

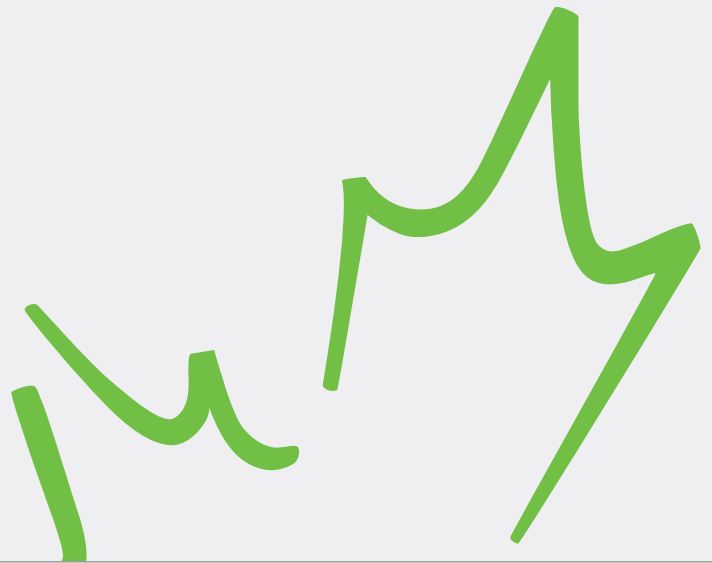


Careers in Natural Resource Management

Current Job Trends and Future Growth
September 2017



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ECO Canada

ECO Canada develops programs that help individuals build meaningful environmental careers, provides employers with resources to find and keep the best environmental practitioners and informs educators and governments of employment trends to ensure the ongoing prosperity of Canada's growing environmental sector.

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Foreword

This report presents the findings of ECO Canada's Survey of Environmental Employers 2016, an in-depth review of job advertisements collected online (Burning Glass Job Ads Database), a series of interviews with 12 experts in natural resource management, and a review of secondary literature.

Introduction

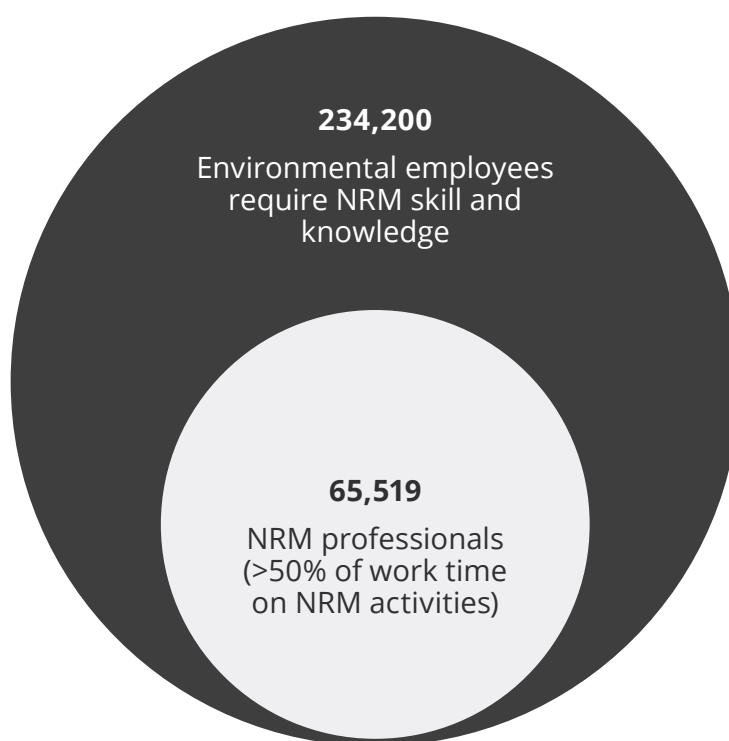
Canada's natural resource management (herein NRM) sub-sector is comprised of professionals who are actively involved in the management of forest resources, agricultural and land resources, aquatic resources, mineral resources, resource-based energy resources, and other natural resource areas.

The NRM sub-sector is a large multi-disciplinary field. NRM professionals perform activities such as scientific research and analysis, engineering and planning, policy development, regulation enforcement, management, forestry, research and development, and technology development and implementation.

