

Newport

#11

8-14

.....Marine Sup.....
.....Shellfish.....
.....Ground fish.....

AUG 14 1972

COASTAL RIVERS INVESTIGATION
INFORMATION REPORT 72-1

.....Pelagic fish.....

Proposed
ODFW
#57

Spawning Fish Surveys in Coastal
Watersheds, 1971

Delbert G. Skeesick

Fish Commission of Oregon
Management and Research Division

August 1972

TABLE OF CONTENTS

	<u>Page No.</u>
GENERAL INFORMATION.....	1
<u>Influence of Weather on the 1971-72 Spawning Fish Surveys.....</u>	3
<u>Influence of Human Activities on 1971-72 Spawning Fish Surveys.</u>	3
RESULTS.....	6
<u>Fall Chinook Salmon.....</u>	6
<u>Coho Salmon.....</u>	6
<u>Chum Salmon.....</u>	15
<u>Age, Size, and Sex Composition of 1971 Chum Salmon.....</u>	15
SUMMARY.....	18
LITERATURE CITED.....	22
APPENDIX TABLES.....	23

LIST OF FIGURES

<u>Figure No.</u>		<u>Page No.</u>
1	Average Numbers of Fall Chinook Per Mile in Standard Survey Areas of Six Coastal Rivers, 1952-71.....	8
2	Average Number of Coho Per Mile in Standard Survey Areas of Eight Coastal Rivers, 1950-71.....	10
3	Calculated Coho Escapement into Tenmile Lakes, 1955-71....	13
4	Average Numbers of Chum Per Mile in Standard and Auxiliary Survey Areas of Three Coastal Drainages, 1953-71.....	17
5	Age Composition of Tillamook Bay Chum Salmon, 1959-71.....	21

LIST OF TABLES

<u>Table No.</u>		<u>Page No.</u>
1	Number of Spawning Fish Surveys and Distances Surveyed by Coastal River Staff During the 1971-72 Spawning Season.....	4
2	Summary of Peak Fish-Per-Mile Counts of Fall Chinook in Standard and Auxiliary Survey Areas of Coastal Rivers Since 1950.....	7
3	Summary of Peak Fish-Per-Mile Counts of Coho in Standard Survey Areas of Coastal Rivers Since 1950.....	9
4	Summary of Peak Fish-Per-Mile Counts of Coho in Standard and Auxiliary Survey Areas of Tenmile Lakes Tributaries Since 1950.....	12
5	Calculated Escapement and Egg Deposition of Coho in Tenmile Lakes, 1955-71.....	14
6	Summary of Peak Fish-Per-Mile Counts of Chum in Standard and Auxiliary Survey Areas of Coastal Rivers Since 1948...	16
7	Composition of Tillamook Bay Chum by Size, Sex, and Age, 1947-71.....	19
8	Estimated Age Composition of Tillamook Bay Chum Runs.....	20

LIST OF APPENDIX TABLES

<u>Table No.</u>		<u>Page No.</u>
1	Peak Counts on Nehalem River Spawning Fish Surveys for Fall Chinook Since 1950.....	24
2	Peak Counts on Tillamook Bay Spawning Fish Surveys for Fall Chinook Since 1950.....	25
3	Peak Counts on Nestucca River Spawning Fish Surveys for Fall Chinook Since 1950.....	26
4	Peak Counts on Siletz River Spawning Fish Surveys for Fall Chinook Since 1952.....	27
5	Peak Counts on Yaquina River Spawning Fish Surveys for Fall Chinook Since 1950.....	28
6	Peak Counts on Alsea River Spawning Fish Surveys for Fall Chinook Since 1952.....	29
7	Peak Counts on Siuslaw River Spawning Fish Surveys for Fall Chinook Since 1952.....	30
8	Peak Counts on Coquille River Spawning Fish Surveys for Fall Chinook Since 1952.....	31
9	Peak Counts on Nehalem River Spawning Fish Surveys for Coho Since 1950.....	32
10	Peak Counts on Wilson River Spawning Fish Surveys for Coho Since 1950.....	33
11	Peak Counts on Nestucca River Spawning Fish Surveys for Coho Since 1950.....	34
12	Peak Counts on Yaquina River Spawning Fish Surveys for Coho Since 1950.....	35
13	Peak Counts on Alsea River Spawning Fish Surveys for Coho Since 1950.....	36
14	Peak Counts on Beaver Creek Spawning Fish Surveys for Coho Since 1950.....	37
15	Peak Counts on Tenmile Lakes Standard Spawning Fish Surveys for Coho Since 1950.....	38
16	Peak Counts on Tenmile Lakes Auxiliary Spawning Fish Surveys for Coho Since 1955.....	39

LIST OF APPENDIX TABLES (Cont.)

<u>Table No.</u>		<u>Page No.</u>
17	Peak Counts on Coos River Spawning Fish Surveys for Coho Since 1950.....	40
18	Peak Counts on Coquille River Spawning Fish Surveys for Coho Since 1950.....	41
19	Peak Counts on Tillamook Bay Standard Spawning Fish Surveys for Chum Since 1950.....	42
20	Peak Counts on Tillamook Bay Auxiliary Spawning Fish Surveys for Chum Since 1960.....	43
21	Peak Counts on Nestucca River Spawning Fish Surveys for Chum Since 1950.....	44
22	Peak Counts on Netarts Bay Spawning Fish Surveys for Chum Since 1953.....	45

SPAWNING FISH SURVEYS IN COASTAL
WATERSHEDS, 1971 1/

GENERAL INFORMATION

Spawning fish surveys on index areas of Oregon coastal rivers and tributaries are made annually by personnel of Coastal Rivers Investigation, Fish Commission of Oregon. Annual peak counts of spawning salmon in the survey areas provide data for computing an index of the escapement into a coast-wide "fish-per-mile" figure for each species. Trends in abundance of spawning salmon are noted by comparing these data over a period of years. This report presents peak counts for 1971-72 and makes comparisons with similar data from previous years.

The earliest spawning fish surveys were established 25 years ago, and others were added as needed to form a coastwide sampling program. This year the survey project was substantially modified. Surveys that were not representative because of lack of suitable habitat, became inaccessible because of changing road use, or could not be adequately surveyed for physical reasons were eliminated. Those surveys that remain represent our current concept of good spawning streams. The net result of eliminating the surveys with poor spawning gravel was to slightly raise the fish-per-mile counts. Statistical analysis using the t-test for paired observations (Dixon and Massey, 1957) indicated that in the cases of fall chinook, coho and auxiliary chum counts, the mean fish-per-mile counts were raised significantly at the 99% level of confidence (t values were 8.83, 5.82, and 6.51, respectively).

1/ This work was partially supported by PL 89-304 funds.

Since the value of these surveys is to determine trends, the next statistical test was to determine if dropping certain of the surveys caused any change in the trends. Linear regressions of the new fish-per-mile counts were run against the initial counts and the square of the correlation coefficient was used to judge any changes (Li, 1957). For chinook 94% of the variations in the new average could be accounted for by the variations in the previous counts, while for coho 99% and for chum 96% of the variability is explainable in the same manner. With this result, it appears that dropping some of the surveys had no appreciable impact on the trends.

Present annual survey distances are 27.5 miles for fall chinook, 7.5 miles for chum, and 39.0 miles for coho. An additional 17.1 miles of stream are surveyed in the Tenmile lakes system to provide the data base for an annual estimate of the population and egg deposition. The spring chinook surveys were suspended because the counts were so low no meaningful trends were evident.

Index areas were often surveyed more than once to ensure that counts were made near the peak of the run. Variability in the timing of the spawning migrations between streams, volume and duration of flood flows and silt load frequently caused aborted surveys that had to be rescheduled and occasionally resulted in inadequate surveys on some standard index areas.

The fall Creek (Alsea River) fall chinook survey was the only survey that was retained but not counted this year. Prolonged high water and heavy silt loads made it impossible to identify the chinook among the tremendous number of coho that traverse this section of stream to the Fish Commission's Fall Creek Hatchery.

Coastal Rivers personnel made 203 surveys encompassing 175 miles during the 1971-72 spawning season (Table 1). The surveys represent about a 40% decrease over the effort of the previous year. Surveys started on October 29, 1971, and continued through January 3, 1972.

Since 1958, survey data have been exchanged with the Oregon Game Commission to avoid duplication of some surveys. The Game Commission biologists provided data from two standard surveys on Nehalem River tributaries, one on a Coos River tributary and two on tributaries of the Coquille River.

Influence of Weather on the 1971-72 Spawning Fish Surveys

Weather was fairly typical during the fall of 1971. Freshets were spaced such that most surveys were completed between storms. However, beginning in December and continuing through January, above normal rainfall kept the streams high and turbid. Consequently, some of the coho surveys were accomplished under less than ideal conditions, and fewer than normal resurveys were possible. The intense storm of early January made further surveying impractical.

Influence of Human Activities on 1971-72 Spawning Fish Surveys

Activities of the Fish Commission and Oregon State University have affected the validity of the counts on some of our standard survey areas.

The fall chinook counts on the Siletz and Alsea rivers have been affected by the activities of the Fish Commission. Ladders and large returns of coho to the hatcheries have made it impossible to make usable index counts in three of the survey areas.

A ladder constructed at the upper end of the fall chinook survey area on Sunshine Creek of the Siletz River in 1963 has allowed fish, which normally would have spawned in the survey area, to spawn farther upstream.

Table 1. Number of Spawning Fish Surveys and Distances Surveyed by Coastal River Staff During the 1971-72 Spawning Season

River System	Fall Chinook		Chum		Coho		Total	
	No.	Miles	No.	Miles	No.	Miles	No.	Miles
Nehalem	10	9.0			14	10.9	24	19.9
Miami			9	4.6			9	4.6
Kilchis	3	3.0	8	5.8			11	8.8
Wilson	4	2.0	3	<u>1/</u>	5	6.6	12	8.6
Trask	1	1.0					1	1.0
Tillamook	2	3.4	1	0.8			3	4.2
Netarts Bay			0	0.0			0	0.0
Nestucca	9	6.9	6	5.4	11	9.4	26	21.7
Siletz	4	4.2					4	4.2
Yaquina	8	11.0			9	7.8	17	18.8
Beaver Creek					3	2.3	3	2.3
Alsea	5	8.0			8	7.7	13	15.7
Siuslaw	5	3.8					5	3.8
Tenmile					52	35.1	52	35.1
Coos					5	5.3	5	5.3
Coquille	<u>7</u>	<u>6.4</u>	<u> </u>	<u> </u>	<u>11</u>	<u>14.4</u>	<u>18</u>	<u>20.8</u>
Total	58	58.7	27	16.6	118	99.5	203	174.8

1/ Concurrent with fall chinook survey.

Since installation of the ladder, the counts have averaged only 70% of the counts that were made in the previous 9 years. Since this survey area represents 40% of the index area for the Siletz River, the change has caused a false decline in the trend for the whole river system of approximately 8%.

The recent increase in returns of coho to the Rock Creek Hatchery has resulted in large numbers of stray coho utilizing the chinook survey area on North Rock Creek for spawning. An overabundance of coho in the survey area was first noted in 1965. Large masses of fish in each pool have made it impossible to count all the live chinook present. The count of chinook carcasses is undoubtedly low because some are buried by the digging of the coho. The superimposition that is occurring in the survey area has undoubtedly been detrimental to the chinook. Since this is a regular occurrence, the survey area is no longer indicative of the chinook abundance in the Siletz River.

