IDENTIFICATION

Department	Position Title	
Environment and Climate Change	Hydrologist	
Position Number	**Community**	**Division/Region**
23-14249	Yellowknife	Water Monitoring and Stewardship/HQ

PURPOSE OF THE POSITION

The Hydrologist leads and implements multiple and diverse hydrological science programs and activities, conducts data analysis and interpretations, and conceives, initiates, and conducts scientific studies in the Northwest Territories (NWT) to achieve the water management goals and objectives of the Department of Environment and Climate Change (ECC). The position provides recommendations, consultations and engagement with northern communities, government agencies and academics.

SCOPE

Located in Yellowknife and reporting to the Senior Hydrologist, the Hydrologist is responsible for planning, designing and implementing water quantity and hydrological programs in the Northwest Territories (NWT) to assess water availability and variability. The incumbent is responsible for leading data collection, interpretation, and analysis, writing reports and contributing to research related to hydrological processes across the NWT. The position implements multiple and diverse hydrological research and monitoring programs utilizing hydrological science and methodologies.

The Department of Environment and Climate Change (ECC) works to promote and support the sustainable use and development of natural resources and to protect, conserve and enhance the NWT environment for the social and economic benefit of all residents.

The Water Monitoring and Stewardship Division bears the primary roles and responsibilities related to water research and monitoring, providing advice to co-management partners, water quality and quantity data analysis and interpretation, and water stewardship and planning. The Division, in cooperation with Environment and Climate Change Canada (ECCC) and other federal and territorial departments, is responsible for collecting and interpreting information

about water quantity and quality in the NWT. The Division works with its water partners on a collaborative approach to water stewardship and planning in the NWT, including transboundary water management agreements.

The Northwest Territories (NWT) is the ultimate downstream jurisdiction in the Mackenzie River Basin (MRB), understanding the hydrology and water movements in the basin and its tributaries is critically important for understanding the availability and health of water in the NWT. The MRB drains an area that consists of a fifth of Canada's land mass and it is one of the largest river basins in the world. The flow of the Mackenzie River plays a significant role in regulating oceanic circulation and maintaining arctic climate systems. The MRB is subject to industrial activity which has the potential to influence water flow and quality and it is experiencing the brunt of climate change as one of the nation's northern watersheds. The Hydrologist is responsible for key hydrological interpretation and assessment by leading the implementation of research and monitoring programs across the NWT to facilitate a better understanding of the regional hydrology in the Mackenzie River but also its tributaries. This includes understanding extreme conditions such a low and high-water including flooding within the basin and potential linkages to a changing climate.

The Hydrologist works within a legislative and regulatory framework that includes the: *Waters Act*, NWT Water Stewardship Strategy and Action Plan, 2030 NWT Climate Change Strategic Framework and Action Plan, as well as other Government of Northwest Territories (GNWT) and departmental policies and programs, including transboundary water management agreements with neighbouring jurisdictions.

The Hydrologist works closely with the Senior Hydrologist as well as the Hydrological Modeller and Hydrogeologist. The Hydrologist also collaborates closely with colleagues in the Aquatic Quality Unit and colleagues within the Water Monitoring and Stewardship Division. The Hydrologist also works collaboratively with colleagues within the Department, particularly within the Climate Change Unit, and regularly collaborates with GNWT colleagues in the Northwest Territories Geological Survey (NTGS), and with scientists from ECCC, the Water Survey of Canada and Meteorological Services Canada. The Hydrologist also works with external contacts (e.g., Indigenous governments and Indigenous organizations, federal government departments including Natural Resources Canada and the Geological Survey of Canada, other provinces/territories and academia).

The Hydrologist must have knowledge and practical experience related to hydrological science and methodologies related to water quantity assessment to lead hydrological interpretations and establish supplemental monitoring programs. The Hydrologist presents results and publishes technical reports, scientific papers and plain language reports on the water levels, flow and water quantity in the NWT.

The Hydrologist works to ensure the implementation of hydrological research and monitoring programs meet the goals of the Strategic Plan and supports/reflects the mandate of Department, the GNWT and the people of the NWT. The Hydrologist regularly meets with Senior Hydrologist to receive assignments and provides professional advice and expertise on hydrology and water management for decision making.

The Hydrologist has significant latitude, provided that best practices in data collection, research and scientific methodology are compiled with while supporting the needs of NWT departments, communities and residents.

