

**Fishery Data Series No. 09-25**

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# **Summary of the Niukluk River Creel Census, 2007**

by

**Brendan Scanlon**

May 2009

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries





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by  
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Development and publication of this manuscript were partially financed by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Project F-10-23, Job R-3-1(d).

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*This document should be cited as:*

*Scanlon, B. 2009. Summary of the Niukluk River Creel Census, 2007. Alaska Department of Fish and Game, Fishery Data Series No. 09-25, Anchorage.*

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## ABSTRACT

From July 25 through September 3, 2007, the Alaska Department of Fish and Game (ADF&G), Division of Sport Fish, conducted a creel census along the Niukluk River, on the Seward Peninsula east of Nome. The census was initiated in response to recent conflicts between sport and subsistence fishers due to the increased popularity of the coho salmon (*Oncorhynchus kisutch*) sport fishery. The census was also initiated over concerns about accurately assessing if the river's sustainable escapement goal (SEG) was being achieved because significant numbers of coho salmon are thought to be harvested above the counting tower where the SEG is assessed. A total of 392 angler interviews were conducted, of which 357 (91%) were sport anglers and 35 (9%) were subsistence anglers. The majority of anglers interviewed were Alaska residents (85%) and just 6% were guided. A total of 507 coho salmon were harvested from the Niukluk River; 309 (61%) above the counting tower and 198 (39%) below the tower. Issues with how harvest is reported by subsistence anglers who also possess sport fishing licenses is discussed, as is the potential need to increase the escapement goal range to accommodate fish harvested above the counting tower.

Key words: coho salmon, *Oncorhynchus kisutch*, Niukluk River, subsistence, sport anglers, creel census, counting tower, escapement goal.

## INTRODUCTION

The Niukluk River is part of the Fish River drainage and supports important sport and subsistence fisheries for coho salmon (*Oncorhynchus kisutch*) in the Northwest Management Area (NWMA; Figure 1). The average sport catch and harvest of coho salmon from 1999 through 2005 were 1,869 and 672, respectively (Howe et al. 2001; Walker et al. 2003; Jennings et al. 2004, 2006a-b; *in prep a-b*). This comprised approximately 55% of the total annual sport catch and harvest of coho salmon on the entire Seward Peninsula (Scanlon and DeCicco 2007; Table 1). During this same time period, subsistence harvest of coho salmon in the Golovin Subdistrict (which includes the Fish River drainage and the marine waters of Golovin Bay; Figure 2) has averaged 1,869 fish per year (Table 1). Bait and treble hooks are permitted year-round in the Niukluk River. The daily sport bag and possession limit for coho salmon harvested from the Niukluk River is three fish of any size.

In 2004, hook-and-line attached to a rod or pole was designated legal subsistence gear for most Seward Peninsula freshwaters (5 AAC 01.170, 2004). From 2004 to 2006, the average annual subsistence harvest of coho salmon using hook-and-line in the Niukluk River was 161 fish (79 above the counting tower and 82 below; Table 1). The daily bag and possession limit for subsistence fishers using hook-and-line for coho salmon is the same as that for sport fishing (3 per day). However, during years of low coho salmon returns the sport fishery may be restricted or closed whereas the subsistence fishery may not.

Telemetry studies were conducted by Alaska Department of Fish and Game (ADF&G) on coho salmon in the Fish River drainage in 2005 and 2006. Results indicate that coho salmon enter the Niukluk River near the second week in July, with the peak of the run usually occurring near the third week in August. The coho salmon run is usually complete by the mid-September. Results also showed that the Niukluk River supports a significant proportion of the total Fish River drainage escapement. In 2005 and 2006, approximately 36% and 43% of the total coho salmon escapement in the Fish River drainage spawned in the Niukluk River (Todd and Balland *In prep*). The proportions of coho salmon escaping to the Niukluk River in 2005 and 2006 were the largest for any tributary of the Fish River.