Similar conditions occur in the standard survey on Fall Creek on Alsea River. A tremendous number of coho returning to the hatchery now traverse the survey area during the fall chinook spawning period. Considerable numbers of these coho spawn in the survey area causing superimposition on chinook eggs already in the gravel, as well as competing with female chinook for the more favorable redd sites. This has resulted in counts in the survey area being no longer indicative of the general conditions in the watershed.

The chum salmon counts on Whiskey Creek are no longer indicative of the run into that system. Oregon State University has constructed a trap in our survey area and takes eggs for their hatchery. Thus, the distribution, abundance, and sex and age data are no longer representative.

RESULTS

Fall Chinook Salmon

The count of fall chinook in six coastal rivers was 29 fish per mile which was 8 fish per mile below the 19-year average (1952-70) (Table 2). The number of fish per mile between river systems ranged from 26 on the Yaquina and Alsea rivers to 55 on the Nestucca River. All the rivers except the Alsea had fish-per-mile counts lower than their long-term averages.

The trend counts show a rise in escapement level after cessation of commercial fishing in the rivers in 1956 followed by about a 10-year period of stability (Figure 1). Although the counts dropped somewhat in 1968, 1969, and 1971, the fluctuations are within expected ranges.

The counts in the auxiliary survey areas on the Siuslaw and Coquille rivers paralleled those of the standard areas by showing a decline from the previous year's record high to a level slightly less than average.

Peak counts for each survey area are tabulated in Appendix tables 1-8.

Coho Salmon

The peak count of coho salmon in eight coastal drainages was 32 fish per mile, which equalled the 21-year average. Counts ranged from 13 fish per mile on the Nestucca River to 58 fish per mile on the Yaquina River (Table 3). The counts for each stream system ranged from 49 to 171% of their 1950-70 averages.

The coastwide average of the peak fish-per-mile counts represent the second year of improvement from the very low count of 1969 (Figure 2). It also represents a 45% improvement over the brood year which produced it which is encouraging since the 1968 spawning season was severely affected by long periods of ice and snow which minimized areas available for spawning. The count of jack coho was two fish per mile which equalled that of the 2 previous years but was only half the long-term average.

Table 2. Summary of Peak Fish-Per-Mile Counts of Fall Chinook in Standard and Auxiliary Survey Areas of Coastal Rivers Since 1950 ^{1/}

Year	Standard							Auxiliary	
	Nehalem	Tillamook Bay Tributaries	Nestucca	Siletz	Yaquina	Alsea	Weighted Average Fish Per Mile	Siuslaw	Coquille
1950	15	--	24	--	--	--	--		
1951	16(2)	--	16	--	--	--	--		
1952	36(3)	63(18)	194(10)	65(2)	63(16)	19(3)	58(8)		
1953	27(7)	18(4)	10(2)	11(2)	12(1)	10(1)	14(2)		
1954	16(4)	12(4)	20(2)	14(1)	21(2)	10(2)	15(2)		
1955	26(13)	4(2)	35(5)	27(17)	30(9)	16(9)	22(9)		
1956	25(1)	9(4)	11(1)	20(5)	13(6)	--	15(4)	10(2)	
1957	58(16)	66(22)	118(33)	43(5)	26(7)	20(5)	43(11)	12(4)	17(6)
1958	35(3)	60(11)	73(4)	77(10)	40(3)	--	52(6)	63(18)	21(6)
1959	41(4)	60(5)	55(0)	29(1)	23(1)	16(1)	31(2)	25(4)	11(2)
1960	67(34)	59(21)	131(34)	30(13)	16(6)	16(8)	39(15)	--	--
1961	70(5)	76(13)	100(16)	35(6)	24(2)	22(3)	43(6)	25(12)	--
1962	46(7)	64(9)	80(16)	66(13)	26(9)	16(5)	40(9)	39(8)	6(2)
1963	59(14)	88(8)	91(8)	49(7)	32(6)	28(6)	48(8)	28(2)	16(1)
1964	55(6)	67(11)	57(10)	50(15)	26(5)	24(7)	40(8)	131(21)	16(5)
1965	59(15)	54(12)	190(11)	32(5)	24(10)	29(5)	48(9)	32(7)	112(34)
1966	47(4)	86(17)	125(14)	36(3)	31(5)	35(6)	49(8)	82(10)	85(12)
1967	34(2)	110(14)	102(18)	29(3)	19(5)	20(5)	41(7)	69(16)	42(3)
1968	23(2)	67(12)	57(3)	15(3)	22(5)	12(4)	27(5)	45(17)	33(13)
1969	12(1)	28(4)	24(4)	11(3)	33(6)	24(4)	24(4)	96(26)	18(4)
1970	36(2)	75(13)	68(7)	42(5)	44(8)	55(10)	52(8)	167(40)	68(28)
1971	29(3)	29(6)	55(5)	27(3)	26(6)	26(4)	29(5)	33(6)	26(8)
1952-70 Average	41(8)	56(11)	81(10)	36(6)	28(6)	22(5)	37(7)	59(13)	37(9)
Departure of 1971 from Av. -12		-27	-26	-9	-2	+4	-8	-26	-11
Miles Surveyed	3.5	3.5	2.3	3.0	7.5	7.7		2.4	1.6

^{1/} Figures in parenthesis indicate numbers of jacks included in the totals.

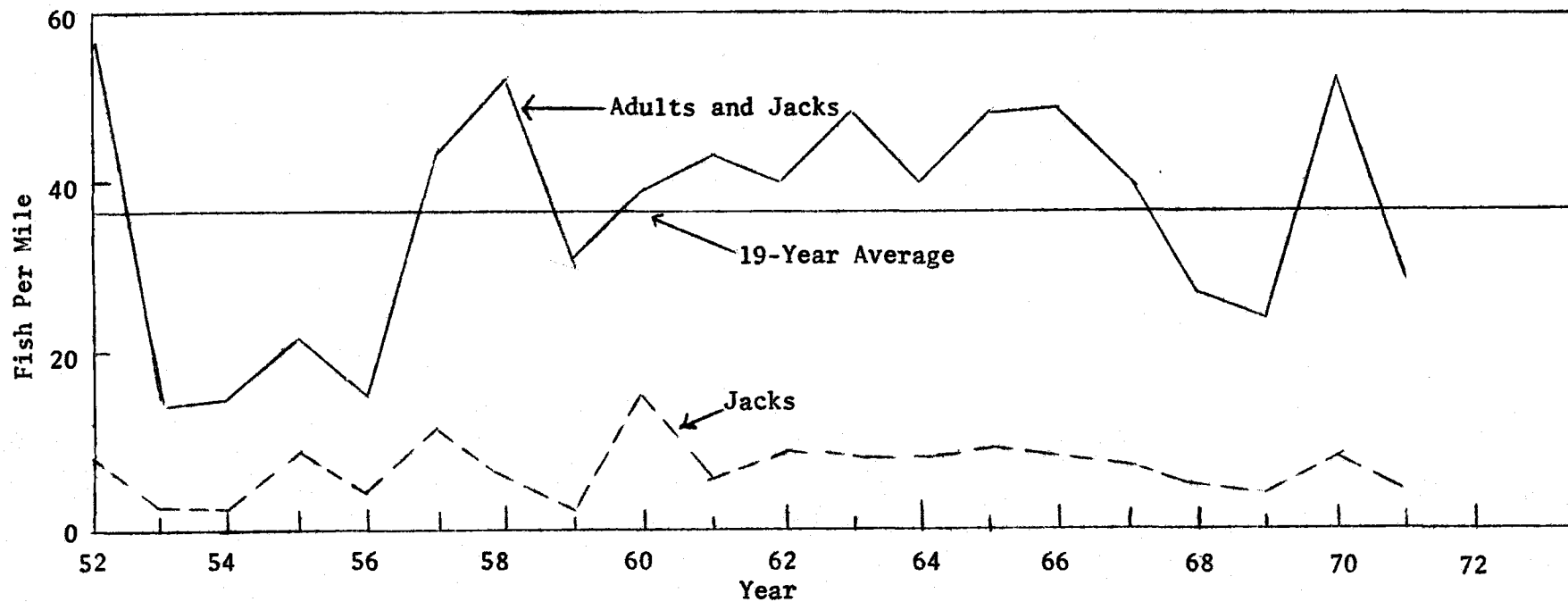


Figure 1. Average Numbers of Fall Chinook Per Mile in Standard Survey Areas of Six Coastal Rivers, 1952-71

Table 3. Summary of Peak Fish-Per-Mile Counts of Coho in Standard
Survey Areas of Coastal Rivers Since 1950 ^{1/}

Year	River								Weighted Average Fish Per Mile
	Nehalem	Wilson	Nestucca	Yaquina	Alsea	Beaver Creek	Coos	Coquille	
1950	17(1)	11	15(1)	12	11(2)	15(3)	54(7)	43(9)	23(3)
1951	45(3)	39(2)	64(1)	80(3)	58(2)	163(8)	118(24)	65(6)	71(5)
1952	45(2)	28(2)	55(1)	24(1)	43(3)	40(4)	104(13)	164(9)	69(4)
1953	19(1)	19(1)	18(0)	5(1)	13(1)	10(2)	31(7)	37(6)	20(2)
1954	9(1)	7(1)	19(2)	20(1)	37(1)	16(3)	29(12)	36(1)	23(2)
1955	18(1)	11(0)	14(0)	12(0)	34(2)	23	35	24(1)	21(1)
1956	42(1)	6(1)	10(1)	28(3)	46(6)	30(4)	81(28)	60(16)	39(7)
1957	59(2)	16(0)	13(2)	46(2)	30(2)	46(3)	24(3)	66(4)	41(2)
1958	6(0)	5(0)	9(1)	14(2)	12(0)	10(1)	8(2)	21(3)	11(1)
1959	21(1)	26(0)	11(0)	27(1)	28(2)	19(0)	23(2)	53(1)	28(1)
1960	21(6)	31(2)	9(2)	20(8)	23(6)	13(2)	19(12)	14(5)	18(5)
1961	40(2)	46(4)	19(2)	67(3)	48(6)	21(4)	75(40)	38(11)	44(8)
1962	30(4)	43(3)	12(1)	36(5)	22(2)	29(3)	55(19)	50(5)	34(5)
1963	19(1)	33(1)	22(4)	34(5)	40(6)	25(11)	26(7)	12(4)	25(4)
1964	43(3)	42(2)	34(5)	55(5)	64(8)	36(4)	37(5)	59(4)	48(5)
1965	34(2)	17(2)	29(5)	52(8)	31(4)	27(4)	16(2)	54(5)	36(4)
1966	22(2)	14(0)	29(4)	58(5)	42(7)	44(5)	19(3)	26(4)	32(4)
1967	18(1)	45(3)	21(2)	27(5)	29(4)	13(4)	24(5)	22(4)	24(3)
1968	--	23(1)	20(2)	35(4)	26(2)	29(2)	15(2)	12(1)	22(2)
1969	17(1)	19(3)	3(0)	16(3)	9(1)	14(3)	19(4)	25(4)	16(2)
1970	23(1)	55(2)	22(3)	43(2)	12(2)	29(3)	17(2)	16(2)	26(2)
1971	38(1)	35(2)	13(1)	58(2)	32(0)	29(2)	23(2)	21(2)	32(2)
1950-70 Average	27(2)	26(1)	21(1)	34(3)	31(3)	31(3)	39(9)	43(5)	32(4)
Departure of 1971 from Av.	+11	+9	-8	+24	+1	-2	-16	-22	0
Miles Surveyed	6.7	3.4	5.0	5.6	5.1	2.3	3.3	7.6	

^{1/} Figures in parentheses indicate numbers of jacks included in the totals.