RESPONSIBILITIES

1. **Develops and implements field- and office-based hydrology research programs.**
    - Develops and initiates research projects that focus on hydrology in support of the NWT Water Stewardship Strategy.
    - Develops and implements research projects that improve floodplain mapping methods and products for flood-prone communities in the NWT.
    - Develops proposals, including budgets and schedules, to sustain hydrological research activities.
    - Contributes to periodic review of NWT Hydrometric Network in collaboration with Senior Hydrologist.
    - Promotes, develops and supports partnerships for research initiatives.
    - Reviews scientific literature and maintains professional contacts to keep informed of advances in the hydrological sciences.
    - Plans fieldwork and leads field activities, both as a research leader and as a scientific contributor to collaborative projects.
    - Manages administrative aspects of research projects, which may include supervision of field staff, the acquisition of permits and licences, and engaging with local communities and land managers to share information and obtain clearances.
    - Collaborates with academics and government research scientists, and in some cases oversees graduate and undergraduate student research related to the hydrology and the Departments mandate.
    - Supervises and mentors casual staff in conducting field and office-based work.
    - Develops comprehensive field safety plans and protocols for research and monitoring teams and ensures they are rigorously followed.
    - Prepares service contracts and purchase orders for environmental laboratory analyses and/or the procurement of experts.

2. **Leads and implements hydro-climatic monitoring networks for the NWT.**
    - Leads the design, implementation and ongoing evaluation of hydro-climatic networks, including budget and operational planning.

- Works with Senior Hydrologist to ensure networks remain current, cost effective and appropriate to address research questions and internal and external client needs.
- Assesses and incorporates new technology for use in NWT monitoring networks.
- Collects data and assembles historic data, often in collaboration with other scientist in the unit and external research partners, and writes scripts (e.g., R, MATLAB) for analysis of data.

3. Publishes and presents scientific findings and data to a wide range of stakeholders.

- Authors or co-authors reports, maps, web content, books, digital atlases and other material to meet objectives of the Department. This may include publishing monitoring and research in peer-reviewed scientific journals and publishes data as open reports.
- Working in close collaboration with the Senior Hydrologist and others in the unit, monitors and synthesizes available data, forecasts, imagery and community information prior to and continuously throughout spring break up, including generation of daily reports sent directly to Emergency Management Offices (territorial, regional and local) and the public.
- Analyzes and synthesizes NWT hydrometric and hydro-climatic data to assess and report on regional and local hydrological conditions and trends, including potential impacts of climate change on water resources and hydrological processes.
- Prepares briefing materials, communication products and media responses related to hydrological research and monitoring programs, findings and conditions in the NWT.
- Prepares technical and plain language reports that include high quality figures, maps and images.
- Prepares and presents research and monitoring results at professional scientific meetings, conferences and workshops, and to various levels of government and community information and outreach activities.
- Develops and delivers communications for a variety of audiences to support understanding of hydrology information across the NWT.

4. Compiles, manages, interprets and archives scientific data holdings.

- Leads the development and maintenance of information management systems for NWT historic community flood information.
- Collaborates with Hydrological Modeller to implement appropriate quality assurance and quality control methods for NWT hydro-climatic data.
- Compiles, organizes and archives NWT hydro-climatic monitoring data collected by the GNWT, other governments, researchers and industry.
- Leads data compilation and synthesis projects, including the recovery of historic datasets.
- Works with NTGS Geoscience Editor to publish and update technical open reports.

5. **Provides expert advice to a wide range of stakeholders on hydrology related topics in the NWT.**
   - Provides hydrological expertise to senior management, federal and Indigenous governments, and communities for the development of floodplain mapping initiatives.
   - Represents the GNWT on the national Community of Practice on Flood Plain Mapping in Canada (CoP-FPM) and other working groups, as required.
   - Leads technical sessions/workshops/discussion tables, as subject matter expert.
   - Conducts or contributes to community information sessions and outreach activities, with the priority of compiling information about high and low water events.
   - Provides expert advice to GNWT departments and researchers on matters related to NWT hydrology and hydro-climatology.
   - Conducts periodic technical reviews of proposed development projects in the NWT.
   - Evaluates collaborative research proposals and makes recommendations regarding departmental support.
   - Maintains membership in, and periodically serves on, Boards of national-level hydrology associations.

WORKING CONDITIONS

Physical Demands

The incumbent usually works in a normal office environment with intermittent field work up to three weeks per year. In the summer field season, the incumbent will be hiking over rough terrain with a backpack and collected samples (up to 50 pounds) for eight hours per day and will be travelling in small aircraft and helicopters for up to four hours per day. In the winter field season, field work involves travelling by snowmobile, working at extreme cold temperatures, and operation of one-person ice augers or other equipment. While in the field, the incumbent is subject to impacts associated with long hours of field work (e.g., fatigue).