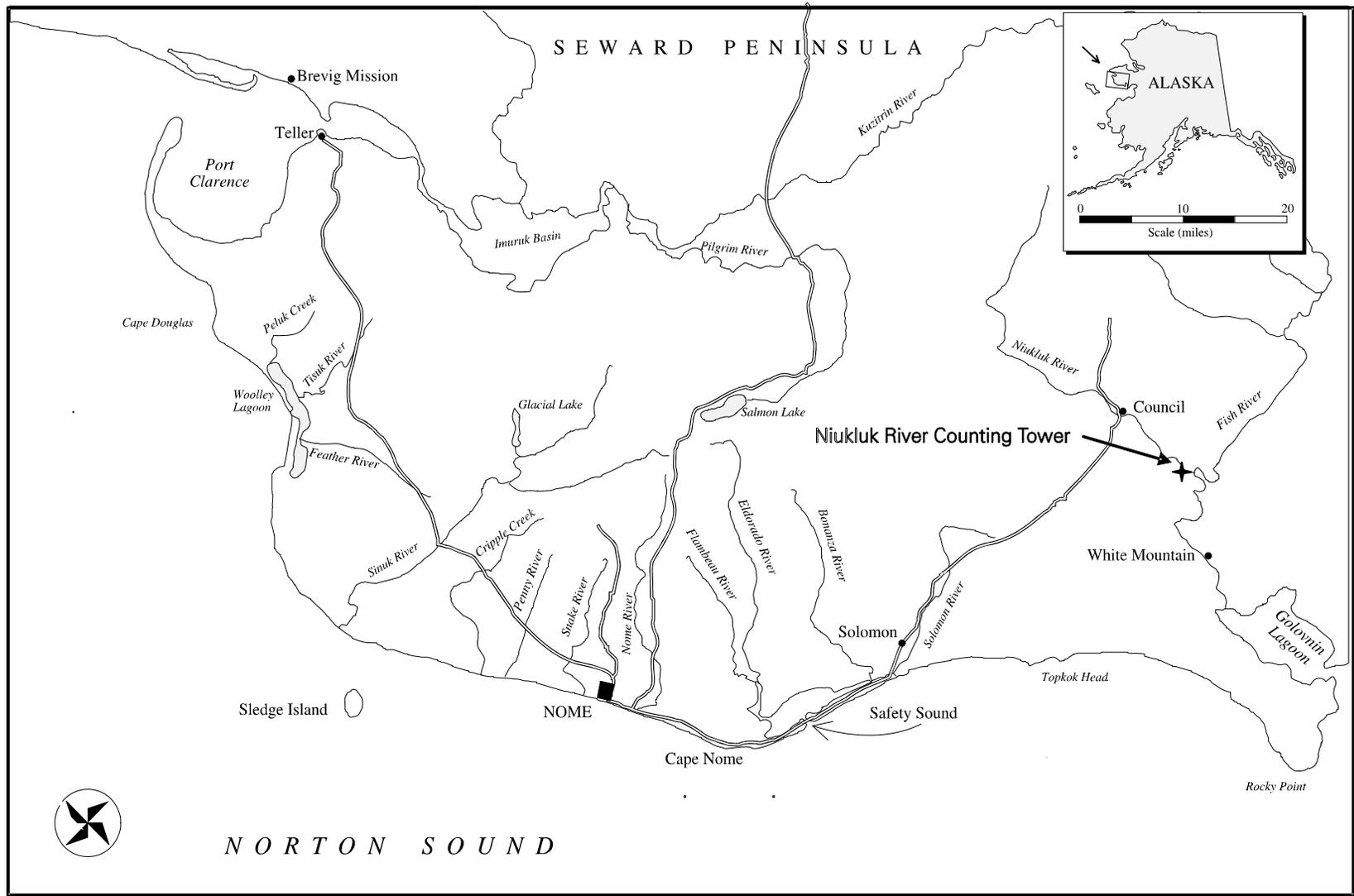


Figure 1.—Map of the Seward Peninsula showing the locations of the Niukluk River counting tower.

Table 1.–Emergency Order history, catches, harvests, and escapements for coho salmon in the Fish River drainage.

Year	Emergency Order (EO)	Effective Date of EO	Niukluk Coho Escapement <sup>a</sup>	Fish/Niukluk Sport Harvest	Fish/Niukluk Sport Catch	Niukluk Subsistence Harvest Above Tower <sup>b</sup>	Niukluk Subsistence Harvest Below Tower	Total Subsistence Harvest (Golovin Subdistrict) <sup>c</sup>	Total Harvest	Sport Harvest
1999	a) One fish/day b) Closure c) Catch-and release, no bait	a) 8/9/1999 b) 8/16/1999 c) 8/27/1999	4,260	1,365	2,151			1,234	2,599	0.53
2000	None		11,382	1,165	2,962			2,335	5,145	0.23
2001	None		3,468	969	1,739			880	1,879	0.52
2002	One fish/day	8/17/2001	7,391	298	1,549			1,640	1,938	0.15
2003	Closure	8/21/2003	1,282	216	1,447			309	525	0.41
2004	Catch-and-release, no bait	8/25/2004	2,064	291	1,653	14	22	652	943	0.31
2005	One fish/day	9/10/2005	2,727	400	1,586	38	49	686	1,086	0.37
2006	None		11,169	N/A	N/A	184	175	1,759	N/A	N/A

<sup>a</sup> Tower count of escapement on the Niukluk River constitutes a proportion of the entire run of coho salmon in the Fish River drainage. In 2005, the estimated return of cohos to the Niukluk (2,727 fish) comprised 36% of the entire run, and the estimated escapement for the entire Fish River drainage was 7,381 fish.

<sup>b</sup> Above-tower and below-tower breakdown not available before 2004. Household surveys used before 2004 and this question were not included.

<sup>c</sup> Golovin Subdistrict includes the entire Fish River drainage, as well as the marine waters between Rocky Point and Cape Darby.