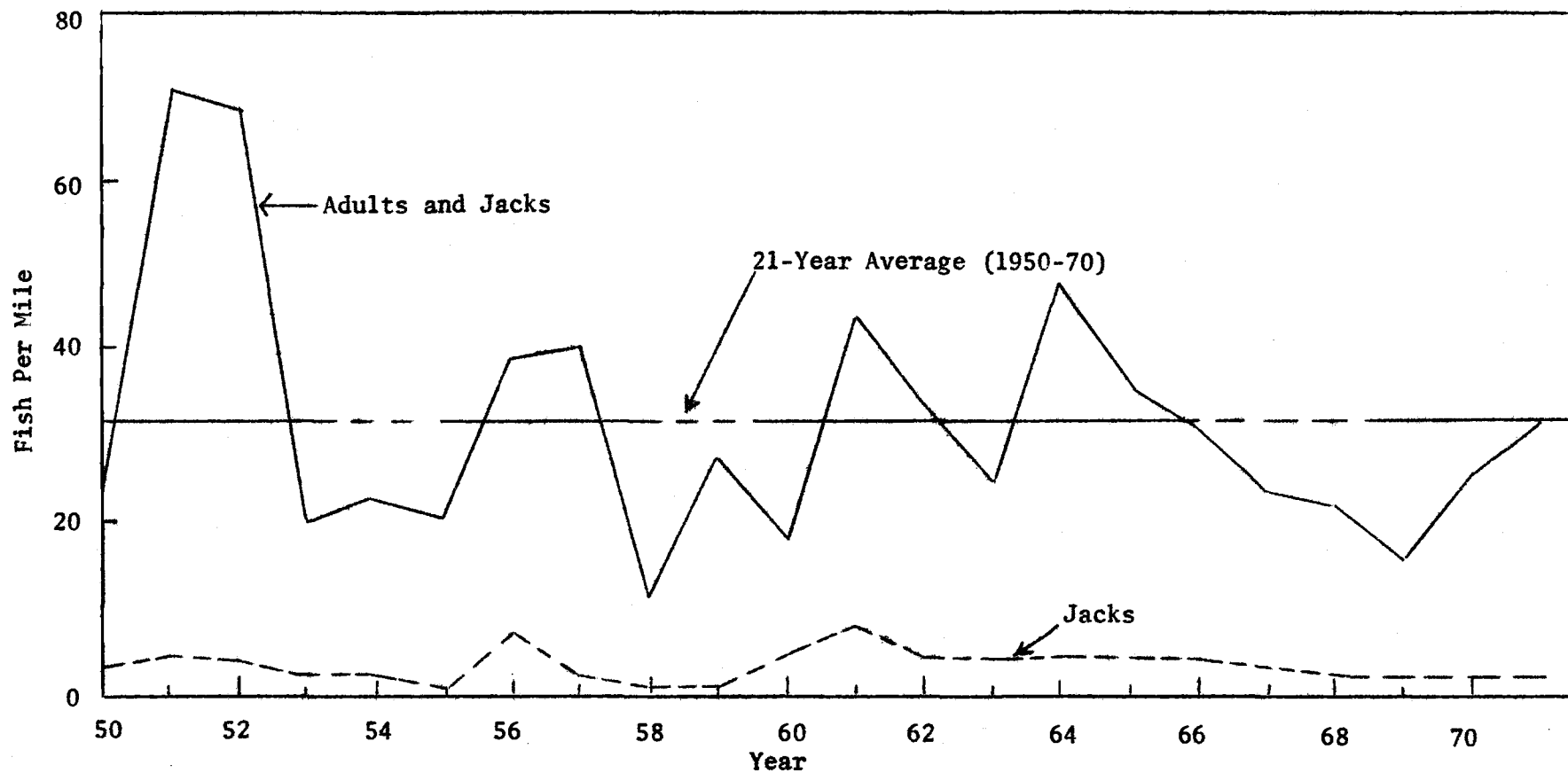


Figure 2. Average Number of Coho Per Mile in Standard Survey Areas of Eight Coastal Rivers, 1950-71

The peak counts of coho in the standard and auxiliary survey areas in tributaries of Tenmile Lake were 71 and 287 fish per mile, respectively (Table 4). These counts were 27 and 113% of the average of the standard and auxiliary counts, respectively. These data can be used to estimate total escapement, based upon a population estimate study completed in 1955-56 (Morgan and Henry, 1959). The resulting estimates indicate a fairly static escapement level between 1960 and 1967 with a sharp decline in 1968 which equaled the record low of 1959 (Figure 3). Since the lake was chemically treated by the Game Commission in 1968 to remove populations of warm-water fish, drastic changes have occurred in the coho population. The returns of jacks in 1969 and adults in 1970 were the result of rearing Tenmile lakes stock coho in a hatchery and releasing them into the system as smolts.

The 57,000 jacks that returned in 1970 and the 33,500 adults that returned in 1971 were the progeny of natural spawning 1968-brood stock. As juveniles, they had the advantage of living in a lake environment with substantially reduced predation and competition. The estimate of 57,000 jacks is the highest since the escapements have been calculated, and the 33,500 adults represented the second highest estimate since they began 17 years ago.

The adult escapement produced an estimated deposition of 61.2 million eggs which was 185% of the 1955-70 average (Table 5) and highest since 1955.

The 1971 jack run estimated at 10,500 was the result of a low number of females in the 1969 spawning escapement and possible adverse environmental factors in the tributary streams.

Peak counts for each survey area are tabulated in Appendix tables 9-18.

Table 4. Summary of Peak Fish-Per-Mile Counts of Coho in Standard and Auxiliary Survey Areas of Tenmile Lakes Tributaries Since 1950 1/

Year	Standard Tenmile Lakes	Auxiliary Survey Tenmile Lakes
1950	145 (45)	
1951	435	
1952	493 (99)	
1953	170 (79)	
1954	260 (111)	
1955	519 (215)	526 (171)
1956	570 (236)	503 (244)
1957	388 (121)	409 (138)
1958	170 (95)	184 (76)
1959	114 (48)	88 (21)
1960	168 (118)	177 (128)
1961	224 (94)	229 (92)
1962	219 (96)	255 (97)
1963	236 (190)	239 (144)
1964	268 (143)	285 (117)
1965	199 (106)	164 (56)
1966	180 (75)	181 (67)
1967	106 (63)	201 (101)
1968	57 (30)	88 (23)
1969	132 (81)	134 (80)
1970	383 (134)	408 (270)
1971	71 (10)	287 (49)
1950-70 Average	259 (109)	254 (114)
Departure from Average	-188	+33
Miles Surveyed	0.8	17.1

1/ Figures in parentheses indicate numbers of jacks included in the totals.

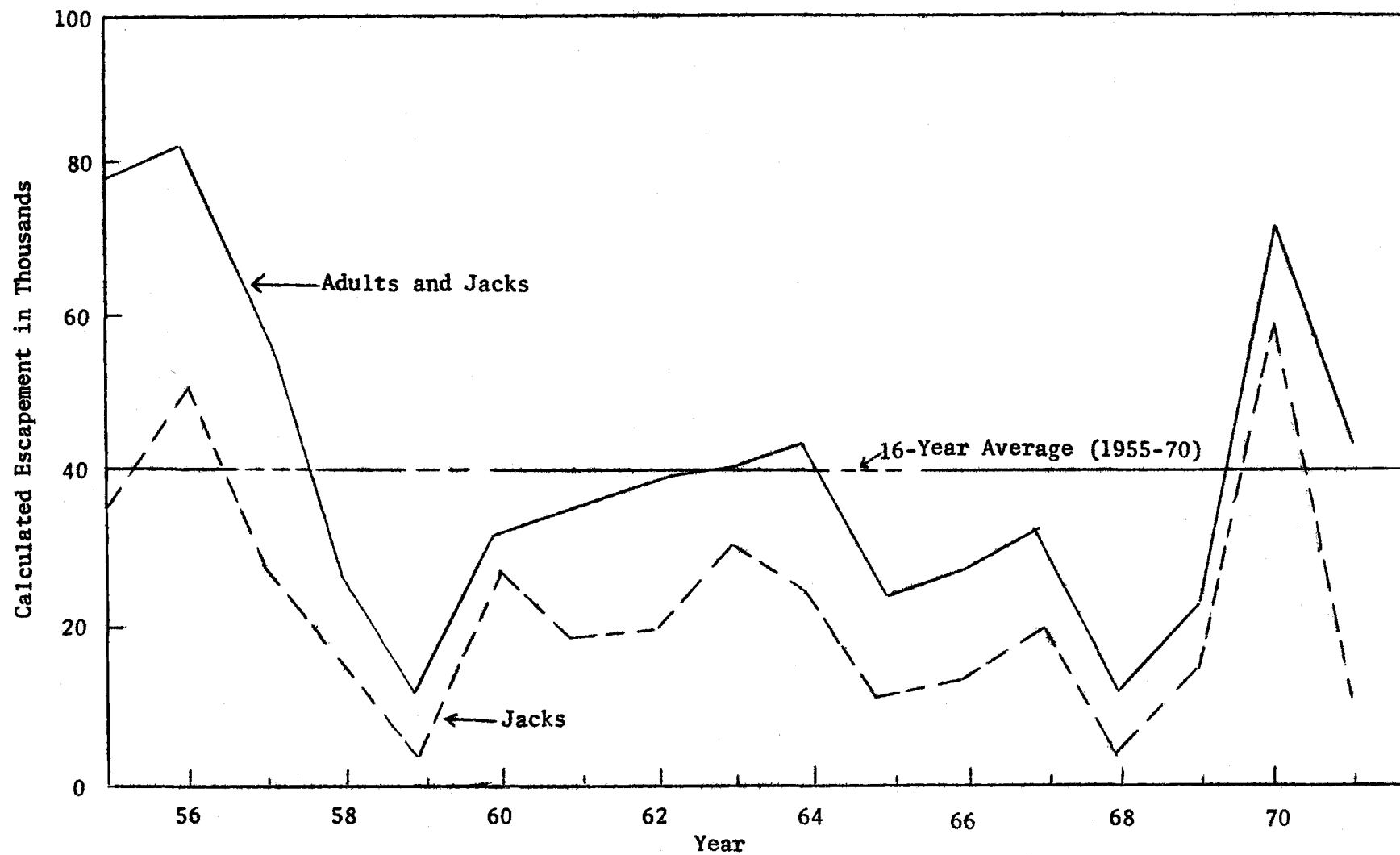


Figure 3. Calculated Coho Escapement into Tenmile Lakes, 1955-71

Table 5. Calculated Escapement and Egg Deposition of Coho in
Tenmile Lakes, 1955-71

Year	Adults	Calculated Escapement			Potential Egg Deposition in Millions ^{2/}
		Percentage Females	Jacks	Total	
1955	41,500	66.5 ^{1/}	36,000	77,500	82.8
1956	30,500	66.5 ^{1/}	51,500	82,000	60.9
1957	31,500	65.2	29,000	60,500	61.5
1958	12,500	62.9	16,000	28,500	23.7
1959	8,000	66.5 ^{1/}	4,500	12,500	15.9
1960	5,500	66.8	27,000	32,500	11.1
1961	16,000	66.2	19,500	35,500	31.8
1962	18,500	67.0	20,500	39,000	37.2
1963	11,000	71.6	30,500	41,500	38.7
1964	19,500	66.1	24,500	44,000	38.7
1965	12,500	71.3	12,000	24,500	26.7
1966	13,500	56.8	14,000	27,500	23.1
1967	11,500	60.9	21,000	32,500	21.6
1968	7,500	66.9	5,000	12,500	15.0
1969	6,500	61.8	17,000	23,500	12.0
1970	14,900 ^{3/}	65.4	57,000	71,900	29.1
1971	33,500	60.8	10,500	44,000	61.2
1955-70 Average	16,300		24,100	40,400	33.1

^{1/} Estimated from the average female-to-male ratio of 1957-64.

