Taku River Coho Salmon Escapement and Smolt Tagging Augmentation 2007

(A study suppported by the Northern Fund under the auspices of the Pacific Salmon Commission)

Interim Report

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Executive Summary

This interim report documents field work to date on the Taku coho wire tagging augmentation project, specifically application of coded-wire tags (CWTs) to emigrating juvenile coho and sampling of immigrating adults.

A total of $92,206 Cdn has been received to date from the Northern Fund to augment an existing Taku coho coded wire tag program. This has permitted operation of third smolt trapline in 2006 and 2007 and the extension of the recapture effort for migrating adults into September and early October when commercial fishing activity was minimal. This is the second interim report for the project. A total of 12,060 coho salmon smolts were tagged in 2007.. Nine percent of the commercial harvest of 5,244 was examined for marks; two were observed. An additional of 2,674 adults were inspected for marks in September and October in a fishery conducted specifically to recover tags; 27 marks were observed. A total of 27 heads were retrieved and sent to Juneau Alaska for coded-wire tag extraction. The project expenditures of $45,033 to date are within $601 of the amount allocated to date for 2007.

Table of Contents

List of Figures

List of Appendices

1.0 Introduction

The Taku River produces the largest run of coho salmon *Oncorhynchus kisutch* and chinook salmon *Oncorhynchus tshawytscha* north of the Skeena River in British Columbia and in Southeast Alaska (Figure 1; McPherson et al. 1998a; Yanusz et al. 1999). The estimated total run of coho salmon from 1992 to 2006 has averaged 91,833 fish from near or upstream of Canyon Island located at the Canada/U.S border.

Each spring since 1991, coho salmon smolt have been tagged with coded wire tags as they emigrate from the Taku River. Then in the following year, returning adults are sampled for these tags using fishwheels and set gillnets operated near Canyon Island in the lower Taku River. At the same time, adults are tagged as part of a two-event mark-recapture study to estimate the inriver abundance and sampled for age, sex, and length composition data. A short distance upriver, in Canada, adults are inspected in the commercial fishery. Typically the commercial fishery ceases in late August and it is necessary to obtain tag ratio information by contract. Data gathered from these efforts has provided estimates of inriver abundance and escapement since 1987, estimates of harvest, exploitation, survival, smolt abundance, and total run since 1992, and run forecasts since 1996. These combined efforts inriver along with adult sampling programs in the various marine fisheries allow detailed stock assessment analyses.

Coho salmon returning to the Taku River pass through an offshore troll fishery before entering inside waters where they encounter seine, drift gillnet, and recreational fisheries. After entering the river, the remaining coho salmon are exposed to a drift/set gillnet fishery in Canada. The goal of this project is to provide annual estimates of escapement necessary to refine escapement goals and forecast runs. Improved escapement goals and run forecasts along with inseason abundance estimates allow implementation of abundance-based management.

Because of the many fisheries that harvest the Taku River stock of coho salmon and the need for a biological escapement goal on adult coho salmon and newly implemented directed chinook salmon fisheries, application to the Northern Fund was made to augment the existing budget to: allow the addition of another smolt trapline in order to boost tag numbers and the associated coded wire tag marked fraction, and extend recapture effort for returning adults through early October.

2.0 Methods

A mark-recapture experiment will be used to estimate the abundance of coho salmon smolt emigrating from Taku River upstream of Canyon Island in 2007 (Figure 1). Smolt were tagged with CWTs and marked with adipose fin-clips in 2007 as part of Event I of a two-event mark-recapture experiment. Returning adult coho salmon which had been tagged in 2006 were inspected for marks in inriver fisheries as part of Event II for the 2006 emigration year.

