SPAWNING FISH SURVEYS IN COASTAL WATERSHEDS, 1967

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Pelagic Fish and Coastal Rivers Investigations

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Spawning Fish Surveys in Coastal Watersheds, 1967

GENERAL INFORMATION

Spawning fish surveys on index areas of Oregon coastal rivers and tributaries are made annually by personnel of Pelagic Fish and Coastal Rivers Investigation, Oregon Fish Commission. Annual peak counts of spawning salmon in the survey areas provide data for computing an index of the escapement into a coastwide "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 1967-68 and makes comparisons with similar data from previous years.

This report also corrects several small computational and typing errors which occurred in the 1966 report.

The earliest spawning fish surveys were established 21 years ago, and others were added as needed to form a coast-wide sampling program. Present annual survey distances are 28.5 miles for spring chinook, 37.7 miles for fall chinook, 9.9 miles for chum, and 58.3 miles for coho. Additional surveys were conducted to observe spawning activity above partial barriers and fish ladders.

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. Pelagic Fish and Coastal Rivers personnel made 329 surveys encompassing 302 miles in 1967 (Table 1). Distances spot checked were not included in the miles surveyed. Surveys started on September 22, 1967, and continued through January 25, 1968.

Table 1. Number of spawning fish surveys and distances surveyed by Pelagic Fish and Coastal Rivers staff during the 1967-68 spawning season

River system	Spring chinook		Fall chinook		Chum		Coho		Total	
	No.	Miles	No.	Miles	No.	Miles	No.	Miles	No.	Miles
Nehalem			17	14.0 1/			32	27.2 1/	49	41.2
Miami					12	7.4			12	7.4
Kilchis	1	2.0	5	6.5	7	6.0			13	14.5
Wilson	3	8.5	5	2.5	3	1.5 2/	10	7.6	21	20.1
Trask	1	2.5							1	2.5
Tillamook			3	5.1	3	1.8			6	6.9
Netarts Bay					2	0.8			2	0.8
Nestucca	1	1.5	11	7.7	6	4.4	17	13.2	35	26.8
Neskowin					2	1.2			2	1.2
Devils Lake							3	0.9	3	0.9
Siletz	2	3.7	9	8.0					11	11.7
Yaquina			14	18.6	2	2.5	22	22.0	38	43.1
Beaver Creek							8	5.9	8	5.9
Alsea	9	15.3	16	25.9			25	21.5	50	62.7
Mercer & Sutton lakes							6	5.5	6	5.5
Siuslaw			7	4.4					7	4.4
Tenmile Lakes							29	15.3	29	15.3
Coos							5	4.5 1/	5	4.5
Coquille			9	6.8			22	19.3 1/	31	26.1
Elk										
Sixes										
Brush Cr.										
Winchuck										
Total	17	33.5	96	99.5	37	25.6	179	142.9	329	301.5

1/ Portions of these counts supplied by Oregon Game Commission.

2/ Concurrent with fall chinook survey.

Since 1958, survey data have been exchanged with the Oregon Game Commission to avoid duplication of some surveys. The Game Commission provides data from 13 standard surveys established by the Fish Commission. These surveys are: 1.5 miles each for fall chinook and coho on the Nehalem River; 3.3 miles for coho on Tenmile Lakes tributaries; and 4.6 miles for coho on the Coquille River. In 1966 and 1967, Fish Commission personnel surveyed the Tenmile Lakes index areas of the Game Commission.

Survey personnel

Robert McQueen of the Astoria Laboratory conducted the surveys on the Nehalem River. Surveys between the Nehalem and Siuslaw rivers were conducted from the Newport Laboratory by Del Skeesick, Dennis Isaac, and Don Gillham. Alan McGie and Edwin Cummings conducted surveys of the Siuslaw River and other stream systems south to Floras Lake from the Charleston Laboratory. Warren Knispel and Ed Schwartz of the Oregon Game Commission provided data from their surveys.

Influence of weather on the 1966-67 spawning fish surveys

Spawning fish surveys were not significantly influenced by variations in weather conditions in 1967. Spring chinook surveys were affected to some extent by a freshet in early October which caused fall chinook to appear in the survey areas on the Nestucca, Wilson and Kilchis rivers. Separation was based upon color and spawning activity. Many fish examined by the Oregon Game Commission during their seining operation on the Nestucca River were too green to be spring chinook. How precisely we separated the spring and fall races cannot be determined.

No other unusual weather conditions which might have affected the counts were noted.

Influence of human activities on 1966-67 spawning fish surveys

Activities of the Fish Commission, Game Commission, logging companies, and recreational users of streams have all 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 satisfactory counts in three of the survey areas.

A ladder which was constructed at the upper end of the fall chinook survey area on Sunshine Creek of the Siletz River in 1962 has allowed fish, which normally would have spawned in the survey area, to spawn farther upstream. Since the installation of the ladder, the counts have averaged only 58% of the counts that were made in the 4 years previous. Since this survey area represents 38% of the index area for the Siletz River, the effect of the change is to cause a false decline in the trend for the whole river system of approximately 22%.

