	0	2	7
Totals and Average	130	333	20.8	10	1	5	16

Table 208

North Fork Nehalem Winter Catch,
November 16, 1960 - March 31, 1961

Period	Anglers	Hours	Hours per Fish	Steelhead	Silvers	Total
11/16/60 to 12/15/60	6	20.5	10.3	1	1	2
12/16/60 to 1/15/61	27	72.5	14.5	5 <u>/1</u>	0	5
1/16/61 to 2/15/61	45	164.5	41.1	4	0	4
2/16/61 to 3/15/61	32	121.5	24.3	5	0	5
3/16/61 to 3/31/61	19	65.5		1	0	1
Totals and Average	129	444.5	26.1	16	1	17

/1 One jack.

Table 209

Miscellaneous Streams, Winter Catch,
November 16, 1960 - March 31, 1961

Stream	Anglers	Hours	Hours per Fish	Species			Total
				St	Si	Ct	
Lewis and Clark River	30	154.5	38.6	0	0	4	4
Salmonberry River	43	188.0	26.9	7	0	0	7
Big Creek	22	78.0	8.7	2	0	7	9
Klaskanine River	6	9.5					0
Cook Creek	3	8.0	8.0	1			1
Rock Creek	4	7.0					0
Totals and Average	108	445.0	21.2	10	0	11	21

From the information collected, it appears that some bright, prime fish do enter Nehalem River tributaries in March, but more fish in an advanced spawning condition are hooked. Less fish appear to be prime in Columbia River tributaries. The main Nehalem River does have a March run of steelhead but these fish become scattered upon entering the tributaries.

Angling pressure on most north coast streams declined after mid-March.

Spawning Surveys

Surveys were made for spring chinook, fall chinook, and silver salmon. The Nehalem River and its tributaries, the Necanicum River, and Cullaby Creek, a tributary to Cullaby Lake, were examined. An annual steelhead survey was conducted on the Salmonberry River.

In 1960 a total of 12.5 miles of stream in the Nehalem system was examined for silver salmon. Just under 15 fish per mile were recorded. Excluding jacks, 11.3 salmon were observed per mile. Lower counts were obtained in the Necanicum system where six fish per mile were counted on four miles of stream. Only one jack salmon was noted on the Necanicum survey.

Fall chinook in 1960 averaged 59.5 fish per mile including jacks and 29 fish per mile excluding jack salmon. That survey includes four miles of stream.

The 1961 spring chinook survey on the Nehalem River extended from Salmonberry to Jewell, a distance of about 12 miles. The number of fish recorded, 61 adults and 6 jacks, was below that of 1957 or 1958 but slightly above the count made in 1960. For information on spawning counts, see Tables 210 and 211.

Table 210

Silver Salmon Spawning Ground Counts, 1960

Stream	Water	Miles	Adults	Jacks	Total
Cronin Creek	Clear	2.5	17	4	21
Necanicum South Fork	Clear	0.5	1		1
Necanicum North Fork	Clear	1.0	3		3
Necanicum, main stream	Clear	1.5	13		13
Bergsvik Creek	Clear	1.0	6	1	7
Cullaby Creek	Clear	2.0	15	18	33
Totals		8.5	55	23	78

Table 211

Spring and Fall Chinook Salmon and Steelhead Spawning Ground Counts

Stream	Water	Miles	Chinook		Steelhead	Total
			Adults	Jacks		
Nehalem River	Clear	12.0	40 ^{/1}	9 ^{/1}		49
Cronin Creek	Clear	4.0	29 ^{/2}	30 ^{/2}		59
Salmonberry River	Clear	3.0			26 ^{/3}	26
Totals		19.0	69	39	26	134

^{/1} Spring chinook, 1961.

^{/2} Fall chinook, 1960.

^{/3} Steelhead, 1961.

Salmon spawning ground data are exchanged with the Oregon Fish Commission.

Trout

Angling for trout in streams was considered good early in the season. Legal-size hatchery releases provided the bulk of the catch in the first two size-groups and for the first five streams listed in Table 212. The catch from the remaining streams was from native stocks.

The Necanicum River, used as a key stocking stream, received the largest releases of hatchery fish. Trout were liberated at approximately weekly intervals to provide good returns to the creel and as long as the temperature and flow remained adequate. See Table 213.

Sunset and Coffenbury Lakes produced nice catches of trout the opening weekend of the season and fair success was experienced for the following three weeks. Most of the fish caught were from legal-size releases. Fingerling trout liberated the previous fall did not enter the creel in Sunset or Coffenbury Lakes. However, near mid-May, rainbow planted as fingerlings began to enter the creel as legal-sized fish at Lost Lake. Prior to that time, most of the catch was from hatchery released cutthroat. See Table 212.

Warm-Water Fish Population Studies

The fish populations of Sunset and Cullaby Lakes were sampled to determine species composition and growth rate. The dominant species in Sunset Lake was perch, while in Cullaby Lake black and white crappie were most abundant. According to scale readings, Sunset Lake perch showed favorable growth for the first two years of life when compared with Siltcoos Lake and the state-wide average. After two years the growth rate declined. Larger perch were absent and could not be used for comparison in the later age classes.

Age determination of crappie and perch in the lake showed them to be below a state-wide average in growth rate. Results of the nets are presented in Table 214.

Habitat Improvement

Logging debris was removed from several streams to maintain or improve the existing habitat. See Table 215. Some of the habitat problems encountered required several discussions with the responsible agency before the existing barriers were removed or the problem corrected. A pair of steelhead was observed spawning above a log jam on Wolf Creek, a Salmonberry River tributary, after considerable work had been done by Commission personnel.

A small lake located on Crown Zellerbach land near Vernonia was treated with rotenone to remove a stunted population of crappie and bullhead catfish. The lake was restocked with trout for public fishing.

Table 212

Trout Creel Census, North Coast, 1961

Water	Anglers	Hours	Fish per Hour	Species	Number in Two-Inch Size Groups						Total Fish
					8-10	10-12	12-14	14-16	16 & Over		
Necanicum River	202	639.5	1.23	Ct Rb	767	15	1			1	782 2
Nehalem River	111	375.0	1.47	Ct	524	25	4				553
Nehalem River, North Fork	78	357.0	1.04	Ct	362	6	3				371
Big Creek	60	200.0	1.16	Ct	230			1			231
Lewis and Clark River	30	102.0	1.11	Ct	113						113
Cook Creek	13	34.0	1.15	Ct	19	16	4				39
Salmonberry River	8	27.0	1.00	Ct	25	2					27
Lost Creek	5	14.0	1.57	Ct	21	1					22
Cronin Creek	2	4.0	2.25	Ct	9						9
Spruce Run Creek	1	2.0	1.00	Ct	2						2
Sunset Lake	214	808.0	0.77	Ct Rb	584	1	1	1	1	1	588 34
Coffenbury Lake	138	406.5	1.20	Ct Rb	451	3	2	12	18		486 1
Lost Lake	87	322.5	1.02	Ct Rb	292 13	10 9		4			302 26
Soapstone Lake	18	39.0	0.92	Rb	33	1	2				36

Table 212 (continued)

Water	Anglers	Hours	Fish per Hour	Species	Number in Two-Inch Size Groups					Total Fish
					8-10	10-12	12-14	14-16	16 & Over	
Spruce Run Lake	4	12.0	1.67	Ct	20					20
Quartz Lake	8	21.0	0.50	Rb	10					10
Totals and Average	979	3,363.5	1.09		3,475	89	27	15	48	3,654

Table 213

Necanicum River Trout Catch, 1961

Period	Anglers	Hours	Fish per Hour	Species	Number in Two-Inch Size Groups					Total Fish
					8-10	10-12	12-14	14-16	16 & Over	
May 16 to June 15	166	530.5	1.16	Ct Rb	606	12	1		1	618
June 16 to July 15	36	109.0	1.50	Ct	161	3				164
Totals and Average	202	639.5	1.23		767	15	1		1	784

Table 214

Net Catch

Lake	Date	Number of Sets	Species	Number of Fish	Size Range (Inches)	Average Size (Inches)
Sunset	April 18, 1961	5 gill nets	P	198	5 - 9	7.5
		1 hoop net	B	13	10 - 13	11.7
		1 New York trap net	Ct	5	10	
			Cottids	6	5 - 6	
			Cp	1	6	
Cullaby	April 19, 1961	5 gill nets	WC	58	5 - 8	7.2
		1 hoop net	BC	70	3 - 8	6.5
		1 New York trap net	BG	36	3 - 7	5.8
			Su	5	8 - 12	11.2
			Wm	4	5 - 8	6.1
			P	45	5 - 8	5.9
			B	47	6 - 12	9.9
			CRC	30	6 - 9	7.6

Table 215

Logging and Pollution Problems, North Coast District, 1961

Stream	Pollution	Cause	Corrective Measure
Necanicum River	Partial stream block	Debris	Landowner removed.
Castor Creek	Siltation	Crushed rock findings	State Sanitary Authority recommended correction.
Brandis Creek	Stream block	Logging	Crown Zellerbach cleared debris.
Bear Creek	Stream block	Logging	Crown Zellerbach cleared debris.
North Fork Cronin Creek	Stream block	Logging	Removed by Game Commission contract.
Nehalem tributary	Organic	Whey	State Sanitary Authority recommended correction.
Soapstone Creek	Stream block	Logging	Logging company removed debris.
Rack Heap Creek	Stream block	Logging	Logging company removed debris.

NORTH COAST - TILLAMOOK DISTRICT

Francis H. Sumner

Fish Distribution

Summer releases of legal cutthroat trout to streams followed a new pattern in which the Nestucca River was designated as the key stream for the district. In four liberations, starting May 18 and ending July 20, the Nestucca and two main tributaries, Three Rivers and Beaver Creek, received 21,182 trout. All other streams together (except the Wilson River which is not stocked for summer angling) divided the remaining 11,604 (of 41,000 total) cutthroat.

Fish Inventory

Anadromous

Spring Chinook Salmon

Anglers fishing spring chinook had a better success ratio than in 1960 but somewhat inferior to that of 1956 and 1957. Creel census data for 1961 is presented in Table 216.

Trolling for spring chinook in Tillamook Bay (Table 217) was much inferior in 1961 to that observed in 1960. The rate of catch for 1961 was 154 hours per fish compared to 84 hours per fish in 1960. Both 1960 and 1961 were below troll quality recorded in 1956 and 1957.

Drifting of the Trask and other streams for spring chinook was done rather frequently and was more successful than bank angling, but very few boats were checked.

On the Nestucca River and Bay several adipose and both ventral marked chinook of the Game Commission 1959 liberation of advanced yearlings were caught.

Fall Chinook and Silver Salmon

Bank salmon angling (Table 216) in the latter part of the 1960 fall season was very close in quality to the angling in 1959, somewhat better than in 1958, and not quite as good as in 1957. The proportion of jacks was much higher in 1960 (57 per cent) compared with 30 per cent in 1957, 32 per cent in 1958, and 12 per cent in 1959.

The checked boat catch at Garibaldi on north Tillamook Bay (Table 217) was characterized by very good silver fishing in the ocean followed by fair bay trolling, mostly for chinook, in late September and October. The season's average rate of catch, 12 hours per fish, was close to that of 1959 and 1960 (15 hours per fish). The ocean troll fishery off Cape Kiwanda, where rate of catch was 5 hours per fish, would probably be matched by the ocean part of the fishery out of Garibaldi.

Reported salmon trolling by moorages at Garibaldi in 1961 was limited to the period July 1 to August 21. The estimate was that 1,234 boats took 474 salmon at a rate of 0.26 salmon per boat. For the same period, the writer's check revealed 0.31 fish per boat.

Table 216

Salmon Bank Angling Tillamook District Streams, 1960-61

River	Period	Trout /1	Chinook Adults	Silver Adults	Jacks	Steelhead	Total Fish	Total Anglers	Angler- Hours	Hours per Fish
<u>Spring Chinook</u>										
All /2	4/16- 6/15/61		3		1		4	46	86	21.5
<u>Fall Salmon</u>										
All /3	10/16- 11/15/60	64	8	11	28	2	49	553	1,388	28.3
All	9/1- 9/30/61 /4	1	25	2	6		33	354	1,103	33.4

/1 Trout are not counted in totals and averages.

/2 Mostly Trask River.

/3 Above tidewater on Tillamook area streams and the Nestucca River.

/4 No checking done October 1-15.

Table 217

Sport Boat Catch, Salmon, Tillamook District, 1960-61

Period	Trout /1	Chinook Adults	Silver Adults	Steelhead Jacks	Total	Anglers	Angler- Hours	Average Hours Angled	Fish per Angler	Fish per Hour	Hours per Fish
<u>Tillamook Bay, Spring Chinook Troll /2</u>											
6/4 to 6/25/61		2			2	94	309	3.3	0.02	0.01	154.5
<u>Tillamook Bay and Ocean, Fall Salmon Troll, Checked /3</u>											
7/1 to 10/31/61		73	204	15 /4	292	896	3,573	4.0	0.33	0.08	12.2
<u>Cape Kiwanda Ocean Troll, Checked</u>											
7/1 to 9/16/61		37	160		197	227	994	4.4	0.87	0.20	5.0
<u>Lower Nestucca Moorage, Report</u>											
10/16 to 10/31/61 /5	31	2	8	15	25	148	960	6.4	0.17	0.03	38.4
8/16 to 10/15/61 /6											
<u>Upper Nestucca Moorage, Report</u>											
10/16 to 10/31/61 /5	16	1	2	5	8	55	386	7.0	0.15	0.02	48.3
8/16 to 10/15/61	105	39	19	70	128	411	3,058	7.4	0.31	0.04	23.9

/1 Trout are not counted in totals and averages.

/2 Determined by interviews.

/3 Most of silvers caught from ocean.

/4 Chinook.

/5 Bad weather ended angling at end of October.

/6 No record.

Spawning of Spring Chinook Salmon

Only one survey was made in the 1961 season to determine the extent of spawning by spring chinooks in the Nestucca River. On September 30, it seemed that intensity of spawning in several spots above Hebo was not as great as in recent past years. It is probable that early low water held salmon in the lower river.

Spawning of Fall Salmon

The fall salmon spawning season was featured by a period of extreme high water in the last week of November. Most redds were leveled so that they were unrecognizable and many salmon carcasses washed away or were left stranded in side channels.

Chinook were seen in Alder Creek for the first time (Table 218). The silver salmon population was fair, not as good as in some years, but still the same count as in 1959.

Probably many more chinook than were found spawned in Edwards Creek at an earlier date.

Marked Salmon

Salmon marks reported in 1961 are listed in Table 219.

It is of interest that no marked salmon were actually examined by the writer except for a missing right ventral, apparently the result of a mechanical injury.

Most of the chinook marks were either both ventrals or adipose and both ventrals, as previously noted. The probable source was the September 1959 liberation of 24,989 spring chinook at 6.9 and 7.0 per pound. In February 1959, a liberation of 11,602 spring chinook at 3.6 per pound and marked anal and right maxillary had been made. Table 219 reveals but one anal-marked chinook which, despite the noted adipose, may have been from the early 1959 release.

Size of Salmon

In Table 220 are given average fork lengths and weights of several groups of salmon. It is noteworthy that adult males and jacks of both chinook and silver salmon are smaller, while females are larger, than in 1960. The percentages of jacks in 1961 are less than half of the proportions in 1960.

Fish Trapped at the Three Rivers Rack

Trapping at the Three Rivers rack (Table 221) started on November 1, 1960 and lasted to the end of February 1961. The shorter trapping season resulted in the catch of about one-half as many silver salmon and steelhead as in the previous season when the trap was operated from September through April.

Steelhead Angling

Angling for steelhead is summarized in Table 222.

Table 218

Fall Salmon Spawning Surveys, 1960

Date	Stream	Species	Redds	Live		Dead		
				Adults	Jacks	Females	Males	Total
12/6/60	Alder Creek (Three Rivers)	Chinook	1			1	1	2
		Silver	17-23	9	12		1	22
12/8/60	Peterson Creek (Miami River)	Silver	1			1		1
	Fawcett Creek (Tillamook River)	Silver	5	2		1	1	4
	Edwards Creek (S. Fk. Trask River)	Chinook	3			3	3	7
		Silver	10	10		4	5	22



Table 219

Marked Salmon Reported, Nestucca River and Pacific Ocean off Cape Kiwanda, 1961

Date	Place	Species	Length (Inches)	Weight (Pounds)	Sex	Mark
May 2	Nestucca mouth	Chinook	24	15.5		BV
May 4	Nestucca mouth	Chinook	22	12.3		BV
May 20	Nestucca mouth	Chinook	24	12.6		BV
June 9	Nestucca mouth	Chinook	24	15.0		BV
	Nestucca mouth	Chinook	26	14.3		BV
June 10	Nestucca mouth	Chinook		12.0		BV
	Nestucca mouth	Chinook		14.0		BV
June 18	Nestucca mouth	Chinook		16.3		BV
June 28	Nestucca mouth	Chinook		15.3		BV
	Nestucca mouth	Chinook		17.3		BV
July 3	Nestucca mouth	Chinook		12.0		BV
	Nestucca mouth	Chinook		13.5		BV
	Nestucca mouth	Chinook		18.3		BV
Aug. 11	Nestucca mouth	Chinook	31			BV
Aug. 20 <u>1</u>	Nestucca mouth	Chinook		26.0		BV
	Nestucca	Chinook		33.0		BV
	Nestucca	Chinook		30.0		BV
Sept. 2	Nestucca tidewater	Chinook		29.0		BV
	Nestucca tidewater	Chinook		33.0		BV
	Nestucca tidewater	Chinook		35.0		BV
	Nestucca mouth	Chinook <u>2</u>			M	1 pectoral
Sept. 17-24	Ocean	Chinook		29.0	M	Ad & BP
	Ocean	Chinook		25.0		Ad & BV
	Ocean	Chinook		27.0		Ad & BV
	Ocean	Chinook		25.0	F	BV

Table 219 (continued)

Date	Place	Species	Length (Inches)	Weight (Pounds)	Sex	Mark
Sept. 24	Nestucca tide	Chinook	30+-			BV
	Nestucca tide	Chinook	30+-			BV
	Nestucca tide	Chinook	30+-			BV
Sept. 30	Nestucca tide	Chinook ¹ / ₃				BV
Aug. 12	Nestucca tide	Chinook		25.0	F	BV
Aug. 20	Ocean, Kiwanda	Silver	10+-	11.0		LP
	Ocean, Kiwanda	Silver	10+-			Ad & LV
	Ocean, Kiwanda	Silver	10+-			Ad & LV
	Ocean, Kiwanda	Silver	10+-			Ad & LV
	Ocean, Kiwanda	Silver	14+-			RP & LV
	Ocean, Kiwanda	Silver				Ad & LP
	Ocean, Kiwanda	Silver				Ad & LP
	Ocean, Kiwanda	Silver				RV
Sept. 9	Ocean, Kiwanda	Silver		7- 8 ¹ / ₄		LP
Sept. 17-23	Ocean, Kiwanda	Silver		9-10		Top caudal
	Ocean, Kiwanda	Silver		9-10		Top caudal
	Ocean, Kiwanda	Silver		9-10		Top caudal
	Ocean, Kiwanda	Silver		9-10		Top caudal
Sept. 23	Ocean, Kiwanda	Silver		10-11		RV
	Ocean, Kiwanda	Silver		10-11		RV
	Ocean, Kiwanda	Silver		10-11		RV
	Ocean, Kiwanda	Silver		10-11		RV
Sept. 24	Ocean, Kiwanda	Silver		10-11		RV
	Ocean, Kiwanda	Silver		10-11		RV
	Ocean, Kiwanda	Silver		10-11		RV

¹ Approximate date.² Jack.³ Adult.⁴ Dressed.

Table 220

Size of Salmon

Species	Number	Sex	Area	Fork Length in Inches		Round Weight in Pounds		Per Cent Jacks
				Average	Range	Average	Range	
Fall Chinook	91	All	Tillamook Bay, tributaries, Nestucca River	29.9	16.0 to 44.0	16.3	2.0 to 40.0	20
	46	Ad M		30.4	24.5 to 40.0	15.6	7.4 to 39.0	
	27	F		36.5	29.0 to 44.0	26.0	12.0 to 40.0	
	18	Jacks		18.8	16.0 to 22.5	3.5	2.0 to 6.0	
Silver Salmon	104	All <u>1</u>	Ocean, Till- amook Bay, tributaries, Nestucca River	26.1	14.3 to 33.7	8.5	1.4 to 17.3	11 <u>2</u>
	40	Ad M		25.5	23.3 to 33.7	8.1	4.3 to 16.0	
	39	F		28.0	25.3 to 31.0	9.9	6.1 to 15.7	
	10	Jacks		17.9	14.3 to 22.0	2.6	1.4 to 3.8	
<u>Dressed Weight</u>								
Fall Chinook	10	All <u>3</u>	Tillamook Bay, tributaries, Nestucca River	25.1	17.0 to 39.5	8.1	2.3 to 21.4	
Silver Salmon	15	All <u>4</u>	Ocean, Till- amook Bay, tributaries, Nestucca River	27.3	24.5 to 31.5	7.7	4.5 to 12.3	
	8	Ad. M		27.0	24.5 to 29.5	7.7	4.5 to 11.3	
	6	F		27.8	26.0 to 31.5	7.9	6.5 to 12.3	

¹ Fifteen fish not sexed.
² Counting only sexed fish.

³ One female.
⁴ One fish not sexed.

Table 221

Mature Salmon and Steelhead Counted at
Three Rivers Trap, 1960-61

Month	Silver Salmon			Chinook Salmon	Steelhead	
	Male	Female	Jack	Jack	Male	Female
November	4	17	19	2		
December	20	17	7		12	5
January	22	27	9		34 <u>/1</u>	35
February			1		15 <u>/2</u>	16 <u>/3</u>
Totals	46	61	36	2	61	56
Total by species		143		2		117
Per cent jacks			25.2			

/1 One BV mark./2 Three marks (1 RV)./3 One RV.

The Wilson River was checked mostly on days not scheduled for a statistical check. The average catch rate of 32 hours per steelhead was only 63 per cent as good as in the season of 1959-60, and the proportion of marked fish was 65 per cent of that in 1959-60. The rate of catch for wild steelhead (50 hours per fish) was close to the same rate for 1959-60 (47 hours per steelhead); but, though it required 35 hours in 1959-60 to take a marked steelhead, a similar catch in 1960-61 required 85 hours.

Of the marked fish checked, 21 per cent were of the 1958 and 79 per cent of the 1959 liberations. The checked return in the 1960-61 season of the adipose-both-ventral fish was 0.014 per cent of the liberation, while for the Cedar Creek Hatchery right-ventral steelhead, the return amounted to 0.049 per cent.

The difference was attributed to the size of fish and time of liberation. The Alsea fish, forming the bulk of the adipose-both-ventral steelhead, averaged about 10.6 per pound and were released from March 25 to May 15, whereas the Cedar Creek fish were 5.5 to 5.8 per pound and were released early in March. The Bandon fish may have been stocked too early (February 9 to 12), before the migratory urge hit them, in which case they would have been more subject to stream predation.

Bank anglers on other streams, mainly the Nestucca River, caught only wild steelhead and at a rate close to that for wild steelhead on the Wilson River. In other years it has been usual for the Wilson catch rate for wild steelhead to be much worse than on other streams.

The catch rate for Nestucca River guided boats has deteriorated in the past few years, from 11 hours per fish in 1957-58 to 24 hours per fish in 1960-61. The main reason is probably the increase in the number of boats fishing the river.

Table 222

Steelhead Angling, December 1, 1960 to March 31, 1961

	Steelhead					Salmon /1	Total	Anglers	Hours	Average Hours per Angler	Steelhead per Angler	Hours per Steelhead	Per Cent Marked
	Wild		Hatchery										
	Adult	Jack	1958	1959	Ad-BV RW								
Trout /1													
Wilson River, Bank, Checked	23	18	5	13	6	65	634	2,051	3.2 /2	0.10	31.6	37.00	
Wilson River, Boat /3	3			3		6	36	195	5.4	0.17	32.5	50.00	
Other Streams, /4 Bank, Checked	15	56	13		8	69	963	3,314	3.4 /2	0.07	48.0	0.00	
Other Streams, /4 Boat, Checked	1	4				4	35	196	5.6	0.11	42.0	0.00	
Other Streams, /5 Boat, Guide Report	2	117	11	1	9	129	460	3,076	6.7	0.28	23.8	0.78	

1 Trout and salmon are not counted in totals and averages.2 Not completed angling.3 Checked and reported.4 Mostly Nestucca River.5 Nestucca River.

In Table 223, a comparison of catch rates for twelve seasons (1949-50 to 1960-61) indicates that angling success for steelhead fluctuates, but that the bank angling trend has been rather steady over-all, with a mean of 37 hours per fish.

