

**YFWET Final Project Report 2022: Yukon River watershed literature review and map series to identify strontium isotope water sampling locations.**

The goal of this project was to generate two tools to support Yukon First Nations, as well as other governments and organizations or agencies that conduct fisheries habitat investigations. The two supporting tools included:

- 1) a literature review of reported juvenile Chinook habitats that could be researched and recorded from online and publicly accessible information and;
- 2) a series of maps that will support the conveyance of this important information to those governments and agencies. The importance of these two tools can not be over-emphasized as there is a recognized gap in current knowledge pertaining to juvenile Chinook rearing and over-wintering habitats, as well as a synthesized data source for the reported information.

No significant issues were encountered during the undertaking of this project, and as a result, no project components would be done differently. There was a small issue with the size of the files when emailing the final product to individual Yukon First Nation Natural Resource departments, and so as a result, the potential of including a method of distribution such as USB driver for each government office could be considered with a similar project in the future.

All activities that were completed followed the proposed outline for the project. The beginning phase of the project included an extensive literature review of online web-based information that is publicly accessible. We conducted a literature review of publicly accessible web-based reported juvenile presence of Chinook salmon, and we recorded all data and/ or information that we found in a spreadsheet that would later be used to inform the GIS mapping layers. Yukon First Nation Salmon Stewardship Alliance staff and I conducted the literature review of the 2005 – 2021 development assessment project file information found on the Yukon Socio-Economic Development Assessment (YESAB) web site. We systematically opened each 'fisheries' related report for 'placer mining', 'quartz mining', and 'transportation' folders found on the YESAB website and conducted a key word search for 'fish', 'salmon', 'Chinook' and/ or 'habitat'. When a location of juvenile Chinook presence was reported, the data was entered into the spreadsheet; we recorded in which traditional territory the assessed project was occurring in, the river and/ or creek that the juvenile presence was reported in, the season the salmon was reported, as well as any additional information that may be of use to a habitat assessment. This included the presence of reported adult Chinook salmon and/ or freshwater fish species that had been reported. In addition to the YESAB website, we also conducted the literature review of any publicly accessible reports that showed up via a "Google" search, as well as publicly available reports from the Department of Fisheries and Oceans Canada. In total, we spent >180 hours researching this aspect of the project and feel that our literature review resulted in a relatively thorough overview and summary of web-based available information of juvenile Chinook reported habitat locations. While there is a caveat to any users of the mapping tool and associated raw data that the product should not be viewed as "comprehensive", we do believe that the output product provides a detailed summary of known and/ or reported juvenile Chinook habitats that can be found on open-source internet data sites.

The second aspect to this project included developing a series of maps that would illustrate these data points of reported Chinook salmon locations. Our intention with this project was to provide YFN government staff, as well as other agency staff, who prepare comments on the YESAB development

assessment files and/ or those who are identifying important salmon habitat, with a source of data that pulls together these reported locations into one, usable and synthesized resource. The maps were developed for each Yukon First Nation traditional territory situated within the Yukon River watershed, as well as the development of one over-arching map for the entire Yukon River watershed. These two scales of maps provide a visual reference for areas that contain reported salmon habitat, and they also clearly identify areas that may have knowledge gaps and/ or investigation gaps. The illustration of these data points will allow people to visually locate areas of reported presence for Chinook salmon and their habitat. It is important to note that this investigation was confined to a limited number of hours, thus resulting in a non-comprehensive mapping product. Additionally, with the bulk of the data being derived from a literature review of the YESAB online registry (YESAB – YOR), it is important to note that only areas that required investigation show up in this search. Hence, in areas where development projects have not submitted projects to be reviewed under the development assessment process (e.g., areas that lack mineral interests), the lack of reported presence of Chinook salmon does not indicate a lack of presence but more of a lack of reported presence. This contributes to our caveat that this product should be considered “non-comprehensive”. However, we believe that the final mapping products that we produced do support our intention to provide useful tools for those conducting reviews of projects that have entered the YESAB development assessment review process within YFN traditional territories.

Generating information and data that supports our knowledge and understanding of critical habitats for freshwater and anadromous fish works to directly support the objectives of Chapter 16 of the Umbrella Final Agreements, specifically s.16.1.1.1., s.16.1.1.4., s.16.1.1.8., and s.16.1.1.11. The maps developed through the financial support of YFWET is foundational to planning for future fish and fish habitat investigations and will support Yukon First Nations by working towards identifying unknown yet important, candidate habitat areas for conservation and protection and will further support s.16.1.1.11 “to enhance and promote the full participation of Yukon Indian People in renewable resources management” and s.16.1.1.8 “to develop responsibilities for renewable resource management at the community level”.

The contractor, Natasha Ayoub, and collaborator, Yukon First Nation Salmon Stewardship Alliance, proposed the audience of this proposal to be Yukon First Nations located within the Yukon River watershed. Our proposal pointed out the lack of synthesized data pertaining to juvenile Chinook rearing and overwintering habitats and we recognize that this information is critical when conducting environmental assessments for projects that have applied to be assessed under the Yukon Socio Economic Assessment Board. As established under the Umbrella Final Agreement, Chapter 16, YFNs are responsible for participating in, and providing comments for, environmental assessments that occur within its traditional territory.

