

## Job Description

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<b>Job Title:</b>	Water Quality and Aquatic Ecosystem Technician
<b>Department:</b>	Biology
<b>Reports To:</b>	Dr. Mark Servos, Department of Biology
<b>Jobs Reporting:</b>	None
<b>Salary Grade:</b>	USG 8
<b>Effective Date:</b>	July 2017

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### **Primary Purpose**

The Water Quality and Aquatic Ecosystem Technician will work as part of a core technical support team of the Global Water Futures (GWF) program. The University of Waterloo core technical team will include a Remote Sensing Technologist, a Sensors Network Scientist, a Water Quality and Aquatic Ecosystems Technician, a Smart Watershed Field Technician, and a Smart Watershed Laboratory Technician. It will bring together the necessary expertise and capacity to fully implement “smart”, interoperable water and watershed monitoring approaches, including linking “live” data streams with legacy data associated with relevant GWF projects.

Global Water Futures: Solutions to Water Threats in an Era of Global Change is a collaborative initiative between multiple Canadian universities and partner organizations. The [research program](#) is led by the University of Saskatchewan and is funded in part by a \$77.8-million grant from the Canada First Excellence Research Fund. GWF aims to deliver risk management solutions for water resources and services - informed by leading edge water science and supported by innovative decision-making tools - in Canada and throughout the cold regions of the world.

### **Key Accountabilities**

*List the major responsibilities of the job, divided into 3 to 5 broad categories. These should reflect 80 - 90% of “what” the job does not the “how”. Insert a category heading and in bullet form below, state specific responsibilities.*

#### **Indicator Design and Development**

The position will work with the GWF team to support the development and implementation of novel environmental indicators and fingerprinting for aquatic ecosystems. This will include, but not be limited to, samples for analysis of trace chemistry, biological samples and ‘omics samples (such as eDNA).

- This will require preparation of Standard Operating Procedures (SOPs) for specific projects and methods.
- Development of sample and data handling standards.
- Review of literature related to sample quality and analyses.
- Coordination field and laboratory sampling.
- Input into project planning and execution of logistics and quality standards.

#### **Environmental Sampling and Analyses**

The candidate will independently resolve problems relating to the preparation and implementation of research projects including the sampling (laboratory and field) of environmental samples, preparation and analyses of water quality, biochemical and contaminants in complex environmental matrices. The position will oversee and ensure the quality of data and the safe operation of the laboratory and field operations. The position will be responsible for the safe coordination of field sampling and operations supporting collection of environmental samples for bio-assessments as well as setting up and execution of collections for laboratory/field based experiments.

- Collection of water quality and contaminant samples in the environment, including automated samplers and high through-put data acquisition systems. Collection of water, groundwater and environmental samples (using appropriate methods) and data.
- Collection of biota (e.g. algae, invertebrates, fish) from aquatic environments. Applying standardized techniques to sample biota for community, population and biochemical endpoints. Coordination of projects to collect wild fish for selected endpoints using electrofishing and netting techniques.
- Maintain certification for fish collection, handling and electrofishing techniques. Ensuring fish collection licensing/permit requirements and animal care protocols.
- Ensures proficient basic field collections and operations, including safety, driving of vehicles (trucks) and trailers, water samplers, sediment cores and grabs, D-nets, fish collections such as nets and electrofishing.
- Support, plan and lead water quality and biological field sampling using a working knowledge of sampling techniques for water, industrial/municipal effluents, and environmental samples (e.g. fish and invertebrates), as well an ability to support laboratory and field experimentation is necessary.

### **Support of Field Based Research**

The position will be responsible for planning and management of laboratory operations in the area of water quality and environmental toxicology and chemistry. The position will organize, conduct and support a variety of research projects on field based research studies at sites in Canada. The candidate will provide functional direction, including advice, coaching and leadership to graduate students, technicians, and visiting scientists on the use and operation of the field and laboratory equipment. The candidate will interact extensively with a variety of students, clients, vendors and researchers in the laboratory as well as inside and outside of the University. They will also assist with implementation of training workshops and programs GWF.

- Assistance in planning, designing, set-up and monitoring of research projects.
- Coordinate safety and compliance training and procedures for lab operations.
- Hire and oversee the work of casual employees (e.g. contractors, term work students, work study students).
- Support and participate in technical training (e.g. demonstrations) for graduate and undergraduate students and visiting fellows and researchers.
- Coordination and maintenance of data bases for the lab's generated data.
- Contribution to the preparation of scientific reports and articles. Conduct literature searches, review and prepare manuscripts and make informal and formal presentations.
- Make scientific and technical presentations at local, national and international meetings.
- Take leadership in the coordination, administration and implementation of training programs.

### **Ensuring Laboratory Operations:**

The position will lead the development and validation of methods for analysis for water quality and contaminants found in the environment as well as effluents and runoff. They will ensure the operation and maintenance of equipment and instruments for collection, preservation, extraction, clean-up and analysis of water quality and contaminants, including the maintenance, operation and troubleshooting of instruments, computers, and related support equipment.

- Application of advanced sample collection methods for environment matrices including water, wastewater, sediment and biota for trace organic contaminants.
- Preservation of samples to ensure quality, e.g., surrogates spiking, blanks, prevention of biological activity, etc.).
- Application of sample preparation, extraction and derivitization techniques for water quality, metals and trace organic contaminants.
- Application of chromatographic separation techniques for separation and isolation of specific analysts (liquid chromatography, fraction collectors, gel permeation, etc.).

