

Spawning Coho and Chinook Salmon Surveys in Coastal
Watersheds of Oregon, 1976

Ed Cummings

Oregon Department of Fish & Wildlife
Fish Management Section

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INTRODUCTION

Spawning salmon surveys have been conducted on coastal streams in Oregon for the past 30 years to provide information on the status of wild stocks. With changes in personnel and duties through the years overall effort devoted to these surveys has been reduced. These changes in the level of effort gave data which was not always directly comparable with quantitative data of previous years. Continued surveys have provided information which showed trends of coastal salmon stock abundance.

In 1976 we again reviewed the spawning salmon survey program; considered personnel available for continuation; and evaluated the need for stock status information. We still had a requirement for trend data but recognized a need for revision of our system both in the number of surveys conducted and in the method of using the data. An analysis system was devised which eliminated some of the obvious bias (Cummings, 1976) yet allowed continuation of trend comparison from year to year.

Data for coho and chinook counts on the selected index areas are presented in this report. Chum salmon counts are reported elsewhere (Berry 1977, in process, personal communication).

METHODS

Changes in work assignments for Oregon Department of Fish and Wildlife (ODFW) biologists along the coast forced another reduction of spawning salmon counts in the 1975 season. In 1976 the ODFW statistical section examined data from prior surveys and selected a group of survey sections which could be used, with caution, to continue coastwide trend comparisons. These sections, surveyed in 1976, included only one index area per stream system but covered more systems than were used in the previous

standard index. In this manner we broadened the index base but sacrificed depth in total numbers of surveys on individual systems and on coastal streams as a whole.

Designated stream sections were surveyed one or more times in 1976-77 in an effort to obtain a count of fish at the time when the largest number of fish were present. Normally the highest count of chinook can be made in late October or early November and coho peak in December or early January. Low flows in the fall and winter of 1976-77 kept salmon from occupying much of the spawning area at normal times so observations were continued after winter rains finally allowed fish to move upstream. In some areas peak numbers of coho were counted in the first week of March. On the south coast index areas were dry and not used by spawning chinook. Additional surveys were relied on to explain or verify the apparently aberrant trends for the whole coast.

RESULTS

Chinook

Biologists examined index areas on 12 streams in 1976 to count spawning chinook. No fish were found on five of these areas and only one fish on another (Table 1). Low flows precluded migration of fish onto their normal spawning grounds. Spawning chinook exceeded base count numbers on three of the six index areas where fish spawned (Figure 1). These were all larger tributary or main stem count areas.

The apparent low count of chinook may have been influenced by a recent shift in index areas and low flows. A definitive trend direction could not be established. These data suggest that we do not have enough separate index areas on a single system to adequately determine

Table 1. Peak Counts on Selected Spawning Fall Chinook Surveys, 1950-76

River	Nehalem	Tillamook	Nestucca	Siletz	Yaquina	Alsea	Siuslaw	Coos	Coquille	Rogue	Jim Hunt	Deep	Pistol	Winchuck
Trib	Humbug	--	Niagara	Sunshine	Grant	Buck	Lake	W.F.	Milllicoma	Salmon	--	--	--	Bear
1950	13(0) ^{1/}	--	5(1)	--	91(23)	--	--	--	--	--	--	--	--	--
1951	34(8)	--	11(0)	--	105	--	--	--	--	--	--	--	--	--
1952	23(2)	115	137(2)	51	226(46)	69(20)	--	--	--	--	--	--	--	--
1953	66(15)	34(13)	7(0)	17(2)	34(0)	1(0)	29(10)	--	14(1)	--	--	--	--	--
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) ^{3/}	0(0) ^{3/}	0(0) ^{3/}	0(0) ^{3/}	0(2) ^{3/}	0(2) ^{3/}
Base	104	110	61	45	52	30	122	7	19	40 ^{2/}	12 ^{2/}	20 ^{2/}	20 ^{2/}	20 ^{2/}

^{1/} Jacks included in total.

^{2/} Base count estimated, surveys standardized in 1976.

