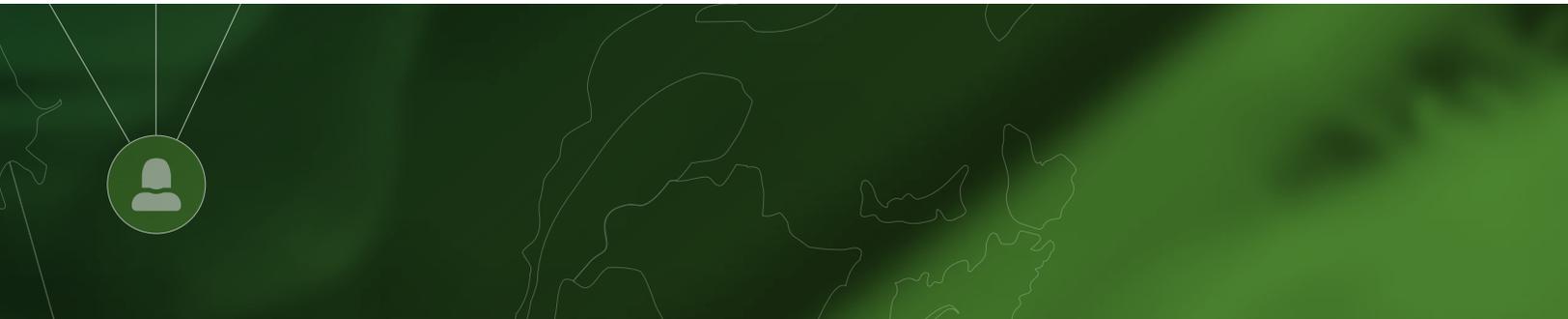


LABOUR MARKET INFORMATION

Environmental Jobs and Influence on Industry: A Key Segment of the Canadian Workforce

June 2020



About ECO Canada

Environmental Careers Organization of Canada (ECO Canada) is the steward for the Canadian environmental workforce across all industries. From job creation and wage funding to training and labour market research, we champion the end-to-end career of an environmental professional.

Our efforts promote and drive responsible and sustainable economic growth to ensure that environmental care and best practices are a priority.

Labour Market Research

We are thought leaders in the environmental labour market. Our research provides unmatched statistics and analysis on economic and labour trends that identify workforce gaps within industry. Our workforce knowledge spans nationally across all provinces and territories, as well as within major Canadian industries including energy, forestry, mining, agriculture, manufacturing and construction.

As we conduct our research, we continue to look for more reliable ways of measuring and reporting on environmental employment:

- Analyzing job postings to identify hiring trends and skills in demand.
- Estimating labour demand and supply using environmental job posting data, Statistics Canada data and supplementary sources. Economic drivers are also factored in to create a demand forecast for environmental employment.
- Profiling segments within the environmental workforce, such as our *Cleantech Defined: A Scoping Study of the Sector and its Workforce* (February 2020) report, with in-depth research on trends and issues driving growth or decline.

We gather and analyze skills and labour market trends within the environmental workforce and provide up-to-date, relevant data and insights for policy, business and educational purposes. Our reports support our stakeholders in four key areas: (1) employers—plan and attract qualified candidates, (2) individuals—prepare for and build their environmental careers, (3) governments—develop programs and update policies, (4) educators and trainers—adapt their offerings to prepare the workforce that is and will be in demand.

Our complete report collection is available at eco.ca/research. We welcome comments and discussion of all our LMI reports. Contact research@eco.ca.

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- Environmental Services Association of Alberta
- Environmental Services Association Maritimes
- EnviroSearch Ltd.
- General Motors
- Government of New Brunswick
- Government of Saskatchewan
- Indigenous Works
- Labour Market Information Council
- Ken Banister and Associates
- North Shore Environmental Consultants
- Royal Roads University
- Ryerson University
- SAIT Polytechnic
- Stantec
- Stratos
- Tait Human Capital



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Contents

Preface	6
Synopsis	8
1 Introduction—Broadening our Scope	10
2 Diving Deeper into the Environmental Job Market	13
2.1 On Average, 260 New Environmental Job Ads Posted Daily	13
2.2 Environmental Job Opportunities in Practically Every Occupation	14
<i>2.2.1 More than 25,000 Environmental Job Ads in the Top 10 Occupations</i>	<i>15</i>
<i>2.2.2 No Matter How You Slice it, there are Lots of Environmental Job Opportunities</i>	<i>17</i>
2.3 Environmental Jobs Abound from Coast-to-Coast-to-Coast	19
3 A Solid Platform for Ongoing Analysis and Reporting	20
Appendix A: More Inclusive Data Means a Clearer Picture	22
A1 The Number of Job Ads	22
A2 The Occupational Distribution of Job Ads	23
A3 The Regional Distribution of Job Ads	25
Appendix B: A Closer Look at the 2018 Environmental Job Ads by Occupation	27

Preface

At ECO Canada, we are always looking for ways to deepen our understanding of the environmental job market and to improve the value of our reporting. We publish our Job Posting Analysis (JPA) reports to describe the state of Canada's environmental job market within a given period and over time.

In 2019, we updated our JPA data sources and methods to provide a new level of insight to our reports. This includes (1) expanding our reach into Canada's territories and the French-language job market, and (2) expanding the definition of an environmental worker. Our description of an environmental worker now includes those employed within environmental goods and services companies regardless of the occupation and those with specialized environmental competencies regardless of the industry employer.

This report keys in on discoveries we made when applying the new scope and definitions to the previously reported JPA data from 2018. We highlight four main takeaways:

- 1 We can pinpoint occupational groups related to the environmental workforce with greater accuracy, as well as the job opportunities presented to them in all regions, and in both official languages.
- 2 The environmental job market is thriving, with close to **100,000 unique environmental jobs advertised online in 2018.**
- 3 Environmental jobs exist in most occupations within Canada, **but not all occupations have an equal share.**
- 4 **Environmental job opportunities abound in Canada,** within all provinces and territories.

Those interested in our JPA reports—government, academia, environmental employers and workers, and stakeholders from other groups including Indigenous communities—will now have a resource to identify where the jobs and job seekers are, what types of jobs are being posted, and which occupations and skills are in the greatest demand. With this information, our stakeholders can identify trends, gaps and opportunities to ensure a qualified and productive workforce within Canada.

The COVID-19 pandemic is affecting every aspect of social and economic life in Canada and around the world. This pandemic, along with other events such as depressed oil and gas prices, may have a deep and long-lasting effect on the employment landscape. A method of establishing its impact on workforce and work programs over the coming weeks, months and years is right here within the pages of this report and in subsequent studies.

ECO Canada's ability to help stakeholders benchmark and analyze trends will be essential to understanding the impact of the pandemic on the environmental job market, assessing current and future needs, and allowing stakeholders to prepare and act, putting data to work in helping us recover and build for the future.



“There’s no doubt the global pandemic will transform the way we work. But we are also presented with a pivotal opportunity to reshape Canada’s economy and its labour market. If implemented properly, the new future of work should be rooted in sound scientific knowledge, technological expertise, be environmentally sound, and of great economic benefit for our society.”

– Kevin Nilsen, President & CEO, ECO Canada

Synopsis

Every year, ECO Canada analyzes millions of job ads posted online by employers across Canada in order to get a clear picture of the job market for environmental workers and to help our various stakeholders make informed decisions.