Smolt trapping operations were based out of a camp located just above Canyon Island, to implement the marking event. Approximately 150-250 baited minnow traps were fished daily in the mainstem of the Taku River near Canyon Island. The start up date was dictated by river ice-out, which was late in 2007 due to an exceptionally late spring. The first traps were set on April 18, 2007. Smolt from all traplines were transported downstream to the smolt camp for processing each day. All healthy Chinook smolt ≥ 50 mm fork length (FL) and coho smolt ≥ 75 mm FL captured each day were tranquilized with a buffered MS 222 solution, had their adipose fin excised, and then were injected with a CWT. Each CWT was formed by cutting a 1.1 mm section of wire from a spool stamped with a unique numeric code; each spool contained enough wire for approximately

10,000 or 30,000 tags. Over the course of the season two codes were applied to coho smolt, specifically 41375 and 41377.

Baited minnow traps were used on each trap line consisting of 30-75 traps each. Three trap lines were operated daily, with two individuals per trap line. The number of sets on the third (i.e. upstream) trapline averaged 57 (range 19 to 93). Minnow traps on each trap line were checked at least once per day. When catches were high, traps were checked twice per day with priority placed on those traps that produced the highest catches during the first check. Traps were baited with salmon roe collected from Taku River chinook and coho salmon in the inriver Canadian commercial and test fisheries. Trap lines extended from the Tulsequah River confluence to the Yehring Creek confluence. All chinook and coho salmon smolt marked with CWTs were released back into the river. Before release each morning, tag retention checks of 100 fish from each tag code were made. After release, the holding net pens were emptied and checked for any overnight mortalities.

Adult coho salmon that were CWTd in 2006 were sampled as they returned to the Taku River as adults as the Event II of the mark-recapture experiment for estimating smolt abundance. Adult coho salmon caught in the inriver commercial and contracted tag recovery gillnet fisheries were inspected for missing adipose fins (July to early October). DFO staff sampled these adults and recorded the associated data. The marked fraction (fish missing adipose fins) of coho salmon captured in the gillnets will be used to estimate smolt abundance in 2006. Similarly, coho returning in 2008 will be inspected for marks applied in 2007.

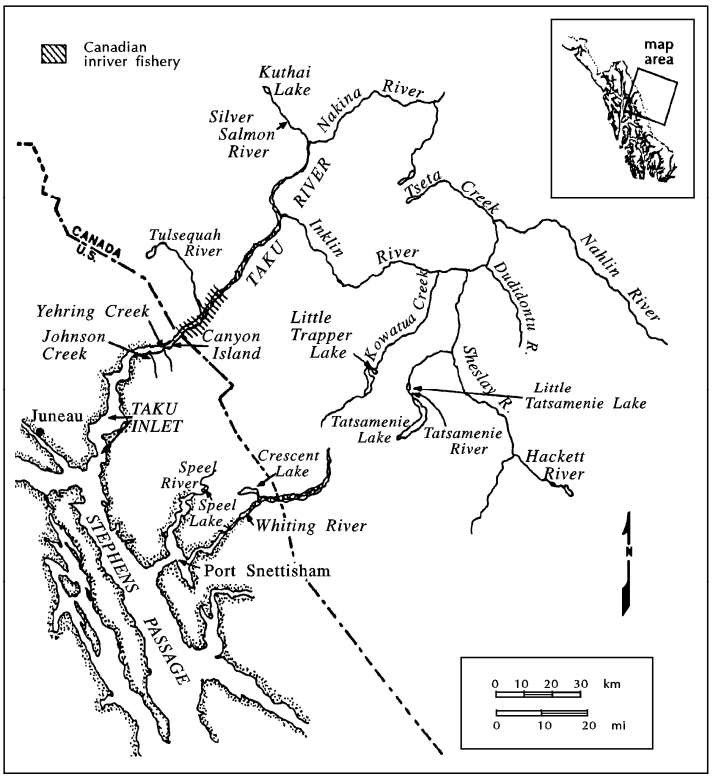
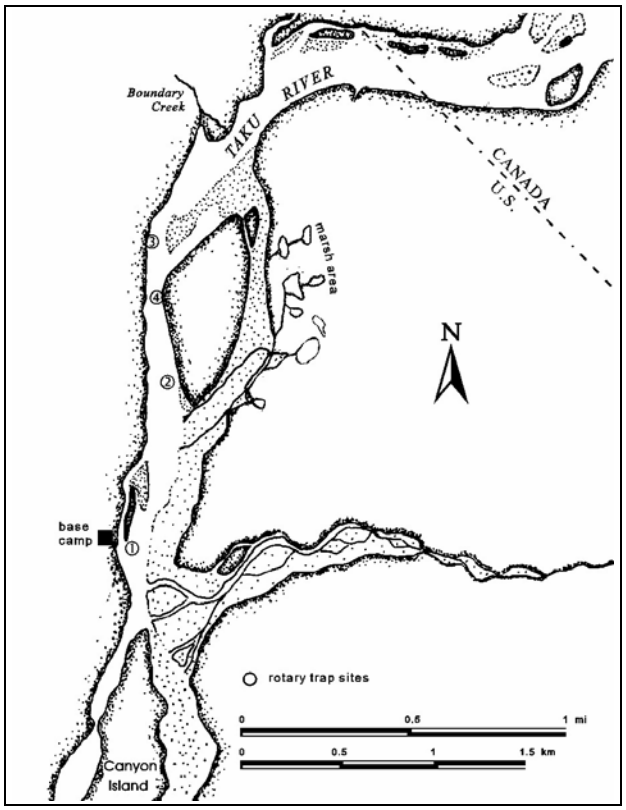


