

**PACIFIC SALMON COMMISSION  
CHINOOK TECHNICAL REPORT ON  
PRELIMINARY 1991 CATCH AND  
ESCAPEMENT**

**REPORT TCCHINOOK (92)-2**

**February 13, 1992**

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## 1.0 1991 CHINOOK SALMON CATCHES IN FISHERIES WITH CEILINGS

Estimates of 1991 catch for each fishery managed under a harvest ceiling established by the Pacific Salmon Commission (PSC) are presented below. These data are preliminary, but major changes are not expected. Catches in all chinook fisheries of interest to the PSC are documented in Table 1.

(numbers x 1,000) Compiled with information available as of February 3, 1992.

Area/Fisheries a/	Ceiling	Catch	Difference	
			Numbers	Percent
S.E. Alaska (T,N,S) b/	273	299.3	+26.3	+9.6%
North/Central B.C. (T,N,S) c/	273	301.4	+28.4	+10.4%
West Coast Vancouver Island (T)	360	195.7	-164.3	-45.6%
Strait of Georgia (T,S)	275	144.3	-130.7	-47.5%

a/ T=Troll; N=Net; S=Sport

b/ The actual total catch was 364,900 chinook, including a hatchery add-on of 65,500.

c/ Excludes 6,057 chinook caught in terminal areas in 1991, which Canada proposes to exclude from the ceiling.

## 2.0 CUMULATIVE DEVIATIONS FROM CATCH CEILINGS

A 7.5% cumulative management range was established by the PSC in 1987. Annual catches (without add-on) and deviations from catch ceilings since 1987 are as follows:

(numbers x 1,000) Compiled with information available as of February 3, 1992.

Area/Fisheries	Ceiling	Catch					Total Deviation	Cumulative Deviation	
		1987	1988	1989	1990	1991		Numbers	Percent
S.E. Alaska (T,N,S) a/	263 b/	265.2	255.2	264.4	318.5	299.3	+38.6	+38.6	+14.7% c/
North/Central B.C. (T,N,S) d/	263 b/	283.0	245.6	303.0	254.0	301.4	+23.0	+23.0	+8.7% c/
West Coast Vancouver Island (T)	360	378.9	408.7	203.7	295.5	195.7	-318.0	-27.0	-7.5% e/
St. of Georgia (T,S)	275	159.0	138.7	162.0	144.3	147.5	-623.5	-20.6	-7.5% e/

a/ S.E. Alaska catches exclude hatchery add-ons of 16,700, 23,700, 26,700, 48,300, and 65,500 for 1987, 1988, 1989, 1990, and 1991 respectively.

b/ The 1990 ceiling was 302,000, and the 1991 ceiling was 273,000.

c/ These overages exceed the 7.5% management range.

d/ Catches exclude 4,819, 5,549, and 6,057 chinook caught in terminal areas in 1989, 1990, and 1991, respectively, for a total of 16,425.

e/ Negative deviations below the 7.5% management range can not be accumulated.

### **3.0 REVIEW OF FISHERIES WITH CATCH CEILINGS**

#### **3.1 S.E. Alaska Fisheries**

In 1991, S.E. Alaska fisheries were managed under the following provisions established by the Pacific Salmon Commission:

- (1) an all gear base catch ceiling of 263,000 plus 10,000 chinook salmon;
- (2) an Alaska hatchery add-on calculated on the basis of coded wire tag sampling;
- (3) a 7.5% management range, calculated in numbers of fish, for cumulative deviations from the base catch ceiling since 1987; this is equivalent to +/- 19,700 chinook salmon for a 263,000 base catch ceiling; and
- (4) a limit of 40,000 chinook, excluding Alaska hatchery add-on, to be taken in June fisheries.

Preliminary data for 1991 indicate the following:

- (1) The total all gear catch (commercial and recreational) was 364,900 chinook salmon, including a hatchery add-on of 65,500.
- (2) The preliminary estimate of the 1991 Alaska hatchery add-on, calculated on the basis of coded-wire-tag recoveries, was 65,500. The add-on was calculated as the estimated total Alaska hatchery harvest of 79,500 reduced by 5,000 for pre-Treaty hatchery harvest and by 9,000 (preliminary) for the risk adjustment.
- (3) The deviation of the 1991 S.E. Alaska chinook salmon catch from the catch ceiling was +26,300. The total cumulative deviation is +38,600 (+14.7% of the catch ceiling). This overage exceeds the 7.5% management range.

Troll Fisheries: The 1991 total troll harvest of chinook salmon was 263,700 of which 38,200 were of Alaskan hatchery origin.

The winter troll fishery was open from October 1, 1990 to April 14, 1991; 42,400 chinook salmon were harvested. A total of 10,100 (23.8%) of these chinook were produced by Alaskan hatcheries. The winter troll fishery takes place entirely within the surfline. Both effort and catch have been low, often due to poor weather and the short number of hours available each day for trolling. The catch has averaged less than 15% of the total annual troll harvest.

During June, experimental, hatchery access, and terminal troll fisheries were conducted. The experimental fisheries are designed to increase the harvest of chinook salmon

produced in Alaskan hatcheries by allowing trolling for 2 to 3 days per week in small areas in the migratory path close to the hatchery. The hatchery access fishery was designed to increase the harvest of Alaskan hatchery chinook salmon while providing general access to wild S.E. Alaska stocks. Terminal fisheries occurred directly in front of hatcheries or remote release sites.

The June fisheries were managed in-season to maximize the catch of Alaskan hatchery chinook and to comply with a limit of 40,000 non-Alaskan hatchery chinook.

Eight different areas were open 9 days each for the experimental fishery. A total of 13,900 chinook salmon were harvested of which 6,600 (47.5%) were produced in Alaskan hatcheries. This was the largest catch since the inception of the fishery in 1986.

