



Photo Credit: Alexandre Mischler

# Agency Report to the Mackenzie River Basin Board

**Meeting #78**  
**December 5, 2023**  
**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 in March 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 (BMC) 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.

Since May 2022, the Yukon-British Columbia BMC has been working alongside the British Columbia-Northwest Territories BMC to develop a learning plan for the Liard River. The committees jointly decided to develop the learning plan following the [Land and People's Relationship model](#) developed by Elder Copper Joe Jack. The model is a framework for bringing together Indigenous knowledge and Western science. As part of the model process, in May 2023 the BMCs gathered 13 Elders from across the Liard Basin to share knowledge and concerns about the Liard River. This event was seen as a historic event and resulted in a "What was heard" report of Indigenous knowledge shared. This knowledge will provide a foundation for the next steps in the learning plan process.

## Northwest Territories and the Yukon

In August 2022, the Northwest Territories and the Yukon signed a new Bilateral Water Management agreement for the Peel River and Mackenzie Delta sub-basin. This agreement replaces the previous agreement signed in 2002. Implementation of the new agreement began this year with an inaugural virtual meeting in June 2023. An in-person meeting was subsequently held in Inuvik, NWT in October 2023. At the in-person meeting, the committee discussed interests and concerns in the basin as well as monitoring activities. The committee also made progress towards establishing a terms of reference and a workplan to guide its work. Indigenous representatives on the committee include staff from Tr'ondëk Hwëch'in, First Nation of Na-Cho Nyäk Dun, Vuntut Gwitchin Government, Gwich'in Tribal Council, and Inuvialuit Regional Corporation.



Additionally, the Northwest Territories and the Yukon signed another Bilateral Water Management Agreement in August 2022, that covers 64 km<sup>2</sup> 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 still 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 already been undertaken 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 study is planned to begin by 2026 and be completed in approximately one year. The Government of Yukon will engage with Liard First Nation as the start of the study approaches.

### Yukon State of the Environment interim report

The Government of Yukon recently tabled the 2023 Yukon State of the Environment Report in the Yukon Legislative Assembly. The report includes information available up until the end of the 2022 calendar year. It provides data on key indicators such as the changes to the Yukon's water systems, the 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. The report can be found at: [See Yukon state of the environment reports | Government of Yukon.](#)

### 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 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. Research and monitoring efforts have focused on wetland inventory and surface disturbance mapping for the whole region and the establishment of two new hydrometric stations in partnership with the Water Survey of Canada.

The Government of Yukon continues to work with First Nations to uphold the provisions of the First Nation 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

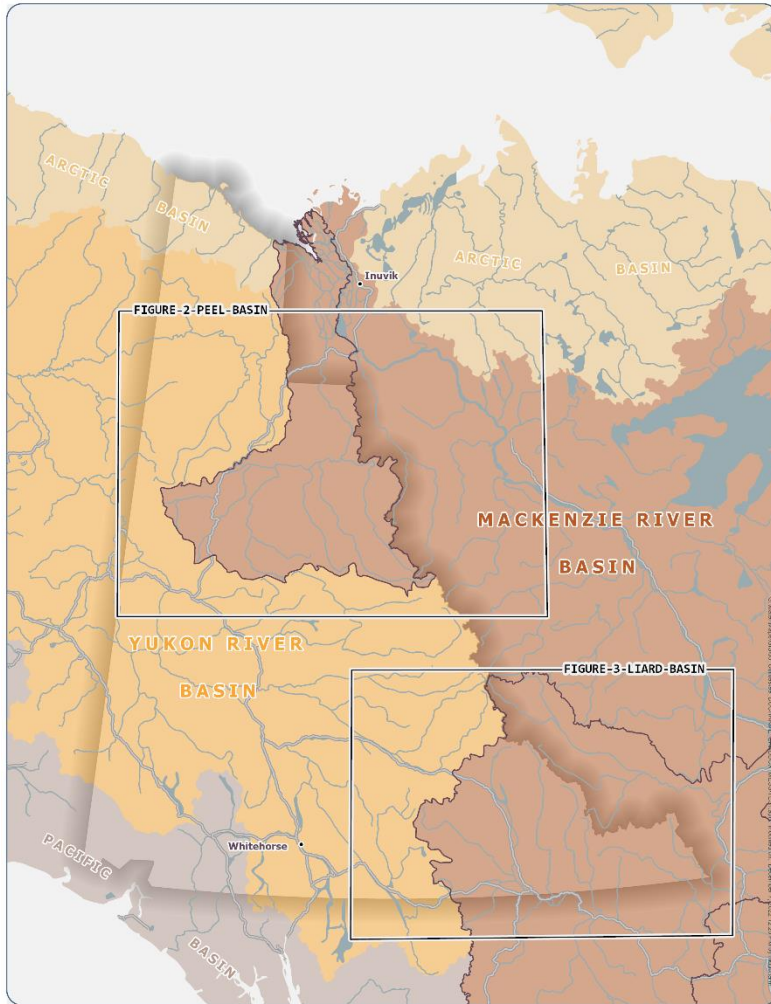


Figure 1 Peel and Liard Basins

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 is a collaboration between the Government of Yukon (Water Resources Branch and Yukon Geological Survey), Liard First Nation (LFN), Dena Kayeh Institute, the Town of Watson Lake, the Geological Survey of Canada, Yukon University and an environmental consultant, WSP-Golder Associates. The project is essentially complete, but Water Resources Branch is continuing to work with LFN to ensure that Kaska place names, (including Kaska names for the three newly mapped, proven aquifers), are included in the deliverables. The final deliverables will be published as soon as the Kaska place names are woven into them. The purpose of the project was 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 involved 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 involved 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 (see above). 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 Northwest Territories are in the Watson Lake area.