Table 223

Steelhead Bank Angling.
A Comparison of Season Success, 1949 to 1961

Season	Number of Steelhead	Number of Anglers	Angler-Hours	Hours per Steelhead
1949-50 <u>/1</u>	114	793	3,143	27.6
1950-51	98	1,836	5,771	58.9
1951-52	246	2,197	9,619	39.1
1952-53	91	1,151	3,860	42.4
1953-54	112	862	3,271	29.2
1954-55 <u>/2</u>	72	910	2,804	38.9
1955-56 <u>/3</u>	104	1,003	2,808	27.0
1956-57 <u>/3</u>	83	1,034	2,627	31.7
1957-58 <u>/3</u>	157	1,830	5,834	37.2
1958-59 <u>/4</u>	32	328	914	28.6
1959-60 <u>/4</u>	70	567	1,986	28.4
1960-61 <u>/4</u>	69	963	3,314	48.0
12-Year Mean				36.4

/1 First five seasons: Nestucca and Wilson Rivers.

/2 Trask, Salmon, Little Nestucca Rivers, and Neskowin Creek.

/3 All streams in the district.

/4 All streams except the Wilson River and the Salmon River in 1959-60 and 1960-61. Includes March.

Boat angling success on the Nestucca River (Table 224), mostly from guide reports, has fluctuated in about the same degree as bank angling in the years 1948-1960, but in the 1960-61 season showed a sharp decline, paralleled in lesser degree by bank angling.

Size of Steelhead

Both hatchery and wild adult steelhead in the 1960-61 season averaged longer and heavier than the 1959-60 fish (Table 225).

Steelhead Spawning Surveys

Relatively few steelhead spawners were found in March (Table 226) except in Elk Creek, tributary to the Wilson River.

Table 224

Steelhead Boat Angling.
A Comparison of Seasonal Success,
Nestucca River, Upstream

Season	Hours per Fish
1948-49	8
1949-50	7
1950-51	13
1951-52	8
1952-53	11
1953-54	14
1954-55 ^{/1}	
1955-56	10
1956-57	10
1957-58	11
1958-59	13
1959-60	15
1960-61	24

^{/1} No data obtained.

Table 225

Sizes of Steelhead, Wilson and Nestucca Rivers, 1960-61

River	Number of Fish	Sex	Hatchery or Wild	Fork Length in Inches		Round Weight in Pounds		Condition Factor of Average
				Average	Range	Average	Range	
Wilson	8	Ad M	H	27.5	23.0-33.8	8.0	3.9-14.9	38.5
	12	F	H	27.0	23.5-29.0	7.4	5.1- 9.3	37.6
	2	Jack	H	18.3	18.1,18.5	2.4	2.3, 2.4	39.2
	9	Ad M	W	27.3	25.3-30.0	7.8	6.3-10.8	38.3
	12	F	W	28.7	24.5-32.5	9.4	6.0-13.5	39.8
	17	Jack	W	19.0	17.8-20.8	2.6	2.2- 3.4	37.9
Nestucca, etc.	18	Ad M	W	27.5	24.5-30.3	8.1	5.8-10.5	38.9
	31	F	W	27.8	24.5-32.0	8.5	5.8-13.3	39.6
	10	Jack	W	19.2	17.8-20.3	2.7	2.0- 3.2	38.1

Trout

Bank Catch

The 1961 trout season (Table 227) saw the inauguration of a key-stream system in which the Nestucca River and tributaries (Three Rivers and Beaver Creek) received 65 per cent of the district allocation of hatchery cutthroat trout. As a result, 76 per cent of the Nestucca catch was of hatchery origin. In 1960 the figure was 68 per cent. Most of the 1961 checking was done on the Nestucca River.

Table 226

Steelhead Spawning Surveys, Tillamook District Streams, 1961

Date	Stream	Length of Section (Miles)	Visibility	Number of Steelhead	Number of Redds
March 7	Elk Creek and West Fork (Wilson River)	0.9	Good	9	3-5
March 21	North Fork Wilson River	0.8	Poor-Good	2	1
March 22	Alder Creek (Three Rivers)	1.1	Fair-Good	1	1
March 27	Fox Creek (Wilson River)	0.7	Fair	0	0
March 28	Peterson Creek (Miami River)	0.5	Good	0	0

Practically all trout were checked above tidewater. Anglers contacted on Nestucca tidewater banks usually had no fish, whereas in past years of tidewater stocking, many hatchery trout were caught from the bank.

The catch rate for wild cutthroat trout was 0.15 fish per hour, 50 per cent higher than in 1960, and nearly up to the average for 1949-53 (Table 228).

Sub-legal salmonids were hooked at the rate of 2.5 fish per angler -- less than the usual rate.

Boat, Tidewater

The upper moorage on the Nestucca River furnished a daily record which is presented in Table 229. Angling at the upper moorage has been usually better than at the lower. The proportion of hatchery trout, 51 per cent, is about twice as high as in 1960 and better than in all but two of nine years in which trout were liberated into tidewater. It must be remembered, though, that most of the hatchery trout were taken from near the head of tidewater, considerably above the moorage, judging from reports of the proprietor.

The lower moorage estimated that through June most of the catch consisted of hatchery trout. From June 30 to August 6, in which period a detailed record was kept on 20 days, hatchery trout comprised 19 per cent of the catch, in contrast with 64 per cent for the upper moorage in July. The catch rate at the lower moorage for the detailed period was 11 hours per fish, while that of the upper moorage in July was 5.7 hours per fish.

As is shown in Table 228, the tidewater catch rate for all fish was less than half that above tidewater, although the rates for wild cutthroat showed much less difference.

The rate of catch for hatchery trout above tide was 0.31 fish per hour, while in tidewater it was 0.12 fish per hour, at best about a third as good. Evidently the upstream angler is still favored over the tidal boater.

A moorage at Woods kept a record which shows a trout catch with 24 per cent of marked trout. At the ratio of marked to unmarked hatchery cutthroat, the total catch proportion of hatchery trout was 71 per cent.

Table 227

Trout Creel Census, Bank Catch, All Tillamook District Streams, 1961

Month	Wild	Hatchery	Undeter- mined	Rainbow	Brown Trout	Steelhead	Undeter- mined Trout	Chinook Jacks	Total Fish	Number of Anglers	Angler- Hours	Fish per Hour	Hours per Fish	Per Cent Hatchery
June <u>1</u>	117	329 <u>2</u>	5	1	1	10	2		465	323	753	0.62	1.6	72
July	52	87				8		1	148	198	428	0.35	2.9	59
August	4	2							6	21	50	0.12	8.3	
September	8	4							12	32	70	0.17	5.8	37
October	27	6		1					34	35	76	0.45	2.2	
Totals and Averages	208	428	5	2	1	18 <u>3</u>	2	1	665	609	1,377	0.48	2.1	65

1 May 27 through June 30.2 One 1960 trout.3 Two RP-marked fingerlings.

Table 228

Tidewater Trout Season Catch per Hour

Year	All Fish		Wild Outthroat		Liberations		Per Cent
	Bank	Tidewater <u>1</u>	Bank	Tidewater <u>1</u>	Tidewater <u>3</u>	Tidewater <u>3</u>	Hatchery
1948	<u>2</u>	0.12	<u>2</u>	0.12	0	0	0.3
1949	0.23 <u>3</u>	0.10	0.16 <u>3</u>	0.10	0	0	
1950	0.24 <u>3</u>	0.14	0.16 <u>3</u>	0.14	0	0	
1951	0.30 <u>3</u>	0.20	0.14 <u>3</u>	0.18	750	750	9.3
1952	0.26 <u>3</u>	0.20	0.17 <u>3</u>	0.16	1,625	1,625	15.2
1953	0.28 <u>3</u>	0.17	0.16 <u>3</u>	0.09	1,730	1,730	46.3
1954	0.29 <u>4</u>	0.15	0.16 <u>3</u>	0.09	1,300	1,300	38.8
1955		0.14 <u>5</u>	0.10 <u>4</u>	0.09	1,200	1,200	33.1
1956	0.27 <u>3</u>	0.10	0.12 <u>3</u>	0.08	1,000	1,000	14.9
1957	0.33 <u>6</u>	0.24	0.10 <u>6</u>	0.15	2,600	2,600	38.2
1958	0.35 <u>6</u>	0.31	0.13 <u>6</u>	0.10	4,100	4,100	77.1
1959	0.32 <u>6</u>	0.28	0.09 <u>6</u>	0.07	3,000	3,000	75.0
1960	0.35 <u>6</u>	0.08	0.10 <u>6</u>	0.06	0	0	27.0
1961	0.48 <u>7</u>	0.23	0.15 <u>7</u>	0.11	0	0	51.0

1 Lower moorage, Nestucca River tidewater.2 Not segregated.3 Nestucca River.4 Trask, Little Nestucca, and Salmon Rivers.5 Wilson River only.6 All streams.7 Mostly Nestucca River.

Table 229

Nestucca River Trout Season, 1961, Reported Tidewater Boat Catch, Upper Moorage

Month	Cutthroat		Rb	Br	Chinook		Total Fish	Anglers	Angler- Hours	Average Hours Angled	Fish per Angler	Fish per Hour	Per Cent Hatchery
	Wild	Hatchery			Adults	Jacks							
June <u>1</u>	45	143	2	1			191	74	520		2.6	0.37	76
July	85	149	1		1		236	191	1,355		1.2	0.17	64
August	113	18			2	1	134	113	779		1.2	0.17	13
Sept. 1-15	62	6	1				69	11	85		6.3	0.81	10
Totals and Averages	305	316	4	1	3	1	630	389	2,739	7.0	1.6	0.23	51

1 May 27 through June 30.

A record check of 53 troll anglers revealed a catch of 59 per cent hatchery trout at the rate of 0.13 per hour, close to the figures calculated from the upper moorage record.

Lakes

From the lake opening on April 22 until June 25, anglers were checked on Smith, Spring, Lytle, Crescent, Clear, Hebo, and Meadow Lakes. Hatchery trout had been liberated into Smith, Spring, Lytle, and Hebo Lakes. The catch of 197 bank anglers comprised 302 fish -- 6 wild cutthroat, 289 hatchery cutthroat, 1 undetermined cutthroat, 1 rainbow, 2 brown trout from Meadow Lake, and 3 largemouth bass -- at the rate of 1.2 hours per fish. Of all the trout, 97 per cent were of hatchery origin. A very few of the hatchery trout were of the 1960 and earlier liberations. Most of the trout seen were in good condition.

To mid-May, 27 boats were checked, mostly on Lake Lytle. Sixty-six anglers had caught 258 fish -- 27 wild cutthroat, 202 hatchery 1961 cutthroat, 3 hatchery 1960 cutthroat, and 14 older hatchery cutthroat, 7 rainbow, and 5 largemouth bass -- at the rate of 0.7 hours per fish. Hatchery trout formed 88 per cent of the trout catch.

Sloughs

A few sloughs in the Tillamook-Nestucca area, not forming tidewater portions of larger streams, were opened to trout angling for the first time, along with lakes, on April 22. In four sloughs between Tillamook and Bay City (Hoquarten, Dougherty, Stasek, and Hathaway Sloughs), 36 bank anglers were checked on eight days between April 22 and June 4. They had caught 11 wild cutthroat at the rate of 3.5 hours per trout. One angler on Hathaway Slough, closest to Bay City, had hooked and released four right pectoral marked steelhead fingerlings from Wilson River liberations. In another slough a few 6 to 8-inch chinook were hooked. After the stream trout opening, sloughs were fished very little.

Bottom Fish

So-called bottom fish, which do not require a license for their pursuit, were fished at several points, principally near the entrance to Tillamook Bay. Checked from February 16 to September 23 were 228 shore anglers who had fished for 424 hours (not completed) and had caught 232 fish -- 65 perch, 80 kelp, 50 seabass, 6 lingcod, 21 flounder, 8 sculpin, and 2 tomcod -- at the rate of 1.8 hours per fish, slightly better than bank trout angling with stocked fish.

Much better success was enjoyed by boat anglers. In 106 checked boats were 311 anglers who had fished for 778 hours (completed) and had caught 779 fish -- 200 perch, 102 kelp, 256 seabass including snapper, 151 lingcod, 31 halibut, 26 sole, and 13 sculpin -- at the rates of 1.0 hour per fish, 2.5 fish per angler, and 7.3 fish per boat.

Most of the boat-caught perch and kelp were from Tillamook Bay; the other fish were practically all from the ocean. At Cape Kiwanda during the summer, if salmon were not biting well, anglers jigged for bottom fish and usually with good success.

Population Studies

With the use of a one-man seine, several population studies were made (Table 230). Several surveys were repetitions of past work to ascertain population status. In some cases, as in those of Wolfe and Slick Rock Creeks (Nestucca River) and Mapes and Myrtle Creeks (Kilchis River), certain road culverts were found to be partial barriers to salmon and steelhead adults. New surveys were made on Tillamook River west side tributaries, Bays Creek (Nestucca River), and other streams.

Holden (Drainage) Creek (Trask River) is very small but supported silver zeros. A lumber mill had placed a log pile over its lower course, but it complied with a request to make a new channel around the pile.

Sand Creek was poor in silver zeros, especially below an old mill pond whose waters polluted much of the creek. A mill operator planned to remove deadheads from the pond and agreed to leave it drained.

Murphy Creek and Kilchis River exhibited an interesting temperature gradient in July just above the lower dry section. A series of pools from the lowest at 90° F. with dead insects and sculpins through 83° F. with dead trout but live insects, and 78° F. to 80° F. with live trout and sculpins to 74° F. with live silver zeros, demonstrate roughly temperature tolerances of several organisms.

A good population of silver fingerlings was found in lower Spring Creek on Lake Lytle, indicating probable ingress into the lake through log jams at the outlet.

Peterson Creek (Miami River) contained a good population of silver zeros although the previous December spawning ground count was very low.

A high culvert at the mouth of Wolfe Creek (Nestucca River) was impassable because of low water during the silver salmon spawning migration but passable during high water when steelhead were coming upstream, judging by the relative populations of fingerlings.

Very good populations of steelhead and silver zeros were found in the North and South Forks of the Little South Fork of the Kilchis River. Cessation of heavy logging in the area has given the streams a good opportunity to recover.

The Netarts Bay channel of Jackson Creek was dry except for seepage to a few small pools in September. Only trout zeros, probably cutthroat, were seen in the pools. A good flow in the main stream supported steelhead and cutthroat fingerlings. Flow to the Netarts channel, cut off by a gravel dike, was partially restored.

On the South Fork of the Kilchis a jam has formed a short distance below the site of a jam removed a few years ago. Though it is not a complete block, it has already greatly reduced the salmon and steelhead reproduction potential of the upper stream. By contrast, the South Fork of the North Fork of the Kilchis revealed a fairly good population of steelhead and silver zeros.

Table 230

Seine Population Studies, 1961

Stream	Date	Fish per 100 Square Feet	Trout Zeros		Outthroat		Steelhead		Silver Salmon		Total Fish
			Number	Length in Inches	Number	Length in Inches	Number	Length in Inches	Number	Length in Inches	
Bowley Creek (Tillamook River)	2/27	0.0									0
Tillamook River, upper	2/27	4.0							2	3.0, 4.0	2
Bays Creek (Nestucca River)	2/28	1.0							1	3.7	1
Bays Creek, 3 tributaries	2/28	2.1	2	1.2, 2.5	2	4.5, 10.0					4
Cedar Creek (Wilson River)	3/16	12.2							11	4	11
Jones Creek (Wilson River)	3/16	2.0	2	1.2, 1.2	2	3.0, 4.1					4
Murphy Creek (Kilchis River)	3/29	16.2	2	1.2, 1.3	2	3.1, 3.5			9	1.4 - 1.9	13
Holsten Creek (Trask River)	4/ 5-18	1.2							5	1.6 - 2.3	5
Sand Creek	7/11	8.5	29	1.5 - 2.5	2	4.7, 6.5	3	4.6 - 5.0	12	4	46
Fawcett Creek (Tillamook River)	6/22	7.0	16	1.3	1	4.0	1	4.0	3	4	21
Murphy Creek (Kilchis River)	7/12	15.8	7	1.4 - 2.5	1	2.8	3	3.4 - 3.8	8	2.8 - 3.2	19
Mapes Creek (Kilchis River)	7/13	17.8	27	1.5 - 2.7	4	3.2 - 5.2	2	3.8, 4.6	8	4	41
Myrtle Creek (Kilchis River) Below culvert	7/13	132.5	33	1.3	3	1.0	3	1.0	17	4	53
Above culvert	7/13	25.7	24	1.2					1	4	28
Fall Creek (Wilson River)	7/25	2.2	3	1	3	2.3 - 6.6					6
Spring Creek (Lake Lytle) Lower	7/27	19.0			1	4.2			18	2.7 - 3.8	19
Upper	8/22	3.3	4	1	4	4.2 - 6.5			1	3.0	9

Table 230 (continued)

Stream	Date	Fish per 100 Square Feet	Trout Zeros		Cutthroat		Steelhead		Silver Salmon		Total Fish
			Number	Length in Inches	Number	Length in Inches	Number	Length in Inches	Number	Length in Inches	
Steinhilber Creek (Lake Lytle)	7/27	0.7	1	5.2							1
Unnamed tributary (Lake Lytle)	7/27	2.7	2	1	1	8.1					3
Peterson Creek (Miami River)	8/23	14.1	3	1.5 - 2.0	1	2.6			20	2.0 - 3.8	24
Edwards Creek (Trask River)	8/23	19.4	15	1.7 - 2.8			11	3.0 - 5.8	7	3.2 - 3.6	33
Wolfe Creek (Nestucca River)	9/12	14.7	15	1.7 - 2.8	2	4.3, 8.3	3	3.1 - 4.2	5	2.6 - 4.0	25
Slick Rock Creek (Nestucca R.)	9/12	4.7	11	2.0 - 3.0	2	7.1, 7.5	1	4.5			14
South Fork Little South Fork (Kilchis River)	9/13	31.8	15	1.8 - 3.2			4	3.6 - 4.4	16	3.0 - 3.8	35
North Fork Little South Fork (Kilchis River)	9/13	38.2	39	1.7 - 3.0			6	3.6 - 4.6	16	3.0 - 3.4	61
Jackson Creek Netarts Channel Ocean Channel	9/19 9/19	32.0 3.8	8	1.7 - 2.5	6	2.8 - 7.0	3	3.3 - 5.0			8 9
Fawcett Creek (Tillamook River)	9/19	8.1	3	2.5 - 2.8					22	2.3 - 3.7	25
Smith Creek (Ocean)	9/20	11.7	4	2.1 - 2.4	10	3.2 - 6.0					14
South Fork Kilchis River Above jam Below jam	9/21 9/21	1.2 5.0	4	1.6 - 2.1			3 1	3.5 - 4.1 3.1	1	4.4	4 5
South Fork of North Fork (Kilchis River)	9/21	5.5	9	1.7 - 2.9			2	3.2, 4.2	5	2.6 - 3.5	16
South Fork Little Nestucca R.	9/26	8.5	7	1.6 - 2.3	1	3.5	2	3.6, 3.6	1	2.8	11
Cedar Creek (Three Rivers)	10/24	3.3	3	2.0 - 2.5	9	2.6 - 5.0	1	3.7			13
¹ Probably all cutthroat. ² Probably mostly cutthroat. ³ Probably mostly steelhead. ⁴ Zeros.											

LINCOLN DISTRICT

Richard G. Herrig

Fish Distribution

In 1961 liberations of legal cutthroat trout were made in only the main streams. Streams and numbers stocked in 1961 were: Salmon River, 10,002; Siletz River, 10,007; Alsea River, 5,502; North Fork Alsea River, 4,763; South Fork Alsea River, 1,996; Five Rivers, 2,927; Lobster Creek, 998; and Yachats River, 3,002. Streams stocked previously, but not in 1961, include Schooner Creek, Drift Creek, Yaquina River, and Big Elk Creek. To date there have been no comments received concerning the streams not planted, and it would appear the discontinued stocking has gone unnoticed.

The plant of winter steelhead in the Alsea River consisted of 101,754 fish. All of these fish were marked by the Research Division.

Seventy-two summer steelhead spawned at the Roaring River station were tagged and returned to the Siletz River.

Devils Lake received 100,000 cutthroat averaging 348.6 to the pound in May. The remainder of the cutthroat, plus some rainbow, will be stocked as larger fish in October and November.

A February plant of 91,742 kokanee was made in Devils Lake. This is the second year kokanee have been liberated in the lake.

Fish Inventory

Inventory of the fish populations in the district has continued to receive major attention. The past year has seen more emphasis on determining the status of anadromous species, with a decrease in attention to resident trout populations. Creel data collected by moorage operators and the district biologist, spawning ground surveys, physical stream surveys, and surveys using SCUBA have been used to make the various inventories.

Anadromous

Winter Steelhead

Steelhead angling in the Lincoln district was poor during the 1960-61 season. Indications are that a large part of the run moved upstream immediately following high water in the latter part of November. There was a brief period of good angling after the high water, and then poor angling the remainder of the season.

Little time was devoted to checking steelhead anglers on the Alsea River. The Research Division, in carrying out a program on the contribution of hatchery fish to the sport catch, has collected extensive creel data on the Alsea River steelhead fishery. That creel census collected by the district biologist on some Lincoln district streams is presented in Table 231.

Table 231

Steelhead Creel Census for some Lincoln District Streams
November 1960 - March 1961

Stream	Anglers	Hours	Steelhead	Hours per Steelhead
Alsea River	96	326	11	30
Beaver Creek	12	37	0	
Drift Creek (Siletz)	25	100	1	100
Schooner Creek	3	15	0	
Yachats River	23	80	3	27

North Fork Trap Count

The trap count at the hatchery dam on the North Fork Alsea River included 687 adult steelhead, 102 jack steelhead, and 76 cutthroat. Seventy-six of the jacks were marked hatchery fish. The ten-year average for adult steelhead at the dam is 867.7 fish, and the five-year average is 767.2 fish. The 687 adult steelhead recorded for the 1960-61 season contained only 90 wild steelhead.

Table 232 presents the steelhead count by periods for the 1960-61 season.

Table 232

Steelhead Count, North Fork Alsea River,
1960-61

Period	Wild Steelhead			Hatchery Steelhead		
	Males	Females	Total	Males	Females	Total
December 1-15	2	0	2	1	5	6
December 16-31	3	3	6	14	10	24
January 1-15	9	9	18	84	77	161
January 16-31	2	5	7	24	31	55
February 1-15	7	6	13	102	176	278
February 16-28	2	1	3	14	14	28
March 1-15	0	4	4	7	14	21
March 16-31	2	4	6	6	10	16
April 1-15	5	6	11	2	3	5
April 16-30	3	5	8	0	1	1
May 1-15	4	8	12	1	1	2
Totals	39	51	90	255	342	597

A comparison of the numbers and sex of steelhead counted from 1951 to 1961 at the hatchery dam is given in Table 233.

Table 233

Sex, Steelhead, North Fork Alsea River,
1951 - 1961

Year	Males	Females	Total
1951-52	623	552	1,175
1952-53	816	1,032	1,848
1953-54	427	628	1,055
1954-55	126	129	255
1955-56	265	243	508
1956-57	345	279	624
1957-58	395	428	823
1958-59	316	301	617
1959-60	597	488	1,085
1960-61	294	393	687

Siletz River

The area from tidewater up to the town of Siletz was the most heavily fished and yielded the least catch success during the 1960-61 steelhead season. Although most of the anglers checked were in this area, they accounted for only three steelhead. State Police game enforcement officers recorded about 90 per cent of the steelhead checked on the Siletz River from Gorge Camp to the winter deadline. Six marked summer steelhead are included in the creel data presented in Table 234. It is believed that a substantial number of the steelhead caught on the Siletz River were actually summer steelhead; however, this was not confirmed in view of the fact that officers collecting creel data did not examine steelhead for marks.

Table 234

Creel Census by Periods, Siletz River,
November 15, 1960 - March 31, 1961

Period	Anglers	Hours	Steelhead	Hours per Steelhead
November 15-30	13	70	1	70
December 1-15	25	88	2	44
December 16-31	52	214	6	36
January 1-15	45	225	1	225
January 16-31	167	609	21	29
February 1-15	50	173	7	26
February 16-28	3	7	1	7
March 1-15	8	20	0	
March 16-31	44	175	9	19
Totals and Average	407	1,581	48 /1	33

/1 Includes 3 jacks.

The March steelhead creel data on the Siletz River included 8 bright and 1 dark steelhead. All of these fish were taken in the upper portion of the river. Table 234 summarizes the creel census collected on the Siletz River.

Salmon River

A low average catch rate of 54 hours per steelhead was obtained on the Salmon River in the 1960-61 season. Only two steelhead were checked in March, both of these being bright fish. Table 235 depicts steelhead creel data collected on the Salmon River.

Table 235

Creel Census by Periods, Salmon River,
November 15, 1960 - March 31, 1961

Period	Anglers	Hours	Steelhead	Hours per Steelhead
November 15-30	19	83	3	28
December 1-15	48	128	3	43
December 16-31	54	148	4	37
January 1-15	84	323	7	46
January 16-31	66	245	4	61
February 1-15	73	279	3	93
February 16-28	35	151	2	76
March 1-15	19	43	1	43
March 16-31	35	124	1	124
Totals and Average	433	1,524	28 <u>/1</u>	54

/1 Includes 7 jacks.