The first hatchery access opening in 1991 occurred from June 5 through 7. However, those waters just east of the surfline (in Districts 103 and 113) were open only 2 days. A total of 22,500 chinook salmon were caught during this period, of which 6,000 (26.7%) were from Alaskan hatcheries. The second opening was scheduled for just 1.5 days in all waters. During this period, a total of 23,900 fish were harvested, of which only 3,100 (13.0%) were from Alaskan hatcheries.

A total of 6,000 chinook salmon were harvested in terminal areas. All of these fish are assumed to be of Alaskan hatchery origin.

The total June catch was 66,300 of which 21,700 (32.7%) were from Alaskan hatcheries. A total of 44,600 chinook salmon harvested in June were not of Alaskan hatchery origin. This was 4,600 chinook over the 40,000 limit stipulated in the Treaty.

The general summer troll season began on July 1 and continued through noon on July 8 (7.5 days). A total of 154,000 chinook salmon were harvested, of which 6,400 (4.2%) were from Alaskan hatcheries. Following the closure of the chinook salmon harvest, areas of high chinook salmon abundance were closed. There was also a 10 day closure of all trolling in mid-August. Trolling for all species closed on September 20. There were a total of 64.5 days of chinook non-retention.

An additional 1,000 chinook were taken in the Annette Island troll fishery, throughout the October 1 through September 30 catch accounting period.

Net Fisheries: Net fisheries had a guideline harvest of 20,000 chinook salmon plus Alaska hatchery add-on. Catches of chinook salmon in the net fisheries are incidental to the harvest of other species and constitute only a fraction (< 1%) of the total net harvest. Purse seine and set net fisheries are managed by non-retention periods. Retention in the purse seine fishery occurs during periods of expected high pink salmon abundance. Night closures are used in the drift fill net fishery to slow down the harvest. In 1991, the net fisheries harvested a total of 32,700 chinook salmon of which 10,900

were Alaskan hatchery chinook harvested in terminal fisheries and 3,800 were Alaskan hatchery chinook harvested in non-terminal fisheries.

**Recreational Fisheries:** There is no guideline harvest level established for recreational fisheries. These fisheries are managed under a 2 fish-per-day bag limit and a 28" minimum size limit. An estimate of the final harvest will not be available until mid-1992; however, the preliminary projection is 68,400 chinook salmon, of which 26,700 are estimated to be from Alaskan hatcheries. The recreational harvest has increased tremendously during the last several years with harvests of 26,200, 31,100, and 51,200 in 1988, 1989 and 1990, respectively.

### 3.2 Canadian Fisheries

The minimum size limit for troll fisheries remained at 62 cm fork length in the Strait of Georgia and at 67 cm fork length in all other areas. Catch statistics for commercial fisheries are based on sales slips accumulated through December 31, 1991. These data are preliminary.

**North/Central B.C.:** The 1991 North/Central B.C. fisheries were managed under the following provisions:

- (1) an all gear base catch ceiling of 263,000 plus 10,000 chinook salmon; and
- (2) a 7.5% management range, with cumulative deviations calculated since 1987. Based on preliminary 1990 catch estimates and terminal exclusion calculation procedures, the cumulative deviation at the beginning of the 1991 season was estimated at -5,400.

The preliminary 1991 all-gear catch was 301,400, excluding terminal exclusions of 6,057. These preliminary catch statistics indicate a 1991 catch deviation of +28,400, and a cumulative deviation through 1991 of +23,000 chinook (+8.7% of the catch ceiling). This overage exceeds the 7.5% management range.

Terminal exclusions, as allowed in the Letter of Transmittal, are calculated as follows:

Area	Base	1991 Catch	1991 Exclusion
Skeena	2,900	7,283	4,383
Bella Coola	2,950	4,624	1,674
Kitimat	2,400	2,305	0
Total			6,057

**Troll Fisheries:** The 1991 troll fishery opened for all species on June 28. There was a four day closure from August 7 through August 10, prior to opening for retention of Fraser River bound sockeye. The management objective for the troll fishery in 1991 was a chinook catch ceiling of 203,300. A number of management actions were taken during the troll fishery to meet this objective, including:

- (1) The west coast of Queen Charlotte Islands south of Buck Point and Areas 107-2, 107-3, 108-111 and 11 were closed to all trolling August 20-24.
- (2) On August 27 all of Area 2W, Area 142, and the area known as the "Red Line" in Area 1 were closed to trolling to slow the chinook catch rate.
- (3) On September 3, the entire North Coast (Areas 1-11, 30) was closed to possession and retention of chinook.
- (4) Also, on September 3 a large portion of Hecate Strait was closed to prevent chinook shaking problems.

Trolling for all species closed on September 30, for a total of 27 days of chinook non-retention. The preliminary catch of chinook in North/Central B.C. troll fisheries was 219,967 (data to Dec. 1, 1991).

**Net Fisheries:** Catch of chinook in North/Central areas was 54,750. Catches by fishery were 6,430 in the Queen Charlotte Islands, 31,870 for the Skeena/Nass and 16,450 in the Central Coast. These catches are the preliminary total catches of chinook >5 lb. including the catch eligible for terminal exclusion.

**Recreational Fisheries:** The tidal water sport fishery catch of chinook was 32,700. Catch by fishery was 15,200 for the Queen Charlotte Islands, 4,300 for the Skeena/Nass and 13,200 for the Central Coast.

