Yukon Chum Salmon Tag Recovery Program

(August 15th-November 30th 1997)
CRE-07-97

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Prepared for:

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Project Summary:

- Recover Tags from DFO fishwheels with four, live-capture fishwheels run by commercial fishers.
- Determine tagged:untagged ratios in three headwater areas to enable population estimation; to test proportionality of tag application; timing and tag loss.

This report has been prepared by J. Duncan of Duncan Contracting

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1.0 Abstract

The return of chum salmon to the upper Yukon River in Canada was expected to be very poor in 1997. This outlook was based on the record low parent year spawning escapement in 1993, estimated to be only 29,700 chum salmon. This was far below the number required in 1993 to meet the rebuilding program objective for the 1997 cycle year, i.e. 50,700 in 1993, and far below the required long-term escapement of >80,000 chum salmon.

Assuming a productivity of 2.5 adult returns per spawner, which is generally assumed to be appropriate by the Yukon Joint Technical Committee for upper Yukon fall chum stocks, a return of about 74,000 chum was all that could be expected to return in 1997. A stock size of this magnitude was thought to likely require drastic management actions to meet escapement requirements. Severe restrictions and low fish availability in the commercial fishery was expected to result in very low effort levels in 1997; levels that would have likely been sporadic and insufficient, in terms of providing the necessary mark-recapture data required to develop a population estimate. The Yukon Chum Salmon Tag Recovery Program was intended to ensure the DFO mark-recapture program attained credible results in 1997. Fishwheels normally engaged in commercial fishing activity were fitted with live-boxes to facilitate non-lethal, non-extractive tag recovery.

Objectives of the program were to recover spaghetti tags, applied by DFO at their Sheep and White Rock fishwheels, and determine the mark:unmarked ratios during the chum season in the commercial fishing area downstream from Dawson City so that estimates of abundance and spawning escapement could be made, as well as determining tag:untagged ratios in 3 headwater areas (Kluane, mainstem Yukon and Teslin). The tag:untagged ratios would determine if assumptions regarding tag application (proportionate tagging) were true, timing of different stock groupings, and potential tag loss present. The tag recovery program was also intended to provide some commercial fishers with alternate employment thereby reducing harvest pressure on chum stocks and resulting in increased wild spawning escapement. An additional objective of the proponent was to conduct and complete the program with the highest respect afforded for the salmon resource and particularly salmon sampled throughout the project.

To date, all project objectives were achieved with the exception of the complete analysis of the data provided by the spawning ground surveys, as the results from collected data is not yet available.[1]

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[1] Age structures, from pectoral fin samples gathered in the Spawning Ground Surveys, will be interpreted at the Pacific Biological Station in Nanaimo B.C. The results, not anticipated to be available until well into 1998, will assist in characterizing the age composition of the chum escapement to the upper Yukon.

2.0 Fishwheel Operations

Previous to tag recoveries, four fishwheels were retrofitted with live pens fabricated for the program, to facilitate the safe capture and temporary storage of live chum salmon. Fishwheels were also fitted with additional gear; special netting in the baskets, slide liners and shoots, and foam padding to ensure the safe handling of chum. Dipnets were also constructed to handle chum in the live pens (see 4.1 Recommendations). Fishers were trained in appropriate fish handling techniques to ensure that sampled fish were treated in a manner that would best preserve their health. Locations of fishwheels were pre-determined for the consideration of limiting recaptures of chum.

The fishwheel component was organized logically into two "Phases", both of which were authorized to commence only in the event that commercial fishing was severely restricted or shut down completely. "The plan to close the commercial chum fishery for the first half of the season was unprecedented. It was made possible by the development of a co-operative stock assessment program between the Yukon River Commercial Fishing Association and DFO to collect data to allow the non-lethal estimation of the run size during the proposed closure".[2] As a result of the confirmation on August 8th that the first half of the chum season was going to be closed (August 15th-September 12th), "Phase 1" was initiated to provide DFO with the necessary mark-recapture information. Data was collected during this period, four days per week by four fishwheels, and continued efforts (after September 12th) was decidedly needed, if the run size was forecasted not to exceed 60,000, pending weekly reassessment of the forecasted boarder escapement.

