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Yukon River Inseason Salmon Harvest Interviews, 2005

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Abstract

Standardized collection and reporting of subsistence salmon harvest information during the fishing season is an important management tool for Yukon River fishery managers. Information gauging the progress towards subsistence salmon harvest goals, fishing conditions, and quality of subsistence catch were collected. Local village interviewers contacted a subsample of fishermen each week to evaluate progress towards meeting subsistence harvest goals. Residents of Emmonak, Holy Cross, Kaltag, Nulato, Huslia, Galena, and Beaver were interviewed weekly between May 31 and October 7, 2005. Ninety-two households were interviewed regarding Chinook salmon *Oncorhynchus tshawytscha* harvests, 36 households were interviewed regarding summer chum salmon *O. keta* harvests, and 13 households were interviewed regarding fall chum salmon harvest progression. Information was reported on 13 weekly public teleconferences, distributed in nine written summaries, and used in two federal inseason management reports. In general, inseason interview data indicated that the largest change, expressed as a harvest percentage increase, in subsistence harvest goal progression occurred around the quarter point of the Chinook and summer chum salmon runs. Fall chum salmon harvest goal progression changes were different between villages. Overall, most interviewed households met or nearly met their subsistence Chinook and chum salmon goals for the 2005 season.

Introduction

Chinook *Oncorhynchus tshawytscha* and chum *O. keta* salmon spawn in rivers located in the Yukon Delta, Koyukuk, Nowitna, Innoko, Kanuti, Arctic, and Yukon Flats National Wildlife Refuges (Figure 1). The Yukon River has a total mileage of approximately 2,000 miles, of which 1,200 miles is located in Alaska and the remainder is in Canada (Kammerer 1990).

Yukon River salmon return to their natal breeding grounds to spawn beginning in the summer months and ending in late fall to early winter. Chinook salmon migrate in the Yukon River from the latter part of May or early in June through mid-July, although stragglers can appear as late as August (Gilbert 1921). Summer chum salmon enter the Yukon River in early June and overlap with the fall chum salmon run in July. Fall chum salmon enter the Yukon River in July with migration occurring into September. Chinook salmon spawn throughout the Yukon River drainage with some spawning grounds located over 1,900 miles from saltwater (Healey 1991). Summer chum spawn primarily in tributaries in the lower and middle river reaches (the mouth of the Yukon River to the Tanana River drainage) while fall chum salmon spawn in the middle and upper reaches (Chandalar, Tanana, Porcupine River drainages and within the Canadian portion of the Yukon River mainstem) of the drainage (Alaska Department of Fish and Game (ADF&G) 2002).

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Chinook and chum salmon are important species for subsistence, commercial, sport, and personal use fishermen in the Yukon River. Within the Yukon River, returning adult salmon are harvested in subsistence and personal use fisheries in Alaska, aboriginal and domestic fisheries in Canada, and commercial and sport fisheries in Alaska and Canada (Dubois 2005). Harvests for Yukon River Chinook, summer chum, and fall chum salmon since the late 1990's have shown a substantial decrease in yield (Lingnau and Salomone 2003). Implementation of the Board of Fisheries (BOF) "windowed" subsistence fishing schedule in 2001 was intended to provide a reasonable opportunity for subsistence fishermen to obtain an average subsistence harvest during years of normal to below average salmon run strength (Brase and Hamner 2003) by: 1) spreading the harvest throughout the run, 2) spreading subsistence harvest opportunity among users throughout the drainage, and 3) to potentially increase the quality of escapement. Postseason surveys have been conducted annually by ADF&G commercial fishing division since 1961 in order to estimate subsistence salmon harvest levels, evaluate management actions postseason, and to detect and quantify shifts in harvest patterns and amounts (Borba and Hamner 2001). In 2005, an estimated 52,400 Chinook, 88,800 summer chum, and 88,500 fall chum salmon were harvested in the subsistence fishery (ADF&G 2006). The ten-year (1993-2002) average subsistence harvest is approximately 51,000 Chinook, 94,200 summer chum, and 70,200 fall chum salmon (Busher and Hamazaki 2005).

Fishery outlook and management strategy information was provided to Yukon River subsistence and commercial fishermen representatives at state and federal committee meetings, and Yukon River Drainage Fishermen Association (YRDFA) annual meetings. Prior to the fishing season, all Yukon River subsistence and commercial fishermen received a joint ADF&G/United States Fish and Wildlife Service (USFWS) salmon outlook flyer in the mail. The 2005 preseason management outlook predicted a below average Chinook salmon run, average summer chum salmon run, and average to above average fall chum salmon run (ADF&G 2005).

Managing overlapping species with compressed or similar entry timing and the use of different harvest types (set gill nets, drift gill nets, and fishwheels) with variable catch efficiencies is a complex task. Monitoring the salmon run inseason is based on many different projects used to evaluate the salmon run timing and run strength. These projects include test-net and fishwheel index fisheries, sonar, genetics, aerial counts, weir and tower counts, salmon age assessment based on scales, and past projects that included radio-telemetry. However, these projects all target quantitative data collection specific to escapement and run assessment and are difficult to apply to inseason subsistence salmon harvest goal management.

The inseason interview project collects and summarizes inseason subsistence salmon harvest information for use in management decisions and public forums. Interview collection and summary techniques are based on the 2003 methodology (Gerken and Holder 2005) and funded by the Office of Subsistence Management, Fisheries Resource and Monitoring Program.

The 2005 project objectives included:

1. Facilitate inseason subsistence salmon interviews from early June to late August in six Yukon River communities (Emmonak, Holy Cross, Nulato, Galena, Huslia, and Beaver or Fort Yukon) conducted by locally residing interviewers.
2. Document subsistence harvest information in a standardized format from 5-10 active fishing households per village. Provide a summary of subsistence fishing to fisheries managers by Monday noon of each week for inclusion in inseason fisheries management decision-making.

3. Promote/support local governments and or tribal organizations in developing their natural resource capabilities and programs.
4. Identify new local interviewers and encourage their participation in the preseason training program.

Inseason interviews performed by local hires can achieve a better understanding how subsistence goals are met throughout the drainage in two ways. First, contact with fishermen during the fishing season has typically been maintained by individual telephone calls and the utilization of river-wide teleconferences to increase understanding of intra-season subsistence use (T. Lingnau and F. Bue, ADF&G, personal communication). However, assessing harvest success through these techniques may not be representative of the majority of subsistence fishermen on the river. Fishermen without telephones, with full time jobs, or living in fish camps are not represented in the historical weekly contacts. It is also of concern that subsistence fishermen who have a commercial permit may be more aggressive in trying to meet their subsistence harvest goals, recognizing that once people begin to report that they have met their needs, then the ADF&G begins to consider commercial fishing opportunities. Local hire interviewers can contact a larger group of subsistence fishermen and can relay this information in a standardized format beneficial to managers and users participating in teleconferences. Utilization of a combination of inseason interviews, teleconferences, and personal telephone calls was valuable on the Kuskowkwim River in strengthening the manager's ability to achieve management priorities (Martz and Whitmore 2005). Second, information that can be compared to past fishing years is a valuable tool in inseason management. Weekly phone calls and teleconferences cannot be compared with past fishing seasons because inseason subsistence harvest indices are not available. Inseason subsistence harvest information becomes useful in implementing fishery management actions directed towards achieving escapement goals, providing for a subsistence use priority, and if harvestable surpluses of salmon are available, to provide an opportunity for other fisheries (Martz and Whitmore 2005).

Methods

Modifications to the original methods have occurred annually since 2002 in an attempt to make data collection easier in field settings and data transfer more efficient. USFWS personnel conducted a two-day training session in Galena on May 17, 2005 to update and receive feedback from interviewers regarding project methodology modifications. USFWS fishery managers and Refuge Information Technicians (RIT's) from the villages of Holy Cross, Nulato, Huslia, Galena, and Beaver, local residents of Galena and Fort Yukon, ADF&G Commercial and Subsistence Fisheries Division Staff, and YRDFA staff attended and provided suggestions and critical review comments for improving project methodology. Similarly, a postseason meeting to discuss project modifications, preliminary results, and to identify other potential interviews took place in Bethel, Ruby, and Fairbanks between the USFWS project leaders.

Interviewers are local residents that have in-depth knowledge about their community, the fishing activities, and have rapport with local fishermen. RIT's are local residents employed with the USFWS National Wildlife Refuge system. Interviewers who were not RIT's were hired through YRDFA contracts.

Interviews were performed in Emmonak, Holy Cross, Kaltag, Nulato, Huslia, Galena, and Beaver (Figure 2). In Emmonak, interviews were conducted by a YRDFA local hire and RIT's

performed interviews in Holy Cross, Nulato, Huslia, and Beaver. Interviews in Kaltag were performed voluntarily by the Kaltag Natural Resources Department in coordination with the Nulato RIT. The Koyukuk/Nowitna National Wildlife Refuge Complex (KNNWRC) subsistence coordinator conducted the interviews in Galena.

Prior to the salmon fishing season, ADF&G provided a list of households, comprised of fishermen in the medium to heavy harvest strata, for each village involved in the project. The list was used to identify potential interview contacts. These lists were extracted from the ADF&G postseason subsistence surveys. Information from the postseason surveys categorized households into unique strata dependent upon their degree of harvest during the prior five fishing seasons. Subsistence survey strata harvest categories were: Unknown, Do Not Fish, Light (1-200 salmon), Medium (201-500 salmon), or Heavy (> 500 salmon) harvester (Brase and Hamner 2003). It was believed that households in the upper harvest categories fished longer and more frequently and would provide a greater consistency in weekly subsistence fishing input. The lists provided by ADF&G did not identify households by harvest strata protecting confidential information attained in the ADF&G postseason survey. Before the fishing season began, interviewers contacted households either in person or by telephone to explain the project, determine if they were willing to participate, and gain their consent to be interviewed.

For the purposes of this study, an interview was defined as a meeting between an interviewer and a representative of a subsistence fishing household where information was obtained and documented by the interviewer. Interviews were conducted weekly from a minimum of five to ten subsistence fishing households per village during the fishing season, June through September, contingent upon when salmon were present. The number of weekly interviews decreased from the number of households initially contacted due to completion of household subsistence salmon harvest goals. Interviews were conducted near the end or after a fishing period(s), in relation to the regulatory subsistence fishing schedule, when households would have harvest information available. Interviewers collected information concerning the fishing gear used, comparison of the catch rate (Better, Same, Poor), and amount of time fished (More, Equal, Less) compared to the 2004 season, the relative fishing success, the harvest goal progress (expressed as a percentage) that households were making toward completing their subsistence harvest, how many days they fished, and general comments from fishermen.

After interviews were completed, interviewers summarized their results and provided the information to the USFWS project leader. The USFWS project leader compiled the weekly subsistence information from all villages (Appendix A). Summarized information was presented by interviewers on weekly public YRDFA teleconferences. Interview information was considered confidential and no information was released to the public that could identify an individual fishing household.