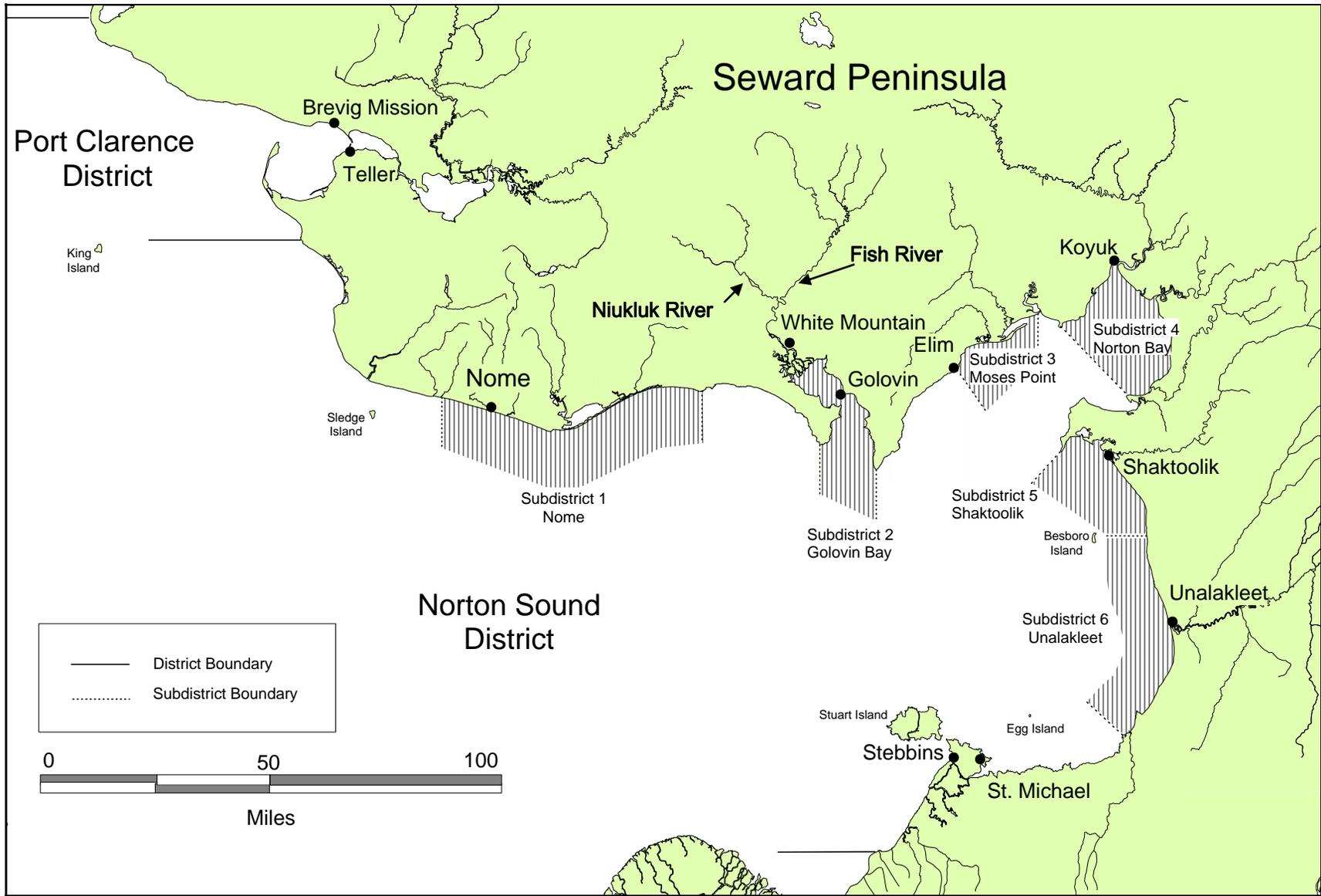


Figure 2.—Commercial salmon fishing subdistricts in Norton Sound with Fish and Niukluk rivers denoted.

A sustainable escapement goal (SEG) of 2,400–5,900 coho salmon above the Niukluk River counting tower was developed from tower counting data collected by ADF&G since 1995 (Brannian et al. 2007). Recent escapement estimates past the Niukluk River counting tower have ranged from 1,282 to 11,382 fish from 1999 through 2006 (Table 1). These estimates along with the results from the telemetry experiment were used to obtain a drainage-wide escapement estimate (Todd and Balland *In prep*).

Unfortunately, the ability to accurately assess the true number of coho salmon that reach the spawning grounds and the capacity to conduct in-season management has been diminished. Until 2006, the counting tower was located approximately 3 miles above the confluence of the Fish and Niukluk rivers on leased land. Recently, the landowner has cancelled the lease and a new site for the tower was found. The new location is less than 1 mile from the confluence, which increases uncertainty in the escapement counts because much of the angling (sport and subsistence) is thought to occur above the counting tower.

Recently, concerns have been expressed by guides and cabin owners on the Niukluk River over the amount of fishing pressure the river receives during the coho salmon season. Since the construction of the bridge over Safety Sound and improvements to the Council Road, the Niukluk River has become a popular destination for coho fishing. On the weekends and over Labor Day, twenty or more boats have been counted on the river. This popularity, along with the unknown harvest above the counting tower and recent low returns (sport fishery restricted by emergency order five of last seven years; Table 1) present a need to enumerate the harvest above the tower to accurately estimate escapement.

To better understand and effectively manage the coho salmon fishery, a creel census that estimated the proportions of catch, effort, and harvest in both the subsistence and sport fisheries that occur above and below the counting tower was conducted in 2007.

## **OBJECTIVES**

The objectives of the 2007 Niukluk River creel census were to:

1. document total effort in angler-days, catch and harvest of coho salmon from the Niukluk River during July 25 to September 5; and,
2. calculate the proportion of the total effort, catch, and harvest (both sport and hook-and-line subsistence) of coho salmon from the Niukluk River that occurs above and below the counting tower.

In addition to the objectives there were four tasks:

1. document locations fished (Niukluk River, Fish River, or other tributary);
2. document all species captured and harvested;
3. document if anglers were guided or unguided; and,
4. document residency of anglers.

# STUDY DESIGN

## STUDY AREA

The Niukluk River begins in the Bendeleben Mountains, is approximately 90 km in length, and is accessed at the village of Council approximately 19 km upstream of the Fish River (Figure 1). The river contains populations of Arctic grayling *Thymallus arcticus*, northern pike *Esox lucius*, burbot *Lota lota*, longnose sucker *Catostomus catostomus*, whitefish *Coregonus* spp., Dolly Varden *Salvelinus malma*, and all five North American Pacific salmon *Oncorhynchus* spp.

Among road-accessible streams on the Seward Peninsula (Figure 3), the Niukluk River is a popular sport fishing destination because it is one of the few streams where there are sport fishing opportunities for five species of Pacific salmon (coho salmon being the most popular), Dolly Varden, and a large population of large ( $\geq 15$  in) Arctic grayling. Nome-based guides fish the river along with two guiding operations located on the river itself. In addition, a number of Nome residents have summer cabins or fish camps along the river (Scanlon and DeCicco 2007). The Niukluk River has one boat launch area at the end of the Nome-Council Road (Figure 1). Most of the angling for coho salmon occurs downstream of Council, while Arctic grayling anglers fish mostly upriver from the village. All cabin owners must access their cabins via the boat launch. Therefore, the creel technician schedule and sampling was designed to ensure that cabin owners and anglers that are fishing will always encounter interview technicians at the boat launch prior to and after fishing. On rare occasions, residents of White Mountain would boat up to the Niukluk River (~25 km) to subsistence fish with hook-and-line (one chum salmon and no coho reported from White Mountain residents in 2006), but they generally stay close to the village and catch coho in the Fish River or in the marine waters of Golovin Bay using gill nets (Figure 2). Prior to the arrival of coho salmon in mid-July, ADF&G informed both subsistence and sport fishers of the project using radio announcements in Nome, and postings at the ADF&G office, local tackle and marine equipment stores, and the Council boat launch.