The recent increase in returns of coho to the Rock Creek Hatchery has resulted in large numbers of strays utilizing the chinook survey area on North Rock Creek for spawning. Abundance of coho in the survey area was first noted in 1965. Large masses of fish in each pool make it impossible to count all the live chinook present. The count of chinook carcasses is undoubtedly low because many are buried by the digging of the coho. The superimposition that is occurring in the survey area will undoubtedly be to the detriment of the chinook. Since this is a unique occurrence, the survey area is no longer indicative of the chinook abundance in the Siletz River.

Similar conditions have been occurring in the standard survey on Fall Creek on Alsea River. The tremendous number of coho which traverse the survey

area during the chinook spawning period make it nearly impossible to obtain good counts. Considerable numbers of coho spawn below the hatchery causing superimposition on spring and fall chinook eggs already in the gravel. Again, this occurrence is unique in the Alsea system so the survey area counts are no longer indicative of the general conditions in the watershed.

The Oregon Game Commission study on Deer Creek has a strong influence on the counts made directly below their study area. Dead or dying fish are examined for completeness of spawning and are discarded below the weir. This disrupts the normal distribution of dead or moribund fish in our survey areas on Deer and Horse creeks.

Log jams on Euchre and Little Euchre creeks on the Siletz River physically covered large portions of the fall chinook survey areas. Thus, the counting efficiency was reduced, and the counts do not reflect the actual number of fish present at the time the survey was made.

Recreational activity on tributaries of Tillamook Bay have affected the spring chinook counts in the standard areas. People have erected low rock dams at the lower ends of pools, either to increase water depth for swimming or for exercise. Since spring chinook typically spawn at low flows, the tails of pools are the most suitable spawning areas. On Wilson and Kilchis rivers, these dams disrupted normal current patterns, destroying the spawning value of the area. At higher flows, these dams became innocuous, but low flows persisted through most of the spring chinook spawning season.

RESULTS

Spring chinook

The count of spring chinook in standard spawning fish surveys on four coastal watersheds was three fish per mile. Counts of spring chinook have generally declined since 1958, and these were the next to the lowest counts

recorded since spring chinook surveys were established in 1953 (Figure 1). The counts of adults on individual watersheds ranged from two fish per mile on the Siletz River to 27 fish per mile on the Nestucca River (Table 2). The jack count was three fish per mile on the Nestucca River. No jacks were seen on the Siletz or Alsea rivers or rivers tributary to Tillamook Bay. The average jack per mile count was zero.

Auxiliary counts on the Trask and Siletz rivers were 18 and 0 fish per mile, respectively. These counts were 55 and 0% of the respective averages.

Peak counts for each survey area are tabulated in the Appendix tables 1-4.

Fall chinook

The count of fall chinook on six coastal rivers was 36 fish per mile which was three fish per mile above the 15-year average (1952-66) (Table 3). The number of fish per mile between river systems ranged from 16 on the Alsea River to 110 on Tillamook Bay tributaries. The Nehalem, Siletz and Yaquina rivers had fish-per-mile counts less than their long-term averages. The Alsea River count equalled the long-term average but was the lowest since 1960. The Nestucca drainage had high counts for the third successive year.

The trend counts show the expected rise in escapement level after cessation of commercial fishing in the rivers in 1956. In recent years, the counts varied less from year to year (Figure 2).

The counts in the auxiliary survey areas on the Siuslaw and Coquille rivers were above their averages but were several fish per mile less than last year's counts.

Peak counts for each survey area are tabulated in the Appendix tables 5-12.