Assessing subsistence harvest progression, based on a percentage, occurred in two different ways. One, an average of the last response from all interviewed households in the project was compared for each salmon species. This information provided insight on the total subsistence harvest completion by household for a species. Harvest progression responses by salmon species were summarized into categories: 1) 0-25%, 2) 26-75%, 3) 76%-100, and 4) unknown. A household that reached 100% of their salmon harvest goals during the interview period was indicative of subsistence salmon harvest goal completion. Unknown status was indicative of a household which was interviewed only one time and no harvest goal progression was interpreted.

Two, a weekly average percentage from each village was compared to salmon run timing by species in that village. This percentage indicated when and how much of a village's subsistence salmon harvest goals, based on a subsample of subsistence households, changed as compared to the quarter point, midpoint, and three-quarter point of the salmon run. Average weekly harvest percentage was calculated using all household responses for a specific interview week. Households reporting 100% salmon harvest goal completion were included in weekly averages occurring after their completion date as 100%. Subsistence salmon harvest goal completion in a village was indicative of a weekly average percentage of 100%. Salmon run-timing occurring in a village was estimated using the length of the run in relation to the ADF&G lower Yukon River set net project for Chinook salmon and the ADF&G Pilot Station sonar counts for chum salmon. Dates for each village were expanded using a daily swimming rate of 36 miles/day for Chinook salmon, 18 miles/day for summer chum (T. Spencer, ADF&G, personal communication), and 36 miles/day for fall chum salmon (Zuray 2005). Radio-telemetry used to identify Chinook salmon movement patterns on the Yukon River indicated that radio-tagged fish traveled an average of 31 miles/day in 2003 (Eiler et. al. 2006), while Chinook salmon captured in the Ramparts Rapids fishwheel project traveled at 41 miles/day in relation to the ADF&G lower Yukon test net project (Zuray 2005). Reports from subsistence fishermen presented on YRDFA teleconferences indicated that Chinook salmon were traveling 36 miles/day, which was the average of the two citations.

A fishing day was defined as a day where subsistence fishing gear is being used to actively catch subsistence salmon. The length of time actively fished could range from 1 minute to 24 hours. If a subsistence fishermen reported that they fished 1 minute on Tuesday, 6 hours on Wednesday, and 24 hours on Thursday then this fishermen would have fished three days that week.

Results

Interviews were performed in the villages of Emmonak, Holy Cross, Kaltag, Nulato, Huslia, Galena, and Beaver. Interviews were conducted between June 12 and October 9, 2006. The number of weeks interviews were performed ranged from 3 to 13. The number of households interviewed weekly ranged from 1 to 24 (Table 1). Data were summarized and presented in both written and oral formats. Presentation of the subsistence interview information was distributed in nine written weekly updates (Appendix A) provided to fishery managers and interviewers, USFWS (Emmonak/Fairbanks), Emmonak Tribal Council, ADF&G Commercial and Subsistence Divisons, YRDFA, Louden Tribal Council; Yukon Flats, Innoko, Yukon Delta, Koyukuk/Nowitna NWR's, local RAC and CFC members, and USFWS/Office of Subsistence Management (Anchorage). Weekly information was presented orally on 13 YRDFA teleconferences by interviewers (Table 2).

Subsistence Harvest Goal Progression

A total of 92 households were interviewed to assess Chinook salmon harvest progression. The majority of households reported making 76% to 100% of their harvest goals (Figure 3). Households categorized in the unknown category were located in fish camps in the Holy Cross area. These fish camps were contacted only one time. Follow-up interviews were not completed due to the remoteness of the fish camps and lack of boat transportation.

Interviews for summer chum and fall chum salmon occurred only in the villages of Emmonak and Huslia. Thirty-six households were interviewed to assess summer chum salmon harvest

progression. Most households reported making 76% to 100% of their harvest goals. A small percentage of households were categorized as unknown. These households were spread between both villages (Figure 4). Thirteen households were interviewed to assess fall chum salmon harvest progression. Households reporting 76% and 100% were the largest proportion (Figure 5).

2005 Catch Rates and Fishing Time

Responses comparing the 2005 Chinook salmon fishing season to the 2004 fishing season were conducted between June 12 and July 17 in Emmonak, Holy Cross, Kaltag, Nulato, Huslia, Galena, and Beaver. A total of 106 responses were provided by households during the Chinook salmon fishing season regarding catch rates and the amount of time fished. Indications of better catch rates and equal amount of fishing time were predominant (Table 3).

Responses comparing the 2005 summer chum salmon fishing season to the 2004 fishing season were conducted between June 12 and July 31 in Emmonak and Huslia. A total of 49 interview responses were provided by households regarding catch rates and 47 interview responses were provided regarding the amount of time fished. Catch rates were primarily ranked as better with less time spent fishing in Emmonak and an equal amount of time spent fishing in Huslia (Table 4).

Responses comparing the 2005 fall chum salmon fishing season to the 2004 fishing season were conducted between July 17 and October 9 in Emmonak and Huslia. A total of 20 interview responses were provided by households regarding catch rates and 18 interview responses were provided regarding the amount of time fished. Responses for catch rate were chiefly better with an equal amount of time spent fishing (Table 5).

Number of Fishing Days per Week

The BOF windowed subsistence schedule sets the beginning date and length of time for subsistence fishing dependent upon fishing district (ADF&G 2004). Differences in the length of time per subsistence window vary from 36 hours twice a week in the lower river (Districts 1 - 3) to unregulated 24 hours/day and 7 days/week in portions of the upper river (Districts 4 - 6) .

Responses by village are expressed in ranges and do not address management changes to the regulatory windowed schedule. The number of households responding to this question varied between villages and information was not collected consistently throughout the season. Most responses were received within the first two weeks of the fishing season. Responses ranged from 1 – 4 days in Emmonak, 1 – 2 days in Holy Cross, 2 – 4 days in Kaltag, 1– 5 days in Nulato, 6 – 7 days in Huslia, and no responses were received from Galena or Beaver.

Gear Type

Different regulations regarding fishing gear type exist in the lower river and the upper river. Subdistrict 4A has a limited drift gillnet fishery availability regulated by date, see 5AAC 01.220(e) (2) (ADF&G 2004). Fifty-seven subsistence fishermen were interviewed for gear type in Districts 1, 3, and Subdistrict 4A. The use of a drift gillnet was predominant. Fifteen subsistence fishermen were interviewed for gear type in Subdistricts 4B, 4C, and 5D. The majority reported fishing with set gillnets (Figure 6).

Emmonak

Interviews began on June 12 and ended on September 4. A range of 1 to 24 households were interviewed weekly. The weekly average percentage for Chinook salmon from all interviewed households was 100% occurring on July 17. Harvest progression increased by 15% before the quarter point of the run, 44% around the quarter point of the run, 9% around the midpoint of the run, and 32% around the three-quarter point of the run (Figure 7).

The weekly average percentage for summer chum salmon from all interviewed households was 100% occurring on July 3. Harvest progression increased by 7% before the quarter point of the run, 49% around the quarter point of the run, 19% around the midpoint of the run, and 25% around the three-quarter point of the run (Figure 8).

The weekly average percentage for fall chum salmon from all interviewed households was 100% occurring on September 4. Harvest progression increased by 35% before the quarter point of the run, increased by 16% between the quarter point and the midpoint of the run, increased by 14% between the midpoint and the three-quarter point of the run, and increased by 35% after the three-quarter point (Figure 9).

Postseason summary of the subsistence fishing in and around the village of Emmonak by the local interviewer characterized the Chinook, summer chum, and fall chum salmon runs as strong enough to meet subsistence harvest goals. Comments provided by fishing households indicated flesh on all species being of good quality (Appendix B).

Holy Cross

Interviews began on June 12 and ended on July 31. A range of 1 to 16 households were interviewed weekly. The weekly average percentage for Chinook salmon from all interviewed households was 100% occurring on July 17. Harvest progression increased by 32% before the quarter point of the run, 21% around the quarter point of the run, 25% around the midpoint of the run, 5% around the three-quarter point of the run, and 17% after the three-quarter point of the run for Chinook salmon (Figure 10).

Postseason summary of the subsistence fishing in and around the village of Holy Cross by the local interviewer stated the Chinook salmon run was strong enough to meet subsistence harvest goals for most fishermen and that the salmon were of good quality. There was concern about the Chinook salmon being a smaller size then in the past and that high gas prices and high water levels made fishing early in the season difficult (Appendix C).

Kaltag

Interviews began on June 26 and ended on July 10. A range of 2 to 4 households were interviewed weekly. The weekly average percentage for Chinook salmon from all interviewed households was 92% occurring on July 10. Harvest progression increased by 63% before the quarter point of the run, 12% around the quarter point of the run, and 17% around the midpoint of the Chinook salmon run (Figure 11).

Nulato

Interviews began on June 19 and ended on July 17. A range of 2 to 6 households were interviewed weekly. The weekly average percentage for Chinook salmon from all interviewed households was 100% occurring on July 17. Harvest progression increased by 30% before the quarter point of the run, 39% around the quarter point of the run, 26% around the midpoint of the run, and 5% around the three-quarter point of the run for Chinook salmon (Figure 12).

Postseason summary of the subsistence fishing in and around the village of Nulato by the local interviewer characterized the Chinook, summer chum, and fall chum salmon runs as strong enough to meet subsistence harvest goals if fishermen made an effort to meet their goals. Comments also included flesh on all species being of good quality (Appendix D).

Huslia

Interviews began on July 3 and ended on October 9. Interviews were not performed on the weeks of September 25 and October 2. A range of 2 to 8 households were interviewed weekly. The weekly average completion percentage for Chinook salmon from all interviewed households was 100% occurring on July 17. Harvest progression increased by 13% before the quarter point of the run, 38% around the quarter point of the run, and 49% around the midpoint of the run for Chinook salmon (Figure 13).

The weekly average percentage for summer chum salmon from all interviewed households was 88% occurring on August 7. Harvest progression increased by 83% before the quarter point of the run and increased by 5% around the quarter point of the run for summer chum salmon (Figure 14).

The weekly average percentage for fall chum salmon from all interviewed households was 100% occurring on October 9. Harvest progression was 75% around the midpoint of the run and increased 25% after the three-quarter point of the run for fall chum salmon (Figure 15).

Postseason summary of the subsistence fishing in and around the village of Huslia by the local interviewer characterized the Chinook, summer chum, and fall chum salmon runs as strong enough to meet subsistence harvest goals (Appendix E).

Galena

Interviews began on June 19 and ended on July 17. A range of 1 to 6 households were interviewed weekly. The weekly average percentage for Chinook salmon from all interviewed households was 100% occurring on July 17. Harvest progression increased by 42% before the quarter point of the run. No interviews were performed during the week of July 3 which included the quarter point. Interviews were performed during the week, July 10, which included the three quarter point indicating a harvest progression increase of 46% since the last interview week. The exact increase attributed to each week is unknown. Harvest progression after the three-quarter point increased by 12% (Figure 16).

