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Oregon coastal salmon spawning surveys and
straying of private hatchery coho salmon from
Yaquina and Coos bays, 1984.

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INTRODUCTION

Spawning salmon have been counted in coastal streams since 1950 to assess the status of natural spawning stocks. The surveys were primarily established to determine escapement of wild salmon past commercial net fisheries operating in several large river systems. When commercial net fisheries were closed in 1957, the surveys were retained to determine escapement trends as ocean troll and sport fisheries developed.

The spawning salmon survey program has evolved through successive efforts over the years--primarily to reduce the number of surveys, consolidate data from a variety of drainages, and still provide valuable data on trends at minimal expense. From 1950 to 1974, the primary information on trends was obtained by the Fish Commission of Oregon (Berry 1975). In 1976, following merger of the Fish Commission and Wildlife Commission into a unified agency in 1975, the program was intensively reviewed and standardized (Cummings 1977). Escapement indexes developed by the Oregon Department of Fish and Wildlife were derived from limited surveys providing a breadth of coverage between coastal drainages at the expense of in-depth coverage within any single drainage.

Beidler and Nickelson (1980) evaluated the surveying effort for coho salmon prior to 1981. They recommended that (1) the standard index be expanded to at least 40 survey units (areas), (2) the peak count be replaced with estimates of the number of spawners in the index unit as an index of escapement, and (3) separate indexes be established for streams influenced by hatchery fish. The recommendations were first adopted in 1981 for coho salmon. Lack of funds prevented a similar improvement in surveys for fall chinook and chum salmon in coastal watersheds.

Additional sampling was conducted in the Yaquina River and at Salmon River Hatchery and in tributaries of Coos Bay to document straying of private hatchery coho salmon from the Oregon Aqua-Foods (OAF) facility at South Beach, Yaquina Bay, and Anadromous, Inc., facility on North Spit, Coos Bay. The program was partially supported with private hatchery funds. The program was conducted in response to concerns by fisheries managers and the public on the possible long-term effects of interbreeding wild and stray hatchery stocks in district streams. Oregon Aqua-Foods released "zero-aged" or accelerated smolts; whereas, Anadromous released yearling smolts. Although smolts are normally liberated at the private hatchery facilities, OAF barged experimental groups and released them offshore in 1983.

METHODS

Spawning Fish Surveys

District fisheries biologists were responsible for surveying index streams established in their respective districts. They were assisted by temporary personnel hired to conduct intensive surveys for coho salmon. Fall chinook salmon were counted between 15 October 1984 and 28 January 1985. Coho salmon were counted between 15 October 1984 and 5 March 1985. Chum salmon were counted between 29 October and 17 December 1984. Pre-established index streams were repeatedly sampled during the spawning season to obtain counts of live and dead salmon. Counts of jacks (age 2) were kept separate from adults ($\geq$ age 3).

The standard index area for coho salmon included 48 streams, totaling 53.0 miles (Table 1). The index streams are stratified into two groups based

Table 1. Standard spawning surveys for coho salmon in Oregon coastal watersheds stratified into hatchery-influenced and wild fish spawning units.

River system	Index stream	Mileage
<u>Hatchery-influenced surveys</u>		
Necanicum R.	Upper Necanicum	1.5
Kilchis R.	Sams Downs Cr.	1.0
Wilson R.	Cedar Cr. ^a	2.9
	Upper Devil's Lake Fork	0.5
Tillamook R.	Simmons Cr.	0.6
Nestucca R.	Clear Cr. ^a	0.8
	Bear Cr.	0.8
Siletz R.	Gravel Cr.	1.0
	Fourth of July Cr.	0.8
Yaquina R.	Salmon Cr.	0.6
	Upper Yaquina R. ^a	2.0
Alsea R. (Five Rivers)	Lobster Cr. ^a	1.3
	Cherry Cr.	0.8
	Wilson Cr.	1.3
Smith R.	Buck Cr.	3.5
	Beaver Cr. ^a	1.5
	Little South Fork	1.0
Coos Bay	Larson Cr. ^a	1.3
Millicoma R.	Marlow Cr.	1.0
South Fk. Coos R.	Daniels Cr.	0.8
Coquille R.		
North Fork	North Fork	1.0
	Cherry Cr.	1.8
	Alder Cr.	1.0
Subtotal		28.8
<u>Wild fish surveys</u>		
Elk Cr.	West Fork	0.5
Nehalem R.	N.F. Cronin Cr.	0.5
	W. Humbug Cr.	1.0
	Hamilton Cr.	1.0
	Oak Ranch Cr.	1.0
	N.F. Wolf Cr. ^a	1.1
Little Nestucca R.	Bear Cr.	0.8
Drift Cr.	Horse Cr.	1.0
	Nettle Cr.	0.8
Beaver Cr.	N.F. Beaver Cr.	1.0
Yachats R.	Williamson Cr.	1.3
	School Fork	0.5
Siuslaw R., mainstem	Dogwood Cr.	1.0
	Doe Cr.	0.5
North Fork	Billie Cr.	1.3
Lake Cr.	Rogers Cr.	1.3
	Misery Cr.	0.8
	Panther Cr. ^a	0.8
Umpqua R.	Schofield Cr. ^a	2.0
	Dean Cr.	1.5
South Fork	North Myrtle Cr.	1.0
Cow Cr.	Quines Cr.	1.0
Coquille R.		
East Fork	Steel Cr. ^a	1.0
Middle Fork	Slater Cr.	0.5
South Fork	Salmon Cr.	1.0
Subtotal		24.2
Total Index		53.0

^aStandard spawning fish survey streams formerly comprising the ODFW index area, 1950-80.

on the potential influence of hatchery fish on the counts. One group of surveys contained streams thought to have light to heavy hatchery influences; whereas, the second group of streams primarily contained wild spawners. Total survey distances were 28.8 and 24.2 miles for hatchery-influenced and wild stocks, respectively. The standard index area for fall chinook salmon contained 12 streams totaling 11.0 miles. The chum salmon index area was comprised of seven streams totaling 4.3 miles in Tillamook Bay and 0.8 mile in Clear Creek, Nestucca River.

Average peak fish/mile in the index streams was calculated from the following relationship:

$$(1) \quad F/M = \frac{\sum_{i=1}^n \frac{c_i}{m_i}}{n} \quad \text{where,}$$

F/M = average fish per mile

c_i = peak count in index stream i

m_i = mileage surveyed in index stream i

n = number of streams surveyed

Separate average peak fish/mile estimates were made for jacks and adults. Prior to 1981, peak counts were obtained from the combined number of jacks and adults observed in the index units.

The total number of spawning coho salmon in the index stream was estimated using area-under-the curve (AUC) techniques (Beidler and Nickelson 1980), expressed as fish/mile. This index was derived from the following relationship:

$$(2) \quad \hat{N} = \sum_{i=1}^n \bar{C}_i t_i / 11.3 \quad \text{where,}$$

$\hat{N}$ = total estimated number of spawning fish

$\bar{C}_i$ = mean count in the i th period

t_i = number of days in the i th period

An average spawning life of 11.3 days was assumed to apply for coho salmon spawning in the index streams (Beidler and Nickelson 1980; Willis 1954). The AUC estimates were based on several stipulations to avoid using streams where few data points were available or significant parts of the run were missed. These criteria were: (1) at least one survey was made prior to or on 16 November; (2) water visibility was acceptable; (3) at least one survey was made on or after 8 January; and (4) successive surveys were 10 or fewer days apart. However, two surveys between 10 and 20 days apart were allowed before the survey was discarded for AUC estimates. If the first or last count in the index area was other than zero, a zero count was assumed to occur 7 days before or after the actual count. All surveys that did not meet these criteria were eliminated from the AUC index.

The results of the spawning survey effort in individual streams, stratified by fishery districts and river basins, are presented in appendixes A, B, and C for fall chinook, coho, and chum salmon, respectively. The appendixes summarize all data from surveys completed during the 1984-85 spawning season including nonstandard units surveyed by district biologists and Research and Development Section biologists for other studies.

Hatchery Fish Strays

Twenty-eight additional streams were intensively surveyed for hatchery fish strays in the Yaquina River to augment the two standard index streams (Table 2). The streams were grouped into four broad geographical areas for analysis. In the Coos Bay watershed, 22 additional streams were monitored besides the 3 standard index streams. The surveys were grouped into three geographical areas similar to surveys at Yaquina Bay (Table 3).

Carcasses of spawned-out coho salmon encountered in the surveys were inspected for adipose fin marks indicating possible coded-wire-tagged fish and scale samples were taken from the key scale area to analyze rearing history (Nicholas and Van Dyke 1982). Sex, MEPS length, location, and date were recorded for each fish sampled.

Hatchery coho salmon were examined for coded-wire tags at public and private hatchery facilities. Representative scale samples were obtained from unmarked adults at Salmon River Hatchery for life history analysis.

Scale analysis

A trained reader examined and subjectively assigned classifications to scale collections from Salmon, Yaquina, and Coos rivers. The scales were classified as "hatchery yearling", "hatchery accelerated" (smolts released in their first year of life from OAF facilities), and "wild".

Spawning Stock Size

The total number of hatchery and wild adult coho salmon spawning in the Yaquina and Coos rivers was estimated from the relationship:

Table 2. Tributaries surveyed for stray coho salmon in the Yaquina Bay watershed, 1984.

Area	Tributary
I Tributaries of Yaquina Bay	Beaver Creek Mill Creek Olalla Creek Wright Creek
II Tributaries of the lower Yaquina and lower Big Elk Creek	Bear Creek Bear Creek (2) Beaver Creek Cook Creek Deer Creek Devils Well Creek Hayes Creek Klamath Creek Little Deer Creek Simpson Creek Thornton Creek
III Tributaries of the upper Yaquina River	Bales Creek Buttermilk Creek Salmon Creek ^a Stony Creek Upper Yaquina River ^a
IV Tributaries of upper Big Elk Creek	Big Elk Creek Feagles Creek Grant Creek Johnson Creek Rail Canyon Creek Savage Creek Spout Creek Sugarbowl Creek Wildcat Creek Wolf Creek

^aStandard spawning fish surveys.

Table 3. Tributaries surveyed for stray coho salmon in the Coos Bay watershed, 1984.

Area	Stream
I Tidewater	Daniels Creek ^a Davis Creek Deton Creek Larson Creek ^a Mettman Creek North Slough Creek Palouse Creek Willanch Creek Wilson Creek
II Millicoma River	Deer Creek Marlow Creek ^a Little Matson Creek Panther Creek Totten Creek Upper West Fork Vaughn Mill Creek
III South Fork Coos River	Beaver Slide Creek Big Creek Bottom Creek Buck creek Burnt Creek Cedar Creek Hog Ranch Creek Tioga Creek 8R Creek

^a Standard spawning fish surveys.

$$(3) \quad \hat{N}_{hw} = \sum_{i=1}^n (M/m_i) \hat{N}_i \quad \text{where,}$$

$\hat{N}_{hw}$ = total number of spawners from hatchery (h) and wild (w) stocks

M = total miles of spawning habitat in the drainage

$\hat{N}_i$ = total number of spawners in index stream i (Equation 2)

The estimated number of hatchery fish ($\hat{N}_h$) was calculated from:

$$(4) \quad \hat{N}_h = \hat{N}_{hw}pr \quad \text{where,}$$

p = percentage of adults spawning prior to 1 January

r = percentage of hatchery fish in the spawning population (N_i)

The estimated number of wild fish ($\hat{N}_w$) was calculated from:

$$(5) \quad \hat{N}_w = (\hat{N}_{hw}P - \hat{N}_h) + (\hat{N}_{hw} - \hat{N}_{hw}P)$$

Straying Rate

The rate of straying (S) by adult coho salmon from Oregon Aqua-Foods in the Yaquina River was obtained from the equation:

$$(6) \quad S = \hat{N}_h / (T + \hat{N}_h - W) \quad \text{where,}$$

T = the total return of adult coho to the private hatchery

W = the estimated number of wild coho adults captured at the private hatchery

RESULTS

Fall Chinook Salmon

Peak Counts

Eleven standard index streams (10.5 miles) were surveyed in 1984 (Table 4). No counts were reported for the Deep Creek, Pistol River, survey. The standard index streams were surveyed 61 times totaling 64.2 miles.

Table 4. Peak counts in selected spawning fall chinook surveys, 1950-84.

