CHAPTER II
INSIDE CHINOOK SALMON FISHERIES AND SPAWNING ESCAPEMENTS

CENTRAL VALLEY STOCKS

Inside Harvest

Recreational catch of salmon during 1991 in the Sacramento River system was estimated to be 47,600 fish, predominantly fall-run chinook. Anglers spent an estimated 705,900 hours in pursuit of salmon, for a catch rate of 0.06 salmon per angler hour. Effort was heaviest in the Feather River (165,800 hours) and in the American River (140,900 hours). Catch was highest in the American River (25,400 fish). The 1991 season marks the second year of a comprehensive angler survey of the Sacramento River system.

Escapement and Goal Assessment

Sacramento River Fall Chinook

A total of 109,500 fall chinook adults returned to spawn in the Sacramento River basin in 1991 (Table II-1). This number of adults is nearly identical to the 1990 escapement (Figure II-1) (107,300 fish). Sacramento River hatchery returns totaled 24,700 adults, slightly above the 1990 escapement (22,400 fish).

The total spawning escapement of Sacramento River fall chinook salmon of 109,500 adults was below the Council's goal range for the stock of 122,000 to 180,000 adult spawners for the second consecutive year. Available data indicate that the majority of the Sacramento River basin naturally spawning fall chinook population is comprised of hatchery-produced fish.

The upper Sacramento River escapement (above the Feather River) of 49,100 adults was 24 percent lower than the 1990 adult escapement. The lower Sacramento River escapement of 60,400 adults was 40 percent greater that the 1990 escapement (43,000). Lower river hatcheries received 24 percent of the lower river adult spawning escapement.

Sacramento River Late-Fall, Winter and Spring Chinook

Late-fall chinook and winter chinook returns in 1991 in the upper Sacramento River were estimated using partial counts at the Red Bluff Diversion Dam. The gates at this facility were opened during the last part of the late-fall run and the first part of the winter run in an attempt to facilitate salmon passage.

Late-fall run chinook salmon escapement during 1990-1991 (1991 brood) was estimated to be 7,400 adults, 800 fish greater than the previous year (Appendix B, Table B-3). A preliminary estimate for the 1991-1992 run (1992 brood) is 9,400 adults. Spawning escapement of winter chinook salmon was estimated to total only 127 adults, well below the 1990 escapement (500), and less than 1 percent of the 1971-1975 average (22,500).

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TABLE II-1. Sacramento River natural and hatchery adult fall chinook escapements in thousands of fish. (Page 1 of 1)

Year	Upper River			Lower River			Total		Grand Total
	Hatchery	Natural[a/]	Subtotal	Hatchery	Natural[a/]	Subtotal	Hatchery	Natural[a/]	
1971–1975	1.8	56.5	58.3	11.5	92.3	103.8	13.3	148.8	162.1
1984	18.7	48.7	67.4	19.1	68.5	87.6	37.8	117.2	155.0
1985	13.1	103.5	116.6	12.9	101.3	114.2	26.0	204.8	230.8
1986	11.3	109.5	120.8	11.3	102.9	114.2	22.6	212.4	235.0
1987	11.3	70.3	81.6	9.9	77.0	86.9	21.2	147.3	168.5
1988	12.5	125.2	137.7	14.2	71.8	86.0	26.7	197.0	223.7
1989	10.2	65.9	76.1	15.7	54.5	70.2	25.9	120.4	146.3
1990	13.5	50.8	64.3	8.9	34.1	43.0	22.4	84.9	107.3
1991	10.0	39.1	49.1	14.7	45.7	60.4	24.7	84.8	109.5

a/ Fish spawning in natural areas are the result of hatchery and natural production.

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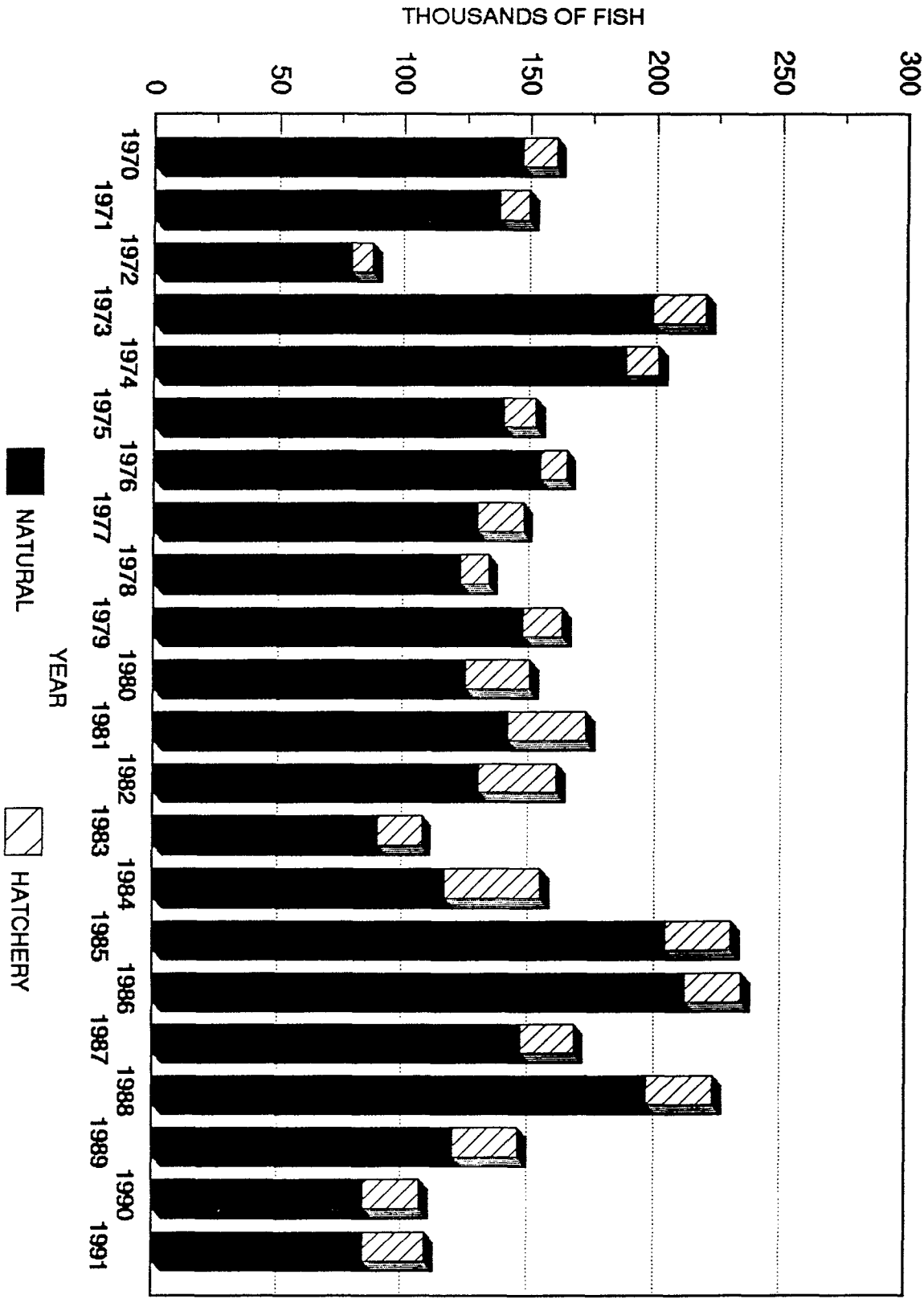