Always striving to deepen our understanding of the environmental job market through data and analysis, we enhanced our sources and methods in 2019 to include Canada's territories and the French-language job market. We also fine-tuned our search terms to expand the definition of an environmental worker, more fully reflecting the categorization. We then compared results from the 2018 Job Postings Analysis (JPA) from the previous sources and methods to the current ones, uncovering a broader, and at the same time, more granular account of where the environmental jobs are. We focused on two measures: (1) the overall number of environmental online job ads, (2) the proportion of environmental to total online job ads, referred to as *EnviroShare*. On both counts, the numbers were higher in the new JPA.

Once our decision to update sources and methods was validated by a detailed comparative analysis, we zeroed in on re-analyzing 2018 data using the new JPA.

Highlights from our new 2018 JPA include:

Numerous new environmental job ads are posted online daily.



Of the 2.8 million jobs advertised online across Canada in 2018, 3.4% or a little over **96 thousand were classified environmental**.

This means an average of **260 new environmental jobs were advertised online every day in 2018**.

Environmental job opportunities exist in almost every occupation.

In 2018, environmental jobs were present in **90% of the 500 occupations listed in the 4-digit National Occupational Classification (NOC)**. Of the 447 occupations with environmental job ads in 2018, we observed that their ranking in number of job ads differed, sometimes significantly, from their ranking in EnviroShare.



The top three occupations with the greatest number of environmental job ads in 2018 combined for **over 12,500 or 13% of the total environmental job ads** that year. The top three occupations with the greatest EnviroShare had over 63% EnviroShare, or about 20x the national average of 3.4%.

Top Three Occupations Based on Number of Environmental Online Job Ads versus EnviroShare in 2018

By Number of Environmental Job Ads		By EnviroShare
Civil engineers	1	Forestry professionals
Inspectors in public and environmental health and occupational health and safety	2	Supervisors, forest products processing
Professional occupations in business management consulting	3	Water and waste treatment plant operators

Environmental job opportunities exist across Canada, from coast-to-coast-to-coast.

The opportunities for those interested in environmental jobs are healthy in Canada from east to west to north to south. Close to 90% of environmental job ads in 2018, or 85,300 ads, were in Ontario, Quebec, British Columbia and Alberta. Although the territories only combined for nearly 1,000 environmental job ads in 2018, they have the highest EnviroShare at almost 8%.

Total and Environmental Online Job Ads and EnviroShare by Region in 2018

	Total Job Ads	Environmental Job Ads	EnviroShare
Canada	2,799,100	96,100	3.4%
British Columbia	503,730	18,130	3.6%
Alberta	326,040	13,780	4.2%
Saskatchewan	73,070	2,380	3.3%
Manitoba	84,640	2,670	3.2%
Ontario	900,970	27,520	3.1%
Quebec	727,680	25,840	3.6%
New Brunswick	58,230	1,420	2.4%
Nova Scotia	75,880	2,110	2.8%
Prince Edward Island	10,410	180	1.7%
Newfoundland and Labrador	25,950	1,090	4.2%
Yukon	4,670	360	7.7%
Northwest Territories	5,630	465	8.3%
Nunavut	2,200	150	6.8%

Given the COVID-19 global pandemic that coincides with the release of this report, this JPA will also prepare our stakeholders for a new job market benchmark resulting from the many impacts of the pandemic.

1 | Introduction—Broadening our Scope

Millions of jobs are posted online by employers each year in Canada.¹ Every day, data analytics companies scan the Internet to compile these job postings into their databases, allowing researchers to study the state of the job market in real time. This type of research is referred to as Job Posting Analysis (JPA).

In 2012, ECO Canada began using JPA to explore the English-language job market for environmental workers within the provinces. Initial efforts focused on developing and testing algorithms that identified environmental job ads based on keywords and phrases, and advanced artificial intelligence techniques.

As the environmental sector has evolved over the years, so too have the definitions of its workforce. ECO Canada's definition of the environmental workforce is broad and includes workers across industries and occupations. Because of this, it was not possible to directly gather data on environmental workers using standard employment data classifications, such as the National Occupational Classification (NOC) system.² However, JPA allows for environmental job ads to be identified based on the textual content of the job postings.

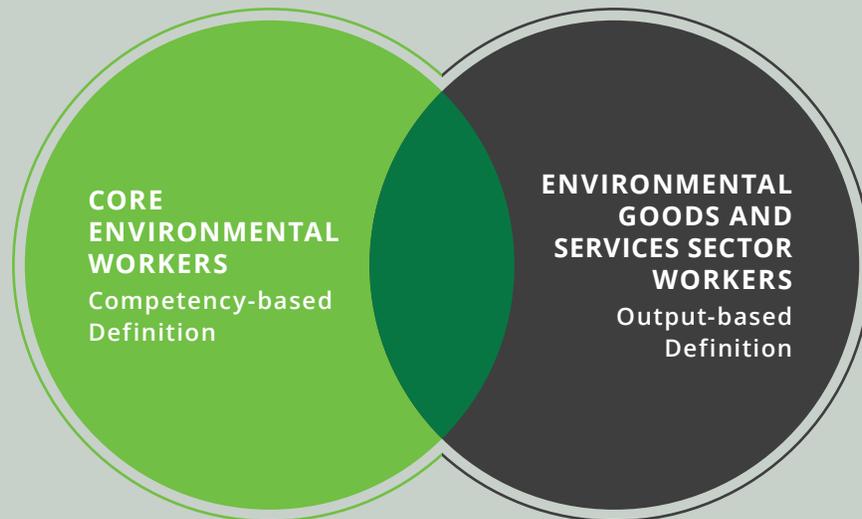
With changes adopted in 2019, we now research two types of environmental workers (see Figure 1):

1. **Core environmental workers:** Those in occupations requiring specialized environmental knowledge, skills or training³, and
2. **Environmental goods and services workers:** Those working for employers supplying environmental goods and services, including those who may or may not require specialized environmental knowledge, skills or training.

1 Statistics Canada's Job Vacancy and Wage Survey data suggest at least 75% of all job vacancies are posted online every quarter. See: Statistics Canada. Table 14-10-0328-01 Job vacancies, proportion of job vacancies and average offered hourly wage by selected characteristics, quarterly, unadjusted for seasonality. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410032801>.

2 The National Occupational Classification (NOC) is Canada's national system of organizing and describing occupations. It has been developed and is maintained by Statistics Canada and Employment and Social Development Canada (ESDC).

3 Learn more about the *Competencies for Environmental Professionals in Canada* (August 2016) at <https://www.eco.ca/research/report/nos-environmental-employment/>

Figure 1*The Environmental Workforce*

Note. The overlap of the two categories represents core environmental workers employed within environmental goods and services sector.

Both *core environmental* and *environmental goods and services sector* employment are spread across industries and occupations and do not align precisely with traditional taxonomies such as NOC codes. By using JPA, ECO Canada can map environmental employment to NOC codes and adopt approaches to demand and supply analysis that would otherwise be unavailable.

With the updates made to our JPA data collection source and methods, we were able to observe:

- a larger number of environmental job ads available online,
- shifts in occupational and geographical distribution among the environmental job ads, and
- a higher proportion of environmental job ads as a percentage of total online job ads, which we refer to as *EnviroShare*.

