



YUKON RIVER FALL CHUM SALMON STOCK STATUS AND ACTION PLAN

A Report to the Alaska Board of Fisheries

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EXECUTIVE SUMMARY

Synopsis

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (SSFP) 5 AAC 39.222, the Alaska Board of Fisheries (Board) classified the Yukon River fall chum salmon stock as a yield concern and classified the Toklat and Fishing Branch Rivers fall chum salmon stocks as management concerns at the September 2000 work session. An action plan was subsequently developed by the Alaska Department of Fish and Game (ADF&G) and acted upon by the Board in January 2001. The SSFP directs ADF&G to assess salmon stocks within areas addressed during the 2003-2004 regulatory cycle to identify stocks of concern and, in the case of Yukon River fall chum salmon, reassess the stock of concern status.

Based on definitions provided in SSFP (5 AAC 39.222(f)(21) and (42)), ADF&G recommended continuation of the Yukon River fall chum salmon stock as a yield concern at the October 2003 Board work session. ADF&G also recommended removing the Toklat and Fishing Branch River stocks from the additional designation as management concerns. The Yukon River fall salmon stock continues to meet the definition of a yield concern based on low harvest levels for the years of 1998 through 2002. Combined commercial and subsistence harvests show a substantial decrease in fall chum salmon yield from the 10-year period of 1989 to 1998 to the recent 5-year (1999-2003) average. Subsistence harvests have been considerably reduced during years of poor runs and commercial fishing was closed four out of the five years in attempts to manage conservatively to provide some subsistence fishing opportunity while endeavoring to meet escapement goals. Therefore, there has been a chronic inability to maintain near average yields despite specific management actions taken annually. The drainage-wide optimal escapement goal of 350,000 fall chum salmon was met twice (2002 and 2003) out of the last five years. Individual spawning escapement goals have been more difficult to meet and tend to vary each year depending on distribution of fish within the drainage. Most goals were not met in 2000 and the fall chum salmon run to the Porcupine River drainage was extremely weak from 1998 to 2000. Since 2000, the runs have been increasing, with 2003 substantially better than the last seven previous years. The Yukon River is a transboundary river with Canada (Figure 1) and is covered by an annex to the Pacific Salmon Treaty, the U.S./Canada Yukon River Salmon Agreement (Agreement). In recent years, because of the poor runs and the desire to rebuild Canadian mainstem stock and stabilize the Fishing Branch stock, the Yukon River Panel (Panel) has recommended escapement goals for Canadian-origin fall chum salmon that are below the goals established in the Agreement for those stocks.

Stock Assessment Background

Fall chum salmon run strength was poor from 1998 through 2002 with a dramatic improvement in drainage-wide run size in 2003. The drainage-wide optimal escapement goal of 350,000 fall chum salmon was met twice (2002 and 2003) out of the last five years (Figure 2). The goal was met by a wide margin in 2003 and most tributary escapement goals were generally met throughout the Alaska portion of the drainage in 2003 (Table 1). The year 2000 was the worst fall chum salmon run on record, with 1998 and 2001 close behind as all time low runs. Current fall chum salmon biological escapement goals within the Yukon River drainage were developed in 2000 (Eggers 2000) and reevaluated in 2003 (ADF&G, 2004).

Biological escapement goals in the Chandalar and Delta Rivers have been met or exceeded the past nine years, except for low escapements in 2000. The Sheenjek River biological escapement goal was met once (2001) since 1998 (Table 1). Escapement objectives for the Yukon River Canadian mainstem and Fishing Branch fall chum salmon stocks were originally established by the U.S./Canada Joint Technical Committee (JTC) and specifically stipulated in the Agreement. However, during the 1990s a three cycle rebuilding plan was in place for the Canadian Yukon River mainstem stock, so annual escapement objectives were below the JTC established goals. Because of recent poor runs, the Panel in 2003 again recommended a lower escapement goal for the Canadian mainstem fall chum salmon stock to allow for some U.S. subsistence and Canadian aboriginal harvest while rebuilding the stock over three life cycles. The escapement objective of >80,000 for this stock, established by the JTC, was exceeded in both 2002 and 2003. Escapement in the Fishing Branch River in Canada, although improved in 2003, has not met the JTC goal established in 1987 of 50,000 to 120,000 fall chum salmon since 1996. ADF&G recommend a biological escapement goal range for this stock of 27,000 to 56,000 (Eggers 2001). This goal was developed by the department in conjunction with total run reconstruction analysis in 2000, but has only been met once (2003) since 1997. Like the Canadian mainstem stock, the Fishing Branch River fall chum salmon stock is managed based on recommendations of the Panel. For example, the Panel agreed to a stabilization management goal of 15,000 fish for the 2003 season, which was exceeded. Escapement goals for Canadian stocks are currently under review by the JTC.

The Toklat River remains a weak system when compared to the optimal escapement goal of 33,000 salmon, in regulation. The Board established this goal in 1993 based on the department escapement goal of a minimum of 33,000 fall chum salmon. The department established a new biological escapement goal range of 15,000 to 33,000 fall chum salmon based on total run reconstruction (Eggers 2001). Using the biological escapement goal range, the goal was met in 1998, 2002 and 2003. The results of mark-recapture projects on both the Kantishna and the Tanana Rivers suggest that the index streams of the Toklat and Delta Rivers support a relatively small proportion of the fall chum salmon and mainstem spawning is common in the upper reaches.

Some have criticized that over harvest caused poor runs in recent years. However, parent year escapement from 1994 through 1996 that produced the extremely poor fall chum salmon runs from 1998 – 2000 were some of the best escapements on record (Figure 2). Extremely poor production from those very good escapements, in some cases dramatically less than 1.0 return per spawner, resulted in the extremely poor runs from 1998 through 2000. Because escapements in these parent years were deemed more than adequate, the resulting poor runs cannot be attributed to over harvest. Most individuals in the scientific community attribute the recent poor runs to poor ocean environments. Poor wildstock runs have occurred throughout Western Alaska and also in Pacific Rim countries as well. Note, in the past there have been as bad or worse escapements as occurred in recent years and those parent years produced good runs.

Combined commercial and subsistence harvests show a substantial decrease in fall chum salmon yield from the 10-year period of 1989 to 1998 to the recent 5-year (1999-2003) average (Table 2 and 4). The recent 5-year (1999-2003) average harvest of approximately 55,500 fish is only 23% of the 1989 to 1998 average harvest of approximately 244,000 fish. Commercial harvests have

been practically non-existent and the subsistence harvest has been severely restricted and closed to meet escapement needs. The 2000 fall chum salmon run was the poorest on record with a subsistence harvest of approximately 19,000 fish. Commercial fishing was closed in 1998 and 2000 to 2002 along with restrictions and closures to the personal use and sport fisheries. Fall chum salmon harvests in Canada have also decreased in recent years (Table 3).

The 2003 fall chum salmon run was much stronger than anticipated and a small commercial harvest of 10,000 fish was taken. Because of conservative management and lack of markets for fall chum salmon after years of unreliable production, harvest was foregone. Subsistence harvests may have been reduced in the lower and middle Yukon River based on conservative management on the early portion of the run while assessments were being conducted. The bulk of the fall chum salmon run materialized late enough in the season to allow the majority of subsistence harvest to occur in the upper Yukon River. In addition, a large run of coho salmon augmented most fisheries where coho salmon were present. Because of these factors, the 2003 subsistence harvest of fall chum salmon is expected to be nearer to the recent low 5-year average than the previous ten-year average.

In summary, the available harvest in the years 1999 through 2002 was substantially less than the average yield from 1989 through 1998, with exceptions for 1992 and 1993, which were poor throughout Western Alaska. However, potential yield in 2003 was near the previous 10-year average (1989-1998).

STOCK OF CONCERN RECOMMENDATION

Based on the definitions provided in the sustainable salmon policy of 5 AAC 39.222(f)(21) and (42), the department recommends continuation of the Yukon River fall chum salmon stock as a yield concern. The Yukon River fall chum salmon stock continues to meet the definition of a yield concern based on low harvest levels since 1998. The recent 5-year average combined subsistence and commercial harvest of approximately 55,500 fish was 23% of the 1989 to 1998 average harvest of approximately 244,000 fish. Several individual fall chum salmon escapement goals were not met during the past five years even though extreme management actions were taken including substantial restriction and closures to all fisheries in attempts to provide for escapement needs. However the drainage-wide OEG of 350,000 fall chum salmon has been met in two of the last five years (2002 and 2003).

The department recommends using the biological escapement goal of 15,000 to 33,000, developed in 2000, to assess the Toklat River escapement during recent years rather than the OEG of 33,000 fall chum salmon, which was based on a BEG developed in the mid-1980s. Utilizing the recent BEG, the Toklat River does not meet the criteria for designation as a management concern since the goal was achieved in 1998, 2002 and 2003. The Toklat River stock will continue to be addressed by the overall fall chum salmon yield concern.