Figure II-1. Sacramento River adult fall-run chinook spawning escapements, 1970-1991.

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The spring chinook salmon return to the upper Sacramento River totaled 1,300 adults, 28 percent of the 1990 run (4,600) and well below the 1971–1975 average (5,100).

The Feather River spring chinook return of 3,300 adults was above the previous years (1,400 in 1990).

San Joaquin River Chinook

San Joaquin River spawning areas are utilized primarily by fall–run chinook salmon. The estimated San Joaquin River fall chinook salmon spawning escapement in 1991 totaled 900 adults, including 300 fish which were spawned in the 2 basin hatcheries and 600 which returned to natural spawning areas. The production in the San Joaquin is largely determined by spring outflows three years earlier. The San Joaquin run formed a small proportion (one percent) of the total Central Valley fall chinook run. The overall adult run was the lowest since the 1976–1977 drought years and was only 6 percent of the 1971–1975 average (14,300).

KLAMATH RIVER STOCKS

Inside Harvest

Fisheries in the Klamath River harvested 13,200 adults, the third lowest inriver landing for the basin since 1978. Both the inriver Indian and recreational fisheries were managed under quotas. The overall inriver allocation consistent with the Council's ocean decisions was 13,000 fall–run adults. Adult chinook landings totaled 10,200 fish in the Indian fishery and 3,000 fish in the recreational fishery (Table II–2). The 1991 landings by recreational and Indian gillnet fisheries were the third lowest since 1978.

Escapement and Goal Assessment

The preliminary inriver run estimate for Klamath River basin fall chinook salmon is 30,900 adults, the lowest since comprehensive inriver monitoring began in 1978 (Figure II–2) and 51 percent of the predicted escapement of 60,300 adults under Council–adopted regulations.

The Klamath River basin spawning escapement of 17,600 adults was 83 percent of the 1990 escapement (21,100) and was the lowest since 1978. The escapement to natural spawning areas of 11,100 was 85 percent of the comparative 1990 escapement (Appendix B, Table B–4) and well below the floor of 35,000. This is the second consecutive year that natural escapement has been below the floor. The hatchery spawning escapement was 6,500 adults.

Natural spawning escapements in upper Klamath River tributaries totaled 6,000 adults, 13 percent greater than 1990. The Shasta River is the most important chinook salmon spawning stream in the upper Klamath River. Counts of chinook salmon spawners in the Shasta River date from 1930 (Appendix B, Table B–6). The 1991 count of 700 adults was 75 percent greater than the 1990 run (400), but was only 11 percent of the 1971–1975 average (6,300). The Shasta River supported a run of 30,700 adults, as recently as 1964, and historically received as many as 63,700 adults.

TABLE II-2. Klamath River adult inriver fall chinook run size, spawning escapement, recreational catch and Indian net harvest in numbers of fish and percent of the total inriver run size. (Page 1 of 1)

	Spawning Escapement		Inriver Recreational Catch		Indian Net Catch		Inriver Run Size
Year	Numbers	Percent	Numbers	Percent	Numbers	Percent	Numbers
1978	71,500	78	1,700	2	18,200	20	91,300
1979	34,300	68	2,100	4	13,700	27	50,100
1980	28,000	63	4,500	10	12,000	27	44,500
1981	38,300	49	6,000	8	33,000	43	77,300
1982	42,400	65	8,300	13	14,500	22	65,200
1983	44,600	79	4,200	7	7,900	14	56,800
1984	23,600	52	3,300	7	18,700	41	45,600
1985	48,200	76	3,600	6	11,600	18	63,400
1986	146,300	76	21,000	11	25,100	13	192,400
1987	130,800	64	20,200	10	53,100	26	204,100
1988	112,300	60	22,200	12	51,700	28	186,200
1989	65,700	55	8,800	7	45,600	38	120,000
1990	21,100	65	3,600	11	7,800	24	32,400
1991[a/]	17,600	57	3,000	10	10,200	33	30,900

a/ Preliminary.

