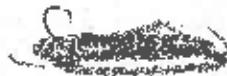


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**OREGON STATE GAME COMMISSION**  
**FISHERY DIVISION**



# 1963

# ANNUAL REPORT

## FISHERY DIVISION

*Editors*

*C.J. Campbell & F.E. Locke*



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## INTRODUCTION

The count of spring chinook over Winchester Dam on the North Umpqua was the largest recorded in the past 10-year period. The estimated number of chinook passing over Winchester Dam was 11,020 fish. The previous highest count in the 10-year period was 9,314 fish. Resting hole counts of spring chinook in Umpqua River tributaries were also the highest in the 10-year period. Numerous marked Umpqua River spring chinook were reported taken in the California offshore troll fishery. The summer steelhead run at the same station also exceeded the previous 10-year period. The count in 1963 was 4,827 fish, as compared with the previous high of 3,430 in 1955.

The offshore sport salmon fishery continued to produce high returns to the angler in 1963. Creel data indicate that the fishery was extremely popular at most of the ports along the Oregon coast. In many ports the fishing intensity and catch were near record highs.

The Rogue River spring chinook run in 1963 was excellent. The count at Gold Ray Dam was 41,527 fish, exceeded only by the number counted in 1942. The catch of chinook and coho salmon in the lower Rogue River for the 1963 season was calculated to be in excess of 150,000 pounds. Although a good run of winter steelhead entered the Rogue River in the 1962-63 season, the size of the summer run has been about one-fourth the magnitude of runs enumerated in the early 1940s.

The Nestucca River was seriously scoured late in the fall of 1963 when a log-crib dam in the headwaters broke, releasing a large volume of water into the main channel. In addition to severe scouring of the riverbed, salmon, steelhead, and cutthroat trout fingerling were found in the debris following the flood.

Fifty-eight percent of the summer steelhead observed in a SCUBA survey of Siletz River were marked hatchery returns.

Big Lava Lake in central Oregon was chemically treated in September 1963. The reason for the decline in fishing pressure in this lake was obvious at the time of treatment when only 0.05 percent of the fish killed were trout.

Many favorable comments were heard regarding the new angling regulation on Hosmer Lake. In 1963 all Atlantic salmon caught in Hosmer Lake had to be returned to the lake unharmed. In addition, anglers were required to use flies with barbless hooks.

Oregon's first warm-water game fish rearing area was completed in the fall of 1963. Ten 1-acre ponds with drawdown and recovery structures will be available for use early in 1964. A well of 400 gallons per minute capacity will provide the water supply.

Detroit Reservoir had an estimated 141,000 angler-days of fishing effort and produced an estimated catch of 310,000 fish. About 12 percent of the fish creeled were kokanee. In addition, a large run of mature kokanee entered tributaries of the reservoir in the fall. It was estimated that the spawning run could have exceeded 20,000 fish. Spot checks on major tributaries indicated the presence of 10,000 fish. In the North Santiam River the migration extended 22 miles above the reservoir.

Several watersheds in southeast Oregon were chemically treated in 1963. Bully Creek and part of the Malheur River system were treated prior to completion of Bully Creek Dam. Cow Lakes and tributaries, including a portion of the streams extending into Idaho, had been treated by mid-September.

Diamond Lake produced a phenomenal fishery in 1963. The estimated total catch was 256,000 trout. The yield per surface acre was 84.4 pounds per acre. The highest previous recorded yield was 23.0 pounds per acre in 1958. The high yield at Diamond Lake was attributed to the excellent survival of fingerling plants made in 1962. Prior to 1962 most of the trout released in Diamond Lake were advanced fry.

# FISH ABBREVIATIONS

AS	Atlantic salmon	K	kokanee
B	bullhead catfish	Lam	lamprey
BB	black bass, or bass	LB	largemouth bass
BC	black crappie	Lc	lingcod
Bg	bluegill sunfish	LT	lake trout
BlB	black bullhead	Mt	madtom
BlC	blue catfish	Mu	mullet
Br	brown trout	P	perch
BrB	brown bullhead	Pk	pumpkinseed sunfish
BSu	bridgelip sucker	PS	pink salmon
BT	brook trout	R	rockfish
C	crappie	Rb	rainbow trout
CC	channel catfish	RbF	rainbow trout (fall)
Ch	chinook salmon	RbS	rainbow trout (spring)
ChF	chinook salmon (fall)	Ro	roach
ChJ	chinook salmon (jack)	RsS	redside shiner
ChS	chinook salmon (spring)	SB	smallmouth bass
Clm	chiselmouth	SCT	blackspotted cutthroat
Co	coho salmon	Sg	sturgeon
CoJ	coho salmon (jack)	Sh	shad
Cot	cottid	Skb	stickleback
Cp	carp	Sq	squawfish
CRC	Columbia River chub	SS	sockeye salmon
CS	chum salmon	St	steelhead
CSu	coarsescale sucker	StB	striped bass
Ct	cutthroat trout	StS	steelhead (summer)
D	dace	StW	steelhead (winter)
DV	Dolly Varden trout	Su	sucker
F	flounder	Tc	tomcod
FC	flathead catfish	WC	white crappie
Gf	goldfish	Wf	whitefish
Gr	greenling	Wm	warmouth bass
GS	green sunfish	WSg	white sturgeon
GSg	green sturgeon	YB	yellow bullhead
GT	golden trout	YP	yellow perch

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# UMPQUA RIVER DISTRICT

Jerry A. Bauer and Ronald L. McDivitt

## Fish Distribution

Table 1 presents a history of the stocking of summer steelhead and the rate of their return.

Table 1

Umpqua Summer Steelhead Stocking and Rate of Return,  
1958-1963

Brood Year	Number Stocked	Date Stocked	Mark	Number Adults Recovered	Percent of Number Released Returned
1956	19,100	March 1958	Ad-RV	335	1.8
1957	49,000	March 1958	Ad-RM	1,428	2.9
1958	34,900	March 1959	Ad-RM	1,360	3.9
1959	16,900	March and April 1960	Ad-RM	886	5.2
1960	83,600	March 1961	Ad-RM	1,918	2.3
1961	99,100	March and May 1962	Ad-RM	1,018	1.0
1962	58,700	March 1963	Ad-RM	<u>1</u>	
			Ad-LM	<u>1</u>	
			Ad-LM-RM	<u>1</u>	

1 Will return 1964.

The spring chinook were released directly into Rock Creek from the hatchery ponds for the second consecutive year. A total of 91,000 fish at 6.0 per pound was released the first week of March. Table 2 gives the history of salmon stocking in the Umpqua since 1949.

Diamond Lake was planted with domestic rainbow stock for the second consecutive year. The 250,000 rainbow of Oak Springs stock were released at 30 to 40 fish per pound during the third week in May. Two different releases were made of the Willamette stock. A total of 191,900 fish at 130.0 per pound and 57,955 fish at 67.0 per pound was released in June.

Kokanee stocking in the district was continued with the release of 93,500 fingerling into Lemolo Reservoir and 40,000 fingerling into Eel Lake.

## Fish Inventory

### Anadromous

Nearly all runs of anadromous fish passing Winchester Dam exceeded counts of prior years. The spring chinook run was the highest on record and

Table 2

## Salmon Stocking in the Umpqua Basin, 1950-1963

Brood Year	Spring Chinook		Fall Chinook		Coho	
	Number	Age in Months <u>/1</u>	Number	Age in Months <u>/1</u>	Number	Age in Months <u>/1</u>
1949	52,000	18	384,500	(fry)	20,000	15
1950			416,500	(fry)	3,500	9
1950	31,500	18	25,000	15	31,500	15
1951	39,000	18	21,500	15	18,500	15
1952	51,000	13	25,500	15	27,000	15
1953	62,000	14	19,000	14	27,000	14
1954	205,000	(fry)				
1954	62,000	14	23,000	12	27,500	12
1955	122,000	(fry)				
1955	75,000	14	23,000	12	30,000	12
1956	702,000	(fry)				
1956	10,000	13	34,500	15	29,000	14
1957	75,600	(fry)				
1957	52,000	18	23,800	15		
1958	51,000	(fry)				
1958	56,000	18	31,300	6		
1959	111,000	18				
1960	81,000	18				
1960	13,280	13				
1961	91,000	18				
TOTALS	1,942,380		1,027,600		214,000	

/1 Age in months from egg-take to liberation.

was nearly 251 percent of the parent run. Summer steelhead continued to increase and were nearly 237 percent of the parent run. Fall chinook and coho salmon counts were the highest since 1956, but jacks made up 53.6 percent of the coho run. Counts for the past ten years are presented in Table 3.

A new ladder was constructed over Winchester Dam by Pacific Power and Light Company in the late summer. During the construction period, 900 fish were collected by hand and put over the dam. The new ladder was put into operation October 23, 1963.

Table 3

## Winchester Dam Fish Counts, 1954-1963

Species	Number of Fish by Years									
	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
<u>Spring Chinook</u>										
Adults	6,613	6,266	7,881	4,285	3,856	3,460	3,594	4,711	5,626	9,222
Jacks	1,576	1,378	1,433	943	542	327	456	542	924	1,798
TOTALS	8,189	7,644	9,314	5,228	4,398	3,787	4,050	5,253	6,550 <u>/1</u>	11,020
<u>Fall Chinook</u>										
Adults	1	656	181	14	61	108	70	72	99	121
Jacks	0	36	3	1	0	3	1	18	5	64
TOTALS	1	692	184	15	61	111	71	90	104	185
<u>Coho Salmon</u>										
Adults	325	2,475	2,303	952	492	768	215	389	419	569
Jacks	64	222	457	111	81	50	131	142	129	658
TOTALS	389	2,697	2,760	1,063	573	818	346	531	548	1,227
<u>Summer Steelhead</u>										
	3,117	3,430	2,927	2,228	2,041	2,049	2,732	3,141	3,072 <u>/1</u>	4,827
<u>Winter Steelhead</u>										
	9,124	4,755	10,211	8,923	6,350	6,372	6,138	5,192	7,734 <u>/1</u>	5,847
<u>Coastal Cutthroat</u>										
	706	960	982	87	108	48	106	306	308	142
<u>Other Trout</u>										
	64	47	269	25	42	104	98	116	185	74
Suckers	14,502	11,752	20,924	2,425	7,458	5,248	8,844	8,098	7,657	6,164

/1 Affected by loss of grate.

The 306 spring chinook counted in the South Umpqua resting holes represented an increase of 57.7 percent over 1962 counts. Jacks made up only 5.6 percent of the count. This was the third consecutive year that SCUBA was utilized to make the counts which are presented in Table 4. In addition to the regular resting hole count area, a 13-mile section of the South Umpqua between Zinc Creek and Tiller was counted. Only three chinook were observed in this section of the South Umpqua.

Table 4

South Umpqua Spring Chinook Inventory, 1950-1963

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 <u>/2</u>	113	45	42	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
1962	135	59	6	200
1963	175	131	62	368

/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 to make counts for the first time.

Spring chinook in resting holes in Rock Creek were counted for the fifth consecutive year. The 453 fish observed represented an increase of over 700 percent of the 1962 counts. The counts for the five years are presented in Table 5. Marked fish made up over 90 percent of the count. Because of excessive poaching, an emergency closure to all fishing was put into effect August 8.

SCUBA was used to check the mortality of spring chinook in resting holes in the North Umpqua between Idleyld Park and Soda Springs. No excessive loss was noted.

Fall chinook spawning ground counts in the lower Umpqua and Smith Rivers increased from 3.49 salmon per mile in 1962 to 4.00 salmon per mile in 1963. Counts are presented in Table 6.



Table 5

## Rock Creek Spring Chinook Inventory, 1959-1963

Year	Adults	Jacks	Total Fish Observed
1959	60	9	69
1960	22	3	25
1961	14	0	14
1962	61	3	64
1963	390	63	453

Table 6

## Fall Chinook Spawning Counts, 1963

Stream	Miles	Water	Adults	Jacks	Unknown	Fish per Mile
North Fork Smith River	0.50	Clear				0.00
Big Paradise Creek	3.50	Milky				0.00
Buck Creek	3.50	Clear				0.00
Mill Creek	1.25	Milky	14	5		15.20
Camp Creek	1.00	Clear	19	1		20.00
TOTALS AND AVERAGE	9.75		33	6		4.00

Lower Umpqua and Smith River tributary spawning ground counts for coho salmon decreased from 12.3 salmon per mile in 1962 to 10.55 salmon per mile in 1963. High water delayed counts on a few streams and carcasses were probably washed away. Numbers of redds in some streams indicated a much higher population of fish than was actually counted. Results of the lower Umpqua and Smith River counts are presented in Table 7.

Table 8 presents a comparison of the counts for selected lower Umpqua and Smith River tributaries for the 19 consecutive years that such counts have been made.

Tenmile Lake tributary spawning ground counts for coho show a decrease of 9 percent from last year's figures. Jacks made up 57 percent of the counts. The total minimum 1963-64 coho run into Tenmile Lakes, exclusive of Eel Lake, is calculated to be 19,594 fish. Comparative spawning ground count data on selected tributaries of the Tenmile Lakes since 1955 are presented in Table 9.

The Eel Lake tributary coho counts increased from 74 in 1962-63 to 356 fish in 1963-64. Count data are presented in Table 10.

Table 7

Coho Spawning Ground Counts on Tributaries  
of the Lower Umpqua and Smith Rivers, 1963-64

Stream	Miles	Water	Adults	Jacks	Unknown	Total
Scholfield Creek	2.00	Clear	76	59		135
Miller Creek	0.75	Clear	21	22		43
Alder Creek	0.25	Clear	1			1
Dry Creek	0.25	Clear	3	4		7
Otter Creek	1.00	Clear	19	26	3	48
Dean Creek	1.25	Clear		3		3
Weatherly Creek	1.25	Milky				0
Brush Creek	1.50	Milky				0
Mehl Creek	3.00	Clear				0
Johnson Creek	1.25	Clear		8		8
Beaver Creek	2.00	Clear	19	12		31
Buck Creek	3.50	Clear	17	3	1	21
Spencer Creek	4.50	Clear	6	3		9
Big Paradise Creek	3.50	Milky				0
Little Paradise Creek	2.00	Clear				0
Camp Creek	1.00	Clear				0
<b>TOTALS</b>	<b>29.00</b>		<b>162</b>	<b>140</b>	<b>4</b>	<b>306</b>

Table 8

Comparative Spawning Ground Count Data on Selected  
Lower Umpqua and Smith River Tributaries,  
1945-46 through 1963-64

Year	Miles Surveyed	Number Adults	Total Salmon	Percent 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
1962-63 /1	29.00	324	356	6.4	11.2	12.3
1963-64	29.00	162	306	46.0	5.6	10.6

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

Table 9

Comparative Spawning Ground Counts of Coho  
on Selected Tributaries of Tenmile Lakes,  
1955-1963 /1.

Year	Miles Surveyed	Number Adults	Total Salmon	Percent Jacks	Adults per Mile	Salmon per Mile
1955	10.25	2,647	3,555	26	258.2	346.8
1956	9.75	1,446	2,425	40	148.3	248.7
1957	10.00	1,391	1,895	27	139.1	189.5
1958	8.00	877	1,584	46	109.6	198.0
1959	6.25	612	830	26	97.9	132.8
1960	7.00	403	1,444	72	57.6	206.3
1961	9.75	1,672	2,717	39	171.5	278.7
1962	9.75	1,973	3,156	38	202.4	323.7
1963	10.50	1,336	3,114	57	127.2	296.6

/1 Includes Fish Commission count data.

Table 10

Eel Lake Tributary Counts of Coho, 1963-64

Stream	Miles	Adults	Jacks	Unknown	Total
Main right fork	0.50	41	23		64
Main left fork	0.75	100	46		146
Cabin fork	0.25	100	43	1	144
Swamp fork	0.25	1	1		2

Poor conditions of the trapping facilities at Winchester Dam allowed only 156 spring chinook to be examined for marks. Thirty-three, or 21.2 percent, were marked. Marked chinook made up 15.3 percent of the angler creels in the river fishery. Umpqua spring chinook made up nearly 5.0 percent of the marked chinook observed in the landings from the California troll fishery during the period April through July 1963.

Seven, or 2.5 percent, of 278 steelhead examined during the winter run were marked summer steelhead. Marked fish made up 1.9 percent of the winter steelhead harvest and were almost equally divided between summer and winter stocks.

Over 800 summer-run steelhead were examined for marks. Three hundred and thirty, or 39.7 percent, were marked fish. In the summer steelhead fishery, marked fish made up 24.8 percent of the catch. Marked fish recovered consisted of 87.0 percent hatchery-reared summer stock, 12.4 percent Whistlers Bend pond-reared summer stock, and 0.6 percent hatchery-reared winter stock. Fish from

the first Whistlers Bend pond release in March 1962 were taken in the fishery for the first time. The fish averaged between 3 and 6 pounds.

During the summer, 19,133 angler-caught salmon were examined at Winchester Bay. Marked fish included 267 coho, 54 chinook salmon, and 1 steelhead. It is probable that approximately 750 marked salmon were landed at Winchester Bay, or about 1.5 percent of the total catch.

Nearly 30 days of freezing weather in January greatly reduced angler effort and catch of winter steelhead. The estimated harvest of 3,200 steelhead by 22,400 angler trips is a decline of about 9 percent from 1961-62. Creel data by sections of river are presented in Table 11.

Table 11

Umpqua River Winter Steelhead Fishery, 1962-63

Area	Calculated Angler Trips	Steelhead			Cutthroat	Fish per Angler	Hours per Fish
		Unmarked	Marked				
			LV	RM			
Main stem	12,985	1,890	5		35	0.15	34.9
North Umpqua	3,908	813	16	31	8	0.22	15.8
South Umpqua	5,535	405	8		16	0.08	37.4
TOTALS AND AVERAGES	22,428	3,108	29	31	59	0.14	30.1

The summer steelhead fishery on the North Umpqua for the second consecutive year showed a decline in angler effort. Angler success was up over 1962, averaging 0.22 fish per trip at a rate of 16.6 hours per fish. With the decline in angler effort and the excellent run of summer steelhead, the harvest amounted to only 12.8 percent of the run. Table 12 gives a comparison of the fishery since 1958.

Water conditions were so bad during the first four weeks of the spring chinook fishery that opening weekend was almost the only time that angling was effective. Water conditions remained poor in the lower main river the entire season. This is the second consecutive year the harvest was in excess of 1,100 fish, but with the excellent run the harvest was just under 10 percent. The spring chinook fishery since 1958 is presented in Table 13.

Winchester Bay salmon angling success in 1963 remained high with an estimated total catch of 46,173 salmon, of which 3,908 were chinook. This is a drop of 870 from 1962 but is still the third highest catch on record. Included in the catch were 19 pink salmon. Angler pressure increased for the fourth consecutive year to reach an all-time high of 46,811 angler trips. Catch per angler in 1963 was 0.99 as compared to 1.01 salmon in 1962. Statistics for the fishery since 1952 are presented in Table 14.

The 1963 fall salmon fishery was generally good in the lower Umpqua and Smith Rivers until the first high water. Most of the Umpqua fish were taken below Elkton. Creel census results are presented in Table 15.

Table 12

## North Umpqua Summer Steelhead Fishery, 1958-1963

Area	Year	Angler Trips	Steelhead		Fish per Angler	Fish per Hour	Percent of Run Harvested
			Number	Percent Marked			
Bait	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
	1962	1,442	188	61.7	0.13	0.04	6.0
	1963	1,199	258	38.4	0.22	0.07	5.2
Fly	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
	1962	1,905	373	21.4	0.20	0.05	11.8
	1963	1,661	380	15.5	0.23	0.06	7.6
TOTALS	1958	2,210	872		0.39	0.07	40.7
	1959	2,715	682	33.3	0.25	0.05	31.4
AND	1960	3,366	590	45.9	0.18	0.05	20.7
	1961	3,831	916	24.9	0.24	0.07	28.2
AVERAGES	1962	3,347	561	34.9	0.17	0.05	17.8
	1963	2,860	638	24.8	0.22	0.06	12.8

Table 13

## Umpqua Spring Chinook Fishery, 1958-1963

Year	Anglers	Adult Chinook	Jacks	Fish per Angler	Hours per Fish	Percent 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
1962	6,684	1,134	93	0.18	26.2	17
1963	6,018	1,014	127	0.19	21.3	10

Coho began entering the sport catch in Tenmile Creek about October 15 and angling remained very good for several weeks. Most of the fish taken were bright jacks. Anglers averaged 1.07 fish per trip, caught at a rate of 3.2 hours per fish. Between the creel census data and the known catch recorded at the docks, it is estimated that a total catch of 3,800 salmon was taken from the Tenmile Lakes system. This represents a take of 19 percent of the calculated minimum total run of 19,594 salmon.

Table 14

Winchester Bay Salmon Angling Effort and Catch, 1952-1963

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	Coho	Chinook	Coho			
1952	7,324	1,397	8,721	19,189	10,375	29,564	4,124	14,387	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	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	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	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	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	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	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	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	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	17.8	9.0	293,354	0.79	8.41
1962	9,266	2,717	11,983	28,053	18,634	46,687	2,631	44,413	15.0	9.0	439,182	1.01	9.41
1963	9,255	2,759	12,014	28,044	18,767	46,811	3,908	42,266	16.2	9.6	469,063	0.99	10.02

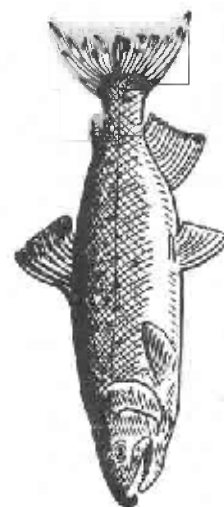


Table 15

## Fall Salmon Fishery, 1963

Water	Anglers	Hours Fished	Salmon			Fish per Angler	Hours per Fish
			Chinook	Coho	Jacks		
Umpqua River	74	349	1	21	16	0.51	9.18
Smith River	6	6		1		0.17	6.00
TOTALS AND AVERAGES	80	355	1	22	16	0.49	9.10

Steelhead success fell off sharply in Smith River during 1963 due to several periods of low and cold water. Tenmile Creek success remained almost the same as in 1962. District angling pressure was again fairly heavy throughout the season. Creel data are presented in Table 16.

Table 16

## Lower Umpqua District Steelhead Fishery, 1962-63

Stream	Anglers	Hours Fished	Steelhead	Fish per Angler	Hours per Fish
North Fork Smith River	17	42	4	0.24	10.50
Tenmile Creek	227	792	41	0.18	19.32
Smith River	83	343	9	0.11	38.11
TOTALS AND AVERAGES	327	1,177	54	0.17	21.80

Sea-run cutthroat were abundant in the lower Umpqua and Smith Rivers but angling pressure was light. Fish per angler increased from 0.16 in 1962 to 0.82 in 1963.

Striped bass angling was generally slow from the first of March until midsummer. Many good catches were made from August into October. The fish ranged in weight from 2 to 51 pounds, with most under 20 pounds. Catch data for the fishery are presented in Table 17.

Table 17

## Lower Umpqua Striped Bass Fishery, 1963

Anglers	Hours Fished	Striped Bass	Fish per Angler	Fish per Hour
279	1,059	64	0.23	0.06

The Umpqua River sturgeon fishery started earlier in 1963 with the first fish landed in mid-February. Angling pressure was heavy for three weeks and then dropped sharply. During this period boat anglers outfished bank anglers by a slight margin. Only light pressure was exerted the remainder of the year. Few undersize fish were reported hooked, while at the same time a fair number of sturgeon over 6 feet in length were landed and released. All fish seen were white sturgeon and ranged in weight from 12 to 105 pounds. Catch data for the fishery are presented in Table 18.

Table 18

Lower Umpqua Sturgeon Fishery, 1963

Anglers	Hours Fished	Sturgeon	Fish per Angler	Fish per Hour
313	1,493	38	0.12	0.03

Trout

There were 121.4 pounds per acre of bottom food organisms in Diamond Lake in 1963. Table 19 shows the pounds of fish food per acre for the years 1954 through 1963. It was actually thought that with nearly 244,000 pounds of fish harvested in 1963, the food production figure would have been down more than 16.3 pounds from the 1962 figure. Table 20 presents a comparison of the individual organisms since 1959 and shows an increase over 1962 in all categories. The absence of large snails is not shown in the table.

Table 19

Bottom Food Production at Diamond Lake, 1954-1963

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
October	1962	137.7
October	1963	121.4



Table 20

## Number of Organisms in Diamond Lake Bottom Samples, 1959-1963

Species	Number by Years				
	1959	1960	1961	1962	1963
Shrimp	3,338	4,526	1,625	701	3,595
Midge	481	1,635	618	577	908
Aquatic Worms	220	243	87	237	612
Leeches	571	779	194	162	862
May Flies	265	54	7	3	67
Caddis	121	40	17	15	46
Snails, Damselfly, Others	39	758	469	414	3,287

The fall gill-net samples indicated a good population of fish with a good carryover of 1962 stocks and very few Kamloops trout. The composition of the four net samples was: 30.0 percent 1963 Willamette stock, 26.4 percent 1963 Oak Springs stock, 22.1 percent 1962 Roaring River stock, 10.7 percent 1962 Willamette stock, 10.0 percent 1962 Oak Springs stock, and 0.8 percent Kamloops stock. Livers from two Roaring River trout were identified as having hepatoma. These were the only two fish in the samples that appeared to be infected. The average for all fish taken in the nets was 11.6 inches and 13.2 ounces. Table 21 gives the length frequency of gill-net-caught fish and Table 22 gives the length frequency for angler-caught fish since 1960.

Table 21

Length Frequency of Gill-Net-Caught Rainbow  
at Diamond Lake, 1960-1963

Year Planted	Size Groups in Inches Illustrated in Percentages						
	6-8	8-10	10-12	12-14	14-16	16-18	18-20
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
1962	7.5	51.6	33.5	1.9	0.5	2.5	2.5
1963	2.1	35.0	19.3	22.9	19.3	0.7	0.7

Table 22

Length Frequency of Angler-Caught Rainbow  
at Diamond Lake, 1960-1963

Year Planted	Size Groups in Inches Illustrated in Percentages							
	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20+
1960	3.5	14.5	9.8	13.1	37.6	15.5	3.9	2.1
1961	0.1	0.5	2.6	19.3	44.8	23.3	7.7	1.7
1962	15.1	37.1	9.5	2.5	4.8	14.9	14.2	1.8
1963	9.2	13.8	14.0	48.4	11.9	1.6	0.9	0.2

Table 23 gives a record of the Secchi disk and temperature readings at Diamond Lake for the period June 15 to September 15, 1963.

Table 23

Secchi Disk and Temperature Readings at Diamond Lake, 1963

Water Depth in Feet	Temperatures in Degrees Fahrenheit						
	June		July		August		September
	15	30	15	30	15	30	15
Secchi Disk Readings	29'	29'	16'	11'	8'	26'	18'
0'	64°	60°	64°	66°	68°	63°	60°
5'	64°	60°	64°	66°	68°	63°	60°
10'	64°	60°	64°	66°	68°	63°	60°
15'	63°	60°	62°	66°	68°	62°	60°
20'	60°	60°	62°	64°	65°	62°	60°
25'	58°	60°	62°	63°	64°	62°	60°
30'	56°	60°	60°	62°	64°	62°	60°
35'	54°	60°	60°	62°	64°	62°	60°
40'	53°	59°	60°	62°	63°	62°	60°
45'	52°	59°	59°	61°	62°	62°	60°

Nets set in the Tenmile Lakes show the perch size to be comparable to those taken in the joint study in 1957. Results of gill-net sets in some lower Umpqua District lakes are presented in Table 24.

The North Umpqua trout fishery showed a marked drop in angler pressure but a return to a more normal rate of success. Anglers averaged 2.56 fish per trip and a rate of 0.78 fish per hour. Success and effort since 1958 are shown in Table 25. Anglers harvested 35.6 percent of the legal rainbow stocked in the North Umpqua. Hatchery trout made up 82.5 percent and migrant steelhead (6 to 8 inches) 15.2 percent of the angler creels. A comparison of the composition of the angler creels since 1958 is presented in Table 26.

Information on the South Umpqua trout fishery was collected in a preimpoundment study. A statistical sampling program was followed on the stream with a dividing point at Tiller. Anglers averaged 2.70 fish per trip at a rate of 1.00 fish per hour. Hatchery trout made up 95.4 percent of the angler creels. Table 27 gives the comparison of the fishery between the area above and below Tiller.

At Diamond Lake an estimated 4,050 anglers took 22,600 trout on opening weekend. Angling was very good the entire season. Only 17.3 percent of the anglers during the entire season were unsuccessful. Even more outstanding than the 256,800 trout harvested by 93,340 angler trips is the fact that Diamond Lake produced 243,940 pounds of fish. Catch data for the years 1956 through 1963 are shown in Table 28. Because of the difference between the new sampling program put into effect in 1962 and the previous method, figures for earlier years should be increased 37 percent.

Table 24

Composition of Length Frequencies of Catch by Gill Nets  
in Some Lakes of the Lower Umpqua District, 1963

Lake	Number of Sets	Species	Number Taken	Percent of Total	Average Length in Inches	Number by Size Groups in Inches					
						4-6	6-8	8-10	10-12	12-14	14+
Saunders	3	YP	47	89.0	6.7		25	21	1		
		Ct	5	9.0	13.2				2	1	2
		BrB	1	2.0	10.7				1		
Clear	2	YP	6	75.0	10.0			2	4		
		Ct	2	25.0	10.0				2		
Eel	4	YP	8	89.0	10.6			3	4	1	
		Ct	1	11.0	10.0				1		
North Tenmile	1	YP	15	88.0	7.2		13	2			
		Ct	1	6.0	6.5		1				
		Co	1	6.0	5.5	1					
South Tenmile	1	YP	7	78.0	7.0	1	5	1			
		BrB	2	22.0	10.5				2		

Table 25

Trout Angling Pressure and Success  
on the North Umpqua, 1958-1963

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
1962	18,009	41,312	2.29	0.71
1963	12,623	32,364	2.56	0.78

Table 26

Composition of North Umpqua Trout Angler Creels, 1958-1963

Year	Total Harvest	Hatchery Rainbow	6- to 8-Inch Steelhead	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
1962	41,312	33,649	6,854		332	421	56
1963	32,364	26,696	4,920		353	335	60

Table 27

South Umpqua Trout Fishery, 1963

Area	Number Anglers	Number Fish	Fish per Angler	Fish per Hour	Percentages by Species		
					Hatchery Rainbow	Migrant Steelhead	Native Trout
Above Tiller	2,724	7,237	2.66	0.98	94.7	4.9	0.4
Below Tiller	1,089	3,044	2.80	1.04	97.3	2.5	0.2
TOTALS AND AVERAGES	3,813	10,281	2.70	1.00	95.4	4.2	0.4

The harvest of 53,932 fish from the 1963 fingerling plants represents 21.2 percent of the fish caught. Table 29 gives the percent harvest from the different rainbow stocks in 1962 and 1963. Trolling remained the most popular method of fishing at Diamond Lake, but there was a noticeable increase in still-fishing. Table 30 shows that still-fishing increased from 7.3 to 41.9 percent of the effort.

Table 28

## Summary of Diamond Lake Catch Statistics, 1956-1963

Year	Angler Trips	Total Trout Caught	Pounds of Fish	Catch per Surface Acre (Pounds)	Average Weight of Fish (Pounds)	Hours Angling per Fish	Fish per Angler
1956	34,706	61,430	60,878	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
1962 <sup>/1</sup>	70,573	55,084	54,533	18.9	0.99	4.87	0.78
1963	93,338	256,781	243,942	84.4	0.95	1.65	2.75

<sup>/1</sup> New statistical program for determining total effort.

Table 29

## Percent of Fish from Each Plant Harvested at Diamond Lake, 1963

Stock	Year Released	Percent of Plant Harvested		
		1962	1963	to Date
Oak Springs	1962	14.8	36.7	51.5
Willamette	1962	3.5	43.9	47.4
Roaring River	1962	2.1	41.1	43.2
Oak Springs	1963		18.5	18.5
Willamette	1963		3.2	3.2

Table 30

## Methods of Fishing at Diamond Lake, 1962-1963

Method	Number of Anglers in Sample		Fish per Angler		Percent of Effort in Lake		Percent of Harvest from Lake	
	1962	1963	1962	1963	1962	1963	1962	1963
Troll	4,317	6,309	0.99	2.99	76.8	45.3	86.4	52.8
Combination	785	1,757	0.34	1.60	14.2	12.6	5.5	7.9
Still-fish	402	5,841	0.81	2.39	7.3	41.9	6.7	39.1
Fly	95	27	0.74	2.07	1.7	0.2	1.4	0.2

For the first time the number of man-days use in the Diamond Lake pay campgrounds topped the 100,000 figure. Table 31 gives the history of campground use since the lake was reopened following chemical treatment.

Table 31

Public Use, Diamond Lake Pay Camps, 1956-1963

Year	Number of People
1956	29,775
1957	40,616
1958	38,729
1959	31,173
1960	96,770
1961	79,806
1962	52,785
1963	104,418

Heavy snowfall reduced angling pressure on North Umpqua reservoirs the first three weeks of the season and angler success never approached the figures recorded for 1962. Table 32 shows that anglers averaged only 1.01 fish per trip. The catch rate was 0.36 fish per hour. Lemolo Reservoir continues to be the most popular of the North Umpqua impoundments. Several brown trout in the 5- to 10-pound class were taken in 1963.

Table 32

Creel Sampling Results for Trout  
in North Umpqua Reservoirs, 1963

Impoundment	Anglers	Rainbow	Brook Trout	Brown Trout	Fish per Angler	Fish per Hour
Lemolo	1,009	402	33	473	0.90	0.31
Toketee	191	67	6	179	1.32	0.59
Soda Springs	63	95		24	1.89	0.62
TOTALS AND AVERAGES	1,263	564	39	676	1.01	0.36

Loon and Saunders Lakes were opened to year-around trout angling February 9. Pressure was light but some good catches were made.

The general coastal lake trout opening was considered good except at Loon Lake. Eel Lake was the most popular and angling pressure increased approximately 50 percent over the 1962 opening. This increase is probably explained by the new boat ramp and parking area. During opening weekend a calculated 890 anglers at Eel Lake caught 5,295 trout. A few 2½-year-old kokanee up to 9.5 inches were observed.

Smith River produced the best catches in the general stream opening

on the coast. Although Smith River was not stocked with legal trout in 1963, angler success was comparable to that obtained in 1962. Angling pressure on the coast dropped considerably in both lakes and streams after the first month. Statistics for coastal lake and stream fisheries are presented in Table 33.

Table 33

Trout Angling Effort and Catch  
for the Lower Umpqua District, 1963

Lakes and Streams	Number Anglers	Species				Fish per Angler	Fish per Hour
		Rainbow	Cutthroat	Coho	Kokanee		
<u>Lakes</u>							
Eel	378		1,064		12	2.85	1.03
Loon	264	848	456			4.94	0.53
Tenmile	234	259	34	5		1.27	0.62
Marie	19		97			5.11	5.39
Saunders	16		8			0.50	0.50
Clear	6		3			0.50	0.30
<hr/>							
LAKE TOTALS AND AVERAGES	917	1,107	1,662	5	12	3.04	1.24
 <u>Streams</u>							
Smith River	58		177			3.05	0.78
Vincent Creek	7		14			2.00	0.63
Lake Creek	6		23			3.83	1.77
Mill Creek	5	18				3.60	1.05
<hr/>							
STREAM TOTALS AND AVERAGES	76	18	214			2.82	0.82

Warm-Water Game Fish

A moderate and constant pressure was exerted on warm-water species throughout the summer and fall. Loon Lake and the Tenmile Lakes were the most popular, and anglers had little trouble in catching some species of warm-water fish. Statistics for the fishery appear in Table 34.

Nongame Marine Fish

Anglers in pursuit of salmon continued to take many other marine species. Figures for ocean-caught nongame marine fish landed are presented in Table 35. Anglers who specifically pursued nongame marine fish enjoyed good success from docks, beaches, and jetties. Creel census data for these fisheries are presented in Table 36.

Table 34

## Warm-Water Fishery for Lower Umpqua District, 1963

Lakes and Streams	Number of Anglers	Number of Fish by Species				Total Fish	Fish per Angler	Fish per Hour
		LB	WC	BrB	YP			
<u>Lakes</u>								
Tenmile	55			716	106	822	14.95	3.44
Loon	78	243	3	78		324	4.15	1.81
Eel	2				1	1	0.50	0.12
<hr/>								
LAKE TOTALS AND AVERAGES	135	243	3	794	107	1,147	8.50	2.69
 <u>Stream</u>								
Umpqua River	33			155		155	4.70	1.84

Table 35

## Ocean-Caught Nongame Marine Fish, 1960-1963

Year	Total Fish	Number by Species				
		Rockfish	Lingcod	Flounder	Halibut	Others
1960	95	48	9	30	5	3
1961	2,320	1,603	443	251	10	13
1962	645	236	84	93	3	229
1963	2,345	1,278	200	759	1	107

Table 36

## Nongame Marine Fishery from Land, 1963

Anglers	Seaperch	Number by Species			Total Fish	Fish per Angler	Fish per Hour
		Tomcod	Greenling	Other			
225	733	3,392	40	47	4,212	18.72	6.72

## Habitat Improvement

The determination of the flow rates of the South Umpqua and key tributaries was accomplished with Rhodamine-B dye and fluorometers. The second flow study was at a moderately high flow. The time and distance traveled were: (1) 27 hours and 41 minutes for 60.4 miles on Cow Creek, (2) 16 hours and 29 minutes for 33.4 miles on Calapooia Creek, (3) 30 hours and 30 minutes for 75.3 miles on the South Umpqua, and (4) 23 hours for 63.0 miles on the main Umpqua River. The last report received on the heat budget analysis studies was that



it appeared up to 1,000 cfs of summer water would be available from the Tiller project.

A stream physical inventory report of lower Umpqua River tributaries was completed. Tributary mileage, exclusive of the Smith River and Mill Creek drainages, consists of approximately 257.75 miles. Of this total, good gravel exists for 54.50 miles and marginal gravel exists for 10.75 miles.

Considerable time was again spent in keeping the Steamboat and South Umpqua fish ladders in operation. Even with this effort, both ladders were out of operation at least 30 percent of the time.

It was found necessary to clean debris from the water diversion dam on Calapooia Creek at least on three occasions. The Water Corporation was asked to maintain the structure more carefully.



## ROGUE RIVER AND SOUTH COASTAL DISTRICT

Edward H. Schwartz and Arvo G. Riikula

### Fish Culture

#### Libby Creek Rearing Pond

The Oregon Fish Commission released its final allocation of coho salmon from Libby Pond on April 5. The release was estimated to be 3,018, or approximately 5.04 percent of the 59,886 stocked. A very large population of cottids and bullfrog tadpoles in the pond may have been in competition with the cohos for food.

The pond outlet was left open through the summer months to facilitate work on a leak in the dam. An attempt to seal the leak by lining a 10-foot ditch at the toe and covering the face of the dam with polyethylene sheeting was not successful.

#### Lobster Creek Egg-Take

A fish rack and holding pond were constructed on Lobster Creek to facilitate the take of fall chinook eggs for rearing in Libby Pond. The project was a cooperative operation by Salmon Unlimited and the Oregon Game Commission. Materials, caterpillar work, and part of the labor were furnished by Salmon Unlimited, while labor and technical knowledge were provided by the Game Commission.

Trapping of adult chinook was accomplished between October 24 and November 4. By the 11th of November, 18 females and 10 males had been spawned to obtain the desired 77,200 eggs. The operation was considered successful and a vast improvement over the operation in 1962.

#### Medco Rearing Pond

The annual drawdown of Medco rearing pond was started on April 22. By the first week in May, a total of 126,869 steelhead smolts was transported to the Butte Falls Hatchery, marked with the Ad-LV-RP fin clip, and released into the Rogue River near the town of Gold Hill. Upon release the marked fish averaged 26 per pound. The survival to release of the steelhead from Medco Pond was 78.3 percent of the number stocked.

There were 50 to 60 catfish, ranging in size from 7 to 9 inches, removed from the pond in the drawdown process. Only about 25 juvenile catfish were noted. Also removed from the pond were approximately 50 pounds of bullfrog tadpoles.

Following the operation, the pond and inflowing tributaries were chemically treated with Pro-Noxfish to remove any catfish or steelhead smolts which may have remained in the pond. Very few catfish were noted.

The unusual success of the rearing program at Medco Pond during the past year, as compared with previous years, indicates that successful fish production is related to the complete removal of all other competitive fish.

## Fish Inventory

### General

The 1963 migratory fishery was in some aspects very encouraging and in others disappointing. All migratory fish appeared to have good spawning conditions. Water temperatures were very favorable from the standpoint of disease prevention. Near record runs of chinook provided excellent angling on the upper Rogue River. Steelhead anglers had generally good water conditions; however, excessive silt loads in sections of the river caused some problems.

Resident trout fisheries remained at a high level in most of the lakes and reservoirs. Stream angling for trout was fair.

### Anadromous

#### Counts at Gold Ray Dam

The counts of salmon and steelhead over Gold Ray Dam continued to show encouraging increases. The spring chinook count of 41,527 was second only to the record 1942 run. It represented a 282.37 percent return of its 1959 parent run.

The winter steelhead count totaled 9,801 and represented a 134.5 percent increase over the previous 5-year average. The summer steelhead count totaled 1,336 and was 91.3 percent of the previous 5-year average.

The 1962 tally of cohos over Gold Ray was 457. This represented 123.2 percent of the 1959 parent run. The 1963 coho run as of December 1 was 3,463, which is already 187.1 percent of its 1960 parent run.

Tables 37 and 38 present the annual comparisons of the counts of anadromous fish over Gold Ray Dam since 1942.

A new counting program was initiated at Gold Ray Dam in early November. The new program, in which the count periods are picked randomly and in which a different method of calculation is used, will give a more accurate estimate of the run over Gold Ray. It will also standardize the counting procedure with that of other counting stations on other streams.

#### Spawning Bed Surveys

No spawning bed surveys were made on the upper Rogue River. The chinook did appear to use the gravel bars extensively in the middle section of the river. Cohos and chinooks appeared to use the Applegate and Illinois River systems more extensively than in previous years. Fall chinook were observed as far upstream as the mouth of Thompson Creek near the town of Applegate. This is as far as they have been observed upstream in the Applegate in several years. Cohos have been observed in tributaries of the Illinois River almost to the California border, and in the East Fork of the Illinois River at the state line.

The 1963 fall chinook spawning bed surveys of the south coastal streams indicated a better than average run, or escapement, of fish. Weather and water conditions appeared to cause several peaks in spawning activity, thus

minimizing the number of fish and redds tallied during the usual period. Comparative counts on ten established sample areas show a decrease of 10.4 percent in the average number of redds counted. The average number of fish per mile showed a 21.2 percent increase, however. Table 39 presents comparative information on number of redds and fish per mile.

Table 37

Counts of Anadromous Fish Runs Over Gold Ray Dam,  
1942-1963

Year	Spring Chinook		Coho		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	17.8	232	0.8	1,391	9,607
1962	32,651	17.0	457	0.0	2,702	11,005
1963	41,527	17.5	3,463	6.1 /1	1,336	127 /1

/1 Incomplete (as of December 1, 1963).

Table 38

Percentage Return of Salmon Progeny at Gold Ray,  
1945-1963

Year of Run	Chinook		Coho	
	Parent Year	Percentage Return <u>/1</u>	Parent Year	Percentage Return <u>/1</u>
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	255.2
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	31.7
1962	1958	207.8	1959	123.2
1963	1959	282.4	1960	187.1 <u>/2</u>

/1 A 100 percent return indicates that a run equalled the run from which it originated.

/2 Incomplete (as of December 1, 1963).

Table 39

## Comparative Spawning Counts, Fall Chinook

Stream	Redds per Mile		Fish per Mile	
	1963	4-Year Average <u>/1</u>	1963	4-Year Average <u>/1</u>
Anvil Creek	92	76	134	40
Deep Creek	0	48	18	9
Dry Creek	88	179	124	192
East Winchuck River	76	50	14	19
Edson Creek	197	118	41	42
Elk River	14	33	4	6
Floras Creek	212	175	82	36
Jack Creek	103	122	30	12
South Chetco River	45	24	28	7
Willow Creek	0	98	0	28
TOTALS	827	923	475	391

/1 4-year average, 1959 to 1962 inclusive.

The most spectacular increase in numbers of spawning fish occurred in the two sample tributaries of the lower Rogue. Lobster Creek exhibited a 181.9 percent increase in the number of fish per mile, while Quosatana Creek showed a 485.3 percent increase. Table 40 gives complete results of the 1963 count.

Table 40  
Spawning Bed Survey, 1963

Drainage Stream	Miles Counted	Redds	Adults	Jacks	Total Fish
<u>Floras Creek</u>					
Floras Creek	0.5	106	33	8	41
Willow Creek	0.5	0	0	0	0
<u>Sixes River</u>					
Dry Creek	1.0	88	114	10	124
Edson Creek	1.0	197	34	7	41
<u>Elk River</u>					
Anvil Creek	0.5	46	65	2	67
Elk River	10.5	95	29	1	30
<u>Rogue River</u>					
Lobster Creek	0.5	227	140	11	151
Quosatana Creek	1.0	314	156	9	165
<u>Pistol River</u>					
Deep Creek	0.5	0	9	0	9
<u>Chetco River</u>					
Jack Creek	1.0	103	15	15	30
South Fork	1.0	45	28	0	28
<u>Winchuck River</u>					
East Fork	1.0	76	12	2	14
TOTALS	19.0	1,297	635	65	700

Most tributaries showed no indication of poaching.

Salmon Catch, Lower Rogue and Offshore

Sport anglers spent 30,534 angler-days on the combined lower Rogue and offshore fishery to catch 13,739 salmon. The take was the highest recorded since the census was started in 1950. Catch success averaged 0.45 fish per angler-day for the season which extended from March 23 to November 30. Angler success was the second highest since 1950, exceeded only by the 0.46 fish per

angler-day recorded in 1952. Angler-day effort and catch success for 1963 are compared by month with previous years and periods in Table 41.

The season's total catch of 3,428 spring chinook from the lower Rogue (March 23 to June 15) was 145 percent of the 1962 catch, 284 percent of the 1959 parent run, and 123 percent of the previous 10-year average. Poor water conditions and frequent storms prevented fishing on many days of the spring season.

Summer salmon angling was greatly aided by excellent bar conditions at the jaws of the Rogue. Nearly half of the angling pressure recorded took place on or seaward of the bar. Large schools of cohos available just offshore, combined with chinooks in the bay, brought the catch and angler pressure to nearly double the usual figure. The summer catch of 6,710 fish was 265 percent of that recorded in 1962 and 179 percent of the 10-year average. An estimated 28 percent of the catch was cohos.

Fall salmon angling maintained the season trend of fine catches. The estimated catch of 3,601 fish was 237 percent of that recorded in 1962 and 138 percent of the 10-year average. Cohos made up 43 percent of the fall catch.

The total weight of angler-caught salmon from the lower Rogue was 151,556 pounds of chinook and 26,825 pounds (troll dressed) of cohos. Average chinook weight was 16.6 pounds through the spring season, 14.1 pounds for the summer season, and 13.0 pounds during the fall season. The spring and summer averages were slightly below those recorded in 1962. Average troll-dressed weight of cohos was 8.0 pounds.

#### Salmon Catch Census Evaluation

The catch destination study made in 1961 and 1962 was concluded in 1963. The purpose of the program was to evaluate the accuracy of computing total salmon catch on the lower Rogue from the number of fish processed at the cannery in Gold Beach. Completed angler trips were recorded on three days per week through the entire salmon season. A total of 1,102 fish was checked during the spring and summer seasons with 720, or 65 percent, destined for the cannery. During the fall season, 515 salmon were checked with slightly less than 80 percent of the catch intended for the cannery. Since the 1963 findings support those of 1961 and 1962, a new correction factor was established to compute the 1963 catch. The spring and summer fish appearing at the cannery were estimated as 65 percent of the total catch, and fall fish as 80 percent. This correction factor is an increase of 15 percent over the percent established in 1950 and 1951 for spring and summer seasons, but remains the same as the earlier survey for the fall season. It appears likely that this correction factor should be re-evaluated at 5-year intervals to compensate for changing trends in the processing of sport-caught salmon.

#### Salmon Catch, Rogue District

The salmon catch in the middle and upper sections of the Rogue River was relatively good. The large numbers of chinook in the river provided many fish to the creel, but also presented a law enforcement problem. The large numbers of fish in the resting holes increased the illegal snagging.

Table 41

## Angler-Day Effort and Catch Success, Lower Rogue

Month	Catch			10-Year Average $\angle$ 1	Angler-Days		Fish per Angler-Day	
	1959	1962	1963		1962	1963	1962	1963
<u>Spring Season</u>								
March	17	12	15	43	244	208	0.05	0.07
April	548	994	1,892	1,295	5,300	4,226	0.19	0.45
May	596	1,328	1,455	1,322	6,510	6,299	0.20	0.23
June 1-15	45	37	66	118	315	296	0.12	0.22
SUBTOTALS AND AVERAGES	1,206	2,371	3,428	2,778	12,369	11,029	0.19	0.31
<u>Summer Season</u>								
June 16-30	171	1	18	71	53	45	0.02	0.40
July	1,058	440	940	608	1,759	2,142	0.25	0.44
August	1,739	1,618	3,761	1,848	3,867	8,912	0.42	0.42
September 1-15	801	473	1,991	1,215	2,170	3,198	0.22	0.62
SUBTOTALS AND AVERAGES	3,769	2,532	6,710	3,742	7,849	14,297	0.32	0.47
<u>Fall Season</u>								
September 16-30	803	1,058	2,220	1,476	2,368	2,556	0.45	0.87
October	549	422	1,356	1,104	925	2,652	0.46	0.51
November	48	41	25	32	62		0.66	
SUBTOTALS AND AVERAGES	1,400	1,521	3,601	2,612	3,355	5,208	0.45	0.69
GRAND TOTALS AND AVERAGES	6,375	6,424	13,739	9,132	23,573	30,534	0.27	0.45

 $\angle$ 1 10-year average, 1954 to 1963, inclusive.



### Hatchery Salmon Study

Eighty-two marked spring chinook were found at the cannery on the lower Rogue up to June 1. The hatchery fish were 3.59 percent of the total catch, or in a ratio of 1 hatchery fish to 28 wild fish. In addition, 7 hatchery-reared chinook were found in the catch between June 1 and September 15. Table 42 illustrates the number of marked fish in the catch by month. Table 43 gives comparative age data of returning hatchery fish by mark.

Table 42

#### Marked Spring Chinook Returns, Rogue River, 1963

Month	Number Fish Examined	Marks						Total Marked Fish
		Ad-LM	RP-LM	LV-RV-LM	RP-RM	An-RP	An-RV	
March	10	0	0	0	0	0	0	0
April	1,330	13	5	7	0	0	1	26
May	946	25	23	2	0	1	5	55
June	55	0	2	0	0	1	1	4
July	426	0	0	0	0	0	1	1
August	1,813	0	0	0	1	0	1	2
September	909	0	0	0	0	0	0	0
TOTALS	5,489	38	30	9	1	2	9	88

Table 43

#### Age of Marked Chinooks, Rogue River, 1963

Mark	Age in Years				Total Fish
	2	3	4	5	
Ad-LM	0	0	37	1	38
RP-LM	0	0	30	0	30
LV-RV-LM	0	0	0	9	9
RP-RM	0	0	1	0	1
An-RP	1 /1	1	0	0	2
An-RV	2 /1	7	0	0	9
TOTALS	3	8	68	10	89

/1 Taken as downstream migrants.

### Salmon Catch, Chetco Bay and Offshore

A random sampling schedule of one week day and one weekend day per week was established at the mouth of the Chetco River in July. The purpose of the program was to obtain an estimate of summer fishery by interviewing anglers as they returned from fishing. These data were applied with the U. S. Coast

Guard boat counts. A total of 1,440 anglers with 751 salmon, including 83 percent cohos, was interviewed. Catch success was 7.5 hours per fish and 0.52 fish per angler. Table 44 presents the information collected, by month, with estimated total angling pressure and catch based on Coast Guard counts.

Table 44

Chetco Offshore Salmon Fishery, 1963

Month	Anglers	Hours	Fish	Hours per Fish	Estimated	
					Anglers	Catch
July	239	864	207	4.2	1,620	1,409
August	773	3,048	400	7.6	3,726	1,938
September	342	1,375	125	11.0	1,468	543
October	86	327	19	17.2	428	94
TOTALS AND AVERAGE	1,440	5,614	751	7.5	7,242	3,984

South Coastal Salmon Fisheries

The fall salmon fishery on the smaller south coast streams started early in October and was essentially complete by the end of November. Unfavorable water conditions prevailed throughout this period. Angler success was good on the fast, clearing streams, such as Chetco, Elk, and Winchuck Rivers, on the few days between storms. Results of periodic creel checks during October and November are shown in Table 45.

Table 45

Fall Salmon Creel Census, South Coastal Streams, 1963

Water	Anglers	Hours	Fish	Hours per Fish
Chetco River	132	413	51	8.1
Elk River	23	56	13	4.3
Hunter Creek	23	24	5	4.8
Pistol River	5	11	1	11.0
Sixes River	129	377	10	37.7
Winchuck River	65	106	14	7.6
TOTALS AND AVERAGE	377	987	94	10.5

Steelhead

A good escapement of steelhead in tributaries of the Rogue system was noted. The conditions for downstream migration of juvenile steelhead were favorable. Low water temperatures kept disease to a minimum.

The Illinois Falls fishway allowed winter steelhead to move to the upper river at earlier dates and perhaps in larger numbers. Steelhead production in the Illinois system should continue to show improvement in years to follow.

Winter-run steelhead were observed in large numbers on spawning bars in the Applegate system.

#### Steelhead Catch

Winter steelhead angling during the 1962-63 season was fair to good above the mouth of Grave Creek. Heavy silt loads in Grave Creek produced turbidities in the Rogue high enough to prohibit successful angling. Occasional releases of water from Emigrant Reservoir caused excessive turbidities which resulted in poor catches in the Rogue below Bear Creek.

Winter steelhead angling on the lower Rogue in the 1962-63 season was generally good during the periods between heavy mining silt loads. Angling pressure from bank anglers in the Gold Beach to Lobster Creek section of the river continued to increase over previous years. Winter steelhead angling is now considered to be a major fishery by local residents.

Fall steelhead angling was generally poor throughout September, October, and November in the upper river, however, occasional good catches were made in the vicinity of Galice.

The 1963 fall steelhead season on the lower Rogue was one of the poorest in the past 12 years. Heavy catches normally made by anglers at the mouth of small tributary springs did not materialize. Water temperatures appeared to remain lower than usual and thus did not force the fish to seek the cooler waters entering the river.

Based on the number of angler-caught fish that were processed at the cannery in Gold Beach, the total catch of fall steelhead from the lower river was estimated to be 3,255. Table 46 presents annual comparisons of this catch since 1952.

Table 46  
Fall Steelhead Catch, Lower Rogue River,  
1952-1963

Year	Catch <sup>/1</sup>
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
1962	5,230
1963	3,255

<sup>/1</sup> Total catch estimated from cannery data.

The study to determine total catch of steelhead in the lower Rogue from Gold Beach to Illahe was terminated on February 28, 1962, with only spot checks made during the fall of 1963. Table 47 presents the steelhead creel census information gathered from December 1, 1962 through November 30, 1963.

Table 47  
Steelhead Catch Success, Lower Rogue River,  
1962-63

Steelhead	Month	Anglers	Hours	Catch	Hours per Fish	Fish per Angler
Winter Steelhead	December 1962	116	421	60	7.0	0.52
	January 1963	236	1,134	114	9.9	0.48
	February 1963	136	724	62	11.7	0.46
Fall Steelhead	August 1963	26	82	6	13.7	0.23
	September 1963	166	427	78	5.5	0.47
	October 1963	54	106	10	10.6	0.19
	November 1963	29	98	10	9.8	0.34
TOTALS AND AVERAGES		763	2,992	340	8.8	0.45

Adult spring-run steelhead trapped at Gold Ray Dam for transportation to Butte Falls Hatchery were measured and the sex recorded. The sample of 110 females averaged 22.06 inches with a range of 17.0 to 28.0 inches, while the sample of 71 males averaged 21.68 inches and ranged in length from 18.0 to 27.0 inches.

Of the total of 181 spring-run steelhead adults examined during the trapping operation at Gold Ray Dam, 8, or 4.42 percent, were marked. This represents a ratio of one mark to every 23 fish examined, as compared to the ratio of one mark to every 216 fish examined during the 1962 trapping operation.

Steelhead migrants released from the bypass traps at screens on Little Butte Creek, Evans Creek, Applegate River, Thompson Creek, and Yale Creek are shown in Table 48.

Table 48  
Steelhead Migrants from some Screen Bypass Traps  
in the Rogue District, 1963

Stream	Number of Migrants by Month					Total Fish
	May	June	July	August	September	
Evans Creek		12,009	10,436	500	12	22,957
Little Butte Creek	1,896	9,757	10,707	2,047	67	24,474
Applegate River		723	4,291	3,125	272	8,411
Thompson Creek		2,281	2,347	523		5,151
Yale Creek		231	140	364	21	756
TOTALS	1,896	25,001	27,921	6,559	372	61,749

## Trout

### Upper Rogue River District Lakes and Reservoirs

Trout angling in the lakes and reservoirs of the Rogue District continued to be generally good. Good growth rates continued, and with some exceptions the catch and angler effort remained at a high level.

Fishermen enjoyed one of the most successful angling seasons at Fish Lake in many years. Both rainbow and brook trout showed good growth rates. The fishery held up very well throughout the summer, with brook trout making up a good share of the catch. The Klamath roach, Siphateles bicolor bicolor, appears to be increasing and may soon become a serious problem. For creel census results see Table 49.

Howard Prairie Reservoir reached full storage capacity for the first time in June 1963. Angler success remained generally good throughout the season.

The Jackson County Parks and Recreation Department estimated a total of 124,000 angler-days usage at Howard Prairie during 1963. This is an increase of 15 percent over 1962. Data from angler interviews are shown in Table 49.

Hyatt Reservoir was disappointing as the warm-water fishery did not produce as expected. The transition of the reservoir from a trout fishery to a warm-water fishery is not progressing as anticipated. Trout angling was fair during the first one-fourth of the season, but continued to decline throughout the remainder of the summer. The trout caught, however, were large, heavy fish. Angler interviews during the first two months of the season showed that 97.1 percent of the trout exceeded 12 inches in length.

Experimental gill-net sets in October produced 380 fish, of which 364 were catfish, 14 were rainbow, and 2 were roach. This is the first time roach had been recorded in Hyatt Reservoir. A supplemental trout plant of 20,022 rainbow fingerling was made in early November to provide a trout fishery for 1964.

For creel census results and catch by gill nets see Tables 49 and 50.

Willow Creek Reservoir produced phenomenal angling during the first two months of the season but then fell off drastically in late June. Kokanee were common in the creel, especially during the latter part of the angling season.

Experimental gill-net sets in August captured 65 fish, of which 48 were kokanee and 17 were rainbow. An additional plant of 39,074 fingerling rainbow was made in September to supplement the regular trout allocations. For creel census results and catch by gill nets see Tables 49 and 50.

### South Coastal District

The trout season showed a slight increase in angler success over 1962, but followed a similar pattern of early season angling. The sea-run

Table 49

## Creel Census of the Trout Fishery, Rogue Basin Lakes and Streams, 1963

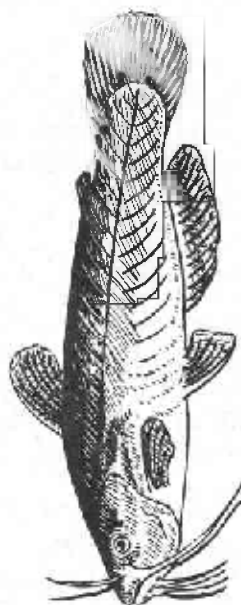
Water	Month <sup>1</sup>	Number of Anglers	Hours Fished	Number of Fish	Percentage Over 12 Inches	Fish per Hour	Fish per Angler
<u>Lakes and Reservoirs</u>							
Fish Lake	April-May	96	335	198 <sup>2</sup>	16.2	0.59	2.06
Howard Prairie Reservoir	April-May	271	1,247	637	49.8	0.51	2.35
Hyatt Lake	April-May	29	214	35	97.1	0.16	1.21
Selmac Lake	April-May	42	92	17	11.8	0.18	0.40
Willow Creek Reservoir	April-May	279	1,047	1,461	2.7	1.40	5.24
<u>Streams</u>							
Applegate River	May-June	87	201	75	2.5	0.37	0.86
Carberry Creek	May-June	10	23	38	0.0	1.65	3.80
Little Applegate River	May-June	2	3	0	0.0	0.00	0.00
Rogue River	May-June	165	394	91	2.1	0.23	0.55
	June-July	175	246	134		0.54	0.77
	July-August	116	187	61		0.33	0.53
	August-September	127	208	81		0.39	0.64

<sup>1</sup> From 16th of one month to 15th of next month.<sup>2</sup> Consisted of 61.8 percent brook trout.

Table 50

Composition and Length Frequency of Game Fish Taken by Gill Nets  
in Rogue District Lakes and Reservoirs, 1963

Lakes and Reservoirs	Month	Number of Sets	Species	Number Fish Taken	Number of Fish by Size Groups in Inches														
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Hyatt Reservoir	October	3	Rb	14							1					1	4	6	2
			BrB	364	1	3	34	53	128	73	51	20	1						
			Ro	2	2														
Selmac Lake	February	3	Rb	2										1	1				
			BrB	39			2	3	9	15	7	3							
			Su	3					1	1					1				
Willow Creek Reservoir	August	6	Rb	17	2		2	4	5	1	1	1		1					
			K	48			5	8	19	14	1	1							



cutthroat fishery on the Rogue Bay drew more angler attention in 1963 even though catch success was relatively low. In popular areas, bank anglers fished nearly shoulder to shoulder for these 8- to 16-inch fish. Table 51 gives the trout catch data collected during the 1963 season.

Table 51

Trout Creel Census, South Coast District, 1963

Water	Number of Anglers	Hours Fished	Species		Total Fish	Fish per Hour
			Rainbow	Cutthroat		
<u>Lakes</u>						
Floras Lake	106	298	286	182	468	1.57
Garrison Lake	84	208	202	5	207	1.00
<u>Streams</u>						
Brush Creek	3	4	0	3	3	0.75
Chetco River	98	223	134	110	244	1.09
Elk River	10	15	0	2	2	0.13
Hunter Creek	23	47	0	40	40	0.85
Pistol River	7	17	0	31	31	1.82
Rogue Bay	100	227	0	47	47	0.21
Winchuck River	10	35	6	15	21	0.60
TOTALS AND AVERAGE	441	1,074	628	435	1,063	0.99

Two experimental gill nets were set in Garrison Lake to determine the population composition. The catch was composed of 5 cutthroat from 8.4 to 12.8 inches and 11 yellow perch from 7.4 to 11.4 inches fork length.

Rogue Tributaries

As in previous years, the early April opening of headwater streams in the Rogue Basin was generally nonproductive. Small tributary streams produced the best catches.

Brook trout fingerlings were again released into small tributaries of the North Fork Rogue River around the Crater Lake National Park boundary in an attempt to re-establish this species. Lack of time and man power prohibited an extensive planting program.

A detailed creel census program was conducted on the Rogue between Laurelhurst Bridge and Robertson Bridge during the trout season to determine the percentage return of the hatchery-released trout and to provide data concerning establishment of an 8-inch minimum size limit.

Data from creel census work on streams are shown in Table 49.



## Warm-Water Game Fish

Selmac Lake began to provide a fair warm-water fishery in 1963. Largemouth bass have successfully spawned for the second year and the number of bass entering the creel is steadily increasing. A few bluegills are also being taken. Experimental gill-net sets in February indicated a low population of trout and an increasing number of catfish. For gill-net catch results see Table 50.

The Josephine County Parks and Recreation Department estimated 25,000 man-days use of Selmac Lake during the past year, of which 15,000 were angler-days. This is an increase of 5,000 angler-days over the 1962 estimate.

The Ken Denman Management Area ponds continue to attract a large number of anglers. Catfish continue to predominate the catch, however, white crappie have been caught in large numbers in the pond adjacent to the Management Area headquarters. Several of the ponds on the area may become overpopulated.

Emigrant Reservoir continued to be a poor producer of fish. A few trout were taken early in the year at the mouth of the several clear tributaries. The bass and bluegill have not become sufficiently established to produce a fishery.

## Marine Fishes

Marine species played an important part in the south coastal fisheries, both as an incidental catch to the summer salmon fishery and as a bay fishery. Angling from beaches and rock formations also provided recreation for residents and tourists but it is not as yet a very intensive fishery. Table 52 gives the incidental catch taken by summer salmon anglers. Table 53 provides the results of a limited bay fishery census program.

Jigging for herring in the Rogue Bay in 1963 did not appear to harm the downstream migrant chinook and coho as was found during the past two years. There were none of the usual reports concerning large numbers of migrants being injured or retained in the bag. Sampling the catch composition by jigging in all popular areas produced a negligible number of salmonids.

## Habitat Improvement

### Fish Passage

The Illinois Falls fishway is successfully passing all runs of salmon and steelhead. Both salmon and steelhead have appeared in the upper Illinois River considerably earlier than in years prior to the installation of the fishway. Internal water pressures have caused some damage to the manhole covers and grates of the fishway. Repairs have been made by a crew from the Central Point screen shop. It now appears as though some repair work will be needed annually on the fishway.

The Soil Conservation Service cooperated in providing a slot to insure adequate fish passage during all stages of winter flow over the concrete base slab at the new Buck-Jones irrigation dam on the Little Applegate River.

Table 52

## Incidental Catch by Salmon Anglers, 1963

Area	Steelhead	Cutthroat	Rockfish	Lingcod	Flatfish	Surfperch	Miscellaneous
Chetco Bay and Offshore	3	20	1,088	111	40	7	81 <u>1</u>
Rogue Bay and Offshore	15	3	307	52	31	89	5 <u>2</u>
TOTALS	18	23	1,395	163	71	96	86

1 Includes 40 greenling, 29 cabezon, 7 hake, 2 skates, 2 wolf-eels, and 1 blue shark.

2 Includes 2 greenling and 3 cabezon.

Table 53

## Bay and Jetty Fishery, May 25 to August 17, 1963

Area	Number of Anglers	Hours Fished	Surf Smelt	Herring	Surfperch	Tomcod	Miscellaneous <u>1</u>
Chetco Bay	224	458			69	5	37
Rogue Bay	168	317	1,803	165	78	66	3
TOTALS	392	775	1,803	165	147	71	40

1 Includes shad, greenling, rockfish, lingcod, and cabezon.

Savage Rapids Dam has been a barrier to fall chinook, coho, and fall steelhead for most of October, November, and part of December when all of the river flow was channeled through the floodgates. Repairs to the pumps and turbines and the north side Link-Belt revolving screens by the Grants Pass Irrigation District necessitated keeping the water below the sill of the dam. The periodic filling and subsequent draining of the south side fishway resulting from freshets forcing water over the sill of the dam has resulted in a substantial fish loss. Approximately 20 adult and 2,000 juvenile salmon and steelhead have been killed in the fishway when left stranded by receding water.

Small fish salvage operations were conducted on Dry Creek, tributary to Sixes River; Emily Creek, tributary to Chetco River; and the main stem of Chetco River. A total of 865 mixed chinook, coho, and steelhead were seined from streamside potholes and placed in the main channel.

### Screens and Turbines

Larger motors were installed on the north side Link-Belt revolving fish screens at Savage Rapids Dam early in the spring of 1963. The new motors, designed to turn the screens continuously, were only partially successful.

Three weeks prior to the end of the irrigation season, the bottom shaft on one of the Savage Rapids north side Link-Belt revolving screens broke, allowing the base of the screen to swing downstream and thus causing the screens to become inoperable. The Grants Pass Irrigation District started the necessary repairs in late November.

The annual 6-week shutdown of the Gold Ray power plant in May and June was not as effective in saving downstream migrants as in the past due to the extended migration period. Low water temperatures are believed to have extended the migration over a longer period of time.

### Pollution

The Rogue system has carried intermittent loads of silt throughout most of 1963. The heaviest silt loads occurred during the fall and winter seasons and directly influenced steelhead angler success. High turbidities caused angler success to drop severely.

The sources of silt have been numerous. Perhaps the most common have been gravel-washing operations, mining, and Emigrant Reservoir.

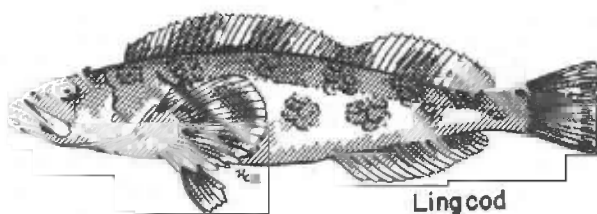
Placer mines of Coyote Creek and Grave Creek at Leland contributed heavy silt loads to the Rogue River at rates similar to those levels recorded prior to 1948. These mines operated almost continually from December through April. The Jo-Jo mine on Coyote Creek continued to operate into May until the Rogue River Coordination Board forced a shutdown.

A plan has been revived to mine on Elliott Creek, tributary to the Applegate River and located in northern California. Developmental work was started during the past summer. The operation of the mine could seriously affect the entire Applegate fishery.

New applications have been received for placer mines on the Illinois

River and on Grave Creek. These mines, if approved, could cause additional silting in the Rogue system.

The impounded waters of Emigrant Reservoir contain a large amount of suspended material, which when released cause high turbidities in Bear Creek and subsequently in the main Rogue River.



Lingcod

## UPPER WILLAMETTE DISTRICT

Ralph L. Swan

### Fish Inventory

#### Anadromous

##### Steelhead

Steelhead were reported to be in the Calapooia River in January. However, none were checked in angler creels or observed in the stream. The ladder over the Sodom Ditch dam on the Calapooia River was blocked for a 2-week period late in the winter, but no concentration of steelhead developed below it. The first fish at the dam were sighted on April 4.

Fish passage continued to be a problem at the dam late in the spring. SCUBA divers from the Fish and Game Commissions salvaged 2 steelhead and 1 chinook from the pool below the dam when the ladder went dry. At least 12 salmon were observed in the pool two days prior to the salvage operation. Parts of fish, dynamite sticks, and blasting caps were found on the bottom by the divers.

The owner of the dam was notified of the fish passage problem, and an additional step was added to the bottom of the ladder. However, excess concrete was allowed to form an apron below the entrance and it could become a barrier to fish at low flows.

Three steelhead were checked through the traps in the ladders over Leaburg Dam on the McKenzie River. A total of 23 passed over the structure in 1962.

##### Spring Chinook

Spring chinook entered the McKenzie River in good numbers in late May and the first fish passed over Leaburg Dam on May 29. The first fish arrived at Cougar Dam four days later. A total of 2,050 chinook was transported around Cougar Reservoir by the U. S. Corps of Engineers. A heavy concentration of chinook, estimated at 7,000 fish, was moved out of the Walterville powerhouse tailrace by Fish Commission personnel on June 12.

A game officer on the McKenzie River reported checking 117 anglers who took 22 salmon at a rate of 11 hours per fish. Nine of the fish had been taken illegally.

A section of Blue River, a tributary of the McKenzie, between a proposed dam site and a falls two miles upstream, was surveyed late in August with personnel of the U. S. Fish and Wildlife Service. No adult salmon were observed but fingerlings were present. However, it was learned later that the adults had moved into the stream at spawning time.

A record number of spring chinook entered the holding ponds at Dexter Reservoir. Approximately 6,000 fish entered the facility, over 2,000 of which arrived after September 1.

## Trout

Creel census data gathered in the district will be found in Table 54. A large percentage of the data on the Cascade pack-in lakes was gathered by U. S. Forest Service fire and recreation guards stationed in the high lakes area. Additional data on the lakes came from voluntary report cards left on automobiles. Angling pressure appeared to be lighter on the more remote lakes than it had been in previous years. Unsettled weather conditions throughout the summer months were at least partially responsible for the decline in pressure. A flight was made over the lakes on one of the better Sundays but only 16 angling parties were observed.

The McKenzie River provided anglers with good catches throughout the season. Guides reported taking many fish from the 1962 releases. Some of the fish from the 1962 plants were nearing maturity at the close of angling season. Reports were received from ten guides whose patrons released 79 rainbow over 14 inches in length, or 1 for each 66 fish kept. See Table 55.

Rainbow trout were observed ascending the Leaburg ladders in February, and traps were installed by March 3. Few fish were taken before April 1. The traps were removed on May 28 to allow the spring run of chinook salmon to move upstream. Catch data for the Leaburg traps are presented in Table 56.

Clear Lake angling pressure was lighter than in 1962 but it was still higher than any year prior to 1962. The trout catch by month is shown in Table 57. Brook trout, stocked in the lake as fingerlings in 1960, spawned in the winter of 1962-63 and heavy concentrations of fry were observed along the shore of the lake in June and July.

Hills Creek Reservoir provided good catches throughout the season; however, as in similar reservoirs, angler use dropped in midsummer. Most of the fish were taken in the Hills Creek and Willamette River arms. The Hills Creek Reservoir trout catch is shown in Table 58. Rainbow stocked as fingerlings in 1963 began to enter the catch as 6- to 7-inch fish by the end of the season.

A series of dissolved oxygen tests and temperature readings were taken at Hills Creek Reservoir in the summer months. The data are recorded in Table 59. Stations were established near the dam, midway up the reservoir, and at the upper end. Both the dissolved oxygen concentrations and temperatures appeared to be favorable for trout. However, most of the fish were found in the arms of the reservoir near sources of fresh water.

Angler success varied from good to poor on waters open to year-around angling. Rainbow trout weighing up to 3 pounds and cutthroat to 10 pounds were taken from the Long Tom River in November and December. Dorena Reservoir provided some good catches of rainbow in the fall and winter months. Cottage Grove Reservoir produced its best catches in midwinter. Lookout Point and Dexter Reservoirs received little attention from the anglers in view of the low population of game fish.

Table 54

Creel Census Data, Upper Willamette District, 1963 Season

Water	Species	Number of Fish by Size Groups. Fork Length in Inches								Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over				
Lakes													
Benson	Rb	11		9						20			
	BT	35								35	16	75	0.73
										55			
Betty	Rb	2	38	10	5	2				57	10	109	0.52
Blair	BT	2	49	67	27	1				146	77	415	0.35
Blue	Rb	1	3	1	1					6	5	14	0.43
Clear	Rb	179	697	693	75	9	1			1,654			
	BT	25	33	21	2					81			
	Ct	7	14	15	7					43			
										1,778	748	3,380	0.53
Cliff	BT	4	1							5	10	40	0.13
Eastern Brook	BT	3	65	39	5	1	1			114	8	65	1.75
Eddeleo, Lower	Rb		4	2	2					8			
	BT		2	1						3	6	24	0.46
										11			
Eddeleo, Upper	Rb			4	1	2				7			
	BT		18	42	36	8				104	19	125	0.89
										111			
Elbow	BT		9	3						12	6	13	0.92
Elf	Rb		6	5		1				12			
	BT		6							6	7	12	1.50
										18			
Emabelle, Lower	Rb	36	77	69	19	1				222	51	254	0.87
Emabelle, Middle	Rb	6	60	68	20	8				162	35	197	0.82

Table 54 (continued)

Water	Species	Number of Fish by Size Groups, Fork Length in Inches								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 continued														
Erabelle, Upper	Rb	8	9								17	10	36	0.47
	BT													
Gander	Rb	1	1	7	11	6	2				28			
	BT		22	26	29	5	1				$\frac{83}{111}$	40	300	0.37
Gold	Rb	5	20	36	28	17	5	2	1		114			
	BT	1	1	1							$\frac{3}{117}$	139	546	0.21
Hand	BT	7	6	18							31	26	122	0.25
Hidden (McKenzie)	Ct		10	6							16	7	19	0.84
	BT													
Horse, Lower	BT	2	4								6			
	Ct	10	75								$\frac{85}{91}$	9	16	5.69
Horse, Upper	Rb		3								3			
	BT	49	138	103	5	1					$\frac{296}{299}$	79	242	1.24
Indigo	Rb													
	BT	7	29	24	9	8					$\frac{77}{1}$	24	82	0.95
Island	BT		55								55	6	24	2.29
Linton	BT													
	Br	11	80	14	5	2	1				$\frac{106}{28}$	57	265	0.51
Marilyn, Lower	BT		7	7	8	4	5				31	17	44	0.70
	BT													
Marilyn, Upper	BT	7	36	41	6	1					91	44	137	0.66
	BT													
Mink	BT	6	12	2	1						21	6	35	0.60



Table 54 (continued)

Water	Species	Number of Fish by Size Groups, Fork Length in Inches								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 continued														
Moonlight	Rb			1	4	5					10			
	BT	5	10	5		1					21	12	52	0.60
											31			
Opal	BT	4	15	10							29	10	29	1.00
Otter	Rb		2	1	3						6			
	BT	5	23	6	3	4					41	25	169	0.28
											47			
Platt	Rb				1	1					2	8	13	0.15
Porky	BT	2									2	10	30	0.07
Robinson	BT		8	21	12	2					43	14	31	1.39
Round	Rb		5	6	10	1					22			
	BT	1	12	6	2		1				22	15	79	0.56
											44			
Salmon, Lower	Rb					1	1	4		2	8	18	33	0.24
Salmon, Upper	Rb	7									7			
	BT	18	89	41	22	7	2				179	32	164	1.13
											186			
Sapphire	Rb							1			1	8	11	0.09
Scott	BT	6	5				1				12	5	10	1.20
Spirit	BT	3	18	45	10	3					79	12	36	2.19
Sunrise	BT										1	7	30	0.03
Sunset (Summit Lake)	BT										6	5	30	0.20

Table 54 (continued)

Water	Species	Number of Fish by Size Groups, Fork Length in Inches							Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20				
Lakes continued												
Timpanogas	Rb	8		3	4	1			16			
	BT	13	21	1	2				37	38	114	0.46
									53			
Timpanogas, Lower	Rb	12	1						13			
	BT	4	14	6	1	1			26	13	26	1.50
									39			
Torrey	BT	1		1					2	5	5	0.40
Waldo	Rb	1	16	32	31	5	13	16	124			
	BT	1	18	21	17		1		58	196	943	0.19
									182			
Streams												
Black Creek	Rb	15	8	1					24			
	Ct	12	1						13	14	41	0.90
									37			
Blue River	Rb	6	3	1					10			
	Ct	2	3						5	8	19	0.79
									15			
Brice Creek	Rb	27	60	8					95	41	119	0.80
Buck Creek	Rb	1	18	3					22	6	13	1.69
Calapooia River	Rb	30	245	190	20				485			
	Ct	32	12	2	2				46			
	St				1		1		7			
	Wf							4	1	372	884	0.61
									539			
Fall Creek (Big)	Rb	11	35	14					60			
	Ct	8							8	61	183	0.37
									68			
Gate Creek	Rb	10	16	5					31	11	23	1.35

Table 54 (continued)

Water	Species	Number of Fish by Size Groups, Fork Length in Inches							Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20				
Streams continued												
Hills Creek	Rb	31	87	76	22	3			219	108	352	0.62
Long Tom River	Rb		1		3	4	4		12			
	Ct			12	14				31			
	Lb	1		1					2			
	Bg	1							1			
	Wc	139	96	11	1				247			
	BrB	26	12						38			
									331	100	190	1.74
Lost Creek	Rb	14	60	20					94	7	17	5.53
McKenzie River	Rb	162	352	159	5				678			
	DV			1					1			
	Wf			1					1			
									680	508	924	0.74
McKenzie River, South Fork	Rb	97	96	18	3				214			
	Ct	7							7	128	272	0.81
									221			
Mosby Creek	Rb	13	20	6					39			
	Ct		1						1	11	28	1.43
									40			
Row River	Rb	28	46	31					105	45	98	1.07
Salmon Creek	Rb	74	98	27	1				200			
	Ct	21							21	88	296	0.75
									221			
Salt Creek	Rb	117	226	37	1				381			
	BT	2							2			
	Ct	3	2						5			
	Wf	1							1			
									389	195	464	0.84
Sharps Creek	Rb	53	80	21					154			
	Ct	1	1						2	80	165	0.95
									156			

Table 54 (continued)

Water	Species	Number of Fish by Size Groups, Fork Length in Inches							Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20				
Streams continued												
Wall Creek	Rb	15	4	8					27			
	Ct	18	6						24	15	39	1.31
									51			
Willamette River, Coast Fork	Rb	7	13	1					21			
	Wf			1					1	22	45	0.49
									22			
Willamette River, Middle Fork	Rb	178	705	137	4	2	1		1,027			
	Ct	10	12	2					24	433	1,232	0.85
									1,051			
Willamette River, North Fork	Rb	65	208	22					295			
	Ct	29	7						36			
	Wf			1					1	128	380	0.87
									332			
Reservoirs												
Beaver Marsh	Rb	10	115	115	8	1			249			
	Br	5			1				6			
	Ct	1		1					2	79	249	1.03
									257			
Dorena	Rb	5	74	181	166	6			432			
	Ct	2							2			
	Wf		2	1					3			
	LB	18	18	10	2	1	1		50			
	BLB		2						2	349	1,082	0.45
									489			
Fern Ridge	Ct			1					1			
	BrB	5	56	10					71	15	30	2.40
									72			
Fern Ridge Pit	Ct			3	2				5			
	LB		1						1			
	BrB		2	2					4	23	47	0.21
									10			

Table 54 (continued)

Water	Species	Number of Fish by Size Groups. Fork Length in Inches							Total Fish	Total Anglers	Total Hours	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18-20				
Reservoirs continued												
Hills Creek	Rb	247	1,658	1,191	77	31	15	4	3,223	1,155	3,665	0.88
	Rb	4	49	63	5				121			
	Ct	1	1						2			
Smith River	DV				1				1	23	87	1.43
									<u>124</u>			
Trail Bridge	Rb	4	38	67	3				112			
	BT	1		1					2			
	Ct		1						1	110	246	0.47
									<u>115</u>			

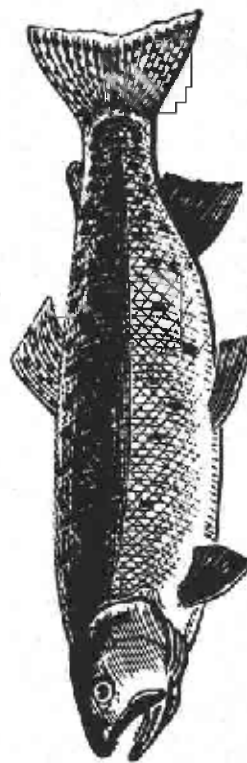


Table 55

## McKenzie River Guides' Catch Reports, 1963

Month	Trips	Anglers	Hours	Trout	14-Inch Rainbow	Fish per Angler	Fish per Hour
April	29	53	292	406	4	7.7	1.4
May	95	179	1,175	1,377	19	7.7	1.2
June	104	206	1,461	1,655	40	8.0	1.1
July	45	93	580	769	5	8.3	1.3
August	36	69	338	596	2	8.6	1.8
September	32	47	320	359	8	7.6	1.1
October	7	10	68	85	1	8.5	1.3
TOTALS AND AVERAGES	348	657	4,234	5,247	79	8.0	1.2

Table 56

## Leaburg Dam Trap Catches, 1959-1963

Year	Rainbow		Steelhead	Cutthroat	Dolly Varden
	Over 14 Inches	Under 14 Inches			
1959	46	97	3	2	1
1960	80	148	7	4	2
1961	97	113	0	4	0
1962	57	123	21	4	0
1963	49	72	3	11	0

Table 57

## Monthly Catches of Trout at Clear Lake, 1963

Month	Moorage Boats	Total Boats	Total Anglers	Total Catch	Average Catch
May	251	289	673	1,479	2.2
June	638	734	1,710	2,736	1.6
July	836	961	2,239	7,150	3.2
August	980	1,127	2,626	13,130	5.0
September	409	470	1,195	1,673	1.4
October	101	116	270	1,350	5.0
TOTALS AND AVERAGE	3,215	3,697	8,713	27,518	3.2

Table 58

## Hills Creek Reservoir Trout Catch, 1963

Month	Anglers	Hours	Trout	Fish per Angler	Fish per Hour
April	6,770	25,477	27,757	4.1	1.09
May	4,978	26,183	40,322	8.1	1.54
June	6,975	25,254	29,295	4.2	1.16
July	3,410	9,909	11,594	3.4	1.17
August	1,802	6,637	2,522	1.4	0.38
September	1,840	7,666	7,360	4.0	0.96
October	2,060	8,926	13,390	6.5	1.50
TOTALS AND AVERAGES	27,835	110,052	132,240	4.8	1.20

Golden trout introduced into several small lakes in the Diamond Peak area in 1962 could not be found in 1963; however, good numbers of the 1963 plants were observed. Golden trout introduced into lakes in the Three Sisters area in 1962 averaged about 5 inches in length in September 1963.

Gill nets were set in several Cascade lakes. Catch data are presented in Table 60. All but 11 of the brook trout taken from Waldo Lake were either mature or maturing for the first time. Immature fish ranged from 5 to 11 inches. Maturing females ranged from 7.2 to 13.5 inches in length. The smallest fish was 1+ and the largest 2+ years of age. Only 8.3 percent of the fish from Waldo Lake were free of tapeworm cysts. Scale samples were taken from the first 100 fish. Age data are presented in Table 61.

The fish populations in Lorin and Jo Ann Lakes appeared to be low but the fish were in excellent condition. A total of 29 dead rainbow was found along the shore of Lucas Lake. These fish were in excellent condition, and no parasites or other cause of death could be found.

Trout stocked by air in Herb, Platt, Park, and Aerial Lakes in the Horse Lake Basin in 1963 were nearly 6 inches long by mid-September.

#### Warm-Water Game Fish

The heaviest angling pressure on the warm-water species occurred in the Fern Ridge Reservoir area. Large numbers of white crappie were taken from the Long Tom River below the reservoir. The best catches were made when Fern Ridge Reservoir was at or near its winter level. Fish were taken in the Long Tom at all stream levels, even when the water temperature dropped as low as 34° F.

Good catches of bullhead catfish were taken from both Fern Ridge and Cottage Grove Reservoirs as the impoundments were being filled.

Juvenile largemouth bass were taken from Dorena Reservoir in good numbers in the summer and fall months. Fingerling were abundant late in the summer in Row River at its confluence with Dorena Reservoir.

Table 59

## Hills Creek Reservoir Oxygen and Temperature Readings, 1963

Date	Location	Station I Near Dam			Station II Midway up Reservoir			Station III at Upper End		
		Temperature in Degrees Fahrenheit	Dissolved Oxygen	Depth in Feet	Temperature in Degrees Fahrenheit	Dissolved Oxygen	Depth in Feet	Temperature in Degrees Fahrenheit	Dissolved Oxygen	Depth in Feet
July 4	Surface	63	8.6	1	64	8.8	1	65	8.3	1
	Thermocline	59	9.0	40	59	8.9	42	60	8.5	16
	Bottom /1	46	9.6	100	47	9.2	100	55	9.0	23
July 12	Surface	64	8.6	1	65	9.1	1	65	8.2	1
	Thermocline	62	9.1	40	62	8.6	37	60	8.6	20
	Bottom /1	45	9.5	100	46	8.9	100	53	9.1	25
July 19	Surface	66	8.7	1	67	8.5	1	67	8.4	1
	Thermocline	61	9.0	40	60	8.9	38	61	9.2	23
	Bottom /1	44	9.9	100	44	9.4	100	55	9.3	30
July 26	Surface	66	8.7	1	67	8.4	1	68	9.1	1
	Thermocline	60	8.8	42	61	8.3	41	63	9.3	18
	Bottom /1	45	9.4	100	45	9.2	100	57	9.4	21
August 2	Surface	66	8.9	1	67	9.6	1	68	10.5	1
	Thermocline	61	8.7	42	64	9.6	36	67	10.4	18
	Bottom /1	43	9.5	100	44	8.4	100	66	10.9	20
August 10	Surface	69	9.0	1	70	8.9	1	69	10.9	1
	Thermocline	62	8.9	50	62	8.6	44	64	10.7	13
	Bottom /1	44	10.1	100	46	9.4	100	62	11.0	18
August 20	Surface	67	8.5	1	69	7.0	1	64	8.2	1
	Thermocline	60	8.3	49	59	7.9	57	62	8.5	12
	Bottom /1	45	9.0	100	45	7.5	100	61	8.9	14
August 27	Surface	67	7.7	1	68	7.7	1	66	7.1	1
	Thermocline	62	7.3	43	61	7.4	50	62	7.3	13
	Bottom /1	45	8.1	100	46	6.8	100	60	7.9	15
September 3	Surface	67	7.5	1	68	7.7	1	67	7.8	1
	Thermocline	62	7.0	47	60	6.8	56	65	7.2	12
	Bottom /1	46	8.0	100	46	6.5	100	62	7.1	14

/1 Bottom indicates length of line used, except at Station III where depth varied as reservoir was lowered.



