Photo Credit: Devon O'Connor

Agency Report to the Mackenzie River Basin Board

Meeting #74
December 5, 2022
Location: Online meeting

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1. Bilateral Water Management agreements

British Columbia and the Yukon

British Columbia and the Yukon signed a Bilateral Water Management Agreement on March 30, 2017. This agreement applies to all transboundary waters shared between British Columbia and the Yukon in the Mackenzie River basin, primarily the Liard River sub-basin. The Bilateral Management Committee was established in 2019. It includes representatives of the Government of British Columbia, the Government of Yukon, First Nation governments and transboundary Indigenous governments and groups.

In May of 2022, the committee held its first in-person meeting since the pandemic. This was a joint meeting with the British Columbia-Northwest Territories Bilateral Management Committee for the Liard River basin. The committees decided to work together to develop a learning plan for the Liard River. Our latest work has focused on coordinating the development of the learning plan. This has included working with the Land and People's Relationship model developed by Elder Joe Copper Jack. The model is a framework for guiding the learning plan process and bringing together Indigenous knowledge and Western science.

Northwest Territories and the Yukon

In August 2022, the Government of the Northwest Territories and the Government of the Yukon signed two new Bilateral Water Management agreements. The first agreement applies to the Peel River and Mackenzie Delta sub-basin, and replaces the previous agreement signed in 2002. Now that the new agreement is signed, implementation will begin with the formation of a new Bilateral Management Committee. Nomination of Indigenous members to the committee is currently underway.

Additionally, the Northwest Territories and Yukon governments signed a new Bilateral Water Management agreement that covers 64 km^2 in the Liard River sub-basin, which is not covered by either of the British Columbia-Yukon or British Columbia-Northwest Territory agreements. During consultation, First Nations governments highlighted that implementation of this agreement should be coordinated through existing Bilateral

Management Committee structures in the Liard River sub-basin that include the Yukon and Northwest Territories.

It is to be determined what the next steps will be. For now, all parties are already working together to develop the learning plan for the Liard River sub-basin.

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2. Water-related legislation / policy / regulations / planning

Flood mapping initiative

The Government of Yukon is undertaking flood hazard mapping for several high risk communities. Flood-related studies have been undertaken already in some communities, often to support short-term infrastructure and land development decision-making. The upcoming flood hazard mapping studies will involve a more thorough level of data collection, modelling and engineering analysis. The products of these studies will serve as highly accurate tools to support long-term decision-making by all levels of government and the public.

Within the Mackenzie River basin, a flood hazard mapping study is planned for the community of Upper Liard. The Government of Yukon will engage with Liard First Nation as the start of the study approaches.

New report: Assessing Climate Change Risk and Resilience in the Yukon

This past September, the Government of Yukon released an assessment report of climate risk and resilience across the territory. The Assessing Climate Change Risk and Resilience in the Yukon report outlines the greatest threats to Yukon communities in light of climate change. The top three vulnerabilities highlighted by the report include transportation infrastructure, flood and fire risk, and permafrost thaw. Actions to increase resilience in these areas are highlighted. Actions already underway to address climate risks to the territory include flood mapping, developing better tools for reliable flood forecasting, as well as assessment of flood risk along transportation corridors.

Yukon State of the Environment interim report

The Government of Yukon recently tabled the Yukon State of the Environment interim report for 2022 in the Yukon Legislative Assembly. The report includes information available up until the end of 2021. It provides data on key indicators such as the changes to Yukon's water systems. The report notes an increase to the volumes of water contained in snowpack that becomes available when melting and earlier average river ice break-up in the Yukon River.

Regional land use planning

The Peel Watershed Regional Land Use Plan was approved in August 2019 and an implementation plan was approved in August 2020. Approximately 55 per cent of the area, including four major tributaries to the Peel River, is now permanently protected from mineral staking and oil and gas activities. The highest level of protection is now applied to these Special Management Areas, and off-road vehicle use is now regulated in specific areas in order to protect both wetlands and alpine habitat. More than half of the existing mineral claims in the conservation areas of the region have been relinquished or have expired, ensuring protection for those lands and waters. Current implementation work includes the legal designation and development of management plans for protected areas, as well as the refinement of management direction for any permissible industrial activities, which will further ensure that environmental values are sustained.

The Government of Yukon continues to work with First Nations to uphold the provisions of the First Nations Final Agreements, including many important initiatives vital to the Yukon's social and economic well-being.