In Appendix A, you will be able to find an overview of methodology, a detailed comparison of our former and new JPA data for 2018, as well as a comparison by total numbers, geography and occupations.

Spotlight: Job Posting Analysis (JPA) Informs Decision-Making

The analysis of job postings has many benefits, including the use of data by:



Job seekers: Data tells them where the jobs are, what skills are in demand and which sectors of the economy are hiring.



Employers: They get insights into which skills are transferable and when supply is short.



Policymakers: Real-time data allows early detection of employment trends.



Academic planners: Data provides relevant information regarding environmental talent and training needs.

The analysis of job postings also has limitations. Challenges faced by job ads researchers include:

- Not all jobs are advertised, and not all posted jobs are actually filled.
- Jobs might be posted in both English and French.
- Not all job aggregator websites can be scraped.
- The sources of job ads (employer websites/job posting aggregators) come and go, changing over time, which results in fluctuations in the number of job ads scraped, independent of the number of jobs available.
- The common practice of posting the same job ads on multiple websites can potentially lead to the over-estimation of job ads.

Where multiple instances of the same job ad occur, whether in different platforms or languages, software is used to identify and eliminate these duplications.⁴

Despite these challenges, the analysis of job ads does serve as an indicator of hiring trends and provides real-time information otherwise unavailable to those interested in the state of the job market. ECO Canada aims to use consistent methodology so that trends can be identified over time.

For the purpose of this report, numbers have been rounded to the nearest 100, or in some cases 10, for improved readability.

⁴ The process of identifying and removing duplicate jobs is known as “deduplication.”

2 | Diving Deeper into the Environmental Job Market

While insights obtained from the original 2018 JPA are still highly informative and valid⁵, we are excited to share what we learned when revisiting the data collection and analysis with new tools. This section explores what we were able to uncover by re-analyzing 2018 data using the new JPA, and in particular, how the data pinpoints requirements and opportunities within the environmental job market.

2.1 On Average, 260 New Environmental Job Ads Posted Daily

The 2018 data shows that, of the 2.8 million jobs advertised online in Canada, more than 96 thousand, or 3.4%, were environmental. This means that an average of 260 new environmental jobs were advertised online daily in 2018.

Table 1

Total and Environmental Online Job Ads in 2018

Total	2,799,100
Environmental	96,100
EnviroShare	3.43%

3 OF EVERY 100 ONLINE JOBS ADS IN 2018 WERE CLASSIFIED AS ENVIRONMENTAL



⁵ Refer to our [Environmental Job Market Trends in 2018](#) (June 2019) report.

The expanded definition of the environmental workforce, along with the inclusion of French-language only and job ads from Canada's territories, explains with little doubt why we are seeing a larger number of environmental job ads and a higher EnviroShare in 2018 compared to our former 2018 JPA results. We should point out that the total number of job ads was also higher with the new JPA.

In a nutshell, by applying our new JPA source and methods to the 2018 job postings, we noted an increase in total job ads to almost 2.8 million, of which, 96,100 were environmental job ads. This resulted in an increase in environmental job ads as a percentage of total job ads (EnviroShare) by 1.3 percentage points.

Table 2

Total and Environmental Online Job Ads and EnviroShare in 2018, Former vs New JPA

	Former JPA	New JPA	Net Change
Total job ads	1,147,200	2,799,100	+1,651,900 job ads
Environmental job ads	24,500	96,100	+71,600 job ads
EnviroShare	2.14%	3.43%	+1.29 percentage points

Refer to Appendix A for a detailed comparison of our former and new JPA data for 2018. Comparisons are available by geography and by occupation.

2.2 Environmental Job Opportunities in Practically Every Occupation

The new JPA method permits a more granular look at environmental job ads and EnviroShare by occupation, allowing us to see which occupations made up the number of environmental job ads being scraped and reported. Whereas we have typically analyzed job categories at the 3-digit National Occupational Classification (NOC) level, results from the new method provide a look at the 2018 JPA at a 4-digit NOC level.⁶

Our findings indicate that environmental jobs exist in practically every occupation. Close to 90%, or 447 of the 500 occupations listed in the 4-digit NOC, registered environmental online job ads in 2018. Refer to Appendix B to see which of the 447 NOCs are in-scope.

⁶ Canada's NOC system categorizes jobs into 3-digit and 4-digit NOC codes, where 3-digit NOC are broader, more inclusive categories and 4-digit NOC are narrower groupings of occupations. For example, NOC 213 represents *Civil, mechanical, electrical and chemical engineers*, while NOC 2131 represents only *Civil engineers*, NOC 2132 represents *Mechanical engineers*, NOC 2133 represents *Electrical and electronic engineers* and NOC 2134 represents *Chemical engineers*.

2.2.1 More than 25,000 Environmental Job Ads in the Top 10 Occupations

The Top 10 occupations with the greatest number of environmental job ads combined for over 25,000 job ads in 2018. These occupations at the 4-digit NOC level comprised 27% of all environmental job ads within the year. This means at least one in every four environmental jobs advertised online in 2018 was for a Top 10 occupation.

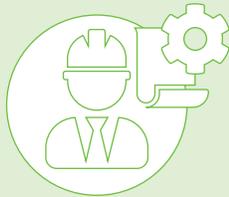
Table 3

Top 10 Occupations Based on the Number of Environmental Online Job Ads in 2018

Occupation	Environmental Job Ads	% of Total
All Occupations	96,100	100%
1 Civil engineers (NOC 2131)	6,690	7.0%
2 Inspectors in public and environmental health and occupational health and safety (NOC 2263)	3,320	3.5%
3 Professional occupations in business management consulting (NOC 1122)	2,510	2.6%
4 Industrial and manufacturing engineers (NOC 2141)	2,400	2.5%
5 Advertising, marketing and public relations managers (NOC 0124)	2,210	2.3%
6 Other business services managers (NOC 0125)	1,950	2.0%
7 Information systems analysts and consultants (NOC 2171)	1,860	1.9%
8 Other repairers and servicers (NOC 7445)	1,820	1.9%
9 Computer and information systems managers (NOC 0213)	1,380	1.4%
10 Mechanical engineers (NOC 2132)	1,360	1.4%

Spotlight: The Most In-demand Occupations in 2018

The three NOCs with the largest number of environmental jobs advertised online in 2018, totalling over 13% or 12,500 of all environmental job ads for that year, are:



Civil engineers: 6,700 environmental online job ads

This group includes bridge engineers, highway engineers, construction managers and so on who plan, design, develop and manage projects for the construction or repair of buildings, powerhouses, roads, tunnels, railways, coastal installations related to highway, transportation services, water distribution and sanitation.

Typical industry employers include:

- Professional, scientific and technical services
- Public administration
- Construction

Sample environmental job titles:

- Environmental Engineer
- Manager Land Protection & Engineering
- Environmental Professional



Inspectors in public and environmental health and occupational health and safety: 3,300 ads

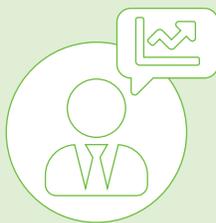
These include individuals who evaluate and monitor health and safety hazards and develop strategies to control risks in the workplace, for example, public health inspector, hazardous waste inspector, and water inspector.