Table 60

## Cascade Lakes Gill-Net Set Results, 1963

Lake	Date	Number of Nets	Species	Number of Fish	Size Range in Inches	Average Length in Inches
Waldo	October 2	13	Rb	1	-	10.5
			BT	341	5.4 - 17.6	9.0
Lorin	September 25	1	BT	1	-	12.5
Jo Ann	September 25	1	BT	5	8.5 - 17.0	10.4
Lucas	September 26	1		0		

Table 61

## Age Analysis of Cascade Lakes Trout Scales, 1963

Lake	Species	Number in Sample	Length at Each Annulus			
			I	II	III	IV
Waldo	Rb	1	5.2			
	BT	100	4.4	8.0	13.2	
Otter	BT	1	6.3	13.1	16.2	
Clear	Rb	1	6.7	11.3	15.0	
Lower Ermabelle	Rb	1	3.6	7.2	9.1	10.8
Lucas	Rb	1	3.9	9.2		

Smallmouth bass were taken from the Willamette River in the Eugene-Springfield area by a few expert anglers.

The catch of gill nets set in the upper Willamette Valley reservoirs is shown in Table 62. Scale samples were taken from the Fern Ridge and Cottage Grove fish. An analysis of the data is presented in Table 63.

## Habitat Improvement

Hills Creek Reservoir

Dace and shiners reappeared in Hills Creek Reservoir in the summer of 1963, but no suckers or squawfish were taken by the anglers or in gill nets.

Table 62

Upper Willamette Gill Net Set Results, 1962-63

Water	Date	Number of Nets	Species	Number of Fish	Size Range		Average Length in Inches
					Pork Length in Inches		
Rash Pond	December 13, 1962	2	Bg	24	4 - 5		4.1
			LB	1	-		12.0
			Clm	2	7 - 8		7.5
			CSu	1	-		10.0
			Sq	5	7 - 9		8.0
			BrB	7	6 - 9		7.6
Hills Creek Reservoir tailrace	March 10, 1963	2	Rb	22	6 - 14		9.7
			Wf	13	7 - 12		9.7
Hills Creek Reservoir	March 25, 1963	2	Rb	98	8 - 12		9.7
Cottage Grove Reservoir	August 22, 1963	2	CSu	38	10 - 18		15.6
			LB	1	-		8.0
Dexter Reservoir	September 5, 1963	3	CSu	35	7 - 19		12.5
			Sq	24	5 - 16		12.0
Dorena Reservoir	August 28, 1963	3	LB	14	4 - 8		6.6
			Rb	7	9 - 12		10.6
			BLB	9	6 - 12		9.2
			CSu	1	-		8.0
Farn Ridge Reservoir	September 4, 1963	3	Cp	14	9 - 16		14.2
			CSu	58	8 - 13		11.2
			Rb	1	-		11.0
			LB	6	8 - 10		9.0
			BLB	1	-		8.0
			WC	47	5 - 10		6.6
Lookout Point Reservoir	August 29, 1963	4	CSu	49	7 - 19		12.1
			Sq	102	7 - 19		11.0
			BlP	2	-		5.0
			Clm	5	7 - 10		8.2
Eugene borrow pit	August 22, 1963	1	CSu	11	13 - 16		14.7
			WC	5	6 - 7		6.3
			Bg	8	4 - 5		4.5
			BLB	2	6 - 7		6.4

Table 63

## Age Analysis of Willamette Valley Reservoir Fish Scales, 1963

Reservoir	Species	Number in Sample	Length at Each Annulus			
			I	II	III	IV
Cottage Grove	CSu	30	3.7	8.0	13.4	
	LB	1	3.3	7.7		
Fern Ridge	WC	47	2.2	5.8	7.5	
	LB	5	4.6			
	CSu	16	4.0	8.7	12.1	
	Cp	6	5.5	9.9		

Log Jams

U. S. Corps of Engineers crews removed several large log jams from the Calapooia River between Tangent and Albany. A considerable number of wind-thrown trees from the Calapooia River near Shedd were removed by a private landowner.

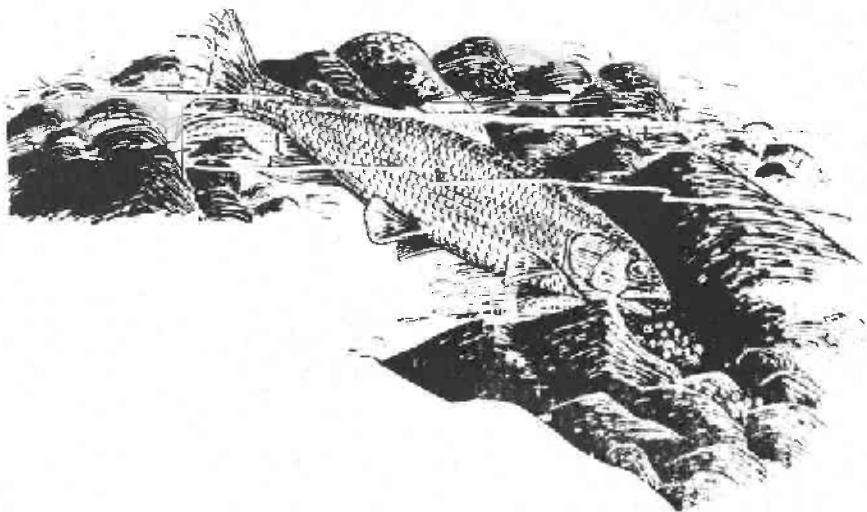
U. S. Forest Service crews removed jams from Staley Creek, Sharps Creek, and the upper portion of Little Fall Creek. Surveys were made of log jams in Deer and Horse Creeks and the upper McKenzie.

Land Slides

Slides of mud and debris blocked Hills Creek above Oakridge and the South Fork of the McKenzie River above Cougar Dam. Channels were cut through both slides by U. S. Forest Service personnel.

Gold Lake Beaver Dams

A survey of the major tributary to Gold Lake revealed that beaver had begun to rebuild some of the dams that were removed by blasting in 1961. The rebuilding took place on the upper portion of the stream only, leaving the lower part of it open to fish passage.



## CENTRAL WILLAMETTE DISTRICT

J. J. Wetherbee

### Fish Inventory

#### Anadromous

Inadequate passage at Willamette Falls during April curtailed steelhead movement into the Santiam drainage. A small run was observed at Stayton on February 26 prior to passage problems at Oregon City. A few hundred steelhead moved above Willamette Falls in late April before high water again flooded the ladder.

Steelhead in the North Santiam were also held up at the upper Stayton dam until the stop logs were removed from the fishway.

Creel census conducted prior to trout season shows few steelhead were checked. Various streams censused are listed in Table 64.

Table 64

#### Creel Census, Steelhead, 1963

Stream	Number of Anglers	Hours Fished	Number of Fish Caught		
			Rainbow	Whitefish	Steelhead
Santiam River	5	5	0	0	0
North Santiam	31	47	1	4	0
Little North Fork	32	44	0	0	0
South Santiam	39	126	0	0	3
Quartzville Creek	23	58	0	0	3
TOTALS	130	280	1	4	6

Spring chinook were attracted into the Stayton power canal in early June when the flow in the main North Santiam was reduced. Concentration of chinook occurred for a time because of an inadequate fishway at the Stayton powerhouse. An intense fishery developed below the dam on the power canal but few fish were caught.

Chinook concentrated behind the upper Stayton dam the last week in May when the fishway became plugged with debris. A good flow through the fishway was obtained after the fishway was cleaned and the dam flashboarded. Chinooks below the dam responded immediately to the attraction of the ladder and moved upstream in a day or two.

As chinook began to concentrate below the falls at Mill City, angling pressure increased. State Police reported the majority of salmon taken were snagged. As this appears to be an annual problem in the area, a short closure below the falls was recommended.

## Trout

### Detroit Reservoir

An estimated 141,715 anglers harvested an estimated 310,500 fish at Detroit Reservoir in 1963. Estimates were made using data furnished by the U. S. Corps of Engineers, who conducted an extensive study of all types of recreational use each month, and catch data obtained by Game Commission personnel.

Table 65 gives the number of anglers and the catch for each month. August was by far the month of heaviest use with nearly 46,000 anglers recorded.

Table 65

Estimated Anglers and Catch, Detroit Reservoir, 1963

Month	Number of Anglers	Estimated Number of Fish Caught
April	6,156	10,526
May	13,799	27,322
June	24,090	42,639
July	31,976	62,033
August	45,971	115,846
September	14,173	31,322
October	5,550	20,812
TOTALS	141,715	310,500

Just over 2,400 anglers interviewed during the 1963 season had an angling success rate of 1.97 fish per angler and 0.54 fish per hour. Opening day success was considered good for the reservoir compared to other years. It was estimated that about 2,800 anglers took just over 6,200 fish.

Although the angling success rate never exceeded one fish per hour in any 2-week period, success was consistent throughout the season. Angling pressure also was steady until Labor Day.

An abundant kokanee population highlighted the 1963 fishery. About 12 percent of all fish checked were kokanee. During the period from mid-July through August, they provided one-third of the catch.

Table 66 lists creel census totals by bimonthly periods.

A kokanee run of considerable magnitude left the reservoir in early September to ascend tributary streams. Although it was impossible to estimate the entire kokanee run, over 10,000 fish were actually observed in spawning surveys and spot checks. An estimated 56,000 kokanee were harvested in the 1963 fishery.

Table 66

## Creel Census, Detroit Reservoir, 1963

Period	Species	Number of Fish by 2-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					
April 20-30	Rb	30	123	778	47	8		986				
	K		1	3	1			5				
	Ct		1					1				
	BT	2		1				3				
	Wf		1	1	2			4	584	2,020	1.71	0.49
								999				
May 1-15	Rb	43	128	336	30	4		541				
	K		3	1				4				
	BT					1		1				
	Wf				1			1				
								547	237	689	2.31	0.79
May 16-31	Rb	23	131	171	20		1	346				
	K		13	11	8			32				
	Ct		1					1				
								379	230	824	1.65	0.46
June 1-15	Rb	23	92	110	6	1		232				
	K	10	56	13	2			81				
								313	163	656	1.92	0.48
June 16-30	Rb	44	94	160	52	3		353				
	K	2	9	13	2			26				
	BrB				1			1				
								380	229	814	1.66	0.47
July 1-15	Rb	50	238	266	49			603				
	K		31	47	2			80				
								683	357	1,237	1.91	0.55

Table 66 (continued)

Period	Species	Number of Fish by 2-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						
July 16-31	Rb	28	203	83	14			328					
	K	1	7	94	2	1		105					
	wf				1			1	218	969	1.99	0.45	
								434					
August 1-15	Rb	11	129	233	40			413					
	K		8	187	12	2		209					
								622	235	843	2.65	0.74	
August 16-31	Rb		23	58	9		1	91					
	K			28	6			34					
	BrB				1			1	62	249	2.03	0.51	
								126					
September	Rb	28	56	94	5			183					
	K			5				5	85	324	2.21	0.58	
								188					
October	Rb	37	46	43	5			131					
	K		2	2				4					
	Ch	1						1	37	180	3.68	0.76	
								136					
SUBTOTALS	Rb	317	1,263	2,332	277	16	2	4,207					
	K	13	130	404	35	3		585					
	Ct		2					2					
	BT	2		1		1		4					
	wf		1	1				6					
	Brb							2					
	Ch	1			2			1					
									4,807	2,437	8,805	1.97	0.55
TOTALS AND AVERAGES													

In late August kokanee began to migrate along the shore of the reservoir. They were readily taken in gill nets around the entire reservoir. Schools of bright red kokanee were observed at the mouth of every tributary of any consequence during the first week of September. On September 5, kokanee were observed in the North Santiam River up to about 18 miles above the reservoir.

Once the magnitude of the run was realized, plans were made to locate a possible egg-taking site. Approximately 5,000 fish were found to be concentrated in the Breitenbush River below a falls about one mile above the reservoir. This appeared to be the best concentration of fish for trapping; however, high water in mid-September thwarted trap-netting attempts.

By September 20, kokanee had moved into most tributaries of the reservoir in good numbers and spawning activities were well under way. Natural barriers stopped kokanee from migrating any distance in Tumble Creek, French Creek, Kinney Creek, Blowout Creek, and the Breitenbush River. Kokanee ascended considerable fast water in the North Santiam and were not stopped until reaching a log jam some 24 miles above the reservoir. After the jam was opened, kokanee moved approximately another mile above. Spawning ground counts were made in some tributaries and in sections of the North Santiam River. Table 67 presents spawning ground survey results.

Table 67

Spawning Ground Counts of Kokanee in Detroit Reservoir Tributaries,  
September 20 and 22, 1963

Stream	Miles from Mouth	Length of Survey (Miles)	Number of Kokanee	Kokanee per Mile
Tumble Creek	Mouth upstream	0.25	430	1,720
French Creek	Mouth upstream	0.80	1,678	2,097
Blowout Creek	Mouth upstream	1.50	1,509	1,006
North Santiam	12	0.25	450	1,800
North Santiam	20	0.25	98	392
North Santiam	23	0.70	838	1,197
TOTALS		3.75	5,003	
AND AVERAGE				1,334

Counts made in the North Santiam at 12 and 23 miles above the reservoir were in areas where kokanee were concentrated.

Redds examined in several streams revealed that kokanee were capable of burying their eggs from 4 to 6 inches in the gravel. Practically every square foot of gravel was utilized by spawning kokanee. Even small gravel pockets about one foot square were used.

Approximately 1,000 kokanee were still spawning in French Creek on October 2. Dead kokanee were quite numerous at this time. A few fish were still spawning in this stream on October 14, indicating the over-all spawning period lasted about one month.



Considering the number of kokanee observed spawning and the depth eggs were buried, it is anticipated that a substantial hatch will occur.

Approximately 30 percent of the legal rainbow stocked in Detroit in 1963 were marked to evaluate their contribution to the catch and to determine migration patterns. Two marks were used to separate releases made at two different sites.

A total of 13,554 right ventral-marked fish was released at the head of the reservoir near the mouth of the North Santiam. Another group of 14,217 adipose-marked rainbow were released at the Mongold boat-launching site. Releases were made over the period from April 29 to July 1.

As no right ventral-marked fish were stocked for three weeks after the original plant, it was possible to trace migration patterns by checking bank anglers. Table 68 gives some indication as to the migration of rainbow from this first plant. It was also determined that fish were readily caught on days releases were made, but success was slow afterwards. There was no evidence of anglers exceeding the bag limit after any releases at the head of the reservoir.

Table 68

Catch Records of Marked Rainbow After Original Release,  
Detroit Reservoir, 1963

Location	Miles from Release Site	Number of Fish and Marks Checked by Dates				
		April 29 (Release Date)	April 30	May 1	May 4	May 5
Hoover Flat	0.0	77 RV	1 RV			1 RV 5 <u>1</u>
Hoover Rock	0.5	5 <u>1</u>	7 RV 20 <u>1</u>	2 <u>1</u>		
Mile 52	0.9		16 <u>1</u>	2 RV 13 <u>1</u>	11 RV 7 <u>1</u>	
Mackey Creek	1.2			1 RV 10 <u>1</u>	1 RV	
Highway Shops	1.7			16 <u>1</u>		
Detroit Flat	2.3				1 RV 3 <u>1</u>	
Sniders	3.0				1 RV	
Tumble Creek	5.0					1 RV
Mongold	6.0					1 RV

1 Unmarked.

A total of 926 marked rainbow, or 28 percent, was recorded out of 3,347 rainbow checked after the first marked fish were released. Right ventral marks made up 55 percent of the total, while adipose marks comprised 45 percent. Records of marked fish for the entire season are compiled by areas caught and are shown in Table 69. The number of right ventral-marked fish checked in the North Santiam Arm is somewhat biased because of the concentrated checking efforts on releases in that area.

By the end of the summer, both types of marks were recorded in every designated area of the reservoir. It is interesting to note that marks were recorded in nearly equal numbers after the last release on July 1. It appears a substantial number of marked fish may hold over to the 1964 season. This was evidenced by the fact that 13 percent of the rainbow checked in October were marked.

An extensive gill-netting program was employed in late August to collect marked fish unbiased by angling. Thirty overnight gill-net sets were distributed around the entire reservoir. A total of 312 rainbow was taken of which 55, or nearly 18 percent, were marked. After at least two months in the reservoir, marked fish examined were of good body condition. Marked fish taken in gill nets are listed by area in Table 70. A reference map of the reservoir (Figure 1) is provided to locate general areas where marked fish were recorded in Tables 69 and 70.

Just over 200,000 fingerling rainbow were also marked and released in early September. These marked fingerling comprised 28 percent of the rainbow fingerling released in 1963. It is hoped that an evaluation of fingerling plants can be made by checking for these marked fish in the 1964 and 1965 fisheries. A few marked fingerling had already entered the fishery in late October at a size of 6 to 7 inches.

Sixteen gill-net sets were made on March 12 and 13 in an attempt to collect mature or maturing rainbow. Nets were set primarily in the mouths of tributaries. A total of 232 fish was taken including 182 rainbow, 49 whitefish, and 1 cutthroat. No maturing or mature females were taken; however, 24 ripe males were collected, ranging from 7.7 to 13.4 inches in fork length. Nearly 50 percent of rainbow examined were infested with larval tapeworm cysts.

Eight overnight sets were made on April 8 to determine the general distribution of fish prior to trout season. One set at the mouth of Box Canyon Creek collected an 18-inch male. Other sets were made in shoal areas. A total of 53 rainbow and 1 whitefish was collected. All rainbow females were immature. The majority of rainbow were thin and many were heavily parasitized.

A more extensive netting program was made in late August to collect marked rainbows over the entire reservoir. Thirty net sets collected 309 rainbow, 239 kokanee, 108 catfish, 4 whitefish, and 1 cutthroat. Kokanee taken at this time apparently had moved in to shore seeking suitable spawning areas. Kokanee ranged from 10.5 to 12.5 inches in fork length. A sample of 66 maturing females averaged 11.38 inches. Only one female in the net catch was immature at 9.8 inches. Seventy percent of kokanee collected were males.

There were no maturing or mature rainbow females taken in the August sets. Gill-net sets are listed by areas and dates of set in Table 71.

Table 69

Greel Census Data on Marked Rainbow by Areas Caught, Detroit Reservoir, 1963

Number of Marked Fish Caught, by Area and by Mark																													
Period	North Shore										South Shore									Total for Period									
	North Santiam					Breitenbush					Vicinity of Island					North Shore					South Shore								
	Arm		Brettenbush			of Island		Reservoir			of Reservoir		Reservoir		Mongold		Blowout		Kinney		Log Boom near Dam		Locality Recorded						
	RV	Ad	RV	Ad	RV	RV	Ad	RV	Ad	RV	Ad	RV	Ad	RV	Ad	RV	Ad	RV	Ad		RV	Ad	RV	Ad	RV	Ad			
April 29 and 30	84																								84				
May 1-15	35		1	21	3	5	4	14					1	28									3	41	44	68			
May 16-31	29					4											3						2	22	29	7			
June 1-15	2			2	1	12										1	2							1	12	4	18		
June 16-30	92	10			9	50																		43	1	101	60		
July 1-15	76	4	2	7	31	88										15	10						1	1	1	125	109		
July 16-31	15	6			6	7										4										25	20		
August 1-15	13	8				4										4	4							3	1	20	21		
August 16-31	3		1		3																			1	1	6	9	8	
September 1-15	2	3			3	3																		2	1	2	6	7	7
September 16-30																											0	0	
October	4	4	3	2													2									1	9	9	
TOTALS	355	35	7	32	56	173	4	14	2	5	1	28	24	29	1	5	7	3					34	89	511	415			
Percentage of Total	69.47	8.43	1.37	7.71	10.96	41.68	0.78	3.37	0.39	1.45	0.20	6.75	4.70	6.99	0.20	1.45	1.37	0.72					10.56	21.45	55	45			
Percentage of Total by Area	42.12		4.21		24.73		1.94		0.87		3.13		5.72		0.76		1.08						15.44		100				

Table 70

Marked Fish Collected in Gill-Net Sets,  
Detroit Reservoir, August 1963

Area	Number of Net Sets	Right Ventral Marks	Adipose Marks	Total Rainbow	Percent of Rainbow Marked
North Santiam Arm	5	8	2	44	23
Breitenbush Arm	6	1	4	54	9
Island	3	3	7	64	16
North shore line	5	3	11	40	35
South shore line	3	3	3	38	16
Blowout Arm	4	6	4	52	19
Kinney Creek Arm	2	0	0	5	0
Lower reservoir near dam	2	0	0	15	0
TOTALS AND AVERAGE	30	24	31	312	17.79

Fingerling plants were increased in 1963 for both rainbow and kokanee. A total of 716,001 rainbow fingerling was released compared to 600,000 planted in 1962. Kokanee fingerling were doubled from 150,000 in 1962 to 314,969 in 1963.

A total of 93,160 legal-size rainbow was also stocked in the reservoir in 1963.

#### Big Cliff Reservoir

Six overnight gill-net sets were made in Big Cliff Reservoir on September 6. A total of 56 kokanee, 26 rainbow, 4 whitefish, and 2 bullhead catfish was collected. There were 26 kokanee maturing which ranged from 10.6 to 12.7 inches. The remaining kokanee appeared to be from two younger age groups. Nine females were bright but maturing and ranged from 7.6 to 9.3 inches. Two females were immature at 6.8 and 7.6 inches. Rainbow ranged from 5.9 to 11.5 inches and all were immature. Results of gill-net sets in Big Cliff Reservoir are shown in Table 72.

The abundant population of kokanee taken in Big Cliff indicates a considerable number have apparently passed over or through Detroit Dam. No kokanee were taken in gill nets in Big Cliff in 1962; however, some were caught by anglers in the North Santiam River, indicating some escapement was occurring. As three different age classes were collected in Big Cliff, it would be difficult to say when their escapement from Detroit occurred.

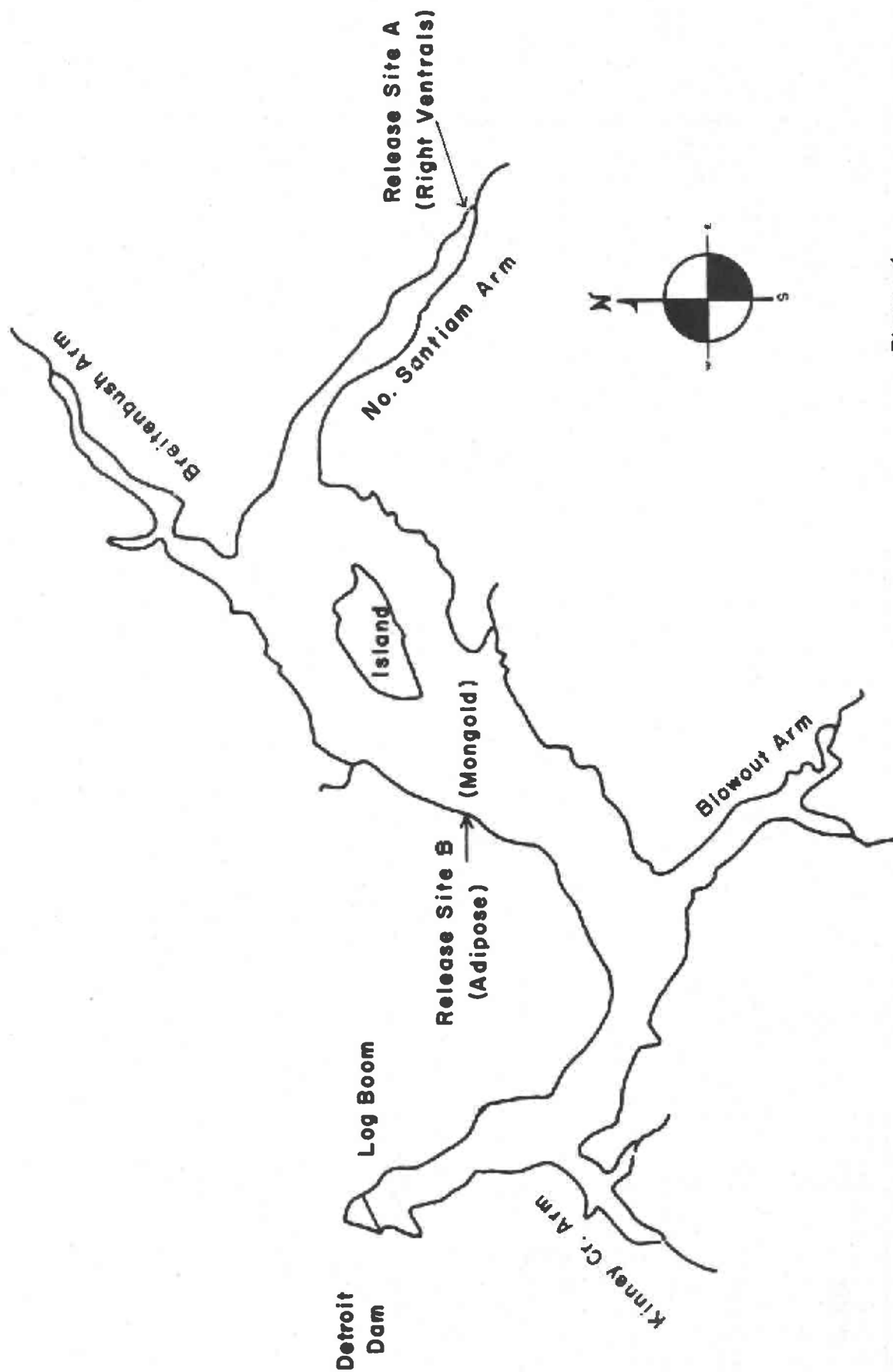


Figure 1

**DETROIT RESERVOIR**



Scale 1 Inch = 1 Mile

Table 71

Gill-Net Catch Records, Detroit Reservoir, 1963

Area	Date	Number of Sets	Species	Number of Fish in 1-Inch Size Groups															Percent of Total
				5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Mouths of Tributaries	3/12/63	10	Rb	4	12	3	6	11	38	24	2	2	1						103
			Ct			1													1
			Wf				4	6	9	4	1								24
																			<u>128</u>
North Santiam Arm	3/13/63	6	Rb	3	11		3	10	26	23	2	1							79
			Wf				1	1	10	6	4				2		1		25
																			<u>104</u>
Around entire shore line	4/8/63	8	Rb	1	2		2	11	20	12	1	2	1						53
			Wf					1											1
																			<u>54</u>
Breitenbush Arm	3/21/63	6	Rb			4	23	19											54
			K							6									<u>1</u>
			BrB	7	3	10	14	10											6
																			<u>46</u>
																			<u>106</u>
North Santiam Arm	8/21/63	5	Rb	1	5	2	14	15	6	1									44
			K						5	16	2								23
			BrB	9	1	6	9	9	1										35
																			<u>102</u>
Piety Knob	8/22/63	3	Rb			3	11	20	14	1									64
			K							2	1								<u>2</u>
			BrB	3	2	3	2	2	1										3
			Wf			1													13
																			<u>81</u>
North shore line	8/23/63	5	Rb			1	9	19	5	3	1								40
			K						5	47	6								<u>3</u>
			BrB				2	1											61
			Wf			1													3
																			<u>106</u>

Table 71 (continued)

Area	Date	Number of Sets	Species	Number of Fish in 1-Inch Size Groups															Total Fish	Percent of Total
				5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
South shore line	8/27/63	3	Rb		1	1	9	7	12	2	2								38	45
			K					1	6	25	3								41	49
			BrB		2	2	2	1											5	6
																			84	
Blowout Arm	8/28/63	4	Rb		3	3	10	14	13	2	2								49	50
			Ct			1													1	1
			K						8	36	1								46	46
			BrB		1	1	1												3	3
																			99	
Kinney Creek Arm	8/28/63	2	Rb			1	1		1	1									5	15
			K							20	2								27	82
			BrB			1													1	3
																			33	
Lower reservoir near dam	8/29/63	2	Rb			1	3	3	1	1									15	25
			K						3	25	4								42	70
			BrB	1		1													2	3
			Wf				1												1	2
																			60	
TOTALS	March and April	24	Rb		8	3	11	32	84	59	5	5	2			1			235	82.17
			Ct			1													1	0.35
			Wf				5	6	19	10	5				2			1	50	17.48
																			286	
	August	30	Rb	1	9	16	80	97	59	11	5								309	46.05
			Ct			1													1	0.15
			K	20	7	24	30	1	27	177	19								249	37.10
			BrB					23	4										108	16.10
			Wf			2		1		1									4	0.60
																			671	

/1 1 eaten by crayfish.  
 /2 15 eaten by crayfish.  
 /3 2 eaten by crayfish.  
 /4 3 eaten by crayfish.  
 /5 4 eaten by crayfish.  
 /6 6 eaten by crayfish.  
 /7 5 eaten by crayfish.  
 /8 10 eaten by crayfish.  
 /9 31 eaten by crayfish.  
 /10 25 eaten by crayfish.

Table 72

Gill-Net Catch, Big Cliff Reservoir,  
September 6, 1963

Number of Sets	Species	Number of Fish in 1-Inch Size Groups										Total Fish	Percent of Total
		5	6	7	8	9	10	11	12	13	14		
6	Rb	2	11	5	1	3	2	2				26	30
	K		1	7	10	12	1	22	3			56	64
	Wf									1	3	4	4
	BrB				1	1						2	2
TOTAL												88	

The U. S. Corps of Engineers estimated just over 1,000 anglers used Big Cliff in 1963. Little creel census was recorded for this reservoir as there are seldom any number of anglers at one time.

A total of 5,932 anglers was checked on all waters within the district. Over-all success was 2.36 fish per angler and 0.73 fish per hour. A comparison of the different stream systems and lakes is given in Table 73. The heavily stocked North Santiam streams provided the best catch per hour success, while Cascade lakes provided a catch of nearly 4 fish per angler.

Creel census records for individual streams are given in Table 74. North Santiam streams averaged just over one fish per hour. Success was below normal in most South Santiam streams. Native cutthroat provided 60 percent of the catch for west side Willamette tributaries, while hatchery rainbow made up the bulk of the catch in other stream systems. All waters sampled were down slightly in success compared to the 1962 season. Creel census for Cascade lakes is listed separately.

Cascade Lakes

Creel census was obtained from 65 lakes in 1963. Post card creel reports accounted for 262 anglers reporting from 38 lakes. Creel census totals for the various lakes are listed in Table 75.

Anglers fishing Marion Lake enjoyed one of the best seasons in recent years. Although the success measured in fish per hour was not great, 64 percent of the total rainbow caught were over 12 inches. Brook trout accounted for 10 percent of the catch. Nearby Ann Lake provided a higher success rate on brook trout; however, most of the trout were under 12 inches. Rainbow from the 1962 fingerling plant exhibited good growth with many exceeding 10 inches by early summer.



Table 73

## A Comparison of Success for Stream Systems, Lakes, and Reservoirs, 1963

Water	Species	Number of Fish in Each Size Group		Total Fish Caught	Number of Anglers	Hours Fished	Fish per Angler	Fish per Hour
		6 to 12 Inches	12 Inches and Over					
Detroit Reservoir	Rb	3,912	295	4,207				
	K	547	38	585				
	other	8	7	15				
		4,467	340	4,807	2,437	8,805	1.97	0.55
Cascade lakes	Rb	1,163	695	1,858				
	BT	2,727	266	2,993				
	Ct	1,102	23	1,125				
	K	620	0	620				
		5,612	984	6,596	1,739	7,022	3.79	0.94
North Santiam system	Rb	963	10	973				
	Ct	87	1	88				
	other	28	11	39				
		1,078	22	1,100	561	1,082	1.96	1.02
South Santiam system	Rb	382	35	417				
	Ct	46	0	46				
	other		3	3				
		428	38	466	400	746	1.17	0.62
West side Willamette tributaries	Rb	284	0	284				
	Ct	435	5	440				
		719	5	724	518	1,014	1.40	0.71
Pudding River system	Rb	266	0	266				
	Ct	39	1	40				
		305	1	306	277	624	1.10	0.49
SUBTOTALS	Rb	6,970	1,035	8,005				
	BT	2,727	266	2,993				
	Ct	1,709	30	1,739				
	K	1,167	38	1,205				
	other	36	21	57				
TOTALS AND AVERAGES		12,609	1,390	13,999	5,932	19,293	2.36	0.73

Table 74

## Creel Census, Mid-Willamette Streams, 1963

Stream	Species	Number by 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 & Over					
North Santiam system												
North Santiam River	Rb	47	234	178	6	2		467				
	Ct	40	5		1			46				
	Ch						6	6				
	St						3	3				
	Wf			1				1		550	1.74	0.95
								<u>523</u>	301			
Little North Fork	Rb	34	273	38				345				
	Ct		3					3				
	St						1	1				
	Wf		3					3		362	1.99	0.97
								<u>352</u>	177			
Breitenbush River	Rb	18	71	37	2			128				
	Wf			4	1			<u>5</u>	48	106	2.77	1.25
								<u>133</u>				
Marion Creek	Rb		21	7				28				
	Ct	19						<u>19</u>				
								<u>47</u>	13	19	3.62	2.47
Mill Creek (Willamette)	Rb		5					5				
	Ct	2		5				<u>7</u>	8	10	1.50	1.20
								<u>12</u>				

Table 74 (continued)

Stream	Species	Number by Size Groups in Inches							Total Fish	Total Anglers	Hours Fished	Fish	
		6-8	8-10	10-12	12-14	14-16	16 & Over	per Angler				per Hour	
South Santiam system													
South Santiam River	Rb	7	68	1				76					
	Ct		1	2				3					
	St						2	2					
	Ch						1	1					
								<u>82</u>	62		131	1.32	0.63
Crabtree Creek	Rb	5	19	18		1	16	60					
	Ct	2	1					<u>3</u> 63	99		137	0.64	0.46
Roaring River Creek	Rb	16	34	10		3	11	77					
	Ct	1						<u>1</u> 78	72		115	1.08	0.68
Thomas Creek	Rb	5	46	19				70	64		118	1.09	0.59
McDowell Creek	Rb	5	53	30				88					
	Ct	9	5					<u>14</u> 102	43		90	2.37	1.13
Hamilton Creek	Rb	2	32					34					
	Ct	12						<u>12</u> 46	24		54	1.92	0.85
Wiley Creek	Ct		1					1	15		60	0.07	0.02

Table 74 (continued)

Stream	Species	Number by 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 & Over					
Quartzville Creek	Rb	7	4					11	6	10	1.83	1.10
Moose Creek								0	6	12	0.00	0.00
<u>West Side Willamette tributaries</u>												
Rickreall Creek	Rb		3					3				
	Ct	42	23	8	3	1		77		124	0.91	0.65
								80	88			
Little Luckiamute River	Rb		6	7				13				
	Ct	14	8	1				23		99	0.80	0.36
								36	45			
North Yamhill River	Rb	24	82	1				107				
	Ct	17	27	11	1			56		158	2.14	1.03
								163	76			
South Yamhill River	Rb	6	4	1				11				
	Ct	9	3	1				13				
	Co	1						1				
								25	18	31	1.39	0.81
Mill Creek (Yamhill)	Rb	13	35	6				54				
	Ct	43	16	2				61		250	0.90	0.46
								115	128			

Table 74 (continued)

Stream	Species	Number by 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 & Over					
Rock Creek (Yamhill)	Rb	3	65					68				
	Ct	5	16	1	1			<u>23</u> 91	36	100	2.53	0.91
Willamina Creek	Rb	1		1				2				
	Ct	21	32	2				<u>55</u> 57	35	77	1.63	0.74
Carlton Lake	Rb	2	14	5				21				
	Ct		1	1				<u>2</u> 23	13	28	1.77	0.82
Fairchild Creek	Ct	24	5	1				30	14	40	2.14	0.75
Baker Creek	Ct	10	17					27	13	18	2.08	1.50
Haskins Creek	Rb		4					4				
	Ct	12	2					<u>14</u> 18	10	19	1.80	0.95
Salt Creek								0	8	4	0.00	0.00
South Branch Mill Creek	Ct	15						15	8	12	1.88	1.25
Cedar Creek (Mill Creek)	Ct	8	1					9	5	19	1.80	0.47

Table 74 (continued)

Stream	Species	Number by 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 & Over					
Gooseneck Creek	Ct		3	1				4	5	10	0.80	0.40
<u>Padding River system</u>												
Abiqua Creek	Rb	9	130	5				144				
	Ct	6	4		1			11				
								155	188	427	0.82	0.36
North Fork Silver Creek	Rb	10	103	7				120				
	Ct	12						12				
								132	58	119	2.28	1.11
Butte Creek	Rb		2					2				
	Ct	3						3				
								5	23	51	0.22	0.10



Table 75

## Creel Census, Cascade Lakes, 1963

Lake	Species	Number of Fish by 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 & Over					
Marion	Rb	54	86	181	375	123	54	18	891				
	BT	30	38	18	15				101				
	Ct	2	4	6	3	2			17				
									1,009	317	1,930	3.18	0.52
Lost	Rb		26	114	44	24	3		211				
	BT	31	337	387	72	6			833				
									1,044	217	901	4.81	1.16
Pamelia	Ct	593	360	92	6				1,051	199	613	5.28	1.71
Ann	Rb	1	29	29	8		1		68				
	BT	32	210	243	90	6	1		582				
									650	147	745	4.42	0.87
Elk	Rb	8	22	2	3				35				
	BT	3	3	5	3				14				
	K	8	564						572				
									621	128	476	4.85	1.30
Duffy	Rb	78	53	1					132				
	BT	90	219	43	1	1			354				
									486	107	458	4.54	1.06
Daly	BT	25	1	1					27				
	Ct	18	3						21				
									48	49	196	0.98	0.24
Presley	Rb	15	189	38	5				247	42	129	5.88	1.91
Movich	Rb	11	15	12			10		48				
	BT	2	58	19			14		93				
									141	41	167	3.44	0.84
Fir	BT		30	25	9	7			71	37	94	1.92	0.76
Santiam	BT	25	10	15	3				53	34	99	1.56	0.54

Table 75 (continued)

Lake	Species	Number of Fish by 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 & Over					
Red Butte	BT	26	9	2					37	31	47	1.19	0.79
Leone	BT	55	112	34	13	1			215	26	154	8.27	1.40
Tumble	BT	95	43						138	27	125	5.11	1.10
Little Duffy	BT	3	3	28	3	1			38	27	61	1.41	0.62
Jorn	Rb BT	13 19	17 41	3 9	1				33 70 103	24	102	4.29	1.01
Hanks	Rb	7	3	7	5				22	19	43	1.16	0.51
Fay	Rb BT		4	12 8	6 1		1	1	22 11 33	19	56	1.74	0.59
Parrish	BT	15	21						36	19	48	1.90	0.75
Lower Berley	BT	1	7	2	1				11	18	64	0.61	0.17
Dunlap	Rb BT	1 11	19 10	1					21 21 42	14	54	3.00	0.78
Dixie	BT	34	4						38	13	21	2.92	1.81
Big	Rb K	1	47		1				1 48 49	11	28	4.46	1.75
Jenny	Rb			5	3	1			9	10	33	0.90	0.27
Hunts	Rb Ct	2	2		5				7 2 9	9	18	1.00	0.50



Table 75 (continued)

Lake	Species	Number of Fish by 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 & Over					
Jo Jo	Rb		27		1	1		1	30				
	BT		5						$\frac{5}{35}$	7	15	5.00	2.33
Mud Puppy	BT		2	1	1	1			5	7	8	0.72	0.63
	BT	2	22	18	4				46	7	28	6.57	1.64
Upper Berley	BT			35					35	7	37	5.00	0.95
Opal	BT	45	6						51	7	25	7.29	2.04
Big Cliff Reservoir	Rb		1	2	1				4	6	11	0.67	0.36
Temple	Rb		43	3			1		47	6	24	7.83	1.96
Pineridge	Rb		2	2					4				
	BT	6	6	2					$\frac{14}{18}$	6	18	3.00	1.00
Indian Prairie	Rb			1					1				
	BT	2							$\frac{2}{3}$	6	6	0.50	0.50
Chris									0	6	7	0.00	0.00
Grenet	Rb	3	5	1					9	5	5	1.80	1.80
Spinning	BT				3				3	5	18	0.60	0.17

Lost Lake provided an excellent fishery in late April after a good opening-day crowd was snowed out. On the second weekend of trout season, about 300 anglers averaged nearly 6 fish each. Success and pressure dropped in early May. Large masses of filamentous algae hampered anglers to some extent. Brook trout made up about 80 percent of the catch for the season; however, rainbow ran larger with over 10 percent exceeding 14 inches. Despite a low snow pack, the water level of the lake help up well.

Success at Pamela Lake was down compared to the previous three years. Unexpected angling pressure occurred during the winter months, as an extremely mild winter made access possible from January through March until snow recurred. An increase in size of cutthroat was again noticeable with 44 percent of the catch being over 8 inches. However, the majority of fish over 8 inches were caught in March. The lake level was affected by a low snow pack which was noticeable even in February. An extremely fast snow runoff in May completely filled the lake. The outlet is underground for 1/4 mile before appearing in Pamela Creek during a normal summer. No visible outlet holes could be seen after examining the lake bottom in mid-July.

After a poor season in 1962, small kokanee provided a good fishery at Elk Lake. Rainbow from the 1962 fingerling plant made a small contribution to the catch, but the bulk of the fishery was kokanee ranging from 8 to 9 inches. A Lahontan strain of cutthroat was introduced in an effort to find a suitable trout species for the lake. Hackleman cutthroat provided a good fishery for three years, but this species disappeared from the catch in 1962 after fingerling were no longer available for stocking. An increased stocking program on nearby Dunlap Lake has encouraged some increase in angling pressure.

A generally good season was experienced on the major lakes located in the Eight Lakes Basin. Duffy Lake was perhaps the most productive, with anglers averaging just over one fish per hour. Leone, Tumble, and Opal Lakes provided success from one to two fish per hour. These are outlying lakes that rely solely on natural propagation of brook trout.

Fay Lake was not as productive as in 1962 when it was first restricted to fly-fishing only. Fish taken were mostly from 10 to 14 inches. It is felt that fingerling stocking will have to be increased to provide more fish in a catchable-size group for the amateur fly-fishermen.

Routine population studies were made on 15 lakes during the summer of 1963. Of particular interest was the examination of golden trout in lakes in the Jefferson Park area. Golden trout were experimentally stocked in these lakes in 1961.

In Russell Lake, 11 goldens collected averaged just under 9 inches and 6 females had matured. Spawning success was not determined. The 27 goldens taken in Scout Lake were a year younger and generally ranged from 6 to 8 inches. Eighteen females were maturing and averaged 6.8 inches. No fish were taken in one net set in Bays Lake. Fish in both Russell and Scout Lakes were typical golden trout coloration and were in excellent condition.

A few golden trout were planted in 1963 in some smaller lakes lying between 5,000 and 6,000 feet to test their adaptation at these elevations. In a 1-acre lake stocked in late July, goldens had grown from 1 inch up to 4 or 5 inches by mid-October. Light conditions made it difficult to observe coloration; however, distinct parr marks typical of goldens were easily seen.

Gill-net sets in Breitenbush Lake revealed a good brook trout population was still present; however, rainbow from the 1962 fingerling plant showed slow growth. Both rainbow and brooks continue to show good growth in Lost Lake. A good spawning run of brook trout was observed in Lost Lake Creek in November and early December.

Data from gill-net collections are shown in Tables 76 and 77.

Two small lakes near Big Lake were found to be only 6 feet and 3.5 feet in depth. Both lakes were stocked by air by mistake in 1962. Rainbow fingerling had survived the winter in both lakes but were too numerous to have reached legal size.

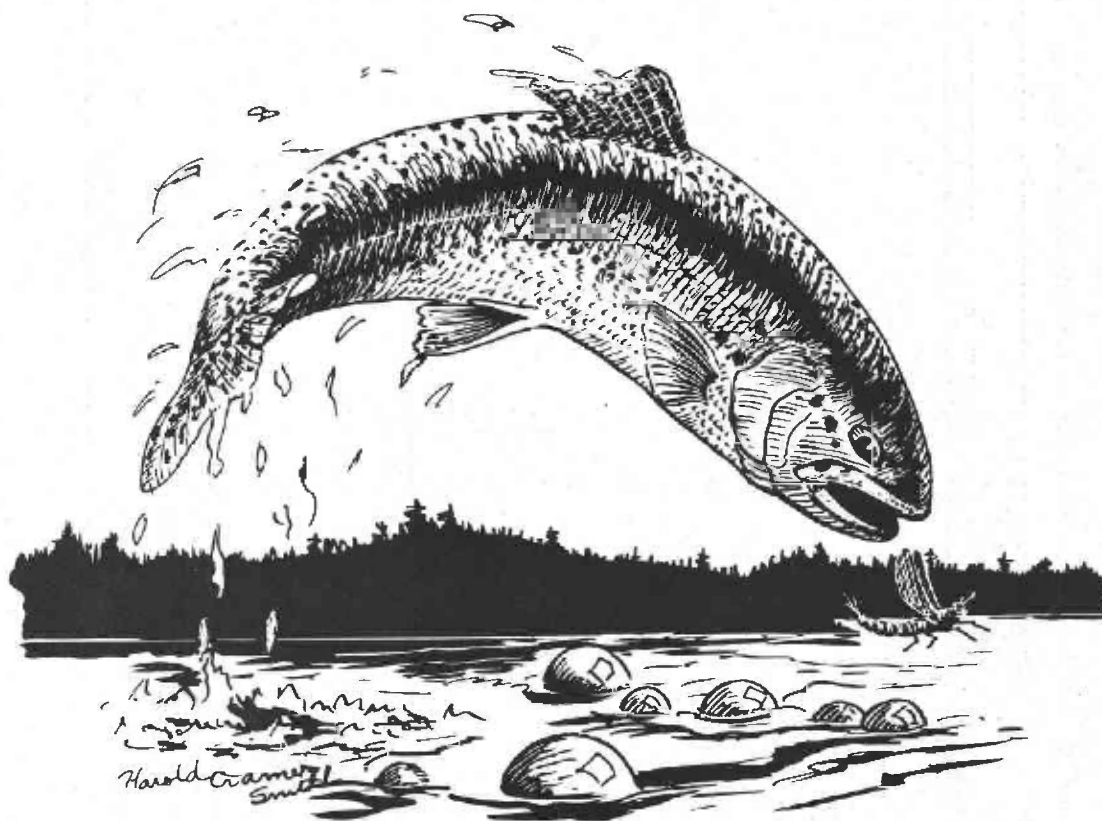


Table 76

Composition and Length Frequency of Catch by Gill-Net Sets, Cascade Lakes, 1963

Lake	Number of Sets	Species	Number Fish Taken	Percent of Total	Length in Inches												
					5	6	7	8	9	10	11	12	13	14	15	16	17
Breitenbush	3	BT Rb	34 10	77 23	2 2	10 7	3	5	2	6	2	2	1		1		1
Pamelia	3	Ct	31	100	4	18	9										
Lost	2	Rb BT	14 7	67 33	1		1	3	4	1	1	1	2	1		2	
Short	1	BT K	19 1	95 5						10	4	2	3				
Fir	1	BT	7	100					4	2						1	
Dunlap	2	BT Rb	6 1	86 14		3		1 1	1	1							
Bradley	2	BT	2	100											2		
Jo Jo	2	Rb BT	2 1	67 33					1			1					
Prill	2	BT	6	100		1	2	3									
Swallow	1	BT	2	100										1		1	
Lula	1	BT	31	100		5	16	5	5								
Russell	1	GT	11	100				5	5	1							
Bays	1		0														
Scout	1	GT	27	100	3	10	14										

/1 Angling.

Table 77

Average Length of Female Fish in Each Stage of Maturity, Cascade Lakes, 1963

Lake	Species	Immature		Maturing		Mature	
		Number	Average Length in Inches	Number	Average Length in Inches	Number	Average Length in Inches
Breitenbush	BT	0		16	8.90	2	16.20
	Rb	6	6.30	1	13.80	0	
Pamelia	Ct	0		20	6.54	1	7.70
	Rb	9	9.30	2	16.55	0	
Lost	BT	0		2	12.80	0	
	BT	0		3	10.80	10	11.70
Fir	BT	0		4	9.80	1	16.10
	BT	0		2	6.25	1	10.70
Elk	BT	0		4	8.45	1	12.90
	BT	0		0		1	15.40
Jo Jo	Rb	1	9.50	1	12.50	0	
	BT	0		4	8.00	0	
Swallow	BT	0		0		2	14.80
	BT	0		2	7.15	8	7.64
Russell	GT	0		2	8.60	6	8.70
	GT	0		18	6.80	0	

## LOWER WILLAMETTE DISTRICT

Wendell H. Stout

### Fish Inventory

#### Anadromous

##### Clackamas River

The enumeration of all upstream and downstream salmonids was conducted on the Clackamas River at the North Fork Dam fish facilities by Portland General Electric Company. The adult coho salmon run increased by almost 1,000 over the 1962 tally, while the number of steelhead was about one-half of the run of the previous year. The chinook salmon run was similar to that of 1962. Table 78 is a resumé of the spawning runs enumerated at the dam since 1958.

Table 78

Upstream Migrant Fish Counts, North Fork Dam,  
Clackamas River, 1958-1963

Year /1	Fish Counted, by Species		
	Coho	Chinook	Steelhead
1958	614	460	1,636
1959	555	578	525
1960	1,331	288	1,149
1961	2,174	367	2,204
1962	2,189	637	4,255
1963	3,116	611	2,332

/1 Runs are listed in the year they terminate.

The size and timing of the anadromous fish runs in the Clackamas River are illustrated graphically in Figure 2.

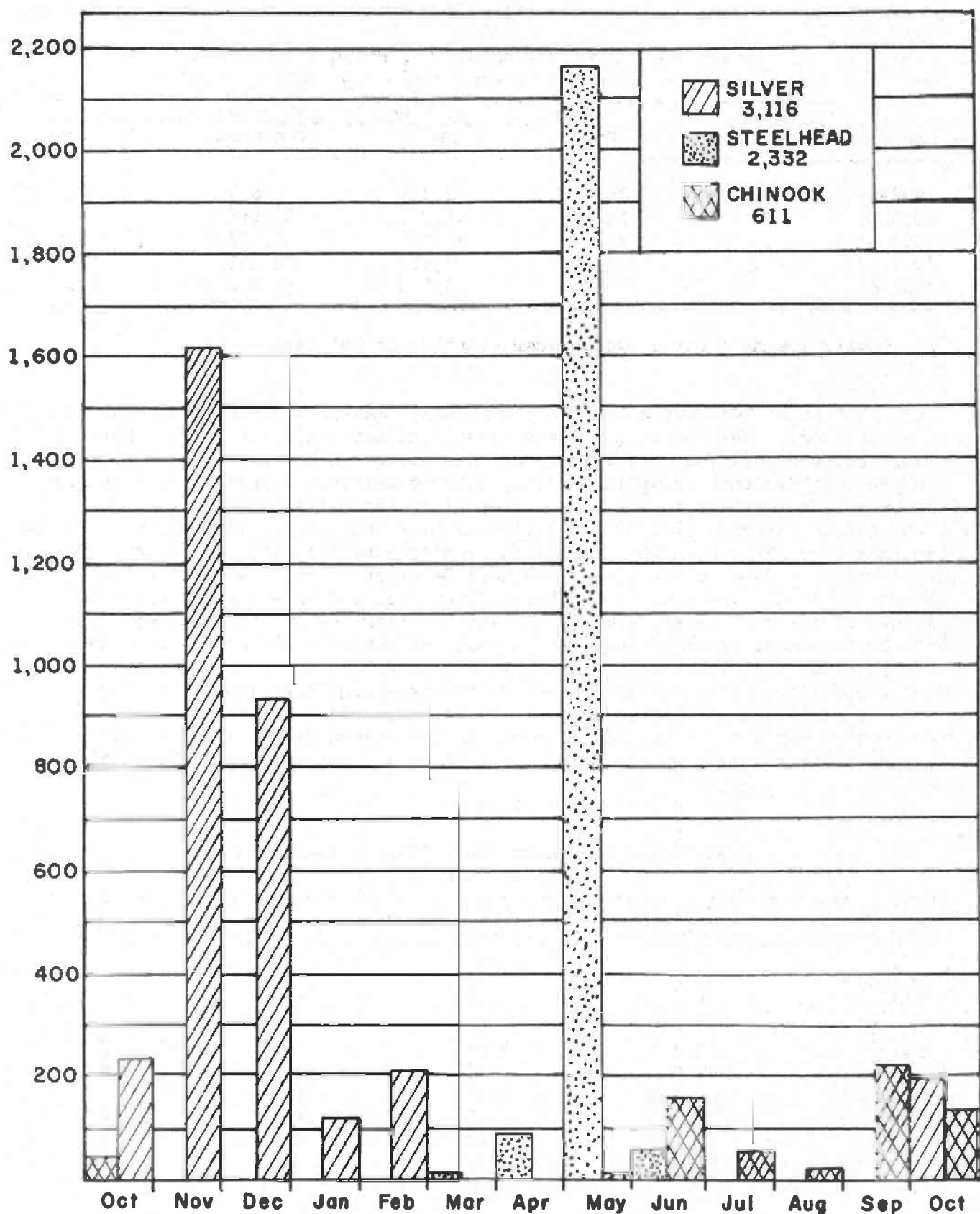
Downstream salmonid migrations for 1958 to 1963 are presented in Table 79. Hatchery liberations entered the counts in 1963.

Of interest are the increasing numbers of blueback, or kokanee, which appear with the downstream migrants, and an unusually large return of spawned-out steelhead, or kelts. The kokanee are apparently migrating out of Elk Lake at the head of the Collawash Fork of the Clackamas River. Unsuccessful attempts were made with seines and electrofishing to find kokanee in the outlet of Timothy Lake, which also flows into the Clackamas River. The number of steelhead kelts observed moving downstream represents more than 50 percent of the spawning run.

##### Sandy River

The research program, conducted during the 1962-63 winter angling season on the Sandy River to evaluate the steelhead sport fishery and the

Figure 2



SIZE AND TIMING OF ADULT ANADROMOUS FISH RUNS,  
NORTH FORK DAM, CLACKAMAS RIVER, 1962-63

Table 79

Downstream Migrant Fish Counts, North Fork Dam,  
Clackamas River, 1958-1963

Migratory Season <u>/1</u>	Fish Counts by Species			
	Coho	Chinook	Steelhead	Blueback
1958-59	15,377	4,439	37,687	
1959-60	22,532	18,227	38,885	
1960-61	44,130	18,821	17,674	
1961-62	54,696	9,478	28,355	179
1962-63	113,407	3,630	35,820	790

/1 Counts are made for a cyclic year starting in October.

contribution of hatchery stocks to the fishery, marked the ninth consecutive year of study. The sampling program, developed and conducted by the Research Division, was modified to eliminate certain biases which were believed to exist in previous designs. Sampling effort, which consisted of angler creel census and angler automobile counts, was increased to ten man-days per week. An increase in the precision of the estimates over that of previous years, resulted in part from changes in the estimation equation and the sampling design. The collection of data in the field commenced December 1, 1962 and terminated March 31, 1963. The area of the Sandy River included in the study was approximately 27 miles of river from the Highway 30 bridge below Troutdale upstream to the Big Sandy (Marmot) Dam. An increase of almost 5,000 angler-days over the previous year was noted for the 1962-63 steelhead season. The size, timing, and composition of the steelhead migration was measured at the Marmot Dam fishway utilizing an electronic fish counter and a fish-trapping device. The catch rate was similar to that recorded in the season of 1961-62. A summary of Sandy River steelhead sport fishery statistics is presented in Table 80.

Table 80

Sandy River Steelhead Sport Fishery Statistics,  
1954 through 1963

Angling Season	Number of Angler-Days	Number of Steelhead	Fish per Angler	Hours per Fish
1954-55	16,000	958	0.06	
1955-56	10,413	1,157	0.11	39.5
1956-57	17,027	972	0.06	51.0
1957-58	24,485	1,893	0.08	36.8
1958-59	27,934	1,306	0.05	62.0
1959-60 <u>/1</u>	30,079	2,074	0.07	55.1
1960-61	32,391	1,494	0.05	88.9
1961-62	20,354	1,071	0.05	72.2
1962-63	25,097	1,302	0.05	73.2

/1 The sampling program was modified in 1959 so that the precision of the estimates could be determined and the accuracy improved.



The contribution of hatchery-reared steelhead to the sport fishery increased significantly over the previous year, and was slightly greater than the 6-year average of 12 percent. The estimated 195 marked steelhead taken in the sport fishery were from plants of the following hatcheries: Gnat Creek station, 129 fish; Eagle Creek National Hatchery, 66 fish. The origins of the Gnat Creek fish were the Sandy River (53 fish) and Big Creek (76 fish). Table 81 is a resume of hatchery contribution to the steelhead sport fishery since 1954.

Table 81

Contribution of Hatchery Stocking to the Sandy River  
Steelhead Sport Fishery, 1954-1963

Angling Season	Marked Fish		Wild Fish		Total Fish
	Number	Percent	Number	Percent	
1954-55	<u>1</u>		958	100	958
1955-56	<u>1</u>		1,157	100	1,157
1956-57	231	24	741	76	972
1957-58	312	16	1,581	84	1,893
1958-59	93	7	1,213	93	1,306
1959-60	247	12	1,824	88	2,071
1960-61	182	12	1,312	88	1,494
1961-62	15	1	1,056	99	1,071
1962-63	195	15	1,107	85	1,302

1 None expected.

The liberation of the steelhead smolts in 1963 was made in the Sandy River at Brightwood, approximately 8 miles above Marmot Dam.

Historical data of hatchery-reared steelhead releases in the Sandy River, showing the egg source, size, and identifying marks, are presented in Table 82.

Comparative weight-length data of angler-caught steelhead for the past four years are depicted in Table 83. The information available indicates that wild and hatchery steelhead of the same salt-water age are similar in size.

The adult steelhead escapement of 3,326 passing over Marmot Dam in 1963 was somewhat less than that of the previous year, but considerably above the 9-year average of 2,487 fish. The contribution of hatchery stocks to the escapement was the greatest obtained thus far. Of the 901 marked steelhead estimated in the escapement, 585 originated from Gnat Creek releases, 297 from the Eagle Creek National Fish Hatchery, and 18 were undetermined. A summarization of the steelhead counted at Marmot Dam for a 10-year period is presented in Table 84.

Fish Commission reported that 37 marked steelhead of the Sandy River were observed in the commercial catch of 1963.

Table 82

Hatchery-Reared Steelhead Liberations  
in the Sandy River, 1955-1963

Brood Year	Release Year	Egg Source	Number Released	Mark	Number per Pound
1954	1955		72,665	Ad-LV-RV	12.6
1954	1955		10,272	Ad-RV	6.2
1955	1956	Chambers Creek, Washington, and Alsea River	78,279	Ad-LV-RV	8.9
1956	1957	Alsea River	67,027 10,167	Ad-LV-RV Ad-RM	9.1
1957	1958	Alsea River	57,623	Ad-LV-RV	29.0
1957	1959	Eagle Creek	34,267	D-LV	9.2
1958	1959	Alsea River	49,195	Ad-LV-RV	11.5
1958	1960	Eagle Creek	76,908	Ad-LV-RV	5.9
1959	1961	Eagle Creek	72,511	Ad-LV-RV	11.0
1960	1961	Big Creek	43,417	Ad-RM	10.7
1960	1961	Sandy River	47,064	Ad-LM	10.8
1961	1962	Big Creek	49,871	RV	9.2
1961	1962	Sandy River	126,974	LV	12.1
1962	1963	Big Creek	94,051	RV-RM	9.7
1962	1963	Sandy River	113,637	LV-RM	12.3

Table 83

Comparative Data of Angler-Caught Steelhead  
from the Sandy River, 1959-1963

Angling Season	Average Length (Inches)	Average Weight (Pounds)	Percent Male	Percent Female
1959-60	26.25	6.50	45	55
1960-61	27.00	7.75	44	56
1961-62	27.50	7.75	50	50
1962-63	26.25	7.30	42	58

Table 84

Adult Steelhead Migration at Marmot Dam,  
Sandy River, 1953-1963

Migratory Season	Wild Fish		Hatchery Fish		Total Fish
	Number	Percent	Number	Percent	
1953-54	2,200		<u>/1</u>		2,200
1954-55	1,581		<u>/1</u>		1,581
1955-56	2,240		<u>/1</u>		2,240
1956-57	1,975	96	79	4	2,054
1957-58	2,917	92	249	8	3,166
1958-59	2,290	97	69	3	2,359
1959-60	1,578	98	34	2	1,612
1960-61	2,749	88	375	12	3,124
1961-62	3,871	96	175	4	4,046
1962-63	2,425	73	901	27	3,326

/1 None expected.

The timing and size of the juvenile steelhead migration in the Sandy River were observed at Marmot Dam by personnel of the Research Division utilizing the downstream trapping devices at the Marmot diversion canal screens. Approximately 6,500 wild smolts and 18,500 hatchery smolts were captured at the screen trap. Weight, length, and growth data were taken. A graphic description of the timing of the migration is presented in Figure 3.

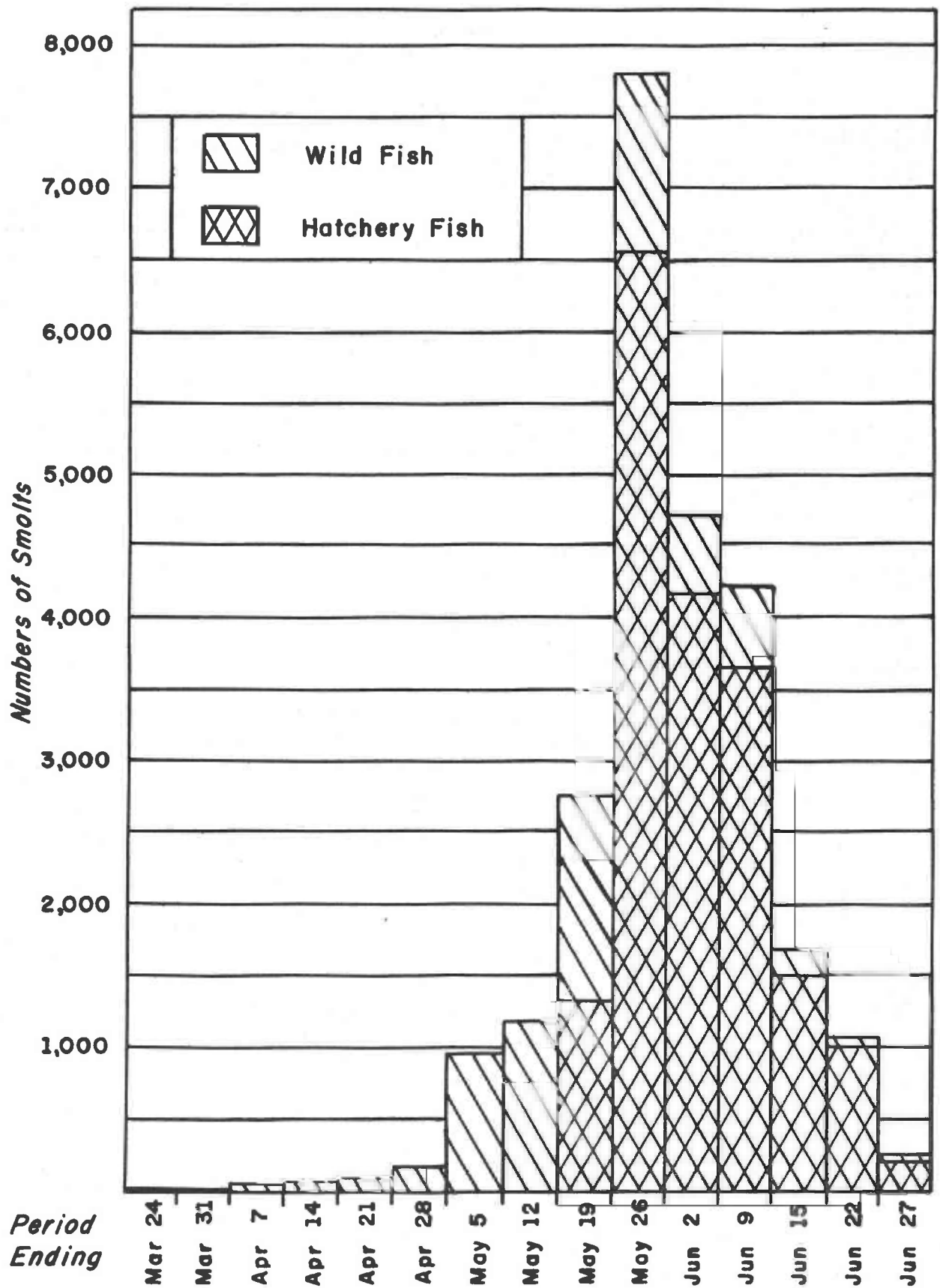
The fish screens in the diversion canal at Marmot Dam have been in operation since 1951. The efficiency of the facility in screening fish from the diversion canal was tested shortly after installation and found to approach 100 percent for fish 4 to 10 inches in length with bypass flows of 5 to 15 cfs.

In 1961 marked juvenile steelhead were found in angler creels at Roslyn Lake, indicating the screens were not 100 percent effective. An examination of the screens failed to reveal the point of entry of the smolts into the canal.

Shortly after the 1963 liberations of marked steelhead above Marmot Dam, reports were received that marked steelhead were again being caught by anglers at Roslyn Lake. Small fish were also observed behind the screens, and several specimens captured proved to be both wild and marked steelhead and coho salmon smolts. A more critical examination of the screens was made, first utilizing SCUBA diving and then with the canal dewatered. A space 1/2 to 3/4 inch wide was discovered along one of the bottom seals, and upon rotating the screens a space sufficiently large to accommodate escaping fish was found at the base of the center screen. Portland General Electric Company adjusted the screens and placed a baffle over the hole. Further testing of the efficiency of the screens is proposed.

An indication of the loss of hatchery steelhead into Roslyn Lake was determined from creel census made on June 22 and 23, which revealed that 35 rainbow trout and 62 marked steelhead were caught by anglers. A total of 6,000 legal-size trout had been planted in the lake. Using this information, it was

Figure 3



TIMING OF SANDY RIVER JUVENILE STEELHEAD MIGRATION,  
MARMOT DAM, 1963

calculated that about 10,600 marked steelhead were present in Roslyn Lake.

The angling regulations for the Sandy River established in 1962, eliminating the summer trout fishery to protect the downstream migrants, remained in effect in 1963. Data obtained by the research study indicate that many of the juvenile steelhead remain two years in the stream, pointing out the need for continuation of summer trout closure.

The coho salmon migration for the 1962-63 season was approximately 300 fish less than the run of the previous year, although still considerably larger than the 6-year average run of 927. Sampling of the run at the Marmot Dam fish ladder revealed a composition of 69 percent adults and 31 percent jacks. Table 85 presents the coho salmon statistics since 1957.

Table 85

Adult Coho Salmon Migration at Marmot Dam,  
Sandy River, 1957-1963

Migratory Season	Adults	Jacks	Total
1957-58	42	222	264
1958-59	83	247	330
1959-60	34	34	68
1960-61	1,102	568	1,670
1961-62	1,557	212	1,769
1962-63	1,006	452	1,458

The Sandy River spring chinook salmon run was almost double the run of 1962. Surveys indicated a good spawning population in the river below the dam. The chinook counts at Marmot Dam are shown for a 10-year period in Table 86.

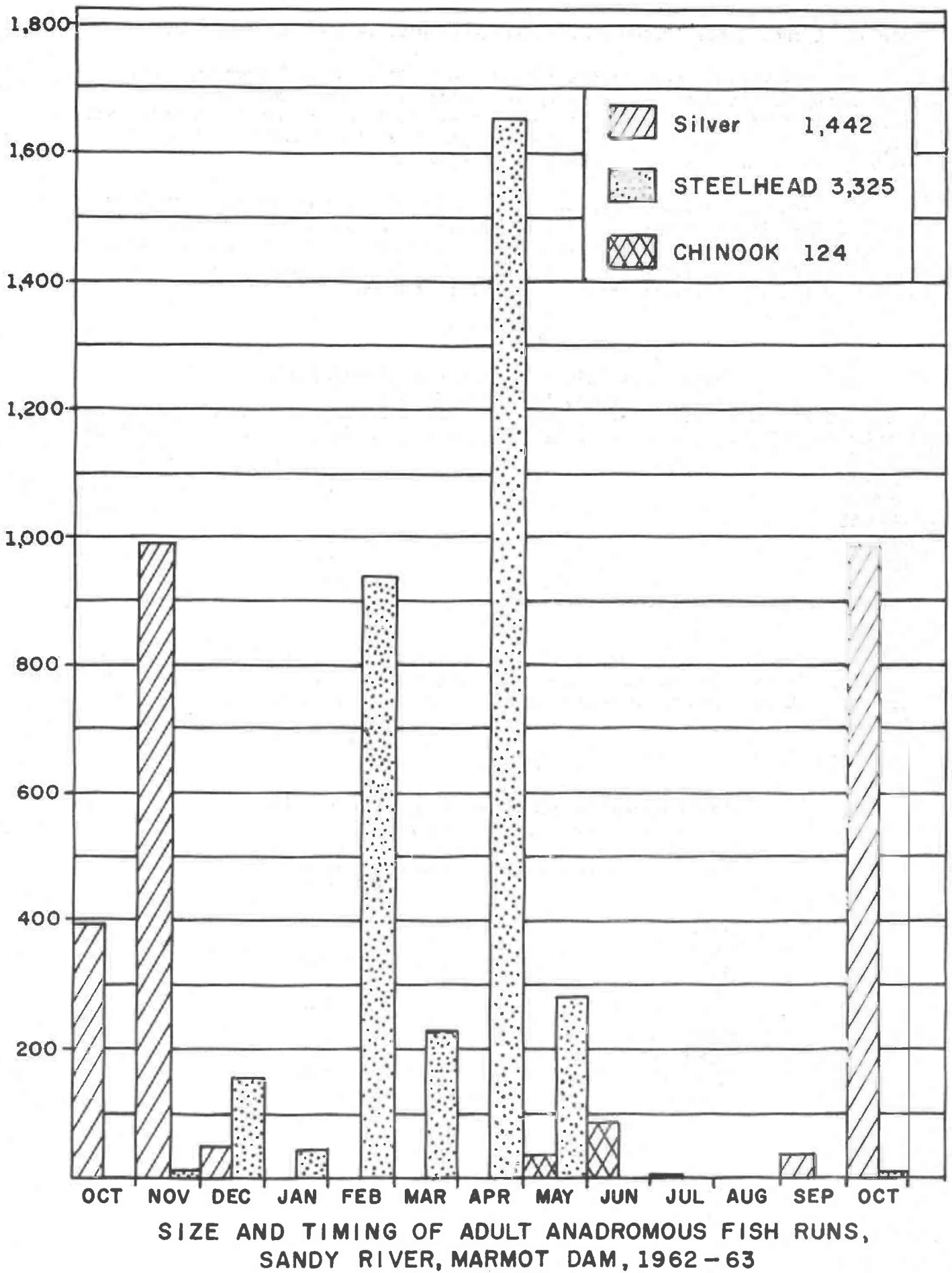
Table 86

Adult Spring Chinook Migration at Marmot Dam,  
Sandy River, 1954-1963

Year	Number of Fish
1954	400
1955	5
1956	0
1957	10
1958	78
1959	304
1960	23
1961	37
1962	65
1963	122

Figure 4 depicts the size and timing of the anadromous salmonid fish runs in the Sandy River.

Figure 4



A substantial sport fishery for shad existed at the lower end of the Sandy River and good catch success was experienced by many anglers. The fish enter the Sandy delta area when high water from the Columbia River floods the area. Interest in this fishery is increasing each year.

For six consecutive years, smelt have failed to enter the Sandy River. The smelt study completed by the Fisheries Research Institute indicates that smelt have a poorly developed homing instinct. The study did not suggest a way to rehabilitate the smelt run in the Sandy River.

#### Molalla River

The spring chinook salmon population of the Molalla River was counted for the third year in August 1963. SCUBA and snorkeling were used to tally the fish which were congregated in resting holes. The area surveyed, as in 1962, extended from the upstream migration barrier at the Henry Creek falls 17 miles downstream to the confluence of Trout Creek. Table 87 lists the numbers of salmon tallied for the three annual surveys.

Table 87

#### Chinook Salmon Resting Hole Counts, Molalla River, 1961-1963

Year	Number of Fish
1961	238
1962	245
1963	274

The distribution of salmon within the survey area varied somewhat from the 1962 patterns in that a larger number of resting holes were occupied.

#### Willamette River Spring Chinook Sport Fishery

The evaluation of the 1963 sport fishery harvest of spring chinook salmon in the Willamette River marks the twentieth year of enumeration. The study, made jointly by the Oregon Fish Commission and the Game Commission, closely follows the original pattern developed by Craig and Townsend of the U. S. Fish and Wildlife Service in 1941 and 1942. The method consists briefly of obtaining an average salmon catch per boat and the number of boats fishing each day during the season. Average boat catches are obtained from records kept by cooperating boat moorages, and the angling pressure and distribution are measured by periodic aerial boat counts.

The area encompassed in estimating the sport fishery harvest extends from Willamette Falls at Oregon City down to the confluence with the Columbia River, and includes Multnomah Channel down to St. Helens. The sampling area is divided into lower and upper sections, with the dividing line being placed at the Ross Island Bridge in the Portland harbor area. Angling in both sections is conducted primarily from boats, although a bank fishery exists in the upper section at Black Point below Willamette Falls and at the mouth of the Clackamas River. Included in total catch estimates are fish caught in the Clackamas River. An auxiliary sampling site in the upper section near Oregon City was established in 1963 to augment the moorage reports which were few in

number. Eighteen days of additional catch records were obtained at this site.

The 1963 sport catch of chinook salmon below Willamette Falls was calculated to be about 13,600 fish, substantially larger than the estimated 9,100 salmon sport catch in 1962. Of this year's harvest, nearly 5,000 fish were taken in the lower river area and approximately 8,600 were caught in the upper area. The salmon catch by weekly intervals and areas is shown in Table 88.

Table 88

Willamette River Spring Chinook Salmon Catch  
by Weekly Intervals and Areas for 1963

Date	Number of Fish by Area		Total Fish
	Below Portland	Above Portland	
March 4-10	140	22	162
11-17	437	202	639
18-24	818	117	935
25-31	206	76	282
April 1- 7	22	0	22
8-14	515	353	868
15-21	593	296	889
22-28	1,686	2,819	4,505
April 29 to May 5	531	2,286	2,817
May 6-12	2	0	2
13-19	0	1,157	1,157
SUBTOTALS	4,950	7,328	12,278
Estimated Clackamas system catch		500	500
Estimated catch from bank fishery near Oregon City		800	800
TOTALS	4,950	8,628	13,578

As has often occurred in past years, the peak catch in the lower and upper river sections was during the same weekly period. About 1,300 salmon were estimated to have been caught by bank anglers near Oregon City and in the Clackamas River system.

The angling intensity in 1963 was calculated to be 84,800 angler-days, a considerable increase over the 1962 intensity. The average catch per angler-day was 0.16 salmon, which represents an average catch per boat of one salmon in 6.2 days of fishing effort. Comparative statistics of the fishery since 1946 are presented in Table 89.



Table 89

A Comparison of Willamette River Spring Chinook Salmon  
Sport Fishery Data, 1946-1963 <sup>/1</sup>

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	102,800	0.16	6.3	18.6
1954	104,100	0.11	9.2	18.6
1955	77,700	0.12	8.6	15.9
1956	84,100	0.19	5.3	18.4
1957	95,500	0.12	8.3	16.1
1958	137,900	0.11	8.9	18.2
1959	134,100	0.14	7.2	19.1
1960	92,300	0.09	11.6	16.4
1961	75,100	0.09	11.7	15.6
1962	74,000	0.12	8.1	16.8
1963	84,800	0.16	6.2	19.0
AVERAGES	91,244	0.13	7.7	17.3

<sup>/1</sup> The Willamette River bank catch and Clackamas River catch were used in computations.

Age-length analysis of salmon in 1963 indicates a predominance of 5-year-old fish in the run. The number and proportion of age groups and average weights are delineated in Table 90. Nearly 2,000 individual fish weights were recorded by moorage operators. Individual weights ranged from 4 to 38 pounds, and the average weight was calculated to be 19 pounds. The combined weight of the total sport catch in 1963 was 258,400 pounds, or about 129 tons of salmon.

The spring chinook salmon escapement over Willamette Falls at Oregon City as enumerated by the Fish Commission totaled 30,300 fish in 1963. This figure, combined with the sport fishery harvest, the estimated Clackamas River escapement, and the known loss (220) in the Willamette Falls area, produces a total run estimate of 48,100 salmon, which compares favorably with the 18-year average run of 50,300 fish. Table 91 summarizes the escapement and sport catch of the Willamette River spring chinook runs since 1946.

### Trout

#### North Fork Reservoir

The sport fishery for trout in North Fork Reservoir was largely sustained by plants of legal-size rainbow trout. Seasonal creel census indicates a catch success of 0.8 fish per angler over the season.

Table 90

Age Composition and Average Weight of Samples of Willamette Spring Chinook  
from the Sport Fishery and Willamette Falls Area /1 1958-1963

Age Groups in Years	1958			1959			1960			1961			1962			1963		
	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total	Number of Fish	Percent of Total
2	0	0.0	1	0.8	4	2.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
3	4	2.5	6	4.5	9	6.0	9	9.4	9	9.4	6	5.0	6	5.0	3	1.1	3	1.1
4	42	26.1	41	30.8	73	48.3	40	41.7	40	41.7	65	54.2	65	54.2	102	37.5	102	37.5
5	114	70.8	84	63.1	64	42.4	44	45.8	44	45.8	48	40.0	48	40.0	164	60.3	164	60.3
6	1	0.6	1	0.8	1	0.7	3	3.1	3	3.1	1	0.8	1	0.8	3	1.1	3	1.1
TOTALS	161	100.0	133	100.0	151	100.0	96	100.0	96	100.0	120	100.0	120	100.0	272	100.0	272	100.0

/1 Stranded fish.



Table 91

## Calculated Willamette River Spring Chinook Runs, 1946-1963

Year	Lower Willamette Sport Fishery Harvest	Willamette Falls Escapement	Clackamas River Escapement (Estimated)	Calculated Total Run	Sport Catch As a Percentage of Run
1946	12,600	53,000	3,000	68,600	18
1947	12,000	45,000	2,000	59,000	20
1948	8,500	30,000	1,800	40,300	21
1949	9,100	27,000	1,800	37,900	24
1950	8,800	14,500	1,500	24,800	35
1951	13,300	34,300	2,000	49,600	27
1952	12,500	52,200	2,800	67,500	19
1953	16,400	76,400	4,000	96,800	17
1954	11,500	31,100	1,800	44,400	26
1955	9,000	22,000	1,500	32,500	28
1956	16,000	58,600	3,000	77,600	21
1957	11,500	39,300	2,000	52,800	22
1958	15,500	45,200	2,100	62,800	25
1959	18,500	31,900	3,000	53,400	35
1960	8,000	14,400	1,800	24,200	33
1961	6,400	18,900	2,200	27,500	23
1962	9,100	26,000	3,000	38,100	24
1963	13,600	30,300	4,000	48,100 <u>/1</u>	28
AVERAGES	11,800	36,000	2,400	50,300	24

/1 Includes 200+ fish loss at Oregon City falls.

To assess the catch of juvenile salmon and steelhead in the reservoir by trout anglers, a creel census was conducted by Fish Commission personnel of the North Fork Evaluation Study on weekends from April 20 to June 1. A summary of the catch composition is as follows: rainbow, 62.5 percent; steelhead (juvenile), 33.5 percent; coho (juvenile), 3.3 percent; and chinook (juvenile), 0.7 percent.

The research team of the Fish Commission, studying the behavior of salmonids in reservoirs, conducted trap-net studies in the North Fork impoundment in 1962. Summary of the net catches is presented in Table 92.

#### Timothy Meadows Reservoir

The over-all angling season in Timothy Lake produced fair catches with the average being 0.9 fish per angler. Rainbow and brook trout comprised the bulk of the catch. A few kokanee of the 1961 plant were taken late in the season. The harvest by species is as follows: rainbow trout, 65 percent; brook trout, 30 percent; blackspotted (Lahontan) cutthroat, 3 percent; cutthroat, 1 percent; and kokanee, 1 percent. The annual fish population survey for the lake is displayed in Table 93.

Almost the entire population of rainbow trout was infected with tapeworms, as was a smaller proportion of the brook trout. SCUBA diving was used to assess the loss of trout during the summer. Courses totaling about 5,500 feet were traversed underwater, but only four fish carcasses were found. It appeared that mortality due to parasitism did not develop as anticipated. Anglers also did not report numbers of dead fish on the bottom as has been the case in other years.

Spawning surveys were made on tributaries of the lake. Crater Creek, one of the major tributaries, provided the best rearing habitat and received the greatest utilization by rainbow and brook trout. SCUBA observations show that some spawning occurs in gravel deposits of stream beds within the impoundment.

A limnological study of the lake was undertaken in 1963. Tests made during the summer months included temperature, turbidity, and dissolved oxygen concentrations. Periodic qualitative plankton samples were also collected.

#### Roslyn Lake

A fish population check early in the year indicated a good holdover of the legal-size trout stocked in 1962. See Table 93. These fish had made excellent growth. An attempt will be made to maintain the sport fishery in the lake with fingerling stocking. During the summer, 48,000 fall rainbow fingerling were released. Survival and growth of the young fish will be checked early in 1964.

#### High Lakes

Fifteen of the high Cascade lakes were surveyed for fish populations and growth during the summer. The results of the surveys are presented in Table 93.

Table 92

## Trap Net Summary, North Fork Reservoir, December 1962 - November 1963

Species	Number of Fish by Month												Total Fish	Percent of Total
	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.		
Chinook <u>1</u>	37	11	109	16	8	18	58	48	0	8	17	88	418	1.41
Coho <u>1</u>	2,160	494	5,888	1,094	1,796	2,476	246	538	9	163	1,106	7,736	23,706	79.79
Blueback	4	0	0	0	0	0	2	3	0	0	0	3	12	0.04
Steelhead <u>1</u>	320	95	775	134	322	678	58	61	287	172	265	371	3,538	11.91
Rainbow	33	11	52	11	15	23	8	4	0	38	158	61	414	1.39
Brown trout	1	0	1	0	0	0	0	0	0	0	0	0	2	0.01
Dolly Varden	0	0	1	0	0	0	0	0	0	0	0	0	1	0.005
Brook trout	0	0	1	0	0	0	0	0	0	0	0	0	1	0.005
Whitefish	0	0	10	0	0	1	0	0	0	0	28	1	40	0.13
Suckers	0	0	2	0	1	12	7	179	637	533	14	0	1,385	4.66
Dace	6	0	2	0	0	3	0	9	28	40	4	7	99	0.33
Cottids	0	1	1	0	2	0	1	0	0	2	16	0	23	0.08
Others <u>2</u>	0	4	39	1	2	5	3	0	0	1	9	8	72	0.24
TOTALS	2,561	616	6,881	1,256	2,146	3,216	383	842	961	957	1,617	8,275	29,711	100.00

1 Juveniles.2 Includes cutthroat, adult steelhead, brook lamprey, and coho jacks and adults.

Table 93

Composition and Length Frequencies of Fish Populations of Some Lakes and Reservoirs  
in the Lower Willamette District, 1963

Lake	Number of Nets	Species	Number in Sample	Percent of Total	Number of Fish in 1-Inch Size Groups																			
					3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Anvil	2	BT	9	64.3						1	4	3	1											
		Ct	5	35.7	1	1	1	3																
Blue	7	BC	1	1.7							1													
		GS	3	5.2	1	1	1																	
	28	BG	28	48.3	2	7	6	13																
		LB	5	8.6			2		2			1												
		Sq	21	36.2								9	9	3										
Burnt	2	BT	8	100.0	1						4	2		1										
Cast	1	BT	7	100.0					2	3	2													
Goodfellow, Middle	2	BT	59 / 1	100.0							9	6	20	8			1	1						
Goodfellow, Upper	3	Rb	1	100.0																				1
Memaloose	2	BT	18	100.0						2	10	6												
Plaza	2	BT	18	100.0				1		6	3	6	1	1										
Rock, Upper	2	BT	15	78.9				2	4				1	1	5	2								
		Rb	4	21.1							2	2												

Table 93 (continued)

Lake	Number of Nets	Species	Number in Sample	Percent of Total	Number of Fish in 1-Inch Size Groups																				
					3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Roslyn	4	Rb	22	68.7							5	7	2	7	1										
		Ct	2	6.3							1	1													
		Wf	5	15.6							3	1	1												
		CSu	3	9.4							3														
Round	2	BT	25	75.8							3	2	6	6	1										
		Br	8	24.2							2		1	1	2	2									
Shining	4	BT	59	100.0							5	14	7		4	1									
Skookum	2	BT	22	100.0							1	1	4	7	8	1									
Squaw	2	BT	59	100.0							1	1	19	13	7	12	5	1							
Surprise No. 2	2	BT	9	100.0																					
Timothy	12	Rb	88	66.7							1	26	17	6	5	11	14								
		BT	41	31.0							5	9	4	3	6	6									
		SCt	3	2.3																					
Trillium	3	Rb	1	50.0																					
		BT	1	50.0							1														
Wendy Meadows	13	Ct	32	100.0							9	13	5	4	1										
/1 Some specimens (13) damaged by crayfish.					/2 Some specimens (28) damaged by crayfish.													/3 Sample obtained by hook and line.							

The average lengths of maturing female trout and comparisons with previous inventories are shown in Table 94. Experimental plantings of golden trout were made in two small lakes (Cachebox and Ercrama) at about the 4,500-foot elevation in the Bull of the Woods area.

### Scoggin Creek

The Bureau of Reclamation is seriously considering the construction of an irrigation and flood control dam on Scoggin Creek, a tributary of the Tualatin River. The size of the proposed impoundment will be in excess of 600 surface acres. The development of a resident fish population will be in order when the dam is constructed. To determine the native fish populations in the area, the field crew of the Basins Section sampled the streams in the area of the proposed impoundment by electrofishing. The delineation of the sampling in Scoggin, Seine, and Tanner Creeks is made in Table 95.

The annual creel census summary for the North Willamette District is presented in Table 96.

### Warm-Water Game Fish

#### Blue Lake

An inventory of the fish population of Blue Lake made in November indicated the existence of some interesting and puzzling conditions. The summary of the inventory is displayed in Table 93. The black crappie were not much in evidence, although net samples made early in 1962 indicated good spawning success from the adults stocked in the lake after the chemical treatment in 1961. The bluegill, the predominant species captured, had not been taken after chemical treatment. Another peculiarity was the presence of green sunfish, a rarity in Oregon waters. The possibility exists that both of the species were introduced with the largemouth bass fry stockings from either Montana or California. The squawfish is the only nongame species found in the lake since rehabilitation.

### Habitat Improvement

The Mount Hood National Forest has initiated stream clearance projects which include the removal of log and debris jams and rock obstacles, as well as channel improvement. Jams were removed from Camp Creek, a Sandy River tributary, which allowed steelhead to utilize additional stream area. On the Clackamas River system, jam removal and stream channel improvements were made on the main river in the Big Bottom area, at the mouth of Pinhead Creek, and on Fish Creek and the Hot Springs Fork of the Collawash River. A boulder barrier was removed from the Oak Grove Fork of the Clackamas River above Timothy Lake.

Improvements were made in the small inlet tributary of Emerald Lake in the Molalla River area to improve the access to spawning gravel. The lake is supported entirely by the natural reproduction of native cutthroat trout.



Table 94

Average Length of Maturing Female Trout in Lakes  
of Lower Willamette District, 1963

Lake	Species	Average Fork Length (in Inches) of Maturing Females	Average Length Last Check	
			Year	Length (Inches)
Anvil	BT	9.8	1957	8.4 <u>/1</u>
	Ct	7.5 <u>/1</u>		
Burnt	BT	9.8	1959	7.9
Cast	BT	8.8 <u>/1</u>	1959	
Goodfellow, Middle	BT	10.5		
Memaloose	BT	9.7	1957	
Plaza	BT	9.1	1957	6.7 <u>/1</u>
Rock, Upper	BT	9.8	1957	7.2 <u>/1</u>
	Rb	10.5 <u>/1</u>		
Round	BT	9.9	1957	8.7 10.6 <u>/1</u>
	Br	11.5 <u>/1</u>		
Shining	BT	9.5	1957	8.4
Skookum	BT	8.6	1957	6.6 <u>/1</u>
Squaw	BT	9.5	1957	9.3
Surprise No. 2	BT	12.6	1957	7.5
Timothy	Rb	11.6	1962	10.5 <u>/1</u>
	BT	9.7		
	SCt	12.3 <u>/1</u>		
Wendy Meadows	Ct	7.2 <u>/1</u>	1957	7.2 <u>/1</u>

/1 Small sample of maturing female trout obtained.