Figure 1. The Taku River drainage in British Columbia and Southeast Alaska.

Figure 2. Location of central portion of smolt trapping area on Taku River near Canyon Island.



3.0 Results and Discussion

Smolt trapping commenced on April 18, 2007 and concluded on June 8, 2007. A total of 12,060 coho were tagged.

The peak daily release of 1,387 coho occurred on May 19; Figure 3.

Timing of the emigration appeared to be normal based on weekly catches, Figures 3&4. The observation, however, may be somewhat misleading because fishing conditions often dictate catch efficiency, independent of run abundance. Fishing conditions are typically affected at the outset of the field season by variations in snow and ice levels. High water levels in 2007 (the highest seen since at least 1988) served to diminish fishing efficiency in mid to late May; however this effect is typically more pronounced on chinook than on coho. Hence late or early springs may result in a varied catch level independent of smolt abundance. This year's spring field season was very late which resulted in a delay to the start of trapping, as well as significant snow pack throughout much of the project limiting access to suitable trapping locations. 2007 also saw much higher than normal water levels in the early spring which may have affected the overall trapping efficiency. An additional factor contributing to the lack of trapping success is believed to be below average smolt abundance. From the middle of April until the 1st week of May, the crews were only able to set about 50%of the normal amount of traps due to snow and ice river margins.