River Tri-b.	Nehalem Humbog	Tillamook Tillamook	Nestucca Nestucca	Siletz Sunshine	Yaquina Grant	Alsea Buck	Sluslaw Lake	Coos W.F. Millicoma	Coquille Salmon	Rogue Jlm Hunt	Pistol Deep	Winchuck Bear
1950	13(0) ^a	--	5(1)	--	91(23)	--	--	--	--	--	--	--
1951	34(8)	--	11(0)	--	105(0)	--	--	--	--	--	--	--
1952	23(2)	115(0)	137(2)	51(0)	226(46)	69(20)	--	--	14(1)	--	--	--
1953	66(15)	34(13)	7(0)	17(2)	34(0)	1(0)	29(10)	--	--	--	--	--
1954	41(15)	22(9)	15(0)	12(0)	56(1)	6(0)	--	--	--	--	--	--
1955	29(18)	7(4)	42(7)	1(1)	112(46)	24(19)	--	--	--	--	--	--
1956	42(3)	12(7)	11(0)	8(0)	69(36)	1(0)	2(1)	--	--	--	--	--
1957	74(24)	36(13)	104(19)	51(2)	97(27)	33(9)	25(8)	--	13(2)	--	--	--
1958	69(11)	83(12)	51(2)	131(12)	88(6)	--	58(16)	--	16(7)	--	--	--
1959	68(6)	104(14)	36(0)	37(1)	74(4)	5(2)	40(5)	--	7(0)	--	--	--
1960	134(80)	100(47)	97(29)	46(21)	31(9)	19(8)	--	--	--	--	--	--
1961	104(8)	166(36)	69(4)	63(11)	52(1)	46(8)	48(22)	6(3)	24(14)	--	--	--
1962	78(9)	117(22)	47(8)	160(29)	47(15)	13(5)	16(4)	2(0)	1(0)	--	--	--
1963	133(37)	150(22)	90(2)	71(8)	80(13)	51(12)	29(2)	2(2)	3(0)	--	--	--
1964	126(14)	163(29)	53(8)	25(7)	25(3)	29(7)	247(35)	1(0)	11(2)	--	--	--
1965	143(43)	111(18)	125(2)	40(8)	78(34)	45(14)	39(11)	2(0)	140(49)	--	--	--
1966	103(8)	110(25)	80(7)	42(6)	82(15)	62(20)	122(11)	6(1)	74(19)	--	--	--
1967	66(2)	158(41)	61(6)	42(3)	48(13)	26(14)	141(31)	7(0)	17(0)	--	--	--
1968	46(2)	110(29)	43(2)	23(4)	41(9)	30(12)	84(32)	0(0)	20(4)	--	--	--
1969	31(2)	54(13)	36(8)	10(3)	88(20)	15(2)	192(52)	8(2)	7(0)	--	--	--
1970	57(3)	168(29)	47(8)	60(9)	115(10)	77(34)	332(76)	12(0)	59(23)	--	--	--
1971	94(10)	39(4)	36(1)	45(5)	95(17)	46(8)	59(10)	43(22)	22(5)	--	--	--
1972	117(46)	66(12)	92(10)	41(14)	48(12)	5(2)	144(56)	20(12)	12(4)	49(25)	--	--
1973	167(28)	85(1)	65(4)	47(0)	52(4)	24(4)	--	22(1)	18(0)	29(6)	--	--
1974	157(16)	49(4)	42(0)	49(2)	93(0)	13(0)	199(68)	44(28)	20(7)	--	--	--
1975	100(28)	--	--	--	--	10(1)	166(60)	26(4)	27(9)	46(3)	--	--
1976	174(39)	40(5)	0(0)	30(12)	16(6)	1(0)	262(74)	52(24)	0(0) ^b	0(0) ^b	2(2) ^b	--
1977	170(12)	58(2)	16(2)	47(2)	180(20)	15(2)	241(60)	27(8)	14(7)	98(36)	5(2)	30(1)
1978	172(6)	70(8)	34(3)	28(0)	181(6)	12(0)	139(24)	60(18)	43(3)	108(4)	--	33(0)
1979	170(2)	47(2)	53(3)	105(7)	222(78)	50(10)	140(12)	59(24)	41(8)	100(2)	--	20(3)
1980	93(3)	120(14)	65(1)	46(2)	149(4)	48(2)	242(24)	95(65)	105(31)	--	0(0)	13(0)
1981	149(1)	100(6)	42(1)	70(2)	198(13)	35(3)	183(43)	8(4)	51(8)	--	15(1)	10(0)
1982	83(13)	122(15)	101(12)	41(1)	178(18)	63(9)	240(34)	10(2)	108(13)	2(0)	26(1)	14(1)
1983	65(4)	46(1)	61(1)	32(3)	97(11)	25(0)	28(0)	9(0)	47(4)	--	34(3)	13(1)
1984	311(31)	110(9)	90(6)	50(3)	212(17)	57(2)	110(7)	1(1)	44(6)	5(1)	--	16(1)
Miles	1.0	1.8	0.4	1.2	1.7	1.0	0.8	0.5	0.8	0.5	0.5	0.8

Figures in parentheses are the number of jacks included in the total number of fish to the left.
bFlows too low to allow spawning.

The average fish/mile count in the 11 index streams was 88.5 adults and 8.0 jacks totaling 96.5 fall chinook/mile (Table 5). The count of adults was the largest recorded since surveys began in 1950 in spite of a poor count recorded in the West Fork Millicoma River. The count of jacks was slightly below average.

The trend in the average peak chinook/mile counts is illustrated in Figure 1. Following the mid-1950's, there has been an upward trend in the spawning stocks.

Coho Salmon

Peak counts

Coho salmon were counted in 48 index streams in 1984. The standard index streams were surveyed 684 times (744.7 miles) to obtain peak counts (Table 6).

Table 6. Summary of peak fish/mile counts and estimated total escapement of coho salmon in standard index streams by fishery district, 1984.

Fishery district	Survey effort		Total miles	Peak count per mile		Estimated escapements ^a		
	No. surveys	Miles		Adults	Jacks	No. surveys	Adults	Jacks
Astoria	7	6.6	77.2	25	3	6	61	4
Tillamook	7	7.4	96.6	12	2	5	30	4
Lincoln	10	10.6	181.9	17	2	10	44	3
Siuslaw	8	7.5	125.6	8	1	6	18	2
Umpqua	7	11.5	140.0	10	2	6	21	3
Coos/Coquille	9	9.4	123.4	30	7	9	77	12
Oregon Coast	48	53.0	744.7	17	3	42	45	5

^aFish/mile derived from area-under-the-curve (AUC) estimates.

Table 5. Average number of fish/mile observed in standard spawning index streams.

Year	Chinook Salmon				Coho Salmon				Chum Salmon	
	Miles	Jacks	Adults	Total	Miles	Jacks	Adults	Total	Miles	Adults
1948	.0	.0	.0	.0	.0	.0	.0	.0	1.7	654.7
1949	.0	.0	.0	.0	.0	.0	.0	.0	1.7	1,251.2
1950	3.1	7.7	27.4	35.2	10.1	2.9	22.3	25.1	2.5	349.6
1951	3.1	2.6	45.8	48.4	10.9	9.4	66.2	75.7	2.5	670.8
1952	7.1	9.9	77.6	87.5	10.9	3.9	49.1	53.0	2.5	296.4
1953	8.7	4.7	18.5	23.2	10.9	2.8	14.4	17.2	2.5	487.6
1954	7.1	3.5	17.9	21.4	10.9	4.1	15.0	19.1	2.5	615.2
1955	7.1	13.4	16.9	30.3	12.1	2.0	29.5	31.5	2.5	138.8
1956	7.9	5.9	12.4	18.4	12.9	12.0	37.6	49.6	2.5	127.6
1957	8.7	12.0	37.8	49.8	12.9	2.4	40.2	42.6	2.5	266.0
1958	7.7	8.6	55.8	64.4	13.6	2.9	14.3	17.2	2.5	273.2
1959	8.7	3.7	39.0	42.6	13.6	1.7	26.8	28.5	2.5	112.8
1960	7.1	27.3	32.8	60.1	14.4	8.1	13.7	21.7	4.8	65.4
1961	9.2	11.6	51.2	62.8	14.4	13.0	47.2	60.1	4.8	95.8
1962	9.2	10.0	42.3	52.3	14.4	4.7	37.0	41.7	4.8	458.3
1963	9.2	10.7	55.5	66.2	14.4	7.6	25.2	32.8	4.8	336.7
1964	9.2	11.4	62.5	73.9	14.4	8.5	53.8	62.3	4.8	314.0
1965	9.2	19.5	59.1	78.6	14.4	15.4	55.5	70.9	4.8	132.5
1966	9.2	12.2	61.8	74.0	14.4	4.4	33.8	38.3	4.8	309.6
1967	9.2	12.0	49.6	61.5	12.9	25.0	39.4	64.3	4.8	159.2
1968	9.2	10.2	32.9	43.2	11.3	2.0	25.3	27.3	4.8	174.8
1969	9.2	11.1	36.8	47.9	14.4	13.0	31.2	44.2	4.8	239.4
1970	9.2	20.9	79.9	100.8	14.4	6.0	42.6	48.7	4.8	403.3
1971	9.2	8.9	43.2	52.1	14.4	3.0	48.1	51.0	4.8	285.4
1972	9.7	19.9	41.3	61.2	14.4	5.7	14.9	20.6	4.8	442.3
1973	8.9	5.4	51.8	57.2	14.4	2.4	28.3	30.7	4.8	706.9
1974	9.2	13.6	58.8	72.4	14.4	11.0	17.9	29.0	4.8	693.5
1975	4.6	22.8	58.7	81.5	11.3	5.1	20.0	25.1	4.8	640.8
1976	10.5	15.4	39.5	55.0	14.4	5.1	20.3	25.4	4.8	242.3
1977	11.0	14.0	67.9	81.9	14.4	2.3	7.8	10.1	4.8	337.9
1978	10.5	6.9	77.0	83.8	14.4	2.8	9.4	12.2	4.5	614.0
1979	10.5	14.4	81.5	95.9	14.4	2.5	21.7	24.2	4.5	53.6
1980	10.5	13.9	79.0	92.9	14.4	5.5	13.5	19.0	4.5	184.7
1981	10.5	7.8	74.2	82.0	52.7	1.6	8.4	10.0	4.5	43.8
1982	11.0	10.8	79.0	89.8	53.0	6.6	16.1	22.7	5.1	523.3
1983	11.0	2.5	39.0	41.5	53.0	1.9	6.7	8.6	4.1	361.2
1984	10.5	8.0	88.5	96.5	53.0	3.0	16.8	19.8	5.1	313.3

