Northwest Territories Geological Survey Permafrost Science Team
Strategic Plan (2021-2024)

Background

Over the past several years, despite limited capacity, the Northwest Territories Geological Survey (NTGS) has increasingly been looked to as a source of permafrost knowledge by the Government of Northwest Territories (GNWT) and others in the broader permafrost community.

The NTGS has recently added three new positions to create a Permafrost Science Team. At present, the NTGS Permafrost Science Team consists of four positions: a Senior Permafrost Scientist, a Permafrost Scientist, a Permafrost Data Scientist, and a Permafrost Geohazard Scientist.

The NTGS Permafrost Science Team has developed its first strategic plan to anticipate increased interest in and need for permafrost science and expertise. This plan is intended to clarify the purpose and focus of the NTGS Permafrost Science Team, and to provide a planning framework for GNWT permafrost science collaborators and external collaborators and partners. This strategic plan will help the staff work with collaborators and partners and engage with clients more effectively, and prioritize their work on an ongoing basis. It will also help the leadership of NTGS and partnering organizations support the success of this growing team.

The plan is meant to be interpreted within the broader NTGS planning framework and is expected to evolve.

The Northwest Territories permafrost community

The NTGS Permafrost Science Team is part of a community, which is integral to the success of this strategic plan.

Our northern science collaborators

We value our key permafrost collaborators within the GNWT and see them as part of our team. This includes permafrost-focused positions at the Department of Lands, the NWT Centre for Geomatics, and Aurora College.

Our science collaborators and partners

We work closely with a wide range of researchers and experts within the territorial and federal governments, academic institutions, industry, and regulatory bodies. It is our hope and intention that these collaborators and partners see themselves within this strategic plan.

Other key considerations in developing this strategic plan include the 2030 NWT Climate Change Strategic Framework and Action Plan (2019-2023) and the subsequent funding allocation by the GNWT to support work in the following areas:

- Establish a permafrost monitoring network for the Northwest Territories (NWT)
- Establish a permafrost data management system
- Analyze collected ground temperature, ground ice, and geotechnical information
- Assess sensitive permafrost terrain and inventory-related geohazards
- Interpret future permafrost behaviour across natural and built environments
- Increase technical capacity to address permafrost issues
- Ensure permafrost research conducted by Canadian and international agencies is coordinated and communicated to inform NWT decision-making
- Continue to identify and address gaps in permafrost knowledge (*i.e.,* hazard mapping)

Our mission

The NTGS Permafrost Science Team advances permafrost knowledge by:

- Leading, supporting, planning, and conducting collaborative research
- Collecting, managing, and analyzing permafrost data
- Providing information and advice
- Sharing permafrost knowledge with practitioners, partners, and the public
- Developing permafrost research and monitoring capacity in the NWT

Through these activities, we contribute to planning and decision-making for a diverse range of stakeholders, improving the prediction and mitigation of risks, and informing adaptation to the challenges of a rapidly changing northern environment.

What do we mean by permafrost knowledge?

Permafrost knowledge is created when we bring together data, skills, and understanding acquired through experience and/or education that advance our theoretical and practical ability to:

- describe the state of permafrost, its characteristics and its processes;
- understand what impacts permafrost conditions, and predict how they may change; and
- anticipate the impacts of permafrost change on the natural and built environments and on people.

Our vision

The NWT has the permafrost science knowledge, expertise, capacity, and partnerships required to plan for, and adapt to, the impacts of changing permafrost conditions.

Our values

We value KNOWLEDGE. As scientists, we create knowledge through the scientific method, and by learning and sharing.

We are INTEGRATIVE and INCLUSIVE. We work collaboratively across disciplines and scales. We listen and are open to the diverse perspectives and types of information that will advance permafrost knowledge, and seek to connect them.

We value QUALITY SCIENCE and follow the SCIENTIFIC METHOD. We dedicate the time and space necessary to conduct thoughtful, rigorous science. This means we must be selective in the work we take on; we prioritize scientific work that is important to the NWT, and we are careful not to overcommit our resources.

We are FORWARD-LOOKING. We are focused on our long-term vision and goals. We contribute to the leading edge of our field through a northern lens. We are proactive in identifying and addressing emerging permafrost science needs, and we work collaboratively with our partners to develop innovative research to address these.

We build and maintain TRUST with our clients, partners, stakeholders, and the public. We do this by acting with integrity, supporting our partners, providing unbiased information, and being transparent and accountable.

We value our RELATIONSHIPS. We see them as central to developing permafrost knowledge and enhancing the scope of work essential to the NWT. We approach our relationships respectfully and collaboratively and ensure mutual benefit when working with partners.

We believe the NTGS Permafrost Science Team has a unique strategic role to play

Permafrost affects ground conditions across the NWT and is the foundation for northern ecosystems, communities, and infrastructure. Climate change is altering permafrost with major implications to the environmental, economic, and social well-being of the NWT.

The need for permafrost knowledge is growing across all sectors and its development and application are critical to ensure a resilient territory. This requires northern science capacity, leadership, and collaboration.

Therefore, this strategic plan was shaped by our belief that the NTGS Permafrost Science Team must focus its unique scientific and northern expertise on high-value, relevant activities that advance permafrost knowledge and its application.

Goals and objectives

This plan is structured around the following five themes: Science, Data, Leadership, Capacity Building, and Communication and Outreach. For each theme we have identified a goal and key objectives, which specify the specific and relevant outcomes that indicate meaningful progress.