Table 95

Electrofishing Samples of Scoggin Reservoir Area Streams,  
1963

Stream	Species	Number Collected	Percent of Sample	Number of Fish in 2-Inch Size Groups						
				2	4	6	8	10	12	14
Scoggin Creek	Co	39	18.6		39					
	Ct	31	14.8	4		6	14	3	3	1
	Rb	1	0.4						1	
	D	50	23.8	32	18					
	Lam	22	10.5				10	12		
	Cot	40	19.0	25	15					
	RsS	27	12.9	12	15					
Seine Creek	Co	25	53.2		25					
	Ct	2	4.3			1	1			
	St	4	8.5	1		2	1			
	Cot	16	34.0	6	10					
Tanner Creek	Co	21	41.2		20	1				
	Ct	7	13.7	1		3	2	1		
	Cot	13	25.5	10	3					
	D	10	19.6	6	4					

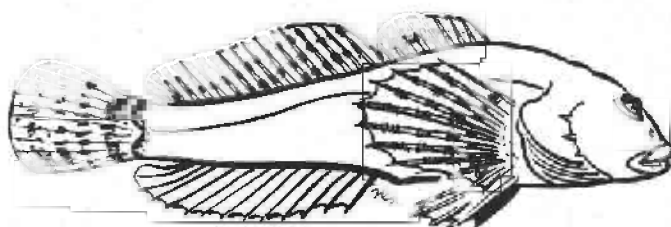


Table 96

## Creel Census Summary, Lower Willamette District, 1963

Lake or Stream	Species	Number of Fish in Size Groups by Inches									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	20-22	22 & Over						
Brook Lake	Bt	3	65	39	5	1	1				114	8	65	14.3	0.6	1.75
Buck Lake	Bt	6	29	5							40	8	27	5.0	0.7	1.48
Camp Creek	Rb		5								5	11	25	0.5	5.0	0.20
Clackamas River	Rb	21	36	34	3						94					
	Ct	11									11					
	Ch								2		2					
	Wf					1					1					
	St								8		8	213	545	0.5	4.7	0.21
Clear Creek	Rb	1	3	4							8	9	18	0.9	2.3	0.44
Collavash River	Rb	17	22	29							68	30	89	2.3	1.3	0.76
Collins Lake	Rb		48	9	3						60					
	Bt	2									$\frac{2}{62}$	23	90	2.7	1.5	0.69
Columbia River (Section 1)	Rb	29	23	7	1						60					
	Ct		1	8	4	1					14					
	St							1	52		53					
	Ch						2	2	18		22					
	Co							1			1					
	Sh						16		2		58					
	LB										1					
	B	2									2					
	Sg									3	$\frac{3}{214}$	827	2,614	0.3	12.2	0.08
Cripple Creek Lake	Bt		10	20	19	6					55	9	60	6.1	1.1	0.92

Table 96 (continued)

Lake or Stream	Species	Number of Fish in Size Groups by Inches										22 & 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	20-22									
Dairy Creek, East	Ct		3	3								6	6	17	1.0	2.8	0.35	
Dinger Lake	Ct	4	2									6						
	BT	28	24	25	5	1						$\frac{83}{89}$	8	86	11.1	1.0	1.03	
Eagle Creek (Clackamas)	Ch										1	1						
	St											$\frac{0}{1}$	28	99	0.04	99.0	0.01	
Fish Creek	Rb	2	11									13	5	15	2.6	1.2	0.87	
Fish Lake	Ct	4	13	1		1						19						
	BT	3	2	2	5							$\frac{12}{31}$	6	40	5.2	1.3	0.78	
Gales Creek	Rb	2	22	15			1					40						
	Ct		2	1								3						
	St										1	$\frac{1}{44}$	38	115	1.2	2.6	0.38	
Gawley Creek	Rb	9										9	6	24	1.5	2.7	0.38	
Hideaway Lake	BT	19	15	8								42	12	58	3.5	1.4	0.72	
Johnson Creek	Ct	2										2	13	15	0.2	7.5	0.13	
Lost Creek	Rb	14	6	2								22	7	17	3.1	0.8	1.29	
Lower Lake	BT	1										1	5	5	0.2	5.0	0.20	
Milton Creek	Rb	6	6	3	1							16						
	Ct	2	6	59								$\frac{67}{83}$	35	85	2.4	1.0	0.98	

Table 96 (continued)

Lake or Stream	Species	Number of Fish in Size Groups by Inches									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	20-22	22 & Over						
Mirror Lake	Bt	3	6								9	9	31	1.0	3.4	0.29
Molalla River	Rb	158	70	1							229					
	Ch									3	232	70	223	3.3	1.0	1.04
North Fork Reservoir	Rb	101	976	13							1,090					
	St	301									301	1,787	6,363	0.8	4.6	0.22
											1,391					
Oak Grove Fork	Ct	5	3								8	5	9	1.6	1.1	0.89
Pyramid Lake	Bt	2			1	35					38	19	36	2.0	0.9	1.06
Rock Creek	Rb		9	1							10					
	Ct	6	1								7	11	12	1.5	0.7	1.42
											17					
Roslyn Lake	Rb	10	25	34	9	5					83					
	St	57	4								61	155	456	0.9	3.2	0.32
											144					
Round Lake	Rb	1	12	6	2		1				22					
	Br		5	6	10	1			1		23	15	79	3.0	1.8	0.57
											45					
Sandy River	St					1	1			116	118					
	Rb			1							1					
	Ct						1				1					
	Ch									1	1					
	Sh						42	3			45	1,847	4,596	0.1	27.7	0.04
											166					

Table 96 (continued)

Lake or Stream	Species	Number of Fish in Size Groups by Inches									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	20-22	22 & Over						
Santosh River	BC	2									2					
	WC	5									5					
	CRC		1								$\frac{1}{8}$	6	14	1.3	1.8	0.57
Sauvie Island	LB		4			1					5					
	WC		49	15							64					
	YP	3									3					
	PC	3	2								5					
	B	39	1	1							$\frac{41}{118}$	147	397	0.8	3.4	0.30
Scappoose Creek, North Fork	Rb		1								1					
	Ct	24	35	48							$\frac{107}{108}$	68	126	1.6	1.2	0.86
Scappoose Creek, South Fork	Rb	4	1								5					
	Ct	23	44	1							$\frac{68}{73}$	50	130	1.5	1.8	0.56
Shellrock Creek, West	BT		31	3							34	6	11	5.7	0.3	3.09
Shellrock Lake	BT	6	28	14							48	7	40	6.9	0.8	1.20
Shining Lake	BT			1							1	9	14	0.1	14.0	0.07
Squaw Lake	BT	18	8		1						27	14	22	1.9	0.8	1.23
Still Creek	Rb	6	79	23							108	40	101	2.7	0.9	1.07

Table 96 (continued)

Lake or Stream	Species	Number of Fish in Size Groups by Inches									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	20-22	22 & Over							
Timothy Lake	Rb	70	107	59	11	1	1				249						
	Ct	3				1		1			5						
	BT	46	61	7	2						116						
	K	3	1								4						
	SCt	1		3	7						<u>11</u> 385		420	1,530	0.9	4.0	0.25
Trillium Lake	Rb	1	9	74	5	7					96	102	283	0.9	2.9	0.34	
Tualatin River	Rb		1								1						
	Ct		1								<u>1</u> 2	8	8	0.3	4.0	0.25	
Twin Lake, Lower	BT	33	16	6	3						58	10	46	5.8	0.8	1.26	
Twin Lake, Upper	BT	27	7								34	7	18	4.9	0.5	1.89	
Veda Lake	BT	28	3	2							33	7	41	4.7	1.2	0.80	
Welcome Lake	Ct	1									1						
	BT	93	32	4							<u>129</u> 130	21	110	6.2	0.8	1.18	
Welcome Lake, West	BT		3	3							6	6	4	1.0	0.7	1.50	
Willamette River	St										3	3					
	Ch										174	174					
	Sh					4	31	3			<u>45</u> 222	1,931	4,400	0.1	19.8	0.05	

## LA GRANDE DISTRICT, NORTHEASTERN OREGON

Robert C. Sayre

### Fish Inventory

#### Anadromous

Creel data were collected from salmon and steelhead anglers on the Grande Ronde, Snake, and Wenaha Rivers and Pine Creek.

Results of creel census of anadromous species on the four streams are shown in Table 97.

The results of steelhead spawning ground counts in the La Grande District for 1963 are presented in Table 98. The steelhead counts made in June, July, and August resulted from stream habitat inventory work. Some redds may have lost their identity because of the late date of the surveys.

A survey for spawning steelhead was conducted for the first time in the main stem of the Grande Ronde River in 1963. Adult fish could not be observed in the murky water of the spring freshet but when river volume diminished the steelhead redds became visible. High water velocity may have leveled some redds before counts were made. The survey revealed that the best spawning gravel and the most spawning was between the upper limits of the impoundment of the proposed Grande Ronde River dam and the head of the State Ditch east of Island City. Just over 79 percent of all redds observed were in this area. There were 36 redds, or 27 percent of the redds, in the proposed impoundment area. The distribution of redds by area is shown in Figure 5.

Fish population sampling was conducted on Meadow Creek to determine if the stream had recovered from the U. S. Forest Service DDT spruce budworm control program of 1953. Good steelhead reproduction and substantial numbers of fingerlings were found.

The spawning ground counts in the Pine Creek watershed were made early and are not indicative of total 1963 use. Past surveys in this system have revealed a run of steelhead spawning in late June.

The results of spring chinook spawning ground counts conducted on streams of the La Grande District in 1963 are shown in Table 99. This table includes surveys on five streams conducted by the Fish Commission of Oregon. The Wenaha River survey was conducted later than planned and no redds were found in the main river downstream from the mouth of Crooked Creek. Redds in this lower section would have been flattened by water velocity prior to the survey. The best spawning gravel and the greatest use were observed on the South Fork of the Wenaha River.

Only 2 salmon redds were found on upper Eagle Creek in the area where 44 were found in 1962. No redds were located on East Eagle Creek.

A comparison of migratory fish counted at Brownlee and Oxbow Dams from 1958 through October 1963 is presented in Table 100. The decline of anadromous species reaching these facilities is alarming.



Table 97

Creel Census of Anadromous Species from Four Streams  
of the Northeast Region, 1963

Stream	Check Period	Anglers Interviewed	Hours Angling	Catch		Fish per Angler	Hours per Fish
				Steelhead	Salmon		
Grande Ronde River	12/10/62 - 3/10/63	154	346	24	0	0.16	14.4
	9/8/63 - 10/20/63	23	100	5	0	0.22	20.0
Pine Creek	2/11/63 - 3/11/63	5	10	0	0		
Snake River	12/2/62 - 4/23/63	147	588	32	0	0.22	18.4
Wenaha River	5/1/63 - 6/20/63	21	81	1	9	0.48	8.1

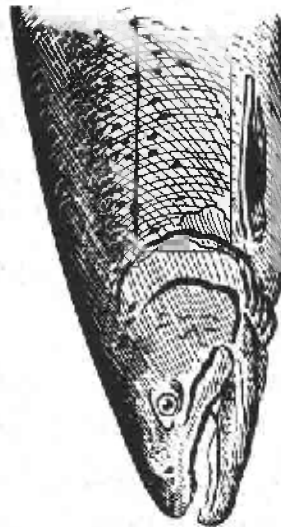


Table 98

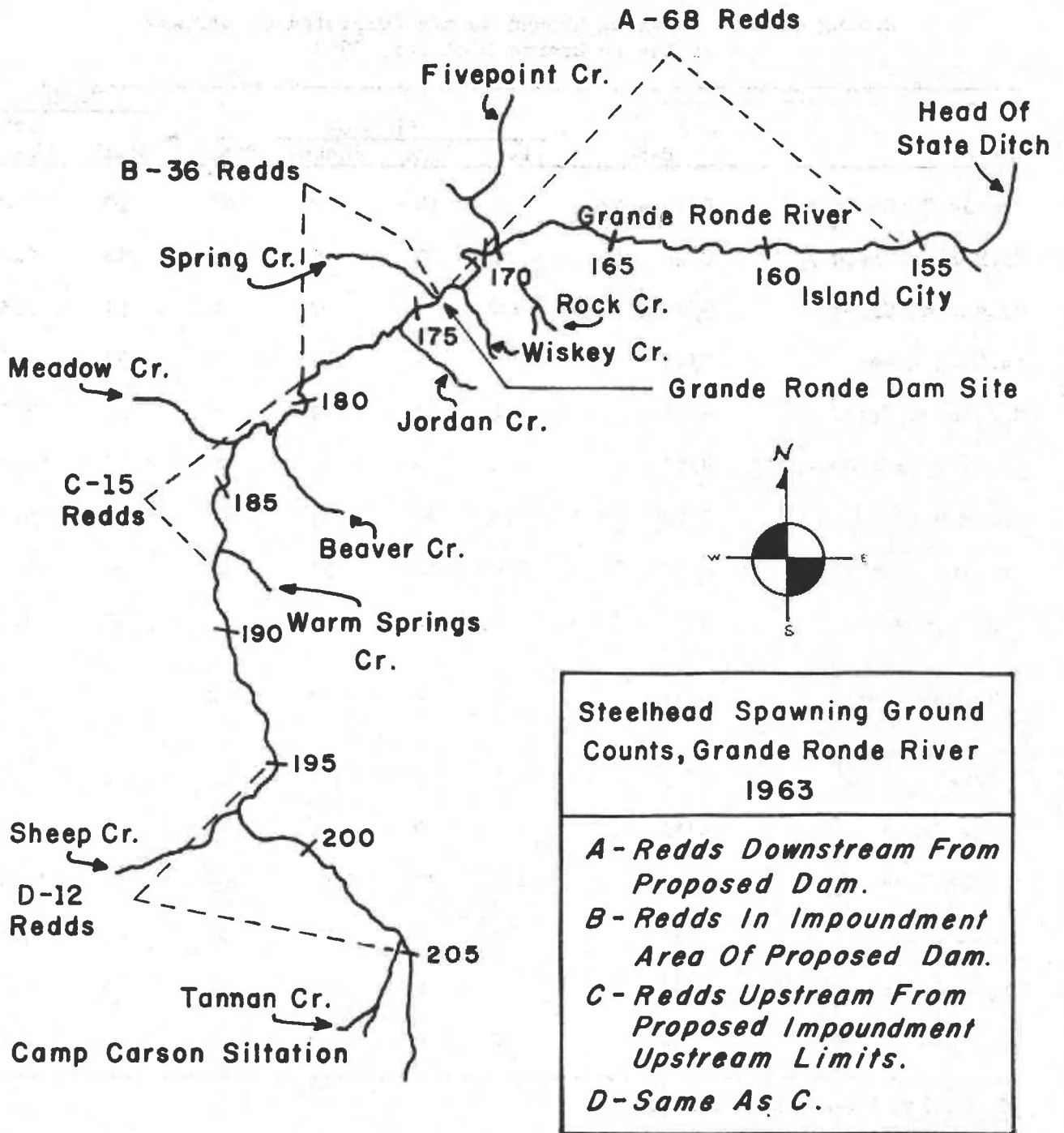
## Steelhead Spawning Ground Counts, La Grande District, 1963

Stream	Date	Miles Checked	Steelhead	Redds	
				Total	per Mile
<u>Union County</u>					
Grande Ronde River	6/12 - 7/2	40.25	0	131	3.3 <u>/1</u>
Beaver Creek	8/6	12.75	0	14	1.1 <u>/1</u>
Dry Beaver Creek	8/8	4.25	0	20	4.7
West Beaver Creek	8/7	1.00	0	5	5.0
Meadow Creek	6/6 - 7/18	7.25	0	42	5.8
Dark Canyon Creek	5/13	1.00	0	3	3.0
McIntyre Creek	5/12	4.00	0	0	0.0
McCoy Creek	6/6	1.00	0	7	7.0
Peet Creek	7/15	1.25	0	18	14.4
Smith Creek	7/16	1.50	0	4	2.7
Waucup Creek	7/12	3.75	0	8	2.1 <u>/1</u>
Sheep Creek	7/23	10.75	0	34	3.2 <u>/1</u>
Chicken Creek	5/13	0.25	0	0	0.0
<u>Wallowa County</u>					
Hurricane Creek	5/10	2.0	1	10	5.0
Chesnimnus Creek	5/10	3.0	4	15	5.0
West Fork Peavine Creek	5/8	2.0	4	13	6.5
East Fork Peavine Creek	5/8	2.0	18	14	7.0
McCarty Creek	5/8	1.0	2	2	2.0
Summit Creek	5/9	2.0	29	30	15.0
<u>Baker County</u>					
East Pine Creek	5/15	0.5	1	10	20.0 <u>/2</u>
Clear Creek	5/15	0.5	0	8	16.0 <u>/2</u>
North Pine Creek	5/15	2.0	0	5	2.5 <u>/2</u>
TOTALS		104.0	59	393	

/1 Some redds had probably lost identity by the late date of the survey.

/2 Surveys made before late spawning run from the Snake River.

Figure 5



**LOCATION OF STEELHEAD REDDS AS OBSERVED IN THE GRANDE RONDE RIVER IN 1963 IN RELATION TO THE PROPOSED GRANDE RONDE DAM**

Table 99

Spring Chinook Spawning Ground Counts Completed on Streams  
of the La Grande District, 1963

Stream	Date	Chinook				Redds	
		Live	Dead	Jacks	Total	Total	per Mile
Grande Ronde River	8/19 - 9/5	51	10	0	61	20	2.8
Catherine Creek <u>/1</u>	8/28	24	0	4	28	18	2.0
Catherine Creek	9/4	66	4	0	70	21	2.3
Wallowa River	9/24	1	8	0	9	37	4.6
Hurricane Creek	9/25	2	7	0	9	29	5.8
Lookingglass Creek <u>/1</u>	8/27	38	2	19	59	55	10.0
Minam River <u>/1</u>	8/26	73	22	29	124	63	8.4
Lostine River <u>/1</u>	8/24	105	38	52	195	97	12.1
Wenaha River	9/11 - 9/13	2	2	0	4	31	1.6
North Fork Wenaha River	9/11	1	3	0	4	15	7.5
South Fork Wenaha River	9/10	7	14	3	24	132	17.4
Butte Creek	9/12	0	0	0	0	8	4.0
Imnaha River <u>/1</u>	8/25	135	40	34	209	133	13.7
North Pine Creek	9/14	4	8	18	30	20	13.3
Eagle Creek	9/14	0	0	0	0	2	0.7
East Eagle Creek	9/14	0	0	0	0	0	0.0

/1 Oregon Fish Commission survey.

Table 100

A Comparison of Migratory Fish Counted at Facilities  
of Brownlee and Oxbow Dams from 1958 through October 1963

Facility	Species	Year					
		1958	1959	1960	1961	1962	1963
<u>Oxbow - Upstream</u>	Ch	14,329	13,285	7,499	8,692	3,390	1,100
	St	3,688	4,760	1,729	1,568	1,330	774
	Trout	67	1	75	0	0	0
TOTAL		18,084	18,046	9,303	10,260	4,720	1,874
<u>Brownlee - Downstream</u>	Ch		129,572	43,803	19,767	13,646	13,457
	St		18,247	2,490	2,143	1,530	1,227
	Trout		2	24	0	0	0
TOTAL			147,821	46,317	21,910	15,176	14,684

Results of the nonscreened diversion sampling carried out in the La Grande District in 1963 are presented in Table 101. Irrigation did not commence as early on the Grande Ronde River as it did in 1962 because of unusual and inclement weather. Sampling of diversions indicated that most of the smolt movement was completed prior to heavy diversion of river water.

Two small diversions from upper Catherine Creek, that were once screened and then abandoned, were found to contain chinook fry. New concrete screen boxes were poured on these ditches.

The sampling of diversions on Goose Creek and the lower Powder River occurred too late in the spring. The spring runoff had occurred around mid-April. The stream flow of all the small tributaries of the lower Powder River was low during the survey. Water temperatures up to 75° F. were common on these streams in midafternoon.

#### Resident Trout

The Wallowa Lake creel census was discontinued after July in order to perform other duties. Table 102 is a summary of the calculated seasonal averages, and Table 103 is a summary of the calculated seasonal totals of angler effort and harvest at Wallowa Lake for 1963. The angling pressure and rainbow catch would have been similar to that of 1961 had the creel census continued through October. Angling pressure has remained low for the past three years on this water.

A summary of the general trout creel census conducted in the La Grande District in 1963 is shown in Table 104. Of special interest is the catch of 5.3 fish per angler at Unity Reservoir. Most of this catch occurred in late September and October as the reservoir neared minimum pool, and resulted from the fingerling releases of 1963. Rainbow trout to 11 inches in length were caught from Unity Reservoir the last week of the season.

Table 101

## Nonscreened Diversion Sampling, La Grande District, 1963

Stream	Watershed	Date	Diversion Sampled	Fish Observed		Sampling Method
				Species	Number	
Little Creek	8	4/10	State No. 2	St	26	DC shocker
				Su	6	
				RSS	2	
				D	1	
Grande Ronde River	8	3/27	Thompson	Clm	18	DC shocker
				Sq	8	
				RSS	11	
Grande Ronde River	8	5/3	Gekeler	St	2	DC shocker
				Sq	7	
				Clm	18	
				RSS	10	
				D	1	
				Cot	4	
				Lam	5	
Grande Ronde River	8	5/3	Orodell	St	2	DC shocker
				Sq	7	
				Clm	2	
				RSS	1	
				Cot	7	
				D	19	
				CSu	1	
				Lam	3	
Grande Ronde River	8	5/3	Thompson	St	1	DC shocker
				Sq	2	
				Clm	57	
				RSS	2	
				CSu	1	

Table 101 (continued)

Stream	Watershed	Date	Diversion Sampled	Fish Observed		Sampling Method
				Species	Number	
Little Creek	8	5/24	Unknown State No. 2		0	Rotenone
					0	Rotenone
Little Creek, North Fork	8	6/5	Unknown	Rb	2	Rotenone
Catherine Creek	8	6/5	Schroth Lower Davis Upper Davis	Ch	12	Rotenone
					0	DC shocker
					0	DC shocker
Powder River	9	5/28	Colvard	BLB	1	Rotenone
				Sq	10	
				CSu	2	
				Cp	1	
Powder River	9	5/28	Shold	St	2	Rotenone
				Sq	3	
				Clm	2	
				Rss	4	
Little Timber Canyon Creek	9	5/28	Shold		0	Rotenone
Goose Creek	9	5/28	Duby	Rb-St D	8	Rotenone
					1	
Goose Creek	9	5/28	Lower Phillips		0	Rotenone

Table 102

Calculated Seasonal Averages of Angler Effort and Harvest  
at Wallowa Lake for 1963 with Two Years Comparison

	Boat			Bank		
	1959	1961	1963	1959	1961	1963
Days in sample	133	133	102	133	133	102
Average number of hours per angler trip	2.9	3.2	4.7	2.0	2.2	2.8
Average number of fish per angler trip	2.1	1.4	2.3	3.5	3.3	1.2
Average number of fish per hour	0.7	0.5	0.3	1.7	0.6	0.9
Average number of anglers per boat	2.3	2.1	1.8			
Average number of possible trips per 12-hour sampling day	4.1	3.2	4.7	6.0	5.5	4.7

Table 103

Calculated Seasonal Totals for a 102-Day Random Sampling Period,  
Wallowa Lake, 1963

	Year	Total Angler Trips	Total Catch	Rainbow	Kokanee	Lake Trout	Dolly Varden
Boat	1963	1,724	7,137	6,645	178	314	0
Bank	1963	3,886	4,663	4,150	125	340	48
TOTALS	1963	5,610	11,800	10,795	303	654	48
	1961	7,376	16,501	15,282	934	285	0
	1959	12,655	30,295	25,770	3,821	504	200
	1958	13,103	42,862	32,263	9,843	756	0
	1956	14,846	46,020	32,356	13,190	0	474

Note: Sampling periods prior to 1963 are for 133 days.



Table 104

A Summary of Trout Creel Census Data,  
La Grande District, Northeast Region, 1963

Water	Species	Number of Fish by 2-Inch Size Groups					Total Fish	Total Anglers	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14+				
Burnt River South Fork	Rb	12	35				47	15	3.1	1.3
Grande Ronde River	Rb	4	24	12	2	1	43	32	1.3	0.4
Haines Pond	Rb	29	11	2	2		44	13	3.4	1.2
Morgan Lake	Rb	412	885	173	21	15	1,506			
	BT	41	147	86	9	1	<u>284</u> 1,790	249	7.2	2.4
Murray Reservoir	Rb	42	93	20	11		166	96	1.7	0.6
Oxbow Reservoir	Rb		3	3	4		10	14	0.7	0.4
Snake River	Rb		2		6	15	23	9	2.6	0.5
Unity Reservoir	Rb	391	24	2			417	79	5.3	1.3
Wallowa Lake	Rb	38	106	93	8	1	246			
	LT	3	7	10	3	3	26			
	DV				1		1			
	K			4			<u>4</u> 277	323	0.9	0.4
Wenaha River	Rb	4	24				28			
	DV				1		<u>1</u> 29	9	3.2	1.5
Wallupa Creek	Rb	13	40	4			57	57	1.0	1.6

Results of gill-netting in the impounded waters of the La Grande District are presented in Table 105. Netting at Unity Reservoir in September produced two bridgelip suckers. Gill-netting was done for the first time at Thief Valley Reservoir. Three Kamloops trout and many coarse fish were caught. The Kamloops were introduced into this water in 1961 as fry.

Table 106 is a summary of the high lake survey work for 1963 with a comparison of fish condition found on previous surveys. The Lahontan cutthroat trout released in 1959 had grown to 13.0 inches in length in Lookingglass Lake and 9.5 inches in length in Bear Lake. The large black spots of this strain were outstanding at these high elevation waters.

Anthony Lake was netted before the release of legal trout in order to determine the survival through the summer and winter. Only five rainbow trout were netted in Anthony Lake prior to the release of legal trout. A 17.3-inch brook trout was also taken in the Anthony Lake sampling.

Netting at Grande Ronde Lake revealed the expected slow growth of rainbow fingerlings released in 1962. These fish did afford angling in 1963 and the release of a few fingerlings every other year should be continued.

#### Warm-Water Game Fish

Warm-water game fish creel data collected by Oregon State Police in the La Grande District are presented in Table 107. Anglers again enjoyed good black crappie angling at Brownlee Reservoir. The Hells Canyon area of the Snake River was excellent for smallmouth black bass, channel catfish, and sturgeon.

### Habitat Improvement

#### Anadromous

Downstream migrants were trapped at 34 rotary fish screen bypass trap boxes in Watersheds 8 and 9 in 1963. The number of fish trapped are shown in Table 108.

Anadromous species observed at 23 rotary screen trap boxes are shown in Table 109. Most of the coho salmon salvaged on the Wallowa River were observed at the new screen Unit No. 8-209. This diversion has not been screened in the past. The ditch heads in the main coho salmon spawning area on the Wallowa River between Enterprise and Joseph. Greater numbers of coho smolts were salvaged at screen No. 8-12, west of the town of Wallowa, than in the past. This may be indicative of the increased smolt salvage by the new rotary screens installed on the upper Wallowa River under the Columbia River Fishery Development Program.

New screen units on Hurricane Creek salvaged good numbers of steelhead, chinook, and coho salmon.

The Eagle Creek chinook smolt movement remained good in 1963. According to the salmon spawning survey of 1963, the smolt numbers should be drastically reduced in 1965.

Table 105

A Comparison of Composition and Length Frequency of Catch by Gill Nets  
in Impounded Waters of the La Grande District, Northeast Oregon, 1963

Lake	Date	Number of Sets	Game Fish			Coarse Fish		
			Species	Number	Fork Length Variation (Inches)	Average Length (Inches)	Species	Number
Morgan	3/29/63	2	Rb	76	6.5 to 18.0	9.2		0
			BT	35	6.5 to 12.1	8.9		
Wallowa	4/6/62	2	Rb	36	7.0 to 16.0	9.9		0
	4/5/63	6	Rb	36	10.5 to 13.0	11.3	CSu	7
			K	1		14.5	BSu	4
			LT	3	7.5 to 25.0			
	4/18/62	4	Wf	9	7.5 to 9.0			
			Rb	20	7.0 to 12.0	9.5	CSu	14
			LT	6	22.0 to 26.0	23.3		
			RbxGt	1		11.8		
			Wf	13	7.8 to 10.0			
Murry Reservoir	4/12/63	1	Rb	42	5.8 to 12.0	8.9		0
Thief Valley Reservoir	3/21/63	3	Rb	3	14.0 to 15.5	14.7	CSu	45
			BC	1		9.5	Clm	113
Unity Reservoir	4/12/63	4		0				0
	9/17/63	4	Rb	614	5.5 to 10.5	7.7	BSu	2
			Rb	118	5.5 to 12.0	8.9	Ro	161
	9/8/61	2					CSu	17
							RSS	2
North Powder Pond No. 1	3/21/63	1	Rb	1		14.0	Sq	1
North Powder Pond No. 2	3/21/63	1	Rb	25	7.0 to 12.5	10.6	BSu	4
			BC	1		8.7		
								8.8

Table 106

A Comparison of Condition of Female Trout in Six High Lakes of Northeast Oregon,  
Determined from Gill-Net and Creel Sampling, 1963

Lake	Date	Species	Total Number Fish	All Fish		Maturing Females	
				Average Length (Inches)	Length Variation (Inches)	Number	Average Length (Inches)
<u>Watershed 9</u>							
Bear	7/23/63	Ct	1	9.5		0	
		BT	9	7.6		3	8.1
		BT	11	8.0	6.5 to 10.5	2	10.3
Lookingglass	7/24/63	Ct	2	13.0	13.0	0	
		BT	12	9.7	7.0 to 12.5	6	9.8
	8/19/58	LT	1	14.0		1	14.0
		BT	20	8.7	5.3 to 12.5	9	9.2
Eagle	7/25/63	LT	2	14.5	13.0 to 16.1	1	13.0
		BT	2	9.5	8.0 to 11.0	0	
	8/21/58	LT	6	10.1	9.3 to 11.5	0	
		BT	20	7.8	6.0 to 10.3	0	
Heart	7/26/63	Rb	5	8.7	7.9 to 9.2	0	
	8/31/60	Rb	14	8.6	7.5 to 11.5	0	
Anthony	6/28/63	Rb	5	-	6.5 to 9.1	0	
		BT	36	8.4	6.0 to 17.3	0	
<u>Watershed 8</u>							
Grande Ronde	6/28/63	Rb	19	9.6	5.9 to 12.5	0	
		BT	5	11.4	8.3 to 17.8	0	
	7/26/55	Rb	11	6.6	5.0 to 7.1	0	
		BT	7	7.4	5.2 to 12.4	0	

Table 107

A Summary of Warm-Water Game Fish Creel Census Data,  
La Grande District, Northeast Region, 1963

Water	Species	Number of Fish by 2-Inch Size Groups					Total Fish	Total Anglers	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14+				
Brownlee Reservoir	Rb		6	12	9	1	28			
	K	5	5				10			
	SB			12	14	10	36			
	BC		439				439			
	Bg	1					1			
	YP	1	3	3	1		8			
	CC		4	4			8			
	BrB		10				10			
							540	144	3.8	1.1
Kinney Lake	BrB		4				4	14	0.3	0.1

Construction and repair of the major rotary fish screen boxes completed in the La Grande District in 1963 are shown in Table 110.

#### Resident Species

Redside shiner and sucker fry were found on the North Fork of the Burnt River and on Camp Creek. Approximately 5 miles of each of these streams were re-treated in the fall of 1963. It does not appear possible to remove completely the undesirable species from these streams because of the vast beaver pond areas and the gold dredge tailings. Nontoxic ground water is available to fish in both of these environments.

The artificial spawning channel for kokanee at the head of Wallowa Lake was excavated by the Parks Division of the Oregon State Highway Commission. Approximately 400 feet of flat channel were developed. No fine gravel was introduced but fair gravel was exposed by excavation. Water was turned into the channel to permit spawning. Eight kokanee had spawned in the new channel by November 30.

Public angling access was gained on a 1/4-acre pond on the Imnaha River, a gravel pit pond in Baker County, and the old Pondosa millpond at Medical Springs. The pond on the Imnaha River is the only one that was used for trout in 1963.

#### Miscellaneous

#### Water Quality Studies

The dissolved oxygen and temperature of the Wallowa River and hatchery spring was determined during the summer of 1963. These data are shown in Figure 6.

Table 108

A Partial Sampling of Downstream Migrants Trapped  
at 34 Rotary Screen Bypasses in Watersheds 8 and 9, 1963

Stream	Total Traps	1963							Total	
		April	May	June	July	August	September	October	1963	1962
Big Creek	1	68	152	117	49	0	0	0	386	23
Catherine Creek	3	68	97	40	353	430	336	1,513	3,486 <u>/1</u>	470
Indian Creek	1	0	4	167	27	17	154	86	486 <u>/1</u>	443
Bear Creek	4 <u>/2</u>	0	22	110	217	340	1,099	131	1,919	4,479
Lostine River	2	252	90	25	107	910	3,832	1,018	6,234	1,391
Wallowa River	4	179	2,675	521	305	163	121	199	4,163	2,927
Hurricane Creek	2	21	163	88	95	236	555	597	1,755	0
Camp Creek	1	0	0	312	502	203	49	0	1,066	957
Innaha River	3	0	64	275	588	1,451	517	13	2,908	4,710
Freezeout Creek	1	0	0	49	0	0	0	0	49	818
Summit Creek	2	0	0	238	234	17	0	0	489	1,092
Grouse Creek	1	0	0	0	0	248	547	2	797	0
Pine Creek	1	0	10	43	131	136	183	113	616	878
East Pine Creek	2	0	0	227	215	57	10	0	509	5,252
Clear Creek	2	0	0	0	341	206	141	216	904	2,100
Dry Creek	2	0	31	393	217	182	218	174	1,215	1,255
Eagle Creek	3	1,055	572	167	564	3,241	5,560	13,084	29,466 <u>/1</u>	37,574
TOTALS	35	1,643	3,880	2,772	3,945	7,837	13,322	17,146	56,448	64,369

/1 Trap boxes operated in November: Catherine Creek, 649; Indian Creek, 31; Eagle Creek, 5,223 smolts.  
These figures are included in the 1963 total.

/2 All smolts transported from traps on Bear Creek to the Wallowa River.

Table 109

A Tabulation of Species Observed at 23 Rotary Fish Screen Bypass Trap Boxes  
on Nine Streams in 1963 with Two Years of Comparison

Stream	Watershed	Total Traps	Steelhead	Chinook Salmon	Coho Salmon	Percent Chinook Salmon 1961	1962	1963
Catherine Creek	8	2	158	3,328	0	90.1	86.2	95.5
Bear Creek	8	4	1,450	469	0	57.1	72.5	24.4
Lostine River	8	3	943	4,691	600	89.5	67.9	75.2
Wallowa River	8	4	1,019	998	2,146	23.4	50.1	24.0
Imnaha River	8	3	1,440	1,386	0	98.8	94.3	49.0
Hurricane Creek	8	2	697	750	287	0.0	0.0	43.3
Eagle Creek	9	2	8,883	20,583	0	72.4	71.8	69.9
Pine Creek	9	1	507	109	0	5.9	0.7	17.7
Clear Creek	9	2	870	34	0	0.0	15.6	3.8
TOTALS		23	15,967	32,348	3,033			

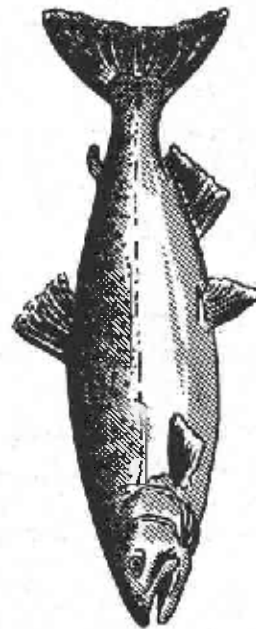


Table 110

Major Rotary Fish Screen Box Construction and Repair,  
La Grande District, Watershed 8, 1963

Stream	Diversion	Screen Number	Type of Work
Catherine Creek	Schroth	8-121	Replacement unit
Catherine Creek	Baker-Schroth	8-110	Replacement unit
Indian Creek	Alvard	8-147	New screen unit
Big Creek	Wanker 5	8-132	Repair walls
Lostine River	Willet	8-40	Replacement unit
Lostine River	McClain	8-44	Replacement unit
Spring Creek	Witty	8-71	Replacement unit
Wallowa River	Island City 2	8-20	Replacement unit
Wallowa River	Rogers	8-67	Replacement unit
Wallowa River	Stein-McAllister	8-72	Replacement unit
Wallowa River	Cook	8-73	Replacement unit
Wallowa River	Burdett	8-209	New federal unit
Wallowa River	Burdett	8-208	New federal stationary unit

The dissolved oxygen content of the hatchery water remained at a higher level than in 1962. Abnormally high precipitation in the spring of the year resulted in less water being diverted from the river. This resulted in more water in the main channel and better dilution of pollutants.

Air and water temperatures and minimum stream flows were determined for the Grande Ronde River.

Figure 7 is a comparison of monthly average maximum air and water temperatures and monthly stream flow at the old Hilgard Gauging Station on the upper Grande Ronde River.

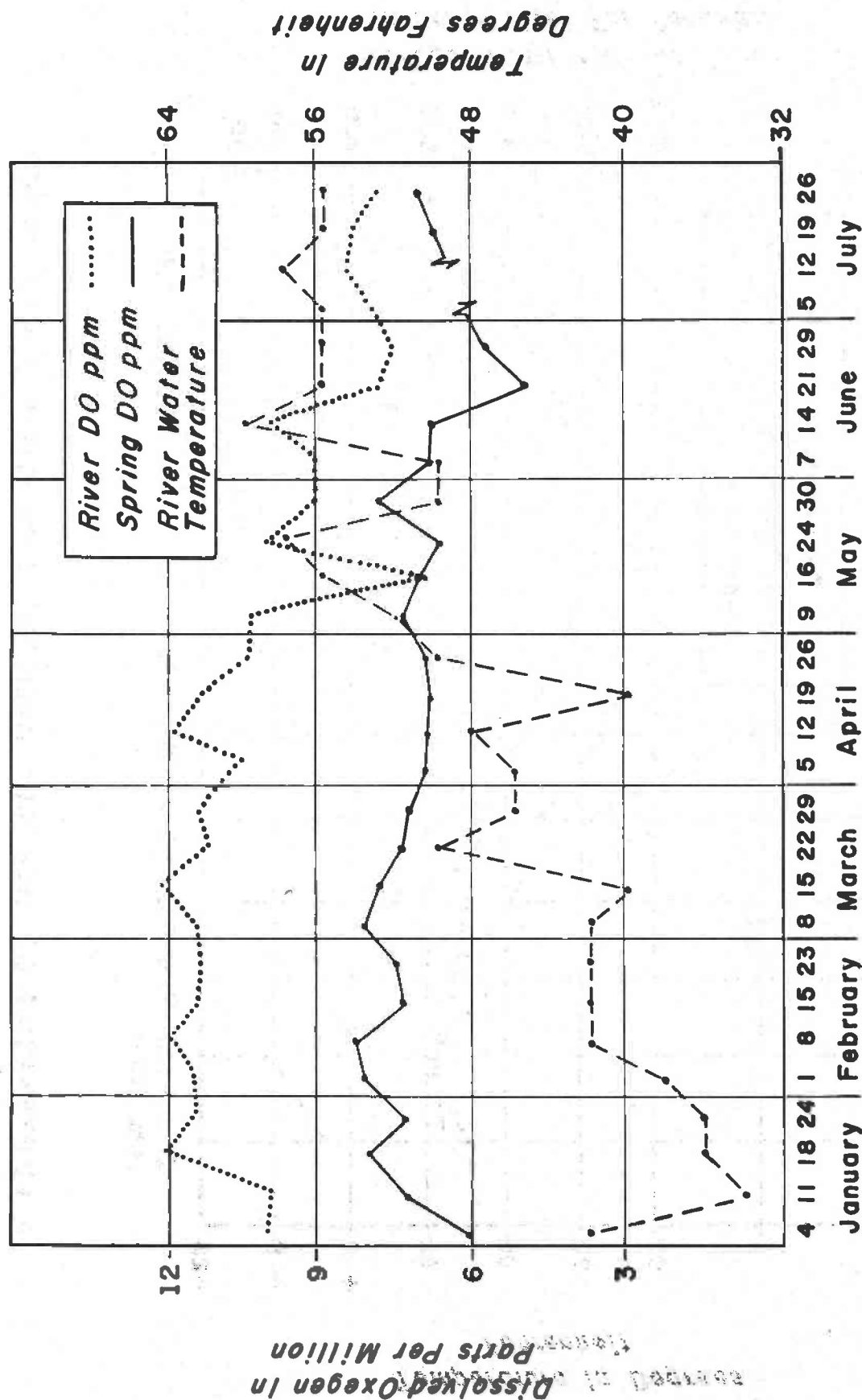
Figure 8 is a comparison of the average monthly minimum air and water temperatures and stream flow at the old Hilgard Gauging Station.

Results of water quality sampling in the La Grande District for 1963 are shown in Table 111.

By the first part of July, the surface flow of Catherine Creek was stopped by intensive irrigation at the lower Davis Dam. Return irrigation water in the main channel four miles downstream from the Davis Dam was laden with phytoplankton. Daylight dissolved oxygen sampling in this water revealed supersaturation. Night sampling revealed less than 5.0 ppm dissolved oxygen in this water. Biochemical oxygen demand analysis had to be discontinued because of the algae growth.

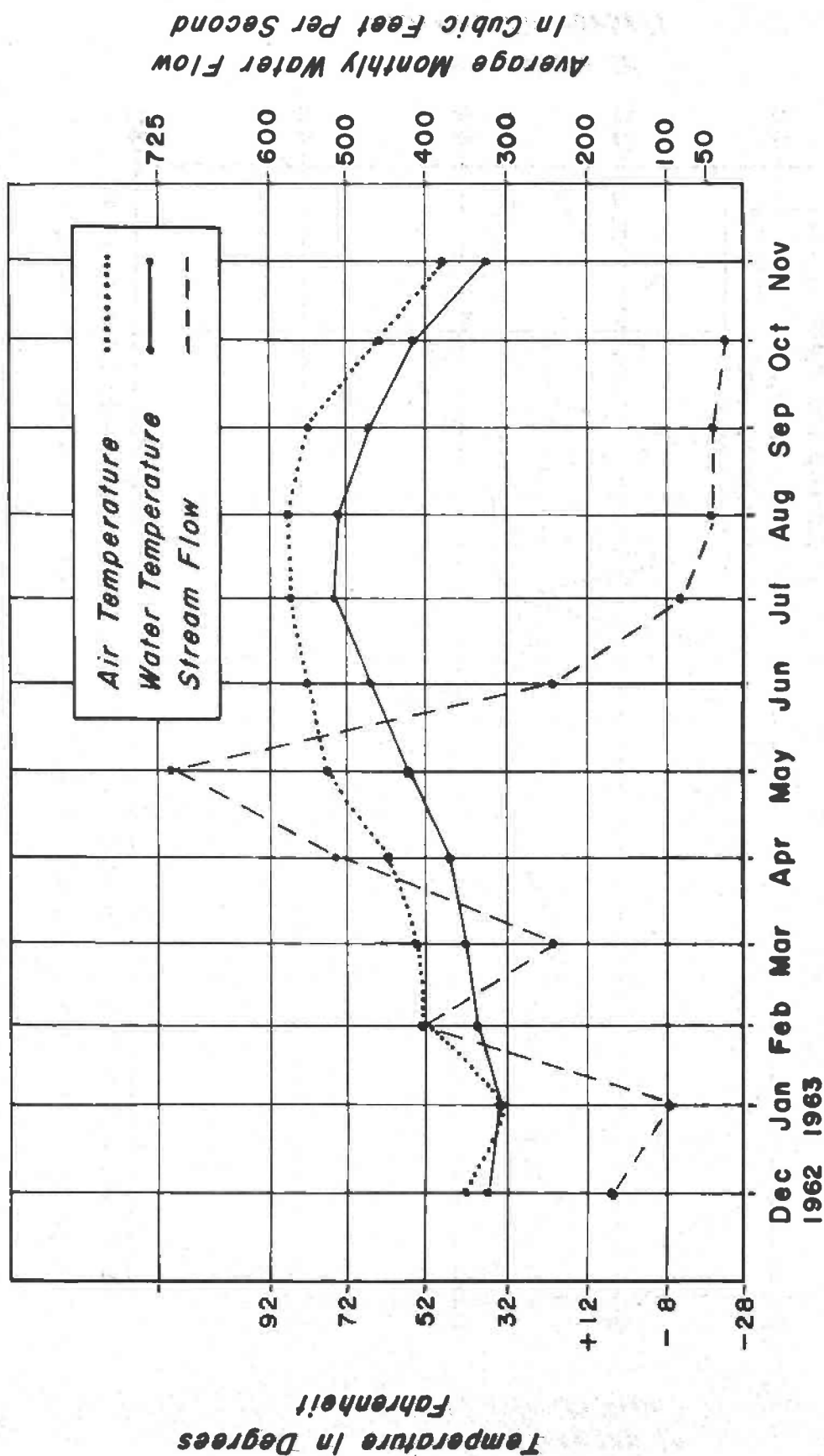


Figure 6



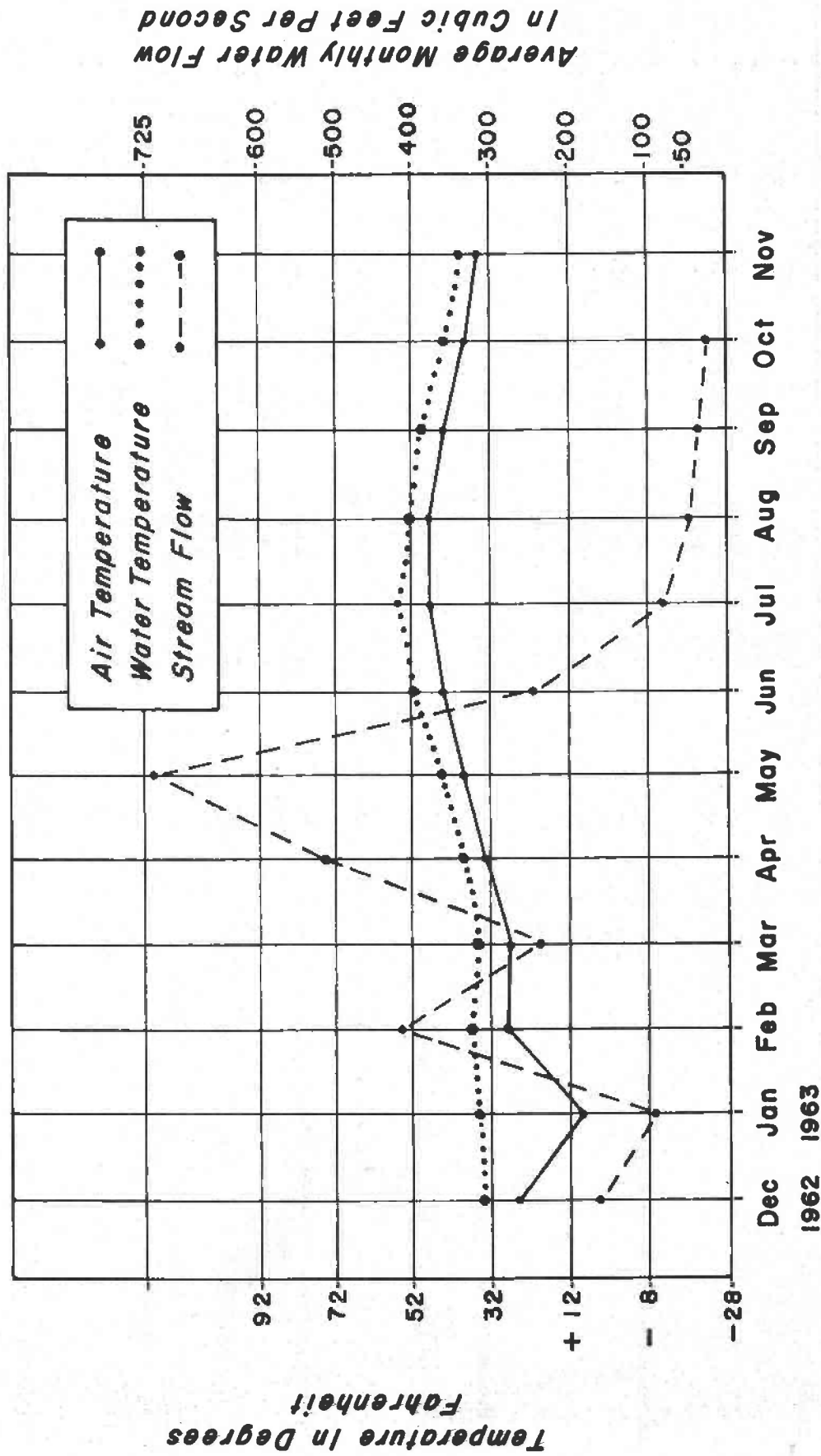
A COMPARISON OF THE DISSOLVED OXYGEN CONCENTRATION OF THE WALLOWA RIVER AND THE HATCHERY SPRING AND THE WALLOWA RIVER WATER TEMPERATURE FOR SEVEN MONTHS IN 1963

Figure 7



A COMPARISON OF MONTHLY AVERAGE MAXIMUM AIR AND WATER TEMPERATURES AND STREAM FLOW AT THE OLD HILGARD GAUGING STATION, UPPER GRANDE RONDE RIVER

Figure 8



**A COMPARISON OF MONTHLY AVERAGE MINIMUM AIR AND WATER  
TEMPERATURES AND STREAM FLOW AT THE OLD HILGARD GAUGING  
STATION, UPPER GRANDE RONDE RIVER**

Table 111

A Comparison of Water Quality Sampling in Some Waters of the La Grande District for 1963

Stream	Sampling Location	Date	Water Temperature in Degrees Fahrenheit	Dissolved Oxygen (ppm)	Percent Saturation	Free Carbon Dioxide (ppm)	Total Alkalinity (ppm)	pH	Biochemical Oxygen Demand (ppm)
Grande Ronde River	At Island City	4/15	40.0	12.3	104.3	1.5	-	-	-
		5/14	47.0	11.2	105.5	9.2	2.4	7.3	-
		6/3	52.0	11.3	113.2	13.0	5.0	7.0	-
		7/5	72.0	8.5	106.6	-	-	-	-
		8/16	65.0	9.5	111.1	20.0	5.0	7.1	-
		9/5 <u>1</u>	60.0	5.4	85.5	-	-	-	-
Grande Ronde River	At mouth State Ditch	4/15	41.0	12.8	111.0	-	-	-	-
		5/14	48.0	10.5	99.9	9.0	2.4	7.1	-
		6/3	51.0	10.2	102.0	14.0	2.0	7.2	1.1
		7/11	70.0	9.1	112.5	-	-	-	1.6
		8/16	71.0	7.5	93.2	20.0	7.0	8.0	-
		9/5 <u>1</u>	63.0	5.7	93.2	-	-	-	-
Catherine Creek	End of Gekeler Lane	7/18	81.0	13.6	140.0 <u>2</u>	-	-	-	-
Catherine Creek	Mouth of Ladd Creek	7/18	90.0	13.6	140.0 <u>2</u>	-	-	-	-
Catherine Creek	Cove highway crossing	7/18	82.0	8.2	114.0 <u>2</u>	-	-	-	-
Catherine Creek	At mouth State Ditch	4/15	47.0	9.1	85.5	-	-	-	-
		5/14	56.0	9.0	95.5	5.0	3.2	7.1	-
		6/3	58.5	8.2	88.8	13.0	3.0	7.1	0.9
		7/11	82.0	8.2	114.2	-	-	-	4.7
		8/16	68.0	5.3	63.3	25.0	9.0	7.5	-
		9/5	61.0 <u>1</u>	4.1	66.6	-	-	-	-
Grande Ronde River	Steel bridge at Elgin	4/15	46.5	10.0	98.6	-	-	-	-
		5/14	52.0	9.5	95.5	10.0	2.0	7.1	-
		7/19	69.0	7.5	91.0	10.0	5.0	8.0	-
		8/16	69.0	9.0	109.9	15.0	5.0	7.5	-
Grande Ronde River	At Palmer Junction	7/19	70.0	8.1	101.0	10.0	-	8.0	-
		7/29	64.0	7.6	86.6	15.0	5.0	8.0	-
		8/16	65.0	6.5	75.5	20.0	6.0	7.3	-
Grande Ronde Lake		5/27	54.0	8.4	100.7	5.0	3.0	6.4	-

Table 111 (continued)

Stream	Sampling Location	Date	Water		Percent Saturation	Free Carbon Dioxide (ppm)	Total Alkalinity (ppm)	pH	Biochemical Oxygen Demand (ppm)
			Temperature in Degrees Fahrenheit	Dissolved Oxygen (ppm)					
Anthony Lake		5/27	50.0	9.5	109.2	5.0	2.0	6.2	-
Wallowa River	Enterprise stockyard	5/21	62.0	8.6	102.1	10.0	21.0	7.5	1.5
		6/3	48.5	9.3	92.8	21.0	8.0	7.6	0.4
		6/10	54.5	10.4	111.9	15.0	8.0	7.8	-
		7/5	60.0	8.9	103.2	-	-	-	-
		7/20	62.0	8.4	98.6	15.0	9.0	7.5	-
Wallowa River	Hatchery intake dam	6/3	48.0	10.1	99.8	23.0	8.0	8.2	-
		6/10	53.5	10.4	110.7	20.0	8.0	8.0	-
		7/5	60.0	8.6	98.6	-	-	-	-
		7/30	57.0	8.8	98.0	15.0	9.0	8.0	-
Wallowa River	Mouth of Trout Creek	6/3	47.0	10.1	99.8	21.0	7.0	7.4	-
		6/10	51.0	9.9	102.1	15.0	8.0	8.0	-
		7/30	57.0	8.8	98.6	20.0	9.0	8.0	-
Wallowa Hatchery	Pond No. 3 inlet	4/25	53.0	9.2	97.4	-	-	-	-
		6/3	47.0	9.8	96.3	20.0	8.0	7.6	-
		7/5	58.0	8.1	90.5	-	-	-	-
Wallowa Hatchery	Pond No. 3 outlet	4/25	53.0	9.4	99.8	0.0	-	-	5.3
		5/21	60.0	7.5	85.8	10.0	21.0	7.5	1.4
		6/3	47.0	9.4	92.8	20.0	8.0	7.6	-
		6/10	52.0	9.4	98.6	20.0	8.0	7.8	-
		7/5	58.0	7.4	84.7	-	-	-	-

/1 Oxygen sampling done at 3:00 a.m.

/2 Oxygen sampling done at midday. A high phytoplankton content in this water is responsible for the oxygen supersaturation.

After July 18, the water quality of lower Catherine Creek was inadequate for the maintenance of salmonids.

Water flow of the Grande Ronde River at the mouth of the State Ditch on July 18 was 0.3 cfs. On the same date, Catherine Creek was discharging 6.2 cfs at the mouth. The Grande Ronde River was flowing 15.0 cfs at Palmer Junction on July 18.

Figure 9 shows the water sampling stations in the La Grande District in 1963.

Delayed mortality studies on fish distribution were carried out in 1963. The work was prompted by reports from the Oregon State Police of fish loss after a release in the Grande Ronde River. Also, poor water quality had been found in the distribution Unit No. 31 at an earlier date. The delayed loss studies shown in Table 112 were with fish from Unit No. 31.

According to the delayed mortality studies, there could have been a loss of 810 trout on the Catherine Creek release and a loss of 1,440 trout on the Grande Ronde River release.

#### Stream Habitat Inventory

Table 113 is a summary of the stream habitat survey completed in the La Grande District in 1963. The best spawning habitat was in Beaver Creek where steelhead fry and fingerling were abundant. Watermelon and Hoodoo Creeks, both tributaries of Beaver Creek, have barriers to fish movement at their mouths, however, neither of these streams contain good fish habitat.

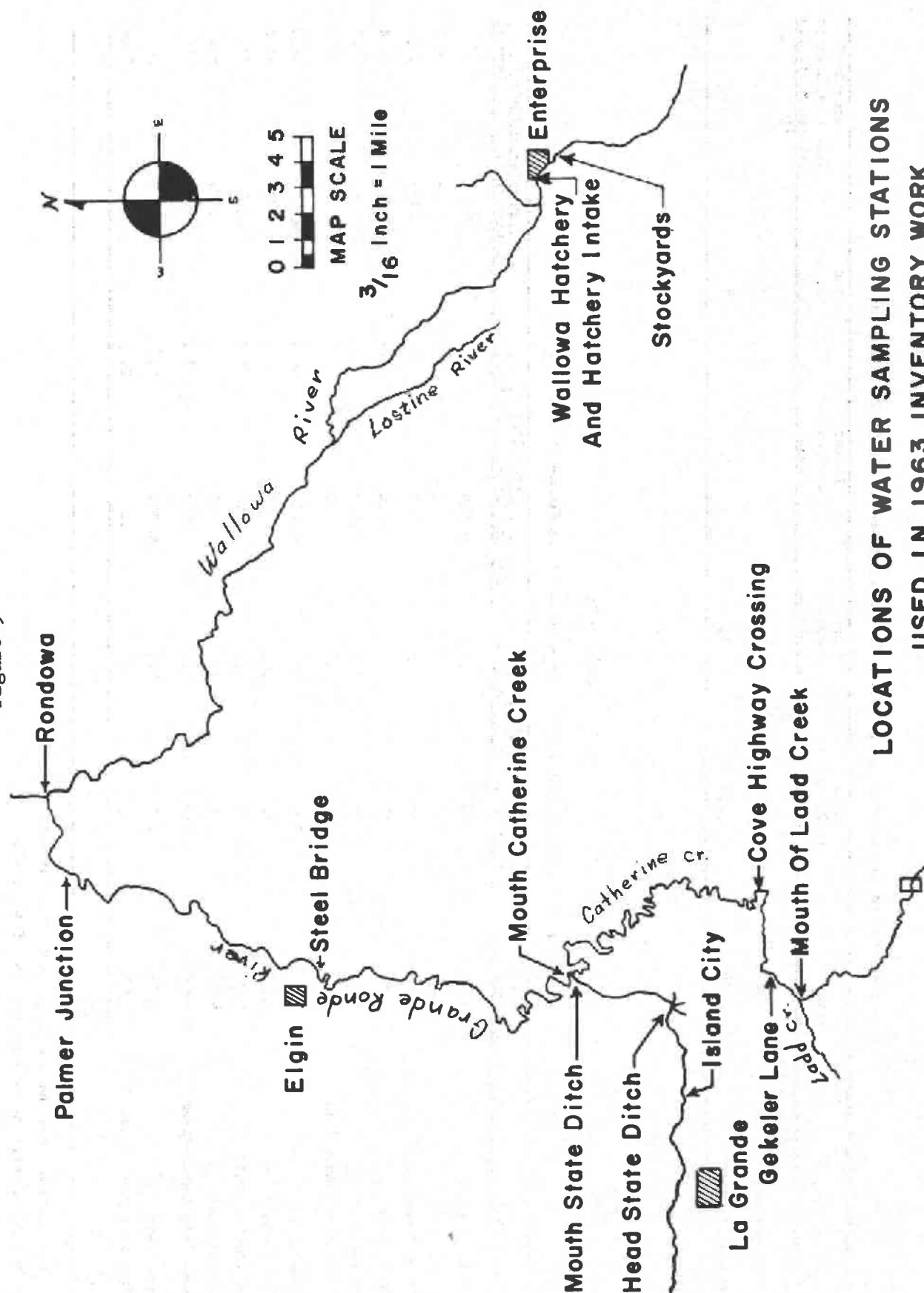
The first 4-mile section of Sheep Creek meanders through meadow land and so has a high percentage of pool area. It provides good rearing area.

Peet Creek, a tributary of Meadow Creek, was almost dry during the survey. Several steelhead redds were found on dry riffles. The fry from Peet Creek probably rear in Meadow Creek.

No evidence of fish production was found in Syrup Creek.



Figure 9



# LOCATIONS OF WATER SAMPLING STATIONS USED IN 1963 INVENTORY WORK

Table 112

Fish Distribution Delayed Mortality Studies Conducted in the La Grande District, 1963

Water	Date of Transportation	Pounds of Trout Hauled	Number of Trout Live-Boxed	Number of Trout Dead	Period of Trial (Days)	Percent of Test Fish Lost to Delayed Mortality
Catherine Creek	6/19/63	1,800	74	11	7	14.9
Grande Ronde River	6/21/63	2,000	40	14	7	35.0

Table 113

A Summary of Stream Habitat Survey Completed in the La Grande District, 1963

Stream Survey	Miles Surveyed	Spawning Gravel		Pool Area		Nonspawning Gravel	
		Square Yards	Percent	Square Yards	Percent	Square Yards	Percent
Meadow Creek	10.50	650	0.7	28,929	32.8	58,583	66.5
Syrup Creek	1.00	6	0.3	0		2,238	99.7
Smith Creek	3.30	33	1.2	197	7.1	2,542	91.7
Pest Creek /1	1.25	19	0.7	194	6.9	2,603	92.4
Waucup Creek /1	3.75	174	1.2	4,635	30.7	10,283	68.1
South Fork Meadow Creek	1.00	6	0.3	0		2,238	99.7
Beaver Creek	12.75	1,106	1.2	14,623	15.8	76,606	83.0
Dry Beaver Creek	4.25	512	6.2	381	4.6	7,335	89.2
Watermelon Creek /2	3.50	6	0.1	261	5.8	4,265	94.1
Hoodoo Creek /2	3.50	107	4.0	33	1.3	2,500	94.7
West Fork Beaver Creek /1	1.00	290	12.7	110	4.8	1,887	82.5
Sheep Creek	10.75	817	1.5	28,074	52.2	24,899	46.3
East Fork Sheep Creek /1	1.00	33	0.7	1,211	26.5	3,332	72.8
TOTAL	57.55						

/1 These streams have additional mileage to be surveyed.

/2 Impassable barriers at mouth and poor fish habitat.



## HARNEY-MALHEUR DISTRICT

Larry E. Bisbee

### Fish Inventory

#### Trout

##### Water Conditions

The early 1963 forecast for reservoir storage and stream flows looked very discouraging. Snow pack in most watersheds was 18 to 20 percent of average on March 1. Reservoir storage as of March 1 was considerably ahead of the storage held at the same period in 1962. However, prospects for a very low runoff made the storage outlook critical.

In mid-April unexpected heavy rains and wet snows changed the water situation from bleak to satisfactory. Most reservoirs came near filling, and stream flows were almost normal throughout most of the season.

##### Creel Census

Trout angler success was good throughout the district. Legal rainbow stocked in streams provided good returns. Small streams on the west side of the Steens Mountains which have no vehicle access provided excellent success. Angler success on lakes and reservoirs was somewhat higher than that for stream anglers. Fish Lake and Malheur Reservoir were the most productive trout lakes in the district.

A summary of creel data by individual lakes and streams is presented in Table 114.

A summary of angler success on all waters checked is presented in Table 115.

##### Composition and Length Frequency of Fish Populations

Fish populations in a majority of the most important fishing waters in the district were sampled by graduated gill nets and trap nets. The composition and length frequency of samples taken in individual waters are presented in Table 116.

##### Maturity

Female trout obtained from population samples were examined to determine the average lengths at various stages of maturity. Maturity information for female fish is presented in Table 117.

##### Beulah Reservoir

Water levels in Beulah Reservoir were near normal after a period of two dry years. A satisfactory amount of water remained at the close of 1963.

Table 114

Summary Creel Census Data, Southeast Region, 1963

Water	Watershed	Species	Number of Fish by Size Groups in Inches										Total Fish	Total Anglers	Total Hours	Fish per Hour	Hours per Fish	
			6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over								
Altnow Pond	10	Rb				1							1					
		LB	21	29	11	4							65					
		Bg	262	94	10								366	72	276	6.0	1.57	0.6
													432					
Antelope Reservoir	11	Rb				1	10	3					14					
		BLB				1							1	12	60	1.3	0.25	4.0
													15					
Bear Canyon Creek	12	Rb	3			1		1					5	6	15	0.8	0.33	3.0
Bear Creek	12	Rb	10	16									26					
		BT	5	1									6	16	31	2.0	1.03	1.0
													32					
Beaver Creek	12	Rb	10	12									22	8	14	2.8	1.57	0.6
Boulah Reservoir	10	Rb	29	4	28	55	28	41	27				212					
		DV			1		1						2	152	781	1.4	0.27	3.6
													214					
Big Creek	10	Rb	17										17					
		BT	1										1	8	20	2.3	0.90	1.1
													18					
Blitzen River	12	Rb	49	89	81	44	13	2					278	46	150	6.0	1.85	0.5
Blue Bucket Creek	12	Rb	4	12	2								18	7	10	2.6	1.80	0.6
Brownlee Reservoir A		St											7					
		SB	1	14	6	1							16					
		CC	3	88	214	91	54	13	10	7			480					
		BLB	2	2									4	214	963	2.4	0.53	1.9
												507						
Brownlee Reservoir B		St	9	20	24	17	1						72					
		Ch	1	2									3					
		Sg											1					
		LB											1					

Table 14 (continued)

Water	Watershed	Species	Number of Fish by 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								
Brownlee Reservoir B (continued)		SB	13	5	4	2	3					27						
		BC		157	2							159						
		Bg	2									2						
		Pk	2									2						
		YP		3								5						
		CC	13	29	23	9	3					77						
		FC									2							
		BIB	5	8	2						15							
											366	138	521	2.7	0.70	1.4		
Burns Gravel Pond	12	Rb	2	6	47	57	1	2			115	120	275	1.0	0.42	2.4		
	12	Rb	19	15							34	7	13	4.9	2.62	0.4		
Chickahominy Reservoir	12	Rb		1			6	3	2		12	5	22	2.4	0.55	1.8		
Cottonwood Creek	10	Rb	26	2							28	8	28	3.5	1.00	1.0		
Crowfoot Creek	12	Rb	1								1	4	4	0.3	0.25	4.0		
Delintment Lake	12	Rb	3	7	36	50	13	16	29	9	163	157	734	1.0	0.22	4.5		
Dunaway Pond	11	Rb LB		1		1					1 1 2		44	0.1	0.05	22.0		
Emigrant Creek	12	Rb	73	80	75	40	1				269	51	291	5.3	0.92	1.1		
Fish Creek	12	Rb BT	48 6	102							150 6 156	22	60	7.1	2.60	0.4		
Fish Lake	12	Rb BT	577 65	4,329 123	2,209 30	22 4		3			7,137 225 7,362	985	3,962	7.5	1.86	0.5		
High Lake	10	BT	195	5	3	1					204	24	124	8.5	1.65	0.6		
Home Creek	12	Rb	8	27	19	8					62	6	32	10.3	1.94	0.5		

Table 114 (continued)

Water	Watershed	Species	Number of Fish by 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						
Krumbo Reservoir	12	Rb	5	10	1	18	17	5	6	60	31	127	1.9	0.47	2.1	
Lake Creek	12	Rb BT	2	24 12	2					26 14 40	5	20	8.0	2.00	0.5	
Little Emigrant Creek	12	Rb	6	2						8	7	33	1.1	0.24	4.1	
Little Malheur River	10	Rb	39	221	6	2				268	44	144	6.1	1.86	0.5	
Malheur Reservoir	10	Rb	371	1,247	206					1,824	342	1,123	5.3	1.62	0.6	
Malheur River	10	CC BLB	4	9 3	12	2	4 1		1	28 8 36	36	76	1.0	0.47	2.1	
Malheur River Middle Fork	10	Rb BT LB CC	117 6	225	28	20	1			391 6 2 4 403	60	287	6.7	1.40	0.7	
Malheur River North Fork	10	Rb DV Wf	172	413	32	11 1	2	1	3	634 1 1 636	127	506	5.0	1.26	0.8	
Mann Lake	12	Ct			33	37	76	99	47	292	68	361	4.3	0.81	1.2	
McCoy Creek	12	Rb	20	91	34	3	1			149	15	59	9.9	2.53	0.4	
Owyhee Reservoir	11	BC LB YP BLB	312	10,634 7 3	210 9 3	1 28 3	25 14		2	11,157 85 3 11,248	908	2,945	12.4	3.82	0.3	

Table 114 (continued)

Water	Watershed	Species	Number of Fish by 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								
Owyhee River	11	Rb	3	49	158	22	2	1	2		237							
		LB				1					1							
		SB									1							
		Bg	3								3							
		CC		15	10	5	2	1			33							
		BLB	5							5								
											280		158	524		1.8	0.53	1.9
Pine Creek	10	Rb	28	22	2						52		6	23		8.7	2.26	0.4
Pine Creek West Fork	10	Rb									6							
		BT	7								7							
											13		7	10		1.9	1.30	0.8
Sawmill Creek	12	Rb	9	10	8	2					29		7	21		4.1	1.38	0.7
Silver Creek	12	Rb	21	18	4	2					47		29	64		1.6	0.72	1.4
Silvies River	12	Rb	2	12			1				15		10	18		1.5	0.83	1.2
Snake River		St			1	1					2							
		LB			1		1		1		3							
		SB			3	1	2				12							
		BC	2	4							2							
		Bg	1	1							6							
		YP	6								1							
		CC	1															
		CC	4	124	86	30	17		2	6	269							
		BLB	1								1							
										296		247	581		1.2	0.51	2.0	
South Cottonwood Reservoir	10	Rb			36	1					37		5	33		7.4	1.12	0.9
Spring Creek	12	Rb	59	23							82		17	53		4.8	1.55	0.6
Trout Creek	12	Rb	127	164	29						320		58	122		5.5	2.62	0.4
Warm Springs Reservoir	10	Rb		1	9	1					11							
		LB			1						1							
		Br-B	6	14	13						33		8	49		5.6	0.92	1.1
											45							



Table 116

Composition and Length Frequency of Catch by Gill Net and Trap Net in Some Southeast Oregon Waters  
Represented in 1-Inch Size Groups (Fork Length), 1963

Water	Number Nets Set	Species	Number Fish Taken	Percent of Total	Number of Fish in 1-Inch Size Groups (Fork Length)																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 & Over
Antelope Reservoir	2 Gill Nets	Rb	17	42.5																			
		BSu	12	30.0						2													
		CSu	11	27.5																			
Beulah Reservoir	3 Gill Nets	Rb	27	60.0					1	7	11		1		2		2					1	
		Wf	16	35.6					4	3			7	1	1								
		Sq	1	2.2																			
	CSu	1	2.2														1						
	1 Trap Net	Rb	133	81.6		7	6	1	2	26	50		6	1	1	1	13	14	2	1	1		
Bully Creek Reservoir	4 Gill Nets	BSu	20	12.3	14	5																	
		BSu	3	1.9								2											
		D	2	1.2																			
		Sq	2	1.2	1																		
		Cot	1	0.6	1																		
	1 Trap Net	CSu	1	0.6																			
		Wf	1	0.6																			
		Cp	511	97.1			13	150	326	20													
		BSu	12	2.3						6	2												
		CSu	2	0.4						1													
Chickahominy Reservoir	1 Trap Net	Sq	1	0.2																			
		Cp	315	40.1	11	32	69	41	131	30													
		BSu	250	31.9	7	172	71																
		BSu	220	28.0			19	139	57	1	2	1											
Delintment Lake	2 Gill Nets	Rb	8	100.0													1		2	2			
	1 Trap Net	Rb	45	100.0							4	15	15	3			1	4	2		1		
Dunaway Pond	1 Gill Net	Rb	5	100.0																			
		BlB	41	89.1																			
		Bg	3	6.5			2	1															
		LB	1	2.2																			
Fish Lake	1 Trap Net	CC	1	2.2																			
		Bg	94	90.4	15	15	15	27	12		8	1	1										
Fish Lake	1 Trap Net	LB	10	9.6																			
		BT	24	47.1																			
		Rb	20	39.2																			
Fish Lake	1 Trap Net	Cot	7	13.7	3	4																	
		Cot	7	13.7																			

Table 116 (continued)

Water	Number Nets Set	Species	Number Fish Retained	Percent of Total	Number of Fish in 1-Inch Size Groups (Fork Length)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Littlefield Reservoir	1 Gill Net	Rb	12	100.0						1	3	5							2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												



Table 116 (continued)

Water	Number Fats Set	Species	Number Fish Taken	Percent of Total	Number of Fish in 1-Inch Size Groups (Fork Length)																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 & Over
Oyhee Reservoir	40 Gill Nets	BC	126	42.0					3	55	31	36	1										
		Cp	65	21.7					2	2	1	1											
		Sq	35	11.7									3	8	5	5	6	3	1	1	1	1	
		CSu	34	11.3									2	1	1	1	1						
		BSu	16	5.3						2													
		YP	15	5.0					3	9	3		2	1	2	3	5	1					
		Clm	8	2.7						1													
		BLB	1	0.3									3	2									
		BC	5,121	67.50	837	4	3		7	136	1,432	2,634	62	6									
		Cp	1,446	19.06					2	2	1	1	1	37	141	216	298	445	202	68	17	6	9
		YP	847	11.16	844																		
		BLB	71	0.93					1				3	6	17	30	12						
		CSu	52	0.69									2	3	2	1	5	4	12	9	8	6	
		BSu	17	0.22									1	3	3	5	5						
		Sq	6	0.08								1	2	1	1	1	1						
		Clm	5	0.07									2	1	1								
Silvies River	5 Gill Nets	LB	21	0.28					5	4		9											
		Mt	1	0.01																			
		WC	18	32.7																			
		YP	14	25.5					5	4		9											
		CSu	13	23.6					1	1	1	1	2										
		Sq	5	9.1																			
		Cp	2	3.7					1	1													
		Ro	1	1.8																			
		Rb	1	1.8																			
		BSu	1	1.8																			
		Sq	43	33.9																			
		YP	30	23.6																			
		WC	20	15.7																			
South Cottonwood Reservoir	1 Gill Net	Pk	10	7.9																			
		Clm	8	6.3																			
		BrB	6	4.7																			
		RS	4	3.1																			
		CSu	3	2.4																			
		Cp	1	0.8																			
		Ro	2	1.6																			
		Sq	43	33.9																			
		YP	30	23.6																			
		WC	20	15.7																			
		Pk	10	7.9																			
		Clm	8	6.3																			
		BrB	6	4.7																			
		RS	4	3.1																			
		CSu	3	2.4																			
		Cp	1	0.8																			
		Ro	2	1.6																			

Table 116 (continued)

Water	Number Nets Set	Species	Number Fish Taken	Percent of Total	Number of Fish in 1-Inch Size Groups (Fork Length)																			19 & Over
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Warm Springs Reservoir	10 Gill Nets	CSu	121	55.8							6	11	6	8	17	14	19	13	9	7	4	7		
		Sq	70	32.3						1	6	16	20	10	15	1	1							
		YP	17	7.8					7	2	4	2	2											
		Rb	4	1.8						1					1	1								
		BSu	3	1.4							1	1	1											
		Clm	2	0.9						1	1													
	2 Trap Nets	BrB	61	82.4			1	1	1				3	21	24	4	6							
		RaS	9	12.1	5	1	2		1															
		Bg	2	2.7					1															
		SB	1	1.4																				
		YP	1	1.4																				

Table 117

Average Lengths and Weights of Female Fish at Various Stages of Maturity,  
Southeast Region, 1963

Water	Species	Number	Immature		Maturine		Mature	
			Fork Length in Inches	Weight in Ounces	Fork Length in Inches	Weight in Ounces	Fork Length in Inches	Weight in Ounces
Antelope Reservoir	Rb	4	9.9	7.2	16.1	42.8	19.5	44.0
Beulah Reservoir	Rb	35	10.1	11.3	15.3	33.5		
Chickahominy Reservoir	Rb	21	10.3	11.1	17.0	47.8		
Littlefield Reservoir	Rb	6	7.9	4.3				
Malheur Reservoir	Rb	85	8.7	5.0				
Mann Lake	Ct	21	11.9	12.3	15.3	24.7	16.1	28.3
Moore Reservoir	Rb	12	9.3	7.9				
Owyhee Reservoir	BC						277	6.0
Silvies River	WC						25	5.0
	Pk						7	0.7
	YP						17	1.9

The release of fingerling rainbow was resumed after being discontinued for two years for lack of water. Fingerling stocked early in the spring were entering the creels as 6- to 10-inch trout by late fall. A good number of trout 12 to 20 inches in length were taken early in the year. Angler success was only fair for the whole period.

The reservoir was fished steadily by a small number of anglers throughout the season. A total of 3,000 angler-days was estimated for Beulah Reservoir in 1963.

Fish populations in the reservoir showed a decrease in numbers of trash fish and an increase in numbers of trout and whitefish. Female trout were maturing at 15.3 inches fork length.

#### Chickahominy Reservoir

Mid-April snows with a heavy water content were responsible for the third best water storage year for Chickahominy Reservoir since the dam was constructed about ten years ago. Due to light irrigation usage, a good quantity of water remained at the close of the season.

Angling pressure on the reservoir was very light. Few fishermen visited the area and success was poor until late fall when the water level was drawn down.

Fish population samples indicated a good growth rate for fingerling stocked in the spring. No trash fish were taken in net samples, indicating that a roach population was successfully removed by the last chemical treatment.

#### Delintment Lake

Delintment Lake was accessible throughout the entire winter due to very mild weather. In spite of such conditions, the lake came within 1 or 2 feet of filling. The ice cover began to go off the lake permanently in mid-March.

Fish populations in the lake survived the winter with little visible loss from winterkill. Winter survival has occurred in the lake only four times in the past ten years.

Trout surviving the winter ranged from 14 to 19 inches in length in May. By October, reports indicated some trout 25 inches in length and weighing 7.5 pounds were being taken by anglers.

By late summer, a serious aquatic weed problem had developed as in previous years. Over 50 percent of the lake area was choked with pondweed, Potamogeton richardsonii. In an effort to find a control for the pondweed, a 1-acre test plot was treated with Chipman Atlas "A"-6 chemical. By late summer, the area treated was free of vegetation. Treatment of a large area of the lake would be expensive.

A windmill-driven air compressor is being set up at the lake. It is hoped that compressed air escaping through a series of carbon air stones anchored in deep water will keep an open area in the ice cover throughout the

winter, thus preventing the complete depletion of oxygen in the lake.

Throughout the late winter and summer, water temperatures and dissolved oxygen samples were taken in Delintment Lake. The lowest concentration of dissolved oxygen found during the study was 4.5 ppm on March 15, 1963.

#### Fish Lake

Total angling pressure for the 1963 season at Fish Lake was estimated to be 1,500 anglers. The lake provided excellent success throughout the season with an average of 7.5 fish per angler and 1.86 fish per hour for the 1963 season. The catch was composed of 97 percent rainbow and 3 percent brook trout. The 1963 take of brook trout showed a 2 percent increase over the 1962 catch. Forty-eight percent of the brook trout taken were marked fish originating from a plant of 1,100 marked fingerling stocked October 10, 1961.

Fish Lake was accessible by vehicle throughout most of the winter, which is very unusual. The ice cover melted off in late May and anglers began fishing two or three weeks earlier than normal.

The surface area of Fish Lake was determined to be 20.02 acres by a plane-table survey completed on March 1.

Water temperatures and oxygen samples were taken throughout the late winter and summer. Oxygen remained well above 5 ppm in the upper 15 feet of water throughout the year.

#### Malheur Reservoir

Malheur Reservoir was chemically treated October 11, 1962 to remove a population of black crappie, bridgelip suckers, and shiners.

Restocking commenced in early April and May with the release of 200,845 two and one-half-inch rainbow fingerling. Another 70,000 smaller fingerling planted in July did not show up in the population samples completed in October. Growth rates for the early-stocked fingerling were good and comparable to past years. However, there was a noticeable decrease in growth rate during the latter part of the summer, apparently due to an increased rate of stocking and a normal drawdown of the reservoir. The average growth rate from April to July was 1.4 inches per month, while the rate of growth from July to October was only 0.7 inches per month.

Anglers began using the reservoir the latter part of July and were catching 6-inch trout. Angling pressure increased steadily, and by the end of the season an estimated 2,300 anglers had visited the reservoir. Anglers averaged 5.3 fish per person and 1.6 fish per hour.

A check of fish populations on October 11 indicated the reappearance of bridgelip suckers in the reservoir. Fish population in October was found to be 98 percent rainbow and 2 percent bridgelip suckers.

Water temperatures and dissolved oxygen samples were taken during the spring and summer. A good supply of dissolved oxygen appeared to be present at all depths throughout the summer.

### Mann Lake

Throughout most of the winter the maximum depth at Mann Lake was 3 feet. After the spring runoff, the maximum depth increased to 5 feet. In spite of the low water, the population of Heenan Lake cutthroat survived the winter. Gill-net samples produced 100 percent cutthroat trout ranging from 9 to 18 inches in length. Female trout examined were maturing at a fork length of 15.3 inches.

Stomach samples of 20 cutthroat trout were analyzed. Crustaceans, primarily *Daphnia*, formed a large percentage of the food consumed by cutthroat.

Angler success at Mann Lake was good. Angling pressure was greatest from April to mid-July. Very little angling occurred during the latter part of the season due to low water.

### Moon Reservoir

Moon Reservoir was chemically treated October 1, 1962 to remove an abundant population of roach, suckers, and shiners. A partial treatment of Silver Creek above the reservoir was included in the project.

The reservoir filled early in the year and continued to spill for several months. Little water was used for irrigation throughout the summer, and the reservoir remained nearly full at the end of the season.

Population samples from the reservoir in September 1963 indicated heavy reinfestation of roach.

Early spring stocked rainbow fingerling made excellent growth. By September 18 they averaged 9.4 inches in fork length and 8.5 ounces in weight.

Little angling pressure occurred at the reservoir in the 1963 season.

### Malheur River System

A physical and biological survey was started on approximately 90 miles of the Malheur River, including the lower portions of its three main tributaries, in conjunction with a rehabilitation program attempting to re-establish a fishery in these waters. With the construction of Beulah and Warm Springs Dams years ago, winter stream flows were interrupted to the point where game fish populations gave way to an abundance of undesirable species. For a number of years these sections of the Malheur River drainage have provided very little angling.

Fish populations were sampled at various locations by means of gill nets throughout the section of river being surveyed. Seven species of rough fish and 7 species of game fish were taken in the samples. The majority of the game fish were taken in the pools below the two dams. A summary of the population samples taken in the Malheur River and its tributaries is presented in Table 116.

Further information on the Malheur River project is presented under Habitat Improvement.

### Upper Cow Lake

Preliminary survey work was started on Upper Cow Lake in preparation for chemical treatment.

On May 28, 1963, contours of the lake bottom were determined by the use of a Bendix sounding instrument. From aerial photos the area of the lake was determined to be 975 surface acres. The volume of the lake was calculated to be 5,320 acre-feet.

### Water Analysis

A number of water samples were sent to the Charlton Laboratories for chemical analysis. Results of the analysis are presented in Table 118.

### Warm-Water Game Fish

#### Altnow Pond

Angler success was excellent throughout the late winter, spring, and early summer as anglers averaged 6.0 fish per angler and 1.57 fish per hour. The composition of the catch was bluegill, 84.7 percent; largemouth bass, 15.0 percent; and rainbow, 0.3 percent. On July 18 the pond was closed to public fishing by the owner because of misconduct by some fishermen.

### Upper Brownlee Reservoir

Angling pressure on the upper end of Brownlee Reservoir was considerably lighter than it was in 1962. The most noticeable lack of anglers was in Section B from the mouth of Burnt River down to Hibbard Creek. The decline in angling pressure was due to the poor crappie and bass fishery. Few of these species were taken above Hibbard Creek.

A comparison of the 1962 and 1963 creel data for upper Brownlee is presented in Table 119.

A larger number of small steelhead was taken in 1963. A short period of good sturgeon fishing occurred in 1962 at the mouth of Burnt River but failed to develop.

### Dunaway Pond

Although Dunaway Pond contains a good population of warm-water game fish, angler success was poor. Some bass and bluegill were taken occasionally.

Fish populations were checked by using skin-diving equipment, as well as nets. Fish samples collected with nets are presented in Table 116. Fish population data determined by use of skin-diving equipment are presented in Table 120.

No fry or fingerling fish of any species were observed. The bullheads were lying over nests, three of which contained eggs. The majority of the bluegills were hovering over a gravel bed upon which nests were dug. No egg deposits were seen.

Table 118

## Summary Analysis of Water Samples from Various Waters in the District, 1963

Sample Number	Water	Date	Location	Depth in Feet	Dissolved Solids ppm	Alkalinity, as CaCO <sub>3</sub>		Conductivity Micromhos per cm	pH Value
						Carbonate ppm	Bicarbonate ppm		
1	Bully Creek	1/9/63	2 miles above Bully Creek Dam	1	230	20	131	305	8.48
2	Hot Lake	1/22/63		3	2,046	132	339	2,800	8.76
3	Malheur River	1/9/63	100 yards above mouth of North Fork below Juntura	1	315	17	144	400	8.25
4	Malheur River	1/9/63	Harper diversion dam	1	245	0	142	315	8.05
5	Malheur River, Middle Fork	1/9/63	U. S. Highway No. 20 bridge	1	145	0	79	160	7.65
6	Malheur River, North Fork	1/9/63	1 mile above mouth at Beulah Road bridge	1	310	0	218	420	8.00
7	Owyhee Reservoir	4/3/63	State park station	5	234	0	105	280	7.78
8	Owyhee Reservoir	4/3/63	State park station	75	252	0	104	290	7.70
9	Owyhee Reservoir	4/3/63	State park station	150	242	0	103	280	7.72
10	Upper Cow Lake	4/29/63	Center of lake	1	263	0	55	105	7.61
11	Upper Cow Lake	4/29/63	Center of lake	12	284	0	54	105	7.42

Table 119

A Comparison of the Angler Catch on Brownlee Reservoir  
Above Hibbard Creek, 1962 and 1963

Species	Section A			Section B		
	1962		1963	1962		1963
	Number	Percent	Number	Number	Percent	Number
St	11	1.5	7	42	2.6	72
Sg				6	0.3	1
Pk						2
LB				3	0.2	1
SB	24	3.4	16	73	4.6	27
BC	16	2.3		1,071	66.8	159
Bg				7	0.4	2
YP				69	4.3	5
FC						2
CC	631	89.0	480	186	11.6	77
BlB	27	3.8	4	147	9.2	15
Ch						3
Total Fish	709		507	1,604		366
Total Anglers	181		138	398		120
Total Hours	831		521	1,613		275
Fish per Angler	3.90		3.70	4.00		3.10
Fish per Hour	0.85		0.97	0.99		1.33



Table 120

Fish Populations in Dunaway Pond  
as Determined by Skin Diving, June 13, 1963

Species Observed	Number	Size Range in Inches
Bg	12	6 to 8
	50	8 to 12
LB	50	6 to 12
	16	12 to 14
	6	14 to 20
	1	Over 22
BlB	40	10 to 14

Owyhee Reservoir

Angler success on Owyhee Reservoir was the best since 1959 as fishermen averaged 12.4 fish per angler and 3.8 fish per hour for the season. The average fork length of crappie in the angler catch was 8.2 inches for the early part of the season.

The peak of the angler success occurred in May. Moderate angling pressure continued throughout the entire season. There was no complete abandonment of the reservoir by anglers from July through early September because of hot weather, as is usually the case. An example of the angler success during the peak of the angling season is presented in Table 121.

Table 121

Summary of Creel Census at Owyhee Reservoir,  
May 19, 1963

Method	Number Anglers	Species Taken		Total Fish	Percent of Total	Hours Fished	Fish per Angler	Fish per Hour
		BC	LB					
Bank Anglers /1	71	739	0	739	26.6	260	10.4	2.8
Boat Anglers	46	2,025	15	2,040	73.4	263	44.3	7.8
TOTALS	117	2,764	15	2,779	100.0			

/1 Anglers who did not have boats and fished in the lower 4 miles of the reservoir.

A sample and distribution of angler license sales by the Owyhee Lake resort is presented in Table 122.

Table 122

Distribution of License Sales by Owyhee Lake Resort,  
April through June 1963

Licenses	Period			Total
	April	May	June	
Resident daily	3	25	22	50
Resident angler	19	29	13	61
Resident combination	10	9	11	30
Resident juvenile	3	10	7	20
Total resident	35	73	53	161
Percent resident anglers	12.0	5.3	6.3	6.4
Nonresident daily	249	1,301	786	2,336
Nonresident seasonal	7	9	2	18
Total nonresident	256	1,310	788	2,354
Percent nonresident anglers	88.0	94.7	93.7	93.6
TOTAL LICENSE SALES	291	1,383	841	2,515 /1

/1 Oregon, 6.4 percent; Idaho, 89.1 percent; California, 1.3 percent; Washington, 0.7 percent; other states (18 represented), 2.5 percent.