Typical industry employers include:

- Public administration
- Professional, scientific and technical services
- Manufacturing

Sample environmental job titles:

- Environmental Compliance and Management System Specialist
- Environmental Protection Officer
- Environmental Management Officer
- Senior Environmental Officer



Professional occupations in business management consulting: 2,500 ads

These include individuals who provide services to management such as analyzing structure, operations and managerial methods in order to propose and implement improvements, for example, a business methods analyst.

Typical industry employers include:

- Professional, scientific and technical services
- Finance and insurance
- Public administration

Sample environmental job titles:

- Energy Management Analyst
- Sustainability & Energy Analyst

2.2.2 No Matter How You Slice it, there are Lots of Environmental Job Opportunities

Determining the number of online job ads that are classified as environmental is one measure of the JPA. Analyzing the occupations by their EnviroShare presents a different perspective.

While an occupation might rank high in the number of environmental job ads, its EnviroShare might be higher or lower compared to the national average. All Top 10 occupations ranked by their number of environmental job ads have an EnviroShare above the 3.4% average (Table 4). However, EnviroShares are highly variable across these occupations. For example, the total number of environmental job ads place Civil engineers at the top with over 6,690 ads, and Mechanical engineers at the lower spot on the list with close to 1,360 ads. When looking at the EnviroShare, these same Top 10 occupy a different order, with Civil engineers still ranking highest at 53.3%, but the lower spot of the Top 10 being taken by Other repairers and servicers, at 4.9%.

Table 4

EnviroShare of the Top 10 Occupations with the Most Environmental Online Job Ads in 2018

Occupation	Total	Environmental	EnviroShare
All Occupations	2,799,100	96,100	3.4%
1 Civil engineers (NOC 2131)	12,570	6,690	53.3%
2 Inspectors in public and environmental health and occupational health and safety (NOC 2263)	9,730	3,320	34.1%
3 Professional occupations in business management consulting (NOC 1122)	31,700	2,510	7.9%
4 Industrial and manufacturing engineers (NOC 2141)	14,920	2,400	16.1%
5 Advertising, marketing and public relations managers (NOC 0124)	28,970	2,210	7.6%
6 Other business services managers (NOC 0125)	15,380	1,950	12.7%
7 Information systems analysts and consultants (NOC 2171)	26,480	1,860	7.0%
8 Other repairers and servicers (NOC 7445)	37,540	1,820	4.9%
9 Computer and information systems managers (NOC 0213)	20,880	1,380	6.6%
10 Mechanical engineers (NOC 2132)	7,460	1,360	18.2%

Ranking all 447 occupations by EnviroShare yielded a vastly different Top 10 list. For example, 7 of every 10 online job ads in 2018 for Forestry professionals and Supervisors, forest products processing were deemed environmental.

Among the Top 10 occupations in Table 4 ranked by EnviroShare, only Civil engineers (NOC 2131) appear in both Tables 4 and 5.

Table 5

Top 10 Occupations Based on EnviroShare in 2018

Occupation	Total	Environmental	EnviroShare
All Occupations	2,799,100	96,100	3.4%
1 Forestry professionals (NOC 2122)	800	560	69.7%
2 Supervisors, forest products processing (NOC 9215)	660	460	69.3%
3 Water and waste treatment plant operators (NOC 9243)	1,350	850	63.1%
4 Meteorologists and climatologists (NOC 2114)	2,000	1,210	60.4%
5 Forestry technologists and technicians (NOC 2223)	1,100	630	56.8%
6 Civil engineers (NOC 2131)	12,570	6,690	53.3%
7 Senior managers - health, education, social and community services and membership organizations (NOC 0014)	650	330	50.5%
8 Geological engineers (NOC 2144)	400	200	49.9%
9 Conservation and fishery officers (NOC 2224)	830	390	47.6%
10 Geoscientists and oceanographers (NOC 2113)	880	370	42.2%

In addition, 198 of the 447 occupations listed in the 4-digit NOC with environmental job ads in 2018 have an above-average EnviroShare. While there are increasingly more environmental jobs available in Canada, the depth of jobs within a given category varies widely.

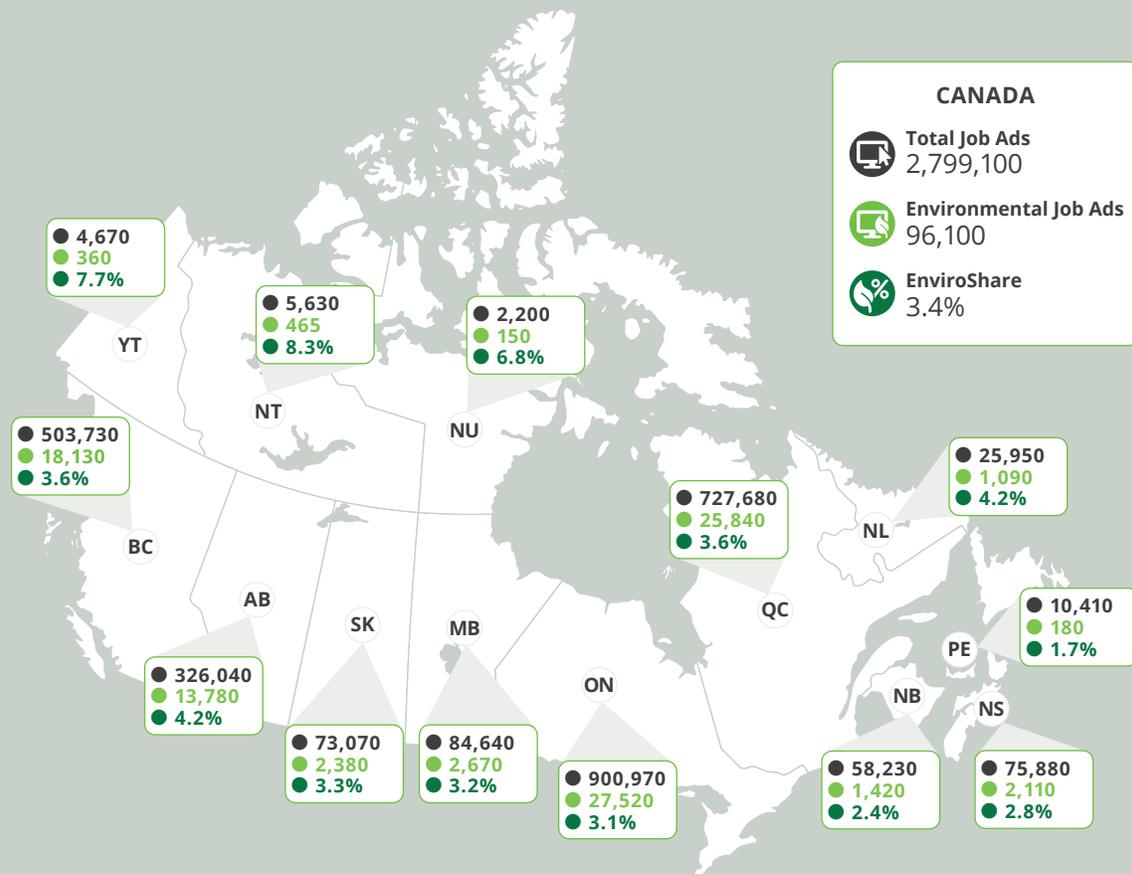
2.3 Environmental Jobs Abound from Coast-to-Coast-to-Coast

The regional breakdown of environmental job ads is similar to the distribution of total job ads across Canadian provinces and territories.⁷ Ontario had the largest number of total and environmental job ads at 901,000 and 27,500, respectively, followed by Quebec, British Columbia and Alberta.