The department recommends removing the Fishing Branch River as a stock of management concern because this river lies entirely within Canada, and the JTC and Yukon River Panel will address escapement targets and management strategies annually. Similar to the Toklat River fall chum salmon stock, it will continue to be addressed under the fall chum salmon yield concern

and will be managed conservatively under the Yukon River Drainage Fall Chum Salmon Management Plan.

Outlook

The preliminary outlook for 2004 is for a fall chum salmon run size ranging from 400,000 to 800,000. In the past, fall chum salmon have shown an odd-even year abundance cycle. The 2003 return of 4-year-old component was excellent and hopefully an indication of increased ocean survival and an indicator of a strong 5-year-old age class return in 2004. It remains to be seen if the 4-year-olds are also strong during an even numbered year, however this return will be from the 2000 parent year, which was the lowest run on record. Information from Bering Sea studies (BASIS) and trawl bycatch data indicate a higher abundance of all salmon species than last year. Depending on the origination of these salmon, the 2004 run may be near average for an even numbered year. Given the inherent difficulties in managing this complex fishery, the yield in 2004 may be near the even-year long-term average and would be anticipated to provide for normal subsistence harvests.

Alaska Board of Fisheries Action

In response to the guidelines established in the Sustainable Salmon Fisheries Policy, it is anticipated that the Board, during the January 12–19, 2004 regulatory meeting, will continue the stock of concern classification for the Yukon River fall chum salmon stock as a yield concern and remove the individual management concern designations for the Toklat River (new BEG range) and Fishing Branch River (jurisdiction issue).

ESCAPEMENT GOAL EVALUATION

The department has undertaken a review of escapement goals for several Yukon River fall chum salmon stocks where long-term escapement, catch, and age composition data exist that enable the development of biological escapement goals based on analysis of production consistent with the escapement goal policy. Escapement goals developed in 2000 (Eggers 2001) were reviewed for this Board cycle with additional data (ADF&G 2004). These fall chum salmon escapement goals include the Tanana, Delta, Toklat, Chandalar, Sheenjek, and Fishing Branch Rivers, as well as the Upper Yukon Mainstem (into Canada), Upper Yukon River tributaries (Chandalar, Sheenjek, and Fishing Branch combined), and the Yukon River drainage-wide escapement goal. Note, however, that the JTC has not accepted the biological escapement goals developed for the Canadian-origin stocks. Goals for these stocks are still under JTC review. Utilizing additional data since the 2000 review for fall chum salmon resulted in no changes in BEGs at this time (ADF&G 2004).

An Agreement between U.S. and Canadian governments was signed in 2002. As per the Agreement, the escapement goal for Canada is greater than 80,000 fall chum salmon. However, the Panel may recommend spawning escapement objectives for implementation by the Parties through their management entities; and may revise the spawning escapement objectives for rebuilt stocks. In March of 2003, the Panel agreed to a three cycle rebuilding plan for the Canadian mainstem fall chum salmon stock. The Panel agreed to an interim minimum spawning escapement objective for Canadian mainstem Yukon River of 65,000 fall chum salmon with an

increase to 72,000 in 2007 and an additional increase to 80,000 by 2011. In addition, the Panel agreed to a one-year stabilization goal of 15,000 fish for the Fishing Branch River in March 2003.

List of Current and Proposed BEGs for Yukon River Fall Chum Salmon.

Stream	Current Goal	Recommended Range	Type of Goal
Yukon River Drainage	OEG of 350,000	300,000-600,000	BEG
Tanana River Drainage	61,000-136,000	No Change	BEG
Delta River	6,000-13,000	No Change	BEG
Toklat River	15,000-33,000	No Change	BEG
Upper Yukon Tributaries	152,000-312,000	No Change	BEG
Chandalar River	74,000-152,000	No Change	BEG
Sheenjek River	50,000-104,000	No Change	BEG
*Fishing Branch River	50,000-120,000	27,000-56,000	Negotiated
*Upper Yukon River Mainstem	>80,000	60,000-129,000	Negotiated

*Fishing Branch and Upper Yukon Mainstem inseason escapement objectives may be adjusted by the US/Canada Panel prior to each season.

MANAGEMENT ACTION PLAN OPTIONS FOR ADDRESSING STOCK OF CONCERN AS OUTLINED IN THE SUSTAINABLE FISHERIES POLICY

Yukon River Fall Chum Salmon Management Plan Review/Development

Current Stock Status

In response to the guidelines established in the Sustainable Salmon Fisheries Policy (5 AAC 39.222), the department recommended the continuation of the stock of concern classification for the Yukon River fall chum salmon stock as a stock of yield concern at the October 2003 Board of Fisheries work session. The Board of Fisheries, after reviewing stock status information and public input during the January 2004 regulatory meeting, is anticipated to continue the stock of concern classification for Yukon River fall chum salmon stock as a yield concern. This determination was based on the continued inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock's escapement needs for four of the last five years.

C&T Use Finding and the Amount Necessary

In 1993, the Board of Fisheries made a positive finding for Customary and Traditional Use for all salmon in the Yukon-Northern Area. In 2001, the department recommended that the Board amend 5 AAC 01.236 to include a revised finding of the amount necessary for subsistence (ANS) for the Yukon Area using updated subsistence harvest data. After a thorough review of various options, the Board made a finding of the ANS for the Yukon Area by species.

ANS Range for the Yukon River Drainage by Species

Chinook Salmon	45,500 – 66,704
Summer Chum Salmon	83,500 – 142,192
Fall Chum Salmon	89,500 – 167,100
Coho Salmon	20,500 – 51,980

The ANS range finding by species for the entire Yukon River uses the low subsistence harvest rounded to the nearest 500 fish and the actual high subsistence harvest estimate during the ten-year period of 1990 to 1999 using the table below. The department recommends no change to current ANS finding, except for correcting the upper end of the fall chum salmon range from 167,100 to 167,900. Several poor runs and lack of commercial fishing opportunity after 1999 has seriously altered the historical subsistence fishing patterns and therefore recent harvests.

Yukon River Subsistence Salmon Harvests, Coastal District and Districts 1-6, 1990-99					
<u>Year</u>	<u>Chinook</u>	<u>Summer Chum</u>	<u>Fall Chum</u>	<u>Coho</u>	<u>Total salmon</u>
1990	48,587	115,609	167,900	43,460	375,556
1991	46,773	118,540	145,524	37,388	348,225
1992	47,077	142,192	107,808	51,980	349,057
1993	66,704	125,574	76,882	15,812	284,972
1994	55,388	124,807	123,565	41,775	345,535
1995	50,620	136,083	130,860	28,377	345,940
1996	45,669	124,735	129,258	30,404	330,066
1997	57,117	112,820	95,141	23,945	289,023
1998	54,124	87,366	62,901	18,121	222,512
1999	53,132	83,784	89,938	20,885	247,739
Max 1990-99	66,704	142,192	167,900*	51,980*	375,556*
Min 1990-99	45,669	83,784	89,938*	20,885*	247,739*
Mean 1990-99	52,519	117,151	123,749*	34,777*	313,863"

**Excluding harvests in 1993 and 1998 because regulations restricted subsistence harvests*

Habitat Factors Adversely Affecting The Stock

Yukon River salmon stocks have generally remained healthy due primarily to undisturbed spawning, rearing, and migration habitat although there are some habitat issues adversely impacting the production of salmon in the Yukon River drainage. A detailed discussion of these issues is found in the Yukon River Comprehensive Salmon Plan for Alaska. This plan discusses mining, logging, and flood control (with these topics briefly discussed below) as well as potential pollution and habitat changes related to urban development, rural sanitation, increased traffic along tributaries, and agriculture.