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### Surface Water Quality Monitoring

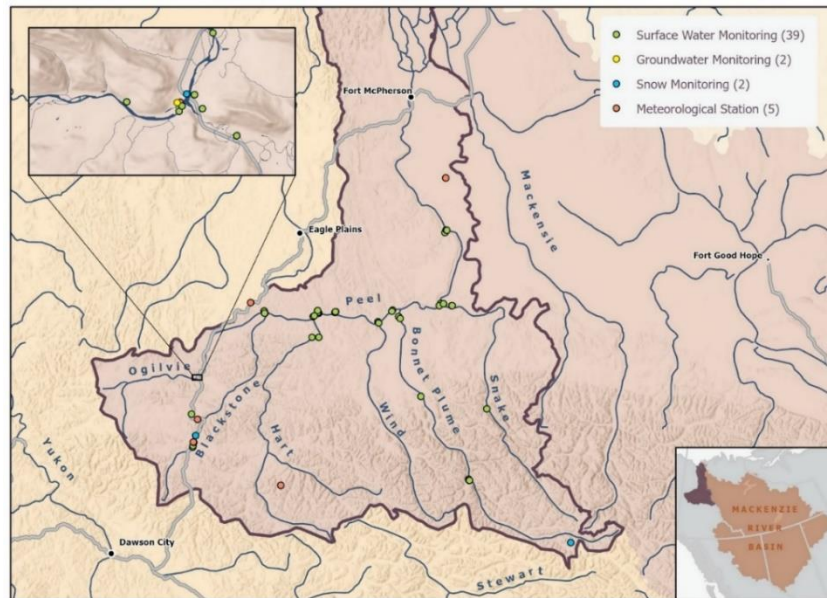
Environment and Climate Change Canada and the Government of Yukon, through a formal agreement signed in 2019, support a coordinated approach to the planning and implementation of water quality and aquatic biomonitoring activities in the Yukon. The agreement also formalizes the ability to set up community 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 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

the

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.” The 2020-2022 Index is currently being calculated and will be shared when available.

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.

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 the previous WQI calculations. The 2020-2022 Index is currently being calculated and will be shared when available.

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# Snow Survey Network Survey Bulletin and Water Supply Forecast

## 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 above average peak snowpack and late onset of snowmelt in 2023.

In the Liard River basin, freshet arrived early due to rapid snowmelt in May and peaked above the long-term average. By June 1, flows had dropped below average and remained below the 25<sup>th</sup> percentile on the Liard River at Upper Crossing for much of the summer and early fall. Other Liard tributaries in the Yukon were similar. A warm and wet October brought flows above the 75<sup>th</sup> percentile going into November and freeze-up. In the upper Peel River basin, the freshet peak was higher than average and likely slightly earlier than average, like the adjacent Porcupine River basin. Gauge lines were taken out at several stations and the Hart River station was destroyed, likely by ice jamming or ice runs. The Hart River station was subsequently decommissioned due to uncertainty in ongoing funding. The Ogilvie River gauge was operational through freshet; flows peaked May 14 and washed out the Dempster Highway in one location.

## Snow and Meteorological 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. It also operates one meteorological station in the Liard River basin; this includes a snow scale that measures snowpack evolution over the winter. Government of Yukon publishes 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 [waterresources@yukon.ca](mailto:waterresources@yukon.ca).