The percentage of nonresident license sales is extremely high since many Oregon anglers purchased their licenses at other locations. Of 498 anglers checked on the reservoir, 59.6 percent were Oregon residents, 39.8 percent were Idaho residents, and 0.6 percent were from other states. The daily angler license is the most frequently used license at the reservoir.

A severe fish mortality occurred in the reservoir between late May and June 5. The larger fish appeared to be most affected. A sample of 7.5 miles of shore line at various parts of the reservoir indicated the loss was composed of black crappie, 99.0 percent; black bass, 0.4 percent; suckers, 0.3 percent; carp, 0.2 percent; and bullheads, 0.1 percent. The cause of the loss was tentatively identified as columnaris disease.

Water temperatures and oxygen samples were taken at various stations on the Owyhee Reservoir. A well defined thermocline was present by midsummer at the 25- to 30-foot depth in the lower end of the reservoir. A depletion of oxygen occurred in and below the thermocline in September.

A chemical analysis of water samples taken at the State park station is presented in Table 118.

Fish populations in Owyhee Reservoir remain predominately black crappie. Crappie continued to show a definite increase in fork length similar to that of 1962. A comparison of crappie taken by nets in May 1962 and May 1963 is presented in Table 123.

Table 123

A Comparison of Crappie Taken at All Stations  
on Owyhee Reservoir, 1963

Size Groups Fork Length in Inches	May 21 to 24, 1962		May 21 to 25, 1963	
	Number Fish Taken	Percent of Total	Number Fish Taken	Percent of Total
0				
1				
2			2	0.07
3			1	0.04
4				
5	17	0.8	8	0.27
6	706	35.3	78	2.67
7	1,171	58.5	1,082	37.09
8	52	2.6	1,696	58.14
9	45	2.3	45	1.54
10	10	0.5	5	0.18
TOTALS	2,001	100.0	2,917	100.00

For the past two years there has been a definite lack of 2- to 5-inch crappie in the catch. Few of last year's fry were taken in 1963.

Crappie, perch, and bass fry of this year were taken in trap nets on June 26. Average length of these species at that time was 0.8 inches.

Scale sample data for crappie and bass have not been completed at this time.

#### Snake River

Angling pressure on the Snake River from Brownlee Reservoir to the Big Bend south of Adrian continued to be light. The majority of anglers fished in the area from the head of Brownlee Reservoir to the Weiser bridge. Channel catfish comprised 91 percent of the total catch. Smallmouth bass made up only 4.1 percent of the catch. The majority of the channel catfish were 10 to 14 inches in length.

#### Warm Springs Reservoir

Three successive low-water years have caused the fishery in Warm Springs Reservoir to decline rapidly. Angling pressure was very light. The catch was comprised mainly of brown bullheads. Rainbow, largemouth bass, and channel catfish populations in the reservoir have declined, while trash fish populations have increased in the past 12 months.

## Habitat Improvement

### Bully Creek Project

The Bully Creek Reservoir dam was completed in May 1963. Chemical treatment of the tributaries above the reservoir began in June and was completed in October 1963. Much of the tributary system is characterized by badly scoured stream beds with small or intermittent flows. Trout inhabited the headwaters of Bully Creek and Upper and Lower Cottonwood Creeks. The remainder of the stream system was inhabited by rough fish. The upper sections of the tributaries were populated with bridgelip suckers, shiners, speckled dace, and rainbow.

The lower sections of Bully Creek contained carp and squawfish in addition to the above mentioned rough species.

Some difficulty was encountered in obtaining a complete kill in spring areas located in stream beds. Several areas were re-treated on three successive occasions in order to eliminate the bridgelip suckers.

Speckled dace were found throughout the tributary system after treatment had been completed. It is thought that dace fry hatched from eggs which were in the stream bed at the time of treatment. No other species were found except suckers in the spring areas.

Bully Creek Reservoir was chemically treated October 21, 1963 after the irrigation season was completed. The reservoir contained 4,400 acre-feet of water. A concentration of 1.7 ppm of Pro-Noxfish was used. Fish killed in the reservoir consisted of carp, 63.0 percent; redbside shiner, 19.0 percent; bridgelip suckers, 17.6 percent; coarsescale suckers, 0.2 percent; squawfish, 0.1 percent; and black bullheads, 0.1 percent.

The reservoir was stocked with 72,058 rainbow fingerling on November 22, 1963.

### Malheur River Project

Since excess water from the Malheur River was occasionally diverted into Bully Creek Reservoir by means of the Harper Diversion Canal, it was necessary to treat a large portion of the Malheur River to delay the reinfestation of Bully Creek Reservoir with trash fish. An effort was made to completely eliminate carp from all waters above the Harper Southside Diversion Dam and temporarily eliminate the other species of rough fish from the river sections treated. This segment of the project included much of the Malheur River and the lower portions of its main tributaries from Beulah and Warm Springs Reservoir Dams downstream to the Harper Southside Diversion Dam.

Because of the low flow and many large pools, the South Fork of the Malheur River was treated with a portable sprayer. An abundant population of trash fish was removed which was 70.05 percent redbside shiners, 11.07 percent coursescale suckers, 10.45 percent bridgelip suckers, 6.85 percent chiselmouth, 1.40 percent dace, 0.15 percent squawfish, and 0.03 percent rainbow, carp, largemouth bass, yellow perch, cottids, and brown bullhead.

Suitable areas of the South Fork were restocked with rainbow fingerling November 22. Warm-water game fish species will be restocked in certain

areas in 1964.

A short section of the Middle Fork of the Malheur River from Warm Springs Dam down to the mouth was treated. A concentration of 3 ppm of Pro-Noxfish was used. Stream flow at the time of treatment was 110 cfs.

An abundant population of rough fish was removed from the stream. Channel catfish, largemouth bass, bluegill, and a few trout were the only game fish found. The game species were recovered immediately below the dam.

Chemical treatment of the Malheur River continued downstream from the mouths of the Middle and South Forks for approximately 56 miles to the Harper Southside Diversion Dam, which will serve as a barrier to upstream fish migration.

Fish populations in the Malheur River main stem were almost entirely rough fish. An estimate of the population included reidside shiners, 34.46 percent; chiselmouth, 18.35 percent; speckled dace, 18.69 percent; longnose dace, 8.12 percent; coarsescale suckers, 7.73 percent; bridgelip suckers, 7.00 percent; cottids, 3.03 percent; carp, 1.15 percent; squawfish, 1.12 percent; rainbow, 0.15 percent; brown bullhead, 0.12 percent; perch, 0.04 percent; and channel catfish, 0.04 percent.

A sufficient rotenone concentration remained in the river to complete the treatment of the section between the Harper Diversion Dam and the Harper Southside Diversion Dam. The rotenone concentration in the river had dissipated by the time it reached the Little Valley steel bridge, approximately 9 miles below the Harper Southside Dam.

Five drip stations were used to treat the Harper Diversion Canal from the Harper Diversion Dam to Bully Creek Reservoir. All lateral head gates and the Bully Creek siphon had been closed prior to the introduction of rotenone. Toxic water was diverted into Bully Creek Reservoir.

#### Upper Cow Lake Project

The chemical treatment of Upper Cow Lake and its tributaries was completed September 12, 1963.

Treatment of the tributaries utilized the combined efforts of the Idaho Department of Fish and Game and the Oregon State Game Commission since the headwaters of Cow Creek are located in Idaho.

A large population of trash fish was present in the lake. Species observed in order of abundance at the time the lake was treated were shiners, bridgelip suckers, coarsescale suckers, squawfish, and black bullheads.

Game fish will be restocked in the lake early in 1964.

## LAKE COUNTY DISTRICT

Henry E. Mastin

### Fish Inventory

#### Trout

The rains of the past winter and spring provided sufficient water to fill all lakes and impoundments with the exception of Lofton Reservoir. The water storage in this reservoir was considerably improved, but the limited drainage area did not provide sufficient storage to fill the irrigation and fishery demands.

Spring and summer stream flows were also improved. Many of the streams which normally go dry in late spring and early summer, maintained flows for a longer period or continued to flow throughout the summer. Such a stream was Parsnip Creek. Many of these streams in good water years provide spawning areas and contribute to the fishery of the area.

The mild weather and a light snow pack contributed to an excellent winter trout fishery. Most of the winter angling took place at Thompson Valley and Ana Reservoirs. Other waters open to winter angling provided poor fishing success and had light angler use. Results of the winter creel census are presented in Table 124.

Results of the creel census for the general summer angling season showed that the average angler interviewed had caught 4.4 trout. The average fishing success for Lake County fishing waters was slightly less than one fish per hour. The trend for the past ten years shows there has been little variation in the angling success from year to year. A 10-year comparison of the angling success is presented in Table 125.

Results of the 1963 general angling season are summarized in Table 126.

Population studies indicate in general that a good trout population is present in most of the lakes and reservoirs. Results of the population studies are recorded in Table 127.

The length at maturity and weight of trout are used as a guide in determining stocking rates and other management procedures for district waters. The lengths and weights of female trout are recorded in Table 128.

In conjunction with the population studies, dissolved oxygen and water temperature studies were conducted. Good levels of dissolved oxygen were present in all waters tested. In general, the water temperatures were considerably lower than those for the past few years and did not present a problem in the summer of 1963. Results of the dissolved oxygen and temperature studies are recorded in Table 129.

Table 124

## Summary of Winter Creel Census Data, Lakeview District, 1963

Water	Watershed	Species	Number of Fish by 2-Inch Size Groups								Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour	Hours per Fish
			6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over						
Ana Reservoir	13	Rb	47	106	10	45	21	4		233	85	332	2.7	0.70	1.4	
Drews Reservoir	13	Rb								0	5	16				
Friday Reservoir	13	Rb	5							5	11	30	0.5	0.17	6.0	
Thompson Valley Reservoir	13	Rb	1	22	19	160	163	81	4	2	452	258	1,120	1.8	0.40	2.5
TOTALS AND AVERAGES			53	128	29	205	184	85	4	2	690	359	1,498	1.9	0.46	2.2

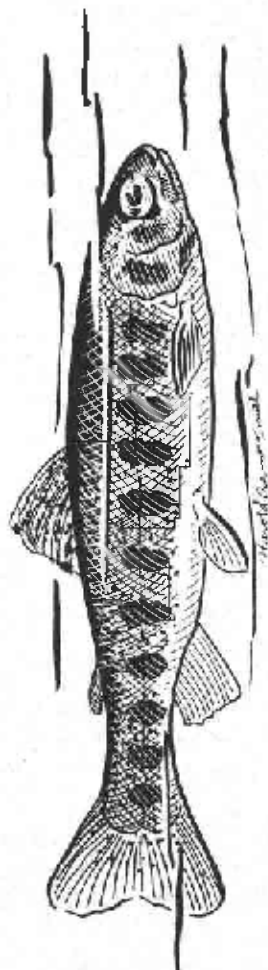


Table 125

Comparison of Creel Census Data for Lake County Waters  
for the Years 1954 through 1963

Year	Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour	Hours per Fish
1954	3,744	1,174	4,729	3.19	0.79	1.26
1955	2,741	885	2,255	3.10	1.22	0.82
1956	2,432	640	1,922	3.80	1.27	0.79
1957	2,005	542	1,837	3.70	1.09	0.92
1958	3,660	1,203	3,963	3.04	0.92	1.08
1959	4,188	1,002	3,753	4.18	1.12	0.90
1960	3,064	1,013	3,082	3.02	0.99	1.01
1961	3,529	839	3,728	4.21	0.95	1.06
1962	5,527	1,061	5,122	5.20	1.08	0.93
1963	4,977	1,130	5,188	4.40	0.96	1.04
AVERAGES	3,587	949	3,558	3.78	1.01	0.99

#### Ana Reservoir

Ana Reservoir was opened to angling the entire year this past winter and was very popular. This resulted in more efficient use of the fishery. The reservoir was chemically treated in the fall of 1961, and was planted with fingerling rainbow in the spring of 1962. Few anglers fished the reservoir until winter as the trout were small.

The winter creel census showed the angler when interviewed had caught an average of 2.7 fish. The average success was 0.70 fish per hour. Many of the trout caught were in the 8- to 10-inch size group, with some trout as large as 17 inches. Trout over 12 inches in length provided 30 percent of the catch.

In the summer fishery, anglers had caught an average 4.3 fish when interviewed. The catch rate was 0.92 fish per hour. As for the winter season, the dominant size group of the fish taken were of the 8- to 10-inch size class, with some fish as large as 17 inches. Fifty percent of the catch in the winter fishery were over 12 inches in length.

#### Campbell Lake

The Campbell Lake trout fishery has been maintained entirely by releases of catchable-size trout. A normal high angler use usually reduced the population of trout present at the end of the season to a low level. Fall releases of spring rainbow fingerling were started in the fall of 1963 in order to improve the trout population. No mature or maturing fish were taken in two gill-net sets.

Interviewed anglers had an average of 3.1 fish. The angler success was 0.49 fish per hour. Legal trout released in 1963 made up 80 percent of the catch.



Table 126

Creel Census Data, Lakeview District, 1963

Water	Watershed	Species	Number of Fish by 2-Inch Size Groups										Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour	Hours per Fish
			6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over								
Anna Reservoir	13	Rb	1	233	175	27	21	12			469	109	510	4.3	0.92	1.1		
Anna River	13	Rb	2	32	3	1	5	1			44	21	32	2.1	1.38	0.7		
Blue Lake	13	Rb	104	169	219	10	1	1	1		505	89	431	5.7	1.17	0.9		
Buck Creek	13	BT		144							144	11	45	13.1	3.20	0.3		
Canas Creek	13	Rb	21	110	17	1					149	43	84	3.5	1.77	0.6		
Camp Creek	13	Rb	7								7	8	7	0.9	1.00	1.0		
Campbell Lake	13	Rb		127	63	17		2			209	68	430	3.1	0.49	2.1		
Chevaucan River	13	Rb Br BT	10 3 3	24 8 3	4 3 3	1					38 3 12 53	16	36	3.3	1.47	0.7		
Cottonwood Meadows Lake		Rb BT	8 22	306 64	116 1	12					442 87 529	121	461	4.4	1.15	0.9		
Crump Lake	13										0	9	21	0.0				
Dairy Creek	13	Rb BT	8 2	72 19	21 1						101 22 123	29	102	4.2	1.21	0.8		
Deadhorse Lake	13	Rb BT		202	70	2					274 3 277	53	262	5.2	1.06	0.9		
Deep Creek	13	Rb	2	52	1	1	1	1			58	22	41	2.6	1.41	0.7		

Table 126 (continued)

Water	Watershed	Species	Number of Fish by 2-Inch Size Groups										Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour	Hours per Fish
			6-8	8-10	10-12	12-14	14-16	16-18	18-20	20 & Over								
Drews Reservoir	13	Rb		4	2	16	37	1	1			61						
		BC									20							
		YP	20			1					82		21	109		3.9	0.75	1.3
Duncan Reservoir	13	Rb	20	53	9	8	37	5			132		20	100		6.6	1.32	0.8
Heart Lake	13	Rb		126	8						134							
		BrB	12	1							13							
											147		32	66		4.6	2.23	0.4
Lofton Reservoir	13	Rb	7	197	73	5					282							
		BT	3	20							23							
											305		118	382		2.6	0.80	1.3
Mud Creek	13	Rb	41	4	1						46		10	23		4.6	2.00	0.5
Parsnip Creek	13	Rb	6	2							8		8	11		1.0	0.73	1.4
Friday Reservoir	13	Rb	25	82							107							
		Ct					3				3		17	88		6.5	1.25	0.8
											110							
Silver Creek	13	Rb	3	24	9	3	1				40		11	44		3.6	0.91	1.1
Thomas Creek	13	Rb	3	4	3	1					11		8	10		1.4	1.10	0.9
Thompson Valley Reservoir	13	Rb	4	80	170	308	226	71	3		862							
		Ro		1							1							
											863		234	1,757		3.7	0.49	2.0
SUBTOTALS			Rb	272	1,903	964	412	329	93	5	1	3,979						
			BT	30	255	5	1					291						
			Br			3						3						
			Ct					3				3						
			BrB	12	1							13						
			YP	20								20						
			BC				1					1						
			Ro		1							1						
TOTALS AND AVERAGES				334	2,160	972	414	332	93	5	1	4,311	1,078	5,052		4.0	0.85	1.17

/1 Includes 434 fish not classified by size groups.

Table 127

Composition and Length Frequency of Catch by Gill Nets and Trap Nets in Some Southeast Oregon Waters Represented in 1-Inch Size Groups, Fork Length, Lake District, 1963

Water	Number Nets Set	Number Fish Taken	Species	Percent of Total	Number of Fish by 1-Inch Size Groups (Fork Length)																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 & Over
Ana Reservoir	3	58 141	Rb Ro	29.1 70.9				4	71	35	25	6		2	15	21	2	1	9	6	1		1
Big Swamp Reservoir /1	3	0																					
Campbell Lake	2	19	Rb	100.0									3	8	6	2							
Cottonwood Meadows Lake	1	34 /2 11 /2	Rb BT	75.6 24.4					1	1	3	8	1				1						
Deadhorse Lake	2	3 4 1	Rb BT K	37.5 50.0 12.5						2	2					1							
Drews Reservoir	5	20 26 81 /2 76 /2 42 /2 4 /2 1	Rb Bg Su YP Ro BrB D	8.0 10.4 32.4 30.4 16.8 1.6 0.4		4	17	5			2	5	6	4	1				2				
Duncan Reservoir	2	87	Rb	100.0			1	29	11	1						1	8	27	7	1	1		
Heart Lake /3	1	1	Rb	100.0																			
Lofton Reservoir	1	46 /2 68 /2	Rb BT	40.4 59.6							1	9	6	1									
Priday Reservoir	3	28 2	Rb Ct /4	93.3 6.7						1	9	17	1										2

Table 127 (continued)

Water	Number Nets Set	Number Fish Taken	Species	Percent of Total	Number of Fish by 1-Inch Size Groups (Fork Length)																		
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 & Over
Sids Reservoir <sup>1</sup> / <sub>5</sub>	3	6	Rb	100.0											1	2	1	1					
Silver Creek Diversion	2	13 8	Rb Ro	61.9 38.1				4	4	1	4												
Taft Miller Reservoir	3	60 26	Rb Ro	69.8 30.2				2	12	39	6	1											
Thompson Valley Reservoir	3	87 <sup>1</sup> / <sub>2</sub> 1,122 <sup>1</sup> / <sub>2</sub>	Rb Ro	7.2 92.8	1	2	7	3					7	6	5	27	8	5	7	4			
Withers Lake	1	33 <sup>1</sup> / <sub>2</sub>	BT	100.0											19	9							

<sup>1</sup>/<sub>1</sub> Big Swamp Reservoir contains largemouth bass, bluegill, and channel catfish.

<sup>1</sup>/<sub>2</sub> Includes some fish released or destroyed.

<sup>1</sup>/<sub>3</sub> Heart Lake is known to have brown bullheads.

<sup>1</sup>/<sub>4</sub> Heenan Lake cutthroat.

<sup>1</sup>/<sub>5</sub> Sids Reservoir contained roach in 1962.

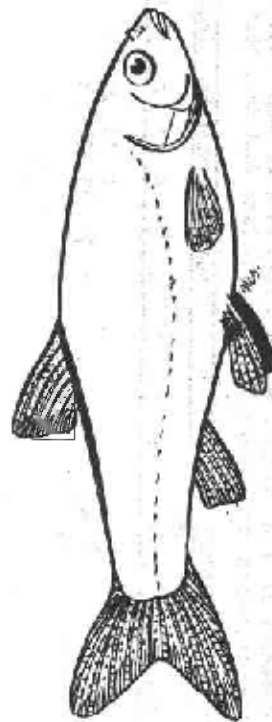


Table 128

Average Lengths and Weights of Female Fish at Various Stages of Maturity,  
Southeast Region, Lake District, 1963

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
Ana Reservoir	Rb	24	9.0	5.5	4	13.9	18.5			
Big Swamp Reservoir <u>1</u>										
Campbell Lake	Rb	9	10.4	7.2						
Cottonwood Meadows Lake	Rb	12	8.8	5.7	1	12.0	13.0	1	9.4	6.0
	BT				4	9.3	6.1			
Deadhorse Lake	Rb	1	10.6	6.5						
	BT	2	7.7	2.4						
Drews Reservoir	Rb	8	9.1	4.6	3	13.8	14.7			
Duncan Reservoir	Rb	12	14.3	19.9	7	14.4	20.6	1	17.2	36.0
Heart Lake	Rb <u>2</u>									
Lofton Reservoir	Rb	7	8.6	4.3						
	BT	2	6.6	2.1	9	7.2	2.8			
Priddy Reservoir	Rb	16	8.1	3.9						
Sids Reservoir	Rb	1	13.9	16.0	4	14.6	18.4			
Silver Creek Diversion	Rb	6	7.4	2.7	1	6.2	1.5			
Taft Miller Reservoir	Rb	27	11.0	8.2						
Thompson Valley Reservoir	Rb	25	12.4	12.4	5	14.8	20.5	3	16.4	25.6
Withers Lake	BT <u>3</u>				16	13.1	13.9			

1 No fish taken.2 No female trout taken.3 These fish were not checked for old egg cases. Some or all of them may have been mature. Many brook trout fingerling were observed in the inlet stream and in the lake.

Table 129

## Results of Dissolved Oxygen Studies of Lake County Lakes and Reservoirs, 1963

Water	Date	Elevation in Feet	Temperature in Degrees in Fahrenheit		Depth in Feet	O <sub>2</sub> ppm	Percent Saturated	Remarks and Location
			Air	Water				
Big Swamp Reservoir	1/29/63	5,500	30	40	7.0	16.31	155.00	8 inches clear ice, 2 inches new snow, 50 yards from southeast end of lake.
	8/23/63		68	67	5.0	5.71	77.50	Center of northeast cove.
			68	67	5.0	4.76	63.75	200 yards below island.
			70	67	5.0	4.28	57.50	100 yards above head gate.
Campbell Lake	7/5/63	7,300	65	59	1.0	7.80	98.25	
				59	10.0	7.50	96.94	
	9/16/63		59	56	5.0	7.50	94.32	
				55	9.0	7.50	89.08	
Cottonwood Meadows Lake	1/29/63	6,150	29	40	14.0	0.00	0.00	17 inches clear ice, 50 yards above dam.
	1/30/63		36	29	1.0	2.56	17.64	17 inches clear ice, 3 inches new snow, 50 yards above dam.
				36	7.0	0.28	2.50	
				40	14.0	0.00	0.00	
Deadhorse Lake				39	5.0	3.28	33.50	50 yards southwest point of island.
				38	5.0	4.77	45.36	40 yards south shore, between tributaries.
	7/5/63	7,300	58	58	1.0	7.70	99.75	Center of lake.
				58	14.0	7.90	102.41	
Duncan Reservoir	9/16/63		55	56	5.0	7.79	96.94	Center of deep water.
				55	15.0	7.47	89.08	
	8/26/63	4,200	70	68	1.0	11.36	147.56	Center of reservoir.
				62	5.0	8.94	109.48	
Heart Lake	1/29/63	5,500	30	39	13.0	7.90	74.40	7 inches ice, 2 inches new snow, 50 feet from shore.

Table 129 (continued)

Water	Date	Elevation in Feet	Temperature in Degrees Fahrenheit		Depth in Feet	O <sub>2</sub> ppm	Percent Saturated	Remarks and Location
			Air	Water				
Heart Lake (continued)	8/23/63		68	70	1.0	7.42	102.50	200 feet from island toward dam.
				67	5.0	7.42	100.00	
				62	10.0	6.19	80.00	
				50	15.0	2.66	31.25	
				43	20.0	0.00	0.00	
				42	25.0	0.00	0.00	
Lofton Reservoir	1/26/63	5,750	36	39	8.5	9.54	89.28	8 inches clear ice, 2 inches new snow, 50 yards above dam.
Friday Reservoir	7/4/63	4,750	65	63	1.0	7.05	85.68	Center of reservoir.
				62	15.0	6.95	84.49	
Sida Reservoir	8/28/63	5,700	74	68	1.0	9.07	122.50	Center of reservoir.
				59	15.0	6.42	78.75	
				51	25.0	0.73	7.50	
Silver Creek Diversion	8/16/63	4,500	80	68	5.0	7.70	98.28	200 feet above dam center.
				58	26.0	6.20	70.20	
Taft Miller Reservoir	9/5/63	4,600	63	66	5.0	6.20	78.54	100 feet above dam center.
				61	10.0	5.30	63.07	
				60	15.0	4.10	46.41	
				60	20.0	2.20	36.89	
Thompson Valley Reservoir	8/16/63	4,920	80	73	1.0	8.10	114.00	100 yards from east shore across from west campground.
				72	5.0	6.50	90.00	
				71	10.0	6.50	86.40	
				70	15.0	6.50	85.20	
				70	20.0	6.50	85.20	

July and September oxygen studies showed the dissolved oxygen level to be 7.8 and 7.5 ppm, respectively. Summer surface water temperatures were from 9° to 10° F. lower than usual.

#### Cottonwood Meadows Lake

This was the second year of angling at the new Cottonwood Meadows impoundment. There was a heavy angler use at the early part of the season. Creel census data showed anglers had caught an average of 4.4 fish. The catch rate was 1.15 fish per hour. The fish developed a poor flavor during the midsummer months, and this resulted in little angler use.

A population study showed that a good number of rainbow and brook trout were present. Female rainbow trout were maturing at 12 inches in length, and brook trout at 9.5 inches in length.

An oxygen study in late January, when the lake was covered with 17 inches of ice and 3 inches of new snow, showed low levels of dissolved oxygen. There were from 2.56 ppm at 1 foot to 0.00 ppm at 14 feet near the dam. Water samples from the upper lake had dissolved oxygen levels of 3.28 and 4.77 ppm.

#### Deadhorse Lake

Releases of catchable-size trout have also maintained the fishery at Deadhorse Lake. Spring rainbow and brook trout fingerling were stocked in the fall of 1963 in order to improve the trout population. A population study in September indicated a very small trout population remained.

Deadhorse Lake provided good angling through the summer months. On an average, anglers caught 5.2 trout at the rate of 1.06 fish per hour.

Water samples taken in July and September had a dissolved oxygen content of 7.9 ppm. Surface water temperatures of 58° F. were 12 degrees lower than usual during the summer.

#### Drews Reservoir

This reservoir was chemically treated in the fall of 1961 to remove a large population of coarse fish. In the spring of 1962, the reservoir was stocked with rainbow fingerling. Subsequent releases of rainbow fingerling and fry have been made. There was little winter fishing effort and no anglers interviewed had any fishing success. The summer angling effort was also very light and few of the anglers were successful in catching trout.

It was not possible to chemically treat the entire watershed. This resulted in the return of undesirable fish species. A population study indicated trout accounted for only 8 percent of the fish population. Yellow perch, bluegill, brown bullhead, and dace made up the remaining 92 percent of the population.

#### Duncan Reservoir

A large trout population in Duncan Reservoir provided excellent angling in the spring and early summer. Through the midsummer and fall months there was little angling effort. Anglers caught an average of 6.6 trout at the



rate of 1.32 fish per hour.

Gill nets set in August indicated there was a good trout population including fingerling rainbow. Female rainbow were maturing at an average 14.7 inches, and one mature trout was 17.1 inches in length.

Water samples taken in August had a dissolved oxygen content of 11.36 ppm. Water temperatures ranged from 61° to 68° F.

#### Heart Lake

Excellent trout fishing was experienced early in the season. Anglers caught an average of 4.6 trout at a rate of 2.23 fish per hour.

Water samples in August showed the dissolved oxygen levels to range from 7.42 ppm at the surface to 0.00 ppm at 25 feet. At 15 feet the oxygen level was 2.66 ppm. Water temperatures ranged from 40° to 70° F. There was a thermocline from 9 to 16 feet.

#### Lofton Reservoir

This was the second year of angling for this reservoir since it was drained and the dam rebuilt. Anglers had good fishing until July. At this time, the trout acquired an unpalatable taste. Trout were caught at the rate of 0.80 fish per hour.

Analysis of water samples in late January showed 9.5 ppm of dissolved oxygen at a depth of 8.5 feet. There was an 8-inch cover of clear ice and 2 inches of new snow.

#### Friday Reservoir

Results of both the summer and winter fishery at Friday Reservoir were poor. Gill-net sets in July indicated good numbers of rainbow, and a few cutthroat trout were still present in the reservoir. The dissolved oxygen content of the water ranged from 7.05 ppm at the surface to 6.95 ppm at 15 feet. Water temperatures were almost uniform, ranging from 62° to 63° F.

#### Sids Reservoir

Only small numbers of trout were present in Sids Reservoir based on the results of three gill-net sets. Female rainbow trout were maturing at an average length of 14.6 inches. The dissolved oxygen content ranged from 0.73 ppm to 9.07 ppm. Thermocline was present at 21 feet. The water temperatures ranged from 67° at the surface to 50° F. at 30 feet.

#### Silver Creek Diversion

Small numbers of trout and roach were taken in three gill nets set in Silver Creek diversion. The dissolved oxygen content ranged between 6.2 and 7.7 ppm. Water temperatures were from 58° to 69° F.

#### Taft Miller Reservoir

The results of three gill nets set in September in Taft Miller Reservoir

indicated an excellent trout population was present. The sample, however, contained 30.3 percent roach.

The dissolved oxygen content of the water ranged from 2.2 to 6.2 ppm. Water temperatures were between 60° and 66° F. Thermocline was located at 7 feet.

#### Thompson Valley Reservoir

Thompson Valley Reservoir had heavy angler use through both the winter and summer seasons. The mild winter of 1962-63 made it possible for ice fishermen to reach the reservoir. For the most part, the winter angler was limited to 5 fish over 12 inches as over 90 percent of the fish caught were over 12 inches in length. The summer fishery was equally popular. Again the angler was usually restricted to a limit of 5 fish over 12 inches in length. For the summer season, over 70 percent of the catch averaged over 12 inches in length.

Normally through the summer months, the fish in the reservoir acquire a bad flavor and the angler use becomes light. In 1963, however, with an increased water storage the fish did not acquire the unpalatable flavor to the extent of other years. Most of the anglers interviewed through the summer months reported that the fish were palatable.

A good population of trout was indicated from a study made in July. A number of size groups were represented. Most of the fish were over 12 inches in length. Trout taken by gill nets made up 48.87 percent of the fish population and roach accounted for 51.13 percent. Even with the roach population, good trout fishing was still available in the reservoir. Female rainbow trout were maturing at an average length of 14.8 inches and were mature at an average length of 16.4 inches.

During March and April, many rainbow were observed spawning in Guyer and Benny Creeks. Little benefit was expected from the spawning in Benny Creek since the stream became dry in late May or early June.

Analysis of water samples showed a dissolved oxygen content that ranged from 6.5 to 8.1 ppm. Water temperatures ranged from 70° to 73° F.

#### Withers Lake

Brook trout were found to be abundant in Withers Lake. Trout taken in a gill-net set averaged 11 to 12 inches in length. The brook trout were reproducing in the inlet stream where many fingerling were observed, as well as in the lake.

#### Warm-Water Game Fish

##### Big Swamp Reservoir

This reservoir has been stocked with bluegill, largemouth bass, and channel catfish to establish a warm-water fishing area. Few anglers have been fishing the reservoir and none have reported catching fish. Some bluegill have been reported seen along the shore. No fish were taken in efforts to sample the fish population by gill nets. An additional 600 bass fingerling were stocked in the reservoir in the summer of 1963. Dissolved oxygen and water temperature studies made in both winter and summer did not indicate an oxygen or temperature problem existed.

## CENTRAL OREGON, COLUMBIA DISTRICT

Allan B. Lichens

### Fish Culture

#### Summer Steelhead, Hood River

Trapping summer steelhead for hatchery production was continued in 1963. Adult fish taken from Powerdale and Punch Bowl traps were transported to Hood River Hatchery. One hundred six were taken at Powerdale and 7 at the Punch Bowl, for a total of 113 fish. One hundred five of the Powerdale steelhead and 3 of the Punch Bowl steelhead were returning tagged fish.

Tables 130 and 131 include a list by months of the steelhead captured at the two traps and the number of fish transported to the hatchery.

In 1963, 42 adult females were spawned at Hood River Hatchery, producing 95,997 eggs. A total of 69,000 green and 26,225 eyed eggs were transported to Gnat Creek Hatchery. These fish will be released in Hood River during 1964.

The marking of fish of the 1963 brood year was checked on two occasions to determine the efficiency of the markers. Instructions on marking and the importance of good marks were explained at the beginning of the projects. A total of 1,593 fish was checked during these experiments, and a combined efficiency of 98.2 percent was achieved by the markers. A breakdown of the fish checked and the percent of efficiency are presented in Table 132.

One group of fish was checked for regeneration of the fins 118 days after marking, and another group 167 days after marking. The first group had 99.27 percent good marks without regeneration. The second group showed only 23.26 percent good marks without regeneration. Table 133 summarizes the data collected from these observations. Unfortunately, a substantial release of steelhead in the second group occurred before the condition of fin marks was noted. Identification of the returning adults of this group will be difficult or impossible for a large proportion of the fish.

### Fish Distribution

#### Summer Steelhead, Hood River

On May 7, 1963, 5,225 two-year-old summer steelhead were liberated in the Lake Branch of Hood River. These fish were from the 1961 brood and averaged 9.5 fish per pound. They were raised at Hood River Hatchery and were marked by the removal of the right pectoral fin, right maxillary bone, and left ventral fin.

In June 1963, 30,335 one-year-old summer steelhead from the 1962 brood, raised at Gnat Creek Hatchery, were liberated in the West Fork and Lake Branch of Hood River. These fish were marked by removal of the left pectoral fin and left maxillary bone. This group of fish averaged 10.5 fish per pound at liberation.

Table 130

## Powerdale Trap Counts by Months, Hood River, 1962-63

Month /1	Summer Steelhead		Winter Steelhead	Unclassified Steelhead	Steelhead Tagged	Number of Steelhead Taken to Hatchery	Other Species of Fish Caught						
	Wild	Marked					Co	Ch	SS	Ct	Rb	DV	Br
November	5						22						
December	16	3	5		8		13		1				
January	29	3	7		32		2		11				
February	6		3		4				4				
March	40	4	28		52				11				
April	29	31	25	240	265				13	1			
May	40	17		458	331				1		3		
June	129	47		156	198	56		16	1	1	2		
July	132	53		2	147	46		6	2		1	1	
August	45	14			31	4			6				
September	22	6			23		35	7	2				
October	22	1			11		73	22	1	1	1	3	
TOTALS /2	515	179	68	856	1,102	106	145	51	11	43	3	6	4

/1 Month covers the period from the 16th of one month to the 15th of the following month.

/2 Grand total of steelhead caught = 1,618.

Table 131

Punch Bowl Trapping Station, West Fork Hood River, 1962-63

Month <u>/1</u>	Summer Steelhead		Winter Steelhead	Unclassified Steelhead	Steelhead Tagged at Powerdale	Number of Steelhead Taken to Hatchery	Other Species of Fish Caught			
	Wild	Marked					Co	Ch	SS	DV
November	8				2		10			
December										
January										
February										
March		2			1					
April	1	1	2	7	6					
May		2	1	7	6					
June	15	4		23	22	7				
July	37	22		3	43			2		
August	29	12			20			1	6	1
September	9	10			12		1	3	8	
October	7	2			5			4	4	
TOTALS <u>/2</u>	106	55	3	40	117	7	11	10	18	1

/1 Month covers the period from the 16th of one month to the 15th of the following month./2 Grand total of steelhead caught = 204.

Table 132

## Marking Efficiency, Columbia District, 1963

Date	Mark	Number of Fish	Percent Efficiency
January 10, 1963	<u>Triple Mark</u>		
	Good mark	571	98.9
	Poor mark	5	0.9
	Missed mark	1	0.2
		<u>577</u>	
May 23, 1963	<u>Double Mark</u>		
	Good mark	991	97.5
	Poor mark	23	2.3
	Missed mark	2	0.2
		<u>1,016</u>	

Table 133

## Marked Steelhead Fin Regeneration and Missed Marks, 1963

	Mark	Number of Fish	Percent Efficiency
Checked 118 days after marking	<u>LV-RP-RM</u>		
	Complete mark	541	99.27
	Light regeneration	4	0.73
	Missed mark	0	
		<u>545</u>	
Checked 167 days after marking	<u>LP-LM</u>		
	Complete mark	127	23.26
	Heavy regeneration	100	18.32
	Light regeneration	308	56.41
	Missed mark	11	2.01
		<u>546</u>	

In September, 34,760 additional summer steelhead from the 1962 brood were liberated in the West Fork and Lake Branch of Hood River. These fish had a left pectoral-left maxillary mark but the left pectoral fin had regenerated on most of the fish. The left pectoral fin was reclipped and a right ventral mark was added prior to liberation. The extra mark was added so this group could be distinguished from the fish liberated in June. This group of steelhead averaged 11 fish per pound.

Marked summer steelhead releases that have been made in Hood River since 1958 are summarized in Table 134.

Table 134

## Marked Summer Steelhead Liberations in Hood River, 1958-1963

Mark	Brood Year	Raised at (Hatchery)	Time of Liberation	Number of Fish	Fish per Pound
Ad-RM	1956	Hood River	April 1958	1,800	9.0
RP-RM	1957	Hood River	April 1959	2,454	8.1
RP	1958	Hood River	April 1960	17,380	11.0
RP	1959	Oak Springs	April 1960	15,156	12.0
LP	1960	Gnat Creek	May 1961	18,242	8.7
LP	1960	Gnat Creek	June 1961	21,730	10.0
LP-RM	1960	Gnat Creek	December 1961	23,000	9.0
RP-RM	1961	Gnat Creek	May 1962	27,432	12.0
RP-RM	1961	Gnat Creek	June 1962	29,238	22.0
LV-RP-RM	1961	Hood River	May 1963	5,225	9.5
LP-LM	1962	Gnat Creek	June 1963	30,335	10.5
RV-LP-LM	1962	Gnat Creek	September 1963	34,760	11.0

Winter Steelhead, Hood River

A total of 100,039 winter steelhead from the 1962 brood was liberated into the Middle and East Forks of Hood River during June 1963. These fish were received from the U. S. Fish and Wildlife Service Eagle Creek Hatchery. They averaged 36.5 fish per pound and were not marked.

## Fish Inventory

AnadromousSteelhead, Hood River

Creel records from Hood River show that 783 anglers interviewed expended 1,095 hours of effort to catch 49 steelhead, or 0.06 fish per angler. Seven (14.3 percent) of the steelhead checked during creel census were returning marked fish.

Table 135 is a comparison of the steelhead catch in Hood River from 1954 through 1963.

Nineteen right pectoral and 4 left pectoral marked steelhead were reported caught by anglers but were not included in the creel census. The brood year and release date for these fish are included in Table 134.

Table 135

## Steelhead Creel Census by Year, Hood River, 1954-1963

Year	Anglers Checked	Fish Caught	Hours Fished	Fish per Angler	Hours per Fish
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
1962	705	73	1,352	0.10	18.5
1963	783	49	1,095	0.06	22.3

During the past year an attempt was made to classify the steelhead migrating over Powerdale Dam as winter or summer fish. Bright colored fresh-run steelhead, immature and not ready to spawn for almost a full year, are classified as summer steelhead. Bright mature steelhead entering the river in the winter months are classified as winter steelhead. Information collected in 1962 from the tagging program indicates that some of the summer steelhead entering fresh water in early spring and summer do not ascend Powerdale Dam until late winter and spring of the following year. At this time the summer steelhead are dark maturing fish. When these fish go over the dam they are mixed with the winter steelhead at the same stage of maturity. After April 1, 1963 it was impossible to distinguish between the mature summer and winter steelhead, so the whole group of mature steelhead, except for the marked fish, was considered just "steelhead".

Two adult steelhead traps were operated at Powerdale Dam during the past year. The trap in the east ladder was operated throughout the year to capture, examine, and tag adult steelhead and to secure summer steelhead brood stock for hatchery production. The trap in the west ladder, installed December 13, 1962, was used to capture and examine adult steelhead for marks and to obtain a total count of steelhead moving over the dam.

A total of 1,618 steelhead was captured in these two traps. One hundred seventy-nine (11.1 percent) of the steelhead were returning marked fish. This is a decrease from the 19.7 percent recorded in 1962. Included in the number of marked fish were 58 with RP marks, 115 with LP marks, 3 with LP-RM marks, and 3 with RP-RM marks. Spaghetti tags were applied to 1,102 (68.1 percent) of the steelhead to gain information on river distribution. Table 130 summarizes trapping and tagging operations at both Powerdale traps.

Forty-nine (4.4 percent) of the steelhead tagged at the east Powerdale trap were retrapped in the east and west traps. Apparently these fish went back



down over the dam, and some re-entered the same trap while others entered the west trap. Eighteen were summer fish, 1 was a winter fish, and 30 were unclassified steelhead.

Eighty of the steelhead tagged at Powerdale were caught by anglers and the tags returned. Thirty-four were summer fish, 6 were winter fish, and 40 were unclassified steelhead. Four other tagged steelhead were caught in commercial gill nets in the lower Columbia and the tags returned.

An attempt was made to determine the number of RP marked steelhead returning as adults from the 32,536 liberated from the 1958 and 1959 broods. Since this mark was used on two successive brood years, the returns are scattered over a 3-year period. Table 136 lists the RP marks that have been accounted for from various sources.

Table 136

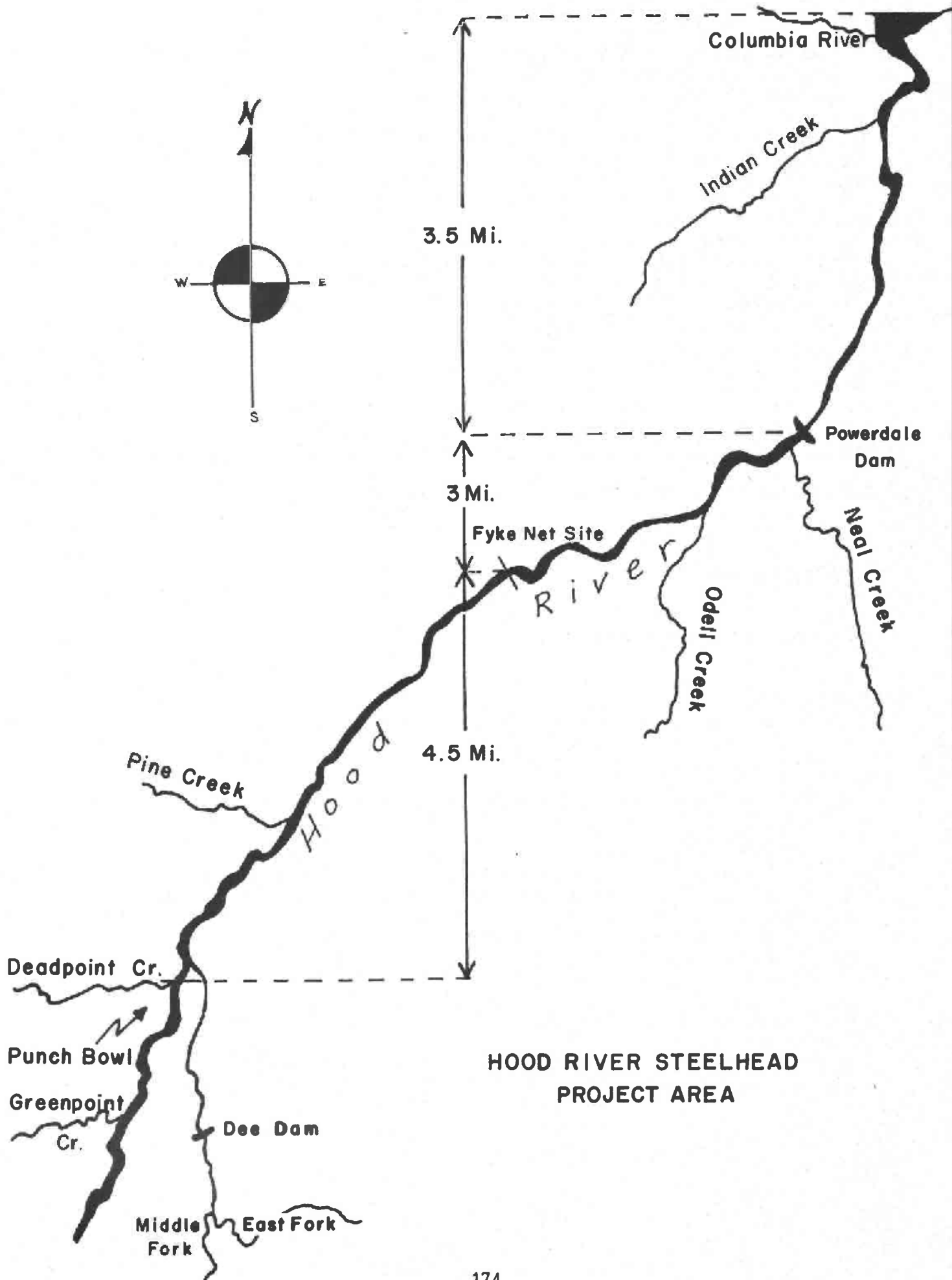
Returns of RP Marked Hood River Steelhead

Source	Year	Number of Marks
Columbia River gill-net fishery	1961	55
	1962	304
	1963	
Powerdale trap counts	1962	306
	1963	58
Creel census and catch record cards	1962	12
	1963	7
Angler reports	1961	10
	1962	66
	1963	19
TOTAL		837

The Punch Bowl trap in the West Fork of Hood River was operated throughout the year. This trap was used to recover steelhead tagged at Powerdale Dam and to take additional summer steelhead for hatchery production. A total of 204 steelhead was caught in this trap. Fifty-five (26.9 percent) of the steelhead were returning marked fish. Included in the number of marked fish were 4 with RP marks, 50 with LP marks, and 1 with an RP-RM mark. Of the 204 steelhead caught, 112 (54.9 percent) were fish that had been tagged downstream at Powerdale Dam. Table 131 summarizes trapping operations at the Punch Bowl. Figure 10 shows the location of the four traps used on Hood River.

The wire fyke net, after being lined with small-mesh hardware cloth, was placed in operation approximately 6 miles above the mouth of Hood River on April 4, 1963. The purpose of this net was to trap juvenile downstream migrant steelhead. Only 7 downstream migrant coho salmon and 18 rainbow were caught in this net before fishing was discontinued on July 16. Fifteen of the rainbow were considered downstream migrant steelhead. With only this small sample, little

Figure 10



information was collected regarding the time, size, and age that young steelhead migrate downstream in Hood River.

#### Steelhead, Deschutes River

The average success from the lower 7.5 miles of river indicates a slightly higher return per angler in 1963 with less anglers participating. Creel records reveal that 757 anglers required 3,375 hours to catch 225 fish, or 0.30 fish per angler.

The anglers using boats for access to fishing areas continued to have much higher success rate than anglers walking to access points. An estimated 2,053 anglers fished the west shore in this section of river during the 58-day period beginning July 13 and ending September 8, 1963.

Table 137 summarizes data collected in the area from 1953 through 1963.

Table 137

#### Summer Steelhead, Sport Catch, Lower Deschutes River, 1953-1963

Year	Anglers Checked	Fish Caught	Hours Fished	Fish per Angler	Fish per Hour	Hours per Fish	Estimated Anglers
1953	882	375	3,578	0.43	0.10	9.5	3,740
1954	1,070	384	4,533	0.36	0.08	11.8	2,800
1955	843	253	2,771	0.30	0.09	11.0	2,700
1956	633	207	2,289	0.33	0.09	11.1	1,865
1957	888	480	3,798	0.54	0.13	7.9	2,268
1958	1,168	281	5,405	0.24	0.05	19.2	3,030
1959	1,464	808	8,698	0.55	0.09	10.8	4,662
1960	1,218	218	4,438	0.18	0.05	20.4	3,590
1961	1,186	300	6,111	0.25	0.05	20.4	2,893
1962	1,498	382	6,008	0.26	0.06	15.7	3,884
1963	757	225	3,375	0.30	0.07	15.0	2,057

#### Salmon-Steelhead, Columbia River

The aerial survey of angler use on the Columbia River, initiated in July 1962, was completed on June 1, 1963. The purpose of this survey was to determine the locations and the intensities of salmon-steelhead angling pressure between Bonneville and McNary Dams. This information is to be used to formulate a statistically sound sampling program.

Table 138 presents the totals for bank and boat salmon-steelhead anglers in the Columbia District.

Table 138

## Columbia River Aerial Counts, Salmon-Steelhead Anglers, June 1962 to June 1963

Date	Bonneville		Cascade Locks		Hood River		The Dalles		The Dalles Pool		Deschutes		Total
	Bank	Boat	Bank	Boat	Bank	Boat	Bank	Boat	Bank	Boat	Bank	Boat	
6/23/62	-	18	5	3	-	-	-	-	-	-	-	-	26
7/7/62	30	8	4	-	-	-	-	4	-	-	-	-	46
7/15/62	32	5	13	-	-	-	1	-	-	-	4	-	55
7/21/62	-	3	32	3	3	-	-	-	-	-	-	-	42
7/29/62	31	35	25	2	-	3	-	-	1	-	-	-	99
8/4/62	-	5	48	-	2	-	-	-	-	-	-	-	55
8/12/62	-	4	48	8	1	-	-	-	-	-	-	3	64
8/18/62	12	14	32	-	2	-	2	-	-	-	-	-	62
8/26/62	-	1	59	-	4	-	-	-	-	-	-	-	67
9/1/62	36	38	40	-	-	-	-	2	-	-	2	1	119
9/9/62	-	5	53	14	8	-	1	-	-	-	-	4	85
9/15/62	6	35	40	7	-	-	-	5	3	-	-	-	96
9/23/62	20	13	40	1	-	-	2	-	-	-	-	-	76
9/29/62	-	-	4	1	-	-	-	-	-	-	-	-	5
10/14/62	-	-	3	-	-	-	-	-	-	-	-	-	3
10/27/62	2	-	-	-	-	-	-	-	-	-	-	-	2
11/10/62	1	-	3	-	-	1	-	-	-	-	-	-	5
12/29/62	6	-	7	-	-	-	-	-	-	-	-	-	13
1/13/63	-	-	-	-	-	-	-	-	-	-	-	-	0
1/27/63	5	-	2	1	-	4	-	-	-	-	2	-	14
2/10/63	6	-	-	-	-	-	-	-	-	-	-	-	6
2/23/63	-	-	-	-	-	-	1	-	-	-	-	1	2
3/9/63	5	11	2	1	-	-	-	-	-	-	-	-	19
3/24/63	47	26	4	-	2	-	-	-	-	-	1	2	82
4/7/63	-	57	9	-	-	-	2	-	-	-	-	-	68
4/21/63	-	-	-	-	-	-	-	-	-	-	-	-	0
5/11/63	26	4	-	2	-	-	1	-	-	-	-	2	35
5/19/63	3	3	2	-	1	-	1	-	-	-	-	-	10
6/1/63	1	6	3	-	-	-	-	-	-	-	-	2	12
SUBTOTALS	269	291	478	43	7	21	6	14	11	4	9	15	
TOTALS	560		521		28		20		15		24		1,168

Figure 11 depicts the bank and boat angling pressure for salmon and steelhead in this area by month. The numbers used in the graph represent the average number of anglers per flight-day for each month.

As indicated by Table 138, the angling for salmon and steelhead in the Columbia District is primarily located in the Bonneville Dam-Cascade Locks area at the present time.

### Trout

#### Hood River

Creel census of trout anglers on Hood River shows that 222 anglers interviewed fished 335 hours to catch 244 rainbow, 2 cutthroat, and 1 Dolly Varden trout. Marked downstream migrant steelhead accounted for 3.9 percent of the total catch. The percent of wild downstream migrants in the trout catch was not determined.

#### Lost Lake

Angler success improved at Lost Lake during 1963. The catch is comparable to the years prior to the 1962 season. The average catch per angler was 2.30 fish.

The percentage of kokanee in the catch continued its downward trend to a low of 0.9 percent, this being the lowest since the first kokanee returns in 1958. The fish contributing to the 1963 season were released as fry (2,740 per pound).

Tables 139 and 140 summarize the catch statistics and size composition of the catch at Lost Lake from 1954 through 1963.

Table 141 provides the composition of the catch at Lost Lake by species and percentages from 1954 through 1963.

#### East Fork Hood River

The angler use and success are returning to normal on this river following intensive road construction and channel changing during the 1962 season. Angler interviews indicated an average catch of 2.0 fish per angler.

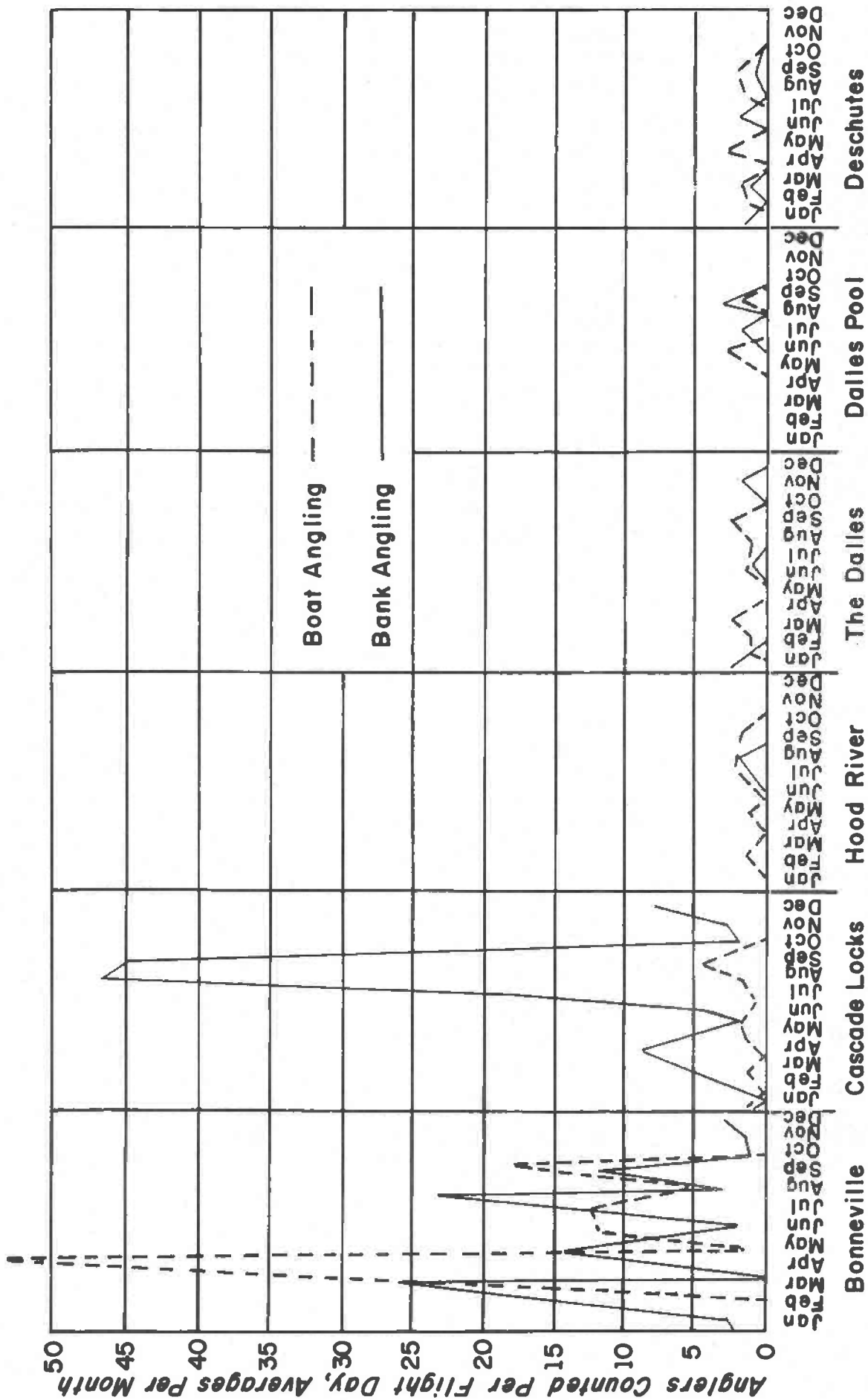
Table 142 summarizes the creel census collected on the East Fork of Hood River since 1954.

#### Clear Lake

Success remained high at Clear Lake during 1963. Anglers enjoyed a success of 3.4 fish per trip. A total of 730 anglers interviewed reported 2,498 fish.

The extensive irrigation use on Clear Lake in 1963 resulted in a small storage pool surrounded by mud flats. This fact and the increased stocking program probably contributed toward reducing the size of maturing brook trout females from 16.9 inches in 1961 to 11.1 inches in 1963.

Figure 11



SALMON—STEELHEAD ANGLING PRESSURE BY MONTH AND AREA

Table 139  
Catch Statistics at Lost Lake, 1954-1963

Year	Fish Checked	Anglers Checked	Hours Fished	Fish per Angler	Fish per Hour
1954	127	72	310	1.76	0.41
1955	145	90	291	1.61	0.50
1956	70	73	186	1.00	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
1962	229	150	473	1.53	0.48
1963	838	364	1,267	2.30	0.66

Table 140  
Size Composition of the Catch Expressed in Percentages,  
Lost Lake, 1954-1963

Year	Catch Expressed in Percentages by 2-Inch Size Groups				
	6-8	8-10	10-12	12-14	14 & Over
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	16.5	64.8	14.5	3.3	0.9
1960	25.9	51.7	21.1	1.3	
1961	10.9	69.6	18.7	0.8	
1962	16.2	58.0	21.4	4.4	
1963	25.0	69.6	5.1	0.1	0.2

Table 143 presents information on the composition and length frequency of the fish population as obtained by gill nets. Table 144 summarizes the average length of females in each stage of maturity.

#### Other Lakes and Streams

In an effort to evaluate the success of stocking legal trout near the mouth of a stream flowing into the Columbia River, 2.5 percent of the fish released into Eagle Creek were tagged with metal jaw tags which were returned by the anglers on a voluntary basis. To aid in getting maximum returns, the stream was well posted and the area was patrolled periodically.

Tag recoveries indicate only 12 percent return to the angler for legal fish stocked in this type of stream.

Table 141  
Composition of the Catch by Species, Lost Lake,  
1954-1963

Year	Percentages by Species				
	Rainbow	Brook Trout	Brown Trout	Kokanee	Cutthroat
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	0.4	2.0	2.7	0.4
1960	92.1	0.4	0.6	6.9	
1961	68.5	0.5	0.2	30.8	
1962	80.4	2.6	0.4	16.6	
1963	98.0	0.6	0.5	0.9	

Table 142  
Trout Catch Statistics on East Fork Hood River, 1954-1963

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
1962	458	289	757	0.61	1.58
1963	571	285	634	0.90	2.00

Creels were checked at other district streams and lakes as the work schedule permitted. Table 145 depicts the data collected during the 1963 fishing season.

The surface water of Bibby Reservoir had 8 ppm of dissolved oxygen on April 8 just prior to a trout liberation. On August 23, reports of dead fish were investigated. Thirty-nine dead fish were observed around the shore line and there was a heavy bloom of algae at this time. Oxygen content was found to be 5.3 ppm. On October 16, two gill nets failed to produce any fish. Another oxygen sample taken on this date showed the water to contain 2.9 ppm.

This reservoir was at its minimum pool level going into the summer, a fact that may have hastened the decrease in dissolved oxygen. Water conditions may be more favorable in future years as more water is stored.



Table 143

Composition and Length Frequency of Catch by Gill Nets in Clear and Olallie Lakes,  
Represented in 1-Inch Size Groups, Fork Length Measurements, 1963

Lake	Number of Sets	Species	Number of Fish	Percentage of Total	Number of Fish by 1-Inch Size Groups (Fork Length)													
					5	6	7	8	9	10	11	12	13	14	15	16	17	18
Clear	4	Rb	22	25.3			11	8			1		1					1
		BT	65	74.7	1		38	10	2	3	4	3	1	1	1			1
Olallie	4	Rb	23	92.0					5	2	11	5						
		BT	2	8.0					2									

Table 144

Average Length of Female Fish in Each Stage of Maturity  
as Collected in Gill Nets in Clear and Olallie Lakes, 1963

Lake	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Clear	Rb	8	8.4				
	BT	18	7.5	8	11.1	1	17.4
Olallie	Rb	9	10.1	14	11.7		
	BT			1	9.8	1	9.3

Table 145

## Creel Census, Lakes and Streams, Columbia District, 1963

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups						Total Fish	Total Anglers	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14+							
<u>Streams</u>													
Cascade Locks	St					2		2	34	131	0.1	65.5	0.02
Columbia River Section 3	Rb	1	5	1	2	3		12					
	St					1		1					
	Sg					1		1					
	Sh				2	1		3					
	LB				6			6					
	BC		2					2					
	YP		1					1					
								<u>26</u>	123	283	0.2	10.9	0.09
Deschutes River Section 1	Rb	72	645	548	195	38		1,498					
	Br		3		1	1		5					
	DV	1	3	2	1			7					
	Wf		4	20	11	3		38					
	Su				1			1					
	Sq		5	4		2		<u>11</u>					
								<u>1,560</u>	818	3,671	1.9	2.4	0.42
	Ch					7		7	124	510	0.1	72.9	0.01
	St					2		2	84	0.3	42.0	0.02	
Deschutes Mouth	St					220		220					
	Ch					5		<u>5</u>					
						<u>225</u>		225	757	3,375	0.3	15.0	0.07

Table 145 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups					Total Fish	Total Anglers	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14+						
Streams continued												
Eagle Creek	Co	41					41					
	Rb	8	16	2			26					
	St				1		1					
	Wf			1			1					
							<u>69</u>	36	67	1.9	1.0	1.03
Fifteenmile Creek	Rb	1	7	3			11	7	11	1.6	1.0	1.00
	St				49		49	783	1,095	0.1	22.3	0.04
Hood River	Rb	173	66	5	1		245					
	Ct				2		2					
	DV				1		2					
							<u>249</u>	222	335	1.1	1.3	0.74
Hood River East Fork	Rb	26	527	17			570					
	Ct	1					1					
							<u>571</u>	285	634	2.0	1.1	0.90
Neal Creek	Rb	21	9				30					
	Ct	2	5				<u>7</u>					
							<u>37</u>	12	42	3.1	1.1	0.88
Lakes												
Bibbys Pond	Rb	6	35	7			48	32	61	1.5	1.3	0.79

Table 145 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups					Total Fish	Total Anglers	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		6-8	8-10	10-12	12-14	14+						
Lakes continued												
Clear Lake	Rb	414	499	282	54	12	1,261					
	BT	269	521	378	62	16	1,246	730	3,554	3.4	1.4	0.71
							2,507					
Frog Lake	Rb	10	130	486	31		657	305	1,140	2.2	1.7	0.58
Kingsley Reservoir	Rb	34	435	19			488					
	BT	34	5	1			40	179	735	2.9	1.4	0.72
							528					
Lost Lake	Rb	200	591	44			835					
	BT	1	1		1		4					
	Br	4	3			1	8					
	K	10	1				11	372	1,287	2.3	1.5	0.67
							858					
McClure Lake	Rb	10	16				26	16	58	1.6	2.2	0.45
Monon Lake	Rb	1	12	3			16					
	BT	16	27	1			44	17	44	3.5	0.7	1.36
							60					
Olallie Lake	Rb	4	149	423	15		591					
	BT	6	53	14			73					
	K	16					16	305	1,183	2.2	1.7	0.57
							680					

Table 145 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups					Total Fish	Total Anglers	Hours Fished	Fish per Angler	Hours per Fish	Fish per Hour
		2-Inch Size Groups										
		6-8	8-10	10-12	12-14	14+						
<u>Lakes continued</u>												
Rock Creek Reservoir	Rb		129	153	14		296	161	671	1.8	2.3	0.44
Timber Lake	BT		4				4	7	18	0.6	4.5	0.22
Wahtum Lake	Rb		12				12					
	BT	39	8				47					
							59	14	50	4.2	0.8	1.18
Warren Lake	BT	5	1				6	7	17	0.9	2.8	0.35



It is suggested that a series of dissolved oxygen samples be taken throughout the summer period in 1964 before trout are allocated.

#### Stream Survey

Stream surveys were completed in Lake Branch tributary to Hood River, and on Wapinitia Creek tributary to the Deschutes River.

A total of 11.25 miles was surveyed on Lake Branch and 1,216 square yards of usable spawning gravel were recorded. The flows ranged from 39 cfs near the mouth to 9.7 cfs at mile point 6.2; this point is considered as the upper limits of anadromous fish migration at the present time. Twenty-one log jams and two falls were located on the upper 5.5 miles of the area surveyed.

Six and one-half miles of Wapinitia Creek were surveyed and 2,311 square yards of usable gravel were recorded. Limiting factors for migrant fish are low summer flows and extreme seasonal fluctuations. One adult steelhead and 6 steelhead redds were observed on this section of stream.

Spawning ground counts were conducted on Buck Hollow and Bakeoven Creeks on previously established sections of stream. Tables 146 and 147 are summaries of redd counts and water depths over redds made on these sections of stream from 1961 through 1963. The production of steelhead appears to be drastically reduced as the result of exposed redds at low stream flows.

Table 146  
Steelhead Redds Observed in 6.5-Mile Section  
of Buck Hollow Creek, 1961-1963,  
and Water Depths Over a Sample of the Redds

Stream Section (Miles From Mouth)	Redds Observed			Depth in Feet	Number of Redds	
	1961	1962	1963		1962	1963
7.3 to 7.5	0	1	1	0.15	1	0
7.5 to 8.0	3	1	5	0.20	0	1
8.0 to 8.5	2	2	2	0.25	2	2
8.5 to 9.0	6	5	4	0.30	1	1
9.0 to 9.5	4	6	4	0.35	4	2
9.5 to 10.0	6	5	2	0.40	5	3
10.0 to 10.5	2	4	2	0.45	2	1
10.5 to 11.0	6	3	2	0.50	1	0
11.0 to 11.5	14	2	4	TOTALS	16	10
11.5 to 12.0	2	5	3			
12.0 to 12.5	0	1	3	Average Depth	0.36 feet	0.54 feet
12.5 to 13.0	6	1	0		0.38 feet	0.55 feet
13.0 to 13.5	9	0	0			
13.5 to 13.8	7	0	0			
TOTALS	67	36	32			

Table 147

Steelhead Redds Observed in a 4-Mile Section  
of Bakeoven and Deep Creeks,  
March 12, 1963

Creek	Stream Section (Miles from Mouth)	Redds Observed	
		1961	1963
Bakeoven Creek	8.00 to 8.50	7	2
	8.50 to 9.00	2	5
	9.00 to 9.25	4	4
Deep Creek	0.00 to 0.50	2	4
	0.50 to 1.00	8	2
	1.00 to 1.50	7	12
	1.50 to 2.00	4	1
	2.00 to 2.50	7	0
	2.50 to 2.75	2	0
TOTALS		43	30

A series of samples were collected from Hood River to determine the state of recovery from damage caused by the flood of 1961. Bottom food samples were collected from the West Fork, Lake Branch, and at one location on the main stem of Hood River during September 1963. Four 1-square foot samples were taken at each of three locations on the West Fork, two locations on Lake Branch, and at one location on the main stem of Hood River. Samples were taken above and below the washout area. Aquatic organisms were much less numerous below the washout area. May fly and stone fly nymphs and caddis fly larvae were the most numerous organisms present. Table 148 summarizes information collected from these samples.

Table 148

Bottom Food Samples, Hood River

Location of Samples	Number Square Foot Samples	Average Number Organisms per Sample		Average Volume of Organisms in cc.	
		1962	1963	1962	1963
<u>West Fork</u>					
Above Ladd Creek	4 <u>/1</u>	96.75	67.0	0.725	0.82
Dry Run	4 <u>/2</u>	22.50	15.0	0.125	0.11
Mohr Park	4 <u>/2</u>	27.25	23.3	0.225	0.28
<u>Lake Branch</u>					
2.25 miles upstream	4 <u>/1</u>	121.25	49.0	0.950	0.72
Mouth	4 <u>/1</u>	95.50	49.0	0.850	1.19
<u>Hood River</u>					
Main stem	4		53.5		0.79

/1 Samples outside the washed-out area.

/2 Samples in washed-out area.

Eight samples in the washout area averaged 19.2 organisms and 0.20 cc. per sample, while 12 outside the flood area averaged 55 organisms and 0.91 cc. per sample. Two years after the flash flood there were still 65 percent less organisms, weighing 78 percent less in the flood-affected section of the West Fork of Hood River than in undisturbed stream sections. This indicates only a slight improvement over samples collected in 1962.

#### Habitat Improvement

##### Barriers

The log jam on West Fork of Hood River reported in 1962 was removed by burning and use of power saws. This was the only known log jam on this stream that was considered as a barrier to migrant fish.

The log jam on the East Fork of Hood River resulting from road relocation reported in 1962 was removed by one of the highway contractors.

Two small log and trash jams were removed from Neal Creek. A complete survey has not been conducted on this stream, although a great number of small jams considered as complete or partial barriers to migrant fish are known to exist and should be removed.

Five log jams considered as barriers were located in a 1.5-mile section of Lake Branch between mile points 6 and 7.5.

The fish ladder at Seufert Falls on Fifteenmile Creek was blocked by rock and dirt from a temporary bridge crossing constructed by a contractor. As many as 57 steelhead jumps were observed at the falls during a 10-minute period; no successful attempts were observed. The problem was corrected immediately after the contractor was notified.

##### Stream Pollution

###### Oregon Lumber Company

In the latter part of August a bacterial slime developed in Hood River. The growth was caused by the high concentration of sugars in solution and was traced to the outfall of the Oregon Lumber Company's fiber settling ponds at Dee, Oregon. The abundance of this material in the river prevented operation of the Farmers Irrigation Diversion fish screen after August 28, 1963. The State Sanitary Authority made an investigation of the bacterial slime upon being notified.

The impoundment behind the Oregon Lumber Company dam was flushed on several occasions during the year.

###### Agricultural

Two cases of agricultural spray pollution were investigated.

A weed sprayer was washed out in Phelps Creek, causing a complete kill of fish for a minimum distance of one-half mile. A second case occurred when a sprayer was being filled with water from Odell Creek and enough spray entered the stream to cause a complete kill of fish for approximately one-half



mile. An estimated 1,500 fish were killed in these streams as a result of this pollution.

### Fish Screens

During the 1963 irrigation season, 13 rotary screens were operating on diversions of streams in Watershed 4 in Hood River and northern Wasco Counties. Two additional screens, a traveling belt and a Lenz shaker screen, were also operated during 1963 by irrigation companies in the Hood River system. Seven screens were in use in the Fifteenmile system, including Ramsey Creek; and eight screens were operated in the Hood River system, including the East and West Forks of Hood River, Neal Creek, and Evans Creek.

Data on downstream migrating fish were obtained from bypass traps at 2 rotary screens and 1 traveling belt screen. Tables 149 and 150 summarize length distribution and time of movement for migrant fish trapped in the Hood River watershed.

Table 149

Length Distribution of Downstream Migrant Trout Trapped at Bypasses  
on Two Rotary Screens and One Traveling Belt Screen  
on Hood River and Its Tributaries, 1963

Period	Number of Fish in Size Groups by Inches									Total Fish
	0-1	1-2	2-3	3-4	4-5	5-6	6-8	8-10	10-12	
3/15 to 4/15					3	5	8	1		17
4/16 to 5/15	1			14	32	59	74	47		227
5/16 to 6/15		3	22	51	65	98	80	9	1	329
6/16 to 7/15		3	11	23	12	9	14	8	4	84
7/16 to 8/15			43	2	5	2	2	1		55
8/16 to 9/15		16	5	1		6	1			29
9/16 to 10/15		17	15	15	4	3	3			57
10/16 to 11/15				1						1
TOTALS	1	39	96	107	121	182	182	66	5	799

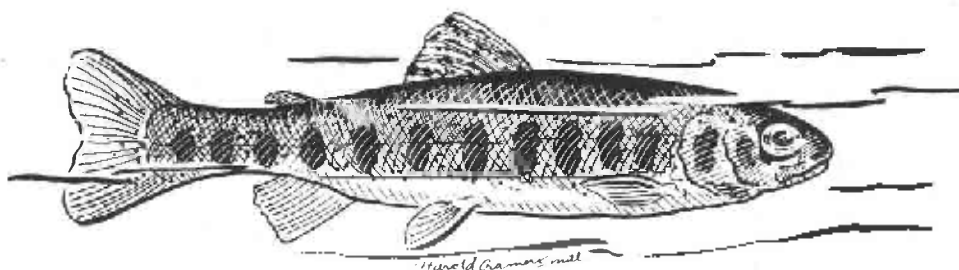
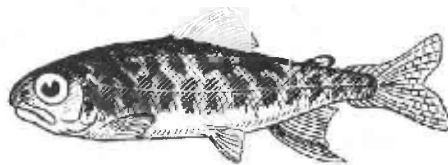


Table 150

Length Distribution of Downstream Migrant Salmon Trapped at Bypasses  
on Two Rotary Screens and One Traveling Belt Screen  
on Hood River and Its Tributaries, 1963

Period	Number of Fish by Size Groups in Inches						Total Fish
	1-2	2-3	3-4	4-5	5-6	6-8	
3/16 to 4/15	2						2
4/16 to 5/15	30			3	2		35
5/16 to 6/15	20	9	136	117	13		295
6/16 to 7/15	12	71	7	3	8	1	102
7/16 to 8/15	85	81	9	6			181
8/16 to 9/15	40	48	18	1			107
9/16 to 10/15	42	49	115	5			211
10/16 to 11/15		1	3	3			7
TOTALS	231	259	288	138	23	1	940



## BEND DISTRICT

James D. Griggs

### Fish Distribution

#### Anadromous

##### Spring Chinook

Spring chinook spawning ground survey information on Squaw Creek, the Metolius River, and tributaries is presented in Table 151. The 1963 fish and redd counts of 35 and 39, respectively, fall far short of the 90 fish and 107 redds enumerated for the parent run of 1959.

The numbers of chinook salmon moving above Pelton Dam are shown in Table 152. In 1959, 511 salmon (410 adults and 101 jacks) were counted upstream. Counts in 1963 indicated 196 adults and 353 jacks passed over the dam. A comparison of adult chinooks shows the 1963 run as 48 percent of the 1959 parentage. This is the lowest number of chinook adults moving over Pelton since counting began.

During May and June, 27 marked chinook were counted at Pelton. These fish were marked and released in 1960 for evaluation studies.

##### Steelhead

Steelhead have been trapped in upper Squaw Creek since 1951 but were blocked from reaching the weir in 1959 by a log jam. Since these fish are considered to be predominantly 4-year fish, a comparison can be made with second generation progeny. Fifty-five steelhead were trapped at the weir in 1955. In 1963, a reduction of 80 percent is noted as only 11 were trapped and released. The counts of fish arriving at the weir since 1955 are listed in Table 153.

The monthly summary of upstream migrant steelhead at Pelton is tabulated in Table 152. The return of 377 adults in 1963 represents 33 percent of the parent run of 1,142 fish moving over Pelton in the 1959 brood year.

Steelhead spawning ground data for Squaw Creek are shown by the following redd counts: 1955, 321; 1959, 60; and 1963, 63. Spawning ground counts from 1956 through 1963 are listed by year in Table 154.

##### Trout

#### Composition and Length Frequency of Fish Population

Fish populations of the major district waters are sampled annually by graduated-mesh gill nets. Table 155 summarizes the composition and length frequency of the gill-net catches.

Table 151

## Spring Chinook Spawning Ground Survey, Squaw Creek, Metolius River, and Tributaries, 1957-1963

Location	Spawning Salmon Observed by Year										Number of Redds Observed by Year						
	1957	1958	1959	1960	1961	1962	1963	1957	1958	1959	1960	1961	1962	1963			
Head of Metolius River to Fish Commission rack	23	<u>1/2</u>	45	24	3	10	18	21	<u>1/2</u>	52	20	10	11	30			
Camp Sherman to Canyon Creek	6	10	3	2	20	8	9	2	18	2	1	28	3	3			
Wizard Falls Hatchery to Bridge 99	15	1	19	23	3	7	4	12	7	33	7	7	12	3			
Bridge 99 downstream one mile	<u>1/2</u>	<u>1/2</u>	2	<u>1/2</u>	<u>1/2</u>	2	0	<u>1/2</u>	<u>1/2</u>	2	<u>1/2</u>	<u>1/2</u>	<u>1/2</u>	0			
Lake Creek (tributary to Metolius River)	<u>1/2</u>	<u>1/2</u>	0	<u>1/2</u>	<u>1/2</u>	<u>1/2</u>	0	<u>1/2</u>	<u>1/2</u>	0	<u>1/2</u>	<u>1/2</u>	<u>1/2</u>	0			
Spring Creek (tributary to Metolius River)	2	3	17	5	4	8	0	0	4	16	8	9	9	0			
Jack Creek (tributary to Metolius River)	0	0	0	0	0	<u>1/2</u>	4	0	0	0	1	4	<u>1/2</u>	3			
Squaw Creek (tributary to Deschutes River)	0	0	4	0	0	0	0	0	0	2	0	0	0	9			
TOTALS	46	14	90	54	30	35	35	35	29	107	37	58	36	39			

1 Information obtained from Fish Commission.2 Not surveyed.

Table 152

## Summary of Upstream Migrant Counts, Pelton Dam, 1958-1963

Species	Year	Counts by Months												Total Fish
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Chinook	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
	1962	0	0	0	21	274	92	36	17	23	3	1	0	467
	1963	0	0	0	46	53	47	150	12	56	145	29	1	539
Steelhead	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
	1962	6	28	30	39	11	28	58	13	20	56	42	20	351
	1963	26	41	28	37	8	12	41	8	17	26	28	10	282
Blueback	1958							1	51	4	0	0	0	56
	1959							18	57	22	2	0	0	99
	1960	0	1	0	0	1	13	5	8	4	3	0	6	41
	1961	0	2	4	4	2	4	18	33	14	1	0	0	82
	1962	0	0	1	0	0	2	135	147	44	5	0	0	334
	1963	0	0	0	0	0	1	99	203	33	4			340

1 Fish counted from November 1960 through June 1961 were marked juveniles released in Metolius River on March 31, 1960.

2 Includes 309 adipose-marked fish.

Table 153

Steelhead Trapped at the Squaw Creek Weir,  
1955 through 1963

Year	Number of Steelhead
1955	55
1956	180
1957	117
1958	317
1959	<u>1</u>
1960	89
1961	85
1962	7
1963	11

1 Steelhead blocked 16 miles below weir  
by log jam.

Maturity

The stage of maturity for each female fish in the population samples is shown in Table 156. Female fish in all district waters surveyed are shown by number and average size as immature, maturing, or mature fish.

Length at Maturity

The lengths at maturity of female fish are listed by species for the years 1955 through 1963 in Table 157.

Big Cultus Lake

Angler use on Big Cultus Lake during the early part of the season was practically eliminated because of a heavy snowpack. A few large lake trout were taken early in the season, indicating that the fish were available but the catch was reduced because of poor access.

A temporary stationary screen was placed in the outlet of Cultus Lake in Cultus Creek to curtail escapement of stocked kokanee. The screen was not satisfactory because of the accumulation of debris. Observations made after kokanee liberations revealed that the immediate movement of kokanee to the outlet was not as readily apparent as has been observed on previous occasions.

Table 155 contains the composition and length frequency of catch by gill net in Big Cultus. Table 158 summarizes the age class and size at capture of the lake trout removed by gill net from Big Cultus Lake in 1962 and 1963.

Table 154

## Steelhead Spawning Ground Survey, Squaw Creek, 1956-1963

Location	Spawning Steelhead Counts by Year							Redd Counts by Year								
	1956	1957	1958	1959	1960	1961	1962	1963	1956	1957	1958	1959	1960	1961	1962	1963
Mouth to Condemned Bridge	12	4 <u>1</u>	2	19	0	0	0	4	58	15	9	13	0	0	4	10
Condemned Bridge to Corral	21	1 <u>1</u>	8	97	0	1	1	4	15	1	11	47	0	5	1	7
Corral to Rim Rock Ranch	5	2 <u>1</u>	4	<u>2</u>	1	5	2	0	39	4	34	<u>2</u>	0	11	5	11
Rim Rock Ranch to Stevens Ranch	6	0 <u>1</u>	14	<u>2</u>	1	2	3	1	25	7	82	<u>2</u>	0	8	5	8
Stevens Ranch to Upper Steelhead Trap	28	5 <u>1</u>	8	<u>2</u>	10	4	3	1	78	30	93	<u>2</u>	13	1	31	27
TOTALS	72	12	36	116	12	12	9	10	215	57	229	60	13	25	46	63

/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 155

Composition and Length Frequency of Catch by Gill Nets Represented in One-Inch Size Groups,  
Fork Length Measurements, in Some Central Oregon Lakes, 1963

Lake or Reservoir	Date	Number of Sets	Species	Number Fish Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																					
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over					
Big Cultus Lake	10/29/63	9	Rb	26	2.9	15.6	1	6	3	6	2	2	3	1	1													
			BT	7	0.8	4.2		2	4																			
			LT	45	5.0	26.9				1	7	10	8	6	3	1	1	1	1	1	1	1						4
			Br	1	0.1	0.6																						
			K	31	3.4	18.6						1	5	24	1													
			Wf	57	6.3	34.1		1	17	12	5	4	3	5	4	1												
Big Lava Lake	6/27/63	2	BT	47	23.5	15.5					2	1	28	15	1													
			Wf	24	12.0	7.9					1		3	9	8	3												
			Ro	232	116.0	76.6	3	109	55	54	11																	
			BT	12	6.0	21.4						1	3	6	2													
			Wf	29	14.5	51.8					10	3	2	5	5	1	3											
	8/2/63		Ro	15	7.5	26.8	8	3	4																			
Big Lava Lake	8/21/63	2	BT	35	17.5	23.2							3	19	11	2												
			Wf	25	12.5	16.6						6	2	6	5	3	3											
			Ro	91	45.5	60.2	43	21	22	5																		
			BT	64	32.0	100.0	5	54	5																			
			Wf																									
Camp Lake	8/10/63	2	BT																									
Crane Prairie Reservoir	6/12/63	8	Rb	95	11.9	9.4	4	7	3	1	7	4	20	23	10	5	3	2	3	1	2							
			BT	23	2.9	2.2						1	5	11	4	1	1											
			K	97	12.1	9.6	11	61	3	8	3	11																
			Wf	29	3.6	2.9						1	2	6	10	6	3	1										
			Ro	767	95.9	75.9	11	164	284	251	57																	
Davis Lake	2/27/63	3	Rb	6	2.0	23.1							3	1	1													
			AS	7	2.3	26.9								3	2													
			K	3	1.0	11.5				1	1																	
			Wf	10	3.3	38.5	1	9																				
			BT	2	0.7	22.2																						
	4/3/63	3	AS	6	2.0	66.7						1			2	3												
			Wf	1	0.3	11.1	1																					
Davis Lake	4/11/63	3	Rb	12	4.0	52.2																						
			AS	10	3.3	43.5																						
			Wf	1	0.3	4.3																						
			BT																									
			Wf																									
Davis Lake	5/1/63	4	Rb	17	4.3	46.0																						
			AS	17	4.3	46.0																						
			Wf	3	0.8	8.0																						
			BT																									
			Wf																									



Table 155 (continued)

Lake or Reservoir	Date	Number of Sets	Species	Number Fish Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																					
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over					
Davis Lake (continued)	5/18/63	4	Rb	24	6.0	48.0			1	5	1		1		1	4	3	7			1							
			AS	11	2.8	22.0																						
			K	3	0.8	6.0							1		1		2	4	2									
			Wf	12	3.0	24.0																						
	6/17/63	3	Rb	9	3.0	50.0		1						1					4	1	2							
			AS	4	1.3	22.2			4																			
			K	4	1.3	22.2			4																			
			Wf	1	0.3	5.6																						
	7/23/63	3	Rb	4	1.3	33.3					1			1	1	1												
			AS	1	0.3	8.3																						
8/15/63	3	K	7	2.3	58.4			1	4		1																	
		Rb	9	3.0	90.0							1	1	2	1													
10/18/63	3	Ro	1	0.3	10.0	1																						
		Rb	24	8.0	61.5		2	6	1					2		1	2	1	2	1	3					3		
		AS	13	4.3	33.3																							
		K	1	0.3	2.6																							
Deer Lake	6/26/63	2	Wf	1	0.3	2.6																						
			BT	13	6.5	100.0			1	3	5	3																
East Lake	8/2/63	4	Rb	76	19.0	19.6		16	20	8	6	3	5	9	3	2	2	2										
			BT	109	27.3	28.2				2	2	1	7	16	33	16	13	12	6	1								
			Br	6	1.5	1.6																						
			Ro	196	49.0	50.6		10	59	47	45	18	11	4	2												4	
9/13/63	4	Rb	53	13.3	25.5			9	14	10	7	5	1	4	1	1												
		BT	154	38.5	74.0					1	3	9	3	23	52	36	17	7	2	1								
		Ro	1	0.3	0.5																							
East Chambers Lake	8/9/63	2	GT	24	12.0	100.0		4	16	4																		
Elk Lake	6/13/63	4	Rb	8	2.0	15.4			2		1		3			1	1											
			BT	10	2.5	19.2																						
			K	34	8.5	65.4			29	5																		
Irish Lake	8/14/63	2	BT	30	15.0	100.0			7	12	6	1	2	1														
Little Cultus Lake	6/13/63	4	Rb	13	3.3	19.1				1	2	4	3	1	1	1												
			BT	55	13.8	80.9		3	8	14	6	8	2	8	2	1	3											

Table 155 (continued)

Lake or Reservoir	Date	Number of Sets	Species	Number Fish Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																					
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over					
Little Lava Lake	8/20/63	4	Rb	1	0.3	0.3			1																			
			BT	10	2.5	2.9			6	2	2																	
			Wf	12	3.0	3.5			1	1	2	2	1	3	2													
			Ro	324	81.0	93.3	11	123	177	13																		
	9/1/63	2	Rb	13	6.5	21.0			5	2	3	3																
			BT	17	8.5	27.4			3	6	2																	
			Wf	15	7.5	24.2					1	2	6	3	2	1												
			Ro	17	8.5	27.4	16		1																			
Lucky Lake	6/26/63	2	Rb	1	0.5	3.8						1																
			BT	25	12.5	96.2			4	1	2		3	5														
North Twin Lake	5/11/63	4	Rb	11	2.8	100.0							1	5	5													
Paulina Lake	5/21/63	1	Rb	18	18.0	50.0			2	2	4	7	2		1													
			Ro	18	18.0	50.0			1	5	6																	
	8/9/63	6	Rb	325	54.2	56.7																						
			Ro	248	41.1	43.3	3	34	44	40	38	27	46	48	29	12	4											
	9/26/63	4	Rb	116	29.0	65.5			10	20	20	21	11	6	11	8	8	1										
			Ro	61	15.3	34.5	1	36	11	2	7	4																
	6/27/63	4	BT	123	30.8	100.0			3	5	19	34	24	21	11	6												
Suttle Lake	9/25/63	4	Br	8	2.0	16.3																						
			K	3	0.8	6.1			2	1	2																	
			Wf	38	9.5	77.6			8	6	10	9	2	1	2													
Tam Lake	8/9/63	2	GT	2	1.0	100.0							1															
Taylor Lake	8/14/63	2	BT	27	13.5	100.0																						
Three Creeks Lake	6/21/63	2	Rb	29	14.5	72.5																						
			BT	11	5.5	27.5			1																			
Todd Lake	8/11/63	4	BT	40	10.0	100.0																						

Table 155 (continued)

Lake or Reservoir	Date	Number of Sets	Species	Number Fish Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																			20 & Over
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Wickiup Reservoir	6/25/63	5	Rb	10	2.0	5.0	2	2	5									1								
			K	76	15.2	38.2			21	13		6	15	3	10	6	2									
			Br	17	3.4	8.6										1										
			Wf	12	2.4	6.0						1		5		1	3	2								
			Ro	84	16.8	42.2			3	4	38	37	2													
	8/14/63	4	Rb	20	5.0	3.2			3	5	5	3	3	1												
			K	18	4.5	2.9					2	1	5	6	3				1		1					
			Br	4	1.0	0.6																				
			Wf	5	1.3	0.8					1	1							2	1						
			Ro	575	143.8	92.5	110	82	91	206	73	12	1													

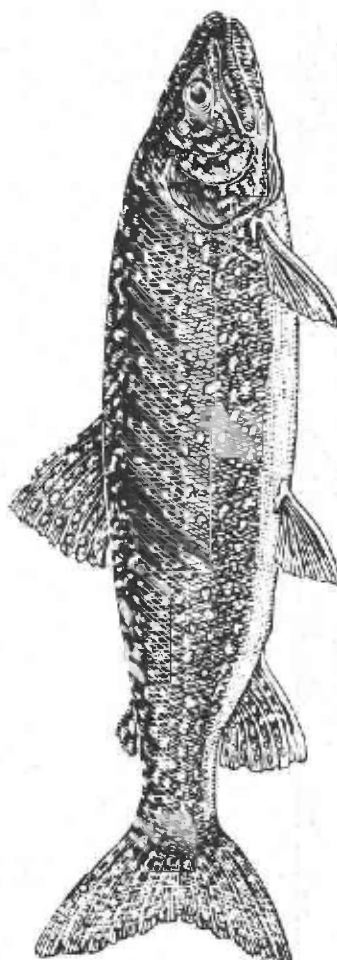


Table 156

Average Fork Length of Female Fish in Each Stage of Maturity  
as Collected in Gill-Net Sets in Some  
Central Oregon Lakes, 1963

Lake or Reservoir	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Big Cultus Lake	Rb	11	8.6	1	16.8		
	BT	3	7.1	1	7.3		
	Wf	7	8.2	18	10.9		
	LT	14	12.4				
	K			14	10.9		
Big Lava Lake	BT			32	10.8	22	10.8
	Wf	4	8.5	21	11.7	14	13.2
Camp Lake	GT	25	6.3	1	6.6		
Crane Prairie Reservoir	Rb	24	11.8	25	13.8		
	BT	3	10.7	13	11.6	1	12.5
	Wf			8	12.2	6	13.6
	K	21	7.0	3	9.1		
Davis Lake	Rb	28	11.7	12	16.2		
	AS	21	14.3				
	K	6	7.6	1	12.8		
	Wf	8	6.9				
Deer Lake	BT	3	7.0	5	8.6	1	7.7

Table 156 (continued)

Lake or Reservoir	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
East Lake	Rb	46	7.3	1	13.5		
	BT	10	9.5	92	12.5	13	13.9
	Br			1	13.6	6	20.6
East Chambers Lake						16	6.3
Elk Lake	Rb			2	8.3	2	13.7
	BT			3	8.2		
	K	20	6.6				
Irish Lake	BT	5	7.1	5	7.1		
Little Cultus Lake	Rb	5	10.0	1	12.5		
	BT	14	7.0	13	11.2	2	12.6
Little Lava Lake	Rb	6	7.2				
	BT	7	7.1	13	7.4	1	9.6
	Wf	1	8.0	3	9.9	5	11.4
Lucky Lake	BT	11	7.2	2	11.1	4	11.0
	Rb			1	11.7		
North Twin Lake	Rb			6	12.5		

Table 156 (continued)

Lake or Reservoir	Species	Immature		Maturing		Mature	
		Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)	Number in Sample	Average Length (Inches)
Paulina Lake	Rb	112	9.0	7	13.5		
Sparks Lake	BT	9	7.0	36	8.8	38	10.2
Suttle Lake	Br	4	7.1	3	21.1		
	Wf			10	9.6		
Tam Lake	GT					1	9.4
Taylor Lake	BT	11	7.8	3	9.7	1	11.4
Three Creeks Lake	BT	3	8.8	4	9.2	4	11.9
	Rb			8	10.5		
Todd Lake	BT	4	7.3	16	8.8	1	9.8
Wickiup Reservoir	Rb	8	8.0				
	K	35	9.5	10	12.9	7	20.7
	Br	2	15.7	6	16.7		
	Wf			6	12.2	1	15.7

Table 157

A Comparison of Average Length of Maturing Female Fish  
in Some Central Oregon Lakes, 1956-1963

Lake or Reservoir	Species	Fork Lengths in Inches, by Years							
		1956	1957	1958	1959	1960	1961	1962	1963
Big Cultus Lake	Rb	11.3	10.3	11.5 $\angle$ 1	9.4	10.1		9.3	16.8 $\angle$ 1
	Wf	8.3	8.8	11.3	8.1	9.4		7.9	10.9
	LT				26.0				
	K				9.8				
	BT							8.5	7.3
Big Lava Lake	BT				11.3	11.3	10.3	10.3	10.8
	Wf	10.3	10.9	11.0	13.4		12.0	11.2	11.7
Crane Prairie Reservoir	Rb	12.5	13.4		13.7	11.8	15.1	13.6	13.8
	BT	8.4	8.8	10.3	11.4	9.6	11.1	9.8	11.6
	Wf	11.7	10.8	11.9	11.9	12.1	11.6	11.2	12.2
	K	12.7	14.1	14.6	11.8	10.6	12.5	10.9	9.1
Davis Lake	Rb	16.2	17.7	14.5	13.3	12.4	15.2		16.2
Deer Lake	BT					9.3	9.2		8.6
East Lake	Rb	15.2	12.1	12.6 $\angle$ 1	13.2 $\angle$ 1	12.2	14.5	11.6	13.5
	BT				11.2		11.3	14.5	12.5
	Br								13.6 $\angle$ 1
Elk Lake	Rb								
	BT	10.8	11.2	9.7	8.8	9.4	12.4	14.0	8.3
	K						10.2	8.6	8.2
Irish Lake	BT	8.2	10.2		8.2	8.4	9.4 $\angle$ 1	8.9	7.1
Little Cultus Lake	Rb			12.5 $\angle$ 1		11.0 $\angle$ 1	9.8	10.5	12.5 $\angle$ 1
	BT	9.6	9.2	11.1	10.6	10.0	10.2	10.3	11.2

Table 157 (continued)

Lake or Reservoir	Species	Fork Lengths in Inches, by Years						
		1956	1957	1958	1959	1960	1961	1962 1963
Little Lava Lake	Rb					10.4	10.4	
	BT	7.5	9.5 /1	8.7	8.7	9.6	8.1	7.4
	Wf	8.9	8.2	9.8	9.2	9.4	8.9	9.9
North Twin Lake	Rb	10.6		9.4 /1	10.4	11.0	13.3	12.5
	Rb	14.0 /1	11.4	13.4	12.6	12.6	14.3	13.5
Sparks Lake	BT	8.8	10.2	9.0	10.0	9.6	8.4	8.8
	Rb					11.4	13.4	
Suttle Lake	Br		17.1	11.1	12.3	15.2		21.1
	Wf		9.6	9.9	9.2	10.8		9.6
	K		9.5					
Taylor Lake	BT	9.0	11.5	8.4		8.2	11.0	9.7
Three Creeks Lake	Rb						10.3	10.5
	BT							9.2
Todd Lake	BT	8.5	9.0	8.8	8.8	8.9	8.9	8.8
Wickiup Reservoir	Wf	12.4	11.1	12.4	11.4	12.6		12.2
	Br	15.0 /1	16.6	16.5	15.6	15.9	12.6	16.7
	K	14.4				12.9		12.9
	BT	12.3	11.6 /1					
	Rb			14.0 /1				

/1 Indication.