Quebec, British Columbia, Alberta, Newfoundland and Labrador, and all three territories had an above-average EnviroShare in 2018, indicating relatively greater demand for environmental workers in those regions. In fact, the Northwest Territories, Yukon and Nunavut had the highest EnviroShare across Canada in 2018 at 8.3%, 7.7% and 6.8% respectively.

Figure 2

Total and Environmental Online Job Ads and EnviroShare by Region in 2018



Regardless of the ranking by the number or share of environmental job ads, one message was clear from our new 2018 JPA data: **environmental opportunities exist in every region in Canada.**

⁷ The distribution of total online job ads aligns with the distribution of employment across Canadian provinces and territories in 2018. This is also generally true for the geographical distribution of total job vacancies reported by employers in 2018. See: <https://www150.statcan.gc.ca/n1/pub/75-004-m/75-004-m2019002-eng.htm>

3 | A Solid Platform for Ongoing Analysis and Reporting

The additional value we have been able to extract from the JPA data captured in 2018 paints a more detailed and comprehensive picture of the environmental job market in Canada. This updated method provides us with a new baseline of environmental jobs and EnviroShare, while also addressing the gaps in French-language and territorial job data.

Though informative on its own, this JPA report focuses on only one part of ECO Canada's approach to understanding the job market for environmental workers. Upcoming reports will provide estimates of the size of Canada's environmental workforce by region and occupation, based in part on the EnviroShare derived from JPA.

Forecasts of demand and supply for environmental employment going forward will also be presented in these reports, derived using a combination of drivers including economic growth, investment cycles, labour availability, productivity, and business cycles.

It should be noted that this report refers to job market data at a given point in time (2018) but is being published during the COVID-19 pandemic. The impact of this unprecedented event on the environmental workforce will be tracked and analyzed in the weeks, months and years to follow. ECO Canada is surveying employers, individual workers and those with a stake in the environmental labour market to obtain short-term and long-term data on the impact of COVID-19. The need for labour market intelligence is greater than ever, and we will be reporting environmental workforce updates and labour market insights accordingly.



Spotlight: We Can Help during the COVID-19 Pandemic, and Afterwards

In addition to our commitment to producing timely, relevant and credible labour market information, ECO Canada also offers a variety of programs and services to support organizations and individuals.

For more than 20 years, we have been connecting environmental employers and skilled junior talent through employment programs that offer wage subsidies to drive valuable on-the-job work experience and essential skills training.

Our self-directed online courses and webinars allow individuals to upgrade skills at their own pace and put new skills to use right away.

As the impact of COVID-19 is being felt within Canada's economy and labour market, we have created a Resource Hub for employers, individuals and labour suppliers to access accurate information and assistance.

We invite you to explore these and our other programs and services at eco.ca.



Appendix A: More Inclusive Data Means a Clearer Picture

From 2013 to 2019, ECO Canada provided environmental job posting analysis and reporting to our various stakeholders. In 2019, we switched data suppliers and revised our JPA method to expand our access into the full range of Canadian job ads and increase our visibility into the results. The JPA now encompasses postings within the Canadian territories and in both official languages.

In our analysis, we are now able to account for workers who are employed by environmental goods and services providers, including those who do not require specialized environmental competencies. These are in addition to those workers who require specialized environmental knowledge, skills or training (core environmental workers), some of whom may also be employed within environmental goods and services. We did this by revising the keywords and phrases used for filtering environmental job ads. Through an extensive review of individual job ads, ECO Canada identified keywords and phrases likely to appear in job ads for environmental workers (either core environmental workers or environmental goods and services workers) but unlikely to appear in non-environmental job ads. A new algorithm for filtering environmental job ads was developed and applied to the new database of job ads provided by our current data supplier.

Revising the scope of the environmental workforce considered in our analysis has impacted our results in three areas:

1. The number of job ads available in the database,
2. The occupational distribution of job ads, and
3. The regional distribution of job ads.

A1 The Number of Job Ads

The new JPA source resulted in a larger database of online job ads to be filtered, as well as a higher number of environmental job ads and a higher proportion of environmental job ads to total job ads (EnviroShare).

Table A1

Total and Environmental Online Job Ads and EnviroShare in 2018, Former vs New JPA

	Former JPA	New JPA	Net Change
Total job ads	1,147,200	2,799,100	+1,651,900 job ads
Environmental job ads	24,500	96,100	+71,600 job ads
EnviroShare	2.14%	3.43%	+1.29 percentage points

A2 The Occupational Distribution of Job Ads

The change in the JPA method impacted both the occupational distribution of environmental job ads and the EnviroShare.

Table A2 shows the 10 occupations with the most environmental job ads before and after the update in method used. Six occupational groups appear in the Top 10 NOCs of both JPAs (bolded).

Table A2

Top 10 Occupations Based on the Number of Environmental Online Job Ads in 2018 by 3-digit NOC, Former vs New JPA

Former JPA			New JPA	
NOC	Environmental job ads		Environmental job ads	NOC
Total	24,500		96,100	Total
Agriculture and horticulture workers (NOC 843)	3,345	1	9,360	Civil, mechanical, electrical and chemical engineers (NOC 213)
Other technical inspectors and regulatory officers (NOC 226)	3,205	2	4,780	Managers in financial and business services (NOC 012)
Civil, mechanical, electrical and chemical engineers (NOC 213)	2,050	3	4,450	Other engineers (NOC 214)
Managers in financial and business services (NOC 012)	1,430	4	4,150	Human resources and business service professionals (NOC 112)
Life science professionals (NOC 212)	920	5	3,710	Other technical inspectors and regulatory officers (NOC 226)
Other engineers (NOC 214)	740	6	3,170	Computer and information systems professionals (NOC 217)
Computer and information systems professionals (NOC 217)	620	7	2,480	Managers in engineering, architecture, science and information systems (NOC 021)
Motor vehicle and transit drivers (NOC 751)	610	8	2,330	Other installers, repairers and servicers (NOC 744)
Cleaners (NOC 673)	585	9	2,210	Technical occupations in computer and information systems (NOC 228)
Managers in engineering, architecture, science and information systems (NOC 021)	490	10	2,140	Technical occupations in civil, mechanical and industrial engineering (NOC 223)

Note. With the new JPA, we can analyze occupational data at the 4-digit NOC (see Tables 3, 4 and 5). Comparisons between the former and new JPA are limited to 3-digit NOC.

Table A3 provides the Top 10 occupational groups by EnviroShare (the proportion of environmental job ads to overall job ads). The results for the new JPA method indicate a higher proportion of environmental workers overall, but lower proportions of environmental workers in some occupational groups. Five occupational groups appear in the Top 10 NOCs of both JPAs (bolded).