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3. Science, monitoring and information

Monitoring update

Groundwater monitoring

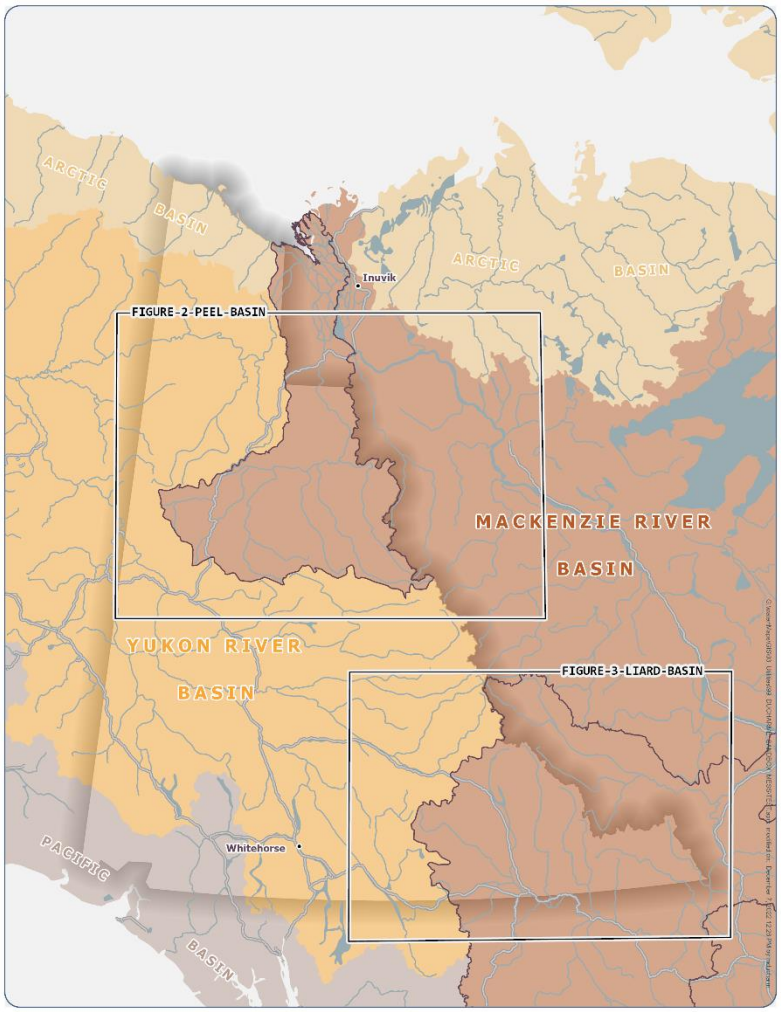

Figure 1 Peel and Liard Basins

In the Liard River watershed, the Water Resources Branch commissioned three new monitoring wells in Watson Lake in 2022 as part of their project to map aquifers underlying the area. The wells form part of the Yukon Observation Well Network (YOWN). One well (YOWN-2208) was installed at a pullout along the Robert Campbell Highway and a pair of nested wells (YOWN-2209-S/D) were installed at a playground on Woodland Crescent. In previous years, Water Resources Branch added two monitoring wells to the well network in the Liard River watershed in 2019 (YOWN-1923 at the Watson Lake solid waste disposal facility and YOWN-1927 at the Upper Liard solid waste disposal facility) and another in 2020 (YOWN-2001, also at the Upper Liard solid waste disposal facility).

In the Peel River watershed, one groundwater well was added to the network in 2019 (YOWN-1918). The well is located near the Eagle Plains solid waste disposal facility. There are two groundwater wells in the Eagle Plains area (the other one is YOWN-1401, near the Eagle Plains Camp). Water Resources Branch added another monitoring well to

the YOWN in 2020 in the Peel River watershed YOWN-2002, which is at the Ogilvie Highway Camp.