#### **West Coast Vancouver Island (WCVI) Troll:**

In light of the below average forecast of chinook abundance to the WCVI troll fishery in 1991, Canada's main objective for the WCVI troll fishery was to manage the fishery in a manner consistent with the intent of the treaty and the rebuilding program. In addition, due to Canada's concern for the Harrison River chinook stock, the intent was to manage the fishery to maintain the 1985-87 average harvest rate. It was estimated that a fishery of approximately 77 days open for chinook retention would maintain the 1985-87 average harvest rate. The fishery opened on June 28 with all areas open except Areas F1, G and S (same areas as Fig. 1, page 11, TCCHINOOK (91)-3). There were four major area/time closures on the west coast of Vancouver Island in 1991:

- (1) Areas F1 and G closed from June 28 to July 14. This area closure was implemented in order to moderate the coho catch rate early in the fishery. Area F1 opened July 14. Area G opened for the duration of the sockeye fishery only (August 11 through August 20).
- (2) Complete closure to all trolling from August 7 through August 10 (4 days) prior to the sockeye fishery.
- (3) Complete closure to all trolling from August 21 through August 23 (3 days) following the sockeye fishery.
- (4) Areas F1, G and the waters easterly of Loran-C line 5990-Z-14740 closed August 24. This action was taken initially to slow coho catch rate. Following closure for coho retention on September 6, the area closure was maintained in order to prevent coho shaking problems.

Trolling closed on September 18, for a total of 76 days open to chinook fishing. There was no chinook non-retention period in 1991. Chinook catch in 1991 for the WCVI troll fishery was 195,700.

#### **Strait of Georgia:**

**Troll:** The management objective was a domestic catch ceiling of 31,000 chinook. The ceiling was reduced to this level in 1988 to achieve a 20% harvest rate reduction, relative to 1987 levels, as part of a conservation plan for lower Strait of Georgia chinook.

The troll fishery opened for chinook retention on June 27 and continued until August 1 without interruption. When an early season troll ceiling of 29,000 was reached, chinook non-retention and non-possession with single barbless hooks was implemented (August 2 through August 9). While the sockeye fishery was open, August 10 through August 19, barbed hooks were allowed, but non-retention and non-possession of chinook was still in effect. On August 20, retention of chinook salmon was again permitted. The objective was to allow for incidental chinook catch during the remainder of the 1991 season. The chinook catch rate proceeded at a faster rate than anticipated and the ceiling of 31,000 was obtained September 12. Beginning September 13 and continuing until the season closed September 30, chinook non-possession and non-retention was in effect. There were a total of 36 chinook non-retention days. Chinook catch by trollers was 32,000.

**Recreational:** The 1991 management objective for the Strait of Georgia recreational fishery was to maintain a 20% harvest rate reduction, relative to 1987 levels, on lower Strait of Georgia chinook. Consequently, the management plan implemented in 1989 was continued in 1991. This plan consists of the following management actions:

- (1) An annual bag limit of 15 chinook and a size limit of 62 cm was implemented for the area north of Cadboro Point (north of Victoria in Statistical area 19B), including Johnstone Strait. These measures represent an increase in the bag limit (from 8 to 15) for the Strait of Georgia recreational fishery compared to 1988.
- (2) For Johnstone Strait, the daily bag limit was reduced from 4 to 2 chinook, the season limit was reduced from 30 to 15, and the size limit was increased from 45 cm to 62 cm, relative to 1988.

The estimated 1991 catch in the creel survey area (including the Victoria area but excluding Johnstone Strait) was 115,500. Effort in 1991 totalled 466,700 boat trips, which is about 20% less than the 1986-90 average effort level.

An evaluation of the lower Strait of Georgia chinook conservation program is currently in progress.

#### **4.0 REVIEW OF OTHER FISHERIES**

##### **4.1 Canadian Fisheries**

Transboundary Rivers: Chinook catch in the Canadian gillnet fishery was: Taku River, 1,177 chinook adults and 432 jacks, and Stikine River, 850 chinook adults and 400 jacks. The catch of chinook in these rivers is limited to incidental catch during catch of the allowed harvest of sockeye salmon.

##### Southern B.C. Commercial Net:

Area (Stat. Area)	Catch (chinook > 5 lb.)
Johnstone Strait (11-13)	13,000
Strait of Georgia (14-19)	1,200
Fraser River (28,29)	13,100
Juan de Fuca Strait (20)	7,000
Barkley Sound (23)	54,000
Other WCVI (21,22,24-27)	200

The catch of chinook in all of these net fisheries is limited to their incidental catch during fisheries on sockeye, pink, or chum, with the exception of the August/September

gillnet fishery in Alberni Inlet (Area 23). This fishery is a terminal gillnet fishery for returns to the Robertson Creek Hatchery. Small numbers of chinook may also be harvested incidentally during gillnet and seine fisheries on sockeye salmon in Barkley Sound in July. Management of southern B.C. net fisheries has an objective to reduce the base period harvest rate on chinook by 25% (an obligation in the PSC chinook rebuilding program). Further, the Johnstone Strait net fisheries have the added objective of reducing harvest rates since 1987 by an additional 20% as part of the conservation program for chinook stocks in the lower Strait of Georgia.

In all the fisheries, regulations and research programs are attempting to limit the incidental mortality of juvenile chinook and coho. Fishing time, location, and gear are limited in southern B.C. net fisheries to conserve juvenile and adult chinook salmon. In Johnstone and Juan de Fuca Straits, known areas of high chinook vulnerability are closed and minimum depth strata are set to reduce the catch of juvenile chinook and coho. In Juan de Fuca, a maximum number of juvenile chinook and coho salmon per set has been established, beyond which the fishing area is further restricted or even closed. Chinook catch in the Fraser River area is usually limited to gillnet fishing and chinook catch is incidental.

Exploitation rate analyses reported by the Chinook Technical Committee in 1991 (TCCHINOOK (91)-1, Feb. 8, 1991) indicated that southern B.C. net fisheries (i.e., non-ceiling B.C. fisheries) have successfully reduced their aggregate exploitation rate on indicator chinook stocks.

