

Yukon River Panel Restoration and Enhancement Fund
Detailed Proposals for 2015

Conservation

#1. Collection and Analysis of Yukon River DNA Baseline Samples in Alaska and Canada

Fisheries and Oceans Canada & Tanana Chiefs Conference

The overall goal of this project is to increase the robustness of the Genetic Stock Identification (GIS) baseline for Yukon River Chinook and fall chum.

This project involves the collection of genetic samples in Alaska and Canada and the subsequent analysis of these samples for inclusion into existing ADF&G and DFO baselines. To date, (approximately 15,700) Chinook and (approximately 9,600) fall chum samples have been collected. Since 2009 this project has received funding from R&E; however, samples were collected prior to this funding, highlighting earlier efforts and in-kind contributions from the agencies. In 2015, as in 2014, the proponents will target specific tributaries (listed in the objectives below) identified as priorities for baseline sampling. This focused effort is meant to explicitly address gaps in the genetic baseline in a more efficient manner.

Several Canadian tributaries are underrepresented in the baselines and some Alaskan stocks are not yet distinguishable from Canadian-origin stocks. Comprehensive GSI baseline information will better result in separation of the stocks, thereby assisting agency staff with in-season and postseason fishery management, escapement estimates, run reconstruction, preseason estimates and harvest sharing objectives. The request is currently for a ninth year of funding; however, another 11 years (20 years total) will likely be needed to complete the baselines.

This project strengthens the genetic baseline used to differentiate Canadian-origin stocks for management purposes. The project increases the ability of managers to produce in-season estimates for Canadian-origin Chinook run sizes, to reconstruct runs postseason, and to project runs preseason. The project thus meets the Yukon River Agreement need identified in the Budget Framework 2007 (Conservation, Stocks, Run Assessment, Rank 1) to “Improve in-season and post-season resolution of genetic stock identification for Chinook and chum runs”.

#2. Genetic stock identification of fall chum salmon in commercial harvests, Yukon River, 2015

Alaska Department of Fish & Game

Fall chum salmon stocks of Canadian-origin have escapement objectives outlined in the Yukon River Salmon Agreement as an Annex to the Pacific Salmon Treaty while U.S. stocks including Tanana, Chandalar and Sheenjek rivers are within the purview of Alaska Department of Fish and Game’s (ADF&G) escapement goal policy. Canadian-origin stocks include both the upper Porcupine River (Fishing Branch River) and the upper Yukon River mainstem. This project is designed to test the feasibility of analyzing stock composition of chum salmon harvested in the fall season commercial fisheries within District 1 of the Yukon River. The commercial harvests in the Lower Yukon Area are substantial; therefore determination of stock composition would result in more informed management decisions concerning achieving escapement goals including treaty objectives for Canadian-origin chum

salmon. It is important to determine whether commercial fishery harvests in District 1 are similar in stock composition to those produced at the mainstem sonar project operated near Pilot Station. This project uses the ADF&G baseline of single nucleotide polymorphisms (SNP's) to provide regional stock composition estimates. Chum salmon compositions will be allocated to the following stocks: summer, fall, U.S., and Canada.

A total of 1,296 samples were collected from the 2014 commercial fishery in District 1. These samples are currently at the ADF&G Gene Conservation Laboratory (GCL) to be analyzed this winter as requested by the Panel (URE-01-14N). However, an additional year of collection is required for this feasibility study to account for variability in stock timing relative to the fishery to allow for robust statistical analysis. We propose to continue sampling the District 1 harvest in 2015 and to analyze samples collected in 2012, 2013 and 2015. Methods for the previous collections are outlined in the regional operational plan currently in review by ADF&G.

#3. Genetic stock identification of fall chum salmon in subsistence harvest from the Tanana Area, Yukon River, 2015

Alaska Department of Fish & Game

The purpose of this 3-year project is to apportion Tanana subsistence chum salmon fishery samples into Canadian and US-origin fish through the season to get a better understanding of the run at this point in the migration. Genetic tissue samples will be collected and analyzed for stock composition from the Yukon River near the community of Tanana on the right bank upstream to the Rampart-Rapids area. Sample sizes of 200 per strata would be required to determine U.S. versus Canada and summer versus fall components and would consist of 3 strata between August 15 and September 30. Households in Yukon Area District 5 harvest on average 60% of the fall chum salmon taken for subsistence and the community of Tanana harvests between 40% and 50% of that or on average 20,000 fall chum salmon. The other large harvesters in District 5 include Fort Yukon and Eagle both of which are located upstream of the Porcupine River and would consist of primarily Canadian stocks. Knowing the stock composition of Canadian-origin fall chum salmon in this large and concentrated fishery in Tanana may provide more informed management decisions.

#4. Yukon River Chinook Salmon Subsistence Sampling: (Anvik, Galena, Ruby, Fort Yukon)

Spearfish Research

This project addresses 2015 near term priority # 1: timely collection and distribution of stock specific harvest estimates. Genetic tissue for stock analysis along with age, sex, length (ASL) and girth will be collected from Chinook salmon by subsistence users in Anvik, Galena, Ruby and Fort Yukon. These communities span districts Y-4 and Y-5 in Alaska where a substantial proportion of Canadian-bound Chinook salmon is harvested. Subsistence fishers will be paid per fish for the samples they collect. Due to the restrictions in subsistence harvest in recent years and lack of samples, the costs for the project this year will be significantly reduced. By employing only fishers who have sampled previously, the PI will not travel to the villages but will instead send the sampling kits to subsistence fishers and provide a training video to remind them of the sampling protocols, in the event that they collect a Chinook salmon. Any samples collected will be sent to ADF&G for processing, archiving and analysis. A final report of estimates of ASL, girth and stock composition (if available in time) will be furnished at the end of the funding period.

If this project is funded, it would be the fourth year of funding through the R&E Fund. The data from this project is crucial to the ASL database to characterize the total Yukon Chinook salmon run and the Canadian-origin Chinook salmon. In the past, these data have been used post-season and have been a key element to creating the Canadian-origin Chinook brood year tables and run reconstruction. The brood year tables form the basis of the spawner-recruit models used to estimate past and future run productivity as well as setting escapement goals for Canadian-origin Chinook. Because of the variability in Chinook salmon runs, annual monitoring is necessary to update brood tables.