Aquifer mapping in the Watson Lake area

This project, which will be completed by April 2023, is a collaboration between the Government of Yukon (Water Resources Branch and Yukon Geological Survey), Liard First Nation, Dena Kayeh Institute, the Town of Watson Lake, the Geological Survey of Canada, Yukon University and an environmental consultant, WSP-Golder Associates. The purpose of the project is to identify, delineate, and classify aquifers in the Watson Lake area (including Upper Liard and Lower Post) and build a foundation for the development of a conceptual hydrogeological model for the area. The project involves compiling, preprocessing, standardizing, and importing subsurface geological and hydrogeological data into a commercially-available 3D subsurface modelling software package for interpretation and aquifer delineation. The project also involves drilling new boreholes to generate stratigraphic information in key locations and the installation of new monitoring wells that form part of the Yukon Observation Well Network. This work builds on the 2020 Liard River Basin Transboundary Aquifer Assessment which concluded that the most vulnerable aquifers in the portions of the Liard River basin in the Yukon and NWT are in the Watson Lake area.

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Surface water quality monitoring

Environment and Climate Change Canada and the Government of Yukon, through a formal agreement signed in 2019, support a coordinated approach to the planning and implementation of water quality and aquatic biomonitoring activities in the Yukon. The agreement also formalizes the ability to set up community monitoring arrangements and agreements with First Nations such as Tr'ondëk Hwëch'in (Peel River) and the Daylu Dena Council (Liard River).

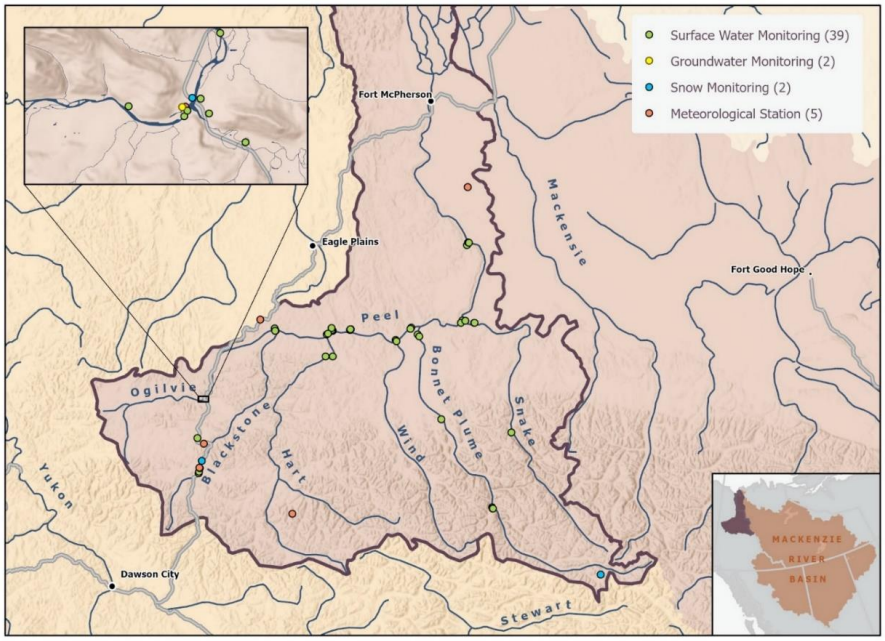

Figure 2 Peel River basin showing the Yukon-based monitoring stations

A water quality monitoring station on the Liard River is located adjacent to the Alaska Highway near Watson Lake and serves as a reference site for the Liard River watershed. Since monitoring data has been collected for over a decade on the Liard River, Environment and Climate Change Canada is conducting a trend analysis to determine how water quality has changed over time. Results will be posted to Yukon.ca when available. Also, the Water Quality Index was calculated for 2019-21 to be "Fair". This is a decrease for the previous 15 years, when the Water Quality Index was "Good".

In the coming years, Environment and Climate Change Canada will be initiating work in the Liard River to support the "Freshwater Action Plan" that would "protect and restore large lakes and river systems" across the country, including the Mackenzie River basin. Two Environment Canada scientists and Water Resources Branch staff joined to collect water quality samples in the Liard River and various tributaries in September 2022.

In the Peel River watershed, water quality monitoring at the Ogilvie River station continues by Tr'ondëk Hwëch'in and is part of the Water Quality Monitoring Network between the Yukon and Canada. This station is road-accessible and is a reference site for the upper portion of the watershed. The Water Quality Index for the Ogilvie River 2019-21 is "Fair" and hasn't changed from last year.

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Surface water flow monitoring

Surface water flows and levels are monitored by the Government of Yukon, Water Resources Branch, and Water Survey of Canada within the Liard and Peel River basins. Water Resources Branch also monitors snowpack at manual snow courses in both the Liard and Peel River basins and at one automated snow weather station within the Liard River basin. Both the Peel and Liard River basins had the highest snowpack on record as of May 1 in 2022.