Area 12 Troll: Catch is reported as 1,200 chinook. This fishery is a small localized group of trollers at the southern limit of Queen Charlotte Sound. The fishery is limited to a catch ceiling of 2,000 chinook.

Tidal Recreational: The catch estimate for the 1991 Barkley Sound recreational fishery is 80,200, of which 43,400 were taken in the terminal fishery inside Alberni Canal and 36,800 in Barkley Sound. The survey period covered from July 15 through September 30. The early to mid-summer fishery primarily occurs in outer Barkley Sound and is limited by size limit, catch per day, and possession limits. The Alberni Canal portion occurs primarily in August and is directed on returns to the Robertson Creek hatchery. Catch estimates for sport fisheries in Johnstone Strait are not yet available, although a creel survey was conducted last year. Catch estimates for sport fisheries off WCVI are not available.

Non-tidal Recreational: Non-tidal recreational fisheries occur in most B.C. rivers, including the Alsek, Skeena, Nass, Kitimat, Bella Coola, Somass and Fraser Rivers and various streams on the east coast of Vancouver Island. Most of these fisheries are small, localized fisheries to provide the local public with some access to salmon fishing. Recent fisheries in the upper Fraser have been limited to the larger chinook populations which

have responded well to the chinook rebuilding program. Each localized fishery in the Fraser has an established catch ceiling.

Chinook catch was estimated at 388 in the Alsek, 8,000 in northern B.C. rivers (Areas 1-10), and 1,500 in the Upper Fraser only. Chinook fisheries occurred in 7 areas of the Upper Fraser River (Bowron, Quesnel, Bridge, Clearwater, Shuswap, South Thompson, Thompson). Sport catches also occur in the Vedder-Chilliwack River and Lower Fraser mainstem, but were not assessed in 1991 due to inadequate resources.

Indian Food Fisheries:

Fishing Area	Adult Catches	Jack Catch
North/Central B.C.	23,800	-
Somass River	23,800	-
Fraser River	16,854	-
Stikine	753	310
Alsek	336	-
Cowichan	200	-
Squamish	1,095	-

The 1991 Fraser River catch was equal to the 1980-89 average of 16,700. Catches in the Cowichan and Squamish Rivers were down 23% from the 1,676 reported for 1990 and about equal to the 1989 catch level.

Each of these fisheries involves directed chinook fishing periods and the incidental catch of chinook during fisheries on other species. Small portions of the catch may be taken in marine waters, with the exception of the Stikine and Alsek catches. Catch in these fisheries is mostly limited by fishing time, but allocation to meet Native food fishing requirements is the first priority use of allowable catches.

**4.2 U.S. Fisheries**

Strait of Juan de Fuca: As in previous years, management measures were taken in the Strait of Juan de Fuca and other mixed stock areas to protect depressed spring chinook stocks. No directed spring chinook fisheries were permitted and no commercial fisheries were permitted during the spring chinook management period (April 15-June 15). Recreational fisheries were also restricted by a maximum size limit of 30 inches. Further actions were taken in all mixed stock areas to protect depressed summer/fall stocks from Puget Sound. It was recognized that the combined actions for chinook salmon should

also serve to protect depressed Canadian-origin chinook stocks (primarily Fraser River runs).

Preliminary estimates of 1991 net catch in the Strait of Juan de Fuca total 3,100 chinook, compared to 5,200 in 1990. These fisheries take chinook incidental to harvest of other species. Preliminary estimates of 1991 tribal troll catch in the Straits (Areas 4B, 5, and 6C) total 34,800 chinook compared to 45,700 caught in 1990. This is a chinook directed fishery. Note that tribal troll catch estimates from this area do not include tribal catch in Area 4B during the May 1-September 30 PFMC management period; catches during this period are included in the North of Cape Falcon troll summary.

Recreational catch estimates for 1991 and 1990 in Areas 5 and 6 are not available at this time. In 1991, about 400 chinook were caught in the Area 4B state waters fishery, after the PFMC fishery, compared to 400 in 1990. Preliminary 1989 recreational chinook catch for Areas 5 and 6 is estimated at 52,300, compared to 39,300 in 1988.

San Juan Islands: Preliminary 1991 estimates of chinook net catch in the San Juan Islands total 13,700, compared to 9,300 in 1990. Recreational catch estimates for 1991 and 1990 in Area 7 are not available at this time. Preliminary 1989 recreational chinook catch for Area 7 is estimated at 9,500, compared to 9,400 in 1988.

Puget Sound: The status of Puget Sound spring chinook stocks continued to be poor in 1991. As in past years, recreational and commercial fisheries in Puget Sound were regulated by time and area closures to avoid all direct harvest and minimize incidental harvest of these depressed stocks. Some directed harvest was allowed on a few Puget Sound summer/fall stocks. However, several terminal areas, including Area 8 (located near the mouth of the Stillaguamish and Snohomish Rivers), did not have directed chinook net fisheries in order to protect depressed summer/fall stocks.

Preliminary estimates of 1991 net catch in Puget Sound marine areas total 69,100 chinook, compared to 150,300 in 1990. Preliminary estimates of 1991 catch in Puget Sound freshwater areas total 18,100 chinook, compared to 28,700 in 1990.

Puget Sound recreational catch estimates for 1991 and 1990 are not available at this time. Recreational fisheries were managed in the same general manner as in recent years. Preliminary recreational chinook catch for 1989 in Areas 8-13 is estimated at 66,500, compared to 59,600 in 1988.

Washington Coast: In 1991, terminal runs of northern Washington coastal stocks were above minimum spawning levels, allowing both commercial and recreational directed chinook fisheries in terminal areas. Preliminary 1991 estimates of Grays Harbor and Willapa Bay net catch total 42,300 chinook, compared to 41,600 in 1990. Preliminary 1991 estimates of commercial net fisheries in north coastal rivers total 11,800 chinook, compared to 16,300 in 1990.