#5. Rampart Rapids All Season Video Monitoring 2015

Stan Zuray and David Daum, Consultants

Long-term monitoring of major salmon stocks is a necessary component of successful fisheries management on the Yukon River. This project provides the only U.S. main stem Yukon River assessment database of run strength, fish size (Chinook) and abundance of Chinook and chum salmon in 1000 miles of river. Many of these stocks are bound for spawning grounds in Canada and contribute to international treaty obligations. Since 2000, the Rapids video fish wheel project has provided daily catch and run timing data of salmon and migratory whitefish species to fisheries managers throughout the Yukon drainage. The project's fish wheel design and construction incorporates features that reduce injury to fish. The installed video system allows fish to be immediately released back into the water, eliminating stress from live box holding and handling. Fish wheel operation, construction and location is maintained in a consistent manner from year to year using a list of standards, so more meaningful comparisons and interpretations can be made. The video technology allows precise and reliable collection of catch-per-unit-effort data as demonstrated by the successful R&E Fund pilot project in 1999 and operational projects from 2000 to 2014. Daily in-season project data are sent to ADF&G and USFWS for distribution. This project partners with, and provides a working platform for, numbers of agency projects each year. The Rapids video monitoring project was designed to collect run timing and assessment information on Chinook (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), sheefish (*Stenodus leucichthys*), humpback whitefish (*Coregonus pidschian*), broad whitefish (*C. nasus*), and cisco spp (*C. laurettae* and *C. sardinella*).

#6. Yukon River Salmon Stock Identification

Fisheries and Oceans Canada

The project goal is to obtain stock composition estimates of Canadian-origin chum and Chinook salmon in the Yukon River and to further establish genetic mixed stock analysis (MSA) as an effective escapement estimation technique for Canadian salmon populations. In 2015, tissue samples from Eagle Sonar will be analyzed to estimate stock composition of the border escapement.

This project (2002 & 2003) has determined that microsatellite variation can be used to determine Yukon River salmon stock composition. This project has analyzed tissue samples from the Eagle sonar test fishery for chum and Chinook, for 6 and 7 years respectively. Run composition as determined by the genetic sampling has been applied to the sonar border passage estimates to estimate escapement numbers to tributaries. These estimates have been compared with passage estimates at tributary Chinook assessment projects (Big Salmon, Blind Creek, Teslin) to assess the accuracy of the MSA estimates for these systems. Big Salmon Sonar passage estimates (2008 to 2013) have been within the confidence interval (CI) of the MSA estimate annually; estimates for the two methods were notably much closer (within 2%) in 2009, when over 900 samples tissue were analyzed, than in 2013 (37% difference), when

only 293 samples were analyzed. Blind Creek escapement has consistently been well below the CI of the MSA estimate.

This project has demonstrated MSA is useful for estimating escapement numbers to specific tributaries. The effectiveness/accuracy of MSA and the number of tributaries to which the method may be applied is expected to increase with the ongoing improvement of the genetic baseline, and with ongoing efforts to increase sample collection at the sonar site.

Continuation of this project for 7 additional years will provide estimation of population returns for 2 life-cycles of both species. Reanalysis of past data using the updated baseline should also provide more accurate escapement estimations for past years. The combination of the improved baseline and two life cycles of sampling data will provide Yukon River salmon managers with baseline population estimates and a useful tool for monitoring future escapement of Canadian origin salmon stocks. The project thus meets the BPF 2007, Conservation-Stocks-Escapement Studies objective to “Identify and monitor escapements to key salmon spawning streams/areas”.

#7. Mainstem Teslin River Chinook Sonar Project - 2015. Year 5

B. Mercer and Associates

The previous Teslin River sonar projects in 2012, 2013 and 2014 enumerated Chinook escapements into the Teslin River system and obtained age, sex length (ASL) data and DNA tissue samples. The 2014 Teslin Chinook sonar project counted a total of 17,507 Chinook entering the Teslin system, approximately 30% of the estimated total upper Yukon River escapement. 504 Chinook ASL samples were also collected in 2014 and spawning locations documented from the mainstem Teslin Chinook stock.

The goal of this project is to continue to provide important stock assessment information. It provides information on run size, run timing, inter annual migration data and comparison of GSI stock proportions from Eagle sampling. Quantifying Chinook escapement into selected upper Yukon River watersheds allows for independent assessment of total above border Chinook escapements. Accurate Chinook escapement enumeration of select tributaries combined with GSI sampling information is used for the post season upper Yukon River Chinook run re-construction. The use of multiple beam sonar has no negative impacts on fish behaviour, enables un-impeded use of the river and is the most cost effective method of collecting quality escapement data from larger tributaries. ASL data provides biological baseline information on the health and long term trends of the stocks as well as sibling based pre-season run forecasts and completeness of the genetic baseline data.

A drainage wide Chinook telemetry project is planned for the Yukon River in 2015, affording a unique opportunity for providing important information on the proportional and spatial distribution of spawning Yukon River Chinook. It will also provide for tributary specific population analyses using mark-recapture techniques of the radio tagged fish. Obtaining accurate tagged/untagged ratios from large segments of the Chinook population is vital for maximizing the quality of the information from this telemetry project. Accurate enumeration of Chinook escapements into selected tributaries, along with counts of radio tagged fish entering the tributaries is the best and most cost effective means by which this information would be acquired. The Teslin Chinook sonar project would complement and be an integral component of the 2015 drainage wide Yukon River Chinook telemetry project.

