

# **YUKON RIVER JOINT TECHNICAL COMMITTEE REPORT.**

prepared by:

**The Joint Canada/ United States  
Yukon River Technical Committee**

March 8-9, 1999

Anchorage, Alaska

# TABLE OF CONTENTS

<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 1999 YUKON RIVER SALMON RUN OUTLOOKS .....</b>	<b>2</b>
<b>2.1 ALASKA.....</b>	<b>2</b>
2.1.1 <i>Chinook Salmon</i> .....	2
2.1.2 <i>Summer Chum Salmon</i> .....	2
2.1.3 <i>Fall Chum Salmon</i> .....	2
2.1.4 <i>Coho Salmon</i> .....	3
<b>2.2 CANADA.....</b>	<b>4</b>
2.2.1 <i>Chinook Salmon</i> .....	4
2.2.2 <i>Fall Chum Salmon</i> .....	6
<b>3.0 PRESEASON PROJECT PLANNING .....</b>	<b>7</b>
<b>3.1 ALASKA.....</b>	<b>7</b>
<b>3.2 CANADA.....</b>	<b>8</b>
<b>4.0 HARVEST OF CANADIAN MAINSTEM YUKON RIVER CHINOOK AND FALL CHUM SALMON BY ALASKA AND CANADA.....</b>	<b>9</b>
4.1 CHINOOK SALMON .....	10
4.2 FALL CHUM SALMON .....	11
<b>5.0 LITERATURE CITED.....</b>	<b>12</b>

## 1.0 INTRODUCTION

The Yukon River Joint Technical Committee (JTC) met in Anchorage on 8-9 March, 1999. The meeting's agenda was as assigned by the chief negotiators for the Canadian and United States delegations involved in the Yukon River salmon treaty negotiations. The agenda was as follows:

1. Prepare preseason run outlooks for the 1999 season.
2. Coordinate 1999 field season planning as necessary.
3. Prepare concise tabular summaries of annual harvest levels by Alaska and Canada of Canadian mainstem Yukon River chinook and fall chum salmon, and Alaska harvest levels of other stocks of these species. Calculate a variety of base period averages. If stock composition information is lacking, consider ways of bounding likely composition, if feasible.
4. Other business?

This report is organised into three subsequent sections which correspond with the above-noted agenda topics. No other business items were identified for the agenda.

A core group participated throughout the meeting, while some additional people attended only during the discussion of specific agenda items. Attendees were as follows:

Alaska Department of Fish and Game (ADF&G)

Larry Buklis (co-chair)  
Elizabeth Andrews  
Dan Bergstrom  
Jeff Bromaghin  
Rich Cannon  
Russ Holder  
Dan Huttunen

Fisheries and Oceans Canada (DFO)

Sandy Johnston (co-chair)  
Ian Boyce  
Peter Etherton  
Pat Milligan

U.S. Fish and Wildlife Service (USFWS)

Rod Simmons

National Marine Fisheries Service (NMFS)

John Eiler  
Richard Wilmot

U.S. Geological Survey (USGS)

Jim Finn

Tanana Chiefs Conference (TCC)

Kevin VanHatten

Bering Sea Fishermen's Association (BSFA)

Jude HENZLER

Council of Athabaskan Tribal Governments (CATG)

Tricia Waggoner

## 2.0 1999 YUKON RIVER SALMON RUN OUTLOOKS

### 2.1 ALASKA

#### 2.1.1 Chinook Salmon

Typically the majority of chinook salmon returning to the Yukon River are 6-year-old fish, though 5- and 7-year-old fish usually make up a significant contribution to the run. Spawning ground escapements in 1993, the brood year producing 6-year-old fish returning in 1999, were judged to be above average in magnitude. However, the return of 5-year-old fish in 1998 appeared to be only near average in strength. The 7-year-old return is expected to be weak based on the unusually low contribution of 5- and 6-year-old fish from the 1992 parent year which returned in 1997 and 1998. The return of 5-year-old fish in 1999 is expected to be average to below average. Although parent year escapements in 1994 were judged to be average to above average in magnitude, the return of 4-year-old fish in 1998 appeared to be weak and many of the 5- and 6-year old fish showed physical signs of stress. Overall, the chinook salmon run is anticipated to be weak to below average in strength. The commercial harvest in Alaska is expected to be 25,000 to 75,000 chinook salmon (23,000 to 69,000 fish in the Lower Yukon Area and 2,000 to 6,000 fish in the Upper Yukon Area), representing a range of catch well below all except two others recorded during the previous 30 years.

#### 2.1.2 Summer Chum Salmon

Based on above average escapements in 1994 and 1995, an above average return of 4- and 5-year-old summer chum salmon would normally be expected. However, it appears that, similar to many salmon stocks in the Bering Sea region, recent productivity of summer chum salmon has declined. Specifically, production of Anvik River chum salmon, which represents the largest spawning stock of Yukon River summer chum salmon, has fallen to well below 1 return per spawner for the 1993, and apparently 1994, brood years. Causes for the observed drop in productivity are still unknown, as are the duration and exact magnitude of the current downward trend. In addition, an unusually small number of age-3 fish from the 1995 brood year were detected in spawning tributary samples collected in 1998. It is possible that the extreme winter of 1995-96, characterized by very little snow cover may also have adversely effected the survival of age-4 fish returning in 1999. Overall, the 1999 outlook is for a below average summer chum salmon run. The commercial harvest is expected to be 25,000 to 300,000 fish given uncertainties associated with recent declines in productivity and market conditions.

#### 2.1.3 Fall Chum Salmon

Drainage-wide, Yukon River fall chum salmon escapements for the period 1974 through 1992 have been estimated by ADF&G to have ranged from approximately 110,000 (1982) to 1,200,000 (1975) based upon expansion of escapement assessments for selected stocks to approximate overa

escapement abundance. Escapements in these years resulted in subsequent returns that ranged in size from approximately 301,000 (1988 production) to 1,400,000 (1975 production) fish, using the same approach to approximating overall escapement. Corresponding return per spawner rates ranged from 1.1 to 4.5, averaging 2.5 for all years combined.

Yukon River fall chum salmon return primarily as age-4 or age-5 fish, although age-3 and age-6 fish also contribute to the run. A Ricker spawner-recruit model was used to predict the returns of chum salmon from the 1993 to 1996 parent-years that will contribute to the 1999 run. This process resulted in a projection of 1,197,000 fall chum salmon with the following approximate age composition:

Age-3 fish	29,000	(1996 Brood Year)
Age-4 fish	769,000	(1995 Brood Year)
Age-5 fish	392,000	(1994 Brood Year)
Age-6 fish	7,000	(1993 Brood Year)

However, there is a high level of uncertainty associated with the 1999 Yukon River fall chum salmon outlook given the widespread failure of salmon runs in Western Alaska in 1997 and 1998. It has been speculated that the failures are likely an artifact of poor marine survival resulting from or accentuated by localized weather conditions in the Bering Sea. The weak runs have been attributed to reduced productivity and not the result of low levels of parental escapement.

The major contributor to the 1999 fall chum salmon run is anticipated to be age-4 fish returning from the parent year 1995. In that year a very strong fall chum salmon run was realized, with excellent escapements observed throughout the drainage. All escapement goals were met for the second consecutive year. However, should the factor(s) that affected the productivity of fish from the parent years that returned in 1998 (and possibly 1997) carry over to fish expected to return in 1999, then a scenario similar to that observed in 1998 could be manifested. If so, the return of Yukon River fall chum salmon in 1999 could materialize at only 46% of the projection of 1,197,000 fish. This produces a range in the 1999 projected run size of approximately 550,000 to 1,197,000 fall chum salmon. The potential for another weak return is based upon the speculation that longer-term climatic changes taking place in the North Pacific Ocean and Bering Sea may result in continuing low salmon production. In addition, the cold temperatures that were accompanied by little snow cover during the winter of 1995-96 may also have an adverse effect upon the major age class (age-4) expected to return in 1999.

#### **2.1.4 Coho Salmon**

Although comprehensive escapement information on Yukon River drainage coho salmon is lacking, it is known that coho salmon have later and overlapping run timing with fall chum salmon and primarily return as age-4 fish. Assuming average survival, an average to above average return of coho salmon would be anticipated in 1999, based upon parental escapement levels observed in several spawning streams in 1995. However, should environmental factors that may have contributed to the Western Alaska salmon run failures in 1997 and 1998 also affect marine survival of coho salmon, then a below average run of coho salmon could materialize in 1999.

The Alaska Board of Fisheries recently adopted a Yukon River coho salmon management plan that would allow a directed commercial coho salmon fishery, but only under very unique conditions. Such a directed commercial coho salmon fishery is not likely to occur in 1999, and it is anticipated that any commercial harvest of coho salmon will be dependent upon the abundance of, and incidental to, the harvest of fall chum salmon.

## 2.2 CANADA

### 2.2.1 Chinook Salmon

The expected total run size of Canadian origin, upper Yukon<sup>1</sup> River chinook salmon for 1999 is in the range of 64,000 to 136,000 fish. In comparison, the upper Yukon chinook run size averaged approximately 134,000 fish during the six year cycle from 1993 to 1998<sup>2</sup>. Qualitatively, the 1999 run is therefore expected to be **below average to average** in magnitude. The 1999 run outlook is based on escapement data for 1992 through 1994, and calculated returns per spawner for the individual brood year escapements based on the spawner-recruitment relationship for the 1977 to 1990 brood years. It is expressed as a range due to the uncertainty associated with marine survival of the fish which spawned between 1992 and 1994 inclusive. The potential for reduced marine survival was made apparent by the 1998 return of upper Yukon chinook salmon, which was significantly lower than expected. The preliminary estimate of the 1998 upper Yukon chinook run size is 67,500 fish; this is 47% of the anticipated return (143,000 fish).

The interim escapement goal range for rebuilt upper Yukon chinook (excluding the Porcupine) is 33,000 to 43,000 chinook. The Yukon River Panel has agreed that, as part of a chinook salmon rebuilding plan, the escapement goal for the period 1996 through 2001 is 28,000 chinook salmon. With the exception of 1993, the principal brood years of the 1999 run saw spawning escapements below both of these targets.