Environmental Conditions

The incumbent usually works in a normal office environment with intermittent field work up to three weeks per year. While in the field, on a daily basis, the incumbent can be exposed to rapidly changing weather and to conditions such as cold (risk of hypothermia), intense sun (risk of sunburn), wind, rain, travelling by helicopters, airplanes, ATVs, road vehicles which may cause physical injury, hearing loss, gas/fumes), exposed to insects and insect bites and/or dangerous, unforeseen, uncontrolled field situations such as vehicular accidents, attack by wild animals, falls; and other accidents while on traverse (cuts, muscle sprains, broken bones, etc.) daily up to three weeks per year.

Sensory Demands

The incumbent will usually work in a normal office environment with intermittent field work.

Mental Demands

The incumbent will usually work in a normal office environment with intermittent field work. From May to August there is expectation of some field-based work. While in the field, the incumbent is subject to substantial disruption of family life due for 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 will be exposed to these demands every day up to three weeks per year.

The incumbent is also required to present research or work plans to scientific peers, collaborators, community groups, etc. and may attend workshops or research meetings in southern Canada two to four times per year.

KNOWLEDGE, SKILLS AND ABILITIES

- Knowledge of hydrological science and methodologies.
- Knowledge of diverse and complex elements of hydrologic science, such as surface runoff and fluvial processes; meteorology theory, related earth sciences theory (e.g. geomorphology, hydrogeology, limnology, soil science, climatology, oceanography); and scientific measurement and analysis techniques.
- Knowledge of current approaches and methodologies used to monitor, assess or predict the nature and extent of impacts on the aquatic environment, to collect and apply hydrological data to studies of the northern environment and to integrate environmental monitoring programs into water management approaches for regulating resource development.
- Knowledge of current NWT water initiatives, such as the NWT Water Stewardship Strategy and Action Plan, Climate Change Strategic Framework and Action Plan, NWT Cumulative Impact Monitoring Program and the Knowledge Agenda.
- Knowledge of and ability to work effectively in a cross-cultural environment and communicate and work effectively with Indigenous peoples in communities, Indigenous government and Indigenous organizations and other agencies.
- Knowledge of new and evolving hydrologic data collection methods including remote sensing capability for snow and water from satellite and air photo platforms, remote access data collection procedures, and automated data analysis and assessment methods and geographical information systems.
- Knowledge of statistical methods to review, analyze and interpret data and produce reports.
- Knowledge of technical and plain language report writing methods, practices and standards to produce detailed scientific study/survey reports in the field of hydrology.
- Ability to relay scientific information to clients in a succinct yet detailed fashion and to interact with partners, academics, consultants and government using plain language communication skills both verbally and in writing.

- Knowledge of databases and basic computer coding to upload, search, evaluate, manipulate, and analyze datasets
- Knowledge of water resource management methods and practices to provide advice on approaches to resolve issues pertaining to the hydrological aspects of water supply, snow, floods, environment, water usage, construction, and inter-jurisdictional waters.
- Knowledge of current technical and scientific literature on hydrology with particular emphasis on the northern environment to ensure the most current techniques and cost-effective methodologies are used in studies and investigations.
- Knowledge of computer systems and commercial/specialty software applications; statistics packages; spreadsheets; databases and word processors and has the ability to use programs that require computer coding.
- Ability to produce scientific reports of high technical quality suitable for publishing in peer-reviewed journals.
- Analytical skills are required to modify methods, techniques and practices, generate independent research results and/or validate the research findings generated by others.
- Interpersonal skills are required to lead multi-disciplinary teams, supervise scientific or technical staff and/or students.
- Ability to deliver presentations to the knowledge level and needs of the respective audience.
- Knowledge of and experience in cold region hydrology, arctic survival, transportation of dangerous goods, first aid, firearms, remote communications, equipment repair and navigation techniques.
- Ability to exercise tact, diplomacy and good judgment.
- Ability to work in an autonomous, flexible, discreet, and trustworthy fashion.
- 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.
- Demonstrated track record of hydrological data analysis, data management experience and peer-reviewed scientific report writing/publication.

Typically, the above qualifications would be attained by:

Completion of a graduate degree (M.Sc.) in hydrology, environmental science or engineering with at least two (2) years of experience in the hydrological sciences and relevant experience in either the public or private sectors.

Equivalent combinations of education and work 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