Beaver

Interviews began on June 19 and ended on July 31. No interviews were performed on the week of July 10. A range of 1 to 8 households were interviewed weekly. The weekly average

percentage for Chinook salmon from all interviewed households was 100% occurring on July 24. Harvest progression around the quarter point of the run was 68% and increased by 32% around the midpoint of the Chinook salmon run (Figure 17).

Postseason summary of the subsistence fishing in and around the village of Beaver by the local interviewer characterized the Chinook salmon runs as strong enough to meet subsistence harvest goals. Concerns included high water and debris during the period of late June (Appendix F).

Discussion

Based on the information collected during the 2005 salmon fishing season it appears that most interviewed households met or nearly met their subsistence harvest goals for Chinook, summer chum, and fall chum salmon. Catch rates were reported as better in 2005, and households reported fishing less or an equal amount of time than in 2004 to complete their subsistence Chinook, summer chum, and fall chum salmon harvest goals.

Chinook salmon harvest progression had the greatest increase early in the run, before the quarter point and around the quarter point of the run. Prior to the quarter point, flooding and high water conditions delayed subsistence fishing activity for Chinook salmon. This was evident in the poor ratings for catch rates in all villages occurring in early June on the lower river, mid-June in the middle river, and in early July in the upper river. During this time, harvest progression did occur, but fishermen reported having to work harder to find fish. As a result, most subsistence fishermen focused on rebuilding fish camps in the lower river and finding more productive fishing sites in the upper river. As high water began to subside, catch rates became more positive and subsistence harvest progression increased. In contrast, the lower Yukon River test nets and Pilot Station sonar information did not show as large of increases as subsistence fishermen were reporting in the lower river. This incongruity in management tools led to scrutiny in assessment projects and the discovery that Pilot Station sonar was underestimating counts on the left bank due to erosion. Consequently, liberalizations were made to the BOF windowed subsistence fishing schedule on June 23 (after the quarter point of the run) in Emmonak, June 27 (on the quarter point of the run) in Holy Cross, and on July 29 (before the quarter point of the run) for Kaltag, Nulato, and Galena. Fishing in Huslia and Beaver was open 24 hours per day and 7 days per week. Consistent with lower water levels and management liberalizations, increases in subsistence harvest progression were reported throughout the remainder of Chinook salmon fishing season in all villages and in general, better comments concerning catch rates with equal amounts of fishing time in comparison to 2004.

Interviews for chum salmon only occurred in the villages of Emmonak and Huslia. Evaluation of summer chum salmon catches by subsistence fishermen tracked consistently with assessment projects, indicating larger than average returns sufficient to fulfill escapement and subsistence needs. Similar to the Chinook salmon run, summer chum harvest progression was greatest around the quarter point.

Fall chum salmon subsistence fishermen indicated that they were fishing later in Emmonak because they started later in the summer season, while Huslia area fishermen stated that they fished later due to the late summer weather being extremely hot. Liberalizations to the windowed subsistence fishing schedule, in place from the Chinook and summer chum salmon season, continued at the beginning of the fall fishing season. Emmonak fisherman reported

fishing steadily throughout the fall chum salmon run, while Huslia fisherman reported fishing primarily before the midpoint and after the three-quarter point of the fall chum salmon run. A decrease in harvest progression in Emmonak occurred before the quarter point of the run because only one fall chum salmon interview was performed. This household reported a high harvest percentage. This percentage was greater than the average weekly harvest percentage in the following week, resulting in a decrease in harvest progression. A higher number of interviews were performed in following weeks, and are likely more representative of the 2005 fall chum salmon harvest progression.

Knowing how subsistence fishermen are progressing in their harvest goals is important in making decisions regarding changes to the subsistence fishing schedule and scheduling of commercial fishing periods. This study showed that in 2005 most of the subsistence harvest for Chinook and summer chum salmon took place before or around the quarter point of the run. The 2005 preseason management strategy was to target commercial fishing for Chinook salmon between the quarter point and three-quarter point of the Chinook salmon run in the lower Yukon River. As a result, Chinook salmon migrating upriver around the quarter point, historically June 15 in the lower river, are highly targeted and run assessment information near this time period becomes extremely valuable. Utilization of inseason subsistence interviews differed between managers. The USFWS Yukon River manager utilized the interview information in two federal statements of non-objection regarding commercial fishing and indicated that the information was one of several tools used to make management decisions. The ADF&G Yukon River summer season fisheries manager indicated that the inseason harvest assessment project did provide him with some information in the upper Yukon River and Koyukuk River, but that he could also obtain this information on the YRDFA teleconferences. However, in most cases subsistence information presented on the YRDFA teleconferences is acquired through this project because interviewers are the only attendees in their communities. Information presented to the ADF&G Yukon River fall season fisheries manager was minimal as most interviewers contributed information only in the summer season.

Multiple factors are involved with how quickly a household can complete their subsistence salmon harvest goals and these factors may change between years or within a fishing season. All villages noted that they were affected by high water, bad weather, high gas prices, and heavy amounts of debris. Additionally, several of the factors were unique to specific villages. Emmonak fishermen noted that they had to search for fish because of the multiple mouths of the Yukon River in their area. Similarly, subsistence fishermen in Beaver reported having to find new fishing sites because of channel changes in their area. Huslia area fishermen stated that due to the limited availability of good fishing locations their nets became inefficient in high water. Holy Cross subsistence fishermen commented that time spent on other occupations, such as firefighting, competed with their fishing time.

Information received from six communities provided an overview of subsistence harvest progression in those areas, but as noted above, many factors influence subsistence harvests. Collecting inseason subsistence harvest information is a valuable management tool, but also beneficial for providing employment in local communities. Expansion of the inseason interviews project to the village of Kaltag was accomplished primarily by the Nulato RIT and continued expansion to other villages should be supported.

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Table 1. Number of weekly interviews by interview week conducted by local hire and Refuge Information Technicians during the 2005 salmon fishing season.

Week Ending	Emmonak	Holy Cross	Kaltag	Nulato	Huslia	Galena	Beaver
29-May							
5-Jun							
12-Jun	11	8					
19-Jun	24	9		2		6	8
26-Jun	19	16	4	6		6	8
3-Jul	9	1	3	6	8		7
10-Jul	11	13	2	5	8	6	
17-Jul	5	1		4	2	1	7
24-Jul	6				2		4
31-Jul	6	2			2		1
7-Aug	6				3		
14-Aug	7						
21-Aug	6						
28-Aug	5				3		
4-Sep	1				3		
11-Sep					3		
18-Sep					3		
25-Sep							
2-Oct							
9-Oct					3		
Total # of interviews	116	50	9	23	40	19	35
Total interview weeks	13	7	3	5	11	4	6

Table 2. YRDFA teleconferences attendance by local hire and Refuge Information Technicians during the 2005 salmon fishing season.

Date	Emmonak	Holy Cross	Nulato	Huslia	Galena	Beaver
31-May					X	X
7-Jun			X	X	X	
14-Jun	X	X			X	
21-Jun	X	X	X		X	X
28-Jun	X	X	X	X	X	X
5-Jul	X		X	X		X
12-Jul	X				X	
19-Jul						
26-Jul	X		X	X	X	X
2-Aug	X		X	X		
9-Aug	X		X		X	
16-Aug	X			X		
23-Aug	X				X	
30-Aug	X			X		
6-Sep						
13-Sep						
Total	11	3	7	7	9	5

Table 3. Results of household responses to the 2005 inseason subsistence interview questions for Chinook salmon.

Interview date	Compared with this time "LAST" year, how were your catch rates for salmon this week?			Compared with this time "LAST" year, is the amount of time you have fished?		
	Poor	Same	Better	Less	Equal	More
			Emmonak			
12-Jun	1	5	1		5	2
19-Jun	1	9	10	11	8	2
26-Jun	1		7	7		1
3-Jul			1	1		
			Holy Cross			
12-Jun	2	1		2	1	
19-Jun	2	1		2	1	
26-Jun	2	10		1	10	1
			Kaltag			
26-Jun	2	1	1	1	2	1
3-Jul		2	2	2	2	
10-Jul		2	1	1	2	
			Nulato			
19-Jun	2			1	1	
26-Jun	1	2	2	1	2	2
3-Jul			6		1	5
10-Jul		1	3			4
17-Jul	1					1
			Huslia			
3-Jul	4		3		7	
10-Jul		1	3		4	
17-Jul			1		1	
			Beaver			
3-Jul	3	3		4	1	
17-Jul	3		2			5
Total	25	38	43	34	48	24

Table 4. Results of household responses to the 2005 inseason subsistence interview questions for summer chum salmon.

Interview date	Compared with this time "LAST" year, how were your catch rates for salmon this week?			Compared with this time "LAST" year, is the amount of time you have fished?		
	Poor	Same	Better	Less	Equal	More
			Emmonak			
12-Jun	1	4	1	1	3	2
19-Jun		7	13	13	6	1
26-Jun			9	8		
3-Jul			2	2		
10-Jul			1	1		
			Huslia			
3-Jul			3		3	
10-Jul			2		2	
17-Jul			2		2	
24-Jul			2		2	
31-Jul			2		2	
Total	1	11	37	25	20	3

Table 5. Results of household responses to the 2005 inseason subsistence interview questions for fall chum salmon.