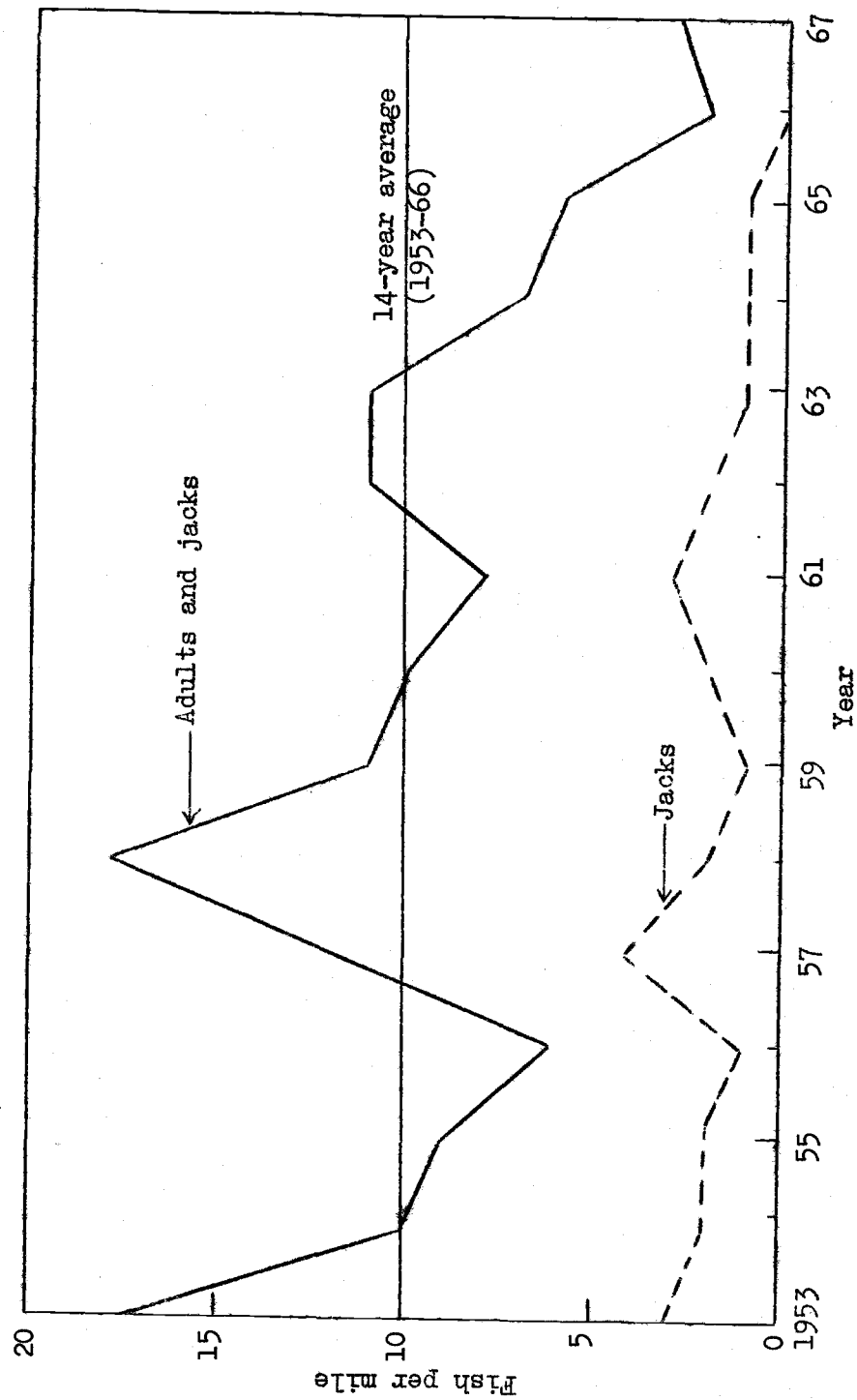

Figure 1. Average numbers of spring chinook per mile in standard survey areas of four coastal rivers, 1953-67

Table 2. Summary of peak fish-per-mile counts of spring chinook in standard and auxiliary survey areas of coastal rivers since 1951 1/

Year	Standard					Auxiliary	
	Tillamook Bay tributaries	Nestucca	Siletz	Alsea	Weighted average fish per mile	Trask	Siletz
1951	---	108(5)	---	---	108(5)	27(3)	
1952	11(0)	39(5)	5(0)	---	13(1)	7(1)	
1953	7(1)	133(11)	11(2)	15(3)	18(3)	28(2)	
1954	12(2)	42(6)	4(0)	6(1)	10(2)	16(7)	
1955	8(2)	39(7)	4(1)	8(2)	9(2)	56(8)	
1956	6(1)	18(2)	4(0)	6(2)	6(1)	3(0)	
1957	16(6)	9(3)	14(4)	8(2)	12(4)	28(10)	13(4)
1958	29(3)	59(6)	2(1)	7(1)	18(2)	48(8)	9(2)
1959	7(1)	42(5)	1(0)	12(1)	11(1)	35(2)	8(1)
1960	10(2)	37(5)	4(0)	7(2)	10(2)	68(8)	8(0)
1961	11(6)	14(1)	1(0)	6(2)	8(3)	32(8)	1(1)
1962	13(1)	23(3)	2(0)	9(3)	11(2)	47(6)	1(1)
1963	16(1)	26(0)	14(8)	3(0)	11(1)	50(2)	15(4)
1964	7(1)	20(1)	15(1)	3(0)	7(1)	52(6)	12(0)
1965	3(1)	14(4)	12(4)	6(1)	6(1)	24(0)	1(0)
1966	3(1)	6(1)	0	2(0)	2(0)	8(2)	2(1)
1967	1(0)	27(3)	2(0)	3(0)	3(0)	18(2)	0
1952-66 average	10(2)	35(4)	7(1)	7(1)	10(2)	33(5)	7(1)
Departure of 1967 from average	-9	-8	-5	-4	-7	-15	-7
Miles surveyed	10.5	1.5	2.5	11.5		2.5	1.7