The 1999 expectation was developed using the observed relationship between spawning escapement and production for the 1977 to 1990 brood years. Estimating of production, incorporated age composition data from escapements, and from harvests of Canadian origin chinook salmon in the U.S. and Canada. When data was not available for individual years, averages were substituted, or, in the case of spawning escapements, adjusted age data from the DFO fishwheels upstream of the Canada/U.S. border were used. Escapements for 1977 and 1978 were estimated by expanding a cumulative four-area escapement index (Tatchun Creek, Big Salmon R., Nisutlin R., and the non-hatchery returns to the Whitehorse Fishway) by the average proportion the index represented of the total escapement estimates (derived from DFO mark-recapture studies in 1982-83, and 1985-89). Escapements for 1979-81 and 1984 were estimated in a similar manner except that a five area index,

---

<sup>1</sup> The upper Yukon River, for the purpose of this report, is defined as the Canadian portion of the Yukon River drainage excluding the Porcupine River drainage.

<sup>2</sup> The 1998 run size estimate is preliminary.

which included the four-area index streams plus the Wolf River index counts, was used. Mark-recapture results were used to estimate the escapement in 1982, 1983 and 1985 through 1998.

The total return from each brood year escapement was estimated by apportioning the total annual run sizes in the principal return years by the average age at maturity. Returns from Canadian origin chinook salmon produced during the 10-year period 1981-1990 were estimated to be as follows: 5% age-four, 22% age-5, 57% age-6, 15% age-7, and 1% age-8. Annual returns were reconstructed using ADF&G scale pattern data and DFO tagging results.

The relationship between the natural logarithm of the return per spawner (R/S) and number of spawners (S) for the 1977 to 1990 brood years is described as follows:

$$\text{Ln}(R/S)=2.568-0.0352(S); \quad [1]$$

where: S = # spawners (in thousands),  
R = returns.

The coefficient of determination ( $r^2$ ) of this regression is 0.60 and the relationship is significant ( $p<0.005$ ).

Based on equation [1] and the average age at maturity, the estimated returns from the principal brood years in 1999 are as follows:

Brood Year	Esc.	Calc'd Ln(R/S)	Calc'd R/S	Est'd prod'n	1999 Return
1992	25,382	1.675	5.337	135,456	20,742
1993	28,558	1.563	4.772	136,290	77,945
1994	25,890	1.657	5.242	135,719	29,852
sub-total (accounts for 94.5% of the return)					128,539
<b>Upper end of 1999 expected run size range (rounded)</b>					<b>136,000</b>

These calculations do not factor in the number of females in the brood year spawning escapements. The only index in the Canadian portion of the Yukon River drainage which provides long-term escapement sex composition data is the Whitehorse Rapids Fishway. The proportion of females in the escapement to the fishway in each of the principle years was as follows: 1992 – 52%; 1993 – 44%; and, 1994 – 23%. Over the six years preceding 1992, the run compositions averaged 42% female.

### 2.2.2 Fall Chum Salmon

An average of 62% of upper Yukon adult chum salmon return at four years of age and 35% return at five years of age. This suggests that the major portion of the 1999 fall chum run should originate from an escapement of 158,092 chum salmon in 1995. This represents the highest escapement recorded and is well above the recent (i.e. 1995-1998) cycle average of 103,000 fish. The 5-year old component of the return is expected from an escapement of 98,358 chum in 1994. This represented a record escapement at the time, although it is slightly below the 1995-1998 average. The escapement goal for upper Yukon chum salmon return is >80,000 fish. Although the rebuilding program for upper Yukon chum was scheduled to be completed by 2001, the recent cycle average was 22% above the rebuilding goal. It was also significantly greater than the long term average, in spite of the record low return observed in 1998.

A return rate of 2.5 adults per spawner (R/S) is used in the joint Canada/U.S. upper Yukon chum salmon rebuilding model and has been used in most years by DFO for developing run expectations. It matches the long-term (i.e. 1974-1992) R/S for the estimated drainage-wide Yukon River stock aggregate. The 1999 expectation using this rate is a run size of 337,000 fall chum salmon. However, the 1998 Yukon River drainage-wide fall chum return was only 46% of the anticipated run size, likely as a result of poor marine conditions. It is reasonable to assume that these conditions may prevail and a similar run shortfall could occur in 1999. The 1999 run size expectation is therefore expressed as a range from 155,000 to 336,000 chum salmon.

Although insufficient stock identification data are available for accurately estimating annual run sizes of Yukon chum salmon, assumptions have been made to allow the 1999 forecast to be expressed in terms of the average estimated run size. Run size estimates for previous years were developed based on the following DFO assumptions:

- a) 30% of the U.S. catch of fall chum salmon is composed of Canadian origin fish;
- b) with respect to the U.S. catch of Canadian origin fall chum, the harvest rate on upper Yukon stocks relative to the harvest rate on Porcupine stocks is directly proportional to the ratio of their respective border escapements; and,
- c) the Porcupine border escapement consists of the Old Crow aboriginal fishery catch plus the Fishing Branch River escapement.

Using these assumptions, the recent four-year cycle (1995-1998<sup>3</sup>) return of upper Yukon Canadian-origin chum salmon is estimated to have been 169,000 fish. In comparison, the 1999 upper Yukon chum salmon expectation ranges from **average to above average**.

The chum salmon run to Canadian portions of the Porcupine drainage in 1999 should originate primarily from the 1995 escapement. The escapement to the Fishing Branch in 1995, as determined by a weir count, was 51,971 chum salmon. It was above the 1995 -1998 cycle average of about 42,364 fish and slightly over the lower end of the interim escapement goal range of 50,000 to 120,000 chum

---

<sup>3</sup> The 1998 run size estimates for both upper Yukon and upper Porcupine stocks are preliminary.

salmon for the Fishing Branch River. An additional contribution to the 1999 run can be expected from five year old fish originating from an escapement of 65,247 chum in 1994.

The productivity of the upper Porcupine River chum stocks appears to be lower than that of both the drainage-wide stock aggregate and the upper Yukon stock aggregate, particularly when averaged over the 1988 to 1991 brood years. (The returns from the 1992 and 1993 brood years have not yet been estimated). Rather than using a R/S value of 2.5, DFO has prepared a stock-recruitment brood table using the assumptions listed above. The average productivity over the 1982-1991 period was estimated to be a R/S rate of 2.2, and this was used to develop the 1999 forecast. Assuming a R/S value of 2.2, and using the average age at maturity for upper Porcupine chum salmon of 60% age four and 36% age five, a return of 124,000 fish is expected in 1999. The Canadian-origin Porcupine chum stock size was estimated to have been approximately 65,000 fish over the 1995-1998 four-year cycle (based on the assumptions previously described). As with the upper Yukon River chum expectation, it was felt that the expected run size should be expressed as a range, in light of the run shortfall experienced in 1998. The forecast of 124,000 fish was therefore reduced by 54% to obtain the lower end of the expectation range. Therefore, a return of between 57,000 and 124,000 chum salmon is expected for 1999. Relative to recent run sizes these values range from **average to above average**. As with the 1999 upper Yukon chinook and chum expectations, the upper Porcupine expectation has been expressed with some ambiguity due to the uncertainty associated with marine conditions.

### 3.0 PRESEASON PROJECT PLANNING

#### 3.1 ALASKA

Reductions in state funding are anticipated for the state fiscal year beginning 1 July, but at the time of our meeting neither the extent of the reductions nor the impact on ADF&G programs are known. Federal funding to the state is in process as a result of the 1998 salmon run failures in western Alaska. A number of Yukon River projects are being considered for support through this funding. The primary goal of the work proposed for the Yukon River is to learn more about the abundance, distribution, timing and age-sex-size of chinook salmon. A smaller component would address fall chum salmon assessment in the Tanana River drainage.

The USFWS South Fork Koyukuk counting weir and Rampart fall chum mark-recapture projects were discussed. The USFWS indicated it was discontinuing the weir project (due to ongoing flooding problems) in favor of a counting tower on a nearby tributary. Plans for the Rampart tagging project include continued mark-recapture of fall chum with the goal of estimating the number of fall chum migrating to the upper Yukon River. Changes in project methodology involving fish holding time, secondary marks, and tag colour are being considered.

Plans for the upper Yukon fall chum salmon telemetry project (spearheaded by NMFS) include application of radio tags to approximately 1,000 fish. Tissue samples for genetic stock identification (GSI) will be collected from each fish tagged. Studies into the effect of holding and crowding fish will be continued with an ultimate goal of minimizing altered behaviour resulting from live-capture and tagging operations. Tracking of tagged fish will involve the existing remote

tracking station network, as well as aerial tracking to acquire more detailed information. The intensity of aerial tracking will be proportional to the amount of internal funding that various agencies can provide.

Funding for Restoration and Enhancement (R&E) projects is still available in Alaska. Fund administration is being provided by the USFWS. A portion of the fund is being allocated to the upper Yukon telemetry project for purchase of radio tags. A request for additional proposals has been made and those submitted are currently being reviewed.

The USGS indicated that it was continuing its research into estimating freshwater survival of Tanana River fall chum as it is influenced by temperature and other environmental variables.

GSI work planned by ADF&G for 1999 includes a continuation of Area-M sampling as well as continued chinook salmon work state-wide. A proposal has been made to sample at Pilot Station in order to examine the transition from summer chum to fall chum migration. In the interim, ADF&G may initiate feasibility level work this season. GSI plans of other agencies were not discussed.

### *3.2 CANADA*

Preliminary information suggests that DFO may face reductions in funding for Yukon River stock assessment activities in 1999. However, it is hoped that the impact on ongoing, core programs will be minimal. Project plans have been submitted and are awaiting funding approval. It is anticipated that a mark-recapture program for chinook and chum salmon will again be implemented to generate border and spawning escapement estimates. However the source of contingency funding is uncertain in the event of a commercial fishery closure. Other projects which have been submitted for funding approval include the Fishing Branch River fall chum enumeration project, commercial fishery age-length-sex (and for chinook salmon, CWT) sampling, as well as aerial surveys of chinook and chum salmon index areas. Request for funding to contribute to the application of coded-wire tags to chinook fry at the Whitehorse Rapids Fish Hatchery and the enumeration of adult chinook salmon at the Whitehorse Rapids Fishway has also been made.

The potential exists for funding of Yukon River stock assessment and fishery projects through the DFO Habitat Restoration and Salmon Enhancement Program (HRSEP) and the Selective Fishing components of the Pacific Fisheries Adjustment and Restructuring Program. The focus of HRSEP is to address stock assessment concerns and to improve the quality and quantity of salmon habitat coast-wide in Canada. The development and strengthening of partnerships is also an important goal of the program. A number of HRSEP applications for Yukon River projects were submitted by individuals and organisations outside of DFO. These are currently being reviewed by DFO. The focus of the Selective Fishing program is to develop means of catching target species and reducing by-catch. Proposals are currently being solicited.