In the Liard River basin, record flows were observed on the Frances River and were the second highest on record at many other stations but did not exceed records set in 2012. There was an active flood response at Upper Liard with sandbagging efforts to mitigate high water. Water levels remained above average until late August following drier than average weather but an unusually warm and wet fall allowed water levels to rise above average in October. In the Peel River basin, the freshet peak was both later than average and higher than average. Record water levels were observed in October due to a much warmer and wetter fall than usual.

Snow survey network survey bulletin and water supply forecast

Snow survey network

The Government of Yukon operates ten snow survey stations within the Yukon portion of the Mackenzie River basin, with three stations in the Peel River basin and seven stations in the Liard River basin. The snowpack at these stations is sampled three times annually for depth, density and snow water equivalent. We also operate one meteorological station in the Liard River basin; this includes a snow scale that measures snowpack evolution over the winter. We publish results in the Yukon Snow Survey Bulletin & Water Supply Forecast at the beginning of March, April and May each year. Past editions of the bulletin can also be viewed. The information presented in the snow bulletin continues to be used to identify any potential spring and early summer flood threat for those basins.

Hydrometric network

The Government of Yukon's small stream hydrometric network includes one station in the Liard River basin and one station in the Peel River basin. Continuous water level

measurements are recorded at each station using electronic data loggers. The station in the Liard River basin is also equipped with real-time data transmitters, so water levels can be tracked remotely. Regular discharge measurements are taken during the open water season so that flow records can be produced, with a particular emphasis on capturing discharge during spring peak flows. Data are available by request by emailing water.resources@yukon.ca.

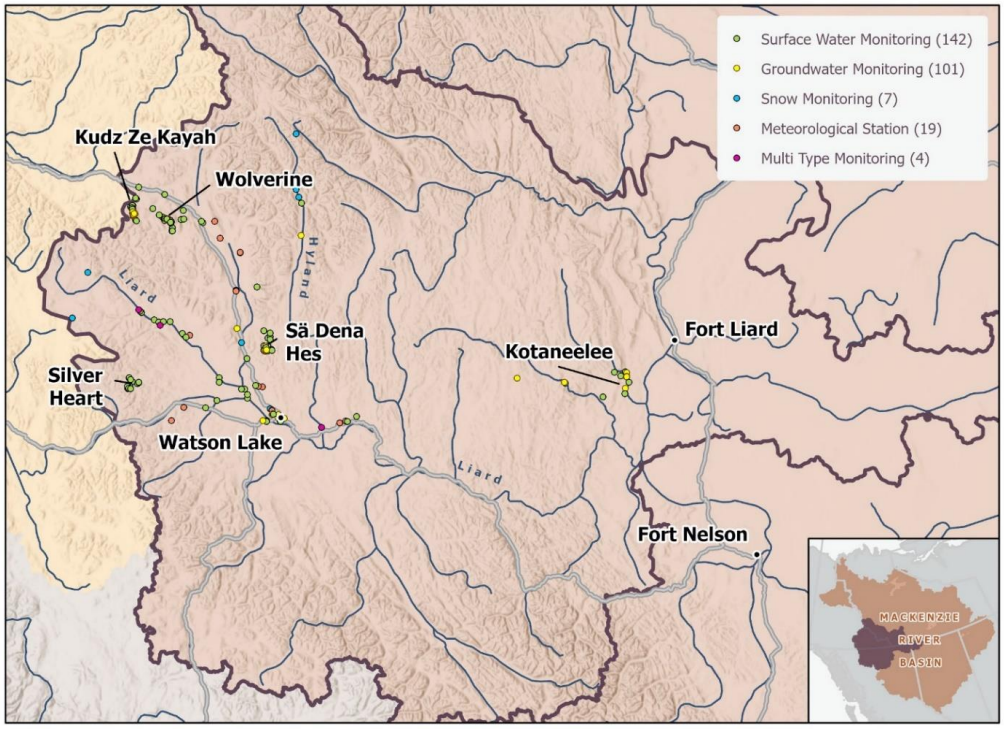

Figure 3 Liard River basin showing the Yukon-based monitoring stations

The Government of Yukon also maintains a cost-sharing agreement with Environment and Climate Change Canada to operate seven hydrometric stations within the Peel River basin and eight hydrometric stations within the Liard River basin. Real-time and historical water levels and discharge data from this network are available online at https://wateroffice.ec.gc.ca/.