Careers in NRM are in high demand and the sub-sector is growing quickly. The combination of positive cycles of growth in the forestry sector, future resource project development, a supportive political environment, stable or growing environmental protection budgets for governments and companies, and the use of advanced technology is expected to result in job opportunities to fill newly created positions, as well as those left vacant by retiring employees.

The NRM workforce is comprised of approximately 234,200 employees who require NRM skills and knowledge to perform a diverse range of environmental management activities. Within this group, there are approximately 65,000 NRM professionals who spend more than half of their time performing activities directly related to the management of natural resources (see Figure 1). This report focuses on the NRM professionals.

Figure 1: NRM Employees and Professionals*



*Source: The number of environmental NRM employees was taken from ECO Canada's Survey of Environmental Employers 2013. The number of NRM professionals was taken from ECO Canada's Survey of Environmental Employees 2016.

Occupational Categories

In Canada, there are approximately 65,000 professionals employed in core NRM occupations. As shown in Figure 2, these professionals include employees in physical sciences, engineers and planners, policy and policy-supporting occupations, senior managers, forestry occupations, and high-tech occupations, researchers and educators.

Figure 2: Common Occupations in NRM

Scientists & Technicians			Engineers & Planners		
Environmental scientist	Biologist or ecologist	Agronomist	Geotechnical engineer	Land surveyor	Environmental engineer
Policy, Regulatory Compliance & Inspection			Management		
Policy analyst	Lawyer	Compliance officer	Supply chain manager	Environmental compliance manager	E- procurement officer
Forestry			High-Tech, Research & Education		
Forestry Technician	Arborist	Silviculture Technician	Spatial database analyst	Compliance technologist	Software engineer

Source: Burning Glass Job Ads Database

In the NRM sub-sector, there are about:

29,000 scientists and technicians working in physical and life sciences: These occupations span a wide range of NRM-related specializations, such as forestry, agronomy (producing and using plants for fuel, fibre, and land reclamation), environmental science, ecology, biology, fisheries and wildlife, aquatic studies, and other scientific fields.

In addition, professionals in this category apply their skills and technical knowledge to develop policy, perform environmental impact assessments, conduct research, and carry out other roles. Scientists and scientific technicians account for nearly half of all NRM professionals.

13,600 engineers and planners: This group includes different engineering disciplines, such as geotechnical, environmental, civil, agricultural, energy, hydrology and hydrogeology, forestry, and land. Planning careers include different disciplines, such as urban, land use, community, conservation, and environmental.

8,000 professionals working in policy, regulatory compliance, and enforcement: Employees in this category include policy analysts and researchers, lawyers, environmental monitoring technicians, and professionals working in inspection and enforcement.

6,000 management professionals:

Management professionals manage procurement, supply chains, carbon and environmental footprints, and sustainability. Managers are employed in agriculture, mining, energy, forestry, and other industries, such as manufacturing (e.g., food manufacturing). Managers work in one of two sub-fields: procurement and supply chain, or sustainability and compliance.

3,700 forestry workers: They work in a variety of positions such as forestry coordinators, urban foresters, log buyers, and arborists. This category does not include scientists and professional foresters.

2,500 research and education professionals: Research and education professionals are employed primarily at universities in research fellowships, professorships, or research assistant positions.