## **4.0 HARVEST OF CANADIAN MAINSTEM YUKON RIVER CHINOOK AND FALL CHUM SALMON BY ALASKA AND CANADA**

The JTC was tasked to prepare concise tabular summaries of annual harvest levels by Alaska and Canada of Canadian mainstem Yukon River chinook and fall chum salmon, and Alaska harvest levels of other stocks of these species. The JTC was further tasked to calculate a variety of base period averages. If stock composition information was lacking, the JTC was to consider ways of bounding likely composition, if feasible. The product of the work of the JTC on this assignment is presented in Tables 1-4. Each species will be discussed separately.

In compiling the data on historical harvest levels by Alaska and Canada of Canadian mainstem Yukon River chinook and chum salmon, the JTC does not mean to imply that these levels represent sustainable harvest levels that are to be expected from rebuilt stocks. To address that question, one would need to model productivity of the stocks over a range of rebuilt stock levels, and over a range of production regimes. Unfortunately, there is very little data for returns for these stocks from those escapement levels, so any modeling would be quite speculative and largely founded on assumptions. Such an analysis was not seen as part of our present assignment.

It was noted, however, that larger total catches beginning in the late 1970's coincided with a period of improved ocean productivity. Despite an ocean regime that likely benefited salmon production, by the late 1980's conservation concerns over decreased escapements of upper Yukon salmon stocks prompted development of escapement rebuilding plans. Depressed escapements indicated that total catch levels were likely above sustainable levels even though ocean rearing conditions during that time period were favorable for salmon. Catches and escapements during the rebuilding program also benefited from continued favorable ocean conditions, until a recent downturn in productivity. If the recently apparent lower ocean productivity persists for some time, as many oceanographers believe it will, it would be overly optimistic to expect that the catch levels observed during the former favorable ocean regime can be sustained during periods of decreased ocean productivity.

### **4.1 Chinook Salmon**

Total annual chinook salmon harvest in the Alaska portion of the Yukon River drainage, and annual Canadian harvests of mainstem Yukon chinook salmon, for the period 1961-1997 were obtained from JTC (1998). Harvests for 1998 in each case are preliminary information available as of March 1999. Estimates of Upper run stock contribution to Alaska harvests are available since 1982 from the scale pattern analysis (SPA) project conducted by ADF&G. That project defines Upper run stock as Canadian origin. Given that small numbers of chinook salmon are harvested in the Canadian Porcupine River drainage, some small but unknown number of chinook originating in the Canadian Porcupine are in the Alaska harvest. However, for the purposes of this exercise, the Upper run was equated to the Canadian mainstem Yukon.

Upper run stock contribution estimates for 1996-1997 are from Lingnau and Bromaghin (1999), and estimates for 1998 are from Lingnau (In Prep). Annual SPA project data for the period 1982-1992 are being reprocessed using an improved data processing program first applied to the 1996-1997 data by Lingnau and Bromaghin (1999). SPA data for 1993-1995 have already been reprocessed, and the resulting revised estimates are used here. Reprocessing of the remaining years back to 1982 will be done on an ongoing basis, but it is expected to be more than one year before this effort is completed. Therefore, estimates of Upper run stock contribution to the Alaska harvest for the years 1982-1992 used here are from the individual annual SPA project reports (Wilcock and McBride, 1983; Wilcock, 1984; 1985; 1986; Merritt, Wilcock, and Brannian, 1988; Merritt, 1988; Wilcock, 1990; Schneiderhan and Wilcock, 1992; Schneiderhan, 1993; 1994a; 1994b; respectively), expanded to account for current estimates of Alaska total harvest for those years. The percentage of the Alaska harvest attributed to the Upper run stock for a given year in that year's SPA project report was applied to the current estimate of Alaska total harvest for that year to obtain the Upper run stock contribution estimates in numbers of fish used here.

While it would be best to await the outcome of the SPA data reprocessing effort due to the superior features of the new program, we understand that there is need for use of the best available information in the meantime. However, harvest totals have changed for historical years since the individual SPA project reports were completed, and the method of application in various fisheries evolved over that period as well, with some harvests not included in earlier years that were included for later years. The simple expansion approach used here, although lacking the rigor of a more careful reanalysis of historical SPA data on a period-by-period and district-by-district basis, should provide a reasonable working set of estimates until superseded by the outcome of the SPA data reprocessing effort now underway.

Stock composition estimates are not available for years prior to 1982. For each year 1961-1981, therefore, the 17-year (1982-1998) average Upper run stock contribution percentage was applied to that year's total Alaska harvest to approximate the Canadian mainstem Yukon stock component in the Alaska harvest. It should be understood that these approximations for the years absent SPA data are only meant to be a rough overall approximation, and may not be representative for any given specific year, considering how stock contributions can vary among years.

The resulting harvest information base was used to calculate 34 sequential 5-year base period averages, 29 sequential 10-year base period averages, the overall 38-year base period average, and the 17-year SPA data-period base period average (Table 1). Additional groupings are of course possible for purposes of calculating base period averages, but the JTC felt that this array of outputs provides a broad sampling of examples. The JTC does not make any technical recommendation as to which, if any, of these many base period averages should be advanced in the harvest sharing negotiations. The JTC recommends that Table 1 be updated on a periodic basis as the outcome of the SPA data reprocessing effort becomes available for the years 1982-1992.

## 4.2 Fall Chum Salmon

Total annual fall chum salmon harvest in the Alaska portion of the Yukon River drainage, and annual Canadian harvests of mainstem Yukon fall chum salmon, for the period 1961-1997 were obtained from JTC (1998). Harvests for 1998 in each case are preliminary information available as of March 1999.

Reliable estimates of the Canadian mainstem Yukon stock contribution to Alaska harvests are not available. Genetic stock identification (GSI) data were collected from chum salmon in the lower Yukon River in the late 1980's. However, that sampling was limited in scope (District 1 only), and there were limitations in the ability to discriminate among a cluster of U.S./Canada border stocks, which included the Canadian mainstem Yukon stock. Genetics staff will be re-examining those data to see if further perspective can be gained on the approximate contribution level of the Canadian mainstem Yukon stock to Alaska harvests, at least during those years.

For the purposes of this exercise, fixed annual contribution levels of 20%, 10%, and 30% were used as scenarios for illustration purposes (Tables 2-4). It should be understood that these are only meant to be rough overall approximations, and may not be representative for any given specific year, considering how stock contributions can vary among years. As a long-term average, it is thought that the 20% scenario may best represent the contribution of the Canadian mainstem Yukon stock to Alaska harvest.

This level seems reasonable as a working assumption until better information becomes available. It is supported by the levels of escapement for the various stocks, by the apparent resulting productivity one obtains for the Canadian mainstem Yukon stock, and is consistent with the 20% level represented by the escapement goal minimum for this stock (80,000) as a percentage of the drainage-wide level for escapement (400,000) in the Alaska fishery management plan. The 10% (Table 3) and 30% (Table 4) scenarios are provided to illustrate reasonable bounds for the long-term average contribution of this stock to the Alaska harvest, although there is always the possibility that for any given year the contribution could lie outside even these bounds.

The resulting harvest information base was used to calculate 34 sequential 5-year base period averages, 29 sequential 10-year base period averages, and the overall 38-year base period average for each of the stock contribution scenarios (Tables 2-4). Additional groupings are of course possible for purposes of calculating base period averages, but the JTC felt that this array of outputs provides a broad sampling of examples. The JTC recommends using the 20% scenario as a reasonable overall approximation of Canadian mainstem Yukon stock contribution to the Alaska harvest for the purposes of this exercise, but does not make any technical recommendation as to which, if any, of the many base period averages within that scenario should be advanced in the harvest sharing negotiations.

## 5.0 LITERATURE CITED

JTC (U.S./Canada Yukon River Joint Technical Committee). 1998. Yukon River salmon season review for 1998 and technical committee report. November report, Whitehorse, Yukon Territory, Canada.

Lingnau, T.L. In Prep. Origins of chinook salmon in the Yukon River fisheries, 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.

Lingnau, T.L., and J.F. Bromaghin. 1999. Origins of chinook salmon in the Yukon River fisheries, 1997. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A99-09, Anchorage.

Merritt, M.F., J.A. Wilcock, and L.K. Brannian. 1988. Origins of chinook salmon in the Yukon River fisheries, 1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 223, Juneau.

Merritt, M.F. 1988. Origins of chinook salmon in the Yukon River fisheries, 1987. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 88-14, Juneau.

Schneiderhan, D.J. 1993. Origins of chinook salmon in the Yukon River fisheries, 1990. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 93-11, Juneau.

Schneiderhan, D.J. 1994a. Origins of chinook salmon in the Yukon River fisheries, 1991. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Technical Fishery Report 94-09, Juneau.

Schneiderhan, D.J. 1994b. Origins of chinook salmon in the Yukon River fisheries, 1992. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Technical Fishery Report 94-18, Juneau.

Schneiderhan, D.J., and J.A. Wilcock. 1992. Origins of chinook salmon in the Yukon River fisheries, 1989. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 92-02, Juneau.

Wilcock, J.A. 1984. Origins of chinook salmon (*Oncorhynchus tshawytscha* Walbaum) in the Yukon River fisheries, 1983. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet 243, Juneau.

Wilcock, J.A. 1985. Origins of chinook salmon (*Oncorhynchus tshawytscha* Walbaum) in the Yukon River fisheries, 1984. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 157, Juneau.

Wilcock, J.A. 1986. Origins of chinook salmon (*Oncorhynchus tshawytscha* Walbaum) in the Yukon River fisheries, 1985. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Data Report 178, Juneau.

Wilcock, J.A. 1990. Origins of chinook salmon in the Yukon River fisheries, 1988. Alaska Department of Fish and Game, Division of Commercial Fisheries, Technical Fishery Report 90-02, Juneau.

Wilcock, J.A., and D.N. McBride. 1983. Origins of chinook salmon (*Oncorhynchus tshawytscha* Walbaum) in the Yukon River fisheries, 1982. Alaska Department of Fish and Game, Division of Commercial Fisheries, Informational Leaflet 226, Juneau.