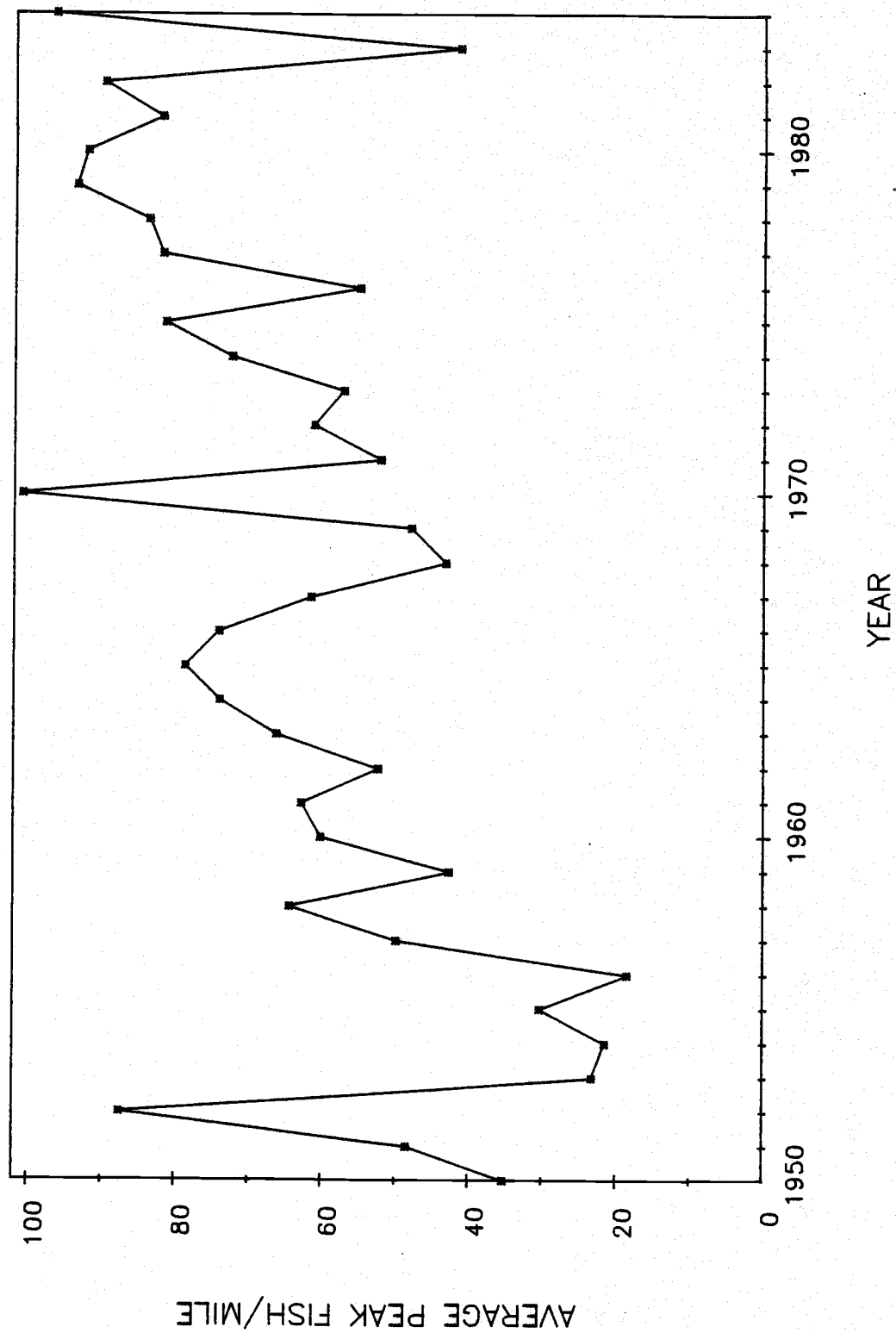


Figure 1. Trends in the escapement of chinook salmon in the standard index areas of Oregon coastal rivers since 1950.

The average peak fish/mile in 48 index streams was 16.8 adults and 3.0 jacks for a total of 19.8 coho/mile. The average peak count of adults was 2.5 times larger than in 1983 when record-low counts were recorded (Table 5). Peak counts were largest in the Astoria and Coos/Coquille districts (25-30 adults/mile), intermediate in the Lincoln District (17 adults/mile), and smallest in the Siuslaw, Umpqua, and Tillamook districts (8-12 adults/mile). Peak jack counts were largest in the Coos/Coquille District (7 jacks/mile) and ranged from 1 to 3 jacks/mile in all other districts.

The trend in the average peak coho/mile has sharply declined in the standard index streams since the mid 1960's (Figure 2).

Total escapement (AUC)

A sufficient number of surveys was conducted in 42 of the 48 index streams (88%) to obtain estimates of the total coho salmon spawning in the index area using the AUC technique. The estimated total escapement averaged 45 adults/mile and 5 jacks/mile in the 42 standard index streams (Table 6). The estimates of total spawners within each district generally paralleled peak fish/mile indexes. Peak counts of adults accounted for 38% of the total estimated escapement in the index streams.

Hatchery-influenced versus wild streams

The average estimated total escapement in 93 hatchery-influenced streams was 43 adults and 5 jacks/mile compared to 37 adults and 3 jacks/mile in 28 streams containing predominately wild stocks. These estimates are based on a total compilation of all standard and nonstandard surveys (excluding surveys in tributaries of lakes) conducted during the 1984-85 spawning season.

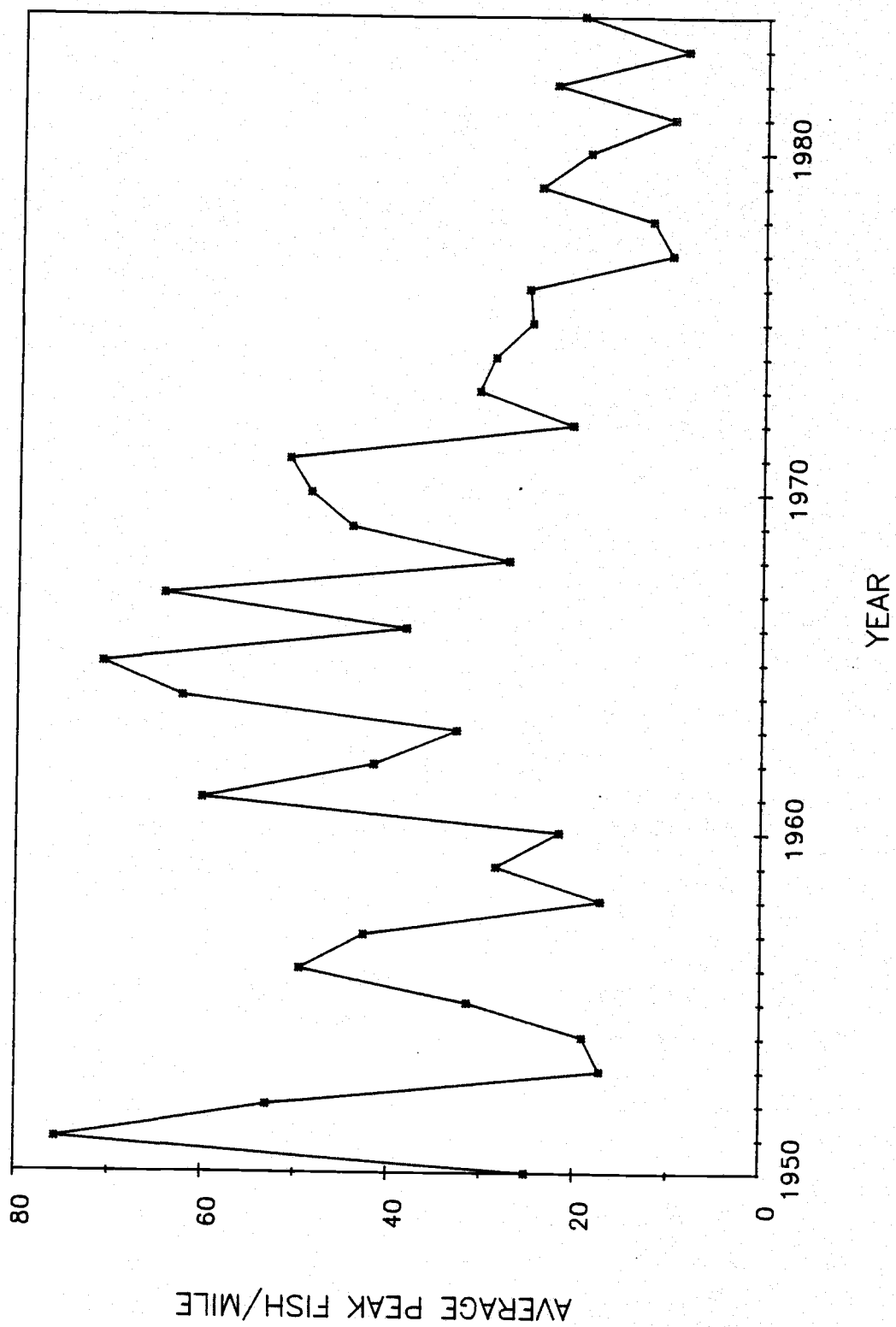


Figure 2. Trends in the escapement of coho salmon in the standard index areas of Oregon coastal rivers since 1950.

Nonstandard surveys comprised 59% or 1,093.1 miles of the 1,839.0 miles surveyed for coho salmon. All standard and nonstandard surveys for coho salmon are summarized by fishery district in Appendix B.

Escapement into Tenmile lakes

Peak counts of 167 adults and 58 jacks were obtained in 4.8 miles of streams surveyed at Tenmile lakes. Based on these counts and previous population estimates from tag-recapture programs, the total escapement in 1984 was 5,000 adults and 3,000 jacks. The total return from the 1981 brood year was only 6,500 coho salmon.

Chum Salmon

Tillamook Bay

Peak counts. Chum salmon have been irregularly counted in eight streams since 1948 (Table 7). Seven index streams are currently used to assess the condition of the stocks in the Miami, Kilchis, and Wilson rivers. The seven index streams were surveyed 23 times totaling 13.7 miles. The average peak count in the standard index streams was 350 chum/mile.

Average peak counts have widely fluctuated since 1948 (Figure 3). The fluctuations since 1962 have primarily been in response to variable natural survival rates following closure of the commercial gill-net fishery in Tillamook Bay in 1961.

Trap counts. A trap was installed in Coal Creek, Kilchis River, in 1977 to collect eggs from excess chum salmon for distribution to private hatcheries. The trap was operated by ODFW hatchery personnel and funded by private hatchery operators with the stipulation that private interests retain 90% of the eggs and replant 10% as smolts in Coal Creek. In addition, a

Table 7. Peak counts of chum salmon in Tillamook Bay tributaries, 1948-84.

Year	Miami River			Kilchis River			Wilson River	Tillamook River
	Main Stem	Moss Cr.	Prouty Cr.	Main Stem	Coal Cr.	Clear Cr.	Little North Fork	Main ^a Stem
1948	--	450	--	--	--	454	209	--
49	--	361	--	--	--	1,347	419	--
1950	--	256	--	--	--	420	142	--
51	--	193	--	--	--	699	712	--
52	--	29	--	--	--	487	182	--
53	--	330	--	--	--	780	104	--
54	--	73	--	--	--	906	381	--
55	--	14	--	--	--	201	97	--
56	--	10	--	--	--	102	194	--
57	--	54	--	--	--	351	172	--
58	--	34	--	--	--	331	153	--
59	--	7	--	--	--	87	152	--
1960	102	0	17	65	104	2	20	4
61 ^b	136	6	4	76	154	13	27	39
62	571	86	0	220	1,142	6	25	61
63	302	39	3	165	802	5	109	62
64	323	18	178	65	870	18	13	16
65	104	0	2	30	404	0	61	18
66	194	50	3	61	1,002	12	87	74
67	173	31	15	18	430	3	25	41
68	151	9	42	37	413	0	107	11
69	214	4	0	34	812	1	50	15
1970	135	183	33	85	1,383	23	64	27
71	102	73	62	105	889	2	94	13
72	235	13	70	271	1,358	0	127	83
73	371	333	119	325	1,662	3	474	68
74	416	111	136	1,266	813	85	373	63
75	349	173	85	797	1,328	22	310	66
76	148	19	0	397	313	2	214	45
77	182	--	--	284	916 ^c	--	124	122
78	857	--	--	985	300 ^d	--	326	182
79	27	--	5	52	57	--	82	14
1980	13	4	3	--	--	75	724	43
81	6	--	--	--	--	--	182	--
82	149	191	221	231	475	532	825	--
83	189	107	14	--	425	102	595	--
84	94	112	70	324	351	70	484	--

Miles	0.6	0.6	0.5	1.0	0.5	0.6	0.5	0.8

^aNonstandard survey unit.^bCommercial gill-net fisheries for chum salmon closed after the 1961 season.^cTrap constructed 0.5 mile above the mouth washed out on 25 November 1977.

The estimated total run was 916 chum salmon (Sams 1980).

^dSurvey area shortened from 0.8 mile to 0.5 mile below the Coal Creek Trap since 1978.