#8. Porcupine River Sonar Program - Chinook Salmon. Year 2

Vuntut Gwitch'in Government

The goals of this project are to provide an accurate, in-season estimate of Chinook salmon passing by the community of Old Crow, and to collect age, sex, length and genetic sample data from Chinook salmon captured in a concurrent test fishery. In 2014, VGG operated two ARIS multi-beam sonars at the location of the Porcupine River chum sonar site (2 km downstream of the community of Old Crow). An unadjusted total of 2,666 Chinook salmon were counted during the period of operation of this program, from July 3 to August 9, 2014. A concurrent drift netting test fishery was conducted during the operation of the Chinook salmon sonar program to apportion the sonar counts between different species of adult fish. This included 14 drifts sets per day, using appropriately sized drift nets at multiple locations in the vicinity of the sonar site; however, only a single Chinook salmon was captured during the test netting. In 2015, VGG proposes to continue the operation of the Porcupine Chinook salmon sonar program for a second season (approximately 6 weeks total). In 2015, set nets will be used in place of drift nets, and will be deployed in the vicinity of the sonar site. Set nets will use a range of small mesh sizes to more effectively target bank oriented chum salmon. This will increase the amount of fish sampling effort, and will facilitate the capture of any co-migrating chum salmon during the latter part of the Chinook run. This project has operated under R&E funding for 1 year, and one additional year of funding is requested to develop an effective species apportionment program for this project. The continued operation of this program is justified by the need to determine the escapement, run timing and genetic baseline data on the Porcupine River Chinook salmon stock. The 2014 Chinook sonar program has shown that multi-beam sonar can be used to enumerate Chinook salmon at the sonar site near Old Crow. In 2015 this project will continue to provide accurate, in-season enumeration of Chinook salmon, and will provide genetic samples and species apportionment data to apportion counts between Chinook salmon and other co-migrating fish species in the vicinity of the sonar site.

#9. Radio tracking of chum salmon in the Porcupine River, Canada. Year 3

Vuntut Gwitch'in Government

This goal of this project is to help fisheries managers to transition the assessment of Porcupine River chum salmon from weir based escapement estimates to sonar based estimates. This goal will be accomplished by conducting a third year of chum salmon radio tagging at the Porcupine Sonar site near Old Crow, and subsequent tracking of chum salmon to their spawning grounds upstream of the former weir site. In 2013 and 2014, a target radio tag application rate of 94 radio tags was planned for deployment from late August to early October. This target was met in 2013, and is anticipated to be met again in 2014. Tracking of 2014 radio tagged chum is scheduled for mid-October 2014. In October 2013, a total of 90 tags were relocated during radio tracking flights, and an adjusted total of 74.1% of all tags were relocated upstream of the former weir site. This proportion is comparable to the previous average tag recovery rate of 65%, during the operation the Fishing Branch weir and a chum salmon mark-recapture/CPUE index program on the Porcupine River, from 2003 to 2010. This outcome demonstrates that this project is effective means to provide data to transition from weir to sonar based escapement estimates for Porcupine River chum salmon. A third year of this project (2015) is intended to allow for the calculation of the average proportion of chum that are counted at the Porcupine River sonar count and are destined for spawning sites in the Fishing Branch River upstream of the former weir. The 2015 chum salmon radio tagging program will follow the same methods as the 2014 program, including a target deployment of 94 esophageal implant radio tags. One additional tag will be purchased as a test tag, to ensure proper functionality of the receiver system during tracking flights. This project has operated under R&E funding for 2 years, and this is anticipated as the third and final year of this program.

#10. Blind Creek Chinook Salmon Enumeration Weir. Year 13

J. Wilson and Associates

The purpose of the proposed project is to install and operate a weir in Blind Creek to enumerate the 2015 Chinook salmon escapement and obtain biological information from the stock. The weir has operated under R&E funding for the past 12 years and has provided accurate Chinook escapements into Blind Creek and a high percentage of ASL data from spawning populations (in past years up to 86% of the run). The goal of this project is to provide important stock assessment information enabling agencies to manage Yukon River Chinook salmon. This goal is consistent with the R&E Fund near term priorities for 2015 – Conservation - Management Needs - 2.

The weir project will also provide a salmon viewing opportunity and on-site interpretation of the salmon resource and management programs. In 2014, at least 100 people visited the weir during its operation. As in previous years, training and employment will be provided for a student from the community of Faro and/or Ross River. These goals are consistent with the R&E Fund near term priorities for 2015 – Communications – management need 6.

Rationale for continuation:

- The Blind Creek weir operation currently provides the only escapement index for the entire Pelly River drainage.
- The Blind Creek weir is the only Chinook weir operation in the Upper Yukon River drainage which enables a high percentage of ASL data to be taken from a spawning population providing an excellent characterisation of the escapement in that system.
- A drainage wide Chinook telemetry project is planned for the Yukon River in 2015. Obtaining accurate tagged/untagged ratios from Chinook populations is vital for maximizing the quality of the information from this telemetry project.
- The weir operation provides an excellent opportunity for salmon viewing and increasing awareness of Yukon River salmon and management programs.

#11. Sonar Enumeration of Chinook Salmon on the Big Salmon River. Year 11

J. Wilson and Associates

The Big Salmon sonar project has provided accurate Chinook escapement counts and ASL data on the Big Salmon Chinook stock for the past 10 years. The 10 year average escapement into the Big Salmon system has been 4,900, representing approximately 12% of the estimated upper Yukon River Chinook escapement (range 9 – 15%). In 2015 the project counted 6,277 Chinook entering the system and collected 143 ASL samples and documented spawning locations and relative densities.

The goal of this project is to provide information on run size, run timing, inter-annual migration data and comparison of GSI stock proportions from Eagle sampling. Accurate Chinook escapement enumeration of select tributaries combined with GSI sampling information facilitates the post season run re-construction of upper Yukon River Chinook.

The rationale for continuing this project is:

- It is one of only two proposed large tributary escapement monitoring projects in the Upper Yukon River drainage and represents the best location for a long term whole tributary escapement index.
- It has provided consistently high quality data in a cost effective manner.

- The Big Salmon stock is uniquely genetically identifiable using the current GSI techniques.
- The importance of long time series and continuous data sets related to escapement monitoring cannot be over emphasized. Discontinuation of the project would diminish the value of the investment the YRP and management agencies have invested in the project to date.
- A drainage wide Chinook telemetry project is planned for the Yukon River in 2015. Obtaining accurate tagged/untagged ratios from large segments of the Chinook population is vital for maximizing the quality of the information from this telemetry project. Accurate enumeration of Chinook escapements into selected tributaries along with counts of radio tagged fish entering the tributaries is the best and most cost effective means by which this information would be acquired.