Mining

The first habitat threats to salmon that were caused by human presence in the Yukon River drainage began in the early 1900s with mine exploration and development. Mining activity was, and continues to be, an important economic industry within the drainage. Fortunately, most historical mining activity occurred on localized, discrete, headwater streams using manual labor,

minimizing impacts on spawning habitat. However, in the 1920s mining practices expanded to include use of hydraulic mining and large scale dredges. Both of these mining practices disturbed extensive acreage, much of which remains un-reclaimed today. Hydraulic mining washed large quantities of overburden and fine sediment into downstream spawning and rearing habitats. A thorough discussion of mining activity and salmon presence in the Yukon River Area can be found in the report entitled "A History of Mining in the Yukon River Basin of Alaska" (Higgs, 1995). As is noted in the report, major mining activity has occurred on the following tributaries: the Iditarod, and Inmok River drainages in the Lower Yukon; American Creek, Eureka Creek, Minook Creek, and upper Sulatna River in the Middle Yukon; Birch Creek, Woodchopper Creek, Coal Creek, Nome Creek, Beaver Creek, and the Fortymile River in the Upper Yukon; Middle and South Forks of the Koyukuk River and Hogatza River in the Koyukuk River drainage; and Goldstream Creek, Chatanika River, Chena River, Livengood Creek, Salcha River, Goodpasture River, in the Tanana River drainage. Northern mining operations coped with short operating seasons, difficult transportation conditions, and high freight and labor costs. Both small and large mining operations exist today. However, more rigid enforcement of environmental regulations since the mid-1980s has resulted in mining operations, which are far less detrimental to fisheries habitat than in the past. Today, all mining operations must obtain numerous environmental permits prior to initiating or continuing mining activity. Wastewater discharge must comply with Alaska's Water Quality Standards and all mines permitted since October 14, 1991 must comply with Alaska's Mining Reclamation Regulations. Currently, there are two large hard rock mines operating; Fort Knox mine near Fairbanks and the Pogo Creek mine near the Goodpasture River, near Delta. Some of these mines are located in potential acid-generating deposits for which strict wastewater controls will be necessary.

Potential natural gas development in the Minto Flats area of the Tanana River drainage may impact habitat in this area.

Logging

Logging has become a potential impact to fisheries habitat in the Tanana River drainage. With the transfer of large tracts of federal land into private native corporation and state ownership, logging activity is increasing to meet both local and export timber demands. Current concerns relate to sufficient buffer or setback zones to protect tributaries from increased runoff, increased temperature fluctuations, loss of spawning and rearing habitat, increased siltation and turbidity, and other effects which can all be stabilized or moderated with sufficient streamside vegetation.

Flood Control and Other Dams

Chena River Lakes Flood Control Project: ADF&G, YR DFA, and local sport and subsistence fishermen have raised concerns about the dam's effects on springtime emigration of salmon fry and immigration of adults. In flood years such as 1985, 1991, and 1992, the dam's gates were closed to slow the Chena River's flow to manageable levels. This caused the river to back up and spread throughout the willow and spruce brush in the Chena River valley floodway. In some of these flood event years, seagulls and other birds were seen feeding off salmon fry at several locations. Three locations noted were; above the dam in the backed up waters, below the dam's chutes where smolt were dumped via small waterfalls, and in pools of water above the dam when the flood waters receded. The exact effects of these events upon salmon returns are unknown.

Chatanika River (Davidson Ditch) Dam: The dam was severely damaged by the 1967 flood, with the top half destroyed and washed downstream. The remainder of the dam was removed with funding from YRDFA and BLM (Bureau of Land Management) in 2001. Prior to the removal, only two species of fish (Arctic grayling and sculpin) were documented above the dam (Al Townsend, ADF&G, Fairbanks, personal communication). Three species of salmon (chinook, chum, and coho salmon), three species of whitefish, sheefish, Arctic grayling, northern pike, burbot, suckers, and sculpin are documented in the Chatanika River downstream of the dam. Although no adult spawners have been observed utilizing the area above the dam, minnow trapping in the summer of 2002 found salmon fry above the dam site, indicating this area is now being utilized as rearing habitat.

Needed Habitat Projects

1. Continued monitoring of Illinois Creek Mine in the Innoko River drainage.
2. Continued restoration of Birch Creek and enhancements to allow fish passage in historical mining areas. Restoration of Birch Creek tributaries whose fish habitat still remains highly impaired due to mining. Much of this mining predated the 1991 Mining Reclamation Regulations.
3. Continued restoration of Nome Creek from damage due to historic mining.
4. Continued evaluation, and possibly implementation, of modifications to the Chena River Lakes Flood Control Project to reduce salmon mortality.
5. Continued monitoring of the bank stabilization project near Rika's Roadhouse, a known fall chum salmon spawning area.
6. Continued monitoring of bank stabilization project near the Whitestone farm located on the Southside of the Tanana River with access crossing the Delta River an important fall chum salmon spawning area.
7. Survey and assessment of critical salmon spawning and rearing habitats in the Tanana River drainage. Continued restoration of Tanana River tributaries from historic mining damage.
8. Advanced identification of previously undocumented anadromous fish streams in the Yukon Watershed. An estimated 50% of all water bodies in the Yukon watershed have not been evaluated for distribution of anadromous species. An estimated 70% of the first and second order tributaries similarly have not been surveyed. Consequently these streams are not afforded legal protection under DNR's AS 16.05.870 permitting program.
9. Continued monitoring of the Fort Knox mine near Fairbanks and the Pogo Creek mine near the Goodpasture River, near Delta.

Do New Or Expanding Fisheries On This Stock Exist?

There are no new or expanding fisheries on this stock. However, proposals 161, 162 and 163 may allow the use of new subsistence fishing gear types potentially effecting historical harvest levels. Yukon River bound fall chum salmon may be caught as bycatch in the Bering Sea groundfish fishery. Recent federal regulations allowing the sale of subsistence caught fish in applicable waters has the potential to increase the subsistence take of Yukon River salmon stocks.

Existing Management Plans

5 AAC 01.249 YUKON RIVER DRAINAGE FALL CHUM SALMON MANAGEMENT PLAN.

5 AAC 01.248. THE TOKLAT RIVER FALL CHUM SALMON REBUILDING MANAGEMENT PLAN.

5 AAC 05.367. TANANA RIVER SALMON MANAGEMENT PLAN.

5 AAC 01.210 FISHING SEASONS AND PERIODS.

ACTION PLAN DEVELOPMENT

Yukon River Fall Chum Salmon Action Plan Goal

Reduce fishing mortality in order to meet spawning escapement goals, to provide the opportunity for subsistence users to harvest levels within the ANS range, and to reestablish historic range of harvest levels by other users.

Review of Management Action Plan

Management of the Yukon River salmon fishery is complex due to: the overlapping multispecies salmon runs, generally high efficiency of existing fisheries, allocation issues, the immense size of the Yukon River drainage, and treaty obligations with Canada. Salmon entering the Yukon River may be more than 2,000 miles from their spawning grounds and it may take those salmon more than a month to traverse that distance. Accordingly, depending on the location of the spawning grounds, some salmon stocks are vulnerable to harvest for a month or more throughout the entire 2,000 mile length of the Yukon River.

Regulation Changes Adopted in January 2001

In January 2001, after review of the management action plan options addressing this stock of concern, the Board only removed the sunset clauses in 5 AAC 01.248 TOKLAT RIVER FALL CHUM SALMON REBUILDING MANAGEMENT PLAN. and 5 AAC 01.249 YUKON RIVER DRAINAGE FALL CHUM SALMON MANAGEMENT PLAN.

The board adopted a fishing schedule for the subsistence salmon fisheries. The schedule will be implemented chronologically, consistent with migratory timing as the run progresses upstream. This schedule may be altered by emergency order if pre-season or in-season indicators suggest this is necessary.

5 AAC 01.210. FISHING SEASONS AND PERIODS

- (1) Coastal District; Koyukuk River drainage; and Subdistrict 5-D: seven days per week;
- (2) Districts 1 -3: two 36-hour periods per week;
- (3) District 4 and Subdistricts 5-B and 5-C: two 48-hour periods per week;
- (4) Subdistrict 5-A and District 6: two 42-hour periods per week; and
- (5) Old Minto Area: five days per week.

Additionally the Old Minto Area was extended in length to accommodate travel and ease of maintaining fish camps in this remote area where travel has become difficult between old Minto and New Minto via the Tolovana River to the Tanana River.

The Board also provided the department with greater flexibility by modifying the regulations to allow up to 42 hours of fishing time per week after August 15 within Subdistrict 5-A and District 6 commercial fishery instead of forcing it into one 42-hour period each week.

Subdistrict 4-A was included in the fall chum salmon guideline harvest range (5,000 to 40,000), which was previously allocated for only Subdistricts 4-B and 4-C.

Management Review

Conservative management strategies based on the management action plan adopted by the Board in 2001 have contributed to success in achieving escapement goals. Beginning in 2001, the subsistence salmon fishing schedule adopted by the Board was implemented progressively upriver consistent with migratory timing. Overall, it appeared that the subsistence fishing schedule assisted in spreading opportunity among users allowing time for fish to spread throughout the districts.

Based on an outlook for a very poor run in 2001 and 2002, no commercial or sport fish fishing occurred. Inseason management actions were taken near the middle of the run to reduce subsistence fishing time less than the regulatory schedule. Runs were managed conservatively to try and allow subsistence opportunity and still meet escapement needs. It was determined postseason that 2001 escapement was slightly under the drainagewide optimal escapement goal of 350,000 salmon and slightly over in 2002. In 2003, an unexpected large return nearly doubled the drainagewide escapement goal. However, the Sheenjek escapement goal was not met. Varying abundance between fall chum salmon stocks makes achieving all individual goals difficult. The Yukon River salmon fisheries are typically harvesting mixed stocks and currently the Canadian portion of the drainage has one strong (Yukon River Canadian Mainstem) and one weak stock (Fishing Branch River). Canadian escapement goals may be negotiated annually. Both the Yukon River Canadian Mainstem and Fishing Branch interim goals were nearly doubled in 2003. After numerous years of not being able to provide for commercial fisheries, the markets have diminished and significant commercial harvests were foregone in 2003.