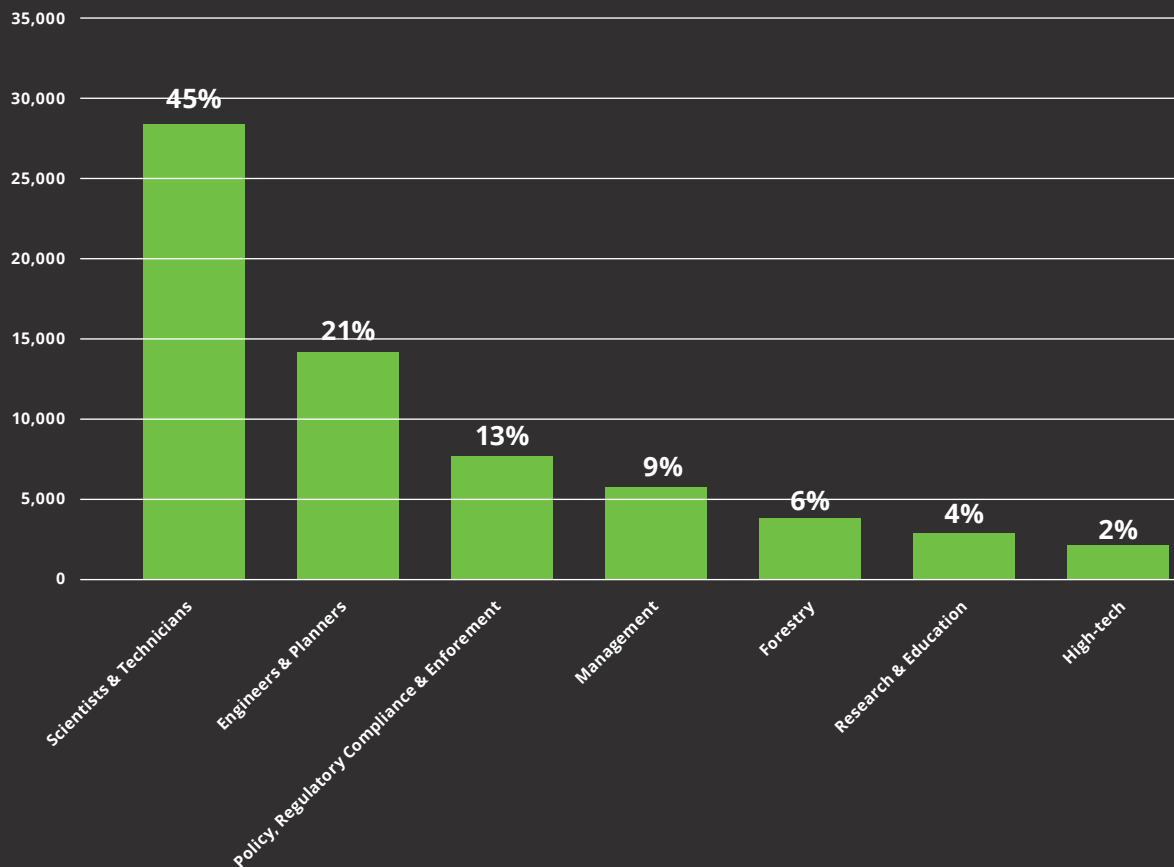
1,200 high-tech occupations: High-tech occupations can be found in programming, GIS and geomatic analyses, precision agriculture technologies, remote-sensing technologies, and other high-tech fields. High-tech professionals combine their knowledge and skills in NRM with technical skills to develop and deploy new technology for resource management.

As shown in Figure 3, scientists and technicians represent the largest component of the core NRM workforce.

NRM PROFESSIONALS WORK IN A BROAD
RANGE OF OCCUPATIONS TO SOLVE
PROBLEMS, CONSERVE RESOURCES, AND
PROTECT THE NATURAL ENVIRONMENT



Figure 3: Number and Percentage of the Core NRM Labour Force by Occupation Category, 2016