Table 1 Alaska harvest of Yukon River chinook salmon, 1961-98, with estimates of the Canadian mainstem Yukon stock component based upon annual scale pattern analysis (SPA) project results for 1982-98, and based upon applying the 17-year average percentage from the SPA project to the harvest data for the other years, and Canadian harvest of mainstem Yukon chinook salmon, 1961-98. The approximated stock compositions using the 17-year average percentage are shown in heavy shading. Interim stock composition estimates that will be superseded by the outcome of the SPA data reprocessing effort now underway are shown in light shading. <sup>1</sup>

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
1961	72,934	52%	68,218	48%	141,152	100%	72,934	85%	12,746	15%	85,680	100%
1962	54,690	52%	51,154	48%	105,844	100%	54,690	80%	13,337	20%	68,027	100%
1963	73,326	52%	68,584	48%	141,910	100%	73,326	88%	10,033	12%	83,359	100%
1964	56,743	52%	53,075	48%	109,818	100%	56,743	89%	7,332	11%	64,075	100%
1965	69,603	52%	65,103	48%	134,706	100%	69,603	93%	5,286	7%	74,889	100%
1966	54,196	52%	50,691	48%	104,887	100%	54,196	93%	4,387	7%	58,583	100%
1967	75,493	52%	70,611	48%	146,104	100%	75,493	94%	5,107	6%	80,600	100%
1968	61,298	52%	57,334	48%	118,632	100%	61,298	92%	5,012	8%	66,310	100%
1969	54,268	52%	50,759	48%	105,027	100%	54,268	95%	2,597	5%	56,865	100%
1970	48,063	52%	44,956	48%	93,019	100%	48,063	91%	4,655	9%	52,718	100%
1971	70,370	52%	65,821	48%	136,191	100%	70,370	92%	6,438	8%	76,808	100%
1972	58,438	52%	54,660	48%	113,098	100%	58,438	91%	5,729	9%	64,167	100%
1973	51,500	52%	48,170	48%	99,670	100%	51,500	92%	4,518	8%	56,018	100%
1974	60,999	52%	57,054	48%	118,053	100%	60,999	92%	5,556	8%	66,555	100%
1975	39,726	52%	37,157	48%	76,883	100%	39,726	87%	5,900	13%	45,626	100%
1976	54,555	52%	51,027	48%	105,582	100%	54,555	92%	5,000	8%	59,555	100%
1977	59,160	52%	55,334	48%	114,494	100%	59,160	89%	7,498	11%	66,658	100%
1978	67,165	52%	62,823	48%	129,988	100%	67,165	92%	5,881	8%	73,046	100%
1979	82,276	52%	76,956	48%	159,232	100%	82,276	89%	10,375	11%	92,651	100%
1980	102,134	52%	95,531	48%	197,665	100%	102,134	83%	20,846	17%	122,980	100%
1981	97,387	52%	91,090	48%	188,477	100%	97,387	84%	18,009	16%	115,396	100%
1982	88,063	58%	64,745	42%	152,808	100%	88,063	84%	16,808	16%	104,871	100%
1983	92,451	47%	105,985	53%	198,436	100%	92,451	83%	18,752	17%	111,203	100%
1984	46,657	29%	116,026	71%	162,683	100%	46,657	74%	16,295	26%	62,952	100%
1985	83,173	44%	104,154	56%	187,327	100%	83,173	81%	19,151	19%	102,324	100%
1986	92,596	63%	53,408	37%	146,004	100%	92,596	82%	20,064	18%	112,660	100%
1987	116,234	62%	72,152	38%	188,386	100%	116,234	87%	17,563	13%	133,797	100%
1988	82,893	56%	65,528	44%	148,421	100%	82,893	80%	21,327	20%	104,220	100%
1989	84,335	54%	73,271	46%	157,606	100%	84,335	83%	17,419	17%	101,754	100%
1990	79,005	53%	70,428	47%	149,433	100%	79,005	81%	18,980	19%	97,985	100%
1991	58,056	38%	96,595	62%	154,651	100%	58,056	74%	20,444	28%	78,500	100%
1992	92,539	55%	75,852	45%	168,391	100%	92,539	84%	17,803	16%	110,342	100%
1993	78,815	48%	84,263	52%	163,078	100%	78,815	83%	16,469	17%	95,284	100%
1994	96,647	56%	75,668	44%	172,315	100%	96,647	82%	20,790	18%	117,437	100%
1995	97,741	55%	79,922	45%	177,663	100%	97,741	83%	20,091	17%	117,832	100%
1996	88,958	64%	49,604	36%	138,562	100%	88,958	82%	19,546	18%	108,504	100%
1997	92,162	53%	82,463	47%	174,625	100%	92,162	85%	15,717	15%	107,879	100%
1998	44,874	45%	55,341	55%	100,215	100%	44,874	88%	5,838	12%	50,712	100%

Continued

Table 1 Page 2 of 3

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 5-Year Averages:</b>												
<b>(Reference annual data to denote approximated stock compositions using the 17-year average percentage)</b>												
1961-65 AVG	65,459	52%	61,227	48%	126,686	100%	65,459	87%	9,747	13%	75,206	100%
1962-66 AVG	61,712	52%	57,721	48%	119,433	100%	61,712	88%	8,075	12%	69,787	100%
1963-67 AVG	65,872	52%	61,613	48%	127,485	100%	65,872	91%	6,429	9%	72,301	100%
1964-68 AVG	63,466	52%	59,363	48%	122,829	100%	63,466	92%	5,425	8%	68,891	100%
1965-69 AVG	62,971	52%	58,900	48%	121,871	100%	62,971	93%	4,478	7%	67,449	100%
1966-70 AVG	58,663	52%	54,870	48%	113,534	100%	58,663	93%	4,352	7%	63,015	100%
1967-71 AVG	61,898	52%	57,896	48%	119,795	100%	61,898	93%	4,762	7%	66,660	100%
1968-72 AVG	58,488	52%	54,706	48%	113,193	100%	58,488	92%	4,886	8%	63,374	100%
1969-73 AVG	56,528	52%	52,873	48%	109,401	100%	56,528	92%	4,787	8%	61,315	100%
1970-74 AVG	57,874	52%	54,132	48%	112,006	100%	57,874	91%	5,379	9%	63,253	100%
1971-75 AVG	56,207	52%	52,572	48%	108,779	100%	56,207	91%	5,628	9%	61,835	100%
1972-76 AVG	53,043	52%	49,614	48%	102,657	100%	53,043	91%	5,341	9%	58,384	100%
1973-77 AVG	53,188	52%	49,749	48%	102,936	100%	53,188	90%	5,694	10%	58,882	100%
1974-78 AVG	56,321	52%	52,679	48%	109,000	100%	56,321	90%	5,967	10%	62,288	100%
1975-79 AVG	60,576	52%	56,660	48%	117,236	100%	60,576	90%	6,931	10%	67,507	100%
1976-80 AVG	73,058	52%	68,334	48%	141,392	100%	73,058	89%	9,920	11%	82,978	100%
1977-81 AVG	81,624	52%	76,347	48%	157,971	100%	81,624	87%	12,522	13%	94,146	100%
1978-82 AVG	87,405	53%	78,229	47%	165,634	100%	87,405	86%	14,384	14%	101,789	100%
1979-83 AVG	92,462	52%	86,861	48%	179,324	100%	92,462	85%	16,958	15%	109,420	100%
1980-84 AVG	85,339	47%	94,675	53%	180,014	100%	85,339	82%	18,142	18%	103,481	100%
1981-85 AVG	81,546	46%	96,400	54%	177,946	100%	81,546	81%	17,803	19%	99,349	100%
1982-86 AVG	80,588	48%	88,863	52%	169,452	100%	80,588	81%	18,214	19%	98,802	100%
1983-87 AVG	86,222	49%	90,345	51%	176,567	100%	86,222	82%	18,365	18%	104,587	100%
1984-88 AVG	84,311	51%	82,253	49%	166,564	100%	84,311	81%	18,880	19%	103,191	100%
1985-89 AVG	91,846	56%	73,703	44%	165,549	100%	91,846	83%	19,105	17%	110,951	100%
1986-90 AVG	91,013	57%	66,957	43%	157,970	100%	91,013	82%	19,071	18%	110,083	100%
1987-91 AVG	84,105	52%	75,595	48%	159,699	100%	84,105	81%	19,147	19%	103,251	100%
1988-92 AVG	79,366	51%	76,295	49%	155,660	100%	79,366	80%	19,195	20%	98,560	100%
1989-93 AVG	78,550	49%	80,042	51%	158,592	100%	78,550	81%	18,223	19%	96,773	100%
1990-94 AVG	81,012	50%	80,521	50%	161,534	100%	81,012	81%	18,897	19%	99,910	100%
1991-95 AVG	84,760	50%	82,420	50%	167,180	100%	84,760	81%	19,119	19%	103,879	100%
1992-96 AVG	90,940	56%	73,022	44%	163,962	100%	90,940	83%	18,940	17%	109,880	100%
1993-97 AVG	90,865	55%	74,384	45%	165,249	100%	90,865	83%	18,523	17%	109,387	100%
1994-98 AVG	84,076	55%	68,600	45%	152,676	100%	84,076	84%	16,396	16%	100,473	100%