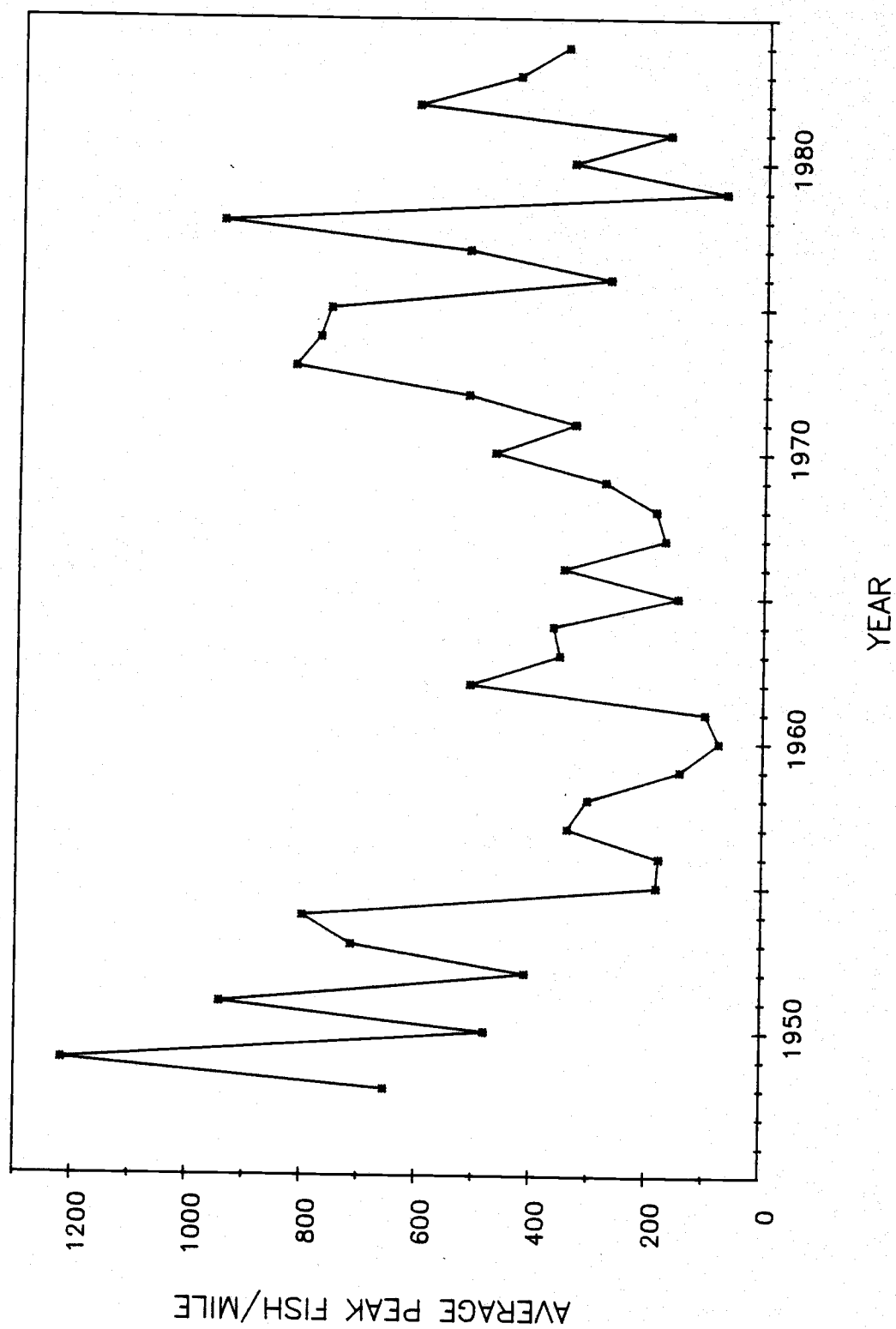


Figure 3. Trends in the escapement of chum salmon in the standard index areas of Tillamook Bay since 1948.

predetermined number of adults was released upstream to spawn. The trap was placed in the standard spawning fish survey unit about 0.5 mile above the mouth. As a result, the survey unit was shortened from 0.8 mile to 0.5 mile. Trap records have been maintained by hatchery personnel since 1977 (Table 8). In 1984, 824 chum salmon were trapped in Coal Creek between 8 November and 10 December. Approximately 390,000 eggs were collected from 156 females taken in the trap.

The sex ratio of chum salmon handled at the Coal Creek trap was 48% females and 52% males. The average sex ratio in previous years (1977-83) contained a slightly smaller proportion of females (44% females and 56% males).

The trap was closed after the egg take in 1984. No further egg takes are planned at the trap site.

Table 8. Coal Creek, Kilchis River, chum salmon trapping records, 1977-84.

Year	Released above		Spawned ^a		Buried		Total trapped
	Males	Females	Males	Females	Males	Females	
1977 ^b	209	176	82	52	0	0	519
78	745	379	254	368	0	0	1,746
79	241	126	0	0	0	0	367
1980	365	209	--	53	38	0	665
81	272	224	--	109	0	0	605
82	958	334	3	366	0	0	1,661
83	575	272	15	300	34	0	1,196
84	430	238	--	156	0	0	824

^aMale chum used for spawning are usually released above the trap.

^bTrap washed out 25 November 1977. Total chum salmon run estimated at 916 in Coal Creek (Sams 1980).

Nestucca River

Chum salmon have been counted in Clear Creek, Nestucca River, since 1950 (Table 9). The annual surveys provide a useful indicator of the long-term trend of chum salmon in the Nestucca River.

Table 9. Peak counts of chum salmon in Clear Creek, Nestucca River, 1950-84.

Year	Peak count ^a	Year	Peak count
1950	56	1970	53
51	73	71	45
52	43	72	49
53	5	73	109
54	178	74	214
55	35	75	34
56	13	76	72
57	88	77	116
58	165	78	295
59	36	79	18
1960	6	1980	87
61	57	81	9
62	156	82 ^b	45
63	196	83 ^b	49
64	40	84 ^b	93
65	35		
66	89		
67	72		
68	80		
69	35		

^aSurveyed 0.8 mile.

^bLandowner denied access to lower 0.2 mile of the survey and 0.2 mile was added to the upper end.

In 1984, the index area was surveyed 14 times totaling 11.2 miles. The peak count was 93 chum salmon (116 fish/mile) on 11 November 1984. A landowner has denied access to the lower 0.2 mile of the index area since 1982 where a large proportion of chum salmon spawned in previous years. Therefore, peak counts since 1982 are probably smaller relative to counts made in earlier years.

Peak counts of chum salmon have shown wide fluctuations since 1950 (Figure 4). A 4-year cycle of dominance has generally occurred since 1954 corresponding to the dominant 4-year-old spawners prevalent in Oregon chum salmon stocks. Large numbers of spawners have generally produced large returns while small numbers of spawners have generally resulted in poor

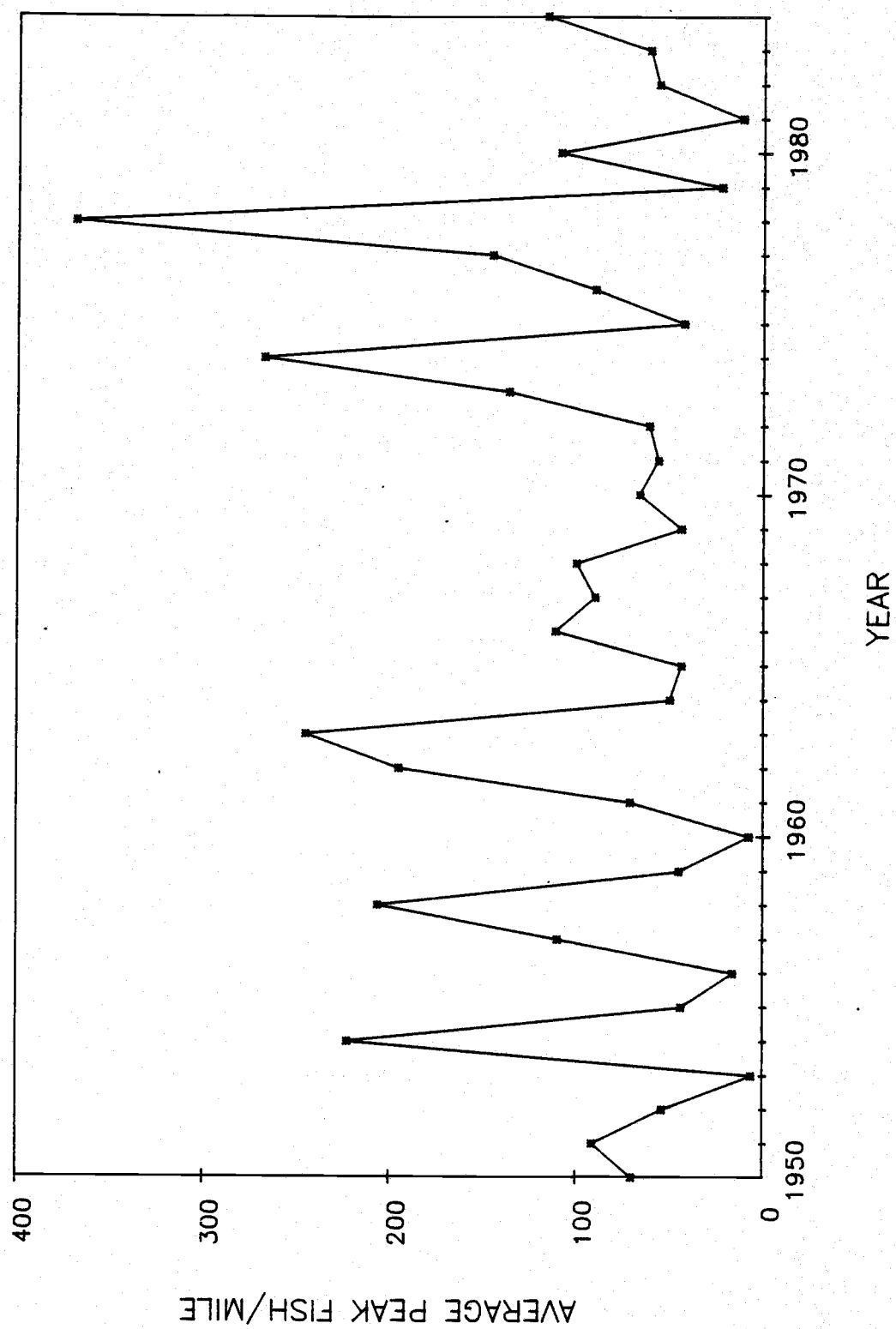


Figure 4. Trends in the escapement of chum salmon in Clear Creek, Nestucca River, since 1950.

returns 4 years later. Nestucca chum salmon have primarily fluctuated from natural mortality factors alone since commercial gill-net fisheries were closed after March 1927 (Cleaver 1951).

Hatchery Coho Salmon Strays

Coded-wire tag recoveries

Three CWT-marked strays from Oregon Aqua-Foods were recovered in the Yaquina River in 1984 (Table 10). No tagged strays from Oregon Aqua-Foods or Anadromous were found in other coastal drainages.

Table 10. Tagged coho released in Yaquina Bay and ocean by Oregon Aqua-Foods and in Coos Bay by Anadromous, Inc. and recovered at Oregon coastal sites in 1984.

Recovery site	Oregon Aqua-Foods		Anadromous
	Yaquina Bay	Ocean	Coos Bay
<u>Hatchery recoveries</u>			
Salmon River	4	7	0
Siletz River	0	1	0
Fall Creek (Alsea River)	1	3	0
Bandon (Coquille River)	0	0	1
Oregon Aqua-Foods	5,500 ^a	--	1
Anadromous	1	--	1,300
<u>Spawning fish surveys</u>			
Yaquina River			
Beaver Creek	0	1	0
West Ollala Creek	0	1	0
Cook Creek	1	0	0

^a 5,800 adipose-marked coho were examined, but tags were only recovered from 5,500.

The relatively large number of strays recovered at Salmon River Hatchery compared to other coastal hatcheries probably reflects differences in the geographic positioning of the facilities rather than any measurable index of straying at each site (Nicholas et al. 1982). Salmon River Hatchery is

located on the main stem a short distance above tidewater, while Fall Creek and Siletz hatcheries are located on tributaries much further upstream.

Distribution

Samplers collected 91 coho salmon scales in the Salmon River, 117 scales in the Yaquina River, and 300 scales in Coos Bay tributaries. An additional 863 scales were sampled at Salmon River Hatchery (Table 11).

Scale samples collected in tributaries after 1 January 1985 were assumed to be from wild coho based on the results of similar studies in 1980 (Nicholas et al. 1982) and 1981 (Nicholas and Van Dyke 1982).

Table 11. Source of coho salmon scales collected in 1984-85.

	Dates	Total	Jacks	Adults	
				Readable	Unreadable
<u>Rivers:</u>					
Salmon watershed	11/8 to 1/28	91	2	88	1
Yaquina watershed	11/5 to 12/31	87	0	75	12
	1/1 to 1/31	30	1	29	0
Coos watershed	10/4 to 12/31	153	7	144	2
	1/1 to 2/5	147	9	131	7
<u>Hatcheries:</u>					
Salmon River	10/10 to 12/31	863 ^a	0	787	76

^a Only coho salmon $\geq 20"$ were sampled at hatcheries.