A small recreational fishery has historically occurred in the Grays Harbor estuary. In 1991, effort and catch in this fishery increased significantly in response to the large coho run returning to Grays Harbor. This fishery was sampled through September 29, and the estimated catch is approximately 400 chinook. Catch from this fishery is not included in Table 1.

Ocean Fisheries North of Cape Falcon: In 1991, ocean commercial and recreational fisheries operating in the Pacific Fisheries Management Council (PFMC) region north of Cape Falcon were constrained by domestic quotas for both chinook and coho salmon. Chinook quotas were established taking into account the need to protect several severely depressed chinook stocks, particularly Upper Columbia River runs. Separate quotas were established for the tribal troll and non-tribal fisheries.

Under PFMC quota management, ocean fisheries are terminated either when coho or chinook quotas are achieved or when seasons expire. Overall, in 1991, chinook catch success was poor, consistent with 1991 pre-season expectations for low abundance of key stocks. Fisheries closed when coho quotas were reached and chinook quotas were not fully harvested. Preliminary estimates of 1991 tribal troll chinook catch total 21,400, 65% of the 33,000 chinook quota and down from 31,400 in 1990. Preliminary recreational catches are estimated at 13,500 (1,000 Oregon and 12,500 Washington), about 34% of the 40,000 chinook quota and down from 33,100 in 1990. Preliminary estimates of non-tribal troll chinook catch total 29,700 (900 Oregon and 28,800 Washington), about 74% of the 40,000 chinook quota and down from 33,100 in 1990. Approximately 27,300 of these non-tribal troll caught chinook were taken during the early season chinook fishery (May 1 through June 15, 1991).

In 1991, there was no experimental fishery conducted in the inside ocean waters north of Destruction Island to Cape Alava. In 1990, this fishery harvested a total of 11 chinook.

Columbia River: Since 1988, all in-river management of Columbia River fish runs and fisheries has been directly based on the Columbia River Fish Management Plan (CRFMP). "The purpose of this management plan is to provide a framework...to protect, rebuild, and enhance upper Columbia River fish runs while providing harvest for both treaty Indian and non-Indian fisheries" (CRFMP, 1988, p.2). The CRFMP specifies management goals, season timing, catch limits, and maximum incidental impacts for all depressed upriver runs of anadromous fish in the Columbia River.

The preliminary 1991 in-river commercial catch of spring and fall chinook is 109,834, compared to 147,000 in 1990 and 274,500 in 1989. Total freshwater recreational catch in 1991 (including a Buoy 10 catch of 11,600) is estimated to be 80,220 compared to 94,820 in 1990 and 96,878 in 1989.

The 1991 total catch of upriver spring chinook was 6,427 fish, consisting of 2,433 caught in the non-Indian sport and commercial fisheries and 3,994 caught in tribal Ceremonial

and Subsistence (C&S) fisheries. The CRFMP limits harvest impacts on upriver spring chinook run sizes between 50,000 and 128,800 to 4.1% of the run in the lower river non-Indian catch and 7.0% of the run in tribal C&S fisheries. The estimated 1991 impacts were 4.1% and 6.7% respectively.

There has not been a targeted in-river fishery on upriver summer chinook since 1964. In the past, incidental harvest of summer chinook has occurred during commercial sockeye fisheries. However, no commercial sockeye fisheries have occurred since 1988. There is a very small C&S catch of summer chinook. The total catch in 1991 is believed to be less than 50 fish.

Commercial catch of fall chinook in 1991 totaled 93,220 (41,550 in lower river non-Indian fisheries above Bonneville Dam). Management constraints imposed by the CRFMP included achieving the Spring Creek hatchery escapement goal of 8,200 adult chinook, an adult escapement of 40,000 Upriver Bright (including a Snake River component) chinook over McNary Dam, and providing a 50% share of the harvestable portion of the upriver fall chinook run to the treaty Indian fisheries. The Upriver Bright escapement goal for in-river management was increased by 5,000 chinook to 45,000 adults for 1990 and 1991 on an interim basis by agreement of the CRFMP parties to account for increased broodstock hatchery needs and because of concern for the Snake River wild component.

Ocean Fisheries Cape Falcon to Humbug Mountain: Ocean fisheries off Oregon's central coast primarily harvest a mixture of southern chinook stocks not involved in the PSC rebuilding program; these stocks do not migrate north into PSC jurisdiction to any great extent. Some stocks that spawn in Oregon coastal streams do migrate into PSC fisheries, including the Northern Oregon Coastal (NOC) stock aggregate. These north migrating stocks are harvested incidentally (probably <10%) in Oregon ocean fisheries. The only troll fishery that predominately harvests the NOC stock aggregate is the late season near-shore fishery off the mouth of the Elk River. In both 1990 and 1991, this Elk River fishery was not conducted due to conservation concerns. Recreational catch estimates for 1991 are not available at this time.

## **5.0 PRELIMINARY REVIEW OF 1991 ESCAPEMENTS**

Many chinook escapement estimates are still being calculated at this time. A brief overview is presented below and in Table 2, summarizing the information that is currently available. This information should be considered very preliminary.

### **5.1 S.E. Alaska and Non-Annex Transboundary Rivers**

In 1991, the ADF&G estimated the total escapement for 30 of the 31 chinook salmon systems in S.E. Alaska (does not include the 3 annex transboundary rivers and excludes

the Chilkat River this year, as the survey methods are under review). The total escapement in these systems in 1991 was 12,600 chinook salmon. This is 77% of the total escapement goal of 16,470 chinook salmon. Of the 30 stocks for which escapement is estimated, 7 are used as CTC indicator stocks.