Continued

Table 1 Page 3 of 3

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 10-Year Averages:</b>												
<b>(Reference annual data to denote approximated stock compositions using the 17-year average percentage)</b>												
1961-70 AVG	62,061	52%	58,049	48%	120,110	100%	62,061	90%	7,049	10%	69,111	100%
1962-71 AVG	61,805	52%	57,809	48%	119,614	100%	61,805	91%	6,418	9%	68,223	100%
1963-72 AVG	62,180	52%	58,159	48%	120,339	100%	62,180	92%	5,658	8%	67,837	100%
1964-73 AVG	59,997	52%	56,118	48%	116,115	100%	59,997	92%	5,106	8%	65,103	100%
1965-74 AVG	60,423	52%	56,516	48%	116,939	100%	60,423	92%	4,929	8%	65,351	100%
1966-75 AVG	57,435	52%	53,721	48%	111,156	100%	57,435	92%	4,990	8%	62,425	100%
1967-76 AVG	57,471	52%	53,755	48%	111,226	100%	57,471	92%	5,051	8%	62,522	100%
1968-77 AVG	55,838	52%	52,227	48%	108,065	100%	55,838	91%	5,290	9%	61,128	100%
1969-78 AVG	56,424	52%	52,776	48%	109,201	100%	56,424	91%	5,377	9%	61,802	100%
1970-79 AVG	59,225	52%	55,396	48%	114,621	100%	59,225	91%	6,155	9%	65,380	100%
1971-80 AVG	64,632	52%	60,453	48%	125,086	100%	64,632	90%	7,774	10%	72,406	100%
1972-81 AVG	67,334	52%	62,980	48%	130,314	100%	67,334	89%	8,931	11%	76,265	100%
1973-82 AVG	70,296	52%	63,989	48%	134,285	100%	70,296	88%	10,039	12%	80,336	100%
1974-83 AVG	74,392	52%	69,770	48%	144,162	100%	74,392	87%	11,463	13%	85,854	100%
1975-84 AVG	72,957	49%	75,667	51%	148,625	100%	72,957	86%	12,536	14%	85,494	100%
1976-85 AVG	77,302	49%	82,367	51%	159,669	100%	77,302	85%	13,862	15%	91,164	100%
1977-86 AVG	81,106	50%	82,605	50%	163,711	100%	81,106	84%	15,368	16%	96,474	100%
1978-87 AVG	86,814	51%	84,287	49%	171,101	100%	86,814	84%	16,374	16%	103,188	100%
1979-88 AVG	88,387	51%	84,557	49%	172,944	100%	88,387	83%	17,919	17%	106,306	100%
1980-89 AVG	88,592	52%	84,189	48%	172,781	100%	88,592	82%	18,623	18%	107,216	100%
1981-90 AVG	86,280	52%	81,679	48%	167,958	100%	86,280	82%	18,437	18%	104,716	100%
1982-91 AVG	82,346	50%	82,229	50%	164,576	100%	82,346	81%	18,680	19%	101,027	100%
1983-92 AVG	82,794	50%	83,320	50%	166,114	100%	82,794	81%	18,780	19%	101,574	100%
1984-93 AVG	81,430	50%	81,148	50%	162,578	100%	81,430	81%	18,552	19%	99,982	100%
1985-94 AVG	86,429	53%	77,112	47%	163,541	100%	86,429	82%	19,001	18%	105,430	100%
1986-95 AVG	87,886	54%	74,689	46%	162,575	100%	87,886	82%	19,095	18%	106,981	100%
1987-96 AVG	87,522	54%	74,308	46%	161,831	100%	87,522	82%	19,043	18%	106,566	100%
1988-97 AVG	85,115	53%	75,339	47%	160,455	100%	85,115	82%	18,859	18%	103,974	100%
1989-98 AVG	81,313	52%	74,321	48%	155,634	100%	81,313	83%	17,310	17%	98,623	100%
<b>All-Years Average:</b>												
<b>(Reference annual data to denote approximated stock compositions using the 17-year average percentage)</b>												
1961-98 AVG	73,145	52%	68,456	48%	141,601	100%	73,145	86%	12,350	14%	85,495	100%
<b>SPA Data-Period Average:</b>												
1982-98 AVG	83,247	52%	77,953	48%	161,200	100%	83,247	82%	17,827	18%	101,074	100%

<sup>1</sup> Data sources were JTC (1998) for Alaska total harvests and Canadian harvests of mainstem Yukon chinook, 1961-1997, and preliminary information for 1998 harvests. Upper run stock contribution to the Alaska harvest, here equated to the Canadian mainstem Yukon stock, is from the following sources: for 1982-1992, from individual annual SPA project reports (see text for references) expanded for current estimates of total harvest for that year, pending reprocessing of historical SPA data using an improved data processing program first applied to the 1996-1997 data; for 1993-1995, from the preliminary outcome of the reprocessing effort for those years; for 1996-1997, from Lingnau and Bromaghin (1999); and for 1998, from Lingnau (In Prep). Stock composition estimates for 1982-1992, highlighted in light shading, are to also be reprocessed, at which time the estimates used here will be superseded, and the light shading will be removed. Reprocessing is necessary to standardize the database to the superior program now in use, and to make use of current estimates of harvest for those historical years.

Table 2 Alaska harvest of Yukon River fall chum salmon, 1961-98, with an approximation of the Canadian mainstem Yukon stock component based upon the assumption that a fixed 20% of the annual Alaska harvest is of the Canadian mainstem Yukon stock, and Canadian harvest of mainstem Yukon fall chum salmon, 1961-98.<sup>1</sup>

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
1961	28,847	20%	115,386	80%	144,233	100%	28,847	80%	7,076	20%	35,923	100%
1962	28,080	20%	112,321	80%	140,401	100%	28,080	79%	7,436	21%	35,516	100%
1963	19,806	20%	79,225	80%	99,031	100%	19,806	72%	7,696	28%	27,502	100%
1964	25,741	20%	102,966	80%	128,707	100%	25,741	81%	6,129	19%	31,870	100%
1965	27,120	20%	108,480	80%	135,600	100%	27,120	86%	4,254	14%	31,374	100%
1966	24,510	20%	98,038	80%	122,548	100%	24,510	84%	4,587	16%	29,097	100%
1967	21,404	20%	85,614	80%	107,018	100%	21,404	80%	5,193	20%	26,597	100%
1968	19,510	20%	78,042	80%	97,552	100%	19,510	92%	1,633	8%	21,143	100%
1969	36,675	20%	146,698	80%	183,373	100%	36,675	89%	4,399	11%	41,074	100%
1970	53,019	20%	212,077	80%	265,096	100%	53,019	94%	3,091	6%	56,110	100%
1971	49,351	20%	197,405	80%	246,756	100%	49,351	96%	1,911	4%	51,262	100%
1972	37,636	20%	150,542	80%	188,178	100%	37,636	94%	2,532	6%	40,168	100%
1973	57,152	20%	228,608	80%	285,760	100%	57,152	94%	3,935	6%	61,087	100%
1974	76,710	20%	306,842	80%	383,552	100%	76,710	94%	4,646	6%	81,356	100%
1975	72,320	20%	289,280	80%	361,600	100%	72,320	88%	9,600	12%	81,920	100%
1976	45,743	20%	182,974	80%	228,717	100%	45,743	96%	2,100	4%	47,843	100%
1977	68,151	20%	272,606	80%	340,757	100%	68,151	91%	6,919	9%	75,070	100%
1978	66,250	20%	265,000	80%	331,250	100%	66,250	94%	4,566	6%	70,816	100%
1979	118,659	20%	474,634	80%	593,293	100%	118,659	84%	22,084	16%	140,743	100%
1980	93,217	20%	372,870	80%	466,087	100%	93,217	85%	16,218	15%	109,435	100%
1981	130,995	20%	523,981	80%	654,976	100%	130,995	87%	19,281	13%	150,276	100%
1982	71,417	20%	285,667	80%	357,084	100%	71,417	83%	15,091	17%	86,508	100%
1983	99,105	20%	396,421	80%	495,526	100%	99,105	78%	27,490	22%	126,595	100%
1984	76,611	20%	306,444	80%	383,055	100%	76,611	75%	25,267	25%	101,878	100%
1985	94,843	20%	379,373	80%	474,216	100%	94,843	72%	37,765	28%	132,608	100%
1986	60,697	20%	242,788	80%	303,485	100%	60,697	81%	13,886	19%	74,583	100%
1987	72,333	20%	289,330	80%	361,663	100%	72,333	62%	44,345	38%	116,678	100%
1988	63,935	20%	255,742	80%	319,677	100%	63,935	66%	32,494	34%	96,429	100%
1989	103,631	20%	414,526	80%	518,157	100%	103,631	84%	20,111	16%	123,742	100%
1990	63,296	20%	253,182	80%	316,478	100%	63,296	67%	31,212	33%	94,508	100%
1991	80,736	20%	322,942	80%	403,678	100%	80,736	70%	33,842	30%	114,578	100%
1992	25,606	20%	102,425	80%	128,031	100%	25,606	58%	18,880	42%	44,486	100%
1993	15,385	20%	61,540	80%	76,925	100%	15,385	55%	12,422	45%	27,807	100%
1994	26,243	20%	104,974	80%	131,217	100%	26,243	43%	35,354	57%	61,597	100%
1995	83,109	20%	332,438	80%	415,547	100%	83,109	67%	40,111	33%	123,220	100%
1996	47,737	20%	190,949	80%	238,686	100%	47,737	69%	21,329	31%	69,066	100%
1997	30,722	20%	122,890	80%	153,612	100%	30,722	77%	9,286	23%	40,008	100%
1998	12,603	20%	50,413	80%	63,016	100%	12,603	88%	1,745	12%	14,348	100%

Continued

Table 2 Page 2 of 3.

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 5-Year Averages:</b>												
1961-65 AVG	25,919	20%	103,676	80%	129,594	100%	25,919	80%	6,518	20%	32,437	100%
1962-66 AVG	25,051	20%	100,206	80%	125,257	100%	25,051	81%	6,020	19%	31,072	100%
1963-67 AVG	23,716	20%	94,865	80%	118,581	100%	23,716	81%	5,572	19%	29,288	100%
1964-68 AVG	23,657	20%	94,628	80%	118,285	100%	23,657	85%	4,359	15%	28,016	100%
1965-69 AVG	25,844	20%	103,375	80%	129,218	100%	25,844	87%	4,013	13%	29,857	100%
1966-70 AVG	31,023	20%	124,094	80%	155,117	100%	31,023	88%	3,781	12%	34,804	100%
1967-71 AVG	35,992	20%	143,967	80%	179,959	100%	35,992	91%	3,245	9%	39,237	100%
1968-72 AVG	39,238	20%	156,953	80%	196,191	100%	39,238	93%	2,713	7%	41,951	100%
1969-73 AVG	46,767	20%	187,066	80%	233,833	100%	46,767	93%	3,174	7%	49,940	100%
1970-74 AVG	54,774	20%	219,095	80%	273,868	100%	54,774	94%	3,223	6%	57,997	100%
1971-75 AVG	58,634	20%	234,535	80%	293,169	100%	58,634	93%	4,525	7%	63,159	100%
1972-76 AVG	57,912	20%	231,649	80%	289,561	100%	57,912	93%	4,563	7%	62,475	100%
1973-77 AVG	64,015	20%	256,062	80%	320,077	100%	64,015	93%	5,440	7%	69,455	100%
1974-78 AVG	65,835	20%	263,340	80%	329,175	100%	65,835	93%	5,566	7%	71,401	100%
1975-79 AVG	74,225	20%	296,899	80%	371,123	100%	74,225	91%	9,054	9%	83,278	100%
1976-80 AVG	78,404	20%	313,617	80%	392,021	100%	78,404	90%	10,377	10%	88,782	100%
1977-81 AVG	95,455	20%	381,818	80%	477,273	100%	95,455	88%	13,814	12%	109,268	100%
1978-82 AVG	96,108	20%	384,430	80%	480,538	100%	96,108	87%	15,448	13%	111,556	100%
1979-83 AVG	102,679	20%	410,715	80%	513,393	100%	102,679	83%	20,033	17%	122,711	100%
1980-84 AVG	94,269	20%	377,076	80%	471,346	100%	94,269	82%	20,669	18%	114,939	100%
1981-85 AVG	94,594	20%	378,377	80%	472,971	100%	94,594	79%	24,979	21%	119,573	100%
1982-86 AVG	80,535	20%	322,139	80%	402,673	100%	80,535	78%	23,900	22%	104,434	100%
1983-87 AVG	80,718	20%	322,871	80%	403,589	100%	80,718	74%	29,751	26%	110,468	100%
1984-88 AVG	73,684	20%	294,735	80%	368,419	100%	73,684	71%	30,751	29%	104,435	100%
1985-89 AVG	79,088	20%	316,352	80%	395,440	100%	79,088	73%	29,720	27%	108,808	100%
1986-90 AVG	72,778	20%	291,114	80%	363,892	100%	72,778	72%	28,410	28%	101,188	100%
1987-91 AVG	76,786	20%	307,144	80%	383,931	100%	76,786	70%	32,401	30%	109,187	100%
1988-92 AVG	67,441	20%	269,763	80%	337,204	100%	67,441	69%	27,308	31%	94,749	100%
1989-93 AVG	57,731	20%	230,923	80%	288,654	100%	57,731	67%	23,293	33%	81,024	100%
1990-94 AVG	42,253	20%	169,013	80%	211,266	100%	42,253	59%	26,342	41%	68,595	100%
1991-95 AVG	46,216	20%	184,864	80%	231,080	100%	46,216	59%	28,122	41%	74,338	100%
1992-96 AVG	39,616	20%	158,465	80%	198,081	100%	39,616	58%	25,619	42%	65,235	100%
1993-97 AVG	40,639	20%	162,558	80%	203,197	100%	40,639	62%	23,700	38%	64,340	100%
1994-98 AVG	40,083	20%	160,332	80%	200,416	100%	40,083	69%	21,565	31%	61,648	100%

Continued

Table 2. Page 3 of 3.