## SURVEY DESIGN

All study objectives and tasks were designed to be accomplished by interviewing fishers as they exit the river, and by regularly contacting guiding operations and cabin owners along the river. ADF&G technicians made initial contact with anglers upon their arrival at the boat launch. Technicians reminded anglers to keep track of the number of coho salmon they caught and if the fish were caught above or below the counting tower. Technicians also inquired about the planned length of an angler's trip and his/her cabin's location, which provided technicians with an expectation of when a multi-day visitor would be exiting the fishery as well as the number of angler-days they fished. Technicians used a boat to contact anglers on the river and at cabins during times of heavy use (generally during the weekends) to remind anglers to expect an exit interview when they arrive at the boat launch to exit the river.

Anglers leaving the river at the boat launch were intercepted for interviews throughout each day (16–18 hours per day from approximately 0600 to 2200). Technicians also made a special attempt to interview the two lodge-based guides at least once a week throughout the season. Instructions for conducting the in-person interviews are provided in Appendix A.

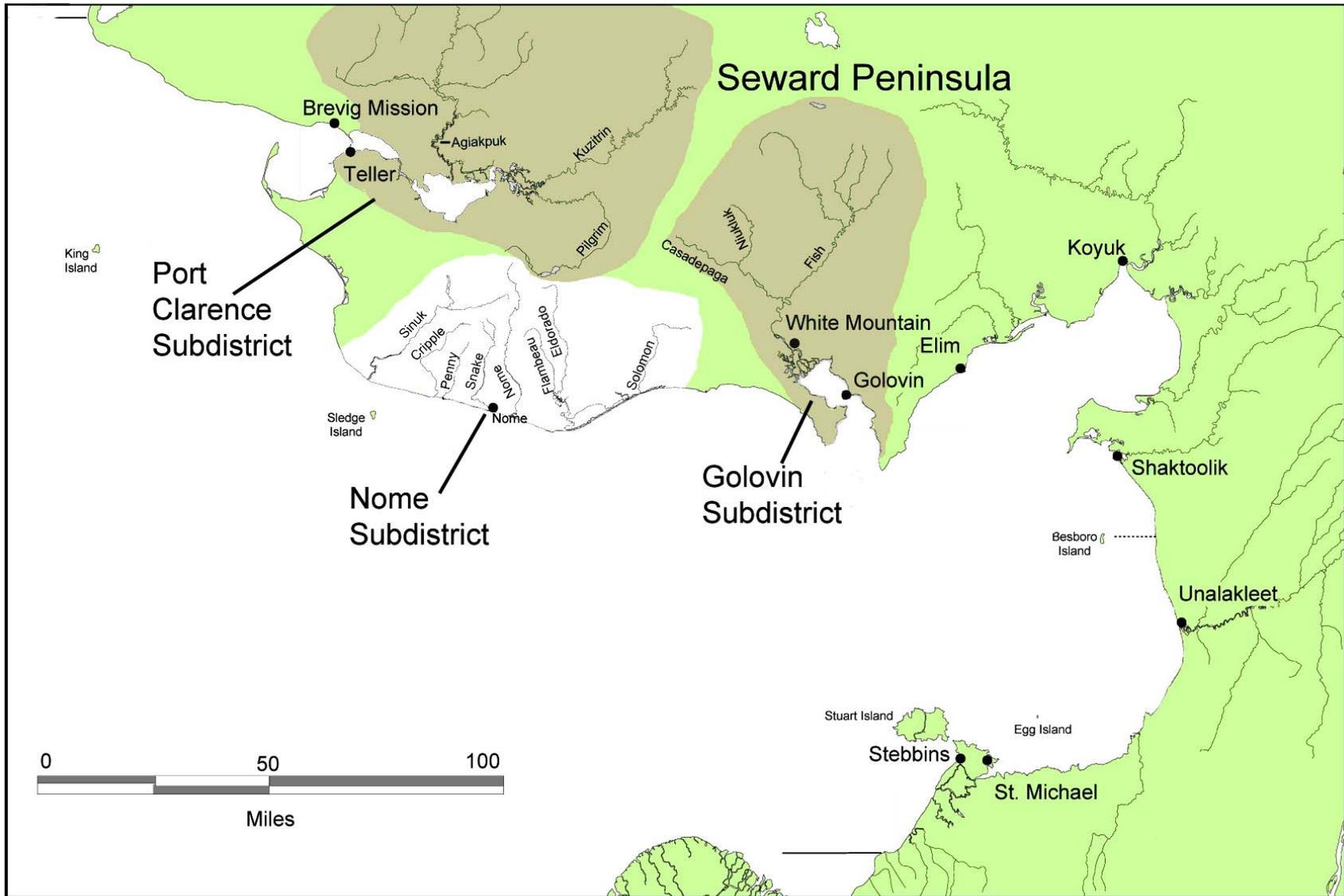


Figure 3.—Road-accessible rivers within three subsistence fishing subdistricts in Norton Sound.

The survey was designed as a census because all anglers were expected to exit the fishery at the boat launch in Council. In attempt to ensure a complete census, a few key indicator variables (see Appendix A) were selected to address non-response bias if anglers refused to be interviewed.