The 5 S.E Alaska indicator stocks (Table 2) had a total escapement of 2,466 chinook salmon in 1991. This is 67% of the total escapement goal for these rivers. Of the 5 stocks, only the Situk was above the escapement goal, the remaining escapements ranged from 30% to 85% of their respective escapement goals.

The 2 non-annex transboundary indicator stocks (Table 2) were both below escapement goals in 1991. Estimated escapement in the Unuk River increased over 1990 while the escapement decreased in the Chickamin relative to 1990.

## **5.2 Annex Transboundary Rivers**

Following the review of chinook spawning escapements by the Transboundary Technical Committee (TCTR(91)-4, 11/27/91), ADF&G and CDFO have revised the escapement goals for the Asek, Taku, and Stikine Rivers. In each river, an index stream or streams (6 in the Taku) have been selected and rebuilding escapement goals established for these indices. The selection of the index streams was based on the availability of the most accurate and most consistently collected data on spawning escapement.

In the Asek River, a counting weir on the Klukshu River is used. The number of spawners is estimated by subtracting the Native catch above the weir from the weir count. The escapement goal now used (4,700) is the average between previous U.S. and Canadian goals for this tributary.

In the Taku River, aerial surveys of escapement have been conducted fairly regularly on six tributaries. The Taku escapement index is now the sum of the counts on these six streams. When data are missing for one stream, the index sum would be increased based on the historical proportion of the index represented by the stream with the missing data. The escapement goal (13,200) was determined as the sum of the largest escapements recorded in each stream between 1965 and 1981.

In the Stikine River, chinook escapement to the Little Tahltan River was selected as the escapement index. Escapements have been counted by aerial surveys since 1975 and using a weir since 1985. The escapement goal now used (5,300) was determined as the average between previous U.S. and Canadian goals (following revision of the U.S. goal by applying the agreed expansion factor of 2.0 to convert aerial counts to weir counts).

The 1991 escapements to the Annex Transboundary Rivers were similar to recent years. Compared to 1990, slight increases occurred in the Klukshu and Little Tahltan Rivers and a decrease for the combined Taku index.

### **5.3 Northern B.C. (Areas 1, 3, and 4)**

In 1991, a substantial decrease in chinook escapements was observed to the Nass area, dropping below even the base period average. The basis for this drop is being investigated but likely resulted from increased Native catch in the Nass River and other fisheries in Statistical Area 3. Skeena chinook stock escapement was also slightly down from 1990, but still well above the escapement goal.

### **5.4 Central B.C. (Areas 6-10)**

Since 1988, index escapements for Area 6 and Area 8 have been adjusted by eliminating rivers with substantial hatchery contributions. The escapement goals for these systems have been adjusted accordingly. Chinook escapements to Kitimat area (Area 6 Index) streams increased compared to 1990 but was still below escapements previous to 1990. Escapement to the Bella Coola area (Area 8 Index) natural streams in 1991 was up slightly from 1990 but still well below the escapement goal. Rivers Inlet was up from 1990 levels but the estimation procedure was changed in 1991 (a mark-recovery program has been implemented). The mark-recovery estimate is being used since Departmental staff were confident that chinook abundance had increased. Further, escapement estimates for the past few years at Rivers and Smith Inlets are under review because of a change in the Fishery Officer collecting the data; the present officer does not expand his visual counts of chinook whereas previous officers had. Chinook escapement to Smith Inlet was about the same as in 1990.

### **5.5 Southern B.C. (outside the Fraser River)**

Chinook escapement to upper Strait of Georgia was up for the Nimpkish and Devereux River indicator stocks in 1991. The Nimpkish River increased to 1,800 from the 1990 escapement level of 1,200 and the Devereux increased from 250 in 1990 to 500 in 1991. The Wakemen and Kakweiken two other Upper Strait of Georgia indicator stock remained at the same level as 1990 with 300 and 150 spawners, respectively. The final indicator streams from upper Strait of Georgia, Kingcome, decreased to 250 in 1991 from the 1990 level of 300. Overall, chinook escapements were up slightly in 1991 from the 1990 level for upper Strait of Georgia but were still below average escapements for the mid to late 1980's, only slightly greater than the base level, and well below the goal.

The estimates of returns to the Lower Strait of Georgia stock increased substantially in the Cowichan and Squamish rivers but were down in the Nanaimo River. The return to the Cowichan River was the largest since 1979. Escapement increased in the Squamish but was associated with increased returns of enhanced chinook. The proportion enhanced and their distribution in the river will be reviewed.

The 1991 reported returns to west coast of Vancouver Island stocks increased slightly from 1990. The primary reason for this increase was due to returns to the Burman and Tahsis Rivers. The 1991 escapement estimate to the Burman River was 2,500 compared to 1,100 in 1990, and for the Tahsis was 1,400 versus 300 in 1990. However, the Marble River was down considerably to 1,000 spawners compared to 2,000 in 1990 and 4,500 in 1989.

### **5.6 Fraser River**

The escapement of Fraser River indicator stocks showed small decreases in 1991 compared to 1990, with the exception of the Harrison River stock which had a substantial drop in escapement from 177,375 in 1990 to 86,500 in 1991. The Middle Fraser escapement estimate remained slightly above its escapement goal, but the Upper Fraser and Thompson stocks were below their goals. Although returns to the Harrison were about one half of the 1990 return, they were better than expected pre-season.

### **5.7 Puget Sound**

Preliminary 1991 spawning escapement estimates are not yet available for most stocks. In 1990, escapements were up slightly for most Puget Sound stocks but below goal for all but the Skagit summer/fall and Green River fall stocks. It is expected that 1991 escapements will continue to be depressed. The preliminary 1991 escapement estimate for Skagit spring chinook is below that for 1990 and only 50% of the goal.

