

Yukon Geological Survey's outreach program: 2024 highlights

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Introduction

The Yukon Geological Survey (YGS), a branch within the Government of Yukon, is dedicated to advancing our understanding of Yukon's geology and disseminating this knowledge to various stakeholders, including other government departments, First Nations governments, private companies and the public.

The YGS team conducts research across a range of Earth science fields including surficial and bedrock geology mapping, mineral assessments, permafrost and landslide monitoring, geotechnical monitoring along highway corridors, and geothermal research. This research generates data essential for understanding Yukon's environment and addressing challenges.

A foundational understanding of Earth science is essential for government partners, First Nations and the public to fully benefit from YGS' findings. The YGS supports informed decision-making, responsible land stewardship, and economic development by making geoscience knowledge accessible. Outreach serves as a bridge between research and real-world application, ensuring that YGS's research is not only shared but also understood by end users.

The YGS seeks to inspire and engage with Yukoners by demonstrating how Earth science is both fascinating and relevant to daily life. The YGS helps individuals make informed decisions about the Yukon's land and resources by sparking curiosity and building an understanding of Earth science.

The YGS prioritizes outreach efforts by fostering collaboration with First Nations, supporting educators with curriculum-aligned resources, and encouraging public engagement with Earth science. This overview highlights YGS' outreach initiatives and achievements throughout 2024.

Earth science education in Yukon schools

The YGS tailors its outreach activities to align with the British Columbia curriculum used by Yukon schools. Earth science appears across multiple grades, from grade three to specialized high school courses like Earth Sciences 11 and Geology 12. The YGS prioritizes assisting teachers with the grade five curriculum objectives, which focus on the rock cycle, as well as secondary students who are beginning to think about career decisions they will make after graduation.

In-class activities are tailored to the students' level and include:

- The rock cycle: identifying igneous, metamorphic and sedimentary rocks using Yukon samples. Students learn about how each rock type is formed, and then work in groups to identify specific samples. Students are prompted to use observational skills to notice textures as they handle samples.

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- Mineral identification: testing mineral physical properties like lustre, streak, hardness, magnetism and conductivity to identify common minerals. Students learn to use geologist's tools such as streak plates, pen magnets and items from Mohs hardness scale like pennies, nails and glass plates. Each student has an opportunity to get 'up close and personal' with mineral samples.
- Product matching: connecting raw materials to everyday items, illustrating how rocks and minerals are essential to products such as phones, copper pipes and toothpaste. This activity highlights the importance of rock and mineral 'ingredients' in creating the 'stuff' we enjoy using.

Workshops include hands-on activities that use rock and mineral samples, which teachers may not have access to. The YGS also maintains a dedicated set of rock hammers and safety glasses that are used on field trips for students to try their hand at breaking and collecting rock and mineral samples.

The YGS outreach activities also extend well beyond the classroom with field trips to geologically significant locations such as Miles Canyon, the Takhini thaw slump (Fig. 1), the clay cliffs in downtown Whitehorse (Fig. 2), the Carcross desert (Fig. 3) and Whitehorse Copper Belt (Fig. 4). Field trips allow students of all grade levels an opportunity to experience geology firsthand.

In 2024, the YGS' outreach team completed 25 school visits and field trips in and around Whitehorse. They also travelled to Yukon communities and offered two

days of workshops in Ross River, one day in Faro, one day in Teslin, and one day at the Kluane Lake Research Station with the students from the Destruction Bay school.



Figure 2. Panya Lipovsky of YGS points out features on the clay cliffs in downtown Whitehorse to students from FH Collins High School.



Figure 1. Students from the Experiential Science 11 (ES11) program exploring the Takhini thaw slump off the Alaska Highway.



Figure 3. Leyla Weston of YGS points out remnants of an ancient post-glacial lake to Golden Horn Elementary School students in Carcross.

Partnership with Kluane Lake Research Station

The YGS partnered with the Kluane Lake Research Station (KLRS) in 2024 to deliver hands-on geology programming for students from the Kluane Lake School in Burwash Landing. The workshop was hosted at the KLRS, providing an opportunity for students to step outside their regular classroom environment and engage with geology in an outdoor setting. Students learned to identify rocks and minerals, observed Kluane-specific samples, and worked together to create geological maps. These activities emphasized the importance of map reading and navigation skills while illustrating how geologists use clues from outcrops to understand regional geology (Fig. 7). The students also participated in an engaging earthquake engineering activity, exploring plate tectonics in the Kluane region, and learning about earthquake monitoring efforts at the research station. The day sparked curiosity and connected students to the unique geology of their surroundings.