^{2/} Based on fecundity of 3,000 eggs per female.

^{3/} Confidence limits (95%) were $\underline{N} = 11,800$ and $\bar{N} = 18,400$.

Chum Salmon

The peak count of chum salmon in three drainage basins was 96 fish per mile (Table 6). This was 64 fish-per-mile lower than the 18-year average and was intermediate between the counts for 1967 and 1968, the years in which they were produced (Figure 4). The runs were down in all three river systems. OSU was only able to take about 280,000 eggs of the 750,000 they had scheduled from Whiskey Creek.

The auxiliary fish-per-mile count on Tillamook Bay tributaries was 390 fish which was 43 fish-per-mile higher than the 11-year average. The 1971 fish-per-mile count was distinctly higher than either of the brood years that produced it.

A strong trend on a 4-year cycle can be noted in the standard survey counts. This trend is also reflected by the auxiliary fish-per-mile counts in 1963 and 1967. The relative low counts in the standard areas in 1971 follow the relative low counts of 1955, 1959, 1963, and 1967. Although widely fluctuating, the counts show evidence of stabilizing at a low level during the 1960's after the decline of the 1950's.

Peak counts for each survey area are tabulated in the Appendix tables 19-22.

Age, Size, and Sex Composition of 1971 Chum Salmon Run

As in previous years, attempts were made to sample dead chum salmon for age, length, and sex by collecting data from the first 50 dead fish encountered in each river system. Because of the poor escapement and flood conditions in the major rivers, we were only able to collect 304 samples, mainly from Coal Creek of the Kilchis River.

Table 6. Summary of Peak Fish-Per-Mile Counts of Chum in Standard and Auxiliary Survey Areas of Coastal Rivers Since 1948

Year	Standard			Weighted Average Fish Per Mile	Auxiliary
	Tillamook Bay Tributaries	Nestucca	Netarts Bay Whiskey Creek		Tillamook Bay Tributaries
1948	484				
1949	925				
1950	356	54			
1951	698	71			
1952	304	32			
1953	530	27	343	311	
1954	591	154	1,255	476	
1955	136	39	240	106	
1956	133	13	328	102	
1957	251	117	1,680	324	
1958	225	158	843	253	
1959	107	71	368	116	
1960	10	11	398	44	97
1961	20	51	875	108	136
1962	51	136	1,100	178	665
1963	66	146	552	141	445
1964	21	33	753	91	484
1965	27	29	353	57	186
1966	65	100	793	144	445
1967	26	58	913	117	226
1968	50	65	197	69	218
1969	24	31	400	60	358
1970	117	45	1,200	185	554
1971	74	36	500	96	390
1953-70 Average	136	71	700	160	347
Departure from Average	-62	-35	-200	-64	+43
Miles Surveyed	2.3	1.8	0.4		3.0

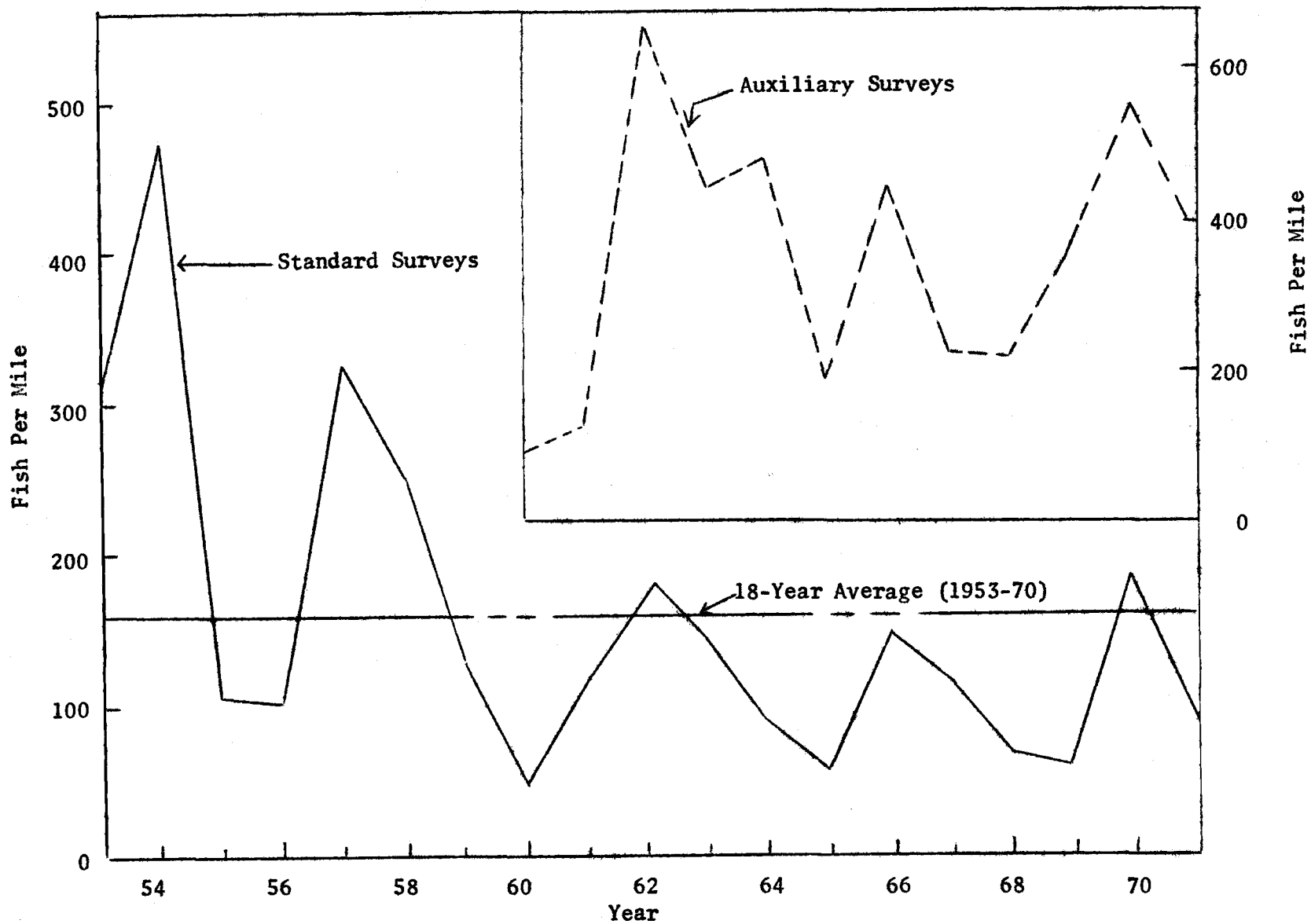


Figure 4. Average Numbers of Chum Per Mile in Standard and Auxiliary Survey Areas of Three Coastal Drainages, 1953-71

The length of fish by age and sex was within the limits found in previous inventories except that 4th year females averaged slightly shorter in length (Table 7). Females ranged in size from 23 to 30.5 inches, while males were from 25 to 32.5 inches.

The sample was predominantly females this year in both year classes. This may have been due to differential die-off time.

The run was nearly equally split between 3rd- and 4th-year fish (Table 8, Figure 5). In general, the fish were smaller, substantiating the hypothesis that 1966-68 brood chum have experienced poor growing conditions in the ocean.

SUMMARY

The surveys of spawning fish in coastal rivers in 1971 indicate that stocks of chum salmon remain at a low, although apparently stabilized level. Fluctuations are probably the result of year-class survival and age at maturity, rather than continued decline of the species.

The fall chinook index of abundance was only 78% of the long-term average. The counts were low in all but one of the standard survey watersheds and in both auxiliary survey river systems so it can be presumed that the surveys accurately reflected a decreased escapement.

The coho index of abundance equaled its long-term average indicating a generally adequate spawning density. The Tenmile Lakes run looks particularly promising because a near record number of eggs were deposited by the escapement this year. However, the low number of jacks returning this year suggests the number of adults returning next year will be considerably reduced.

Table 7. Composition of Tillamook Bay Chum by Size, Sex, and Age, 1947-71

Age	Sex	1947	1949	1950	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
		Mean Fork Length (Inches)															
3	Females	27.4	25.5	27.3	26.4	26.4	26.6	27.2	26.5	26.3	25.6	27.0	27.5	27.3	26.1	24.8	25.9
	Males	29.6	27.9	28.8	29.1	28.2	29.4	30.4	29.5	29.6	28.8	30.4	30.2	29.8	29.4	29.0	28.4
4	Females	28.8	27.9	28.6	28.4	27.5	29.0	29.0	28.6	29.0	28.3	28.0	28.8	28.2	29.1	27.5	27.3
	Males	31.4	30.3	30.5	31.5	39.0	30.1	32.5	32.3	32.6	30.8	30.7	31.9	31.8	32.1	30.3	30.3
5	Females	30.0	28.0	29.0	28.0	--	--	--	--	30.0	--	--	--	--	--	--	--
	Males	--	--	31.2	32.5	30.0	31.0	32.0	--	--	--	--	32.0	--	--	--	31.4
Sex Ratios (Numbers)																	
3	Females	16.0	3.0	135.0	79.0	34.0	53.0	85.0	24.0	57.0	26.0	24.0	23.0	45.0	44.0	6.0	102.0
	Males	5.0	12.0	232.0	71.0	26.0	48.0	81.0	30.0	50.0	38.0	19.0	22.0	22.0	54.0	3.0	55.0
4	Females	20.0	137.0	51.0	57.0	12.0	7.0	22.0	88.0	14.0	44.0	55.0	60.0	18.0	31.0	68.0	85.0
	Males	23.0	134.0	57.0	100.0	19.0	14.0	18.0	62.0	5.0	28.0	54.0	29.0	14.0	29.0	37.0	58.0
5	Females	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Males	0.0	0.0	5.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	4.0
Total																	
Sex Ratios (Percentage)																	
Females		57.0	49.0	39.0	44.0	50.0	49.0	52.0	55.0	57.0	51.0	52.0	61.0	68.0	47.0	68.0	61.5
Males		43.0	51.0	61.0	56.0	50.0	51.0	48.0	45.0	43.0	49.0	48.0	39.0	32.0	53.0	32.0	38.5

Table 8. Estimated Age Composition of Tillamook Bay Chum Runs

Year	Source of Data	Percentage Composition by Age		
		3	4	5
1947	Gill Net	32.3	66.2	1.5
1949	" "	4.6	95.4	0.3
1950	" "	77.5	21.1	1.5
1959	" "	51.2	48.0	0.8
1960	" "	68.2	30.8	1.0
1961	" "	83.4	16.0	0.6