#12. Stewart River Sonar Pilot Program

First Nation of the Na'cho Nyak Dun

The government of the First Nation of the Na'Cho Nyak Dun (NND) is proposing to conduct a site search and potential testing of sonar system on the lower Stewart River, near its confluence with the Yukon River. The goal of this project is to evaluate the potential for establishing a sonar enumeration site on the lower Stewart River, to enumerate Chinook salmon that migrate into spawning grounds in the Stewart River watershed. The site search will be conducted during the peak of the Chinook salmon run, to evaluate the site under water levels, current patterns and river turbidity conditions that could be expected to occur during the period of the Chinook salmon run. The Stewart River watershed has never had an index for Chinook salmon escapement, despite being a major Chinook salmon bearing tributary to the Yukon River. Several spawning streams within the Stewart River are known to support Chinook salmon spawning populations, and a sonar deployment near the mouth of the river would provide an aggregate estimate of the spawning populations in the entire watershed. The Stewart River is wide, deep, and turbid; under these conditions enumeration technique such as counting weirs and aerial surveys cannot be used. The use of scientific grade, split-beam sonar system would provide an effective and accurate means to enumerate Chinook migrating to spawning grounds further upstream. This project aligns with the Yukon River Panel R&E Fund 2015 near term goal of Conservation, Escapement Studies which focuses on implementing "Chinook salmon stock escapement monitoring projects on selected Canadian tributaries for use in reconstructing Canadian origin runs".

#13. Draanjik Salmon Weir, Yukon Flats National Wildlife Refuge, Alaska (Phase 1: feasibility and conceptual design)

Tanana Chiefs Conference

The goal of this project is to complete Phase 1 objectives to help establish a weir in the Draanjik (Black River) drainage for fall chum salmon. Phase 1 objectives are to assess the suitability of previously identified weir sites, evaluate potential new weir sites, and to research and price out all components of fabricating and transporting a resistance board weir to the documented potential weir site. This proposal addresses the new 2015 Near-Term Priorities need for priority number 1, Conservation, and falls under the management need for Escapement Studies, and the need to monitor escapements on key salmon spawning streams.

The Draanjik is a trans-boundary river system with headwaters in Yukon, Canada. Both the Draanjik and the Teedraanjik (Salmon Fork River) provide spawning habitat for fall chum salmon, as well as Chinook salmon and coho salmon. With continued conservative fishery management practices and moratoriums for Chinook salmon throughout the Yukon River drainage, the reliance on fall chum salmon to meet the

needs of customary and traditional users continues to increase. It is a top priority of both the Tanana Chiefs Conference (TCC) and the Council of Athabaskan Tribal Governments (CATG) to better understand the biology and ecology of the salmon in these trans-boundary rivers in order to protect the resources of the Draanjik. Installing and operating a weir for a minimum of one life cycle, Phase 2, would provide quality escapement and run timing data, age, sex, and length (ASL) data, genetic data, and serve as a platform for additional research, which would all aid in the conservation and management of the Draanjik salmon resources.

#14. Big Salmon River Juvenile Chinook Out-migrant Assessment Study 2015

Fisheries and Oceans Canada

Yukon River Chinook salmon returns have experienced a sustained decline over the past decade. While there are numerous projects that enumerate returning adult Chinook salmon, there is a significant gap in knowledge and monitoring of freshwater survival and productivity. The goal of this new project is to begin to develop a baseline of outmigration timing and juvenile abundance to increase our knowledge of the early freshwater life history component of the Yukon Chinook salmon lifecycle; this information will contribute to the development of effective approaches to restoration of Canadian-origin Chinook salmon stocks. The scope of this project is the assessment of juvenile chinook outmigration timing, abundance, and stock composition on the Big Salmon River in Canada in 2015. The project will estimate abundance and run timing through the operation of a rotary screw trap (RST) sampling study near the mouth of the Big Salmon River, and stock composition estimation of age 1+ juvenile Chinook salmon through genetic mixed stock analysis (MSA) of tissue samples collected from Chinook salmon captured in this trap and in nearby Gee minnow traps.

The Big Salmon River is selected as an index stream because of associated escapement estimates for the adult Chinook salmon brood years that will contribute to the 2015 fry outmigration, and because the spawning population size and genetic baseline adequacy indicate the Big Salmon River will be a suitable candidate for long term MSA estimation of run sizes. It is expected that four years of project operation will allow fry production per spawner estimates for a range of escapement sizes, and will provide an indication of the variability in stock composition of Age 1+ chinook migrating out of the Big Salmon River.

#15. Radio tracking of Chinook salmon and genetic sampling in the Porcupine River, Canada. Year 2

Vuntut Gwitch'in Government

The goals of this project are to determine the spawning locations of Chinook salmon in the Canadian portion of the Porcupine River, to determine the relative abundance of spawning in each area, and to collect DNA samples from Chinook salmon that can be referenced to specific spawning tributaries. In 2014, a target of 50 esophageal implant radio tags were slated for deployment on captured Chinook salmon. Due to low in-river abundance of Chinook salmon in 2014 and challenges related to fish capture methods and locations, only 6 tags were applied during an intensive 7 day fishing period during the peak of the run. The decision was made to conserve the remaining radio tags rather than risk an incomplete deployment of an insufficient number of radio tags. The collection of Chinook salmon genetic samples from the spawning ground was also unsuccessful in 2014 due to high, turbid water conditions in the Miner and Fishing Branch River during the early part of August. The 2015 project aims to apply 50 radio tags to captured Chinook salmon, which will include the balance (44 tags) of the radio tags that were not

deployed in 2014. Changes to the project plan will be implemented to ensure the success of this project, and will include a greater amount of field time to capture and tag Chinook salmon, changes to netting methods and a more focused effort on the most effective tagging locations that were fished in 2014. No helicopter based collection of DNA will be conducted in 2015. Instead, genetic samples collected at the time of tagging will be referenced to the terminal location of radio tracked fish. The continuation of this project is justified as there is still a very limited amount of data available on Chinook salmon spawning location in the upper Porcupine River, as well as lack of genetic baseline data for this area. With the refinements to the methods of this project outlined above, this project will help address both of these goals. This project has operated under R&E funding for 1 year, and an additional 1 year of funding is requested at this time. This project also meets the 2015 near term Conservation Management Need 3, which including locating and documenting salmon spawning locations throughout the Yukon River drainage.