During "Phase 2", operations were dependant upon updates made by the Stock Assessment Department at DFO; decisions to continue sampling chum were made on a week by week basis. The first of these decisions occurred at the end of operational week 3 (4 days ending September 11th) and resulted in a restricted commercial opening for two days during the following week as the bottom-end forecasted border escapement at that time was 63,000; just above the 60,000 cut-off point. Fishwheel operations continued on September 17th and 18th after the commercial fishery was closed, and again the following week in the same manner; two days commercial fishery/two days fishwheel operations. In total, fishwheels were used to collect data for five weeks; 4 days per week for 3 weeks and 2 days per week for 2 weeks. The only "break" in the data collection occurred in week 4 when one of the fishwheels was moved to a more suitable site.[3]

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[2] Reported by the Joint Technical Committee (JTC) in the 1997 Fall Report.

[3] Fishwheel operator Steve Kormendy's fishwheel, originally located just below Moosehide, was not catching enough chum for statistical consideration. His fishwheel was moved to a site just above the Chandindu River on the same side of the river. See attached data.

Improvements in the run forecast and a low cumulative commercial catch allowed a four day per week commercial fishery (no fishwheel operations deemed to be necessary to obtain run statistics) to exist on the Canadian portion of the upper Yukon River in operational week 6. Fishwheel operations in the following weeks ceased as the fishery was declared open due to the revised in-season run forecast at that time being 79,000 boarder escapement; significantly higher than the 60,000 cut-off point. Fishwheels were then packed up and all equipment was stored.

During the Fishwheel Operations, fishers and their assistants sampled as many as 522 chum salmon per day from their fishing efforts. Operators recorded the time and date, and sampled each chum for its sex, spaghetti tags (DFO and USF&WS) present and if present recorded the tag number, left pelvic fin clips, Caudel/Dorsal Punches (project recaptures), and the general condition of chum. All "Live-Fishers", with the exception of one, then marked the sampled fish with a punch (on the caudel or dorsal fins of chum) and released them back into the system.[4]

Over the course of the fishwheel operations, Operators reported the captures to the supervisor on a daily basis, who then compiled and reported the data to DFO Stock Assessment on a weekly basis. The compiled data was then entered into spreadsheet format for statistical considerations by DFO. The data has also been made available to USF&WS for their statistical considerations regarding the possibility of tag-loss from efforts in Rampart.[5]

In total 3,746 Chum were captured and sampled during the fishwheel component. All, with the exception of a few incidental mortalities, were released back into the Yukon River; 122 of these chum were tagged.[6] All resulting information from the Fishwheel operations was passed on to DFO during the season for management considerations and their in-season decision making process (see 5.2 Attachments).

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[4] The upper-most fishwheel operator Tommy Taylor, located at the bottom of the bluffs opposite Moosehide did not mark chum captured in his fishwheel. The chum captured from his efforts were not expected to turn up below this location, thus the additional handling was not deemed to be necessary. See attached data.

[5] USF&WS clipped the left pelvic fin of all spaghetti-tagged chum salmon from Rampart Alaska. The Yukon Chum Salmon Tag Recovery Program (CRE-07-97) sampled all chum captures for the pelvic fin clips to help determine the possibility of tag-loss from the USF&WS program.

[6] In total 58 mortalities were reported. 1 was due to a chum being left in a live-pen over closure (see 4.1 Recommendations); 2 mortalities were due to chum being "hung-up" mid-capture in a fishwheel basket after it bottomed out and 55 mortalities were reported from a single incident in-which a "rush" of chum was captured overnight. The resulting crowding of salmon in the live-pen, noted the following morning, caused the 55 chum to suffocate. This was thought to be due to the characteristic seasonal improvements in clarity of the silty waters found in the Yukon River and the perceived ability of chum to notice and avoid fishwheels during daylight hours.