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

Table 3. 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	
	Nehalam	Tillamook Bay tributaries	Nestucca	Siletz	Yaquina	Alsea	Weighted average fish-per mile	Siuslaw	Coquille
1950	15	--	24	--	23(3)	--	--		
1951	16(2)	--	16	--	33	--	--		
1952	41(5)	63(18)	194(10)	53(9)	61(16)	18	53(10)		
1953	24(6)	18(4)	10(2)	9(2)	14(1)	8(1)	13(2)		
1954	19(4)	12(4)	20(2)	13(1)	20(2)	10(3)	15(2)		
1955	26(12)	4(2)	35(5)	21(13)	29(9)	13(8)	20(9)		
1956	22(1)	9(4)	11(1)	15(4)	13(6)	--	14(4)	9	
1957	52(15)	66(22)	118(33)	34(5)	25(7)	18(4)	38(10)	11(4)	13(3)
1958	32(3)	60(11)	73(4)	62(7)	39(3)	--	49(5)	56(16)	17(3)
1959	37(3)	60(5)	55(0)	25(1)	23(2)	13(0)	28(2)	23(4)	13(1)
1960	60(30)	59(21)	131(34)	28(11)	15(6)	13(6)	35(13)	--	--
1961	62(5)	76(13)	100(16)	30(5)	23(2)	17(2)	38(5)	22(1)	--
1962	44(7)	64(9)	80(16)	55(11)	25(9)	12(4)	35(8)	17(7)	11(2)
1963	57(13)	88(8)	91(8)	40(6)	32(7)	21(4)	43(7)	25(1)	9(1)
1964	56(6)	67(11)	57(10)	55(14)	25(5)	18(5)	37(7)	119(18)	16(4)
1965	52(14)	54(12)	190(11)	26(4)	23(9)	22(4)	42(8)	29(6)	72(25)
1966	43(3)	86(17)	125(14)	30(2)	30(5)	27(5)	43(6)	73(9)	48(7)
1967	34(2)	110(14)	102(18)	23(3)	19(5)	16(4)	36(6)	61(14)	27(2)
1952-66 average	41(9)	52(10)	86(11)	33(7)	26(6)	16(4)	33(7)	38(7)	25(6)
Departure of 1967 from average	-7	+58	+16	-10	-7	0	+3	+23	+2
Miles surveyed	4.0	3.5	2.3	4.0	7.8	10.5		2.7	2.9

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

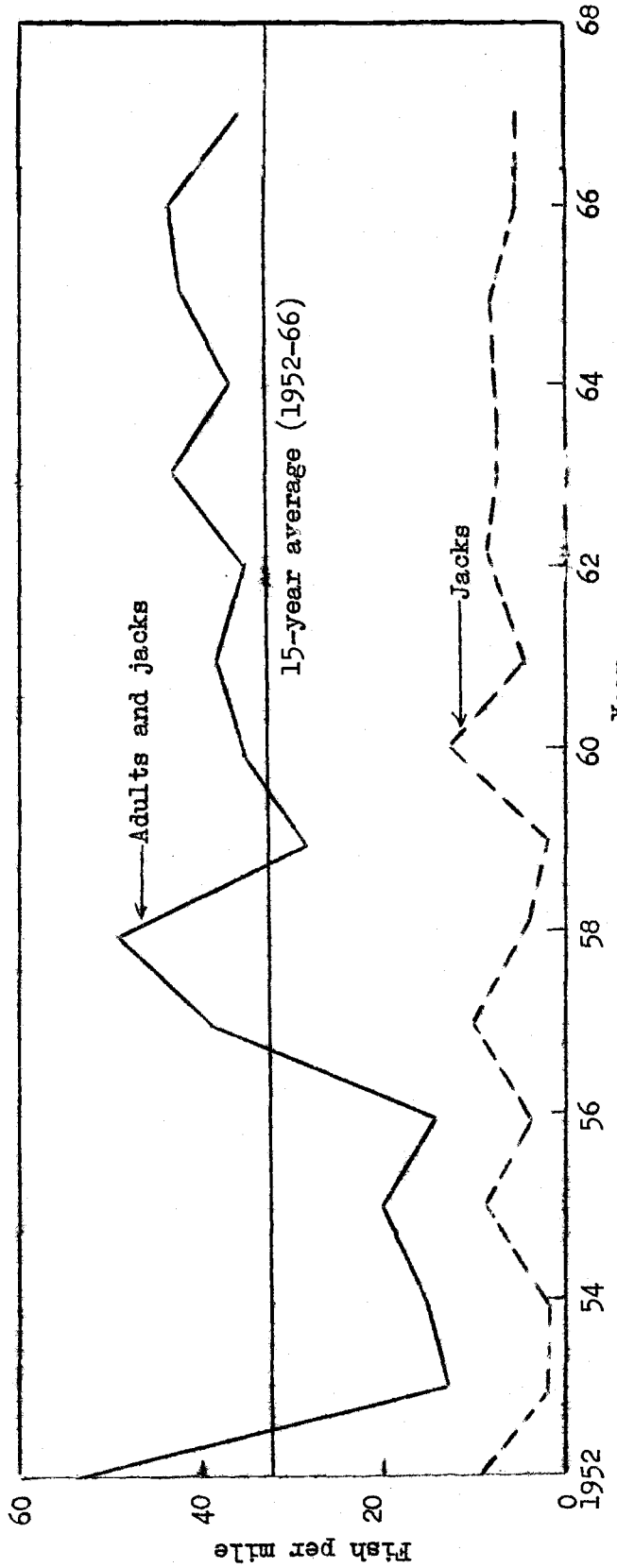

Figure 2. Average numbers of fall chinook per mile in standard survey areas of six coastal rivers, 1952-67

Coho salmon

The peak count of coho salmon in eight coastal drainages was 23 fish per mile, which was ten fish per mile less than the 17-year average. Counts ranged from 13 fish per mile on Beaver Creek to 41 fish per mile on the Wilson River (Table 4). The Wilson River was the only one which had a peak fish per mile count higher than its average. The counts on the other streams were from 1 to 26 fish less than the 1950-66 averages.

The peak fish-per-mile counts were the lowest since 1960 (Figure 3). The adult fish this year were progeny of the large run in 1964. While in the stream, they had experienced the severe flooding in late 1964 and early 1965. They had also been subjected to exceptionally low stream flow in the summer of 1965. These two factors may explain part of the lack of adults.