^{3/} Flows too low to allow spawning.

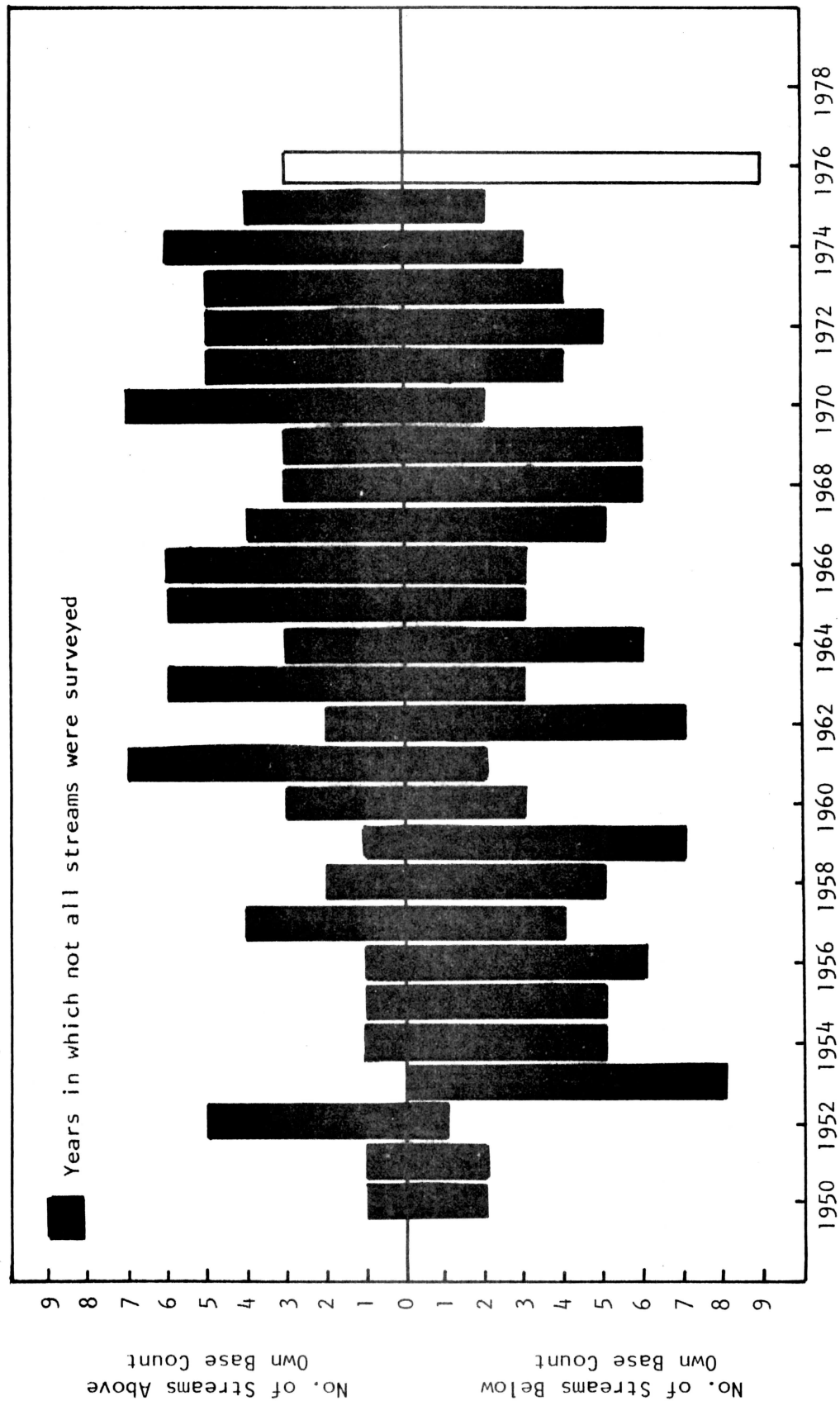


Figure 1. Comparison of Number of Streams with Counts of Spawning Fall Chinook Above and Below Their Individual Base Count Since 1950

Note: Streams on which counts equalled the base count for that stream are shown above reference line 0.

the status or trend of spawning chinook through index counts alone under all conditions.