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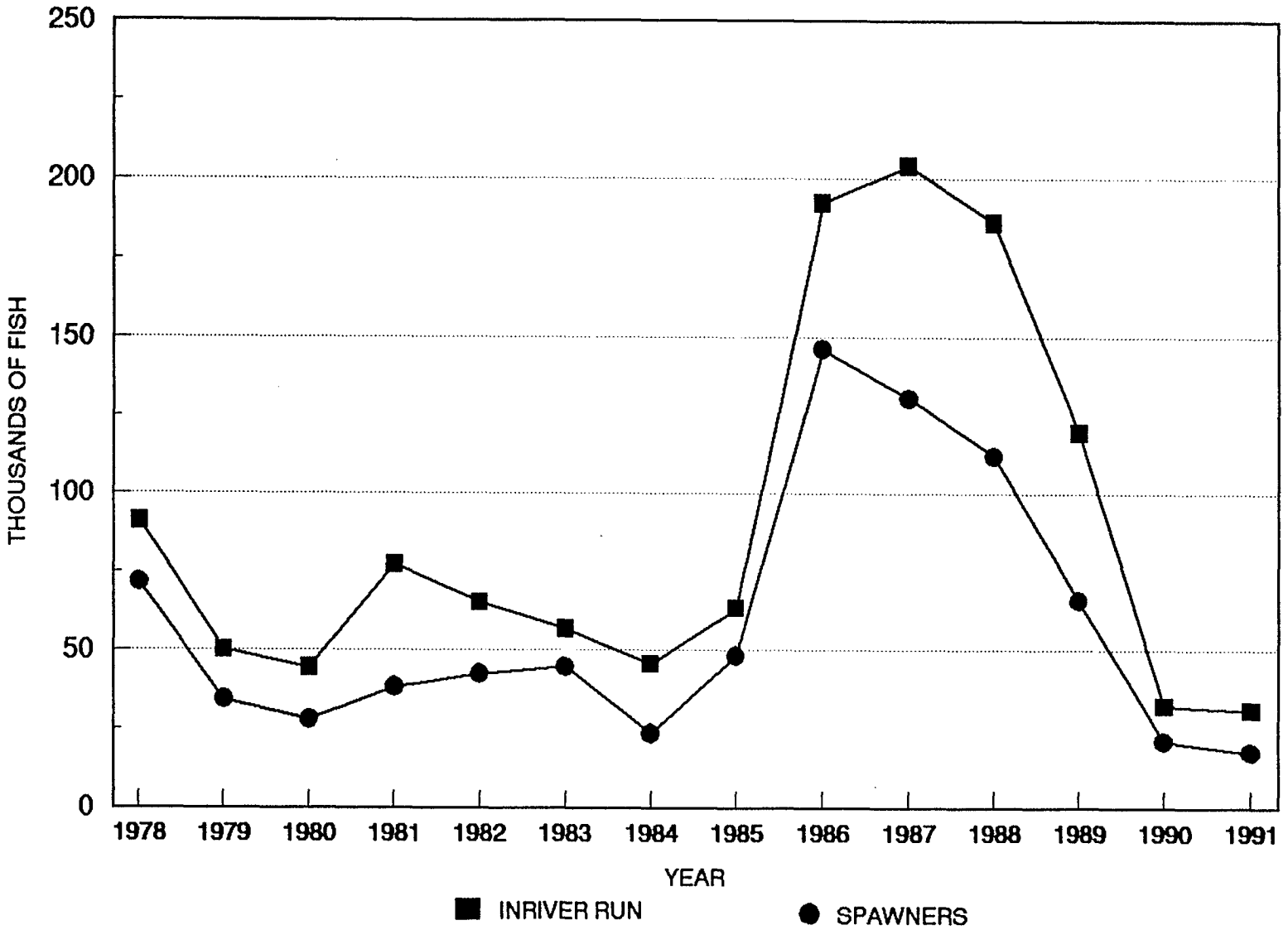

Figure II-2. Klamath River fall-run chinook salmon inriver and spawning escapements, 1978-1991.

NORTHERN CALIFORNIA COASTAL STOCKS

River harvest estimates for streams outside the Klamath River basin are not available. Indices of spawning abundance, or actual spawning escapement estimates, for chinook salmon in California coastal streams outside of the Klamath River basin are limited to one tributary of the Mad River and two tributaries of the Eel River (Appendix B, Table B–7). The preliminary results of the 1991–1992 surveys indicate very few chinook spawned in those areas. No spawning escapement goals are in place for these river systems.

OREGON COASTAL STOCKS

Oregon coastal chinook stocks are commonly categorized into two major subgroups based on ocean migration patterns. Although their ocean harvest distributions somewhat overlap, they have been labeled as either north or south/localized migrating.

North migrating chinook stocks include stocks north of and including the Elk River, with the exception of Umpqua River spring chinook. These stocks contribute primarily to ocean fisheries off British Columbia and southeast Alaska, and to a lesser degree off Washington and Oregon.

South/localized migrating chinook stocks include Rogue River spring and fall chinook, and fall chinook from smaller rivers south of the Elk River. These stocks are important contributors to ocean fisheries off Oregon and northern California. Another central Oregon stock, Umpqua River spring chinook, contributes primarily to ocean fisheries off Oregon and California, and to a lesser degree off Washington, British Columbia and southeastern Alaska.

Inside Harvest

Inside recreational harvest of fall and spring chinook occurs in most Oregon coastal estuaries and rivers. Complete estimates of the 1991 recreational chinook harvest will not be available until the fall of 1992. Estimates of estuary chinook harvests in Tillamook, Yaquina, Siuslaw, Umpqua and Coos bays from July 29 through September 2, occurring after the closure of the ocean salmon season, totaled approximately 1,000 adults. The 1990 recreational harvest estimates of fall and spring chinook, derived from ODFW salmon and steelhead punch card returns, were 39,800 and 15,500 adults, respectively (Table II–3).

Inside commercial chinook harvest is limited to returns to private aquaculture operations. A total of 4,100 chinook adults (Table II–4) returned to Oregon private aquaculture facilities in 1991.

