



## **IDENTIFICATION**

<b>Department</b>	<b>Position Title</b>	
Industry, Tourism and Investment	Senior Permafrost Scientist	
<b>Position Number</b>	<b>Community</b>	<b>Division/Region</b>
63-13454	Yellowknife	NWT Geological Survey

## **PURPOSE OF THE POSITION**

The Senior Permafrost Scientist is accountable for providing authoritative scientific and strategic advice and overseeing the conceptualization, development, implementation, and evaluation of research programs, projects, and services. These actions lead to improved permafrost geoscience knowledge that informs adaptation and mitigation efforts in response to the impacts of climate change on physical infrastructure and the natural environment.

## **SCOPE**

The Senior Permafrost Scientist is located in Yellowknife and reports to the Director, Northwest Territories Geological Survey (NTGS). The NTGS is a research-focused division of the Department of Industry, Tourism and Investment (ITI). The Senior Permafrost Scientist is the Government of Northwest Territories (GNWT) scientific authority and research leader on permafrost which underlies a significant portion of the Northwest Territories (NWT).

All governments in the NWT have recognized the need for permafrost and environmental geoscience knowledge in order to better understand and adapt to the effects of climate change on both infrastructure and the environment. An ability to predict the environmental impacts of climate change represents a distinct advantage in planning and maintaining infrastructure and in preparing for changes to the natural environment such as permafrost thaw and its associated impact on water quality. This knowledge has become a key factor in supporting sustainable economic development and maintaining a positive socio-economic environment for NWT residents.

Permafrost research supports decision making as it relates to the development and maintenance of transportation infrastructure. The NTGS permafrost research group contributes to these goals through environmental geoscience studies, compiling relevant



datasets, and disseminating information to stakeholders. The NTGS works closely with the GNWT Department of Infrastructure in contributing permafrost knowledge to inform construction, maintenance, and regulatory decisions for existing and new road corridors.

Permafrost thaw in the NWT is increasing the frequency and magnitude of geohazard disturbances, affecting the cultural, environmental, and socio-economic health of the NWT. The NWT Climate Change Strategic Framework (NWT CCSF) has identified that understanding permafrost conditions and the effects of climate change on terrain stability is necessary to develop informed mitigation and adaptation strategies that minimize impacts on society and is necessary to advance infrastructure development in a responsible manner. Scientific knowledge of permafrost conditions provides the necessary foundation for predicting impacts of climate change in the north, making the discipline relevant across scientific disciplines and government and industry sectors. Developing a permafrost knowledge base is now a key factor in supporting sustainable economic development and maintaining a positive socio-economic environment for NWT residents and is reflected through a significant part of the NWT CCSF Action Plan.

The Senior Permafrost Scientist works with legislative, regulatory, policy, and strategic frameworks that include the GNWT Mandate, the NTGS Strategic Plan, the NWT CCSF and its Action Plan, the NWT Transportation Strategy, the GNWT Knowledge Agenda and its Action Plan, *NWT Scientist Act*, Aurora College Research Policies, and the *Mackenzie Valley Resource Management Act*.

The Senior Permafrost Scientist is responsible for leading the work of the NTGS permafrost research group and ensuring that this work addresses the research and planning needs of NWT governments and communities. This includes the development, implementation, and ongoing adaptive management of a multi-year strategic and operational plan for permafrost research that informs GNWT decision making to ensure that risks to the NWT's natural environmental and physical infrastructure are minimized. The Senior Permafrost Scientist provides leadership on major research initiatives that involve stakeholders both inside and outside the GNWT.

The Senior Permafrost Scientist is often called upon by ITI and other GNWT departments to provide analysis and advice based on extensive scientific and technical knowledge. This informs and supports the decision making that facilitates and enables adaptation to, and mitigation of, the effects of climate change and the planning and construction of major infrastructure projects in the NWT.

The Senior Permafrost Scientist provides information, evidence, and advice to the Mackenzie Valley Land and Water Board and the Mackenzie Valley Review Board to inform their decision-making processes (setting the terms and conditions on Land Use Permits and Water Licenses and Environmental Impact Assessments, respectively).



The Senior Permafrost Scientist also conducts research, remains current on advances in permafrost and environmental geoscience, seeks funding opportunities, and collaborates with external researchers on work of relevance to the NWT. Within this context, the Senior Permafrost Scientist has wide and varied relationships with: academic funding councils and associations (e.g., Natural Sciences and Engineering Research Council of Canada, Canadian Permafrost Association, Canadian Association of University Research Administrators); industry and government research agencies and organizations (e.g., Environmental Studies Research Fund, Industrial Research Assistance Program, Canada Foundation for Innovation, Polar Knowledge Canada); various federal science departments (e.g., Natural Resources Canada, Environment and Climate Change Canada), and territorial, provincial, Indigenous and municipal governments. The Senior Permafrost Scientist maintains regular contact with Indigenous governments and northern non-governmental organizations. The incumbent regularly works with the Aurora Research Institute, the Prince of Wales Northern Heritage Centre, and the GNWT departments of Environment and Natural Resources, Infrastructure, Lands, and Municipal and Community Affairs.