Summer Steelhead

A survey of the summer steelhead in the Siletz River from Boulder Creek on the North Fork down to the fishway on the main river was conducted with the aid of diving gear. The North Fork was in excellent condition when surveyed, and data collected should represent close to actual numbers present. In contrast, the main river contained considerable suspended material and visibility was poor. The rate of marked to unmarked steelhead in the main river was estimated to be the same as the ratio found in the North Fork.

In 1960, there were many marked steelhead smolts observed; however, this year there were no steelhead smolts of migratory size observed. Table 236 compares the fish and marks observed in 1960 with those of 1961.

Table 236

Survey of Adult Summer Steelhead with SCUBA, Siletz River, 1960-61

Year	Marked	Unmarked	Jacks
1960	136	307	20
1961	399	100	16

Total figures show 423 adult summer steelhead observed in 1960 of which 32 per cent were marked hatchery fish. Figures for 1961 show a total of 499 adult summer steelhead observed of which 81 per cent were marked.

Summer steelhead lying in the various holes in the upper Siletz River are extremely vulnerable to poaching. Many of the fish can be seen in the holes from the road. State Police game enforcement officers arrested at least four anglers with six illegal steelhead from the North Fork in 1961. At present, the North Fork of the Alsea River in the Lincoln district is being considered as one area for the introduction of summer steelhead.

The fishery for summer steelhead begins with the opening of the coastal streams in May. Almost all of the fish taken are caught in the upper river between the fishway and the confluence of the North and South Forks. Three summer steelhead were checked opening weekend this year but the bulk of the fish are taken after the first rains in September. The fishery continues on through the winter season with a few bright fish still being taken in March.

Yaquina Offshore Salmon Fishery

Salmon angling was excellent for silver salmon and poor for chinook salmon off Yaquina Bay in 1961. It is possible that the poor chinook catch by both sport and commercial fishermen was in contrast to counts of adult fish in selected spawning areas. Spawning ground counts by local Fish Commission biologists indicate a good escapement of chinook.

An estimate of the total 1961 offshore sport catch at Yaquina Bay was unsuccessful. The sport boat count of the U. S. Coast Guard station was found to be incomplete. A local moorage agreed to keep catch records on weekdays. These records appeared to be good until careful examination revealed that discrepancies existed. Since the moorage operator had no explanation for the discrepancies, the records were discarded.

Weekend creel data collected by the district fisheries agent is included in Table 237 which gives creel sample data for the past seven years.

Table 237

Creel Census, Yaquina Bay Offshore Salmon Fishery,
1955 - 1961

Year	Boat Trips	Anglers	Chinook	Silvers	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	0.05	0.51
1958	205	557	56	129	0.10	0.23
1959	847	2,287	348	1,105	0.15	0.48
1960	875	2,360	80	885	0.03	0.38
1961	457	1,271	86	1,017	0.07	0.80

Salmon Spawning Ground Surveys

Spawning ground surveys for silver salmon in December 1960 indicated no particular peak in spawning activity; rather, the spawning was spread over a long

period. This tends to give a low fish-per-mile figure for comparison with data from previous years. Over-all, the escapement of silver salmon in the district appeared to be poor.

Table 238 gives the fish-per-mile figures for the past four years on Rock Creek, tributary to Devils Lake. Table 239 is a summary of other spawning ground surveys.

Table 238

Rock Creek, Tributary of Devils Lake,
Silver Salmon Spawning Survey, 1957 - 1960

Year	Fish per Mile	Number of Jacks
1957	10	3
1958	36	30
1959	63	7
1960	16	12

Table 239

Siletz and Yachats Rivers Silver Salmon Spawning Surveys
December 1961

Stream	Date	Miles	Silvers		Dead
			Live		
			Total Fish	Number of Jacks	
<u>Siletz River</u>					
Cerene Creek	12/20/61	0.50	3		0
Erickson Creek	12/20/61	0.25	0		0
Little Euchre Creek	12/22/61	0.50	10	5	0
Schooner Creek	12/22/61	0.50	4	1	0
Gravel Creek	12/23/61	1.00	13		3
Fourth of July Creek	12/23/61	0.75	5	2	1
North Fork Sunshine Creek	12/23/61	0.75	0		0
Buck Creek	12/27/61	1.25	7	3	0
<u>Yachats River</u>					
School Creek	12/21/61	1.25	7	3	0
Williamson Creek	12/21/61		6	1	0

Schooner Creek Stream Survey

A physical study of the Schooner Creek watershed was started during the reporting year. Approximately three miles of stream remain to be surveyed. Most of the good spawning gravel in Schooner Creek was found to be inaccessible to anadromous fish. A falls at the mouth of the North Fork and a dam near the mouth of the South Fork prohibit fish passage.

Tidewater Sea-Run Cutthroat Trout and Salmon Fishery

An estimate of the tidewater fishery for the Alsea and Siletz Rivers is obtained each year from moorage catch records and a series of aerial boat counts. The method is described by K. A. Henry, A. R. Morgan, and R. L. Rulifson in "The Salmon Catch of the Sport Fishery in the Coastal Rivers of Oregon in 1949", Fish Commission Research Briefs, Volume 3, Number 1, September 1, 1950.

The tidewater silver salmon catch did not show the large run that was evident from the offshore sport catch and spawning ground surveys. It appeared that the silver salmon in 1961 were in tidewater for an extended period because of low water flows in the rivers, however, the fish were difficult to catch.

Siletz

An estimate of the cutthroat, chinook, and silver fishery in Siletz tidewater for the period July 16 to November 11 is depicted in Table 240.

Table 240

Calculated Intensity and Catch, Siletz River Tidewater Fishery, 1961

Week	Boat-Days	Cutthroat	Chinook	Silvers	Jacks
July 16-22	281	118	0	0	0
July 23-29	435	278	13	0	26
July 30-August 5	470	249	28	0	42
August 6-12	641	147	77	6	32
August 13-19	589	318	65	6	112
August 20-26	677	278	54	14	54
August 27-September 2	813	488	41	41	81
September 3-9	914	311	110	0	201
September 10-16	703	148	112	70	218
September 17-23	909	64	127	55	218
September 24-30	734	73	81	51	161
October 1-7	694	125	90	104	382
October 8-14	984	98	39	236	305
October 15-21	901	63	99	153	243
October 22-28	369	77	4	55	177
October 29-November 4	167	21	40	48	40
November 5-11	149	0	0	13	36
Totals	10,430	2,856	980	852	2,328

The total catch and success ratio were up for chinook, silvers, and silver jacks over 1960.

Cutthroat were down considerably and chinook jacks to a lesser extent from the 1960 catch figures.

Catch per boat for the Siletz is shown in Table 241.

Table 241

Catch per Boat, Siletz River Tidewater Fishery
September 1-October 31, 1953-1961

Year	Cutthroat	Chinook		Silvers	
		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
1960	0.58	0.07	0.14	0.08	0.13
1961	0.17	0.11	0.12	0.12	0.18

Alsea

An estimate of the cutthroat, chinook, and silver fishery in Alsea tidewater for the period July 9 to November 18 is presented in Table 242.

Table 242

Calculated Intensity and Catch, Alsea River Tidewater Fishery, 1961

Week	Boat-Days	Cutthroat	Chinook	Silvers	Jacks
July 9-15	200	86	0	0	0
July 16-22	443	359	4	0	4
July 23-29	329	158	3	0	13
July 30-August 5	239	105	5	0	5
August 6-12	302	196	3	0	18
August 13-19	373	347	11	60	52
August 20-26	408	212	53	147	29
August 27-September 2	376	827	0	38	26
September 3-9	584	590	6	6	18
September 10-16	376	346	34	38	60
September 17-23	765	421	62	99	383
September 24-30	671	121	60	195	443
October 1-7	753	68	30	271	572
October 8-14	792	63	24	444	396
October 15-21	729	22	22	328	241
October 22-28	388	0	8	124	50
October 29-November 4	412	0	12	243	103
November 5-11	494	0	0	356	44
November 12-18	408	0	4	302	12
Totals	9,042	3,921	341	2,651	2,469

More boats were counted in 1961 than in 1960. Catch figures for the fishery show that more chinook and silver salmon were taken in 1961 but the catch of cutthroat and jacks was below that recorded in 1960.

Table 243 presents catch-per-boat figures for the last nine years on the Alsea.

Table 243

Catch per Boat, Alsea River Tidewater Fishery,
September 1-October 31, 1953-1961

Year	Cutthroat	Chinook		Silvers	
		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
1960	0.47	0.03	0.17	0.10	0.49
1961	0.35	0.05	0.06	0.30	0.35

Trout

Anglers found good trout fishing opening weekend on the streams in the district. Because of the marked cutthroat planted in the Siletz River prior to the trout opening, considerable effort was made to obtain catch data on this stream the first two weeks of the season. Creel data on opening weekend showed 80 per cent of the cutthroat caught from the area stocked were marked fish. In addition, a few marked cutthroat were reported taken in upper tidewater areas opening weekend. Marked cutthroat were being taken in lower Siletz Bay one week after their release.

Moorage operators on the Siletz River reported poor angling for the few anglers fishing.

As in previous years, the angling pressure declined rapidly after opening weekend. The North Fork Alsea River maintained fair angling pressure throughout the season. This was due to frequent cutthroat releases over the season. Creel data collected on the streams in the district are presented in Table 244. Included in the table are two spring chinook and three summer steelhead taken opening weekend.

In contrast to the excellent angling at Devils Lake opening weekend in 1960, the 1961 opening provided only fair angling. Most of the cutthroat taken were in the 10 to 16-inch class. The cutthroat stocked in the summer of 1960 should have been 8 to 10 inches long, but few of these fish were taken.

Angling success dropped off after the opening weekend, and poor success coupled with an extremely heavy weed growth reduced the angling intensity to a much lower level.

Table 244

Creel Census, Lincoln District Streams
May 27-July 31, 1961

Stream	Anglers	Hours	Species					Fish per Hour
			Ct	Rb	Br	St	Ch	
Salmon River	32	90	48	-	-	-	-	0.53
Siletz River	284	939	761	5	1	3	2	0.82
Alsea River	105	356	221	-	-	-	-	0.62
Yachats River	15	45	30	-	-	-	-	0.67

Creel data collected on Devils Lake are presented in Table 245.

Two fish population studies were conducted on Devils Lake in 1961. Both the cutthroat and rainbow had been feeding extensively on snails and small stickleback. Parasitic worms were found in the body cavities of four cutthroat. All of the rainbow showed signs of Myxosporidia.

Table 246 depicts size range and average size of cutthroat and rainbow taken by gill nets.

Length at maturity data were difficult to interpret. The March gill nets caught 4 mature female cutthroats ranging from 10.8 inches to 13.4 inches. Gill nets set in September caught 27 female cutthroat up to 17.4 inches in length, but no retained eggs could be found in these females.

In October, gill nets were set to collect black bass for release in other waters. The catch for these sets, in addition to the bass, included 167 cutthroat, 3 rainbow, and 1 kokanee. Largest female rainbow was 5 pounds, and scale examination indicated the fish to be from the 1959 fall plant. The single kokanee taken was 7 inches fork length.

Eckman Lake received fair angling pressure when the season opened, but after the first week it was utilized mainly for water skiing and swimming. Those that fished the lake took cutthroat up to 15 inches. Creel census collected at Eckman Lake showed 18 anglers fished 54 hours for 24 cutthroat.

One gill net placed in Eckman Lake on April 20, 1961, caught 5 cutthroat (6.3 to 15.5 inches), 1 silver yearling, and 7 cottids.

The city reservoir on Big Creek near Newport was opened to trout angling this past season. Fishing on the reservoir is mainly by juveniles, and the catch consists mostly of sub-legal wild cutthroat. Future management on this body of water will depend on the policy adopted by the city council. In the past, they have approved fishing on the reservoir.

Cutthroat trout planted in Ollalie Reservoir had not reached legal size by opening day 1961. A news release was issued to local radio stations and newspapers indicating that most of the cutthroat were of sub-legal size; however, many anglers were present opening day and the catch was mostly small fish. The reservoir is fished mainly by local residents, and after opening weekend there was little fishing the remainder of the season.

Table 245

Creel Census, Devils Lake, April 22 - May 13, 1961

Date	Species	Size Groups in Inches						Total Fish	Total Anglers	Total Hours	Fish per Hour
		8-10	10-12	12-14	14-16	16-18	18-20				
4/22/61	Ct Rb	21	49	89	44 1	4	2	203 $\frac{7}{210}$	185	810	0.26
4/23/61	Ct Rb	4	10	21	10		1	45 $\frac{1}{176}$	99	370	0.12
4/29/61	Ct	7	2	7	3			19	70	249	0.08
5/ 6/61	Ct	6	9	10	5			30	26	91	0.33
5/13/61	Ct Rb	1	6	4	1	1	1	12 $\frac{2}{14}$	13	49	0.49
Totals	Ct Rb	39	76	131	63 1	5	4	309 $\frac{10}{319}$	393	1,569	0.20
Average											

Table 246

Devils Lake Fish Population Inventory
Determined by Gill Nets, 1961

Month	Species	Sample Size	Fork Length (Inches)	
			Size Range	Average Length
March	Ct	88	5.3 - 13.9	10.8
	Rb	4	14.9 - 16.9	15.6
September	Ct	60	6.3 - 17.4	10.1
	Rb	2	5.2 - 14.2	-

One gill net was fished two nights just prior to the season opening. The catch consisted of 32 cutthroat. Size range was 6.7 to 17.2 inches. Only 7 of the 32 fish were over 8 inches in length.

State Police game enforcement officers' creel data for Valsetz Lake are presented in Table 247.

Table 247

Creel Data, Valsetz Lake, April 22 - June 11, 1961

Date	Species	Size Groups in Inches					Total Fish	Total Anglers	Total Hours	Fish per Hour
		8-10	10-12	12-14	14-16	Over 16				
April	Ct	199	44	2			245			
	Br	13	7	2	1	1	24			
							269	102	322	0.84
May	Ct	103	45	1			149			
	Br	6	5	1	1	1	14			
							163	82	388	0.42
June	Ct	11	1				12			
	Br	3					3			
							15	12	42	0.36

Valsetz Lake anglers report there is a large population of goldfish present in the lake, and that occasionally largemouth bass are taken.

Warm-Water Game Fish

Brown bullhead, black bass, and yellow perch are well established in Devils Lake. Six gill net sets in September caught 35 bass with a size range of 5.3 to 12.1 inches. Average fork length for the bass was 9.7 inches. The bass scales indicate the 7 to 12-inch fish are over one year of age. The 5 to 6-inch bass are zeros and appear to be from natural reproduction in the lake.

The nets set for population studies during the year caught 26 brown bullhead ranging in size from 4 to 14 inches. The first of these were taken by gill net on March 20, 1961.

Yellow perch were first taken in Devils Lake by gill nets September 29, 1961. At that time, two 5.5-inch fish were taken. A total of 30 perch ranging in size from 5.5 to 8.7 inches in length was taken in 1961 gill net sets.

Only one channel catfish was recovered from Devils Lake during the year. This was a 22-inch catfish taken by gill net March 20. The fish had a clipped pectoral spine, and was one of those transported from eastern Oregon.

Non-Game Marine Species

Little time was available to perform creel census on the various non-game marine species present in the district. The important fisheries for non-game species include tomcod, flounder, and perch fisheries in the bays, the Yaquina Bay lingcod fishery, and the many bottom fish taken offshore from Yaquina and Depoe Bays. These fisheries are receiving increased pressure each year and will likely become of major importance in future years.

Complaints have been received from many anglers that there are too many flounder being taken. Most of these complaints stem from the boat fishery on Siletz Bay. At times, single boats may bring in as many as 100 flounders. Moorage operators on the lower Siletz Bay were asking anglers to release small, uninjured flounder this past season.

Habitat Improvement

Observations of the seal population in Alsea Bay were started in March and continued during the summer. Several methods were used to collect seal stomachs but they were only partially successful.

The first seals observed on the haul-out area were found during the early morning minus tides starting May 13. The count varied from 20 to 45 seals during these tides. Other observations have been made of the seals as they pass back and forth near the mouth of the bay. Present indications are that some seals stay in the bay throughout the day, while others move back and forth from the bay to the ocean.

Attempts to recover seals shot with rifles proved unsuccessful. Six seals were killed in this manner but all sank before they could be recovered.

A fence was built on the haul-out area in an attempt to trap seals long enough to get close to them with shotguns. This method was tried several times with several innovations, and only three seals were collected.

Dynamite was anchored in the channel in front of the haul-out in August and the seals were frightened into the water. When the last seal hit the water, the dynamite was set off. It appeared that most of the seals were directly over the dynamite at the time. Only three seals floated to the surface. Several reports of dead seals were received from moorage operators and fishermen two days after the blast. The second morning after the blast, there were 15 seals on the haul-out. The seal population on the haul-out remained fairly constant, ranging from 9 to 15 seals after the dynamite blast.

In all, six seals were collected for stomach analysis. Three stomachs were empty, one stomach contained perch and a set of trolling blades, one had sand and a shrimp, and the other had perch and herring. No evidence of salmonids was found in the stomachs.

A survey was conducted of a proposed road site on the North Fork Alsea River. It is felt that the proposed road site is located too close to the stream and that construction of this road would cause an extreme silt load which would enter the hatchery water intake. It was recommended that the road site be completely relocated.

Table 248 lists other cases of pollution and barriers encountered in 1961.



Table 248

Pollution and Barriers, Lincoln County, 1961

Location	Pollution or Barrier	Cause	Corrective Measure
<u>Alsea River</u>			
Five Rivers	Falls	Channel change	Forest Service is starting fishway
Five Rivers	Silt	Logging across stream	Operator agreed to stay out of stream
<u>Salmon River</u>			
Salmon River	Log jam	Natural	Removed by highway department
Salmon Creek	Three dams	Built by private individual	No action -- above spawning area
<u>Siletz River</u>			
Siletz Fishway	Baffles destroyed	Floods and logging	Install new baffles and repair others
Valsetz Dam	Silt	Reconstruction of dam	Operator agreed to minimize silting
Fall Creek	Log jams	Logging by Georgia-Pacific	Removed by Georgia-Pacific
Horse Creek	Stream block	Bridge collapsed	Replaced bridge -- Georgia-Pacific
Cedar Creek	Plugged fishway	Natural	Remove debris and report to Fish Commission
North Creek (Drift Creek)	Stream block	Impassable culvert	Improvements by Forest Service
<u>Big Creek</u>			
South of Waldport	Impassable dam	Flow going through culvert under dam	Owner agreed to let water down fishway
North of Newport	Stream block	Impassable culvert	Newport Jaycees agreed to remove culvert

COOS-COQUILLE DISTRICT

Robert A. Corthell

Fishery Resource Inventory

Spawning Ground Counts

Coquille River silver salmon spawning ground counts for 1961 show an average of 42.5 silver salmon per mile of stream as indicated in Table 249. There were 17 silver salmon per mile in Coquille streams last year.

Table 249

Silver Salmon Spawning Ground Counts on the
Coquille River and Tributaries, 1961

Stream	Miles Counted	Adults	Jacks	Total	Fish per Mile
<u>North Fork Coquille River</u>					
Main River	1.00	42	12	54	
Woodward Creek	0.50	2	1	3	
Cherry Creek	1.75	73	21	94	
Middle Creek	1.00	55	23	78	53
<u>Middle Fork Coquille River</u>					
Rock Creek /1	1.00	16	4	20	
Rock Creek	0.25	31	5	36	
Slater Creek	0.50	35	10	45	
Big Creek	1.00	29	9	38	50
<u>South Fork Coquille River</u>					
Hayes Creek	1.00	37	10	47	
Salmon Creek	1.00	1	0	1	24
<u>East Fork Coquille River</u>					
Hantz Creek	0.25	0	0	0	
Steel Creek	1.00	30	19	49	
Elk Creek	0.75	3	0	3	26
Totals and Average	11.00	354	114	468	42.5

/1 Tributary to Myrtle Creek.

The peak count for silver salmon in most Coquille streams was made during the last week in December and the first week of January.

Jack salmon made up 24 per cent of the total number of silver salmon observed on the spawning beds of the Coquille River system.

Coos Bay area silver salmon spawning ground counts show an average of 62 fish per mile of stream as shown in Table 250. There were 27 silver salmon per mile in Coos Bay area streams last year.

Table 250

Silver Salmon Spawning Ground Counts,
Coos Bay Area, 1961

Stream	Miles Counted	Adults	Jacks	Total	Fish per Mile
<u>South Fork Coos River</u>					
Morgan Creek	1.00	4	4	8	
Daniels Creek	0.75	3	7	10	
Big Creek	1.00	13	0	13	11
<u>West Fork Millicoma River</u>					
Toten Creek	0.25	10	3	13	
Vaughn Mill Creek	0.25	90	0	90	206
<u>East Fork Millicoma River</u>					
Matson Creek	0.80	0	0	0	
Marlowe Creek	1.00	34	12	46	25
<u>Coos Bay Tributaries</u>					
Palouse Creek	1.00	51	13	64	
Larson Creek	1.00	76	116	192	
Mettman Creek	0.25	20	12	32	
Kentuck Creek	0.50	16	2	18	111
Totals and Average	7.80	317	169	486	62

The peak counts of silver salmon in most Coos Bay area streams were made during the last week of December and the first week of January.

Jack salmon made up 35 per cent of the silver salmon counted during the spawning ground surveys in Coos Bay area streams.

A comparison of peak silver salmon counts on a fish-per-mile basis in the Coos-Coquille area for the last seven years is given in Table 251.

Table 251

A Comparison of Silver Salmon Counts, 1955 - 1961

Stream System	Fish per Mile by Year						
	1955	1956	1957	1958	1959	1960	1961
Coquille Rivers	35	95	54	15	54	17	42
Coos Bay Streams	42	114	27	10	24	27	62

The silver salmon counts recorded in Tables 249, 250, and 251 are peak counts. New runs of silver salmon seem to enter Coos and Coquille streams with each new rise in water through November, December, and the early part of January.

For example, Vaughn Mill Creek, tributary of the West Fork of the Millicoma River, contained 31 spawning silver salmon on November 25, 1961. A month later, on December 26, 1961, another run of 91 fresh silver salmon was spawning in the same area. This seems to be the pattern in most Coos and Coquille streams with each stream receiving two or three different runs of silver salmon during the spawning season.

The East Fork of the Coquille River has a run of silver salmon that spawns about the middle of February.

Of interest were the many silver salmon spawning throughout the South Fork of the Coos River system. The South Fork of the Coos River was blocked by splash dams until 1957. A hatchery rack at the head of tidewater blocked most of the silver run from 1957 through 1960.

Chinook salmon spawning ground counts on the Coquille River system are given in Table 252.

Table 252

Chinook Salmon Spawning Counts, Coquille River, 1961

Stream	Miles Counted	Adults	Jacks	Total	Fish per Mile
<u>North Fork Coquille</u>					
Main River	1.00	24	6	30	
Woodward Creek	0.50	3	1	4	
Middle Creek	1.00	21	5	26	24
<u>Middle Fork Coquille</u>					
Main River	0.75	70	15	85	
Rock Creek	0.50	8	1	9	75
<u>South Fork Coquille</u>					
Main River	1.75	3	1	4	
Salmon Creek	0.80	10	14	24	11
<u>East Fork Coquille</u>					
Main River	0.75	36	0	36	48
Totals and Average	7.05	175	43	218	31

Chinook salmon spawning ground counts for Coos Bay rivers are given in Table 253.

Chinook salmon were present in greater than average numbers in the Coquille River system during the fall of 1961.

Table 253

Chinook Salmon Spawning Ground Counts,
Coos River, 1961

Stream	Miles Counted	Adults	Jacks	Total	Fish per Mile
<u>South Coos River</u>					
Main River	7.00	2		2	0.28
<u>West Fork Millicoma River</u>					
Main River	0.50	3	3	6	12.00
Totals and Average	7.50	5	3	8	1.06

Early rains allowed the chinooks to get well upstream and into the larger tributaries.

At least two runs of chinook, occurring a month apart, were observed in the North Fork of the Coquille and in the East Fork of the Coquille.

Chinooks were seen in good numbers throughout the North Fork of the Coquille drainage in 1961. This is due in part to the recent log jam removal program in this system.

Coos Bay chinook counts are extremely low.

Marked Salmon

Forty marked salmon, or about 2 per cent, were found among the 1,962 salmon examined at Coos Bay during the 1961 summer salmon fishery. Scale samples were collected from all marked salmon and were read to determine the brood year and probable point of origin. This information is given in Table 254. Agency abbreviations used in the table are as follows: (CDFG) California Department of Fish and Game, (OGC) Oregon State Game Commission, (OFC) Fish Commission of Oregon, (HSC) Humbolt State College, (BCF) Bureau of Commercial Fisheries, (WSDF) Washington State Department of Fisheries, and (UW) University of Washington.

The marked chinook salmon taken at Coos Bay during 1961 appeared to be mostly of California origin with three from the Umpqua River and only one of the ten fish from the Columbia River system.

One-half of the 30 marked silver salmon taken at Coos Bay during 1961 were from the Millicoma pond of the Fish Commission. The first Millicoma pond marked silver salmon was recorded in the Coos Bay sport fishery on August 8, 1961.