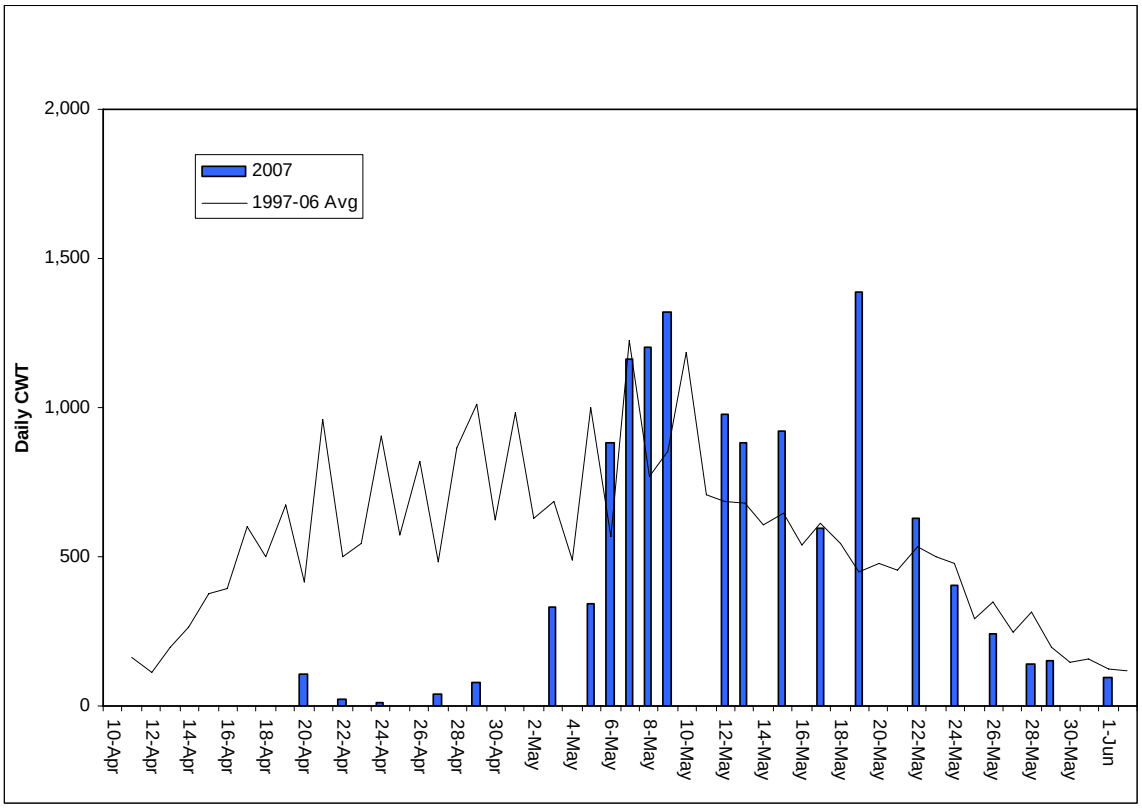


Figure 3. Daily releases of coded-wire tagged Taku River coho salmon smolt, 2007.