The count of jack coho was four fish per mile in 1967. This count equalled the 17-year average on these watersheds.

The peak counts of coho in the standard and auxiliary survey areas in tributaries of Tenmile Lake were 106 and 197 fish per mile, respectively (Table 5). These counts were only 38 and 73% 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 since 1960 (Figure 4). The slight increase indicated for 1967 was caused by an increase in the counts of jacks.

The estimated egg deposition in 1967 was 21.6 million eggs which was only 59% of the 1955-66 average (Table 6). The nearly record low of 60.9% females accounts for part of the low estimate of deposition. This year, the ratio of females to males was based upon live fish. In previous years, the ratio was based upon carcass counts.

Table 4. 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	10	17(1)	9	13	15(3)	54(7)	41	21(--)
1951	43(2)	39(3)	73(1)	66(3)	67(4)	163(8)	118(24)	64(11)	67(6)
1952	51(3)	31(3)	67(1)	21(1)	36(3)	40(4)	104(13)	159(9)	69(5)
1953	21(1)	20(1)	20(0)	4(0)	11(1)	10(2)	31(7)	37(5)	20(2)
1954	8(1)	6(1)	23(2)	21(2)	27(1)	16(3)	29(12)	35(2)	21(2)
1955	14	15	21	12	27	23	35	26	20(--)
1956	34(1)	12(2)	13(1)	20(2)	45(5)	30(4)	81(28)	56(15)	37(6)
1957	45(1)	23(2)	20(3)	40(2)	38(2)	46(3)	24(3)	58(4)	41(2)
1958	7(1)	10(0)	10(1)	12(2)	9(0)	10(1)	8(2)	17(3)	11(1)
1959	21(1)	28(0)	14(0)	22(1)	26(2)	19(0)	22(2)	46(2)	27(1)
1960	16(4)	42(5)	11(3)	16(6)	21(6)	13(2)	19(12)	15(5)	18(5)
1961	34(2)	46(4)	21(2)	50(3)	50(8)	21(4)	75(40)	36(10)	41(7)
1962	23(3)	39(3)	13(1)	29(5)	24(3)	29(3)	55(19)	47(6)	31(5)
1963	18(1)	30(2)	26(4)	28(5)	36(5)	25(11)	26(7)	13(4)	24(4)
1964	32(2)	38(2)	42(6)	43(4)	53(7)	36(4)	37(5)	62(6)	45(5)
1965	27(2)	16(2)	34(7)	38(6)	34(6)	27(4)	16(2)	50(5)	34(4)
1966	18(2)	12(0)	31(4)	44(1)	45(6)	38(3)	19(3)	27(3)	30(3)
1967	16(1)	41(3)	25(3)	20(4)	29(4)	13(4)	24(5)	21(4)	23(4)
1950-66 average	26(2)	24(2)	26(2)	28(3)	33(3)	33(4)	44(11)	47(6)	33(4)
Departure of 1967 from average	-10	+17	-1	-8	-4	-20	-20	-26	-10
Miles surveyed	11.5	4.0	5.4	8.4	8.5	2.3	3.3	11.0	