Interview date	Compared with this time "LAST" year, how were your catch rates for salmon this week?			Compared with this time "LAST" year, is the amount of time you have fished?		
	Poor	Same	Better	Less	Equal	More
			Emmonak			
17-Jul	1					1
24-Jul			2	2		
31-Jul			1	1		
7-Aug	1					1
			Huslia			
28-Aug			3		1	
4-Sep			3		3	
11-Jun			3		3	
18-Sep			3		3	
9-Oct			3		3	
Total	2		18	3	13	2

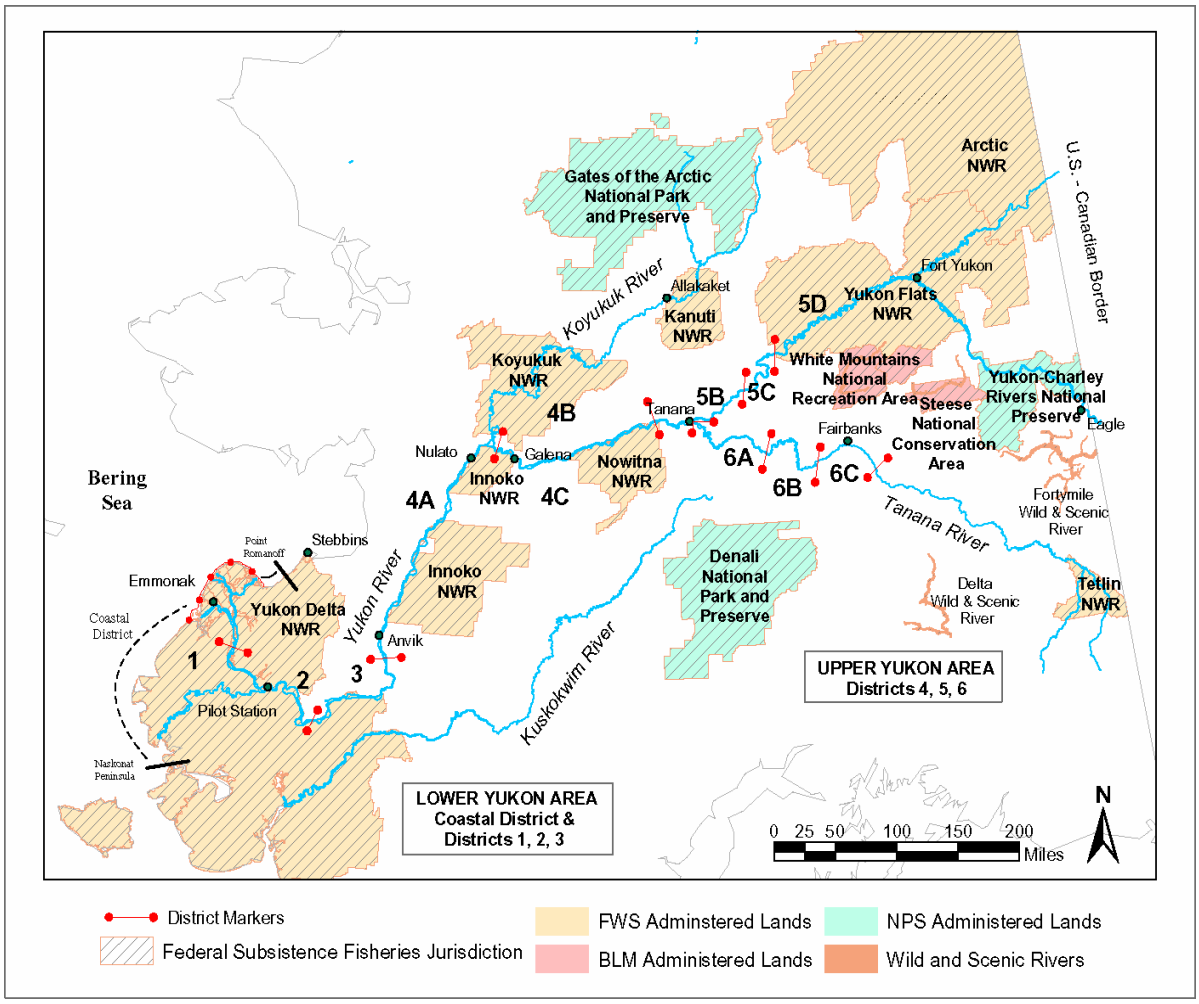

Figure 1. Map of the Yukon River drainage highlighting Yukon River federal conservation units.

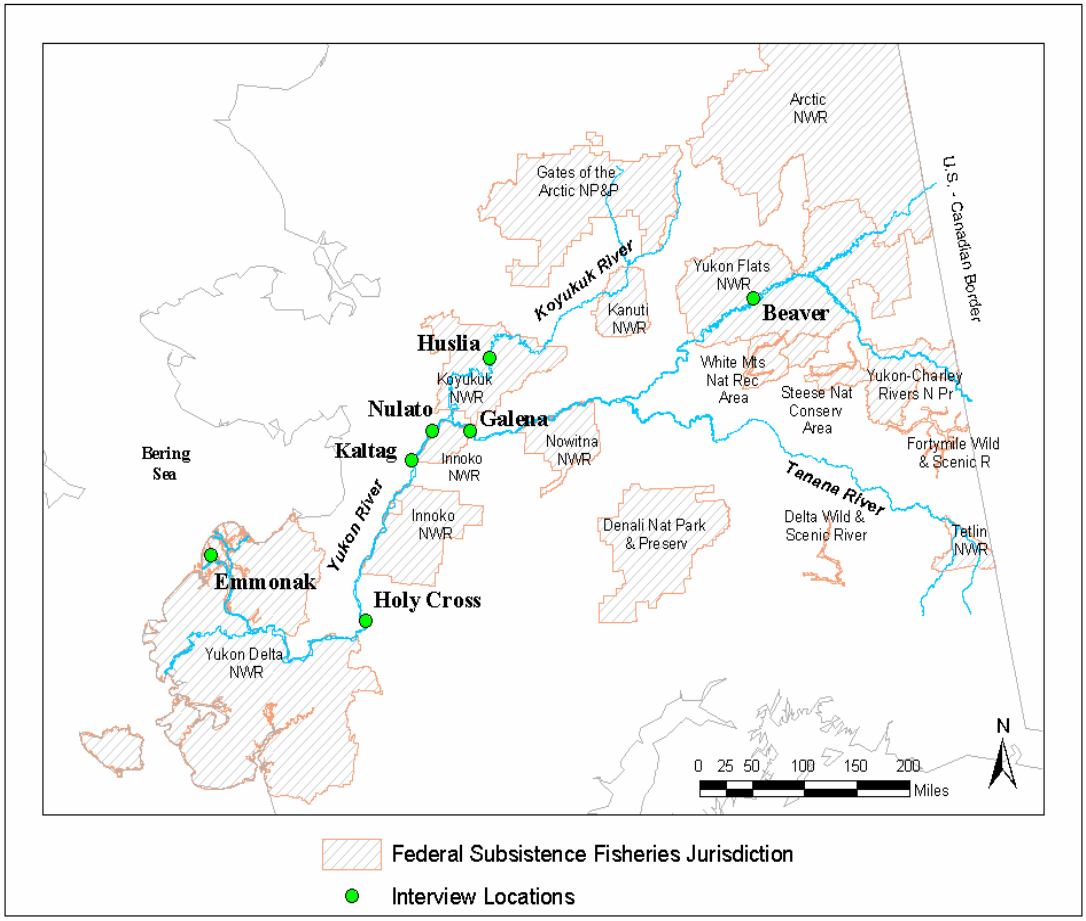

Figure 2. Map of the Yukon River drainage highlighting the villages of Emmonak, Holy Cross, Kaltag, Nulato, Huslia, Galena, and Beaver.

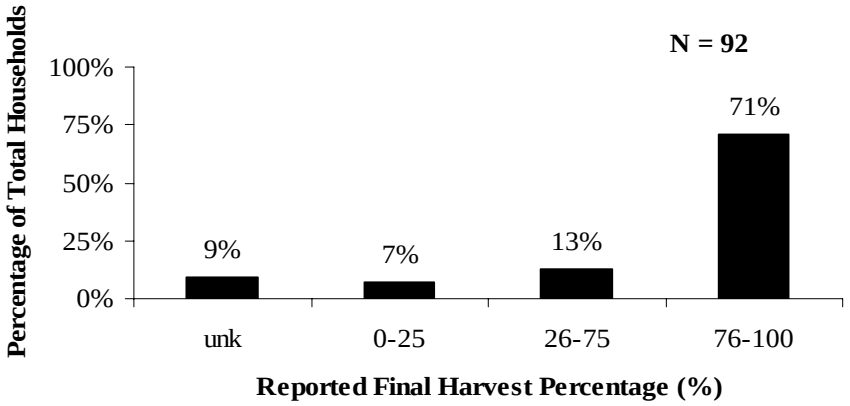

Figure 3. Final responses of harvest progression for Chinook salmon in all interviewed villages.

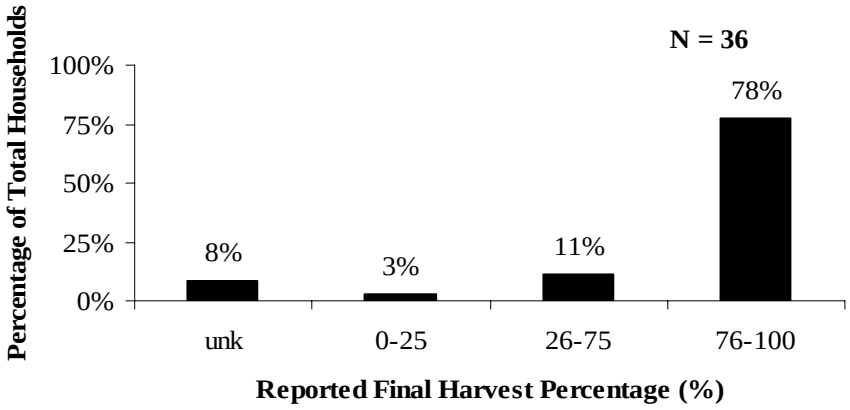

Figure 4. Final responses of harvest progression for summer chum salmon in all interviewed villages.

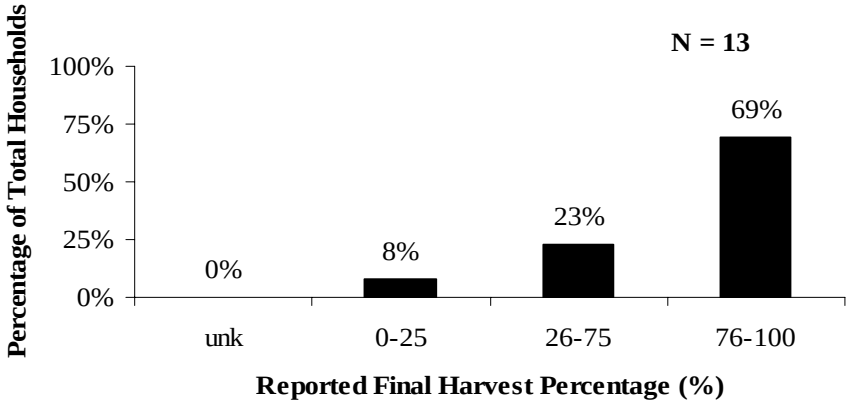

Figure 5. Final responses of harvest progression for fall chum salmon in all interviewed villages.