Public and community outreach events

The YGS recognizes the importance of increasing the public's understanding of geoscience. Many workshop and event participants have shared that they initially had little knowledge of Earth science or its impact on daily life. However, after attending these events, they gained a greater appreciation for its relevance (Fig. 8). Below are highlights from public outreach events.



Figure 7. Students from Burwash Landing learn how to use compasses during the geological mapping activity at the KLRS.

Tombstone on the Rocks weekend

The YGS' Tombstone on the Rocks weekend is held annually at Tombstone Territorial Park in partnership with park staff on the Traditional Territories of the Tr'öndëk Hwëch'in First Nation and the First Nation of Na-Cho Nyäk Dun. This popular event features guided hikes and evening talks led by YGS geologists (Fig. 9). The guided hikes, which include hikes on the Goldensides and Grizzly Lake trails, allow participants to explore the geological history of the park and learn firsthand how to observe clues in the rocks and landscape that geologists have used to piece together this history (Fig. 10). Evening talks included an overview of the park's bedrock geology by YGS Bedrock Geologist Rosie Cobbett (Fig. 11) and an overview of the surficial geology of the park and discussion on Beringia by YGS' Head of Surficial Geology Derek Cronmiller.

Kluane National Park and Reserve interpretive hike

In 2024, YGS hosted its second annual interpretive hike in Kluane National Park and Reserve, located on the Traditional Territories of the Champagne and Aishihik First Nations and the Kluane First Nation (Fig. 12). Modelled after the Tombstone on the Rocks weekend, YGS and Parks Canada have partnered to offer Earth science-themed public outreach events at Kluane National Park and Reserve. This year YGS geologists led a hike from the Thechàl Dhâl' Visitor Centre along the first few kilometres of the Ä'äy Chù trail. Moya Painter of YGS spoke about the glacial history of the park and the significant change of direction of the Ä'äy Chù in



Figure 8. Whitehorse Copper Belt field trip participants at the Little Chief pit. This field trip was run as a part of the 2024 International Conference on Permafrost, organized by the Canadian Permafrost Association.



Figure 9. Cobbett points out features on geological maps before an interpretive hike in Tombstone Territorial Park.



Figure 11. Cobbett giving an evening lecture on the bedrock geology of Tombstone Territorial Park at the interpretive centre.



Figure 10. Interpretive hike participants at the Grizzly Valley lookout in Tombstone Territorial Park with Derek Cronmiller and Amanda O'Connor of YGS.



Figure 12. Painter and Cobbett planning out a new interpretive hike route in Kluane National Park and Reserve.

2016. Cobbett, who completed her master's thesis on the area, discussed the Duke River fault and the bedrock geology of the park. The event drew participants from the local community as well as travellers on their way to Alaska, all of whom appreciated the extensive knowledge of the park shared by YGS geologists.

Yukon Geoscience Forum Family Day

The Yukon Chamber of Mines hosts the Yukon Geoscience Forum each November in Whitehorse. The conference kicks off with a Family Day event on Saturday, held on the upper level of the Canada Games Centre. Organized by participating companies, government

agencies and non-governmental organizations, the event features engaging and educational activities for all ages.

In 2024, the authors, along with with Painter, participated by providing YGS' most popular activities, which include the augmented reality (AR) sandbox, rock and mineral identification and product matching (Fig. 13). The rock and mineral identification and product-matching activities provided children and their parents hands-on opportunities to learn about Yukon's geology by working together with guidance from a geologist.



Figure 13. Painter shows off the AR sandbox at Yukon Geoscience Forum Family Day.

The AR sandbox, a highlight of the event, captivated participants of all ages. This innovative tool projects a live topographic map onto the sand surface, updating in real time as users reshape the topography of the sand. By sensing the height of the sand, and projecting topographic lines onto the map surface, it makes understanding the complexities of topographic maps intuitive and interactive.

The Family Day event drew more than 300 attendees and received widespread praise.