1962	Spawning Grounds	82.1	17.6	0.3
1963	" "	28.0	72.0	0.0
1964	" "	85.5	13.8	0.6
1965	" "	47.1	52.9	0.0
1966	" "	28.3	71.7	0.0
1967	" "	33.1	65.4	1.5
1968	" "	67.7	32.3	0.0
1969	" "	62.0	38.0	0.0
1970	" "	7.9	92.1	0.0
1971	" "	51.6	47.0	1.3

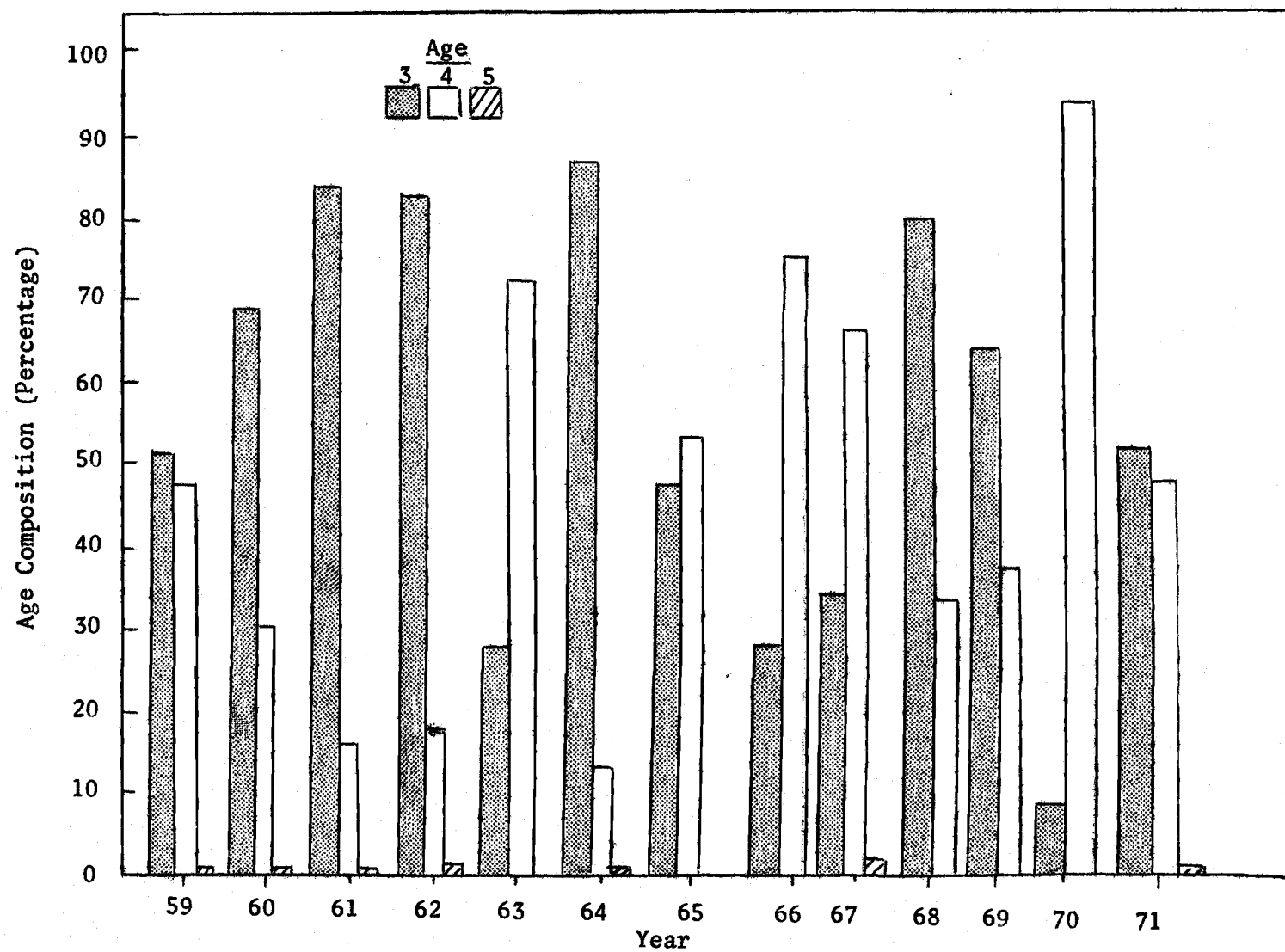


Figure 5. Age Composition of Tillamook Bay Chum Salmon, 1959-71

LITERATURE CITED

- Dixon, W. J. and F. J. Massey, Jr. 1957. Introduction to Statistical Analysis. McGraw-Hill Book Co., Ltd., New York. 488 p.
- Li, J. C. R., 1957. Introduction to Statistical Inference. Edwards Brothers Inc., Ann Arbor, Mich. 568 p.
- Morgan, A. R. and K. A. Henry. 1959. The 1955-56 silver salmon run into the Tenmile Lakes system. Fish Comm. Oreg. Res. Briefs, 7(1):57-77.

APPENDIX TABLES

Appendix Tables

The tables in this appendix are presented first by species and within species by watershed from north to south. The peak counts and fish per mile figures may not agree precisely with reports from years prior to 1971 because of a reduction in the number of surveys, and deletion of spring chinook surveys entirely.

Within the tables, the figures in parentheses are the jack salmon counts and these figures are included in the totals. In some instances, the standard survey could not be made. In these cases the numbers of fish were estimated. This was done by determining the ratio of total fish which were seen in that particular survey during the preceding 2 years to the total fish seen in all the other streams in that system during the same period. That ratio was applied to the total of the other surveys in the drainage for the year in question and the resulting figure was assumed as the number of fish which should have been seen in the survey area. That figure was then entered into the calculations as if the survey was done.

The supplemental surveys are included for reference. Data from these surveys are not used in computing fish-per-mile values because, in most cases, the supplemental surveys were started at a later date. The Tenmile Lake auxiliary survey provides the data for the actual population estimate.

Table 1. Peak Counts on Nehalem River Spawning Fish Surveys for Fall Chinook Since 1950

Year	Standard Surveys					Fish per Mile
	Buchanan Creek	Cronin Creek 1/	East Humbug Creek	Humbug Creek	Total	
1950	6	8	27(1)	13	54(1)	15.4
1951	2	5	14	34(8)	55(8)	15.7
1952	20(4)	55(4)	29	23(2)	127(10)	36.3
1953	5(2)	8(4)	14(3)	66(15)	93(24)	26.6
1954	0	8	7	41(15)	56(15)	16.0
1955	16(5)	12(4)	33(18)	29(18)	90(45)	25.7
1956	4	16	25	42(3)	87(3)	24.9
1957	39(9)	34(8)	57(16)	74(24)	204(57)	58.3
1958	9	21	24	69(11)	123(11)	35.1
1959	22(4)	44(3)	10	68(6)	144(13)	41.1
1960	36(9)	20(1)	46(30)	134(80)	236(120)	67.4
1961	73(5)	32(3)	35(3)	104(8)	244(19)	69.7
1962	24(9)	16(1)	44(7)	78(9)	162(26)	46.3
1963	20(2)	18	36(9)	133(37)	207(48)	59.1
1964	39(5)	10	17(3)	126(14)	192(22)	54.9
1965	40(8)	10(1)	13(2)	143(43)	206(54)	58.9
1966	23	31(6)	6	103(8)	163(14)	46.6
1967	26(1)	10(2)	16(1)	66(2)	118(6)	33.7
1968	12(1)	12(3)	10	46(2)	80(6)	22.9
1969	8(1)	3(0)	0	31(2)	42(3)	12.0
1970	25(1)	13(2) 2/	32(1)	57(3)	127(7)	36.3
1971	30(0)	6(0)	27(2)	39(7)	102(9)	29.1

Miles 0.5 1.0 1.0 1.0 3.5

1/ Surveys made by Oregon Game Commission since 1958.

2/ Estimated--surveys not done.

Table 2. Peak Counts on Tillamook Bay Spawning Fish Surveys
for Fall Chinook Since 1950

Year	Standard Surveys				Fish per Mile
	Kilchis River Sam Down Creek	Tillamook River	Lower N. Fk. Wilson River	Total	
1950	-	-	52(1)	52(1)	
1951	-	-	25(1)	25(1)	
1952	7(2)	115	99(24)	221(26)	63.1
1953	0	34(13)	30(2)	64(15)	18.3
1954	4(3)	22(9)	17(1)	43(13)	12.3
1955	0	7(4)	7(2)	14(6)	4.0
1956	3(1)	12(7)	15(5)	30(13)	8.6
1957	37(15)	36(13)	157(48)	230(76)	65.7
1958	64(22)	83(12)	62(6)	209(40)	59.7
1959	62(3)	104(14)	43(1)	209(18)	59.7
1960	65(24)	100(47)	43(3)	208(74)	59.4
1961	71(7)	166(36)	29(4)	266(47)	76.0
1962	54(4)	117(22)	52(4)	223(30)	63.7
1963	70(3)	150(22)	87(2)	307(27)	87.7
1964	55(8)	163(29)	17	235(37)	67.1
1965	36(2)	111(18)	43(21)	190(41)	54.3
1966	104(20)	110(25)	87(15)	301(60)	86.0
1967	93(2)	158(41)	133(7)	384(50)	109.7
1968	66(6)	110(29)	57(6)	233(41)	66.6
1969	6(0)	54(13)	37(1)	97(14)	27.7
1970	32(5)	168(29)	64(13)	264(47)	75.4
1971	19(3)	39(4)	43(15)	101(22)	28.9

Miles	1.3	1.7	0.5	3.5
-------	-----	-----	-----	-----

Table 3. Peak Counts on Nestucca River Spawning Fish Surveys
for Fall Chinook Since 1950

Year	Standard Surveys				Fish per Mile
	East Beaver Creek	Moon Creek	Niagara Creek	Total	
1950	17	33(3)	5(1)	55(4)	23.9
1951	15(1)	10	11	36(1)	15.7
1952	130(9)	178(12)	137(2)	445(23)	193.5
1953	7	10(3)	7	24(3)	10.4
1954	19(2)	11(3)	15	45(5)	19.6
1955	17(2)	21(2)	42(7)	80(11)	34.8
1956	4	10(2)	11	25(2)	10.9
1957	30(5)	137(52)	104(19)	271(76)	117.8
1958	59(3)	57(5)	51(2)	167(10)	72.6
1959	63(1)	27	36	126(1)	54.8
1960	60(7)	145(42)	97(29)	302(78)	131.3
1961	34(6)	126(27)	69(4)	229(37)	99.6
1962	69(11)	68(18)	47(8)	184(37)	80.0
1963	53(5)	66(12)	90(2)	209(19)	90.9
1964	42(7)	35(8)	53(8)	130(23)	56.5
1965	68(6)	244(17)	125(2)	437(25)	190.0
1966	48(7)	159(19)	80(7)	287(33)	124.8
1967	64(2)	109(33)	61(6)	234(41)	101.7
1968	32(1)	57(4)	43(2)	132(7)	57.4
1969	16(1)	4(0)	36(8)	56(9)	24.3
1970	47(3)	63(4)	47(8)	157(15)	68.3
1971	27(2)	64(9)	36(1)	127(12)	55.2

Miles	1.5	0.4	0.4	2.3
-------	-----	-----	-----	-----

Table 4. Peak Counts on Siletz River Spawning Fish Surveys
for Fall Chinook Since 1952