3.0 Spawning Ground Surveys

First Nations in each of the headwater areas were consulted prior to entering their individual traditional areas for the purpose of conducting the spawning ground surveys. During these consultations, First Nation personnel, familiar to the study area and in some cases already familiar to sampling, were hired in each area to assist with the surveys.

Surveyors conducted the work in a respectful manner to avoid disturbing salmon redds, un-spawned chum salmon and salmon actively engaged in spawning. Great care was given in all surveys to ensure that they would be completed without negative impacts on the spawning grounds.

Two thorough "ground" surveys were conducted in the Minto and Kluane headwater areas. One ground survey and one aerial survey was conducted in the Teslin area.

Surveyors observed and recorded the following: total number of live chum to total number of live DFO and USF&WS spaghetti tagged chum present, total dead chum to total dead tagged chum present, number of tags observed from stream-bed bank, number of recovered tags and recovery method ie from live counts vs dead counts, tag identification numbers, total fish examined for clipped pectoral fins (done, but not in original proposal) total clipped fins, and survey areas and waypoints. Surveyors also took scale samples and pectoral fin samples from chum carcasses.

In total 47 DFO and USF&WS spaghetti tags were physically recovered in the spawning ground recoveries. Additional tags were reported on live chum to support a tag:untagged ratio. In the Minto area, 14 surveys were conducted in 7 different areas from the Minto Landing to the Pelly river on October 14th and 22nd. In Kluane, 6 surveys were completed in 3 main areas from Swede Johnson Slough to the "1118" Slough on October 18th and 25th. The Teslin aerial survey was conducted on October 28th; 4 passes were surveyed from the air and one ground survey was completed in the Boswell Slough.

During the course of the surveys 457 pectoral fins were collected from chum carcasses,[7] with corresponding post-orbital/hypural lengths and sex information.[8] Results from these samples are not expected to be available for analysis until well into 1998. The age structures of the samples will be interpreted at the Pacific Biological Station in Nanaimo B.C., and will assist in characterizing the age composition of the chum escapement to the upper Yukon River. DFO intends to examine tag

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[7] 6 more than the 451 samples determined to be needed by the project's Technical Advisor to statistically represent the run size.

[8] 23 live, but spawned-out, chum were netted and sacrificed for pectoral fin samples on the Teslin River due to poor carcass availability. These were the only salmon sacrificed for samples; all other samples were obtained from carcasses found on the spawning grounds.

recovery data further with a view to gain insight on stock timing, proportionality of tagging and tag loss.

All resulting information from the Spawning Ground Surveys was passed on to DFO and USF&WS during the season for analysis and management considerations (see 5.3 Attachments).

4.0 Project Management

The Yukon River Commercial Fishing Association contracted project management and supervision for the Tag Recovery Program to Jake Duncan, of Duncan Contracting (a fisherman himself).

Consultations, planning and project progress reporting between the contractor, Ian Boyce DFO technical advisor, Sandy Johnston DFO Stock Assessment, the Yukon River Commercial Fishing Association, and the Yukon Panel's Executive Secretary Hugh Monaghan was conducted throughout the project. Consultations between the contractor and the Tr'on dëk Hwech'in First Nation, the Kluane First Nation, the Selkirk First Nation, the Teslin Tlingit Council, Commercial Fishers, Fishwheel Operators and Spawning Ground Surveyors were also conducted over the duration of the project to facilitate the successful completion of the Tag Recovery Program.

4.1 Recommendations

- In future operations, should they be needed, live-pens would benefit from being altered to avoid missing chum salmon with dipnets. The live-pens fabricated had "pointed" upstream compartments where salmon could "hide" while being netted by the fisher (resulting in one un-necessary mortality and much grief during netting). A compartment with a squared front compartment is needed so fishers can successfully dip out all salmon and to minimize the cumulative handling stress experienced by chum.

- Radio communications, either by radio phone (VHF) or SBX, should be incorporated into future projects of this kind. This addition would greatly benefit future operations, as the increased level of communication would translate into less interruptions in the data collection process and more efficient use of river/freighting trips.