Coastal biologists observed fall chinook spawning in lower main stem and larger tributaries instead of using areas higher in the system. We can deduce that many of these upper areas, which include some of the better rearing habitat, were not seeded in 1976.

Coho

Significant spawning populations of coho do not use several of the southern Oregon streams. Spawning coho are not counted south of the Coquille. We found base counts for the individual streams exceeded on only three of the 11 systems surveyed in 1976-77 (Table 2). Counts were significantly below those of the 1960's in most cases (Figure 2).

Biologists observed that coho remained in tidewater and deeper freshwater areas for extended periods. In areas where saltwater was available for coho to 'hold' good numbers of fish were found on spawning beds when winter rains finally allowed enough stream flow for upstream movement. In areas like Siltcoos Lake where coho probably stayed in freshwater to await better streamflows few or no fish appeared on spawning beds when flows improved. Biologists generally felt coho counts were somewhat inflated in the high count areas because of the short period in which all fish occupied spawning areas once they could move upstream. Thus even on those index areas which actually showed increased counts (use) in 1976-77 the total numbers of fish were probably lower than in previous years when spawning occurred over a longer period. The general trend of coho then continues downward.

Table 2. Peak Counts on Selected Spawning Coho Surveys, 1950-76

River	Nehalem	Wilson	Nestucca	Yaquina	Alsea	Siuslaw	Smith	Umpqua	Tenile L.	Coos	Coquille
Trib.	N.F. Wolf	Cedar	Clear	--	Lobster	Panther	Beaver	Scho- field	Johnson	Larson	Steele
1950	8(0)	27(0)	19(5)	36(2)	4(1)	--	--	--	--	158(21)	2(0)
1951	55(3)	118(8)	46(5)	190(4)	56(3)	26(2)	--	--	--	327(77)	7(1)
1952	76(3)	75(3)	50(4)	45(1)	44(1)	29(5)	--	--	--	254(26)	5(0)
1953	7(0)	49(3)	7(1)	5(0)	14(0)	8(0)	--	--	--	65(19)	32(7)
1954	5(1)	14(3)	16(3)	43(3)	44(1)	14(1)	--	--	--	67(33)	5(0)
1955	12(0)	27(0)	5(1)	35(0)	65(0)	--	--	127(4)	2,513(711)	96(18)	14(1)
1956	60(2)	18(1)	4(1)	79(6)	89(12)	23(5)	--	141(48)	2,270(1,248)	195(72)	31(8)
1957	106(0)	9(0)	23(5)	117(0)	85(3)	18(0)	--	131(17)	1,946(577)	49(6)	11(0)
1958	6(1)	8(0)	11(4)	46(7)	35(0)	--	0(0)	95(19)	983(484)	24(6)	9(2)
1959	44(0)	26(0)	6(0)	87(1)	75(4)	--	10(0)	72(11)	388(129)	63(7)	5(0)
1960	38(13)	38(4)	18(8)	62(21)	50(12)	3(2)	5(2)	37(17)	821(563)	47(30)	15(7)
1961	70(4)	77(7)	23(6)	269(4)	72(5)	9(0)	9(1)	96(26)	883(281)	192(116)	49(18)
1962	26(3)	88(4)	7(1)	128(11)	24(1)	7(0)	44(1)	105(4)	994(396)	129(31)	43(12)
1963	32(0)	45(4)	20(7)	72(4)	73(5)	2(1)	31(12)	135(59)	1,224(749)	53(17)	10(1)
1964	75(5)	47(1)	31(3)	171(20)	116(3)	9(0)	22(3)	260(63)	1,276(515)	52(11)	114(13)
1965	86(3)	51(7)	29(15)	153(16)	37(4)	2(0)	47(4)	440(146)	695(261)	28(2)	148(25)
1966	33(2)	11(1)	14(7)	212(17)	40(6)	8(2)	28(2)	111(7)	899(318)	50(10)	44(10)
1967	45(1)	122(8)	11(1)	82(16)	30(1)	23(3)	--	414(266)	997(495)	53(11)	50(15)
1968	--	54(4)	9(4)	113(4)	17(0)	11(1)	33(0)	--	396(135)	26(3)	46(7)
1969	30(0)	42(7)	5(1)	59(13)	14(0)	21(2)	10(3)	342(140)	791(486)	45(7)	68(14)
1970	65(6)	116(8)	24(7)	154(4)	15(2)	20(3)	3(0)	249(48)	1,763(994)	35(5)	20(4)
1971	71(3)	71(2)	13(0)	251(10)	82(0)	13(0)	27(4)	133(18)	1,068(136)	18(2)	56(4)
1972	15(0)	31(2)	3(0)	36(10)	13(0)	7(0)	5(1)	94(31)	480(150)	53(29)	40(9)
1973	11(1)	82(4)	12(1)	58(4)	18(0)	20(0)	16(1)	155(7)	929(238)	58(16)	12(0)
1974	17(0)	49(0)	6(0)	20(1)	16(1)	13(0)	2(0)	167(110)	297(63)	103(42)	24(5)
1975	--	50(4)	9(1)	--	--	13(0)	20(2)	61(4)	151(36)	79(46)	30(1)
1976	9(1)	32(2)	0(0)	1(0)	7(0)	21(2)	0(0)	118(39)	99(21)	82(20)	96(9)
Base	33	51	13	96	30	9	19	145	899	52	44