#16. Temperature monitoring of Yukon River Chinook Salmon spawning and migration habitats in Canada. Year 3

AvF R&D

This project built on an ADF&G project focused on methodology. The project is now the operation of a water temperature monitoring network in Yukon River (YR) Chinook migration and spawning habitats in Canada. It includes 3 seasonal and 11 annual stations. Seasonal stations monitor upstream migration habitats. Annual stations focus on Chinook spawning habitats. Two loggers are deployed at each station. There have been 59 completed deployments to date. Only one set of loggers has been lost. Loggers are currently deployed at annual stations. Temperatures are recorded hourly. Data is downloaded and data sets created. Analysis of 2013-14 data is underway. Data sets and mean daily temperatures will be distributed to agencies, First Nations and others. A total of 354 data sets were distributed in 2012-13. The data sets are, or will soon be, available at Yukonwatertemperatures.info There were no substantive changes to the project in 2013-14 and none are planned for 2014-15. Data collected to date indicates that Yukon River Chinook have a much wider range of thermal tolerance(s) than standards and thresholds developed elsewhere infer. Importantly, the data collected will be widely and freely distributed. This reduces the risk of data loss due to personnel changes, government reorganizations, etc. It will also allow YR Salmon management agencies or others with present or future capacity to do so the ability to track long term water temperature trends and develop models such as those implemented in more southerly basins (including the Fraser). Annual thermal conditions may be considered in future management plans and actions. The project addresses the 2015 Near Term Priorities Conservation/Habitat. "Collect and assess baseline data on....temperature..." Two additional years of funding are sought in accordance with the specific 2015 instructions for ongoing projects, which read: "...how many additional years are requested (maximum of 3 years).

#17. Fishing Branch River Chum Salmon Habitat Assessment. Year 2

Vuntut Gwitch'in Government

The goal of this project is to assess the suitability of chum salmon spawning and egg incubation habitat in the upper Fishing Branch River, which will build on the initial assessment work conducted in 2013. In 2013, VGG assessed chum spawning habitat in the Fishing Branch River upstream of the former enumeration weir site (the Study Area). An aerial survey was conducted to document the extent of current chum salmon spawning, and baseline data was collected on water quality, ice conditions (including permafrost), river hydrology, geomorphology and geology. The results of this study indicated that the

majority of the Study Area provides excellent habitat for chum salmon spawning and egg incubation. In a small portion of the Study Area near the headwaters of the river, spawning was observed in areas that became dewatered in mid-winter. Due to the prevalence of groundwater inputs in the study area, it was postulated that subsurface, intra-gravel flow could allow for continued incubation of chum salmon despite the lack of surface water flows. Assessments of off-channel habitat areas and the collection of current aerial imagery were also identified as areas that would benefit from additional study. In 2015, VGG will conduct a second year of more focused chum salmon habitat assessments in the Fishing Branch River. These assessments will focus on determining the extent of chum spawning in off channel habitats as well as the dewatering in upper portion of the Study Area (temporal and spatial extents). This work will determine if subsurface, intra-gravel flows are present in the area and could support successful chum salmon egg incubation. In addition, new project specific aerial imagery will be collected, to allow for a more detailed analysis of recent change in river geology/geomorphology and their potential effects on chum salmon. This project has operated under R&E funding for 1 year, and one additional year of funding is requested. The project has provided important baseline information on the quality of chum salmon spawning and egg incubation habitat, and has set the stage for future monitoring of this habitats.

#18. 2015 Michie Creek Salmon and Habitat Monitoring Project. Year 17

Kwanlin Dun First Nation

The primary focus of this project is to maintain continued access of migrating Chinook to the primary spawning location on upper Michie Creek. This project has been ongoing for over a decade. Over the years many barriers such as beaver dams and logjams have been breached to maintain the access for migrating Chinook to the primary spawning location at the outlet of Michie Lake. The Michie Creek spawning population is important to maintain as it represents one of the longest migrations of Chinook salmon in the Yukon Drainage Basin and is upstream of the Whitehorse Rapids Dam. Other studies associated with this project that have been completed included collecting information on egg to fry survival, behavior of hatchery introductions of fry, benthic diversity, CWT recovery and adult redd and spawner counts, as well as the monitoring of some basic physical parameters of Michie Creek (temperature and flow).

In 2014 numbers of spawning salmon / redds in Michie Creek were above average and correlated well to the number of migrants passing through the Whitehorse Rapids Fish Ladder. Part of the project in 2014 was to monitor the sediment inputs originating from thermokarst activity in a small adjacent tributary stream that was first observed in 2011. The steam cleared up prior to the arrival of salmon and we are pleased to report that there were no direct impacts from the sediment in 2014. One logjam, with a 0.5 meter hydraulic head, was breached prior to the arrival of salmon. A total of 245 spawners and 102 redds were enumerated, as well as 14 CWTs were recovered in 2014. Additionally, physical data was successfully obtained on both Michie Creek and the small tributary stream contributing sediment. This project is a continuation of efforts to document the status and habitat conditions associated with this unique spawning stock that is situated in a remote location above the Whitehorse Rapids Dam.

This project addresses the Near-Term Priority (Priority 1) for Conservation and Assessment of Habitat by collecting and assessing baseline data on physical parameters such as temperature, discharge, spawning reach lat./longs and conditions, as well as other spawning and rearing habitat characteristics. The project continues to build on a long-term database monitoring the biophysical habitat (barriers, flow and temperature) at the Michie Creek spawning site. The expected outcome is continued use of Michie Creek by spawning Chinook salmon by maintaining access to the primary spawning area near the outlet of Michie Lake. Additionally proposed for 2015 will be a spawning site visitation by KDFN Chief and Council.