Year	Standard Surveys				Fish Per Mile
	Euchre Creek	N.Fk. Rock Creek	Sunshine Creek	Total	
1952	35 (7)	108	51	194 (7)	64.6
1953	3	13 (4)	17 (2)	33 (6)	11.0
1954	4 (1)	27 (1)	12	43 (2)	14.3
1955	2	78 (51)	1	81 (51)	27.0
1956	18 (8)	33 (7)	8	59 (15)	19.6
1957	37 (7)	42 (6)	51 (2)	130 (15)	43.3
1958	40 (12)	59 (5)	131 (12)	230 (29)	76.6
1959	23 (1)	28	37 (1)	88 (2)	29.3
1960	16 (1)	33 (16)	46 (21)	89 (38)	29.6
1961	11 (1)	31 (5)	63 (11)	105 (17)	35.0
1962	20 (1)	18 (8)	160 (29)	198 (38)	65.9
1963	28 (3)	47 (11)	71 (8)	146 (22)	48.6
1964	34 (13)	92 (26)	25 (7)	151 (46)	50.3
1965	29 (1)	26 (6)	40 (8)	95 (15)	31.6
1966	32 (3)	33 (1)	42 (6)	107 (10)	35.6
1967	31 (6)	15 (1)	42 (3)	88 (10)	29.3
1968	14 (4)	8 (2)	23 (4)	45 (10)	15.0
1969	16 (2)	6 (3)	10 (3)	32 (8)	10.7
1970	18 (2)	49 (5)	60 (9)	127 (16)	42.3
1971	28 (5)	9 (0)	45 (5)	82 (10)	27.3

Miles	1.0	0.8	1.2	3.0
-------	-----	-----	-----	-----

Table 5. Peak Counts on Yaquina River Spawning Fish Surveys for
Fall Chinook Since 1950

Year	Standard Surveys					Total	Fish Per Mile
	Feagles Creek	Grant Creek	Simpson Creek	Salmon Creek	Yaquina River		
1950	15	91 (23)	11 (1)	-	-	-	
1951	32	105	26	-	-	-	
1952	89 (18)	226 (46)	71 (39)	0	84 (22)	470 (125)	62.7
1953	5	34	19 (1)	3	28 (3)	89 (4)	11.9
1954	41 (4)	56 (1)	3 (1)	6	52 (7)	158 (13)	21.1
1955	24 (1)	112 (46)	36 (9)	25 (3)	31 (9)	228 (68)	30.4
1956	9 (5)	69 (36)	11 (2)	4	3 (3)	96 (46)	12.8
1957	76 (18)	97 (27)	5 (2)	3 (2)	14 (3)	195 (52)	26.0
1958	87 (14)	88 (6)	25 (1)	29 (2)	67 (2)	296 (25)	39.5
1959	43 (3)	74 (4)	15	24 (4)	15	171 (11)	22.8
1960	27 (14)	31 (9)	21 (11)	9 (6)	30 (8)	118 (48)	15.7
1961	34 (3)	52 (1)	47 (9)	8	35 (1)	176 (14)	23.5
1962	38 (10)	47 (15)	63 (34)	16 (8)	29 (2)	193 (69)	25.7
1963	40 (4)	80 (13)	40 (10)	3	74 (19)	237 (46)	31.6
1964	39 (7)	25 (3)	50 (13)	33 (10)	47 (4)	194 (37)	25.9
1965	35 (9)	78 (34)	46 (23)	3 (2)	14 (5)	176 (73)	23.5
1966	34 (4)	82 (15)	56 (10)	16 (7)	44 (5)	232 (41)	30.9
1967	34 (7)	48 (13)	41 (15)	19 (3)	2	144 (38)	19.2
1968	29 (9)	41 (9)	47 (9)	16 (5)	36 (6)	169 (38)	22.5
1969	38 (13)	88 (20)	80 (8)	19 (4)	25 (0)	250 (45)	33.3
1970	60 (4)	115 (10)	113 (40)	12 (1)	26 (4)	326 (59)	43.5
1971	44 (11)	95 (17)	35 (9)	10 (0)	13 (6)	197 (43)	26.3

Miles	2.0	1.5	1.5	0.5	2.0	7.5
-------	-----	-----	-----	-----	-----	-----

Table 6. Peak Counts on Alsea River Spawning Fish Surveys
for Fall Chinook Since 1952

Year	Standard Surveys					Total	Fish Per Mile
	Buck Creek	Drift Creek Upper	Fall Creek	Lobster Creek	N.Fk. Alsea River		
1952	69(20)	53	5	18(5)	3(1)	148(26)	19.2
1953	1	38(2)	3(2)	9(5)	25(1)	76(10)	9.9
1954	6	16(4)	21(6)	20(7)	11(2)	74(19)	9.6
1955	24(19)	44(37)	15(8)	13(9)	25	121(73)	15.7
1956	1	34(17)	-	-	-	-	-
1957	33(9)	66(17)	35(5)	11(3)	10(3)	155(37)	20.1
1958	-	67(6)	21(3)	2	4	-	-
1959	5(2)	79(2)	14(1)	11	12	121(5)	15.7
1960	19(8)	73(38)	14(3)	10(6)	11(3)	127(58)	16.5
1961	46(8)	71(8)	31	18(5)	5	171(21)	22.2
1962	13(5)	49(13)	22(7)	29(13)	14(3)	127(41)	16.5
1963	51(12)	60(12)	36(4)	45(12)	20(4)	212(44)	27.6
1964	29(7)	86(31)	29(5)	18(8)	22(4)	184(55)	23.9
1965	45(14)	38(4)	73(9)	33(5)	36(4)	225(36)	29.2
1966	62(20)	64(7)	24(1)	32(8)	85(11)	267(47)	34.7
1967	26(14)	46(15)	14	18(3)	52(4)	156(36)	20.3
1968	30(12)	34(10)	2(1)	0	23(5)	89(28)	11.6
1969	15(2)	71(6)	29(4)	33(10)	35(5)	183(27)	23.8
1970	77(34)	78(10)	64(5)	123(23)	84(4)	426(76)	55.3
1971	46(8)	41(2)	30(3) ^{1/}	42(14)	39(6)	198(33)	25.7

Miles	1.0	1.5	1.2	2.5	1.5	7.7
-------	-----	-----	-----	-----	-----	-----

^{1/} Estimated

Table 7. Peak Counts on Siuslaw River Spawning Fish
Surveys for Fall Chinook Since 1952

Year	Auxiliary Surveys			Fish Per Mile
	N.F. Siuslaw River B	Esmond Creek	Lake Creek	
1952	13(1)	-	-	-
1953	-	-	29(10)	-
1954	-	-	-	-
1955	16(6)	-	-	-
1956	13(3)	8	2(1)	9.6
1957	0	4(2)	25(8)	12.1
1958	35(9)	58(17)	58(16)	62.9
1959	4	17(5)	40(5)	25.4
1960	-	-	-	-
1961	4(2)	7(5)	48(22)	24.6
1962	72(14)	5(0)	16(4)	38.7
1963	7(1)	32(1)	29(2)	28.3
1964	44(13)	23(3)	247(35)	130.8
1965	9(1)	28(5)	39(11)	31.7
1966	35(13)	41(1)	122(11)	82.5
1967	14(4)	11(3)	141(31)	69.2
1968	7(2)	17(7)	84(32)	45.0
1969	7(0)	31(10)	192(53)	95.8
1970	29(12)	39(9)	332(76)	166.6
1971	3(0)	17(4)	59(10)	32.9

Miles	0.7	1.0	0.7	2.4
-------	-----	-----	-----	-----

Table 8. Peak Counts on Coquille River Spawning Fish
Surveys for Fall Chinook Since 1952

Year	Auxiliary Surveys			Total	Fish Per Mile
	N.Fk. Coquille River	Salmon Creek	S.Fk. Coquille R. C		
1952	-	-	10(1)	-	-
1953	-	14(1)	14(1)	-	-
1954	2	-	-	-	-
1955	-	-	-	-	-
1956	-	-	-	-	-
1957	12(7)	13(2)	2	27(9)	16.9
1958	11(2)	16(7)	6	33(9)	20.6
1959	10(4)	7	0	17(4)	10.6
1960	0	-	-	-	-
1961	0	24(14)	0	-	-
1962	7(2)	1	2(1)	10(3)	6.2
1963	13(1)	3	10	26(1)	16.2
1964	13(6)	11(2)	1	25(8)	15.6
1965	19(5)	140(49)	20	179(54)	111.9
1966	10(1)	74(19)	52	136(20)	85.0
1967	9(1)	17	41(4)	67(5)	41.9
1968	27(17)	20(4)	5	52(21)	32.5
1969	16(5)	7(0)	5(1)	28(6)	17.5
1970	39(20)	59(23)	10(2)	108(45)	67.5
1971	15(7)	22(5)	5(0)	42(12)	26.2

Miles	0.3	0.8	0.5	1.6
-------	-----	-----	-----	-----

Table 9. Peak Counts on Nehalem River Spawning Fish Surveys for Coho Since 1950

Year	Standard Surveys								Total	Fish Per Mile
	Cow Creek	N.Fk. Cronin Creek 1/	Fish-hawk Creek No. 2	Hamilton Creek	West Humbug Creek	N.Fk. Wolf Creek	North-west Creek	Oak Ranch Creek		
1950	8	11	36	6(1)	9	8	4	29(3)	111(4)	16.6
1951	24(3)	29(3)	36(2)	30	63(5)	55(3)	24(1)	40(3)	301(20)	44.9
1952	20	27(3)	93(2)	45(3)	15(1)	76(3)	27(3)	0	303(15)	45.2
1953	7(2)	20(2)	45	8	29	7	1	11	128(4)	19.1
1954	8(3)	12(2)	9(1)	4(1)	10	5(1)	1	10	59(8)	8.8
1955	11	23(1)	12	8	7	12	39(3)	5	117(4)	17.5
1956	20	35(3)	27	27	56	60(2)	22(1)	36	283(6)	42.3
1957	24	7	71	24	80	106	37(7)	45(4)	394(11)	58.8
1958	2(1)	14	2	0	11	6(1)	6(1)	0	41(3)	6.1
1959	2	10(1)	8(1)	4	23(1)	44	20(1)	28	139(4)	20.8
1960	11(3)	10(2)	15(2)	34(13)	5	38(13)	9(1)	18(3)	140(37)	20.9
1961	28(3)	8(2)	48(4)	16	28	70(4)	27	41(1)	266(14)	39.7
1962	12(3)	10	17(1)	17(4)	49(7)	26(3)	11(1)	57(8)	199(27)	29.7
1963	12(1)	3(1)	17(2)	6	34	32	7(2)	16(2)	127(8)	19.0
1964	18(3)	19(2)	38(2)	26	48(1)	75(5)	9	52(7)	285(20)	42.6
1965	18(2)	2	43(4)	16	56(2)	86(3)	5	4	230(11)	34.3
1966	8	7(1)	4	12(1)	24(2)	33(2)	5(4)	54(1)	147(11)	21.9
1967	1	13(3)	18(1)	17	18(1)	45(1)	5	5(1)	122(7)	18.2
1968	-	-	-	-	-	-	-	-	-	-
1969	0	8(1)	14	3	34(4)	30	24(5)	1	114(10)	17.0
1970	4(0)	22(1) 2/	12(0)	10(0)	12(0)	65(6)	17(0)	10(0)	152(7)	22.7
1971	3(0)	7(0)	39(1)	7(0)	70(0)	71(3)	26(1)	28(1)	251(6)	37.5
Miles	0.5	0.5	1.0	1.0	1.1	1.1	0.5	1.0	6.7	

1/ Surveys made by Oregon Game Commission since 1958.