Table 158

Comparison of Lake Trout Caught by Gill Nets,  
Big Cultus Lake, 1962-1963

Year Stocked	Number Stocked	Size at Stocking (Inches)	Fin Excised	Number Caught		Average Size at Capture (Inches)		Age at Capture	
				1962	1963	1962	1963	1962	1963
1956	23,700	8	D	1	5	16.0	22.2	8	9
1957	24,000	6-7	Unmarked	1	5	17.9	12.2	7	8
1958	32,000	6-8	Ad-LP	1	4	10.4	14.9	6	7
1959	58,000	5	Ad	9	20	11.5	11.2	5	6
1960	26,000	6	Ad-LV	1	3	9.2	10.1	4	5
1961	22,000	7	Ad-RP	5	6	8.5	11.7	3	4
1962	14,000	5	Ad-RV	3	2	8.3	12.3	2	3
1963	8,538	7	LV		0				
TOTALS				21	45				

### Big Lava Lake

Big Lava Lake was chemically treated September 19 to eliminate a population of roach and whitefish. An estimated kill in excess of 400,000 fish, composed of 55 percent roach, 44 percent whitefish, and 0.5 percent brook trout resulted from the application of 4,620 gallons of liquid rotenone.

Five live-boxes containing four brook trout each were placed at various depths in Big Lava Lake, October 14, 1963. These live-boxes were removed at the end of 238 hours with a mortality of only one fish.

Plankton samples revealed the presence of both phytoplankton and zooplankton.

### Crane Prairie Reservoir

Angler success was fair to good throughout the season with excellent fly-fishing available during September and October.

Population data, as shown in Table 155, reveal undesirable fish comprised 75.9 percent of the total gill-net sample. This was the lowest percentage occurring since 1956 when 64 percent of the total sample was rough fish. The 1963 gill-net sets caught 95.8 rough fish per net, the lowest number recorded since 1957 when 83.5 fish were taken per net.

### Davis Lake

A sampling program to determine the toxaphene concentration in fish, water, plants, insects, plankton, and bottom materials was continued on Davis Lake. Results, as determined by the Oregon State University Department of Agricultural Chemistry on the bimonthly samples, are tabulated in condensed form in Table 159.

Table 159

## Davis Lake Toxaphene Concentrations

Item	Date	Davis Lake Area	Toxaphene Concentration ppm	Notes
		Section		
Aquatic Organisms	5/31/62	1	1.2	
	5/31/62	2	2.2	
	4/4/63	1	0.4	
	4/4/63	2	1.8	
	8/15/63	1	0.3	Snails
	8/15/63	2	0.3	Snails
Plankton	5/31/62	1	0.001	
	5/31/62	2	0.003	
	2/26/63	1	0.01	
	2/26/63	2	0.01	
	10/17/63	1	0.01	
	10/17/63	2	0.01	
Plants	5/31/62	1	0.6	
	5/31/62	2	0.2	
	2/26/63	1	0.4	
	2/26/63	2	0.9	
	10/17/63	1	0.1	
	10/17/63	2	0.1	
Algae	5/31/62	1	0.6	
	5/31/62	2	0.7	
	10/17/63	1	0.32	
	10/17/63	2	0.21	
Bottom Material	5/31/62	1	0.6	
	5/31/62	2	1.0	
	2/26/63	1	0.4	
	2/26/63	2	0.3	
	10/17/63	1	1.33	
	10/17/63	2	0.95	
Water	5/31/62	1	0.0007	
	5/31/62	2	0.0006	
	4/5/63	1	0.0005	
	4/4/63	2	0.0005	
	8/15/63	1	0.0005	
	8/15/63	2	0.0005	

Table 159 (continued)

Item	Date	Davis Lake	Toxaphene Concentration ppm	Notes
		Area Section		
Fish	4/11/63		2.80	Rainbow viscera
	10/17/63		4.31	Rainbow viscera
	6/17/63	2	15.30	Rainbow viscera
	2/26/63		11.20	Kokanee
	2/26/63		10.70	Kokanee
	6/17/63		3.32	Kokanee
	10/17/63		3.27	Kokanee
	5/1/63		13.30	Whitefish (whole)
	10/17/63		1.91	Whitefish (whole)
	6/17/63		3.25	Atlantic salmon head
	10/17/63		1.75	Atlantic salmon head
	8/15/63	1	5.07	Rainbow head
	8/15/63	2	4.28	Rainbow head
	10/17/63		2.09	Rainbow head

Individual fish growth, as delineated in Table 155, has been excellent. Gill-net sets on October 18 revealed the largest rainbow caught was 22.5 inches in length and weighed 2.5 pounds. The largest Atlantic salmon taken in the sets was 18.2 inches in length and weighed 2.25 pounds.

The low number of fish caught per gill net would indicate a smaller than desired population of fish.

Bottom food studies conducted during August showed production at 173 pounds per acre. In 1959 aquatic organisms totaled 6.7 pounds per acre, and in 1940 they totaled 97 pounds per acre. Twenty-five sample locations were selected in order to continue the food production study on an annual basis.

Opening day of the 1963 angling season there were 310 boats on Davis Lake. The following morning there were only 40 boats present. Angling success during the year was poor, as indicated by the creel census of 438 anglers checked with a success of 0.13 fish per hour.

#### East Lake

Since the intensive study of East and Paulina Lakes terminated in the fall of 1961, limited biological data are being gathered by district personnel.

Angler boat counts on East Lake show a decrease from 1962. Cold weather prevailed during opening weekend and many of the major weekends which discouraged angler visits.

Average size of trout entering the catch was larger than in 1962. Creel data indicate 24.9 percent were in the 12- to 14-inch class, as compared to 7.8 percent in 1962. Fish at 6 to 8 inches totaled 3.6 percent in 1963 and 6.4 percent in 1962.

Brook trout comprised 10.3 percent of the 1963 catch, exceeding the 5.7 percent recorded in 1962.

The catch rate was 0.5 fish per hour and 2.5 fish per angler in 1963; however, higher returns were recorded in 1962 when the catch rate was 0.83 fish per hour and 3.6 fish per angler.

Losses from tapeworm (Proteocephalus sp.) in East Lake were estimated at 20,000 fish, which was more than in 1962 but only 50 percent of the 40,000 estimated loss in 1958. Greatest fish losses occurred in late June and early July. Rainbow from gill-net sets in September showed 87.3 percent tapeworm infestation, as compared to 100 percent in fish from the 1962 sets.

Approximately 15,000 roach were killed at East Lake through partial rough fish control in 1963.

#### Paulina Lake

Cold, wet weather was also a factor in reducing angler use at Paulina Lake.

Fewer rainbow (0.43 fish per hour) were taken during the early season than in 1962 (1.32 fish per hour); however, angler success improved considerably during the latter part of the season.

Size groups entering the catch were approximately the same as in previous years except for a greater percentage of 6- to 8-inch fish (19.2 percent, 1963; 9.0 percent, 1962). The fish appearing in the 6- to 8-inch class in mid-August were fall rainbow fingerling stocked in early June. The fingerling averaged 4 inches in length at time of stocking.

Angler effort returned 0.5 fish per hour and 2.3 fish per angler in 1963, as compared to 0.7 fish per hour and 3.7 fish per angler in 1962.

Losses from tapeworm (Proteocephalus sp.) appeared to be minor in the lake. Rainbow from gill-net sets during May showed 61 percent infestation, but fish caught by gill net in September revealed little evidence of tapeworm. In September 1962, 88.5 percent of the fish taken in the population sample were infested.

Without unforeseen winter losses, Paulina Lake is expected to again produce an outstanding fishery in 1964. Gill nets in August caught rainbow trout at the rate of 50 fish per net.

#### South Twin Lake

A large school of fry, identified as roach, was reported by the resort operator. This was the first authentic record of roach in South Twin since the lake was treated in 1957. Early survey work in 1964 will determine the feasibility of chemical treatment.

#### Elk Lake

The fork length of maturing female kokanee continued to decline in Elk Lake. Although many limit catches of kokanee were made, the fish remain

small in size, averaging 6 to 8 inches in length. Brook trout and rainbow were also in poor condition, indicating an overpopulation of fish.

In an effort to maintain and possibly increase the average size of fish, the number of kokanee stocked was again reduced in 1963. The stocking of rainbow was discontinued, and the number of brook trout stocked was reduced by one-half. Table 160 shows the number and size of kokanee stocked in Elk Lake between 1957 and 1963.

Table 160

Kokanee Liberations in Elk Lake,  
1957-1963

Year	Number of Kokanee	Size
1957	124,300	fry
1958	203,236	fry
1959	100,000	fry
1960	100,325	fry
1961	99,600	600 per pound
1962	74,995	700 per pound
1963	40,225	270 per pound

Average fork lengths of maturing female kokanee and brook trout are summarized in Table 161.

Table 161

Average Fork Length of Maturing Female  
Kokanee and Brook Trout  
in Elk Lake, 1963

Year	Average Fork Length in Inches	
	Kokanee	Brook Trout
1957		11.2
1958		9.7
1959		8.8
1960		9.4
1961	9.4	10.2
1962	8.5	8.6
1963	8.3	8.2

Size groups of kokanee taken by anglers in 1959 through 1963 are contained in Table 162.

The large number of kokanee reported in the 8- to 10-inch size group were barely over 8 inches in length.

Table 162

Lengths and Numbers of Kokanee Caught by Anglers,  
Elk Lake, 1959 through 1963

Year	Number of Kokanee by 2-Inch Size Groups		
	6-8	8-10	10-12
1959	72	174	1
1960	118	252	64
1961		450	5
1962	90	101	2
1963	432	733	5

### Hosmer (Mud) Lake

Many complimentary remarks were heard regarding the Commission policy of quality fishery on Hosmer (Mud) Lake during the 1963 season. Present law requires all Atlantic salmon to be taken on a barbless fly and returned to the lake unharmed.

Creel census data are difficult to obtain with the no-fish bag limit; however, indications are that angler success improved over 1962. Angler contacts revealed fish caught at the rate of 1.25 fish per hour in 1962 and 2.18 fish per hour in 1963.

Partial evaluation of Atlantic salmon spawning success in Quinn Creek was undertaken March 7, 1963. Most redds made in November 1962 were undistinguishable. One redd examined contained all dead eggs. Anchor ice or suffocation of the eggs by fine pumice silt may be limiting factors in reproduction.

On November 15, 1963, 202 Atlantic salmon were found in Quinn Creek. It was estimated that the average size of the fish observed in the stream was 16 inches. Six fish were 22 inches in length. No redds were found. It is recommended that passage over Quinn Creek falls be provided in order to permit adult Atlantic salmon to utilize the upper section of the stream.

Three trap nets were fished overnight on October 14 to secure mature Atlantic salmon for egg-taking purposes at Wizard Falls Hatchery. Of 106 fish taken, only 6 were mature females. No large salmon, such as were netted in 1962, were caught. Since sufficient males were being held at the hatchery, no males were removed from the lake. The limited number of mature fish available at the lake roughly parallels the population of adults at Wizard Falls Hatchery where only a small group of fish were maturing although they were in their fourth year of life.

### Suttle Lake

Creel census, as shown in Table 163, indicates that anglers took about the same number of rainbow as in 1962, with the kokanee catch declining slightly and the brown trout catch remaining approximately the same.

Table 163

Creel Census, Bend District, 1963

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups								20 & Over	Total Fish	Total Anglers	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								
Big Cultus Lake	Rb	12	2	5	1						20					
	K			1							1					
	Lt		1					2			$\frac{3}{24}$	9	36	2.7	1.5	0.67
Big Lava Lake	BT	10	154	934	289	34	1				1,422					
	Wf			1		5					$\frac{6}{1,428}$	487	1,896	2.9	1.3	0.75
Blue Lake	Rb	25	39	15							79					
	BT	3									$\frac{3}{82}$	36	144	2.3	1.8	0.57
Bobby Lake	BT			13	17	7					37	14	107	2.6	2.9	0.35
Brahma Lake	BT		25								25	6	9	4.2	0.4	2.78
Charlton Lake	BT		2	5	1	1	1				10	11	33	0.9	3.3	0.30
Crane Prairie Reservoir	Rb	83	260	592	493	196	92			23	1,779					
	BT	15	140	180	57	22	1				415					
	K	17	83	69	15	5					189					
	Br			8	5	2					15					
	AS										2					
	Wf					1					$\frac{1}{2,401}$	984	4,339	2.4	1.8	0.55
Davis Lake	Rb		3	4	8	35	35			18	129					
	K		4	5	5						14					
	AS			1	2	9	9	8			$\frac{29}{172}$	438	1,810	0.4	10.5	0.10
Deer Lake	BT	29	6	2	2	1					40	7	32	5.7	0.8	1.25
Deschutes River, Section 3	Rb	32	438	152	12						634					
	BT	5									5					
	St	8	12								20					
	Br	7	40	80	47	10	6	4			194					
	DV				2						2					
	Wf	1	3	10	5						19					
	BrB	12	1								$\frac{13}{887}$	379	1,069	2.3	1.2	0.83

Table 163 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups								20 & Over	Total Fish	Total Anglers	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								
Deschutes River, Section 4	Rb	16	82	15	9					122						
	Bt	54	21	3	2					80						
	K		2	2	1					5						
	Br	6	10	6	6	1	3			32						
	Wf		9	30	27	21				<u>87</u>	58	410	5.6	1.3	0.80	
										<u>326</u>						
Devils Lake	Rb	14	55	7						76						
	Bt	9	6	8	1			1		<u>25</u>	46	107	2.2	1.1	0.94	
										<u>101</u>						
East Lake	Rb	148	976	1,694	972	253	14	1	1	4,059						
	Bt	15	38	203	157	41	8	3	2	467						
	Br		6	7	5	2	1			<u>21</u>	1,811	9,083	2.5	2.0	0.50	
										<u>4,547</u>						
Elk Lake	Rb		7	4	2					13						
	Bt		14	2	2					20						
	K	2	694	5						<u>999</u>	258	693	4.0	0.7	1.49	
		300								<u>1,032</u>						
Fall River	Rb		4	1						5						
	Bt	10	1	2						10						
	Br									<u>3</u>	7	13	2.6	0.7	1.38	
										<u>18</u>						
Irish Lake	Bt	15	43	8	4	1				71	18	61	3.9	0.9	1.16	
Johnny Lake	Bt		2		1					3	4	4	0.8	1.3	0.75	
Lesiah Lake	Bt	2		2						4	4	10	1.0	2.5	0.40	
Lily Lake	Bt		1							1	3	9	0.3	9.0	0.11	
Little Cultus Lake	Rb	17	24	12		3	1	2		59						
	Bt	19	40	81	28	8				<u>176</u>	65	274	3.6	1.2	0.86	
										<u>235</u>						
Little Deschutes River	Rb	2	12	1						15						
	Br	8	1		1					<u>10</u>	17	33	1.5	1.3	0.76	
										<u>25</u>						

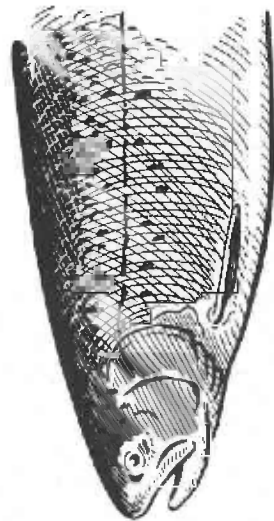


Table 163 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups							20 & Over	Total Fish	Total Anglers	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							
Little Lava Lake	Rb BT	1	1	3	1					1 6 7	2	8	3.5	1.1	0.88
Little Three Creeks Lake	Rb					2				2	4	4	0.5	2.0	0.50
Lucky Lake										0	6	12	0.0		
Metolius River	Rb Br DV AS Wf	69 2 2 9	279 4 2	133 3 5 20	23 3 1 12	3 4 1	1 1 2 1 1			508 13 17 1 43 582	564	1,397	1.0	2.4	0.42
Mud (Hosmer) Lake	AS		7		62	162	30	1	23	285	50	186	5.7	0.7	1.53
Muskrat Lake	Rb BT	9 23	2 4	1						12 27 39	11	20	3.5	0.5	1.95
North Twin Lake	Rb	36	220	49	35	15	3			358	118	431	3.0	1.2	0.83
Paulina Lake	Rb	418	686	794	230	37	3		1	2,169	964	4,323	2.3	2.0	0.50
Pocket Lake	BT	4								4	4	2	1.0	0.5	2.00
South Teddy Lake	BT	1			28	6		1		36	4	52	9.0	1.4	0.69
South Twin Lake	Rb	33	163	293	80	15	3	1		588	247	927	2.4	1.6	0.63
Sparks Lake	Rb BT	6 6	12 42	11 35	2 12	2				25 97 122	38	110	3.2	0.9	1.11

Table 163 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups										Total Fish	Total Anglers	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	20 & Over								
Suttle Lake	Rb	185	431	116	1						733						
	K	217	27	2							246						
	Br	2	15	12	7	6	6	3			57						
	Wf	1	3	2	4	1					11						
											1,047	697	3,690	1.5	3.5	0.28	
Taylor Lake	BT	11	14	2							27	21	110	1.3	4.1	0.25	
Three Creeks Lake	Rb	50	113	63	10						236						
	BT		1	1	1	1					4	116	364	2.1	1.5	0.66	
											240						
Timmy Lake	BT	8	20								28	6	9	4.7	0.3	3.11	
Todd Lake	BT		1	2							3	15	37	0.2	12.3	0.08	
Tumalo Creek	Rb	2	5								7						
	BT	2									2	12	12	0.8	1.3	0.75	
											9						
Wickiup Reservoir	Rb	6	62	54	31	11	11	8	3		186						
	BT	8	10	1	6						25						
	K	2	68	415	407	191	22		2		1,107						
	Br	1	23	17	20	14	20	30	25		150						
	Wf		2	3	3		1				9	1,419	4,843	1.0	3.3	0.30	
											1,477						



Limited information has been gained from gill-net sets regarding the size of maturing kokanee in Suttle Lake, however, 6- to 8-inch kokanee were predominant in the spawning population observed in Link Creek. The size of spawning kokanee indicates that Suttle Lake is becoming overpopulated with kokanee.

Kokanee liberations in Suttle Lake are shown in Table 164.

Table 164

Kokanee Liberations, Suttle Lake,  
1954 through 1963

Year	Number of Kokanee	Size
1954	20,042	54 per pound
	2,248	47 per pound
1955	None	
1956	None	
1957	None	
1958	None	
1959	None	
1960	None	
1961	93,372	Fry
1962	97,138	253 per pound
1963	49,900	400 per pound

Kokanee were released in Suttle Lake in 1961 after six years of no stocking. Fall rainbow fingerling plants were discontinued in 1961 because of large losses from tapeworms. The following year (1962) the average size of kokanee was decreasing from about 10 inches to 6.5 inches. If the reduced rate of fish stocking in Suttle Lake fails to produce an increase in size of fish returned to the angler creel, all stocking of fingerling fish in the lake should be temporarily discontinued.

Suttle Lake kokanee creel census data are summarized in Table 165.

Table 165

Length Groups of Kokanee Caught by Anglers in Suttle Lake,  
1956 through 1963

Year	Number of Kokanee by 2-Inch Size Groups					
	6-8	8-10	10-12	12-14	14-16	16-18
1956	1,225	1,391	7	1		
1957	30	81				
1958	119	54	693	67		
1959	176	623	94	7		
1960	22	174	346	4	1	1
1961		134	652	9		
1962	759	408	19			
1963	217	27	2			

### Wickiup Reservoir

The lake survey crew conducted a physical and biological survey of Wickiup Reservoir in both early summer and late summer. A detailed report has been prepared.

The number of brook and rainbow trout taken by anglers has decreased since the stocking of kokanee. Kokanee comprised 75 percent of the catch in 1963. The brown trout fishery continues to be very good.

Creel census during 1963 indicates fish were caught at the rate of 0.31 fish per hour, which is somewhat higher than 0.20 per hour recorded in 1962.

### Golden Trout Lakes

Stocking records for golden trout in some of the central Oregon high lakes are listed in Table 166.

Population data were secured by gill net from Camp, Eric, Golden, Rim, Tam, and East and West Chambers Lakes in mid-August. Composition and length frequency are depicted in Table 167.

The surface of West Chambers Lake was partially ice-covered during the August 9 survey. East Chambers Lake, although separated from West Chambers by only a few feet, did not have the heavy ice-cover. Golden trout in East Chambers, however, were generally in poor condition.

Although no fish were taken in Golden Lake, reports of good fish populations in 1959 and 1960 would indicate that the lake can support fish life during a normal winter. Winter severity, however, undoubtedly presents a constant threat of winterkill.

### Creel Census

Most streams in the district provided good catch rates due largely to the legal plants of rainbow.

The Metolius River continued to produce fair fishing for the large numbers of anglers in both the fly-fishing-only and nonrestricted areas of the stream.

Although the Deschutes River fishery is largely supported by plants of legal rainbow, fair numbers of brown trout were taken between the confluence of the Metolius and the Little Deschutes River.

Creel census data were gained from a number of back-country lakes: Bobby, Brahma, Charlton, Deer, Irish, Johnny, Lemish, Fly, Little Three Creeks, Lucky, Muskrat, Pocket, South Teddy, and Timmy. Angling success ranged from 0.3 to 3.11 fish per hour on these small high lakes.

Creel data, as compiled by district personnel and the Oregon State Police, are presented in Table 163.

Table 166

## Golden Trout Stocking Records for Some Central Oregon High Lakes

Lake	Location	Year	Date	Number Stocked	Weight (Pounds)	Size (Inches)	Method of Stocking
Camp	T. 17 S. R. 8 E. S. 3	1959	July 21	132	30.0	8	By plane
		1959	August 11	143	32.5	8	By plane
		1960		0			
		1961	August 9	593	1.5	2	By plane
		1962	July 28	1,116	2.0	0-2	By plane
Chambers, East	T. 17 S. R. 8 E. S. 3	1958	September	1,033	4.0	2	By pack train
		1959	August 11	109	24.7	8	By plane
		1960	July	1,112	2.0	2	By plane
Chambers, West	T. 17 S. R. 8 E. S. 3-10	1958	September	1,000	4.0	2	By pack train
Eric	T. 17 S. R. 8 E. S. 24	1962	July 28	279	0.5	2	By plane
Golden	T. 17, S. R. 8 E. S. 13	1958	October 9	319	17.0	5	By pack train
Rim	T. 17 S. R. 8 E. S. 17	1959	August 11	143	32.5	8	By plane
Tam	T. 17 S. R. 8 E. S. 5	1960	July 29	1,112	20.0	2	By plane

Table 167

## Composition and Length Frequency of Catch by Gill Nets Represented in One-Inch Size Groups, Fork Length Measurements, of Some Golden Trout Lakes, Bend District, 1963

Lake	Number of Sets	Species	Number Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																		
						4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20+		
Camp	2	GT	64	32.0	100.0				5	54	5													
Chambers, East	2	GT	24	12.0	100.0				4	16	4													
Chambers, West /1	2		0																					
Eric	1		0																					
Golden	1		0																					
Rim	2		0																					
Tan	2	GT	2	1.0	100.0						1													

/1 Three-inch golden trout observed in the lake.

### Kokanee Spawning Escapement

Table 168 contains kokanee spawning escapement data for three waters for the years 1958 through 1963.

Table 168

#### Kokanee Spawning Ground Data, 1958-1963

Year	Cultus River		Deschutes River Sheep Bridge Area		Link Creek	
	Kokanee	Redds	Kokanee	Redds	Kokanee	Redds
1958	78	42	48	26	105	143
1959	850	400	450		419	387
1960	100	190	597	343	502	507
1961	1,534	337	4,000 /1	900	486	972
1962	600	140	342	104	359	136
1963	1,000	220	680	240	3,000 /1	422

/1 Estimated.

Most kokanee in the district are believed to mature in their fourth year. The 1963 survey shows an increase in escapement of mature fish in three areas over that found in 1959. The size of mature kokanee in Link Creek (tributary of Suttle Lake) declined, with few fish over 8 inches in length observed.

### Habitat Improvement

#### Sparks Lake

Two permanent water depth gauges were installed in Sparks Lake--one near surface outlets on the north shore and the other in Soda Creek near its mouth.

The Game Commission financed construction of an earth dam across the main outlet in an effort to maintain the lake level during the summer months. The work was done by the U. S. Forest Service. A work road was constructed around the east side of the lake to the dam site.

A number of additional outlets were marked during late fall to facilitate additional sealing work.

#### Metolius River

The U. S. Forest Service felled 40 to 50 snags below Bridge 99 to afford fish cover and improve holding water in this section of the stream.

#### Rough Fish Control

Trap nets, gill nets, and rotenone were used in controlling undesirable fish in East and Paulina Lakes. The estimated kill of roach is listed in Table 169.

Table 169

Estimated Kill of Roach by Gill Net, Trap Net, and Rotenone,  
Bend District, 1963

Lake	Species	Approximate Number Killed	Weight (Pounds)	Methods
East	Ro	10,000	30	Rotenone
Paulina	Ro	171,000	510	Gill nets, trap nets, and rotenone

Table 170 presents the percentages of rough fish in gill-net sets  
from 1949 through 1963.

Table 170

Percentage of Rough Fish in Total Catch of Gill Nets  
in Some Central Oregon Lakes and Reservoirs,  
1949-1963

Year	Percentage of Rough Fish				
	Davis Lake	Big Lava Lake	Little Lava Lake	Crane Prairie Reservoir	Wickiup Reservoir
1949	92	100 <u>/1</u>	98	0	
1950		0			96
1951	86	28	97		95
1952		6	82	0	96
1953		9	92	2	
1954	87	51	82	6	87
1955	98	65	99	77	89
1956	98	61	76	64	<u>/2</u>
1957	98	55	93	84	12 <u>/2</u>
1958	97	50	87	87	92
1959	92	35	74	87	84
1960	94	56	67	89	87
1961	98 <u>/1</u>	76	92	82	
1962	0	31	42	87	
1963	0 <u>/3</u>	55 <u>/1</u>	93	76	80

/1 Chemically treated.

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

/3 No rough fish taken during scheduled gill-net sets; one roach was taken on August 15.

## KLAMATH DISTRICT

Arthur H. Gerlach

### Fish Inventory

#### General

##### Creel Census

Creel census data were gathered on streams and lakes in the Klamath District by personnel of the Game Commission, State Police, and U. S. Forest Service. Statistics obtained, including information on trout, kokanee, warm-water fish, and mullet, are presented in Table 171.

##### Population Studies

Composition and length frequencies of fish populations in some district lakes were collected through overnight sets of graduated-mesh nylon gill nets. Table 172 lists the number and species for each body of water.

##### Length at Maturity

Female fish taken in population studies in 1963 were separated into different stages of maturity and the average lengths calculated. These data are listed in Table 173. The average lengths of maturing female fish taken from lakes within the district from 1952 through 1963 are compared in Table 174.

#### Trout

##### Age Studies

Thirty-one scale samples were taken from rainbow trout landed by anglers at Klamath and Agency Lakes. The median age of the fish was 5 years, and the average length was 26.6 inches with a range from 20.0 to 33.3 inches. Table 175 presents the age composition of the trout.

Because of cold water and less food in spawning tributaries of both lakes, the scales from many of the trout are similar to steelhead scales that show slow growth in streams and rapid growth in the ocean. Agency and Klamath Lakes are exceedingly rich in organisms and furnish the same type of growth rate found in fish migrating to the ocean from a stream environment.

##### Agency Lake

Agency Lake was noted for poor angling throughout the season. Roach were not a problem to the angler in 1963 and few were hooked. Rainbow in the catch showed a wide length range, which indicates a good survival of either natural or hatchery propagation.

The largest rainbow trout known to be taken from Agency Lake in 1963 weighed 16.5 pounds.

The number of brown trout increased 37.5 percent over the 1962 catch. The length distribution of the fish was from 8.4 to 27.8 inches.



Table 171

Creel Census, Klamath District, 1963

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups								Total Fish	Total Anglers	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	20 & Over								
Lakes																	
Agency	Rb	1	3	8	18	21	12	13	15	91							
	Br		1	1	10	12	3	3	2	32							
	YP		3	10	4	4				21							
										<u>144</u>	177	1,036	0.81	7.19	0.14		
Boyle Reservoir	LB				8	13		1		22							
	BC			2	4					<u>6</u>	16	46	1.75	1.64	0.61		
Crescent	Rb							1		1							
	K									75							
	Br	1	18	25	20	12				1							
	Lt					1	4	3	9	<u>17</u>	174	402	0.54	4.28	0.23		
Fourmile	Rb	3	19	36	2					60							
	BT	14	37	12	1					64							
	K	1	197	8						<u>206</u>	173	890	1.91	2.70	0.37		
										<u>330</u>							
Gerber Reservoir	LB			3						3							
	BrB	8								8							
	BC	293								293							
	YP	12								<u>12</u>	16	87	19.75	0.28	3.63		
Klamath	Rb			8	12	30	6	1	6	63							
	Br				1					1							
	BrB	61	35							96							
	YP	14	30	7						<u>51</u>	96	429	2.20	2.03	0.49		
										<u>211</u>							
Lake of the Woods	Rb			6	6	24	7			43							
	BT		3	3	2					8							
	K		32	168	4					<u>204</u>	85	375	3.00	1.47	0.68		
										<u>255</u>							

Table 171 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups								20 & Over	Total Fish	Total Anglers	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									
Lakes (continued)																	
Odell	Rb		2	3			1			6							
	K	7	182	238	388	14				829							
	LT	4	1	2		3	6	3	30	51							
	DV				1					1							
	Wf	1	8	1	1	1				12							
										899	490	1,726	1.83	1.92	0.52		
Posary	BT		2	4	2					8	5	8	1.60	1.00	1.00		
Rosary, South	BT			3	2					5	8	23	0.63	4.60	0.22		
Yoran	Rb	4								4	5	10	0.80	2.50	0.40		
Streams																	
Big Marsh Creek, Upper	BT	10	1							11							
	Br	2	1							3		10	2.80	0.71	1.40		
										14							
Crazy Creek	Rb	31								31	4	8	7.75	0.26	3.88		
Crooked Creek	Rb	2	4	11	4	1				22							
	BT			1						4							
	Br	3		1					1	2	17	63	1.65	2.25	0.44		
										28							
Klamath River	Rb		190	118	5	34	11	2	3	363	93	356	3.90	0.98	1.02		
Little Deschutes River	Rb	11	47	1						59							
	Br	1	4							5	17	35	3.77	0.55	1.83		
										64							
Lost River	LB	2		1	5					8							
	BC	171	62							233							
	YP	9	22							31							
	BrB	1	21							22		152	6.00	0.52	1.93		
										294	49						

Table 171 (continued)

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups										20 & Over	Total Fish	Total Anglers	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										
Streams (continued)																		
Sevenmile Creek	Rb	3	47	29	2	9		5				95						
	BT	13	18									31						
	Br		5	2	2	3						12	93	373	1.48	2.70	0.37	
												<u>138</u>						
Skull Creek	Rb	75										75	8	12	9.38	0.16	6.25	
Sprague River	Mu							29				29	10	20	2.90	0.69	1.45	
Sun Creek	BT	2	6									8	5	14	1.60	1.75	0.57	
Spring Creek	Rb	6	85	15	6							112						
	BT	7	3	1								11						
	Br				2	1						3	115	304	1.10	2.41	0.41	
												<u>126</u>						
Williamson River	Rb	5	29	23	5	15		6				83						
	BT				1							1						
	Br		1									1	55	228	1.55	2.68	0.37	
												<u>85</u>						
Wood River	Rb	19	283	12								314						
	BT		3									3						
	Br	3	3	1		5	5	1				18	111	406	3.02	1.21	0.83	
												<u>335</u>						

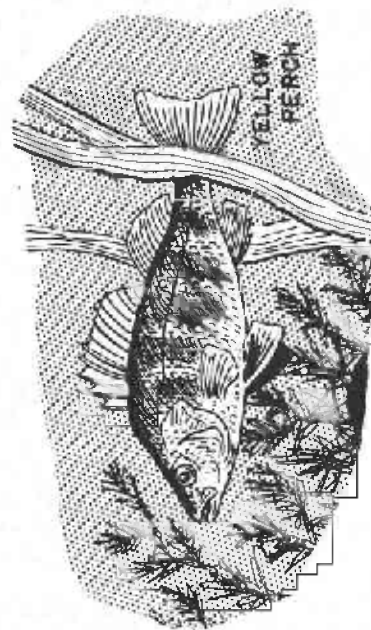


Table 172

Composition and Length Frequency of Catch by Gill Nets, Represented in 1-Inch Size Groups,  
Fork Length Measurements, from Seven Klamath District Lakes, 1963

Lake	Date	Number of Sets	Species	Number Taken	Fish per Net	Percentage of Total	Number of Fish by 1-Inch Size Groups																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Crescent		8	Rb	1	0.1	0.1						1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																</

Table 173

Average Fork Length of Female Fish in Each Stage of Maturity  
as Collected in Gill-Net Sets  
from Five Klamath District Lakes,  
1963

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	16.70	2	24.00		
	K	1	11.30				
	Wf			3	9.90	2	15.95
Fourmile	BT	19	7.60	22	7.49	1	10.60
	K			43	9.49		
Lake of the Woods	Rb	4	11.70	1	15.50		
	BT	1	8.20	14	9.35	2	13.30
	BrB	3	6.76	11	10.26		
	K			1	9.10		
Odell	Rb			1	12.00		
	K	1	11.00	2	12.70		
	DV	2	15.25				
	Wf	2	7.55	2	10.55	3	14.13
Summit	BT	6	6.20	9	7.81	6	9.81

#### Crescent Lake

The creel census data at Crescent Lake were again separated into two categories: (1) kokanee anglers, and (2) lake trout anglers. The majority (74.1 percent) were fishing for kokanee. The 1963 average catch for both species was down from last year with 0.58 kokanee and 0.35 lake trout per angler taken by the respective groups. In comparison, in 1962 the kokanee and lake trout anglers caught 0.97 and 1.64 fish per angler.

The number of roach taken by gill nets at the time of the population studies increased 374 percent over the number taken in 1962. The increase may possibly be attributed to high lake levels in the past two years, allowing the mature roach more optimum spawning sites.

Kokanee predation investigations were continued on Crescent Lake in 1963. For three consecutive nights following releases of kokanee fingerling, gill nets were set in areas in which the small fish congregate. At no time were any large numbers of resident fish attracted to the kokanee. No fingerling were found in stomachs of fish taken in the gill nets.

Table 174

Average Length of Maturing Female Fish in Some Klamath District Lakes, 1952-1963

Lake	Species	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Fork Lengths in Inches, by Years													
Agency	Rb											18.7	<u>1</u>
	Br									16.7			
	YP									10.4		10.5	
	BrB											10.6	
Crescent	Rb		18.7	15.0	14.1								
	Br			16.3	12.3	15.9							
	LT												24.0
	K						11.0						
	Wf		8.9	12.3	8.4	10.2	8.1	8.7	8.3	9.7	10.2	11.4	9.9
Devils	Rb										9.5	10.6	
Fourmile	Rb										8.0		
	BT								9.1	8.1	8.6	8.2	7.5
	K			12.0					10.2	9.9	8.5	8.7	9.5
Klamath	BrB											8.5	
Lake of the Woods	Rb						10.7	13.7	7.5		11.5	17.8	<u>1</u>
	BT								9.0	12.3	9.5	11.5	9.4
	K									11.6	10.6	9.3	<u>1</u>
	BrB											8.9	10.3
Odell	Rb						13.1	10.9				11.7	<u>1</u>
	LT	28.0	25.7			16.5	15.3						
	DV	27.0											
	Wf	9.0			18.8								
	K				9.8	9.2	8.3	8.5	8.8	9.4	8.9	9.6	10.6
Summit									17.1			12.7	
	BT	7.7					8.0	11.1		8.5		10.8	7.8
	LT	17.7					18.9				24.4	24.6	
	K							13.2					

1 One fish in sample.

Table 175

Ages and Length Frequencies of 31 Rainbow Trout  
Taken in the Sports Fishery from Agency  
and Klamath Lakes, 1963

Number of Fish	Age	Average Length (Inches)	Length Frequencies (Inches)	
			Minimum	Maximum
4	III	21.7	20.0	23.5
4	IV	23.6	21.0	26.0
9	V	26.1	22.3	31.0
6	VI	28.6	26.3	30.5
5	VII	29.2	26.5	32.0
2	VIII	29.3	26.5	32.5
1	IX	33.3		33.3

#### Devils Lake

Water storage improved at Devils Lake in 1963, and the stocking of rainbow trout has been resumed. Gill-net surveys demonstrated that a few large rainbows (14 to 16 inches) were still present. No small fish from natural reproduction have been hooked or taken by nets.

Rainbows taken in the gill nets were infested with the parasitic copepod, Salmincola edwardsii. Although parasitized quite heavily, the fish were still in good condition.

Crayfish were more numerous in the population samples in 1963, and it is hoped that this was an indication that the crustaceans are on the increase.

#### Fourmile Lake

The second poorest angling season on record was experienced at Fourmile Lake in 1963. Data obtained by creel census show that the average catch was 1.91 fish per angler, a drop of 4.63 fish from the 1961 peak of 6.54. The reason for the diminished catch was the small parent run of kokanee in 1959. Since kokanee make up the bulk of the fish taken from this lake, it is recommended that a supplementary stocking of kokanee fingerling be made in years when there is a low production of natural fry.

The length at maturity of kokanee at Fourmile Lake has improved. The rapid decline of the average length occurred in 1962, and an increase of 0.8 inch was recorded in 1963. A small maturing population of kokanee and the reduction of numbers of trout stocked were probably responsible for the improved growth.

Brook trout maturity length has continued to decline. The female fish averaged 7.5 inches and were in poor condition.

Tapeworm infestation of trout increased in 1963 with 61.2 percent parasitized. A severe loss of hatchery brook trout fingerling occurred approximately one month after release into the lake. Many of the dead fish

were examined, and large numbers of tapeworms were found in the body cavities.

Early in the trout season, anglers reported taking spawned-out kokanee on hook and line. As late as the first of July, the average kokanee catch per party consisted of at least 5 mature fish from the 1962 spawning population. Examination of the fish revealed that the sex organs were atrophied, but food was present in the stomachs. None of the mature fish were seen or apparently caught after August 1.

#### Klamath Lake

Results of a fingerling rainbow stocking program were evident at Klamath Lake in 1963, with many reports of rainbow trout from 14 to 18 inches taken. This size group has not been too prevalent in past years. One resort operator reported over 200 fish in this size range taken by anglers fishing from his resort. Scales from a few of these fish placed them in the 1+ year class.

The number of rainbow trout over 20 inches taken in the sport fishery was approximately the same as the number taken in 1962, with 39 landed this year as compared to 35 in 1962. The length ranged from 20 to 33.3 inches, and averaged 26.6 inches. A comparison of length frequencies for the period 1956 through 1963 is made in Table 176.

Table 176

A Comparison of Length Frequencies of a Sample of Rainbow Trout,  
20 Inches and Over in Length, Taken in the Klamath Lake  
Sports Fishery, 1956-1963

Length (Inches)	Number of Fish by Year							
	1956	1957	1958	1959	1960	1961	1962	1963
20		5	1	6	1	1	3	1
21	10	16	2	8	5	4	2	2
22	16	30	22	9	9	2	3	3
23	18	21	31	20	5	4	2	4
24	13	20	27	16	6	2	2	4
25	11	12	18	13	12	4	7	
26	3	13	23	16	10	4	4	7
27	6	8	11	9	8	3	4	2
28	4	4	12	2	4	3	1	3
29	4	3	7	4	4	1	1	4
30	3	2	4	1	4	2	3	4
31	3	2			3	3	1	2
32		1		1	1	1	2	2
33								1
34								
35	1							
36								
37	1							

None of the marked rainbow from a release made in 1962 were checked



or reported caught by anglers. In 1963, one-half of the 250,000 rainbow fingerling stocked in Klamath Lake were marked.

Roach, a major irritation to anglers in 1962, were not a problem in 1963. The trash fish were still present but anglers had learned to avoid the roach by trolling deep.

### Klamath River

Angling was slow during the spring trout season on Klamath River. High runoffs in the Klamath drainage basin necessitated the releasing of extra water into Klamath River, which caused sporadic fluctuation of the river. The fall season was excellent, and anglers reported good results from all sections of the river.

Flow studies to determine whether the minimum flow of the river could be reduced without damage to game fish were completed below the J. C. Boyle Dam. These results will be compiled in a separate report.

Six tagged trout were reported by anglers on Klamath River. All of the fish were tagged and released at Boyle Dam. Four of the trout were taken within 1 mile downstream from the dam, and the remaining 2 were caught at the Frain Ranch 7 miles below the dam and at Keno 8 miles above the dam.

Eight hundred seventy-one rainbow trout have been tagged at the J. C. Boyle Dam since 1960, and 11.3 percent of the tags have been returned. Seventy-one percent of these tagged fish were taken in a 3-mile section immediately downstream from the dam.

### Klamath Basin Streams

Angling on Klamath Basin streams was limited in many cases by forest closures due to hazardous conditions in privately-owned timber lands. Those streams that were available to the public furnished excellent angling.

Stream surveys of major tributaries to Klamath Lake and Agency Lake were continued in 1963. Seventeen miles of stream were checked for spawning rainbow. An average of 2.1 adult trout per mile was calculated. Sisemore Slough, an irrigation drain entering Agency Lake, was added this year since it was found that a number of trout enter this drain to spawn. The observations by streams are found in Table 177.

### Lake of the Woods

Fish populations at Lake of the Woods were sampled to obtain data on the growth rate and survival of kokanee, rainbow, and brook trout. These data show a good survival of all hatchery fish, with the rainbows particularly showing excellent growth rates. Brook trout length at maturity has decreased from a high of 11.5 inches in 1962 to 9.35 inches in 1963. Length at maturity of kokanee continued a downward trend, with an average length of 9.1 inches in 1963 as compared to 9.3 inches in 1962.

Marked kokanee from a release of 3-inch fingerling made in September 1961 began to enter the sport catch and gill-net samples. Nine kokanee with 1961 marks, gill-netted in the fall studies, were all mature males that averaged

Table 177

Spawning Ground Survey of Nine Tributary Streams  
of Upper Klamath Lake, 1963

Stream	Miles Surveyed	Number of Trout	Number of Redds
Crane	2.0	0	0
Fort	3.0	5	7
Larkin	3.0	0	0
Sevenmile	3.0	13	0
Short	2.0	0	0
Sisemore Slough	1.0	11	0
Spring	0.5	2	2
Sunnybrook	0.5	0	0
Wood River	2.0	6	9

8.7 inches. These fish are in the 2+ year class, or 3-year-olds. A number of similarly marked kokanee, all mature males, were taken by anglers in the late fall fishery. The marked fish entered the catch as they matured in the fall; none were reported taken during the spring and summer fishery.

A sampling program to estimate the amount of food organisms present in Lake of the Woods was continued in 1963. Thirty-three random bottom samples were taken, and the calculated amount of fish food per surface acre was determined to be 106.7 pounds, an increase of 44.9 pounds over 1962. Table 178 presents a comparison with samples of past years.

Table 178

Bottom Samples, Lake of the Woods, 1941-1963

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
1962	33	61.8
1963	33	106.7

Table 179 lists the type and quantities of food organisms found in Lake of the Woods.

Table 179

Number and Percentage of Bottom Food Organisms,  
Lake of the Woods, 1963

Species	Number	Percentage
Midge	549	68.37
Worms	74	9.22
Dragonflies	71	8.84
Scuds	37	4.60
May flies	31	3.86
Clams	30	3.74
Alder, caddis, snail, leech, damsel	11	1.37

The incidence of tapeworms has increased at Lake of the Woods from less than 1 percent in 1962 to 7.5 percent in 1963. The parasites were found only in brook trout.

#### Odell Lake

Kokanee continue to be the most sought-after fish in Odell Lake. Fifty-eight percent of the anglers interviewed were pursuing kokanee and 11 percent were after lake trout. The remaining 31 percent of the anglers were fishing for no particular species.

The 1963 average catch of kokanee increased to 1.90 fish per angler, but the lake trout take (0.25) dropped below the 1962 average of 0.63 fish.

Length frequencies in 1-inch size groups were obtained from a portion of the sport-caught kokanee and are compared with data recorded in 1960 through 1962 in Table 180. The average length was 11.5 inches, an increase of 0.6 inch over 1962. The increase in average length is attributed to decrease in the number of fish 10 inches or less entering the catch.

Although the average length of kokanee entering the sport catch increased slightly, measurements of maturing female fish indicate the average size is continuing to diminish, as shown in Table 181.

Kokanee populations at Odell Lake have reached such proportions as to continue the downward trend in average size of maturing fish and to indicate the possibility of overcropping available food, such as has occurred in the past at Fourmile Lake. Recommendations for Odell Lake in 1964 include a reduction or possible elimination of kokanee stocking, along with an increase in the kokanee bag limit. Trawling operations by the Research Division indicate a substantial natural kokanee fry hatch and survival in 1963. Likewise, observations made at Odell Lake in late October 1963 indicate that a large spawning population was present.

**Table 180**

Length Frequencies of a Sample of Sport-Caught Kokanee  
in Odell Lake Represented by Percentages  
in 1-Inch Size Groups, 1960-1963

Length (Inches)	Percentages by Years			
	1960	1961	1962	1963
7			0.7	
8	2.2	2.9	4.4	7.7
9	6.5	10.6	28.6	13.5
10	15.2	13.6	12.1	11.5
11	4.3	5.9	5.7	23.1
12	10.9	11.9	23.6	42.3
13	10.9	17.9	16.4	1.9
14	6.5	16.5	7.1	
15	8.7	8.9	1.4	
16	6.5	5.9		
17	8.7	2.9		
18	8.7	1.5		
19	6.5	1.5		
20	2.2			
21	2.2			

**Table 181**

A Comparison of Average Length of Mature Kokanee  
Taken in Trapping and Gill-Net Operations  
at Odell Lake, 1959-1963

Year	Average Length (Inches)	
	Males	Females
1959	18.8	18.4
1960	18.2	17.6
1961	15.2	14.9
1962	14.9	14.5
1963		13.0 /1

/1 Data obtained from Research Division.

Continued surveillance of the production and survival of the various kokanee age classes in Odell Lake is imperative for proper management of the fishery.

Hatchery-reared trout continue to support the lake trout sports fishery with over 50 percent of the catch originating from fish reared at Klamath Hatchery. Table 182 compares the total lake trout checked with the percentage of marked fish from 1952 through 1963. The type of mark and year released with the percentage found in the 1963 sports fishery are listed in Table 183.

Table 182

Total Checked Lake Trout Compared with Percent of Marked Lake Trout  
in Sport Catch, Odell Lake, 1952-1963

Year	Total Lake Trout Catch	Percent 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
1962	108	51
1963	51	51

The 1951 release (adipose removed) was the predominant mark examined in 1963. In 1962 there was some doubt whether all of the adipose-marked fish were from the original release or partially from the 1959 stocking. Scale reading confirmed that all adipose-marked lake trout were from the release made in 1951. The lake trout planted in 1951 ranged from 16 to 27 inches in length in 1961.

Length frequencies of a sample of lake trout taken in the sport catch from 1952 through 1963 are depicted in Table 184. The spread in sizes of the trout was wide and ranged from 11.6 to 33 inches in length. The average length of the sport fish was 22.4 inches.

Regeneration of fins has not occurred in a group of lake trout held at the Klamath Hatchery for the past five years. All of the marks are quite recognizable, and little sign of regeneration is in evidence. Table 185 lists the various types of marks and the average lengths of the fish for 1959 through 1963. The size of the fish varied from 12 to 22.1 inches.

#### Warm-Water Game Fish

##### Lake of the Woods

Brown bullhead catfish have become well established in Lake of the Woods. The average length of the fish taken in population studies was 10.3 inches. No sign of natural reproduction has been observed at the lake, but 11 of 23 bullheads taken in nets this year were maturing females.

Table 183

Percent of Different Years Hatchery Releases Appearing in Catch,  
Lake Trout Sport Fishery, Odell Lake, 1952-1963

Year	Percent of Marked Fish in Catch by Year Released and by Mark												
	1951 Ad	1952 LV	1953 RV	1954 LP	1955 RP	1956 D	1957 None	1958 LP-Ad	1959 Ad	1960 LV-Ad	1961 RP-Ad	1962 RV-Ad	1963 LV
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	4	6			
1961	56	12	11			13			4	1	3		
1962	80	2			4	5		5			2	2	
1963	68	4	4					8	4		4		8

Table 184

Length Frequencies of a Sample of Sport-Caught Lake Trout in Odell Lake,  
Represented by Percentage in 2-Inch Size Groups, 1952-1963

Year	Under 20	Percentages by 2-Inch Size Groups											
		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		
1962	38.6	20.0	20.0	8.6	8.6	1.4	2.8	0.0	0.0	0.0	0.0		
1963	28.1	9.4	25.0	12.5	18.8	3.1	0.0	3.1	0.0	0.0	0.0		

Table 185

A Comparison of the Growth of Four Marked Groups of Lake Trout  
of the Same Age at the Klamath Hatchery, 1959-1963

Mark	Length in Inches by Year				
	1959 <u>/1</u>	1960	1961	1962	1963
Maxillary	5.9	13.2	15.7	16.8	18.4
Left ventral	5.6	12.8	15.1	17.2	18.3
Right pectoral	5.8	13.2	16.1	18.1	19.1
Dorsal	5.9	13.6	16.5	18.3	19.1

/1 Average length at time of marking as yearling fish.

#### Willow Valley Reservoir

At one time an attempt was made to establish a trout fishery in Willow Valley Reservoir, but extreme drawdowns and a large population of roach removed any hope of having a successful fishery. Because of these drawbacks a warm-water fishery was planned, and this year 284 maturing bluegills and 50,000 largemouth bass were introduced into the impoundment. By October 1963 the bass fry were approximately 3 inches long. No bluegill fry have been observed, but a successful natural reproduction is anticipated.

#### Habitat Improvement

##### Miller Lake

Analysis of water, vegetation, fish food, organisms, algae, and fish by Oregon State University chemists shows that the amount of toxaphene present in the water at Miller Lake, although of minute quantities, was still sufficient to cause continued residual buildup in organic matter in and surrounding the lake and outlet. Figure 12 shows water sampling stations at Miller Lake and on the outlet, Miller Creek.

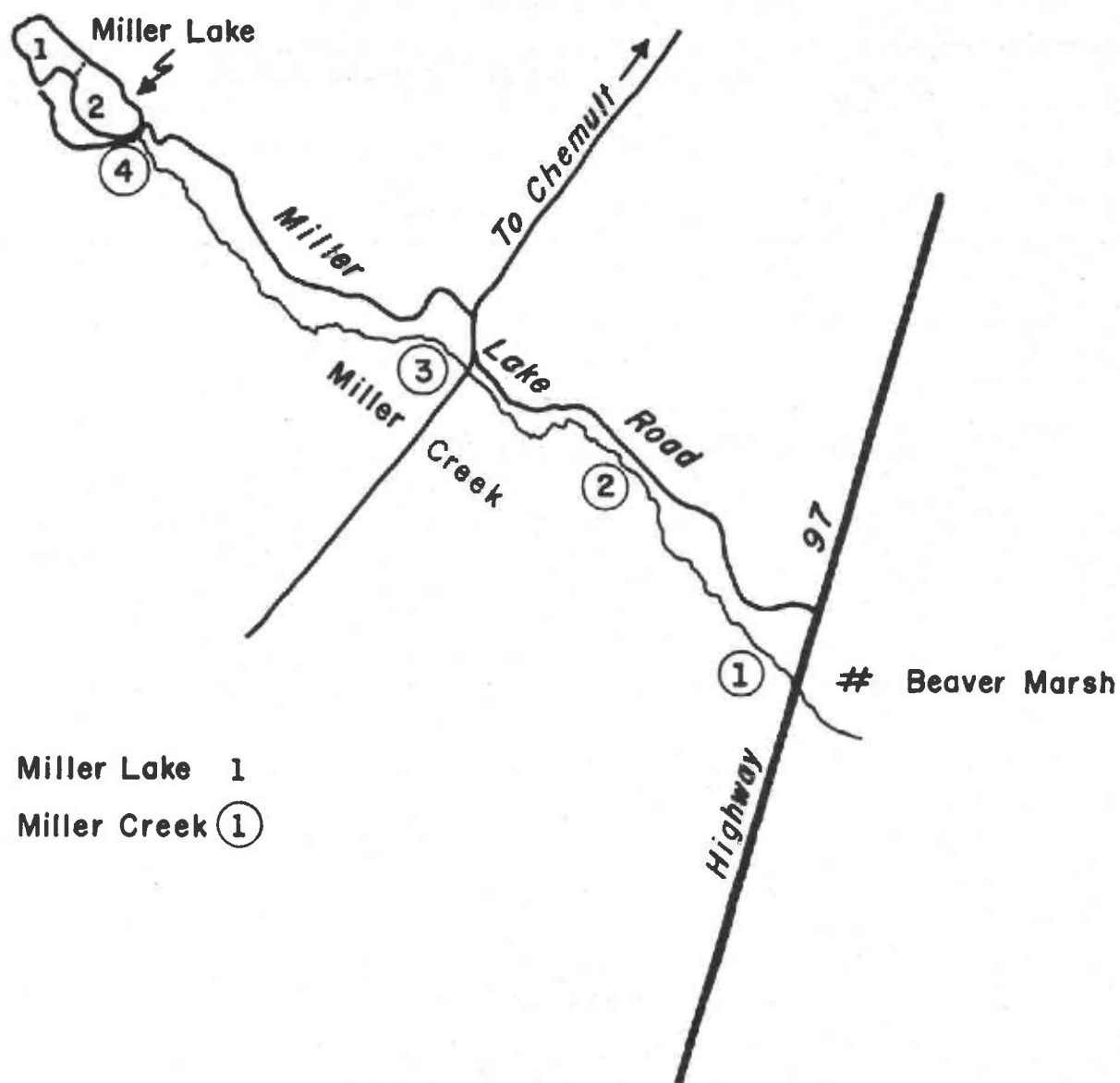
Tables 186 and 187 list the results of analyses of the water taken at the stations for 1962 and 1963. The absence of a gradual detoxification pattern over the 2-year period is discouraging.

Two types of vegetation, Eleocharis sp., a shore plant, and Polygonum sp., a water plant, have been analyzed and results are shown in Table 188. There has been a gradual reduction in the amount of residue in Eleocharis sp. and in the plant portion of Polygonum sp., but a progressive increase of residue was found in the underground root stem of the water plant.

Rainbow trout used as test fish were placed in Miller Lake at various times, as in past years. The longest period of life for the test fish was ten days. The concentration of toxaphene in the form of residue in the dead fish varied from 3.9 to 15.9 ppm. In order to obtain a more accurate knowledge on the accumulation of residue, a special test was conducted. Live fish were



Figure 12



Miller Lake 1

Miller Creek ①

**MILLER LAKE AND CREEK WITH SAMPLING STATIONS FOR  
WATER ANALYSIS TO DETERMINE TOXAPHENE CONTENT**

Table 186

Results of Toxaphene Analysis in ppm of Surface Water  
from Miller Lake, 1962-1963

Sample Station	ppm of Toxaphene by Sampling by Dates				
	6/20/62	8/28/62	11/1/62	6/17/63	9/17/63
1	0.0015	0.0009	0.0019	0.0026	0.00115
2	0.0017	0.0009	0.0015	0.0008	0.00116

Table 187

Results of Toxaphene Analysis in ppm of Water  
from Outlet of Miller Lake, Miller Creek, 1962-1963

Sample Station	ppm of Toxaphene by Sampling Dates				
	6/20/62	8/28/62	11/1/62	6/17/63	9/17/63
1		0.0004	0.0008	0.0003	
2	0.0009	0.0008	0.0006	0.0008	0.00118
3	0.0012	0.0004	0.0005	0.0004	0.00091
4	0.0025	0.0011	0.0016	0.0016	0.00106

Table 188

Results of Toxaphene Analysis in ppm of Plants  
Taken from Shore Line and Shallows  
of Miller Lake, 1962-1963

Species Sampled	ppm of Toxaphene by Sampling Dates				
	6/20/62	8/28/62	11/1/62	6/17/63	9/17/63
<u>Eleocharis</u> sp.					
Plant	15.50	4.10	0.73	0.20	0.03
Roots		7.81	11.30	4.50	0.28
<u>Polygonum</u> sp.					
Plant		2.49	5.40	3.63	2.93
Roots		1.44	3.10	3.68	5.22

sacrificed at 2-day intervals for a period of 10 days. Fish that had been in the lake for 2 days contained 3.05 ppm, and an increase in the amount of chemical was found after each sampling period. The final test fish died at the end of 10 days, at which time the concentration of toxaphene had reached 12.1 ppm.

Test trout in Miller Creek lived for a longer period. One trout held in a live-box at Miller Creek bridge at Station No. 3 was still alive at the end of 33 days and had a residue of 13.0 ppm of toxaphene. Other trout that had died in a shorter length of time had concentrations from 3.0 to 16.9 ppm.

Toxaphene residues in insects and annelids varied in quantity in the 1963 tests. Dragonfly larvae contained from 0.18 to 0.42 ppm and leeches had from 3.18 to 8.23 ppm.

#### Miscellaneous

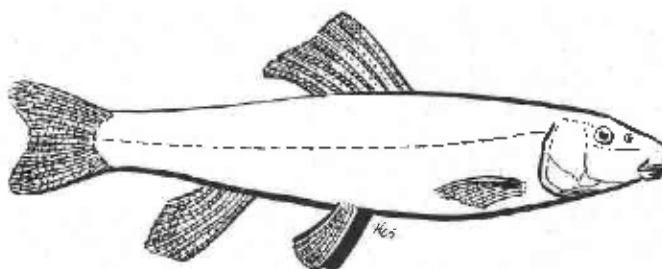
#### Mullet

Fecundity studies were conducted on the Lost River sucker in 1963. Four females were snagged in the Williamson River during the spawning run, and the data obtained are depicted in Table 189. The number of eggs per gram was 268.7, and the average weight of the ovaries was 743.2 grams. The average number of eggs per female was 195,122.

Table 189

Fecundity and Other Data Obtained from Lost River Suckers  
Taken from Williamson River, May 7, 1963

Length (Inches)	Weight (Pounds)	Age	Weight of Ovaries (Grams)	Eggs per Gram	Number of Eggs in Ovaries
29.5	8.25	7	616.5	297.4	172,250
29.0	10.00	10	782.0	286.2	224,808
29.5	9.00	11	587.4	254.2	149,317
29.3	11.00	12	987.0	237.9	234,116



## OCHOCO DISTRICT

Richard G. Herrig

### Fish Inventory

#### Anadromous

##### Spring Chinook

The late May opening of the sport fishery at Pelton Reservoir in 1963 practically eliminated the catch of young chinook migrants. Creel census collected from 1,464 anglers by personnel from the Warm Springs Reservation, Oregon State Police, and Oregon Game Commission included only 5 chinook migrants in the catch.

A summary of downstream migrant counts through the fish facilities at Pelton Reservoir is tabulated in Table 190. Downstream counts of wild chinook for the first 11 months of 1963 indicate a continued annual decrease. The 11-month count of 11,321 wild chinook represents 61 percent of the 4-year average of 18,448. Excluded is the 1959 count which includes an undetermined number of hatchery fish.

##### Steelhead

Creel census of 271 anglers opening weekend at Pelton Reservoir revealed a total catch of 1,353 fish. Steelhead smolts made up 13.3 percent of the catch. Creel data collected by the various agencies during the season are summarized in Table 191 to show the percentages of steelhead taken by month. Steelhead smolts represented 12.8 percent of the catch checked for the season.

Downstream migrant steelhead counts through the fish facilities at Pelton Reservoir are given in Table 190. The 11-month count for 1963 of wild steelhead shows an increase over the previous 2 years and is slightly above the 5-year average of 7,927. No direct correlation can be drawn between numbers of downstream migrant steelhead and the parent spawning run without considering the sport catch of immature steelhead and other environmental factors. The incomplete 1963 emigration of 8,161 young steelhead is the result of a spawning escapement of 480 steelhead from the 1961 brood year. The 1962 downstream count of 7,690 fish and sport catch of 1,074 steelhead resulted from a spawning run of 521 fish, and the 1961 downstream count of 4,344 steelhead and reservoir sport catch of 3,543 fish was the result of a spawning run of 1,142 fish. In summary, for the past 3 years the highest downstream counts have come from the lowest parent runs. The sport catch of migrant steelhead is not taken into account in this comparison.

Reference is made to the Bend District section of this report for upstream annual counts over Pelton Reservoir.

Table 190

Summary of Downstream Migrant Counts, Pelton Reservoir, 1958-1963

Species	Year	Number of Fish by Month												Total Fish
		January	February	March	April	May	June	July	August	September	October	November	December	
<u>Chinook</u>	1958												1,174	
	1959	320	550	585	25,313	24,105	3,225	516	0	0	0	627	170	55,411
Wild Hatchery	1960	137 0	84 0	2,733 0	14,801 11,301	3,497 2,774	1,673 796	116 60	0 0	7 0	751 0	1,576 3	660 8	26,035 14,942
Wild Hatchery	1961	228 2	1,567 7	1,193 3,545	9,610 4,528	5,487 2,041	944 1,130	140 310	2 5	46 7	93 4	614 1	1,270 2	21,194 11,582
Wild Hatchery	1962	565 7	1,204 7	1,413 3	6,528 11	2,959 5	309 0	67 0	0 0	0 0	86 0	992 0	1,119 0	15,242 33
Wild Hatchery	1963	105 0	1,973 0	860 0	2,037 216	5,474 7,425	569 1,902	41 66	19 110	37 11	23 0	183 12		11,321 9,742
<u>Steelhead</u>	1958												0	
	1959	0	0	6	644	4,010	3,509	826	0	0	0	18	2	9,015
Wild Hatchery	1960	1 0	2 0	133 0	2,004 0	3,813 904	4,311 602	116 1	4 0	1 0	3 0	17 0	2 0	10,427 1,507
Wild Hatchery	1961	1 0	19 0	106 2	845 385	2,011 475	2,080 701	133 144	47 1	164 1	273 0	91 0	74 0	5,844 1,709
Wild Hatchery	1962	29 0	127 0	111 0	873 2	2,633 6	3,840 83	64 0	0 0	0 0	2 0	4 0	7 0	7,690 91
Wild	1963	1	1,226	224	305	3,337	2,840	174	11	11	8	24		8,161
<u>Blueback</u>	1959	0	0	0	12	16	28	1	0	0	0	0	0	57
Wild Hatchery Suttle Lake	1960	0 0	0 0	48 0	126 10,553 13	20 1,109	6 269	0 1	0 0	2 0	1 0	0 0	0 0	203 11,932 13
Wild Hatchery	1961	0 1	2 39	11 162	14 318	11 494	2 282	0 5	0 0	0 1	0 20	0 0	0 2	40 1,324
Wild Hatchery	1962	0 1	0 1	0 0	2 26	11 12	3 3	0 0	0 0	0 0	0 11	2 4	0 0	18 58
Unknown	1963	0	11	1	2	20	1	1	0	0	0	0	0	36

Table 190 (continued)

Species	Year	Number of Fish by Month												Total Fish
		January	February	March	April	May	June	July	August	September	October	November	December	
Coho														
Hatchery	1963	0	0	0	195	82	13	3	3	2	6	21		325
Trout														
	1958									2	6	193	662	863
	1959	262	264	285	1,108	3,311	1,453	448	1	8	21	207	47	7,415
	1960	46	128	963	1,700	2,345	870	42	15	151	310	455	135	7,160
	1961	103	995	114	284	224	69	22	3	42	46	78	29	2,009
	1962	111	289	172	603	388	1,126	359	0	0	146	334	372	3,900
	1963	76	860	248	150	796	1,395	757	164	143	236	205		5,030
Other Game Fish														
	1958									1	1	9	47	
	1959	7	4	21	27	13	8	2	0	784	24	98	26	1,014
	1960	12	7	70	93	12	14	0	0	0	0	23	12	243
	1961	21	62	5	23	35	15	1	0	9	11	46	16	244
	1962	3	9	2	43	16	62	7	0	0	2	39	24	207
	1963	5	141	20	22	102	81	15	13	22	5	6		432
Coarse Fish														
	1958									37	14	10	13	
	1959	4	10	18	38	27	179	488	4	72	9	77	7	933
	1960	1	9	120	464	202	165	59	0	0	0	20	5	1,045
	1961	3	93	22	64	75	111	102	6	17	34	8	9	544
	1962	0	7	5	20	52	46	38	0	0	21	26	23	238
	1963	3	80	678	481	493	330	105	42	61	6	8		2,287

Table 191

## Pelton Creel Census, Steelhead Catch, 1963

Month	Anglers	Total Catch	Steelhead	Percent Steelhead
May	374	1,728	238	13.8
June	588	1,134	212	18.7
July	181	180	9	5.0
August	221	414	6	1.4
September	100	176	0	0.0
TOTALS AND AVERAGE	1,464	3,632	465	12.8

TroutCreel Census

Emphasis was placed on collecting creel data at Prineville and Pelton Reservoirs in 1963. A large sample was necessary on Prineville Reservoir in order to make an estimate of the total catch for the year. Pelton Reservoir received attention mainly at the first of the season to determine the percentage of downstream migrant steelhead in the catch.

The creel census data summarized in Table 192 were collected by State Police game enforcement officers, Warm Springs Reservation conservation officers, and Game Commission personnel.

Composition and Length Frequencies

Composition and length frequencies of fish populations in district lakes sampled periodically by gill nets in 1963 are tabulated in 1-inch size groups in Table 193. The regular fall sampling of Pelton, Ochoco, and Haystack Reservoirs was not obtained in 1963.

Maturity Data

Table 194 gives the average size of maturing females in Ochoco District lakes from 1959 through 1963.

Haystack Reservoir

Haystack Reservoir was chemically treated in October 1962, and restocked with 53,000 rainbow fingerling in November and December of 1962. Four gill nets set March 6 took 105 rainbow with an average length of 6 inches. After an additional release of 21,500 fingerling in April, a single gill net set in July took 32 rainbow averaging 6.6 inches in length. The fish showed little or no growth over the 4-month period, and some were observed dead and dying in the reservoir. Examination of the body cavity gave indications of a bacterial infection. No cultures were taken.

Table 192

Creel Census, Ochoco District, 1963

Lake or Stream	Species	Number of Fish by 2-Inch Size Groups							Total Fish	Total Anglers	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							20 & Over
Lakes															
Haystack	Rb	131	7	1					139	40	89	3.5	0.6	1.56	
Ochooc	Rb	379	837	916	159	15	1		2,307	1,140	3,814	2.0	1.7	1.60	
Pelton /1	Rb	344	1,482	184	27	6	2		3,307 1/2						
	St							6	6						
	BT		4	2	7	7	7	1	56 1/2						
	DV	2	5	1	4				25 1/2						
	K	4	11	3	3				235 1/2						
	Ch								5 1/2						
	Wf	2			1				5 1/2						
	LB				1				1						
	BrB								1 1/2						
									3,641	1,468	7,144	2.5	2.0	0.51	
Prineville	Rb	273	398	728	1,895	205	6		3,562 1/2						
	BrB	11	342	431	51				835						
	LB	22	9	32	39	3			105						
	SB	10	29	5					44						
									4,546	2,843	10,137	1.5	2.2		
Walton	Rb	9	55	80	36	11	1		192	210	659	0.9	3.4	0.23	
Streams															
Crooked River, Section 1	Rb	29	64	21	1				115						
	Br		1	4					5						
	DV	1				1	1		3 1/2	67	197	1.8	1.6	0.62	
Crooked River, Section 2	Rb	7	95	184	60	17	8	4	385						
	SB		1						1	226	528	1.7	1.4		
									386						
Crooked River, Section 3	Rb	14	9	8	16	1	1		49						
	BrB			6	6				12						
	SB		1						1	72	69	2.9			
Deep Creek	Rb	38	36	1	1				76						



Table 192 (continued)

Lake or Stream	Species	Number of Fish by 2-inch Size Groups								Total Fish	Total Anglers	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	20 & Over							
Streams (continued)																
Deschutes River, Section 2	Rb	60	469	143	56	9	6	1		744						
	DV		1	1	2	2				6						
	Br		2							2						
	Wf			2	2					4						
										756	428	1,570	1.8	2.1	0.48	
Marks Creek	Rb	7	68							75	29	86	2.6	1.1	0.87	
Mill Creek	Rb		18	1						19	14	18	1.4	0.9	1.06	
Ochoo Creek	Rb	6	26	8	6					46	27	63	1.7	1.4	0.73	
Trout Creek	Rb	17	5	3												
										25	8	34	3.1	1.4	0.74	

/1 Steelhead smolts are included with the rainbow and represent 14.1 percent, or 465, of the fish shown.

/2 Includes fish for which size data are unavailable.

Table 193

Composition and Length Frequency of Catch by Gill Nets, Represented in 1-Inch Size Groups, Fork Length Measurements, Ochoo District, 1963

Lake	Date	Number of Sets	Species	Number Taken	Fish per Net	Percentage of Total	Number of Fish in 1-Inch Size Groups																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Haystack Reservoir	3/6/63	4	Rb	105	26.3	100.0		22	58	20	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

Table 193 (continued)

Lake	Date	Number of Sets	Species	Number Taken	Fish per Net	Percentage of Total	Number of Fish in 1-Inch Size Groups																						
							4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over						
Pelton Reservoir	2/20/63	5	Rb	7	1.4	8.5				1	3		2		1														
			Br	2	0.4	2.4																							
			DV	1	0.2	1.2			1																				
			Wf	3	0.6	3.7					1		2																
			Sq	8	1.6	9.8			2	6	14	4	3	2	1														
	4/30/63	5	Clm	32	6.4	39.0		2																					
			Su	29	5.8	35.4		1		2	12	6	7	1															
			Rb	5	1.0	2.0				1	1	1	1	1	1														
			Br	7	1.4	2.8																							
			DV	12	2.4	4.8				2		4	1	1	1														
	7/23/63	5	Wf	26	5.2	10.5				1	2	8	7	8															
			Sq	29	5.8	11.7			6	1	1	2	2	7	7	3													
			Clm	86	17.2	34.7		3	2	10	53	17	1	16	16	8	4	1											
			Su	83	16.6	33.5			1	6	20	11	16	16	8	4	1												
			Rb	17	3.4	4.9			2	1	6	5	3																
	7/23/63	5	Br	6	1.2	1.7									1	2													
			DV	6	1.2	1.7				2																			
			Wf	2	0.4	0.6																							
			Sq	19	3.8	5.5			1		5	3	4	3	2	1													
			Clm	54	10.8	15.5		1	2	4	13	19	9	5	1														
Prineville Reservoir	3/8/63	5	Su	186	37.2	53.4		1	7	8	14	29	44	44	28	10	1												
			Su	58	11.6	16.7																							
			Wf	2	0.4	0.6																							
	7/16/63	5	Rb	158	31.6	95.8				2	4	10	45	55	37	3	2												
			BrB	5	1.0	3.0																							
			Sq	2	0.4	1.2		1	1																				
			Rb	15	3.0	31.3		1	4	2			1	6	1														
			BrB	6	1.2	12.5					2	1	2	1															
	8/22/63	5	LB	10	2.0	20.8		8																					
			SB	5	1.0	10.4																							
Su			8	1.6	16.7																								
Sq			4	0.8	8.3																								
Rb			9	1.8	81.8				3	4				2															
Walton Lake	3/28/63	1	SB	1	0.2	9.1																							
			Su	1	0.2	9.1																							
			Rb	102	20.4	95.3		1	7	28	17	23	4	13	7	2													
	8/27/63	2	BrB	3	0.6	2.8																							
			Su	2	0.4	1.9																							
			Rb	75	75.0	100.0		2	12	20	16	10	6	4	3	2													
			Rb	56	28.0	100.0		1	6	20	18	1	3	1	4	1													
			Rb	1																									

/1 Unidentified rough fish.

Table 194

Average Length of Maturing Female Fish,  
Ochoco District, 1956-1963

Reservoir	Species	Fork Lengths in Inches, by Year				
		1959	1960	1961	1962	1963
Haystack	Rb		14.7		12.1	
	Br				13.4	
Ochoco	Rb	11.9	12.4		12.7	
Pelton	Rb	12.2		9.7		
	Br	11.6	10.6	11.5	12.9	
	DV	13.3	12.8	13.8		
	Wf	10.7	10.0	10.2	9.9	
	K				12.8	
Prineville	Rb					13.0

During the period that fish were dying in Haystack Reservoir, a similar mortality of U. S. Fish and Wildlife hatchery fish was occurring at Pelton Reservoir. A detailed field examination of fish from Pelton, and subsequent report by U. S. Fish and Wildlife Service biologists, documented symptoms and conditions of the fish identical to those noted in Haystack Reservoir.

Cultures subsequently demonstrated the presence of typical Aeromonas liquefaciens bacteria which are common in wild trout and develop rapidly when water temperatures exceed 60° F.

It seems likely the causative agent at Haystack Reservoir was the same as that found in Pelton. The loss continued throughout the month of July and the first two weeks of August.

On August 29, two gill nets set in Haystack Reservoir took 62 rainbow, 2 brown bullhead catfish, 2 suckers, and 1 roach. The trout averaged 8.4 inches in length. The external body condition was good; however, internal examination revealed a heavy infestation of tapeworms and a mild infestation of roundworms. The gill-net sample showed that by August the trout were starting to show reasonably good growth and, although no creel or gill-net data are available for the period since August, reports have been received of good angling for trout to 12 inches.

The capture of catfish, suckers, and roach in the August gill-netting provided the first evidence of these species since the impoundment was chemically treated in October 1962. Catfish were thought to survive the treatment project.

Angling pressure at Haystack Reservoir has been light for the past year, primarily due to the small size of the fish. An increase in pressure can

be expected in the 1963 winter period because of the good growth the fish are demonstrating.

#### Ochoco Reservoir

Angling pressure and success were good on Ochoco Reservoir through the winter of 1962 and spring of 1963. During this period the angling is primarily by bait fishermen along the shore line. In February and March there was a concentration of anglers and fish in the reservoir at the mouth of Ochoco Creek. Angling success was excellent with only two percent of the fish taken being dark spawners. Fishing was poor the first part of July, but by the latter part of the month many of the 1963 spring fingerling plants entered the fishery. Angling remained fair to good from late July on into the winter period. The catch in this period was primarily from plants made in 1963.

Four gill nets set in March 1963 took 167 rainbow and 30 suckers. In April 1962 three nets caught 4 rainbow and 58 suckers, and four nets set in November 1962 caught 230 rainbow and 110 suckers.

Although substantial numbers of suckers are present, trout show good growth and condition and are apparently not being seriously crowded by the sucker population.

#### Pelton Reservoir

Pelton Reservoir produced excellent angling for hatchery fish the first week of the season. Success then dropped off rapidly for the bulk of the season until the last two weeks of October when fair to good angling was again recorded.

Fishermen reported in late June and July that many trout could be seen swimming near the surface and that few could be caught. An investigation early in July revealed the fish could be taken by dip net. An examination of the body cavity gave indications of extreme hemorrhaging. U. S. Fish and Wildlife Service biologists examined and took cultures from dead and dying fish on July 25. The cultures demonstrated the presence of typical Aeromonas liquefaciens bacteria. A review of counts of dead and dying hatchery trout entering the skimmer at Pelton Dam prompted the U. S. Fish and Wildlife Service biologists to estimate a mortality of at least 12,000 hatchery fish.

A plant of 30,188 rainbow on July 20 by the U. S. Fish and Wildlife Service failed to increase angling success to any measurable degree.

Creel records from 1,468 anglers over the season denote an average of 2.5 fish per angler taken at a rate of 0.51 fish per hour. Because more emphasis was put on checking creels early in the season when angling was best, the catch-rate figures for the entire season are probably high.

Gill nets were set at Pelton Reservoir in February, April, and July. The 15 nets set took 668 fish, 86 percent of which were rough fish. The rough fish catch in 1963 is an increase from 61 percent in 1962 and 84 percent in 1961. A comparison of rough fish per net shows 41.6 fish for 1961, 11.5 fish for 1962, and 39 fish for 1963.

The number of whitefish in the total catch by gill net decreased from 19.9 percent in 1962 to 4.5 percent in 1963. The catch of game fish (including whitefish), as expressed in fish per net, has shown consistent decline for the past three years. In 1961 game fish were taken at a rate of 8.1 fish per net; 1962, 7.2 fish per net; and 1963, 6.3 fish per net.

Pelton Reservoir was not turbid from Round Butte Dam construction during the 1963 fishing season as it was in 1962. Secchi disk readings above Willow Creek were around 30 feet in 1963, and the maximum transparency readings occurred at the extreme upper end. Willow Creek arm had an extremely heavy bloom of phytoplankton throughout the fishing season, which apparently spread through the lower section of the reservoir. Portland General Electric resident biologist had not seen such blooms in previous years.

### Prineville Reservoir

Angling success at Prineville Reservoir was much lower in 1963 than the previous year. For a short period in early summer, many limits of trout over 12 inches in length were taken. Throughout most of the summer and early fall, relatively poor catches were made. The fish caught were mainly 6- to 10-inch trout from 1963 fingerling plants. Creel data collected from 2,843 anglers showed an average catch of 1.2 trout per angler and 0.53 trout per hour.

Examination of fish taken by anglers, gill net, and trap net indicated little survival of the 1962 fall plant of rainbow fingerling which should have been 10 to 12 inches long in midsummer. The poor angling in 1963 can largely be attributed to the apparent loss of this group.

Gill nets were set at Prineville Reservoir in March, July, August, and December. The five nets set in March took 152 rainbow, 5 brown bullhead catfish, and 2 squawfish. Size range for the trout was 7.6 to 14.1 inches, with 85 percent in the 10- to 12-inch class. In July and August a total of ten nets was set, and the catch consisted of 24 rainbow, 6 brown bullhead catfish, 10 largemouth bass, 6 smallmouth bass, 9 suckers, and 4 squawfish. Only 1 of the 24 trout taken appeared to be from the 1962 fall plant.

Five nets were set in December to obtain data on maturity of females. The catch consisted of 102 rainbow, 3 brown bullhead catfish, and 2 suckers. About 80 of the trout taken were from 1963 plants. Seven of the trout were maturing females with an average size of 13.0 inches.

Nine of the trout taken in December were 10.5 inches in length. These trout had been planted as 3.5-inch fish in April 1963.

The incidence of lamprey scars has decreased in 1963 at Prineville Reservoir. Two percent of 102 trout captured in December 1963 bore lamprey scars, while 7.6 percent of 158 trout gill-netted in March 1963 had scars. In October 1962, lamprey scars appeared on 13 percent of 123 trout.

Collection of physical, chemical, and biological data at Prineville Reservoir was expanded in 1963. Sampling included periodic Secchi disk readings, water temperature series, organism samples, plankton sampling, and water chemistry. Three main stations for data collections were established. One station is near the dam, another near the middle of the reservoir off the state park, and the third station is at the upper end off the mouth of Owl Creek.

The few Secchi disk readings taken are presented in Table 195. It is anticipated that these readings will be taken monthly in 1964.

Table 195  
Secchi Disk Readings, Prineville Reservoir, 1963

Date	Depth in Inches			Weather
	Dam	State Park	Owl Creek	
April 24, 1963	25		29	Overcast, water calm
May 3, 1963	26		20	Overcast, water calm
August 2, 1963	82	147	120	Clear, water calm

Ekman dredge sampling proved unsuccessful in the compact soils. Exploratory sampling later with a Peterson dredge was also unsuccessful in locating suitable sampling sites. Efforts will be continued in 1964 to find satisfactory sample stations for bottom organisms.

Plankton samples were taken with a standard Birge plankton net. Vertical hauls resulted in meager quantities, but 5-minute surface tows produced measurable amounts.

Preliminary observations of the plankton taken would indicate it is composed mainly of *Daphnia*. Table 196 depicts samples taken in 1963.

Table 196  
Plankton Samples, Prineville Reservoir, 1963

Date	5-Minute Samples in Milliliters			
	Dam	State Park	Owl Creek	Bear Creek
April 24, 1963		4	3	
May 3, 1963	2	11	1-	10
August 6, 1963	18	20	6	27

Some water temperatures collected at Prineville Reservoir and the Crooked River below the dam are presented in Table 197.

Water chemistry tests were conducted at Prineville Reservoir on August 15, 1963. Results of the tests are presented in Table 198.

A total catch estimate for 1963 will be made for Prineville Reservoir. Three car counters are in operation to provide use data, and these counts will be combined with catch statistics to provide the estimate. Comparisons of use for access points without car counters have been correlated with areas with car counts to give a total-use figure. Checking stations were established near each car counter to obtain data on number of anglers per car, percentage of cars with fishermen, numbers of house and boat trailers, and the number of days staying on each trip.

Table 197

## Water Temperatures for Prineville Reservoir, 1963

Date	Stations												
	Dam				State Park				Owl Creek				
	Temperatures in				Temperatures in				Temperatures in				
	Degrees Fahrenheit				Degrees Fahrenheit				Degrees Fahrenheit				
	Surface	10	30	60	90	Surface	10	30	60	90	Surface	10	30
					Feet					Feet			
Remarks													
2/14/63	36	36	36	36	34	36	36	35	35	33			
3/7/63	37	37	37	37	37	41	40	39	38				
3/23/63	39	39	39	39	39	39	39	39	39		42		
4/24/63	47	45	44	43	43						49	48	43
5/3/63	45	44	44	44	43	49	49	47	45		47	46	45
5/31/63	60										68	67	48
8/1/63	70	66	63	49	47	71	67	57	48	48	72	68	62
8/15/63						70	70	60	48	48			

Crooked River below  
Dam 33. Upper end  
of reservoir frozen  
over.

Crooked River below  
Dam 42.

Crooked River below  
Dam 46.

Crooked River below  
Dam 47.

Table 198

## Water Chemistry, Prineville Reservoir, 1963

Test	Parts per Million at Depths in Feet		
	0 Feet	35 Feet	70 Feet
Dissolved oxygen	7.55	4.20	0.92
pH	8.30	7.60	7.20
CO <sub>2</sub>	0.00	5.25	13.20
Phenophthalein alkalinity	3.00	0.00	0.00
Methyl orange alkalinity	63.00	60.00	61.00

Round Butte Reservoir (Lake Chinook)

Storage of water in Round Butte Reservoir is scheduled to begin in January 1964. Inasmuch as joint jurisdiction with the Warm Springs Indian Reservation for fisheries management of the impoundment is indicated, a management program has been outlined and adopted.