Coos Bay Salmon Fishery

Coos Bay salmon anglers averaged 0.44 salmon each during the summer of 1961 for the highest fish-per-angler catch since 1957.

Table 254
Marked Salmon, Coos Bay, 1961

Species	Mark	Number of Salmon	Brood Year	Agency and Origin
Chinook	D Ad RM	2	1958	(CDFG) Sacramento River
Chinook	D LM	2	1958	(CDFG) San Francisco
Chinook	D Ad LM	1	1958	(CDFG) San Francisco
Chinook	Ad RM	2	1958	(OGC) Umpqua River
Chinook	RM	1	1958	(OFC) Clackamas River <u>/1</u>
Chinook	LV RV RM	1	1958	(OGC) Umpqua River
Chinook	Ad	1	1957	(HSC) Big Lagoon <u>/2</u>
Silver	Ad LP	15	1958	(OFC) Millicoma Pond
Silver	RM	3	1958	(OFC) Clackamas River
Silver	D Ad	3	1958	(OFC) Hood River
Silver	LM	2	1958	(OFC) Clackamas River
Silver	RP	2	1958	(OFC) Gnat Creek
Silver	RV	1	1958	(BCF) Columbia River
Silver	Ad RP	1	1958	(WSDF) Puget Sound
Silver	Ad An	1	1958	(unknown)
Silver	D RP	1	1958	(WSDF) Minter Creek
Silver	Ad	1	1958	(WSDF) Puget Sound

/1 Duplicate mark (OFC) Deschutes River.

/2 Duplicate mark (UW) Lake Union.

The calculated total catch of 11,352 salmon was about 10 per cent greater than the total taken at Coos Bay during 1960. Angler trips in 1961 declined about 21 per cent from the total trips recorded during the summer of 1960.

The total catch of salmon at Coos Bay during the summer of 1961 has been computed through a statistical analysis of creel sampling data and boat counts. The boat counts were obtained by the U. S. Coast Guard. The calculated total catch for the 1961 angling season is presented in Table 255.

Table 255

Calculated Sport Salmon Catch, Coos Bay, 1961

Method	Boat Trips	Angler Trips	Salmon		Total	Fish per Angler
			Silver	Chinook		
Skiff	7,827	20,981	7,019	1,408	8,427	0.40
Charter	835	4,610	2,586	339	2,925	0.63
Totals and Average	8,662	25,591	9,605	1,747	11,352	0.44

A comparison of the fishing effort and catch in the Coos Bay sport salmon fishery from 1955 through 1961 is shown in Table 256.

The average number of skiff anglers per party was 2.69 and the average number of anglers per charter boat trip was 5.71.

Coquille River Salmon Fishery

The Coquille River salmon sport fishery is located between Bandon and Myrtle Point and occurs in the fall. An offshore salmon fishery may develop out of Bandon as the result of a recent launching site constructed in the lower Coquille River.

Lower Coquille River salmon anglers caught fish at a rate of 0.28 fish per angler and 16.7 hours per fish during the 1961 fall angling season as shown in Table 257.

Boat launching facilities, one ramp at Coquille and another at Arago, have made the upper Coquille River tidewater popular with salmon anglers. This is especially true between Coquille and Myrtle Point.

A limited check of fall salmon anglers in the upper tidewater of the Coquille River indicated that angler success might be higher here than in the lower river near Bandon. Nine anglers contacted at Arago had caught salmon at the rate of 1.55 fish per angler.

A comparison of salmon angler success on the lower Coquille River for the years 1955 through 1961 is given in Table 258.

Winter Steelhead Fishery

The 1960-61 winter steelhead season was very poor. Good water conditions prevailed through December and part of January with high and muddy water the rule during the remainder of the steelhead season.

Because comparatively few steelhead anglers were interviewed, the creel sample data presented in Table 259 is not compared with data from former years.

Table 256

Summer Salmon Angling Effort and Catch, Coos Bay, 1955 - 1961

Year	Boats		Anglers		Fish			Fish per Angler			
	Skiff	Charter	Total	Skiff	Charter	Total	Chinook		Silvers	Jacks	Total
1955	5,280	728	6,008	15,403	3,882	19,285	2,789	8,964		11,753	0.61
1956	8,355	997	9,352	21,689	5,493	27,182	5,649	21,889	850	28,388	1.04
1957	9,962	1,466	11,428	27,767	8,640	36,407	1,816	30,207	599	32,622	0.90
1958	5,266	1,052	6,318	14,822	5,027	19,849	2,269	3,482	1,947	7,698	0.39
1959	6,306	1,467	7,773	18,224	7,614	25,838	1,791	6,473		8,264	0.32
1960	9,492	1,310	10,802	25,628	6,943	32,571	2,579	7,643		10,222	0.31
1961	7,827	835	8,662	20,981	4,610	25,591	1,747	9,605		11,352	0.44

Table 257

Sport Catch, Salmon, Lower Coquille River, 1961

Month	Angler Trips	Silver		Chinook		Jacks		Fish per Angler		Hours per Fish
September	409		46		7		29		0.20	25.0
October	440		62		9		88		0.36	14.3
Totals and Average	849		108		16		117		0.28	16.7

Table 258

Coquille River Salmon Angler Success, 1955 - 1961

Year	Anglers	Salmon	Fish per Angler	Fish per Hour	Hours per Fish
1955	975	222	0.23	0.05	20.0
1956	790	232	0.29	0.07	14.3
1957	1,732	564	0.33	0.13	7.7
1958	2,455	730	0.30	1.10	10.0
1959	993	278	0.28		
1960	933	271	0.29	0.07	14.3
1961	849	241	0.28	0.06	16.7
Totals and Average	8,727	2,538	0.29		

Table 259

Steelhead Creel Sampling, Coos and Coquille Rivers, 1960 - 1961

System	Anglers	Steelhead	Fish per Angler	Fish per Hour
Coos River	40	5	0.13	0.03
Coquille River	22	10	0.45	0.10
Totals and Averages	62	15	0.24	0.06

Steelhead Life History Study

An analysis of the 305 steelhead scale samples collected from steelhead in the Coos and Coquille Rivers is presented in Table 260.

The dominant life history pattern is two years in fresh water and two years in salt water. A total of 226 scale samples, or 74 per cent, showed this four-year pattern.

Only 14 per cent of the 305 steelhead sampled showed a second spawning run. Evidence of a third spawning run could be seen in 2.3 per cent of the samples.

Five different life history patterns were observed in the Coquille steelhead and three patterns were seen in the Coos River fish as shown in Table 260.

Trout Fishery

The average catch rate of anglers fishing three trout lakes in the Coos-Coquille district was 1.47 fish per hour. The average catch per person was just

Table 260

Coos and Coquille River Steelhead Life History Patterns
as Determined by Scale Reading

Scale Pattern, Years to First Spawning	Number Fish in Sample	Repeat Spawners, Second Time	Percentage	Repeat Spawners, Third Time	Percentage
<u>Coquille System</u>					
2 fresh, 1 salt	40	5		0	
2 fresh, 2 salt	178	28		5	
2 fresh, 3 salt	9	1		1	
3 fresh, 1 salt	5	0		0	
3 fresh, 2 salt	16	2		0	
Totals and Averages	248	36	14.5	6	2.4
<u>Coos River System</u>					
2 fresh, 1 salt	4	0		0	
2 fresh, 2 salt	48	7		1	
3 fresh, 2 salt	5	0		0	
Totals and Averages	57	7	12.3	1	1.8

under 3 fish and ranged from 1.92 in Empire Lakes to 4.47 in Squaw Lake. (See Table 261).

Table 261

Creel Sampling, Trout Lakes of the
Coos-Coquille Watersheds, 1961

Lake	Anglers	Trout	Fish per Angler	Fish per Hour
Empire Lakes	170	326	1.92	0.66
Bradley Lake	80	292	3.65	1.54
Squaw Lake	85	380	4.47	1.20
Totals and Averages	335	998	2.98	1.47

The Squaw Lake trout fishery has been maintained by fingerling plants, while Bradley and Empire Lakes have been dependent upon plants of legal-size trout prior to the season.

The stream angler caught trout at the rate of 2.77 fish per person in the streams of the Coos-Coquille watersheds during the 1961 trout angling season as shown in Table 262.

Table 262

Creel Sampling, Trout Streams of the
Coos-Coquille Watersheds, 1961

Stream	Anglers	Marked Trout	Wild Trout	Fish per Angler	Fish per Hour
South Fork Coquille	69	294	6	4.35	0.54
Middle Fork Coquille	32	30	0	0.94	0.31
North Fork Coquille	163	365	86	2.77	1.06
East Fork Coquille	116	100	155	2.20	0.49
South Coos River	186	252	197	2.41	0.62
East Fork Millicoma	69	218	35	3.67	1.06
Totals and Averages	635	1,259	497	2.77	0.66

All of the main streams of the Coos and Coquille systems were planted with legal-size trout just prior to the opening of the trout season. About 73 per cent of the trout checked in the anglers' creels were of hatchery origin.

Trout angling pressure on the Coos and Coquille streams was very light after the first two weekends of the trout season.

Sea-run cutthroat trout appear to be responding to the protection afforded

them by the later opening date of the trout season in coastal streams. It is anticipated that the fall sea-run cutthroat trout fishery will become a more popular and productive fishery in the near future. The 562 salmon anglers checked on the lower Coquille River during September 1961 caught 18 sea-run cutthroat trout while fishing for salmon.

The population of brook trout is low in main Matson Creek, but natural reproduction in a large tributary, Conklin Creek, in the fall of 1959 has provided this stream with a good population.

Matson and Conklin Creeks have been logged off along their entire lengths during the last ten years. It is interesting to note that the brook trout have survived the logging. The Matson Creek watershed is beginning to stabilize and the habitat for the brook trout should continue to improve.

There has been no evidence that brook trout planted in the upper South Fork of the Coquille River in 1960 survived.

Golden trout are reported to have been planted in the upper South Fork of the Coquille River many years ago. There is a population of small, colorful rainbow present in the South Fork of the Coquille River above the falls, but these have been identified as resident rainbow trout.

The Empire Lakes trout fishery has been dependent upon legal-size plants of trout during the two seasons that these lakes have been open to public angling.

Empire Lakes contained populations of carp, bluegill, black crappie, yellow perch, warmouth bass, black bass, and bullhead catfish. Population studies revealed that most warm-water species were of small average size with the exception of the bullhead catfish. See Table 263. The lakes were chemically treated for the removal of all fish in November of 1961.

Table 263
Age-Length Determinations of Bullhead Catfish
from Empire Lakes, 1961

Completed Annuli	Average Length in Inches	Number of Fish in Sample
I	9.9	2
II	11.3	25
III	11.8	25
IV	12.1	14
V	12.6	11
VI	13.3	3
VII	13.8	3

It has been recommended that trout be planted in the upper Empire Lake and that trout, bullhead catfish, and black bass be stocked in the lower lake. It is hoped that fingerling plants of trout will maintain a summer trout fishery in the upper Empire Lake.

The trout fishery of Bradley Lake has been maintained by liberation of

legal-size trout. See Table 261. This lake contains a small native population of cutthroat trout. The native trout made up only three per cent of the trout catch taken by anglers during the 1961 trout season.

Squaw Lake anglers caught fish at the rate of 4.47 fish per angler during the early part of the 1961 trout season. See Table 261. This fishery has been maintained by annual plants of fingerling rainbow trout in recent years. The fingerling plant of 1959 failed but all others have been successful. A gill net set overnight during April of 1961 captured 34 rainbow trout, of which 25 were from the 1960 fingerling plant and averaged 8.5 inches in length. Nine of the trout were from the 1959 fingerling plant and averaged 11.5 inches in length.

The Pony Slough Reservoirs are the municipal water supply for the Coos Bay area. The upper reservoir is a 125-acre impoundment which drains to the lower reservoir of 50 acres. They are not available for public fishing at this time, but preliminary inquiries made of city officials indicate that these waters might be used for rearing pond purposes.

The upper Pony Slough Reservoir has a population of native cutthroat trout. Two overnight gill net sets in April of 1961 caught 22 cutthroat trout ranging from 6.75 inches to 14.25 inches in length. All of the cutthroat trout taken were in good condition.

The lower reservoir is reported to contain cutthroat trout, black bass, and bullhead catfish.

Pony Creek runs from the lower reservoir to tidewater at Pony Slough, a distance of approximately $3/4$ of a mile.

Striped Bass Fishery

Coos Bay striped bass anglers caught fish at a rate of 0.36 fish per angler, as shown in Table 264.

Table 264

Creel Sampling, Striped Bass, Coos Bay, 1961

Method	Anglers	Striped Bass	Fish per Angler	Hours per Fish
Boat	583	261	0.45	12.50
Bank	504	126	0.25	12.05
Totals and Average	1,087	387	0.36	

A comparison of striped bass angler success, based on creel sampling data obtained at Coos Bay over the past nine years, is shown in Table 265.

Shad Fishery

Coos Bay anglers caught shad at a rate of 2.64 fish per angler trip and required over two hours of angling effort per fish during the 1961 season, as

shown in Table 266.

Table 265

A Comparison of Striped Bass Angler Success,
Coos Bay, 1950 - 1961

Year	Anglers	Striped Bass	Fish per Angler	Hours per Fish
1950	3,708	1,507	0.41	12.5
1951	4,481	2,375	0.53	10.0
1955	769	216	0.28	14.2
1956	444	95	0.21	16.6
1957	1,711	823	0.48	11.1
1958	1,709	845	0.49	11.1
1959	787	340	0.43	12.5
1960	885	277	0.31	20.0
1961	1,078	387	0.36	12.5
Totals and Average	15,572	6,865	0.44	

Table 266

Sport Catch, Shad, Coos Bay, 1961

Method	Anglers	Shad	Fish per Angler	Fish per Hour
Boat	128	358	2.80	0.48
Bank	10	6	0.60	0.42
Totals and Averages	138	364	2.64	0.48

The best shad angling in the Coos Bay district is in the Millicoma River tidewater about four miles above the junction of the Millicoma River with South Coos River.

A comparison of shad angler success on Coos Bay for the past several years is shown in Table 267.

Non-Game Marine Species

Non-game marine species that were taken as incidental fish by Coos Bay salmon fishermen were recorded where possible. A total of 4,278 salmon anglers was checked at Coos Bay and their incidental catch of these fish is given in Table 268.

A considerable off-season non-game marine fishery exists in Coos Bay and along the rocky shore of the state park located south of Coos Bay. A popular fishery for ocean perch is located on the south jetty at Bandon.

Table 267

Sport Catch, Shad, Coos Bay, 1955 - 1961

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	1.85	0.44
1960	155	356	2.30	0.51
1961	138	364	2.64	0.48
Totals and Average	1,483	3,535	2.38	

Table 268

Non-Game Marine Fish Caught by 4,278 Salmon Anglers,
Coos Bay, 1961

Species of Fish	Number of Fish	Fish per Angler
Black rockfish	225	
Red snapper	65	
Flounder	224	
Lingcod	42	
Halibut	9	
Greenling	12	
Sculpin	7	
Total and Average	584	0.13

SCUBA divers are becoming more numerous and spear fishing for non-game marine fish in Coos Bay, near Charleston, has become quite popular.

Warm-Water Fishery

The 114 anglers interviewed at Empire Lakes during the opening of the trout season had caught only 7 yellow perch, 3 bluegill, and 5 black crappie. By way of contrast, these same anglers had taken 273 trout.

The bullhead catfish found in Empire Lakes were in excellent shape and were apparently quite numerous, but no one fished for them. In a sample of 83 bullhead catfish collected during 1961, the average length was 11.7 inches fork length.

The age-length determinations of the 83 catfish collected from Empire Lakes during 1961 are given in Table 263.

Habitat Improvement

Coquille River Log Jam Cleanup

A number of large log jams on the North Fork of the Coquille River, resulting from years of accumulation of logging debris, have been partial barriers to fish passage. These were removed with 60 per cent of the cost borne by the Game Commission and 40 per cent by local interests.

Angler Access

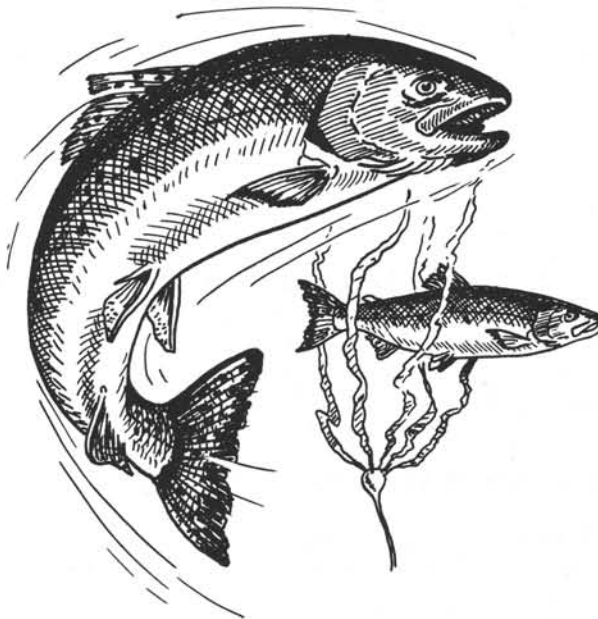
The Fetters tract on the lower Coquille River near Bandon was acquired for a future boat-launching site.

The City of Bandon developed a boat-launching ramp and parking area on the Coquille River at Bandon.

The Arago boat-launching ramp on the Coquille River near Arago was completed.

Gravel was placed on the access roads and parking area at Empire Lakes.

Gravel was obtained for the access road and parking area of the Coos River boat-launching ramp on Coos Bay.



SIUSLAW RIVER DISTRICT

William O. Saltzman

Fish Inventory

Anadromous

Ocean Salmon Fishery

A statistical sampling program designed by the Research Division was put into operation for the first time in 1961. The program is similar to that employed at other coastal ports to determine the angler effort and catch of salmon taken by the sport fishery. Bar and ocean conditions were generally good in the summer of 1961 and angling was excellent. Statistics for the fishery are presented in Table 269. The figures for boat trips in the table include moored, rented, and launched craft. There is no charter boat fishery at the mouth of the Siuslaw River at the present time. Boat count figures are supplied by the U. S. Coast Guard.

Table 269

Salmon Angling Effort and Catch at the Mouth
of the Siuslaw River, Summer of 1961

Boat Trips	Angler Trips	Number of Salmon			Average Weight (Pounds)		Salmon per Angler Trip	Pounds of Salmon Taken	Pounds of Salmon Taken per Angler Trip
		Ch	Sil	Total	Ch	Sil			
3,036	8,569	376	8,754	9,130	16.4	8.0	1.07	76,198	8.9

Siuslaw Tidewater Fishery

Catch statistics were determined for the Siuslaw River tidewater fishery for the thirteenth consecutive year. Angling for silver salmon was generally good, although the catch of jacks and cutthroat trout was well below that recorded in recent years. Tables 270 and 271 present catch statistics. The data for the years 1949 through 1957 presented in Table 271 were obtained by the Fish Commission.

Silver Salmon Spawning Ground Counts

Counts of spawning silver salmon were made on thirteen standard survey sections within the Siuslaw River system. A fish-per-mile figure of 7.7 was obtained for the counts in 1961-62 which represents nearly a threefold increase over the count of 3.0 fish per mile obtained in the winter of 1960-61. The data are presented in Table 272.

Silver salmon were counted on selected portions of Siltcoos and Tahkenitch Lake tributaries. These count areas were established in the winter of 1960-61. Comparable counts for the two years show an increase in fish per mile in the Siltcoos Lake units from 51 in 1960-61 to 105 in 1961-62. A comparable increase was noted on the Tahkenitch Lake units where the fish-per-mile figure in 1960-61 was 161 compared with 353 fish per mile in 1961-62. A short section was established in 1962 on a tributary of Woahink Lake. Salmon were noted at the rate of 64 fish per mile. The data are presented in Table 273.

Table 270

Calculated Angling Intensity and Catch,
Siuslaw River Tidewater Fishery, 1961

Week	Boat Days	Cutthroat	Chinook	Silvers	Jacks
July 30 - Aug. 5	4	6	0	0	0
August 6 - 12	87	107	0	0	0
13 - 19	207	366	0	0	0
20 - 26	305	567	0	0	0
Aug. 27 - Sept. 2	385	770	0	0	0
September 3 - 9	388	667	0	0	4
10 - 16	372	729	0	0	26
17 - 23	414	700	0	0	102
24 - 30	321	424	26	39	99
October 1 - 7	287	241	14	66	109
8 - 14	296	172	30	33	50
15 - 21	301	166	12	90	75
22 - 28	278	28	22	131	45
Oct. 29 - Nov. 4	550	33	17	413	116
November 5 - 11	724	14	14	760	217
12 - 18	514	10	5	386	129
19 - 25	118	0	0	80	30
Totals	5,551	5,000	140	1,998	1,002

Table 271

Summary of Statistics of the Siuslaw River Tidewater Fishery

Year	Boat Days	Calculated Catch			
		Cutthroat	Chinook	Silvers	Jacks
1949	5,869	-	240	2,900	660
1950	3,803	-	38	989	570
1951	2,771	-	43	1,672	671
1952	2,849	-	61	1,713	678
1953	4,979	-	221	2,501	1,158
1954	6,363	-	318	3,881	3,117
1955	5,030	-	50	2,515	1,358
1956	4,154	-	29	1,994	2,035
1957	10,637	-	308	7,552	7,020
1958	14,148	11,362	398	5,600	8,307
1959	14,730	13,339	1,614	6,777	5,324
1960	7,268	9,961	239	1,243	1,774
1961	5,551	5,000	140	1,998	1,002

Table 272

Peak Counts of Spawning Silver Salmon
on Selected Tributaries of the Siuslaw River

Stream	Distance in Miles	Adults	Jacks	Total	Fish per Mile
Bernhardt Creek	0.25	0	0	0	
Knowles Creek	0.50	1	1	2	
Billie Creek	1.00	2	0	2	
McLeod Creek	1.50	12	5	17	
Fish Creek	0.50	3	0	3	
Haynes Creek	0.75	3	0	3	
Rogers Creek	0.50	5	1	6	
Taylor Creek	0.75	5	1	6	
Misery Creek	1.00	16	1	17	
Nelson Creek	0.50	3	1	4	
Greenleaf Creek	1.00	4	2	6	
Panther Creek	0.75	9	0	9	
Deadwood Creek	1.00	2	0	2	
Totals and Average	10.00	65	12	77	7.7

TroutLake Creel Census Studies

Routine creel census records were obtained at the various lakes in the district as time permitted. These data were supplemented by records obtained by the Oregon State Police and by certain dock owners.

Table 273

Peak Counts of Spawning Silver Salmon on Selected Tributaries
of Lakes on the Central Coast

Stream	Distance in Miles	Adults	Jacks	Total	Fish per Mile
Siltcoos Lake					
Maple Creek units	1.75	181	26	207	
Fiddle Creek units	1.75	119	41	160	
	<u>3.50</u>	<u>300</u>	<u>67</u>	<u>367</u>	105
Tahkenitch Lake					
Leitel Creek	0.75	248	36	284	
Fivemile Creek	0.75	113	33	146	
	<u>1.50</u>	<u>361</u>	<u>69</u>	<u>430</u>	287
Woahink Lake					
Unnamed tributary	0.25	16	0	16	64

All cutthroat trout of legal size planted in the district were marked by the removal of one or both ventral fins. These marked fish comprised some 83 per cent of all trout checked in the various lakes throughout the year. In addition, some three per cent of all fish checked were rainbow trout. The marked rainbow trout were from plantings of legal-size fish made in coastal lakes in 1960 and in Triangle Lake in 1961. No rainbow trout of legal size were planted in the coastal lakes in 1961. Cutthroat trout planted as fingerlings in 1960 comprised about one per cent of the fish checked. Wild cutthroat trout made up only slightly over 12 per cent of the 2,254 trout checked. The trout creel census data are presented in Table 274.

Stream Creel Census Studies

Little effort was directed to creel census activities on coastal streams. Cutthroat trout of legal size were the only fish released and all of these were marked. Table 275 presents creel census data obtained on opening weekend of the trout season on coastal streams.

Warm-Water Game FishLength Measurements from the Sport Catch

Length measurements of warm-water game fish were made in the summer of 1961 at three lakes. The data collected are presented in Table 276.