Table A3

Top 10 Occupations Based on EnviroShare in 2018 by 3-digit NOC, Former vs New JPA

Former JPA			New JPA	
NOC	EnviroShare		EnviroShare	NOC
Overall EnviroShare	2.1%		3.4%	Overall EnviroShare
Supervisors, logging and forestry (NOC 821)	100.0%	1	44.0%	Utilities equipment operators and controllers (NOC 924)
Logging and forestry workers (NOC 842)	100.0%	2	41.9%	Physical science professionals (NOC 211)
Other technical inspectors and regulatory officers (NOC 226)	75.0%	3	37.0%	Supervisors, logging and forestry (NOC 821)
Agriculture and horticulture workers (NOC 843)	60.4%	4	32.2%	Civil, mechanical, electrical and chemical engineers (NOC 213)
Managers in agriculture, horticulture and aquaculture (NOC 082)	44.8%	5	30.3%	Other technical inspectors and regulatory officers (NOC 226)
Technical occupations in life sciences (NOC 222)	37.5%	6	25.4%	Life science professionals (NOC 212)
Utilities equipment operators and controllers (NOC 924)	35.8%	7	25.2%	Architects, urban planners and land surveyors (NOC 215)
Life science professionals (NOC 212)	35.7%	8	18.8%	Managers in public administration (NOC 041)
Contractors and supervisors, agriculture, horticulture and related operations and services (NOC 825)	31.8%	9	18.5%	Contractors and supervisors, mining, oil and gas (NOC 822)
Physical science professionals (NOC 211)	23.2%	10	18.0%	Legislators and senior management (NOC 001)

Note. Comparisons between the former and new JPA are limited to 3-digit NOC.

A3 The Regional Distribution of Job Ads

The updated JPA method resulted in an increase in the total number of job ads in each province over the former JPA (Table A4). At the same time, the proportion of job ads attributable to each province or territory changed, with smaller regional shares in Ontario, Nova Scotia and Saskatchewan.

Table A4

Environmental Online Job Ads by Region in 2018, Former vs New JPA

Region	Former JPA		New JPA	
	Environmental Job Ads	Regional Share	Environmental Job Ads	Regional Share
Canada	24,500	100%	96,100	100%
British Columbia	4,480	18%	18,130	19%
Alberta	5,300	22%	13,780	14%
Saskatchewan	2,770	11%	2,380	2.5%
Manitoba	440	1.8%	2,670	2.8%
Ontario	8,530	35%	27,520	29%
Quebec	1,200	5%	25,840	27%
New Brunswick	290	1.2%	1,420	1.5%
Nova Scotia	1,190	4.9%	2,110	2.2%
Prince Edward Island	115	0.5%	180	0.2%
Newfoundland and Labrador	200	0.8%	1,090	1.1%
Yukon	–	–	360	0.4%
Northwest Territories	–	–	465	0.5%
Nunavut	–	–	150	0.2%

With respect to EnviroShare (Table A5), we see that Canada's territories have the highest proportion of their workforce considered to be environmental workers. The change in the JPA method resulted in higher EnviroShare for most provinces, with Saskatchewan and Nova Scotia as the exceptions. Among the provinces, Alberta and Newfoundland and Labrador have the highest EnviroShare (4.2%).

Table A5

EnviroShare by Region in 2018, Former vs New JPA

Region	Former JPA	New JPA
Canada	2.1%	3.4%
British Columbia	2.4%	3.6%
Alberta	4.2%	4.2%
Saskatchewan	6.7%	3.3%
Manitoba	1.7%	3.2%
Ontario	1.8%	3.1%
Quebec	0.5%	3.6%
New Brunswick	1.4%	2.4%
Nova Scotia	3.1%	2.8%
Prince Edward Island	1.9%	1.7%
Newfoundland and Labrador	2.2%	4.2%
Yukon	–	7.7%
Northwest Territories	–	8.3%
Nunavut	–	6.8%

Appendix B: A Closer Look at the 2018 Environmental Job Ads by Occupation

While it is evident that environmental jobs exist in several occupations, our findings suggest that environmental online job ad numbers and EnviroShare vary greatly from occupation to occupation. The following table lists the occupations with 130 or more environmental job ads in 2018, along with their corresponding EnviroShare. The occupational share, which depicts the distribution of the environmental job ad numbers across the in-scope occupations, are also provided.

Due to the desired detail of the occupational data presented, the numbers in this table have not been rounded.

Table B1

Total and Environmental Online Job Ads, Occupational Share and EnviroShare by Occupation in 2018

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
All Occupations	2,799,093	96,092	100%	3.43%
Civil engineers (NOC 2131)	12,566	6,694	6.97%	53.27%
Inspectors in public and environmental health and occupational health and safety (NOC 2263)	9,734	3,319	3.45%	34.10%
Professional occupations in business management consulting (NOC 1122)	31,704	2,512	2.61%	7.92%
Industrial and manufacturing engineers (NOC 2141)	14,922	2,402	2.50%	16.10%
Advertising, marketing and public relations managers (NOC 0124)	28,969	2,211	2.30%	7.63%
Other business services managers (NOC 0125)	15,381	1,954	2.03%	12.70%
Information systems analysts and consultants (NOC 2171)	26,480	1,864	1.94%	7.04%
Other repairers and servicers (NOC 7445)	37,537	1,820	1.89%	4.85%
Computer and information systems managers (NOC 0213)	20,875	1,383	1.44%	6.63%
Mechanical engineers (NOC 2132)	7,458	1,359	1.41%	18.22%
Automotive service technicians, truck and bus mechanics and mechanical repairers (NOC 7321)	31,671	1,223	1.27%	3.86%
Meteorologists and climatologists (NOC 2114)	2,002	1,209	1.26%	60.39%
Civil engineering technologists and technicians (NOC 2231)	5,048	1,189	1.24%	23.55%
Financial auditors and accountants (NOC 1111)	24,421	1,180	1.23%	4.83%

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Electrical and electronics engineers (NOC 2133)	8,604	1,169	1.22%	13.59%
Transport truck drivers (NOC 7511)	133,163	1,099	1.14%	0.83%
Administrative assistants (NOC 1241)	41,291	1,070	1.11%	2.59%
Biologists and related scientists (NOC 2121)	5,130	1,065	1.11%	20.76%
University professors and lecturers (NOC 4011)	17,369	1,047	1.09%	6.03%
Contractors and supervisors, electrical trades and telecommunications occupations (NOC 7202)	6,463	1,030	1.07%	15.94%
Computer network technicians (NOC 2281)	16,429	1,006	1.05%	6.12%
User support technicians (NOC 2282)	22,361	1,002	1.04%	4.48%
Construction millwrights and industrial mechanics (NOC 7311)	10,268	982	1.02%	9.56%
Professional occupations in advertising, marketing and public relations (NOC 1123)	16,554	971	1.01%	5.87%
Sales and account representatives - wholesale trade (non-technical) (NOC 6411)	55,449	948	0.99%	1.71%
Construction managers (NOC 0711)	5,936	881	0.92%	14.84%
Engineering managers (NOC 0211)	3,357	881	0.92%	26.24%
Computer programmers and interactive media developers (NOC 2174)	34,247	877	0.91%	2.56%
Facility operation and maintenance managers (NOC 0714)	20,300	863	0.90%	4.25%
Water and waste treatment plant operators (NOC 9243)	1,353	854	0.89%	63.12%
General office support workers (NOC 1411)	30,185	850	0.88%	2.82%
Other labourers in processing, manufacturing and utilities (NOC 9619)	23,642	836	0.87%	3.54%
Transportation route and crew schedulers (NOC 1526)	12,835	832	0.87%	6.48%
Technical sales specialists - wholesale trade (NOC 6221)	13,106	797	0.83%	6.08%
Urban and land use planners (NOC 2153)	1,926	790	0.82%	41.02%
Registered nurses and registered psychiatric nurses (NOC 3012)	25,143	756	0.79%	3.01%
Contractors and supervisors, carpentry trades (NOC 7204)	15,812	717	0.75%	4.53%