The program includes treatment of 60 miles of Crooked River and tributaries (completed), a stocking program for 1964 consisting of up to 800,000 rainbow fingerling and 225,000 kokanee, and the subsequent annual stocking of 500,000 rainbow fingerling and 225,000 kokanee. Also included in the program are the various fishery inventory investigations.

Walton Lake

Walton Lake had an ice cover of approximately 10 inches the first two months of 1963. Periodic observations at the lake throughout the winter revealed that there was no fish kill. Dissolved oxygen samples taken February 13 gave a range of 9.3 ppm at the surface to 2.9 ppm at 17 feet. After February 13 the ice was present only periodically.

A single gill net set March 28 indicated a good carry-over of fish from 1962. The net took 75 rainbow trout with a size range of 5.8 to 15.4 inches. General body condition of the fish was excellent. Two additional gill nets were set in August, and the catch consisted of 56 rainbow trout from 5.4 to 16.9 inches.

Creel data collected from 210 anglers during the 1963 season showed poor success. Average fish per angler was 0.9 fish, and the catch rate was 0.29 fish per hour.

Many complaints have been received of the muddy taste of fish taken in the summer. This, along with the poor catch success and possibilities of large winterkills, is the argument presented by local anglers for consideration of a winter fishery at Walton Lake.



### Crooked River

The Crooked River at Cove Palisades State Park was fished as a stream for the last time in 1963. This section of stream will be inundated by Round Butte Reservoir in 1964. Sixty-seven anglers checked during the season caught 115 rainbow, 5 brown trout, and 3 Dolly Varden. The fish were taken at a rate of 0.62 fish per hour, and the catch was primarily hatchery-released rainbow trout.

In terms of fish per hour, the Crooked River from Prineville Dam downstream to Stearns Dam was one of the best producers in the district. The catch rate was 0.71 fish per hour, and the size range on rainbow trout was 6 to 20 inches. Rainbow were stocked in November 1962 at 4.5 inches in length, and averaged just over 11 inches at the end of October 1963.

Little data are available for the fishery on the Crooked River above Prineville Reservoir. Reports indicate good angling for rainbow trout to 16 inches for the few anglers taking advantage of the fishery. Creel data from 22 anglers gave a catch rate at 0.90 fish per hour. Most of the river above the reservoir is private property and closed to trespass.

### Deschutes River

Deschutes River from Pelton reregulating dam to Mecca provides good angling, particularly near the areas of hatchery-fish liberations. The catch rate for 428 anglers checked in this area was 0.48 fish per hour in 1963. Most of the fish checked were hatchery-reared rainbow trout.

### Sugar Creek

In 1962 the U. S. Forest Service placed log barriers in Sugar Creek, a small spring-fed stream in the upper Crooked River watershed near Rager Ranger Station, to improve the riffle-pool ratio. Rainbow fingerling were liberated in the stream in the fall of 1962.

On March 3 the population of a 50-yard section was sampled with electroshocking equipment. The sample included rainbow trout in the following sizes and numbers: 2 inches, 13 rainbow; 3 inches, 31 rainbow; 4 inches, 12 rainbow; 5 inches, 5 rainbow; 6 inches, 3 rainbow. In addition to the 64 trout, there were 10 cottids taken. It was estimated that all the trout and most of the cottids were accounted for between the two barriers.

The area will be resampled in 1964 to determine any changes in the fish populations.

### Warm-Water Game Fish

Angling for warm-water game fish in the Ochoco District is primarily centered at Prineville Reservoir. A small proportion of the anglers at the reservoir are after warm-water fish, although a fair number of anglers fish the upper end of the reservoir and the Bear Creek arm purposely to catch both catfish and trout. The 2,843 anglers interviewed at Prineville Reservoir in 1963 took 835 brown bullhead catfish, 105 largemouth bass, and 44 smallmouth bass, along with 3,562 trout. In general, the bass are not large enough at present to draw the more accomplished bass fishermen. Almost all of the bass

examined were taken by anglers trolling for trout. A few of the catfish were also taken in this manner.

Two trap nets were set in Prineville Reservoir in June for seven days in order to determine survival of the 1962 fall plant of fingerling trout. The trap in the Bear Creek arm caught only 2 fish, while the trap at the upper end of the reservoir took 755 brown bullhead catfish, 34 rainbow, 55 bass (not classified to species), 10 suckers, and 2 squawfish.

A mortality of bullhead catfish occurred in Prineville Reservoir in June. Cause of the mortality was not determined.

As the reservoir is drawn down in the summer, there is a large area at the upper end of the reservoir that potholes fish. In June and July there were thousands of largemouth bass and brown bullhead in the various potholes. By late July these potholes start drying up. The area could provide an annual supply of bass and catfish fingerlings for other waters.

A "common sense" seine was used to catch 844 largemouth bass fingerling for transplanting to the Lakeview District on July 19.

### Rough Fish Inventories

Electroshocking was attempted twice in the Crooked River above Prineville Reservoir to determine relative numbers of rough fish present. In March the sampling was mostly unsuccessful, but both suckers and chiselmouth were found in a side channel near the Merwin Ranch above the mouth of the North Fork Crooked River.

July electroshocking showed large numbers of rainbow, brown bullhead catfish, suckers, and squawfish present between the reservoir and Post. Unfortunately, no records as to percentage by species are available.

Percentages of rough fish taken in gill nets over several years and for various bodies of water are shown in Table 199.

### Habitat Improvement

A 40-mile section of Crooked River, starting at Rice-Baldwin Dam 9 miles above Prineville and ending near Highway 97 bridge, was chemically treated with rotenone in the fall of 1963. Total mileage of streams treated was about 75. This includes 10 miles of Ochoco Creek, 20 miles of McKay Creek, and 5 miles of Dry Creek. The purpose of the project was to eliminate a large population of rough fish prior to the impoundment of Round Butte Reservoir and also to establish a trout fishery in the treated area.

Two summer trainees were employed to survey the streams for location of ditches, sloughs, and other problem areas. They also contacted landowners to explain the project and acquire trespass privileges. Sampling with electroshocking equipment and seine was conducted to determine a starting point below Prineville Dam. No rough fish were taken between Prineville Dam and Rice-Baldwin Dam as this area was not treated. An excellent trout fishery is presently established in this area.

Table 199

Percentage of Rough Fish in Total Catch of Gill Nets  
in Ochoco District Lakes, 1949-1963

Year	Percentages of Rough Fish in Gill Nets			
	Reservoirs			
	Haystack	Ochoco	Pelton	Prineville
1949		100 <u>/1</u>		
1950		10		
1951		71		
1952				
1953		83		
1954		95		
1955		61		
1956		95		
1957		100 <u>/1</u>		
1958		0 <u>/2</u>		
1959		12	67	
1960	2	31	80	
1961	0 <u>/2</u>		84	0.4
1962	99 <u>/1</u>	32	61	4.8
1963	2	15	86	5.0

/1 Chemically treated.

/2 Inadequate samples obtained.

Ochoco and McKay Creeks were treated with a concentration of approximately 2 ppm liquid Pro-Noxfish in early October. The rotenone was applied with dripper barrels and back-pack cans. A good kill of all species other than goldfish was accomplished.

The main Crooked River treatment was started October 20 and generally completed by November 5. The first section was treated at a concentration of 2 ppm Pro-Noxfish. Cold water (42° F.) caused considerable difficulty in accomplishing a good kill of the sucker population, and so it was necessary to re-treat the area several times. It is likely that the sucker and goldfish populations were not entirely removed from the area; however, the original intention of reducing the population as much as practicable was accomplished. There are several readily available sources for reinfestation with undesirable species; therefore, the cost and time involved would not have been justified in trying for total eliminations.

Large numbers of rough fish were eliminated throughout the project area, and only in Ochoco and McKay Creeks were any substantial numbers of trout killed. About 20 rainbow trout were observed dead in the main river, with

most of these observed in the first 10 miles below Rice-Baldwin Dam.

Potassium permanganate was introduced into the river as a detoxifying agent two miles above Highway 97 bridge from the night of November 1 through midday on November 5. The chemical was put in gunny sacks and placed in the stream to dissolve. Observations below the detoxification point showed no indication of fish dying in the stream. The observations were hampered somewhat by dead and dying fish drifting down from above the detoxification station.

A complete report, giving concentrations of rotenone and potassium permanganate along with stream flows and application procedures, will be submitted at a later date.

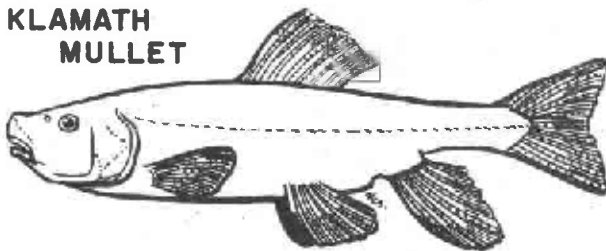
Mr. William McCormack has fulfilled his commitments to the Game Commission for dam and outlet revisions at Antelope Reservoir. Basically, this involves providing a minimum pool of 100.8 acre-feet of water. The impoundment is presently filling and should receive initial stocking in the spring of 1964.

#### Miscellaneous

Cattle guards and signs denoting points of access were placed on the ZZ Ranch in cooperation with the owner. The purpose was to improve land-owner relations and benefit access to such popular fishing points on the Deschutes River as Foley Waters, Steelhead Falls, and the mouth of Squaw Creek. The project was completed to the satisfaction of all parties concerned.

Several meetings were held with the Warm Springs Tribal Council concerning Pelton (Lake Simtustus) and Round Butte (Lake Chinook) Reservoirs, as well as the Deschutes River flow studies. Good working relationships have been promoted through these meetings.

**KLAMATH  
MULLET**



# JOHN DAY DISTRICT

James A. Hewkin

## Fish Inventory

### Anadromous

#### Steelhead

Spawning ground counts conducted on 11 streams involving a total of 30.5 miles indicated an average of 7.1 redds per mile. This is a slight increase compared to the counts of previous years. However, reductions in spawning density were noted in individual streams. Murderers Creek showed a poor spawning escapement with 2.3 redds per mile in comparison to 21.4 redds per mile in 1962.

In general, most streams in the upper John Day drainage contained a good spawning escapement, while those at low elevations, such as Parrish Creek and Bear Creek in Wheeler County, had less spawning per mile than recorded in previous seasons. Steelhead spawning counts in 1963 are given in Table 200. Table 201 compares spawning count data collected on 8 streams over a 5-year period.

Table 200

Steelhead Spawning Inventory, John Day District, 1963

Stream	Date	Miles	Steelhead	Redds	Redds per Mile
Parrish Creek	3/29/63	2.0	0	14	7.0
Bear Creek	3/30/63	3.0	0	7	2.3
Little Indian Creek	4/12/63	1.0	1	6	6.0
Fields Creek	4/18/63	2.5	8	21	8.4
Riley Creek	4/23/63	1.0	4	17	17.0
Canyon Creek	4/24/63	5.5	18	56	10.2
Cottonwood Creek	4/25/63	2.0	8	17	8.5
Reynolds Creek	5/17/63	5.0	7	49	9.8
Cable Creek	5/22/63	3.0	0	7	2.3
Camas Creek	5/22/63	2.0	0	14	7.0
Murderers Creek	6/4/63	3.5	1	8	2.3
TOTALS AND AVERAGE		30.5	47	216	7.1

The 1960 spawning counts were conducted prior to the peak of spawning and show less than the spawning that actually occurred. The 5-year average for 8 streams in the drainage is 6.42 redds per mile.

Table 201

Steelhead Spawning Inventory Conducted on Some Streams  
in the John Day District for a 5-Year Period,  
1959-1963

Stream	Miles Surveyed	1959		1960 <sup>/1</sup>		1961		1962		1963	
		St	Redds	St	Redds	St	Redds	St	Redds	St	Redds
Bear Creek	3.0	12	27	16	10	5	9	15	12	0	7
Canyon Creek	5.5	10	16	11	10	23	35	4	22	18	56
Cottonwood Creek	2.0	0	6	4	12	5	13	5	8	8	17
Fields Creek	2.5	0	29	4	7	4	6	2	5	8	21
Parrish Creek	2.0	5	21	10	8	4	31	6	13	0	14
Murderers Creek	3.5					4	17	11	75	1	8
Reynolds Creek	5.0					8	48	4	27	7	49
Riley Creek	1.0	3	9	4	16	3	7	8	8	4	17
TOTALS	24.5	30	108	49	63	56	166	55	170	46	189
REDDS PER MILE		6.75		3.94		6.78		6.94		7.71	

<sup>/1</sup> Counts were conducted prior to peak of spawning.

In the spring of 1963 a series of spawning counts were taken on Cottonwood Creek over a 2-week period along a 2-mile section of the stream. The purpose was to depict the progress of spawning activity in the stream and illustrate the importance of obtaining data at the peak of spawning if density-per-mile figures are to be accurate. The data collected on Cottonwood Creek are given in Table 202.

Table 202

A Progressive Account of Steelhead Spawning  
in a 2-Mile Section of Cottonwood Creek,  
1963

Date	Water Temperature in Degrees Fahrenheit	Steelhead	Redds	Redds per Mile
4/13/63	48	4	1	0.5
4/18/63	42	5	6	3.0
4/25/63	42	8	17	8.5

Steelhead catch data collected by Game Commission personnel and State Police officers in the John Day District indicate that 263 anglers caught 42 steelhead in 991 hours of effort at the rate of 23.6 hours per fish. The steelhead catch per angler shows a decline in the last 3-year period. Some of the decline in the steelhead catch is attributed to the March 15 closure, which actually eliminated the fishery in the upper portion of the John Day River.

Monthly catch data tabulated for the 1963 steelhead season are presented in Table 203. Table 204 compares the steelhead catch since 1956.

Table 203

Steelhead Creel Check, John Day District, 1963

Stream	Report Period	Anglers	Steelhead	Hours Fished	Hours per Fish
John Day River	10/17 to 11/16	41	8	120	15.0
	11/17 to 12/16	6	1	17	17.0
	12/17 to 1/16	11	0	43	
	1/17 to 2/16	26	0	86	
	2/17 to 3/16	117	21	407	19.4
John Day River North Fork	2/17 to 3/16	62	12	318	26.5
TOTALS AND AVERAGE		263	42	991	23.6

Table 204

A 7-Year Comparison of Steelhead Catch Statistics  
on the John Day River, 1956-1963

Year	Total Anglers	Hours Fished	Total Fish	Hours per Fish	Fish per Angler
1956	309	831	95	8.75	0.31
1958	197	457	72	6.35	0.37
1959	373	1,499	78	19.22	0.21
1960	270	993	99	10.03	0.37
1961	200	654	29	22.55	0.15
1962	193	639	35	18.26	0.18
1963	263	991	42	23.60	0.16

Chinook Salmon

Spawning ground counts in the John Day District revealed an above average number of chinook salmon in Clear Creek and Granite Creek. However, salmon were scarce in the upper John Day River and the Middle Fork John Day River.

Counts on 37 miles of spawning grounds showed 419 salmon, 44 jack salmon, and 274 redds. The 1963 spawning count is the second best spawning run tallied since 1958. Spawning ground counts are given in Table 205. A tabulation of spawning ground counts taken since 1957 on four streams is found in Table 206.

Table 205

Chinook Salmon Spawning Count,  
John Day District, 1963

Water	Date	Miles	Water Temperature in Degrees Fahrenheit	Adult Salmon	Jack Salmon	Redds	Fish per Mile
John Day River	8/26	12	52	4	0	11	0.33
John Day River Middle Fork	9/4	15	57	1	1	7	0.07
Granite Creek	9/5	5	54	144	15	132	28.80
Clear Creek	9/5	4	52	264	28	117	66.00
Bull Run Creek	9/9	1	61	6	0	7	6.00
TOTALS AND AVERAGE		37		419	44	274	12.51



Table 206

A Comparison of Chinook Salmon Spawning Ground Counts  
on Four Streams over a 7-Year Period,  
1957-1963

Year	John Day River		Granite Creek		Clear Creek		Middle Fork John Day River		Totals	
	Salmon	Redds	Salmon	Redds	Salmon	Redds	Salmon	Redds	Salmon	Redds
1957	0		81		35		50		166	
1958	4	2	16	5	4	10	3	0	27	17
1959	0	1	14	27	26	13	0	0	40	41
1960	1	3	24	45	47	49	16	29	88	126
1961	16	12	44	24	14	10	7	8	81	54
1962	81	110	410	199	447	198	24	23	962	530
1963	4	11	144	132	264	117	1	7	413	267
TOTALS	106	139	733	432	837	397	101	67	1,777	1,035

Attempts were made to find coho salmon in Desolation Creek, Canyon Creek, and the North Fork John Day River. There was no evidence of salmon or redds in any of the areas examined. It is believed that a few coho salmon are present in these waters but they are so few in numbers that spawning grounds have not been located.

#### Rotary Screen Bypass Trapping

Rotary screen bypass traps in the John Day District in 1963 captured 21,354 steelhead, 2,597 chinook salmon, 141 cutthroat, 67 Dolly Varden, 2 whitefish, 19 bullhead catfish, 417 squawfish, and 2 brook trout. A weekly report on the number of traps in operation and of fish taken during the 1963 season is presented in Table 207. The 21,354 steelhead tallied at the traps is the lowest count in the past 5 years. However, the 2,597 chinook trapped is the highest number recorded since screens have been in operation. The chinook salmon increase was expected because of the good spawning run that utilized the upper John Day in 1962. Much of the decrease in steelhead numbers at the traps was thought to be due to an above average water flow during the spring and retarded irrigation activity. Also, a dry autumn failed to stimulate the September movements of fish that usually occur when fall rains arrive. Figure 13 compares the numbers of juvenile steelhead recorded at bypass traps in the John Day District since 1957. Figure 14 shows the numbers of juvenile chinook salmon recorded at bypass traps since 1957.

#### Trout

##### Strawberry Lake

Rainbow trout in Strawberry Lake showed improved condition in comparison to previous years. Wintering conditions were improved by rain and snow in the fall, which raised the lake level about 5 feet before it froze in 1962. Reduced competition because of declining brook trout population is another factor. Only one brook trout was taken in gill-net samples and the angler catch was minor.

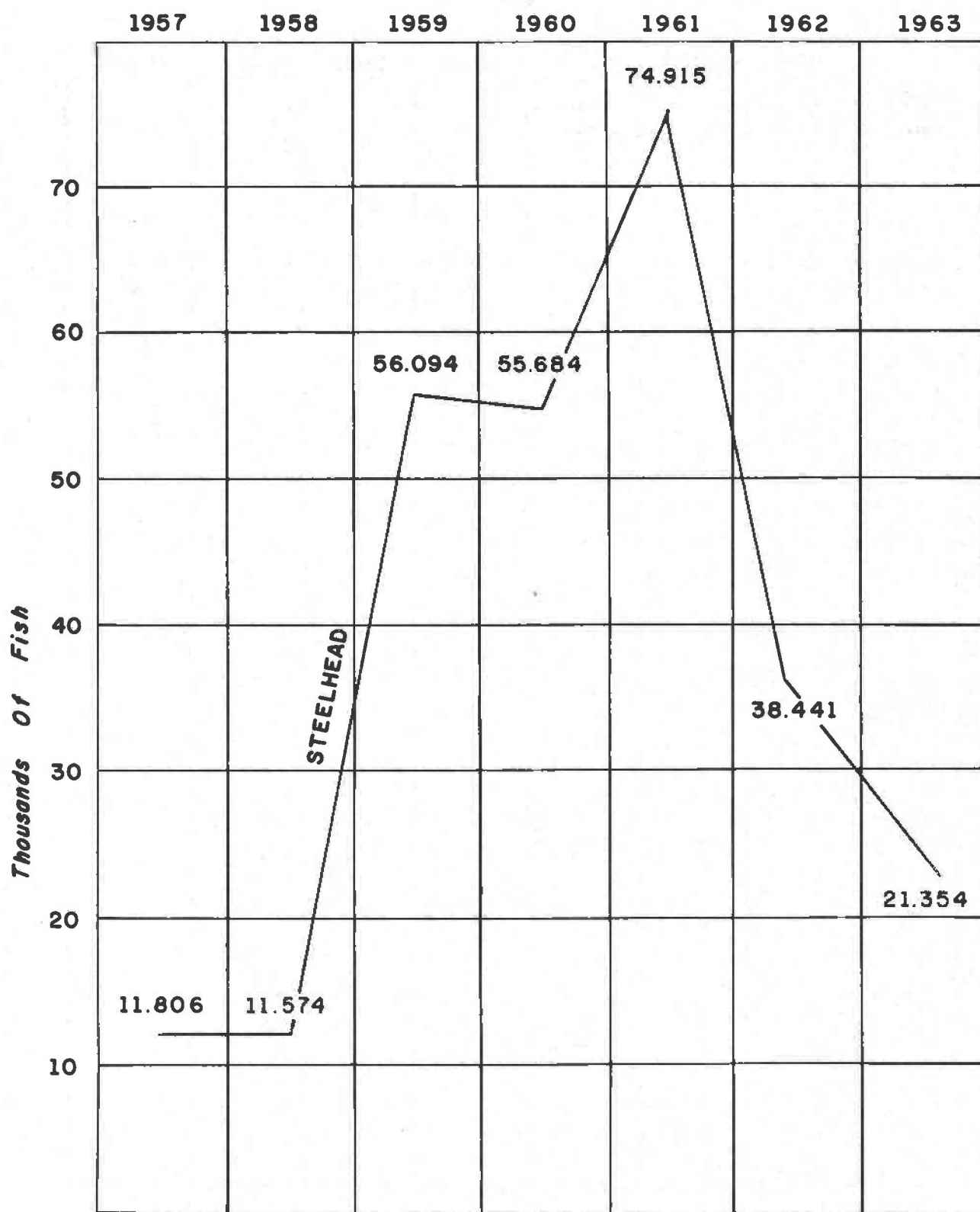
Table 207

## Rotary Screen Bypass Trapping, John Day District, 1963

Month	Week	Number Traps	Steelhead	Chinook Salmon	Cutthroat	Dolly Varden	Whitefish	Bullhead Catfish	Squawfish	Brook Trout
April	1	5	8							
	2	10	201		1				7	
	3	14	240						5	
	4	14	233							
May	1	14	261							
	2	14	317							
	3	27	1,807						18	
	4	32	2,080					1	11	
June	1	41	1,158		3					1
	2	41	1,386	14	4			1	13	
	3	44	1,309	35	18	1		1	65	
	4	46	875	78	13		1	6	15	1
July	1	47	543	79	13				12	
	2	47	1,682	483	7			1	77	
	3	44	947	291	12	10		5	50	
	4	39	561	152	6	8		1	35	
August	1	37	373	80	3	7			9	
	2	39	627	162	7	7			5	
	3	32	1,229	473	5	9			12	
	4	36	1,158	281	9	1			5	
September	1	35	431	149	12		1		24	
	2	32	457	50	10			2	8	
	3	32	2,076	126 <sup>/1</sup>	4	4			10	
	4	25	97	50	1	1			13	
October	1	19	105	52	2	4			5	
	2	21	288	36	8	1			7	
	3	16	273	6	3				11	
	4	13	632	1		9				
TOTALS		816	21,354	2,598 <sup>/1</sup>	141	67	2	19	417	2

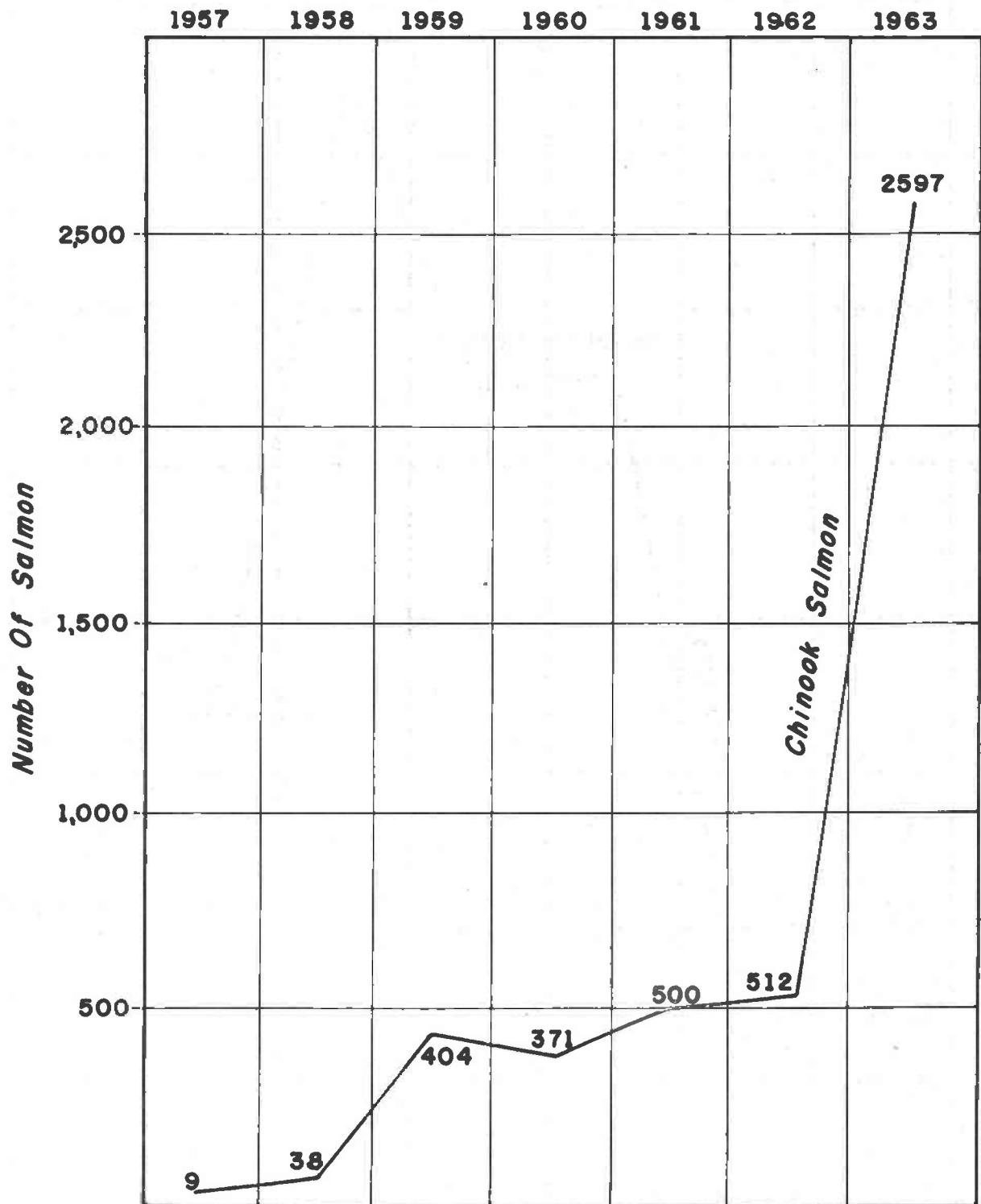
<sup>/1</sup> Includes one jack salmon.

Figure 13



JUVENILE STEELHEAD COUNTED AT ROTARY SCREEN BYPASS  
TRAPS IN THE JOHN DAY DISTRICT, 1957 TO 1963

Figure 14



**NUMBERS OF JUVENILE CHINOOK SALMON RECORDED  
AT ROTARY SCREEN BYPASS TRAPS IN THE JOHN DAY  
DISTRICT, 1957 to 1963**

Female trout were maturing at 10.6 inches, and the average of all fish measured in gill-net samples was 9.6 inches. Gill-net results are given in Table 208.

#### Magone Lake

Brook trout in Magone Lake show a reduction in size of about 1 inch compared to the samples of 1962. Female brook trout were maturing at 8.9 inches as compared to 9.6 in 1962. The average total length of all fish was 8.75 inches compared to 9.66 in the preceding year.

Access was available to the lake throughout the winter and ice fishing was popular. Many kokanee were taken through the ice in January and February. During this time, kokanee were attempting to spawn in shallow water at the boat ramp where coarse rock had been introduced. Excellent catches of kokanee were also taken in the spring and early summer. See Table 208 for gill-net data collected at Magone.

#### Olive Lake

The condition of small rainbow was poor in contrast to the condition recorded in 1962. The shiner control program, discontinued in 1963, was believed responsible for the poor condition of trout. Female kokanee are reaching maturity at 10.7 inches, which is about 1 inch larger than previous years. Cutthroat are maturing at 8.5 inches.

#### Bull Prairie Lake

This new recreation area is fast becoming popular. United States Forest Service estimates based on traffic counters indicate that approximately 32,000 people visited the lake in 1963. Of this total, about 75 percent were anglers.

Spring and fall gill-net sets were made at Bull Prairie to establish growth data and fish condition.

During the spring, brook trout averaged 7.57 inches and by fall had increased their average length to 9.85 inches, an increase of over 2 inches. Female brook trout were reaching maturity at 9.89 inches and at 2 years of age.

Female rainbow trout in Bull Prairie are averaging 12.08 inches and are immature. The rainbow have been in the lake about 18 months. See Table 208 for gill-net data.

#### Jump Off Joe Lake

A gill net was fished in Jump Off Joe Lake to check on survival and growth of rainbow fry released in the fall of 1962. Observations indicate a good survival of fish. The growth rate was about 0.3 inches per month, as indicated in Table 209. This lake has a short growing season.

Table 208

Gill-Net Sampling Results Showing Fish Species Composition, Size, and Condition of Female Trout in Some Lakes of the John Day District, 1963

Lake	Number of Sets	Date	Species	Number of Fish	Average Length in Inches			Length Variation in Inches	
					Female Fish		All Fish		
					Immature	Maturing			Mature
Baldy	1	8/22	BT	23	8.50	9.70	10.34	10.60	6.00 to 13.00
Bull Prairie	2	5/28	BT	66	7.57			7.57	6.50 to 9.00
			Rb	49	9.97			9.10	6.75 to 11.75
	2	10/24	BT	56		9.89		9.85	7.50 to 11.00
	<u>1</u>		Rb	8	12.08			10.28	5.00 to 12.75
Magone	3	5/16	BT	89	8.95		9.85	7.40	6.00 to 13.50
			Rb	7			17.50	10.78	8.75 to 17.50
			K	3		8.25		8.00	7.75 to 8.25
	3	10/16	BT	41		8.50	10.25	8.75	7.75 to 10.50
Olive	4	10/23	K	18		10.71		9.05	8.25 to 12.00
			Rb	18	7.16	8.92	9.25	8.75	6.75 to 16.00
			Ct	7	6.75	8.50	8.20	8.00	6.75 to 8.75
Slide <u>2</u>		10/2	BT	8		10.50	12.00	10.91	9.75 to 12.25
Little Slide <u>2</u>		10/2	BT	9		7.00	9.25	7.75	6.50 to 9.25
Strawberry	2	8/29	Rb	10		10.26		9.60	7.25 to 12.25
			BT	1			14.00	14.00	
Jump Off Joe	1	8/15	Rb	23	6.60			6.60	5.00 to 9.25

1 Three-hour gill-net set.

2 Rod sample.

Table 209

Gill-Net Results at Jump Off Joe Lake Showing Growth Rate  
of Rainbow Trout from Releases in 1959 and 1962

Date Stocked	Number Stocked	Number per Pound	Date Sampled	Growing Period (Months)	Number Fish in Sample	Length Variation (Inches)	Growth Increase (Inches)	Growth Rate per Month (Inches)
7/24/59	6,000	2,000	8/16/60	12.75	29	5.5 to 9.5	6.5	0.50
8/2/62	6,000	400	8/16/63	12.50	23	5.0 to 9.2	4.6	0.36

### Creel Census

Angler interviews were obtained at random throughout the district. Additional creel information was gathered from voluntary creel check boxes stationed at some of the more popular angling waters. Creel check stations were installed at Strawberry, Magone, and Olive Lakes.

A summarization of the creel census for the John Day District during the 1963 angling season shows that 1,302 anglers reported a catch of 3,238 fish in 4,602 hours of effort for a success ratio of 2.5 fish per angler and 0.7 fish per hour. A creel census summary is given in Table 210.

As indicated in Table 210, about 41 percent of the angler catch consisted of trout in the 6- to 8-inch size group, and about 42 percent were trout in the 8- to 10-inch size group. The stocking of trout (8 to 10 inches) in many of the popular angling waters appeared to contribute substantially to the heavy catch of fish reported in this size group.

Angling pressure appeared comparatively light on the streams in the John Day District. Although a 40-mile section of the John Day River was rehabilitated and stocked with rainbow trout, angling activity was noticeably light in the area. Shocker sampling results obtained in the rehabilitated section revealed that populations of 8- to 12-inch rainbow were abundant. Natural recruitment was the major factor contributing to the abundance of game fish available to the angler in the rehabilitated waters of the John Day. Marked fish from the hatchery release were noted in lesser numbers.

### Warm-Water Game Fish

#### Retherford Pond, Largemouth Black Bass

The Retherford Pond near John Day was treated with powdered rotenone on December 14, 1962, to remove a small population of largemouth bass that had been introduced in about 1956. The bass were eliminated from the pond because this species failed to produce a fishery. Water temperatures were apparently too low for successful reproduction and growth.

The rotenone application revealed a minimum population of 30 bass was residing in the pond which covers 1/2 acre, has a maximum depth of 7.5 feet, and contains about 3 acre-feet of water.

Table 210

Creel Census Summary, John Day District, 1963

Water	Species	Number of Fish by Size Groups in Inches							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18 & Over					
Bates Pond	Rb	4	36	3	1				44	17	40	2.6	1.10
Beech Creek	Rb	6							6	6	5	1.0	1.20
Bull Prairie Lake	Rb	7	146	20					173				
	Bt	5	7						12	78	199	2.4	0.93
									185				
Butte Creek	Rb	6	2						8	8	14	1.0	0.57
Camas Creek	Rb	12	10	4					26	13	20	2.0	1.30
Canyon Creek	Rb	35	72	21	7				135	45	70	3.0	1.93
Clear Creek	Rb	28	2						30				
	DV		1						1				
	Wf			1					32	11	29	2.9	1.10
Dollarhide Pond	Rb	5	48						53	21	72	2.5	0.74
Granite Creek	Rb	47	5						52				
	DV		1		3				4	20	39	2.8	1.44
									56				
John Day River	Rb	10	34	24	6				74				
	Ct	8	5						13				
	Bt	2							2				
	Wf			1					1				
	St							36	36	251	817	0.5	0.15
									126				
John Day River North Fork	Rb	3	27	13	1				44				
	St							17	17				
	Ch					2			2	112	508	0.6	0.12
									63				
John Day River South Fork	Rb	12	46	12	1				71	18	31	3.9	2.29



Table 210 (continued)

Water	Species	Number of Fish by Size Groups in Inches							Total Fish	Total Anglers	Total Hours	Fish per Angler	Fish per Hour
		6-8	8-10	10-12	12-14	14-16	16-18	18 & Over					
Little Strawberry Lake	BT	101	14						115	19	57	6.1	2.02
Magone Lake	Rb	58	116	39	4	1	1	2	221				
	BT	436	297	38	12	5	1	2	791				
	K	234	208						442				
									1,454	276	1,107	5.3	1.31
Olive Lake	K	8	21		1				30				
	Rb	54							54	79	433	1.1	0.19
									84				
Rove Creek Reservoir	Rb	13	63	45	2	5			128	88	314	1.5	0.41
Service Creek	Rb	30	4						34	9	16	3.8	2.13
Strawberry Lake	Rb	37	113	96	36	9	2		293				
	BT					1	1		2	155	663	1.9	0.44
									295				
Trout Farm Pond	BT	32	5	1					38				
	Rb		31	15	1				47	28	66	3.0	1.29
									85				
TOTALS AND AVERAGES		1,193	1,314	332	76	21	7	57	3,000	1,254	4,500	2.4	0.67



An examination of 23 bass collected following the treatment showed their average weight increase over the past 10-month period was 1.1 ounces. Table 211 gives largemouth bass growth data for Retherford Pond.

Table 211  
Growth of Largemouth Bass in Retherford Pond, John Day

Date Sample Taken	Number of Fish	Age of Fish (Years)	Average Fork Length (Inches)	Average Weight (Ounces)	Annual Growth Increase (Inches)	Annual Weight Increase (Ounces)
1/13/61	11	4.5	10.25	8.9		
2/14/62	5	5.5	10.75	10.3	0.50	1.4
12/14/62	23	6.5	11.07	11.4	0.32	1.1

#### Habitat Improvement

##### Canyon Creek Meadows

The Canyon Creek Meadows Dam, financed by the Oregon State Game Commission, was completed in September 1963.

The new lake will cover 35 acres, contain 500 acre-feet, and have a maximum depth of 45 feet. The dam, constructed of rock and clay materials found in the site area, is 53 feet high.

The U. S. Forest Service has completed several facilities for camping and picnicking, including a boat ramp and water system. Additional camp and picnic units in the recreation area are being developed.

##### Introduced Spawning Gravel, Middle Fork John Day River

Conclusions, based from observations taken at five riffles in the Middle Fork John Day River where spawning gravel was introduced for salmon over one year ago, reveal that much of the gravel washed downriver. Gravel did not wash out where a log was buried at the tail end of a short riffle. The Middle Fork John Day spawning riffle statistics are given in Table 212.

##### Murderers Creek, Fish Passage Barrier

A fish passage channel to enhance steelhead migration to spawning grounds was blasted around a small falls on Murderers Creek. Steelhead were concentrated at the falls in the spring of 1963 during high water flow and none were observed to successfully pass the falls at the time. It is believed that the late arrival of adult steelhead in Tex Creek each spring is due to delay at the falls.

Table 212

A 1-Year Evaluation on Stability of Introduced Spawning Gravel  
in the Middle Fork John Day River

Plot Number	Square Yards of Gravel Introduced 3/16/62	Square Yards of Gravel Present 9/23/63		Downstream Development of Riffles and Bars (Square Yards)	
		Good	Marginal	Available	Unavailable
1	147	5	3	4	0
2	70	9	4	0	20
3	105	0	2	3	0
4	48	4	0	0	0
5	36	10	0	0	0
TOTALS	406	28	9	7	20

South Fork Deer Creek Check Dams, U. S. Forest Service

A series of small check dams constructed along a 1/2-mile section of the South Fork of Deer Creek by the U. S. Forest Service show promise of stabilizing the stream channel and building up the water table. Fish passage was considered in the construction of the weirs. Also, the possibility of introducing spawning gravel for steelhead and resident rainbow is being studied. A special report was prepared concerning this project.



## NORTH COAST, ASTORIA DISTRICT

Warren M. Knispel

### Fish Inventory

#### Anadromous

##### Winter Fishery

The first steelhead recorded in the Astoria District was taken from the Nehalem River on November 18. Stream flows at the time were slightly above average but not sufficient to start steelhead migrations or to attract many anglers. However, freshets began two days later. Water conditions favored the drift fishermen throughout much of the winter season. Best results were obtained from guided boat trips on the Nehalem River. See Table 213. Additional information may be observed in Table 214.

Waters, such as the Necanicum, Nehalem North Fork, Lewis and Clark, and Big Creek, had limited angler effort in January when the streams remained low and clear. Results of the winter creel inventory appear in Tables 215, 216, and 217.

Weights of Nehalem River steelhead varied from 5.75 to 17.25 pounds and averaged 8.7 pounds.

##### Nehalem Bay Ocean Fishery

Intensity of the salmon sport fishery at the mouth of the Nehalem River continued to increase. Starting in July, the angler effort continued until September when the river bar became too rough to navigate. Sampling results in August showed 552 anglers caught 217 coho and 14 chinook salmon at a rate of 0.42 fish per trip.

##### Columbia River Sand Bars

Anglers fishing along Columbia River sand bars were interviewed in late March and April when the river was closed to commercial gill nets. See Table 218.

During the period of low flows a fibrous pollution collected on fishing lines, reducing the effectiveness of the fishery. Freshets appeared to dilute and flush out the disagreeable substance.

##### Spawning Surveys

Spawning surveys for coho and spring and fall chinook were conducted on several north coast streams. Information was exchanged with biologists of the Fish Commission. Data from the Fish Commission surveys are included in this report. River systems receiving the most coverage were the Nehalem and Necanicum.

Table 213

Creel Census, Nehalem River 1962-63 Winter Catch by Boat

Period	Boat Trips	Anglers Censused	Total Hours	Hours per Fish	Steelhead	Coho	Chinook	Total Fish
12/16/62 to 1/15/63	Guided Nonguided	15 34	117 175	13.0 9.2	8 19	1 0	0 0	9 19
1/16/63 to 2/15/63	Guided Nonguided	41 20	332 124	14.4 13.8	23 (1) 9 (1)	0 0	0 0	23 9
2/16/63 to 3/15/63	Guided	15	117	9.0	13 (1)	0	0	13
3/16/63 to 4/1/63	Guided	24	122	4.1	30	0	0	30
SUBTOTALS AND AVERAGES	Guided Nonguided	95 54	688 299	9.2 10.7	74 (2) 28 (1)	1 0	0 0	75 28
TOTALS AND AVERAGE		149	987	9.6	102	1	0	103

NOTE: Figures in parentheses denote number of jacks.

Table 214

Creel Census, Nehalem River 1962-63 Winter Catch from Shore

Period	Anglers Censused	Total Hours	Hours per Fish	Steelhead	Coho	Chinook	Cutthroat	Total Fish
11/1/62 to 12/15/62	157	636.5	21.9	28 (1)	1	0	0	29
12/16/62 to 1/15/63	241	873.5	27.3	28 (4)	1	0	3	32
1/16/63 to 2/15/63	126	529.0	25.2	21 (1)	0	0	0	21
2/16/63 to 3/15/63	80	268.0	22.3	11	0	0	1	12
3/16/63 to 4/1/63	0							0
TOTALS AND AVERAGE	604	2,307.0	24.5	88	2	0	4	94

NOTE: Figures in parentheses denote number of jacks.

Table 215

## Necanicum River 1962-63 Winter Catch Census

Period	Anglers Censused	Total Hours	Hours per Fish	Steelhead	Coho	Cutthroat	Total Fish
11/1/62 to 12/15/62	42	90.0	22.5	3	0	1	4
12/16/62 to 1/15/63	40	121.0	17.3	5 (1)	1	1	7
1/16/63 to 2/15/63	23	94.5	18.9	3	2	0	5
2/16/63 to 3/15/63	7	15.0	7.5	2	0	0	2
3/16/63 to 4/1/63	0						0
TOTALS AND AVERAGE	112	320.5	17.8	13	3	2	18

NOTE: Figure in parenthesis denotes number of jacks.

Table 216

## North Fork Nehalem River 1962-63 Winter Catch Census

Period	Anglers Censused	Total Hours	Hours per Fish	Steelhead	Coho	Chinook	Cutthroat	Total Fish
11/1/62 to 12/15/62	25	74.5	14.9	3	1	1	0	5
12/16/62 to 1/15/63	43	206.0	17.2	10	2	0	0	12
1/16/63 to 2/15/63	36	103.5	20.7	5 (1)	0	0	0	5
2/16/63 to 2/28/63	33	87.0	43.5	2	0	0	0	2
TOTALS AND AVERAGES	137	471.0	19.6	20	3	1	0	24

NOTE: Figure in parenthesis denotes number of jacks.

Table 217  
Miscellaneous Streams, Winter Catch Census, 1962-63

Stream	Anglers Censused	Total Hours	Hours per Fish	Steelhead	Coho	Cutthroat	Total Fish
Lewis and Clark River	21	68.5	34.25	1	0	1	2
Salmonberry River	10	33.5	8.38	4 (2)	0	0	4
Cook Creek	8	30.5	30.50	1	0	0	1
Klaskanine River	7	17.0	17.00	1	0	0	1
TOTALS AND AVERAGE	46	149.5	18.69	7	0	1	8

NOTE: Figure in parenthesis denotes number of jacks.

Table 218  
Catch Census, Columbia River Sand Bars, 1963

Period	Anglers Censused	Total Hours	Hours per Fish	Chinook	Steelhead	Jacks	Cutthroat	Total Fish
March-April	290	1,746.5	54.58	26	6	0	0	32
April-May	147	947.0	35.07	16	2	8	1	27
TOTALS AND AVERAGE	437	2,693.5	45.65	42	8	8	1	59

The fish-per-mile average for 11.5 miles of coho salmon surveys on Nehalem tributaries was 22.2 fish per mile including jacks, and 20.1 adults per mile. Fall chinook were enumerated at 43.7 fish per mile including jacks, and 37 adults per mile, for 4 miles of survey. A decline of 10 coho salmon per mile and 20 chinook per mile occurred between 1961 and 1963. However, the chinook escapement was larger than the parent runs and compared favorably with the higher counts obtained since 1957. Coho spawning surveys have fluctuated, with some years of the lowest counts producing the best returns.

Coho surveys on the Necanicum drainage compare favorably with 1961 as 18.1 fish per mile were recorded including jack salmon, and 16.2 adults per mile for salmon spawning ground survey data. Spring chinook spawning ground counts on the Nehalem were similar to those observed in previous years. See Tables 219 and 220.

Table 219

Coho Salmon Spawning Surveys, 1963

Stream	Water Condition	Miles Surveyed	Adults	Jacks	Total Fish
Cronin Creek	Clear	2.50	21	0	21
Necanicum main stem	Clear	1.50	25	2	27
Necanicum South Fork	Fair	0.50	9	0	9
Bergsvik Creek	Clear	1.00	20	3	23
Beerman Creek	Clear	0.50	4	1	5
Hawley Creek	Clear	0.25	0	0	0
Volmer Creek	Clear	0.25	6	2	8
Mail Creek	Clear	0.25	5	0	5
TOTALS		6.75	90	8	98

Table 220

Spring and Fall Chinook Salmon and Steelhead Spawning Surveys, 1963

Stream	Water Condition	Miles Surveyed	Species	Adults	Jacks	St	Total Fish
Nehalem River	Clear	12.0	ChS (1963)	31	10		41
Cronin Creek	Clear	1.5	ChF (1962)	27	2		29
Salmonberry River	Clear		St (1963)				/1
TOTALS		13.5		58	12		70

/1 Count unobtainable.



# Columbia River-Ocean Sport Fishery

The 1963 salmon catch at the mouth of the Columbia River was 148,800 fish and consisted of 116,200 coho and 32,600 chinook. It was the third consecutive year that the harvest has been above 100,000 salmon. Angler effort, measured in trips, increased to 117,800. See Table 221. The main sampling ports were Ilwaco, Washington, and Warrenton, Oregon. Information was collected by the Washington Department of Fisheries and the Oregon Game Commission.

Table 221

## Columbia River-Ocean Sport Fishery, 1946-1963

Year	Number of Boats	Angler Trips	Number of Chinook	Number of Coho	Total Salmon	Catch per Angler Trip	Period for Which Catch Was Estimated
1946	14,900	40,400	23,400	2,600	26,000	0.64	8/24 - 9/7
1947	13,600	39,000	12,800	3,200	16,000	0.41	8/24 - 9/1
1948	15,600	47,500	12,000	3,000	15,000	0.32	8/24 - 9/5
1949	13,900	40,500	11,200	2,800	14,000	0.35	8/24 - 9/4
1950	15,000	40,000	16,600	2,300	18,900	0.47	8/24 - 9/2
1951	17,200	48,500	7,200	1,900	9,100	0.19	8/24 - 9/3
1952	11,800	34,000	11,000	4,000	15,000	0.44	8/24 - 9/1
1953	18,500	50,700	14,700	8,000	22,700	0.45	8/10 - 9/15
1954	15,700	55,000	12,500	16,000	28,500	0.52	8/1 - 9/15
1955	20,000	64,300	12,500	15,200	27,700	0.43	8/1 - 9/15
1956	20,000	78,000	34,000	50,000	84,000	1.08	8/1 - 9/15
1957	14,600	54,000	18,500	38,700	57,200	1.06	7/3 - 9/15
1958	19,000	66,000	25,000	39,600	64,600	0.98	6/1 - 9/15
1959	19,200	75,000	23,400	50,000	73,400	0.98	6/1 - 9/30
1960	21,000	78,000	37,700	34,600	72,300	0.93	6/30 - 9/30
1961	29,600	89,800	20,500	85,500	106,000	1.18	6/11 - 9/30
1962	30,500	116,400	29,900	118,900	148,800	1.28	6/7 - 9/15
1963	30,600	117,800	32,600	116,200	148,800	1.26	6/10 - 9/22

Charter boats experienced a higher success ratio than pleasure craft and outboards. See Table 222.

Table 222

## Columbia River-Ocean Sport Fishery Catch By Boat Type, June-September 1963

Boat Type	Number of Boat Trips	Number of Angler Trips	Anglers per Boat	Number of		Catch per Trip	
				Chinook	Coho	Angler	Boat
Charter	6,016	36,399	6.1	11,267	45,758	1.6	9.5
Pleasure	10,263	36,745	3.6	10,683	30,042	1.1	4.0
Kicker	14,311	44,669	3.1	10,640	40,423	1.1	3.6
TOTALS AND MEANS	30,590	117,813	3.9	32,590	116,223	1.3	4.9

The catch of incidental species increased over 1962 and included 417 pink salmon. See Table 223.

Table 223

Columbia River-Ocean Annual Catch  
of Miscellaneous Species, 1960-1963

Year	Rockfish	Lingcod	Halibut	Other	Total
1960	20,970	119	79	271	21,439
1961	12,742	1,560	551	3,333	18,186
1962	6,539	378	360	3,182	10,459
1963	7,526	463	102	4,554	12,645

The number of hatchery marked chinook salmon that appeared in the sport catch was calculated to be 548 of the 32,600 fish caught. The marked to unmarked ratio was 1:60, or near 1.7 percent of the total chinook landed. Oregon Game Commission marks appeared on 22, or 5.1 percent, of the hatchery chinook. These fish were of 1960 brood stock from the Nestucca and Umpqua Rivers.

Examination of 29,026 coho salmon showed 225 hatchery clips, or a 1:129 ratio. The calculated number of hatchery coho to enter the fishery was 900.

#### Trout

The majority of trout caught in the larger north coast streams and lakes were hatchery reared. Native fish accounted for the success in small tributaries. See Table 224 for creel census results. Sea-run cutthroat provided late season fishing in many streams as most flows remained good throughout the latter part of the summer season.

The early season fishing in the lakes was good, as seen in Table 225. Several small impoundments stocked with fingerling cutthroat have provided new fishing areas.

#### Habitat Improvement

An extensive clearance program opened many north coast streams to migrations of salmon and steelhead. Complete and potential barriers were removed. Lack of funds prevented completion of the program.

Pollution on the Salmonberry River increased turbidity and blanketed much of the downstream spawning areas with silt. Investigation with State Sanitary Authority personnel showed the Southern Pacific Railroad Company had removed a slide by dumping the surplus material in the river.

Table 224

## Trout Creel Census, North Coast Streams, 1963

Water	Species	Number in 2-Inch Size Groups				Total Fish	Number of Anglers	Hours Fished	Fish per Hour
		8-10	10-12	12-14	14 & Over				
Necanicum River	Ct	400	94			494	128	302.5	1.63
Nehalem River	Ct	572	59	10	10	651	154	312.5	2.08
North Fork Nehalem River	Ct	251	49			300	76	220.0	1.36
Cook Creek	Ct	138	2	2		142	33	65.0	2.18
Lost Creek	Ct	35	4	2		41	8	20.0	2.05
Humbug Creek	Ct	6				6	6	6.0	1.00
Beaver Creek	Ct	113				113	56	118.0	0.96
Cochran Pond	Ct	15				15	16	40.0	0.38
TOTALS AND AVERAGE		1,530	208	14	10	1,762	477	1,084.0	1.63

Table 225

## Trout Creel Census, North Coast Lakes, 1963

Lake	Species	Number in 2-Inch Size Groups				Total Fish	Number of Anglers	Hours Fished	Fish per Hour
		8-10	10-12	12-14	14 & Over				
Sunset	Ct	373	2	3	1	379	196	591.5	0.64
Coffenbury	Ct	462	1	5		468	187	549.5	0.85
Lost	Ct	165	8	4	6	183	52	135.0	1.36
Quartz	Ct	16	14	9	2	41	14	45.0	0.91
Spruce Run	Ct	9				9	8	10.5	0.86
TOTALS AND AVERAGE		1,025	25	21	9	1,080	457	1,331.5	0.81

## NORTH COAST, TILLAMOOK DISTRICT

Francis H. Sumner

### Fish Inventory

#### Anadromous

##### Spring Chinook Angling

The spring chinook season opened on April 20 and provided bank angling (Table 226) of a quality very close to that of the 1962 season. In general, the average success is very close to that recorded during the steelhead season.

From April 20 to June 30, 187 boat anglers caught 16 spring chinook and 1 coho salmon at the rate of 38 hours per spring chinook.

##### Ocean Summer Angling

##### Cape Kiwanda

The Cape Kiwanda sport fishery was similar in intensity and catch to that recorded in 1962. The catch rate of 6.2 hours per salmon and 10 hours per incidental bottom fish on 25 days checked is slightly better than in 1962 (6.9) but not quite as good as in 1961 (5.0). The proportion of chinook (3.4 percent) was close to that of 1962 (3.2 percent) but much lower than in 1961 (18.7 percent). Table 227 presents this data.

Kiwanda charter boats are dories carrying about six passengers. Their catch rate of 4.1 hours per salmon (Table 228) was better than that of private boats (6.2). Charters tended to take the same proportion of chinook (3.7 percent) and of pink salmon (0.41 percent) as private boats, but commercial trollers took 1.9 percent chinook and 1.7 percent pinks.

The catch rate of 135 commercial trips was 1.6 hours per salmon, close to the 1962 rate of 1.4 hours per salmon (Table 228).

##### Garibaldi

At Garibaldi (Table 227), catch rates were 9 hours per salmon and 11 hours per incidental bottom fish, somewhat inferior to Kiwanda rates. The catch per boat of 1.2 salmon was slightly better than the 1.0 salmon per boat in 1962. Coho comprised 96 percent and chinook 4 percent of the salmon catch. In numbers of anglers, Garibaldi was only one-fourth as popular as Cape Kiwanda.

Despite the better landing and berthing facilities at Garibaldi, making possible the use of larger boats, numbers of anglers per boat were 2.8 at Garibaldi and 3.3 at Kiwanda.

The monthly figures in Table 227 indicate that August was the most popular and productive month, absorbing 59 percent at Kiwanda and 80 percent at Garibaldi of the total effort in hours, and producing 71 percent at Kiwanda and 85 percent at Garibaldi of the sport salmon catch.

**Table 226**  
**Salmon Bank Angling, 1962-63**

River	Period	Trout /1	Adult Ch	Adult Co	Chum	Jack	St	Total Fish	Anglers Hours	Fish per Hour	Hours per Fish
Spring Chinook	All /2	4/20 to 6/15/63	4					4	80	140	0.029 35.00
Fall Salmon	All	10/16 to 11/30/62	8	15	13	1	16	7 /3	429	1,230	0.042 23.65
		9/1 to 10/31/63	15	24	14		44		402	945	0.087 11.52

/1 Trout are not counted in totals and averages.

/2 Mostly Trask River.

/3 Wilson River, 1 RP and 2 LP.

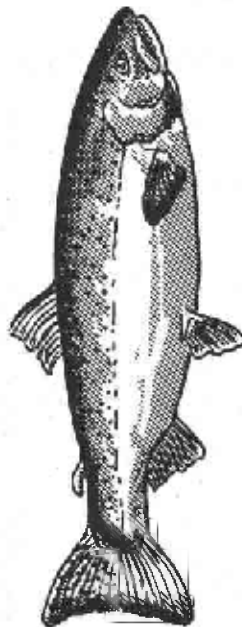


Table 227

## Ocean Salmon Sport Fishery, 1963

Area	Period	Salmon			Incidental		Boats	Anglers	Angler-Hours	Average Hours Angled	Salmon		Hours per Salmon
		Chinook	Coho	Pink	Bottom Fish	Total					per Boat	per Angler	
Cape Kiwanda	June 16-30 /1	3	40	43	162		60	172	644	3.7	0.7	0.25	15.0
	July /2	24	573	2	439	599	342	1,130	5,118	4.5	1.8	0.53	8.5
	August /3	59	1,716	9	900	1,784	559	1,879	9,175	4.9	3.2	0.95	5.1
	September 2 and 8 /4		86	86	38		52	167	688	4.1	1.7	0.51	8.0
TOTALS AND AVERAGES		86	2,415	11	2,512	1,539	1,013	3,348	15,625	4.7	2.5	0.75	6.2
Garibaldi	June 15-30 /5												
	July /6	2	22	24	10		4	9	47	5.2		0.18	19.5
	August /3	11	302	1	34	314	242	680	2,818	4.1	1.3	0.46	9.0
	September 1 and 3 /4	2	31	33	266		20	57	164	2.9	1.7	0.58	5.0
TOTALS AND AVERAGES		15	355	1	310	371	315	882	3,497	4.0	1.2	0.42	9.4

/1 Three days.  
/2 Eight days.

/3 Twelve days.  
/4 Two days.

/5 Four days.  
/6 Nine days.

Table 228

## Boat Salmon Fishing, Miscellaneous, 1963

Period	Trout /1	Salmon			Incidental		Anglers	Angler- Hours	Average Hours Angled	Salmon		Hours per Salmon	
		Chinook	Coho	Pink	Jacks	Total				Bottom Fish	per Angler		per Hour
<u>Kiwanda charters.</u>													
7/8 - 9/8		9	234	1		244	69	175	1,001	5.7	1.4	0.24	4.1
<u>Garibaldi charters.</u>													
7/7 - 9/3		3	295			298	1,433	694	2,595	3.7	0.4	0.11	8.7
<u>Kiwanda commercial.</u>													
7/4 - 9/8		16	797	14		827	122	207	1,296	6.3	4.0	0.64	1.6
<u>Garibaldi commercial.</u>													
7/13 - 9/3		4	166	1		171	17	23	199	8.7	7.4	0.86	1.2
<u>Tillamook Bay sport.</u>													
7/1 - 10/31 /2		29	14		1	44	2	280	1,143	4.1	0.2	0.04	26.0
<u>Neatucca River upper tidewater moorage Report</u>													
9/1 - 10/31	334 /3	75	17			308		338	2,452	7.3	0.9	0.13	8.0

/1 Trout are not counted in totals and averages.

/2 Seven days.

/3 Sixteen hatchery cutthroat, 5 percent; 3 summer steelhead (LP).

/4 One hundred forty-nine chinook, 69 percent; 4 LV 1962 spring chinook to 25 inches.

Only 16 commercial boats (Table 228) with 23 fishermen were checked at Garibaldi, partly because of lack of cooperation. Their catch rate was much higher than that of sport anglers because the commercial fishery uses multiple gear. The superior catch rate of Garibaldi commercial boats is undoubtedly a result of using more lines than could be used by the smaller Kiwanda dories.

#### Fall Salmon Angling

##### Bank Angling

Bank fishing in the period October 16 to November 30, 1962 on all main streams (Table 226) resulted in the same rate of catch (24 hours per salmon and jack) as in 1961.

The catch rate for the early part of the season (September 1 to October 31) for salmon and jacks was over twice as good in 1963 as in 1962.

##### Boat Troll, Nestucca Tidewater Moorage

In the 1963 season (Table 228), the catches per angler and per hour were more than twice as high as in 1962, and included 70 percent jacks in comparison to 85 percent jacks in 1962.

#### Salmon Spawning Surveys

In the fall of 1962 some of the standard surveys were made and, in addition, preliminary surveys were made on streams not heretofore checked. (Table 229.)

Peterson Creek revealed a much smaller spawning population of coho than in the year before. Neighboring Minich Creek, complicated by farming diversion and logging, revealed very little salmon activity, but more fish may have come in later.

Alder Creek was well up to its usual high coho productivity.

Edwards Creek enjoyed a good seeding of chinook eggs, but relatively few coho were found.

Wolf Creek again demonstrated the almost impassable condition of the culvert at its mouth--only 3 coho being seen in 1.5 miles of stream.

Fawcett Creek revealed a fair population of coho but no chinook.

On Mossy Creek, chums were found only below the county road culvert. Above the culvert, in 1 mile of stream, only 3 coho were found.

Bays Creek is a good producer of chinook despite a long stretch of bedrock in its lower part.

On the Devils Lake Fork of the Wilson, two possible redds were noted in the more quiet lower part near Elliott Creek.

Table 229

Fall Salmon Spawning Surveys, 1962-63

Stream	Date	Length Section (Miles)	Species	Raddis	Alive			Dead			Total Fish
					Adults	Jacks	Females	Males	Jacks	Unknown	
Peterson Creek (Miami River)	12/5/62 12/27/62	0.5 0.5	Coho Coho	0 3-5							0 0
Minich Creek (Miami River)	12/5/62	1.1	Coho	0				1			1
Alder Creek (Three Rivers)	12/10/62	1.5 <sup>1</sup> / <sub>1</sub>	Coho	20-21	25	8	1	3	1		38
	1/14/63	1.1 <sup>2</sup> / <sub>2</sub>	Coho	82-93	14	4	3	2	2	4	29
Wolf Creek (Nestucca River)	12/10/62	1.5	Coho	4	3						3
Edwards Creek (South Fork Trask River)	12/11/62	0.8	Coho Chinook Unidentified	6 8 12	7 3	3 6	2 32	4 30		1	14 72
Fawcett Creek (Tillamook River)	12/18/62	1.0	Coho	6-8	4	1	5	7		2	19
Mossy Creek (Miami River)	12/19/62	1.3	Coho Chum	4-5 15-25	1 10			1 5		1	3 30
Days Creek (Nestucca River)	12/27/62	0.6	Chinook Coho	26-34			13 2	18 7	1	9	41 9
Boulder Creek (Nestucca River)	12/28/62	0.4	Chinook Coho	2 9-10	1 3		1				1 4
Turkey Creek (Boulder Creek)	12/28/62	0.6	Coho	16	1		8	7	4	6	26
Limestone Creek (Nestucca River)	12/28/62	0.5	Coho	5						1	1
Elk Creek (Wilson River)	1/10/63	0.3	Unidentified	0							0
Devils Lake Fork (Wilson River)	1/10/63	1.0	Unidentified	2							0

<sup>1</sup> Four sections (revised mileage).<sup>2</sup> Three lower sections.



### Salmon Marks

All but 1 of 39 salmon marks obtained in 1963 (Table 230) were recovered from the ocean fishery. The lone exception was a 35-pound both-ventral-marked spring chinook taken from the Nestucca River above tidewater on July 27. It was 1 of 36,587 spring chinook from Nestucca eggs taken in 1957 and 1958, reared at the Cedar Creek Hatchery, and liberated in 1959.

Table 230

#### Salmon Marks, 1963

Species	Mark	Garibaldi	Kiwanda	Total
<u>Chinook</u>	RV		3	3
	An-LV		6	6
TOTALS			9	9
<u>Coho</u>	LP	2	4	6
	RV		2	2
	LV	1	3	4
	RM	4	3	7
	LM	3	7	10
	D-RV	1		1
	RP	1		1
	Ad	2	1	3
	An-LP	2		2
	D		1	1
	RV-LM	1		1
TOTALS		17	21	38

Other chinook returns were 6 anal-left-ventral spring chinook taken off Cape Kiwanda in August. Four fish weighed and measured, averaged 22.2 inches in length and 5.1 pounds in weight. These chinook were from a liberation of 18,581 spring chinook made into the Nestucca River in 1962. Eggs had been taken from 1960 Nestucca spring chinook, and the young fish had been reared for one year at the Cedar Creek Hatchery. All chinook marks were taken off Cape Kiwanda.

Of all marks, 79 percent were on coho salmon. The most common marks observed were left and right maxillary, with single pectoral and ventral marks next in numbers.

In the California ocean salmon troll fishery, 4 chinook were reported caught with Cedar Creek Hatchery marks (2 Ad-LV-RV and 2 An-LV). Estimated numbers of the marked chinook caught were 8 fish.

### Size of Salmon

Average sizes of salmon in Table 231 show that such figures do not

Table 231

Size of Salmon, Tillamook District, 1963

Species	Number	Sex	Fork Length in Inches		Round Weight in Pounds		Percent Jacks <u>/1</u>
			Average	Range	Average	Range	
ChF	122	All	31.3	17.5 - 43.0	18.3	2.5 - 47.0	5.7
	60	Adult Males	29.2	20.0 - 43.0	15.0	3.2 - 47.0	
	55	Females	35.3	23.6 - 42.0	23.7	7.5 - 36.8	
	7	Jacks	18.7	17.5 - 19.5	3.2	2.5 - 4.3	
Co	32	All <u>/2</u>	24.0	16.8 - 32.0	6.4	1.8 - 14.5	34.4
	11	Adult Males	26.1	22.0 - 32.0	7.5	4.2 - 14.5	
	10	Females	28.2	25.3 - 29.5	9.5	6.2 - 11.9	
	11	Jacks	17.8	16.8 - 19.0	2.4	1.8 - 3.0	
	35	All <u>/3</u>	25.7	22.8 - 28.0	7.1	5.3 - 9.1	
Ch	34	All <u>/4</u>	31.9	17.0 - 53.0	16.1 <u>/5</u>	1.7 - 45.0 <u>/5</u>	2.9
Co	4	All	22.9	16.0 - 29.7	5.4 <u>/5</u>	1.9 - 10.0 <u>/5</u>	50.0

/1 Legal length; under 20 inches./2 Not marked./3 Marked./4 Twenty-two unknown sex, 8 males (1 jack among males), 4 females./5 Dressed weight.

vary notably from year to year, and variation may depend as much on sample size as on year of catch.

The average size of 35 marked coho was slightly less than that of those unmarked, but the condition factors were very close--41.8 for the marked and 42.3 for the unmarked.

It should also be noted that jack size in Table 231 is legal size rather than biological size as in the 1962 Annual Report. The inclusion of some larger jacks in the figures for males would have reduced those figures.

### Steelhead Angling

#### Bank Angling

The season's catch rate of 26 hours per fish, adult and jack, for bank angling on all streams except the Wilson, as shown in Table 232, is only slightly better than the 29 hours per steelhead of the previous season. It is the best catch rate so far and much above the 14-year mean. Angling became more successful as the season progressed, according to Table 233, which shows that best results came in March.

Table 232

Steelhead Bank Angling,  
A Comparison of Season Success,  
December 1-February 28, 1949-1963

Season /1	Number of Steelhead	Number of Anglers	Angler-Hours	Steelhead per Hour	Hours per Steelhead
1949-50	114	793	3,143	0.036	28
1950-51	98	1,836	5,771	0.017	59
1951-52	246	2,197	9,619	0.026	39
1952-53	91	1,151	3,860	0.024	42
1953-54	112	862	3,271	0.034	29
1954-55 /2	72	910	2,804	0.026	39
1955-56 /3	104	1,003	2,808	0.037	27
1956-57 /3	83	1,034	2,627	0.032	32
1957-58 /3	157	1,830	5,834	0.027	37
1958-59 /4	32	328	914	0.035	29
1959-60 /4	70	567	1,986	0.035	28
1960-61 /4	69	963	3,314	0.021	48
1961-62 /4	173	1,549	4,992	0.035	29
1962-63 /4	153	1,309	4,048	0.038	27
14-Year Mean				0.031	33

/1 First 5 seasons: Nestucca and Wilson Rivers.

/2 Trask, Salmon, and Little Nestucca Rivers and Neskowin Creek.

/3 All streams in the district.

/4 All streams except the Wilson, and except the Salmon River after 1958-59. Includes March.

### Boat Angling

The drift boat season (Table 234) almost reversed the trend of the bank season, but still the catch rate was about ten times more productive than bank angling. Since the bulk of the boat fishery is on the Nestucca River, the 15-year summary in Table 235 is applicable. Thus the 1962-63 season was almost as good as that of 1961-62, but not up to the 14-year average of 12 hours per steelhead.

### Steelhead Marks

Of the 81 marks summarized in Table 236, 52 were reported and 29 were checked. Scales were not read, hence right-pectoral marks could not accurately be assigned to year. Probably some of the 1961 marks listed under 1961 were of the 1960 liberation. The five 1960 right-pectoral fish were 10 to 15 pounds in weight.

### Size of Steelhead

Since very few marked steelhead are included in Table 237, no special category for them has been set up. Steelhead jacks are classified according to legal rather than biological length. Average sizes show very little difference from those of past years reported.

It is interesting to note that the average condition factors of dressed and spent steelhead are very close.

### Trout

The 1963 bank catch rate for trout was quite close to that of 1962 (Table 238).

Again the tidewater bank angler caught only one-half as many trout per hour as did the upstream angler, despite the fact that hatchery trout comprised over one-half of the tidewater catch.

The tidewater troll angler had slightly better success than did the bank angler, but the proportions of hatchery trout were close.

The best trout angling success was enjoyed by upstream drift boats in the early season. The proportion of hatchery trout was relatively low, partly because more drift anglers release hatchery fish.

The Wilson River late opening (Table 238) resulted in a bank catch rate of 0.22 fish per hour, close to that in tidewater on other streams. In the absence of hatchery trout, the over-all Wilson River rate of 0.25 wild cutthroat per hour is three times better than that on other streams (all data combined) of 0.08 wild cutthroat per hour. On the Wilson, hatchery steelhead to 10 inches in length formed 14 percent of the catch. Many more were reported hooked and released.

At the Nestucca tidewater moorage, angling success was somewhat better than in 1962. Among the chinook jacks was a marked spring chinook 22.5 inches in length caught on August 31. It had been stocked in early 1962. By coincidence, the sole summer steelhead reported caught July 15 by a boat angler was 22.5 inches in length and 4 pounds in weight.

Table 233

## Steelhead Bank Angling, 1962-63

Month	Ct	Ch		Coho		Steelhead		Total Anglers	Angler-Hours	Steelhead per Hour	Hours per Steelhead
		Adult	Jack	Adult	Jack	Adult	Jack				
December		2	3	3	2	50	<u>1</u>	55	1,519	0.0362	27.6
January						27	<u>2</u>	29	815	0.0356	28.1
February	3					32	<u>3</u>	41	1,103	0.0372	26.9
March	5					25	<u>3</u>	28	611	0.0458	21.8
TOTALS AND AVERAGES	8	2	3	3	2	134	19	153	1,309	0.0378	26.1

1 Nestucca River, 14 RP; Trask River, 2 RP and 1 LP.

2 Nestucca River, 4 RP; Trask River, 1 RP.

3 Nestucca River, 4 RP.

4 Trask River, 1 Ad-LV.

Table 234

## Steelhead Boat Angling, 1962-63

Month	Ct	Coho		Steelhead		Total Boats		Total Anglers	Angler-Hours	Steelhead per Hour	Hours per Steelhead
		Adult	Jack	Adult	Jack	Adult	Jack				
December		1	3	132	<u>1</u>	3	135	83	1,481	0.091	11.0
January				76	<u>2</u>		76	66	1,191	0.064	15.7
February				26	<u>3</u>		26	39	710	0.037	27.3
March				19		3	22	23	384	0.057	17.5
TOTALS AND AVERAGES	1	3	3	253	6	259	211	577	3,766	0.069	14.5

1 Nestucca River, 22 RP and 1 LP.

2 Nestucca River, 11 RP.

3 Nestucca River, 1 RP.

**Table 235**  
Steelhead Boat Angling,  
A Comparison of Seasonal Success,  
Nestucca River, Upstream, 1948-1963

Season	Fish per Hour	Hours per Fish
1948-49	0.128	8
1949-50	0.146	7
1950-51	0.079	13
1951-52	0.129	8
1952-53	0.092	11
1953-54	0.070	14
1954-55 <sup>/1</sup>		
1955-56	0.104	10
1956-57	0.099	10
1957-58	0.092	11
1958-59	0.079	13
1959-60	0.068	15
1960-61	0.042	24
1961-62	0.074	13
1962-63	0.069	15

<sup>/1</sup> No data obtained.

**Table 236**  
Steelhead Marks, 1962-63

Month	River	Brood Year and Mark					Unidentified		
		1959 Ad-BV	1960 RP	1961 RP	1961 LP	1962 Ad-LV	Short RV	LV	P
November	Nestucca						1		1
	Wilson		1		1				
December	Nestucca			28		1			
	Wilson	1 <sup>/1</sup>	2	3	1				
	Tillamook				1				
December- January	Nestucca			5					
January	Nestucca			10					
	Wilson		1	3					
	Trask					2			1
February	Nestucca			3				1	
	Wilson			3					
	Trask			3		2			
March	Nestucca		1	3					
	Wilson	1			1				
TOTALS		2	5	61	4	5	1	1	2

<sup>/1</sup> Adipose only.

Table 237

Steelhead Sizes, 1962-63

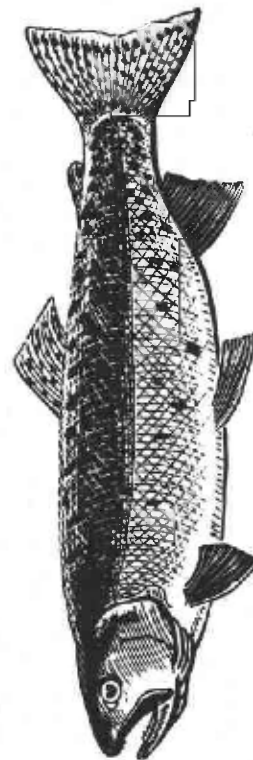
River	Number of Fish	Sex	Fork Length in Inches		Round Weight in Pounds		Average Condition Factor
			Average	Range	Average	Range	
All <u>1</u>	116	All	26.0	16.5 - 34.0	7.1	1.6 - 14.3	38.5
	47	Adult Males	26.5	20.0 - 33.0	7.3	3.1 - 12.3	37.7
	62	Females	26.5	22.8 - 34.0	7.5	4.8 - 14.3	39.3
	7	Jacks	17.9	16.5 - 19.0	2.1	1.6 - 2.8	37.1
	17	All	22.9	16.5 - 30.0	4.3 <u>2</u>	1.2 - 9.0 <u>2</u>	33.3
	7	Adult Males	24.7	20.0 - 30.0	5.3 <u>2</u>	2.5 - 8.1 <u>2</u>	34.2
	4	Females	26.4	25.0 - 30.0	6.4 <u>2</u>	5.3 - 9.0 <u>2</u>	34.3
	6	Jacks	18.4	16.5 - 19.8	1.9 <u>2</u>	1.2 - 2.4 <u>2</u>	31.5
	10	All	25.9	15.0 - 30.5	6.1 <u>3</u>	1.2 - 10.0 <u>3</u>	33.1
	4	Males	24.1	15.0 - 30.0	5.7 <u>3</u>	1.2 - 9.5 <u>3</u>	35.0
	6	Females	27.1	25.0 - 30.5	6.5 <u>3</u>	5.1 - 10.0 <u>3</u>	31.8

1 Data from streams in the Tillamook District.2 Dressed weight.3 Spent weight.

Table 238

Trout Season Catch, 1963

Area	Period	Cutthroat		Unidentified	Chinook		Coho		Steelhead		Total Fish	Total Anglers	Angler-Hours	Fish per Hour	Hours per Fish	Percent Hatchery Fish
		Wild	Hatchery		Adults	Jacks	Adults	Jacks	Wild	Hatchery						
Above tide, bank <u>1</u>	5/25-10/31	64	359	40					3		467	409	978	0.48	2.1	77
Tidewater, bank <u>1</u>	5/25-10/31	19	23	6							48	111	232	0.21	4.8	48
Tidewater, troll <u>1</u>	5/25-10/31	31	41	12							84	82	288	0.29	3.4	49
Drift boat, above tide, reported and checked	6/16-7/15	38	16								54	15	61	0.89	1.1	30
Wilson River, bank <u>1</u> and <u>2</u>	7/6-9/28	35	1						1	6	43	78	194	0.22	4.5	16
Wilson River, troll, tide <u>1</u>	7/6-9/28	32				1		1			34	33	73	0.47	2.1	0
Lakes, bank <u>1</u>	4/20-8/31	2	194	129							339	297	548	0.62	1.6	58
Lakes, boat <u>1</u>	4/20-6/15	5	161	34							204	69	372	0.55	1.8	80
Nestucca moorage report	5/25-8/31	651	211		22	61	2				948	476	3,669	0.26	3.9	22 <u>1</u>

1 Partly incomplete effort, checked.2 Upstream and tide, mostly opening day.3 Trout only.



## Lakes

Ninety-two percent of the bank catch and 95 percent of the boat catch in lakes were hatchery fish. Very small proportions of the hatchery trout were from previous liberation years, and it was a rare hatchery trout that had been in the lake more than two years. A few coho salmon yearlings, barely legal in length, were taken from Smith and Lytle Lakes where they had been stocked as advanced fry a year before by the Fish Commission of Oregon.

## Size of Cutthroat

Nine unspawned sea-run cutthroat caught in October and November averaged 12.8 inches in length (11.0 to 16.0 inches) and 0.72 pound (0.5 to 1.4 pounds). The average of their condition factors was 32.5. Five spent sea-run cutthroat taken in March averaged 14.4 inches in length (12.0 to 17.0 inches) and 0.95 pound in weight (0.5 to 1.4 pounds), with an average condition factor of 30.5.

Apparently bank and tidewater boat catch rates for all trout have not changed much in the last three seasons (Table 239). Neither have any drastic changes in the rate of catch for wild cutthroat shown up. The percentages of hatchery trout in tidewater are of the checked boat catch since 1961.

Although only one steelhead was checked in the Nestucca bank catch, several more were reported caught, mostly in July and August. One angler had caught 4 summer steelhead below Beaver. A lodge at the mouth of Beaver Creek reported 5 were caught by mid-July. A resident 11 miles above Beaver thought that summer steelhead need protection; they bit at anything. As the summer season tapered off, less and less was heard of the summer-run fish.

The average length of 4 summer steelhead, mostly reported, was 21.4 inches (19 to 23 inches), and the average round weight was 4.1 pounds (3.5 to 4.5 pounds). The average weight of 8 summer steelhead was 4.3 pounds (3.5 to 5.5 pounds).

## Warm-Water Game Fish

In the trout season lake catch (Table 238) it will be noted that some nonsalmonid species were taken. Largemouth bass came mostly from Lake Lytle, but some were from Smith and Spring Lakes. The lone bluegill was from Spring Lake and is the only bluegill seen there since one was gill-netted in 1957. Bluegill had been stocked into Lytle and Smith Lakes in 1950, and possibly also into Spring Lake at that time, but no bluegill has been checked from Smith or Lytle Lakes.

Brown bullhead were easily caught during the dark of the evening from Crescent Lake in the lower part of the Lake Lytle drainage system. Others were reported from Lake Lytle. At the small Manhattan Pond, a boy took a 6-inch bullhead on a bread ball, and another boy had caught several the day before. Seven adult brown bullhead had been stocked into the pond in 1959.

Table 239

Trout Season Catch per Hour, 1948-1963

Year	Catch per Hour			Wild Cutthroat		Liberations		Percent	
	Bank	All Fish Tidewater /1	Bank	Bank	Tidewater /1	Tidewater /3	Hatchery Tidewater /3		
1948	/2	0.12	0.12	/2	0.12	0	0.3		
1949	0.23 /3	0.10	0.16 /3	0.16 /3	0.10	0			
1950	0.24 /3	0.14	0.16 /3	0.16 /3	0.14	0			
1951	0.30 /3	0.20	0.14 /3	0.14 /3	0.18	750	9.3		
1952	0.26 /3	0.20	0.17 /3	0.17 /3	0.16	1,625	15.3		
1953	0.28 /3	0.17	0.16 /3	0.16 /3	0.09	1,730	46.3		
1954	0.29 /4	0.15	0.10 /4	0.10 /4	0.09	1,300	38.8		
1955	/5	0.14	0.14	/5	0.09	1,200	33.1		
1956	0.27 /3	0.10	0.12 /3	0.12 /3	0.08	1,000	14.9		
1957	0.33 /6	0.24	0.10 /6	0.10 /6	0.15	2,600	38.2		
1958	0.35 /6	0.31	0.13 /6	0.13 /6	0.10	4,100	77.1		
1959	0.32 /6	0.28	0.09 /6	0.09 /6	0.07	3,000	75.0		
1960	0.35 /6	0.08	0.10 /6	0.10 /6	0.06	0	27.0		
1961	0.48 /7	0.23	0.15 /7	0.15 /7	0.11	0	51.0		
1962	0.44 /6	0.28	0.10 /6	0.10 /6	0.18	0	36.0 /8		
1963	0.43 /6	0.26	0.08 /6	0.08 /6	0.18	0	57.0 /8		

/1 Lower moorage, Nestucca River tidewater through 1961.

/2 Not isolated.

/3 Nestucca River.

/4 Trask, Little Nestucca, and Salmon Rivers.

/5 Wilson River.

/6 All streams.

/7 Mostly Nestucca River.

/8 Nestucca River, 90 percent.



## Nongame Marine Species (Bottom Fish)

Bottom fish anglers were interviewed throughout the summer. Table 240 summarizes combined data. In most areas, bank angling was about 60 percent as good in 1963 as in 1962. Miscellaneous fish included 2 cutthroat and 1 small largemouth bass from Sand Lake (brackish), plus a few tomcod and blenny eels from north Tillamook Bay.

In the category "Sport Boats, Ocean, Cape Kiwanda, Garibaldi", early checking is not included since bottom fish angling was not distinguished from incidental catch of bottom fish in the first part of the season.

Bottom fish angling success at Cape Kiwanda was slightly better than in 1962, but average catch was down because average time out was 0.6 hour shorter. Hours fished out of Garibaldi were also down, as was angling success.

For boats in bays, mostly Tillamook Bay, hours fished were practically identical with those in 1962, but success was down slightly.

Incidental bottom fish taken by sport salmon anglers at Kiwanda and Garibaldi were caught much more slowly than when fished for intensively (10.2 and 11.3 hours per incidental fish, respectively, as compared to 0.8 and 0.7 hours per fish for intensive fishing). Charter boats in the two areas were not specific as to goals, but it is known that Garibaldi charters sought bottom fish entirely during most of the first half of the season. Thus, the catch rate for Garibaldi charters was 1.8 hours per bottom fish as compared to 14.5 hours for Kiwanda charters, which were primarily fishing for salmon.

## Habitat Improvement

### Barriers

Culverts have again been thorns in the flesh of anglers and biologist alike. Tillamook County authorities have done nothing to improve bad culverts at Wolf and Slick Rock Creeks on the Nestucca River, Mapes and Myrtle Creeks on the Kilchis, and Mossy Creek on the Miami during the past year, except possibly to add to the dumped rock piles at the lower ends of some culverts. Another bad culvert is that of the State Board of Forestry in lower Clear Creek on the Kilchis River where a 1- to 2-foot falls at the outlet stops chums and forms a partial barrier to other salmon and steelhead.

The U. S. Bureau of Land Management has set a good example by installing half-round culverts at the Bear and Testament Creek crossings of the Nestucca River road. Such culverts leave the stream bottom natural and require only low concrete walls at either bank as culvert supports.

The county road culvert on East Creek (Nestucca River) was cleared of debris partly blocking its intake but the intake lip was left bent over, forming a fall. Despite this hindrance, a few early coho salmon were found above it.

### Log Jams

A program of log jam clearance in the district was undertaken in the winter and spring. Contracts were let and crews with heavy equipment removed

Table 240

Bottom Fish Angling, 1963

Area	Period	Species					Total Fish	Total Anglers	Average Hours Angled	Fish per Angler	Fish per Hour	Hours per Fish
		Perch	Kelp	Rockfish	Lingcod	Flatfish	Misc.					
Bank, checked	3/16-8/3	175	80	35	3	46	29	368	339	728	<u>1</u>	0.51 2.0
Sport Boats, Ocean, Cape Kiwanda	7/6-9/8	103		1,025	518	167	58	1,871	755	1,589	2.1	2.5 1.18 0.8
Sport Boats, Ocean, Garibaldi	7/5-9/3	18		131	95	26	8	278	132	206	1.6	2.1 1.35 0.7
Kiwanda Charters, checked	7/8-9/8	1		46	9	9	4	69	175	1,001	5.7	0.4 0.07 14.5
Garibaldi Charters, checked	7/7-9/3	59		902	418	28	26	1,433	694	2,595	3.7	2.1 0.55 1.8
Sport Boats, Bays	4/16-10/15	97		7		1	20	243	132	385	2.9	1.8 0.63 1.6

1 Largely incomplete.

jams from the Trask River system, particularly the North Fork of the North Fork, Elkhorn, Clear, and Bark Shanty Creeks, and the Little South Fork and Clear Creek on the Kilchis River. A series of small jams in the Devils Lake Fork of the Wilson were to be removed by the State Board of Forestry.

A bad jam was cleared from East Creek (Nestucca River) by the U. S. Forest Service.

On an inspection trip on June 5 with State Board of Forestry personnel, advice was given on the removal of logging slash from Minich Creek (Miami River).

On February 19, a study of Tony Creek (Nestucca River) revealed a log road culvert blocked enough by logging debris that it was impassable to fish. Arrangements were made to have the block removed.

An investigation of reported blocking jams in Farmer Creek (Nestucca River) showed that steelhead had penetrated above the jams and were found spawning on March 1.

A report that a jam was blocking Bear Creek (Little Nestucca River) brought about an inspection trip on August 9 which revealed a good population of coho zeros above the jam.

#### Fishways

Several complaints were heard that State Highway Department fishways on Highway 101 at Killam and Fawcett Creeks (Tillamook River) were not passing fish satisfactorily. Many unsuccessful jumps were reported. Only Fawcett Creek was studied. As is noted under "Salmon Spawning Surveys", several coho salmon were found a mile above the highway, but former runs of chinook were not apparent.

#### Lake and Stream Improvement

Consultation on a proposal to enlarge Cedar Lake on Mount Hebo was held with the U. S. Forest Service wildlife biologist on September 3. The lake partly fills with winter rains but becomes very shallow by summer. By diverting a small stream into the lake it would be possible to maintain 2 or 3 surface acres of water with a minimum depth of 30 feet.

#### Chemical Control

On March 11 it was reported that part of the Cedar Creek (Wilson River) watershed was to be sprayed by the State Board of Forestry to control brush. The Board was asked to keep the spray 200 feet away from the creek. After the job had been done, a trip along the creek showed that no, or very little, damage was done since coho zeros were common.

#### Pollution

On July 5, Wilson River tidewater was found to be heavily polluted by grease particles which constantly issued from a Tillamook cheese factory outfall. The grease particles spread out, forming a thin film over a good portion of the area. The source was found in a boiler room pipe leak. Although the pipe was cut out of the line and another pipe was substituted, much more grease left the outfall thereafter.

## Dams

### Meadow Lake Dam

The Meadow Lake Dam, a log-crib structure over 60 years old, collapsed during a freshet on November 20, 1962. The lake emptied over a period of about an hour. The resulting flood destroyed or damaged several of the bridges along its course. Some trees along the bank were knocked down and large masses of logs were left along banks and in pastures.

Large numbers of dead fish were reported. The majority were fingerlings, many undoubtedly were from a liberation of 56,384 steelhead fingerlings made the day before the flood. Others were wild cutthroat, steelhead, and coho salmon fingerlings, plus fish from Meadow Lake. Relatively small numbers of adult salmon and steelhead were reported. Most of the chinook salmon were either alive and spent or dead before the flood hit, but most of the coho salmon had not yet spawned. A few decaying carcasses were seen in log jams later.

It was alleged by several reporters that all the gravel had been washed out of the river; good gravel riffles were found up to the cascade below the dam site.

It is possible that the flood wiped out most of the spawn of spring and fall chinook in the main Nestucca, but a few fall chinook probably spawned after the flood.

If the main stream spawning of fall chinooks is not sufficiently compensated by tributary production, a definite shortage will be felt for a few years.

### Skookum Lake Dam

In connection with the water-supply dam planned for the outlet of Skookum Lake by the City of Tillamook, a survey was made downstream about 1,000 yards below the lake on March 12. Several small falls (one considered impassable), cascades, and jams were encountered.

## Falls

Falls on the Middle Fork of the Trask River were investigated. At a point about 1.5 miles below Camp No. 5, a bedrock fall-cascade 10 feet high was judged impassable.

## Lakes

Cape Meares Lake is about 100 acres in extent and located between the Bayocean dike and the Cape Meares beach. Its bottom was formerly part of the Bayocean Peninsula before the ocean washed through. Three small streams from hills to the south supply the lake. In order to keep the lake low enough not to flood the county road, the county installed a tide-gate culvert in the dike close to the county road in November. The result has been that the lake level has been lowered about 6 feet, thus almost drying up the bay on the southwest corner and adjoining marshes.

### Three Rivers Rack

The fish counts at the Three Rivers rack (Table 241), made during the same period as in 1961-62 (plus part of April), were of the same order as those of past years. The numbers of coho salmon were about one-third higher than in 1961-62. Steelhead were slightly under the number counted the preceding season. However, it is realized that counts at the rack can never be truly quantitative because an unknown proportion of the runs pass over the rack during freshets. The rack, however, does give good indications of the composition of the runs.