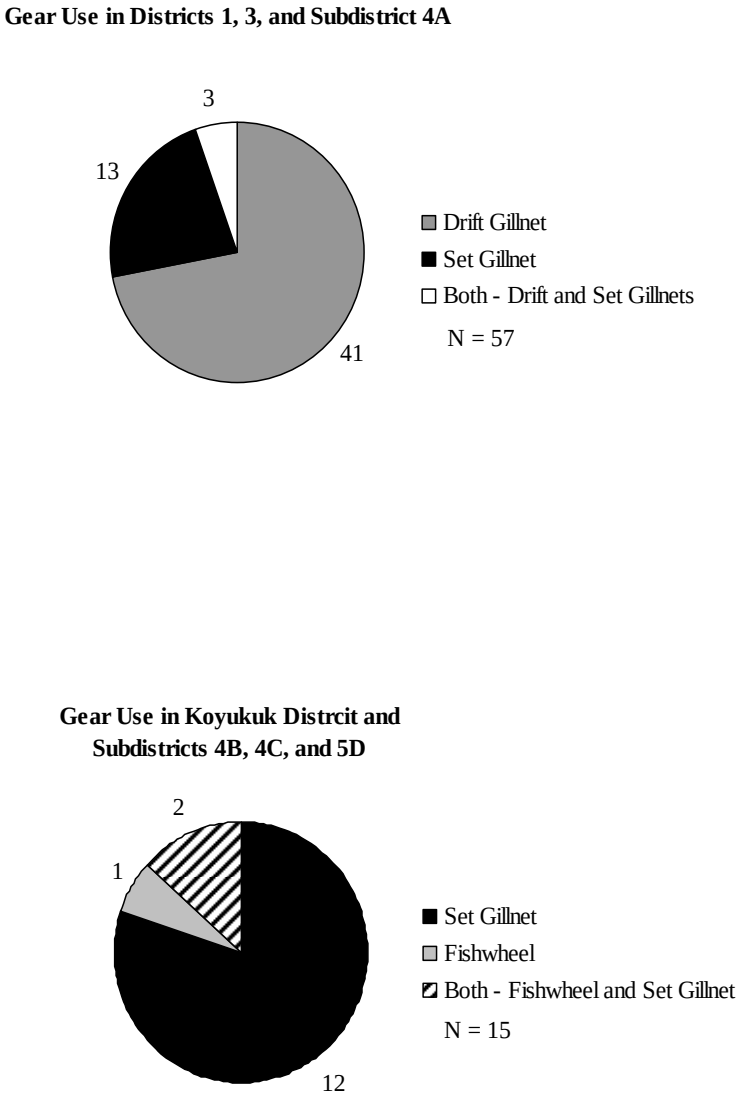

Figure 6. Reported gear type use by fishermen in interviewed villages.

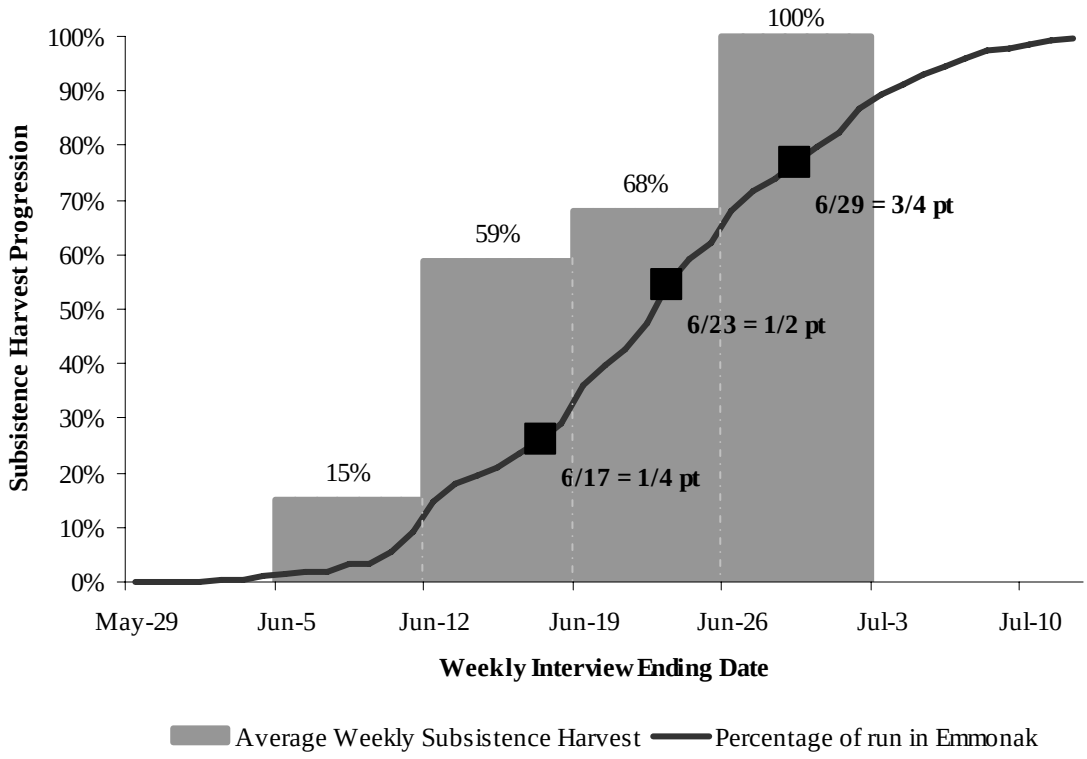

Figure 7. Chinook salmon subsistence harvest progression versus percentage of run in Emmonak.

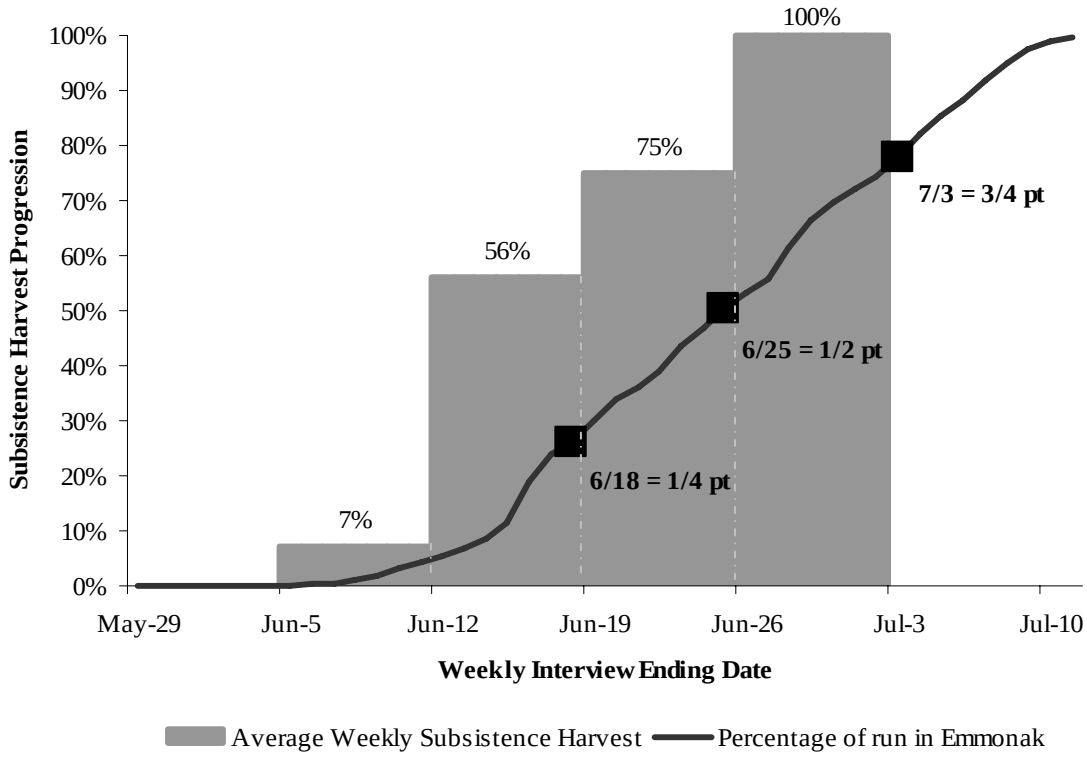

Figure 8. Summer chum salmon subsistence harvest progression versus percentage of run in Emmonak.

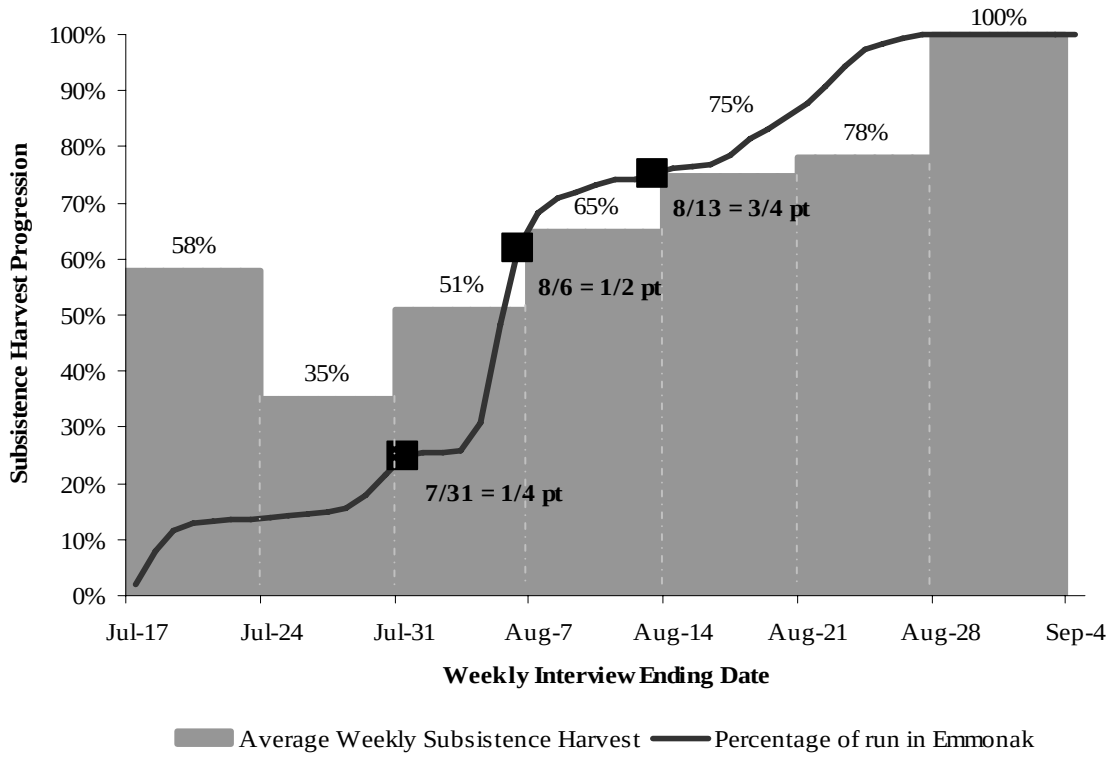

Figure 9. Fall chum salmon subsistence harvest progression versus percentage of run in Emmonak.