Because of the preseason poor fall chum salmon run expectation in 2001, the lower river started on a complete subsistence closure until near the midpoint in the run. The front end of the run was strong and the back end was weak. Subsistence fishing was allowed through most of the run in the upper river and opened only on the second half of the run in the lower river.

In 2002, the preseason strategy was to begin the fall chum salmon season with the same subsistence fishing allowances that were in place at the end of the summer chum salmon season. The logic was that the preceding summer chum salmon run is a good indicator for the following fall chum salmon run. The lower river began subsistence fishing on the regulatory windowed schedule until near the midpoint when the run was assessed to be poor. The entire river was shut down to subsistence fishing at the same time in mid-August, which meant that for much of the upper river, fishing closed before the fish arrived. Only very late in the season did subsistence fishing reopen to target coho and some fall chum salmon.

The 2003 fall season began with the possibility that Pilot Station Sonar chum salmon passage estimates may have been too high during the summer season. Consequently, management was initially very cautious and began with subsistence fishing reduced to one third of the regulatory schedule in the lower river. In mid-August assessment projects further upriver confirmed the accuracy of the sonar, so all subsistence fishing was relaxed to the full regulatory schedule throughout the river. Confidence in assessment increased and commercial fishing was opened near the end of the run harvesting primarily coho salmon. About 10,000 fall chum salmon were harvested in the commercial fishery that could have potentially taken 200,000 to 300,000 had the management approach been less conservative and markets available.

The fall chum salmon run has a far more erratic entry pattern than the other salmon species and the run strength is difficult to project. Furthermore, low runs have resulted in lost market interest, which has led to decline in the closely related commercial and subsistence efforts. Management has become much more responsive inseason to provide fishing opportunities wherever and whenever it may be possible to lessen the hardships during this period of poor production.

ACTION PLAN ALTERNATIVES

ACTION 1.

Amend the Yukon River Drainage Fall Chum Salmon Management Plan drainage wide escapement goal and run projection triggers; and repeal the Toklat River Fall Chum Salmon Rebuilding Management Plan incorporating key elements of the Toklat Plan into the Fall Chum Plan.

Objective

Update the Yukon River Drainage Fall Chum Salmon Management and the Toklat River Fall Chum Salmon Rebuilding Management Plans based on the most current biological escapement goals, recognizing changes in use patterns, increase management flexibility to be responsive to unanticipated swings in production, and simplify existing regulations. Management strategies to meet US/Canada Agreement obligations are not specifically addressed in this plan because the Panel may change border passage and escapement objectives.

Specific Action Recommended to Implement the Objective

DRAFT OF PROPOSED MODIFICATIONS TO YUKON RIVER DRAINAGE FALL CHUM SALMON MANAGEMENT PLAN December 15, 2003

The Yukon River Drainage Fisheries Association (YR DFA), working in cooperation with ADF&G, drafted the following proposed modifications to the Yukon River Drainage Fall Chum Salmon Plan based on Proposal #150, which YR DFA submitted in April 2003. As part of the proposal, the Toklat River Fall Chum Salmon Rebuilding Management Plan would be repealed with some elements incorporated into the fall chum salmon plan. The following DRAFT language is for public review and comment and may be further amended prior to the Board of

Fisheries meeting in January 2004. A meeting with Yukon River organizations is planned for early January.

Regular text indicates current regulatory language.
Underlined and bold text indicates language proposed to be added.
Strikethrough text indicates current regulatory language proposed to be deleted.

5 AAC 01.249. YUKON RIVER DRAINAGE FALL CHUM SALMON MANAGEMENT PLAN. The objective of the management plan contained in this section is to ensure adequate escapement of fall chum salmon into the Yukon River drainage and to provide management guidelines to the department. The commissioner shall implement this plan during the period from July 16 through December 31 each year, as follows:

(I) the department shall use the best available data, including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects to assess the run size for the purpose of implementing this plan;

(2) when the projected run size is ~~350,000~~300,000 chum salmon or less, the commissioner shall close, by emergency order, the:

(A) commercial, sport, and personal use directed chum salmon fisheries; and

(B) subsistence directed chum salmon fisheries except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(3) when the projected run size is more than ~~350,000~~300,000, but not more than ~~450,000~~500,000 chum salmon, the:

(A) targeted drainagewide ~~optimal~~ minimum escapement goal is ~~350,000~~300,000 chum salmon;

~~(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries; and~~

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries. except that if indicators suggest that an individual escapement goal and identified subsistence needs in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a sport or personal use fishery in that subdistrict, district, or portion of the subdistrict or district; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide ~~optimal-escapement~~ goal, except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(4) when the projected run size is more than 450,000, but not more than 550,000 chum salmon, the

(A) targeted drainagewide ~~optimal-escapement~~ goal is 375,000 chum salmon;

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide ~~optimal-escapement~~ goal, except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(5) when the projected run size is more than 550,000, but not more than 600,000 chum salmon, the

(A) targeted drainagewide ~~escapement~~ goal is 400,000 chum salmon;

(B) commissioner shall close, by emergency order, the commercial, sport, and personal use directed chum salmon fisheries, except that if indicators suggest that an individual escapement goal and identified subsistence needs in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a sport or personal use fishery in that subdistrict, district, or portion of the subdistrict or district; and

(C) department shall manage the subsistence chum salmon directed fisheries to achieve the targeted drainagewide ~~escapement~~ goal, except that if indicators suggest that an individual escapement goal in a subdistrict, district, or a portion of a subdistrict or district will be achieved, the commissioner may open, by emergency order, a less restrictive subsistence directed chum salmon fishery in that subdistrict, district, or portion of the subdistrict or district;

(6)(4) when the projected run size is more than ~~600,000~~500,000 chum salmon, the:

(A) targeted drainagewide ~~escapement~~ goal is ~~400,000~~300,000 or more chum salmon;

(B) commissioner may open, by emergency order, a subsistence fishery according to the fishing seasons and periods specified in 5 AAC 01.210. ~~(c)-(h)~~ and 5 AAC 05.367, open a personal use fishery of up to 84 hours of fishing per week, and open a sport fishery to allow for the retention of chum salmon, and;

(C) if indicators **suggest** that an individual escapement is goal and identified subsistence needs in a subdistrict, district, or a portion of a subdistrict or district will be achieved. the commissioner may open, by **emergency** order, a commercial fishery in that subdistrict, district, or portion of the subdistrict or district;

(A) (5) when the projected run size is more than ~~675,000~~**600,000** chum salmon, the commissioner may open, by **emergency** order, a **drainagewide** commercial fishery with the targeted harvest of the surplus above ~~625,000~~**600,000** chum salmon distribution by district or subdistrict proportional to the **guideline harvest range** established in 5 AAC 05.365; the department shall distribute the harvest levels below the low end of the guideline harvest range by district or subdistrict proportional to the midpoint of the guideline **harvest range**;

(B) it is recognized that there are difficulties and imprecision in managing the pulse type nature of the Yukon River fall chum salmon run; to compensate for the inherent complexity of the chum salmon fisheries, this plan provides for additional protection for escapement and subsistence needs by increasing the run size levels for consideration of commercial fisheries;

(7) for future versions of this management plan after the year 2000, it is the intent of the Board of Fisheries to strongly consider allowing Upper Yukon commercial fisheries at run sizes between 625,000 and 675,000 fall chum salmon; the terminal fisheries in a particular subdistrict, district, or portion of the subdistrict or district would only be considered if indicators suggest that escapement goals and identified subsistence needs in that subdistrict, district, or portion of a subdistrict or district will be achieved;

(6) for management of Toklat River salmon stocks, the Kantishna River and Subdistricts 5-A and 6-A fisheries will be **managed** to achieve established spawning escapement goals and the following provisions apply:

~~5 AAC 01.248. THE TOKLAT RIVER FALL CHUM SALMON REBUILDING MANAGEMENT PLAN~~

~~(a) The Board of Fisheries finds that a comprehensive long term management plan is necessary to promote sustained yield of the Toklat River fall chum salmon stock. The lack of complete resource information concerning the Toklat River fall chum salmon stock limits the ability of the board to develop a long term management approach at this time. The Yukon River Drainage Fisheries Association presented to the board a Toklat River Fall Chum Salmon Rebuilding Management Plan which contained recommended management actions that will aid in the rebuilding effort of the Toklat River fall chum salmon stock. The objective of the plan is to achieve the minimum escapement objective of 33,000 fall chum salmon on the Toklat River spawning grounds. To accomplish this objective, the department shall implement the following provisions:~~