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 10-Year Averages:</b>												
1961-70 AVG	28,471	20%	113,885	80%	142,356	100%	28,471	84%	5,149	16%	33,621	100%
1962-71 AVG	30,522	20%	122,087	80%	152,608	100%	30,522	86%	4,633	14%	35,155	100%
1963-72 AVG	31,477	20%	125,909	80%	157,386	100%	31,477	87%	4,143	13%	35,620	100%
1964-73 AVG	35,212	20%	140,847	80%	176,059	100%	35,212	89%	3,766	11%	38,978	100%
1965-74 AVG	40,309	20%	161,235	80%	201,543	100%	40,309	91%	3,618	9%	43,927	100%
1966-75 AVG	44,829	20%	179,315	80%	224,143	100%	44,829	91%	4,153	9%	48,981	100%
1967-76 AVG	46,952	20%	187,808	80%	234,760	100%	46,952	92%	3,904	8%	50,856	100%
1968-77 AVG	51,627	20%	206,507	80%	258,134	100%	51,627	93%	4,077	7%	55,703	100%
1969-78 AVG	56,301	20%	225,203	80%	281,504	100%	56,301	93%	4,370	7%	60,671	100%
1970-79 AVG	64,499	20%	257,997	80%	322,496	100%	64,499	92%	6,138	8%	70,638	100%
1971-80 AVG	68,519	20%	274,076	80%	342,595	100%	68,519	92%	7,451	8%	75,970	100%
1972-81 AVG	76,683	20%	306,734	80%	383,417	100%	76,683	91%	9,188	9%	85,872	100%
1973-82 AVG	80,062	20%	320,246	80%	400,308	100%	80,062	90%	10,444	10%	90,506	100%
1974-83 AVG	84,257	20%	337,027	80%	421,284	100%	84,257	88%	12,800	12%	97,056	100%
1975-84 AVG	84,247	20%	336,988	80%	421,235	100%	84,247	86%	14,862	14%	99,109	100%
1976-85 AVG	86,499	20%	345,997	80%	432,496	100%	86,499	84%	17,678	16%	104,177	100%
1977-86 AVG	87,995	20%	351,978	80%	439,973	100%	87,995	83%	18,857	17%	106,851	100%
1978-87 AVG	88,413	20%	353,651	80%	442,064	100%	88,413	80%	22,599	20%	111,012	100%
1979-88 AVG	88,181	20%	352,725	80%	440,906	100%	88,181	77%	25,392	23%	113,573	100%
1980-89 AVG	86,679	20%	346,714	80%	433,393	100%	86,679	77%	25,195	23%	111,873	100%
1981-90 AVG	83,686	20%	334,745	80%	418,432	100%	83,686	76%	26,694	24%	110,381	100%
1982-91 AVG	78,660	20%	314,642	80%	393,302	100%	78,660	74%	28,150	26%	106,811	100%
1983-92 AVG	74,079	20%	296,317	80%	370,397	100%	74,079	71%	28,529	29%	102,609	100%
1984-93 AVG	65,707	20%	262,829	80%	328,537	100%	65,707	69%	27,022	31%	92,730	100%
1985-94 AVG	60,671	20%	242,682	80%	303,353	100%	60,671	66%	28,031	34%	88,702	100%
1986-95 AVG	59,497	20%	237,989	80%	297,486	100%	59,497	65%	28,266	35%	87,763	100%
1987-96 AVG	58,201	20%	232,805	80%	291,006	100%	58,201	64%	29,010	36%	87,211	100%
1988-97 AVG	54,040	20%	216,161	80%	270,201	100%	54,040	66%	25,504	34%	79,544	100%
1989-98 AVG	48,907	20%	195,628	80%	244,535	100%	48,907	68%	22,429	32%	71,336	100%
<b>All-Years Average:</b>												
1961-98 AVG	56,024	20%	224,096	80%	280,119	100%	56,024	80%	14,893	20%	70,916	100%

<sup>1</sup> Data sources were JTC (1998) for 1961-1997 harvests, and preliminary information for 1998 harvests. The stock composition percentage that was applied to the Alaska harvest was a selected scenario level for illustration purposes; reliable stock composition estimates are lacking

Table 3. Alaska harvest of Yukon River fall chum salmon, 1961-98, with an approximation of the Canadian mainstem Yukon stock component based upon the assumption that a fixed 10% of the annual Alaska harvest is of the Canadian mainstem Yukon stock, and Canadian harvest of mainstem Yukon fall chum salmon, 1961-98.<sup>1</sup>

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
1961	14,423	10%	129,810	90%	144,233	100%	14,423	67%	7,076	33%	21,499	100%
1962	14,040	10%	126,361	90%	140,401	100%	14,040	65%	7,436	35%	21,476	100%
1963	9,903	10%	89,128	90%	99,031	100%	9,903	56%	7,696	44%	17,599	100%
1964	12,871	10%	115,836	90%	128,707	100%	12,871	68%	6,129	32%	19,000	100%
1965	13,560	10%	122,040	90%	135,600	100%	13,560	76%	4,254	24%	17,814	100%
1966	12,255	10%	110,293	90%	122,548	100%	12,255	73%	4,587	27%	16,842	100%
1967	10,702	10%	96,316	90%	107,018	100%	10,702	67%	5,193	33%	15,895	100%
1968	9,755	10%	87,797	90%	97,552	100%	9,755	86%	1,633	14%	11,388	100%
1969	18,337	10%	165,036	90%	183,373	100%	18,337	81%	4,399	19%	22,736	100%
1970	26,510	10%	238,586	90%	265,096	100%	26,510	90%	3,091	10%	29,601	100%
1971	24,676	10%	222,080	90%	246,756	100%	24,676	93%	1,911	7%	26,587	100%
1972	18,818	10%	169,360	90%	188,178	100%	18,818	88%	2,532	12%	21,350	100%
1973	28,576	10%	257,184	90%	285,760	100%	28,576	88%	3,935	12%	32,511	100%
1974	38,355	10%	345,197	90%	383,552	100%	38,355	89%	4,646	11%	43,001	100%
1975	36,160	10%	325,440	90%	361,600	100%	36,160	79%	9,600	21%	45,760	100%
1976	22,872	10%	205,845	90%	228,717	100%	22,872	92%	2,100	8%	24,972	100%
1977	34,076	10%	306,681	90%	340,757	100%	34,076	83%	6,919	17%	40,995	100%
1978	33,125	10%	298,125	90%	331,250	100%	33,125	88%	4,566	12%	37,691	100%
1979	59,329	10%	533,964	90%	593,293	100%	59,329	73%	22,084	27%	81,413	100%
1980	46,609	10%	419,478	90%	466,087	100%	46,609	74%	16,218	26%	62,827	100%
1981	65,498	10%	589,478	90%	654,976	100%	65,498	77%	19,281	23%	84,779	100%
1982	35,708	10%	321,376	90%	357,084	100%	35,708	70%	15,091	30%	50,799	100%
1983	49,553	10%	445,973	90%	495,526	100%	49,553	64%	27,490	36%	77,043	100%
1984	38,306	10%	344,750	90%	383,055	100%	38,306	60%	25,267	40%	63,573	100%
1985	47,422	10%	426,794	90%	474,216	100%	47,422	56%	37,765	44%	85,187	100%
1986	30,349	10%	273,137	90%	303,485	100%	30,349	69%	13,886	31%	44,235	100%
1987	36,166	10%	325,497	90%	361,663	100%	36,166	45%	44,345	55%	80,511	100%
1988	31,968	10%	287,709	90%	319,677	100%	31,968	50%	32,494	50%	64,462	100%
1989	51,816	10%	466,341	90%	518,157	100%	51,816	72%	20,111	28%	71,927	100%
1990	31,648	10%	284,830	90%	316,478	100%	31,648	50%	31,212	50%	62,860	100%
1991	40,368	10%	363,310	90%	403,678	100%	40,368	54%	33,842	46%	74,210	100%
1992	12,803	10%	115,228	90%	128,031	100%	12,803	40%	18,880	60%	31,683	100%
1993	7,693	10%	69,233	90%	76,925	100%	7,693	38%	12,422	62%	20,115	100%
1994	13,122	10%	118,095	90%	131,217	100%	13,122	27%	35,354	73%	48,476	100%
1995	41,555	10%	373,992	90%	415,547	100%	41,555	51%	40,111	49%	81,666	100%
1996	23,869	10%	214,817	90%	238,686	100%	23,869	53%	21,329	47%	45,198	100%
1997	15,361	10%	138,251	90%	153,612	100%	15,361	62%	9,286	38%	24,647	100%
1998	6,302	10%	56,714	90%	63,016	100%	6,302	78%	1,745	22%	8,047	100%