First Nations engagement

The YGS is committed to fostering early, collaborative engagement with Yukon First Nations on geology program activities to build trusting and meaningful relationships. This approach includes seeking input from First Nations governments during the initial planning stages of projects. Regular engagement includes spring and fall updates detailing program activities and holding meetings with Lands and Resources Department staff from First Nations governments to share and interpret data, results and publications. Recognizing the evolving landscape of engagement, YGS strives to adapt its approaches, learn continuously, and enhance the accessibility and impact of its outreach programs.

Carcross/Tagish First Nation Research Confluence

In 2024 YGS was honoured to participate in the Carcross/Tagish First Nation (CTFN) Research Confluence, a community event designed to connect CTFN citizens with researchers working on CTFN lands. This open house-style gathering provided an opportunity for YGS Bedrock Geologist Tyler Ambrose to engage directly with the community, including the CTFN Lands Board, and discuss his research on their Traditional Territory. The YGS continues to integrate its researchers into engagement processes to encourage the two-way flow of ideas and foster collaborative relationships between researchers, First Nations governments, and citizens.

First Nations hiring initiatives

The YGS strives to collaborate with First Nations governments to create meaningful on-the-job learning opportunities to First Nation citizens through fieldwork and mentorship. This year, while in Teslin to share data and geology project plans with the Teslin Tlingit Council (TTC) government, YGS facilitated geology workshops at the local school. During these workshops, the authors met Chloe Johnston or Khàshdáchh Tlá, a young woman working at the school with a clear passion for geology. Chloe was later hired as a field assistant on a collaborative project with Nathan Cleven of the Geological Survey of Canada (GSC). After receiving safety training, provided by YGS, Chloe joined Cleven and the GSC field team for a week of fieldwork on TTC Traditional Territory. The group set out to document the stratigraphy, structure and metamorphic history of a part of the Dorsey Range where the Yukon-Tanana terrane meets the much older rocks of the North American craton. Chloe got to shadow Cleven and the GSC team as they worked to develop a model for this area's tectonic evolution. Using video and photographic footage from her experience, including landscapes, rocks, helicopter rides and day-to-day experiences of fieldwork and living on the land, Chloe created a video to share her journey on social media. She combined her geology work with language learning by introducing Tlingit vocabulary related to the land to video viewers (Figs. 14 and 15). Chloe is a leader within her community and this opportunity provided valuable work experience for her as a student pursuing post-secondary studies in Earth science, and as a Tlingit language learner who is motivated to share her learnings with others. We hope her experience will inspire others to learn more about geology and the land. Her video is available here: <https://fb.watch/wdYSGMcpAm/>



Figure 14. Still image of Chloe Johnston or Khàshdáxh Tlá from her video documenting her first geology field experience, created through a YGS-GSC partnership.

Geological Survey of Canada collaborative pilot project

In 2023, YGS initiated an ongoing partnership with the GSC to streamline engagement processes with Yukon First Nations' governments when both organizations are conducting geological projects on a First Nation's Traditional Territory. This pilot project aims to reduce the administrative burden on First Nations governments while fostering collaboration and mutual understanding between the GSC and YGS.

The feedback received from Yukon First Nation government partners during the project's first couple of years has been positive, highlighting the value of this cooperative approach. The YGS is committed to refining the initiative to enhance accessibility and improve the availability of geological information for Yukon First Nations governments, to ensure that the program effectively meets their needs.



Figure 15. Still image from Chloe Johnston's video depicting GSC Field Assistant Eve Frechette taking strike and dip measurements on an outcrop in the Dorsey Range.

Summary

The YGS' 2024 outreach activities highlight the organization's dedication to fostering Yukoners' understanding of Earth science, as well as the commitment to engage with Yukon First Nations. Through hands-on school workshops, collaborative First Nations engagement, and public events, YGS bridges the gap between geoscience research and its practical applications in daily life, empowering Yukoners with knowledge to make informed decisions about their land and resources. The YGS shares findings in ways that are engaging and understandable, ensuring that this information is useful for decision-makers and communities.

To keep up to date with the latest YGS news and events, follow us on Facebook here: <https://www.facebook.com/YukonGeologicalSurvey/>

If you would like to contact the YGS outreach team you can email YGS-Outreach@yukon.ca to request a field trip or classroom visit for your class.