~~(1)~~(A) from August 15 through May 15, the Toklat River drainage is closed to sport and subsistence fishing;

~~(2)~~(B) in the Kantishna River, the following subsistence permit requirements apply:

~~(A)(i)~~ from August 15 through December 31, the subsistence salmon harvest limit in the Kantishna River is 2,000 chum salmon;

~~(B)(ii)~~ from August 15 through December 31, the annual possession limit for the holder of a Kantishna River subsistence salmon fishing permit is 450 chum salmon; until the fishery harvest limit is reached, permits for additional salmon may be issued by the department;

~~(C)~~ salmon may be taken only by set gillnet or fish wheel; after August 15, once the allowable fishery harvest limit of 2,000 chum salmon is reached, only fish wheels equipped with a livebox may be operated, as follows:

~~(i)~~ the livebox must be constructed so that it contains no less than 45 cubic feet of water volume while it is in operation;

~~(ii)~~ the livebox must be checked at least once every 12 hours while the fish wheel is in operation, and all chum salmon in the livebox must be returned alive to the water;

~~(iii)~~ for the purpose of this subparagraph, a "livebox" is a submerged container that is attached to the fish wheel and that will keep fish caught by the fish wheel alive;

~~(D)(iii)~~ based on an evaluation of inseason run strength indicators, the commissioner, by emergency order, may reopen the Kantishna River fall season chum salmon subsistence fishery and allow the fishery to exceed the 2,000 fall chum salmon harvest limit if indications are that the Toklat River fall chum salmon minimum escapement objective described in this subsection will be achieved; the department shall close that fishery when it determines it to be necessary for the conservation and protection of chum salmon;

(C) the Kantishna River subsistence salmon fishing periods are from 6:00 p.m. Monday until 12:00 noon Wednesday and 6:00 p.m. Friday until 12:00 noon Sunday, unless modified by emergency order;

~~(3)~~ the fishery management strategy is to allow a commercial harvest that is lower than the maximum harvest level that could be supported by the Yukon River fall chum salmon return;

~~(4)~~ in Subdistricts 5-A and 6-A, during the commercial fall chum salmon season there may not be more than one 24-hour commercial period per week;

~~(5)~~ in Subdistrict 5-A, following the commercial salmon season closure, salmon may be taken by subsistence fishing from 6:00 p.m. Tuesday until 6:00 p.m. Sunday.

~~(b)~~ The provisions of this section supersede corresponding commercial, sport and subsistence regulations in this title.

Cost/Benefit Analysis

This plan would increase the opportunity for subsistence harvest during lower fall chum salmon runs than is allowed with the current plan while higher escapement levels will be managed for when the run is abundant. Allowances for subsistence harvest would reduce the economic and social hardships derived from poor salmon production, but would not cause escapement to drop below the established BEG. There is some concern that during this cycle of poor production, escapement should be maintained at a higher level so that the fall chum salmon stocks may rebuild faster once production increases. However, the lower end of the BEG range should be expected to produce the desired yield.

Subsistence Issues/Considerations

Subsistence fishers are becoming overwhelmed by regulations, disheartened by several years of poor salmon runs, and feel powerless to affect management or improve their situation. This action will allow some subsistence fishing opportunity at lower run sizes.

Performance Measures

Continue to monitor run abundance and harvest levels as a way to assess changes in productivity and benefits to the users.

ACTION 2.

Amend the Tanana River Management Plan, which has an exception reference to 5AAC 01.248 Toklat River Fall Chum Salmon Rebuilding Management Plan and replace with 5AAC 01.249 Yukon River Fall Chum Salmon Management Plan, if Action 1 is adopted. Further, remove restriction in plan requiring no more than 42-hours of commercial salmon fishing per week is allowed after August 15.

Objective

Based on poor market conditions and new run assessment capabilities through tagging projects in the Tanana and Kantishna rivers, the conservative fishing time of no more than 42-hours of commercial fishing time per week during the fall season is no longer necessary. The potential magnitude of commercial harvest has greatly decreased under poor market conditions. More importantly, assessment tools can now be used to manage Tanana River fisheries inseason to achieve escapement goals.

Specific Action Recommended to Implement the Objective

Amend **5 AAC 05.367. TANANA RIVER SALMON MANAGEMENT PLAN** (a) The purpose of this management plan is to provide for the sustained yield of the Tanana River salmon resource. The department shall manage the salmon fisheries in the Tanana River drainage to achieve established spawning escapement goals. Except as provided in 5 AAC ~~01.248~~ 01.249, the department shall manage the District 6 and Subdistrict 5-A salmon fisheries in accordance with the provisions of this section.

(b)(2) the commercial salmon fishing periods shall be opened and closed by emergency order; after August 15, no more than 42 hours of commercial salmon fishing per week is allowed;

Cost/Benefit Analysis

Current regulations are more conservative than necessary. Depending on run assessment and availability of markets, more commercial fishing time may be provided with this action. The proposed language change should not be an additional expense for fishers wishing to harvest salmon.

Subsistence Issues/Considerations:

Subsistence fishermen should not be affected by this action.

Performance Measures

A measure of performance would be meeting established salmon escapement goals. Harvest levels would be determined through commercial fish tickets, subsistence permit reports, and personal use permit reports.

ACTION 3.

Require subsistence salmon fishing permits in all of Subdistrict 5-C.

Objective

Currently, subsistence permits are required in areas with road access of which Rampart is soon to be included and since the school has closed in this community, many of the residents have become increasingly transient. The purpose for requiring permits is to collect accurate subsistence harvest information particularly in an area where potential fishers are difficult to find and survey post season.

Specific Action Recommended to Implement the Objective

Require subsistence users to obtain a subsistence permit before harvesting salmon in all Subdistrict 5-C by extending the existing permit area from Hess Creek down to the lower boundary of Subdistrict 5-C (westernmost tip of Garnet Island). These permits can be requested and processed via mail, fax, and more recently, via **email**. Subsistence users in this area will not need to request an amount to harvest. The permit will be used to determine more accurately the subsistence harvests, and participation in this area. The permits provide documentation of fish harvested by species by day.

Cost/Benefit Analysis

A more accurate assessment of subsistence harvests in an area of high exploitation will be available. Requiring permits will allow the department to better assess the needs of subsistence users in this area. This harvest information is necessary for fisheries management on both sides of the border and for salmon run reconstruction.

This requirement would create additional time necessary for subsistence users in Subdistrict 5-C to record their harvests on the permit, and take additional steps to obtain permits and to return their permits to ADF&G.

Subsistence Issues/Considerations:

Subsistence fishers may be reluctant to describe their specific harvests. Previously, personal interviews were conducted to assess the subsistence harvest take and did not require maintaining

records of their harvests. If permits were issued for this community the annual subsistence survey could be eliminated.

Performance Measures

A measure of performance would be the reporting success of subsistence users in Subdistrict 5-C. A secondary performance measure would be the accuracy of the subsistence harvest in that area.

ACTION 4.

When the subsistence salmon fishing schedule is in effect, require gillnets with greater than 4 inches mesh size must be removed from the water and fish wheels must be stopped during subsistence salmon fishing closures.

Objective

The purpose of this action is to reduce the harvest of salmon to provide for adequate spawning escapement while allowing the harvest of other species for subsistence needs. This action will improve enforceability of regulations and remove the necessity of using emergency authority to accomplish this action.

Specific Action Recommended to Implement the Objective

During subsistence salmon fishing schedule closures, require all salmon nets with a mesh size larger than four inches must be removed from the water and fish wheels may not be operated.

5 AAC 01.220. LAWFUL GEAR AND GEAR SPECIFICATIONS. (4)

(4) during subsistence salmon fishing closures as provided under 5 AAC 01.210 (b), all salmon nets with a mesh size larger than four inches must be removed from the water and fish wheels may not be operated.

Cost/Benefit Analysis

Current subsistence regulations allow subsistence gear to be used to harvest non-salmon species during subsistence salmon fishing closures. During subsistence salmon fishing closures, emergency authority is necessary to implement mesh size and net length restrictions. This authority has been used previously, restricting mesh size to be no more than four-inches or less mesh size, and the length of the net to be no more than 60 feet. However, no requirement removes gillnets greater than 4 inch mesh size completely from the water nor ceases operating fish wheels for other species during such closures.

The proposed language change should not change the current subsistence harvest patterns, or be an additional expense for fishers wishing to harvest non-salmon species during closed subsistence salmon fishing periods.

Subsistence Issues/Considerations:

Subsistence fishermen would be required to remove gillnets greater than four inches mesh size from the water and stop fish wheels during subsistence salmon fishing closures, which most do already.