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

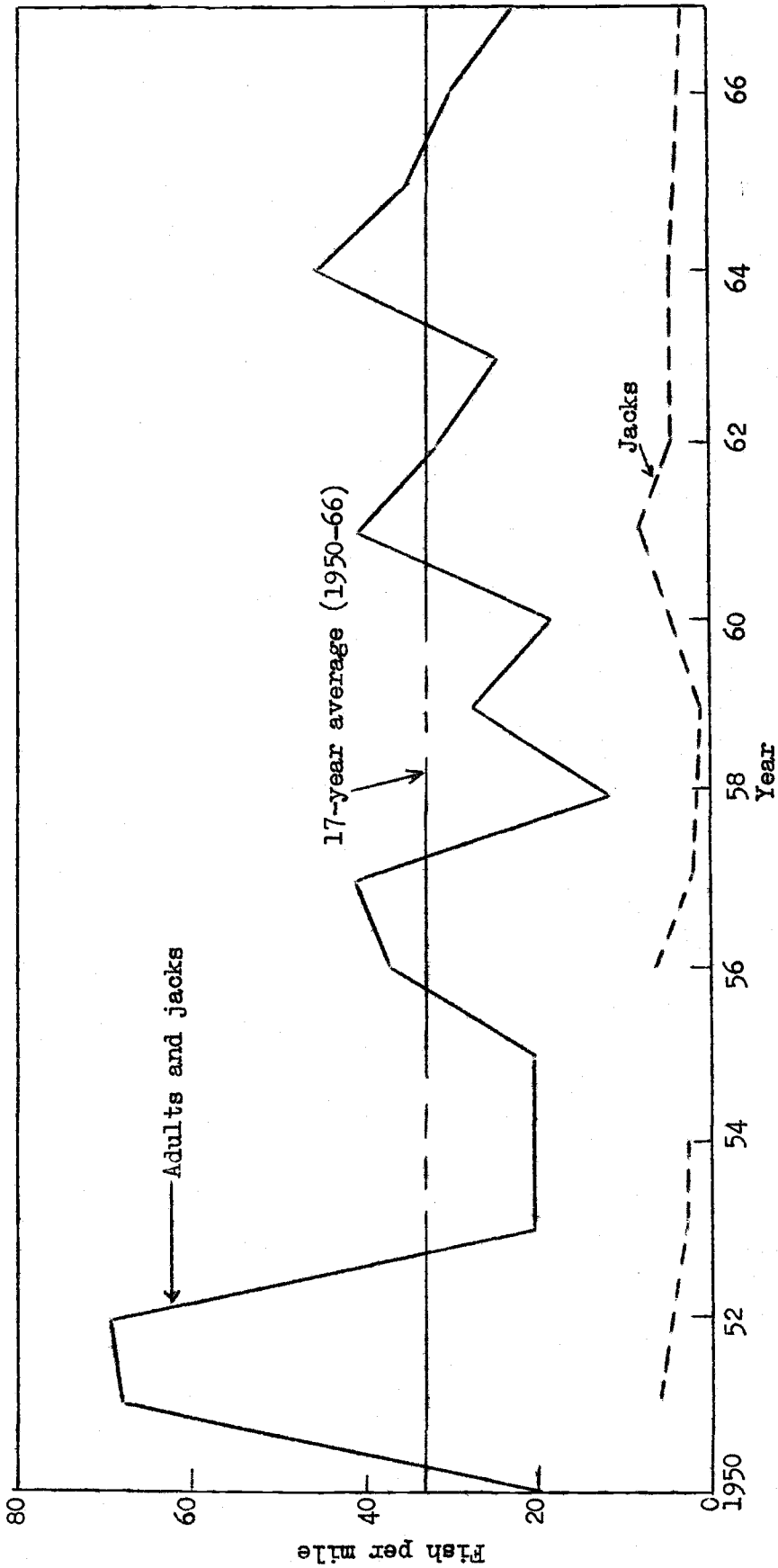

Figure 3. Average number of coho per mile in standard survey areas of eight coastal rivers, 1950-67

Table 5. Summary of peak fish-per-mile counts of coho in standard and auxiliary survey areas of coastal lakes tributaries since 1950 1/

Year	Standard	Auxiliary surveys		
	Tenmile Lakes	Tenmile Lakes	Devils Lake	Mercer and Sutton
1950	145(45)			
1951	435			
1952	493(99)			
1953	170(79)			
1954	260(111)			
1955	519(215)	526(171)		
1956	570(236)	504(244)		
1957	388(121)	406(138)	26(4)	
1958	170(95)	186(76)	43(36)	
1959	114(48)	88(21)	63(7)	47(14)
1960	168(118)	177(49)	17(11)	77(14)
1961	224(94)	229(92)	39(9)	56(19)
1962	219(96)	255(97)	84(20)	49(24)
1963	236(190)	238(144)	11(6)	34(13)
1964	268(143)	285(117)	30(7)	22(7)
1965	199(106)	164(56)	3(0)	9(2)
1966	180(75)	181(67)	19(0)	24(6)
1967	106(63)	197(100)	4(0)	15(6)
1950-66 average	280(117)	270(113)	33(10)	40(12)
Departure from average	-174	-73	-29	-25
Miles surveyed	0.8	17.1	0.7	2.5