Continued...

• Local spawning ground surveyors, possibly (and probably) people from the local First Nation, should be employed in the headwater areas to "test" or feel out run timing in their particular survey area. This could be easily instituted for future surveys in the Kluane and Minto areas. This addition, in the planning stage, would ensure that surveys were conducted on the best possible dates. Also, surveyors, if equipped with sampling gear, could then sample carcasses on the spawning grounds as they became available on these "testing" trips to the spawning grounds.

* For further information detailing run characteristics it is recommended to refer to section 3.2, "Fall Chum Salmon", of the Joint Technical Committee's 1997 Fall Report.

5.0 Attachments

The attached forms (stapled to report) were developed for the fishwheel data collection and copied on water-proof paper. The attached data has been compiled from both the Fishwheel Operations and the Spawning Ground Recoveries. The fishwheel data has been collected and organized by fisher/fishwheel and the spawning ground recoveries have been organized by survey, with sampling data attached as well.

5.1 Sample Forms

"Yukon River Chum Salmon Tag Recovery Program 1997 Daily Totals Sheet"; and "Yukon River Chum Salmon Tag Recovery Program 1997 Data Sheet".

5.2 Fishwheel Operations Data

5.3 Spawning Ground Recoveries Data

* A 3.5" Floppy disk containing the data spreadsheets in Microsoft Excel format has also been attached to this report.

* Attached to this progress report are 15 pages containing mounted photos of the Spawning Ground Recoveries (to accompany the 5 pages of photos previously handed in with the October 1st progress report).

6.0 Acknowledgements

The **Yukon River Commercial Fishing Association** would like to acknowledge the following people who aided in the success of this project:

Sandy Johnson, for providing direction and good communications throughout the project.

Ian Boyce, for providing technical advice.

Fishwheel operators: **Mel Besharah, Sebastion Jones, Steve Kormendy Jr.**, and **Tommy Taylor**, for the competent operation of all live-capture fishwheels and for the diligent use of fish handling techniques that resulted in chum salmon being released in excellent condition.

Mary Ellen Jarvis, for conducting spawning ground surveys, taking a leadership role in the planning and organization of the surveys, and for providing needed assistance in personnel training.

Spawning ground surveyors: **George Johnson, Derek Edwards**, and **Ruby Grant**, for a job well done and for braving the freezing temperatures in search of chum.

Randy Brown and **John Eiler** for providing the impetus for the project to gather data regarding USF&WS spaghetti tag loss.

Your efforts and experience has benefitted the project greatly.

Many Thanks.

Funding for this project was provided by the Yukon River Salmon Restoration and Enhancement Fund

Yukon River Chum Salmon Tag Recovery Program 1997
Daily Totals Sheet

Fishwheel Operator:_____Number of data sheets to follow:_____

Date: (Circle) Aug. Sept. Oct. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Hours of Operation:_____/start_____/finish_____/hrs total

-Data Sheets to Accompany Daily Totals Sheet-

Total Catch		Total Tags			Total Chum With Clipped Left Pelvic Fin	Total Caudel Punches				General Condition		
Males	Females	DFO	USF&WS White	USF&WS Yellow		None	1 Punch	2 Punches	Other	Total Poor	Total Fair	Total Good
1	2											
3		4	5	6	7	8	9	10	*11	12	13	14

*11 list in notes below.

*notes:

Please Include: RPM of Fishwheel • Incidental catch • Any incidents occurred during day • Comments and/or Suggestions

Yukon River Chum Salmon Tag Recovery Program 1997
Data Sheet

Fishwheel Operator:_____Page Number:_____of_____

Date: (Circle) Aug. Sept. Oct. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Time (00:00)	Male (check)	Female (check)	Spaghetti Tags (Record Number)			Left Pelvic Clips (check)	Caudel/Dorsal Punches -check one-				General Condition -check one-		
			DFO Orange	USF&WS White	USF&WS Yellow		None	1	2	(Describe)*	Poor	Fair	Good