Escapement and Goal Assessment

Oregon coastal chinook are managed for an aggregate spawning escapement of 150,000 to 200,000 naturally spawning adults. Actual escapement is not estimated for this stock aggregate. Achievement of this goal is assessed through spawning escapement indices (e.g., stream surveys, dam counts, etc.). The escapement goal is equivalent to peak spawner index counts of 60 to 90 adults per mile for both subgroups, and include both spring and fall chinook, as stated in the FMP.

TABLE II-3. Oregon coastal adult spring and fall chinook hatchery escapement and freshwater harvest. (Page 1 of 1)

	Hatchery Return		Freshwater Harvest[a/]	
	Chinook		Chinook	
Year	Spring	Fall	Spring	Fall
	THOUSANDS OF FISH			
1976	2.9	0.5	13.5	24.3
1977	2.4	4.2	13.8	35.6
1978	4.4	1.6	13.1	43.4
1979	7.0	2.0	16.4	31.2
1980	7.9	1.8	11.9	22.7
1981	2.5	1.8	11.2	30.0
1982	4.1	2.3	11.6	25.1
1983	3.9	4.0	4.9	21.5
1984	5.6	3.3	4.1	29.0
1985	8.7	3.5	9.0	29.5
1986	30.6	5.8	17.3	36.5
1987	22.8	7.1	20.2	54.8
1988	22.0	6.4	28.9	61.7
1989	32.7	4.3	23.7	53.7
1990	6.3	3.4	15.5	39.8
1991[b/]	5.2	2.6	NA	NA

a/ Freshwater harvests are derived from punch card returns and represent fish larger than 24 inches.
b/ Preliminary.

TABLE II–4. Number of salmon returning to Oregon private hatchery facilities. (Page 1 of 1)

Year	Chinook Adults	Chinook Jacks[a/]	Coho Adults	Coho Jacks[b/]	Chum
		THOUSANDS OF FISH			
1978	0.2	0.03	8.1	3.9	0.5
1979	0.3	0.4	48.5	0.7	0.01
1980	0.8	2.6	39.2	4.2	0.5
1981	2.6	2.5	111.3	6.6	0.5
1982	7.5	4.4	176.9	7.8	1.1
1983	5.1	0.9	138.1	0.8	0.5
1984	3.5	2.7	114.9	0.5	0.8
1985	9.3	25.4	313.2	18.8	3.2
1986	62.6	8.2	445.1	8.6	0.8
1987	36.8	1.9	119.0	1.5	0.3
1988	20.9	3.4	115.7	3.6	1.0
1989	13.7	0.7	45.4	1.5	0.5
1990	6.6	1.2	35.6	0.0	0.3
1991[c/]	4.1	0.0	35.1	0.0	NA

a/ Number of chinook jacks include adults less than 24 inches in length.
b/ Biological coho jacks only (separated from small adults by scale analysis).
c/ Preliminary.

North Migrating Chinook

An index of spawning adults (peak count per index mile) in nine standard streams is used to measure natural spawning escapement trends for north migrating fall chinook stocks. Data have been collected since about 1950 for most systems. Overall peak chinook adult index spawning counts in 1991 are preliminarily estimated at 150 adults per mile (Appendix B, Table B-11). The north migrating stock component remains healthy as the 150 fish per mile exceeds the goal range of 60 to 90 fish per mile.

South/Localized Migrating Chinook

Standard fall chinook spawning index escapement data for the smaller southern Oregon coastal rivers (south of the Elk River) are available for the Winchuck, Chetco and Pistol rivers (Appendix B, Table B-8). Two trend indicators of Rogue River fall chinook ocean escapements are used: (1) seining studies to determine the average number of fish caught per seine haul in the lower river and (2) carcass counts (Appendix B, Table B-10). In addition, two trend indicators of spring chinook ocean escapements are utilized: (1) Rogue River counts at Gold Ray Dam and (2) Umpqua River counts at Winchester Dam (Appendix B, Table B-9). Stock status based on these indicators peaked generally during the 1986-1988 period, mostly as a result of excellent survival due to favorable ocean environmental conditions. A decrease in ocean and spawning escapement occurred from 1989-1991, with extremely low counts observed in 1990. Spring chinook escapement remained extremely poor in 1991, but escapement of fall chinook improved somewhat, probably a result of reduced chinook harvest rates during the 1991 ocean fisheries. Overall, the south/localized migrating component remained depressed in 1991.

The aggregate Oregon coastal chinook natural spawning goal of 150,000 to 200,000 adults probably was met in 1991, although the south/localized migrating component remained depressed. The status of the north migrating component remains healthy.

A preliminary estimate of total fall and spring chinook returns to Oregon coastal hatcheries in 1991 is 2,600 and 5,200 adults, respectively. Spring chinook hatchery egg-take goals were not met for the Umpqua River. Fall chinook hatchery egg-take goals were not met for the Alsea, Elk and Chetco rivers.

COLUMBIA RIVER STOCKS

Columbia River Fall Chinook

Inside Harvest

Columbia River fisheries which harvest significant numbers of fall chinook include the treaty Indian gillnet fishery operating in the area between Bonneville and McNary dams, the non-Indian gillnet fishery operating in the area below Bonneville Dam, and the recreational fishery which harvests fall chinook throughout the main stem from the river mouth (Buoy 10) to Priest Rapids Dam. Inside fishery harvest, escapement and run size data for Columbia River fall chinook stocks are presented in Appendix B, Tables B-15 through B-19.