2/ Estimated.

Table 10. Peak Counts on Wilson River Spawning Fish Surveys
for Coho Since 1950

Year	Cedar Creek	Standard Surveys		Total	Fish Per Mile
		Devils Lake Fork Wilson River			
		Lower	Upper		
1950	27	4	5	36	10.6
1951	118(8)	8	6	132(8)	38.8
1952	75(3)	19(4)	1	95(7)	27.9
1953	49(3)	16(2)	0	65(5)	19.1
1954	14(3)	7	2(1)	23(4)	6.8
1955	27	9	2	38(0)	11.2
1956	18(1)	3(1)	0	21(2)	6.2
1957	9	47	0	56(0)	16.5
1958	8	10	0	18(0)	5.3
1959	26	62	0	88(0)	25.9
1960	38(4)	63(3)	4(1)	105(8)	30.9
1961	77(7)	66(4)	14(2)	157(13)	46.2
1962	88(4)	44(6)	13(1)	145(11)	42.6
1963	45(4)	49	17	111(4)	32.6
1964	47(1)	56(2)	39(5)	142(8)	41.8
1965	51(7)	2	6	59(7)	17.4
1966	11(1)	15	20	46(1)	13.5
1967	122(8)	12(1)	18(1)	152(10)	44.7
1968	54(4)	10	14	78(4)	22.9
1969	42(7)	20(4)	2	64(11)	18.8
1970	116(8)	60	11	187(8)	55.0
1971	71(2)	26(2)	22(3)	119(7)	35.0

Miles	2.9	0.3	0.2	3.4
-------	-----	-----	-----	-----

Table 11. Peak Counts on Nestucca River Spawning Fish Surveys
for Coho Since 1950

Year	Standard Surveys					Total	Fish Per Mile
	Bear Creek	Clear Creek	East Creek	Moon Creek Upper	Niagara Creek		
1950	5(1)	19(5)	25	10	18	77(6)	15.4
1951	45(1)	46(5)	132	62	33	318(6)	63.6
1952	22(1)	50(4)	25(1)	131	47(1)	275(7)	55.0
1953	21	7(1)	32	16	13(1)	89(2)	17.8
1954	1	16(3)	49(1)	21(4)	9	96(8)	19.2
1955	14	5(1)	40	0	9	68(1)	13.6
1956	11(1)	4(1)	11(1)	6	16(2)	48(5)	9.6
1957	11(2)	23(5)	13(1)	3	15(1)	65(9)	13.0
1958	5(1)	11(4)	16(1)	4(1)	10	46(7)	9.2
1959	2	6	20	14(1)	13	55(1)	11.0
1960	0	18(8)	13	10	4(1)	45(9)	9.0
1961	5(1)	23(6)	38(1)	13(1)	16(2)	95(11)	19.0
1962	4	7(1)	28(1)	16(3)	3	58(5)	11.6
1963	13(3)	20(7)	37(4)	25(4)	15(1)	110(19)	22.0
1964	16(3)	31(3)	42(1)	61(16)	19(2)	169(25)	33.8
1965	14(2)	29(15)	56(5)	36(4)	9	144(26)	28.8
1966	17(5)	14(7)	63(6)	33(2)	16	143(20)	28.6
1967	19(2)	11(1)	15(1)	21(4)	39(2)	105(10)	21.0
1968	6(3)	9(4)	50(5)	24	12	101(12)	20.2
1969	1	5(1)	3(1)	4	3	16(2)	3.2
1970	39(6)	24(7)	5(1)	13(2)	28(1)	109(17)	21.8
1971	20(1)	13(0)	1(0)	19(1)	13(2)	66(4)	13.2
Miles	1.5	0.8	1.5	0.8	0.4	5.0	

Table 12. Peak Counts on Yaquina River Spawning Fish Surveys
for Coho Since 1950

Year	Standard Surveys						Fish Per Mile
	Feagles Trib.	Grant Creek	Salmon Creek	Simpson Creek	Yaquina River	Total	
1950	4	2	6	17(3)	36(2)	65	11.6
1951	27	135(3)	43	54(14)	190(4)	449(19)	80.2
1952	9	51	14(3)	15(1)	45(1)	134(5)	23.9
1953	5	15(1)	4(2)	0	5	29(3)	5.2
1954	6	32(1)	25(3)	5(1)	43(3)	111(8)	19.8
1955	10(1)	10(1)	9	4	35	68(2)	12.1
1956	15(3)	24(3)	30(4)	9(3)	79(6)	157(19)	28.0
1957	3	49	58(7)	28(6)	117	255(13)	45.5
1958	0	11	12(3)	8(2)	46(7)	77(12)	13.8
1959	11	12(2)	27	12(1)	87(1)	149(4)	26.6
1960	5(2)	19(10)	20(9)	3(1)	62(21)	109(43)	19.5
1961	15(2)	35(2)	48(5)	9(5)	269(4)	376(18)	67.2
1962	7(1)	30(5)	25(12)	11(1)	128(11)	201(30)	35.9
1963	3(1)	56(9)	18(5)	42(12)	72(4)	191(31)	34.1
1964	46(5)	57(2)	6(1)	26(2)	171(20)	306(30)	54.7
1965	31(5)	35(3)	29(4)	42(19)	153(16)	290(47)	51.8
1966	24(3)	27(3)	9	54(7)	212(17)	326(30)	58.2
1967	21(3)	25(3)	12(3)	10(4)	82(16)	150(29)	26.3
1968	37(7)	20(3)	8(1)	19(5)	113(4)	197(20)	35.2
1969	11(2)	8	4	5	59(13)	87(15)	15.5
1970	12(1)	28(1)	7(0)	42(5)	154(4)	243(11)	43.4
1971	25(1)	26(0)	11(1)	13(0)	251(10)	326(12)	58.2
Miles	0.1	1.5	0.5	1.5	2.0	5.6	

Table 13. Peak Counts on Alsea River Spawning Fish Surveys
for Coho Since 1950

Year	Standard Surveys						Fish Per Mile
	Bummer Creek	Cherry Creek	Horse Creek	Lobster Creek	Wilson Creek	Total	
1950	15 (3)	6	23 (5)	4 (1)	10 (1)	58 (10)	11.4
1951	76	62	58 (4)	56 (3)	46 (4)	298 (11)	58.4
1952	57 (3)	23 (5)	49 (4)	44 (1)	46 (4)	219 (17)	42.9
1953	17 (1)	8	12 (3)	14	14 (1)	65 (5)	12.7
1954	40 (2)	14 (1)	56 (1)	44 (1)	36	190 (5)	37.3
1955	23	18	34	65	34 (9)	174 (9)	34.1
1956	41 (3)	20 (6)	18 (2)	89 (12)	65 (7)	233 (30)	45.7
1957	3	12 (2)	14	85 (3)	40 (4)	154 (9)	30.2
1958	9 (1)	1	10	35	6	61 (1)	12.0
1959	4 (3)	19 (1)	9 (1)	75 (4)	36 (2)	143 (11)	28.0
1960	14 (3)	17 (5)	17 (3)	50 (12)	17 (7)	115 (30)	22.6
1961	54 (10)	26 (6)	61 (4)	72 (5)	30 (8)	243 (33)	47.7
1962	33 (4)	13 (4)	21 (1)	24 (1)	19	110 (10)	21.6
1963	10 (3)	22 (4)	38 (2)	73 (5)	60 (18)	203 (32)	39.8
1964	75 (17)	40 (12)	34	116 (3)	59 (9)	324 (41)	63.5
1965	25	26 (4)	34 (4)	37 (4)	36 (8)	158 (20)	31.0
1966	40 (7)	55 (16)	33 (1)	40 (6)	46 (6)	214 (36)	42.0
1967	24 (8)	24 (3)	46 (7)	30 (1)	24 (3)	148 (22)	29.0
1968	37 (5)	25 (3)	29	17	25	133 (8)	26.1
1969	17 (2)	7 (3)	4	14	6 (2)	48 (7)	9.4
1970	12 (0)	8 (1)	10 (2)	15 (2)	16 (3)	61 (8)	12.0
1971	32 (1)	15 (0)	27 (1)	82 (0)	9 (0)	165 (2)	32.4
Miles	1.0	0.8	1.0	1.0	1.3	5.1	

Table 14. Peak Counts on Beaver Creek Spawning
Fish Surveys for Coho Since 1950

Year	Standard Surveys				Fish per Mile
	N. Fk. Beaver Creek	N. Fk. of Beaver Creek	S. Fk. of N. Fk. Beaver Creek	Total	
1950	12(2)	5(2)	17(4)	34(8)	14.8
1951	179	80(8)	115(11)	374(19)	162.6
1952	47(4)	25(4)	20(1)	92(9)	40.0
1953	11(2)	2	9(2)	22(4)	9.6
1954	11	13(3)	13(3)	37(6)	16.1
1955	24	20(3)	8(2)	52(5)	22.6
1956	24(4)	18(4)	27(1)	69(9)	30.0
1957	52(2)	22(3)	32(2)	106(7)	46.1
1958	15(2)	0	9(1)	24(3)	10.4
1959	32(1)	5	6	43(1)	18.7
1960	29(4)	0	1	30(4)	13.0
1961	23(5)	5(1)	21(4)	49(10)	21.3
1962	37(3)	9(1)	20(3)	66(7)	28.7
1963	25(10)	18(11)	15(4)	58(25)	25.2
1964	20(0)	17(5)	45(3)	82(8)	35.7
1965	26(5)	25(5)	12	63(10)	27.4
1966	40(1)	42(11)	18	100(12)	43.5
1967	15(5)	14(5)	2	31(10)	13.5
1968	39(3)	21(1)	6	66(4)	28.7
1969	17(3)	6(2)	9(3)	32(8)	13.9
1970	46(5)	15(2)	5(0)	66(7)	28.7
1971	52(3)	12(1)	3(0)	67(4)	29.1

Miles	1.0	0.5	0.8	2.3
-------	-----	-----	-----	-----

Table 15. Peak Counts on Tenmile Lakes Standard
Spawning Fish Surveys for Coho Since 1950

Year	Hatchery Creek & Left Fork	Right Fork Hatchery Creek	Total	Fish per Mile
1950	79(25)	37(11)	116(36)	145.0
1951	279	69(38)	348	435.0
1952	315(52)	79(27)	394(79)	492.5
1953	126(61)	10(2)	136(63)	170.0
1954	166(71)	42(18)	208(89)	260.0
1955	341(144)	74(28)	415(172)	518.7
1956	384(176)	72(13)	456(189)	570.0
1957	248(77)	62(20)	310(97)	387.5
1958	110(58)	26(18)	136(76)	170.0
1959	81(32)	10(6)	91(38)	113.7
1960	121(83)	13(11)	134(94)	167.5
1961	173(72)	6(3)	179(75)	223.7
1962	162(73)	13(4)	175(77)	218.7
1963	185(151)	4(1)	189(152)	236.2
1964	87(47)	127(67)	214(114)	267.5
1965	79(48)	80(37)	159(85)	198.7
1966	95(39)	49(21)	144(60)	180.0
1967	53(27)	32(23)	85(50)	106.2
1968	32(22)	14(6)	46(28)	57.5
1969	83(54)	23(11)	106(65)	132.5
1970	241(111)	65(23)	306(134)	382.5
1971	46(6)	11(2)	57(8)	71.2