Scale analysis showed that hatchery and wild coho salmon were distributed throughout the Yaquina Bay and Coos Bay systems (Table 12). Hatchery strays were more frequently recovered than wild coho salmon in the lower Yaquina Bay watershed. Most of the hatchery fish recoveries consisted of accelerated smolt releases. In Coos Bay, wild coho salmon were more abundant than hatchery fish. Hatchery fish were primarily recovered in tributaries emptying into tidewater in Coos Bay.

Table 12. Classification of coho salmon scales collected from the Yaquina and Coos Bay watersheds by area, 1984.

Watershed area	Hatchery				Wild		Total
	Yearling		Accelerated		No.	%	
	No.	%	No.	%	No.	%	
<u>Yaquina Bay</u>							
I Tidewater	10	29.4	18	52.9	6	17.7	34
II Lower Big Elk & Yaquina	5	17.9	11	39.3	12	42.8	28
III Upper Yaquina	3	15.8	3	15.8	13	68.4	19
IV Upper Big Elk	2	8.7	6	26.1	15	65.2	23
<u>Coos Bay</u>							
I Tidewater	18	42.9	0	0.0	24	57.1	42
II Millicoma River	8	7.3	0	0.0	101	92.7	109
III South Fork Coos River	11	8.9	0	0.0	113	91.1	124
Total Yaquina Bay	20	19.2	38	36.6	46	44.2	104
Total Coos Bay	37 ^a	13.5	0	0.0	238	86.5	275

^a Five fish (1.8%) were classified from Anadromous, Inc. The remaining 32 fish (11.7%) could not be classified with any certainty as either hatchery or wild.

Salmon River Hatchery

Analysis of scale samples collected at Salmon River Hatchery indicated that only about 3% were accelerated hatchery fish from OAF's Yaquina Bay facility (Table 13). Wild coho salmon composed 1.0% of the fish taken at Salmon River Hatchery.

Table 13. Classification of coho salmon scales collected at Salmon River Hatchery, 1984.

Hatchery				Wild		Total
Yearling		Accelerated		No.	%	
No.	%	No.	%			
756	96.1	23	2.9	8	1.0	787

Number of spawning adults

The area-under-the-curve estimates of the total spawning escapement of adult coho salmon in stream surveys were used to provide rough estimates of spawning stock sizes of hatchery and wild fish in the Yaquina and Coos Bay watersheds. The estimates are predicated on the following assumptions: 1) there are 156 miles of spawning habitat in Yaquina River and 268 miles in the Coos Bay watershed (Beidler and Nickelson 1980); (2) the spawning density in the surveys was representative of the total spawning population; and (3) fish counted in the survey areas were spawners rather than migrants to upstream spawning sites. Beidler and Nickelson (1980) describe additional assumptions pertaining to AUC estimates. The estimates derived from AUC data are likely maximal since most violations of the assumptions tend to overestimate true spawning stock sizes.

Yaquina Bay. An estimated 754 adult coho salmon spawned in 23.1 miles of tributary streams in Yaquina River in 1984-85. Of these, 86% spawned prior to 1 January 1985. The total estimated number of spawners was 5,090. The spawning stock was composed of 3,181 hatchery adults and 1,909 wild adults. Therefore, the total adult spawning population in the Yaquina River consisted of 62% hatchery fish and 38% from natural production. Most of the hatchery fish (2,173) were strays from accelerated smolt releases while the remaining fish presumably originated from presmolts liberated in 1982 that strayed upstream (Jonasson 1983), strays from nearby streams, or returns from fish liberated in the Yaquina River.

A total of 108,651 coho returned to Oregon Aqua-Foods in 1984. The estimated straying rate from accelerated smolt releases was 2.0% in the

Yaquina River. The straying rate of OAF coho was <1% in Salmon River based on data summarized by Beidler (1985).

Coos Bay. An estimated 942 adult coho salmon spawned in 16.2 miles surveyed in the Coos Bay watershed in 1984-85. Approximately 63% spawned prior to 1 January 1985. The total estimated number of spawning adults was 15,581. The spawning population contained 343 adults from Anadromous, 1,867 unclassified adults, and 13,371 wild adults (86% wild fish). No strays from accelerated smolt releases at Yaquina Bay were recovered in Coos Bay tributaries. Possible sources of unclassified adults include (1) hatchery strays from another river basin; (2) wild fish with atypical growth patterns; (3) strays from Anadromous with atypical growth patterns, and (4) presmolts or smolts released from STEP projects.

Anadromous reported 5,923 adult coho returned in 1984 from yearling smolt releases at their Coos Bay facility. The percentage of wild adults at the facility is unknown. However, assuming that few if any wild fish entered the hatchery, the estimated straying rate was about 5.5% in the Coos Bay watershed from scale sampling data. The straying rate is based on the assumption that none of the unclassified adults originated from the Anadromous hatchery.

DISCUSSION

Spawning stocks of fall chinook and coho salmon were much larger in 1984 compared to 1983 when a combination of increased natural mortality from the effects of El Nino and high exploitation rates by ocean fisheries decimated the stocks (McGie 1984). The increased escapement was largely the result of unprecedented restrictions placed on the harvest of coho in the ocean and reduced fishing effort for chinook salmon in the northern fisheries (S.E.

Alaska, British Columbia, and Washington). Chum salmon escapement in 1984 was slightly below 1983, but still healthy compared to stock sizes in the period 1955-70.

The average peak count of adult fall chinook was the largest recorded since surveys began in 1950, exceeding the previous record-high count of 81.5 adults/mile set in 1979 by 7 fish/mile. The count of jacks rose from 2.5 jacks/mile in 1983 to 8.0 jacks/mile in 1984. This may indicate an improved survival rate for 1982-brood fall chinook salmon.

The average peak count of 16.8 adult coho/mile in 1984 was a marked improvement over the 6.7 adults/mile recorded in 1983. However, the actual strength of the escapement was more accurately reflected in the average total count of spawners derived from AUC data. In this comparison, the average index count in standard surveys increased from 14 adults/mile in 1983 to 45 adults/mile in 1984. The difference between index counts in 1984 was primarily the result of the protracted spawning period due to a drought in early January and strong complement of wild fish that delayed spawning until late January and early February. Most peak counts occurred in late November and December. This serves as a good example of why peak counts may not be consistently proportional to the total run size (Beidler and Nickelson 1980).

The overall average total count in standard and nonstandard surveys combined was 42 adults/mile. This is equivalent to an optimum escapement objective of 200,000 adults in the Coho Salmon Management Plan (ODFW 1982). However, the escapement goal was primarily achieved as a result of severe restrictions imposed on ocean sport and commercial troll fisheries rather than a reflection of increased natural production by Oregon coastal stocks.

Stray coho salmon from private hatcheries and returns from offstation presmolt and smolt releases probably influenced the peak counts and estimates of total spawner densities in certain watersheds where index streams are situated. The degree of influence by hatchery fish is unknown which hampers any straightforward analysis of natural production in coastal rivers. Stray spawners from private hatcheries generally overlap the spatial and temporal distribution of wild fish in the Yaquina River (Nicholas et al. 1982; Nicholas and Van Dyke 1982). The average total spawning density in hatchery-influenced streams was 16% larger than the average obtained in streams believed to be restricted to wild spawners. This suggests the escapement of wild stocks was somewhat smaller than indicated by the coastal average count of 42 adults/mile when the strata are combined. Other nonrelated factors may have biased the results; i.e., streams classed as hatchery influenced are possibly more productive than streams classed as containing wild stock alone.

The chum salmon run at Tillamook Bay was 19% smaller than in 1983. The number of chum salmon trapped in Coal Creek, Kilchis River, also declined in 1984 compared to the number trapped in 1983. No scale samples were collected in 1984 which precludes any analysis of the relative strength of the three primary age classes (ages 3-5) that normally spawn in Tillamook Bay tributaries. The decline in the spawning population follows the loss of the dominant brood year in 1978 and poor recruitment from the 1979 and 1980 brood years (McGie 1984).

The percentage of OAF strays at Salmon River Hatchery dramatically declined from 54.7% in 1983 to only 2.9% in 1984. The small number of strays is attributed to a combination of reduced straying rates and returns of OAF

fish and increased returns of Salmon River Hatchery fish. In 1983, the adult return to Salmon River Hatchery was 535 compared to 1,870 in 1984 while the number of OAF strays declined from 293 to 54 (Beidler 1985).

Hatchery coho comprised 62% of the spawning stock in Yaquina River in 1984. The majority of the hatchery fish (2,173 adults) originated from accelerated smolt releases by Oregon Aqua-Foods. The estimated straying rate was 2.0% from the accelerated group of adults returning to Yaquina Bay. The percentage of wild fish spawning in Yaquina River has varied from 13% to 38% since 1981 (Table 14). The increased proportion of wild fish in 1984 was due to a strong return of wild stocks and comparatively poor return of hatchery fish to Oregon Aqua-Foods. The number of hatchery fish spawning in Yaquina River has remained remarkably constant since 1981 after adjusting for the effects of El Nino in 1983 (Table 14).

Table 14. Population estimates of hatchery and wild adult coho salmon in Yaquina River, 1981-84.

Year	Hatchery adults		Wild adults		Total
	No.	%	No.	%	
1981	3,158	74	1,102	26	4,260
1982	3,380	78	959	22	4,339
1983 ^a	1,461	87	210	13	1,671
1984	3,181	62	1,909	38	5,090

^a Estimates adjusted for a 58% mortality from the effects of El Nino (PMFC 1984) would be 3,500 hatchery and 500 wild adults.

The estimated number of spawning coho in tributaries of Coos Bay increased from 4,173 in 1983 to 15,581 in 1984. The percentage of wild fish

in the population in 1984 (86%) was identical to that obtained in 1983 (McGie 1984). The straying rate by private hatchery fish returning to Anadromous declined from about 30% in 1983 to 5.5% in 1984, although the estimates in 1983 were based on limited scale sampling and spawning fish survey data (McGie 1984). A major difference between the population estimates in 1983 and 1984 is that 1,867 (12%) of the spawning fish were unclassified and may have originated from hatchery or wild smolts with atypical growth patterns or some combination of both stocks. For the purposes of this analysis, I assumed that all unclassified fish originated from hatchery or STEP-related programs by ODFW and were not atypical Anadromous strays. If the unclassified fish were all assigned to Anadromous, the straying rate would increase from 5.5% to 27.2%. The true rate probably lies somewhere between the two extremes.

The possible long-term affects of hatchery fish strays on the wild stocks are unknown; however, contemporary genetic theories suggest a potential loss in the "productivity" of wild stocks may result if gene flow continually occurs between hatchery and wild stocks. Puget Sound, Washington, stocks comprise a large segment of the private hatchery production of coho salmon. These stocks are being outcrossed with known lineage (marked) Oregon stocks returning to the private hatcheries or with male gametes collected within other ODFW programs. Outcrossing should help ease the potential genetic effects of private hatchery fish strays on Oregon coastal stocks.

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Appendix A

Peak Counts of Fall Chinook Salmon in Standard and Nonstandard Index Streams Stratified by Fishery District and River Basins

Explanation of Columns in Appendix Tables

No. Sur.--the number of individual surveys included in the strata.

Miles--miles surveyed in the strata.

Times Sur.--number of actual surveys made within the strata.

Total Miles--cumulative total miles surveyed within the strata.
For multiple surveys, it is the sum of the individual surveys
times the frequency surveyed.

Peak Counts

1984 Peak--maximum combined live and dead salmon seen on a given survey.

Per Mile--peak count expressed as a fish/mile count.

Date--date of the survey when the peak count was observed.

1983 Peak--peak count obtained in the survey during the previous year.

Estimated Run Size (AUC)

Sur.--the number of surveys used for area-under-the curve (AUC estimates
within the strata.

Run Size--the total estimated number of salmon that spawned in a given
survey.

Per Mile--the total estimated number of fish/mile that spawned in a given
strata.