## DATA COLLECTION

Attempts were made to interview all anglers exiting the fishery from mid-July through early September. All anglers that agreed to be interviewed, following a brief set of introductory remarks, were asked a series of questions and their responses were recorded on the 2007 Niukluk River field interview form (Appendix A1). The in-person interview questions were relatively straightforward questions requiring anglers to report facts related to their current trip to the Niukluk River.

For anglers that consented to the interview, the following questions were asked:

1. Have you been fishing?
2. Where did you fish (Niukluk River, Fish River, Casadepaga River, or other)?
3. If you fished the Niukluk River, for how many days did you fish above or below the counting tower, or both?
4. Are you a resident of Alaska? If no, where do you live?
5. Did you fish with a registered guide? If yes, did you pay for their service?
6. Are you sport fishing or subsistence fishing? May I see your sport license or subsistence permit?
7. How many coho salmon did you catch in the Niukluk River above the counting tower? Of these, how many did you keep?
8. How many coho salmon did you catch in the Niukluk River below the counting tower? Of these, how many did you keep?
9. What other species did you catch in the Niukluk River? Of these, how many did you keep?
10. May I see your harvested fish (if applicable and it is not in plain view)?
11. What is the guide's business name that you fished with?

All data was entered onto an *Angler Interview Form* (Appendix A1) and then later into a Microsoft Excel<sup>®1</sup> spreadsheet for analysis.

## DATA ANALYSIS

The information collected from anglers was summarized and reported over all anglers contacted. Sport and subsistence fishery catch, harvest, and effort data were depicted by date; angler status (guided or unguided) and residency (analysis of catch and effort by fishing location was not

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<sup>1</sup> Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

available from census data). Level of visitor use was also portrayed by date, with daily and overall use levels further subdivided by residency and angler status.

The primary assumption necessary to obtain unbiased estimates of catch, harvest, and effort above and below the counting tower is that interviewed anglers accurately report their responses to the survey questions. There is no direct way of evaluating or testing this assumption. Based on knowledge from similar projects in the past, the department feels that anglers report these particular characteristics accurately.

## **RESULTS**

A total of 392 angler interviews were conducted between July 25 and September 3. Of these, 337 (86%) were Alaska residents and 55 (14%) were nonresidents (Table 2 and Figure 4). Of all fishers, 357 (91%) were sport fishers and 35 (9%) were subsistence fishers (Table 2 and Figure 5). There was no non-response bias because every person contacted for an interview agreed to participate, and many were appreciative of ADF&G's presence.

From July 25 through September 3, a total of 559 coho salmon were caught and 507 were harvested by both user groups on the Niukluk River (Table 2). Of these, sport fishers harvested 439 fish (87%) and subsistence fishers harvested 68 fish (13%). The total harvest of coho salmon above the counting tower was 309 fish (259 sport, 50 subsistence) and below the counting tower was 198 fish (180 sport, 18 subsistence). In addition, 78 coho salmon were caught and all but one were harvested on the Fish River, but it was not determined whether or not these fish were caught upstream or downstream of the confluence of the Niukluk and Fish rivers, and consequently it is not known if these fish were destined to spawn in the Niukluk River or elsewhere in the Fish River drainage.

Table 2.–Summary of results from interviews of sport and subsistence fishers on the Niukluk River, 2007.

Summary of Angler Characteristics							
Total Number of Anglers	Number of Subsistence Anglers	Number of Sport Anglers	Resident	Non-resident	Guided Sport	Unguided Sport	Subsistence
392 (100%)	35 (9%)	357 (91%)	337 (86%)	55 (14%)	29 (7%)	328 (84%)	35 (9%)

Niukluk River Coho Salmon Catch and Harvest by Fishery							
Total Catch	Total Harvest	Total Harvest		Subsistence Harvest		Sport Harvest	
		Above Tower	Below Tower	Above Tower	Below Tower	Above Tower	Below Tower
559	507	309 (61%)	198 (39%)	50	18	259	180

Catch and Harvest of Other Species In Niukluk and Fish Rivers													
Arctic Grayling		Dolly Varden		Sockeye Salmon		Chum Salmon		Chinook Salmon		Pink Salmon		Northern Pike	
Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest	Catch	Harvest
228	36	80	46	6	6	10	10	1	0	80	80	10	1