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

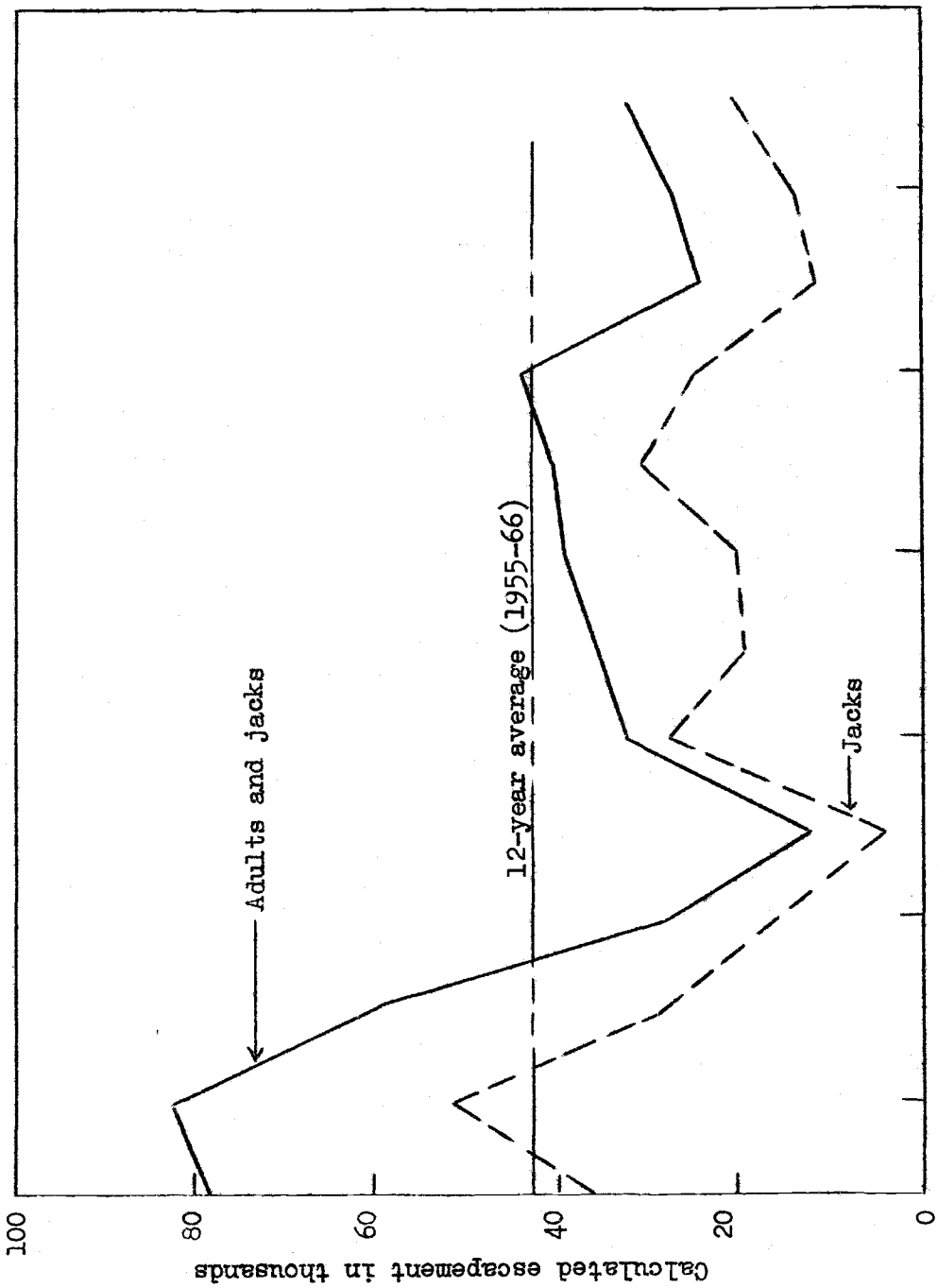

Figure 4. Calculated coho escapement into Tenmile Lakes, 1955-66

Table 6. Calculated escapement and egg deposition of coho in Tenmile Lakes, 1955-67

Year	Calculated escapement				Potential egg deposition in millions 2/
	Adults	Per cent 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	41,000	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
1955-66 average	18,380		23,750	42,130	36.4

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

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

The peak counts of spawning coho in tributaries of Devils Lake and the Mercer Lake system were 4 and 15 fish per mile, respectively. These counts were only 12 and 38% of the averages for these two systems.

Peak counts for each survey area are tabulated in the appendix tables 13-24.

Chum salmon

The peak count of chum salmon in three drainage basins was 117 fish per mile (Table 7). This was 59 fish per mile less than the 14-year average but was intermediate between the counts of the 1963 and 1964 broods which produced it (Figure 5). The count was 207 fish per mile higher than its average. The Nestucca River and Tillamook Bay counts were 20 and 134 fish per mile less than their respective averages. The Tillamook Bay and Nestucca River counts were intermediate between the counts of adults which produced them, but the Whiskey Creek counts were above the counts of the brood years.

The auxiliary fish-per-mile count on Tillamook Bay tributaries was 140 fish which was 75 fish per mile lower than the 7-year average. The 1967 fish-per-mile count was less than either of the brood years which produced it indicating a continued downward trend.

A strong downward trend on a 4-year cycle can be noted in the standard survey counts. This trend is reflected by the auxiliary fish-per-mile counts in 1963 and 1967.

Peak counts for each survey area are tabulated in the appendix tables 25-28.

Age, size, and sex composition of 1967 chum 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

Table 7. Summary of peak fish-per-mile counts of chum in standard and auxiliary survey areas of coastal rivers since 1948

Year	Standard				Auxiliary
	Tillamook Bay tributaries	Nestucca	Whiskey Creek	Weighted average	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	56
1961	20	51	875	108	80
1962	51	136	1,100	178	408
1963	66	146	552	141	288
1964	21	33	753	91	305
1965	27	29	353	57	107
1966	65	100	793	144	265
1967	26	58	913	117	140
1953-66 average	160	78	706	176	215
Departure from average	-134	-20	+207	-59	-75
Miles surveyed	2.3	1.8	0.4		5.4