ASTORIA FISHERIES DISTRICT
CHINOOK SALMON

SURVEYS *****	PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
	ADULTS					JACKS					ADULTS					JACKS				
	NO. SUP	MILES	TIMES SUR	TOTAL MILES	1984 PER MILE	1984 PEAK MILE	1983 PER MILE	1983 PEAK MILE	DATE	1983 PEAK MILE	1983 PER MILE	1983 PEAK MILE	DATE	1983 PEAK MILE	1983 PER MILE	1983 PEAK MILE	DATE	1983 PEAK MILE	1983 PER MILE	1983 PEAK MILE
ASTORIA DISTRICT	1	1.0	3	3.0	280		31													
STANDARD SURVEYS	1	1.0	3	3.0	280		31													
NON STANDARD SURVEYS	0	.0	0	.0																
HATCHERY INFLUENCED	0	.0	0	.0																
NO HATCHERY INFLUENCE	1	1.0	3	3.0	280		31													
NEHALEN RIVER	1	1.0	3	3.0	280		31													
STANDARD SURVEYS	1	1.0	3	3.0	280		31													
NON STANDARD SURVEYS	0	.0	0	.0																
HATCHERY INFLUENCED	0	.0	0	.0																
NO HATCHERY INFLUENCE	1	1.0	3	3.0	280		31													
MAIN STEM	1	1.0	3	3.0	280		31													
HUMBOLDT CREEK	1	1.0	3	3.0	280	11/ 1/84	31	31	11/ 1/84	4										

**ASTORIA FISHERIES DISTRICT
CHINOOK SALMON:**

[illegible]

1934-35 SPARKING GROUND SURVEY SUMMARY

TILLAMOOK FISHERIES DISTRICT
CHINOOK SALMON

PEAK COUNTS (LIVE AND DEAD)

ESTIMATED RUN SIZE (AUG)

SURVEYS	NO.	SUF	MILES	SUR	TOTAL	HILES	PEAK	HILE	ADULTS		JACKS		ESTIMATED RUN SIZE (AUG)	
									1934	1933	1934	1933	1934	1933
TILLAMOOK DISTRICT	3	3.0	16	16.4	126	12								
STANDARD SURVEYS	2	2.2	12	13.2	84	7								
NON STANDARD SURVEYS	1	1.0	4	3.2	243	26								
HATCHERY INFLUENCED	2	1.2	10	5.6	232	23								
NO HATCHERY INFLUENCE	1	1.8	6	10.8	56	5								
TRASK RIVER	1	1.0	4	3.2	243	20								
STANDARD SURVEYS	0	0.0	0	0.0	243	20								
NON STANDARD SURVEYS	1	1.0	4	3.2	243	20								
HATCHERY INFLUENCED	1	1.0	4	3.2	243	20								
NO HATCHERY INFLUENCE	0	0.0	0	0.0	243	20								
SOUTH FORK	1	1.0	4	3.2	243	20								
EDWARDS CREEK	1	1.0	4	3.2	243	20								
TILLAMOOK RIVER	1	1.0	6	10.8	56	5								
STANDARD SURVEYS	1	1.0	6	10.8	56	5								
NON STANDARD SURVEYS	0	0.0	0	0.0	56	5								
HATCHERY INFLUENCED	0	0.0	0	0.0	56	5								
NO HATCHERY INFLUENCE	1	1.0	6	10.8	56	5								
MAIN STEM	1	1.0	6	10.8	56	5								
TILLAMOOK RIVER	1	1.0	6	10.8	101	5								
NESTUCCA RIVER	1	1.0	6	10.8	210	15								
STANDARD SURVEYS	1	1.0	6	10.8	210	15								
NON STANDARD SURVEYS	0	0.0	0	0.0	210	15								
HATCHERY INFLUENCED	1	1.0	6	10.8	210	15								
NO HATCHERY INFLUENCE	0	0.0	0	0.0	210	15								
MAIN STEM AND BAY	1	1.0	6	10.8	210	15								
NIAGARA CREEK	1	1.0	6	10.8	84	6								

1964-15 SPANNING SECOND SURVEY SUMMARY

LINCOLN FISHERIES DISTRICT
CHINOOK SALMON

ESTIMATED RUN SIZE (AUG)

PEAK COUNTS (LIVE AND DEAD)

NO. TIMES TOTAL 1984 PER 1983 1984 PER 1933 RUN PER RUN PER

SURF MILES SUP MILES PEAK MILE DATE PEAK MILE DATE PEAK MILE DATE PEAK MILE DATE PEAK MILE DATE PEAK MILE DATE

LINCOLN DISTRICT

STANDARD SURVEYS

NON STANDARD SURVEYS

HATCHERY INFLUENCED

NO HATCHERY INFLUENCE

SALMON RIVER

STANDARD SURVEYS

NON STANDARD SURVEYS

HATCHERY INFLUENCED

NO HATCHERY INFLUENCE

MAIN STEM AND BAY

BEAR CREEK (LCMR-3)

HATCHERY TO PANTHER CREEK

PRAIRIE TO LITTLE SALMON

TROUT CREEK

SILETZ RIVER

STANDARD SURVEYS

NON STANDARD SURVEYS

HATCHERY INFLUENCED

NO HATCHERY INFLUENCE

MAIN STEM AND BAY

SUNSHINE CREEK

YAGUINA RIVER

STANDARD SURVEYS

NON STANDARD SURVEYS

HATCHERY INFLUENCED

NO HATCHERY INFLUENCE

ELK CREEK

BIG ELK CREEK #1

FEAGLES CREEK

GRANT CREEK (LOWER)

ALSEA RIVER

STANDARD SURVEYS

NON STANDARD SURVEYS

LINCOLN FISHERIES DISTRICT
CHINOOK SALMON

		PEAK COUNIS (LIVE AND DEAD)				ESTIMATED RUN SIZE (AUC)			
		ADULTS		JACKS		ADULTS		JACKS	
SURVEYS	NO.	LINES		TOTAL		1984 PER		1983 PER	
		MILES	SUR	MILES	PEAK	MILE	DATE	PEAK	DATE
*****	***	*****	*****	*****	*****	*****	*****	*****	*****
HATCHERY INFLUENCED	1	1.0	0	0.0	55				
NO HATCHERY INFLUENCE	0	0.0	0	0.0					
FIVE RIVERS	1	1.0	0	0.0	55				
BUCK CREEK	1	1.0	0	0.0	55	11/ 5/84	25	2 11/ 5/84	0

1984-85 SPANNING GROUND SURVEY SUMMARY

SIUSLAH FISHERIES DISTRICT
CHINGOK SALMON

SURVEYS *****	PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUG)									
	ADULTS					JACKS					ADULTS					JACKS				
NO. SUR MILES	TOTAL MILES	1984 PER MILE	1983 PER MILE	1984 PER MILE	1983 PER MILE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
3	2.6	20	17.8	72	9															
1	.8	3	2.4	129	9															
2	1.8	17	15.4	46	9															
0	.0	0	.0																	
3	2.6	20	17.8	72	9															
3	2.6	20	17.8	72	9															
1	.8	3	2.4	129	9															
2	1.8	17	15.4	46	9															
0	.0	0	.0																	
3	2.6	20	17.8	72	9															
1	1.0	9	9.0	39	39	11/3/84	5	4	4	10/30/84	0									
1	1.0	9	9.0	39	39	11/3/84	5	4	4	10/30/84	0									
1	.8	8	6.4	55	55	11/21/84	30	12	15	10/31/84	11									
1	.8	8	6.4	55	55	11/21/84	30	12	15	10/31/84	11									
1	.8	3	2.4	129	129	10/26/84	28	7	9	10/26/84	0									
1	.8	3	2.4	103	129	10/26/84	28	7	9	10/26/84	0									

COOS/CORQUILLE FISHERIES DISTRICT
CHINOOK SALMON

SURVEYS *****	PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
	ADULTS					JACKS					ADULTS					JACKS				
NO. SUP	MILES	TOTAL	1984	PER	1983	1984	PER	1983	1984	DATE	PEAK	DATE	PEAK	DATE	PEAK	DATE	PEAK	DATE	PEAK	DATE
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
COOS/CORQUILLE DISTRICT																				
STANDARD SURVEYS	8	6.8	15	12.4	42	5	6	5	5											
NON STANDARD SURVEYS	2	1.3	6	3.9	35	5	6	6	6											
HATCHERY INFLUENCED	6	5.5	9	8.5	43	4	4	4	4											
NO HATCHERY INFLUENCE	4	3.5	8	6.5	18	8	8	8	8											
	4	3.3	7	5.9	67															
COOS RIVER																				
STANDARD SURVEYS	3	2.3	7	5.5	19	5	5	5	5											
NON STANDARD SURVEYS	1	.5	3	1.5	2	2	2	2	2											
HATCHERY INFLUENCED	2	2.0	4	4.0	24	6	6	6	6											
NO HATCHERY INFLUENCE	3	2.5	7	5.5	19	5	5	5	5											
	0	.0	0	.0	.0															
MILLICOMA RIVER																				
WEST FORK	1	.5	3	1.5	2	2	2	2	2	11/5/84	9	1	2	11/5/84	0					
	1	.5	3	1.5	2	2	2	2	2											
SOUTH FORK																				
SOUTH FORK A	2	2.0	4	4.0	24	6	6	6	6	10/31/84	7	7	10/31/84							
WILLIAMS RIVER A	1	1.0	2	2.0	18	5	5	5	5	10/31/84										
	1	1.0	2	2.0	18	5	5	5	5											
CORQUILLE RIVER																				
STANDARD SURVEYS	5	4.3	8	6.9	55	6	6	6	6											
NON STANDARD SURVEYS	1	.8	3	2.4	55	8	8	8	8											
HATCHERY INFLUENCED	4	3.5	5	4.5	55	6	6	6	6											
NO HATCHERY INFLUENCE	1	1.0	4	1.0	5	1	1	1	1											
	4	3.3	7	5.9	67	8	8	8	8											
NORTH FORK																				
MIDDLE CREEK D	1	1.0	1	1.0	15	1	1	1	1	11/16/84										
	1	1.0	1	1.0	15	1	1	1	1											
EAST FORK																				
EAST FORK (LOWER)	1	1.0	1	1.0	96	12	12	12	12	10/31/84	7	12	10/31/84	1						
	1	1.0	1	1.0	96	12	12	12	12											
MIDDLE FORK																				
MIDDLE FORK	1	.5	1	.5	76	10	10	10	10	10/31/84										
	1	.5	1	.5	76	10	10	10	10											
SOUTH FORK																				
SALMON CREEK (LOWER)	2	1.8	5	4.4	48	4	4	4	4	11/5/84	43	6	11/5/84	4						
SOUTH FORK C	1	.8	3	2.4	44	4	4	4	4	10/31/84	2	2	10/31/84							
	1	1.0	2	2.0	42	2	2	2	2											

Appendix B

Peak Counts and Estimated Spawning Density of Coho Salmon in Standard and Nonstandard Index Streams Stratified by Fishery District and River Basins

Explanation of Columns in Appendix Tables

No. Sur.--the number of individual surveys included in the strata.

Miles--miles surveyed in the strata.

Time Sur.--number of actual surveys made within the strata.

Total Miles--cumulative total miles surveyed within the strata.
For multiple surveys, it is the sum of the individual surveys times the frequency surveyed.

Peak Counts

1984 Peak--maximum combined live and dead salmon seen on a given survey.

Per Mile--peak count expressed as a fish/mile count.

Date--date of the survey when the peak count was observed.

1983 Peak--peak count obtained in the survey during the previous year.

Estimated Run Size (AUC)

Sur.--the number of surveys used for area-under-the curve (AUC) estimates within the strata.

Run Size--the total estimated number of salmon that spawned in a given survey.

Per Mile--the total estimated number of fish/mile that spawned in a given strata.