Source: Burning Glass Job Ads Database

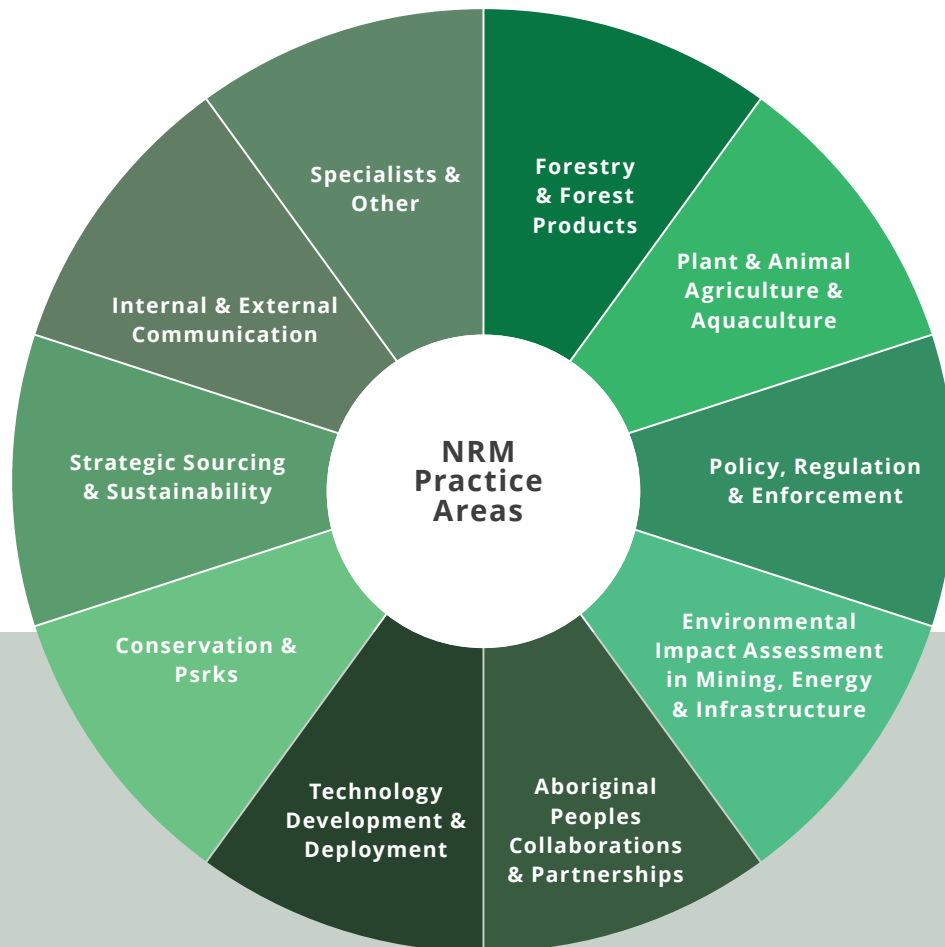
Practice Areas

Practice areas describe the field of work in which professionals are employed. Although NRM professionals perform various types of work, most NRM occupations are related to ten broad practice areas (see Figure 4):

1. **Forestry and Forest Products:** Forestry careers span the full spectrum of forest management, from genomic research to advanced forest products. Professionals in this practice area include forestry professionals (i.e., Professional Foresters and Registered Forest Technologists or Technicians), managers, and other professionals who have forest management skills and knowledge. Many jobs in this practice area are for scientists working in fields such as ecology, geology, geography, biology, forestry, hydrology, chemistry, and others. Common sub-fields of practice in this area are genomic research and development, forest lands environmental management, silviculture (tree cultivation), forest harvesting, biomaterials, forest products production, forest management technology development and deployment, communication and Aboriginal-peoples relations, environmental impact assessment, urban forestry, international forestry management, and other specialized projects and practices. Key employers in this practice area include governments, forest management organizations (including those owned by First Nations-owned enterprises), forest products companies, forest non-governmental organizations (NGOs), and forest product materials research and development organizations.
2. **Plant and Animal Agriculture and Aquaculture:** This practice area includes farm managers, agrology professionals, genome researchers, agricultural information analysts, specialists in precision farming technology, fertilizer and pest control specialists, farm service providers, and specialists in fisheries and aquaculture.
3. **Policy, Regulation, and Enforcement:** This area includes professionals who work in resource management policy analysis, policy development, advocacy, compliance, litigation, monitoring, enforcement, and program management. Employers in this area include Natural Resources Canada (NRCan) and similar organizations at the provincial level.
4. **Aboriginal Peoples Collaborations and Partnerships:** Natural resource policies, projects, and programs on traditional lands require consultation with Aboriginal communities. Professionals working in this practice area require NRM competencies as well as skills to work effectively with Aboriginal communities and peoples.
5. **Technology Development and Deployment:** Technology is integrated into most roles in NRM. Technologies such as GIS and geomatics, remote sensing, robotics and remote operations, precision forestry and precision agriculture technology, imagery, monitoring technology, and other technology applications are becoming standard tools for many professionals in NRM, especially foresters and agronomists. In the NRM sub-sector, there is a convergence of careers that focus on applying technology to NRM and traditional information technology (IT) careers in the development of new technology.