#19. Southern Lakes Chinook Salmon Restoration and Enhancement

Carcross/ Tagish First Nation

The Carcross/ Tagish First Nation (CTFN) has a long history of cultural connections and subsistence interaction with Yukon River Chinook salmon. In more recent years, major spawning runs occur at the periphery of our Traditional Territory on the McClintock/ Mitchie Creek system at the north end of Marsh Lake as well as the Takhini River system at the north end of Kusawa Lake. There are documented accounts of adult Chinook salmon in the Tagish River system between Marsh Lake and Tagish Lake and elsewhere in the southern lakes system, including at the bridge in Carcross. Residents, CTFN citizens and commercial fishers have caught Chinook salmon in the past within this system; during the summer of 2014 CTFN Heritage, Lands and Natural Resources department (HLNR) caught two adult male Chinook salmon in one net that had been set at Deep Bay near the southern end of Tagish Lake. This catch provides the furthest upstream record, as well as the most recent account of Chinook salmon activity within the Southern Lakes.

This project will provide invaluable information to the continued conservation efforts in the head water areas of the Yukon River Chinook salmon run. Habitat assessments will enable conservation and restoration activities within this region. The salmon run is of major cultural importance to the Carcross/ Tagish First Nation and with the populations of other culturally significant and subsistence-dependent species dwindling, the enhancement of Chinook to this region would be a profound addition to our subsistence resources. This project would also help enhance the run and provide critical support for salmon and salmon habitat at the head waters of their Yukon River migration.

Restoration

#20. Ta'an Kwäch'än Council Fox Creek Salmon Restoration Project. Year 3

Ta'an Kwäch'än Council

The overall goal of the project is restoration of Chinook salmon spawning populations in Fox Creek; this population was identified as extirpated in a Traditional Ecological Knowledge (TEK) study and subsequent habitat investigations lead to the development of the 2008 Fox Creek Restoration Plan (FCRP). This Plan guides the TKC Fox Creek project activities until 2015. Success of this project will support sustainability of Canadian Chinook salmon populations, and improve harvest opportunities. This project was initially a Stewardship project and as our capacity has grown, it has changed into engaging our Stewards in restoration work.

We have outplanted Chinook fry to Fox Creek annually for 6 years. TKC has surveyed Fox Creek monthly throughout the open water seasons to monitor temperature, water level, and dissolved oxygen and to sample Chinook fry growth and condition of wild and released fry. Since 2012 to present TKC and partners surveyed the creek weekly during the potential spawning period to document returning adult Chinook, and identify barriers to migration. In 2013 TKC observed and sampled the first returning adults, indicating that released fry had successfully completed their life cycle and returned to spawn. In 2014, the first 6 year old returns (which are expected form the greatest proportion) we did not observe adult returns. The project will now focus on assessing adult returns and on monitoring the locations and success of spawning and incubation at Fox Creek based on modifications to the Fox Creek Chinook restoration plan.

#21. Yukon River Chinook Salmon Mainstem Outplant Program spawning evaluation. Year 2

Access Consulting Group

The goal of this project is to determine Chinook salmon spawning success from hatchery juveniles outplanted in the mainstem of the Yukon River. The project was proposed and approved last year by the YRP and will be repeated to provide confirmatory data. The 2014 program involved a sampling event that occurred in late-May over a two week period and was aimed at finding emergent (0+) juvenile salmon in the vicinity of the outplant location and determining the quality of fish habitat within the outplant area. In August, an aerial reconnaissance was conducted via helicopter to survey any spawning salmon in the vicinity of the outplant area as well as upstream and downstream. Finally, in early September a snorkel survey was completed to evaluate substrate conditions and look for any signs of spawning Chinook salmon. No significant changes will be employed in the second year of this project. The sampling that occurred in 2014 gave a good understanding of the outplant area and a second year is required for the project as one year does not give enough evidence to either support or refute the spawning success within the outplant area.

#22. Teslin River Chinook Stock Restoration Investigation

Teslin Tlingit Council

This project is a Chinook salmon stock restoration project with the goal of identifying a site for Chinook restoration in the Teslin River watershed and investigating the feasibility of such a restoration. The Teslin watershed is a major spawning destination for Canadian-origin Chinook. The total 2014 Chinook passage at the Teslin River sonar was approximately 17,500 fish representing 27% of the total 2014 Canadian escapement at the Eagle sonar site. The watershed is relatively accessible, providing potential for logistically feasible stock restoration opportunities. The proposed project will be conducted over two years, the first year (2015) will follow the first and second steps for restoring depleted stocks as outlined in the Budget Priorities Framework 2007. The first step in this process will be to review the results of previous R&E projects conducted in the watershed including a fisheries information summary completed by EDI for the Teslin River watershed during 2003 (CRE-43-03). This summary documented Chinook salmon spawning and rearing habitats throughout the watershed. A second step will be to conduct a site visit at a small number of potential stock restoration sites to investigate the feasibility of restoring depleted stocks in candidate streams. It is envisioned that year 2 of the project (2016) would complete the additional steps outlined in the Budget Priorities Framework 2007. Also outlined in the Budget Priorities Framework 2007, under restoration level three (research), this project will develop cost effective stock restoration options which focus on developing techniques to make artificial enhancement closer to wild conditions, which will include the exploration of techniques used in other locations such as egg insertion – artificial red construction and or in-stream egg incubation trays.

#23. Yukon River Chinook Salmon Hatchery Augmentation Feasibility Assessment and Development

Fisheries and Oceans Canada

Significant declines in Chinook salmon escapements to the Yukon River, including particularly the Canadian portion of the Yukon River, have led to a need to increase actions that address the declines. Significant efforts made by fisheries managers on both sides of the international border have led to