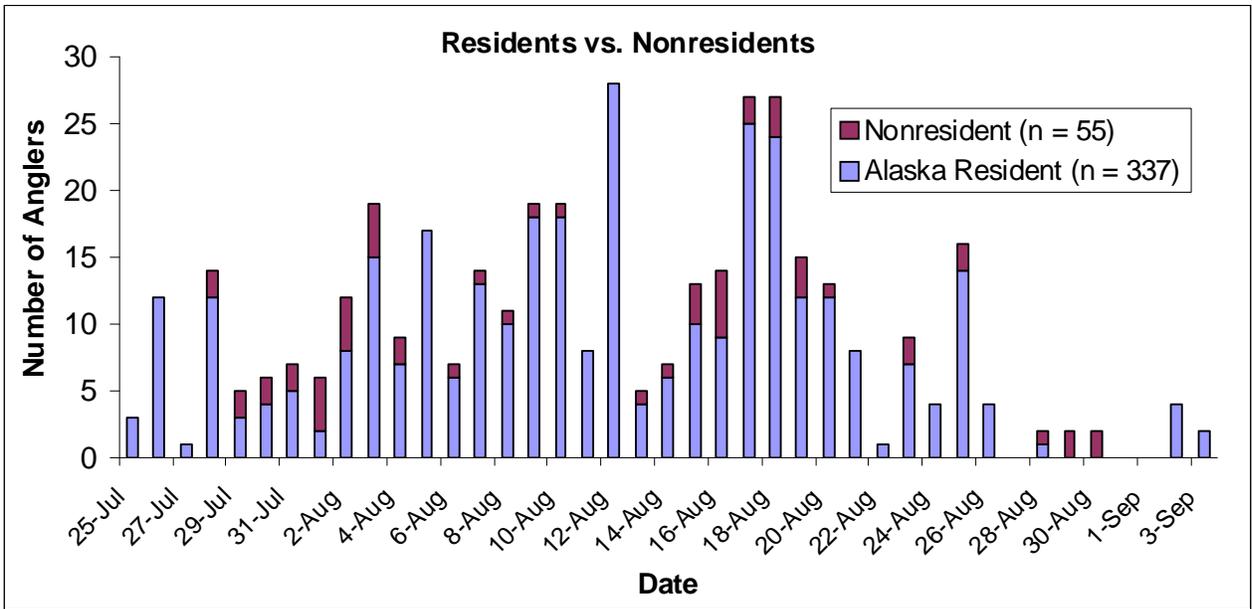
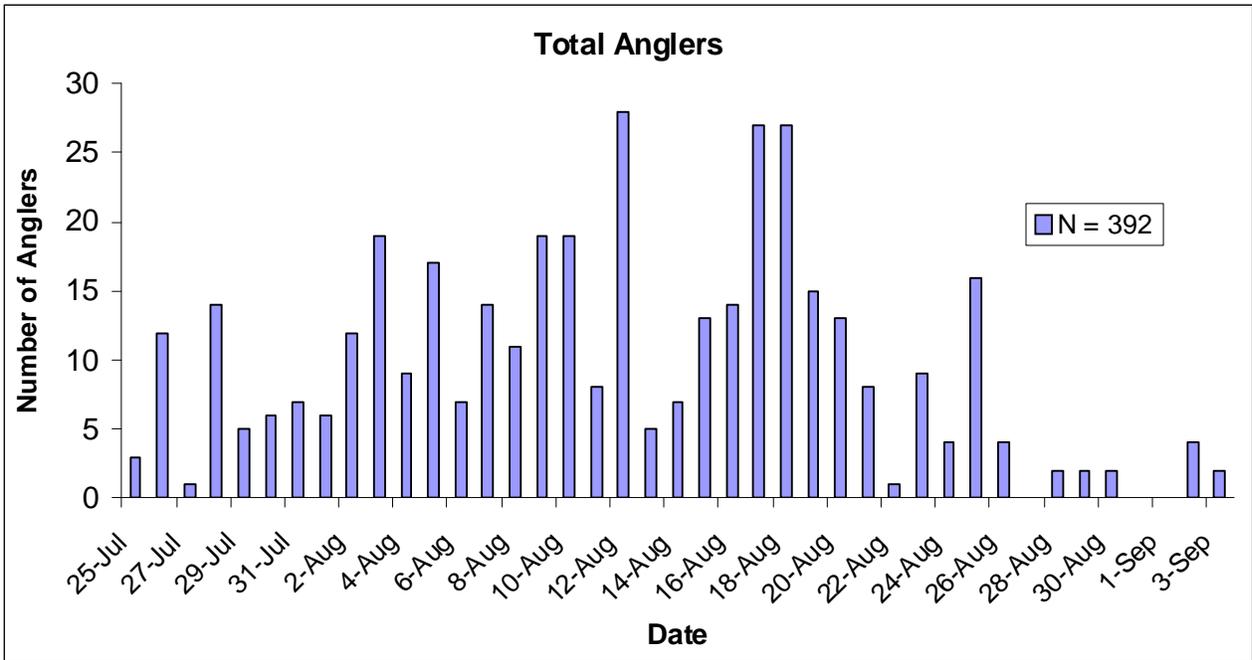


Figure 4.—Total daily visitors interviewed overall and by residency for the Niukluk River creel census between July 25 and September 3, 2007.