6. **Conservation and Parks:** Professionals in this practice area work in natural resource conservation activities related to fish and wildlife, land management, ecological monitoring and biodiversity, coordination of conservation volunteers, national heritage, parks management, naturalist activities and ecotourism, and stewardship of private land.
7. **Strategic Sourcing and Sustainability:** Professionals in this practice area manage the ethical sourcing of resources consumed by an organization or used in its goods and services.
8. **Internal and External Communication:** NRM professionals in this practice area are involved with marketing, lobbying, communications, public engagement, and consultation on projects that impact natural resources.
9. **Specialists and Other Practice Areas:** There are other NRM professionals who work in roles that are either related to, or independent from the practice areas listed above. This practice area includes specialists, researchers or consultants in research management and environmental management.

Figure 4: NRM Top Practice Areas



Source: Burning Glass Job Ads Database

Natural Resource Management Employers

According to ECO Canada's data 2016, NRM professionals in Canada are employed in a variety of sectors. The natural resource sector, environmental consulting and the public sector are far more likely than other sectors to employ NRM professionals. As well, these three sectors account for 85% of advertised NRM jobs.

The proportion of NRM professionals in each sector varies:

- **Approximately one in ten establishments (10.5%) in the natural resource sector (agriculture, forestry, and aquaculture/fishing) employs at least one NRM professional.** The natural resource sector is the largest employer of NRM professionals. It is estimated that there are nearly 24,500 establishments in this sector that employed NRM professionals in the 2015-16 period. Employers in this sector include agricultural producers, land and forestry resource management organizations, suppliers of agricultural goods, agricultural trade associations, and agricultural services providers. A review of job advertisements in 2015 found that 60.0% of all job openings for NRM professionals were in this sector.
- **Approximately 11.2% of environmental consulting establishments employ at least one NRM professional.** Environmental consulting companies provide professional, scientific and technical services. These companies accounted for 17.0% of all job advertisements for NRM occupations in 2015.
- **The public sector, as well as parks, zoos, and botanical gardens, employ NRM professionals.** Public sector departments and agencies such as Natural Resources Canada employ a large number of NRM professionals. Governments rank as the third-highest employer recruiting for NRM jobs, accounting for 8.0% of 2015 NRM job advertisements. In addition, while not exclusively in the public sector, it is estimated that 27.0% of parks and similar employers and 13.5% of zoos and botanical gardens employ NRM professionals.
- **Other sectors that employ NRM professionals include remediation services, utilities, academia and research and development, and construction.** Approximately 6.2% of remediation services establishments employ NRM professionals. About 2.7% of utilities providers (water, sewage, and electricity) employ NRM professionals. A small percentage (2.2%) of research and development organizations employ NRM professionals. In the construction sector, 1.8% of companies employ NRM professionals.