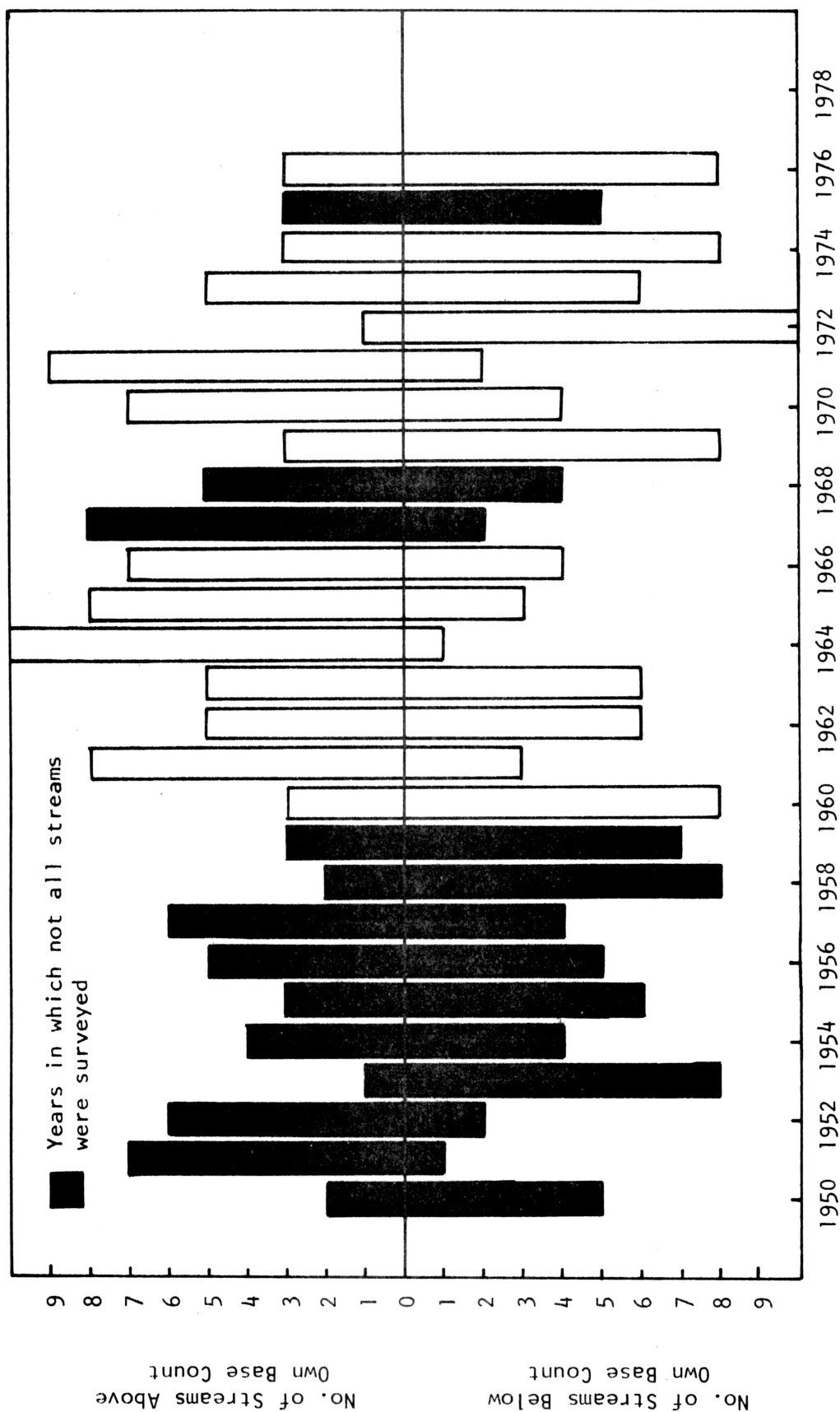


Figure 2. Comparison of Number of Streams with Counts of Spawning Coho Above and Below Their Individual Base Counts Since 1950

Note: Streams on which counts equalled the base count for that stream are shown above reference line 0.

DISCUSSION

Low stream flows during the normal spawning period for coastal salmon in the fall and winter of 1976-77 caused problems in defining trends of returning adults. Spawners could not reach some of the index areas used to show trends.

The numbers of fish occupying individual index areas has varied considerably from one stream system to another in recent years but generally appears to be on the decrease since the early 1950's. Intermediate peaks of improvement in trends during the mid 1960's and early 1970's were not maintained. Coho counts have declined significantly in most coastal systems since 1970. Chinook counts have also declined although some systems appear to be maintaining chinook at a better rate than they have coho. Overall, our present wild production appears to be well below the historic levels suggested by old landing records (ODFW files). The apparent divergence in the rate of decline between coho and chinook may be partially explained by the ocean harvest where fishermen are more adept at capturing coho or concentrate more on the easily caught coho rather than chinook.