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Yukon water online information

Water monitoring

The Government of Yukon has an online water information portal (Water research and assessments), which is the main source for information about water monitoring in the Yukon. The website houses the Water Data Catalogue, an interactive map that provides metadata of water monitoring stations throughout the Yukon (e.g., site location, period of record, type of data collected, etc.).

We continue to add additional monitoring locations to the water data catalogue. The catalogue contains over 2,600 water monitoring locations, 58 of which are in the Peel River watershed and 279 in the Liard River watershed. They include snowpack, surface water, groundwater and meteorological observations from 23 networks. In addition to the metadata provided through the catalogue, many monitoring stations link to the associated water data, and the long-term goal is to provide direct access to water data for additional networks.

The portal also provides educational material and information about the Yukon's water resources including:

- Water facts and information (e.g., water cycle, water use, etc.);
- Water management;
- Legislation that guides interactions with water; and
- News and updates related to water in the Yukon.

Access to water data

The Yukon maintains an open data portal as a single access point to all public water data. All historical snow survey data collected as part of the government network is now accessible through the platform. Currently, work is underway to share annual monitoring results from the Yukon Observational Well Network.

Water Resources Branch launched the Yukon Water Well Registry in 2020. The registry is a web-based interactive map where users can find water well records for various well types (private domestic, public supply, environmental monitoring, etc.) across the territory. Water Resources Branch is currently mapping aquifers underlying the Watson lake area. This work builds on the Liard River Basin Transboundary Aquifer Assessment,

which concluded that the most vulnerable aquifers in the portions of the Liard River basin in the Yukon and Northwest Territories are in the Watson Lake area. The areal extents of the mapped aquifers will be shown on the well registry. Factsheets and reports describing the aquifers and the processes used to map them will also be available on the well registry. All the spatial layers in the well registry are available on the Government of Yukon's Corporate Spatial Warehouse and can be viewed along with other spatial data via GeoYukon.

Regulatory data

The Yukon Water Board maintains an online public registry called Waterline that stores and shares information related to water licensing processes in the Yukon. The system allows licence holders to submit reports and data as required by water licences and allows for public access to this information. Significant improvements to the registry's notification process allows regulators to track reports that are late or have not been submitted.

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4. Major projects

Regulatory update

Mineral exploration

Peel River watershed: One mineral exploration project has been proposed in the Peel River watershed in 2022; it is still undergoing an environmental assessment and therefore there is no decision as to whether it will be permitted. There is one active Class 3 (exploration) Mining Land Use Approval in the watershed. This authorization slightly overlaps the Peel River watershed in its southern reaches in between the Wind and Bonnet Plume Rivers. There were no Class 1 Notifications (low level exploration programs) in the Peel River watershed for 2022.

Liard River watershed: There are two Class 1 approvals valid in 2022; these are only valid for one year at a time. There are four active Class 3 Mining Land Use Approvals and one active Class 4 Approval in the Liard River watershed. There is one project currently undergoing an environmental assessment; however, this project already has a licence and would not be a new exploration project. The Mining Land Use Approvals in the Liard River watershed are dispersed throughout the watershed's territory in the Yukon.

Major mines

Liard River watershed

Wolverine Mine: Yukon Zinc Corporation put the Wolverine Mine, located 180 km southeast of Ross River, into temporary closure on January 27, 2015. The Government of Yukon is now managing the site. Primary activities continue to be treating and discharging contaminated water at site, while preparations for full closure are ongoing.

Sä Dena Hes Mine: Permanent closure and decommissioning activities of this former lead-zinc mine were completed in 2015; the site is now in post-closure monitoring.

Kudz Ze Kayah Mine: in June 2022, Decision Bodies, including the Government of Yukon and the Government of Canada, issued a joint Decision Document under the *Yukon Environmental and Socio-economic Assessment Act*, allowing the mine to proceed subject to terms and conditions. The company, BMC Minerals, is now pursuing regulatory

authorizations to begin construction of the mine. There is uncertainty as to the timing of this process due to affected First Nations governments, led by Ross River Dena Council, applying for judicial review of the Yukon Environmental and Socio-economic Assessment Board decision with the Supreme Court of Yukon.

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