Historically, four stocks have contributed significantly to the Columbia River fall chinook fisheries. These include two lower river stocks, LRH tules and LRW chinook, and two upper river stocks, SCH

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tules and URB chinook. In recent years, large numbers of hatchery upriver bright fall chinook have been released in the mid-Columbia River area (Bonneville to McNary dams). These fish have been termed MCB. Adult inriver returns from MCB production have increased from a 1982-1986 average of 11,700 to returns of 56,900 in 1987, 77,700 in 1988, 93,100 in 1989 and 58,500 in 1990. Preliminary estimates of river mouth run size for the five stocks have been made based upon preliminary CWT readings, skin color categorization of brights and tules at Bonneville Dam and in the fisheries, and preliminary estimates of hatchery returns. Preliminary estimates of the 1991 Columbia River fall chinook river mouth adult returns by stock are LRH - 71,600, LRW - 15,500, SCH - 46,800, URB - 108,000 and MCB - 32,000. Preliminary catch estimates for the major commercial and recreational fall chinook fisheries are based upon fishery sampling and fish ticket summaries. The lower river non-Indian gillnet fishery harvested 43,800 adult chinook, and the treaty Indian gillnet fishery harvested 51,700 adult chinook. The Chinook/Hammond and Buoy 10 recreational fisheries caught 11,600 adult chinook, while the main stem recreational fishery above the Astoria/Megler Bridge harvested 7,100 adult chinook (3,100 adult chinook above McNary Dam).

Inriver fisheries, both above and below Bonneville Dam, were restricted in an attempt to meet the 1991 adult URB escapement goal of 45,000 chinook at McNary Dam, as well as to provide protection for Snake River wild fall chinook which are a component of URB. No stock specific inriver harvest information is currently available for wild Snake River fall chinook; however, the 1991 inriver harvest rate for the overall URB is preliminarily estimated at 47 percent compared to 57 percent in 1990 and a 1985-1989 average of 59 percent (from Appendix B, Table B-16). It is believed that the Snake River fall chinook harvest rate is less than the overall URB harvest rate because there are harvest impacts on URBs beyond where the Snake River fall chinook impacts occur, such as in the Hanford Reach and the Deschutes River.

Escapement and Goal Assessment

The escapement to Spring Creek Hatchery of 12,500 adults included 700 adults trapped at the Bonneville Dam north shore fish ladder and 11,800 adults returning to the hatchery. The combined total achieved the hatchery escapement production goal of 8,200 adults for the first time since 1984.

Total ocean escapement of LRH was 71,600 adults compared to 59,900 adults in 1990. Because of the predicted poor return of this stock in 1991, the State of Oregon, with support from local recreational groups, commercial interests and other agencies, again conducted a brood stock collection program in Plympton Creek, a tributary to the lower Columbia River near Big Creek Hatchery. In addition, main stem lower Columbia River commercial fisheries were severely restricted in 1991, as in 1990, in an attempt to achieve LRH brood stock collection goals. Oregon facilities were able to achieve their brood stock needs for LRH with assistance from the Plympton Creek trapping operation. Washington facilities, however, experienced a shortfall in their collection of LRH, but this shortfall was nearly alleviated by a transfer of over 5.4 million surplus SCH tule eggs to Washington tule hatchery facilities below Bonneville Dam.

Total ocean escapement of LRW was 15,500 adults, compared to a 1990 return of 20,300 adults and the 1979-1982 average run size of 27,400 adults.

Total inriver run size of the URB stock in 1991 was 108,000 adults, down from the return of 152,200 adults in 1990, but 39 percent greater than the 1979-1982 average of 77,900 adults. The escapement of URB adults measured at McNary Dam was 46,700 adults compared to the FMP goal

of 40,000 adults over the dam. (The escapement goal for inriver management was increased by 5,000 chinook to 45,000 adults for 1990 and 1991 by agreement of the CRFMP parties to account for increased brood stock hatchery needs.) A recreational fishery operating above McNary Dam harvested 3,100 adults.

Total ocean escapement of MCB was 32,000 adults compared to 58,500 adults in 1990 and a 1982–1986 average of 11,700 adults.

The preseason expectation for ocean escapement of Columbia River fall chinook stocks, under Council-adopted seasons and harvest quotas and planned inside fishery impacts, was sufficient to meet the Council's management goals for natural stocks (URB and LRW) and hatchery stocks (LRH, SCH and MCB). Ocean escapements for bright fall chinook stocks (URB, LRW and MCB combined) slightly exceeded their preseason expectations, while tule returns (SCH and LRH combined) were slightly below preseason expectations. However, in spite of tule returns slightly lower than expected, escapement goals for the two hatchery stocks (LRH and SCH) were almost fully achieved due to the supplemental brood stock capture program and transfer of surplus SCH tule eggs to lower river tule facilities.

No specific escapement goal has been developed for Snake River fall chinook or its wild component. Since nearly all spawning of the wild Snake River stock occurs upstream from Lower Granite Dam, establishing a spawning escapement goal at Lower Granite Dam would be an appropriate accounting location. Historical estimates of the number of adult wild Snake River fall chinook counted at Lower Granite Dam are provided in Appendix B, Table B-16. The preliminary 1991 adult wild Snake River fall chinook estimate at Lower Granite Dam is 318 fish compared to 78 in 1990 and a 1985–1989 average of 360 fish.

Upper Columbia River Spring and Summer Chinook

Inside Harvest

The inriver run size of adult spring chinook destined for areas above Bonneville Dam in 1991 was 59,800 fish (Appendix B, Table B-12), 40 percent below the 1990 return of 99,400 fish. Incidental catches of adult upriver spring chinook in 1991 were limited to the non-target winter season (January through March) and amounted to 900 fish in the lower river commercial and 1,500 fish in the lower river recreational fisheries. The 1991 lower river main stem recreational season was closed by emergency action on March 25 due to inseason estimates of upriver stock impacts per the CRFMP harvest guidelines. The 1991 treaty Indian ceremonial and subsistence catch of this stock is estimated at 4,000 fish. Using run reconstruction methodology, the Columbia River Technical Advisory Committee estimated that these 1991 inriver fisheries caught 786 wild Snake River adult spring chinook compared to 1,106 adults in 1990 and a 1985–1989 average of 1,171 adults.