A low level of spawning escapement was noted in last year's report (Cummings, 1976). The following possible alternatives were posed for consideration (1) ignore the decline in wild stocks in favor of hatchery fish released at the hatchery; (2) reduce seasons to allow a better escapement; or (3) use hatchery fish to supplement stream stocks. The most viable option continues to be that of supplementing wild stocks in our streams.

Several techniques are being used to supplement natural spawning with fish produced in or returning to state hatcheries. After the egg requirement at the hatcheries has been met, surplus adults are hauled to other streams and released above barriers or in poorly used areas for natural

spawning. Some smolts or fingerlings have been released away from the hatchery and in nonhatchery streams for several years. This effort is being accelerated in Department planning procedures and through implementation of major smolt plants in streams where results can be evaluated. Evaluation of success of these planted fish will guide future efforts to improve the numbers of naturally reared salmon which can contribute to the fisheries.

SUMMARY

Spawning counts of both chinook and coho indicate a low or declining level of natural spawning. Although surveys are conducted on only a few streams, we can with caution assume they are indicative of coastwide trends. Low flows in 1976-77 confused the trend data somewhat but nonindex surveys confirmed a low level of spawning fish abundance.

Efforts to improve the numbers of fish returning to coastal streams for natural spawning are underway and additional methods are being studied.

LITERATURE CITED

- Cummings, Ed. 1976. Spawning fish surveys in coastal watersheds, 1975. ODFW, Fish Mgmt. Sect. Mimeo. 10 p.