Continued

Table 3 Page 2 of 3

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 5-Year Averages:</b>												
1961-65 AVG	12,959	10%	116,635	90%	129,594	100%	12,959	67%	6,518	33%	19,478	100%
1962-66 AVG	12,526	10%	112,732	90%	125,257	100%	12,526	68%	6,020	32%	18,546	100%
1963-67 AVG	11,858	10%	106,723	90%	118,581	100%	11,858	68%	5,572	32%	17,430	100%
1964-68 AVG	11,829	10%	106,457	90%	118,285	100%	11,829	74%	4,359	26%	16,188	100%
1965-69 AVG	12,922	10%	116,296	90%	129,218	100%	12,922	77%	4,013	23%	16,935	100%
1966-70 AVG	15,512	10%	139,606	90%	155,117	100%	15,512	79%	3,781	21%	19,292	100%
1967-71 AVG	17,996	10%	161,963	90%	179,959	100%	17,996	83%	3,245	17%	21,241	100%
1968-72 AVG	19,619	10%	176,572	90%	196,191	100%	19,619	87%	2,713	13%	22,332	100%
1969-73 AVG	23,383	10%	210,449	90%	233,833	100%	23,383	88%	3,174	12%	26,557	100%
1970-74 AVG	27,387	10%	246,482	90%	273,868	100%	27,387	90%	3,223	10%	30,610	100%
1971-75 AVG	29,317	10%	263,852	90%	293,169	100%	29,317	87%	4,525	13%	33,842	100%
1972-76 AVG	28,956	10%	260,605	90%	289,561	100%	28,956	87%	4,563	13%	33,519	100%
1973-77 AVG	32,008	10%	288,069	90%	320,077	100%	32,008	86%	5,440	14%	37,448	100%
1974-78 AVG	32,918	10%	296,258	90%	329,175	100%	32,918	86%	5,566	14%	38,484	100%
1975-79 AVG	37,112	10%	334,011	90%	371,123	100%	37,112	83%	9,054	17%	46,166	100%
1976-80 AVG	39,202	10%	352,819	90%	392,021	100%	39,202	82%	10,377	18%	49,579	100%
1977-81 AVG	47,727	10%	429,545	90%	477,273	100%	47,727	79%	13,814	21%	61,541	100%
1978-82 AVG	48,054	10%	432,484	90%	480,538	100%	48,054	76%	15,448	24%	63,502	100%
1979-83 AVG	51,339	10%	462,054	90%	513,393	100%	51,339	72%	20,033	28%	71,372	100%
1980-84 AVG	47,135	10%	424,211	90%	471,346	100%	47,135	69%	20,669	31%	67,804	100%
1981-85 AVG	47,297	10%	425,674	90%	472,971	100%	47,297	66%	24,979	34%	72,276	100%
1982-86 AVG	40,267	10%	362,406	90%	402,673	100%	40,267	64%	23,900	36%	64,167	100%
1983-87 AVG	40,359	10%	363,230	90%	403,589	100%	40,359	59%	29,751	41%	70,110	100%
1984-88 AVG	36,842	10%	331,577	90%	368,419	100%	36,842	56%	30,751	44%	67,593	100%
1985-89 AVG	39,544	10%	355,896	90%	395,440	100%	39,544	58%	29,720	42%	69,264	100%
1986-90 AVG	36,389	10%	327,503	90%	363,892	100%	36,389	57%	28,410	43%	64,799	100%
1987-91 AVG	38,393	10%	345,538	90%	383,931	100%	38,393	54%	32,401	46%	70,794	100%
1988-92 AVG	33,720	10%	303,484	90%	337,204	100%	33,720	53%	27,308	47%	61,028	100%
1989-93 AVG	28,865	10%	259,788	90%	288,654	100%	28,865	51%	23,293	49%	52,159	100%
1990-94 AVG	21,127	10%	190,139	90%	211,266	100%	21,127	42%	26,342	58%	47,469	100%
1991-95 AVG	23,108	10%	207,972	90%	231,080	100%	23,108	42%	28,122	58%	51,230	100%
1992-96 AVG	19,808	10%	178,273	90%	198,081	100%	19,808	42%	25,619	58%	45,427	100%
1993-97 AVG	20,320	10%	182,878	90%	203,197	100%	20,320	46%	23,700	54%	44,020	100%
1994-98 AVG	20,042	10%	180,374	90%	200,416	100%	20,042	54%	21,565	46%	41,607	100%

Continued

Table 3. Page 3 of 3

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 10-Year Averages:</b>												
1961-70 AVG	14,236	10%	128,120	90%	142,356	100%	14,236	73%	5,149	27%	19,385	100%
1962-71 AVG	15,261	10%	137,347	90%	152,608	100%	15,261	75%	4,633	25%	19,894	100%
1963-72 AVG	15,739	10%	141,647	90%	157,386	100%	15,739	78%	4,143	22%	19,881	100%
1964-73 AVG	17,606	10%	158,453	90%	176,059	100%	17,606	81%	3,766	19%	21,372	100%
1965-74 AVG	20,154	10%	181,389	90%	201,543	100%	20,154	83%	3,618	17%	23,772	100%
1966-75 AVG	22,414	10%	201,729	90%	224,143	100%	22,414	83%	4,153	17%	26,567	100%
1967-76 AVG	23,476	10%	211,284	90%	234,760	100%	23,476	85%	3,904	15%	27,380	100%
1968-77 AVG	25,813	10%	232,321	90%	258,134	100%	25,813	87%	4,077	13%	29,890	100%
1969-78 AVG	28,150	10%	253,354	90%	281,504	100%	28,150	87%	4,370	13%	32,520	100%
1970-79 AVG	32,250	10%	290,246	90%	322,496	100%	32,250	86%	6,138	14%	38,388	100%
1971-80 AVG	34,260	10%	308,336	90%	342,595	100%	34,260	85%	7,451	15%	41,711	100%
1972-81 AVG	38,342	10%	345,075	90%	383,417	100%	38,342	83%	9,188	17%	47,530	100%
1973-82 AVG	40,031	10%	360,277	90%	400,308	100%	40,031	81%	10,444	19%	50,475	100%
1974-83 AVG	42,128	10%	379,156	90%	421,284	100%	42,128	79%	12,800	21%	54,928	100%
1975-84 AVG	42,123	10%	379,111	90%	421,235	100%	42,123	76%	14,862	24%	56,985	100%
1976-85 AVG	43,250	10%	389,246	90%	432,496	100%	43,250	74%	17,678	26%	60,928	100%
1977-86 AVG	43,997	10%	395,976	90%	439,973	100%	43,997	71%	18,857	29%	62,854	100%
1978-87 AVG	44,206	10%	397,857	90%	442,064	100%	44,206	68%	22,599	32%	66,806	100%
1979-88 AVG	44,091	10%	396,816	90%	440,906	100%	44,091	64%	25,392	36%	69,483	100%
1980-89 AVG	43,339	10%	390,053	90%	433,393	100%	43,339	64%	25,195	36%	68,534	100%
1981-90 AVG	41,843	10%	376,589	90%	418,432	100%	41,843	61%	26,694	39%	68,537	100%
1982-91 AVG	39,330	10%	353,972	90%	393,302	100%	39,330	59%	28,150	41%	67,480	100%
1983-92 AVG	37,040	10%	333,357	90%	370,397	100%	37,040	56%	28,529	44%	65,569	100%
1984-93 AVG	32,854	10%	295,683	90%	328,537	100%	32,854	53%	27,022	47%	59,876	100%
1985-94 AVG	30,335	10%	273,017	90%	303,353	100%	30,335	50%	28,031	50%	58,366	100%
1986-95 AVG	29,749	10%	267,737	90%	297,486	100%	29,749	50%	28,266	50%	58,014	100%
1987-96 AVG	29,101	10%	261,905	90%	291,006	100%	29,101	48%	29,010	52%	58,111	100%
1988-97 AVG	27,020	10%	243,181	90%	270,201	100%	27,020	50%	25,504	50%	52,524	100%
1989-98 AVG	24,453	10%	220,081	90%	244,535	100%	24,453	53%	22,429	47%	46,883	100%
<b>All-Years Average:</b>												
1961-98 AVG	28,012	10%	252,107	90%	280,119	100%	28,012	68%	14,893	32%	42,904	100%

<sup>1</sup> Data sources were JTC (1998) for 1961-1997 harvests, and preliminary information for 1998 harvests. The stock composition percentage that was applied to the Alaska harvest was a selected scenario level for illustration purposes; reliable stock composition estimates are lacking.

Table 4 Alaska harvest of Yukon River fall chum salmon, 1961-98, with an approximation of the Canadian mainstem Yukon stock component based upon the assumption that a fixed 30% of the annual Alaska harvest is of the Canadian mainstem Yukon stock, and Canadian harvest of mainstem Yukon fall chum salmon, 1961-98. <sup>1</sup>

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
1961	43,270	30%	100,963	70%	144,233	100%	43,270	86%	7,076	14%	50,346	100%
1962	42,120	30%	98,281	70%	140,401	100%	42,120	85%	7,436	15%	49,556	100%
1963	29,709	30%	69,322	70%	99,031	100%	29,709	79%	7,696	21%	37,405	100%
1964	38,612	30%	90,095	70%	128,707	100%	38,612	86%	6,129	14%	44,741	100%
1965	40,680	30%	94,920	70%	135,600	100%	40,680	91%	4,254	9%	44,934	100%
1966	36,764	30%	85,784	70%	122,548	100%	36,764	89%	4,587	11%	41,351	100%
1967	32,105	30%	74,913	70%	107,018	100%	32,105	86%	5,193	14%	37,298	100%
1968	29,266	30%	68,286	70%	97,552	100%	29,266	95%	1,633	5%	30,899	100%
1969	55,012	30%	128,361	70%	183,373	100%	55,012	93%	4,399	7%	59,411	100%
1970	79,529	30%	185,567	70%	265,096	100%	79,529	96%	3,091	4%	82,620	100%
1971	74,027	30%	172,729	70%	246,756	100%	74,027	97%	1,911	3%	75,938	100%
1972	56,453	30%	131,725	70%	188,178	100%	56,453	96%	2,532	4%	58,985	100%
1973	85,728	30%	200,032	70%	285,760	100%	85,728	96%	3,935	4%	89,663	100%
1974	115,066	30%	268,486	70%	383,552	100%	115,066	96%	4,646	4%	119,712	100%
1975	108,480	30%	253,120	70%	361,600	100%	108,480	92%	9,600	8%	118,080	100%
1976	68,615	30%	160,102	70%	228,717	100%	68,615	97%	2,100	3%	70,715	100%
1977	102,227	30%	238,530	70%	340,757	100%	102,227	94%	6,919	6%	109,146	100%
1978	99,375	30%	231,875	70%	331,250	100%	99,375	96%	4,566	4%	103,941	100%
1979	177,988	30%	415,305	70%	593,293	100%	177,988	89%	22,084	11%	200,072	100%
1980	139,826	30%	326,261	70%	466,087	100%	139,826	90%	16,218	10%	156,044	100%
1981	196,493	30%	458,483	70%	654,976	100%	196,493	91%	19,281	9%	215,774	100%
1982	107,125	30%	249,959	70%	357,084	100%	107,125	88%	15,091	12%	122,216	100%
1983	148,658	30%	346,868	70%	495,526	100%	148,658	84%	27,490	16%	176,148	100%
1984	114,917	30%	268,139	70%	383,055	100%	114,917	82%	25,267	18%	140,184	100%
1985	142,265	30%	331,951	70%	474,216	100%	142,265	79%	37,765	21%	180,030	100%
1986	91,046	30%	212,440	70%	303,485	100%	91,046	87%	13,886	13%	104,932	100%
1987	108,499	30%	253,164	70%	361,663	100%	108,499	71%	44,345	29%	152,844	100%
1988	95,903	30%	223,774	70%	319,677	100%	95,903	75%	32,494	25%	128,397	100%
1989	155,447	30%	362,710	70%	518,157	100%	155,447	89%	20,111	11%	175,558	100%
1990	94,943	30%	221,535	70%	316,478	100%	94,943	75%	31,212	25%	126,155	100%
1991	121,103	30%	282,575	70%	403,678	100%	121,103	78%	33,842	22%	154,945	100%
1992	38,409	30%	89,622	70%	128,031	100%	38,409	67%	18,880	33%	57,289	100%
1993	23,078	30%	53,848	70%	76,925	100%	23,078	65%	12,422	35%	35,500	100%
1994	39,365	30%	91,852	70%	131,217	100%	39,365	53%	35,354	47%	74,719	100%
1995	124,664	30%	290,883	70%	415,547	100%	124,664	76%	40,111	24%	164,775	100%
1996	71,606	30%	167,080	70%	238,686	100%	71,606	77%	21,329	23%	92,935	100%
1997	46,084	30%	107,528	70%	153,612	100%	46,084	83%	9,286	17%	55,370	100%
1998	18,905	30%	44,111	70%	63,016	100%	18,905	92%	1,745	8%	20,650	100%