Tahkenitch Lake Fish Population Studies

Forty-four gill net sets were made at Tahkenitch Lake from September 19 through 22. The nets were placed at scattered locations throughout the lake. Some size differences were noted in the catches of various species from different sites. This was most noticeable with the bluegills. The best locations for taking larger perch are in Fivemile Creek, but this area could not be fished because of heavy

Table 274

Creel Census from Lakes in the Siuslaw Fisheries District, 1961

Lake	Period	Method	Anglers	Hours	Outthroat			Rainbow	Kokanee	Bass	Crappie	Bluegill	Perch	Total Fish	Fish per Hour
					1961	Legals	Fingerlings								
Siltcoos	April 1 - 21	Boat	28	71						8	3		4	15	0.2
	April 22 - 30	Boat	26	92	2		7	1						10	0.1
	April 22 - 30 <u>1</u>	Boat	21	-	9		11	4						24	-
	May 1 - 15 <u>1</u>	Boat	33	-	42		37							79	-
	May 16 - 31 <u>1</u>	Boat	44	-	52		56							108	-
	Aug. 15 - 31 <u>1</u>	Boat	1	-	1		1							2	-
	Sept. 1 - 15 <u>1</u>	Boat	-	-	38		10							48	-
	Sept. 16 - 30	Boat	-	-	12		2							14	-
	Oct. 1 - 15 <u>1</u>	Boat	-	-	6		2							8	-
	April 22 - 30	Boat	46	192	208		10	3						221	1.2
Tahkenitch	May 1 - 15	Boat	2	1	1									1	1.0
	May 1 - 15 <u>1</u>	Boat	21	-	4		9			15	187	63	50	328	-
	May 16 - 31 <u>1</u>	Boat	114	-	81		56							137	-
	June 1 - 15 <u>1</u>	Boat	1	-	4		2							6	-
	April 22 - 30	Boat	59	237	261		7	8	6					282	1.2
Woahink	May 1 - 15	Boat	6	12	3				2					5	0.4
	Feb. 15 - 28	Boat	3	6			1							1	0.2
Mercer	March 1 - 15	Boat	2	2			1							1	0.5
	April 16 - 21	Boat	4	10	13		1							14	1.4
	April 22 - 30	Boat	26	104	91		4	2						97	0.9
	April 22 - 30 <u>1</u>	Boat	20	-	116		14							130	-
	May 1 - 15 <u>1</u>	Boat	30	-	180		11							191	-
	May 16 - 31 <u>1</u>	Boat	2	-	17		2							19	-
	Feb. 15 - 28	Boat	3	6			1							1	0.2
	March 1 - 15	Boat	2	2			1							1	0.5

Table 274 (continued)

Lake	Period	Method	Anglers	Hours	Cutthroat				Rainbow	Kokanee	Bass	Crappie	Bluegill	Perch	Total Fish	Fish per Hour
					1960	Legals	Fingerlings	Wild								
Sutton	April 22 - 30	Boat Bank	45 17	173 51	189 63			7 1	12 6						208 70	1.2 1.4
	July 1 - 15	Bank	1	1	1										1	1.0
Munsel	April 22 - 30	Boat Bank	28 3	95 6	145 3			2	3						150 3	1.6 0.5
	May 16 - 31	Bank	3	6											0	0.0
Clenow	April 22 - 30	Boat Bank	1 34	3 55	6 96										6 96	2.0 1.7
	May 1 - 15	Bank	3	9	5										5	0.6
Carter	April 22 - 30	Boat Bank	19 9	45 12	120 8			1	1						120 10	2.7 0.8
	May 1 - 15	Boat Bank	2 3	8 4	6 4										6 4	0.8 1.0
Lest	April 22 - 30	Boat Bank	5 16	23 36	14 44		3 1		3 5						20 50	0.9 1.4
	May 1 - 15	Bank	5	5	2										2	0.4
Elbow	April 22 - 30	Boat Bank	9 24	32 72	64 58			1							64 59	2.0 0.8
	April 22 - 30	Bank	39	121	123				3						126	1.0
Alder	April 22 - 30	Bank	4	6	19										19	3.2
Dune	April 22 - 30	Boat	4	8	30										30	3.8
Erhart	April 22 - 30	Boat Bank	10 2	46 3	68 8		18		1						87 8	1.9 3.0

Table 274 (continued)

Lake	Period	Method	Anglers	Hours	Cutthroat		Rainbow	Kokanee	Bass	Crappie	Bluegill	Perch	Total Fish	Fish Per Hour
					1961	1960								
Georgia	April 22 - 30	Boat	5	5	8								8	1.6
	May 1 - 15	Bank	2	8	2								2	0.3
Perkins	April 22 - 30	Boat	7	23	27	10	1						38	1.7
Triangle	Feb. 15 - 28	Boat	4	6		3							3	0.5
	March 1 - 15	Boat ^{/2}												
	March 16 - 31	Boat	6	10		20							20	2.0
	April 1 - 15	Boat	29	89		53	44						97	1.1
	April 16 - 21	Boat	2	2		4							4	2.0

^{/1} Records from boat rental docks.
State Police records are combined with those of the Game Commission.

^{/2} None checked.



Table 275

Creel Census of Coastal Streams in the Florence Area,
May 27 and 28, 1961

Stream	Anglers	Hours	Cutthroat		Total Fish	Fish per Hour
			Marked	Wild		
Lake Creek	16	41	28	12	40	1.0
Deadwood Creek	3	1	2	1	3	3.0
Indian Creek	2	2	0	0	0	0.0
North Fork Siuslaw River	4	10	7	2	9	0.9
Siuslaw River	4	10	2	9	11	1.1

Table 276

Lengths of Warm-Water Fish Taken
from Three Coastal Lakes, 1961

Lake	Species	Number Taken	Length Range in Inches	Average Length in Inches
Siltcoos	LB	23	10.3 to 17.0	13.0
	BrB	69	7.0 to 14.0	11.1
	YP	122	6.5 to 12.5	8.3
	BG	9	6.5 to 7.8	7.1
	BC	1	--	8.0
Tahkenitch	BrB	24	8.5 to 10.3	8.9
	YP	21	6.0 to 8.3	7.0
	BG	44	5.0 to 7.0	5.8
Mercer	YP	48	7.0 to 11.0	8.1

barge traffic. In general, the sites from which the larger specimens were taken are those which are known to, and favored by, local anglers. Of interest is the fact that not a single trout was taken. A summary of the gill net collections is presented in Table 277.

Table 277

Length Measurements of Fish Taken by Gill Net
from Tahkenitch Lake, 1961

Species	Number Taken	Length Range in Inches	Average Length
BG	786	3.6 to 8.0	5.1
YP	220	5.3 to 9.0	6.8
BrB	33	8.5 to 10.9	9.6
WC	32	4.6 to 10.8	8.4
Wm	17	3.7 to 6.8	4.8
LB	19	5.2 to 17.5	9.0
Sil (Jack)	1	--	14.3

Non-Game Marine Species

Jetty Creel Census

Angling from the north jetty at the mouth of the Siuslaw River is conducted nearly twelve months of the year. A limited creel census of the fishery was conducted in July and August and the data collected are presented in Table 278. The average length of the perch taken was about 12.0 inches in fork length.

Table 278

Creel Census of Jetty Anglers at the Mouth of the
Siuslaw River, Summer 1961

Anglers	Perch	Greenling	Tomcod	Total Fish	Fish per Hour
40	49	4	1	54	0.8

Habitat Improvement

Woahink Lake Kokanee Project

Approximately 200 cubic yards of gravel were hauled and deposited at five selected sites along the shore line of Woahink Lake. SCUBA gear was used prior to the gravel deposition to clear debris from the proposed spawning sites and to locate with precision the boundary markers for each site. The more extensive project this year is an extension of the initial efforts made in 1960 to create spawning facilities for kokanee at the lake. Lack of suitable spawning sites appears to be a limiting factor to kokanee production, and the gravel beds are designed to correct this deficiency.

Stream Clearance

Stream clearance activities by the Game Commission have been limited. Meetings with the U. S. Forest Service, logging companies, and individual loggers have been held and some progress has been made. The Forest Service removed jams from Fiddle Creek, a tributary of Siltcoos Lake, and from Thompson Creek, a tributary of the Siuslaw River. Loggers removed debris from an unnamed tributary of Woahink Lake upon request.

Lake Improvement

Old logging debris was removed from the surface of Erhart Lake. The lake is on U. S. Forest Service land, and that agency generously donated a power wagon and two men to accomplish this improvement as a joint project with the Game Commission.

Game Commission and U. S. Forest Service personnel cooperated in the preliminary cleanup of the shore line of Carter Lake where much debris hinders effective trolling.

On Elbow Lake, the Game Commission and Crown Zellerbach personnel cooperated to remove and burn much surface debris which has been a nuisance to anglers fishing the lake.

Road Construction Investigations

Proposed Bureau of Public Roads access road projects were examined in company with Bureau of Public Roads and Bureau of Land Management personnel. Projects investigated include the Wolf Creek and Fish Creek road sites. Suggestions to minimize the damage to fish were discussed and will be carried out during the construction phase of the projects.

Miscellaneous

Triangle Lake Study

The study of Triangle Lake begun in 1960 was completed this year. The purpose of the investigation was to obtain physical and biological information which could be used to formulate a future management plan for the lake.

Included in the study were the collection of all available stream flow records of Lake Creek, mapping of the tributary system, the determination of lake acreage and volume, and the inventory of the fish and fish food populations. A compilation of all fish liberation records for the lake was also prepared. All data has now been assembled into a special report.

Cleawox Lake Study

Cleawox Lake came under study in 1960 for much the same reason as Triangle Lake. The study was completed in 1961 and a special report was prepared. The data in the report indicate that the lake does not warrant rehabilitation at this time.

Lake Data Compilation Projects

All available data from Mercer, Sutton, and Carter Lakes were assembled into special reports. The initial purpose of the projects was to present background data for access consideration. Such reports have, in addition, proven valuable for quick reference to a particular lake and the plan is to have such reports available in the future for all waters. Currently, the report on Woahink Lake is in preparation.

Lake Soundings

Soundings were completed on all principal waters in the area which had not been mapped in 1960. Included in the sounding work in 1961 were Siltcoos, Tahkenitch, Woahink, Triangle, and Elbow Lakes. Contour maps of most of these lakes are now complete.

Angling Regulations

Regulations permitting trout angling on a year-around basis were tried at Mercer and Triangle Lakes for the first time in 1961. The regulations were favorable to the anglers and did provide additional angling opportunities. No harm to the fishery resource has been demonstrated.

UMATILLA DISTRICT, NORTHEASTERN OREGON

David N. Heckerorth

Fish Inventory

Anadromous

Anglers made good catches of steelhead on Columbia River tributaries in the district. Slightly fewer anglers were checked on the Umatilla River than in the 1959-60 season, but they spent one hour less per fish. More anglers were checked on the Walla Walla River in 1960-61 than in 1959-60, and some improvement in success was apparent. Table 279 compares the steelhead angling success for the two rivers for the 1959-60 and 1960-61 seasons.

Table 279

A Two-Year Comparison of Steelhead Angling Success
for the Umatilla and Walla Walla Rivers,
1959-60 and 1960-61

River	Season	Anglers	Hours	Steelhead Caught	Fish per Angler	Hours per Fish
Umatilla	1959-60	266	800	70	0.26	11.4
	1960-61	211	512	49	0.23	10.4
Walla Walla	1959-60	51	104	2	0.04	52.0
	1960-61	68	235	16	0.23	14.7

Winter steelhead angling on the Columbia River during the 1960-61 season was poor, with few anglers being checked between December 1, 1960 and March 31, 1961.

The catch of summer steelhead and salmon on the Columbia River was not as good as it was in 1960. Angling in both the McNary and Boardman areas never became consistently good for any period of time. Wind kept boats off the river through much of September and October. As usual, only a few dark and nearly ripe chinook were taken. The river was very low during the steelhead run and high water temperatures may have influenced the angling. Table 280 illustrates summer steelhead angling success for the Columbia River between Boardman and McNary Dam, as compared to 1960 catch data.

Surveys of steelhead spawning areas were made on tributaries of the Umatilla River.

A total of 83 miles of stream was surveyed. A total of 3,851 square yards of good gravel and 2,952 square yards of marginal gravel was recorded in 83 miles of stream surveyed.

Table 280

A Comparison of Summer Steelhead Angling Success
for the Columbia River, Boardman to McNary Dam,
1960 and 1961

Method	Year	Anglers	Hours	Catch			Fish per Angler	Hours per Fish
				St	Ch	Total		
Boat Anglers	1960	175	668	65	4	69	0.39	9.6
	1961	260	1,242	40	4	44	0.17	28.2
Bank Anglers	1960	257	774	43	4	47	0.18	16.5
	1961	93	452	6		6	0.06	75.3
Guided Boat	1960	8	35	5		5	0.63	7.0
	1961	3	7	2		2	0.67	3.5

Meacham Creek, a tributary of the Umatilla River, was found to contain excellent gravel spawning areas. Table 281 compares the gravel found on the part of the Meacham Creek system surveyed to date with that found on other tributaries of the Umatilla River.

Table 281

Comparison of Spawning Gravel on Tributaries
of the Umatilla River

Tributaries	Miles Surveyed	Square Yards Gravel per Mile		Total	
		Good	Marginal	Good	Marginal
Meacham Creek system	32.75	87	40	2,762	1,342
North and South Forks Umatilla, Buck Creek, and others	52.25	21	32	1,089	1,610
Totals	85.00			3,851	2,952

The short spring-fed creek at Hat Rock Park was surveyed for mature fall chinook and redds. The 250-yard long creek contained 2 redds, 1 live adult chinook, and 1 dead adult chinook.

Trout

Trout angling in the district was only fair in 1961. At the start of the season, cold, wet weather was discouraging to anglers. In addition, the catch per unit of effort was low. Later, as stream temperature rose, angling effort increased and the rate of catch improved.

The fishery was short-lived as dry, hot weather and lack of good snow pack combined to drop most streams to minimum flow. The South Fork of the Walla Walla River alone continued to carry good, cold flows, and stocking that stream resulted in some good angling with many limit catches being recorded.

Particularly disappointing was the angler success at McKay Reservoir. It is believed that poor survival of the fry planted in 1960, coupled with the loss of many fish to the creek below the dam in the late summer of 1960, was responsible for the poor angling. Fish up to 14 inches were common although not abundant. By late summer, the fingerlings stocked early in the spring were entering the creel as 6 to 8-inch fish.

Excellent angling occurred on McKay Creek below the dam just prior to the time irrigation ceased and the outlet was closed. The lake was drawn down to an all-time low of 360 acre-feet, resulting in thousands of fish being drawn out into the creek below. The good angling continued after the water was shut off but oxygen depletion, caused by the large numbers of fish concentrated in the pool below the outlet, made salvage necessary. Seines were used to salvage an estimated 35,000 fish which were released in the Umatilla River near Reith.

Table 282 summarizes creel check data on trout waters in the district.

Table 283 presents the data from population and growth studies at McKay Reservoir. Table 284 shows further population information for McKay. All rainbow from the 1960 plant (12 to 14 inches) were maturing.

Another survey was made at McKay this year to determine the extent of rainbow predation on the bluegills. Of 398 trout taken by two gill nets, only five trout 12 to 14 inches long had bluegills in their stomachs. Apparently little predation occurred in spite of the concentration of both species in the relatively small area of the low pool.

Warm-Water Fish

Creel census data gathered by State Police and Game Commission personnel indicates that warm-water game fish angling was only fair in 1961. Pressure on sloughs of the Columbia River and along McNary pool was considerably lighter than it was in 1960, although success per unit of effort was better.

The angling pressure at Cold Springs Reservoir was similar to that of 1960, but the total catch and fish per hour were greater. The take of all species increased over 1960, but the greatest increase was in bullhead catfish, most of which were caught during the month of February.

Table 285 compares creel census data in three warm-water angling waters for 1960 and 1961.

Table 286 presents data obtained from trap net samples from Cold Springs Reservoir. The lack of adult crappie in the September survey is probably due to the location of the net set. The same is believed to be true concerning the carp, although a considerable reduction in the carp population took place during the summer of 1960 due to an undiagnosed disease.

Table 282

Creel Census Data for Trout Streams
in the Umatilla District, 1961

Water	Anglers	Hours	Catch	Fish per Angler	Fish per Hour	Hours per Fish
Birch Creek <u>/1</u>	137	280	379	2.77	1.35	0.74
Butter Creek	12	39	20	1.67	0.51	1.95
Cutsforth Pond <u>/1</u>	30	49	37	1.23	0.76	1.32
McKay Reservoir <u>/1</u>						
Boats	550	2,157	1,034	1.88	0.48	2.09
Bank	567	1,089	368	0.65	0.34	2.96
Mill Creek <u>/2</u>	44	203	146	3.31	0.72	1.39
McKay Creek	168	620	323	1.92	0.52	1.92
Rhea Creek <u>/1</u>	59	159	212	3.59	1.33	0.75
Paddy Creek	25	141	84	3.36	0.60	1.68
Umatilla River <u>/1</u>	226	734	414	1.83	0.56	1.77
Walla Walla River North Fork	74	292	228	3.08	0.78	1.28
Walla Walla River South Fork <u>/1</u>	351	1,293	1,432	4.08	1.11	0.90
Weston Pond <u>/1</u>	74	300	128	1.73	0.42	2.34
Willow Creek <u>/1</u>	70	204	136	1.94	0.67	1.50

/1 Waters stocked by Oregon Game Commission./2 Waters stocked by Washington.

A $3\frac{1}{2}$ -acre pond was recently acquired as a public fishing area through a 10-year access agreement. Though the pond is shallow and alkaline, live-box tests indicate it has possibilities for bass and crappie. The pond is owned by Mr. Beatty Rand.

Table 283

Population Growth Studies at McKay Reservoir

Date	Method	Species	Size in Inches						Average Length (Inches)
			2-4	4-6	6-8	8-10	10-12	12-14	
12/14/60	trap net	Rb		1	4	3		1 <u>1</u>	7.52 <u>2</u>
1/24/61	2 gill nets	Rb		1	4	11	1		8.35
3/15/61	trap net	Rb		1	7	15	1		8.20

1 One 14½-inch trout that evidently came down from creek and does not represent growth of fish stocked in 1960.

2 Average length does not include the 14½-inch trout described above.

Table 284

Population Density and Species Percentages, McKay Reservoir

Date	Method	Species	Number Taken	Size Range in Inches	Percentage of Sample
9/14/61	2 gill nets	Rb	319	6-14	85
		BG	39	2- 6	11
		BrB	7	6	2
		Su	2	6-14	2

Habitat Improvement

Anadromous

Observations were made at the dam near the Nursery Bridge on the Walla Walla River at Milton-Freewater during the steelhead migration period to determine the adequacy of a concrete apron and chute constructed by the Flood Control District.

It was concluded that fish passage facilities were inadequate when only 25 fish were successful in entering the chute out of 970 observed jumps.

The Flood Control District was requested to build a suitable fish ladder. Plans for such a structure were supplied to them and the Hudson Bay Ditch Company. Neither organization is willing to accept responsibility for the barrier. Both were advised of their right to protest to the Water Resources Board, and Hudson Bay is known to have done so. A hearing is to be conducted by the Water Resources Board sometime in the future.

Attempts to get the owner of a small diversion dam on the Little Walla Walla River to construct a fish passage facility over the dam have been unsuccessful.

Table 285

A Comparison of Warm-Water Angling Success in Three Waters
in the Umatilla District, 1960-1961

Water	Year	Catch by Species	Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour	Hours per Fish
Columbia River ^{/1}	1960	SB	196					
		LB	2					
		WC	7					
		CC	2					
		YP	1					
		Sg	<u>15</u>					
			223	373	1,241	0.60	0.18	5.57
	1961	SB	72					
		LB	4					
		WC	107					
		CC	11					
Cold Springs Reservoir	1960	YP	10					
		Sg	1					
		BrB	<u>4</u>					
			209	119	403	1.76	0.52	1.93
		LB	53					
		WC	88					
		BrB	290					
			<u>431</u>	331	1,090	1.30	0.40	2.53
	1961	LB	145					
		WC	173					
		BrB	<u>842</u>					
			1,160	350	1,087	3.31	1.07	0.94
Dodd Pond	1960	LB	94	73	167	1.29	0.56	1.78
	1961	LB	46	18	60	2.56	0.77	1.30

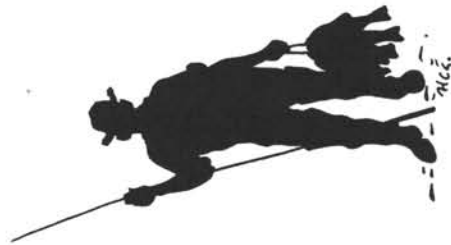
^{/1} Includes Columbia River, Boardman and Irrigon sloughs, and McNary pool.

Table 286

Trap Net Population Studies at Cold Springs Reservoir, 1961

Date	Duration of Set (Hours)	Species	Catch by Size Groups in Inches					Total Catch	Average Length (Inches)	Per Cent of Sample
			2-4	4-6	6-8	8-10	10-12	12-14		
3/31/61	48	BrB				1,022	116	12	1,150	8.46
		WC		4	5	71	21	5	106	9.24
		Carp							64	
		Su							18	
9/26/61	24	BrB			1	83	147	17	285	9.74
		WC	10	37					10	3.00
		Carp							1	0.32
		Su							12	3.90

Note: No bass were taken though a fair population is known to exist.



Negotiations over the past few years culminated in the removal of the old abandoned power dam on the Umatilla River near Hermiston.

For several years the three-mile dam on the lower Umatilla River, owned and operated by the West Extension Irrigation District, has been a partial barrier for steelhead. The fish ladder becomes clogged with driftwood and other debris, and passage through the ladder is often difficult or impossible. Game Commission personnel have many times had to clear the ladder of drift, as have the State Police game officers. Verbal requests to the irrigators for a cleanup of the ladder went unheeded. This year, a formal letter was sent to the Board of Directors of the ditch company reminding them of their legal responsibility to maintain the ladder free and clear of debris and suggesting immediate attention and periodic maintenance in the future. Results were swift and have been satisfactory to date.

Pollution

Two meetings with representatives of the Corps of Engineers and representatives of the Washington Department of Fish and Game, Washington Department of Fisheries, Bureau of Sport Fisheries, and the Oregon Fish Commission were attended during the year to discuss work the Corps had proposed that would be detrimental to fish.

An island in the Columbia River near Boardman was visited in response to a request by the Boardman Sand and Gravel Company for permission to operate on the island. It was recommended that operation be permitted if work was done in such a way or at such a time of year that would preclude any siltation of the river as some fall chinook salmon spawn in the area and steelhead angling takes place below the island.

The Pendleton Ready-Mix Concrete Company was contacted concerning their gravel washing operation. The State Sanitary Authority representative for the area was notified and settling basins are being constructed.

In July a Union Pacific Railroad tank car derailed near the town of Meacham. Part of the fuel oil in the car was spilled and reached Meacham Creek about 100 feet below the point of the derailment. Interviews with members of the wrecking crew revealed that after the car was returned to the track, the drain valve on the car was opened and the remaining oil allowed to run out and into the creek. The total amount of oil spilled and drained was about 10,000 gallons.

Estimates based on counts made along the polluted stretch of creek are that 10,000 fish were killed, 85 to 90 per cent of which were trout or juvenile steelhead. The kill ranged from 100 per cent at the point of pollution to 90 per cent at the lower end of the affected portion about five miles downstream. The pollution stopped at a point where the creek went underground. All insect life and crayfish were destroyed.

As negligence was apparent in the wrecking operation, the State Police arrested the foreman of the crew on a charge of introducing a pollutant to a stream. The court fined the man thirty dollars.

Trout

Lake Rehabilitation

Although it has been only two years since McKay Reservoir was treated,

bluegill, pumpkinseed, and catfish were present in numbers. Because of this and an unusually great reservoir evacuation, it was decided to chemically treat the impoundment in 1961.

As many trout remained in the lake, the use of a light concentration of rotenone was felt to be a good way to let the public salvage some of them. On October 26th, 100 gallons of liquid rotenone were distributed in the lake with two boats. In addition, approximately 25 acres of shallow water were sprayed by airplane, and springs and potholes along the creek running through the dry lake bed were spot treated.

The public responded well to the publicized plan concerning salvage and between 200 and 300 people came to the lake to pick up the rainbow, taking home several thousand fish. Many thousands of bluegill and pumpkinseed sunfish were killed, the majority of which were about 1 to 2 inches long. A few up to 7 inches were observed. Also killed by the rotenone were a few suckers.

The following day, nine gallons of toxaphene were introduced to the reservoir to insure a complete kill of all fish, especially the catfish. A rotenone drip barrel was maintained on the creek for 96 hours after treatment began.

Live-box trials using trout, bluegills, and suckers indicated that the fish died soon after treatment. A gill net survey 12 days after treatment failed to take any fish. A few crayfish were taken in the nets.

Impoundment Development

A potential fish impoundment site is located at a meadow on Meadowbrook Creek near Dale. The site could be developed into a trout lake of about 60 acres with a dam about 20 or 25 feet high.

No migratory fish would be involved as a natural falls just below the dam site prevents passage. Two creek systems feed the meadow and the water supply appears adequate. Rainbow and brook trout are present in the creeks. The site is less than one mile from Highway 395 and logging roads provide access.

The land is presently owned by Georgia Pacific Lumber Company, but is in the process of being acquired by the U. S. Forest Service through a land exchange program. The Forest Service is interested in having the site developed as a public fishery. They would provide camping facilities and improve road access. The land exchange is expected to be completed by late spring of 1962.

Working with local sportsmen's clubs, requests for improvement of the boat launching facilities at McKay Reservoir were made to the Umatilla County Court. The use of boat license funds was urged. A loop turn-around road was constructed at the lake and improved parking area developed. As the reservoir was at high level at the time, only a short gravel ramp could be made, but the plan is to extend it further as time and funds permit.