The Senior Permafrost Scientist is regularly called upon to address or delegate local, national, and international media requests including written, oral, and video responses.

Work is performed under the general direction of the Director. The Senior Permafrost Scientist has a significant amount of latitude provided that the policies, guidelines, and interests of the NTGS and the GNWT are upheld. Sound judgment is required, particularly when speaking on behalf of the GNWT and during interactions with partners and stakeholders.

## **RESPONSIBILITIES**

- 1. Plans and participates in field-based research and monitoring programs.**
  - Leads or participates in field programs that involve the collection and analysis of permafrost, ground temperature, geotechnical, and geohazard information.
  - Coordinates research teams that may include external and community-based partners.
  - Collaborates with universities to facilitate, and in some cases oversee the field component of post-doctoral, graduate, and undergraduate research.
  - Directs or supervises project participants including volunteers and summer students.
  - Ensures that field programs are cost effective and efficient and that field safety plans are properly documented and adhered to.
  - Communicates the planning and results of field programs to a variety of stakeholders.
- 2. Develops, implements, evaluates and adaptively manages long-term strategic and operational research initiatives.**
  - Develops and refines a long-term vision and mandates and creates shorter-term (e.g., annual) operational goals and objectives to develop research capacity.



- Researches and investigates research-related opportunities with partners and stakeholders.
- Represents the GNWT on international, federal, territorial/provincial academic committees that are developing programs in support of permafrost research.
- Works with GNWT department experts to evaluate and prioritize potential research initiatives and to incorporate these into strategic and business planning processes.
- Provides reports and conduct reviews of long-term plans and adjusts where required.
- As manager of a highly-skilled scientific research team, provides guidance on a broad range of permafrost research activities.
- Directs, coordinates, and reviews complex permafrost projects, including field research programs, to produce authoritative scientific reports.

**3. Promotes, develops and supports partnerships for priority research initiatives.**

- Develops and cultivates positive and productive relationships with governments, research of funding agencies, and the private sector for developing, funding, and implementing research activities.
- Develops and cultivates positive and productive relationships with academic funding councils and associations.
- Sources financial resources from potential funding agencies through partnerships and grants (both core and project funding opportunities).
- Negotiates funding or revenue-generating agreements or partnerships with funding agencies and addresses the related reporting requirements.
- Supervises graduate and undergraduate student research projects in conjunction with university staff.

**4. Acts as the GNWT subject-matter expert on permafrost and its impact on the natural environment and infrastructure.**

- Provides advice and subject matter expertise to environmental regulators, consulting engineers, and project proponents to inform infrastructure development and land-use management decisions.
- Leads and participates in a variety of planning- and decision-making meetings and activities throughout the NWT.
- Utilizes subject matter expertise to combine knowledge and data collected to identify existing and potential issues and to recommend possible mitigation measures.
- Oversees the collection, tracking, and evaluation of data based on best-practice guidelines, standards, process reviews, and policy changes to analyze and identify territorial, regional, and program-specific issues.
- Develops and maintains extensive and current knowledge of national and international permafrost research and applies it to the NWT context.



**5. Manages the human resources, financial, and administrative functions of the permafrost research group to provide effective and efficient services within budgeted frameworks.**

- Develops and implements annual work plans that establish short- and long-term objectives.
- Manages human resource functions within the group including staffing, direction setting, and performance evaluations.
- Manages the annual budget for the group (\$200,000 O&M and external funds ranging between \$500,000 and \$1,000,000) and projects future budget requirements in a fiscally-responsible manner.
- Oversees contract management, including preparing terms of reference and statements of work to direct contractors.
- Develops objectives and performance indicators for the group including individual staff goals, ensuring they are complimentary to NTGS goals and objectives.
- Provides positive leadership and advice to unit staff.
- Encourages employee development through performance appraisals, training plans, and professional development opportunities.
- Supports objectives of succession planning within the group, the NTGS, and ITI.
- Participates as a member of the NTGS management team in planning short- and long-term objectives for the NTGS.

**WORKING CONDITIONS**

**Physical Demands**

The incumbent works in a normal office environment but also conducts summer and winter field work. During the summer field season, the incumbent may hike over rough terrain with a backpack and collected samples (up to 50 pounds) for 8 hours per day, up to 3 weeks per year; travel in small aircraft and helicopters for up to 4 hours per day, up to 3 weeks per year; and travel in small water craft for up to 1 hour per day, up to 3 weeks per year. During the winter field season, work may involve travelling by snowmobile, working at extreme cold temperatures, operating two-person drills, and working alongside industrial diamond/sonic geotechnical drills for up to 8 hours per day, up to 3 weeks per year.

**Environmental Conditions**

The incumbent works in a normal office environment but also conducts summer and winter field work. While in the field, the incumbent may be exposed to: rapidly-changing weather; conditions such as cold (hypothermia), intense sun (burn), wind, and rain; helicopters, airplanes, ATVs, snowmobiles, and road vehicles (physical injury, noise fatigue, fumes from fuel); insects and insect bites; and dangerous, unforeseen, and uncontrolled field situations such as vehicular accidents, attack by wild animals, falls, and other accidents while travelling or



on traverse (broken bones, cuts, etc.). The incumbent may be exposed to these environmental conditions while in the field for up to six weeks per year.