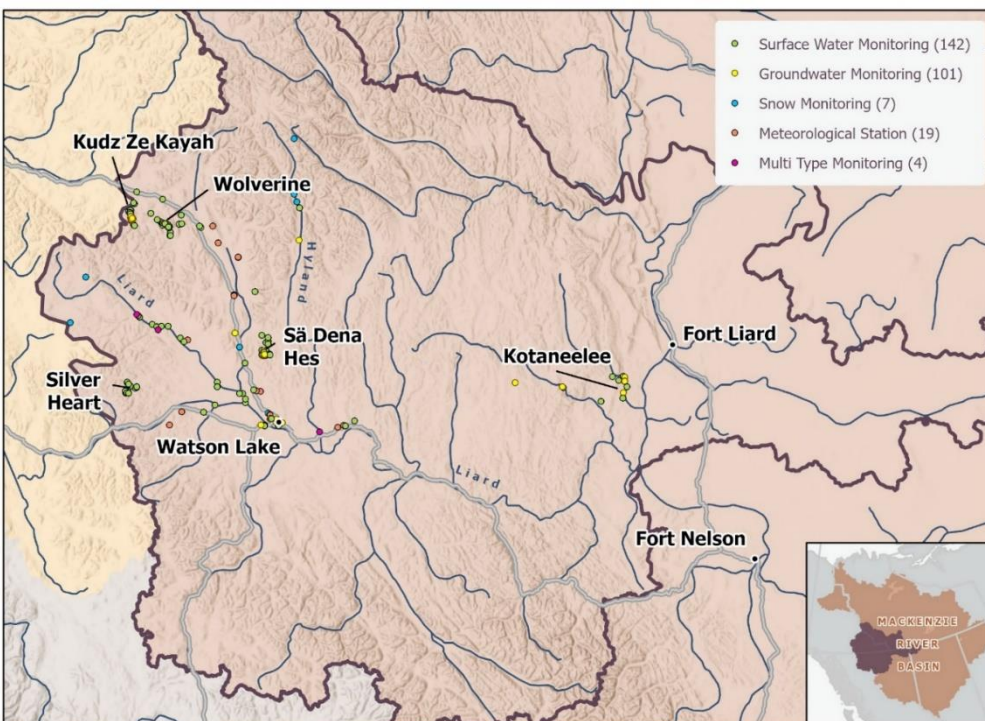


Figure 3 Liard River basin showing the Yukon-based monitoring stations

The Government of Yukon also maintains a cost-sharing agreement with Environment and Climate Change Canada to operate six 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 Data Access (2023 update)

Government of Yukon online data platforms such as the [Waterline](#), [Water Data Catalogue](#) (WDC), [Water Well Registry](#) (WRR), [Government of Yukon's meteorological data repository](#), and the [Snow Survey Network portal](#) continue to be operational and available to the public. *Waterline* is an online water license registry maintained by the Yukon Water Board that stores information related to water licensing processes (e.g., water quality lab reports).

The WDC and WRR are housed online as interactive maps that provides metadata of water monitoring stations (e.g., site location, period of record, type of data collected) as well as data on historical wells across the territory (e.g., well depth, estimated yield, etc.).

The *meteorological data repository* houses near real-time weather data (e.g., air temperature, precipitation, wind speed) for a select number of stations across the territory. Up to one month's worth of data can be downloaded, or more data be provided upon request.

The *Snow Survey Network portal* makes available recent and historical snow depth and snow water equivalent data from across the territory. There are three survey locations in the Peel basin and eight in the Liard basin, each measured three times annually (~March 1<sup>st</sup>, April 1<sup>st</sup>, and May 1<sup>st</sup>).

Additional spatial layers to compliment the online portals are available on the Government of Yukon's Corporate Spatial Warehouse and can be viewed via [GeoYukon](#). New for 2023 (within the Yukon's Mackenzie River sub-basins) include:

- Most recent real-time hydrometric (water level) data from [Water Survey of Canada stations](#) (six in Peel River basin; eight in Liard River basin)
- Weather station data (six stations in Liard basin; three in Peel) available through Government of Yukon's meteorological repository portal
- Updated well data in WDC and WRR
- Updated Snow Water Equivalent data
- Updated water license data through *Waterline*



Links to data mentioned above:

Waterline: <https://apps.gov.yk.ca/waterline>

Water Data Catalogue: <https://open.yukon.ca/data/datasets/water-data-catalogue>

Water Well Registry: <https://yukon.ca/en/get-information-about-yukon-groundwater-and-wells>

Meteorological data repository: <http://rwis.gov.yk.ca/weather/>

Snow Survey Network: <https://open.yukon.ca/data/datasets/yukon-snow-survey-network>

GeoYukon: <https://mapservices.gov.yk.ca/GeoYukon/>

Water Survey of Canada: [https://wateroffice.ec.gc.ca/search/real\\_time\\_e.html](https://wateroffice.ec.gc.ca/search/real_time_e.html)

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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 and the Yukon Socio-economic Assessment Board (YESAB) issued their recommendation for the project not to proceed. The Government of Yukon has applied for a judicial review of YESAB's recommendation. 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 2023. There is one remediation project currently undergoing environmental assessment that would require the development of 50 km of winter road through the NWT to access the site in the Yukon as well as a water licence. The Government of Yukon is anticipating the submission of a YESAB Executive Committee project for continued exploration of oil and gas resources in the Eagle Plains area in late 2023 or early 2024.

**Liard River watershed:** There are three Class 1 approvals valid in 2023; these are only valid for one year at a time. There are six active Class 3 Mining Land Use Approvals and one active Class 4 Approval in the Liard River watershed. There are three projects currently undergoing an environmental assessment; however, all three projects have previously been explored and would not be new exploration projects. The Mining Land Use Approvals in the Liard River watershed are dispersed throughout watershed's territory in the Yukon. Water Resources Branch conducted an audit of the Silver Hart exploration property in 2022; this report is expected to be [published](#) in late 2023 or early 2024.

#### 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. BMC submitted the final version of their water licence application in 2023, and a first round of public comment period occurred. 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. The court's ruling on this case is expected to be imminent.

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