Ocean Alliance Canada

eco canada

Water Quality Specialist

BNOS PROFILE

Future Skills Centre | Centre des Compétences futures

Funded by the Government of Canada's Future Skills Program | Canada

ROLE OVERVIEW

Water quality specialists test, analyze, and monitor water quality in coastal, marine, and freshwater environments. They apply scientific and technical expertise to interpret ecological data, evaluate environmental impacts, and ensure compliance with environmental regulations.

These specialists synthesize findings into clear, evidence-based reports and proposals that inform clients, regulators, and other stakeholders. Working both independently and collaboratively, their role requires strong technical, analytical, and communication skills, along with knowledge of aquatic ecosystems, environmental legislation, and data quality assurance practices.

INDEX OF POTENTIAL TITLES

- Water Quality Technician
- Environmental Technician (Water)
- Marine Water Quality Specialist
- Intermediate Aquatic Resources Biologist
- Marine Environmental Specialist

NATIONAL OCCUPATIONAL CLASSIFICATION

22110 - Biological technologists and technicians

STRATA LEVEL

3A – Specialist, Technical specialist

RELATED CAREER PROFILE(S)

Water Quality Specialist

EDUCATION AND EXPERIENCE

EDUCATION:

- Environmental sciences
- Geography
- Oceanography
- Biology
- Fisheries Management
- Aquatic Resources

EXPERIENCE:

- Past experience in conducting field work, especially aquatics-focused surveys.
- Experience operating boats of various sizes and following safety procedures is an asset.
- Experience maintaining and repairing field equipment is an asset.
- Experience analyzing and evaluating water quality data in the context of environmental effects.

TECHNICAL COMPETENCIES

SAMPLING DESIGN AND PLANNING

Develops protocols for sample collection with consideration to project objectives, sample environment, and characteristics to ensure standardization and quality of sample collection.

- Develop field survey plans for data collection activities, using industry/research standard techniques, to ensure data is accurate, reproducible, and relevant.
- Designs quality assurance and sampling protocol documents to support effective data collection, analysis, and management.
- Coordinates with field teams to organize sampling logistics, equipment, and safety protocols to ensure operational readiness and data quality during deployment.
- Identifies and interprets the ecology and distribution of organisms to understand the project location and its biodiversity..

FIELD SURVEYS

Conducts field surveys to collect samples of the area's ecosystem, water quality, and organisms to determine impacts of human activity and the intra-ecosystem relationships.

- Adheres to protocols and procedures while using survey equipment and materials to ensure data is accurately collected.
- Uses survey instrumentation to collect samples and data for identifying physical, chemical, or biological characteristics of the environment.
- Troubleshoots and calibrates field equipment on-site to maintain data reliability during extended surveys.
- Independently conducts field surveys in diverse environments (e.g., estuaries, coastlines, tidal), collecting physical, chemical, and biological water quality data.
- Operates independently in the field to collect, analyze, and synthesize data that informs team planning and broader project objectives. .

DATA ANALYSIS

Applies recognized statistical tools and techniques to interpret and analyze data for the purposes of uncovering trends, patterns, and opportunities to enable strategic decision making.

- Analyzes and interprets environmental data from multiple sources to identify underlying causes of observed patterns and inform mitigation strategies.
- Conducts statistically appropriate tests on environmental data, considering sampling context, to ensure valid and accurate analytical outcomes.
- Applies quantitative and qualitative analysis methods to evaluate environmental characteristics, trends, and the effectiveness of organizational initiatives.
- Applies programming techniques (e.g., R, Python) to sample data using standard analytical tools to support evidence-based decision-making.
- Prepares technical and research reports on observations, findings, and/or impacts to communicate conclusions to stakeholders, industry, government, or the public.
- Creates data visualizations to communicate complex data sets to stakeholders in reports, presentations, and meetings.

TECHNICAL COMPETENCIES

DATA QUALITY ASSURANCE AND CONTROL

Follows appropriate processes, as directed by organizational best practices, to ensure quality is maintained throughout the collection, analysis, and management of data.

- Maintains and calibrates equipment prior to and after use to ensure collection of quality data and avoidance of contamination.
- Collects biological and physical data across varying temporal and spatial scales to meet project's objectives.
- Reviews laboratory results for completeness and accuracy, flagging data anomalies and initiating corrective actions when needed.
- Follows quality assurance procedures and protocols to support accurate data collection and analysis.

TECHNICAL WRITING AND REPORTING

Compiles complex analysis and findings to produce clear, well-structured reports and proposals that inform internal and external stakeholders, including clients, regulators, and the public.

- Collaborates with subject matter experts and project teams to integrate technical contributions into cohesive reports to support cross-disciplinary understanding.
- Synthesizes technical data and research findings into structured written reports to communicate environmental impacts to regulators and clients.
- Includes data visualizations and technical appendices to support report narratives and ensure transparency in scientific findings.
- Translates complex environmental or scientific information into accessible language to inform decision-makers and facilitate regulatory approval.
- Prepares regulatory submissions and permit applications using collected data and analysis to obtain approvals from relevant authorities.

PERSONAL & PROFESSIONAL COMPETENCIES

COLLABORATION

Engages in professional collaborative efforts with other members of the team, including sharing information and expertise, utilizing input from others, and recognizing others' contributions to work towards a common goal.