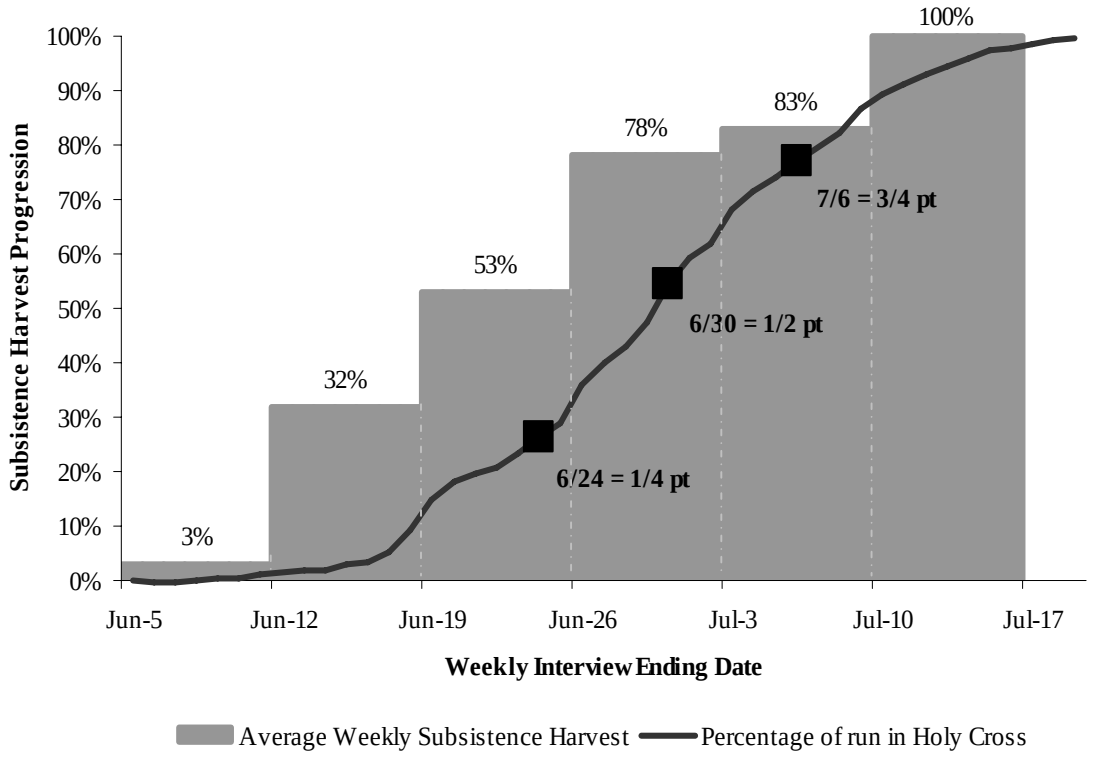

Figure 10. Chinook salmon subsistence harvest progression versus percentage of run in Holy Cross.

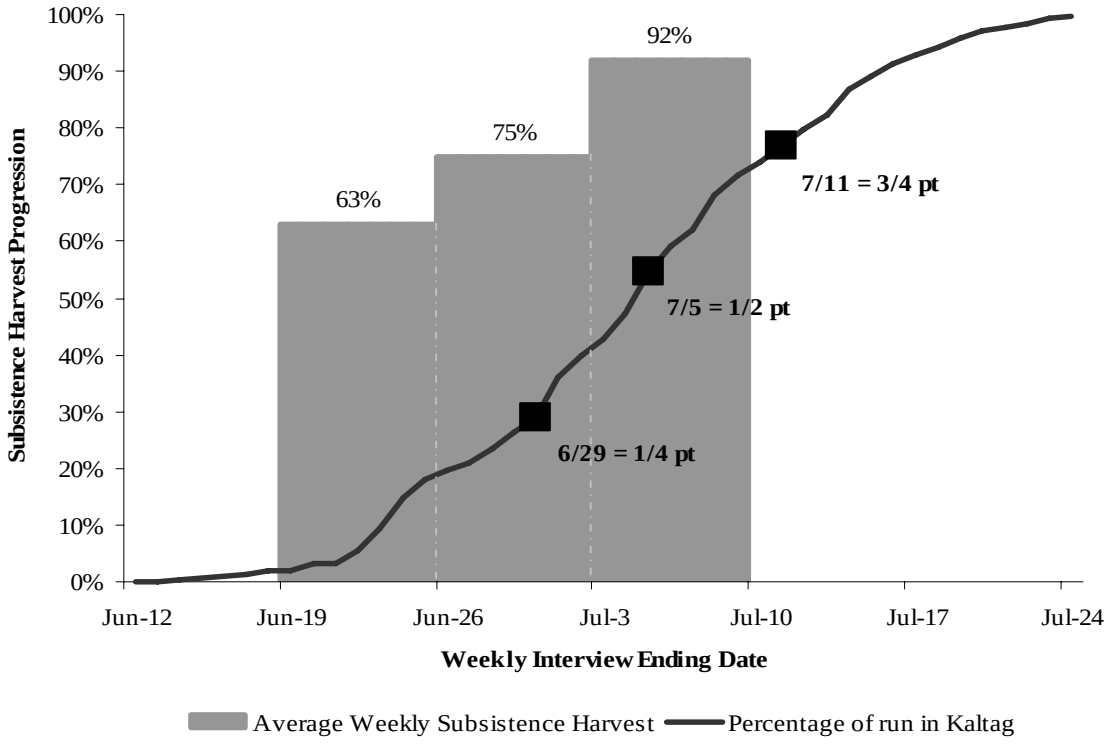

Figure 11. Chinook salmon subsistence harvest progression versus percentage of run in Kaltag.

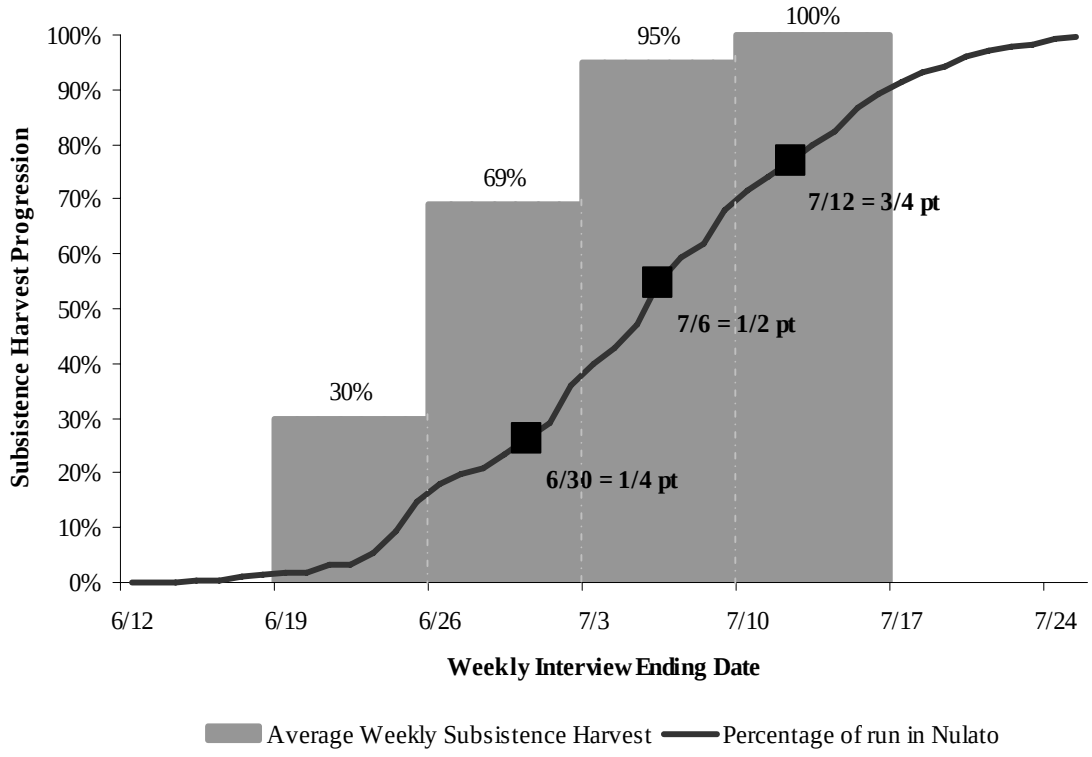

Figure 12. Chinook salmon subsistence harvest progression versus percentage of run in Nulato.

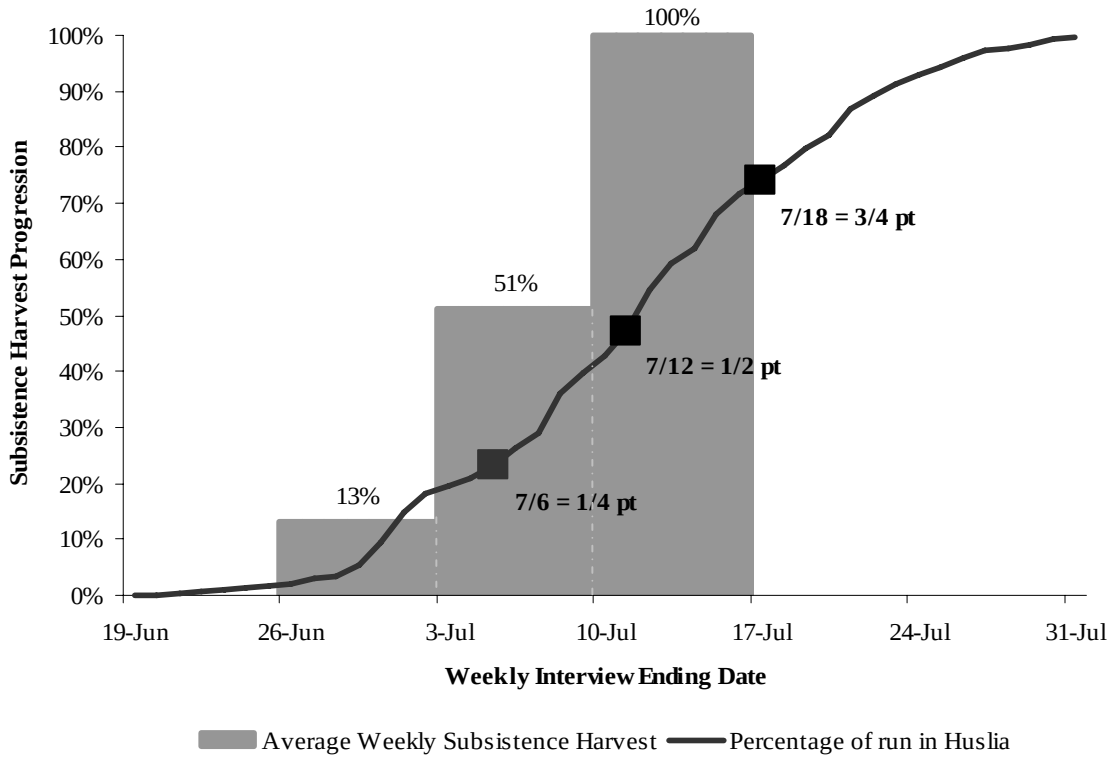

Figure 13. Chinook salmon subsistence harvest progression versus percentage of run in Huslia.