conservative management measures in order to increase escapements to spawning grounds. As the decline of adult Chinook salmon returns has been both progressively negative and sustained, restoration efforts to support the rebuilding of Canadian-origin Chinook salmon stocks may need to involve artificial propagation initiatives to improve abundance through augmentation of fry and smolt production. From a technical / feasibility perspective, one of the greatest barriers to implementing a Chinook salmon augmentation program in the Yukon is the lack of hatchery facility space and capacity. It is recognized that a number of possible options could be pursued to develop this capacity, which may include exploring the possibility of expanding existing facilities in the Yukon, creating a new facility(s) in the Yukon, or relying on existing hatchery facilities in BC or Alaska. In advance of the establishment of a final stock restoration plan, but recognizing the need to plan for stock restoration efforts proactively, this proposal intends to complete two objectives: 1) Complete an assessment of possible hatchery facility options that could providing capacity to rear Canadian-origin Chinook salmon fry (beyond levels that existing local facilities currently accommodate) and 2) provided stock restoration (hatchery augmentation) projects are likely to be pursued in 2015 or beyond, proceed with engaging most feasible option(s) to accommodate receipt of Chinook salmon fry.. Under a near-term scenario, and provided the initiative is supported by Yukon governments, stakeholders and the Yukon River Panel, Chinook salmon eggs from Canadian-origin salmon stocks could be collected and moved to the selected hatchery facility in the late summer of 2015. . This project meets the intent of the Panels stock restoration and enhancement priorities and serves to improve stock restoration activity opportunities throughout the Canadian portion of the Yukon River. It is expected that this program will lead to the recovery of Yukon River Chinook and the re-establishment of harvest opportunities.

Note – This proposal is submitted to the Yukon River Panel in a proactive manner, and implementation of the second stage of the project is contingent upon respective support, approval and endorsement of Chinook salmon stock restoration project(s) from various governments, stakeholders, project partners and the Yukon River Panel.

Stewardship

#24. Salmon Stewardship Coordinators for Yukon Schools. Year 4

Can-nic-a-nick Environmental Sciences

This project will lead by a Program Coordinator who will place Salmon Stewardship Coordinators (SSCs) in Yukon communities to assist teachers with the delivery of DFO's Stream to Sea program in all interested Yukon Schools. The Program Coordinator and the SSCs will support teachers in fisheries education activities, including salmon incubation equipment set-up and operation, hands on classroom activities, presentations, and aquatic studies field trips that may include the broader community. These hands on activities with youth are identified by the JTC as key in achieving the near term Stewardship priority. Over the duration of the project, the coordinators will be responsible for continuing to build capacity and seek support within each community, including within the school, to allow the continuation of the Stream to Sea program at the end of the proposed three project years. Coordinators will keep a record of activities, documenting the technical support they have provided to the schools, and the activities they have fostered in terms of the types of activities and the numbers of students and teachers engaged in these activities. The Program Coordinator and SSCs will also record the efforts they have made towards developing capacity within the community to deliver the program, including the contacts they have made and the commitments they have sought and/or garnered. The Program Coordinator will compile the information into a final project report for the Yukon River Panel.

In 2013/14 the Stream to Sea program was delivered at 7 schools in the Whitehorse Area (Dusk'a Head Start Family Learning Centre, Elijah Smith, Jack Holland, Golden Horn, Porter Creek Secondary, Selkirk Elementary and Whitehorse Elementary) and at 8 rural schools (Carcross, Carmacks, Dawson City, Destruction Bay, Haines Junction, Pelly Crossing, Ross River and Teslin) in rural Yukon. Approximately 290 students were engaged in various program activities that included presentations, fish dissections and the opportunity of participating in a field trip to release fry that were raised over the winter in classroom aquariums.

#25. Yukon River North Mainstem Stewardship. Year 10

Dawson District Renewable Resource Council

This project started in 2006, with the goal of developing and maintaining community capacity to protect, maintain and restore salmon stocks and habitats in the Dawson City region. The project has been implemented annually since then. Each year we provide two local high school students with hands-on training and participation in Chinook salmon related assessment, management and research projects. High school students are chosen as they are looked up to by younger students and children and listened to by their peers, parents and community members. Dawson City is a mining town. It receives little economic and declining social benefit from salmon as the numbers of Chinook returning to Canada decline. The students provide a conduit to the community by which knowledge of, and community interest in, salmon and their habitats and management can be transferred. Of importance, this is an ongoing need: mining will remain the dominant economic activity for the foreseeable future. Supervision is by a respected Dawson City elder. Technical oversight is by a retired DFO Biologist. Field activities include young-of-year Chinook salvage, access restoration, growth monitoring, and such other activities as agency staff may suggest or partner in. The youth demonstrate their acquired skills and knowledge to children and community members during a Public Involvement Day at the end of the project. A "Record of Activities" is updated annually, forms the basis of the following year's project and is included in the Final Report. Since 2006 the overall project has been successful, with only one student leaving before the end of the year's project. The annual positions are sought after by students. No significant changes in personnel or approach are proposed for 2014. In accordance with this year's instructions we are requesting three additional years of funding.

#26. Yukon River Chinook Salmon Stock Restoration Community Technical Advisor

Yukon Salmon Sub-Committee

Interest in salmon stock and habitat restoration within the Yukon Territory has increased amid significant declines Canadian-origin Yukon River Chinook over the past 15 years. Yukon First Nations and Canadian stakeholders are both leaders and potential partners that could support efforts to actively engage in the restoration of Yukon River Chinook salmon stocks in Canada. It is recognized that in order to undertake effective and appropriate stock restoration initiatives, it is necessary to have a feasible project plan that encompasses both sound biological and technical parameters. Although much progress has been achieved in developing knowledge and capacity among Yukon governments and stakeholders, there has been limited opportunity for exposure to the complex principles and specialized scientific expertise in the field of salmon stock restoration. This project proposes to retain a Technical Advisor that will be dedicated to providing guidance, technical expertise and assisting with the development of stock restoration projects that could be completed throughout the Canadian portion of the watershed by Yukon First Nations, stakeholders and partners. It is expected that this initiative will result in improved capacity to enable for the development of stock restoration plans and projects designed to benefit Yukon River Chinook salmon.

This initiative is also anticipated to facilitate a coordinated approach to both habitat and stock restoration activities as well as broader, watershed-based stock restoration planning. The Technical Advisor would be retained in April 2015 and provide assistance and advice to the various First Nation Governments and partners. The Yukon Salmon Sub-Committee and Fisheries and Oceans Canada's Salmonid Enhancement Program will provide oversight and guidance to enable for effective integration of biological, community, regulatory and international considerations. This project is complimentary to the project Yukon River Chinook Salmon Stock Restoration Education Initiative, that will also work to increase the capacity of First Nations on stock restoration. The project is also directly intended to further the Yukon River Panel's interests in supporting the restoration and re-building of Canadian-origin Chinook salmon stocks.