Warm-Water Fish

Dodd Pond angling has been seriously restricted due to a heavy weed infestation. An attempt was made, as an Izaak Walton League chapter project, to remove some of the weeds by dragging chains and cables through the pond. Although huge piles of weeds were removed, it hardly dented the weed growth. Chemical weed

control is planned for the spring of 1962.

A 10-year easement agreement was obtained to a $3\frac{1}{2}$ -acre pond near Irrigon. The pond was treated with liquid rotenone to destroy a population of carp and stunted catfish. Tentative plans are to stock the pond in the spring with large-mouth bass which will be obtained from Dodd Pond.

Miscellaneous

A second number of steelhead juveniles were salvaged in the district this year by screen operations. In addition to the two rotary screens operated by Game Commission personnel, the operation of the experimental louver-type screen on the Maxwell ditch was continued by the U. S. Fish and Wildlife Service. Table 287 lists the number of fish trapped at the three screens in the district that have bypass traps.

Table 287

Steelhead Migrants Recorded in Bypass Traps on Three Screens
in the Umatilla District in 1961

Water	Screen Number	Period of Operation	Steelhead Salvaged	
			Juveniles	Adults
Umatilla River	7-61	4/4 - 6/14	50,128	504
Umatilla River	Maxwell ditch ^{/1}	4/4 - 5/23	7,406	102
Little Walla Walla River	7-100	4/4 - 6/6	240	
Totals			57,774	606

^{/1} U. S. Fish and Wildlife Service experimental louver-type screen.

All fish trapped at screens on the Umatilla River were hauled to the Columbia River and released.

Screen Number 7-61 on the Westland Canal, took the greater portion of migrants. Frequent thunder showers and high water during the last month of operation brought down greater numbers of migrants than is usual for that period. An increase in the number of one-year-old migrants was also apparent during the latter portion of the run. Table 288 compares the numbers of steelhead juveniles trapped at screen Number 7-61 on the Westland Canal for the last eight years.

Table 289 illustrates the month-by-month catch of steelhead juveniles at the three screens with trap-boxes in the Umatilla district for 1961.

Table 288

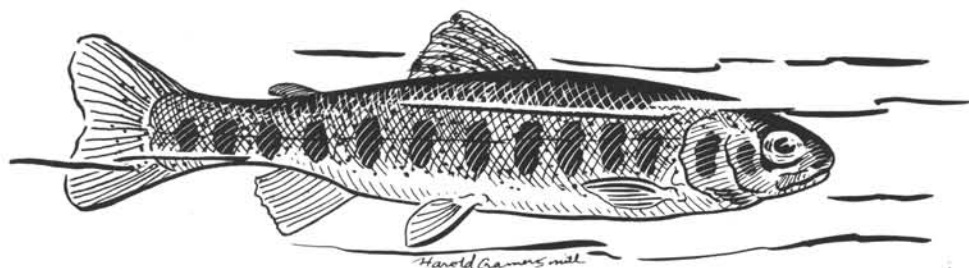
An Eight-Year Comparison of Juvenile Steelhead
Trapped at Screen Number 7-61,
Westland Canal, Umatilla River

Year	Number Trapped
1954	32,685
1955	6,276
1956	5,950
1957	9,092
1958	4,380
1959	27,418
1960	15,991
1961	50,128
Total	151,920
Average for 8 years	18,990

Table 289

Monthly Catch of Steelhead Juveniles at Three Screens
in the Umatilla District, 1961

Screen	Water	Trapped Juvenile Steelhead			
		April	May	June	Total
No. 7-61	Umatilla River	15,416	31,600	3,112	50,128
No. 7-100	Little Walla Walla River	86	128	16	230
Maxwell Ditch (USFWS)	Umatilla River	3,317	4,089		7,406



FISH PROPAGATION

C. C. Jensen

Introduction

The sixteen Oregon Game Commission hatcheries operated at full capacity in 1961 and provided the majority of trout which were stocked in Oregon waters.

Egg Production

A summation of the hatchery egg production, including the importing and exporting of eggs to other states and countries, is listed in Table 290. Of the 44.2 million eggs which were obtained, 21.9 million originated from wild stock within the state, 15.1 million were from hatchery brood stock, and 7.2 million were imported from other states and Canada. Approximately 8.7 million were exported to neighboring states and British Columbia. In 1960, approximately 27.9 million eggs were handled in the hatcheries.

Table 290

Annual Egg Production Including Eggs
Imported from Other States, 1961

Species	Eggs from Wild Fish	Eggs from Hatchery Brood Fish	Eggs Imported or Exchanged	Eggs Exported or Exchanged
Spring rainbow	295,480	2,679,390	1,030,886	294,840
Fall rainbow		10,446,852	1,912,156	2,001,510
Kamloops rainbow	15,571,149			4,641,247
Cutthroat		1,787,686	150,000	150,544
Brook trout	4,126,838			1,627,920
Brown trout			468,228	
Golden trout		9,159		
Lake trout	40,334			
Winter steelhead	865,761			
Summer steelhead	682,579			
Silver salmon	80,000			
Spring chinook	193,124			
Atlantic salmon		148,740		
Kokanee	79,380		3,673,047	
Totals	21,934,645	15,071,827	7,234,317	8,716,061
Total incoming eggs		44,240,789		

Rainbow trout eggs including Kamloops (15,571,149) accounted for about 78.2 per cent of the eggs taken at Oregon installations. Cutthroat, brook, golden, and lake trout accounted for 16.2 per cent; summer and winter steelhead 4.2 per cent; and salmon including kokanee, spring chinook, silver, and Atlantic salmon about 1.4 per cent. Table 291 summarizes the egg-take by species for each station.

Table 291

Number of Eggs Taken at Oregon Egg-Taking Stations, 1961

Station	Spring Rainbow	Fall Rainbow	Kamloops	Cutthroat	Brook Trout	Golden Trout	Lake Trout	Winter Steelhead	Summer Steelhead	Kokanee	Silver Salmon	Chinook Salmon	Atlantic Salmon	Total
Alsea Hatchery				1,271,886				430,140						1,702,026
Bandon Hatchery				515,800										515,800
Butte Falls Hatchery (McCloud Station - Rogue River)									159,450		80,000			239,450
Diamond Lake			15,571,149											15,571,149
Fall River Hatchery (Lava Lake) (East Lake)	295,480				1,154,348 2,972,490									1,154,348 3,267,970
Gnat Creek Hatchery (Crystal Springs Cr.)								7,400						7,400
Big Creek (Fish Commission)								83,168		80,000				163,168
Sandy River								229,745						229,745
Hood River Hatchery (Hood River)									79,736					79,736
Klamath Hatchery (Lake of the Woods) (Odell Lake)							40,334			9,780 69,600				9,780 109,934
Leaburg Hatchery		3,649,052												3,649,052
Oak Springs Hatchery		2,096,000												2,096,000
Roaring River Hatchery (Siletz River)		4,701,800							145,935					4,701,800 145,935
Rock Creek Hatchery (Umpqua River)								115,308	297,458			113,124		525,890
Willamette Hatchery	2,679,390													2,679,390
Wizard Falls Hatchery						9,159						148,740		157,899
Totals	2,974,870	10,446,852	15,571,149	1,787,686	4,126,838	9,159	40,334	865,761	682,579	79,380	80,000	193,124	148,740	37,006,472

Fish Production

For the calendar year 1961, a total of 19,256,925 fish weighing 951,838 pounds were produced (Table 292). This year's production represents a 31.5 per cent increase in poundage over fish production in 1960 which amounted to 16,214,043 fish totaling 729,530 pounds.

Table 292

Summary of Annual Fish Production Data for Operating Stations, 1961

Stations	Total Pounds Food Fed	Pounds of Food Fed to -		Fish Liberated from Hatcheries	
		Brood Fish	Fry, Fingerling, & Yearling Fish	Number	Pounds
Alsea	137,736	22,510	115,226	678,652	55,245
Bandon	69,773	3,286	66,487	812,431	32,200
Butte Falls	116,672		116,672	753,622	51,601
Cedar Creek	128,642		128,642	342,578	49,332
Diamond Lake				501,696	117
Fall River	29,560		29,560	3,312,888	11,117
Gnat Creek	53,866		53,866	333,930	20,834
Hood River	58,319	19	58,300	698,911	36,601
Klamath	112,468		112,468	3,111,055	57,614
Leaburg	319,778	19,605	300,173	2,347,684	158,834
Oak Springs	359,585	142,881	216,704	1,874,519	123,790
Roaring River	219,551	44,775	174,776	480,891	73,181
Rock Creek	186,972		186,972	827,322	100,238
Wallowa	72,194		72,194	481,211	31,532
Willamette	156,522	32,657	123,865	874,196	57,307
Wizard Falls	161,997	7,010	154,987	1,825,339	92,295
Totals	2,183,635	272,743	1,910,892	19,256,925	951,838

Food Consumed

From Table 292 it is noted that brood fish utilized 272,743 pounds of food and that fry, fingerling, and yearling fish consumed 1,910,892 pounds for a total of 2,183,635 pounds. Food consumed in 1961 increased approximately 7 per cent over 1960.

The amounts and types of fish food fed over the past four years are shown in Table 293. Of importance is the decrease in meat products from 82.40 per cent of the diet in 1958 to only 19.85 per cent in 1961. Pellets, on the other hand, increased from 3.18 per cent of the diet to 77.91 per cent from 1958 to 1961. The amount fed in 1961, totaling 2,203,343 pounds, differs from the totals in Table 292 because of locker shrinkage in weight of the meat and fish products.

Of the approximately 1.7 million pounds of pellets fed, 1,312,287 pounds were Clarks New Age; 340,212 pounds were Smalls Dina-Fish; and the Oregon frozen pellet amounted to 44,179 pounds. The remaining pellets were made up of other brands which were fed experimentally (Table 293).

Table 293

Amounts and Types of Fish Foods Utilized
at Fish Cultural Stations - Calendar Year 1961

Type of Food	Pounds of Food	Percentages of Each Type Used			
		1958	1959	1960	1961
Beef liver	116,940	7.40	10.39	8.39	5.31
Beef offal products	101,115	25.55	13.80	10.95	4.59
Pork liver	16,674	- -	- -	1.53	0.75
Pork offal products	57,621	16.19	9.52	5.01	2.62
Lamb liver	13,771	1.40	0.33	0.81	0.62
Salmon viscera	120,441	28.62	31.81	13.71	5.47
Shrimp and ocean fish	10,689	3.24	1.16	0.55	0.48
Meals (milk, yeast, cottonseed, wheat middlings, herring)	40,882	12.75	10.74	6.69	1.86
Salt	8,499	1.67	1.30	0.77	0.39
<u>Pellets</u>					
Clarks	1,312,287				59.56
Centennial	12,350				0.56
Smalls	340,212				15.44
Stockton	2,958				0.13
Purina	550				0.02
Silver Cup	4,175				0.19
Oregon frozen	44,179				2.01
Total pellets	1,716,711	3.18	20.95	51.59	77.91
Total	2,203,343	100.00	100.00	100.00	100.00

Conversion Ratios

A comparison of the average number of pounds of food required to produce one pound of fish for the past four years is shown in Table 294. Conversion ratios are based on net pounds produced at each hatchery and also take into consideration transfers of fish between stations. From a 4.81 food conversion shown for 1958, improved feeding practices and the use of pellets decreased the conversion ratios to 2.01 for 1961, an improvement of 172 per cent. Wizard Falls had the lowest conversion, 1.6, while the highest, 2.9, was found at Cedar Creek. Because conversions in Table 294 are computed on the pounds of food fed in a calendar year in relation to the pounds of fish liberated during the same year, the food conversion ratio is not a true reading for a group of fish from the fry stage to the yearling release size. Table 295, however, lists each lot of fish which was planted in 1961 and shows the true conversion and the mortality by species for each hatchery. It may be seen that rainbow trout have a better average conversion than some of the other species; thus some hatcheries will show a higher conversion factor because a majority of the fish reared are species other than rainbow. Mortalities in Table 295 appear abnormally high, but the majority of the loss occurs among the weaker fish early in life as they start to feed.

Table 294

Comparison of Conversion Ratios from 1958 through 1961 Calculated from Fry, Fingerling, and Yearling Fish Produced at each Station

Station	Net Pounds Fry, Fingerling, and Yearling Fish Released				Average Conversion Ratios			
	1958	1959	1960	1961	1958	1959	1960	1961
Alsea	29,549	48,557	39,279	60,268	5.23	2.42	2.28	1.90
Bandon	21,700	26,120	19,379	33,232	5.07	2.36	3.10	2.00
Butte Falls	38,810	45,518	56,372	50,599	5.81	4.11	2.85	2.30
Cedar Creek	38,276	42,479	39,742	44,487	7.17	4.32	3.00	2.90
Diamond Lake	402	602	484	117				
Fall River	5,750	5,131	4,625	10,645	4.11	3.37	3.54	2.80
Gnat Creek			--	22,237			--	2.40
Hood River	21,283	19,326	33,160	33,919	5.42	5.04	2.17	1.70
Klamath	38,616	39,945	35,670	58,111	5.06	2.43	3.27	1.90
Leaburg	106,006	122,273	149,541	158,834	5.93	2.08	1.82	1.90
McKenzie	32,970	37,632			--	--		
Oak Springs	159,601	96,816	100,168	131,643	3.22	2.98	2.22	1.70
Roaring River	38,107	32,201	48,660	71,428	5.76	3.83	3.03	2.40
Rock Creek	39,202	55,109	62,410	99,196	5.07	3.53	3.08	1.90
Wallowa	22,279	23,143	27,261	27,869	3.37	5.09	2.56	2.60
Willamette	37,249	28,946	42,418	55,228	5.13	3.83	2.50	2.20
Wizard Falls	56,545	46,916	65,028	94,469	3.76	2.80	2.11	1.60
Totals	686,345	670,714	724,197	952,282	4.81	3.02	2.49	2.01

Table 295

Summary of Feeding Results for Lots of Fish Closed in 1961

Species	Lot Number	Hatchery	Number Liberated & Transferred	Net Production in Pounds	Pounds Food Fed	Conversion	Total Mortality
AS	58.18	Wizard Falls /1	50,640	560	1,658	2.98	106,005
Br	75.05	Klamath	181,424	724	2,451	3.38	3,191
ChS	55.04	Rock Creek	111,006	10,720	61,012	5.69	30,824
	46.05	Butte Falls	56,097	8,320	38,828	4.66	5,868
	46.09	Oak Springs	58,089	1,012	3,103	3.07	2,750
Ct	71.04	Wizard Falls	78,996	87	694	7.97	35,264
	44.06	Bandon	290,845	11,196	22,663	2.02	11,555
	73.07	Hood River	18,910	61	208	3.40	179,545
	43.12	Alsea	360,103	26,243	48,182	1.84	88,452
	43.12	Cedar Creek	284,821	39,590	88,007	2.22	57,792
EB	80.01	Fall River	954,204	5,437	12,738	2.34	50,796
	67.02	Fall River	734,551	3,838	9,647	2.51	35,449
	67.02	Klamath	288,675	1,659	3,954	2.38	15,325
	67.02	Oak Springs	161,651	2,340	2,494	1.07	79,989
GT	58.09	Wizard Falls	2,370	6	62	10.33	5,532
K	79.01	Klamath	183,840	1,180	4,346	3.68	5,860
	72.03	Fall River	431,610	710	5,441	7.66	33,390
	72.03	Wizard Falls	454,020	368	518	1.41	3,184
	73.05	Butte Falls	242,356	980	5,214	5.32	37,120
	73.05	Fall River	186,472	48	100	2.08	4,759
	73.05	Klamath	368,824	1,087	4,128	3.80	20,106
	73.05	Rock Creek	196,643	68	100	1.47	3,400
	73.05	Wallowa	18,260	55	419	7.61	105,951
	73.05	Willamette	272,565	673	3,101	4.60	33,125
LT	70.03	Klamath	43,957	5,153	13,402	2.60	2,360
	70.03	Wallowa	32,640	680	4,628	6.80	2,570

Table 295 (continued)

Species	Lot Number	Hatchery	Number Liberated & Transferred	Net Production in Pounds	Pounds Food Fed	Conversion	Total Mortality
Rb	67.01	Oak Springs	183,711	62,146	107,648	1.73	2,750
	48.02	Rock Creek	3,808	14	161	1.15	172,985
	53.03	Oak Springs	1,299,609	45,689	61,808	1.35	106,061
	57.05	Rock Creek	161,148	15,756	34,617	2.20	11,325
	57.05	Willamette	180,931	24,166	45,591	1.89	54,937
	57.05	Wizard Falls	863,466	83,862	132,837	1.58	113,096
	59.05	Leaburg	903,803	146,246	283,664	1.94	40,213
	57.06	Fall River	144,951	237	522	2.62	17,710
	57.06	Klamath	384,033	1,761	5,046	2.87	17,634
	57.06	Wallowa	92,919	275	432	1.57	31,404
	57.06	Willamette	445,047	2,944	6,417	2.18	7,532
	73.06	Wizard Falls	586,334	8,294	12,453	1.50	69,475
	54.10	Butte Falls	424,975	40,634	91,039	2.24	46,279
	54.10	Klamath	558,027	45,722	85,343	1.87	34,785
	54.10	Roaring River	326,740	42,390	100,739	2.08	83,810
	54.10	Rock Creek	236,054	68,637	123,165	1.79	4,920
	54.11	Bandon	598,652	7,201	11,148	1.54	26,908
	54.11	Oak Springs	511,348	7,381	9,948	1.35	89,052
	53.14	Hood River	163,830	33,268	64,326	1.93	26,390
	53.14	Roaring River	128,512	20,536	53,676	2.61	37,708
	53.14	Wallowa	109,632	28,255	70,340	2.58	20,568
	53.14	Willamette	115,949	33,035	62,631	1.90	1,631
Sil	75.04	Gnat Creek	94,766	4,291	10,826	2.52	1,844
St	77.01	Gnat Creek	63,105	4,742	10,757	2.26	8,974
	78.01	Gnat Creek	60,912	4,906	10,773	2.19	1,565
	75.03	Gnat Creek	89,284	2,763	7,288	2.64	27,546
	50.05	Gnat Creek	75,074	5,675	11,363	2.00	9,286
	50.05	Hood River	23,076	1,564	4,865	3.11	11,999
	55.05	Bandon	83,689	7,271	18,590	2.55	6,681
	46.06	Bandon	58,283	4,786	15,740	3.28	31,809
	55.06	Bandon	44,099	1,461	3,929	2.69	2,674
	43.13	Alsea	183,753	18,487	37,551	2.03	22,205
	43.13	Cedar Creek	113,659	10,921	22,044	2.02	4,819

1 1960 data used because information for 1961 is unavailable.

Costs of Operation

A summary of hatchery fiscal year expenditures from 1957 through 1961 is illustrated in Table 296. Total costs have increased from \$497,086 in 1957 to \$638,114 in 1961, an increase of 28.37 per cent. Fish production, which climbed from 516,395 pounds in 1957 to 951,838 pounds in 1961, has shown an increase of 84.32 per cent (Table 297). The expenditures for feed alone, \$209,123 to \$219,716, for the same period (Tables 298 and 297) show an increase of only 5.07 per cent. Over-all costs in relation to fish production thus indicate that production has increased at a ratio of approximately 3 to 1 over increases in production costs.

Table 296

Comparison of Total Fiscal Expenditures for each Hatchery, 1957-61

Station	1957	1958	1959	1960	1961
Alsea	\$ 27,700.47	\$ 33,332.07	\$ 35,701.34	\$ 40,907.93	\$ 34,042.95
Bandon	25,457.07	27,745.69	27,995.02	26,936.61	32,819.52
Butte Falls	27,218.71	30,294.80	36,025.60	36,564.51	47,569.34
Cedar Creek	29,480.32	35,205.00	39,342.26	47,326.37	31,573.22
Diamond Lake	7,220.54	6,715.07	4,261.63	4,718.44	6,457.24
Fall River	16,882.15	18,802.65	18,950.19	17,627.03	21,427.95
Gnat Creek	1,340.89			27,296.51	31,531.02
Hood River	18,275.05	22,748.18	25,199.19	24,712.35	28,923.49
Klamath	37,734.90	38,236.50	34,076.09	35,274.61	39,230.95
Leaburg	60,071.11	77,616.44	74,994.53	64,986.88	57,355.25
McKenzie	28,576.97	33,697.96	24,587.59	9,679.97	631.27
Oak Springs	57,371.20	77,722.52	67,535.89	70,108.93	66,761.60
Roaring River	32,777.88	36,395.51	36,823.75	40,155.02	63,289.78
Rock Creek	36,197.47	39,474.29	47,928.78	51,758.74	63,916.05
Wallowa	22,030.74	27,203.12	24,785.33	25,878.92	28,941.53
Willamette	33,313.25	42,813.79	43,641.13	39,856.05	37,294.20
Wizard Falls	35,437.41	40,772.51	36,198.56	35,865.61	46,348.91
Totals	\$497,086.08	\$588,826.10	\$578,046.88	\$599,654.48	\$638,114.27

In 1961, gross rearing costs per pound of fish were \$0.67 (Table 297) compared to \$0.96 per pound of fish in 1957. Liberation costs in 1961 averaged \$.085 per pound; thus the over-all costs for a pound of fish liberated to the stream was \$0.7554 in 1961. Rearing costs for feed only averaged \$0.2308 per pound in 1961 as compared to \$0.4050 in 1957. The average cost of a pound of feed was \$0.1006 in 1961, a slight increase over past years. The addition of sulfa drugs to the pellets increased the costs at a few hatcheries during the past three years.

In computing costs shown in Table 297, fiscal year data are used for making calculations because it is readily available from the accounting department. The poundage of fish reared at the hatcheries is shown on an annual basis, however, because liberations cannot satisfactorily be split in midyear for cost purposes.

Fiscal year expenditures shown in Tables 296, 297, and 298 include salaries, materials and services, and all capital items except vehicles. Apportional items such as pre-engineering, painting, Civil Service, Retirement, Social Security,

Table 297

Summary of Fiscal Year Production Costs, 1957-61

	1957	1958	1959	1960	1961
Gross pounds fish liberated annually	516,395	706,279	685,773	729,530	951,838
Fiscal year costs of operation, including capital	\$ 497,086	\$ 588,826	\$ 578,047	\$ 599,654	\$ 638,114
Fiscal year costs for feed	\$ 209,123	\$ 267,681	\$ 267,820	\$ 217,325	\$ 219,716
Gross rearing costs per pound of fish	\$ 0.9626	\$ 0.8337	\$ 0.8429	\$ 0.8220	\$ 0.6704
Rearing and liberation costs per pound of fish	\$ 1.0276	\$ 0.8987	\$ 0.9079	\$ 0.8870	\$ 0.7554
Rearing costs, for feed only, per pound of fish	\$ 0.4050	\$ 0.3790	\$ 0.3910	\$ 0.2980	\$ 0.2308
Average cost - food per pound	\$ 0.0802	\$ 0.0843	\$ 0.0917	\$ 0.1004	\$ 0.1006
Pounds of food used during fiscal year -					
1st six months	1,210,551	1,306,062	1,670,965	992,098	870,660
2nd six months	1,393,777	1,869,012	1,249,067	1,172,263	1,245,827
Total for fiscal year	2,604,328	3,175,074	2,920,032	2,164,361	2,116,487

Table 298

Comparison of Total Fiscal Expenditures
for Feed Only, 1957-61

Station	1957	1958	1959	1960	1961
Alsea	\$ 12,419.11	\$ 13,512.94	\$ 15,705.89	\$ 14,150.93	\$ 13,435.85
Bandon	9,482.44	8,672.05	8,374.74	6,089.33	8,021.67
Butte Falls	11,965.40	13,700.51	18,473.98	15,488.51	12,625.80
Cedar Creek	13,991.16	18,196.41	22,300.35	15,177.79	11,725.42
Fall River	2,027.43	3,563.76	4,480.60	2,433.54	3,450.89
Gnat Creek	- - -			224.19	6,539.18
Hood River	5,305.27	8,141.70	9,516.53	6,580.59	8,123.13
Klamath	15,629.80	12,531.09	10,835.09	9,082.61	11,905.43
Leaburg	29,963.37	45,110.07	45,993.47	27,653.35	29,089.29
McKenzie	11,804.37	15,164.35	6,084.36	1,776.38	- - -
Oak Springs	31,815.06	48,085.04	40,914.66	38,626.36	34,234.78
Roaring River	16,834.99	17,435.79	18,530.06	19,921.17	20,256.60
Rock Creek	13,105.58	14,329.65	19,829.04	20,158.33	23,570.45
Wallowa	6,020.54	9,964.36	9,963.79	8,781.34	5,664.63
Willamette	12,821.14	20,342.16	22,259.35	16,046.25	15,403.77
Wizard Falls	15,937.75	18,931.31	14,558.02	15,134.79	15,669.15
Totals	\$209,123.41	\$267,681.19	\$267,819.93	\$217,325.46	\$219,716.04

gas and oil, office supplies, etc. are not charged against the hatcheries by the accounting department and are, therefore, not included in the hatchery costs in this report. Automotive gas and oil used by hatchery vehicles and the feed truck for the calendar year 1961, plus office supplies, totaled \$13,628.27, or \$0.0143 per pound of fish reared in the hatcheries.