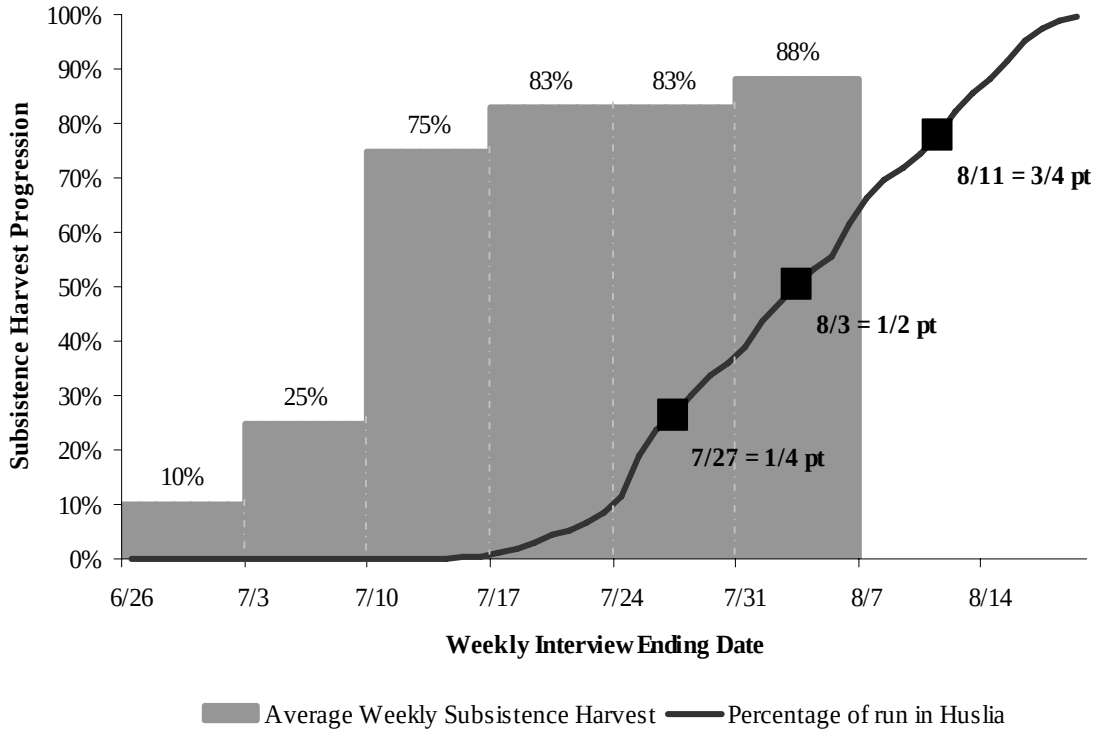

Figure 14. Summer chum salmon subsistence harvest progression versus percentage of run in Huslia.

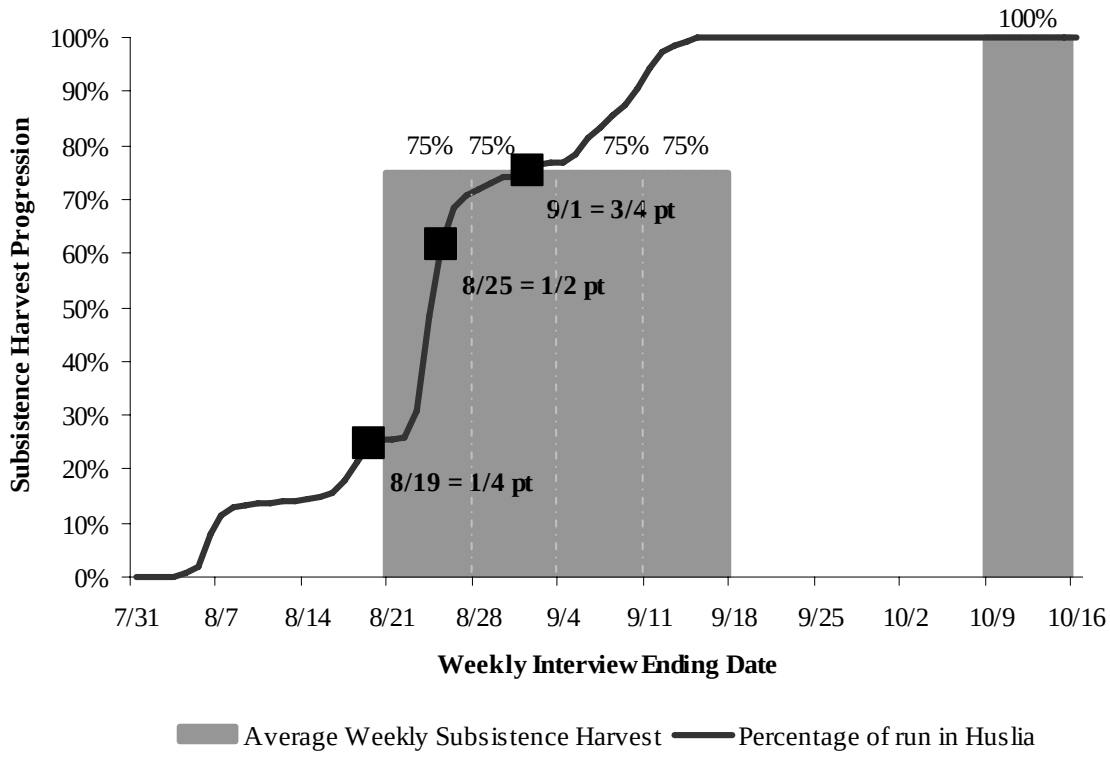

Figure 15. Fall chum salmon subsistence harvest progression versus percentage of run in Huslia.

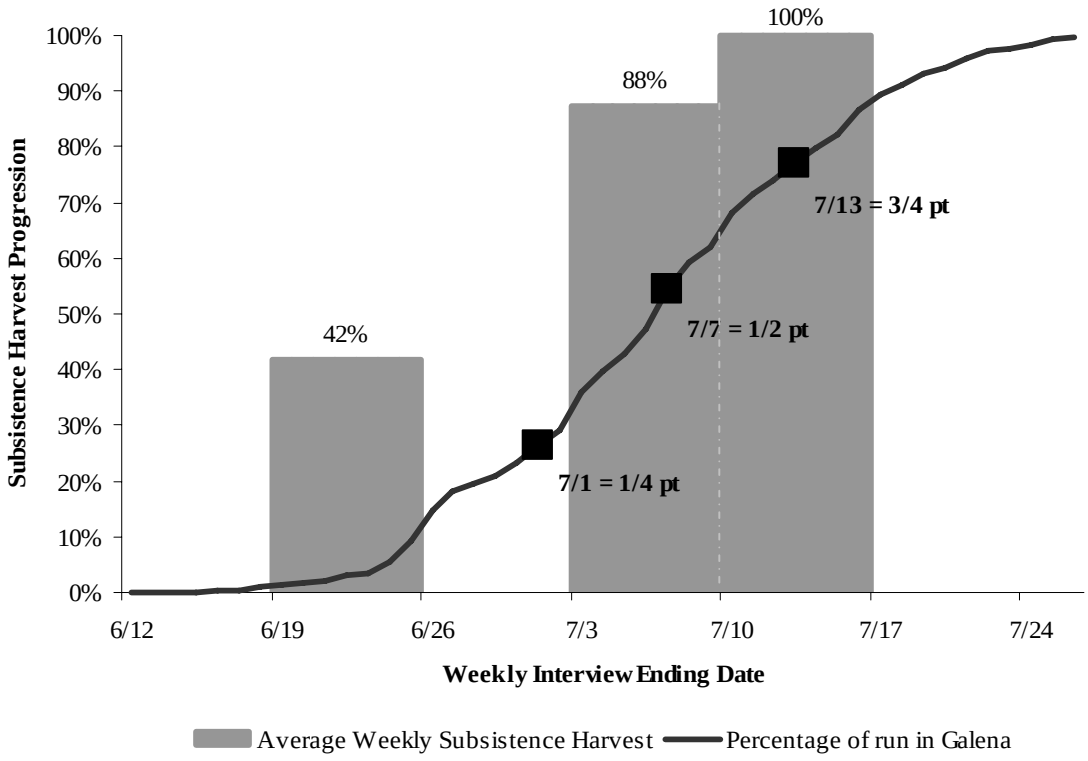

Figure 16. Chinook salmon subsistence harvest progression versus percentage of run in Galena.

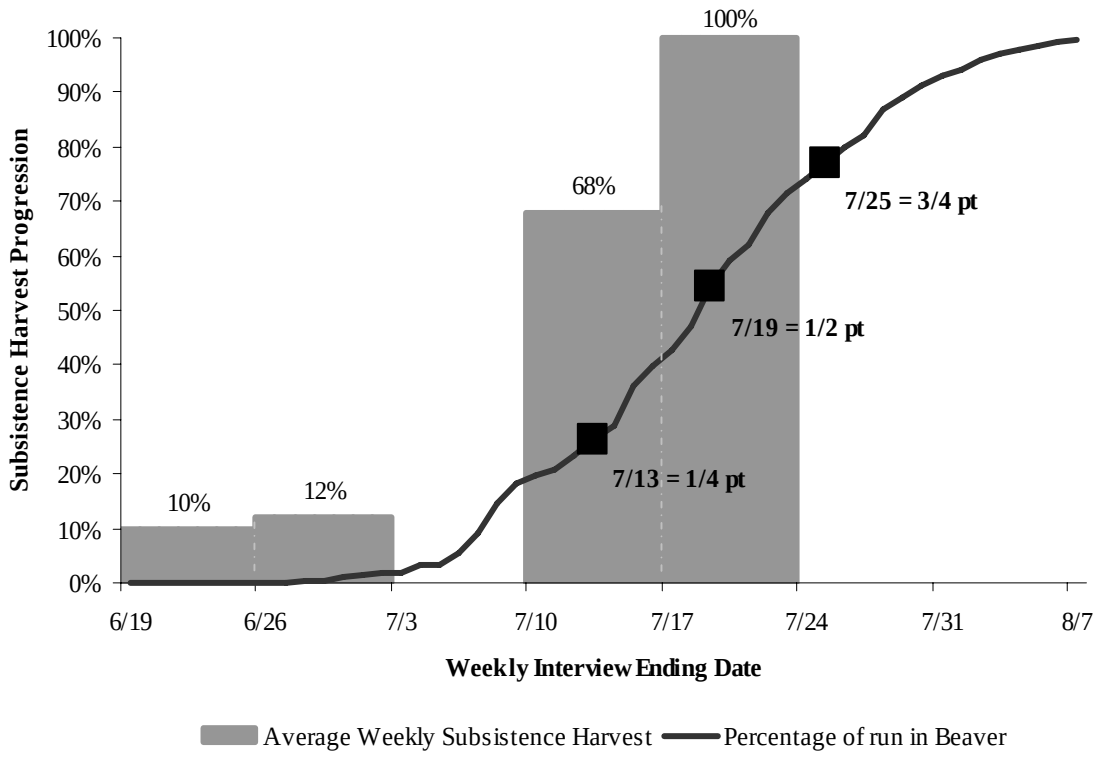

Figure 17. Chinook salmon subsistence harvest progression versus percentage of run in Beaver.