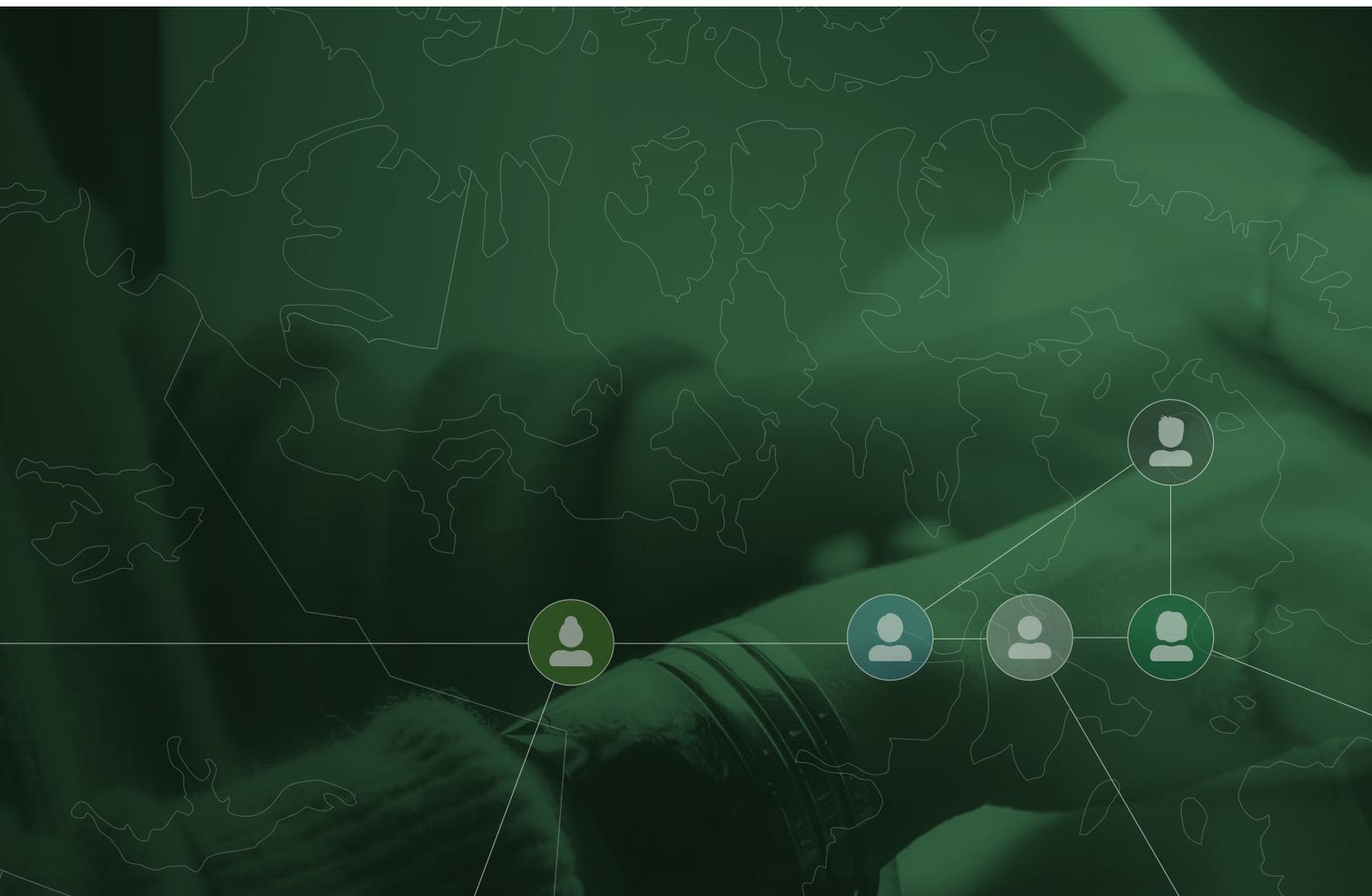
National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Business development officers and marketing researchers and consultants (NOC 4163)	24,587	706	0.73%	2.87%
Contractors and supervisors, mechanic trades (NOC 7301)	8,115	693	0.72%	8.54%
Human resources professionals (NOC 1121)	19,244	667	0.69%	3.47%
Cooks (NOC 6322)	64,570	629	0.65%	0.97%
Forestry technologists and technicians (NOC 2223)	1,100	625	0.65%	56.82%
Insurance, real estate and financial brokerage managers (NOC 0121)	23,305	618	0.64%	2.65%
Other professional engineers, n.e.c. (NOC 2148)	1,685	612	0.64%	36.32%
Human resources managers (NOC 0112)	13,908	595	0.62%	4.28%
Government managers - education policy development and program administration (NOC 0413)	2,494	590	0.61%	23.66%
Supervisors, finance and insurance office workers (NOC 1212)	17,648	584	0.61%	3.31%
Corporate sales managers (NOC 0601)	14,182	583	0.61%	4.11%
Forestry professionals (NOC 2122)	796	555	0.58%	69.72%
Other customer and information services representatives (NOC 6552)	73,291	552	0.57%	0.75%
Plumbers (NOC 7251)	5,592	551	0.57%	9.85%
Biological technologists and technicians (NOC 2221)	2,659	549	0.57%	20.65%
Purchasing and inventory control workers (NOC 1524)	28,217	544	0.57%	1.93%
Supervisors, petroleum, gas and chemical processing and utilities (NOC 9212)	1,906	527	0.55%	27.65%
Supervisors, electrical products manufacturing (NOC 9223)	11,835	507	0.53%	4.28%
Construction trades helpers and labourers (NOC 7611)	34,723	490	0.51%	1.41%
Social and community service workers (NOC 4212)	26,990	489	0.51%	1.81%
Social workers (NOC 4152)	13,718	484	0.50%	3.53%
Purchasing agents and officers (NOC 1225)	8,774	482	0.50%	5.49%
Computer engineers (except software engineers and designers) (NOC 2147)	10,292	467	0.49%	4.54%