### North Fork of Trask River Survey

A spawning ground survey of the North Fork of the Trask River was made during the summer of 1963. The North Fork extends from the confluence with the South Fork upstream 11.7 miles to the confluence with the North Fork of the North Fork and the Middle Fork.

In the lower 6 miles of the survey, the lengths of sections vary but the average was 465 paces, the standard used thereafter. The road parallels the stream for about 5 miles; speedometer readings were checked against pacing.

The estimation of spawning gravel was partly by sight and partly by pacing. Marginal gravel might occur in patches between rubble and boulders but each patch large enough for a single redd, or in dry bars along banks, was estimated by sight as comprising a certain percentage of a total area.

Good gravel was not infrequent at the banks where salmon and steelhead often spawn. Marginal gravel also may be in such situations but is then finer or coarser in texture and is often in exposed bars mixed with rubble or in small patches between boulders. At the tails of pools, marginal gravel lies in deeper, slower water upstream from good areas.

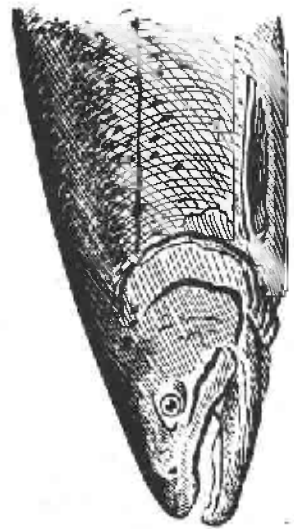
Riffles, including rapids and falls, constituted 62 percent of the stream length (range by sections, 24 to 92 percent) and 38 percent of the pools (8 to 76 percent). At normal winter levels the proportion of pool may go as low as 20 percent or less because of water velocities.

Spawning gravel totaled 43,700 square yards (rounded to hundreds), of which 16,800 square yards (38 percent) were considered good and 26,900 square yards (62 percent) marginal. When spring and fall chinook later spawned, it was noted that some gravel called marginal was used (at the foot of a rapid and on a then dry shore bar). Assuming an average width of 60 feet (20 yards), all of the spawning gravel would form 11 percent of the stream bottom.

Table 241

Three Rivers Trap, 1962-63

Month	Coho Salmon				Chinook Salmon				Steelhead		Total Fish
	Percent			Male	Percent		Male	Female			
	Male	Female	Jack		Jacks	Jacks					
October	7	17	13	2	1	4					44
November	48	123	15	5	1	8					200
December	12	31	3						12	12	70
January	39	38	6						6	10	99
February	7	8							14	10	39
March	1								2	1	4
April									10	13	23
TOTALS	114	217	37	10	7	12	57	44	46		479
TOTALS BY SPECIES	368			21			90				





LINCOLN DISTRICT

Rollie F. Rousseau

Fish Inventory

Anadromous

Winter Steelhead

Water conditions were excellent through most of the steelhead season.

The Salmon River steelhead catch per unit of effort was greater during the 1962-63 season, while the Siletz River catch dropped below that recorded for the previous season.

The Alsea River steelhead catch was recorded by the Research Division, but reports indicate that anglers enjoyed above average fishing. Approximately 60 percent of the steelhead caught in the Alsea were of hatchery origin.

Siletz River anglers fished 24 hours per steelhead in 1962-63 while only 18 hours of angling effort were required per steelhead in the 1961-62 season.

Boat drifters again enjoyed a much higher success than did bank anglers on the Siletz. Forty-eight boat anglers checked fished only 13 hours for a steelhead, while 150 bank anglers fished 33 hours per fish.

A noticeable drop in angler intensity was observed by veteran anglers. The exceptional Alsea River fishing no doubt attracted anglers from the Siletz and other nearby streams.

Table 242 illustrates the monthly Siletz River catch data collected by the district biologist and State Police.

Table 242

Creel Census by Month, Siletz River,  
November 16, 1962 - March 31, 1963

Month	Anglers	Hours	Steelhead	Hours per Steelhead
November	34	115	9	12.8
December	200	791	32	24.7
January	113	403	11	36.6
February	181	651	19	34.3
March	30	109	15	7.3
TOTALS AND AVERAGE	558	2,069	86 <sup>/1</sup>	24.1

<sup>/1</sup> Total includes 13 summer steelhead.

Creel data were collected by section of river this past season to determine which portion of the Siletz is most productive. Table 243 presents the steelhead catch by area.

Table 243  
Steelhead Catch by Area, Siletz River,  
1962-63

Section	Anglers	Hours	Steelhead	Hours per Steelhead
Mouth to town of Siletz	145	516	7	73.7
Siletz to Logsden	36	185	14	13.2
Logsden to Buck Creek	106	371	27	13.7
Buck Creek to North Fork Siletz	271	1,017	42	24.2

Anglers fished 33 hours per steelhead on the Salmon River during the 1962-63 season. In 1961-62 anglers fished 61 hours for each steelhead caught. Angling pressure was below normal for this popular coastal stream. It appeared that a few local anglers caught by far the majority of fish.

Table 244 presents the steelhead creel data from the Salmon River for the 1962-63 period.

Table 244  
Creel Census by Month, Salmon River,  
November 16, 1962 - March 31, 1963

Month	Anglers	Hours	Steelhead	Hours per Steelhead
November	21	42	0	
December	60	166	5	33.2
January	13	42	4	10.5
February	20	35	0	
March	7	13	0	
TOTALS AND AVERAGE	121	298	9	33.1

The Alsea River steelhead catch determination was conducted by the Research Division.

On February 9 (Saturday) an additional 0.8 mile of the North Fork Alsea River was opened to steelhead angling in order to harvest surplus hatchery fish. Eighty anglers checked had fished 193 hours and caught 50 steelhead, of which over 90 percent were marked. Anglers fished less than 4 hours for each steelhead caught. About 70 to 75 steelhead were caught on

February 9.

The North Fork Alsea River trap count included 2,042 steelhead, 71 jack steelhead, 72 coho salmon, and 10 cutthroat trout. Ninety-six percent of the adult steelhead and 93 percent of the jack steelhead were hatchery marked fish. The 1962-63 trap count is the second highest steelhead count recorded since records commenced in 1951.

A comparison of numbers and sex of steelhead counted from 1951 to 1963 at the hatchery dam is given in Table 245.

Table 245

Steelhead Trapped, North Fork Alsea River,  
1951-1963

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
1961-62	1,063	1,038	2,101
1962-63	1,190	852	2,042

Large numbers of juvenile winter steelhead were collected with an electric shocker in the North and South Forks of the Alsea River. The six shocking locations are above impassable barriers where adult steelhead were liberated in February 1962 and 1963. Peak Creek, tributary to the South Fork Alsea, was the only stream where steelhead were not abundant. Steelhead lengths were recorded in an effort to determine the rearing potential of the stream with the number of adults planted.

Number and size of steelhead collected above barriers appear in Table 246.

Summer Steelhead

A total of 473 summer steelhead and 76 spring chinook salmon was observed on a survey with diving gear of 17 resting holes in the upper Siletz River system. The survey began at Boulder Creek (North Fork Siletz River) and extended downstream to the quarry hole on the main river. The 1963 count was the second highest during the four years this survey has been conducted. Hatchery steelhead accounted for 58 percent of the total. Water conditions were ideal for underwater observations.

Table 247 compares the fish and marks counted from 1960 through 1963.

Table 246  
Number and Size of Juvenile Steelhead  
Above Barriers in Alsea River,  
1963

Stream	Adults Planted		Yards Sampled	Steelhead Collected by Age Class		Average Size of Steelhead in mm. by Age Class	
	1962	1963		0	1	0	1
North Fork Alsea River	75	76	100	33	26	71	125
Parker Creek (North Fork Alsea River)	95	50	100	54	23	63	112
Peak Creek (South Fork Alsea River)	0	41	150	10			
Fall Creek (South Fork Alsea River)	0	65	75	13			

Table 247  
Summer Steelhead Survey, Siletz River,  
1960-1963

Year	Number of Fish Observed		Percent Marked Steelhead
	Steelhead	Chinook Salmon	
1960	443	24	33
1961	515	/1	80
1962	284	52	48
1963	473	76	58

/1 Not recorded.

Summer steelhead were trapped during July and October at the Siletz River ladder. A total of 108 steelhead, of which 90 were July fish, was transported to Roaring River Hatchery. Sixty-nine percent of the July steelhead were marked, compared with only 13 percent of the October fish. The low number of hatchery fish taken in October is probably due to the fact that all Siletz summer steelhead eggs have come from the July fish.

Table 248 illustrates the number of trapped steelhead and their origin.

Of the 74 marked steelhead trapped, 66 were marked Ad-RM (age - 2 years stream and 1 ocean); 4 Ad-LM (age - 2 years stream and 3 ocean, 3 years stream and 2 ocean, or repeat spawner); and 4 Ad-LP (age - 1 year stream and 1 ocean). Some summer steelhead released at 2 years of age return to the stream after

2 years of life in the ocean, but because no 2-year-old fish were planted in 1961, this combination was not available in 1963.

Table 248

Number and Origin of Summer Steelhead,  
Siletz River Trapping Operation,  
1963

Date	Steelhead Trapped			Percent Marked	Steelhead Hauled to Hatchery
	Wild	Marked	Total		
July 7-25	31	68	99	69	90
October 28 to November 4	39	6	45	13	18
TOTALS	70	74	144	51	108

Summer steelhead angling was good on the Siletz River in 1963. A total of 149 anglers fished an average of 14 hours for each of the 34 steelhead checked. Seventy-six percent of the fish caught were marked. All marks were Ad-RM clips.

An interested Valsetz fisherman recorded the summer steelhead caught by himself and friends on the Siletz River. From the end of June through November he checked 82 steelhead, of which 57 percent were marked.

Table 249 illustrates the origin of summer steelhead and marks observed in the sport catch by Valsetz fishermen, State Police, and Game Commission personnel.

Table 249

Origin and Marks of Summer Steelhead in Sport Catch by Month,  
Siletz River, 1963

Month	Steelhead Observed	Wild Steelhead	Marked Steelhead				Total	Percent Marked
			Ad-LP	Ad-RM	Ad-LM	Ad /1		
June	8	2		6			6	75
July	44	6	1	35		2	38	86
August	20	8	1	9	1	1	12	60
September	30	15		9	4	2	15	50
October	9	9					0	0
November	5	3		2			2	40
TOTALS	116	43	2	61	5	5	73	63

/1 Observer failed to record additional fin clip with adipose.

Summer steelhead entered the Alsea River for the first time in 1963. These fish are the result of the Siletz River stock planted in 1962 as yearlings.

Some of the steelhead were caught in the main river, but the most productive fishery developed in the North Fork above Highway 34 bridge. All fish observed bore an Ad-LP mark.

Five resting holes were surveyed with diving gear on the North Fork and main Alsea River. Visibility was only fair, and poor access to the upper main river limited the area surveyed. Six summer steelhead were counted. Steelhead were observed in the main river three miles below the town of Alsea. It is apparent that many fish are holding in the river proper rather than the North Fork where the volume of flow and pool areas are limited. This was indicated during an October freshet when about 25 steelhead were caught by anglers on the North Fork near the hatchery. Also at this time, the first summer steelhead was trapped at the hatchery dam. As of the middle of November, 21 summer steelhead had entered the hatchery trap.

### Salmon

Coho salmon fishing in tidewater was exceptionally good on the Alsea. A large coho salmon fishery developed again on Fall Creek (Alsea River). The Siletz River provided good coho and chinook salmon fishing when the river was not muddy from logging activity. Spring chinook counts on the Siletz River were the highest recorded since counts were initiated in 1960.

Trap counts of coho on the North Fork Alsea River were the lowest recorded since 1951. During the 1963-64 migration period only 14 adult and 33 jack salmon were tallied. Table 250 illustrates the coho salmon counts from 1951 through 1963 on the North Fork Alsea River.

Table 250

Coho Salmon Count on North Fork Alsea River Trap,  
1951-1963

Year	Adults	Jacks	Total
1951-52	74	345	419
1952-53	125	161	286
1953-54	51	160	211
1954-55	93	496	589
1955-56	70	96	166
1956-57 /1			
1957-58	87	24	111
1958-59 /1			
1959-60	111	10	121
1960-61 /1			
1961-62	36	34	70
1962-63	59	13	72
1963-64	14	33	47

/1 Counts not available.

### Coho Salmon Spawning Ground Surveys

Coho salmon spawning ground surveys in 1963 indicate average escapement for the Siletz River, Rock Creek (Devils Lake), and Yachats River.

An average of 15 coho salmon was observed per mile of stream surveyed. Twenty-one coho were counted in 1962 and 19 in 1961. The Siletz River in 1963 averaged 20 coho salmon per mile of stream compared with 19 in 1962. The 11-year average for the Siletz River is 26 fish per mile.

The escapement of coho may have been greater than the counts indicate. An early freshet in November brought many fish to the spawning areas early. Many fish spawned but the apparent peak was not reached until Christmas, at which time the streams were high and colored from heavy rains; thus, good counts were difficult to obtain.

Rock Creek (Devils Lake) coho counts appear in Table 251. Tables 252 and 253 present historical data on spawning ground surveys for the Siletz and Yachats Rivers.

Table 251

Rock Creek (Devils Lake) Coho Salmon  
Spawning Ground Counts, 1957-1963 /1

Year	Miles Surveyed	Number of Salmon	Number of Jacks Included in Total	Salmon per Mile
1957	0.70	18	10	26
1958	0.70	30	25	43
1959	0.70	44	5	63
1960	0.70	12	8	17
1961	0.70	27	6	39
1962	0.70	59	14	84
1963	0.70	6	4	9

/1 Joint survey with Fish Commission of Oregon.

Tidewater Sea-Run Cutthroat Trout and Salmon Fishery

An estimate of the tidewater fishery for the Alsea and Siletz Rivers is obtained from moorage records and boat counts. The accuracy of the estimates is dependent upon number and quality of records supplied by moorage operators and the number of boat counts available. Estimates of total boat trips and fish catch are subject to high error. The catch-per-boat figures are more accurate and probably are a better indicator of the trend in the tidewater fisheries.

A calculated 5,930 boat trips produced a catch of 1,234 cutthroat trout, 447 chinook salmon, 1,093 coho salmon, and 401 jack salmon for 1963. Angler intensity and catch estimates were the lowest recorded since 1958. In 1962, 4,851 cutthroat, 666 chinook, 1,025 coho, and 3,419 jack salmon were caught by anglers in 10,561 boat trips. Table 254 lists a comparison of the calculated catch and boat trips for Siletz tidewater from 1957 through 1963.

During 1963 the moorage operators checked 53 percent of the boats, which is 23 percent above the 6-year average. It is apparent that the higher the percentage of boats checked by the moorages the lower the boat intensity and catch estimates become.

Table 252

Siletz River Coho Salmon Spawning Ground Surveys, 1952-1963

Stream	Miles	Number of Fish by Years /1											
		1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
<u>Siletz River</u>													
Buck	1.25	117 (3)	20 (3)	28 (5)	14 (1)	31 (2)	10 (2)	14	14	7 (3)	6	10 (4)	17 (1)
Cerine	0.50	23	5	5	2	16 (3)	1	8	8	3	8 (1)	6 (2)	11 (1)
Erickson	0.25	18	5	8 (1)	10 (3)	25 (10)	17 (1)	6	6	0	19 (6)	0	2
Fourth of July	0.75		14	16 (1)	12	24 (3)	46	14	14	6 (2)	101 (7)	44 (6)	53 (2)
Gravel	1.00		0	3	4		32 (1)	2	2	16	0	23 (8)	20
Little Euchre	0.75	14 (1)	6		6	19 (2)	37 (2)			10 (5)	6 (2)	2	2
North Fork Sunshine	0.75	63 (1)	1	0	24	27	17	13	13	0	5 (1)	4	5
Schooner	0.50	68 (1)	13 (1)	4	3	19	14	11	11	4 (1)	12 (1)	18 (3)	6
TOTAL FISH		303 (6)	64 (4)	64 (7)	75 (4)	161 (20)	174 (6)	60	60	46 (11)	157 (18)	107 (23)	116 (4)
<hr/>													
TOTAL MILES	5.75	4.00	5.75	5.00	5.75	4.75	5.75	0.00	5.00	5.75	5.75	5.75	5.75
<hr/>													
FISH PER MILE	87	11	14	13	38	30	14	14	8	27	19	20	20
<hr/>													
11-YEAR AVERAGE		26											

NOTE: Figures in parentheses indicate number of jacks included.

/1 Fish Commission of Oregon counts through 1957.

Table 253

Yachats River Coho Salmon Spawning Ground Surveys, 1951-1963

Stream	Miles	Number of Fish by Years /1												
		1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
<u>Yachats River</u>														
School	0.50	15	7	6	13	3	17	4		9	2 (1)	11 (1)	0	0
Williamson	1.25	73	23	13	25	15	15	9		7 (3)	7 (3)	31 (1)	8 (2)	2
TOTAL FISH		88	30	19	38	18	32	13		9	9 (4)	42 (2)	8 (2)	2
TOTAL MILES	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	0.00	0.50	1.75	1.75	1.75	1.75
FISH PER MILE		50	17	11	22	10	18	7		18	5	24	5	1
12-YEAR AVERAGE		16												

NOTE: Figures in parentheses indicate number of jacks included.

/1 Fish Commission of Oregon counts through 1957.



Table 254  
Annual Estimated Intensity and Catch,  
Siletz River Tidewater Fishery,  
1957-1963

Year	Boat Trips	Cutthroat	Chinook	Coho	Jacks		Total
					Chinook	Coho	
1957	5,002	1,391	364	1,570	330	409	739
1958	10,656	4,334	723	504	469	400	869
1959	14,564	3,875	2,069	2,955	541	479	1,020
1960	9,040	6,223	603	556	870	803	1,673
1961	10,430	2,856	980	852	931	1,397	2,328
1962	10,561	4,851	666	1,025	1,436	1,983	3,419
1963	5,930	1,234	447	1,093	253	148	401

Data on the average catch per boat which appear in Table 255 indicate that the catch per unit of effort for cutthroat was below 1962, coho and chinook success was above the previous year, and jack salmon success was down considerably. It is interesting to note that the catch per boat for cutthroat trout from 1957 has alternated each year from low to high with the even-numbered years providing anglers with the best catches.

Table 255  
Catch per Boat, Siletz Tidewater Fishery,  
July 1 to November 15,  
1957-1963

Year	Catch per Boat			
	Cutthroat	Chinook	Coho	Jacks
1957	0.28	0.07	0.31	0.15
1958	0.41	0.07	0.05	0.08
1959	0.27	0.14	0.23	0.07
1960	0.69	0.07	0.06	0.18
1961	0.27	0.09	0.08	0.22
1962	0.46	0.06	0.10	0.32
1963	0.21	0.08	0.18	0.07

The 1963 Alsea tidewater estimates indicate that 10,068 boat trips produced 3,845 cutthroat, 872 chinooks, 3,599 coho salmon, and 4,659 jack salmon. The cutthroat catch was down from that recorded in 1962, but the catch of chinooks, coho, and jacks was the highest ever recorded since records commenced in 1957. As in the Siletz estimate, the boat intensity and catch are subject to unknown error and thus the catch-per-boat figures should be used as

a more accurate indication of the fishery trend. Table 256 illustrates a comparison of the calculated Alsea tidewater catch from 1957 through 1963.

Table 256  
Annual Estimated Intensity and Catch,  
Alsea River Tidewater Fishery,  
1957-1963

Year	Boat Trips	Cutthroat	Chinook	Coho	Jacks		Total
					Chinook	Coho	
1957	5,675	3,008	244	1,294	511	516	1,027
1958	9,685	7,774	475	1,814	843	2,167	3,010
1959	7,659	3,772	303	2,570	198	791	989
1960	8,694	7,287	188	568	1,020	2,903	3,923
1961	9,047	3,921	341	2,651	346	2,123	2,469
1962	11,290	9,582	348	1,654	1,190	4,218	5,408
1963	10,068	3,845	872	3,599	1,118	3,541	4,659

Data on the Alsea catch per boat which appear in Table 257 indicate that 1963 was an outstanding year for salmon fishing. The Alsea cutthroat fishery like the Siletz varies noticeably in catch per boat for even- and odd-numbered years. The even-numbered years have produced the highest catch per unit of effort.

Table 257  
Catch per Boat, Alsea Tidewater Fishery,  
July 1 to November 15,  
1957-1963

Year	Catch per Boat			
	Cutthroat	Chinook	Coho	Jacks
1957	0.53	0.04	0.23	0.18
1958	0.80	0.05	0.19	0.30
1959	0.49	0.04	0.34	0.13
1960	0.84	0.02	0.07	0.45
1961	0.43	0.04	0.29	0.27
1962	0.85	0.03	0.15	0.48
1963	0.38	0.09	0.35	0.46

### Depoe Bay Offshore Salmon Fishery

In 1963 a statistical creel sampling program was initiated on Depoe Bay offshore fishery so angling intensity and fish harvest estimates could be made with a greater degree of accuracy. Five man-days per week were devoted to the creel sampling program. The United States Coast Guard cooperated by numerating boats on Saturdays, Sundays, and two alternating weekdays.

Salmon angling was excellent throughout most of the season. An estimated 39,153 anglers entered the ocean in 8,972 boat trips. They returned with 29,813 coho and 452 chinook salmon. Anglers averaged 0.77 salmon per ocean trip. Charter boats accounted for 19,924 anglers and 15,624 salmon. The precision of the estimate was high according to the percent of error calculated. A plus or minus error of 14 percent exists in the angler estimate and 21 percent in the salmon catch. Table 258 presents the offshore salmon catch estimate for Depoe Bay in 1963.

Table 258

Depoe Bay Offshore Salmon Catch,  
June 15 to September 30, 1963

Type of Craft	Bar Crossings	Anglers	Estimated Catch		Salmon per Angler Trip
			Coho	Chinook	
Pleasure	6,730	19,229	14,397	244	0.76
Charter	2,242	19,924	15,416	208	0.78
TOTALS AND AVERAGE	8,972	39,153	29,813	452	0.77

Thirty-three percent of the pleasure craft and 48 percent of the charter boats were sampled at Depoe Bay to obtain the catch estimate. Ninety coho salmon, 3 chinook salmon, and 2 steelhead were observed as marked fish in the catch. Of the 9,575 salmon observed in the catch, one percent were marked.

### Yaquina Bay Offshore Salmon Fishery

Offshore salmon angling from Newport in 1963 was good throughout the season, reaching a peak in late August. An estimated 41,798 anglers crossed the bar in 14,259 boat trips and returned with a catch of 23,218 coho and 561 chinook salmon. The estimate does not include angler intensity or catch inside the bar. Total anglers and salmon harvest are considerably above the 31,716 anglers and 12,199 salmon recorded in 1962. Fishermen averaged 0.57 salmon per bar crossing in 1963 compared with only 0.38 salmon per angler trip in 1962. Table 259 presents the Yaquina Bay offshore salmon catch estimates for 1963.

The creel checker sampled 18 and 61 percent, respectively, of the sport and charter boats crossing the bar. In doubling the sampling effort in 1963 to five days per week, the percent of error of the salmon catch estimate dropped from 41 percent in 1962 to 28 percent. Twenty-seven marked coho and two chinook were observed in the Yaquina catch.

Table 259

Yaquina Bay Offshore Salmon Catch,  
June 15 to September 30, 1963

Type of Craft	Bar Crossings	Anglers	Estimated Catch		Salmon per Angler Trip
			Coho	Chinook	
Pleasure	13,192	35,764	20,230	479	0.58
Charter	1,067	6,034	2,988	82	0.51
TOTALS AND AVERAGE	14,259	41,798	23,218	561	0.57

Table 260 compares the Yaquina offshore salmon catch estimates for 1962 and 1963.

Table 260

Yaquina Bay Offshore Salmon Catch,  
1962-1963

Year	Bar Crossings	Anglers	Catch Estimate			Salmon per Angler Trip
			Coho	Chinook	Total	
1962	10,809	31,716	11,833	366	12,199	0.38
1963	14,259	41,798	23,218	561	23,779	0.57

TroutCoastal Streams

The spring trout fishery followed the pattern of the past few years with excellent angling in the areas planted. Angling intensity was high on the first two weekends of the season but fell sharply thereafter. The Alsea River received the highest trout angling pressure.

Trout angling was poor in the Siletz and Alsea tidewaters opening day, although large plants of trout were made in upstream areas prior to the trout season.

Creel census collected on the streams in the district appears in Table 261.

All 33,630 legal cutthroat released in the streams of the district were marked with an RV-LV fin clip. Of the 1,123 cutthroat trout observed in the angler creels, 746, or 64 percent, were of hatchery origin. In 1962, 69 percent of the cutthroat checked were marked. The 1963 tidewater catch of marked cutthroat was considerably below that recorded in 1962. It was obvious that fewer planted cutthroat migrated to tidewater in 1963 than in 1962.

Table 261  
Creel Census, Lincoln District Streams,  
May 25 to September 31, 1963

Stream	Anglers	Hours	Ct	Rb (St)	Fish per Hour by Year			
					1963	1962	1961	1960
Salmon River	120	249	126	0	0.51	0.54	0.54	0.65
Siletz River	203	631	479	50	0.84	0.60	0.82	0.69
Alsea River	218	725	506	46	0.76	0.59	0.63	0.58
Yaquina River	29	78	39	0	0.50			

Table 262 presents the marked cutthroat caught in streams and tide-water of the Lincoln District.

#### Coastal Lakes

Angling pressure on the lakes was generally light. Rainbow trout were planted in several Lincoln District lakes in 1963, and creel data collected on them are presented in Table 263.

Composition and length frequency data for the various lakes are listed in Table 264.

#### Devils Lake

Devils Lake angling was poor in 1963, although a fair population of trout and warm-water game fish is present. A total of 347 anglers interviewed fished more than 4 hours each to catch 238 fish. Twenty-nine percent of the catch were warm-water game fish.

More rainbow trout were recovered by gill nets in November 1963 than had ever been taken before. All were in good condition, with one weighing over 5 pounds.

An increasing population of warm-water game fish has been noted over the past two years in Devils Lake. Yellow perch appear to be the predominant species.

Table 265 presents a comparison of trout and warm-water game species captured in gill nets from 1960 through 1963.

#### Eckman Lake

Eckman Lake provided a good fishery for the first month of the season. Legal rainbows planted prior to the season opening, accounted for one-third of the observed catch. Rainbow taken by gill nets in November showed excellent growth through the summer. The fish averaged 4 ounces at planting, and 7 months later weighed 12 ounces.

Table 262

Marked Cutthroat Trout Observed in Creels,  
May 25 to November 15, 1963

River	River			Tidewater			Percent of	
	Cutthroat			Cutthroat			Marked in Total Catch	Percent Marked
	Total	Marked	Percent Marked	Total	Marked	Percent Marked		
River	Total	Marked	1963	1962	Total	Marked	1963	1962
Salmon River	126	70	56	83			56	83
Siletz River	491	368	75	77	10	3	30	83
Alsea River	506	308	61	51	61	17	28	45
TOTALS AND AVERAGES	1,123	746	66	74	71	20	28	69
							64	69

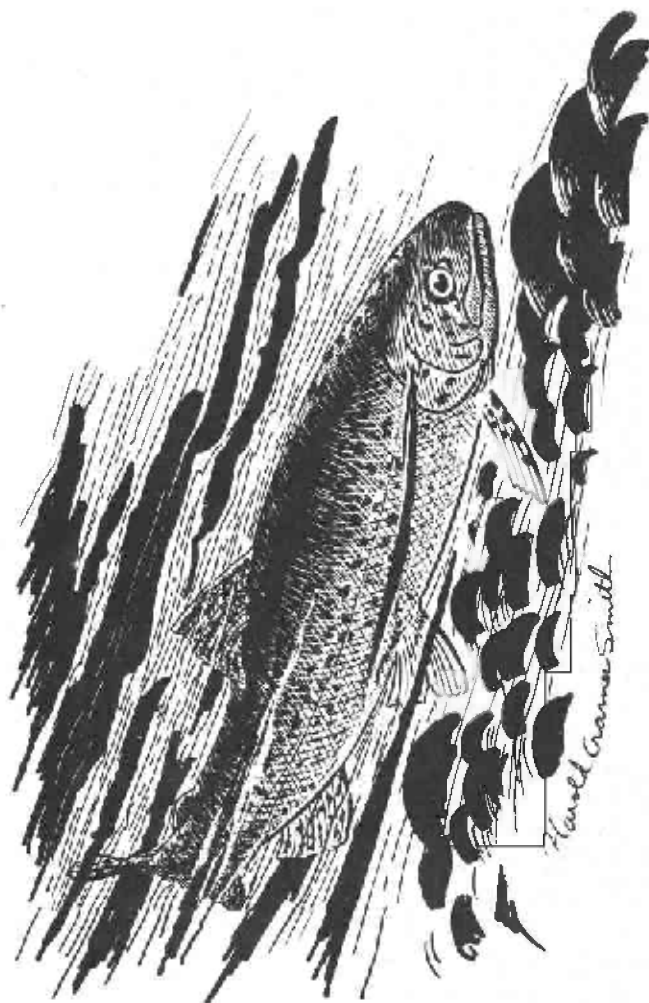


Table 263

Creel Data, Lincoln District Lakes, 1963

Water	Species	Number in Size Groups in Inches						Total Fish	Total Anglers	Hours Fished	Fish per Angler			Fish per Hour				
		8-10	10-12	12-14	14-16	16-18					1963	1962	1961	1960	1963	1962	1961	1960
Devils Lake	Ct	129	12	7	9	3		160										
	Rb	3			1	2		6										
	Co	3						3										
	LB		1	1	7			9										
	BrB			2				2										
	YP	56	2					58										
		191	15	10	17	5		238	347	1,139	0.69	0.91	0.81	5.60	0.21	0.29	0.20	1.50
Eckman Lake	Ct	39	7		3			49										
	Rb	20						20										
		59	7		3			69	33	83	2.09	0.67	1.33	0.83	0.25	0.44		
Newport Reservoir	Ct	8						8										
	Rb	32	1					33										
	BrB	7						7										
		47	1					48	22	67	2.18	0.18		0.72	0.06			
Olalla Reservoir	Ct	96	21					117										
	Rb	137	3					140										
		233	24					257	91	253	2.82	4.00		1.02	1.10			
Valsert Lake	Ct	23	39	2				64										
	Br		2					2										
	LB	16	14	2				32										
		39	55	4				98	95	351	1.03	2.60	2.28	1.81	0.28	0.56	0.59	0.36

Table 264

Composition and Length Frequency of Catch by Gill Nets in Lincoln District Lakes,  
Represented in 1-Inch Size Groups, Fork Length Measurements, 1963

Lake	Number of Sets	Species	Number Fish Caught	Percentage of Total	Number of Fish by 1-Inch Size Groups																
					4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 & Over
Devils	15	Ct	21	12.5		1			6	2	1	4	2	1	1		2	1			
		Rb	30	17.9		1	4		1	1	4	6	1	4	3	1	1	1	1	1	1
		Co	9	5.3		3	1														
		LB	14	8.3				2				2	4	3		1	2	2			1
		BrB	4	2.4				1				1	2								
		YP	80	47.6		7	11	32	21	9											
		WC	4	2.4		2	1	1	1												
		BC	5	3.0			1	3	1												
		CC	1	0.6																	1
Eckman	4	Ct	66	79.5			2	6	37	5	4	4	4	3	3	2					
		Rb	5	6.0		1					3	1									
		Co	12	14.5									1	1		1	2	3	3	1	1
Olalla	2	Ct	15	79.0		1	2	3	5	4											
		BrB	4	21.0		1	2	1													
Valsetz	2	Ct	14	28.6			3	4	5	1	1										
		Br	14	28.6							2	6	4	1							1
		YB	18	36.7		1	11	3													
		Gf	3	6.1			3														



Table 265

A Comparison of Trout and Warm-Water Game Fish  
Collected with Gill Nets from Devils Lake,  
1960-1963

Year	Total Fish	Percent Trout	Percent Warm-Water Game Fish
1960	112	86	14
1961	204	75	25
1962	147	33	67
1963	159	32	68

#### Newport Reservoir

The Newport city reservoir provided nearby residents a fair fishery during the spring of 1963. Planted legal rainbow accounted for most of the catch. Four overnight gill-net sets caught one cutthroat and one juvenile steelhead.

#### Olalla Reservoir

Olalla Reservoir provided good cutthroat and rainbow angling throughout much of the season. Anglers averaged 2.82 fish each. Legal rainbow were planted prior to opening, and fingerlings were stocked in November. The dam was increased about 14 feet in height during the summer. The reservoir when full should cover about 200 surface acres.

Brown bullhead catfish were recovered in gill nets for the first time, although their presence had been known.

#### Valsetz Lake

Valsetz Lake is checked frequently by State Police officers. Creel data indicate a good population of cutthroat trout to 12 inches.

Two overnight gill nets caught 14 brown trout, 14 cutthroat trout, 18 yellow bullhead, and 3 goldfish. One brown trout was 26 inches in length and weighed 8.5 pounds. The lake contains a large population of largemouth bass under 12 inches. Goldfish are also numerous.

#### Warm-Water Game Fish

Warm-water game fish are present in Devils and Valsetz Lakes.

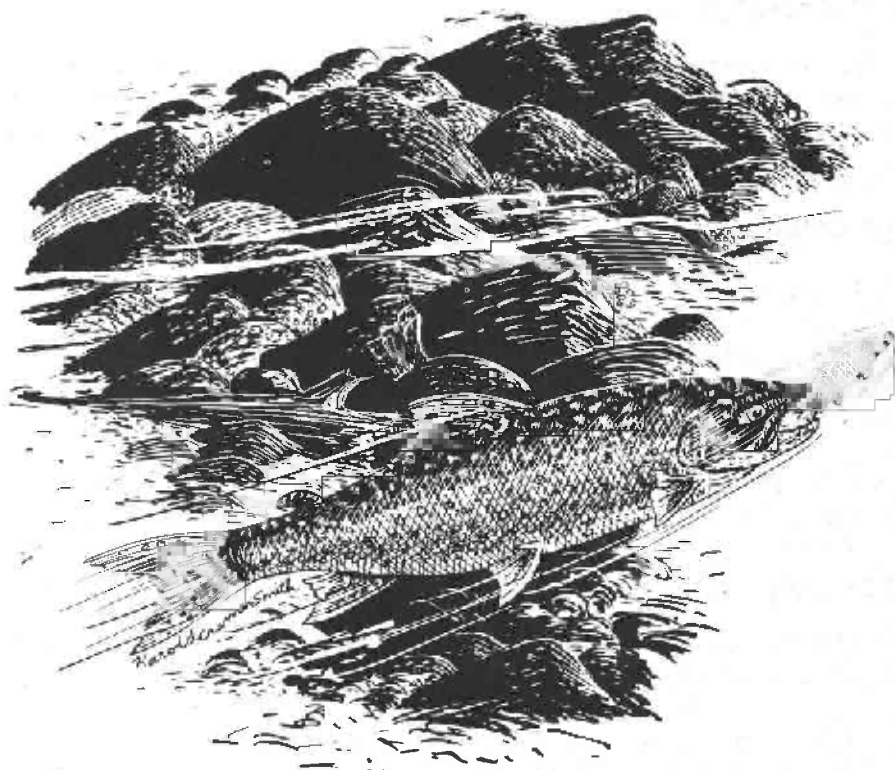
Creel and length frequency data are available in Tables 263 and 264.

The black bass and yellow perch in Devils Lake are increasing rapidly. Bass are now running to 4 pounds, and anglers are becoming more interested in them.

Yellow perch accounted for 48 percent of the 168 fish collected in gill nets in 1963.

#### Habitat Improvement

A thermograph was installed and maintained on the Siletz River at Logsdan. Flows, water temperatures, and dissolved oxygen samples were taken periodically from the South and North Forks of the Siletz River to determine the influence of pollution from Valsetz Lake on the Siletz River.



## COOS-COQUILLE DISTRICT

William I. Haight

## Fish Inventory

AnadromousSalmon Spawning Ground Counts

Coquille River coho salmon spawning ground counts for 1963 show an average of 20 fish per mile, which is low compared to the 1962 average of 51 fish per mile. Spawning ground surveys were hampered on many streams by high, muddy water conditions which lasted through much of the spawning period. The resulting counts indicate a smaller run than was actually present. Peak runs appeared in most streams in late December and early January. Jack salmon made up 40 percent of the total number of coho salmon observed on sample count areas.

Table 266 shows the coho salmon spawning ground counts by streams for the Coquille River system.

Table 266

Coho Salmon Spawning Ground Counts, Coquille River  
and Tributaries, 1963

Stream	Miles Counted	Adults	Jacks	Total Fish	Fish per Mile
<u>North Fork Coquille River</u>					
Main River	1.00	31	12	43	
Steinnon Creek	0.50	11	6	17	
Cherry Creek	1.75	11	9	20	
Middle Creek	1.00	7	0	7	
					20
<u>Middle Fork Coquille River</u>					
Rock Creek /1	1.00	5	8	13	
Rock Creek	0.25	1	1	2	
Slater Creek	0.50	28	31	59	
Big Creek	1.00	6	5	11	
					31
<u>South Fork Coquille River</u>					
Hayes Creek	1.00	4	0	4	
Salmon Creek	1.00	15	7	22	
					13
<u>East Fork Coquille River</u>					
Hantz Creek	0.25	1	3	4	
Steel Creek	1.00	9	1	10	
Elk Creek	0.75	5	7	12	
					13
TOTALS AND AVERAGE	11.00	134	90	224	20

/1 Rock Creek, tributary to Myrtle Creek.

Spawning ground surveys for the Coos River system show an average of 34 coho salmon per mile in 1963. Peak counts were made in the second week of November and the fourth week of December, but fish appeared in some streams through the middle of January. Counts are incomplete on some streams where surveys were hampered by long periods of poor water conditions. Jack salmon made up 30 percent of the total number of cohos counted on survey areas.

Coho salmon spawning ground counts for the Coos River system are listed by streams in Table 267. Two streams usually counted were not included in the table. Mettman Creek is no longer a representative spawning stream, so it was dropped from the list of sample areas. Williams River was not surveyed in 1963 because of continuously poor water conditions.

Table 267

Coho Salmon Spawning Ground Counts,  
Coos River System, 1963

Stream	Miles Counted	Adults	Jacks	Total Fish	Fish per Mile
<u>South Fork Coos River</u>					
Morgan Creek	1.00	22	4	26	
Big Creek	1.00	7	3	10	
Daniels Creek	0.75	13	1	14	
					18
<u>West Fork Millicoma River</u>					
Totten Creek	0.25	5	18	23	
Vaughn Mill Creek	0.25	24	6	30	
					106
<u>East Fork Millicoma River</u>					
Matson Creek	0.80	7	1	8	
Marlowe Creek	1.00	6	1	7	
					8
<u>Coos Bay Tributaries</u>					
Palouse Creek	1.00	52	16	68	
Larsen Creek	1.00	36	17	53	
Kentuck Creek	0.50	6	9	15	
					54
TOTALS AND AVERAGE	7.55	178	76	254	34

An exceptionally large run of coho salmon migrated up the East Fork Millicoma River in November 1963. Oregon Fish Commission hatchery people counted over 2,000 fish through their rack which is located above Allegany. They estimated that an additional 2,000 fish passed over the rack during a freshet. Considerable angling effort was spent on this run of fish and the success was high.

Table 268 gives a comparison of peak coho counts on the Coos and Coquille systems since 1958.

Table 268

A Comparison of Coho Salmon Counts,  
Coos and Coquille River Systems,  
1958-1963

Year	Fish per Mile by Stream System	
	Coquille River System	Coos River System
1958	15	10
1959	54	24
1960	17	27
1961	42	62
1962	51	43
1963	20	34

Chinook salmon spawning ground counts on the Coquille system for 1963 show an average of 51 fish per mile as compared to 50 fish per mile in 1962. Peak spawning counts were made in the last two weeks of November and the first week of December, but fresh runs were seen in the East and North Forks as late as December 28. Counts of spawning fish were made in many streams in October after the first good freshet, but the next good flows did not come until the middle of November.

On December 3, an exceptional count of 146 fish was made on the 3/4-mile sample area on the East Fork Coquille River. An earlier count of 40 fish had been made on this area on October 30.

The sample count area near Gaylord on the South Fork Coquille River was dropped because of extensive gravel removal.

Jack salmon made up 16 percent of the chinook salmon counted in the Coquille system.

The 1963 chinook salmon spawning ground counts for the Coquille system are shown in Table 269.

A remnant run of spring chinook salmon in the South Fork Coquille River apparently improved in 1963. Loggers reported counting 78 fish in one resting hole which was later dynamited. The number of fish killed may have been as high as 50. SCUBA was used early in September to investigate three resting holes, including the one that was dynamited. Thirty-one salmon were observed.

Chinook salmon spawning ground counts in the Coos River system show an average of 1.13 fish per mile, which is a slight decline from the 1962 average of 2 fish per mile. Peak counts were made in the first week of October and the third week of November.

A few chinook salmon which utilize gravel bars in the South Coos River early in October show indications of being spring-run fish. Trout anglers fishing the deep holes on that stream in August reported hooking chinook salmon.

Table 269

Chinook Salmon Spawning Ground Counts,  
Coquille River and Tributaries, 1963

Stream	Miles Counted	Adults	Jacks	Total Fish	Fish per Mile
<u>North Fork Coquille River</u>					
Main River	1.00	26	3	29	
Middle Creek	1.00	6	0	6	
					18
<u>Middle Fork Coquille River</u>					
Main River	0.50	38	13	51	
Rock Creek /1	1.00	19	6	25	
					51
<u>South Fork Coquille River</u>					
Main River	1.00	23	7	30	
Salmon Creek	0.80	19	2	21	
					28
<u>East Fork Coquille River</u>					
Main River	0.75	129	17	146	195
TOTALS AND AVERAGE	6.05	260	48	308	51

/1 Rock Creek, tributary to Myrtle Creek.

Landowners along the West Fork Millicoma River reported that an exceptionally large run of chinook salmon passed upstream in the third week of November. None of these fish were seen on the sample count area, but many carcasses were observed about two miles above the count area.

Table 270 presents the 1963 chinook salmon spawning ground counts for the Coos River system.

Table 270

Chinook Salmon Spawning Ground Counts,  
Coos River System, 1963

Stream	Miles Counted	Adults	Jacks	Total Fish	Fish per Mile
<u>South Coos River</u>					
Main River	7.00	4	0	4	
Williams River	0.50	3	0	3	
					0.93
<u>West Fork Millicoma River</u>					
Main River	0.50	0	2	2	4.00
TOTALS AND AVERAGE	8.00	7	2	9	1.13

Chinook salmon spawning ground counts on the Coos and Coquille systems are compared from 1958 to 1963 in Table 271.

Table 271

A Comparison of Chinook Counts,  
1958-1963

Year	Fish per Mile by Stream System	
	Coquille River System	Coos River System
1958	22	
1959	11	
1960	4	
1961	31	1
1962	50	2
1963	51	1

Coos Bay Salmon Fishery

A calculated catch of 21,077 coho and 991 chinook salmon were taken at a rate of 0.80 fish per angler during the 1963 Coos Bay salmon fishery. The total calculated catch of 22,068 salmon is 16 percent greater than the 1962 figure, and is the third highest recorded for the Coos Bay fishery. The 1963 rate of angler success is also the third highest recorded for this fishery.

An estimated 27,465 angler trips were made over the Coos Bay bar in 1963. This was 6 percent fewer than in 1962. The 1963 angler trip figure is a combined total of charter boat and skiff angler trips. Total catch records gathered from charter boat operators show that 6,804 angler trips were made on the ten charter boats operating out of Charleston. The Research Division, using U. S. Coast Guard boat counts as a basis, calculated that 20,661 skiff angler trips were also made.

The average number of anglers per skiff in 1963 was 2.35, while the number of anglers per charter boat was 5.14.

Table 272 presents calculated catch and angler information for the 1963 Coos Bay salmon fishery. A comparison of angling effort and catch from 1958 to 1963 is given in Table 273.

Table 272

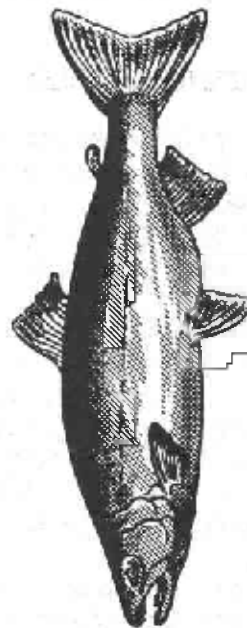
Calculated Sport Salmon Fishery,  
Coos Bay, 1963

Type Craft	Boat Trips	Angler Trips	Salmon			Fish per Angler
			Coho	Chinook	Total	
Skiff	8,787	20,661	13,073	616	13,689	0.66
Charter	1,283	6,804	8,004	375	8,379	1.23
TOTALS AND AVERAGE	10,070	27,465	21,077	991	22,068	0.80

Table 273

A Comparison of Calculated Sport Salmon Fisheries, Coos Bay,  
1958-1963

Year	Boat Trips		Angler Trips		Number of Fish			Fish per Angler			
	Skiff	Charter	Total	Skiff	Charter	Total	Chinook		Coho	Jacks	Total
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
1962	7,431	1,453	8,884	20,547	8,293	28,840	709	18,243		18,952	0.66
1963	8,787	1,283	10,070	20,661	6,804	27,465	991	21,077		22,068	0.80





Salmon catch data were gathered in 1963 at a rate of 5 days per week rather than 2.5 days per week as in previous years. As part of its evaluation study on Columbia River hatcheries, the U. S. Bureau of Commercial Fisheries supplied the Oregon Game Commission with additional summer employees, which resulted in the increased sampling at Coos Bay.

Standard Oil Company's seismic studies, conducted off the southern Oregon coast in June, were criticized by many Coos Bay commercial fishermen and charter boat operators. The fishermen blamed the offshore blasting for poor angling success, saying that the fish were being scattered.

#### Coquille River Salmon Fishery

Creel census data gathered from the 1963 fall salmon fishery on the lower Coquille River shows that 698 anglers interviewed caught 270 salmon for a success of 0.39 fish per angler, which is the highest rate of success recorded for this fishery. The catch of adult coho salmon declined slightly as compared to 1962, but the catch of jack salmon was more than doubled. Catch data for the fishery are given in Table 274.

Table 274

#### Sport Salmon Catch, Lower Coquille River, 1963

Month	Angler Trips	Coho	Chinook	Jacks	Fish per Angler	Hours per Fish
September	518	100	13	109	0.43	8.43
October	180	15	8	25	0.27	11.76
TOTALS AND AVERAGES	698	115	21	134	0.39	9.42

Table 275 presents a comparison of angler success on the lower Coquille River from 1955 to 1963.

Table 275

#### A Comparison of Coquille River Salmon Catch Success, 1955-1963

Year	Anglers	Salmon	Fish per Angler	Hours per Fish
1955	975	222	0.23	20.0
1956	790	232	0.29	14.3
1957	1,732	564	0.33	7.7
1958	2,455	730	0.30	10.0
1959	993	278	0.28	
1960	933	271	0.29	14.3
1961	849	241	0.28	16.7
1962	673	243	0.36	10.0
1963	698	270	0.39	9.4
TOTALS AND AVERAGE	10,098	3,051	0.30	

### Winter Steelhead Fishery

Winter steelhead anglers fishing the Coquille River system in the 1962-63 season caught fish at the rate of 0.16 fish per angler, or 22 hours per fish. Coos River anglers caught steelhead at the rate of 0.08 fish per angler, or 37 hours per fish. The Coquille River success figure is comparable to preceding years, but that for the Coos system is noticeably low. A long rainless period resulting in low water flows existed through much of January and into February. Continuous and unsuccessful angler effort in this period is largely responsible for the low angler success figures. Tables 276 and 277 show winter steelhead angler success for the 1962-63 season in the Coquille and Coos River systems, respectively.

Table 276

#### Steelhead Creel Data, Coquille River System, 1962-63

Stream	Anglers	Steelhead	Fish per Angler	Hours per Fish
Coquille River (Tidewater)	329	46	0.14	28
North Fork Coquille River	26	5	0.19	15
South Fork Coquille River	92	21	0.23	11
East Fork Coquille River	11	1	0.09	20
Middle Fork Coquille River	9	1	0.11	34
TOTALS AND AVERAGES	467	74	0.16	22

Table 277

#### Steelhead Creel Data, Coos River System, 1962-63

Stream	Anglers	Steelhead	Fish per Angler	Hours per Fish
Coos River	121	12	0.10	33
South Coos River	292	13	0.04	62
Millicoma River	130	15	0.12	27
Coos Bay Tributaries	47	6	0.13	15
TOTALS AND AVERAGES	590	46	0.08	37

Table 278 presents a comparison of winter steelhead success figures for the Coos and Coquille River systems since 1958. The combined steelhead angling success for the district in 1963 was 0.11 fish per angler, which is the lowest district average recorded for the winter steelhead fishery.

Table 278

Steelhead Angling Success by Year  
Coos and Coquille River Systems,  
1958-1963

System	Fish per Angler by Year				
	1958-59	1959-60	1960-61	1961-62	1962-63
Coquille	0.20	0.14	0.12	0.19	0.16
Coos	0.15	0.12	0.45 /1	0.13	0.08
AVERAGES	0.17	0.13	0.24	0.17	0.11

/1 The 1960-61 success figures are based on a comparatively small angler check.

### Shad Fishery

Shad were caught at a rate of 1.95 fish per angler, or 0.56 fish per hour during the brief spring run in the Coos River system. The fish became plentiful in the Millicoma River around the middle of May and angling was good until the first week of June, after which it turned spotty. Creel sampling results for the 1963 shad fishery are shown in Table 279.

Table 279

Shad Creel Data, Coos River System, 1963

Method	Anglers	Shad	Fish per Angler	Fish per Hour
Boat	150	321	2.14	0.52
Bank	54	76	1.41	0.77
TOTALS AND AVERAGES	204	397	1.95	0.56

The 1963 sport catch of shad was considerably better than that of 1962, but still below average. Table 280 shows a comparison of shad catch figures from 1955 to 1963.

### Striped Bass Fishery

Striped bass anglers fishing Coos Bay and the tidal areas of the Coos River system in 1963 caught fish at the rate of 0.15 fish per angler, or 0.05 fish per hour. This is the lowest rate of success recorded for the Coos Bay striped bass fishery. Table 281 presents creel sampling data for the 1963 striped bass fishery.

A comparison of striped bass angler success from 1950 to 1963 is given in Table 282.

Table 280

A Comparison of Shad Angler Success by Year,  
Coos River System, 1955-1963

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
1962	97	94	0.97	0.31
1963	204	397	1.95	0.56
TOTALS AND AVERAGE	1,784	4,026	2.26	

Table 281

Striped Bass Creel Data, Coos River System, 1963

Method	Anglers	Striped Bass	Fish per Angler	Fish per Hour
Boat	139	29	0.21	0.06
Bank	395	51	0.13	0.05
TOTALS AND AVERAGES	534	80	0.15	0.05

Table 282

A Comparison of Striped Bass Angler Success by Year,  
Coos River System, 1950-1963

Year	Anglers	Striped Bass	Fish per Angler	Fish per Hour
1950	3,708	1,507	0.41	0.08
1951	4,481	2,375	0.53	0.10
1955	769	216	0.28	0.07
1956	444	95	0.21	0.06
1957	1,711	823	0.48	0.09
1958	1,709	845	0.49	0.09
1959	787	340	0.43	0.08
1960	885	277	0.31	0.05
1961	1,078	387	0.36	0.08
1962	530	114	0.22	0.07
1963	534	80	0.15	0.05
TOTALS AND AVERAGE	16,636	7,059	0.42	

## Trout

### Lakes

Trout were caught at the rate of 2.28 fish per angler, or 0.92 fish per hour in Coos-Coquille District lakes in 1963. The trout season had a good opening at Empire Lakes where an estimated 20 percent of the catch consisted of holdover trout ranging up to 16 inches in length. Anglers at Bradley Lake had only fair success due to a high incidence of sublegal cutthroat trout. Public access had not been developed in to Bradley Lake prior to the opening of trout season, consequently legal trout had not been planted. The lack of good public access was also responsible for the low angling pressure on this lake. Squaw Lake provided good fishing, but it did not receive the expected angling pressure due to a late snow storm in the Eden Ridge area.

Creel census data showing catch success on district lakes are presented in Table 283.

Table 283

Trout Creel Data, Coos-Coquille District Lakes, 1963

Lake	Anglers	Trout	Fish per Angler	Fish per Hour
Squaw Lake	8	26	3.25	0.63
Empire Lakes	270	613	2.27	0.99
Bradley Lake	12	23	1.92	0.40
TOTALS AND AVERAGES	290	662	2.28	0.92

Trout samples were taken by gill net from all district lakes in March prior to the opening of trout season. Trout from Squaw Lake and Upper Empire Lake averaged less than 8 inches in total length, but those from Lower Empire and Bradley Lakes averaged over 8 inches in length. Several Bradley Lake cutthroat in the 7-inch size group were mature fish. All of the Bradley Lake fish had tapeworm infestations. Table 284 shows gill-net catch data for district lakes.

Upper and Lower Empire Lakes received plants of legal rainbow trout prior to the opening of trout season to compensate for a low population of legal fish.

A physical survey made on Bradley Lake in July revealed that the thermocline extended over 90 percent of the lake bottom. Water temperatures near the bottom were in the low 40s. Minimal water temperatures were as low as 42° F. The lake population of cutthroat trout are stunted, maturing as small as 6.8 inches in fork length. Large populations of cottids and sticklebacks are present in the lake.

A temperature study was conducted on Upper Empire Lake in August. A thermocline was found that covered approximately 75 percent of the bottom. The bottom temperature at that time was 48° F.

Table 284

Composition and Length Frequency of Catch by Gill Net,  
Coos-Coquille District Lakes, 1963

Lake	Number of Sets	Species	Number Taken	Percent of Total	Fork Lengths by 1-Inch Size Groups							
					5	6	7	8	9	10	11	12
Upper Empire	4	Rb	9	100		9						
Lower Empire	4	Rb	12	92				5	7			
		LB	1	8	1							
Bradley	4	Ct	59	86	1	9	31	7	6	2	2	1
		Cot	10	14	7	3						
Squaw	1	Rb	23	100		2	12	4	1	3	1	

Streams

District streams provided good catch rates on opening weekend of trout season with the exception of the North Fork Coquille River. Fair to good angling success continued in most streams for several weeks. Some native cutthroat up to 14 inches in length were caught.

Trout angling success varied from a low of 0.74 fish per angler on the North Fork Coquille River to a high of 4.10 fish per angler on the South Coos River. The district average of 2.93 fish per angler is comparable to preceding years.

Creel census data gathered on district trout streams in 1963 are listed by streams in Table 285.

Table 285

Creel Sampling, Trout Streams, Coos-Coquille District, 1963

Stream	Anglers	Trout	Fish per Angler	Fish per Hour
South Coos River	71	291	4.10	1.03
East Fork Millicoma	43	87	2.02	1.28
West Fork Millicoma	4	32	8.00	1.77
North Fork Coquille	58	43	0.74	0.50
East Fork Coquille	67	278	4.15	1.33
Middle Fork Coquille	14	41	2.93	1.28
South Fork Coquille	167	458	2.74	1.10
Middle Creek	14	54	3.86	1.02
TOTALS AND AVERAGES	438	1,284	2.93	1.10

Sea-run cutthroat trout were commonly taken as incidental fish by anglers on the lower Coquille River during the fall salmon fishery. Comparatively few anglers fished specifically for these fish.

#### Warm-Water Game Fish

Largemouth black bass appear to be doing well in both Empire Lakes. Gill nets set in Upper Empire Lake early in August captured 4 bass of the 10-inch size group. The 4 fish were apparently among the fingerlings which had escaped from Lower Empire Lake in September 1962. Many black bass between 7 and 12 inches in length were reportedly caught at Lower Empire Lake throughout the summer of 1963. Numerous bass fingerlings were observed along the shore of Lower Empire Lake in July, indicating that the fish had spawned successfully.

Little angling effort for bullhead catfish was observed on the Coquille River in 1963.

#### Nongame Marine Fish

A growing fishery for nongame marine fish has been observed at the Bandon south jetty, as well as several of the rocky points in the Cape Arago area. No creel census work was done on this fishery, but it is estimated that an excess of 2,000 angler-days were spent in 1963 at the Bandon jetty alone.

A year-round fishery exists to some degree for salt-water fish in the Charleston area of Coos Bay. Seaperch and flounder make up most of the catch.

Nongame marine fish were caught incidental to salmon during the summer fishery at Coos Bay at a rate of 0.08 fish per angler. Large schools of blackcod, which actually hampered salmon angling effort in 1962, did not appear in 1963. This accounts largely for the lower incidental catch in 1963. Table 286 lists the numbers of nongame marine fish which were caught incidental to salmon at Coos Bay.

Table 286

#### Nongame Marine Fish, Coos Bay, 1963

Species	Number of Anglers	Number of Fish	Fish per Angler
Rockfish	14,388	593	
Red Snapper		7	
Flounder		271	
Sole		123	
Lingcod		109	
Blackcod		3	
Halibut		11	
Greenling		30	
Cabzone		10	
Perch		4	
TOTALS AND AVERAGE	14,388	1,161	0.08

Albacore moved within 15 miles of the Coos Bay bar early in September when warm ocean currents shifted shoreward. Thirteen charter boat trips, including 69 anglers, were made from Coos Bay after these fish. The total catch was 203 albacore, or 2.94 fish per angler.

#### Habitat Improvement

##### Access

Three boat landings were completed in the Coos-Coquille District in 1963. The Millicoma River boat ramp and parking lot were completed in June by the Oregon Game Commission. Rocky Point landing near Randolph on the lower Coquille River and the Bradley Lake landing were cooperative projects between the Oregon Game Commission and Coos County. Both projects were completed in August.

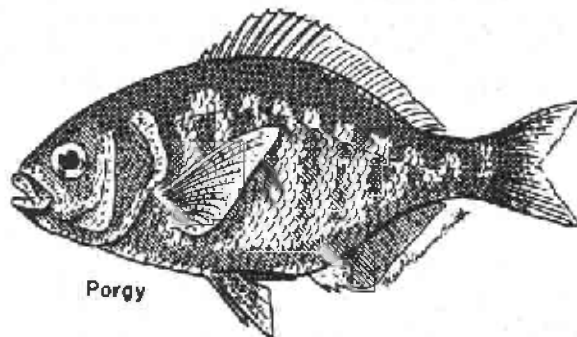
The U. S. Corps of Army Engineers completed the reconstruction of the Coos Bay south jetty late in the fall of 1963. The new jetty should enhance the bay's salt-water fishery.

The Coos Sportsmen Association, Inc., a newly organized Coos Bay sportsmen's club, spent several days removing logs and brush from the shore line of Lower Empire Lake. Angler access to the lake increased approximately one-third as a result of the club's work.

The Coos Bay Port Commission has plans to expand the Charleston Small Boat Basin by 395 boat berths. A 100-foot launching ramp is also planned.

##### Gravel Removal

Weyerhaeuser Timber Company has prohibited the removal of gravel from the South Coos River within the confines of its property. The action was taken when it became apparent that gravel removal work being done by Menasha Corporation was seriously reducing spawning potential for chinook salmon.





## SIUSLAW RIVER DISTRICT

William O. Saltzman

### Fish Inventory

#### Anadromous

##### Siuslaw River Tidewater Fishery

Catch estimates have been prepared for the fall cutthroat and salmon fishery on tidewater of the Siuslaw River as in past years. An increase in the take of sea-run cutthroat was recorded, but the catch of both chinook and coho salmon was low. Nearly 19 percent of the cutthroat examined by boat moorage operators were marked. A sample of 355 cutthroat checked by Game Commission personnel at the peak of the trout fishery revealed 97, or 27.3 percent, marked fish. The tidewater fishery statistics are summarized in Tables 287 and 288.

Table 287

A Summary of Statistics of the Siuslaw River  
Tidewater Fishery, 1963

Boat-Days	Calculated Catch			
	Cutthroat	Chinook	Coho	Jacks
7,788	14,634	319	1,209	3,089

Table 288

A Comparison of the Catch of Wild to Hatchery-Released  
Cutthroat Trout in the Tidewater Fishery  
of the Siuslaw River in 1963

Total Number Fish Checked	Wild Trout	Marked Trout	Percentage Marked
4,102	3,336	766	18.7

#### Coho Spawning Ground Surveys

A number of changes were made in the survey units for spawning coho on the Siuslaw River. Certain poor units were discontinued and some minor boundary changes were made in others. Seven additional survey units were established on Wolf Creek and the upper Siuslaw River area. The changes were made to provide a measure of the utilization by coho of the upper watershed of the Siuslaw River. Heretofore, all effort has been directed to the tributaries of the lower river. A summary of the data obtained is presented in Table 289.

Table 289

Peak Counts of Coho Salmon on Selected Tributaries  
of the Siuslaw River, 1963-64

Stream	Length of Survey Unit (Miles)	Number of Times Surveyed	Adults	Jacks	Total Fish	Fish per Mile
<u>North Fork</u>						
Billie Creek	1.25	2	10	3	13	
McLeod Creek	1.50	2	12	0	12	
<u>Wildcat Creek</u>						
Haynes Creek	0.75	1	4	0	4	
<u>Lake Creek</u>						
Fish Creek	1.00	2	12	3	15	
<u>Indian Creek</u>						
Taylor Creek	0.75	1	2	0	2	
Rogers Creek	1.25	2	11	2	13	
<u>Deadwood Creek</u>						
Misery Creek	1.00	3	1	0	1	
Panther Creek	0.75	1	1	1	2	
<u>Wolf Creek</u>						
Oat Creek	1.00	2	7	1	8	
<u>Upper Siuslaw River</u>						
Bounds Creek	0.50	2	5	2	7	
Edris Creek	0.25	2	1	0	1	
Oxbow Creek	0.50	2	4	2	6	
Dogwood Creek	1.00	2	10	3	13	
Doe Creek	1.00	1	0	0	0	
Hawley Creek	0.75	1	0	1	1	
TOTALS	13.25		80	18	98	7.4

Escapement of coho to the tributaries of Siltcoos, Tahkenitch, and Woahink lakes was generally good, as indicated by spawning ground surveys on these waters. The counts on the Siltcoos Lake units were comparable to the counts of last winter. A slight decline over last year was recorded for the two Tahkenitch Lake tributaries. The length of the survey section was extended slightly on the tributary of Woahink Lake to include a prime spawning area. Jack salmon were especially numerous on the Siltcoos Lake units and made up about one-third of all fish observed. A summary of the data is presented in Table 290.

Table 290

Peak Counts of Coho Salmon on Selected Tributaries  
of Lakes in the Florence Area, 1963-64

Stream	Length of Survey Unit (Miles)	Number of Times Surveyed	Adults	Jacks	Total Fish	Fish per Mile
<u>Siltcoos Lake</u>						
Maple Creek Units						
Maple Creek	0.75	1	56	26	82	
North Prong	0.50	2	52	29	81	
Henderson Creek	0.25	1	56	29	85	
SUBTOTALS	1.50		164	84	248	
Fiddle Creek Units						
Fiddle Creek	1.50	1	112	45	157	
Alder Creek	1.00	1	130	69	199	
SUBTOTALS	2.50		242	114	356	
TOTALS	4.00		406	198	604	151.0
<u>Tahkenitch Lake</u>						
Leitel Creek	0.75	1	86	41	127	
Fivemile Creek	0.75	1	162	48	210	
TOTALS	1.50		248	89	337	224.7
<u>Woahink Lake</u>						
Unnamed creek	0.25	1	156	34	190	760.0

Ocean Salmon Fishery

Salmon anglers fishing at the mouth of the Siuslaw River harvested nearly 65 tons of salmon in the summer of 1963. Favorable bar and ocean conditions, together with an abundant supply of salmon, were responsible for the excellent angling. Greater publicity given to this coastal fishery undoubtedly was effective in attracting more anglers to the area.

Intensive creel census efforts were directed to the fishery for the third consecutive year. Statistical analyses of the data were made by the Research Division.

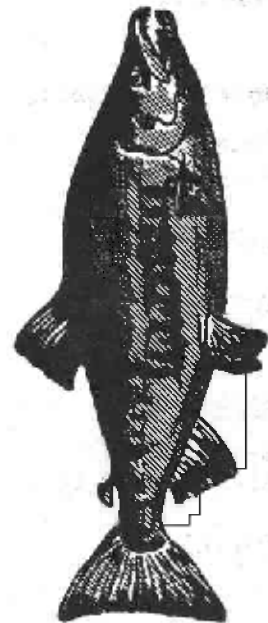
A summary of these data for 1961 through 1963 is presented in Table 291. The table also shows available Coast Guard boat count figures from 1957 through 1963.

Table 291

Ocean Salmon Angling Effort and Catch at the Mouth of the Siuslaw River  
from 1957 through 1963

Year / <sup>1</sup>	Boat Trips	Angler Trips	Number of Salmon Taken		Average Weight (Nearest 0.1 Pound)		Pounds of Salmon Taken	Salmon per Angler
			Chinook	Coho	Chinook	Coho		
1957	1,853							
1958	1,634							
1959	2,200 to 3,000							
1960	2,199							
1961	3,036	8,569	376	8,754	16.4	8.0	76,198	1.1
1962	2,964	8,190	330	6,848	23.7	8.6	66,714	0.9
1963	5,380	15,380	455	16,163	15.6	7.6	129,937	1.1

<sup>1</sup> A sampling program was not in effect prior to 1961.



## Trout

### Creel Census Studies on Coastal Lakes

Creel census records were obtained by Game Commission personnel and by boat moorage operators at various lakes in the district. Trout angling was generally good from the opening on April 20 through May. Planting smaller numbers of fish at more frequent intervals was effective in extending the fishery into the summer at Tahkenitch and Mercer Lakes. Trout of legal size released earlier in the year made up the bulk of the catch. Table 292 presents available creel census data for the fisheries at the various coastal lakes.

Table 293 presents a summary of the origin of the fish examined in the sport catch in 1963. Kokanee are included in the table. Differences in the table between Game Commission and moorage figures can be attributed to the fact that most Game Commission records cover the April and early May fishery, whereas the moorage reports are more complete for the May and June period. Moorage records are from Tahkenitch and Mercer Lakes only. Game Commission records are a composite from 15 lakes in the area. The table indicates that slightly over one-half of the catch examined was comprised of legal trout planted earlier in the season. Of these planted fish, twice as many cutthroat as rainbow trout were seen. Fingerlings released in 1962 contributed slightly over 25 percent of the fish observed. Wild cutthroat trout comprised less than 10 percent of all fish observed.

### Sea-Run Cutthroat Trout Fishery in Siltcoos River

Marked cutthroat trout again contributed heavily to the catch in Siltcoos outlet in the fall of 1963. Dam construction and a bypass tube delayed the normal migration pattern of the sea-run fish and intensified the fishery in the lower river. A summary of available data is presented in Table 294. Most of the marked fish were presumably from releases of trout of legal size in Siltcoos Lake earlier in the season. However, some of the fish were from releases of fingerlings in the lake in 1962. A single specimen bore marks indicating that it had been planted as a fingerling in Tahkenitch Lake in 1962.

### Warm-Water Game Fish

Length measurements of various warm-water species taken by the sport fishery were obtained whenever possible. These data are summarized in Table 295.

### Fish Population Studies of Coastal Lakes

Samples of the fish populations in various lakes in the district were obtained in the summer of 1963 by means of standard five-sectional experimental gill nets. The data are summarized in Table 296. Data from Siltcoos Lake were obtained as part of the weed control experiments on that water. Cutthroat trout records collected at Munsel Lake were obtained as a part of the coastal cutthroat investigations by the Research Division and are not included in the table. Records for all other fish taken are shown in the table.

Table 292

Creel Census Records from Coastal Lakes in the Florence Area,  
Spring-Summer 1963

Lake	Period	Method	Anglers	Hours	1963		1962				Total Trout	Trout per Hour
					Legal Plants		Holdover	Cutthroat	Wild	K		
					Ct	Rb						
Siltcoos	April 20-21	Boat	57	280	49	0	10	0	22	0	81	0.3
	May	Boat	6	14	0	0	0	0	1	0	1	<u>1</u>
	June	Boat	23	126	4	0	2	0	15	0	21	<u>1</u>
	July	Boat	33	153	6	0	0	0	8	0	14	<u>1</u>
	TOTALS		119	573	59	0	12	0	46	0	117	
Tahkenitch	April 20-21	Boat	20	61	0	0	13	0	11	0	24	0.4
		Bank	5	3	0	0	2	1	0	0	3	1.0
	April 22-30	Boat	15	64	1	6	7	1	14	0	29	0.5
	May	Boat	6	12	0	2	1	0	0	0	3	<u>1</u>
	June	Boat	50	221	73	44	2	0	6	0	125	<u>1</u>
TOTALS		96	361	74	52	25	2	31	0	184		
	April 20 to May 30 /2	Boat	104		9	157	150	0	47	0	363	
Mercer	April 20-21	Boat	12	34	0	1	3	1	0	0	5	0.1
	April 22-30	Boat	6	22	0	4	9	0	0	0	13	0.6
	TOTALS		18	56	0	5	12	1	0	0	18	0.3
	April 22 to May 31 /2	Boat	73		0	107	341	0	11	0	459	

Table 292 (continued)

Lake	Period	Method	Anglers	Hours	1963			1962			Total Trout	per Hour		
					Legal Plants		Holdover	Cutthroat	Wild					
					Ct	Rb				Fingerling			Legals	Ct
Sutton	April 20-21	Boat	58	139	6	10	0	0	0	13	0	29	0.2	
		Bank	19	31	1	3	1	0	0	7	0	12	0.4	
	April 22-30	Boat	10	47	13	15	0	0	0	1	0	29	0.6	
		Bank	6	18	9	1	0	0	0	1	0	11	0.6	
TOTALS			93	235	29	29	1	0	0	22	0	81	0.3	
Carter	April 20-21	Boat	34	96	47	0	0	0	48	0	0	95	1.0	
		Bank	67	102	61	0	0	0	46	0	0	107	1.0	
	April 22-30 July	Boat	6	9	8	0	0	0	0	0	0	8	0.9	
		Bank	22	49	28	0	0	0	0	0	0	28	0.6	
TOTALS			129	256	144	0	0	0	94	0	0	238	0.9	
Woahink	April 20-21	Boat	33	138	11	4	0	0	1	8	0	24	0.2	
		Boat	8	25	4	5	0	0	0	0	14	23	0.9	
	April 22-30 May	Bank	2	1	2	0	0	0	0	0	0	2	2.0	
		TOTALS			43	164	17	9	0	1	8	14	49	0.3
Cleawox	April 20-21	Boat	1	6	2	0	0	0	0	0	0	2	0.3	
		Bank	52	98	33	0	0	0	29	0	0	62	0.6	
	TOTALS			53	104	35	0	0	0	29	0	0	64	0.6

Table 292 (continued)

Lake	Period	Method	Anglers	Hours	1963		1962				Total Trout	Trout per Hour	
					Legal Plants		Holdover	Cutthroat	Wild	K			
					Ct	Rb							
Lost	April 20-21	Boat	7	18	35	0	7	4	0	0	42	2.3	
		Bank	21	37	17	0	4	4	0	0	21	0.6	
	April 22-30	Bank	15	25	17	0	1	4	0	0	18	0.7	
TOTALS			43	80	69	0	12	0	0	0	81	1.0	
Elbow	April 20-21	Boat	8	27	27	0	0	0	0	1	0	28	1.0
		Bank	13	20	18	0	0	0	0	1	0	19	1.0
	April 22-30	Boat	4	3	3	0	0	0	0	0	0	3	1.0
TOTALS			10	9	12	0	0	0	0	0	12	1.3	
Buck	April 20-21	Bank	43	62	64	0	1	4	1	0	0	66	1.1
	April 20-21	Bank	6	4	12	0	1	4	1	0	0	14	3.5
	April 20-21	Bank	7	16	19	0	0	0	0	0	0	19	1.2
Georgia	April 20-21	Boat	2	8	9	0	0	0	0	0	0	9	1.1
		Bank	20	17	36	0	1	4	0	0	0	37	2.2
	April 22-30	Bank	6	6	6	0	0	0	0	0	0	6	1.0
TOTALS			28	31	51	0	1	0	0	0	0	52	1.7



Table 292 (continued)

Lake	Period	Method	Anglers	Hours	1963			1962			Trout		
					Legal Plants		Holdover Cutthroat	Wild	Ct	K	Total		
					Ct	Rb						Fingerling	Legals
Earhart	April 20-21	Boat	8	22	24	0	0	0	1	0	0	25	1.1
	April 22-30	Boat	4	16	27	0	0	0	0	0	0	27	1.7
TOTALS				12	38	51	0	0	1	0	0	52	1.4

/1 Trout-per-hour figure not determined as most of effort at this time was directed to warm-water species; trout were taken incidentally.

/2 From moorage reports.

/3 From brood fish plant made in March 1963.

/4 Not marked, but presumably from release of fingerlings made in 1961.

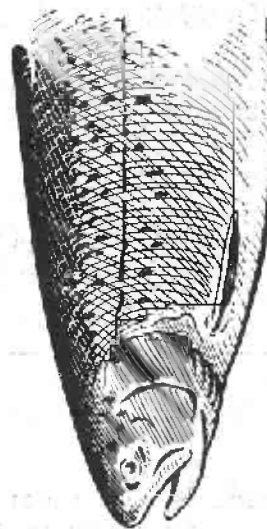


Table 293

A Summary of the Catch Composition of Trout  
Taken from Lakes in the Florence Area in 1963

Species	Source of Fish	Number of Fish Checked			Percent of Total
		Game Commission	Boat Moorages	Combined Total	
Rb	Legal plant, 1963	95	264	359	18.8
Ct	Legal plant, 1963	685	9	694	36.4
Ct	Holdover from fingerling plant made in 1962	39	491	530	27.8
Ct	Holdover from fingerling plant made in 1961	15	0	15	0.8
Ct	Holdover from legal plant made in 1962	7	0	7	0.4
Ct	Excess brood fish released in 1963	123	0	123	6.4
Ct	Wild stock	109	58	167	8.7
K	Fry plant made in 1961	14	0	14	0.7
TOTALS		1,087	822	1,909	100.0

Table 294

Creel Census Records from the Fall Cutthroat Fishery  
in Siltcoos River, September-October 1963

Number of Anglers Checked	Cutthroat			Percent Marked	Fish per Hour
	Wild	Marked	Total		
16	8	17	25	68	1.2

### Habitat Improvement

#### Stream Clearance

In the spring of 1963 the Siuslaw River system was inspected for log jams and other barriers to fish passage. All tributaries of any consequence have been inspected, and jams and debris in need of removal were reported.

Stream clearance activities were concentrated on the upper Siuslaw River above Lorane. Many miles of stream have been opened or improved for use by anadromous fish.

Table 295  
Length Measurements of Various Warm-Water Species  
Taken in the Sport Fishery in the Summer of 1963

Lake	Species	Number of Fish Measured	Length Range in Inches	Average Length in Inches
Siltcoos	YP	108	6.4 - 12.1	9.2
	Bg	6	5.3 - 8.4	6.6
	BC	2	7.2 - 7.5	7.4
	B	11	9.5 - 13.2	11.6
	LB	1	-	15.5
Tahkenitch	YP	49	6.1 - 8.7	7.0
	Bg	201	4.3 - 8.6	5.8
	WC	8	5.1 - 11.5	8.5
	B	42	9.0 - 10.8	9.8
	LB	15	10.6 - 22.1	16.9

Table 296  
Summary of Gill-Net Collections  
Made in the Summer of 1963

Lake	Number of Net Sets	Species	Number Taken	Length Range in Inches	Average Length in Inches
Siltcoos	29	Co	105	3.9 - 8.0	5.8
		Ct	35	8.0 - 14.3	10.2
		K	1	-	12.5
		YP	327	3.6 - 12.0	7.6
		Bg	122	2.3 - 9.3	6.0
		BC	22	4.0 - 12.0	7.1
		LB	5	3.3 - 10.4	6.9
		B	107	5.9 - 13.9	10.8
		Su	1	-	8.5
		Sq	1	-	14.0
		Cot	2	7.1 - 7.6	7.4
			728		
Tahkenitch	13	Co	4	4.2 - 6.2	5.4
		Rb	1	-	8.3
		Ct	3	7.3 - 12.1	9.8
		YP	22	5.1 - 8.0	6.8
		Bg	246	3.5 - 7.5	6.0
		Wm	4	3.7 - 6.2	4.7
		WC	3	7.1 - 8.3	7.5
		LB	2	10.3 - 13.2	11.8
		B	20	9.4 - 11.1	10.1
			305		

Table 296 (continued)

Lake	Number of Net Sets	Species	Number Taken	Length Range in Inches	Average Length in Inches
Woahink	29	K	121	6.3 - 10.9	9.7
		Rb	17	8.3 - 10.1	9.4
		Ct	9	8.0 - 13.8	10.3
		YP	152	5.6 - 11.6	8.2
		LB	5	10.1 - 14.2	12.2
		Sq	21	8.8 - 16.5	13.1
		Su	7	16.1 - 18.0	17.3
		Cot	4	4.0 - 7.8	7.6
			<u>336</u>		
Mercer	14	Co	18	4.4 - 6.0	5.1
		Ct	21	7.7 - 12.8	9.6
		Rb	2	10.8 - 11.4	11.1
		YP	290	5.5 - 10.9	7.7
		Bg	23	3.5 - 8.9	4.7
		BC	4	7.6 - 12.0	10.0
		B	1	-	10.0
			<u>359</u>		
Sutton	16	Ct	11	7.0 - 10.9	8.7
		Rb	6	7.6 - 15.8	12.6
		YP	181	3.4 - 13.4	8.2
		Bg	9	2.6 - 8.3	5.4
		LB	13	3.4 - 9.9	4.4
		B	10	9.5 - 11.6	10.5
		RsS	5	3.7 - 6.2	4.4
		Cot	1	-	3.8
			<u>236</u>		
Munsel	149	YP	148	4.5 - 11.2	7.2
		Bg	4	6.5 - 7.2	6.9
		Wm	1	-	6.7
		LB	2	6.9 - 8.5	7.7
			<u>155</u>		
Collard	10	Co	1	-	15.6
		YP	76	5.8 - 9.3	7.8
		Bg	10	3.5 - 7.2	4.7
		LB	2	7.0 - 7.2	7.1
		B	2	8.7 - 10.9	9.8
		Sq	8	5.7 - 11.5	8.6
			<u>99</u>		

Table 296 (continued)

Lake	Number of Net Sets	Species	Number Taken	Length Range in Inches	Average Length in Inches
Clear	18	Co	1	-	17.4
		Ct	5	9.6 - 13.4	10.6
		Rb	4	10.9 - 12.1	11.8
		YP	102	5.4 - 10.5	7.2
		Bg	1	-	6.3
		LB	3	7.3 - 9.3	8.5
		B	1	-	10.4
		Sq	41	4.7 - 17.1	12.0
		Cot	2	3.7 - 6.0	4.9
			<u>160</u>		
Carter	18	Ct	8	7.0 - 10.2	9.5
		LB	2	6.5 - 7.1	6.8
		RsS	16	3.7 - 4.2	4.0
		Cot	5	3.5 - 7.0	6.1
			<u>31</u>		
Cleawox	8	YP	33	5.5 - 9.8	7.7
		BC	5	6.8 - 8.0	7.2
		B	2	10.5 - 10.9	10.7
			<u>40</u>		
Lost	3	YP	37	5.4 - 8.9	6.8
Triangle	14	Ct	55	5.3 - 9.9	7.7
		Rb	11	8.4 - 10.2	9.1
		YP	45	5.0 - 8.0	7.1
		Bg	8	4.5 - 6.2	5.1
		B	26	6.6 - 9.6	7.8
		Su	3	17.5 - 18.6	18.1
			<u>148</u>		

## Miscellaneous

Special Studies

Studies have been continued on Triangle Lake in an effort to formulate the best management program for that water. Effort has been directed to the determination of the rearing potential of the lake for coho and steelhead. The Fish Commission of Oregon made releases of coho fry into the lake, and the Game Commission planted both adult and fingerling steelhead in the headwaters above the lake. Testing for the survival of out-migrants from these releases is planned for the spring of 1964.

# UMATILLA DISTRICT, NORTHEASTERN OREGON

David N. Heckeroth

## Fish Inventory

### Anadromous

#### Creel Census

Winter steelhead angling on the Columbia River tributaries during the 1962-63 season was similar to the preceding one as indicated by creel check data. The Umatilla River showed a slight improvement over last year in the hours per fish.

The shortened season again reduced the harvest of steelhead on the Walla Walla River. The fish do not appear in the Oregon section of the river until late March, and the March 15 closure in effect for the past two years precludes the anglers catching them.

Table 297 compares the winter steelhead angling success on the Umatilla and Walla Walla Rivers for the past four years.

Table 297

Winter Steelhead Angling Success,  
Umatilla and Walla Walla Rivers,  
1959-1963

River	Season	Year	Anglers Checked	Hours Fished	St Caught	Fish per Angler	Hours per Fish
Umatilla	12/1 to 3/15	1959-60 /1	266	800	70	0.26	11.4
		1960-61 /1	211	512	49	0.23	10.4
		1961-62	199	616	21	0.11	29.3
		1962-63	326	863	31	0.10	27.8
Walla Walla	12/1 to 3/15	1959-60 /1	51	104	2	0.04	52.0
		1960-61 /1	68	235	16	0.24	14.7
		1961-62	12	40	0		
		1962-63	42	114	4	0.10	28.5

/1 Denotes April 1 closure.

Winter steelhead angling on the Columbia River within the district was confined primarily to the McNary area. Boat angling success improved over the previous year, but bank angling success declined. Guided boat party success also showed a slight improvement. Table 298 compares winter steelhead angling success for the past two years on the Columbia River.

Steelhead anglers on the Columbia River during the summer season enjoyed success similar to that of 1962.

Table 298

A 2-Year Comparison of Steelhead Angling on the Columbia River  
During the Winter Season, 1961-1963

Method	Year	Dates	Anglers	Hours	Catch	Fish per Angler	Hours per Fish
Boat	1961-62	11/1-3/1	141	707	33	0.23	21.4
	1962-63	11/1-3/1	167	738	63	0.38	11.7
Bank	1961-62	11/1-3/1	188	673	20	0.11	33.7
	1962-63	11/1-3/1	439	1,644	30	0.07	54.8
Guided Boat	1961-62	11/1-12/31	16	65	19	1.19	3.4
	1962-63	1/1-3/2	19	73	18	0.95	4.1

Table 299 illustrates steelhead angling success during the summer season in the Columbia River for the past four years.

Table 299

Summer Season Steelhead Angling Success,  
Columbia River, 1960-1963

Method	Year	Anglers	Hours	Catch		Fish per Angler	Hours per Fish
				St	Ch		
Boat	1960	175	668	65	4	0.39	9.7
	1961	260	1,342	40	4	0.17	30.5
	1962	347	1,595	71	0	0.20	22.5
	1963	318	1,229	49	3	0.16	23.6
Bank	1960	257	774	43	4	0.18	16.5
	1961	93	452	6	0	0.06	75.3
	1962	272	986	25	3	0.10	35.2
	1963	132	475	7	0	0.05	67.9
Guided Boat	1960	8	35	5	0	0.63	7.0
	1961	3	7	2	0	0.67	3.5
	1962	31	123	27	0	0.87	4.6
	1963	18	66	15	0	0.83	4.4

#### Columbia River Salmon-Steelhead Angling Surveys

The study of Columbia River salmon-steelhead angling pressure initiated in 1962 was completed. Areas and periods of angling pressure revealed by the survey were submitted in a special report. The data may be used to set up a statistical study that will result in more accurate information on the salmon-steelhead catch in the eastern portion of the Columbia River.

### Physical and Biological Stream Surveys

The survey of a few small tributaries of Meacham Creek completed the field work for that system. Nearly 84 miles of stream were surveyed on the Birch Creek system this year. Lack of water prevented completion of that watershed, but only a few small tributaries remain.

Table 300 indicates spawning gravel classified by stream surveys done in 1963.

Table 300

#### Gravel Classified by Stream Surveys, 1963

Stream	Miles Surveyed	Square Yards Gravel per Mile		Total Gravel	
		Good	Marginal	Good	Marginal
Birch Creek	83.75	92	191	7,922	16,373
Meacham Creek	14.90	9	18	145	269

### Salmon-Steelhead Redd Surveys

Attempts were made to count spawning steelhead on tributaries of the Umatilla River, but murky water prevented good observation. One steelhead was seen on spawning gravel in Squaw Creek.

A search for salmon and redds in Hat Rock Creek disclosed only one salmon redd.

SCUBA was used to observe the Hat Rock Park swimming area to check reports of steelhead using the area for a resting pool. No steelhead were seen, but about 30 juvenile chinook were observed in the mouth of the creek near where redds had been seen previously.

### Trout

#### Creel Census

Inclement weather during the first two weeks of trout season kept angling pressure down and prevented stocking some of the smaller streams until high flows subsided. Fair angling prevailed as weather and stream conditions improved, but stream flows dropped quickly and much of the stream fishing was over by midsummer.

Table 301 presents creel census data for streams in the district.

McKay Reservoir started producing catches about midsummer when fingerling rainbow, stocked in April, reached legal size. Warm weather and a heavy algae bloom restricted angler efforts until late summer when a 30-fish bag limit was set for the lake in preparation for a complete drawdown. Good success was had until the October 15 closure.



Table 301  
Creel Census Data for Umatilla District  
Streams and Ponds, 1963

Water	Anglers	Hours	Catch by Species			Total Fish	Fish per Angler	Fish per Hour
			Rb	DV	Wf			
Birch Creek /1	73	173	169			169	2.32	1.0
Cutsforth Pond /1	5	13	17			17	3.40	1.3
McKay Creek	186	468	895			895	4.81	1.9
Mill Creek	18	35	30			30	1.67	0.9
Rhea Creek /1	5	18	20			20	4.00	1.1
Umatilla River /1	320	593	405	8	12	425	1.33	0.7
Walla Walla River /1	123	253	126	4		130	1.06	0.5
Weston Pond /1	66	142	119			119	1.80	0.8
Willow Creek /1	7	22	45			45	6.43	2.0

/1 Denotes waters stocked with hatchery fish.

Table 302 summarizes creel check data for McKay Reservoir.

Table 302  
McKay Reservoir Creel Census Data, 1963

Anglers	Hours	Catch Rb	Fish per Angler	Fish per Hour
117	347	477	4.1	1.4

#### Fish Salvage

Drawdown at McKay Reservoir was halted on September 14 with 1,200 acre-feet of water remaining. Seining in the pool below the outlet produced only 1,200 trout which were released in the South Fork of the Walla Walla River. Apparently, the fish had not left the reservoir in the great numbers experienced in the previous two years.

#### Lake Survey

McKay Reservoir was gill-netted in late May to check on growth of the trout stocked in April. Growth was estimated at 1 to 1.5 inches per month. Table 303 gives the results of the survey.

Table 303  
Gill-Net Survey at McKay Reservoir, May 1963

Number of Nets	Species	Catch by 2-Inch Size Groups			Total Fish	Percentage of Sample	Average Length of Maturing Females (Inches)
		4-6	6-8	8-10			
2	Rb	40	0	4	44	83	9.3 <u>/1</u>
	Su <u>/2</u>				12	17	

/1 3 fish.

/2 5 to 12 inches.

Another survey was made after drawdown was completed to determine if a good trout population remained in the lake. As can be seen by Table 304, a sizeable population was indicated. It was also revealed by the survey that white crappie had been introduced during the summer.

Table 304  
Gill-Net Survey at McKay Reservoir,  
September 25, 1963

Number of Nets	Species	Catch by 2-Inch Size Groups					Average Length of Maturing Females (Inches)
		4-6	6-8	8-10	10-12	12+	
1	Rb		131	99	1	1	12.5 <u>/1</u>
	WC	52					0.0
	Su <u>/2</u>						

/1 One fish.

/2 21 fish, 6 to 13 inches.

#### Warm-Water Game Fish

##### Creel Census

Spiny ray angling success in the Columbia River fell below that of 1962, but Cold Springs Reservoir improved considerably over 1962. Water conditions for crappie angling at Cold Springs were more favorable than in the past two years, and periods of excellent angling resulted. See Table 305.

##### Surveys

Table 306 reveals the results of a gill-net survey at Cold Springs Reservoir.