Miles	0.7	0.1	0.8
-------	-----	-----	-----

Table 16. Peak Counts on Tenmile Lakes Auxiliary Spawning
Fish Surveys for Coho Since 1955

Year	Adams Creek	Benson Creek	Big Creek	Johnson Creek	Murphy Creek	Shutters Creek	Wilkins Creek	Total	Fish per Mile
1955	1,014(221)	517(247)	2,222(304)	4,214(1,032)	437(236)	340(187)	255(108)	8,999(2,925)	526.3
1956	1,712(851)	471(198)	2,035(874)	3,548(1,933)	430(213)	254(70)	161(41)	8,611(4,180)	503.6
1957	1,179(380)	289(106)	1,596(659)	2,969(850)	557(227)	281(98)	123(46)	6,994(2,366)	409.0
1958	292(123)	107(28)	905(293)	1,348(684)	334(99)	64(27)	87(44)	3,137(1,298)	183.5
1959	160(38)	76(12)	336(64)	655(218)	191(22)	55(7)	32(6)	1,506(367)	88.1
1960	200(160)	168(143)	1,030(786)	1,339(891)	165(125)	51(35)	76(55)	3,029(2,195)	177.1
1961	236(100)	122(48)	1,575(627)	1,323(439)	490(259)	44(20)	126(43)	3,916(1,575)	229.0
1962	150(61)	131(41)	1,773(628)	1,596(629)	624(275)	46(22)	51(8)	4,371(1,664)	255.6
1963	395(279)	129(67)	1,160(709)	1,878(1,088)	370(227)	78(47)	70(45)	4,080(2,462)	238.6
1964	443(145)	88(26)	1,720(802)	2,007(817)	442(188)	83(9)	102(21)	4,885(2,008)	285.7
1965	317(146)	117(49)	949(297)	1,015(378)	284(42)	51(23)	63(20)	2,796(955)	163.5
1966	173(87)	164(66)	1,065(408)	1,339(454)	280(108)	23(7)	63(24)	3,107(1,154)	181.7
1967	461(254)	148(103)	966(462)	1,414(702)	313(155)	73(23)	73(34)	3,448(1,733)	201.6
1968	206(54)	80(26)	464(79)	560(182)	146(40)	46(18)	3(1)	1,505(402)	88.0
1969	224(156)	88(53)	617(347)	1,102(654)	111(41)	84(64)	67(45)	2,293(1,360)	134.1
1970	1,382(1,077)	293(159)	1,728(1,289)	2,579(1,492)	193(144)	497(280)	312(174)	6,984(4,615)	408.4
1971	1,003(56)	139(18)	1,730(484)	1,563(216)	155(27)	180(15)	136(27)	4,906(843)	286.9
Miles	2.6	0.9	3.0	6.0	1.1	2.5	1.0	17.1	

Table 17. Peak Counts on Coos River Spawning Fish Surveys for Coho Since 1950

Year	Standard Surveys				Fish per Mile
	Larson Creek	Morgan Creek	Marlow Creek	Total	
1950	158(21)	6(1)	15	179(22)	54.2
1951	327(77)	28(3)	33	388(80)	117.6
1952	254(26)	68(12)	20(6)	342(44)	103.6
1953	65(19)	18(2)	18(3)	101(24)	30.6
1954	67(33)	15	15(6)	97(39)	29.4
1955	96(18)	17	1	114(18)	34.5
1956	195(72)	40(19)	32(2)	267(93)	80.9
1957	49(6)	11(2)	19(2)	79(10)	23.9
1958	24(6)	2	0	26(6)	7.9
1959	63(7)	10	3	76(7)	23.0
1960	47(30)	10(3)	7(7)	64(40)	19.4
1961	192(116)	8(4)	46(12)	246(132)	74.5
1962	129(31)	25(12)	27(19)	181(62)	54.8
1963	53(17)	26(4)	7(1)	86(22)	26.1
1964	52(11)	26(3)	43(3)	121(17)	36.7
1965	28(2)	7	16(4)	51(6)	15.5
1966	50(10)	7	6	63(10)	19.1
1967	53(11)	21(5)	6(1)	80(17)	24.2
1968	26(3)	16(2)	6	48(5)	14.5
1969	45(7)	16(5)	3(1)	64(13)	19.4
1970	35(5)	16(2)	4(1)	55(8)	16.7
1971	18(2)	25(5)	33(1)	76(8)	23.0
Miles	1.3	1.0	1.0	3.3	

Table 18. Peak Counts on Coquille River Spawning Fish Surveys
for Coho Since 1950

Year	Standard Surveys						Total	Fish Per Mile
	N.Fk.Coquille River			E.Fk.Coquille River	M.Fk.Coquille River 1/	S.Fk.Coquille River 1/		
	Cherry Creek	Middle Creek	North Fork	Steel Creek	Big Creek	Salmon Creek		
1950	57(16)	94(18)	61	2	77(23)	39(11)	330(68)	43.4
1951	57(13)	144(22)	86	7(1)	145(12)	54	493(48)	64.9
1952	383(15)	316(20)	232(14)	5	191(15)	117(3)	1,244(67)	163.7
1953	22(2)	65(6)	36(4)	32(7)	59(9)	65(17)	279(45)	36.7
1954	24	55	91(2)	5	56(2)	44(7)	275(11)	36.2
1955	50	50	33	14(1)	14(2)	23(2)	184(5)	24.2
1956	76(24)	110(18)	77(18)	31(8)	96(17)	69(35)	459(120)	60.4
1957	121(7)	96(5)	143(13)	11	63	71(6)	505(31)	66.5
1958	38(9)	26(6)	31(2)	9(2)	25(3)	28(4)	157(26)	20.7
1959	79(3)	45(3)	184(4)	5	55	35(1)	403(11)	53.0
1960	21(1)	20(12)	29(18)	15(7)	11(1)	11(2)	107(41)	14.1
1961	67(21)	78(23)	52(12)	49(18)	38(9)	1	285(83)	37.5
1962	38(3)	100(7)	62(4)	43(12)	73(4)	67(11)	383(41)	50.4
1963	20(9)	7	43(12)	10(1)	11(5)	2(1)	93(28)	12.2
1964	113(5)	33(3)	63(3)	114(13)	95(5)	27(4)	445(33)	58.6
1965	35(2)	36(1)	95(4)	148(25)	77(2)	16(1)	407(35)	53.6
1966	28(1)	5(1)	22(1)	44(10)	60(2)	36(17)	175(32)	25.7
1967	19(2)	11(3)	1	50(15)	51(3)	33(6)	165(29)	21.7
1968	6	5	1	46(7)	32	5(1)	95(8)	12.5
1969	55(9)	40(5)	12(2)	68(14)	9(0)	4(0)	188(30)	24.7
1970	46(5)	15(4)	21(0)	20(4)	7(0)	15(3)	124(16)	16.3
1971	28(4)	17(0)	18(3)	56(4)	22(1)	20(3)	161(15)	21.2
Miles	1.8	1.0	1.0	1.0	1.5	1.3	7.6	

1/ Counts made by Oregon Game Commission since 1958.

Table 19. Peak Counts on Tillamook Bay Standard Spawning Fish
Surveys for Chum Since 1950

Year	Standard Surveys			Total	Fish per Mile
	Kilchis River Clear Creek	Miami River Browns Creek	Wilson River Lower N. Fk.		
1950	420	256	142	818	355.7
1951	699	193	712	1,604	697.4
1952	487	29	182	698	303.5
1953	780	330	104	1,214	527.8
1954	906	73	381	1,360	591.3
1955	201	14	97	312	135.7
1956	102	10	194	306	133.0
1957	351	54	172	577	250.9
1958	331	34	153	518	225.2
1959	87	7	152	246	107.0
1960	2	0	20	22	9.6
1961	13	6	27	46	20.0
1962	6	86	25	117	50.9
1963	5	39	109	153	66.5
1964	18	18	13	49	21.3
1965	0	0	61	61	26.5
1966	12	50	87	149	64.8
1967	3	31	25	59	25.7
1968	0	9	107	116	50.4
1969	1	4	50	55	23.9
1970	23	183	64	270	117.4
1971	2	73	94	169	73.5

Miles	0.8	1.0	0.5	2.3
-------	-----	-----	-----	-----

Table 20. Peak Counts on Tillamook Bay Auxiliary Spawning Fish
Surveys for Chum Since 1960

Auxiliary Surveys							
	Miami River		Kilchis R.		Tillamook River		Fish
	C	Prouty Creek	Coal Creek	A	A	Total	Per Mile
1960	102	17	104	65	4	292	97.3
1961	136	4	154	76	39	409	136.3
1962	571	0	1,142	220	61	1,994	664.6
1963	302	3	802	165	62	1,334	444.6
1964	323	178	870	65	16	1,452	484.0
1965	104	2	404	30	18	558	186.0
1966	194	3	1,002	61	74	1,334	444.6
1967	173	15	430	18	41	677	225.6
1968	151	42	413	37	11	654	218.0
1969	214	0	812	34	15	1,075	358.3
1970	135	33	1,383	85	27 <u>1/</u>	1,663	554.3
1971	102	62	889	105	13	1,171	390.3

Miles 0.8 0.2 0.8 0.4 0.8 3.0

^{1/} Estimated count (no survey).

Table 21. Peak Counts on Nestucca River Spawning
Fish Surveys for Chum Since 1950

Year	Standard Surveys			Fish per Mile
	Clear Creek	Creek No. 1	Total	
1950	56	40	96	53.3
1951	73	55	128	71.1
1952	43	15	58	32.2
1953	5	44	49	27.2
1954	178	100	278	154.4
1955	35	35	70	38.9
1956	13	11	24	13.3
1957	88	122	210	116.7
1958	165	120	285	158.3
1959	36	91	127	70.5
1960	6	13	19	10.6
1961	57	34	91	50.6
1962	156	88	244	135.5
1963	196	66	262	145.5
1964	40	19	59	32.8
1965	35	18	53	29.4
1966	89	91	180	100.0
1967	72	32	104	57.8
1968	80	37	117	65.0
1969	35	20	55	30.6
1970	53	28	81	45.0
1971	45	20	65	36.1

Miles

0.8

1.0

1.8

Table 22. Peak Counts on Netarts Bay Spawning Fish Surveys for Chum Since 1953

Year	Standard Survey	
	Whiskey Creek	Fish per Mile
1953	137	342.5
1954	502	1,255.0
1955	96	240.0
1956	131	327.5
1957	672	1,680.0
1958	337	842.5
1959	147	367.5
1960	159	397.5
1961	350	875.0
1962	440	1,100.0
1963	221	552.0
1964	301	752.5
1965	141	352.5
1966	317	792.5
1967	365	912.5
1968	79	197.5
1969	160	400.0 ^{1/}
1970	480	1,200.0 ^{1/}
1971	200	500.0 ^{1/}

Miles

0.4

^{1/} Estimated total run to Whiskey Creek made by OSU. Run in excess of OSU needs was allowed to spawn above rack (approximately 750,000 eggs taken in 1969 and 1970; approximately 280,000 eggs taken in 1971).