Appendix A. Weekly summary form of inseason subsistence salmon interviews, 2005.

Preliminary Data

Chinook Salmon Harvest Interview Summary

Interview Week Weekly Date: 2005

Village	Interview Date(s)	# of Interviews	Gear Type	Harvest % [a]	Catch Rate [b]	Time Fished [c]	Fishing Days [d]
Emmonak			Drift gillnet Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Holy Cross			Drift gillnet Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Kaltag			Drift gillnet Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Nulato			Drift gillnet Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Huslia			Drift gillnet Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Galena			Fishwheel Set gillnet Drift gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	
Beaver			Fishwheel Set gillnet Combination Other	0 - 25 26 - 75 76 - 100	BETTER SAME POOR	MORE EQUAL LESS	

a Where are you at in your harvest?
b Compared to "LAST" year how were you catch rates?
c Compared to "LAST" year is the amount of time fished?
d Average number of fishing days of all interview participants?

Appendix B. Emmonak postseason summary of subsistence fishing, 2005.

Summary report of the subsistence fishing on the lower Yukon River delta around the village of Emmonak, AK, 2005 by Theodore Hamilton, Natural Resource Specialist – Emmonak Tribal Council.

This year we experienced 4 days of flood water in Emmonak. The flood was mostly due to heavy ice jamming with lots of snow melt water upriver. After the flood, water levels remained high throughout the Chinook and summer chum salmon season which is normal as compared to these last few years where we had low water during and after break up (ice out). Most of the fishers did not start fishing till the ground dried up around the dry rack and smoke house. The bulk of the Chinook salmon run arrived while the ground was drying up.

Once the ground dried up, most of the fishers met their goals quickly. Even the weather cooperated with a continuous North wind and no rain. The good conditions allowed most of the fishers to meet their goals. The Chinook salmon flesh was of good quality, except for the blushed Chinook salmon caught late in the season. The few fishers that started late did not reach their goals with Chinook salmon and were planning to use the fall chum salmon in place of the Chinook salmon.

This year the summer chum salmon arrived in strong numbers and after the Chinook salmon. This is considered normal by Yupik standards. The summer chum salmon flesh was of good quality except for the water colored salmon that arrived late. The few fishers that did not meet their needs planned to wait till the fall chum salmon arrived.

When the fall chum salmon arrived, the run was very strong. This allowed the few fishers who did not meet their needs with either Chinook or summer chum salmon to reach their goals. The fall chum salmon flesh was of good quality.

Overall subsistence fishing was great when compared to other good years before 1998 and much better than 1998 and 1999 when the salmon runs were poor. Most of the fishers were satisfied with what they brought home. Some of the people who are on the subsistence salmon interview list complained that the subsistence windows affected their ability to move to camp, drying time, and catch rates. This year more fisher complained about the subsistence salmon windows than last year.

Appendix C. Holy Cross postseason summary of subsistence fishing, 2005.

Summary report of the subsistence fishing in the GASH area (Grayling, Anvik, Shageluk and Holy Cross) 2005 by Clara Demientieff, Refuge Information Technician-Innoko NWR.

Breakup up was early this spring and few of the fishers began fishing for salmon the first week in June. Around the middle of June, all fishers settled into their fish camps. Similar to 2004, there was high water, heavy debris loads, and high gas prices which prevented some fishers from salmon fishing early. Those who started fishing early in June, stated that the salmon were very small but of good quality. Some fishers reported only two/three sores on their catches. The high water caused different river channel changes and the fishers looked for other spots to do their salmon catches.

Chinook salmon catch was satisfied by all except for one fisher who did not catch their limit and continued with the silver salmon catches. The summer was very hot and the fish had to be processed immediately. September was the rainy month.

Concerns of the fishers were: the regulation window for the fishing season, gas prices and high water.

I appreciate all the fishers I have been in contact with and thank them for assisting me with the fish interviews.

Appendix D. Nulato postseason summary of subsistence fishing, 2005.

Summary report of the subsistence fishing around the village of Nulato, 2005 by Patrick Madros Jr., Refuge Information Technician, Koyukuk/Nowitna National Wildlife Refuge Complex.

To begin, this summary is the observations of RIT Madros from interviews conducted throughout the summer and fall. Information was collected in an informal non-structured nature.

When conducting inseason subsistence salmon harvest interviews for Chinook salmon, I noted a few things. First of all, most fishermen who put a concerted effort into fishing achieved their harvest quotas, which were most fishermen interviewed. As in every fishery there are some hardships by individuals. The most apparent this past season was fishermen attempting to fish when there were little run passage at that time. In those instances they fared bad, but it was only one time throughout the season. Most fishermen concluded that if they wanted fish there was ample time and opportunity to do so. Secondly, the subject of fish quality also arose. I talked to a lot of fishermen and only a few had stated they caught fish that were too unhealthy for eating. Most fishermen never mentioned catching more than five and only a couple of hardcore fishermen stated otherwise. In conclusion, the king season went well for all fishermen who participated.

In looking at the fall season I must clarify a few things. One, people tend to harvest fall chum once or twice during the season and are not on any kind of schedule like Chinook salmon season. Second, some will wait until the last minute and participate in the fall fishery. I was not able to conduct conclusive interviews that could give insight on these harvest variables. But, I did talk with various fishermen throughout the season and took these observations. First, the fall chum run was really good according to fishermen who went drift netting. They stated they caught all they needed in a few drifts and were finished. Secondly, harvest goals ranged from 25 – 75% generally and all fishermen I talked with reached their respective goals for the fall chum season. Most fishermen stated that the fish were really good in quality and had nice red meat. The only negative factor in the fall fishery was weather, we had a string of bad weather days and fishermen were not able to go out and harvest fish. In general the fall fishery went very well and people who participated met their harvest needs.

Appendix E. Huslia postseason summary of subsistence fishing, 2005.

Summary report of the subsistence fishing around the village of Huslia, 2005 by Orville Huntington, Refuge Information Technician, Koyukuk/Nowitna National Wildlife Refuge Complex.

At least three fishermen in the Huslia area were subsistence fishing during the entire summer season in 2005. All fishermen used setnets along the Koyukuk River and drainages within the Koyukuk National Wildlife Refuge. During the Chinook salmon run a few villagers went down to Koyukuk and fished across from Koyukuk River Mouth on the Yukon River. Also, many local fishermen used rod and reel for freshwater fishing, but not for salmon.

In 2005, the Chinook salmon run on the Koyukuk was good for fishermen with setnets on both sides of the Koyukuk River. There was only one active fishcamp during the 2005 summer fishing season, which is the lowest level of fishcamp activity observed at Huslia ever. All but one family fished from the village. Most were working full time at Huslia and the price of gas was very high. With average to high water levels reported by fishermen, most took advantage of the fishery near town during the Chinook salmon pulse on the Koyukuk River, and most met their subsistence goals. Other fishers may not have been able attain a high harvest for their families needs fishing on the Koyukuk River within the Huslia area because they were either focusing on work or were Elders trying to catch some fish while the young adults were working.

Most interviews were conducted between the weeks of July 3 and August 7. Nine individual households contributed data during the 6-week period. There were some Elders who didn't have time to participate in interviews, but gave anecdotal information during the season from what they were catching and the quality of fish they observed. I averaged a fairly good range of 2 to 8 households that were interviewed weekly. All households targeted Chinook salmon when they were fishing during the pulse and at least four households reported fishing for summer chum salmon.

Reported Chinook salmon harvest began July 3 and ended on July 17. This was fairly accurate as my test net caught the first Chinook salmon, but I know there were many going by that I did not catch because of fairly high water levels during the initial pulse. Right after I reported my catch to fisherman working in the village, everyone was out with their Chinook gear. Four households reported finishing between 76% to 100%, three households reported finishing between 26% to 75%, and one household reported finishing between 1% to 25% of their subsistence Chinook salmon harvest goals. The earliest report of a household completing their harvest goals was on July 10 and the latest occurred on July 17. The amount of time depended on the gear they were using. The fisherman with deep and long gear caught about 80-90% of Chinook caught, and those with traditional short and shallow gear did not do as well.

Reported summer chum salmon fishing harvest began July 3 and ended on August 7. Three households reported finishing between 76% to 100% and one household reported finishing between 1% to 25% of their subsistence summer chum salmon harvest goals. All reports of 100% harvest completion occurred on August 7. It should be noted that most fishermen who report percentages rarely say they reach 100% because of the waste that occurs when too many salmon are taken at one time.

Appendix E cont.

During the summer chum salmon run on the Koyukuk River the water was variable. In the Huslia area, the water level was average and good for fishing with setnets during the time when the main pulse of summer chum were passing. All fishermen were able to meet their goals for summer chum salmon because of the large pulse that went through and the run was very long and heavy, similar to the summer of 2004. The fisherman who fished did note that there were window affects during the summer season on the Koyukuk River which corresponded with ADF&G escapement estimates and run strength. Most fishermen said it's easy for them to see because the Koyukuk River is open for seven days a week when it is open and there is no commercial fishery on the Koyukuk River. Weather on the Koyukuk River is what drives the success of set netters within the middle Koyukuk River fishery because when it is raining the water gets high very fast and when it is sunny the water level goes down or stabilizes.

The fall chum salmon run on the Koyukuk River was a very healthy pulse. During the season the weather was warm and water was average. However, several people noted that fishermen from Hughes did not do well in their subsistence driftnet fishery due to high water. The water was about right for set netters and they caught many fall chum salmon. Most fishermen caught more than enough to feed their families. The later summer weather was very hot and allowed for an extremely late fishing period of what appeared to be sockeye salmon and many coho salmon. As noted in my 2003 report, these fish are not preferred for eating, as the meat is very dry and do not have much oil and there was never much access to these fish in the past. This pulse normally goes by during fall ice-flow on the Koyukuk River.

Appendix F. Beaver postseason summary of subsistence fishing, 2005.

Summary report of the subsistence fishing around the village of Beaver, 2005 by Paul Williams Sr., Refuge Information Technician, Yukon Flats National Wildlife Refuge.

Overall, I would say it was a very good season for fishing Chinook salmon, although high water and drift on the river hampered fishers in late June.

Of the 6 fishers I interviewed, all have got enough fish for their family and winter use. In the beginning of the season there were some comments of commercial fishing opening in the lower Yukon River when there was no fish to be had in and around Beaver, also a few fish with defects such as part of the guts hanging out, but none of real significance.

Due to the Yukon River being braided in the Yukon flats and the high erosion on the banks there are constant changes in the water flow and which affects fishing spots. Every year we have to hunt new spots to fish and the bigger Chinook salmon travel in the middle of the main channel and seldom go near the banks. It is not like the canyon where fish are easily caught, even in high water.

Some fishers who have good spots to fish, share their places with other fishers who are behind in their annual catch.