- Build and maintain effective relationships with stakeholders and the public to foster collaborative partnerships and support the interpretation of environmental data and findings.
- Collaborate with internal teams to set project priorities and deliver technical support that aligns with organizational goals.
- Shares relevant knowledge, experience, or expertise to help team members accomplish their objectives more efficiently or effectively.
- Engages stakeholders in collaborative dialogue and decision-making processes, demonstrating openness to diverse perspectives to achieve consensus-based solutions.

ATTENTION TO DETAIL

Applies a focused and flexible approach by organizing resources, adapting to changing information, and aligning tasks to efficiently meet evolving objectives.

- Adapts to change in a fast-paced environment to ensure that priorities are always met.
- Effectively prioritizes actions and tasks to respond to diverse challenges and demands.
- Adjust work tasks and direction in response to evolving circumstances to maintain productivity and meet objectives.
- Responds to emergencies calmly to maintain operational efficiency and ensure a smooth transition back to standard procedures.
- Demonstrates flexibility by reallocating priorities and resources and applying analytical problem-solving to overcome operational challenges.

COMMUNICATION SKILLS

Delivers clear, purposeful communication to improve understanding of goals, capture interest, and gain support for timely action.

- Prepares and reviews high-quality technical reports and presentations tailored to internal and external audiences, clearly communicating objectives, findings, and defensible recommendations.
- Collects, refines, and presents information to decision-makers in a structured, actionable format that supports understanding and informed planning.
- Communicates effectively with team members to share updates and resources, enhance coordination, maintain system consistency, and reduce duplication.
- Clearly and accurately conveys complex technical information—verbally and in writing—to support understanding among diverse stakeholders.
- Integrates contributions from multiple disciplines into a cohesive and accessible narrative that meets client and stakeholder needs.

LEGAL, POLICY, & REGULATORY COMPETENCIES

REGULATORY COMPLIANCE

Adheres to specific regulations, codes, and legislation within a defined jurisdiction to ensure the health and safety of others and the environment.

- Analyzes applicable laws and technical standards to ensure project activities meet jurisdictional regulatory requirements.
- Demonstrates knowledge of provincial and federal aquatic legislation and regulatory agencies, including those governing licensing or zoning, to support organizational compliance.
- Monitors and ensures onboard compliance with maritime legislation to protect crew safety and meet regulatory obligations.
- Maintains up-to-date knowledge of environmental regulations to ensure operational practices align with applicable codes and standards.
- Prepare regulatory applications and consults with appropriate government bodies to secure necessary project approvals.
- Oversee regulatory compliance for operations in and around aquatic and wildlife habitats, ensuring adherence to provincial and federal environmental requirements.

HSE COMPLIANCE

Carries out inspections, remedial action oversite, and reporting for the site to ensure that the operation complies with the regulatory requirements, internal policies, and procedures as well as client expectations.

- Implements monitoring tools to track regulatory changes and support proactive compliance solutions.
- Observes and inspects workplace to ensure compliance with applicable regulations, internal policies and procedures, and client expectations.
- Supports organizational HSE reporting and permitting requirements to prevent compliance-related disruptions to the operation.
- Apply knowledge of regulations, standard operating procedures, and safety protocols to ensure safe and proper execution of organizational activities.

POLICY CYCLE MANAGEMENT AND GUIDANCE

Applies critical knowledge of existing policies to support implementation, inform policy development, and engage stakeholders and decision-makers throughout the policy cycle.

- Supports policy development by providing data-driven insights and field-based evidence on emerging water quality issues.
- Participates in internal and external consultations to align operational practices with current regulatory and policy requirements.
- Synthesizes technical findings into background materials to support regulatory reviews and planning processes.
- Engages with stakeholders, particularly Indigenous communities, to understand environmental context and maintain relationships throughout the evolving project lifecycle.

ENVIRONMENTAL COMPETENCIES

ENVIRONMENTAL ANALYSIS

Applies appropriate methodologies to conduct sampling, screening, and analysis of a specific location for the purposes of characterizing and monitoring the location' environment.

- Applies GIS tools to monitor change and identify trends in natural habitats or ecosystems to manage environmental quality.
- Collects water and biological samples using established protocols to ensure reliable, contamination-free data for environmental assessment
- Uses hydrographic research to predict the effects of proposed and existing marine developments on the environment.
- Conducts appropriate water sampling methods to assess quality and determine impacts of human and industrial behaviours.

ENVIRONMENTAL MONITORING

Monitors and reports on the changes to the environmental conditions of an area to determine the impacts of policies, projects, and their implementation.

- Defines variables and parameters to monitor the environment, ensuring necessary resources and systems are in place to support effective monitoring.
- Develop long-term programs to monitor the marine environment and assess related environmental impacts.
- Seeks feedback from other technical specialists and stakeholders to validate monitoring program to ensure reporting is accurate and in compliance with legislation and best practices.
- Screens collected samples and/or modeled data to measure outcomes in relation to provincial and or federal regulations.

ECOSYSTEM IDENTIFICATION

Uses primary and secondary sources of information to identify an area's ecosystem to plan and propose development, remediation, or environmental management activities.

- Contributes to the design, development, and implementation of complex environmental studies to assess the effects of development activities on the environment.
- Develops and implements long-term monitoring programs for the marine environment to assess environmental impacts.
- Generates real-time forecasts of water levels, wave heights, coastal erosion, and flooding to inform decision-making.
- Identifies and interprets the ecology and distribution of biological species to understand the project location.
- Uses appropriate databases to explore and analyze coastal and seafloor images along the coast for coastal and marine hazards, and resource imaging.