The inriver run size of adult summer chinook destined for areas above Bonneville Dam was 18,900 fish (Appendix B, Table B-14). Major fisheries for summer chinook in the Columbia River have been eliminated in recent years due to the chronically depressed status of this stock. No treaty Indian commercial seasons targeted on sockeye have occurred since 1988. Thus, there was no incidental commercial summer chinook harvest impact associated with sockeye fisheries as occurred in 1985–1988.

Escapement and Goal Assessment

The escapement above Bonneville Dam of 53,300 upriver spring chinook adults is 39 percent below the 1990 escapement of 87,300 adults and 54 percent below the 1991 interim goal of 115,000 adults. Under the court-ordered CRFMP, an interim escapement goal of 115,000 adult upriver spring chinook was adopted in October 1988. This interim goal is within the 100,000 to 120,000 original adult escapement goal range at Bonneville Dam, which was developed when the composition of the run was approximately 70 percent natural and 30 percent hatchery. In recent years, the natural component has comprised only about 23 to 45 percent of the run. The natural component of the upriver spring chinook run continues to be very depressed.

Snake River escapement of adult spring chinook at Lower Granite Dam in 1991 was 6,600 fish, the third lowest count since 1975 when Lower Granite Dam was completed. Using run reconstruction methodology, the Columbia River Technical Advisory Committee estimated that the 1991 wild adult spring chinook escapement at Lower Granite Dam was 2,706 fish compared to the CRFMP interim management goal of 25,000 wild/natural adult spring chinook.

Escapement of upper Columbia River summer chinook, measured as the count of adult fish passing Bonneville Dam minus any main stem treaty commercial and ceremonial/subsistence harvest above Bonneville Dam, was 18,800 adults, 25 percent below the 1990 escapement, and far below the goal of 80,000 to 90,000 adults.

The upper Columbia River natural spawning stocks of spring and summer chinook continue to be very depressed, having ocean escapements significantly below their respective spawning escapement goals. The Council's ocean FMP objective for these far-northerly migrating stocks is essentially not to increase the rate of harvest within the Council jurisdiction. This goal was probably achieved in 1991 based upon the restrictive chinook quotas established to protect these stocks along with the tule fall chinook stocks, and the fact that actual catches were well below the chinook quotas due to closures for coho quota attainment.

Lower Columbia River Spring Chinook

Inside Harvest

The 1991 minimum inriver run size of lower river adult spring chinook was 131,700 fish, 12 percent below the 1990 return of 150,200 fish, but 33 percent above the 1982-1986 average return of 99,200 chinook (Appendix B, Table B-13). Lower river commercial fisheries in the winter season are primarily designed to harvest surplus abundance of the earlier returning segments of runs destined for areas below Bonneville Dam and to provide protection for depressed upper river runs. Winter season commercial landings were 12,600 fish, of which 11,700 chinook were estimated to be of lower river origin. The winter season lower river recreational fishery landed 5,600 fish, of which 4,100 chinook were of lower river stock origin. No commercial or recreational fisheries were authorized during April through May to protect depressed upriver runs.

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Escapement and Goal Assessment

Returns to the Willamette River in 1991 totaled 90,900 adult spring chinook. The Willamette Falls escapement of 48,700 adult spring chinook exceeded the 1991 escapement goal for the stock of 45,000.

WASHINGTON COASTAL STOCKS

Willapa Bay Chinook

Inside Harvest

Run size, harvest and escapement data for Willapa Bay chinook are presented in Appendix B, Table B-22.

A non-Indian gillnet fishery directed at non-local chinook stocks was conducted from July 5 to August 15. This fishery catches primarily Columbia River tule stocks in a mixture similar to adjacent ocean area catches. The 1991 fishery had an allowance of 3,000 fish for Grays Harbor and Willapa Bay combined. The harvest from this fishery was 1,900 chinook, with 200 fish taken in Grays Harbor and 1,700 fish in Willapa Bay. The Willapa Bay catch was a reduction of 11 percent from the 1,900 chinook caught in 1990.

An expected good return of fall chinook of local origin provided for limited directed chinook non-Indian gillnet fisheries in late August. Most of the available local chinook harvest was used, however, to maximize coho catches in mixed stock fisheries beginning in mid-September. Non-Indian gillnet fisheries for 1991 totaled 25,600 chinook, 35 percent greater than the 18,900 fish caught in 1990. Recreational catch estimates are not yet available, but catches are expected to be above recent year levels. This is the result of increased inriver catches and increased effort and catch in the Cape Shoalwater marine fishery.

Escapement and Goal Assessment

Willapa Bay chinook are managed for hatchery stocks, the predominant component of the run. Chinook returns to Willapa Bay hatcheries totaled 11,500 fish with an escapement goal of 8,500 fish. Egg-takes above station goals are used for inbasin cooperative programs.

Natural spawning escapements are not yet available. Because of persistent low flows, distribution of spawners into tributaries and upper main stem areas was limited. There is no wild escapement goal.

Grays Harbor Chinook

Inside Harvest

Run size, harvest and escapement data for Grays Harbor chinook are presented in Appendix B, Table B-24.

Run expectations were allowed for a small directed harvest of Chehalis River spring chinook in 1991. The Chehalis tribal gillnet fishery harvested 200 fish. A small number of spring chinook (estimated at less than 25 fish) were also taken in a non-Indian recreational fishery. A summer non-Indian gillnet fishery directed at non-local origin chinook harvested 200 fish.

Expectations of a strong return of local fall chinook again allowed for directed treaty Indian, non-Indian and Chehalis tribal gillnet fisheries. Most chinook were used, however, to maximize coho catches in mixed stock fisheries. A total of 14,500 chinook were taken in net fisheries in 1991. This included 8,000 in the Quinault treaty fishery, 5,900 in the non-Indian fishery and 600 in the Chehalis tribal fishery. This is a reduction of 28 percent from the 1990 total gillnet catch of 20,200 chinook. Recreational catch estimates are not yet available, but catches are expected to be above recent year catch levels due to increased opportunities and returns in 1991.