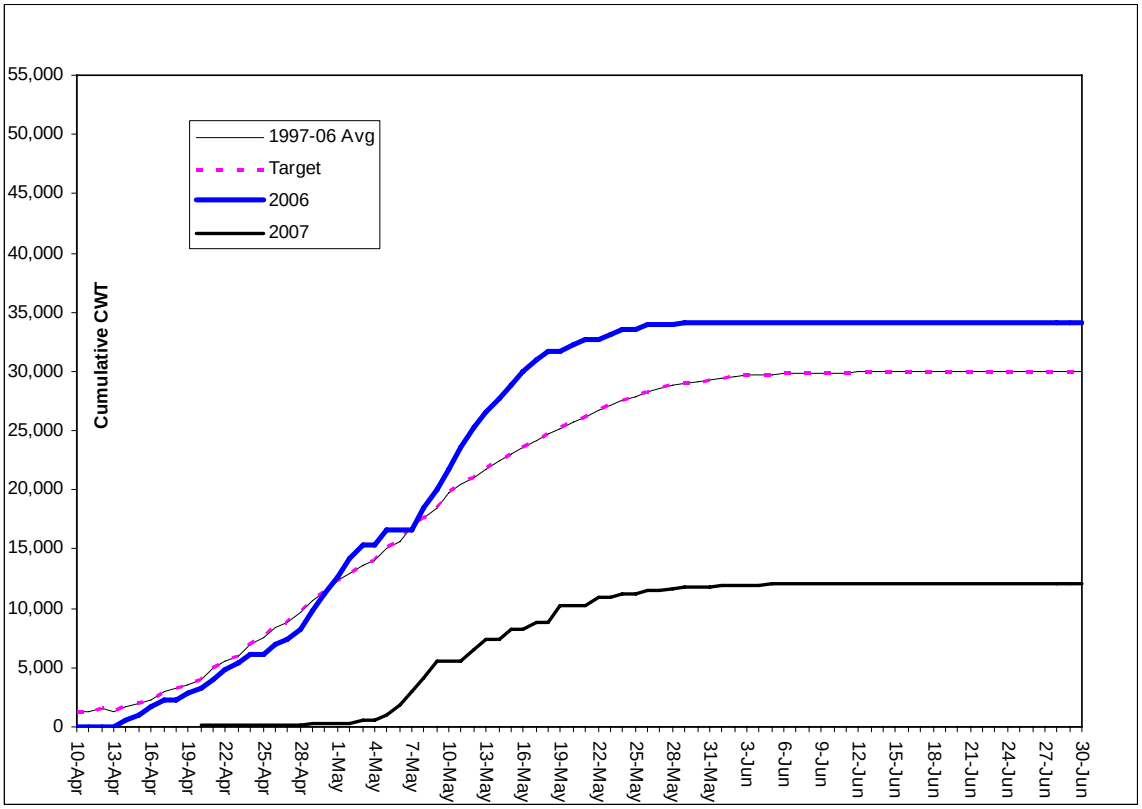


Figure 4. Cumulative daily releases of coded-wire tagged Taku River coho salmon smolt, 2007.

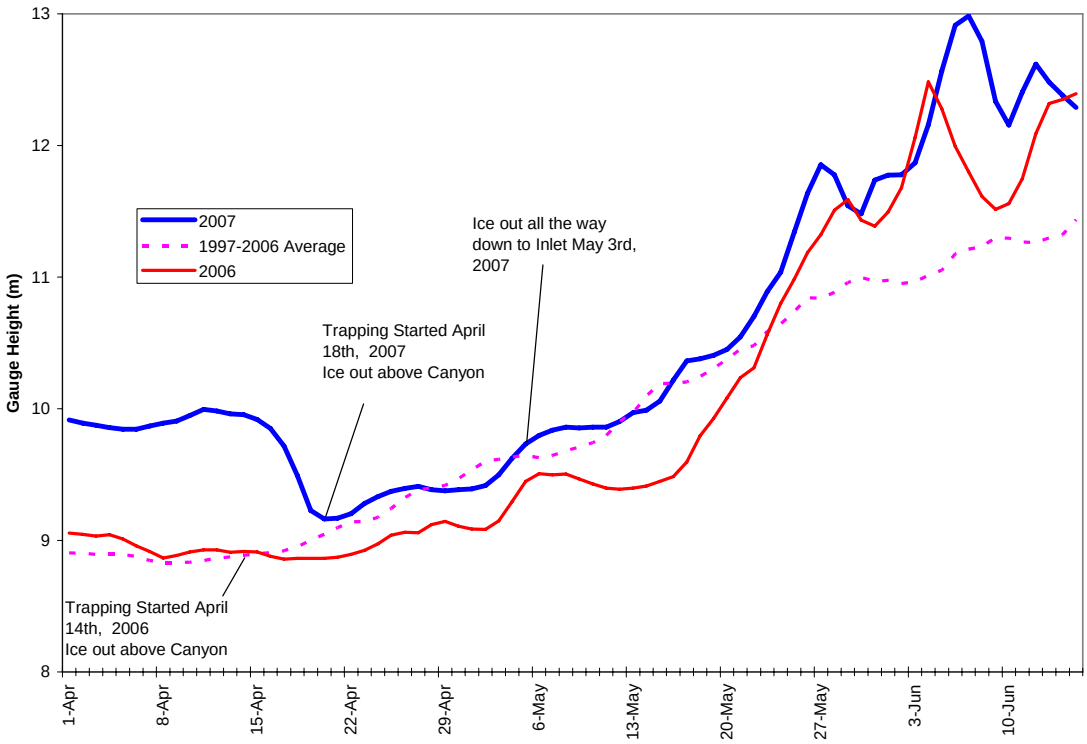


Figure 5. River level measurements recorded at the US Geological Survey gauge located downstream of the Taku River canyon, 2006 and 2007.