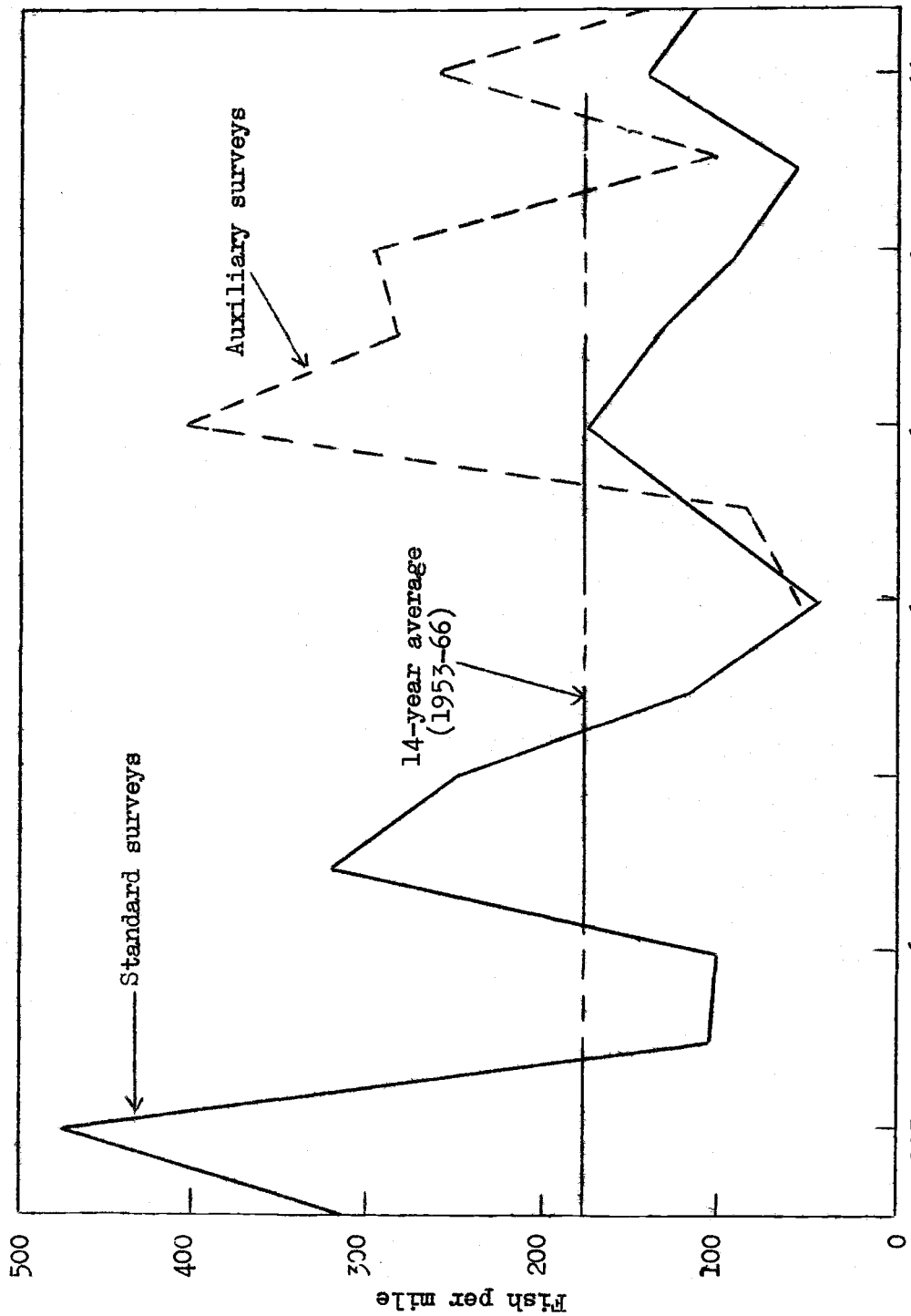

Figure 5. Average numbers of chum per mile in standard and auxiliary survey areas of three coastal drainages, 1953-67

encountered in each river system. The runs into Tillamook and Wilson rivers were too small to provide that large a sample. A total of 136 fish was checked on Tillamook Bay tributaries.

The length of fish by age and sex was within the limits found in previous inventories (Table 8). The size range was from 25 to 36 inches.

Fourth-year males were much less abundant than fourth-year females, but there were about equal numbers of third-year fish. The overall sex ratio was weighted toward females. This ratio was substantiated by auxiliary carcass counts made on Coal Creek (Kilchis River) and Whiskey Creek. Of 156 dead fish examined on Coal Creek, 94 or 60.3% were females. In a sample of 179 dead or moribund fish on Whiskey Creek, 107 or 59.8% were females.

The fourth-year fish dominated the run at about the same ratio as in 1963 and 1966 (Table 9, Figure 6). A greater abundance of fourth-year fish also occurred in the Nestucca River (87%) and Whiskey Creek (58%). Dominance of fourth-year fish has occurred four times in the last 5 years indicating a change from the period 1959-62 when third-year fish were dominant.

SUMMARY

The surveys of spawning fish in coastal rivers in 1967 indicate that stocks of spring chinook and chum salmon continue to decline. At present, they represent only 30 and 66% of their long-term averages, respectively.

Although the fish per mile counts for fall chinook and coho salmon declined somewhat from the previous 3 years, they are still within the range of normal fluctuations and cause little concern at this time.

LITERATURE CITED

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.

Table 8. Composition of Tillamook Bay chum by size, sex, and age for years sampled, 1947-67

Age	Sex	1947	1949	1950	1959	1960	1961	1962	1963	1964	1965	1966	1967
		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
	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
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
	Males	31.4	30.3	30.5	31.5	30.9	30.1	32.5	32.3	32.6	30.8	30.7	31.9
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
		Sex ratio (numbers)											
3	Females	16	3	135	79	34	53	85	24	57	26	24	23
	Males	5	12	232	71	26	48	81	30	50	38	19	22
4	Females	20	137	51	57	12	7	22	88	14	44	55	60
	Males	23	134	57	100	19	14	18	62	5	28	54	29
5	Females	1	1	1	1	0	0	0	0	1	0	0	0
	Males	0	0	5	2	1	1	1	0	0	0	0	2
Total		65	287	481	310	92	123	207	204	127	136	152	136
		Sex ratio (per cent)											
	Females	57	49	39	44	50	49	52	55	57	51	52	61
	Males	43	51	61	56	50	51	48	45	43	49	48	39