

## Surface Water Quality Baseline Studies

Surface water quality is important for maintaining healthy ecosystems and safe water. Casino hired Ensero to research surface water quality around the proposed Casino Project. Between 2008 and 2023, water samples were collected from major creeks and rivers in the area, including:

- Casino Creek
- Britannia/Canadian Creek
- Dip Creek
- Klotassin River
- Sunshine/Isaac Creek
- Yukon River

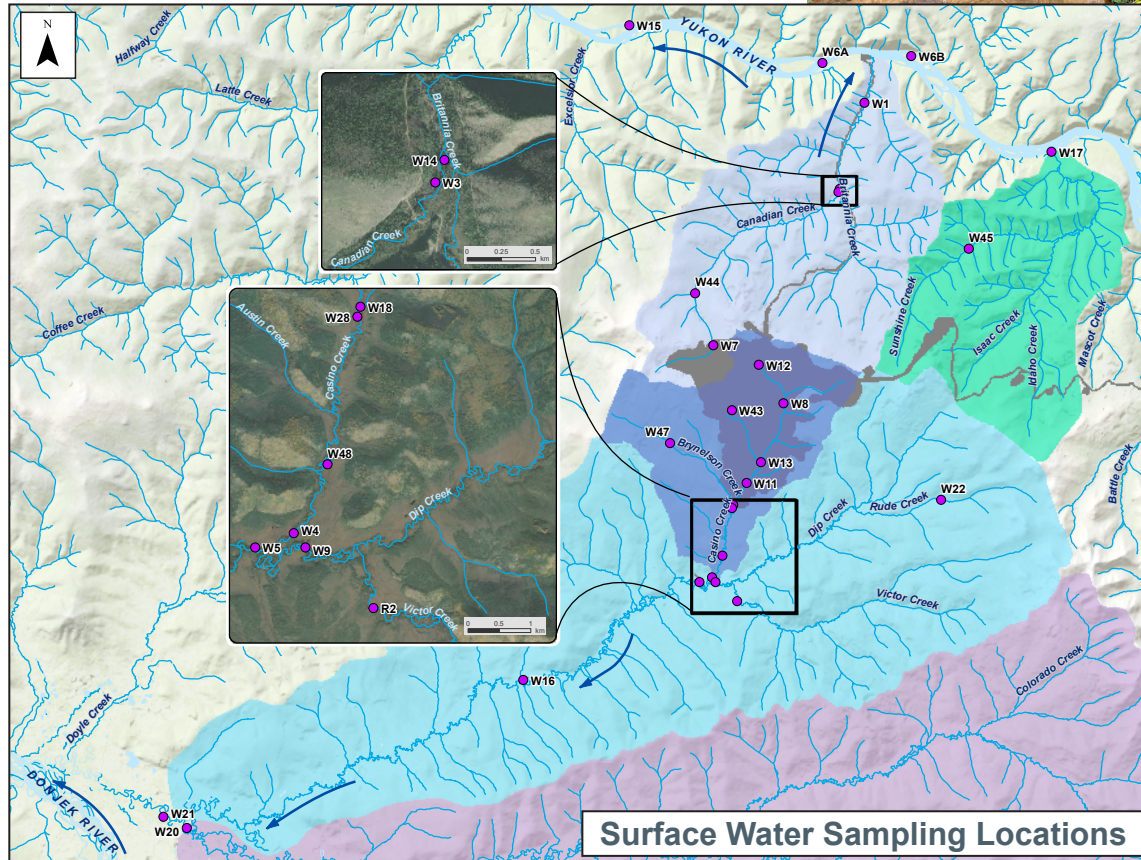
## Water Quality Guidelines

All this work is consistent with territorial and national water quality guidelines. Information from lab tests compare water samples to Canadian water quality guidelines. These guidelines focus on the protection of aquatic life and drinking water.

- Canadian Water Quality Guidelines for the Protection of Aquatic Life
- British Columbia Aquatic Life Guidelines
- Federal Environmental Quality Guidelines
- Guidelines for Canadian Drinking Water Quality



Headwaters of Casino Creek



Dip Creek

- Monitoring Locations
- Proposed Mine Footprint
- Waterbody
- Watercourse
- Water Flow Direction
- Casino Creek System
- Britannia Creek System
- Dip Creek System
- Klotassin River System
- Sunshine Creek System



## Sampling

While Casino has been studying surface water since 1993, the number and locations of sampling sites have changed slightly over time. Since 2022, surface water samples have been collected from approximately 27 sites monthly. All water samples are sent to a lab to look at levels of the following:

- pH (acidic or basic)
- Nutrients (nitrate/nitrite/ammonia)
- Sulphates
- Arsenic
- Cadmium
- Cobalt
- Copper
- Cyanide
- Flouride
- Lead
- Mercury
- Selenium
- Uranium
- Zinc

## Findings

Some of Ensero's findings are below.

- pH is mostly neutral, except for Casino Creek headwaters and upper Canadian Creek.
- Nutrient levels are low in all creeks/ivers sampled.
- Sulphates are low, except for Casino Creek headwaters.
- Levels of metals are generally low with the exception of some metals (e.g., Copper, Iron, Cobalt) in some creeks/ivers.
- Seasonal cycles affect water quality; concentrations of metals, nutrients, and sulphates in the water increase during spring, when snow melts; however, pH and cyanide do not change with the seasons.



Winter water sampling



Canadian Creek

## Acid Rock Drainage and Metal Leaching

Acid rock drainage (ARD) happens when certain rocks are exposed to air and water. This leads to a chemical reaction that creates acidic water. When this acidic water touches metals in the rocks, it picks up the metal and water quality decreases. This is called metal leaching.

ARD and metal leaching can happen naturally, but it is more common around mines. Naturally occurring ARD is found at the top of Casino Creek and Canadian Creek. As water travels downstream, water quality improves. Dip Creek, Sunshine Creek, the Klotassin River, and the Yukon River waters showed no natural ARD.

## What's Next?

Casino will continue to study surface water. Understanding current conditions will help Casino understand if surface water quality changes. This work will help Casino in its development of future monitoring and management plans for water.

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