Escapement and Goal Assessment

Chehalis River spring chinook are of natural origin. The estimated spring chinook escapement was 1,200 fish with a goal of 1,400 fish.

Fall chinook spawning escapement estimates are not yet available, but the goal of 14,600 adults appears to have been met. However, the distribution of spawners into some systems and out of main stem areas appears to have been poor because of persistent low stream flows. There is no management goal for hatchery production.

Quinault River Chinook

Inside Harvest

Historical terminal gillnet harvest data for Quinault River chinook stocks are presented in Appendix B, Table B-26.

A run of naturally spawning spring/summer chinook entered the river from April through July, followed by hatchery and natural fall chinook. The spring/summer chinook run is typically small. The treaty Indian gillnet catch of spring/summer stock was approximately 100 fish, taken incidentally during fisheries directed at sockeye and steelhead. This catch was about 42 percent below the 1990 catch.

The 1991 harvest of Quinault River fall chinook was taken while the treaty Indian fishery targeted on hatchery salmon production during August through mid-November. The treaty Indian net catch of 6,300 fish was about 20 percent above the 1990 catch.

Escapement and Goal Assessment

Hatchery and natural escapement estimates are not yet available for 1991. Sufficient information is not yet available to permit assessment of escapements for Quinault River chinook stocks.

Queets River Chinook

Inside Harvest

Historical terminal run size, catch and escapement data for Queets River spring/summer and fall chinook are presented in Appendix B, Tables B-28 and B-29, respectively.

The treaty Indian gillnet fishery harvested 120 spring/summer chinook in an intermittent fishery operating a maximum of 2 days per week. This fishery utilized small mesh gear to increase the catch of summer steelhead while harvesting the available spring/summer chinook. The inseason run size estimate indicated an inriver return of 950 fish. The inriver recreational fishery was expected to harvest approximately 50 fish from this stock.

Fall chinook were harvested in conjunction with fall coho beginning September 1, utilizing a fishing pattern set forth in a preseason management agreement between the Quinault Nation and WDF. The inriver natural run was estimated inseason to be 5,100 fish. The treaty Indian gillnet fishery harvested 1,500 fall chinook and the inriver recreational fishery was expected to harvest 200 fish from this stock. The management agreement was intended to minimize impacts on coho, given the run size anticipated under the preseason forecasts and the Council's adopted regulations. The fishing plan under the agreement, coupled with intermediate freshet fishing opportunities, constrained the catch of fall chinook to 65 percent of the number of chinook that were available for harvest under the normal management approach established for this stock.

Escapement and Goal Assessment

Analysis of 1991 spawning escapement data has not yet been completed for Queets River chinook stocks. Preliminary data indicate that 1991 spawning escapement for the Queets River spring/summer chinook stock was 650 fish, slightly below the floor level of 700 fish.

Inseason run size and catch estimates suggest that spawning escapements for Queets River fall chinook should exceed 3,600 adults, above the minimum of 2,500 adults established for this stock.

Hoh River Chinook

Inside Harvest

Historical terminal run size, catch and escapement data for Hoh River spring/summer and fall chinook are presented in Appendix B, Tables B-31 and B-32, respectively.

The tribal spring/summer chinook fishery on the Hoh River targeted spring/summer chinook at a rate of 22 percent based on evaluation of the catch and effort over an 8-week period with fishing scheduled at 1 day per week from May through July. The terminal run size estimate of 2,900 fish appears to have been approximately 50 percent below the 1990 return, and well below the 1986-1990 average of 4,200 fish. The treaty Indian gillnet catch for the season was 600 spring/summer chinook, well below the 1986-1990 average of 1,100. The inriver recreational fishery was expected to harvest approximately 300 adults of this stock.

The tribal fall fishery on the Hoh River had been planned to harvest fall chinook at a rate of 31 percent. A schedule of two and three days per week through September, prior to significant wild coho entry, was planned to achieve the targeted catch rate. The fishery in October was set at one day per week, then returned to two days during the week of October 23. Inseason data through that week indicated a fall chinook terminal run size of 3,500 fish. The fishery was curtailed to avoid coho with a 20 hour, chinook directed, large mesh fishery conducted in the first week of November. The tribal gillnet fishery caught 1,100 fall chinook, well below the 1986–1990 average of 2,000. The inriver recreational fishery was expected to harvest 100 fish of this stock.

Escapement and Goal Assessment

The preliminary estimate of natural spawning escapement of spring/summer chinook in the Hoh River is 2,000 fish, about 49 percent below the level achieved in 1990. Final terminal run size and spawning escapement estimates for Hoh River spring/summer chinook are expected to be lower than indicated inseason. The preliminary estimate of fall chinook natural escapement is 2,300 adults, 49 percent below the level achieved in 1990. Final terminal run size and spawning escapement estimates for Hoh River fall chinook are expected to be higher than indicated inseason. Minimum spawning escapement goals for Hoh River chinook spring/summer and fall stocks were achieved.

Quillayute River Chinook

Inside Harvest

Historical terminal run size, catch and escapement data for Quillayute River spring/summer and fall chinook are presented in Appendix B, Tables B–34 and B–35, respectively.

The preseason terminal run size estimate for hatchery spring chinook predicted 2,700 fish. The preliminary postseason terminal run size estimate for this stock is 2,100. The treaty Indian gillnet spring chinook catch for the season was 1,000 fish, taken during a May through June fishery. The inriver recreational fishery was expected to harvest 250 fish from this stock.

The natural run size of summer chinook was evaluated during the treaty Indian net fishery in July. The inseason estimate predicted a terminal run size of 1,750 fish. Total gillnet catch for the season was 300 natural summer chinook, and the recreational fishery was expected to catch 50 fish from this stock. The postseason estimate for the summer chinook terminal run size is 1,500 fish.