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Use of data acquisition software and management of the research databases.

### **Oversee Quality Assurance**

The position will oversee and ensure the quality of data, compliance and the safe operation of the laboratory. With minimal supervision the incumbent will maintain the equipment and instrumentation and ensure QA/QC of laboratory and field operations. This will include the purchasing, maintenance, operation and installation of a wide variety of measurement devices associated specifically with water quality and ecotoxicology/biological samples. The incumbent is responsible for the monitoring and maintaining of the proper functioning of the analytical and ecotoxicology laboratory including related field sampling equipment. They are responsible for sample planning, control and reporting of results along with QA/QC. The incumbent will also interact and manage research deliverables with numerous researchers and students within the research group, and collaborators within the University of Waterloo and outside (academia, industry, government) nationally and internationally.

- Ensuring Quality Assurance and Quality Control (QA/QC) and Good Laboratory Practices (GLP) on all lab and field procedures. Ensure routine maintenance of equipment.
- Write and maintain the technical procedures (SOPs) and records for all techniques including QA/QC procedure and Good Lab Practices (GLP).
- Oversee purchasing and budgeting for lab operation and field research facilities.
- Ensure maintenance of lab infrastructure.
- Preparation of invoices for analytical services.
- Demonstration of proficient basic laboratory chemical and biochemical skills, including safety, reagent handling, pipetting, mixing of solutions, operation of balances, fume hoods, gas cylinders. Ensure and oversee safe operation of laboratory and field based research and training in areas of responsibility.

### **Required Qualifications**

*If hiring today, what would be the required education, experience, knowledge, skills and abilities?*

#### **Education**

- A MSc in environmental biology, chemistry or related environmental field or equivalent education and experience.

#### **Experience**

- 5 years of experience in conducting environmental field collection, analyses, data processing and QA/QC for water quality and environmental bio-assessments.

#### **Knowledge/Skills/Abilities**

- Experience and expertise in water quality and biological bio-assessment collections and analysis including the operation and maintenance of sampling, analyses and data management. Method development, QA/QC and GLP for water quality and ability to present and prepare reports of data, and quality control/assurance. Understanding and experience in project planning, budgeting and management. Ability to operate a laboratory and field sampling/collection programs safely and efficiently for environmental matrices including wastewater, water, sediment, benthos and fish. Ability to administer, organize, and lead training workshops and programs. Must have excellent verbal and written communication skills. Intermediate MS Office skills plus experience with data processing and management.

### **Nature and Scope**

**Contacts:** This position is part of the core technical support team for the Global Water Futures program, which involves 4 major University partners (U of Saskatchewan, McMaster U, W Laurier U, and UW) and multiple Canadian and international institutional, government, community, and industrial partners.

**Level of Responsibility:** The job has specialized work with some supervision of others (casual hires/contractors) but provides considerable guidance and authority to support others (e.g. clients, students). The position will require the safe operation of the laboratory and field operations, management of work load, training of staff, students and collaborating researchers, maintenance of over \$2M worth of advanced instrumentation. The incumbent will be

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required to develop and apply new and novel methodologies using advanced techniques and instrumentation; ensure quality (QA/QC) and manage the reporting. They will review and manage budgets and prepare invoices for lab services. They will participate in the administration of major training initiatives and programs

**Decision-Making Authority:** Although the person will answer to the senior researcher for overall scientific direction, they will have considerable leadership for operation of the field and lab operations, budgeting, invoicing and purchasing. They will schedule the use of instruments and equipment in the field and lab. They will direct and hire junior staff (short-term contracts) and temporary help (such as summer students). They will oversee safety and lab/field operations (set priorities and direct work). The incumbent will be required to do considerable problem solving and work independently with minimal supervision. They will be expected to address problems and seek solutions on their own and come to the supervisor with options. The position has responsibility for ensuring the operation of equipment and instruments worth several millions of dollars that are very sensitive and require constant care and maintenance. The QA/QC requires considerable problem solving and technical knowledge as well as judgement. Poor performance would jeopardize field/lab safety, expensive instruments and databases requiring extensive cost and lab down time (operational costs).

**Physical and Sensory Demands:** Although normal days would require slight fatigue etc, some periods of time (field operations) would require moderate effort (fatigue and risk). The position requires the person to balance many conflicting demands and priorities. There will be a significant amount of personal interaction with a wide variety of different infrastructure users and there will be numerous deadlines related to operation of the equipment and reporting. The person will work in the laboratory with loud continuous noise where hearing protection may be required. Lab work requires the use of solvents and chemicals. Field work may require long hours and adverse weather conditions and use of boats, electrofishing gear, driving of small trucks and trailers. The work will require the handling of live animals, wastewaters and environmental samples.

**Working Environment:** The position will be located primarily in the water quality and ecotoxicology laboratories of the Department of Biology and Earth and Environmental Sciences, and will include working in the Department of Biology Wet Lab as well as frequent field trips often under adverse weather conditions. The position requires work around water (rivers, lakes and in the laboratory) and remote areas. The maintenance and operation of the field infrastructure will require a significant amount of time in the field occasionally requiring irregular and extended work hours during field or laboratory experimentation. There will be some travel required to field locations, workshops and conferences. The work includes water quality analyses and part of the time will be associated with office management and report writing, etc. There is potential exposure to hazardous chemicals and situations in the laboratory, Wet Lab and field situations.