934-65 SPANNING CROUND SURVEY SUMMARY

SOUTHWEST FISHERIES DISTRICT
CHINOOK SALMON

SURVEYS	NO. SUR	MILES	TIMES SUR	TOTAL MILES	PEAK COUNTS (LIVE AND DEAD)				ESTIMATED RUN SIZE (AUC)			
					ADULTS	JACKS	ADULTS	JACKS	ADULTS	JACKS	ADULTS	JACKS
					1984 PER	1983 PER	1984 PER	1983 PER	1984 PER	1983 PER	1984 PER	1983 PER
					PEAK MILE	DATE	PEAK MILE	DATE	PEAK MILE	DATE	PEAK MILE	DATE
					****	****	****	****	****	****	****	****
SOUTHWEST DISTRICT												
STANDARD SURVEYS	3	2.3	21	16.9	18		3					
NON STANDARD SURVEYS	2	1.3	12	7.8	15		2					
HATCHERY INFLUENCED	1	1.0	9	9.0	23		4					
NO HATCHERY INFLUENCE	2	1.3	12	7.8	15		2					
ROGUE RIVER												
STANDARD SURVEYS	1	.5	6	3.0	8		2					
NON STANDARD SURVEYS	1	.5	6	3.0	8		2					
HATCHERY INFLUENCED	0	.0	0	.0								
NO HATCHERY INFLUENCE	1	.5	5	3.0	8		2					
MAIN STEM JIM HUNT CREEK												
STANDARD SURVEYS	1	.5	6	3.0	8	12/ 2/84	2	12/ 2/84				
NON STANDARD SURVEYS	1	.5	6	3.0	4		1					
HATCHERY INFLUENCED	1	1.0	9	9.0	23		4					
NO HATCHERY INFLUENCE	0	.0	0	.0								
CHETCO RIVER												
STANDARD SURVEYS	1	1.0	9	9.0	23		4					
NON STANDARD SURVEYS	1	1.0	9	9.0	23		4					
HATCHERY INFLUENCED	1	1.0	9	9.0	23		4					
NO HATCHERY INFLUENCE	0	.0	0	.0								
MAIN STEM BIG EMPTY CREEK												
STANDARD SURVEYS	1	1.0	9	9.0	23	12/14/84	38	12/19/84	4			
NON STANDARD SURVEYS	1	.8	6	4.8	19		1					
HATCHERY INFLUENCED	0	.0	0	.0								
NO HATCHERY INFLUENCE	1	.8	6	4.8	13		1					
MAIN STEM BEAR CREEK												
STANDARD SURVEYS	1	.8	6	4.8	19	12/ 3/84	1	12/ 3/84	1			
NON STANDARD SURVEYS	1	.8	6	4.8	15		1					
HATCHERY INFLUENCED	0	.0	0	.0								
NO HATCHERY INFLUENCE	1	.8	6	4.8	13		1					

TILLAMOOK FISHERIES DISTRICT
COHO SALMON

-44-

1984-85 SPawning Ground Survey Summary

TILLAMOOK FISHERIES DISTRICT
COHO SALMON

SURVEYS *****	NO. SUR ***	MILES *****	TIMES SUR *****	TOTAL MILES *****	PEAK COUNTS (LIVE AND DEAD)				ESTIMATED RUN SIZE (AUG)			
					ADULTS	JACKS	ADULTS	JACKS	ADULTS	JACKS	ADULTS	JACKS
					1984	1983	1984	1983	1984	1983	1984	1983
					PEAK	PEAK	PER	DATE	DATE	DATE	DATE	DATE
					MILE	MILE	MILE	DATE	DATE	DATE	DATE	DATE
					*****	*****	*****	*****	*****	*****	*****	*****
NO HATCHERY INFLUENCE	0	.0	0	.0								
MAIN STEM	1	.6	14	8.4	18	18	2	2	4/85	2	1	31
SIMONS CREEK	1	.6	14	8.4	11	18	1	1	2	4/85	2	1
SAND LAKE	2	2.3	33	37.8	13		1				2	27
STANDARD SURVEYS	0	.0	0	.0								
NON STANDARD SURVEYS	2	2.3	33	37.8	13		1				2	27
HATCHERY INFLUENCED	2	2.3	33	37.8	13		1				2	27
NO HATCHERY INFLUENCE	0	.0	0	.0								
SAND LAKE	2	2.3	33	37.8	13		1				2	27
JEWELL CREEK	1	1.0	27	17.0	12	12	2	2	12/2/84	2	1	33
SAND CREEK	1	1.3	16	20.3	18	14	1	1	11/15/84	4	1	28
NESTUCCA RIVER	8	5.6	104	75.3	11		2				4	25
STANDARD SURVEYS	3	2.4	43	34.4	12		3				3	31
NON STANDARD SURVEYS	5	3.2	61	40.9	10		0				1	2
HATCHERY INFLUENCED	5	3.4	72	46.5	14		2				2	45
NO HATCHERY INFLUENCE	2	1.8	32	28.8	4		0				2	6
MAIN STEM AND RAY	5	3.3	61	41.0	14		3				2	45
BEAR CREEK (MAIN STEM)	1	.8	13	10.4	0		0				0	0
CLEAR CREEK	1	.3	14	12.2	23	23	8	10	10/29/84	4	1	72
ELK CREEK	1	.5	10	5.0	17	34	1	2	1/8/85	0		
ELK CREEK NO. 2	1	.5	12	6.0	3	6	0	0		0		
ELK CREEK NO. 3	1	.7	12	8.4	3	4	0	0		0		
BEAVER CREEK	1	.5	11	5.5	12		0					
UPPER EAST BEAVER	1	.5	11	5.5	6	12	0	0		0		
LITTLE NESTUCCA	2	1.8	32	28.8								
BEAR CREEK (LITTLE NESTUCCA)	1	.8	16	12.3	5	6	0	0		0	1	8
LOUIE/BAXTER CREEK	1	1.0	16	16.0	2	2	0	0		0	1	2
NEKOWIN CREEK	1	.7	18	12.6	7		1				1	25
STANDARD SURVEYS	0	.0	0	.0								
NON STANDARD SURVEYS	1	.7	18	12.6	7		1				1	25
HATCHERY INFLUENCED	0	.0	0	.0								
NO HATCHERY INFLUENCE	1	.7	18	12.6	7		1				1	25

1981-85 SPANNING GROUND SURVEY SUMMARY

TILLAMOOK FISHERIES DISTRICT
COHO SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
ADULTS										ADULTS									
JACKS										JACKS									
NO.	SUR	MILES	TOTAL	1984	PER	1983	1984	PER	DATE	1983	1984	PER	1983	1984	PER	DATE	1983	1984	PER
SUR	MILES	TOTAL	1984	PER	1983	1984	PER	DATE	1983	1984	PER	DATE	1983	1984	PER	DATE	1983	1984	PER
***	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
1	7	10	12.6	5	7	11/20/84	7	1	11/20/84	1	1	17	25	1	1	25	1	1	1
	7	10	12.6	5	7	11/20/84	7	1	11/20/84	1	1	17	25	1	1	25	1	1	1

MAIN STEM
HESGWIN CREEK

1944-85 SPawning Ground Survey Summary

LINCOLN FISHERIES DISTRICT
COMO SALMON

SURVEYS	NO.	SUC	MILES	TIMES	TOTAL	1984	PER	PEAK COUNTS (LIVE AND DEAD)				ESTIMATED RUN SIZE (AUG)			
								ADULTS	1983	1984	PER	ADULTS	1983	1984	JACKS
					MILES	PEAK	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
LINCOLN DISTRICT	76	61.5	939	738.8	13	13	2	2	2	2	2	31	52	31	2
STANDARD SURVEYS	10	10.6	172	181.9	17	17	2	2	2	2	2	44	20	44	3
NON STANDARD SURVEYS	65	49.7	766	555.7	12	12	2	2	2	2	2	26	42	26	2
HATCHERY INFLUENCE	67	54.0	734	631.8	13	13	2	2	2	2	2	31	44	31	2
NO HATCHERY INFLUENCE	10	8.7	146	108.2	13	13	2	2	2	2	2	34	8	34	3
SALMON RIVER	11	12.8	83	89.9	16	16	2	2	2	2	2	42	3	42	3
STANDARD SURVEYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON STANDARD SURVEYS	10	11.6	32	88.7	16	16	2	2	2	2	2	42	3	42	3
HATCHERY INFLUENCE	10	10.8	30	83.3	19	19	2	2	2	2	2	42	3	42	3
NO HATCHERY INFLUENCE	2	3.2	4	7.2	8	8	1	1	1	1	1	0	0	0	0
MAIN STEM AND BAY	11	12.8	83	89.9	16	16	2	2	2	2	2	42	3	42	3
BEAR CREEK (LOWER-3)	1	2.0	3	6.0	7	7	1	1	1	1	1	11/15/84	0	0	0
BEAR CREEK (UPPER-3)	1	1.1	2	2.2	13	13	12	11/26/84	0	0	0	0	0	0	0
BEAR CREEK (UPPER-4)	1	1.4	8	11.2	35	35	25	11/21/84	3	3	3	2	11/21/84	0	0
DEER CREEK NO. 1	1	1.4	9	12.6	41	41	29	11/16/84	3	3	3	2	11/16/84	1	78
LITTLE SALMON RIVER	1	9	11	9.9	24	24	27	11/5/84	4	4	4	4	11/14/84	1	4
PRAIRIE CREEK	1	9	12	10.3	8	8	9	11/14/84	2	2	2	2	11/14/84	1	21
SALMON CREEK (2)	1	1.5	10	15.0	16	16	11	11/9/84	2	2	2	11/15/84	0	0	0
TROUT CREEK	1	1.2	1	1.2	17	17	14	12/13/84	1	1	1	12/13/84	0	0	0
WEST FORK OF WIDOW CREEK	1	5	8	4.0	7	7	14	11/16/84	1	1	1	11/6/84	0	0	0
WIDOW CREEK	1	1.3	8	10.4	13	13	10	11/16/84	1	1	1	11/6/84	0	0	0
WILLIS CREEK	1	6	11	6.6	27	27	45	11/20/84	2	2	2	3	11/8/84	0	0
DEVIL'S LAKE	1	1.0	18	13.0	12	12	5	5	5	5	5	27	1	27	0
STANDARD SURVEYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NON STANDARD SURVEYS	1	2.0	18	19.0	12	12	5	5	5	5	5	27	1	27	0
HATCHERY INFLUENCE	1	2.0	18	18.0	12	12	5	5	5	5	5	27	1	27	0
NO HATCHERY INFLUENCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN STEM	1	2.0	18	18.0	12	12	2	2/22/85	2	2	2	27	1	27	0
ROCK CREEK	1	1.0	18	18.0	12	12	2	2/22/85	2	2	2	27	1	27	0
SILETZ RIVER	4	3.8	64	60.6	12	12	1	1	1	1	1	23	2	23	1
STANDARD SURVEYS	2	1.8	34	30.6	15	15	2	2	2	2	2	41	2	41	1
NON STANDARD SURVEYS	2	2.0	30	30.0	10	10	1	1	1	1	1	17	2	17	1
HATCHERY INFLUENCE	4	3.8	64	60.6	12	12	1	1	1	1	1	23	2	23	1
NO HATCHERY INFLUENCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MAIN STEM AND BAY	2	2.8	34	30.6	15	15	2	2	2	2	2	41	2	41	1

1984-85 SPARKING GR JUND SURVEY SUMMARY
LINCOLN FISHERIES DISTRICT
CONC SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED SUR SIZE (AUC)									
*****										*****									
ADULTS										JACKS									
*****										*****									
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LINCOLN FISHERIES DISTRICT
COHC SALMON

SURVEYS	PEAK COUHS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
	MC.	SUR MILES	TIMES SUR	TOTAL MILES	1984 PER	1983 PER	1984 PER	1983 PER	1984 DATE	1983 DATE	ADULTS	JACKS	ADULTS	JACKS	KUN PER	SUR SIZE	MILE	RUN PER	SIZE PER	JACKS
ALSEA RIVER	9	6.6	130	109.7	13		2									8	25			2
STANDARD SURVEYS	5	5.2	85	33.7	15		2									5	33			3
NON STANDARD SURVEYS	3	1.4	45	21.0	6		1									3	12			1
HATCHERY INFLUENCED	3	3.4	49	52.7	13		2									3	30			4
NO HATCHERY INFLUENCE	5	3.2	81	54.0	13		2									5	22			2
ORIFT CREEK	5	3.2	81	54.0	13		2									5	22			2
ORIFT CREEK NC. 1	1	.5	15	9.0	2		1									1	1			0
ORIFT CREEK NC. 2	1	.4	15	6.0	4		1									1	6			1
ORIFT CREEK NC. 3	1	.4	15	6.0	3		0									1	6			0
HORSE CREEK	1	1.0	21	21.0	25		3									3	1			2
NEITLE CREEK	1	.8	12	12.0	9		2									1	14			3
FIVE RIVERS	3	3.4	49	55.7	13		2									3	30			4
CHERRY CREEK	1	.8	16	12.8	5		2									1	12			5
LOBSTER CREEK	1	1.3	17	22.1	16		3									3	1			6
WILSON CREEK	1	1.3	16	20.8	22		2									2	1			3