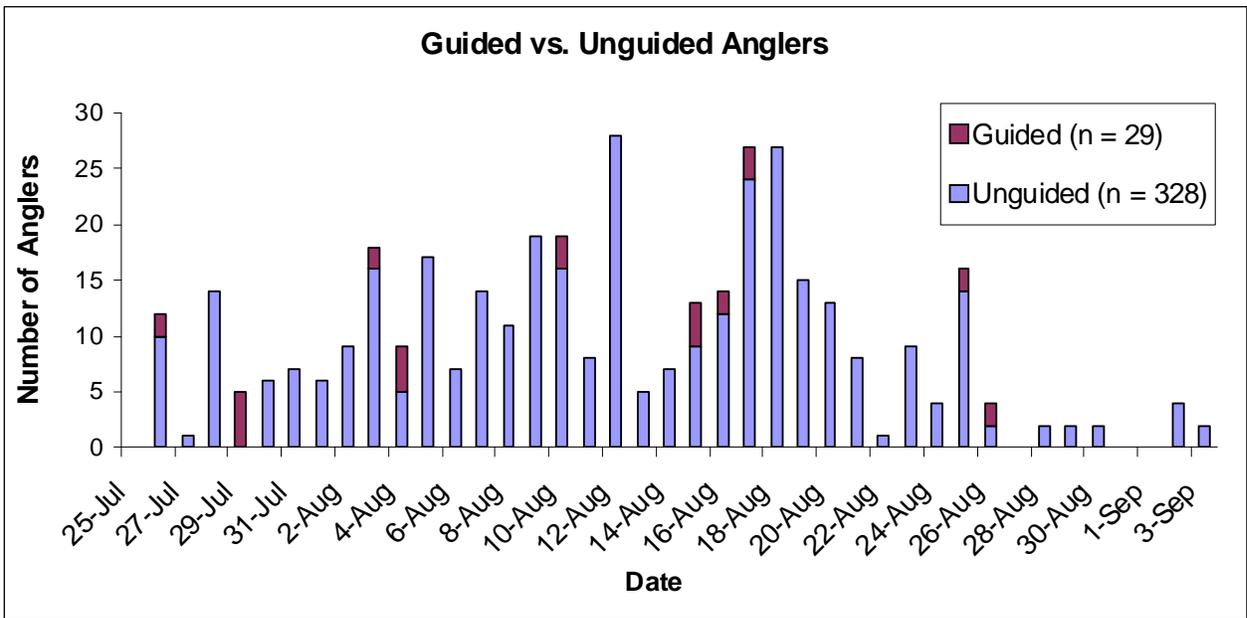
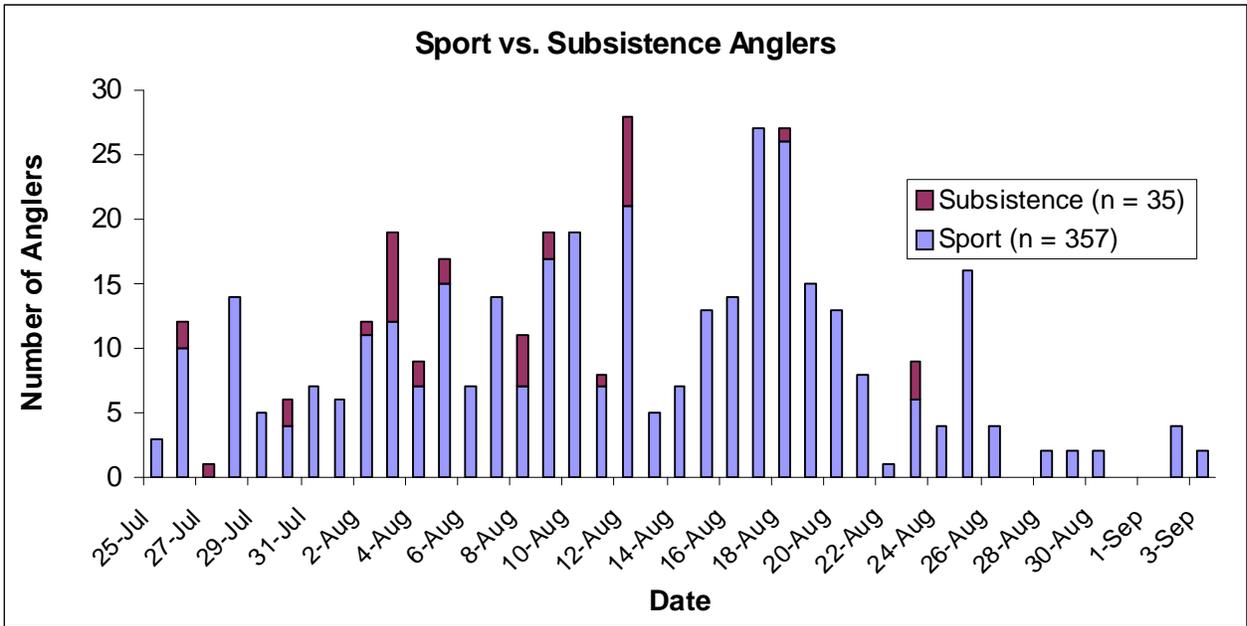


Figure 5.—Total daily visitors interviewed by angler status (guided or unguided, sport or subsistence) for the Niukluk River creel census between July 25 and September 3, 2007.

## DISCUSSION

All estimates obtained by this survey can only be used to make inferences about anglers to the Niukluk River from July 25 through September 3, 2007. Angler demographics and use patterns during this time period may be similar to past and future demographics and use patterns; however, the survey does not represent a probability-based sample of past and potential anglers. Accordingly, the information collected this year should not be used to infer to other years.

Results from the creel census indicate that anglers were interviewed throughout the entire coho salmon run. Coho salmon were documented in river on July 21 but there were no reports of harvest prior to the start of the project on July 25. In addition, interviews concluded on September 3 and the last coho salmon counted at the tower was on September 4. The final count totaled 3,498 fish (S. Kent, ADF&G, Nome, unpublished data) and the largest pulse of fish arrived between August 8 and August 22, when an average of 133 fish per day passed the tower.

Results also indicate a substantial proportion of the coho salmon fishery participants are local sport and subsistence users. Based on regular contact with the people entering and exiting the river, project technicians felt that the majority of fishers (sport and subsistence) interviewed either owned property in Council or on the Niukluk River, or were friends and family of these property owners. For example, 10 families with cabins in Council or nearby on the Niukluk River constituted at least 200 of the 392 interviews.

Estimates of subsistence harvest from the creel census compared to harvest information reported on the Golovin Subdistrict permits revealed some discrepancies in the harvest reporting process. For example, results from the permit data for the Golovin Subdistrict collected by ADF&G's Commercial Fisheries Division show that a total of 217 coho salmon were harvested for subsistence from the Niukluk River (114 above the counting tower, 103 below; S. Kent, ADF&G, Nome, unpublished data), compared to 68 coho salmon (50 above the tower, 18 below) harvested for subsistence in the creel sampling. In another example, one angler who was also a licensed sport fishing guide reported a sport harvest of 73 coho salmon and a subsistence harvest of 15 coho salmon over the course of the study, which encompassed almost the entire run of coho salmon. The same individual reported a subsistence harvest of 81 coho on salmon the Niukluk River (S. Kent, ADF&G, Nome, unpublished data). Similar discrepancies were reported for at least two other subsistence permit holders; however, the extent of the duplicity in harvest reporting is unknown because the interview technicians were not asked to take everyone's name during the interviews, which makes it impossible to cross-reference the creel census information with reported harvests on the subsistence permits. Based on the number of participants in both fisheries and the number of interviews conducted, it appears that there was at least 150 coho salmon harvested from the Niukluk River that were reported as sport caught in the creel census and on the Golovin Subdistrict subsistence permits.