The 272,743 pounds of meat and fish products fed to brood fish in 1961 cost \$27,438. In 1960, the cost was \$24,080, in 1959 the total was \$20,357, and for 1958 the cost was \$21,467. The 15,071,827 eggs taken from hatchery brood stock in 1961 cost \$1.82 per thousand for food only.

Pellet Feeding

Fry

The successful starting and maintenance of fry on pelleted foods has been limited to Clarks pellets. Feeding trials were conducted on other pellets but heavy mortalities soon ended the experiments.

At stations where water temperatures in the early spring ranged below 48° or 50° F., it was sometimes necessary to supplement the pellet diet with four or five feedings of liver per day. At other exceptionally cold water stations, the fish were started on liver and were switched to pelleted foods when the water warmed up to a more suitable temperature. Successive feedings of dry foods at close time intervals often proved helpful under marginal conditions. Concentrating the fish in a small area, when they started to feed, usually proved more successful than allowing the fry excessive room. It was also found that competition between the fry in the early stage of feeding promoted stronger feeding habits among the fish. With the exception of spring chinook salmon, all species adapted quite readily to pellet feeding under favorable water temperatures.

Yearlings and Fingerlings

Two brands of commercial dry pellets plus the Oregon Fish Commission's frozen pellet were fed successfully on a production basis to fingerlings and yearlings in the hatcheries. Clarks pellet proved successful on all species except spring chinook, while Smalls pellet was generally found to be successful at most stations after the fish had reached three or four inches in length. The Oregon frozen pellet, manufactured by Bioproducts, Inc., proved to be an excellent substitute for the meat diet formerly fed sub-yearling spring chinook. Young salmon have heretofore been started on meat products and then switched to frozen pellets when they reached about 100 per pound. Bioproducts, in cooperation with the Fish Commission, may soon place on the market a frozen pelleted material which will be suitable for starting salmon fry.

Experiments are underway utilizing pelleted diets for brood fish, but there will need to be some improvements in the brood pellet before it can be considered wholly successful. A new frozen-type brood pellet incorporating only meat and fish products is being considered.

Pellet-fed fish are proving to be equal or better in condition and stamina than meat-fed fish and are equal in flavor.

Disease Control

Disease and parasites took their usual toll in Game Commission hatcheries throughout the state, but timely treatments with various drugs and chemicals prevented any disastrous outbreak. Malachite green again demonstrated its ability for controlling fungus on eggs and fish and also proved effective in controlling columnaris disease and the parasites Trichodina and Ichthyophthirius. Pyridylmercuric acetate (PMA) treatments accompanied by regulated doses of sulfa drugs proved effective in controlling systemic columnaris in chinook salmon. Terramycin and nitrofurans were tried experimentally on selected groups of fish and indicated good results.

By incorporating the sulfa and other antibiotics into the dry and frozen pellets, it was found that lower levels of the drugs affected a satisfactory cure. Leaching of the drug into the water was minimal, and thus the test animal received the full benefit of the drug within the pellet.

Hepatoma of the liver was not found in any of the sub-yearling and yearling fish examined throughout the state. Rainbow brood fish at Roaring River and cutthroat brood fish at Alsea hatcheries were lightly infected. Production of eggs did not seem to be effected adversely, however, nor were the fry considered to be weaker.

Automation and New Equipment

Pellet Feeders

Ninety additional pellet feeders were added to the 50 feeders which had been placed in operation in 1960. The new feeders have double-wall construction to guard against moisture problems, and in some of the more humid areas electric light bulbs have been installed in the base of the feeder as added protection. Unlike the first machine, which straddled the pond wall and fed two ponds simultaneously, the second group of feeders was constructed to spread pellets to only one pond. On some installations, three machines have been mounted along one

100-foot pond wall, but generally two are sufficient to insure a good feeding pattern. A new and improved model will be built in 1962.

Fry Feeders

Automatic fry feeders are presently in use at all of the stations which feed fry. The original model, eight feet in length and equipped with many small hoppers, has been outmoded by feeders ten and twelve feet in length equipped with heating cables but with no permanent hoppers. Feeders are used in troughs, inside tanks, outside tanks and live-pens, and in outside ponds. The machines may either be suspended or floated on the water surface. Automatic feeders have been highly instrumental in making the pellet feeding program successful.

Controllers and Wiring

Numerous improvements have been made in the controllers or timers which actually control the time feeding cycle of the fry and pellet feeders. Time intervals may now be set or changed by turning a dial. Groups or single feeders can also be changed from one timer to another by simple wire changes. In future models, feeders will be changed from one timer to the next by use of three-way toggle switches. Present controllers can regulate feeding at intervals of from six minutes to five or ten hours and can start and stop feeding at selected times.

Incubator and Heating Devices

Incubators have been used at Klamath and Alsea hatcheries with fair success. As hatchery troughs wear out and if new production facilities are constructed, incubators will play an important role.

Small water heating devices constructed of two 4,000-watt immersion units have been installed in many of the hatcheries. Their greatest asset is that, by control of water temperature on eggs or fry, the incubation period and the growth of fry can be regulated to bring about fish of more equal size. Cost of operation is the primary drawback.

Fingerling Grader and Other

A new grader recently developed at Alsea Hatchery separates fry successfully into two grades. It is small enough to use in a trough but may also be used in an outside live-pen or pond. It is anticipated that the fry grader will be a highly successful hatchery tool.

A fish moving device developed at Gnat Creek and consisting of a 20-foot aluminum pipe rigged on a fulcrum is being used to advantage in several other hatcheries.

Plastic and aluminum irrigation pipes are being used at many hatcheries to move fish from one pond to another. At Wizard Falls Hatchery, pipes are attached to the grader which is elevated to a position that allows the graded fish to flow back to separate ponds on a cushion of water flowing through the aluminum pipes.

Fish hatcheries provide numerous opportunities for development of new techniques and automation, and it is anticipated that many changes will occur in the next few years.

ANGLING REGULATIONS

In a joint effort to halt the decline of summer-run steelhead in the Columbia River, sport fishing regulations in the States of Oregon, Washington, and Idaho were modified in order to allow a greater escapement of adult fish. The contribution made by the Oregon Game Commission included a reduction in a state-wide season bag limit for steelhead. The season limit was reduced to 20 fish. The former bag limit permitted an angler to catch 40 fish, not more than 20 could be salmon. In addition, the steelhead season in 15 eastern Oregon streams was reduced approximately one month.

The Sandy River was closed to all trout fishing from Brightwood bridge to the mouth in order to protect downstream migrant steelhead and salmon. The steelhead season was closed April 21 to October 31. The salmon season was reduced to the months of September and October. Poor returns of marked hatchery steelhead and a remnant spring chinook run were factors in promulgating the Sandy regulations.

Devils Lake, Lookout Point Reservoir, and Dexter Reservoir were opened to year-around fishing. The bodies of water opened to winter fishing were found to be supporting warm-water game fish or coarse fish populations.

The all-year trout fishery was permitted on Thompson Reservoir in the Southeast Region in order to increase the harvest of fish in this remote section of the State.

An apparent decline in the number of large trout in the Klamath basin prompted the Commission to set a two-fish daily bag limit for trout over 20 inches in length in Zone 6.

The fishing-for-fun concept on Mud Lake Atlantic salmon was carried a step further in 1962 when the one-fish bag limit was removed. The regulation at Mud Lake for 1962 will require the angler to fish with barbless flies and release all fish. It is hoped that the new regulation will protect larger fish which will enable fishery biologists to trap sufficient adult Atlantic salmon in Mud Lake to fill the shortage of adult males at Wizard Falls Hatchery.

The fly fishing regulations on lakes and streams formerly covered by legislative action were modified in such a manner that fixed spool reels and mono-filament line, except for backing, could not be used. This regulation was not applied to the North Umpqua River where the fly fishing closure was made to protect spring chinook salmon. The fly-fishing-only regulation on the Deschutes River and tributaries above Crane Prairie Reservoir was deleted in view of incidence of roach and whitefish in Big and Little Lava Lakes and possible rehabilitation of the upper Deschutes system.

The March steelhead season on the lower Columbia River and Nehalem River tributaries was eliminated because of the preponderance of spent or gravid fish caught by anglers after February 28.

Only minor adjustments were made in the opening dates of the early and late trout seasons. The late April and late May openings for general season and coastal streams and high lakes season appears to offer the best solution to the general and late season openings.

WARM-WATER GAME FISH

Ralph A. Grenfell

Fish Culture

Thirty-five acres of land have been purchased for development of a warm-water game fish holding and rearing area. It is located three miles south of Saint Paul on the east side of the Saint Paul-Fairfield Highway.

Permission for use of the Walton ponds near Turner has been revoked. The owner is using the ponds to produce snails and bullfrogs for market.

Fish Distribution

Fifty adult largemouth bass were seined from a private pond near Drain and placed in a pond on the Turner area. Removal of these fish was necessary because of their availability to the Umpqua River system where largemouth bass are not established and are not desired.

Sixty adult largemouth bass were seined from ponds on the Turner area and liberated in Prineville Reservoir. The small number of fish does not seem to be an adequate stock when the size of the reservoir is considered, but a few mature largemouth bass have produced excellent populations in other lakes.

Forty-three adult largemouth bass were taken from the Turner ponds and released in Emigrant Reservoir.

Forty adult largemouth bass were taken by gill net in Devils Lake, Lincoln County, and stocked in Blue Lake east of Portland.

Fish Inventory

Oak Grove Lake

Oak Grove Lake was chemically treated in the summer of 1959 to remove a carp population. It was restocked with 500 largemouth bass fingerlings that fall. During the 1960 Thanksgiving flood, the submergence of the lake's drainage culvert allowed rough fish to come in from the Willamette River. According to local residents, it was the first time since the Vanport flood that the river has come into the lake.

In the spring of 1961, two gill nets took 23 brown bullhead, 1 warmouth, 2 carp, and 17 downstream migrant silver salmon.

Withy Lake

Withy Lake was treated in 1959 and planted with bluegill and largemouth bass. Both species have done well and furnished some excellent angling. The landowner reported up to twenty cars a day on weekends.

Two gill nets set for 48 hours in May 1961 caught 32 bluegill, 13 warmouth, 14 suckers, 11 cutthroat trout, 10 squawfish, 7 brown bullhead, and 5 largemouth bass. The population composition as indicated by this sample is the same as it was before the four-day flood in the fall of 1960.

A thick growth of Canadian waterweed, Anacharis canadensis, continues to be a problem in Withy Lake. Several chemicals have been used to control the waterweed, but none have resulted in a permanent kill. A new product of the Northwest Weed Control Service, Tacoma, Washington, was donated for experimental use. It is pelletized attaclay impregnated with 37 per cent active sodium arsenite and fluorescein dye. The pellets are easier to handle than liquid sodium arsenite in that no spray equipment is needed. The dye is released immediately on contact with water so the person distributing the chemical can see where it has been placed, thus assuring an even distribution. Three days after application of this product, the waterweed was dead. No loss of fish was experienced. One month after treatment the weedy areas were open and completely fishable. Sufficient material is on hand to carry out another treatment in the spring if necessary.

Oak Creek Lake

Gravel removal has resulted in a 40-acre borrow pit in the channel of Oak Creek at the freeway overpass just south of Albany. The borrow pit was first filled with water in 1959. Gill net sets that summer took bullhead, carp, suckers, squawfish, and cutthroat trout in that order of abundance. Two gill nets set for 24 hours in 1961 took 25 white crappie, 18 bluegill, 9 bullhead, 4 whitefish, 2 largemouth bass, 1 cutthroat trout, 10 suckers, 9 squawfish, and 2 carp.

Timber Linn Lake

Timber Linn Lake is a borrow pit in the channel of Cox Creek east of Albany. It is located in a 75-acre city park. The lake was chemically treated in 1959 and stocked with rainbow trout and largemouth bass. Rough fish have gained access through an unscreenable outlet from the Lebanon ditch. Gill net samples show the population composition, with the exception of bluegill numbers, to be about the same as before chemical treatment. Table 299 shows the population of the lake.

Table 299

A Comparison of Gill Net Samples, Timber Linn Lake
1959 and 1961

Species	1959	1961
Brown bullhead	26	32
Bluegill	1	25
Largemouth bass	5	7
Trout		3
Suckers	20	25
Squawfish	1	4
Goldfish		1
Carp	2	

Largemouth bass were up to 10.5 inches fork length and rainbow trout to 12.7 inches fork length.

Willamette River

Sampling operations were carried out in the Willamette River during June, July, and August to determine the distribution of rough and game fish in the river proper and in the connected sloughs. The area covered was from Albany downstream to Wheatland, a distance of 50 river miles.

Two experimental gill nets, 3 trotlines, 1 New York trap net, and 6 pockets of catfish traps were used. The trap nets were virtually useless in the main river because they presented too much resistance to the current; consequently, they were used in the sloughs while the trotlines and gill nets were used in the river. Sampling in the main stream below Salem was abandoned when nets were quickly fouled by pollution slime. Slime was deposited in a few hours in such quantity the nets appeared as a solid wall when hanging in the water.

Chiselmouth were the most abundant species taken in the river proper, squawfish were a close second, and suckers were third. Squawfish made up the entire catch on the trotlines and could be taken at a rate of one for every three casts when angling. Fifty-five squawfish stomachs were opened during the course of the sampling. Thirty-nine were empty, 6 contained crayfish, 5 had insects and molluscs in them, 3 were full of unidentifiable fish remains, 1 had fish and crayfish in it, and 1 contained some unidentifiable material.

The only game fish taken in the river above Wheatland were 8 white crappie, 1 bluegill, and 1 bullhead.

The catch in the sloughs was composed of white crappie, squawfish, suckers, chiselmouth, bluegill, and black crappie, in that order of abundance. As many as 300 white crappie were taken in a single night in the New York trap net. All fish, and especially the white crappie, were in much better condition than the same species taken in the oxbow lakes.

The only salmonid caught in either the river or the sloughs was a nine-inch cutthroat taken in a slough above Independence.

Portland Harbor

Sampling in the Portland Harbor was done in conjunction with studies by the Sanitary Authority. Object of the testing was to determine specific abundance during the period of lowest dissolved oxygen content.

One experimental gill net, a New York trap net, and six pockets of catfish trap nets were set overnight at Swan Island in July and again in August. On July 18 the dissolved oxygen level where the nets were set was 2.5 p.p.m. A total of 691 fish was taken with 13 species represented. Most numerous game fish were the crappies (272) which were up to 10 inches fork length and in excellent condition. Three of the larger crappie had each eaten one salmonid. Eighty bullhead, up to 13 inches fork length, and 4 white sturgeon, ranging from 12 to 30 inches fork length, were next in order in the game species. Most common rough fish were the carp, 194 of which were taken by the New York trap net. Coarse-scaled suckers, 94 in number, were in second place in the take of rough fish.

On August 18 the dissolved oxygen was 2.5 p.p.m. The same nets were set where they had been on the earlier date. Catch composition was nearly the same, but total number taken was only 23 per cent of the July catch.

Although the dissolved oxygen was the same at both test periods, it had dropped between the two dates to 1.8 p.p.m. and it is suspected that many fish moved out of the area because of this oxygen deficiency.

Willamette Valley Borrow Pits

SCUBA gear was used to inventory warm-water game fish populations in six small borrow pits in the Willamette Valley.

Largemouth bass were censused in the Jefferson Borrow Pit in 1960 and 1961. The count by size groups is listed in Table 300.

Table 300

An Inventory of Largemouth Bass with SCUBA,
Jefferson Borrow Pit, 1960 and 1961

<u>Largemouth Bass</u> <u>Size in Inches</u>	1960	1961
3 - 4	14	50
8 - 10	62	90
10 - 12	2	0
14	0	1

Although adult bluegill were stocked in 1960, no adult bluegill or evidence of bluegill reproduction was seen in 1961.

Coffin Butte Borrow Pit #1 was treated and not restocked in 1955. Underwater observations were made this year to see if illegal introductions had been made. No fish were found, but numerous crayfish representing several size groups were seen. They are believed to be the progeny of 16 adult crayfish stocked in 1956.

Coffin Butte Borrow Pit #2 was stocked with bluegill and largemouth bass in the early 1950s. Gill net sampling proved ineffective in taking fish, so underwater observations were used to census the fish population. A heavy zooplankton bloom curtailed visibility, but even so a great many bass were seen. Most of the fish were in the 10-inch size group. Bluegill 3 to 5 inches long were in evidence throughout the pond.

Gill net sampling proved an unsatisfactory method of determining the status of warm-water game fish populations in three of the borrow pits located between Junction City and Eugene, so underwater observations were made in an attempt to evaluate these populations.

In Borrow Pit #1 it was found that largemouth bass were too numerous to count accurately. Distribution fell into four size groups, with 10-inch fish the most abundant.

In #4 Borrow Pit, the bass in the 6 to 8-inch size were most numerous, with other sizes represented, and 4 bass in the 3 to 5-pound class were counted.

The Northeast Crossing Borrow Pit at Eugene presented the same picture—few fish were taken in gill nets but many were seen during underwater observations.

Item of greatest note in this five-acre body of water was the presence of 12 bass in the 5 to 7-pound class.

Willamette River Sturgeon Catch

A few reports of sturgeon have been obtained from anglers fishing the Willamette River between Harrisburg and Wheatland. Those considered fairly reliable are listed in Table 301.

Table 301

Sturgeon Reported Caught in Willamette River above
Oregon City Falls, 1959 - 1961

Year	Number of Sturgeon	Size	Area	Remarks
1959	3	undersize, released	Wheatland	Illegal--no open season
	1	100 pounds	Harrisburg	Illegal--no open season
	1	20 inches <u>1</u>	Buena Vista	Illegal--no open season
1960	1	94 pounds	Corvallis	Legal
	1	60 inches	Corvallis	Legal
	1	72 inches, 100 pounds	mouth Long Tom River	Legal
	4	4 - 6 feet	mouth Long Tom River	Legal
	2	undersize, released	Irish Bend	Legal
1961	1	108 pounds	mouth Long Tom River	Legal
	1	86 inches, released	mouth Long Tom River	Legal
	1	51 inches, 55 pounds	Irish Bend	Legal
	1	72 inches, 100 pounds	Irish Bend	Legal

1 Minus head and tail.

One very reliable Corvallis angler states that in the last two years he has witnessed the taking of 14 sturgeon from the hole at the mouth of the Long Tom River. These fish ranged from 4 to 7 feet in length, with the majority in the 5 to 6-foot size.

No reports of tagged sturgeon have been received.

Miscellaneous

Warm-Water Game Fish Growth Studies

Analysis of scale samples collected from 1953 through 1960 has provided information on the growth rate of eight species of warm-water game fish found in Oregon. Data is presented in Table 302.

Table 302

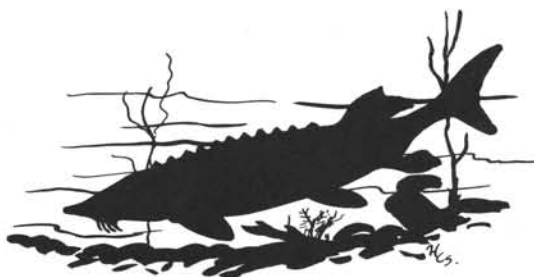
Calculated Fork Lengths of Eight Species of
Warm-Water Game Fish in Oregon

Species	Number of Waters Sampled	Fork Length at Completed Annulus ^{/1}										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
LB	73	2.6	6.3	9.4	11.8	13.6	15.0	16.5	17.2	17.7	18.8	19.4
BG	54	1.5	3.6	5.2	6.0	6.9	7.7	8.1				
WC	33	2.0	5.1	6.9	8.0	9.0	9.4					
YP	30	2.4	5.0	7.4	8.5	9.7	9.8					
BC	16	2.1	5.2	6.8	8.3	8.8	10.2					
Wm	9	2.2	4.0	4.9	6.0	6.8	10.2	10.7				
PK	5	1.4	2.7	3.2								
SB	3	2.8	7.0	10.6	12.5	14.0	14.5					

Note: These figures include the information from the 1958 annual report.

^{/1} Calculations are made with the use of the formula:

$$\text{Fork Length of Fish at Annulus} = \frac{(\text{Fork length of fish at capture}) \left(\frac{\text{Scale length}}{\text{Length of scale, focus to margin}} \right)}{(\text{at Annulus})}$$



OREGON SALMON AND STEELHEAD SPORT FISHERY

January 1, 1960 to December 31, 1960

The 1960 salmon and steelhead sport catch may be considered normal. The steelhead catch was down from 1959, as was the salmon catch, but total catch for each species was close to the average for eight years of record.

A charge for the salmon-steelhead punch card was initiated in 1960, which resulted in a reduced number of cards issued. It is of interest to note that although there was a drop of more than 100,000 cards issued, 60,000 anglers purchasing cards actually did not fish for either species.

Table 303 presents the information obtained for the 1960 season through an analysis of the data by Dr. Lyle Calvin of Oregon State University.

Table 303

1960 Oregon Salmon and Steelhead Catch

	Salmon	Steelhead	Total
Number Anglers Receiving Tags			172,332
Percentage of Tags Returned			30.75
Estimated Number Anglers not Fishing			59,235
Estimated Number Anglers Fishing - No Catch			45,528
Estimated Number Anglers Catching both Salmon and Steelhead			9,239
Estimated Number Anglers Catching Fish	51,977	24,836	67,639
Estimated Number Fish Caught	145,758 \pm 2,332	79,841 \pm 2,085	225,652 \pm 3,309
Estimated Number Fish per Angler	.846 \pm .014	.463 \pm .012	1.309 \pm .019
Estimated Number Fish per Angler Catching	2.80	3.22	3.33

A special summary of the catch by species for an eight-year period, showing also the number of cards issued and percentage returned, is presented in Table 304.

An estimate of the catch by area is presented in Table 305. Although confidence limits are established for the state-wide catch, no limits have been

placed on the individual area estimates. The catch of salmon in the ocean and in the Columbia River apparently held up well, but major decreases occurred in coastal rivers and bays except for the Rogue and Siuslaw systems. For convenience, the Columbia River and its tributaries are listed separately in Table 305, followed by the remaining streams in alphabetical order.

Table 304

Special Summary, Salmon-Steelhead Catch

Punch Cards Issued, Returned, and State-Wide
Catch of Salmon and Steelhead

Year	Number Issued	Number Returned	Percentage Returned	Salmon Catch <u>/1</u>	Steelhead Catch	Total Catch
1953	173,216	50,106	28.92	91,683	87,942	179,625
1954	170,879	53,019	31.02	98,896	74,333	173,229
1955	165,442	45,508	27.51	82,342 <u>/2</u>	59,287	141,629
1956	166,386	57,374	34.48	155,823	83,845	239,668
1957	135,230	69,527	51.41	130,285	57,762	188,047
1958	215,410	69,108	32.08	127,975	90,709	218,684
1959	285,700	67,030	23.46	221,360	121,223	342,583
1960	172,332	52,996	30.75	145,758	79,851	225,609
Totals	1,484,575	464,668				
Averages			31.30	131,765	81,869	213,634

/1 Yearly catch figures are estimates from data. Confidence limits vary each year and appear in annual reports. Totals on this table and those on stream catch summaries may not agree because of confidence limit variance.

/2 1955 figures are for a 9-month period. Records changed over to calendar year.