Performance Measures

A measure of performance would be meeting established salmon escapement goals and better enforceability of regulations. Harvest levels would be determined through postseason subsistence surveys. The department encourages fishermen to keep track of their subsistence salmon harvest on household subsistence catch calendars or subsistence fishing permits. A postseason analysis of subsistence salmon harvests and escapement monitoring projects will be conducted to determine if the objective was achieved.

Board of Fisheries Regulatory Proposals Addressing Yukon River Fall Chum Salmon Stocks of Concern

- 9 Fall Chum Salmon and Toklat Management Plans – proposal numbers: 150 and 151.
- 9 Subsistence fishing schedule and fishing periods - proposal numbers: 132, 153, 154, 155, 156, 157 and 158.
- 9 Subsistence fishing gillnet gear – proposal numbers 159, 160, 161, 162, and 163.
- 9 Close spawning streams to all fishing – proposal number 165.
- 9 Commercial fishing allocations – proposal numbers 166, 167, 168 and 170.
- 9 Commercial gear specifications – proposal number 172.

RESEARCH PLAN

US-Canada Joint Technical Committee Plan

The US/Canada Yukon River Joint Technical Committee is currently developing a research plan and a draft of this plan is provided in Lingnau and Bergstrom (2003). This planning process was initiated in 2002. The goals, issues, and needs contained in this plan will provide a clear framework for research in the entire Yukon River basin. A comprehensive plan for the JTC will help management meet and protect escapements, and maximize harvest. This plan will provide a focus and direction for research time and monies. Projects can be prioritized, and personnel and equipment allocated to those agreed most important. This plan will guide the JTC on key research and conservation needs for the entire Yukon River basin. This plan will be used the plan in each agency internally and to communicate with an international public. The plan's comprehensive listing of all research needs for the entire basin provides a framework for other plans in the region.

Mark-recapture

A mark-recapture project was initiated in 1999 to estimate abundance of fall chum salmon in the Kantishna River drainage originally funded by Western Alaska Disaster Grant funds. This project complements the inseason estimates provided by the Upper Tanana River and Rapids/Rampart Upper Yukon River fall chum salmon mark-recapture projects as part of the equation for total run reconstruction. The project is currently funded by U.S./Canada Yukon River Salmon Negotiation Studies with the possibility of US/Canada Treaty Implementation for the future, with annual funding provided by BSFA and NPS. The goal of this multi-year cooperative study is to assess the abundance of fall chum salmon in the Kantishna River drainage of which the Toklat River is a major producing tributary. The project has now been operational for five years and has provided insight into the contributions of the Upper Kantishna and Toklat River stocks as well as providing insights as to the relationship of the population estimate and the

long-standing estimate of abundance provided by ground surveys on the Toklat Springs. The project also provides information on migratory characteristics of fall chum salmon within the Kantishna River drainage and will provide information on relative importance of known spawning areas such as the Toklat River Springs. Genetic samples were collected in the Upper Kantishna River for addition to the baseline. The project currently has operated through some extremely low returns and it will be important to collect the information in years when the performance of the stock improves to provide contrast in the data and therefore better models for developing BEG's and total fall chum salmon run reconstructions.

Border Sonar

In 2003, U.S./Canada Treaty Implementation funding was used to conduct a feasibility study for developing a sonar operation at the U.S./Canada Border. Site selection was the goal for this first year. If additional funding is secured, an in river feasibility process will be the first step to provide population estimates of salmon crossing the U.S./Canada Border directly assisting in assessment of U.S. management and commitments to Canadian origin salmon stocks. A proposal was submitted to the U.S./Canada Yukon River Restoration and Enhancement Fund for operation in 2004, but did not get support. Currently it is felt that the DFO mark-recapture estimates for both chinook and fall chum salmon are insufficient and untimely for inseason management purposes of Alaskan fisheries.

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Table 1. Preliminary fall chum salmon passage estimates or escapement estimates for selected spawning areas, Yukon Rivn drainage, 1971 to 2003. a

Year	Alaska									Canada						
	Yukon River Mainstem Sonar Estimate	Tanana River Drainage				Upper Yukon River Drainage				Fishing Branch River j	Mainstem Escapement Tagging Estimate k					
		Toklat River b	Upper Tanana River Tagging Estimate m	Delta River d	Bluff Cabin Slough e	Rampart Rapids Tagging Estimate f	Chandalar River g	Sheenjek River h								
1971										312,800						
1972				5,384						35,125	m					
1973				10,469						15,989	n					
1974		41,798		5,915				89,966	p	32,525	n					
1975		92,265		3,734	r			173,371	p	353,282	n					
1976		52,891		6,312	r			26,354	p	36,584						
1977		34,887		16,876	r			45,544	p	88,400						
1978		37,001		11,136				32,449	p	40,800						
1979		158,336		8,355				91,372	p	119,898						
1980		26,346		5,137				28,933	p	55,268						
1981		15,623		23,508				74,560		57,386	s					
1982		3,624		4,235		1,156		31,421		15,901	31,958					
1983		21,869		7,705		12,715		49,392		27,200	90,875					
1984		16,758		12,411		4,017		27,130		15,150	56,633	r				
1985		22,750		17,276	r			152,768		56,016	n	62,010				
1986		17,976		6,703	r	3,458		84,207	v	31,723	n	87,940				
1987		22,117		21,180		9,395		52,416		153,267	v	48,956	n	80,776		
1988		13,436		18,024				33,619		45,206	v	23,597	n	36,786		
1989		30,421		21,342	r			69,161		99,116	v	43,834	n	35,750		
1990		34,739		8,992	r	1,632		78,631		77,750	v	35,000	w	51,735		
1991		13,347		32,905	r	7,198				86,496	x	37,733	n	78,461		
1992		14,070		8,893	r					78,808	x	22,517	n	49,082		
1993	292,000	27,838		19,857						42,922	x	28,707	n	29,743		
1994		76,057		23,777	r					150,565	x	65,247	u	98,358		
1995	1,070,968	54,513	z	268,173		20,587	19,460	280,999		241,855	x	51,959	n	158,092		
1996		18,264		134,563	y	19,758	r	3,920	654,296	208,170		246,889	x	77,278	n	122,429
1997	521,531	14,511		71,661		7,705	r	3,145	369,546	199,874		80,423	ab	26,959	n	85,439
1998	374,597	15,605		62,384		7,804	r	2,110	194,963	75,811		33,058		13,248	n	46,305
1999	438,755	4,551		104,869		16,534		5,078	189,742	88,662		14,229		12,904	n	62,035
2000	267,181	8,911	ac	47,635		3,001	r	1,595	-	af	64,500	30,084	y	5,053	n	55,362
2001	396,012	6,007	z	96,556		8,103	r	1,808	201,766	110,971		53,932		21,556		33,989
2002	359,565	28,519		109,961		11,992		3,116	196,186	89,580		31,642		13,300		85,650
2003 y	930,000	21,492		200,000		22,582		5,407	488,552	197,000		44,047		29,519		128,500
All Year Average	516,734	31,551		121,756		13,069		5,326	337,864	114,908		80,592		56,103		71,269
Five Year Average 1999-2003	478,303	13,896		111,804		12,442		3,401	269,062	110,143		34,787		16,466		73,107
BEG Range	NIA	15,000 to 33,000	ag	46,000 to 103,000		6,000 to 13,000		NIA	NIA	74,000 to 152,000		50,000 to 104,000		NIA		N/A ad

Regulatory OEG: > 33,000 Treaty Negotiated Interim Objective: 50,000-120,000 > 80,000
 Yukon River Panel Negotiated Objectives for 2003: > 15,000 > 65,000