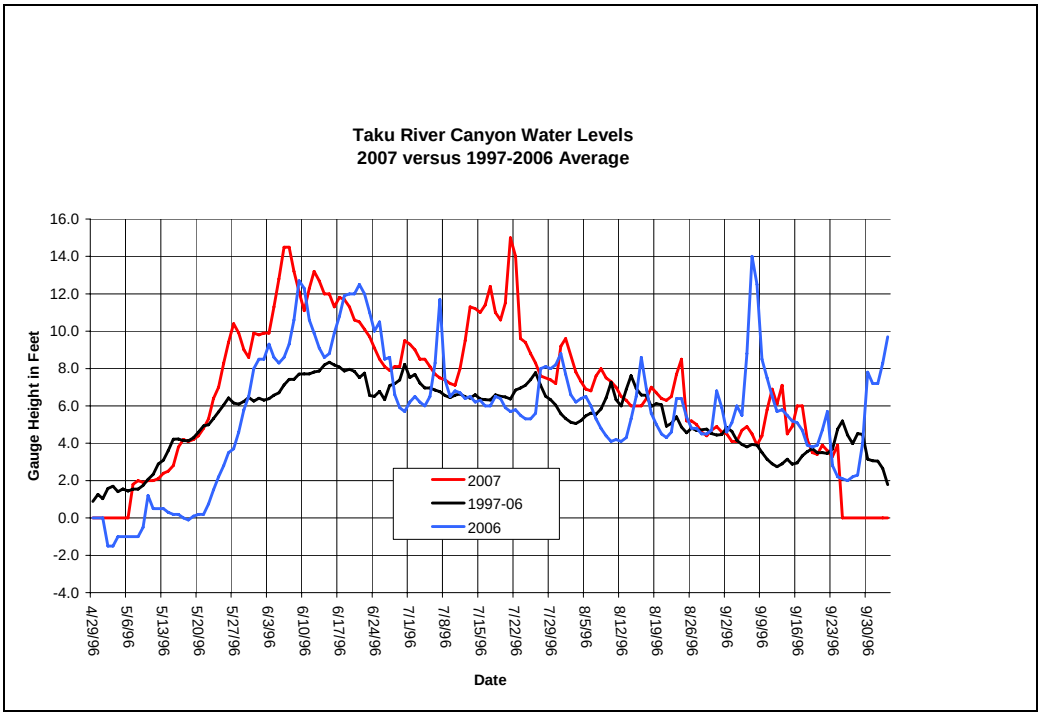


Figure 6. River level measurements using the Canyon Island gauge located just below smolt camp.