### **5.8 Washington Coast**

The northern Washington coastal chinook stocks from the Quillayute (except summer run), Hoh, and Queets Rivers are managed on the basis of escapement floors and terminal area fishery harvest rates. Terminal area abundance for these stocks in 1991 was sufficient to allow directed harvest. Preliminary indications are that spawning escapement levels exceeded the established floors. Final escapement estimates for most stocks are not available at this time. The preliminary 1991 estimate for Grays Harbor spring chinook is slightly below the goal.

### **5.9 Columbia River**

Escapement of Upriver Spring chinook over Bonneville Dam (adjusted for Zone 6 and C&S catch above the dam) was 53,000 adults, the lowest since 1984. Separation of the run into hatchery and wild components has not yet been accomplished. As an approximation, applying the 1986-90 average percent wild (35.8%) yields an estimate of 19,100 wild spring chinook, slightly down from the 1990 escapement of 20,100.

Escapement of Upriver Summer chinook continued to decline in 1991 from the peak count of 31,800 in 1987. The Bonneville Dam count was 18,800 adults, the lowest count since 1983, and a 25% reduction from the 1990 escapement of 25,000.

Upriver Bright fall chinook escapement over McNary Dam, while above the escapement goal of 40,000, continued to decline from the 1987 high of 154,100. Escapement totaled 46,600 adults through October 31, down 19% from the 1990 escapement of 57,600.

#### **5.10 Oregon Coast**

Spawning escapements into the 10 standard Oregon Coastal index streams were lower than the last three years, as indicated by counts of the peak number of live and dead fish seen during foot surveys of the spawning grounds. The spawner abundance index for the aggregated north migrating stocks was 93 fish per mile in 1991. This compares with 125 fish per mile in 1990, 150 fish per mile in 1989, and 221 fish per mile in 1988. The abundant 1984 brood year of this stock aggregate has completed its life cycle and subsequent broods have not survived as well, resulting in decreased spawner abundance in 1990 and 1991. Continued lower stock sizes are anticipated

TABLE 1. Summary of the 1988-1991 Chinook catches in fisheries relevant to the U.S./Canada Pacific Salmon Treaty (numbers in thousands of fish). Note: Catches for 1991 are preliminary (estimates as of 3-Feb-92).

Area	Troll				Net				Sport				Total			
	1991	1990	1989	1988	1991	1990	1989	1988	1991	1990	1989	1988	1991	1990	1989	1988
S.E. ALASKA a/	264	288	236	231	33	28	24	21	68	51	31	26	365	367	291	278
BRITISH COLUMBIA b/c/																
North/Cent. Coast	220	181	225	182	48	41	42	44	33	32	36	19	301	254	303	245
W. Vanc. Island d/	196	296	204	409	55	29	40	15	80	61	48	33	331	386	292	457
Georgia St./Fraser e/	32	32	29	20	14	15	24	8	116	112	133	119	162	159	186	147
Johnstone St.	1	2	2	2	13	18	29	6	10	10	10	10	24	30	41	18
Juan de fuca Strait	0	0	0	0	7	7	22	4					7	7	22	4
sub-total	449	511	460	613	147	110	157	77	239	215	227	181	825	836	844	871
WASHINGTON INSIDE f/																
Strait (mar) g/	35	46	65	49	3	5	10	10	NA	NA	52	39	NA	NA	127	98
San Juans (mar) h/	0	1	1	0	14	9	16	32	NA	NA	9	9	NA	NA	26	41
Other PS (mar+fw) i/	0	0	0	0	130	179	156	133	NA	NA	70	63	NA	NA	226	196
Coastal (mar+fw) i/	0	0	0	0	54	58	85	74	NA	NA	6	7	NA	NA	91	81
sub-total	35	47	66	49	201	251	267	249	NA	NA	137	118	NA	NA	470	416
COLUMBIA RIVER j/k/	-	-	-	-	110	147	275	489	80	95	97	110	190	242	372	599
WA/OR N OF FALCON l/	51	65	75	108	0	0	1	3	14	33	21	19	65	98	97	130
OREGON																
Inside Waters m/	0	0	5	4	-	-	-	-	NA	38	45	49	NA	38	50	53
GRAND TOTAL	799	911	842	1005	481	536	724	839	NA	NA	558	503	NA	NA	2124	2347

- a/ Southeast Alaska troll chinook catches shown for Oct. 1 - Sept. 30 catch counting year.
- b/ British Columbia net catches includes only fish over 5 lb. round weight. Native food fishery catches are not included. 1989, 1990, and 1991 exclude catch from terminal gillnet fisheries (3 year total of 16,425) which are excluded from the catch ceiling.
- c/ Sport catches are for tidal waters only.
- d/ Estimates of WCVI tidal sport catches are from creel surveys in Barkley Sound only. Survey times and areas may vary from year to year.
- e/ Georgia Strait sport catches include Juan de Fuca Strait sport catches.
- f/ All WA inside sport numbers adjusted for punch card bias. See "1988 WA State Sport Catch Report" for details.
- g/ Strait troll catch includes all catch in areas 5 and 6C and catch in area 4B outside of the PFMC management period (Jan.- May and Oct.- Dec.).
- h/ San Juan net catch includes catch in areas 6, 6A, 7 and 7A; sport catch includes area 7.
- i/ Coastal and Puget Sound sport catches include marine and freshwater, but only adults in freshwater.
- j/ Columbia River net catches include Oregon, Washington and treaty catches, but not ceremonial.
- k/ Columbia River sport catches include adults only, for Washington, Oregon, Idaho and Buoy 10 anglers.
- l/ North of Falcon troll catch includes catch in area 4B during the PFMC management period (May-Sept.).
- m/ Troll = late season troll off Elk River mouth (Cape Blanco); sport = estuary and inland (preliminary for 1990).

TABLE 2. Summary of the 1987-1991 escapement of Pacific Salmon Commission Chinook Escapement Indicator Stocks. Escapements for 1991 are very preliminary (estimates as of 3-Feb-92).