The inriver fishery for fall chinook was established by preseason agreement. The preseason run size estimate was 18,000 fish. The run size of fall chinook in the Quillayute River was updated in September using the treaty Indian gillnet fishery harvest rate as a predictor. The update estimated a terminal run size of 7,500 fish, which was 10,500 fish lower than the preseason estimate. The fishery proceeded according to the preseason agreement until mid–October. One freshet fishery was conducted in the first week of November. Total catch for the treaty Indian gillnet fishery was 1,000 fish. The inriver recreational fishery was expected to harvest 300 fish.

Escapement and Goal Assessment

Hatchery escapement for spring chinook was 800 fish. Natural spawning of summer chinook was estimated at 1,200 fish, including hatchery strays. The preliminary estimate of fall chinook natural

spawning escapement in the Quillayute River system was 6,300 fish. Minimum spawning escapement goals for all natural and hatchery Quillayute River chinook stocks were achieved.

PUGET SOUND STOCKS

Puget Sound Chinook

Inside Harvest

Commercial inside fishery harvest of Puget Sound chinook is managed on the basis of six regional stock management units: Strait of Juan de Fuca, Nooksack–Samish, Skagit, Stillaguamish–Snohomish, South Puget Sound and Hood Canal. Harvest of chinook for each management unit is regulated according to the natural spawning escapement or hatchery program escapement goal for that unit. Commercial net and troll harvest (treaty Indian and non–Indian) for all chinook stocks combined is presented in Appendix B, Table B–37. These catches include some fish of non–Puget Sound origin. The total commercial harvest of Puget Sound chinook in 1991 was 142,200 fish, a 43 percent reduction from the 249,400 chinook caught in 1990. This reduction reflects the generally poorer status of chinook stocks in 1991 relative to 1990. The non–Indian net catch was 21,800 chinook, a 58 percent reduction from the 52,400 fish caught in 1990. The treaty Indian net and troll harvest was 120,400 chinook, a 39 percent reduction from the 196,900 fish caught in 1990. The treaty Indian troll catch in the Strait of Juan de Fuca (Washington Areas 5 and 6C) was 29,000 chinook, a 25 percent reduction from the 38,400 fish caught in 1990. No non–Indian trolling was conducted in Puget Sound in 1991.

Recreational chinook harvest data for Puget Sound for the period of 1989–1991 are unavailable at this time, pending review of recent data in the WDF/Tribal Sport Emphasis Study. Historic chinook recreational catches for years from 1976–1988 are presented in Appendix B, Table B–38.

Escapement and Goal Assessment

Estimates of 1991 natural spawning escapements are unavailable at this time. Historic hatchery and natural run component escapements and net catches for each Puget Sound region of origin are presented in Appendix B, Table B–39.

Puget Sound spring chinook hatchery egg–take goals were generally met, with the exceptions of the Nooksack and Hupp Springs facilities. Puget Sound summer/fall chinook were in generally poor shape in 1991, with most of the runs coming in below preseason forecasts. Numerous Puget Sound hatchery facilities did not meet their egg–take goals for fall chinook in 1991, including the following: Nooksack, Skagit, Skykomish, Issaquah, Green River, Puyallup, Deschutes, McAllister, Glenwood Springs, and the Nisqually, Lummi and Suquamish tribal facilities.

COASTWIDE GOAL ASSESSMENT SUMMARY

A summary of 1991 performance for chinook salmon by river system and stock in relation to escapement goals is presented in Table II–5.

TABLE II-5. Preliminary summary of 1991 performance for chinook salmon by river system and stock in relation to escapement goals. (Page 1 of 1)

System and Stock	1991 Escapement Goal	Escapement Goal Assessment
1. Sacramento River Fall Chinook	122,000–180,000 natural and hatchery adults.	Escapement of 109,500 adults was below goal range.
2. Klamath River Fall Chinook	Inriver run size target for 1991 was 60,300.	Inriver escapement of 30,900 adults was 51 percent of the goal.
3. Oregon Coastal Chinook	Escapement of 150,000–200,000 naturally spawning adults.	Probably met the goal range.
4. Columbia River		
Upper River Fall Chinook (Brights)	Escapement of 40,000 adults above McNary Dam, plus meet treaty Indian obligations.	McNary Dam escapement was 46,700 or 117 percent of the FMP goal.
Upper River Spring Chinook	Escapement of 115,000 adults above Bonneville Dam plus meet treaty Indian obligations. Escapement of 35,000 minimum to Snake River.	Bonneville Dam escapement was 53,300, 46 percent of the goal. Snake River escapement was 6,600 or 19 percent of goal. However, the Bonneville Dam goal was developed when the natural component comprised about 70 percent of the run. In recent years, the natural component has averaged only 23 to 45 percent of the return so naturally produced upriver spring chinook are still very depressed.
Upper River Summer Chinook	Escapement of 80,000–90,000 adults above Bonneville Dam (not attainable) plus meet treaty Indian obligations.	Bonneville Dam escapement was 18,800, 24 percent of the lower end of the range.
Lower River Spring Chinook (Willamette)	Escapement of 30,000–45,000.	Escapement of 48,700 exceeded the escapement goal range.
5. Washington Coastal Fall Chinook	Meet natural spawning escapement objectives and treaty Indian obligations.	Hatchery egg-take goals were achieved. Escapement objectives for Queets, Hoh and Quillayute rivers met. Escapement estimates for Grays Harbor is not yet available. Data necessary for allocation determinations not yet available.
6. Washington North Coastal Spring/Summer Chinook	Meet natural spawning escapement objectives and treaty Indian obligations.	Escapement objectives for north coastal stocks were met with the possible exception of Queets River. Data necessary for allocation determinations not yet available.
7. Puget Sound Chinook	Minor part of Washington ocean harvest and the Council's ocean management not directed toward these stocks.	Natural chinook stock escapement estimates not available. Summer/fall chinook egg-take goals generally not met. For details see Chapter II text.

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