STUSLAW FISHERIES DISTRICT
COINC SALMON

-51-

1934-85 SPANNING GROUND SURVEY SUMMARY

SIUSLAW FISHERIES DISTRICT
COHO SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
ADULTS										ADULTS									
JACKS										JACKS									
NO.	TIME	TOTAL	1934	PER	1933	1934	PER	1932	1933	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS	ADULTS
SUR	MILES	SUR	PEAK	MILE	DATE	PEAK	MILE	DATE	PEAK	SUR	SUR	SUR	SUR	SUR	SUR	SUR	SUR	SUR	SUR
***	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
HATCHERY INFLUENCED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NO HATCHERY INFLUENCE	1	0	15	12.0	294	91	91	91	91	1	1	1	1	1	1	1	1	1	1
LEITEL CREEK	1	0	15	12.0	294	91	91	91	91	1	1	1	1	1	1	1	1	1	1
LEITEL CREEK	1	0	15	12.0	235	234	234	234	234	102	73	91	12	5/8	51	1	485	606	206

1984-85 SPANNING GROUND SURVEY SUMMARY

UMPOUA FISHERIES DISTRICT
CCHC SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUG)											
ADULTS										JACKS											
NO.	SUR	MILES	TOTAL	1984	PER	DATE	1983	1984	PER	1983	1984	PER	DATE	1983	1984	PER	DATE	1983	1984	PER	DATE
SUR	MILES	SUR	MILES	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE	PEAK	MILE

1981-82 SPANNING GROUND SURVEY SUMMARY

COOS/COQUILLE FISHERIES DISTRICT
COHO SALMON

PEAK COUNTS (LIVE AND DEAD)												ESTIMATED RUN SIZE (AUG)											
ADULTS												JACKS											
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COOS/COQUILLE FISHERIES DISTRICT
COHO SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUG)									
ACULIS										JACKS									
1983										1983									
NO.	SUR	MILES	TOTAL	PER	DATE	1984	PER	DATE	1983	SUR	PER	DATE	1983	SUR	PER	DATE	1983		
***	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
SURVEYS																			

10	7.1	135	94.8	32	12/13/84	28	93	12/13/84	3	10	12/31/84	7	10	90	12	12	12		
1	.3	14	9.2	28	12/13/84	34	170	12/24/84	3	15	12/4/84	3	1	35	118	4	12		
1	.2	14	2.9	34	12/17/84	2	2	12/17/84	5	1	12/17/84	2	1	1	1	0	0		
1	1.0	12	12.0	2	12/17/84	2	2	12/17/84	5	1	12/17/84	2	1	1	1	0	0		
1	.8	14	11.2	32	12/19/84	27	40	12/19/84	7	3	4/11/13/84	0	1	36	120	6	8		
1	.8	12	9.6	27	12/13/84	24	34	12/13/84	14	16	2/13/85	6	1	68	85	5	6		
1	1.0	13	13.0	24	2/13/85	47	31	12/13/84	3	5	3/12/13/84	1	1	41	41	17	17		
1	1.5	14	21.0	47	12/13/84	22	24	12/4/84	3	2	2/12/4/84	1	1	86	57	8	6		
1	.9	14	12.6	22	12/4/84	3	10	12/4/84	2	0	0	0	1	47	52	2	2		
1	.3	14	4.2	3	10/12/4/84	8	27	12/31/84	13	17	57/12/31/84	2	1	8	26	14	47		
1	.3	14	4.2	8	27/12/31/84	37	60	12/3/84	12	7	20/12/3/84	7	7	79	99	12	13		
10	6.5	115	76.9	36	12/14/84	31	52	12/14/84	3	3	5/12/14/84	1	1	59	99	12	19		
1	.6	14	8.4	31	12/14/84	4	4	12/14/84	3	1	1/11/15/84	0	1	5	5	1	1		
1	.6	10	6.0	31	12/14/84	8	10	12/2/84	9	4	5/12/2/84	2	1	13	16	4	5		
1	1.0	13	13.0	4	12/14/84	62	62	1/2/85	9	3	3/12/11/84	2	1	121	121	9	9		
1	.3	12	9.6	62	1/2/85	3	6	1/9/85	1	1	2/12/6/84	4	1	45	57	13	17		
1	1.0	14	14.0	62	1/2/85	14	18	2/13/85	5	7	9/2/13/85	4	1	52	172	7	22		
1	.5	2	1.0	3	2/13/85	25	83	1/2/85	4	4	13/12/3/84	1	1	52	172	7	22		
1	.8	13	10.4	14	2/13/85	8	20	12/3/84	3	4	10/1/3/85	1	1	32	79	6	14		
1	.3	14	4.2	25	1/2/85	49	98	1/2/85	3	4	8/1/2/85	0	0	0	0	0	0		
1	.4	12	4.8	8	12/3/84	39	72	12/19/84	27	7	7/12/11/84	16	1	175	175	14	14		
1	.5	11	5.5	49	1/2/85	39	72	12/19/84	27	7	7/12/11/84	16	1	175	175	14	14		
7	7.0	82	85.1	39	12/19/84	72	72	12/19/84	27	7	7/12/11/84	16	1	175	175	14	14		
6	6.3	81	84.4	33	1	43	43	1	1	1	1	1	1	1	1	1	1		
1	.7	1	.7	43	1	43	43	1	1	1	1	1	1	1	1	1	1		
4	4.5	40	50.1	41	1	41	41	1	1	1	1	1	1	1	1	1	1		
3	2.5	42	35.0	34	1	34	34	1	1	1	1	1	1	1	1	1	1		
NO HATCHERY INFLUENCE																			
4	4.5	40	50.1	41	1	41	41	1	1	1	1	1	1	1	1	1	1		
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
NORTH FORK																			
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
ALDER CREEK																			
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
CHERRY CREEK A																			
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
NORTH FORK (UPPER-A)																			
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
PAK CREEK																			
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
EAST FORK																			
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
STEEL CREEK																			
1	1.0	13	13.0	72	12/19/84	49	27	12/14/84	7	9	5/12/14/84	2	1	171	171	13	13		
1	1.0	13	23.4	49	12/14/84	32	32	1/17/85	8	3	3/17/85	2	1	65	65	5	5		
1	1.0	13	13.0	32	1/17/85	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
1	.7	1	.7	30	4/12/11/84	30	43	12/11/84	26	3	4/12/11/84	7	1	112	112	10	10		
MIDDLE FORK																			
1	.5	14	7.0	43	1	43	43	1	1	1	1	1	1	1	1	1	1		
1	.5	14	7.0	43	1	43	43	1	1	1	1	1	1	1	1	1	1		
1	.5	14	7.0	43	1	43	43	1	1	1	1	1	1	1	1	1	1		
1	.5	14	7.0	43	1	43	43	1	1	1	1	1	1	1	1	1	1		

APPENDIX C

Peak Counts of Chum Salmon in Standard and Nonstandard Index Streams Stratified by Fishery District and River Basins

Explanation of Columns in Appendix Tables

No. Sur.--the number of individual surveys included in the strata.

Miles--miles surveyed in the strata.

Times Sur.--number of actual surveys made within the strata.

Total Miles--cumulative total miles surveyed within the strata.
For multiple surveys, it is the sum of the individual surveys
times the frequency surveyed.

Peak Counts

1984 Peak--maximum combined live and dead salmon seen on a given survey.

Per Mile--peak count expressed as a fish/mile count.

Date--date of the survey when the peak count was observed.

1983 Peak--peak count obtained in the survey during the previous year.

Estimated Run Size (AUC)

Sur.--the number of surveys used for area-under-the curve (AUC) estimates
within the strata.

Run Size--the total estimated number of salmon that spawned in a given
survey.

Per Mile--the total estimated number of fish/mile that spawned in a given
strata.

CODS/COQUILLE FISHERIES DISTRICT
COMC SALMON

		PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUC)									
		ADULTS					JACKS					ADULTS					JACKS				
		1984 PER					1983 PER					1983 PER					1983 PER				
		DATE					DATE					DATE					DATE				
		MILE					MILE					MILE					MILE				
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**WILLAMOOK FISHERIES DISTRICT
CHUM SALMON**

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUG)									
ADULTS										JACKS									
ADULTS					JACKS					ADULTS					JACKS				
SURVEYS	NO.	MILES	TIMES	ICTAL	1934	PER	1983	1984	PER	1953	PER	SUM	PER	SUM	PER				
*****	SUR	*****	SUR	MILES	PEAK	MILE	PEAK	PEAK	MILE	PEAK	MILE	SIZE	SIZE	SIZE	SIZE				
TILLAMOOK DISTRICT	0	5.1	37	24.9	313	0			0										
STANDARD SURVEYS	3	5.1	37	24.9	313	0			0										
NON STANDARD SURVEYS	0	0.0	0	0.0															
HATCHERY INFLUENCE	1	2.0	3	3.0	324	0			0										
NO HATCHERY INFLUENCE	7	4.1	34	21.9	311	0			0										
MIAMI RIVER	3	1.7	9	5.0	162	0			0										
STANDARD SURVEYS	3	1.7	9	5.0	162	0			0										
NON STANDARD SURVEYS	0	0.0	0	0.0															
HATCHERY INFLUENCE	0	0.0	0	0.0															
NO HATCHERY INFLUENCE	3	1.7	9	5.0	162	0			0										
MAIN STEM	3	1.7	9	5.0	162	0			0										
MIAMI RIVER	1	.6	2	1.2	94	157	12/ 4/84	183	0	0	0								
HOSS CREEK	1	.6	3	1.8	112	187	12/ 4/84	107	0	0	0								
PROUTY CREEK	1	.5	4	2.0	70	140	12/ 4/84	14	0	0	0								
KILCHIS RIVER	3	2.1	7	5.2	355	0			0										
STANDARD SURVEYS	3	2.1	7	5.2	355	0			0										
NON STANDARD SURVEYS	0	0.0	0	0.0															
HATCHERY INFLUENCE	1	1.0	3	3.0	324	0			0										
NO HATCHERY INFLUENCE	2	1.1	4	2.2	383	0			0										
MAIN STEM	3	2.1	7	5.2	355	0			0										
CLEAR CREEK	1	.6	2	1.2	70	117	11/15/84	132	0	0	0								
COAL CREEK	1	.5	2	1.0	351	702	11/25/84	+25	0	0	0								
KILCHIS RIVER	1	1.0	3	3.0	324	324	12/ 6/84		0	0	0								
WILSON RIVER	1	.5	7	3.5	968	0			0										
STANDARD SURVEYS	1	.5	7	3.5	968	0			0										
NON STANDARD SURVEYS	0	0.0	0	0.0															
HATCHERY INFLUENCE	0	0.0	0	0.0															
NO HATCHERY INFLUENCE	1	.5	7	3.5	968	0			0										
LITTLE NORTH FORK	1	.5	7	3.5	968	0			0										
LITTLE NORTH FORK	1	.5	7	3.5	968	484	11/21/84	595	0	0	0								
NESTUCCA RIVER	1	.8	14	11.2	116	0			0										
STANDARD SURVEYS	1	.8	14	11.2	116	0			0										
NON STANDARD SURVEYS	0	0.0	0	0.0															
HATCHERY INFLUENCE	0	0.0	0	0.0															
NO HATCHERY INFLUENCE	0	0.0	0	0.0															

TILLAMOOK FISHERIES DISTRICT
CHUM SALMON

PEAK COUNTS (LIVE AND DEAD)										ESTIMATED RUN SIZE (AUG)									
*****										*****									
AGULTS					JACKS					ADULTS					JACKS				
NO.	TIMES	TOTAL	1984	PER	1983	1984	PER	1983	1984	NO.	TIMES	TOTAL	1984	PER	1983	1984	PER	1983	1984
SUR	MILES	SUR	MILES	PER	DATE	DATE	DATE	DATE	DATE	SUR	MILES	SUR	MILES	PER	DATE	DATE	DATE	DATE	DATE
***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
NO HATCHERY INFLUENCE	1	.8	14	11.2	1.6					0									
MAIN STEM AND BAY	1	.8	14	11.2	1.6					0									
CLEAR CREEK	1	.8	14	11.2	93	116	11/13/84	49	0	0									