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Supervisors, forest products processing (NOC 9215)	662	459	0.48%	69.34%
Executive assistants (NOC 1222)	11,354	454	0.47%	4.00%
Manufacturing managers (NOC 0911)	4,264	441	0.46%	10.34%
Accounting technicians and bookkeepers (NOC 1311)	28,396	437	0.45%	1.54%
Security guards and related security service occupations (NOC 6541)	17,492	425	0.44%	2.43%
Collectors (NOC 1435)	4,383	424	0.44%	9.67%
Supervisors, general office and administrative support workers (NOC 1211)	19,976	412	0.43%	2.06%
Industrial engineering and manufacturing technologists and technicians (NOC 2233)	4,970	408	0.42%	8.21%
Property administrators (NOC 1224)	7,673	403	0.42%	5.25%
Conservation and fishery officers (NOC 2224)	828	394	0.41%	47.58%
Petroleum engineers (NOC 2145)	1,148	391	0.41%	34.06%
Waterworks and gas maintenance workers (NOC 7442)	1,991	388	0.40%	19.49%
Administrative officers (NOC 1221)	3,271	382	0.40%	11.68%
Drafting technologists and technicians (NOC 2253)	3,441	378	0.39%	10.99%
Managers in health care (NOC 0311)	7,414	376	0.39%	5.07%
Food counter attendants, kitchen helpers and related support occupations (NOC 6711)	61,346	373	0.39%	0.61%
Geoscientists and oceanographers (NOC 2113)	877	370	0.39%	42.19%
Financial and investment analysts (NOC 1112)	9,629	350	0.36%	3.63%
Construction inspectors (NOC 2264)	1,871	349	0.36%	18.65%
Retail sales supervisors (NOC 6211)	53,594	348	0.36%	0.65%
Retail and wholesale trade managers (NOC 0621)	18,586	346	0.36%	1.86%
Electrical and electronics engineering technologists and technicians (NOC 2241)	4,430	342	0.36%	7.72%
Mathematicians, statisticians and actuaries (NOC 2161)	6,075	335	0.35%	5.51%

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Senior managers - health, education, social and community services and membership organizations (NOC 0014)	647	327	0.34%	50.54%
Production logistics co-ordinators (NOC 1523)	6,258	321	0.33%	5.13%
Public works maintenance equipment operators and related workers (NOC 7522)	4,183	311	0.32%	7.43%
Construction estimators (NOC 2234)	4,553	306	0.32%	6.72%
Other sales related occupations (NOC 6623)	24,577	287	0.30%	1.17%
Light duty cleaners (NOC 6731)	27,741	287	0.30%	1.03%
Food service supervisors (NOC 6311)	35,911	273	0.28%	0.76%
Janitors, caretakers and building superintendents (NOC 6733)	30,317	269	0.28%	0.89%
Managers in social, community and correctional services (NOC 0423)	6,071	262	0.27%	4.32%
Landscape and horticulture technicians and specialists (NOC 2225)	20,861	259	0.27%	1.24%
Industrial electricians (NOC 7242)	2,932	249	0.26%	8.49%
Lawyers and Quebec notaries (NOC 4112)	5,004	245	0.25%	4.90%
Supervisors, supply chain, tracking and scheduling co-ordination occupations (NOC 1215)	5,127	244	0.25%	4.76%
Other administrative services managers (NOC 0114)	2,988	241	0.25%	8.07%
Other assisting occupations in support of health services (NOC 3414)	13,948	240	0.25%	1.72%
Mechanical engineering technologists and technicians (NOC 2232)	3,071	238	0.25%	7.75%
Web designers and developers (NOC 2175)	16,978	236	0.25%	1.39%
Financial managers (NOC 0111)	3,784	232	0.24%	6.13%
Commissioned police officers (NOC 0431)	4,382	230	0.24%	5.25%
Nursing co-ordinators and supervisors (NOC 3011)	11,383	226	0.24%	1.99%
Supervisors, mining and quarrying (NOC 8221)	907	224	0.23%	24.70%
Government managers - health and social policy development and program administration (NOC 0411)	2,147	222	0.23%	10.34%
Architecture and science managers (NOC 0212)	3,050	213	0.22%	6.98%

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Electronic service technicians (household and business equipment) (NOC 2242)	2,402	213	0.22%	8.87%
Architects (NOC 2151)	1,134	213	0.22%	18.78%
Customer and information services supervisors (NOC 6314)	12,130	211	0.22%	1.74%
Other products assemblers, finishers and inspectors (NOC 9537)	6,712	209	0.22%	3.11%
Chemical technologists and technicians (NOC 2211)	2,310	205	0.21%	8.87%
Power engineers and power systems operators (NOC 9241)	1,056	205	0.21%	19.41%
Information systems testing technicians (NOC 2283)	7,437	203	0.21%	2.73%
Government managers - economic analysis, policy development and program administration (NOC 0412)	643	200	0.21%	31.10%
Geological engineers (NOC 2144)	399	199	0.21%	49.87%
Retail salespersons (NOC 6421)	83,351	198	0.21%	0.24%
Welders and related machine operators (NOC 7237)	10,266	198	0.21%	1.93%
Heavy equipment operators (except crane) (NOC 7521)	14,360	198	0.21%	1.38%
Purchasing managers (NOC 0113)	3,222	194	0.20%	6.02%
Health information management occupations (NOC 1252)	3,183	192	0.20%	6.03%
Oil and solid fuel heating mechanics (NOC 7331)	5,935	190	0.20%	3.20%
Mining engineers (NOC 2143)	780	187	0.19%	23.97%
Supervisors, mineral and metal processing (NOC 9211)	601	184	0.19%	30.62%
Oil and gas well drillers, servicers, testers and related workers (NOC 8232)	1,176	175	0.18%	14.88%
Other financial officers (NOC 1114)	18,091	174	0.18%	0.96%
Architectural technologists and technicians (NOC 2251)	2,956	172	0.18%	5.82%
Electricians (except industrial and power system) (NOC 7241)	7,689	164	0.17%	2.13%
General farm workers (NOC 8431)	16,091	164	0.17%	1.02%
Home building and renovation managers (NOC 0712)	4,302	162	0.17%	3.77%

National Occupational Classification Title (and Code)	Total	Environmental	Occupational Share	EnviroShare
Contractors and supervisors, oil and gas drilling and services (NOC 8222)	1,177	161	0.17%	13.68%
Mechanical assemblers and inspectors (NOC 9526)	2,377	157	0.16%	6.60%
Land surveyors (NOC 2154)	1,062	156	0.16%	14.69%
Metallurgical and materials engineers (NOC 2142)	715	156	0.16%	21.82%
Fire chiefs and senior firefighting officers (NOC 0432)	536	156	0.16%	29.10%
Other automotive mechanical installers and servicers (NOC 7535)	4,402	156	0.16%	3.54%
Food and beverage servers (NOC 6513)	30,148	155	0.16%	0.51%
Senior managers - construction, transportation, production and utilities (NOC 0016)	542	154	0.16%	28.41%
Senior government managers and officials (NOC 0012)	1,048	149	0.16%	14.22%
Managers in transportation (NOC 0731)	2,172	148	0.15%	6.81%
Shippers and receivers (NOC 1521)	9,379	145	0.15%	1.55%
Nurse aides, orderlies and patient service associates (NOC 3413)	23,714	145	0.15%	0.61%
Heavy-duty equipment mechanics (NOC 7312)	4,612	141	0.15%	3.06%
Agricultural service contractors, farm supervisors and specialized livestock workers (NOC 8252)	3,512	139	0.14%	3.96%
Chemical engineers (NOC 2134)	446	137	0.14%	30.72%
Supervisors, food and beverage processing (NOC 9213)	3,512	133	0.14%	3.79%
Library, archive, museum and art gallery managers (NOC 0511)	566	131	0.14%	23.14%
Licensed practical nurses (NOC 3233)	9,816	130	0.14%	1.32%
Other occupations	783,318	9,365	9.75%	1.20%



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