The results from the creel census demonstrated that there is potential for considerable discrepancies between reported and actual subsistence and sport harvests in areas on the Seward Peninsula where hook-and-line is legal gear for permit-based subsistence fishing (including all waters inside the Golovin, Nome, and Port Clarence Subdistricts; Figure 3). Alaska residents who participate in these subsistence fisheries are not required to purchase a sport fishing license, but many do and therefore are subject to misreporting their harvest if they happen to respond to a statewide harvest survey (SWHS). The water bodies where confusion in harvest reporting is

most likely are the Niukluk, Nome, Snake, Sinuk, Pilgrim, and Kuzitrin rivers (Figure 3). As a potential remedy, a recommendation will be made to Research and Technical Services (RTS) within Sport Fish Division, to explicitly state in the instructions to anglers requesting that subsistence-caught fish, even if caught with hook-and-line, not be included in their survey answers. In addition, Sport Fish Division will work with Commercial Fisheries Division to educate subsistence fishers who receive permits how to properly record harvests of fish caught with hook-and-line. These efforts should rectify the reporting problems with harvested fish in these areas.

Estimates from the creel census show considerable harvest (>60%) of coho salmon occurring above the Niukluk River counting tower. In 2007, Brannian et al. (2007) developed a SEG using ten consecutive years of counting tower data. However, their analysis did not account for the harvest occurring above the counting tower. Based on the results of this study, the harvest of coho salmon above the counting tower must be taken into consideration when reviewing the current SEG (2,400–5,900).

## **ACKNOWLEDGEMENTS**

The author thanks Rachael Kvapil, Region III Publications Technician, for her assistance with tables, formatting, and final report preparation. Thanks also Brian Collyard, Matthew Albert, and Brad Fuerst for their assistance with the data collection. The author also thanks Adam Craig for biometric support; and Matt Evenson, the Regional Research Coordinator, for assistance in design, execution, and funding coordination. This project and report were made possible by partial funding provided by the U.S. Fish and Wildlife Service through the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777K) under Project F-10-23, Job Number R-3-1(d).

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**APPENDIX A**  
**2007 NIUKLUK RIVER CREEL CENSUS**  
**TECHNICIAN MANUAL**

## ***Introduction***

The main objective for this project is to estimate angling effort, catch, and harvest of coho salmon in the Niukluk River fishery by sport anglers and subsistence hook-and-line fishers. Some anglers will be targeting chum salmon, Arctic grayling and possibly Dolly Varden, but we will be focusing on collecting information pertaining to coho salmon. Principally, we are attempting to determine how much of the entire coho salmon harvest and catch by both user groups in the Niukluk River occurs both below above the counting tower, after they have been counted.

All visitors will be interviewed as they exit the river at the boat launch in Council. In addition, after the Area Manager assists the crew in building a rapport with the local cabin owners and the two riverside fishing guides (Tom Gray and John Osborn), weekly visits to these groups will be made and interviews will be conducted. Interview questions will consist of the following:

1. Have you been fishing?
2. Where did you fish (Niukluk River, Fish River, Casadepaga River, or other)?
3. If you fished the Niukluk River, for how many days did you fish above or below the counting tower, or both?
4. Are you a resident of Alaska? If no, where do you live?
5. Did you fish with a registered guide? If yes, did you pay for their service?
6. Are you sport fishing or subsistence fishing? May I see your sport license or subsistence permit (if they refuse, do not push the issue and continue with the interview, but in the “Comments” section and in the field notebook describe the person and the incident)?
7. How many coho salmon did you catch in the Niukluk River above the counting tower? Of these, how many did you keep?
8. How many coho salmon did you catch in the Niukluk River below the counting tower? Of these, how many did you keep?
9. What other species did you catch in the Niukluk River? Of these, how many did you keep?

-continued-

10. May I see your harvested fish (if applicable and it is not in plain view)?

11. What is the guide's business name that you fished with?

Please attempt to determine precisely which location fishing occurred using the enclosed USGS map and asking fishers to show you where they fished. If the fishers decline to show you exactly where fishing occurred, then drop the inquiry and proceed with the interview. Angler data will be transferred from the field interview form to a Microsoft Excel workbook in the provided laptop computer.

Visitors unwilling to be interviewed will be accounted for by recording each instance on the interview form in the appropriate column, and also by noting the following indicator variables:

1. date of contact;
2. location (boat launch, cabin location, guide lodge);
3. visitor status – if known (subsistence fisher, sport angler, guided, unguided);
4. number in party with individual;
5. residency – if known (local resident, Alaska resident, U.S. resident or non-U.S. resident); and,
6. reason for refusal – if given (briefly explain in a field notebook along with proper reference to the notation on the angler interview form).

Appendix A2.-Angler Interview Form.

**Angler Interview Form**

Page \_\_\_\_\_ of \_\_\_\_\_ Date: \_\_\_\_\_ Sampler Name: \_\_\_\_\_ Sample Period: \_\_\_\_\_ Location: \_\_\_\_\_

	Time	Number of days fished	Location fished (Fish, Niukluk, other trib)	If Niukluk, above or below tower	Res / Non Res	Guided / Un-guided Pay/No Pay	Sport or subsistence	FOR NIUKLUK ANGLERS ONLY						Was fish harvest verified	Guide Business Name (and any other comments)
								How many coho were caught above tower		How many coho were caught below tower		Other species caught and how many e.g.; DV-3 (see abbreviations for species below)			
								Har.	Rel.	Har.	Rel.	Har.	Rel.		
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Arctic grayling = **AG**; Dolly Varden = **DV**; Burbot = **BB**; Chinook salmon = **KS**; Pink salmon = **PS**; Chum salmon = **CS**; Sockeye salmon = **RS**; Whitefish = **WF**