Continued

Table 4. Page 2 of 3.

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 5-Year Averages:</b>												
1961-65 AVG	38,878	30%	90,716	70%	129,594	100%	38,878	85%	6,518	15%	45,397	100%
1962-66 AVG	37,577	30%	87,680	70%	125,257	100%	37,577	86%	6,020	14%	43,598	100%
1963-67 AVG	35,574	30%	83,007	70%	118,581	100%	35,574	86%	5,572	14%	41,146	100%
1964-68 AVG	35,486	30%	82,800	70%	118,285	100%	35,486	89%	4,359	11%	39,845	100%
1965-69 AVG	38,765	30%	90,453	70%	129,218	100%	38,765	91%	4,013	9%	42,779	100%
1966-70 AVG	46,535	30%	108,582	70%	155,117	100%	46,535	92%	3,781	8%	50,316	100%
1967-71 AVG	53,988	30%	125,971	70%	179,959	100%	53,988	93%	3,245	7%	57,233	100%
1968-72 AVG	58,857	30%	137,334	70%	196,191	100%	58,857	95%	2,713	5%	61,571	100%
1969-73 AVG	70,150	30%	163,683	70%	233,833	100%	70,150	96%	3,174	4%	73,323	100%
1970-74 AVG	82,161	30%	191,708	70%	273,868	100%	82,161	96%	3,223	4%	85,384	100%
1971-75 AVG	87,951	30%	205,218	70%	293,169	100%	87,951	95%	4,525	5%	92,476	100%
1972-76 AVG	86,868	30%	202,693	70%	289,561	100%	86,868	95%	4,563	5%	91,431	100%
1973-77 AVG	96,023	30%	224,054	70%	320,077	100%	96,023	95%	5,440	5%	101,463	100%
1974-78 AVG	98,753	30%	230,423	70%	329,175	100%	98,753	95%	5,566	5%	104,319	100%
1975-79 AVG	111,337	30%	259,786	70%	371,123	100%	111,337	93%	9,054	7%	120,391	100%
1976-80 AVG	117,606	30%	274,415	70%	392,021	100%	117,606	93%	10,377	7%	127,984	100%
1977-81 AVG	143,182	30%	334,091	70%	477,273	100%	143,182	92%	13,814	8%	156,995	100%
1978-82 AVG	144,161	30%	336,377	70%	480,538	100%	144,161	91%	15,448	9%	159,609	100%
1979-83 AVG	154,018	30%	359,375	70%	513,393	100%	154,018	88%	20,033	12%	174,051	100%
1980-84 AVG	141,404	30%	329,942	70%	471,346	100%	141,404	87%	20,669	13%	162,073	100%
1981-85 AVG	141,891	30%	331,080	70%	472,971	100%	141,891	85%	24,979	15%	166,870	100%
1982-86 AVG	120,802	30%	281,871	70%	402,673	100%	120,802	84%	23,900	16%	144,702	100%
1983-87 AVG	121,077	30%	282,512	70%	403,589	100%	121,077	81%	29,751	19%	150,827	100%
1984-88 AVG	110,526	30%	257,893	70%	368,419	100%	110,526	79%	30,751	21%	141,277	100%
1985-89 AVG	118,632	30%	276,808	70%	395,440	100%	118,632	80%	29,720	20%	148,352	100%
1986-90 AVG	109,168	30%	254,724	70%	363,892	100%	109,168	79%	28,410	21%	137,577	100%
1987-91 AVG	115,179	30%	268,751	70%	383,931	100%	115,179	78%	32,401	22%	147,580	100%
1988-92 AVG	101,161	30%	236,043	70%	337,204	100%	101,161	77%	27,308	23%	128,469	100%
1989-93 AVG	86,596	30%	202,058	70%	288,654	100%	86,596	75%	23,293	25%	109,890	100%
1990-94 AVG	63,380	30%	147,886	70%	211,266	100%	63,380	68%	26,342	32%	89,722	100%
1991-95 AVG	69,324	30%	161,756	70%	231,080	100%	69,324	68%	28,122	32%	97,446	100%
1992-96 AVG	59,424	30%	138,657	70%	198,081	100%	59,424	67%	25,619	33%	85,044	100%
1993-97 AVG	60,959	30%	142,238	70%	203,197	100%	60,959	71%	23,700	29%	84,660	100%
1994-98 AVG	60,125	30%	140,291	70%	200,416	100%	60,125	76%	21,565	24%	81,690	100%

Continued

Table 4 Page 3 of 3.

Year	Alaska Harvest						Harvest of Canadian Mainstem Yukon Stock					
	Canadian Mainstem Yukon Stock		Other Stocks		Total		Alaska		Canada		Total	
	Num	%	Num	%	Num	%	Num	%	Num	%	Num	%
<b>Sequential 10-Year Averages:</b>												
1961-70 AVG	42,707	30%	99,649	70%	142,356	100%	42,707	89%	5,149	11%	47,856	100%
1962-71 AVG	45,782	30%	106,826	70%	152,608	100%	45,782	90%	4,633	10%	50,415	100%
1963-72 AVG	47,216	30%	110,170	70%	157,386	100%	47,216	91%	4,143	9%	51,358	100%
1964-73 AVG	52,818	30%	123,241	70%	176,059	100%	52,818	92%	3,766	8%	56,584	100%
1965-74 AVG	60,463	30%	141,080	70%	201,543	100%	60,463	93%	3,618	7%	64,081	100%
1966-75 AVG	67,243	30%	156,900	70%	224,143	100%	67,243	94%	4,153	6%	71,396	100%
1967-76 AVG	70,428	30%	164,332	70%	234,760	100%	70,428	94%	3,904	6%	74,332	100%
1968-77 AVG	77,440	30%	180,694	70%	258,134	100%	77,440	95%	4,077	5%	81,517	100%
1969-78 AVG	84,451	30%	197,053	70%	281,504	100%	84,451	95%	4,370	5%	88,821	100%
1970-79 AVG	96,749	30%	225,747	70%	322,496	100%	96,749	95%	6,138	5%	102,887	100%
1971-80 AVG	102,779	30%	239,817	70%	342,595	100%	102,779	94%	7,451	6%	110,230	100%
1972-81 AVG	115,025	30%	268,392	70%	383,417	100%	115,025	94%	9,188	6%	124,213	100%
1973-82 AVG	120,092	30%	280,215	70%	400,308	100%	120,092	93%	10,444	7%	130,536	100%
1974-83 AVG	126,385	30%	294,899	70%	421,284	100%	126,385	92%	12,800	8%	139,185	100%
1975-84 AVG	126,370	30%	294,864	70%	421,235	100%	126,370	90%	14,862	10%	141,232	100%
1976-85 AVG	129,749	30%	302,747	70%	432,496	100%	129,749	89%	17,678	11%	147,427	100%
1977-86 AVG	131,992	30%	307,981	70%	439,973	100%	131,992	88%	18,857	12%	150,849	100%
1978-87 AVG	132,619	30%	309,444	70%	442,064	100%	132,619	86%	22,599	14%	155,218	100%
1979-88 AVG	132,272	30%	308,634	70%	440,906	100%	132,272	84%	25,392	16%	157,664	100%
1980-89 AVG	130,018	30%	303,375	70%	433,393	100%	130,018	83%	25,195	17%	155,213	100%
1981-90 AVG	125,530	30%	292,902	70%	418,432	100%	125,530	82%	26,694	18%	152,224	100%
1982-91 AVG	117,991	30%	275,311	70%	393,302	100%	117,991	81%	28,150	19%	146,141	100%
1983-92 AVG	111,119	30%	259,278	70%	370,397	100%	111,119	79%	28,529	21%	139,648	100%
1984-93 AVG	98,561	30%	229,976	70%	328,537	100%	98,561	77%	27,022	23%	125,583	100%
1985-94 AVG	91,006	30%	212,347	70%	303,353	100%	91,006	74%	28,031	26%	119,037	100%
1986-95 AVG	89,246	30%	208,240	70%	297,486	100%	89,246	73%	28,266	27%	117,511	100%
1987-96 AVG	87,302	30%	203,704	70%	291,006	100%	87,302	73%	29,010	27%	116,312	100%
1988-97 AVG	81,060	30%	189,141	70%	270,201	100%	81,060	74%	25,504	26%	106,564	100%
1989-98 AVG	73,360	30%	171,174	70%	244,535	100%	73,360	75%	22,429	25%	95,790	100%
<b>All-Years Average:</b>												
1961-98 AVG	84,036	30%	196,084	70%	280,119	100%	84,036	85%	14,893	15%	98,928	100%

<sup>1</sup> Data sources were JTC (1998) for 1961-1997 harvests, and preliminary information for 1998 harvests. The stock composition percentage that was applied to the Alaska harvest was a selected scenario level for illustration purposes; reliable stock composition estimates are lacking