Production Unit	Stock Type	Ave Esc. Base a/	Esc. Goal	1987 Esc.	1988 Esc.	1989 Esc.	1990 Esc.	1991 Esc.	1991 % Base	1991 % Goal
<b>S.E. Alaska</b>										
Situk	Spring	1,299	600	1,884	885	652	700	875	67%	146%
King Salmon	Spring	92	250	193	206	238	168	134	146%	54%
Andrew Creek	Spring	379	750	1,042	752	848	1,062	640	169%	85%
Blossom	Spring	163	1,280	2,158	614	550	411	382	234%	30%
Keta	Spring	325	800	1,229	920	1,848	970	435	134%	54%
<b>Transboundary Rivers Not Addressed in Treaty Annexes</b>										
Unuk (U.S.)	Spring	1,469	2,880	3,157	2,794	1,838	946	1,221	83%	42%
Chickamin (U.S.)	Spring	338	1,440	1,560	1,258	1,494	902	779	231%	54%
<b>Transboundary Rivers Addressed in Treaty Annexes</b>										
Klukshu R. (Alsek)	Spring	2,696	4,700	2,615	2,018	2,456	1,915	2,489	92%	53%
Taku Index	Spring	4,582	13,200	5,743	8,626	9,480	12,249	10,153	222%	77%
Little Tahltan (Stikine)	Spring	1,945	5,300	4,783	7,292	4,715	4,392	4,500	230%	85%
<b>B.C. North Coast</b>										
Yakoun River	Summer	788	1,580	2,000	2,000	2,800	2,000	1,900	241%	120%
Nass area	Spr/Sum	7,944	15,890	11,431	10,000	12,525	12,103	4,017	51%	25%
Skeena area	Spr/Sum	20,883	41,770	59,120	68,705	57,202	55,976	52,753	253%	126%
<b>B.C. Central Coast</b>										
Area 6 Index	Summer	2,760	5,520	1,566	3,165	998	281	709	26%	13%
Area 8 Index	Spring	2,725	5,450	1,456	1,650	2,535	2,385	2,470	91%	45%
Rivers Inlet	Spr/Sum	2,475	4,950	5,239	4,429	3,265	4,039	6,500	263%	131%
Smith Inlet	Summer	1,055	2,110	1,050	1,050	225	510	500	47%	24%
<b>West Coast Vancouver Island</b>										
Indicator Stocks	Fall	5,832	11,670	3,545	5,725	7,720	6,110	6,440	110%	55%
<b>Fraser River</b>										
Upper River	Spring	12,229	24,460	39,420	34,248	25,310	35,907	21,757	178%	89%
Middle River	Spr/Sum	9,216	21,130	27,330	24,164	15,095	26,060	21,255	231%	101%
Thompson River	Summer	22,059	55,710	36,730	47,103	37,975	41,995	36,307	165%	65%
Harrison River	Fall	120,837	241,700	78,038	35,116	74,685	177,375	86,500	72%	36%
<b>Georgia Strait</b>										
Upper	Sum/Fall	2,546	5,100	5,700	3,300	6,600	2,200	2,850	112%	56%
Lower	Fall	11,139	22,280	2,530	6,914	6,830	7,605	11,645	105%	52%
<b>Puget Sound</b>										
Skagit	Spring	1,217	3,000	2,108	1,988	1,853	1,902	1,495	123%	50%
Skagit	Sum/Fall	13,265	14,900	9,647	11,954	6,776	17,206	NA		
Stillaguamish	Sum/Fall	817	2,000	1,321	717	811	842	NA		
Snohomish	Sum/Fall	5,028	5,250	4,689	4,513	3,138	4,209	NA		
Green	Fall	5,723	5,800	10,338	7,994	11,512	7,035	NA		
<b>Washington Coast</b>										
Hoh	Spr/Sum	1,325	NA b/	1,700	2,600	4,800	3,900	NA		
Queets	Spr/Sum	925	NA b/	600	1,800	2,600	1,800	NA		
Grays Harbor	Spring	425	1,400	900	3,500	2,100	1,600	1,289	303%	92%
Grays Harbor	Fall	8,575	14,600	18,800	28,200	26,100	17,475	NA		
Quillayute	Summer	1,275	1,200	600	1,300	2,200	1,300	NA		
Quillayute	Fall	5,850	NA b/	12,400	15,200	10,000	13,700	NA		
Hoh	Fall	2,875	NA b/	4,000	4,100	5,100	4,200	NA		
Queets	Fall	3,875	NA b/	6,000	7,600	8,900	10,100	NA		

TABLE 2 continued.

Production Unit	Stock Type	Ave Esc. Base a/	Esc. Goal	1987 Esc.	1988 Esc.	1989 Esc.	1990 Esc.	1991 Esc.	1991 % Base	1991 % Goal
<b>Columbia River</b>										
Upper River	Spring	28,050	84,000	41,400	35,100	27,000	20,100	19,100	c/ 68%	23%
Upper River	Summer	23,100	85,000	31,800	30,100	28,700	25,000	18,800	81%	22%
Lewis River	Fall	13,021	NA	12,900	12,100	21,200	17,500	12,000	92%	
Upriver Bright	Fall	28,325	40,000	154,100	114,700	96,500	57,600	46,600	165%	117%
<b>Oregon Coast</b>										
Aggregate Index d/	Fall	91	NA	131	221	151	125	93	101%	

a/ Base period for Alaskan and Transboundary stocks 1975-80; base for all other stocks 1979-82.

b/ Stocks managed on the basis of an escapement floor and fixed harvest rates.

c/ Based on average wild proportion of total adult escapement.

d/ Oregon coastal north-migrating chinook stocks are assessed in terms of spawners per mile survey units.