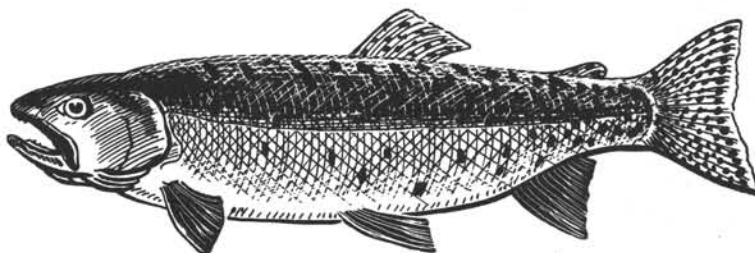
Table 305

Salmon and Steelhead Sport Catch by Area, 1960

Stream	Estimated Number of Salmon Caught	Estimated Number of Steelhead Caught	Total
Columbia River	33,253	14,009	47,262
Big Creek	130	767	897
Calapooya River	13	143	156
Catherine Creek	296	59	355
Clackamas River/Eagle Creek	858	1,362	2,220
Clatskanie River	75	231	306
Deschutes River	1,551	4,803	6,354
Gnat Creek	20	3	23
Grande Ronde River	75	709	784
Hood River	78	1,564	1,642
Imnaha River	387	1,018	1,405
John Day River	364	5,388	5,752
Johnson Creek	3	46	49
Klaskanine River	36	224	260
Lewis and Clark River	13	309	322
McKenzie River	195	39	234
Minam River	65	65	130
Molalla River	33	88	121
Pine Creek	16	146	162
Powder River/Eagle Creek	7	36	43
Sandy River	728	3,548	4,276
Santiam River	133	309	442
Scappoose Creek	36	127	163
Snake River	234	2,338	2,572
Sucker Creek	20	75	95
Umatilla River	49	995	1,044
Walla Walla River	3	78	81
Wallowa River	101	221	322
Wenaha River	42	85	127
Willamette River	10,933	1,418	12,351
Youngs River	3	0	3
<u>Ocean (Pacific)</u>	29,175	195	29,370
Alsea River and Bay	1,525	1,922	3,447
Applegate River	78	1,405	1,483
Beaver Creek	20	42	62
Chetco River and Bay	732	800	1,532
Coos River and Bay	3,795	582	4,377
Coquille River and Bay	690	1,772	2,462
Depoe Bay	-	-	-
Devils Lake	-	16	16
Drift Creek	208	1,015	1,223
Elk River	224	432	656
Floras Creek	20	23	43
Hunter Creek	42	81	123
Illinois River	270	2,384	2,654
Kilchis River	156	293	449
Miami River	36	289	325
Millicoma R./Middle Fk. Coos R.	52	159	211

Table 305 (continued)

Stream	Estimated Number of Salmon Caught	Estimated Number of Steelhead Caught	Total
Necanicum River	159	452	611
Nehalem River and Bay	2,972	3,915	6,887
Neskowin Creek	68	133	201
Nestucca River and Bay	2,933	5,802	8,735
Pistol River	176	182	358
Rock Creek	10	46	56
Rogue River	10,305	13,085	23,390
Salmon River	605	1,418	2,023
Salmonberry River	78	192	270
Siletz River and Bay	1,730	2,036	3,766
Siltcoos Lake	198	68	266
Siuslaw River and Bay	2,000	1,753	3,753
Sixes River	224	354	578
Smith River	192	524	716
Tahkenitch Lake	7	3	10
Tenmile Lakes and River	595	527	1,122
Tillamook Bay	1,587	169	1,756
Tillamook River	250	81	331
Trask River	1,310	1,954	3,264
Umpqua River	5,483	4,133	9,616
Umpqua River, North Fork	296	478	774
Wilson River	1,616	5,814	7,430
Winchester Bay	1,668	101	1,769
Winchuck River	55	55	110
Yachats River	46	52	98
Yaquina River	2,234	146	2,380
Totals	123,570	95,086	218,656



FISH STOCKING

R. O. Koski

The distribution of fish to the waters of the state in 1961 was carried on in a similar manner as in previous years but with increases in both numbers and pounds of fish transported.

Approximately 500 lakes and streams received fish with 2,100 separate liberations necessary to stock all areas properly. The total number of fish released was 19,942,119 with a weight of 976,917 pounds. The weight of fish transported was over 210,000 pounds more than in 1960. The releases made in each watershed, by species, in numbers and pounds are shown in Table 306.

The number and pounds of fish released from each hatchery, by species, are presented in Table 307. The figures shown do not represent the actual production of each hatchery but only the fish transported from the hatcheries to state waters during the year.

A large increase was noted in the release of yearling steelhead and salmon, compared to 1960, with a slight increase in catchable trout. Table 308 presents the distribution of anadromous yearlings and trout for the past two years.

Improved refrigeration tankers were in use during 1961 and have performed well, although considerable maintenance problems exist. The performance of reefers in hauling large loads of transfer fish has been especially notable. The total fleet of tankers, both standard and portable, numbered 23, and this number of tankers insured the release of almost all fish on schedule during the year. In addition to the large number of lake and stream plants, there were 63 transfers of fish recorded. The number of fish transferred was 1,838,534 with a weight of 22,143 pounds. A total mortality of only 5,789 fish was suffered during transfer.

With fish being released from the new Gnat Creek Hatchery for the first time in 1961, the fish distribution in pounds per licensed angler increased sharply. Table 309 presents this information, which is of interest because previous comparisons with other states have indicated that Oregon ranks among the top states in production of pounds of fish per angler.

The airplane stocking program was quite similar to that of the last few years. The total number of drops made was 352 with 677,221 fish weighing 3,054 pounds carried during the 18-day planting schedule. Brook trout were stocked in the greatest number with rainbows following. A few golden trout and cutthroat were also stocked.

The increased importance of salmon and steelhead in our fishery program can be noted in Table 310. The release of anadromous fish in 1961 was almost double that of the previous year, on a weight basis.

The increased need for accurate evaluation of the stocking programs as related to anadromous species has greatly increased the number of fish being marked each season. Nearly one and one-half million steelhead and salmon are now being marked each year. For reference, the various lots of fish being marked for 1962 release are shown in Table 311.

The stocking of warm-water fish for the past five years is delineated in Table 312.

Table 306
1961 Fish Stocking

Watershed	Rainbow	Outthroat	Brook Trout	Steelhead	Kokanee	Brown Trout	Lake Trout	Golden Trout	Chinook Salmon	Silvers	Atlantic Salmon	Total
1	523 1,412.0	163,872 36,448.5		259,330 20,589.8						94,698 4,366.4		518,423 62,816.7
2	3,467,522 229,818.4	11,014 2,519.8	511,604 2,838.9	3	469,436 160.6			2,176 48.5				4,461,755 235,386.2
3	692,318 68,239.0	12,010 2,871.0	201,225 1,259.4	179,952 15,551.0	20,029 285.9				5,144 148.1			1,110,678 88,354.4
4	78,885 22,374.0		54,496 353.0	63,047 6,833.7	74,430 122.0							270,858 29,682.7
5	2,908,170 150,099.1		1,071,641 6,889.5		1,362,012 3,884.2	171,422 720.5	43,929 5,149.3	680 19.5			20,010 235.4	5,577,864 166,997.5
6	121,871 22,686.5		10,114 228.9									161,985 22,915.4
7	369,575 13,650.0											369,515 13,650.0
8	185,751 27,463.4	7,990 25.8	30,800 154.0		13,260 39.9		32,620 679.6					270,421 28,362.7
9	374,459 16,312.0	8,020 26.4	21,844 123.5									404,323 16,461.9
10	299,262 12,838.8											299,262 12,838.8
11	58,746 2,362.2											58,746 2,362.2
12	37,990 10,974.6	83,970 147.4	1,100 10.0									123,060 11,132.0
13	339,271 22,409.1		15,580 154.9									354,851 22,564.0
14	1,010,800 24,975.4		64,648 449.9		49,020 14.0							1,124,468 25,439.3
15	1,144,245 58,119.5		55,860 252.3	172,148 4,831.3	148,660 528.5				51,294 10,271.4			1,572,207 74,003.0
16	1,484,567 59,395.2	4,992 1,783.7	40,085 211.0	272,391 8,538.3					123,986 12,274.9			1,926,021 82,203.1
17	60,971 21,375.1	351,357 7,598.4		20,620 716.0	46,420 19.8							479,368 29,709.3
18	27,050 3,612.0	488,085 36,494.5		101,826 11,866.0	241,353 65.3							858,314 52,037.8
Totals	12,661,916 768,116.3	1,146,890 88,070.4	2,093,417 12,770.4	1,069,317 68,926.1	2,424,620 5,120.2	171,422 720.5	76,549 5,828.9	2,856 68.0	180,424 22,694.4	94,698 4,366.4	20,010 235.4	19,942,119 976,917.0

Note: Lower figures denote pounds of fish.

Table 307

Total Release of Fish by Hatchery/1
1961

Hatchery	Species	Number	Pounds
Alsea	Cutthroat	513,516	36,996.4
	Steelhead	164,885	18,229.2
Bandon	Cutthroat	366,347	12,060.1
	Rainbow	172,203	5,248.1
	Steelhead	222,669	13,979.7
Butte Falls	Chinook	51,294	10,271.4
	Kokanee	238,806	957.0
	Rainbow	345,747	40,196.2
	Steelhead	113,865	45.3
Cedar Creek	Cutthroat	151,467	38,659.4
	Kokanee	91,542	17.1
	Steelhead	98,560	10,619.3
Diamond Lake	Rainbow	484,496	113.0
Fall River	Atlantic salmon/2	20,010	235.4
	Brook trout	1,614,004	9,123.3
	Cutthroat	83,970	147.4
	Kokanee	614,807	753.7
	Rainbow	966,939	939.7
Gnat Creek	Silver salmon	94,698	4,366.4
	Steelhead	245,051	16,573.0
Hood River	Brook trout	75,520	236.0
	Cutthroat	16,010	52.2
	Rainbow	579,845	33,684.2
	Steelhead	23,076	2,564.0
Klamath	Brook trout	288,414	1,657.0
	Brown trout	171,422	720.5
	Kokanee	547,564	2,247.2
	Lake trout	43,929	5,149.3
	Rainbow	2,031,537	47,825.5
Leaburg	Rainbow	2,346,417	158,861.1
Oak Springs	Brook trout	161,589	2,339.0
	Rainbow	1,710,120	121,197.7
Roaring River	Chinook	13,280	1,581.0
	Rainbow	481,279	73,355.0
	Steelhead	75	252.0

Table 307 (continued)

Hatchery	Species	Number	Pounds
Rock Creek	Chinook	110,706	10,693.9
	Kokanee	196,231	68.0
	Rainbow	377,279	87,634.5
	Steelhead	128,625	60.6
Wallowa	Kokanee	13,260	39.9
	Lake trout	32,620	679.6
	Rainbow	419,799	30,791.7
Willamette	Kokanee	271,465	670.8
	Rainbow	600,271	55,812.8
Wizard Falls	Golden trout	2,856	68.0
	Kokanee	450,945	366.5
	Rainbow	1,366,135	91,643.7
Totals		19,115,145	949,782.8

/1 Fish shown as released from hatcheries may not have been reared exclusively at that hatchery but were transferred as fingerlings or, in some cases, as an emergency move of some nature.

/2 Transferred from Wizard Falls.

Note: Releases of brood fish are included.

Table 308

Comparison of Numbers of Salmon, Steelhead, and Trout
Yearlings, and Total Fish Stocked

Year	Fry and Fingerlings	Yearling Salmon	Yearling Steelhead	Yearling Trout	Total
1960	14,086,171	103,453	381,164	2,354,859	16,925,647
1961	16,436,181	269,978	777,464	2,458,496	19,942,119

Table 309
Fish Production per Licensed Angler
1957 - 1961

Year	Number of Anglers	Pounds Stocked	Pounds per Angler
1957	337,248	525,979	1.56
1958	400,044	713,806	1.78
1959	440,522	703,007	1.59
1960	451,015	766,310	1.70
1961	474,900	976,917	2.06

Table 310
Salmon and Steelhead Stocking
1948 - 1961

Year	Steelhead		Salmon		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
1948	1,359,307	17,364	2,648,468	6,947	4,007,775	24,311
1949	884,789	7,305	859,625	7,826	1,744,414	15,131
1950	73,936	4,572	1,140,188	6,343	1,214,124	10,915
1951	58,400	1,855	768,238	23,714	826,638	25,569
1952	105,721	7,678	272,860	30,246	378,581	37,924
1953	106,214	8,103	361,300	44,594	467,514	52,697
1954	164,197	7,689	496,436	42,831	660,633	50,520
1955	268,896	32,739	570,419	31,449	839,315	64,188
1956	306,807	31,873	831,721	19,589	1,138,528	51,462
1957	294,354	21,309	1,436,712	10,420	1,731,066	31,729
1958	345,722	28,065	263,848	10,565	609,570	38,630
1959	372,012	42,123	102,114	13,906	474,126	56,029
1960	416,325	40,021	158,009	14,079	574,334	54,100
1961	1,069,242	68,674	275,122	27,061	1,344,364	95,735
Totals	5,825,922	319,370	10,105,060	289,570	16,010,982	608,940

Table 311

Marked Fish Releases Scheduled for 1962-63

Species	Mark	Number	Size in Inches	Brood Year	Release Area	Date of Release	Object of Experiment
ChS	An-RV	25,000	7	1961	Rogue River	5/63	Time and place study
ChS	An-RP	25,000	6	1961	Rogue River	12/62	Time and place study
ChS	IV-RV-RM	100,000	6	1961	North Umpqua River	3/63	Contribution to sport fishery
ChF	RV-IP (Lint Slough)	300,000	3	1962	Alsea Bay	5/63 ¹ / ₁	Rearing pond experiment
SLI	RP	100,000	6	1961	Lower Columbia tributaries	2/63	Hatchery evaluation
St(S)	D-Ad-RP (Hemlock Meadows)	120,000	6	1962	North Umpqua River	1/63 ¹ / ₁	Rearing pond experiment
St(W)	Ad-LV	50,000	6	1961	North Umpqua River	3/62	Return of hatchery fish
St(W)	Ad-LV	100,000	7	1961	Wilson River	3/62 - 1/62	Contribution to fishery
St(W)	Ad-LV	25,000	6	1961	Bear Creek, Columbia	5/62	Hatchery evaluation
St(S)	Ad-LV-RP (Medco Pond)	370,000	6	1962	Rogue River	1/63 ¹ / ₁	Rearing pond experiment
St(W)	Ad-RV	30,000	7	1961	Big Creek, Columbia	5/62	Hatchery evaluation
St(S)	Ad-RV	25,000	3	1962	Steamboat Creek	8/62	Return of hatchery fish
St(W)	Ad-RV	25,000	7	1961	Wilson River	5/62	Contribution to fishery
St(S)	Ad-RV-IP (Whistlers Bend)	175,000	6	1962	North Umpqua River	1/63 ¹ / ₁	Rearing pond experiment
St(S)	Ad-IP	78,000	6	1961	Central coast streams	1/62	Establish summer runs
St(S)	Ad-LM	18,000	7	1961	Rogue River	1/62	Contribution to fishery
St(S)	Ad-RM	100,000	6	1961	North Umpqua River	3/62	Return of hatchery fish
St(S)	Ad-RM	28,000	7	1960	Siletz River	1/62	Contribution to fishery
St(W)	IV	50,000	7	1961	Alsea River	2/62	Time and size study
St(W)	IV	50,000	6	1961	Nestucca River	1/62	Contribution to fishery
St(W)	IV	150,000	7	1961	Sandy River	1/62	Time and size study
St(W)	IV-RV	50,000	7	1961	Alsea River	5/62	Time and size study
St(W)	RV	50,000	7	1961	Alsea River	3/62	Time and size study
St(W)	RV	50,000	7	1961	Sandy River	1/62	Time and size study
St(S)	RP-RM	60,000	7	1961	Hood River	5/62	Return of hatchery fish
Rb	RV	192,500	8	1961	Umpqua River and south coast streams	¹ / ₂	Hatchery contribution to fishery
Ct	RV	130,000	8	1961	Central coast streams	5/62 - 7/62	Hatchery contribution
Ct	RP	10,000	8	1961	Nestucca River	5/62 - 7/62	Downstream movement

¹/₁ Liberation into stream.¹/₂ Spring and summer of 1962.

Table 312
Warm-Water Fish Stocking
1957 - 1961

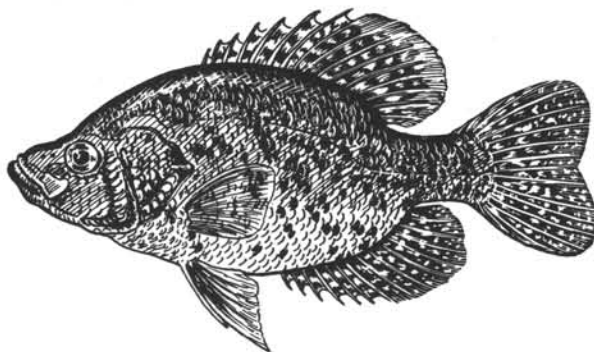
Year	Region	Area	Number	Species	Size in Inches
1957	I	Holmason Pond, Sauvie Island	55	LB	5 - 10
			55	BG	adult
		Loe Pond, Silverton	150	LB	2
		Wiley Pond, Sauvie Island	24	LB	5 - 10
			16	BG	adult
	V	Withy Lake, Amity	500	LB	1
			100	LB	5 - 10
			200	BG	adult
		Burns Gravel Pit, Burns	12	CC	14 - 30
		Middle Fork Malheur River, Drewsey	42	CC	14 - 30
		Morrison Lake, Burns	900	LB	1 - 4
			7	LB	8 - 14
			20	CC	14 - 30
		Pole Creek Reservoir	125	LB	2 - 4
			20	BG	4 - 6
		Silvies River	91	CC	14 - 30
		Warm Springs Reservoir	30,000	CC	2 - 4
1958	I	Burnham Pond, Prescott	600	LB	2
			12	BG	7
		Long Lake	21	YP	8
	III	Ochoco Pond 1	500	LB	2
			11	BG	6
		Ochoco Pond 2	500	LB	2
		Reynolds Pond, Alfalfa	1,058	LB	1 - 16
			355	BG	1 - 8
		Shumway Pond, Prineville	500	LB	2
		Zell Pond, Alfalfa	457	BG	4 - 8
	IV	Cold Springs Reservoir, Hermiston	7,250	LB	2

Table 312 (continued)

Year	Region	Area	Number	Species	Size in Inches
1958 (con't'd)	V	Crater Lake	100	LB	2 - 4
		Harris Pond, Summer Lake	700	LB	2 - 4
		Middle Fork Malheur River, Drewsey	30	SB	2 - 14
		Silver Lake	31,500	LB	2 - 4
1959	I	Devils Lake, Lincoln County	12	CC	7 - 10
			29	CC	14 - 17
		Rockaway Pond	17	BrB	14
		Smith Lake, Tillamook	77	BrB	14
	III	Reynolds Pond	422	LB	7 - 13
	V	Burns Gravel Pit, Burns	759	BG	1
			38	BG	2 - 5
			6	BG	6 - 8
1960	I	Waverly Lake, Albany	1,000	LB	1
			729	LB	3 - 12
			24	BG	4 - 6
		Timber-Linn Lake, Albany	415	LB	3 - 14
			800	BG	1
		Eugene Millrace, Eugene	400	LB	3
		Oak Grove Lake, Oak Grove	500	LB	3
		Oswego Golf Course Pond	200	LB	3
		Burkes Lake, Warrenton	300	LB	3
		Waltons Pond F, Turner	24	CC	3
		Sam Ropp Pond, Albany	15	LB	6 - 14
		Aaron Ropp Pond, Albany	15	LB	6 - 14
		Devils Lake, Lincoln County	36,600	CC	2
		Crooked River Reservoir	23,500	LB	3
1961	I	Blue Lake, Portland	4,786	LB	3
			40	LB	adult
		Turner Ponds	50	LB	adult

Table 312 (continued)

Year	Region	Area	Number	Species	Size in Inches
1961 (con't'd)	II	Emigrant Reservoir	6,000	LB	3
			43	LB	adult
		Hyatt Reservoir	6,000	LB	3
		Selmac Lake	3,440	LB	3
	III	Prineville Reservoir	60	LB	adult
		Crooked River Reservoir	20,000	SB	2
	IV	Grande Ronde River	86	CC	7 - 11
		Upper Grande Ronde River	130	CC	4 - 14
		Sloughs, Grande Ronde River	8	SB	6 - 9
	V	Big Swamp Reservoir	1,300	BG	4
		Burns Gravel Pit, Burns	1,400	BG	4



Federal Aid Expenditures by Activity
January 1 to December 31, 1961

Project No.	Description	Expenditures		
		Federal	State	Total
FW-17-C-15 & 16	Coordination	\$ 5,487.02	\$ 1,829.01	\$ 7,316.03
	<u>Research</u>			
F-51-R-2	Drift Creek	8,879.46	2,959.82	11,839.28
	<u>Development and Operation of Access Projects</u>			
F-29-D-4 & 5	State-Wide Access Maintenance	270.17	90.06	360.23
F-48-D-1	Clackamas River	8,409.58	2,803.20	11,212.78
	<u>Fishery Rehabilitation Projects</u>			
F-20-D-11	Miller Lake	650.51	216.83	867.34
	<u>Fish Ladder Projects</u>			
F-55-D-1	Illinois Falls	14,855.83	4,951.94	19,807.77
Total Expenditures 1/1/61 to 12/31/61		\$38,552.57	\$12,850.86	\$51,403.43



LAKE AND STREAM REHABILITATION

R. L. Borovicka

Table 313

Summary of Oregon State Game Commission Fishery Rehabilitation Projects
1961

Name	Surface Acreage at Treatment	Acreage $\frac{1}{2}$ Normal	Water Volume Treated (Acre-Feet)	Location by County	Month of Treatment	Miles of Rivers and Streams Treated	Quantity of Chemical Used		Species of Undesirable Fish Removed	Estimated Cost of Treatment	Restocking
							Powdered (Pounds)	Rotenone Liquid (Gallons)			
Ana Reservoir	50	57	1,035	Lake	October	5		250	24	\$ 4,025.00	Rainbow trout
Beulah Reservoir	channel	1,900	channel	Malheur	September	56		380		4,000.00	Rainbow trout
Blue Lake	64	64	800	Multnomah	May	1	5,440	75		5,207.00	Crappies Bass
Davis Lake	3,200	3,500	15,835	Deschutes	October	10		300	478	7,600.00	Rainbow trout Kokanee
Drews Reservoir	25	4,517	650	Lake	September	33		150	28	2,000.00	Rainbow trout
Empire Lakes	30	45	350	Cocis	November	2		290		2,000.00	Cutthroat trout Bass
McKay Reservoir	40	1,280	500	Umatilla	October	3		155	9	1,600.00	Rainbow trout
Rock Creek Reservoir	2	106	10	Wasco	October	1		20		100.00	Rainbow trout
Taft-Miller Reservoir	0	65	0	Harney	August	3		5		110.00	Rainbow trout
Miscellaneous ponds	33	95	303	State-Wide	(1961)	1	200	129		1,235.00	Miscellaneous
Totals	3,444	11,629	19,483			115	5,640	1,754	539	\$27,877.00	

$\frac{1}{2}$ Irrigation and flood control reservoirs are chemically treated in the late summer or fall, at the time of lowest drawdown following irrigation season.
Normal surface acreage is given to show the amount of fishery area improved by chemical treatment.

Fishery Resource Expenditures
Fiscal Year July 1, 1960 to June 30, 1961

Fish Resources	Expenditures Fiscal Year to Date
Basin Investigations	\$ 18,974.03
Fishery Administration	70,455.26
Fishery Access	74,986.87
Alsea Hatchery	34,042.95
Bandon Hatchery	32,819.52
Gnat Creek Hatchery	31,531.02
Butte Falls Hatchery	47,569.34
Cedar Creek Hatchery	31,573.22
Diamond Lake Hatchery	6,457.24
Fall River Hatchery	21,427.95
Hood River Hatchery	28,923.49
Klamath Hatchery	39,230.95
McKenzie Hatchery	631.27
Oak Springs Hatchery	66,761.60
Roaring River Hatchery	63,289.78
Rock Creek Hatchery	63,916.05
Wallowa Hatchery	28,941.53
Willamette Hatchery	37,294.20
Wizard Falls Hatchery	46,348.91
Leaburg Hatchery	57,355.25
Elk River Hatchery	- - -
Warm-Water Fish	544.20
Hood River Egg-Take	- - -
Klamath Egg-Take	1,672.28
East-Paulina Egg-Take	1,489.21
Siletz-Crystal Springs Egg-Take	1,175.05
Odell Lake Egg-Take	- - -
Fish Habitat Improvement	363,878.48
Fish Inventory	165,136.74
Fish Food Transportation	13,294.34
Columbia River Fisheries	7,184.73
John Day Screens	37,377.10
Crystal Springs Project	- - -
Willamette Project	29,512.60
Walla Walla Screens	2,251.05
Fish Stocking	40,136.22
Fish Protection	2,502.37
Sandy River	2,908.08
Screen Administration	6,355.44
Screen Manufacture	11,938.23
Screen Maintenance	50,478.59
Total	\$1,540,365.14

CONTRIBUTING PERSONNEL

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Borovicka, R. L.	Aquatic Biologist	Rehabilitation
Corthell, R. A.	Field Agent, Aquatic Biologist	Coos-Coquille District
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Harold C. Smith, Staff Artist, developed the layout of the figures, prepared them in final form, and made the illustrations. Agnes M. Eicher typed and proofed the manuscript.

GAME COMMISSION HATCHERIES

Hatchery	Location	Superintendent	
Alsea	Philomath	Paul E. Vroman	
Bandon	Bandon	Willis C. Baker	
Butte Falls	Butte Falls	Everett M. Moore	
Cedar Creek	Hebo	Charles T. Roadarmel	
Diamond Lake	Diamond Lake	William C. Wingfield	
Fall River	Bend	John K. Susac	
Gnat Creek	Clatskanie	Arne V. Shannon	
Hood River	Hood River	Archie H. McRae	
Klamath	Klamath Agency	Richard A. Evans	
Leaburg	Leaburg	Lynn W. Webb	
Oak Springs	Maupin	Andrew B. Smith	
Roaring River	Scio	Percy W. Southwick	
Rock Creek	Idleyld Park	Henry J. Reed Raymond F. Culver	1/61- 7/61 8/61-12/61
Wallowa	Enterprise	Ralph D. Kay	
Willamette	Oakridge	C. C. Green Henry J. Reed	1/61- 7/61 8/61-12/61
Wizard Falls	Camp Sherman	K. E. (Gene) Morton	

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