### **Sensory Demands**

The incumbent works in a normal office environment but also conducts summer and winter field work. While in the field, the incumbent may be affected by long hours of work (fatigue, stress). The incumbent may be exposed to these sensory conditions while in the field for up to six weeks per year.

### **Mental Demands**

The incumbent works in a normal office environment but also conducts summer and winter field work. While in the field, the incumbent may be subject to substantial disruption of family life due to field work in distant locations. The incumbent is also responsible for the continuous management of scientific and logistical activities and safe work practices while in the field, including the prediction and mitigation of potentially-hazardous situations and managing personality conflicts amongst field staff. The incumbent may be exposed to these mental demands for up to six weeks per year.

The incumbent is also required to present work plans and research findings to scientific peers, collaborators, community groups, etc., and to attend research meetings in southern Canada two to four times per year and give presentations at international conferences one to two times per year.

### **KNOWLEDGE, SKILLS AND ABILITIES**

- Knowledge of the scientific principles and techniques behind permafrost and environmental geoscience research and monitoring, including field-based data acquisition and analysis.
- Knowledge of the drivers that influence permafrost conditions, including in particular surficial geology and geomorphic processes in the NWT and northern Canada.
- Knowledge of the linkages between: permafrost and environmental geoscience research; climate change impacts; adaptation strategies; and sound policy development, planning, and operational decision-making.
- Knowledge of the role of permafrost research in contributing to government objectives.
- Knowledge of the roles and needs of other government departments and agencies.
- Knowledge of the legal and ethical obligations of the scientific profession.
- Knowledge of needs and issues of NWT Indigenous Governments, organizations and communities including sensitivity to Northern and cross cultural issues and concerns.
- Knowledge of needs and issues of National and International research scientists working in the NWT.
- Knowledge of financial planning, budgeting and administration systems.



- Knowledge of policy and strategy development approaches.
- Knowledge of and experience in field work preparation and conducting efficient and safe field programs within prescribed budgets and timelines.
- Interpersonal skills and the ability to cultivate positive working relationships.
- Oral and written communication skills, including the ability to read, understand, and effectively communicate complex scientific ideas including methodologies and reports to professional audiences.
- Consensus-building skills to lead groups of diverse stakeholders in implementing science-based research and monitoring programs.
- Awareness of the linkages between scientific research and the evidence-based decision-making processes employed by governments.
- Marketing skills to promote programs and the GNWT.
- Project management, organizational, and logistical skills to effectively manage and participate in independent and collaborative research projects.
- Skills in scientific writing, critical peer review, and editing of scientific reports and interpretations.
- Supervisory skills to oversee contractors, other staff, and field assistants.
- Field skills that are grounded in best practices in permafrost and environmental geoscience research and monitoring.
- Presentation skills that result in effective communication both with scientific peers and laypersons.
- Ability to facilitate meetings and workshops.
- Ability to develop and build positive external and internal relationships and partnerships.
- Ability to identify strategic direction and conceptualize scientific collaborations in permafrost science.
- Ability to initiate, anticipate, shape and adapt to emerging opportunities.
- Ability to advocate and encourage scientific research of interest/concern to the NWT.
- Ability to deal with politically-sensitive issues where a high degree of sensitivity, tact, and diplomacy are required.
- Ability to effectively interact with industry, government agencies, Indigenous organizations, and the public.
- Ability to effectively communicate scientific knowledge and complex processes to non-professional audiences.
- Ability to resolve conflicts and differences of opinion.
- Ability to commit to actively upholding and consistently practicing personal diversity, inclusion and cultural awareness, as well as safety and sensitivity approaches in the workplace.



**Typically, the above qualifications would be attained by:**

A minimum of a Master of Science degree in Geology or Geography with a focus on permafrost supplemented by environmental geoscience or related sub-disciplines, and at least five to seven years of work experience in industry, academia, or a government agency in a related capacity including at least two years of supervisory experience. The incumbent will have a proven record of conducting field work, writing peer-reviewed scientific publications, managing research teams, mentoring scientists, and presenting the results of their original scientific work to colleagues.

Assets include:

- Eligibility for registration in Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG).

Equivalent combinations of education and experience will be considered.

**ADDITIONAL REQUIREMENTS**

**Position Security** (check one)

- No criminal records check required
- Position of Trust – criminal records check required
- Highly sensitive position – requires verification of identity and a criminal records check

**French language** (check one if applicable)

- French required (must identify required level below)  
Level required for this Designated Position is:  
ORAL EXPRESSION AND COMPREHENSION  
Basic (B)  Intermediate (I)  Advanced (A)   
READING COMPREHENSION:  
Basic (B)  Intermediate (I)  Advanced (A)   
WRITING SKILLS:  
Basic (B)  Intermediate (I)  Advanced (A)
- French preferred

**Indigenous language:** Select language

- Required
- Preferred