During the research phase of the project, the Yukon Salmon Stewardship Alliance (YFNSSA) met with Yukon First Nations members of YFNSSA to provide them with background information and a summary of the project that was being worked on. This project had also been discussed with YFN natural resource managers prior to beginning the literature review. It was communicated that the intention of the project is to develop tools that support the current development assessment process that each YFN is mandated to participate in for projects that have entered the assessment stage of YESAB within their traditional territory. At a meeting held in June, prior to the completion of the project, the contractor was asked to join the group discussion to be on hand to answer any questions or to record any suggestions. This communication was shared with the directors and/ or managers of the natural resource departments and provided important background information about the intention behind the project, as well as foreseen

limitations of the tools. Again, while this mapping tool is recognized as being a non-comprehensive product, the benefit of having synthesized and organized data pertaining to Chinook salmon habitat is much needed to be able to participate in development assessment activities and/ or conservation land use planning for critical habitats of this species. A total of >180 hours was dedicated to the literature review and data entry to be used for the mapping phase of this project.

The phase of researching geological GIS layers (i.e., carbonate and silicate surficial geology classifications) from previously existing and publicly accessible shapefiles from Yukon Geological Society (YGS) was proposed to help identify variations in the surficial geological layers. Where these variations occur, this indicates where water samples should be collected for strontium analysis. Priority areas for a future water sampling program consisted of gathering supporting layers that could be used by the GIS contractor to develop the foundational map. Our geology contractor researched the optional layers that YGS make available to the public, and we determined which layers to include in the final mapping product. Once the raw data had been collated into a spreadsheet, the shapefiles had been produced, and the GIS maps had been developed, this information was shared with all Yukon First Nations situated within the Yukon River watershed. Our GIS contractor, Aspect North, worked diligently to ensure that each of the mapping products reflected accurate boundaries for individual traditional territories, as well as carefully chose mapping icons that infer the data that the point on the map is representing. As a result, the maps should be easy to use and should be visually discernible immediately as to what is being conveyed by the map.

Once all 14 maps were complete, the project collaborator, Yukon First Nation Salmon Stewardship Alliance received the full suite of raw data, as well as the finalized maps, and are now digitally storing and housing the final products at the Council of Yukon First Nations. This ensures that the output materials will be easily accessible to any First Nations governments, and/ or agencies mandated under Chapter 16 of the Umbrella Final Agreement to support fish and wildlife and natural resources management. While this information is technically accessible publicly, there is no common storage area for the raw data and resulting maps. The issue of accessing publicly accessible research and/ or environmental monitoring data for the Yukon is not unique to this project and arises often in Yukon due to the lack of a communal research portal. However, governments, non-government organizations, Yukon Socio-Economic Assessment Board or any individual interested in having a better understanding of juvenile salmonid habitats are welcome to access the data and maps that have been posted on the YFWET website through the summary and final report submission to the Trust.

This project resulted in a total of 14 maps divided by Yukon First Nations traditional territories located within the Yukon River watershed, as well as an overview map that depicts the entire Yukon River watershed drainage. Each map has recognized the generous support provided by the Yukon Fish and Wildlife Enhancement Trust (YFWET) by including the YFWET logo within the metadata/ information section located at the bottom right corner of each map. These maps were distributed broadly amongst YFN government Natural Resources departments. Additionally, the maps (containing the YFWET logo) and supporting data have been shared with Department of Fisheries and Oceans Canada. The maps have been included with the final report submission.

Letters were sent to the Yukon First Nation Chiefs and Natural Resource Department directors, and offered a background explanation of this mapping tool, as well as the research process (lit. review) that uncovered the data that was used to develop this map set. The letter explained how this information could be used to support their development assessment processes within the first nation, future land planning exercises,

or however they so choose. The letter provided a brief background of the project intention, as well as the process that resulted in the final output map and raw data. It was explained to the YFNs that while this product should not be considered a comprehensive product, it could be thought of as a tool to support and inform inquiries pertaining to reported juvenile Chinook salmon rearing and overwintering habitats. This letter also recognized that the financial support for this project was received through the Yukon Fish and Wildlife Enhancement Trust fund. As mentioned above, the maps illustrating salmon habitats, along with the explanatory letter of the data sources and mapping process was sent to individual YFNs and Natural Resource Departments and we received excellent feedback from numerous YFN Natural Resource Department staff on the importance, as well as the usefulness, of this mapping product that was gifted to each YFN located within the Yukon River watershed.

A short summary presentation was provided to the YFWET Board so that project details could be shared and questions pertaining to the details of the project output could be answered. As representatives of fish and wildlife interests in the Yukon, sharing project details with the board members could also assist in spreading the word that these tools have been developed and are accessible through the YFWET website final report 2022 web link.