Career Paths in Natural Resource Management

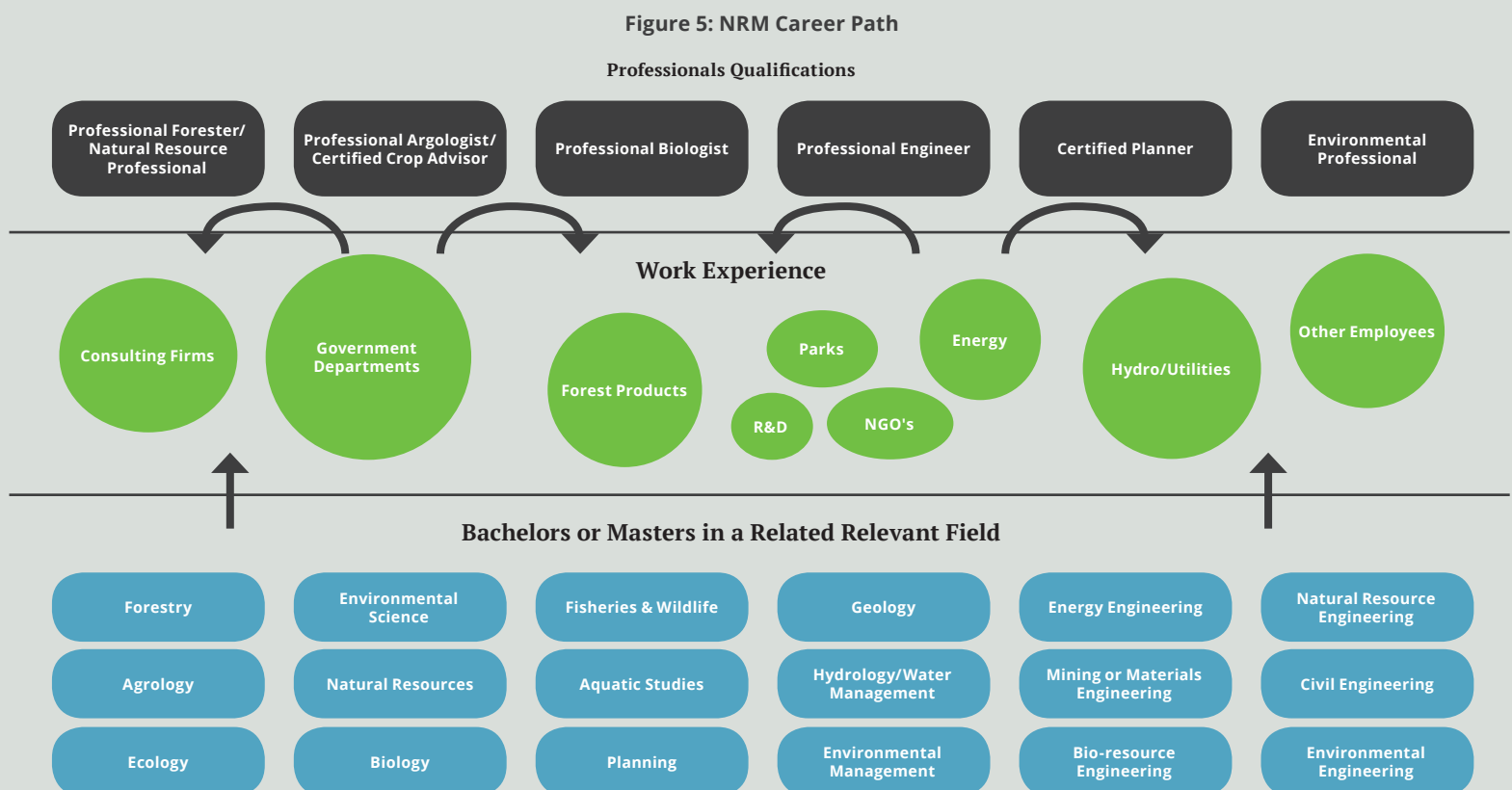
Career paths for NRM professionals begin with a relevant degree (or relevant diploma for technologists) (see Figure 5), followed by experience in one or more of the practice areas.

Professional development and opportunities for advancement are based on both experience and the attainment of professional qualifications such as the Professional Forester designation.

Some of the most common occupations that require professional designations and licenses include foresters, geologists, biologists, engineers, community planners, geoscientists, chemists, land surveyors, and lawyers. Licenses are also required for technologist and technician occupations in sciences and engineering. The most common job openings for licensed occupations are for professional foresters, agronomists, biologists, and engineers.

The requirements for licensure or registration differ by province and typically include a combination of an academic requirement, work experience, an exam, and a demonstration of competencies and references. NRM professionals with a designation have career mobility and can work across Canada due to inter-provincial credential recognition. In 2015, about one-third of hiring NRM employers filled a vacant position with an employee who relocated from another province.

Typically, NRM professionals move vertically within a practice area as they gain more experience. However, NRM professionals can also move between practice areas over the course of their career.





NRM employers typically hire professionals with environmental experience (either in NRM or in another sub-sector), although there are opportunities available to those outside non-environmental sectors. For example, in 2016 almost half (48.0%) of NRM employers filled one or more vacant positions with a professional with a non-environmental background.

In addition, NRM employers hired recent graduates and Aboriginal Canadians in 2016:

- Nearly two-thirds (65.0%) of NRM hiring employers filled one or more vacant positions with a recent graduate.
- Nearly one-quarter (24.0%) of NRM hiring employers filled one or more positions with an Aboriginal Canadian.