SCIENCE

Goal #1: Conduct and support high-quality research and monitoring that generates permafrost knowledge for the NWT

Objectives (i.e., target outcomes)

1.1. Improved characterization of permafrost in the NWT (what is the state of permafrost)
1.2. Improved understanding of permafrost processes and behaviour in natural and built environments
1.3. Increased infrastructure to support permafrost science and monitoring

DATA

Goal #2: Lead the stewardship of NWT permafrost data

Objectives (i.e., target outcomes)

2.1. More NWT permafrost data is standardized and discoverable due to improved communication and collaboration among permafrost data generators
2.2. Improved interoperability of data between permafrost databases developed by our partners and other organizations
2.3. Increased use of NWT permafrost data in research, synthesis reports, and modelling outputs

LEADERSHIP

Goal #3: Provide scientific leadership, mentorship, and advice that advances the state of permafrost knowledge and improves the quality of decision-making in the NWT

Objectives (i.e., target outcomes)

3.1. Increased number and diversity of NTGS-led permafrost research and monitoring initiatives that create knowledge to support NWT practitioners, planners, and decision-makers
3.2. Through collaborative and equitable science partnerships, the NWT permafrost community increases its influence and the benefits from permafrost research and monitoring of importance to the NWT

CAPACITY BUILDING

Goal #4: Foster a growing and collaborative community of permafrost experts who bring passion, vision and diverse talents to their work and are able to make a scientific contribution to northern issues

Objectives (i.e., target outcomes)

4.1. Increased permafrost positions at NTGS or in other NWT departments and/or NWT organizations (*e.g.,* permafrost specialists, interns, *etc.*)
4.2. Increased staff retention and a consistently high degree of job satisfaction within the NTGS Permafrost Science Team
4.3. Increased depth and breadth of expertise in the NWT permafrost community

COMMUNICATIONS AND OUTREACH

Goal #5: Advance professional and public understanding of permafrost issues and their importance to the NWT

Objectives (i.e., target outcomes)

5.1. Increased public and partner awareness of permafrost issues and of research and monitoring by the NTGS Permafrost Science Team and collaborators
5.2. Increased support for long-term funding for permafrost research and monitoring
5.3. More partners participating in, or conducting, activities that align with the NTGS Permafrost Science Team's values, and research and monitoring projects, and mandates
5.4. Increased support from partners that enhances the NTGS Permafrost Science Team's ability to conduct outreach, communications

Strategies

The NTGS Permafrost Science Team has identified 6 core, interrelated strategies that it will pursue over the next 3-5 years. Each strategy will help advance one or more goals by either putting the pieces in place to directly achieve the goal, improving the conditions required to achieve the goal, or addressing a critical barrier to success.

STRATEGY 1 Develop a Permafrost Science Strategy

- 3–5-year timeframe
- Framed around effectively implementing the scientific method to generate permafrost knowledge through research and monitoring
- Indicates clear linkages to core GNWT strategies and plans (*i.e.*, State of the Environment, Climate Change Action Plan)
- Provides a planning framework that is structured to advance the Science and Data objectives, to support annual work planning, focus collaborations, and contribute to annual reporting requirements
- Describes the state of NWT permafrost knowledge and highlights critical gaps
- Articulates NTGS Permafrost Science Team's research and monitoring priorities
- Describes the type of partnerships the NTGS Permafrost Science Team will prioritize

STRATEGY 2 Work with partners to develop an NWT Permafrost Data Management Strategy

- Identifies approaches, workflows, tools, support, and collaborations necessary to ensure proper permafrost data stewardship
- Must clarify NTGS staff and partner roles and responsibilities
- Will be linked to other initiatives such as NWT Permafrost monitoring network, regional data syntheses (ITH synthesis), or legislatively mandated items (NWT State of Environment)
- Key partners will include:
    - GNWT data generators
    - Department of Infrastructure
    - Geological Survey of Canada
    - Academic partners
    - NSERC PermafrostNet
    - Industry
    - Regulators
- Will require workshops, a whitepaper, or other activities to develop workflows, procedures, standardization, interoperability, roles, responsibilities, *etc*. for different data streams

STRATEGY 3 **Build an annual learning plan process to create more focus for the NTGS Permafrost Science Team's approach to professional development, in line with the goals and objectives of this strategic plan and the Permafrost Science and Data Management Strategies**

- Look at professional development at the individual and team level
- Identify topical focus areas
- Assess valuable networking opportunities
- Consider the role of mentorship in team development

STRATEGY 4 **Develop a guidance document for the NTGS Permafrost Science Team's approach to mentorship**

- Mentorship by and for the NTGS Permafrost Science Team
- When, why, and how the NTGS Permafrost Science Team takes on mentees, utilizing this strategic plan and Science and Data Management Strategies as a guide
- When, why, and how the NTGS Permafrost Science Team members seek mentorship for their own development
- Approaching potential mentors for the NTGS Permafrost Science Team

STRATEGY 5 **Actively identify, monitor, and engage in critical permafrost issues/initiatives**

- Ensure NTGS is focussing advice and influence in ways that are likely to have strategic value/impact
- Clear internal tools to track and assess client requests, presentations/outputs, requests for advice, and opportunities to participate in initiatives/committees

STRATEGY 6 **Advocate for, and support the development of an NTGS outreach and communications plan**

- Provide leadership and support in establishing an NTGS Outreach and Communication working group
- Development may require external contracted expertise
- Ensure permafrost science needs and interests are incorporated in the planning
- Actively participate in the implementation