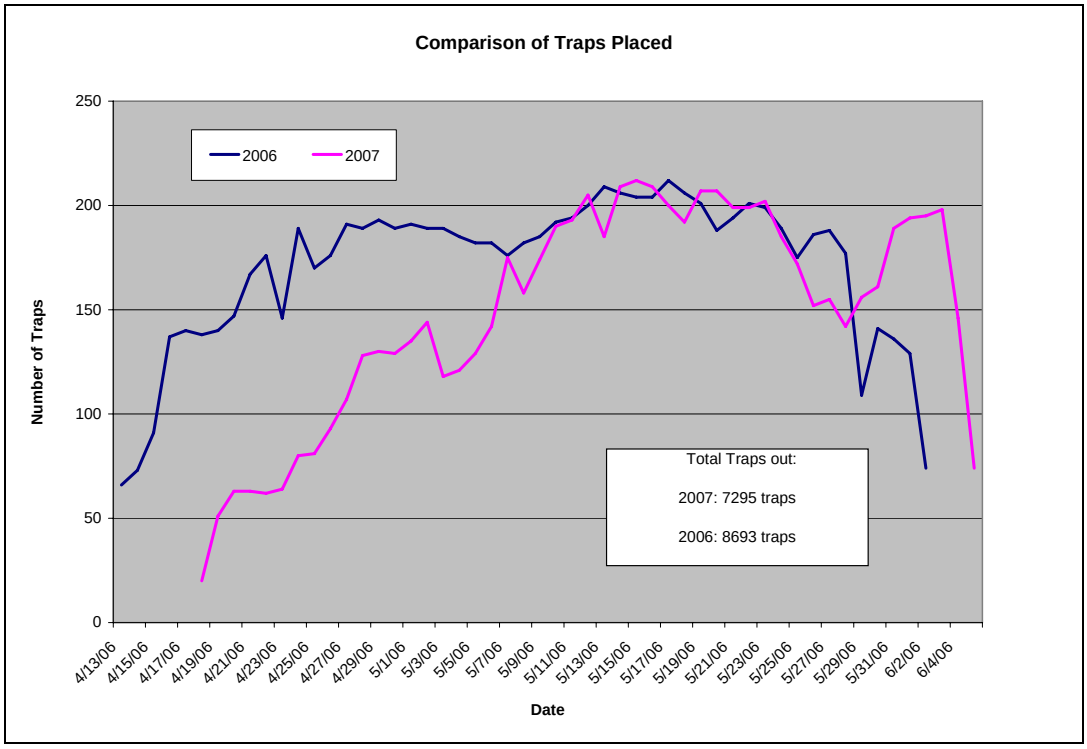


Figure 7. Comparison of smolt traps placed on the Taku river for 2006 and 2007.

Tag release codes Coho salmon are stored into the Alaska Department of Fish and Game's (ADFG) coded wire tag website (www.taglab.org). Once this data set is verified, it will be forward to and inputted into Regional Mark Processing Centre website (www.rmpc.com). Returning marked fish from this year's project will be intercepted in 2008 by marine gillnet, troll and sport approach water fisheries, primarily in Alaska, and in in river Taku commercial, aboriginal, test and sport fisheries.

Although length and weight measurement were taken from tagged Coho smolts, these data have not yet been processed. The analyses complete with annual length weight comparisons will be conducted in the winter of 2007-08.

Returning adults were sampled in the commercial fishery which commenced on April 30, 2007, targeting first Chinook, then sockeye and finally Coho. A total of 5,244 were caught; 451(9%) were examined for marks. A total of 2 marks were observed; however, as expected and planned for, CWT recovery was not possible since fish were headed prior to being landed. As commercial interest waned, a tag recovery fishery contract began. The first Coho was caught on September 2; fishing continued to October 5. This fishery caught 2,674 Coho; 100% of these were inspected for marks. A total of 27 marks were observed; 27 heads were recovered and sent to Juneau via float plane for CWT extraction. As with tag release date, the recovery data will be stored into the ADFG coded-wire tag website (www.taglab.org), and the Regional Mark Processing Centre website (www.rmpc.com).

29% of the Coho caught in the contracted tag recovery fishery were sampled for age (using scales) and size.

Mark data from returning fish will be analyzed in the winter of 2008-09; an estimate of the number of smolts that emigrated in 2006 will be available in the spring of 2008.

3.1 Budget and Project Operations

In general the scheduling was followed as planned. Smolt tagging did, however, start somewhat later than normal and end somewhat earlier than scheduled due to the late spring and the very high water in early June. Tag recovery was conducted into the first week of October.

Expenditures amount to $45,033; which is within $601 of the amount allocated to date. It is understood that additional funds will be applied to the account pending a final credit subject to acceptance of this interim report.

4.0 Conclusion

The Taku River CWT Augmentation project did not achieve the tagging objective of 30,000 smolts but did achieve its returning adult mark examination target. The lack of tagging success is attributed to extreme environmental conditions (late spring, heavy snow pack and record high water levels) as well as below average smolt abundance. The contracted tag recovery fishery went as planned with 2,674 Coho caught and examined for marks.

Current snow pack is lower than that observed this time last year which is promising for the 2008 tagging season.

5.0 Literature Cited

McPherson, S. A., D. R. Bernard, S. K. Kelley, P. A. Milligan, and P. Timpany. 1998a. Abundance of Chinook salmon in the Taku River in 1997. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series Report 98-41, Anchorage.

Yanusz, R. J., McPherson, S. A., and D. R. Bernard. 1999. Production of coho salmon from the Taku River, 1997-1998. Alaska Department of Fish and Game, Division of Sport Fish, Fishery Data Series Report 99-34, Anchorage.

Appendix 1: Photographs

Appendix 2: Financial Summary