Communications

#27. Yukon River In-Season Salmon Management Teleconferences. Year 12

Yukon River Drainage Fisheries Association

The goal of this program is to foster community support for the management of Yukon River salmon through the hosting of in-season salmon management teleconferences during the fishing season. The program has run consistently for the past 11 years, funded by the Yukon River Panel and the Fisheries Resource Monitoring Program. Participants include fishermen, community harvest surveyors, Tribal councils, First Nations, policy makers and state and federal resource managers. A set agenda is followed each week with reports from villages on fishing activities and management reports on their fisheries assessments and strategies. Open discussion and question and answer periods take place following the reports. The calls are focused on in-season management, but there are numerous comments and questions about issues that may impact the decline of the Chinook salmon runs such as salmon bycatch in the Bering Sea pollock fisheries and mining. During the Chinook salmon season, there are 10 harvest surveyors that participate each week with community fisheries information to share. Outcomes from this program have included the development of a cadre of people from the Yukon River that communicate on a weekly basis about the Yukon River salmon runs in-season, many of which are different than those that participate in other annual forums. The teleconferences have given people the opportunity to stay involved and to learn from management and other fishers as well as gives people a space to air their concerns and thoughts about the salmon runs. The calls are a reliable, affordable and effective in-season forum that should continue for the next three years in order to cast a wide net of opportunities for people from the Yukon River to participate in fisheries management discussions that will help build community support for the conservative management actions taking place in recent years.

#28. Yukon River Education Exchange Program. Year 12

Yukon River Drainage Fisheries Association

The program goal is to foster community partnerships and relations along the Yukon River in Alaska and Yukon, with the outcome of a more aware public that will maintain and protect the salmon stocks and habitat. This project was developed by YRDFA and funded by the Yukon River Panel for the past ten years. It has created a people-to-people exchange trip for Alaskan and Yukon fishers. State and federal agency personnel, Yukon River Panel members, Elders, youth, fish processors and guides augment the group. The exchange has accomplished an increased awareness of the importance of Canadian origin Chinook salmon to people along the Yukon River and built relationships among people from Alaska and Yukon. The Alaskan itinerary has visited the lower river villages of Emmonak, and St. Mary's and mid-river villages of Kaltag and Galena and upriver to Tanana and Eagle. This year the project would take

Alaskan adult fishers to Canada, where they would meet with Yukoners from various communities that rely on salmon. This project should continue, as conservative management of Canadian origin Chinook salmon continues, there are many hardships and changes people are facing. Continuing to include people in public outreach processes that expose them to new information can motivate them to protect salmon stocks and their habitat in partnership with each other. There is an extended public along the Yukon River that could benefit from exposure to new information and experiences, especially in relation to low Canadian origin Chinook salmon stocks. Based on the number of new younger people that are involved in the fishery, such as the dipnet fishers in the lower river or the stewardship workers in the Yukon, this project should continue for at least the next three years to build relationships among the people that share the salmon resource.

#29. Yukon River Pre-Season Planning Meeting. Year 6

Yukon River Drainage Fisheries Association

The project goal is to build a public constituency that is motivated to maintain and protect Chinook salmon stocks. For six out of the past seven years the Yukon River Drainage Fisheries Association (YRDFA) has hosted a one-day meeting to discuss pre-season planning for the management of declining Canadian origin Chinook salmon. This project has operated under R&E funding for all of the past meetings and anticipates three more years of funding. Meeting attendees have included active fishermen, Tribal council representatives and consortia, state and federal agencies and other stakeholders. Each meeting was an accomplishment; a majority of stakeholders along the Alaskan portion of the Yukon River met to discuss how to protect Canadian origin Chinook salmon. They have been continuing to convene, mostly on an annual basis with fisheries managers to learn about the status of the Yukon River Chinook salmon and how to best manage anticipated returns. Last year's meeting was hosted in coordination with the international summit, also funded by the Yukon River Panel. While this jointly hosted Alaskan and Canadian meeting was a success, this proposal is for a stand alone one-day Alaskan meeting in the spring of 2016. This project has demonstrated that face-to-face discussions among fishers and the state and federal agency managers has proven effective during in-season management when fisheries managers are working to conserve Canadian origin Chinook salmon. Outcomes have included fisheries managers learning from fishers about timing of fisheries harvests; this has influenced openings and closures and fishers have learned about upcoming management actions pre-season; this has enabled community members to prepare in advance with new gear purchases and fishing plans for their families. Continued outreach through face-to-face meetings is needed in future years to continue the relationships developed among fishers and managers to manage the resource for the future.

#30. Yukon River Chinook Salmon Stock Restoration Education Initiative

Fisheries and Oceans Canada

Significant declines in Chinook salmon escapements to the Yukon River, including particularly the Canadian portion of the Yukon River, have led to a need to increase actions that address the declines. It is important that as key partners, Yukon First Nation government renewable resource / fish and wildlife divisions are provided the opportunity become informed and involved in programs and projects to better protect and improve the health of Canadian-origin Chinook salmon stocks. Significant efforts made by fisheries managers on both sides of the international border have led to conservative management measures in order to increase escapements to spawning grounds. The restoration of Chinook salmon stocks may involve exploring strategies including habitat restoration and enhancement, and artificial propagation opportunities in Canada to improve abundance. First Nations governments and communities in the Yukon Territory will play an integral role in evaluating opportunities, developing plans and

conducting the necessary projects to succeed in addressing this initiative. The goal of this project is to support and enable capacity building through development of expertise among Yukon First Nation government staff in the areas of habitat restoration, stock restoration and artificial propagation principles that have the potential to benefit Yukon River Chinook Salmon by increasing abundance. The project will involve the delivery of a structured educational / training initiative focused on salmon biology, habitat requirements, restoration concepts, principles, techniques and case studies. Key target audiences will be those responsible for fish and wildlife management in their traditional territories and delegated representatives so as to provide an informed group of individuals in each Yukon Territory First Nation Government and Community. This project meets the intent of the Panels stock restoration and community outreach communication priorities and serves to improve restoration activity opportunities throughout the Canadian portion of the Yukon River.