There were lower levels of hiring for immigrants and temporary foreign workers in 2016:

- Only 7.0% of NRM employers filled a vacant position with a recent immigrant (an individual who had immigrated in the past five years).
- Only 6.0% of NRM employers filled a vacant position with a temporary foreign worker.

Hiring and Retention Challenges

About 30.0% of NRM employers experienced hiring difficulties in 2016. Of the employers who have experienced hiring difficulties:

- 32.0% experienced a lack of qualified external applicants,
- 19.0% had challenges with recruiting due to the level of compensation offered,
- 14.0% experienced a lack of internal applicants, and
- 11.0% had challenges finding applicants to work in remote or undesirable locations.

Of the NRM employers who experienced hiring challenges, most were concerned about filling intermediate and senior-level positions. 65.0% anticipated future hiring difficulties for intermediate employees, and 57.0% anticipated hiring difficulties for senior-level employees.

Employers have experienced difficulties recruiting candidates to occupations such as forestry technician, wildlife biologist, environmental engineer, and arborist (see Table 1).

Table 1: NRM Occupations for which Employers Experienced Hiring Difficulties, 2016

Forestry and Agriculture	Other Scientists and Environmental Professionals	Engineers and High-Tech	Other
Forestry Technician/Technologist	Wildlife Biologist	Environmental Engineer	Campaigners
Forester	Terrestrial Ecologist	Forest Resource Engineer	Clean Energy Researcher
Arborist	Environmental Geologist	Software Engineer	Park Manager
Lumber Sales	Botanist	Programmers	Water Quality Technician
Forest Resource Engineer	Biochemist		Water and Wastewater Plant Engineer
Agrologist	Environmental Monitor		Active Transport
Agriculture Specialist	Environmental Consultant		General Labourer
Agriculture Engineer	Environmental Assessment Experience		
Farmworker	Environmental Assessment Analyst		

Source: ECO Canada Survey of Environmental Employment, 2016

Career Outlook

The demand for NRM professionals in Canada generally reflects the total labour force distribution across the country, with a few notable exceptions. British Columbia has a large proportion of NRM professionals relative to its proportion of the total Canadian labour force. The province represents 13.0% of Canada's total labour force, and has 22.0% of Canada's NRM labour force. In Quebec, Manitoba, and Alberta, the NRM labour force is slightly smaller in proportion than each province's total labour force.

In 2015, job openings for NRM professionals somewhat reflected NRM employment across the country, but with some notable differences.

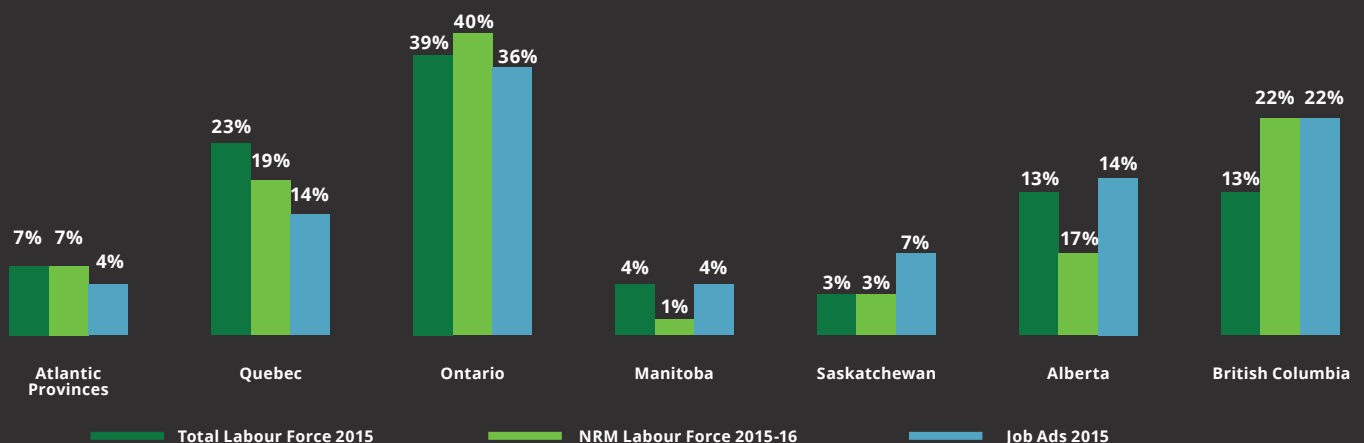
Relative to the Canadian labour force, hiring was proportionally higher in Alberta, Saskatchewan, and Manitoba. It was somewhat lower in Quebec, Ontario, and the Atlantic provinces (see Figure 6).