Table 305

Warm-Water Game Fish Creel Census Data, Umatilla District, 1963

Water	Anglers	Hours	Catch by Species						Total Fish	Fish per Angler	Fish per Hour
			LB	SB	WC	SG	BrB	CC	Rb	St	Ch
Columbia River	356	1,441	32			21	4	1		1	1
Cold Springs Reservoir	531	2,119	32		1,604		193		42		
Dodd Pond	10	29	10								
									10	1.00	0.34

Table 306

Gill-Net Survey at Cold Springs Reservoir, October 17, 1963

Number of Nets	Species	Catch by Size (Inches)						Total Fish	Percent of Sample	Average Length (Inches)	
		4-6	6-8	8-10	10-12	12-14	14-16			Maturing Females	All Fish
2	LB	1					2	3	3	14.0 <u>1</u>	11.8
	WC	3	33	37				73	76	7.7 <u>2</u>	7.8
	Su <u>3</u>							11	12		
	D		2					2	2		
	Sq <u>4</u>							3	3		
	Cp <u>5</u>							4	4		

1 One fish.  
2 Thirty fish.  
3 11 to 18 inches.  
4 9 to 12 inches.  
5 9 to 16 inches.

The survey results are somewhat misleading in that no bullhead catfish were taken in the sample. A large population of catfish is known to be present.

The average length of crappies taken in the sample shows an increase of 1/4 inch over the 1962 figure.

Table 307 compares population percentages at Cold Springs Reservoir for the past four years. It is felt that the figures do not necessarily reflect true fluctuations in the population composition, but rather may only be a result of some variation in sampling dates, type of net used, and location of net sets.

Table 307  
A 4-Year Comparison of Population Composition,  
Cold Springs Reservoir, 1960-1963

Month and Year	Type of Net	Percentage Game Fish				Percentage Trash Fish
		WC	BrB	LB	Total	
August 1960	Trap	68.8	21.6	0.4	90.8	9.2
September 1961	Trap	3.3	92.5		95.8	4.2
August 1962	Trap	43.6	19.3		62.9	37.1
October 1963	Gill	76.0		3.0	79.0	21.0

#### Habitat Improvement

##### Screen Program

The Walla Walla River screening project was completed, bringing the total number of screens on that system to 31. The installation of the new screens and improvements made on the bypass trap at the screen on the Little Walla Walla resulted in greatly improved salvage of migrants in that river system.

Lack of suitable water in the Walla Walla River below Milton-Freewater necessitated the hauling of migrants back upriver to be released. The use of a holding pond for future operations, to eliminate excessive handling, is being studied.

Because all ditches below the Westland Canal are now screened, hauling the fish from the Westland trap to the Columbia River was necessary only when flows below the trap were insufficient to carry the fish down naturally.

Breakdowns twice forced shutdown of the Westland screen. The screen is overloaded and is in need of enlargement. The screen on the Stanfield Canal is also in need of extensive repairs.

Chinook salmon juveniles appeared in the Westland trap for the first time in several years. Although only 81 were taken, it is felt many more were in the river because considerable water was going over the diversion dam at the time the fish were taken.

Table 308 summarizes screen bypass trap figures in the district for 1963.

Table 309 offers a comparison of the numbers of juvenile steelhead salvaged by the screen on the Westland Canal over the past ten years.

#### Water Sample Analysis

A water sample analysis program was initiated on the streams of the district. Information obtained will be of value in detecting and controlling pollution and in establishing water quality criteria for streams in the area.

Table 310 presents the results of the first series of tests made in the fall of 1963.

#### Weed Control

SCUBA was used to check on regrowth of weeds in Dodd Pond, which was treated with sodium arsenite in 1962. Although regrowth has occurred, the weeds are not as dense as before treatment.

#### Pond Development

A potential pond for a resident fishery was investigated. It is a gravel pit pond and is located near Emigrant Springs Park on Highway 30. It offers some value as a put-and-take pond. The Lands Section was requested to secure access from the State Highway Department.

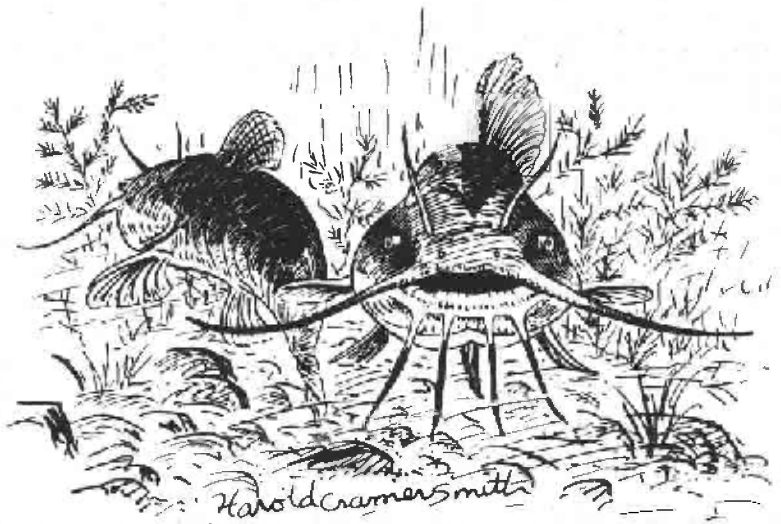


Table 308

## A Partial Sample of Downstream Migrants at Umatilla District Screens, 1963

Water	Screen No.	Dates of Operation	Fish Salvaged			
			Steelhead		Dolly Varden	
			Juvenile	Adult	Juvenile Chinook	
Umatilla River	7-61	3/24 to 6/28	20,513	538	81	
Little Walla Walla	7-100	4/24 to 11/23	5,360	63		28
Walla Walla	7-72	5/8 to 5/31	124			
	7-70	6/1 to 10/15	140			1
	7-65	5/24 to 11/15	2,181			65
Walla Walla, North Fork	7-97	6/1 to 11/8	411			11
	7-90	6/1 to 10/31	836			
Walla Walla, South Fork	7-83	6/1 to 8/8	53			3
	7-73	6/1 to 8/8	546			1
SUBTOTALS:						
Umatilla River			20,513	538	81	
Walla Walla River			9,651	63		109
TOTALS			30,164	601	81	109



Table 309

A 10-Year Comparison of Bypass Trapped  
Juvenile Steelhead at Screen No. 7-61,  
Umatilla River, 1954-1963

Year	Salvaged Juvenile Steelhead
1954	32,685
1955	6,276
1956	5,950
1957	9,092
1958	4,380
1959	27,418
1960	15,991
1961	50,128
1962	18,761
1963	20,513
10-YEAR TOTAL	191,194
10-YEAR AVERAGE	19,119



Table 310

## Water Sample Analysis on Umatilla District Streams, 1963

Stream	River Mile	Temperature in Degrees Fahrenheit		Flow in cfs	DO ppm	pH	CO2 ppm	Total		Percent DO Saturation
		Air	Water					Alkalinity	Alkalinity	
North Fork Umatilla River	0.5	72	54	25	10.3	7.5	20.0	4.0		95
South Fork Umatilla River	0.5	80	64	15	9.2	8.5	15.0	4.0		95
Main Umatilla River	91.0	66	54	40	10.1	8.0	15.0	3.2		93
	75.5	80	68	50	10.7	8.0	10.0	3.2		99
	56.0	80	62	40	10.0	8.5	10.0	4.0		101
	50.0	80	70	40	10.0	8.0	17.5	5.6		110
	33.0	72	59	20	10.1	8.0	20.0	4.8		99
	16.0	72	62	20	8.4	8.0	40.0	13.6		82
	1.0	82	64	12	18.7	8.5	5.0	14.0		160
Meacham Creek	30.0	48	43	3	12.6	7.5	30.0	5.2		102
	0.2	80	68	30	10.4	8.5	15.0	2.3		114
Birch Creek	16.5	80	63	5	10.3	8.0	17.5	15.2		105
	12.0	85	72	5	9.6	8.5	20.0	16.8		105
	6.5	85	72	5	8.6	8.5	20.0	19.6		97
	0.5	86	70	5	13.0	8.5	22.5	16.8		105
East Fork Birch Creek	11.0	80	61	5	8.7	8.5	22.5	5.6		87
West Fork Birch Creek	5.2	80	70	3	9.6	8.5	15.0	10.0		107



Table 310 (continued)

Stream	River Mile	Temperature in Degrees Fahrenheit		Flow in cfs	DO ppm	pH	CO <sub>2</sub> ppm	Total Alkalinity		Percent DO Saturation
		Air	Water							
North Fork Butter Creek	23.5	54	50	10	12.6	8.0	45.0	13.2		111
South Fork Butter Creek	18.5	58	50	5	9.5	8.0	45.0	10.0		83
Willow Creek	65.5	56	48	5	10.8	8.0	45.0	11.6		93
	51.7	54	60	5	9.2	8.5	40.0	19.6		92
	3.5	72	56	10	11.2	8.5	30.0	21.2		107
Rhea Creek	2.0	69	53	7	10.6	8.5	45.0	20.0		96
	21.0	56	52	7	10.0	8.5	40.0	14.4		90
North Fork Walla Walla River	0.5	50	52	5	11.0	7.5	20.0	4.0		100
South Fork Walla Walla River	0.5	50	49	70	12.0	7.5	20.0	3.6		105
Main Walla Walla River	41.5	76	63	13	10.7	8.0	15.0	3.6		110

# FISH PROPAGATION

C. C. Jensen

The Game Commission fish cultural program is maintained through the operation of 15 permanent hatcheries, plus from 12 to 15 egg-taking stations located on streams and lakes.

## Egg Production

A summation of hatchery egg production, including eggs imported and exported, is listed in Table 311. Of the 41.9 million eggs which were obtained, 20.7 million originated from wild fish within the State, 17.8 million were from hatchery brood stock, and 3.3 million were imported from other states and Canada. Approximately 10.8 million were exported to neighboring states and Canada.

Table 311

Annual Egg Production Including Eggs Imported  
from Other States and Countries, 1963

Species	Eggs from Wild Fish	Eggs from Hatchery Brood Fish	Eggs Imported or Exchanged	Eggs Exported or Exchanged
spring rainbow	143,046	4,581,631	25,000	
fall rainbow		11,017,748		1,036,820
Kamloops rainbow	13,224,311			8,105,807
cutthroat		2,121,572	167,895	25,160
brook trout	4,353,540			1,604,320
brown trout			300,104	
golden trout		39,401		
lake trout			185,918	
winter steelhead	1,252,736 125,000 <u>/1</u>			
summer steelhead	889,898		188,800	
coho salmon	310,167 <u>/1</u>			
spring chinook	328,443			
Atlantic salmon		78,796		
kokanee	7,600		2,439,769	
fall chinook	77,200 15,400 <u>/1</u>			
TOTALS	20,727,341	17,839,148	3,307,486	10,772,107
TOTAL INCOMING EGGS		41,873,975		

/1 Oregon Fish Commission

Rainbow trout eggs, including Kamloops (13.2 million), accounted for 75.1 percent of the eggs taken at Oregon installations. Table 312 summarizes the egg-takes by species for each station.

### Fish Production

For the calendar year 1963, a total of 20,677,326 fish weighing 1,074,340 pounds was liberated from the hatcheries (Table 313). Production in 1962 amounted to 22,726,484 fish weighing 939,842 pounds.

### Food Consumed

In Table 313 it is shown that brood fish were fed 211,906 pounds of food and that production fish consumed 2,137,454 pounds for a total of 2,349,360 pounds. The amount of fish food fed in 1963 increased by approximately 15.6 percent over 1962, while production of fish increased by 14.5 percent for the same period.

A summation of the type of fish food consumed over the past six years is shown in Table 314. Meat and fish products in the diets have decreased to approximately 7 percent in 1963 from a high of 82 percent in 1958, while pellets have currently increased to approximately 93 percent of the diets being utilized.

Of the 2.2 million pounds of pellets consumed by the fish in 1963, 93.4 percent were dry. Frozen Oregon moist pellets (Oregon Fish Commission formula), fed to spring chinook salmon at Rock Creek and Butte Falls Hatcheries, made up approximately 2 percent and frozen brood pellets about 4.6 percent of the total. The latter pellet was fed experimentally to brood fish at Roaring River, Oak Springs, Leaburg, Wizard Falls, Alsea, and Bandon Hatcheries.

### Conversion Ratios

A comparison of conversion ratios (pounds of food required to produce a pound of fish) over a period of six years is shown in Table 315. Ratios are computed on net production. For the past three years conversion rates have remained almost constant. The slight increase in 1963 may be a result of such factors as less favorable water temperatures, higher mortalities, and holding additional fish for liberation in 1964. The slight difference in total pounds produced and liberated, shown in Tables 313 and 315, is accounted for by the release of small groups of fish for other than liberation purposes.

In Table 316, a summation has been made of each lot of fish liberated in 1963. Food conversions and mortalities shown in this table represent true food to growth ratios by species for each hatchery from fry to liberation. The weight of the unfed fry was not deducted in calculating the net production. Mortalities include invisible losses and shortages. The average conversions in 1963 ranged from a low of 1.78 for rainbow trout to a high of 3.69 for kokanee. Of the remaining important groups of fish, food conversions were as follows: cutthroat, 1.84; steelhead, 2.32; brown trout, 2.37; and chinook salmon, 2.26.

Table 312

Number of Eggs Taken at Hatcheries and Other Egg-Taking Stations, 1963

Station	Spring Rainbow	Fall Rainbow	Kamloops	Cutthroat	Brook Trout	Golden Trout	Kokanee	Winter Steelhead	Summer Steelhead	Spring Chinook Salmon	Fall Chinook Salmon	Coho Salmon	Atlantic Salmon	Total
Alsea Hatchery (Fall Creek, ORC)				1,125,572				911,680			15,400	133,632		2,186,284
Bandon Hatchery (Lobster Creek)				996,000							77,200			1,073,200
Butte Falls Hatchery (McCloud Station, Rogue River)									335,600	89,900				425,500
Cedar Creek Hatchery								141,013						141,013
Diamond Lake			13,224,311											13,224,311
Fall River Hatchery (East Lake)	143,046				4,353,540									4,496,586
Gnat Creek Hatchery (Sandy River) (Big Creek, ORC)								163,197 125,000				176,535		464,732
Hood River Hatchery (Hood River)									95,997					95,997
Leaburg Hatchery		2,505,376												2,505,376
Oak Springs Hatchery		2,664,000												2,664,000
Roaring River Hatchery (Siletz River) (Freitenbush River)		5,848,372					7,600		195,532					6,051,504
Brook Creek Hatchery (Umpqua River)								36,846	262,769	238,543				538,158
Williamette Hatchery	4,581,631													4,581,631
Wizard Falls Hatchery						39,401							78,796	118,197
TOTALS	4,724,677	11,017,748	13,224,311	2,121,572	4,353,540	39,401	7,600	1,377,736	889,898	328,443	92,600	310,167	78,796	38,566,489

Table 313

Summary of Annual Fish Production Data  
for Calendar Year 1963

Station	Pounds of Food Fed to-		Total Pounds Food Fed	Fish Liberated from Hatcheries	
	Brood Fish	Fry, Fingerling, and Yearling Fish		Number	Pounds
Alsea	14,320	149,068	163,388	426,558	51,790
Bandon	2,434	83,938	86,372	808,294	34,272
Butte Falls		96,833	96,833	606,985	50,801
Cedar Creek		146,282	146,282	344,738	76,330
Fall River		36,125	36,125	3,339,788	12,694
Gnat Creek		79,097	79,097	432,384	30,597
Hood River		57,760	57,760	314,381	33,619
Klamath		93,731	93,731	3,496,035	57,266
Leaburg	24,455	399,525	423,980	2,500,813	195,370
Oak Springs	92,358	397,907	490,265	2,643,788	191,756
Roaring River	39,574	152,831	192,405	1,408,808	85,309
Rock Creek		136,187	136,187	610,632	78,092
Wallowa		31,682	31,682	189,384	29,369
Willamette	29,768	102,113	131,881	1,482,253	62,181
Wizard Falls	8,997	174,375	183,372	2,072,485	84,894
TOTALS	211,906	2,137,454	2,349,360	20,677,326	1,074,340

#### Cost of Operation

The fiscal year expenditures from 1957 through 1963 (taken from the hatchery financial statements) are illustrated in Table 317. Large capital expenditure contracts late in fiscal 1963 increased hatchery costs to \$983,397, which is the highest amount on record. Included were new water-supply systems, ponds, residences, wiring systems, and numerous lesser items. Feed costs increased from \$216,163 in 1962 to \$291,531 in fiscal 1963 (Table 318). The increase was caused by the production of more fish (from 939,947 pounds in 1962 to 1,075,458 pounds in 1963) and the new accounting system which does not take into consideration the food inventory at the close of the fiscal period. On hand was a total of 365,473 pounds of various kinds of fish food valued at approximately \$40,000.

Table 314

## Fish Foods Fed During Calendar Year as Recorded from Monthly Inventory Sheets

Type of Food	Gross Pounds of Food Fed 1963	Percentages of Each Type Used by Year					
		1958	1959	1960	1961	1962	1963
<u>Meat Products</u>							
Beef liver	87,350	7.40	10.39	8.39	5.31	4.25	3.72
Beef, tripe, spleen, lungs	48,790	25.55	13.80	10.95	4.59	4.39	2.08
Pork liver	5,505			1.53	0.75	0.89	0.23
Pork spleen, kidney	9,300	16.19	9.52	5.01	2.62	0.87	0.40
Lamb liver	1,500	1.40	0.33	0.81	0.62	0.36	0.06
Salmon viscera	7,120	28.62	31.81	13.71	5.47	1.45	0.30
Shrimp and ground fish	830	3.24	1.16	0.55	0.48	0.17	0.04
TOTAL MEAT PRODUCTS	160,395						6.83
<u>Meals (herring, cottonseed, middlings, milk, yeast)</u>							
	5,350	12.75	10.74	6.69	1.86	0.95	0.23
Salt	5,055	1.67	1.30	0.77	0.39	0.27	0.21
<u>Pellets</u>							
Clarks	1,543,305						
Smalls	490,963						
Hills	128						
Rangens	117						
Stocktons	442						
Oregon Moist Pellets, frozen	43,313						
Trouf Brood Pellets, frozen	100,576						
TOTAL PELLETS	2,178,844	3.18	20.95	51.59	77.91	86.40	92.73
GRAND TOTALS	2,349,644	100.00	100.00	100.00	100.00	100.00	100.00
/1 Total dry pellets.							

Table 315

Comparison of Conversion Ratios from 1958 through 1963  
Calculated from Fry, Fingerling, and Yearling Fish Produced at Each Station

Station	Net Pounds of Fry, Fingerling, and Yearling Fish Produced, by Years					Average Conversion Ratios by Years						
	1958	1959	1960	1961	1962	1963	1958	1959	1960	1961	1962	1963
Alsea	29,549	48,557	39,279	60,268	54,057	52,307	5.23	2.42	2.28	1.90	1.97	2.85
Bandon	21,700	26,120	19,379	33,232	43,478	36,647	5.07	2.36	3.10	2.00	2.09	2.29
Butte Falls	38,810	45,518	56,372	50,599	50,989	49,838	5.81	4.11	2.85	2.30	2.03	1.94
Cedar Creek	38,276	42,479	39,742	44,487	66,865	76,330	7.17	4.32	3.00	2.90	1.77	1.92
Diamond Lake	402	602	484	117	362							
Fall River	5,750	5,131	4,625	10,645	11,536	12,052	4.11	3.37	3.54	2.80	2.82	3.00
Gnat Creek				22,237	24,499	33,972				2.40	2.42	2.33
Hood River	21,283	19,326	33,160	33,919	28,614	28,834	5.42	5.04	2.17	1.70	1.84	2.00
Klamath	38,616	39,945	35,670	58,111	62,280	57,326	5.06	2.43	3.27	1.90	1.70	1.64
Leaburg	106,006	122,273	149,541	158,834	157,893	195,570	5.93	2.08	1.82	1.90	2.02	2.04
McKenzie	32,970	37,632										
Oak Springs	159,601	96,816	100,168	131,643	140,183	207,634	3.22	2.98	2.22	1.70	1.79	1.92
Roaring River	38,107	32,201	48,660	71,428	70,906	85,019	5.76	3.83	3.03	2.40	1.82	1.80
Rock Creek	39,202	55,109	62,410	99,196	56,478	75,826	5.07	3.53	3.08	1.90	1.95	1.80
Wallowa	22,279	23,143	27,261	27,869	31,828	17,921	3.37	5.09	2.56	2.60	1.96	1.77
Willamette	37,249	28,946	42,418	55,228	53,745	57,977	5.13	3.83	2.50	2.20	1.76	1.76
Wizard Falls	56,545	46,916	65,028	94,469	86,234	88,205	3.76	2.80	2.11	1.60	1.78	1.98
TOTALS AND AVERAGES	686,345	670,714	724,197	952,282	939,947	1,075,458	4.81	3.02	2.49	2.01	1.90	1.99

Table 316

## Summary of Feeding Results for Lots of Fish Closed in 1963

Species	Lot Number	Hatchery	Number Liberated and Transferred	Net Production in Pounds	Pounds Food Fed	Conversion	Total Mortality $\frac{1}{\text{Total}}$
AS	58.05	Wizard Falls	2,669	14	94	6.71	3,669
ChS	44.02	Bandon	31,610	545	823	1.51	5,250
	46.06	Oak Springs	59,706	963	3,996	4.14	7,110
	55.06	Rock Creek	93,087	15,318	31,755	2.07	10,694
	46.07	Butte Falls	71,407	16,246	38,175	<u>2.34</u>	1,801
Co	77.04	Gnat Creek	79,912	3,363	6,225	1.85	229
Br	71.01	Klamath	204,552	947	3,716	3.92	6,445
BT	67.04	Fall River	1,731,046	10,785	26,054	2.46	42,000
	67.04	Klamath	253,467	711	2,095	2.94	41,133
	67.04	Oak Springs	95,879	1,987	2,850	<u>1.43</u>	188,178
Ct	71.02	Wizard Falls	151,160	261	549	2.10	4,554
	44.04	Bandon	109,051	15,319	27,344	1.78	1,200
	43.06	Alsea	283,996	30,795	66,030	2.14	290,134
	43.06	Cedar Creek	215,105	60,850	103,570	<u>1.70</u>	63,353
GT	58.10	Wizard Falls	10,826	17	116	6.82	9,789
K	70.02	Wizard Falls	535,999	3,536	7,352	2.08	97,221
	76.02	Alsea	69,708	222	2,520	1.13	146,298
	76.02	Klamath	426,084	1,072	4,949	4.61	28,416
	76.02	Leaburg	216,000	675	3,064	4.53	10,212
	76.02	Roaring River	197,310	556	2,052	3.69	75,005
	72.08	Fall River	380,217	1,149	9,842	8.56	255,783
	72.08	Oak Springs	239,818	2,052	3,350	1.63	62,182
	73.10	Klamath	205,100	586	2,952	5.03	23,053
	73.10	Willamette	194,171	516	2,264	<u>4.39</u>	30,255
						3.69	



Table 316 (continued)

Species	Lot Number	Hatchery	Number Liberated and Transferred	Net Production in Pounds	Pounds Food Fed	Conversion	Total Mortality <sup>/1</sup>
Rb	48.01	Fall River	1,132,800	236			
	54.01	Bandon	515,700	2,290	3,065	1.33	11,200
	57.03	Fall River	26,220	57			
	57.03	Klamath	201,102	708	2,516	3.55	79,928
	59.03	Fall River	140,380	692	229	0.33	47,420
	53.05	Oak Springs	1,900,295	76,058	122,405	1.60	23,090
	54.06	Butte Falls	526,431	35,025	71,109	2.03	26,611
	54.06	Klamath	1,425,664	52,195	86,944	1.64	96,770
	54.06	Leaburg	200,563	74,926	125,368	1.67	2,542
	54.06	Roaring River	706,372	72,818	137,194	1.98	179,156
	54.06	Rock Creek	203,905	54,287	80,094	1.47	5,736
	54.06	Wallowa	56,644	14,176	27,890	1.96	33,356
	54.06	Willamette	147,723	36,681	64,866	1.77	7,989
	53.07	Hood River	165,270	27,158	48,616	1.79	79,928
	53.07	Wallowa	47,349	14,776	25,802	1.74	5,964
	53.07	Roaring River	15,051	4,071	7,074	1.73	155
	67.07	Oak Springs	283,654	113,129	204,931	1.82	37,745
	57.08	Wizard Falls	1,218,315	75,744	137,280	1.82	161,646
	59.09	Leaburg	1,243,291	111,179	214,629	1.96	402,454
	59.09	Willamette	55,422	10,744	19,177	1.78	6,858
St	72.01	Gnat Creek	68,208	753	1,350	1.79	37,792
	47.03	Cedar Creek	191,453	17,330	37,178	2.14	9,643
	68.03	Roaring River	26,179	3,410	7,070	2.07	4,065
	78.03	Gnat Creek	196,933	11,615	25,360	2.18	3,402
	46.05	Bandon	41,078	2,526	10,309	4.08	20,039
	55.05	Bandon	73,258	4,379	11,705	2.67	8,114
	77.05	Gnat Creek	155,174	13,027	23,875	1.83	4,123
	50.06	Gnat Creek	59,555	3,256	12,315	4.16	5,024
	43.07	Alsea	194,688	22,456	58,037	2.62	75,850
	50.07	Hood River	5,225	550	3,010	5.47	1,150
	55.07	Bandon	65,448	4,268	12,808	3.00	12,363
	68.08	Oak Springs	69,011	7,703	11,880	1.80	60,565
	68.08	Roaring River	18,017	2,310	2,690	1.16	1,050
	50.09	Gnat Creek	78,984	1,156	2,300	1.98	211
	46.12	Butte Falls	178,947	177	534	3.01	36
						2.32	

<sup>/1</sup> Total mortality includes shortages.

Table 317

Comparison of Total Fiscal Expenditures for Each Hatchery, 1957-1963

Station	Expenditures by Years <sup>/1</sup>						
	1957	1958	1959	1960	1961	1962	1963
Alsea	\$ 27,700	\$ 33,332	\$ 35,701	\$ 40,907	\$ 34,042	\$ 36,258	\$ 56,827
Bandon	25,457	27,745	27,995	26,936	32,819	32,450	79,102
Butte Falls	27,218	30,294	36,025	36,564	47,569	34,338	42,414
Cedar Creek	29,480	35,205	39,342	47,326	31,573	36,254	46,478
Diamond Lake	7,220	6,715	4,261	4,718	6,457	7,854	11,415
Fall River	16,882	18,802	18,950	17,627	21,427	23,169	26,380
Gnat Creek	1,340			27,296	31,531	37,493	50,831
Hood River	18,275	22,748	25,199	24,712	28,923	23,596	27,953
Klamath	37,734	38,236	34,076	35,274	39,230	42,173	47,477
Leaburg	60,071	77,666	74,994	64,986	57,355	66,291	92,059
McKenzie	28,576	33,697	24,587	9,679	631		
Oak Springs	57,371	77,722	67,535	70,108	66,761	73,053	123,829
Roaring River	32,777	36,395	36,823	40,155	63,289	40,569	74,580
Rock Creek	36,197	39,474	47,928	51,758	63,916	56,327	57,516
Wallowa	22,030	27,203	24,785	25,878	28,941	27,248	95,345
Willamette	33,313	42,813	43,641	39,856	37,294	40,944	46,674
Wizard Falls	35,437	40,772	36,198	35,865	46,348	42,607	94,511
TOTALS	\$497,086	\$588,826	\$578,046	\$599,654	\$638,114	\$620,624	\$983,397

<sup>/1</sup> The cents columns have been dropped.

Table 318

Comparison of Total Fiscal Expenditures for Feed Only, 1957-1963

Station	Expenditures by Years <sup>/1</sup>					
	1957	1958	1959	1960	1961	1962
Alsea	\$ 12,419	\$ 13,512	\$ 15,705	\$ 14,150	\$ 13,435	\$ 13,621
Bandon	9,482	8,672	8,374	6,089	8,021	8,410
Butte Falls	11,965	13,700	18,473	15,488	12,625	10,815
Cedar Creek	13,991	18,196	22,300	15,177	11,725	12,350
Fall River	2,027	3,563	4,480	2,433	3,450	4,038
Gnat Creek				224	6,539	6,741
Hood River	5,305	8,141	9,516	6,580	8,123	4,549
Klamath	15,629	12,531	10,835	9,082	11,905	11,594
Leaburg	29,963	45,110	45,993	27,653	29,089	29,564
McKenzie	11,804	15,164	6,084	1,776		
Oak Springs	31,815	48,085	40,914	38,626	34,234	38,419
Roaring River	16,834	17,435	18,530	19,921	20,256	19,883
Rock Creek	13,105	14,329	19,829	20,158	23,570	18,037
Wallowa	6,020	9,964	9,963	8,781	5,664	7,437
Willamette	12,821	20,342	22,259	16,046	15,403	13,586
Wizard Falls	15,937	18,931	14,558	15,134	15,669	17,119
TOTALS	\$209,123	\$267,681	\$267,819	\$217,325	\$219,716	\$216,163
						\$291,531

<sup>/1</sup> The cents columns have been dropped.

The gross cost of rearing one pound of fish in 1963 (disregarding food inventory) was \$0.91 (Table 319) as compared with \$0.66 for 1962. Liberation costs averaged \$0.085; thus with increased capital expenditures and existing food inventories, the average cost of liberating a pound of fish in a given water was \$0.995 in 1963. Cost of feed only was \$0.27 per pound of fish, which is a slight increase over \$0.23 in 1962.

The food fed to brood fish is included in the \$0.27 to cover cost of egg production. Based on feed only, eggs cost \$1.31 per thousand to produce in 1963 as compared with \$1.58 per thousand in 1962.

The average cost of a pound of fish food in 1963 was \$0.11, deducting the inventory--a slight increase over previous years. The addition of medicants to the foods has also increased the costs.

Production costs and related data in Table 319 are computed from the ending fiscal year financial statements, plus hatchery and liberation records based on a calendar year.

Fiscal year expenditures shown in the tables include hatchery salaries, materials and services, and all capital items except vehicles. Apportioned items such as pre-engineering, painting, Civil Service, retirement, Social Security, gas and oil, and office supplies are not charged specifically to the hatcheries on the financial statements (Gnat Creek and Leaburg excepted) and have, therefore, not been included in the production costs in this report. Also excluded is the cost of operating the one state-wide feed truck. It is estimated that the excluded expenditures add approximately \$0.05 per pound to production cost.

#### Disease Control

Sulfas, antibiotics, and other chemicals were used successfully to control parasites and disease problems in the hatcheries. Chondrococcus columnaris was effectively controlled in trout and steelhead with hour-long baths of malachite green solutions, plus the feeding of sulfamerazine. In salmon, Pyridylmercuric acetate (PMA) baths controlled columnaris at most stations. Furunculosis (Aeromonas salmonicida) and general septicemia (Aeromonas liquefaciens), common diseases of trout and salmon, were effectively treated with oral doses of Terramycin. Protozoan parasites and fungus were successfully treated using one or more of the following compounds: formalin, malachite green, salt, and acetic acid.

Sulfamerazine and Terramycin incorporated in the pellets were fed at levels of 5 and 3 grams, respectively, per 100 pounds of fish. In meat diets, the drugs were fed at a higher level.

Hepatoma of the liver was found in a few brood fish at Willamette and Roaring River Hatcheries, but was not found in yearling fish examined throughout the hatchery system.

Kidney disease (Corynebacterium sp.), discovered in yearling and fingerling cutthroat trout and kokanee at Alsea Hatchery, failed to respond to sulfa or Terramycin treatments.

Table 319

## Summary of Fiscal Year Production Costs, 1957-1963

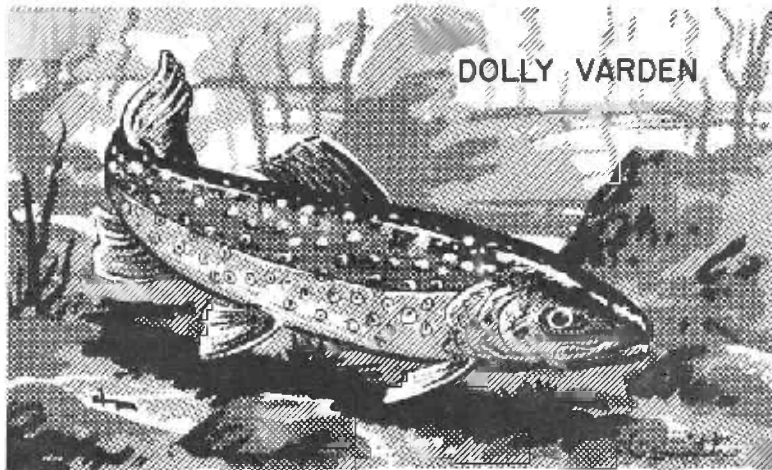
	1957	1958	1959	1960	1961	1962	1963
Gross pounds of fish liberated annually from hatcheries	516,395	706,279	685,773	729,530	951,838	939,947	1,075,458
Fiscal year costs of operation, including capital expenditure <sup>/1</sup>	\$497,086	\$588,826	\$578,047	\$599,654	\$638,114	\$620,624	\$983,397
Fiscal year costs for feed only (food inventory not deducted)	\$209,123	\$267,681	\$267,820	\$217,325	\$219,716	\$216,163	\$291,531
Gross rearing costs per pound of fish	\$ 0.9626	\$ 0.8337	\$ 0.8429	\$ 0.8220	\$ 0.6704	\$ 0.6603	\$ 0.9100
Rearing and liberation costs per pound of fish	\$ 1.0276	\$ 0.8987	\$ 0.9079	\$ 0.8870	\$ 0.7554	\$ 0.7453	\$ 0.9950
Rearing costs, feed only, per pound of fish (includes brood fish)	\$ 0.4050	\$ 0.3790	\$ 0.3910	\$ 0.2980	\$ 0.2308	\$ 0.2300	\$ 0.2700
Average cost of food per pound	\$ 0.0802	\$ 0.0843	\$ 0.0917	\$ 0.1004	\$ 0.1006	\$ 0.1068	\$ 0.1300
Pounds of food fed during fiscal year:							
First 6 months	1,210,551	1,306,062	1,670,965	292,098	870,660	937,708	944,839
Second 6 months	1,393,777	1,869,012	1,249,067	1,172,253	1,245,827	1,086,915	1,278,911
TOTALS FOR FISCAL YEAR	2,604,328	3,175,074	2,920,032	2,164,351	2,116,487	2,024,626	2,223,750

<sup>/1</sup> Excludes automotive and related supplies, feed transportation, salary overhead, retirement, postage, office supplies (Leaburg and Gnat Creek excepted).

<sup>/2</sup> Minus inventory.

Strawberry disease was found at Roaring River Hatchery among yearling fish being held for summer liberation. The causitive factor was not discovered.

A high mortality occurred among kokanee at Fall River Hatchery during an unusually heavy fall of jack pine pollen. Upon examination, it was discovered that the fish had ingested the pollen particles, probably mistaking them for pellets. Pollen, which contains small amounts of turpentine, is thought to be toxic to small fish.



## ANGLING REGULATIONS

Only minor adjustments were made in the opening dates for the trout seasons in 1964.

Through a cooperative agreement with the Idaho Department of Fish and Game, the sturgeon bag limit in the Snake River and its impoundments was reduced to one fish per day and two in any one year. Under a similar agreement the bass bag limit in the same area was also eliminated.

A special single-hook regulation was applied to a portion of the upper Rogue River in order to prevent the loss of spring chinook through snagging. This measure was supported by sportsmen's organizations and individual anglers of the upper Rogue area.

Eagle Creek, tributary to the Clackamas River, was closed to salmon angling April 1 to September 30 in order to permit an adequate escapement of adult fish to the U. S. Fish and Wildlife Service hatchery.

Areas on the McKenzie and North Santiam were closed to angling to protect adult chinook salmon. In addition, Rock Creek, tributary to the North Umpqua River, was designated a fly-only area to eliminate foul hooking spring chinook in resting holes.

The shad possession limit of ten fish was abolished but the daily bag limit was retained.

The special ten-fish bag limit for spring chinook in the Rogue River was eliminated in view of the magnitude of recent runs.

As the result of the imminent completion of Round Butte Dam on the Deschutes River, the trout season on Round Butte Reservoir and Pelton Reservoir was opened in April rather than with the late season.

Regulations on Klaskanine River and Big Creek were changed in order to permit a greater harvest of surplus hatchery coho jack salmon.

The steelhead season in Zones 7 and 9 was extended two weeks to the first of April. The catch of steelhead under the mid-March closure previously adopted practically eliminated the steelhead catch in Zones 7 and 9.

A fly-fishing-only regulation was applied to Fall River in Deschutes County.



## WARM-WATER GAME FISH

Ralph A. Grenfell

### Fish Culture

Physical development of the State's first warm-water game fish rearing area was completed in the fall of 1963. The facility is located 3 miles south of the town of Saint Paul in northwest Marion County.

There are ten ponds, each 1 acre in area and 5-acre-feet in volume; drawdown and fish recovery structures; well, pump, and water distribution line; a storage building; and 15 acres of land for future development.

The entire area of 35 acres is fenced.

### Fish Distribution

Channel catfish, 15,600 in number, were trapped in Brownlee Reservoir and hauled to the Willamette Valley. They ranged in size from 3 to 20 inches, averaged about 9 inches, and were distributed in the Pudding, South Yamhill, Willamette, and Long Tom Rivers.

Two hundred fifty adult bluegill were taken from Withy Lake near Amity for stocking in Willow Valley Reservoir.

Black crappie, bluegill, brown bullhead, and largemouth bass were planted in Gateway Park pond at Salem. Among them were 11,000 bass fry from the U. S. National Fish Hatchery at Miles City, Montana.

Releases of warm-water game fish are included in the liberation section of this report.

### Fish Inventory

#### Withy Lake

Withy Lake is a 15-acre oxbow of the South Yamhill River. It is 3 miles west of Amity on the Bellvue Highway. The lake was chemically treated and restocked with bluegill and largemouth bass in 1957. Flooding has introduced warmouth, cutthroat trout, white crappie, brown bullhead, squawfish, and suckers. No carp have been taken since the chemical treatment.

Experimental gill nets are used in an annual sampling of the fish population in Withy Lake. The catch in 1963 was nearly the same as in the previous year. All species are in excellent condition, with the bullheads and suckers so fat they seem deformed. Table 320 summarizes the sampling done in Withy Lake since restocking.

A pelletized aquatic weed killer, called Herbicide 191, was used on some test plots in Withy Lake. Applied at the rate of 2 ppm it was ineffective in reducing the dense growth of Canadian waterweed, *Anacharis canadensis*. Control of this plant is urgently needed because it destroys any possibility of fishing after early June.



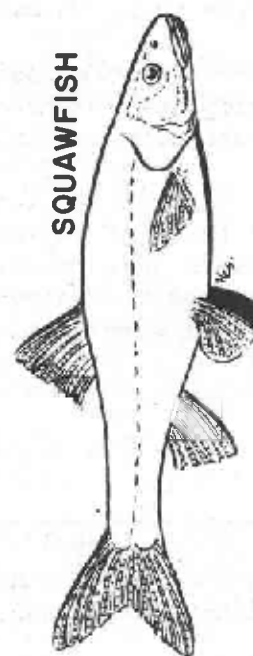
Table 320

Results of Annual Gill-Net Sampling in Withy Lake,  
1959-1963

Species	1959 /1			1960 /1			1961 /2			1962 /1			1963 /1		
	Number of Fish	Average Length in Inches		Number of Fish	Average Length in Inches		Number of Fish	Average Length in Inches		Number of Fish	Average Length in Inches		Number of Fish	Average Length in Inches	
Bg	10	6.3		10	5.5		32	5.8		14	5.6		6	6.6	
LB	3	13.2					5	8.3		4	6.5		2	12.4	
B	4	9.1		3	7.3		7	8.6		12	8.5		6	9.1	
Ct	5	9.1		1	8.9		11	8.2					1	9.8	
Wm				2	5.7		13	6.2		11	6.6		2	6.5	
WC				1	10.0					1	7.8				
Sq	6	7.4		2	7.4		10	7.2		8	10.0		10	9.1	
Su	4	9.4		23	11.2		14	12.5		19	11.7		2	12.0	

/1 Two gill nets set 24 hours.

/2 Two gill nets set 48 hours.



The rank growth of submerged vegetation completely disappeared following a week of cool cloudy weather in mid-August. The same phenomenon took place in 1962.

### Black Lake

Black Lake is a 10-acre oxbow of the Willamette River southeast of Corvallis. It is being used in an experiment to determine the effect of artificial fertilization on the growth rate of white crappie in a wild fish population. White crappie are the most abundant fish; hence, are considered here as an index species. Rough fish are not a problem in this lake.

Periodic activities carried out at Black Lake were population sampling, temperature gradient measurements, dissolved oxygen determination, turbidity measurements, and fertilizer application.

Population samples were made each month from March through October. A total of 345 white crappie was taken. Population samples are presented in Table 321. Statistical tests were applied to the catch data to determine the degree of confidence that could be placed in the sampling procedure. The same tests were applied to the 1962 catch of white crappie.

Table 321

#### White Crappie Sampling Data, Black Lake, 1962 and 1963

Year	Number of Fish	Length Range	Mean Length	Confidence Interval 95%
		Fork Length in Inches	Fork Length in Inches	
1962	141	4.4 - 8.5	5.5	$\pm 0.20$
1963	345	4.5 - 9.3	6.9	$\pm 0.09$

The high degree of confidence indicates that the samples are adequate and comparable.

Temperature gradients were measured monthly from March through October. In late March the temperature was a uniform 49° F. from the surface to the bottom at 14 feet. By July, thermal stratification had developed with the thermocline lying between the 3- and 5-foot levels. The stratification remained in the same position for the remainder of the summer.

During the five months from May to October there was an evaporation and percolation loss of 5 feet. The maximum depth of the lake decreased from 14 feet in May to 9 feet in October. These are quite shallow depths for a nearly weed-free water to undergo thermal stratification.

Dissolved oxygen determinations made in June, July, and August showed less than 5 ppm below the thermocline. This, then, would restrict fish to the upper 3 to 6 feet of water during most of the summer.

Turbidity measurements were made at monthly intervals using a standard 8-inch black and white quartered Secchi disk. This measure was intended to discern the changes in plankton turbidity brought about by the increased fertility of the water. Turbidity data for 1962 and 1963 are compared in Table 322.

Table 322

Turbidity Readings, Black Lake, 1962 and 1963

Month	1962 (Inches)	1963 (Inches)
March	/1	50
April	/1	53
May	52	60
June	29	47
July	26	30
August	32	27
September	/1	28

/1 No measurement.

It would appear, from a comparison of these observations, that the cooler weather during the summer of 1963 may have exerted considerable influence on plankton numbers.

The first fertilizer was put in the lake in April when surface temperature of the water was 50° F. Urea was applied at the rate of 33 pounds per surface acre and single superphosphate at 50 pounds per surface acre. Fertilization was carried on for seven months, with the last application on September 5.

Present plans call for continuation of this study for three more years.

#### Miller (Pine) Lake

Miller Lake is an oxbow of approximately 10 surface acres. It is one mile from the Black Lake mentioned above. It supports a large population of white crappie that do not get very big. A sample of 100 of the crappie was taken in October. Scale samples will be used to determine the age and growth rate of these fish. These findings will be used as a check, control, and a comparison against growth of the white crappie in the Black Lake fertilizer experiment.

Mean fork length of the 1963 sample was 6.4 inches. Sampling will be done annually.

As in Black Lake, rough fish are not a problem in Miller Lake.

#### Siltcoos Lake

Extensive beds of vegetation in protected bays of Siltcoos Lake were

spot treated with chemicals in an attempt to provide open areas for a fishery. Fishing in the weed-free area of Siltcoos Lake is frequently curtailed by heavy wave action from offshore winds. It was hoped that by opening small plots of vegetation in protected bays, anglers could fish during the windy periods of the day.

Two reasons are advanced for the singular lack of success: (1) the weeds are 4 feet under the surface so there was room for water circulation over the top of the weed beds; (2) the wind was evidently circulating the water at the time of treatment. These factors allowed dispersal of the chemical before it could affect the plants.

Experimental gill nets were set in each of the weed-control plots in late July, late August, and early October (Table 323).

The July net sets, with the weeds 3 feet below the surface, took 43 percent of the total catch of all fish. The August and October sets took 28 percent and 29 percent, respectively, of the total catch. At these times the weeds were surfaced or slightly under the surface.

Species distribution in Siltcoos Lake seems homogenous, and with the exception of largemouth bass, kokanee, and rough fish, some of each species were taken at each station some time during the summer.

In numbers, the yellow perch outstrip any other species, composing 45 percent of the total catch. Bluegill, brown bullhead, coho salmon, cutthroat, and black crappie followed the perch in order of abundance. There was a shift in the percentage of the catch of each species as the summer advanced and the weeds grew. The highest percentage (46 percent) of the yellow perch catch was taken in July when the weed growth had not yet surfaced. The highest percentage of the bluegill (40 percent), brown bullhead (52 percent), and black crappie (54 percent) catches were taken in the October sets when weed growth was at its very peak.

Four of the 10 sampling stations were located on straight shore lines, 5 in the apex of coves, and 1 directly off a long point. The nets were set at right angles to the shore line. The average catch of those set off a straight shore line was 74 fish, those set in the coves averaged 64 fish, but the one set off the point averaged 114 fish. Location of net sets seems to be an important factor in the number of fish taken.

#### Devils Lake

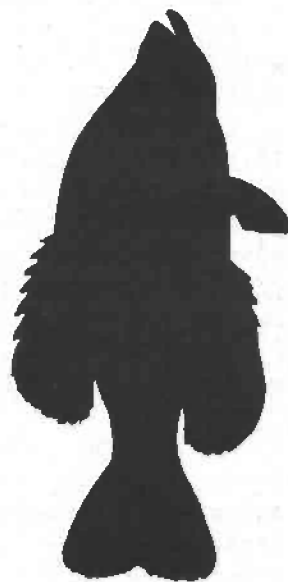
Aquatic weed growth in Devils Lake, Lincoln County, is a difficult problem. It virtually eliminates fishing from late spring until fall in most of the lake. Heavy winds during the winter of 1962-63 were thought to have removed most of the vegetation by wave action. Steps were taken to measure the rate of regrowth.

The first measurements were made on May 31, at which time all species were 3 or 4 inches in length.

Table 323

Summary of Gill-Net Catch in Ten Weed-Control Plots, Siltcoos Lake, 1963

Species	Plot No. 1			Plot No. 2			Plot No. 3			Plot No. 4			Plot No. 5			Plot No. 6			Plot No. 7			Plot No. 8			Plot No. 9			Plot No. 10			Average Length in Inches
	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	No. of Fish	Avg. Length in Inches	Avg. Fork in Inches	Total Fish			
YP	39	7.4	27	7.5	59	7.3	68	6.5	15	7.7	6	6.5	36	7.3	48	8.6	18	7.4	9	8.0	325	7.4									
Bg	11	5.6	24	7.2	5	5.2	2	6.8	2	4.3	35	4.6	15	6.8	7	7.1	11	5.0	12	6.0	124	5.9									
BtB	2	12.3	20	12.0	8	11.8	17	6.0	16	9.4	18	11.0	7	10.6	8	9.0	7	11.4	4	12.0	107	10.6									
BC	2	6.9	1	7.8	1	5.0	1	12.0	1	10.1	2	5.2	5	8.2	5	6.4	5	6.7	1	10.2	24	7.9									
LB	1	5.8			1	3.3											2	8.6	1	8.3	5	6.5									
Co	6	6.6	11	6.1	8	5.3	26	5.0	11	5.9			17	6.6	5	6.7	18	5.2	3	5.4	105	5.9									
Ct	8	11.1	2	10.5	1	10.4			8	8.9	1	8.7	7	11.0	1	8.0	4	9.5	3	9.6	35	9.7									
K													1	12.5							1	12.5									
Cot			2	7.4																	2	7.4									
Su			1	8.5																	1	8.5									
Sq														1	14.0						1	14.0									



The second measurements were made on June 20. SCUBA and a yardstick were used to measure the amount of growth on ten sample areas around the lake. The Canadian waterweed (Anacharis canadensis) was from 12 to 48 inches high, water milfoil (Myriophyllum sp.) was 24 to 36 inches, and Sago pondweed (Potamogeton pectinatus) was 36 to 48 inches high.

The third check was made July 15. All three species were surfaced in water depths from 0 to 10 feet. Complete regrowth had taken place in slightly more than 46 days.

Five of the weedier areas were sampled with experimental gill nets, while a sixth was sampled with the New York trap net. They were fished for a 24-hour period. The range and average length of the fish caught are shown in Table 324.

Table 324

Gill-Net and New York Trap-Net Catch,  
Devils Lake, Lincoln County,  
July 15, 1963

Species	Number of Fish Caught	Length Range (Fork Length) in Inches	Average Length (Fork Length) in Inches
YP	41 (16 trap net)	6.2 - 10.6	8.9
LB	7 (1 trap net)	7.0 - 15.3	11.8
Ct	6	6.7 - 9.2	8.2
BC	3	8.3 - 8.7	8.5
WC	3 (3 trap net)	6.0 - 9.6	7.2
BrB	2 (1 trap net)	11.6 - 12.8	12.2
Cot	2	7.6 - 7.7	7.7
Rb	1	20.5	20.5

Although the number of fish taken was not high, the size of the fish and their condition were excellent.

Despite the late date none of the crappie had spawned, nor had five of the bass.

During the course of the weed check with SCUBA, extensive beds of fresh-water clams were discovered. The largest of these clams measured 7 inches long and 3 inches deep in the shell.

#### Columbia River

Thirteen gill-net-days were utilized in sampling in the Bonneville pool between the dam and Hood River. See Table 325.

Table 325

Gill-Net Catch in Bonneville Pool,  
Columbia River, August 1963

Species	Number	Length Range (Fork Length) in Inches
Sturgeon	86	10.6 - 26.7
Steelhead	4	21.6 - 29.4
Chinook Salmon	1	15.0
Black Crappie	1	10.0
Coarsescale Sucker	70	7.0 - 18.5
Bridgelip Sucker	13	8.0 - 14.0
Squawfish	99	6.5 - 18.2
Chiselmouth	19	5.5 - 10.7
Columbia River Chub	10	7.0 - 11.8
Carp	11	6.2 - 17.0
Cottid	1	5.4

Game fish made up 29 percent of the total catch; the other 71 percent were various rough fish. The 86 sturgeon were 27 percent of the total catch and 93 percent of the catch of game fish. They averaged 17.9 inches fork length.

Smooth water and calm winds prevailed during a 24-hour period when four gill nets and a New York trap net were set in the Columbia at the mouth of the Willamette River. The trap net was torn by a boat but still caught 23 carp, 23 coarsescale suckers, 15 Columbia River chub, 6 black crappie, 4 squawfish, 1 white crappie, and 1 largemouth bass.

Results of the netting at the mouth of the Willamette are shown in Table 326.

Table 326

Gill-Net Catch, Columbia River  
at Mouth of Willamette River,  
August 14, 1963

Species	Number	Length Range (Fork Length) in Inches
Sturgeon	131	6.0 - 21.0
Yellow Perch	3	3.5 - 9.8
Coarsescale Sucker	11	8.2 - 15.5
Squawfish	11	9.2 - 14.5
Columbia River Chub	3	7.2 - 10.0
Carp	6	13.5 - 14.3

Game fish composed 81 percent and rough fish 19 percent of the total

catch number. Sturgeon made up 79 percent of the total catch and 98 percent of the game fish catch. Sturgeon in this catch averaged smaller (12.8 inches fork length) than those in the Bonneville catch. The average fork length difference is 5.1 inches less for the downriver catch.

#### Gilbert River and A-1 Slough

Three gill nets set overnight on July 17 in the Gilbert River on Sauvie Island took 13 carp, average fork length 13.4 inches; 5 brown bullhead, average 8.9 inches; and 1 largemouth bass, 7.0 inches. The nets were set about one mile above the A-1 Slough. Water was clear and cold.

A New York trap net was set in the A-1 Slough at the same time. See Table 327.

Table 327

#### Trap-Net Catch, A-1 Slough, July 17, 1963

Species	Number	Length Range (Fork Length) in Inches	Average Length (Fork Length) in Inches
White Crappie	81	5.5 - 8.1	6.6
Brown Bullhead	25	8.3 - 13.0	9.9
Bluegill	19	4.5 - 8.0	6.6
Black Crappie	13	4.5 - 7.1	6.2
Warmouth	6	4.8 - 8.0	6.0
Largemouth Bass	5	7.8 - 18.5	13.2
Carp	94	12.2 - 15.9	14.1
Sucker	1	18.4	18.4

The six species of game fish accounted for 61 percent of the catch. Two species of rough fish made up 39 percent of the catch.

#### Mill Creek

The New York trap net was fished in the forebay of the penitentiary diversion dam, in Mill Creek at Salem, for 48 hours. The catch consisted of 12 suckers and 9 squawfish.

A heavy deposit of slime bacteria collected on the net.

#### Kaub Pond

This oxbow of the Luckiamute River is located southwest of Monmouth, 15 miles above the Willamette River. It encompasses about 10 surface acres and is flooded annually by the Luckiamute River.

The owner of the property asked for assistance in determining the species of fish present. It was an opportunity to see if warm-water game fish species were present that far from the Willamette River.



Two gill nets were set overnight. They took 38 suckers, 5.9 to 13.8 inches; 8 squawfish, 6.3 to 9.2 inches; and 1 bullhead, 11 inches. Evidently the crappie and bluegill do not range that far up from the Willamette.

#### Haldeman Pond

Haldeman Pond is the name given the borrow pit at Oak Island on Sauvie Island. It was stocked with 4,800 largemouth bass fry on June 15, 1962.

The length range of 14 bass taken July 17, 1963, was from 6.3 to 7.0 inches fork length. Average length was 6.6 inches. These fish had grown an average of 6 inches in one year--a remarkable rate of growth.

#### Habitat Improvement

#### Gateway Pond

Liquid rotenone was used to remove a population of carp, suckers, bluegill, brown bullhead, squawfish, largemouth bass, black crappie, and pumpkinseed from Gateway Pond. Carp and suckers were the most abundant species and were the reason for the treatment.

Thirteen days after treatment some bluegill were live-boxed in the pond. They lived for four days and were released alive. The water temperature was 70° F.

Gateway Pond is in a Salem city park where angling will be allowed and encouraged. City engineers raised a dike to exclude the floodwaters of Mill Creek from the pond.

Bluegill, largemouth bass, black crappie, and brown bullhead have been restocked. Largemouth bass, planted as fry in early July, had reached a length of 4 inches by September 1. All other species were mature adults and were placed in the pond to produce spawn in the summer of 1963.

#### Age and Growth Studies

Ten years of scale reading and back calculating have given a good picture of what may be expected of growth rates in eight species of warm-water game fish found in Oregon. Fork length at completion of annulus for the eight warm-water species is shown in Table 328.

Scale samples from largemouth bass caught in the Willamette River by members of the Oregon Bass and Panfish Club, Portland, were aged. These fish were caught in the lower Willamette between the mouth of Johnson Creek and the mouth of the Clackamas River. Data from these fish are presented in Table 329.

The same information was taken from largemouth bass caught in Siltcoos Lake by a local resort owner and is shown in Table 330.

The Oregon Bass and Panfish Club also furnished scale samples from smallmouth bass taken in Arlington Slough off the Columbia River. Age and length of smallmouth bass from the area are shown in Table 331. This slough will be in the impounded area of the John Day Dam.

Table 328

Age-Length Relationship of Warm-Water Game Fish Collected Throughout Oregon,  
1953-1962

Species	Number of Areas	Calculated Fork Length at Completed Annulus Number										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
WC	51	1,117 (1.8)	940 (5.1)	463 (6.7)	195 (7.7)	57 (8.4)	14 (8.8)	5 (10.4)				
Bg	72	1,110 (1.4)	979 (3.5)	570 (5.1)	248 (5.9)	76 (6.5)	13 (7.2)	1 (10.4)				
BC	28	547 (2.0)	399 (5.1)	235 (6.8)	102 (7.8)	33 (8.6)	8 (10.8)					
YP	40	588 (2.7)	488 (5.1)	285 (7.0)	97 (8.0)	70 (9.0)	2 (10.9)					
SB	3	134 (2.8)	106 (6.9)	80 (10.4)	30 (12.5)	10 (14.0)	2 (14.5)	1 (15.8)	1 (17.0)			
Pk	6	55 (1.4)	45 (3.5)	14 (4.3)								
Wm	10	34 (2.4)	34 (3.7)	27 (4.8)	20 (5.7)	6 (6.1)	1 (10.2)	1 (10.7)				
LB	96	934 (2.8)	704 (6.4)	396 (9.5)	225 (11.6)	128 (13.2)	77 (14.6)	54 (16.0)	37 (17.2)	19 (18.2)	11 (19.1)	6 (19.4)

NOTE: Figures in parenthesis show average length in inches.

Table 329

Growth Data for Largemouth Bass  
Taken in the Lower Willamette River,  
1963

Year of Life	Number	Average Length in Inches	Average Weight	
			Pounds	Ounces
3	34	9.2	0	9
4	30	12.1	1	4
5	21	13.6	1	13
6	11	14.5	2	2
7	2	16.1	2	10
8	1	13.5	1	10
9	2	16.4	3	6
10	1	17.7	4	0
11	2	19.7	5	2
TOTAL	104			

Table 330

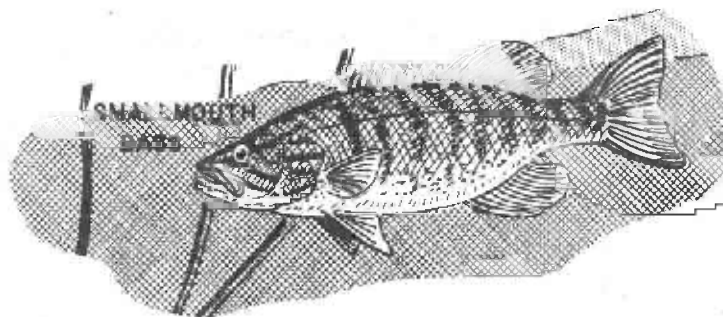
Growth Data for Largemouth Bass  
Taken in Siltcoos Lake,  
1963

Year of Life	Number	Average Length in Inches	Average Weight	
			Pounds	Ounces
2	9	10.3	1	2
3	21	12.4	1	3
4	9	14.7	2	6
5	1	15.0	3	6
6	4	16.3	3	2
7	7	17.0	3	8
8	7	17.4	3	10
9	7	19.0	4	13
10	4	20.6	6	2
11	4	21.6	6	13
12	4	21.9	7	10
TOTAL	77			

Table 331

Growth Data for Smallmouth Bass  
Taken from a Slough near Arlington, Oregon,  
1963

Year of Life	Number	Average Length in Inches	Average Weight	
			Pounds	Ounces
3	4	9.9	0	9
4	26	12.4	1	5
5	11	13.6	1	10
6	5	15.1	2	0
7	0			
8	1	17.0	3	4
TOTAL	47			



## OREGON SALMON AND STEELHEAD SPORT FISHERY

R. O. Koski

The 1963 sport catch of both salmon and steelhead was quite successful when catches, as determined by analysis of punch cards, are considered. The catch rate per angler of all who fished for salmon reached a new high, but for steelhead the catch rate dropped slightly.

Some generalizations can be made for the season. The Columbia River salmon catch held fairly steady as it has since 1960. The steelhead catch in this stream decreased slightly. The ocean catch of salmon increased greatly, due primarily to increased availability of cohos.

Other streams showing noticeable fluctuations are the Rogue River, which had a decline in the steelhead catch but a considerable increase in salmon, and the Yaquina and Siuslaw Rivers with salmon catches doubling the 1962 figures. The Alsea River exhibited a marked increase in salmon and an even more impressive jump in steelhead reported by punch card.

This is the first season's catch data to be presented, which includes a revised estimate based on a correction factor for nonresponse bias as determined by the punch card evaluation study. Table 332 presents the analysis for the 1963 catch, showing estimates derived from the original method of computation, as well as the corrected estimates.

For the purpose of correcting previous total catch figures for salmon and steelhead, estimating equations were developed by the authors of the punch card evaluation study. Table 333 presents revised total catch figures for years shown. The revised catch estimates have been obtained by a correction of an appreciable bias due to nonresponse (nonreporting anglers' catch less fish). The method and results of the study are fully reported in "An Evaluation of the Punch Card Method of Estimating Salmon-Steelhead Sport Catch" by Ronald H. Hicks and Lyle D. Calvin, Department of Statistics, Oregon State University. Deviation from previous catch estimates is shown as a percentage figure in Table 333. For the years shown, the revised estimates show a reduction in the salmon catch ranging from 17.9 to 28.2 percent, and for steelhead a range from minus 11.0 to a minus 17.3 percent. These revisions cannot be applied with any reliability to specific stream catches.

In 1963 there were 160,668 anglers who reported fishing for salmon and steelhead. This was an increase of only 1,286 anglers over the 1962 total. Surprisingly, there were some 5,000 less anglers fishing for such fish in 1963 than there were in 1959, the last year of the free punch card. Table 334 presents the participation and average catch of anglers for the period that punch cards have been used. Of interest is the relatively stable catch of both salmon and steelhead per angler for successful fishermen. The steelhead catch per angler for all fishermen has varied little from year to year, while the average catch of salmon for all anglers involved has increased significantly.

Table 335 provides estimates of the catch frequency for salmon and steelhead. It is interesting that some anglers reported catching more than the 20 fish of either species legally allowed.

Table 332

## 1963 Oregon Salmon-Steelhead Catch

	Salmon	Steelhead	Total
Number anglers receiving tags			236,277
Percent tags returned			30.87
Estimated number anglers not fishing			76,491
Estimated number anglers fishing--no catch			44,826
Estimated number anglers catching both			18,832
Estimated number anglers catching fish	95,335	38,465	114,955
Estimated number fish caught $\frac{1}{1}$	302,789	115,492	418,281
Estimated number fish per angler	$1.282 \pm 0.014$	$0.489 \pm 0.010$	$1.770 \pm 0.019$
Estimated number fish per angler catching	3.18	3.00	3.64
$\frac{1}{1}$ Revised estimates of catch using alternative method as described in "An Evaluation Of The Punch Card Method Of Estimating Salmon-Steelhead Sport Catch" by Ronald H. Hicks and Lyle D. Calvin.			
Estimated number fish caught	225,928	97,468	323,396
95 percent confidence limits on number of fish caught	250,751 - 201,105	119,886 - 75,050	356,886 - 289,906

Table 333

## Revised Total Catch Figures, 1955-1963

Year	Number Cards Issued	Percent Cards Returned	Salmon		Steelhead		Total Catch	Percent Deviation
			Catch	Percent Deviation	Catch	Percent Deviation		
1955	165,442	27.51	59,612	-27.6 <u>/1</u>	49,659	-16.2	109,271	-22.8
1956	166,386	34.48	118,175	-24.1	71,403	-14.2	189,578	-20.8
1957	135,230	51.41	106,959	-17.9	51,399	-11.0	158,358	-15.7
1958	215,410	32.08	95,944	-25.0	76,736	-15.4	172,680	-21.0
1959	285,700	23.46	158,958	-28.2	100,198	-17.3	259,156	-24.3
1960 <u>/2</u>	172,332	30.75	92,053	-25.5	80,175	-15.7	172,228	-23.6
1961	202,977	27.90	164,362	-26.5	69,613	-16.3	233,975	-23.7
1962	221,364	29.33	175,917	-26.0	106,067	-16.0	281,984	-22.5
1963	236,277	30.87	225,928	-25.4	97,468	-15.6	323,396	-22.7
AVERAGES		29.64	133,100		78,080		211,180	

/1 Deviation is shown as percentage difference from previous unadjusted estimates./2 Initial year for \$1.00 punch card.

Table 334

Salmon-Steelhead Angler Participation and Catch per Angler, <sup>/1</sup>  
1953-1963

Year	Anglers Receiving Tags	Percent Not Fishing	Catch per Angler			
			All Those Fishing		Successful Anglers	
			Salmon	Steelhead	Salmon	Steelhead
1953	173,216	45	0.53	0.51	2.56	3.12
1954	170,879	46	0.57	0.43	2.71	2.97
1955	165,422	50	0.49	0.36	2.66	2.83
1956	166,386	42	0.94	0.50	3.17	3.12
1957	135,230	45	0.96	0.43	3.27	3.07
1958	215,410	48	0.59	0.42	2.57	3.08
1959	285,700	42	0.77	0.42	2.80	3.21
1960 <sup>/2</sup>	172,332	34	0.85	0.46	2.80	3.22
1961	202,977	30	1.10	0.41	2.98	2.93
1962	221,364	28	1.07	0.57	2.90	3.09
1963	236,277	32	1.28	0.49	3.18	3.00

<sup>/1</sup> The nonresponse bias correction factor not applied to these estimates.

<sup>/2</sup> First year for \$1.00 charge.





Table 335

## 1963 Salmon and Steelhead Catch Frequency

	Salmon			Steelhead		
	Number Fish	Number Anglers	Total Catch	Number Fish	Number Anglers	Total Catch
Did not fish		23,688			23,688	
No catch		13,882			13,882	
Fished and caught		29,524			11,912	
Caught both species		6,078			23,690	
1		8,719	8,719	1	4,873	4,873
2		8,826	17,652	2	2,510	5,020
3		3,291	9,873	3	1,327	3,981
4		2,884	11,536	4	888	3,552
5		1,438	7,190	5	618	3,090
6		1,160	6,960	6	429	2,574
7		816	5,712	7	315	2,205
8		577	4,616	8	240	1,920
9		424	3,816	9	147	1,323
10		342	3,420	10	140	1,400
11		254	2,794	11	101	1,111
12		195	2,340	12	72	864
13		148	1,924	13	72	936
14		121	1,694	14	49	686
15		108	1,620	15	32	480
16		64	1,024	16	25	400
17		56	952	17	26	442
18		40	720	18	25	450
19		27	513	19	12	228
20		26	520	20	9	180
21		2	42	21	1	21
22		4	88	29	1	29
23		1	23			
24		1	24			
TOTALS		73,172	93,772		73,172	35,765



## FISH DISTRIBUTION

R. O. Koski

There were very few changes in the fish distribution program in 1963 when compared with the previous year. Slightly fewer fish were stocked than in 1962, but the total weight of fish distributed exceeded the million-pound mark for the first time. The reduction in numbers stocked was a result of decreased fry and fingerling releases. Yearling trout and steelhead smolts were stocked at a larger size than previously, adding to the total poundage figure.

In 1963 there were 21,339,046 fish stocked in State waters. This is a decrease of approximately 1.5 million from the 1962 total. The total weight of fish distributed amounted to 1,093,532 pounds, which was an increase of 138,694 pounds over the total in 1962. Eleven different species were released and 2,060 separate trips were required for the distribution. The numbers and pounds of each species released in each watershed are shown in Table 336. The release of fish from each hatchery to State waters is presented in Table 337. This table does not show the actual production of fish at each station, but only the numbers and pounds released. Production tables are included in the Fish Propagation section. Distribution from Hagerman National Fish Hatchery of fish received on exchange is not shown in Table 337, but the 741,342 rainbow trout weighing 19,671 pounds are included elsewhere as they were stocked with our equipment as a part of our regular program.

Planned stocking of required numbers of the various size-classes and species has continued within budgeted means. Steelhead smolt releases remained near the 1962 level, with expansion planned for the near future. Salmon yearling distribution increased somewhat but the annual production is dependent in part upon egg availability. Table 338 shows distribution for a 4-year period by size-classes and species.

Production of fish per licensed angler increased in 1963, as is shown in Table 339. The index is of interest by showing the need of increased production to maintain adequate stocks of fish for the growing army of anglers. Table 340 presents stocking information for steelhead and salmon for a 10-year period. A steady climb in steelhead production is evident, with immediate further expansion being planned. In view of the increased interest by all fishery agencies in the anadromous species of the Columbia River system, the stocking of steelhead there by the Game Commission is tabulated in Table 341.

Fish distribution tanks in use during 1963 numbered 25. Of this number, 14 were large truck units, with the remainder being portables for hatchery and incidental use. Five of the large units were equipped with refrigeration systems which have proven advantageous in providing increased load capacity.

Transfer of fish from one hatchery to another and the transplantation of wild fish, surplus to requirements, are activities of fish distribution personnel which are recorded separately from liberation tables. In this category there were 87 transfers made in 1963. The number of fish involved was 2,455,708 with a total weight of 41,755 pounds.

Table 336

Fish Stocking by Watersheds, 1963

Watershed	Rainbow	Outthroat	Brook Trout	Steelhead	Kokanee	Brown Trout	Lake Trout	Golden Trout	Chinook Salmon	Atlantic Salmon	Silver Salmon	Total
1		169,837 55,304.6		287,515 24,661.9							80,711 3,363.0	538,063 83,329.5
2	3,632,615 256,372.0	7,045 1,904.0	548,053 1,901.0		514,807 1,501.7			6,527 12.3				4,709,047 261,691.0
3	391,533 90,577.3	149,327 3,230.7	69,149 239.0	224,192 19,732.0	217,347 598.3			735 1.1				1,052,283 114,378.4
4	77,717 19,176.0		20,160 64.0	70,336 6,601.0	24,725 199.4							192,938 26,040.4
5	3,405,898 167,825.5		1,038,653 9,640.4		994,008 5,549.2	202,402 936.1	19,502 2,267.7	1,021 1.5		4,289 23.3		5,665,773 186,245.7
6	149,925 20,521.2		25,090 123.0	10,667 401.0	59,220 170.4							244,902 21,215.6
7	334,817 12,726.0											334,817 12,726.0
8	253,036 35,574.8		17,530 105.6		203,593 1,128.8							474,159 36,809.2
9	790,243 28,688.1	74,710 313.3	37,000 157.6									901,953 29,159.0
10	632,124 13,587.0											632,124 13,587.0
11	32,694 1,755.9											32,694 1,755.9
12	64,846 11,453.3	10,710 29.5	5,031 53.0									80,587 11,535.8
13	1,035,718 18,577.6		17,540 185.0									1,053,258 18,762.6
14	1,318,845 24,281.5		162,449 411.3		100,000 217.0							1,581,294 24,909.8
15	961,790 53,639.4	9,008 2,723.0	65,976 355.5	277,170 3,090.0	99,720 270.0				95,527 14,168.0			1,509,191 74,545.9
16	846,940 51,004.4	14,014 3,786.4	64,902 214.7	195,610 8,726.0	93,433 272.0				95,375 15,611.0			1,310,274 79,614.5
17	76,994 14,268.7	164,214 10,973.0			40,244 116.0							281,452 25,357.7
18	81,214 10,100.0	314,439 31,546.2		238,974 29,915.6	109,610 306.5							744,237 71,868.3
TOTALS	14,086,949 830,128.7	913,304 109,810.7	2,071,533 13,450.1	1,304,464 93,127.5	2,456,707 16,329.3	202,402 936.1	19,502 2,267.7	8,283 14.9	190,902 30,079.0	4,289 23.3	80,711 3,363.0	21,339,046 1,093,532.3

Note: lower figures denote pounds of fish.

Table 337

Total Release of Fish by Hatchery <sup>/1</sup>  
1963

Hatchery	Species	Number	Pounds	Total Number	Total Pounds
Alsea	Ct	165,532	28,948.2	426,558	51,789.7
	K	69,558	221.5		
	St	191,468	22,620.0		
Bandon	Ch	31,607	545.0	744,427	34,175.3
	Ct	414,699	21,385.3		
	Rb	1,988	604.0		
	St	296,133	11,641.0		
Butte Falls	Ch	63,920	13,923.0	606,776	50,787.8
	Rb	366,209	36,689.8		
	St	176,647	175.0		
Cedar Creek	Ct	182,068	59,316.7	344,304	76,147.6
	St	162,236	16,830.9		
Fall River	BT	1,652,278	10,526.4	3,339,158	12,694.9
	GT	8,283	14.9		
	K	378,617	1,145.0		
	Rb	1,299,980	1,008.6		
Gnat Creek	Co	80,711	3,363.0	432,365	30,597.0
	St	351,654	27,234.0		
Hood River	BT	70,245	223.0	314,129	33,614.7
	Rb	203,899	29,681.7		
	St	39,985	3,710.0		
Klamath	Br	202,402	938.1	3,484,342	57,121.0
	BT	253,166	714.5		
	K	629,280	1,653.4		
	LT	19,502	2,267.7		
	Rb	2,379,992	51,547.3		
Leaburg	K	215,380	673.0	2,499,928	195,330.2
	Rb	2,284,548	194,657.2		
Oak Springs	BT	95,844	1,986.2	2,637,746	191,685.6
	K	237,943	2,037.9		
	Rb	2,254,025	181,074.0		
	St	49,934	6,587.5		
Roaring River	K	197,100	555.3	1,399,831	85,210.9
	Rb	1,176,991	80,727.5		
	St	25,740	3,928.1		

Table 337 (continued)

Hatchery	Species	Number	Pounds	Total Number	Total Pounds
Rock Creek	Ch	95,375	15,611.0	612,626	78,065.5
	Rb	517,251	62,454.5		
Wallowa	Rb	187,964	29,290.7	187,964	29,290.7
Willamette	K	193,976	516.0	1,479,354	62,077.0
	Rb	1,285,378	61,561.0		
Wizard Falls	AS	4,289	23.3	2,077,529	84,872.1
	Ct	151,005	160.5		
	K	534,853	3,527.2		
	Rb	1,387,382	81,161.1		
TOTALS				20,587,037	1,073,460.0

NOTE: 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.

Table 338

Comparison of Numbers of Salmon, Steelhead, and Trout  
Yearlings, and Total Fish Stocked, 1960-1963

Year	Fry and Fingerlings	Yearling Trout	Yearling Steelhead	Yearling Salmon	Total
1960	14,086,171	2,354,859	381,164	103,453	16,925,647
1961	16,436,181	2,458,496	777,464	269,978	19,942,119
1962	19,246,294	2,613,366	881,302	166,432	22,907,394
1963	17,687,240	2,534,146	882,002	235,658	21,339,046

Table 339

Fish Production per Licensed Angler, 1957-1963

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 <u>/1</u>	766,310	1.70
1961	474,900 <u>/1</u>	976,917	2.06
1962	504,771 <u>/1</u>	954,838	1.89
1963	531,118 <u>/1</u>	1,093,532	2.06

/1 Includes daily anglers.

Table 340

Ten-Year Salmon and Steelhead Stocking Summary,  
1954-1963

Year	Steelhead		Salmon		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
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	207,602	22,783	579,614	64,906
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
1962	1,221,746	86,087	166,432	37,174	1,388,178	123,261
1963	1,304,464	93,127	271,613	33,432	1,576,077	126,559

Table 341

Releases of Hatchery Steelhead in Columbia River Tributaries  
by Oregon Game Commission, 1955-1963

Year	Winter Steelhead		Summer Steelhead		Total	
	Number	Pounds	Number	Pounds	Number	Pounds
1955	112,115	10,229	37,783	3,459	149,898	13,688
1956	107,432	12,162	63,168	4,338	170,600	16,500
1957	76,765	6,505	53,279	3,945	130,044	10,450
1958	72,616	2,393	1,800	200	74,416	2,593
1959	93,492	8,899	2,454	303	95,946	9,202
1960	96,882	14,648	32,536	2,843	129,418	17,491
1961	260,631	18,364	63,047	6,833	323,678	25,197
1962	276,937	20,876	45,264	2,659	322,201	23,535
1963	321,303	24,343	70,336	6,601	391,639	30,944

NOTE: Summer-run fish from 1955 through 1957 were stocked primarily in Deschutes system. From 1958 to date the releases have been in the Hood River system. Winter-run fish have been released primarily into the Sandy system and Columbia and Clatsop County tributaries. Fish in the above table were almost all full-term smolts or yearlings. A few odd thousand were 4- to 5-inch subyearlings.

The small isolated lakes in the mountains were again stocked by airplane. The program was conducted in July and early August on favorable flying days. Only 12 days of operation were required for the program. The contract cost for flying was \$6,922, compared with \$6,556 in 1962. A total of 361 lakes received fish in comparison with only 307 in the previous year. This brought the cost down from \$21.35 per lake to \$19.17 per lake stocked. Table 342 presents the stocking information for the air-stocking program by watershed and species.

Table 342

Air-Stocking Summary, 1963

Watershed	Brook Trout		Rainbow		Golden Trout	
	Number	Pounds	Number	Pounds	Number	Pounds
2	172,908	524.0	157,695	710.0	6,527	12.3
3	44,149	139.0			735	1.1
4	20,160	64.0				
5	131,222	404.0	13,585	63.0	1,021	1.5
6	5,130	15.0				
8			53,365	267.0		
9	17,100	50.0	5,093	25.5		
13			12,000	96.0		
14	32,055	82.5				
15	3,295	8.5	3,500	28.0		
16	14,646	37.7				
TOTALS	440,665	1,324.7	245,238	1,189.5	8,283	14.9

Warm-water fish distribution records are not combined with normal hatchery or liberation accounting. Areas in which warm-water fish were released during the year are shown in Table 343.

The cataloging of the lakes, reservoirs, and streams of the State is a never-ending task. New bodies of water are added each year, and corrections must be made when new information is obtained. The catalog is far from perfect, but is in constant use for public information and has also been requested by other agencies. In the past 15 years over 350 lakes have been added to the manual. Lack of personnel precludes any major revision of the stream section of the indexed catalog containing over 12,000 named streams. Table 344 is presented to show the geographical distribution of lake waters within the State. Not included are main stem Columbia River reservoirs and usually dry, large, lake basins located in the arid sections of the State.

Table 343

## Warm-Water Game Fish Stocking Record, 1963

Region	Water Stocked	Date	Species	Number Stocked	Size
					Fork Length in Inches
I	Long Tom River	4/24	CC	4,200	3 to 14
I	Pudding River	4/30	CC	2,800	3 to 20
I	South Yamhill River	5/3	CC	4,800	3 to 20
I	Willamette River	5/7 and 5/10	CC	3,800	3 to 18
I	Gateway Pond	6/14 to 10/4	Bg	20	6 to 8
			BrB	20	10 to 14
			LB	11,000	1
			BC	6	6 to 8
I	Blue Lake	7/1	LB	15,300	1
		7/8	LB	35,420	1
I	Haldeman Pond	7/8	LB	3,220	1
III	Willow Valley Reservoir	6/4	Bg	225	6 to 8
		7/8	LB	50,000	1
IV	Grande Ronde River	4/22	CC	640	3 to 12
		4/26	CC	2,686	3 to 14
V	Big Swamp Reservoir	8/6	LB	833	2.5

Table 344

## Regional Lake Water Summary

Region	Number of Lakes	Percent of State	Acreage	Percent of State
I	710	46.7	42,313	19.2
II	123	8.0	13,507	6.2
III	364	24.0	114,083	52.0
IV	179	11.6	8,645	3.9
V	139	9.0	40,499	18.5
TOTALS	1,515		219,047	



## FISHERY REHABILITATION

R. L. Borovicka

### Chemical Treatment

Undesirable fish populations were controlled with liquid rotenone in 3 major lakes and reservoirs, 2 river sections, and 10 small ponds. A total of 1,618 surface acres and 332 stream and river miles was involved in the rehabilitation. Table 345 is a listing of the chemical treatment projects accomplished in 1963.

### Special Projects

Two studies concerning habitat improvement in the John Day River system were active in 1963. Following are abstracts from each project. The complete reports are on file at the Oregon Game Commission office.

#### Habitat Improvement to Enhance Anadromous Fish Production

##### Abstract

Tex Creek, a tributary of Murderers Creek on the South Fork John Day River, was found to be intermittent by August 4, 1963. A total of 598 juvenile salmonids was salvaged from potholes and released in Murderers Creek.

Of the eight subterranean weirs installed since 1961, only the all-plastic weir which extended across the valley floor appeared to raise water in August.

The 1963 upstream-downstream trapping program on Tex Creek was terminated on June 26, 1963. A total of 767 juvenile and 12 adult steelhead was taken.

A spawning survey of the Clear Creek project was made in September. Two hundred ninety-two adult spring chinook and 117 redds were recorded with 90 percent of the redds on introduced gravel. The survey indicates that 253 female chinook may be nearing the maximum number of spawners that can use Clear Creek.

A high percentage of introduced gravel has been washed from the upper half of the project area. The technique of installing a log across the stream to stabilize this gravel appears very effective.

High water volume and velocity in Clear Creek may act as deterrents to steelhead use of the introduced gravel.

#### Reduction of Salmonoid Predators by Chemical Treatment

##### Abstract

Since chemical treatment of the test section of the John Day River,

Table 345

## Summary of Oregon State Game Commission Fishery Rehabilitation Projects, 1963

Name	Surface Acreage <sup>/1</sup> at Treatment	Normal	Water Volume Treated (Acre-Feet)	Location by County	Month of Treatment	Miles of Rivers and Streams Treated	Gallons of Rotenone Used	Species of Undesirable Fish Removed	Estimated Cost of Total Project	Restocking
Big Lava Lake	350	350	7,000	Deschutes	September	2	4,620	Roach Whitefish	\$20,360.00	Brook Trout
Bully Creek Reservoir	243	1,000	4,440	Malheur	October	88	2,768	Suckers Carp Shiners Squawfish	\$12,100.00	Rainbow Trout
Malheur River			3,500	Malheur	July - October	95	1,732	Suckers Carp Shiners Squawfish	\$11,400.00	Rainbow Trout
Crooked River, Lower			1,720	Crook Deschutes	August - November	90	860	Suckers Squawfish Chiselmouth Goldfish	\$12,192.00	Rainbow Trout
Cow Lake, Upper	975	975	5,320	Malheur	September	55	2,525	Suckers Squawfish Shiners Dace	\$12,775.00	Rainbow Trout
Miscellaneous Ponds	50	55	250	State-Wide	1963	2	125	Miscellaneous	\$ 2,500.00	Trout and Warm-Water Game Fish
TOTALS	1,618	2,380	22,230			332	12,630		\$71,327.00	

<sup>/1</sup> Irrigation and flood control reservoirs are chemically treated in the late summer or fall, at the time of lowest drawdown following irrigation season. Normal surface acreage is given to show the amount of the fishery area improved by chemical treatment.

population studies have been made by nets and electric shocker. Fish population sampling on the John Day River in 1963 was completed in August. Twenty-two stations containing 1,410 yards of river were sampled. Of 1,439 fish collected, 542 were rainbow. The estimated population indicated an increase of 15,551 fish over the 1962 estimate. Resident rainbow trout are providing a valuable trout fishery in the treated section.

### General Projects

During 1963 Game Commission district fishery biologists have investigated and reported 57 road construction or culvert projects, 106 cases of stream pollution, 230 locations of logging debris in streams, 139 instances of stream blockages to fish migration, 25 gravel removal and mining operations, and investigation of 52 water-right applications.

The Game Commission was charged with the responsibility of surveillance of seismic activities related to offshore oil explorations. Commission personnel acted as observers on the Standard Oil Company survey vessels.

The construction of Canyon Creek Meadows Dam was started in 1963. The 35-acre fishing lake is located on the headwaters of Canyon Creek, a tributary to the John Day River.

A complex of 10 one-acre warm-water fish-rearing ponds was constructed near St. Paul, Oregon. The ponds will provide populations of warm-water fish for stocking in rehabilitated lakes and reservoirs and to establish warm-water fish in other desirable areas.

A dike was constructed at the outlet of Sparks Lake in central Oregon to aid in increasing water depth and fishery production. The dike was a cooperative project with the U. S. Forest Service.

Stream clearance crews removed log jams and debris from 10 major coastal rivers and their tributaries. Projects completed in Tillamook, Clatsop, Washington, Lincoln, and Lane Counties made available to anadromous fish approximately 350 miles of spawning area that were previously blocked by log jams.

Approximately 1,100 rotary fish screens were in operation on water supply ditches in Oregon. The screens are installed primarily on streams that contain anadromous fish. Partial checking of screens with bypass traps gives an indication of the value of the program. Detailed listing of bypass trapping results are presented by district.



**Federal Aid Expenditures by Activity  
January 1 to December 31, 1963**

Description	Project Number	Federal	Expenditures	
			State	Total
<u>Coordination</u>	<b>FW-17-C-17 &amp; 18</b>	<b>\$ 12,755.09</b>	<b>\$ 4,251.70</b>	<b>\$ 17,006.79</b>
<u>Development and Operation of Access Projects</u>				
Schroeder Park, Rogue River	F-19-D-8	1,620.03	540.01	2,160.04
Alameda Bar, Rogue River	F-19-D-9	3,546.00	1,182.00	4,728.00
State-Wide Maintenance	F-29-D-6 & 7	1,353.38	451.13	1,804.51
Wocus Bay, Klamath Lake	F-53-D-2	4,520.62	1,506.88	6,027.50
Illinois Falls Fish Ladder	F-55-D-1 & 2	8,888.30	2,962.77	11,851.07
Gates Access, Umpqua River	F-57-D-2	7,918.61	2,639.54	10,558.15
Stambuck Access, Coos River	F-60-D-1	5,144.22	1,714.74	6,858.96
Canyon Creek Meadows	F-61-D-1	50,941.14	16,980.38	67,921.52
St. Paul Ponds	F-63-D-1	55,042.19	18,347.40	73,389.59
Bradley Lake Access	F-64-D-1	3,052.50	1,017.50	4,070.00
Winchester Fish-Viewing Station	F-68-D-1	1,261.87	420.63	1,682.50
Stream Flow Studies	F-69-R-1	3,969.88	1,323.30	5,293.18
<u>Fishery Rehabilitation Projects</u>				
Bully Creek	F-2030	11,034.62		11,034.62
Miller Lake	F-20-D-11	235.83	78.61	314.44
Malheur Reservoir	F-20-D-18	5,985.44	1,995.15	7,980.59
Unity Reservoir	F-20-D-19	1,919.98	639.99	2,559.97
State-Wide Rotenone	F-20-D-20	1,687.50	562.50	2,250.00
Upper Cow Lake	F-20-D-21	6,501.81	2,167.27	8,669.08
Crooked River	F-20-D-22	8,607.92	2,869.31	11,477.23
Big Lava Lake	F-20-D-23	4,782.22	1,594.07	6,376.29
<u>Acquisition of Access</u>				
Martin Tract, Rogue River	F-2-L-7	16,701.55	5,567.18	22,268.73
Mapleton Tract, Siuslaw	F-23-L-3	4,113.26	1,371.09	5,484.35
Roberts Tract, Drews Reservoir	F-56-L-1	4,816.87	1,605.63	6,422.50
Bunnele Tract, Klamath Lake	F-66-L-1	2,795.62	931.88	3,727.50
<b>TOTAL EXPENDITURES</b>		<b>\$229,196.45</b>	<b>\$72,720.66</b>	<b>\$301,917.11</b>

**Fishery Resource Expenditures**  
**Fiscal Year July 1, 1962 to June 30, 1963**

<u>Fish Resource</u>	<u>Expenditures</u> <u>Fiscal Year</u>
Basin Investigations	\$ 53,373.92
Fishery Administration	86,793.53
Fish Propagation	62,558.90
Alsea Hatchery	45,145.47
Bandon Hatchery	45,627.35
Gnat Creek Hatchery	50,830.93
Butte Falls Hatchery	40,203.05
Cedar Creek Hatchery	41,349.21
Diamond Lake Hatchery	11,414.82
Fall River Hatchery	25,936.16
Hood River Hatchery	27,513.23
Klamath Hatchery	44,287.30
Oak Springs Hatchery	96,752.20
Roaring River Hatchery	50,793.39
Rock Creek Hatchery	56,736.93
Wallowa Hatchery	32,946.43
Willamette Hatchery	43,068.10
Wizard Falls Hatchery	54,999.12
Leaburg Hatchery	92,058.58
Fishery Habitat Improvement	783,346.99
Sandy River	713.37
John Day Screen Shop	43,117.56
Central Point Screen Plant	42,637.83
Lake and Stream Management	238,279.23
<b>TOTAL</b>	<b>\$2,070,483.60</b>

OREGON STATE GAME COMMISSION HATCHERIES

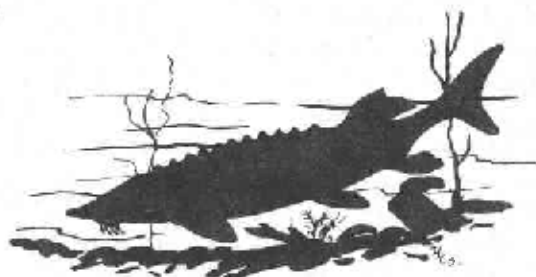
1963

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	Chemult	James H. Olsen
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	William C. Wingfield
Rock Creek	Idleld Park	Raymond F. Culver
Wallowa	Enterprise	John D. Bliss
Willamette	Oakridge	Henry J. Reed
Wizard Falls	Camp Sherman	K. E. (Gene) Morton

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Wetherbee, J. J.	Field Agent, Aquatic Biologist	Central Willamette District

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.



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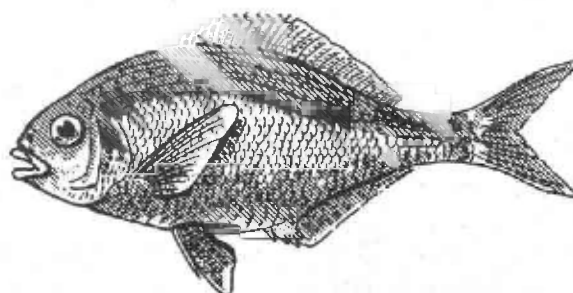


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