- a Latest table revision December 19, 2003.
- b Total abundance estimates for the upper Toklat Rivn drainage spawning index area using stream life curve method developed with 1987 to 1993 data.
- c Fall chum salmon passage estimate for the upper Tanana River drainage based on tag deployment from a fishwheel (ova fishwheels in 1995) located just upstream of the Kantishna River and recaptures from two fishwheels located downstream from the village of Nenana.
- d Total escapement estimate generated from the migratory time density curve method, unless otherwise indicated.
- e Peak counts from foot or aerial surveys.
- f Fall chum salmon passage estimate for the upper Yukon River drainage based on tag deployment at two fishwheels located at the "Rapid." and recaptured at two fishwheels located near the village of Rampart.
- g Side-scan sonar estimate, in 1986 through 1990. Split beam sonar estimate since 1995.
- h Side-scan sonar estimate unless otherwise indicated.
- j Located in the Canadian portion of the Tanana River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72. - 1 e & m i, -
- k Estimated border passage minus Canadian mainstem harvest and excluding Canadian Porcupine River drainage escapement.
- m Weir installed on September 22. Estimate consists of a weir count of 17,190 after September 22, and a tagging passage estimate of 17,935 prior to weir installation.
- n Weir count.
- p Total escapement estimate using sonar to aerial survey expansion factor of 2.22.
- r Population estimate generated from replicate foot surveys and stream life data (area under the curve method).
- s Initial aerial survey count was doubled before applying the weir to aerial expansion factor of 2.72 since only half of the spawning area was surveyed.
- t Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
- v Expanded estimates for period approximating second week August through middle fourth week September, using Chandalar River run timing data.
- w A single survey flown October 26, counted 7,541 chum salmon. A population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial to weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000 to 40,000 fish considering aerial survey timing.
- x Total abundance estimates are for the period approximating second week August through middle fourth week of September. Comparative escapement estimates prior to 1986 are considered more conservative; approximating the period of end of August through middle week of September.
- y Preliminary.
- z Minimal estimate because of late timing of ground surveys with respect to peak of spawning in 2001 because Sushanna was unsurveyable due to mainstem breach.
- za Minimal count because weir was closed while submerged due to high water, during the period August 31 to September 8
- ab The passage estimate includes an additional 15,134 salmon that were estimated to have passed during 111 hours that the sonar was inoperable due to high water from August 29 until September 3, 1997.
- ac Aerial Survey (10/23/00) in R-22 helicopter one week after foot surveys.
- ad The escapement goal after rebuilding is greater than 80,000 fish. Rebuilding plan for the years 1990 to 2001 has been established. Interim goals were established for 2002 and 2003 of 60,000 and 65,000 fall chum salmon respectively.
- af Project terminated early. Estimated 45,021 fall chum salmon through August 19.
- ag The Toklat regulatory optimal escapement goal (O.E.G) is greater than 33,000 fall chum salmon.

Table 2. Alaskan catch of Yukon River fall chum salmon, 1961-2003.

Year	Estimated Subsistence	Harvest		
	Use ^a	Subsistence ^b	Commercial ^c	Total ^d
1961	101,772 ^{f, g}	101,772 ^f	42,461	144,233
1962	87,285 ^{f, g}	87,285 ^f	53,116	140,401
1963	99,031 ^{f, g}	99,031 ^f	0	99,031
1964	120,360 ^{f, g}	120,360 ^f	8,347	128,707
1965	112,283 ^{f, g}	112,283 ^f	23,317	135,600
1966	51,503 ^{f, g}	51,503 ^f	71,045	122,548
1967	68,744 ^{f, g}	68,744 ^f	38,274	107,018
1968	44,627 ^{f, g}	44,627 ^f	52,925	97,552
1969	52,063 ^{f, g}	52,063 ^f	131,310	183,373
1970	55,501 ^{f, g}	55,501 ^f	209,595	265,096
1971	57,162 ^{f, g}	57,162 ^f	189,594	246,756
1972	36,002 ^{f, g}	36,002 ^f	152,176	188,178
1973	53,670 ^{f, g}	53,670 ^f	232,090	285,760
1974	93,776 ^{f, g}	93,776 ^f	289,776	383,552
1975	86,591 ^{f, g}	86,591 ^f	275,009	361,600
1976	72,327 ^{f, g}	72,327 ^f	156,390	228,717
1977	82,771 ^g	82,771 ^g	257,986	340,757
1978	94,867 ^g	84,239 ^g	247,011	331,250
1979	233,347	214,881	378,412	593,293
1980	172,657	167,637	298,450	466,087
1981	188,525	177,240	477,736	654,976
1982	132,897	132,092	224,992	357,084
1983	192,928	187,864	307,662	495,526
1984	174,823	172,495	210,560	383,055
1985	206,472	203,947	270,269	474,216
1986	164,043	163,466	140,019	303,485
1987	361,663	361,663 ^h	0	361,663
1988	158,694	155,467	164,210	319,677
1989	230,978	216,229	301,928	518,157
1990	185,244	173,076	143,402	316,478
1991	168,890	145,524	258,154	403,678
1992	110,903	107,602	20,429 ⁱ	128,031
1993	76,925	76,925	0	76,925
1994	127,586	123,218	7,999	131,217
1995	163,693	131,369	284,178	415,547
1996	146,154	129,222	107,347	236,569
1997	96,899	95,425	59,054	154,479
1998	62,869	62,869	0	62,869
1999	89,999	89,998	21,542	111,540
2000	19,307	19,307	0	40,462
2001	35,154	35,154	0	35,154
2002	19,393	19,393	0	19,393
2003	60,000 ^k	60,000 ^k	10,966	70,966 ^k
1989-1998				
Average	137,014	126,146	118,249	244,395
1999-2003				
Average	44,771	44,770	6,502	55,503

^a Includes salmon harvested for subsistence and personal use purposes, and an estimate of the number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence. These data are only available since 1990.

^b Includes salmon harvested for subsistence and personal use. Includes ADF&G test fish sales, fish sold in the roe, and estimated numbers of female salmon commercially harvested for production of salmon roe (see Bergstrom et al. 1992 1990 Yukon Area AMR)

^d Does not include sport-fish harvest. The majority of the sport-fish harvest is believed to be taken in the Tanana River drainage. Sport fish division does not differentiate between the two races of chum salmon. However, the majority of this harvest is believed to be summer chum salmon.

^f Catches estimated because catches of species other than chinwk salmon were not differentiated.

^g Minimum estimates because surveys were conducted prior to the end of the fishing season.

^h Includes an estimated 95,768 and 119,168 fall chum salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.

ⁱ Commercial fishery operated only in District 6, the Tanana River.

^k Subsistence harvest estimate for 2003 is preliminary.

Table 3. Canadian catch of Yukon River fall chum salmon, 1961-2003.

Year	Mainstem Yukon River Harvest				Total	Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Combined Non-Commercial			
1961	3,276		3,800	3,800	7,076	2,000	9,076
1962	936		6,500	6,500	7,436	2,000	9,436
1963	2,196		5,500	5,500	7,696	20,000	27,696
1964	1,929		4,200	4,200	6,129	6,058	12,187
1965	2,071		2,183	2,183	4,254	7,535	11,789
1966	3,157		1,430	1,430	4,587	8,605	13,192
1967	3,343		1,850	1,850	5,193	11,768	16,961
1968	453		1,180	1,180	1,633	10,000	11,633
1969	2,279		2,120	2,120	4,399	3,377	7,776
1970	2,479		612	612	3,091	620	3,711
1971	1,761		150	150	1,911	15,000	16,911
1972	2,532			0	2,532	5,000	7,532
1973	2,806		1,129	1,129	3,935	6,200	10,135
1974	2,544	466	1,636	2,102	4,646	7,000	11,646
1975	2,500	4,600	2,500	7,100	9,600	11,000	20,600
1976	1,000	1,000	100	1,100	2,100	3,100	5,200
1977	3,990	1,499	1,430	2,929	6,919	5,560	12,479
1978	3,356	728	482	1,210	4,566	5,000	9,566
1979	9,084	2,000	11,000	13,000	22,084		22,084
1980	9,000	4,000	3,218	7,218	16,218	6,000	22,218
1981	15,260	1,611	2,410	4,021	19,281	3,000	22,281
1982	11,312	683	3,096	3,779	15,091	1,000	16,091
1983	25,990	300	1,200	1,500	27,490	2,000	29,490
1984	22,932	535	1,800	2,335	25,267	4,000	29,267
1985	35,746	279	1,740	2,019	37,765	3,500	41,265
1986	11,464	222	2,200	2,422	13,886	657	14,543
1987	40,591	132	3,622	3,754	44,345	135	44,480
1988	30,263	349	1,882	2,231	32,494	1,071	33,565
1989	17,549	100	2,462	2,562	20,111	2,909	23,020
1990	27,537	0	3,675	3,675	31,212	2,410	33,622
1991	31,404	0	2,438	2,438	33,842	1,576	35,418
1992	18,576	0	304	304	18,880	1,935	20,815
1993	7,762	0	4,660	4,660	12,422	1,668	14,090
1994	30,035	0	5,319	5,319	35,354	2,654	38,008
1995	39,012	0	1,099	1,099	40,111	5,489	45,600
1996	20,069	0	1,260	1,260	21,329	3,025	24,354
1997	8,068	0	1,218	1,218	9,286	6,294	15,580
1998	0	0	1,742	1,742	1,742	6,159	7,901
1999	10,402	0	3,104	3,104	13,506	6,000	19,506
2000	1,519	0	2,917	2,917	4,236	5,000	9,236
2001	2,198	3	2,717	2,720	4,918	4,594	9,513
2002	3,065	0	3,093	3,093	6,158	1,850	8,008
2003 ^a	7,550	0	1,180	1,180	8,730	^b	8,730
1989-1998 Average	20,001	10	2,418	2,428	22,429	3,412	25,841
1999-2003 Average	4,907	1	2,602	2,603	7,510	4,361	10,999

a Data is preliminary.

b Data is unavailable at this time.