Based on ECO Canada's survey of NRM employers (2015) and an analysis of recent environmental job vacancies, the demand for NRM employment is healthy and increasing, and is expected to continue increasing:

- In 2015, approximately 2,000 employers posted 4,020 advertisements for job vacancies for NRM professionals in Canada.
- In 2015, 21.0% of NRM employers had experienced an increase in environmental employment in the preceding 12 months. In addition, nearly one-third (31.0%) of NRM employers reported that they expect their overall employment will increase from 2015-18.
- Over half (57.0%) of NRM employers reported that they filled vacant positions for NRM professionals in 2015-16.

Replacements of existing employees due to retirements and out-migration are expected to create significant job opportunities from 2015-26. Cumulatively, NRM employers anticipate that they will lose nearly one-third (31.0%) of their environmental labour force over the next decade. For a labour force of 65,000 NRM professionals, could equate to job openings for nearly 20,000 new professionals.

Figure 6: Demand for NRM Professionals by Province



Source: Labour Force Survey, ECO Canada Survey of Environmental Employment, 2016, Burning Glass Job Ads

Industry Trends

As shown in Table 2, some of the main trends that are shaping the demand for NRM professionals include the following:

- **Regulation of natural resource development and management is becoming more complicated, creating more work for the private sector to both navigate and comply with regulation.** Governments are working to improve natural resource stewardship and are increasing their environmental protection budgets.
- **There is a growing demand for professionals with certifications and designations.** To meet this demand, the number of professional designations offered, such as Professional Forester and Professional Agronomist, is increasing.
- **Increasing consultation with Aboriginal communities is required.** Governments and industry are looking to build the capacity to work with Aboriginal communities to achieve mutual goals.
- **Social license to operate is becoming much more determinant of the viability of natural resource development.** Oil sands projects can have a dramatic impact on climate change and public awareness is driving up the requirements on oil sands companies to assess and mitigate environmental impacts.
- **New technology is reshaping the NRM sub-sector.** The ability to apply new technologies such as precision agriculture technology and imagery is critical to many positions in the NRM sub-sector.

Table 2: Trends Affecting Future Demand for Natural Resource Management Professionals

	Driver	Description
↗	Regulation	More stringent environmental legislation and regulation.
↗	Demand for Certified Professionals	Growing demand for employees with professional designations.
↑	Consultation and Partnership with Aboriginal Communities	Consultation with Aboriginal communities on natural resource development projects.
↗	Social License to Operate	Companies are becoming more proactive in addressing environmental concerns.
↑	New Technology	NRM professionals will be needed to develop and implement new technology.
↗	Greater Volume of Information	There is a growing need for management of environmental data to inform decision-making.
↔	Government Funding	Shifts in funding from national and provincial government organizations.
↗	Media and Public Awareness	Public concern over climate change and natural resource management.
↗	Aging Labour Force	The older labour force will be retiring in the next decade.
↘	Economic Conditions	Demand for natural resources.
↗	Climate Change	More NRM professionals will be needed to address climate adaptation and mitigation.

Source: Expert interviews. *Upward arrows indicate that the trend has a positive impact on labour demand.

Downward arrows indicate that the trend has a negative impact on labour demand. Downward and sideways convey respective meanings.

In Summary

The current political environment is driving a positive outlook for NRM careers because governments are looking to improve natural resource stewardship. In addition, the use of technology is reshaping the sub-sector. These, and other factors, will maintain demand for NRM skills and knowledge. The NRM sub-sector is expected to continue to grow, creating a stable, vibrant, and diverse future for NRM professionals.





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