Table 4. Historical fall chum salmon run reconstruction data, Yukon River, 1974-2003

Year	Estimated Return	U.S./Canada Total Harvest	Estimated Escapement
1974	916,361	478,875	437,486
1975	1,938,275	473,062	1,465,213
1976	607,884	339,043	268,841
1977	962,762	447,918	514,844
1978	754,517	434,030	320,487
1979	1,396,195	615,377	780,818
1980	749,418	488,305	261,113
1981	1,228,450	677,257	551,193
1982	553,003	373,175	179,828
1983	872,173	525,016	347,157
1984	682,363	412,322	270,041
1985	1,179,907	515,481	664,426
1986	694,402	318,028	376,374
1987	1,058,086	406,143	651,943
1988	678,380	353,242	325,138
1989	1,047,351	541,177	506,174
1990	719,754	350,100	369,654
1991	1,030,228	439,096	591,132
1992	473,099	148,846	324,253
1993	443,704	91,015	352,689
1994	939,145	169,225	769,920
1995	1,460,305	461,147	999,158
1996	1,056,678	260,923	795,755
1997	660,841	170,059	490,782
1998	329,436	70,770	258,666
1999	423,897	131,046	292,851
2000	240,919	28,543	212,376
2001	382,747	44,666	338,081
2002 *	413,790	28,601	385,189
2003 *	850,000	79,726	770,274
Avg 1989-1998	816,054	270,236	545,818
Avg 1999-2003	462,271	62,516	399,754
		Optimal Escapement Goal:	350,000
		Biological Escapement Goal:	300,000 to 600,000

* Preliminary data.

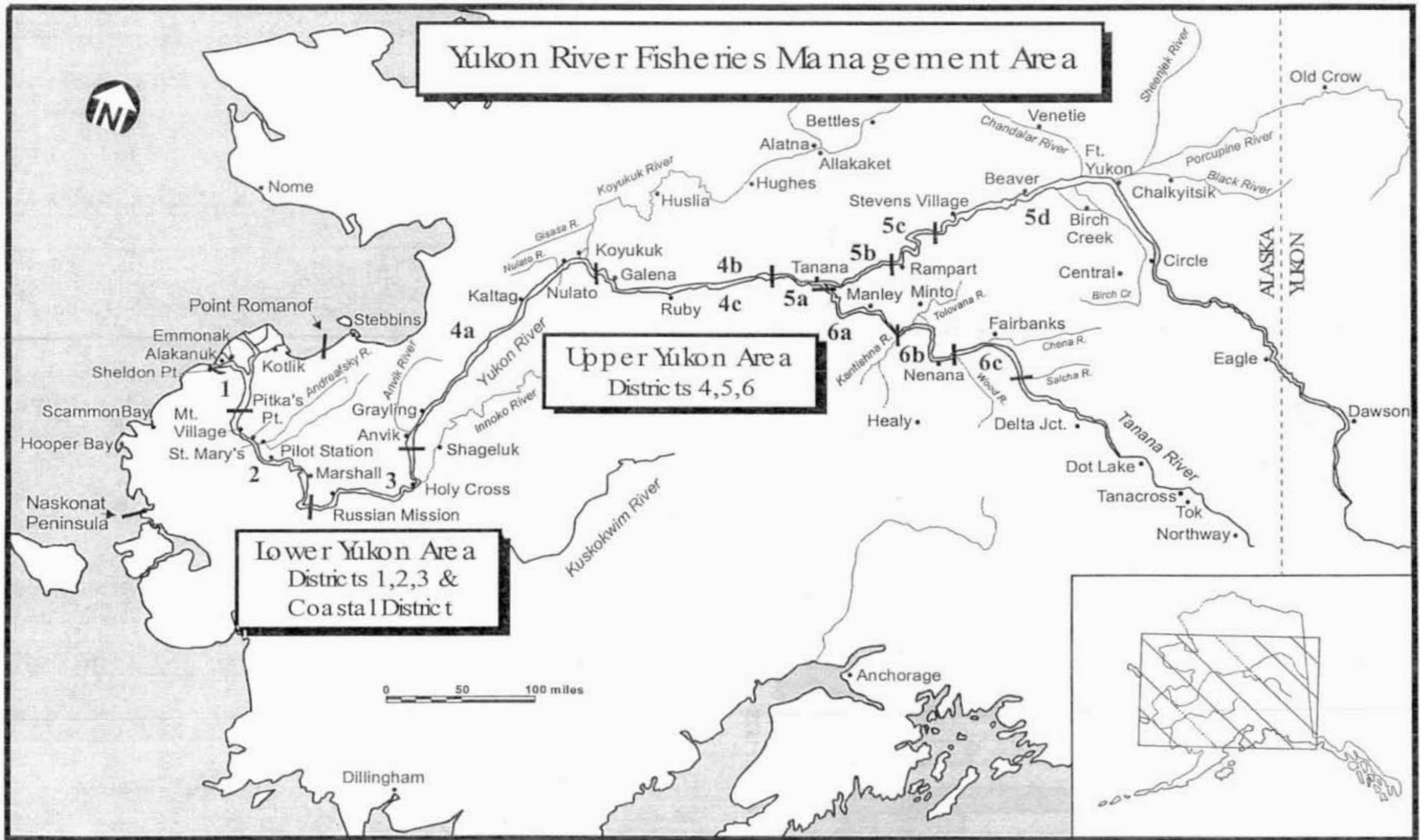


Figure 1. Yukon Area showing communities and fishing districts

YUKON RIVER DRAINAGE

ALASKA AND CANADA

FALL CHUM SALMON HARVEST AND ESCAPEMENT

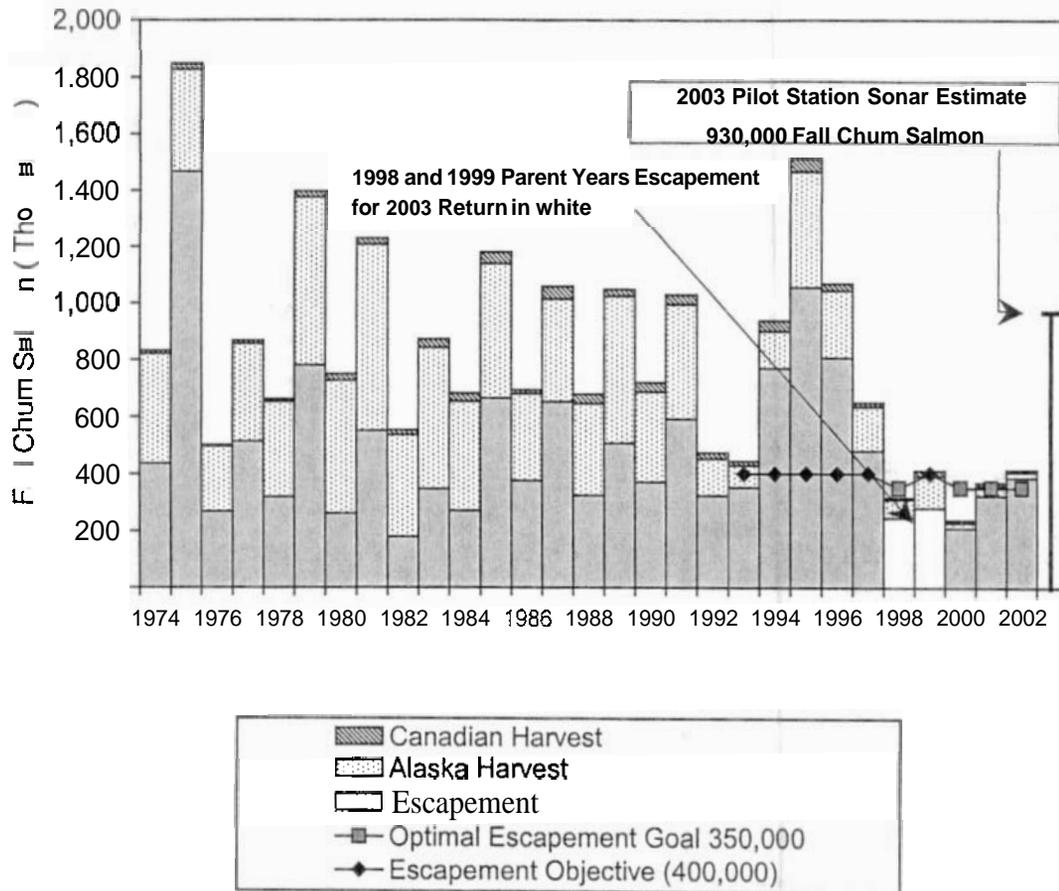


Figure 2. Yukon River fall chum salmon total run reconstruction including estimated escapement and U.S. and Canadian harvests, 1974 to 2003.