

Canadian Environmental Employment

Job posting trends (preliminary findings)

September 2017



About ECO Canada

For over 20 years, we've studied the environmental labour market and examined ways to improve access for new graduates as well as those entering the industry mid-career.

The data we collect provides insights on environmental career trends, from top jobs to skills gaps to high-growth sectors. Governments, educators, youth and industry planners use our findings to make decisions and formulate strategy.

Our research has also informed our development of the Environmental Professional Certification (EP) – an occupational standard for skills and training – as well as ongoing training and professional development for Canada's EPs.

Introduction

- Environmental employment is **cross-sectoral** (spread across industries), and previously, environmental occupations could not be organized into individual Statistics Canada National Occupational Classifications (NOCs).
- Therefore, ECO Canada developed the National Occupational Standards (NOS) for environmental work. The NOS have many applications, including certifying qualified environmental workers with the Environmental Professional certification.
- The development of these standards has enabled ECO to develop a framework, whereby environmental work (NOS) falls into 3 sectors and 13 sub-sectors. For more information: <http://www.eco.ca/wp-content/uploads/2016-NOS-for-Environmental-Professionals.pdf>. This ECO Canada Sector Model, is a useful tool for classifying environmental jobs, goods, services and technologies that contribute to environmental protection, resource management and sustainability in Canada.
- To gather its labour market information, ECO Canada has primarily used employer surveys, which represent point-in-time information and are costly to implement.



Introduction

ECO Canada is moving away from large multifaceted surveys as its primary source of labour market information and is examining new ways of measuring environmental employment. The following report is one of a suite of four preliminary reports:

- *Canadian Environmental Employment: Summary Analysis*
 - This report introduces some new concepts and ways of exploring trends in environmental employment. It summarizes the major findings of the following three, more detailed reports.
- ***Canadian Environmental Employment: Job Posting Trends***
 - **This report looks at how job posting analysis can be useful in looking at hiring trends and presents some findings for environmental employment.**
- *Canadian Environmental Employment: Supply and Demand*
 - ECO Canada has begun work on a supply-demand model, and this report presents some early findings.
- *Canadian Environmental Employment: Environmental Goods and Services*
 - This report analyses data from UK-company kMatrix and presents major findings on market size and employment. It also looks at the contribution of each ECO Canada sub-sector to Canada's GDP.

Introduction

In 2012, ECO Canada began using Job Posting Analysis (JPA) for estimating the size of the *core* environmental workers in Canada (workers who have at least one of ECO Canada's NOS) and mapping them to the NOC code (because each job posting is related to a NOC code).

- Now that a form of NOS-NOC mapping can be obtained ECO Canada is using the JPA to feed into a Labour Market Modelling System that will provide a more comprehensive picture of supply and demand for the environmental workforce.
- This report focuses on job postings and provides an analysis of trends for the environmental sector and for ECO Canada's sub-sectors. A separate report on environmental supply and demand will accompany this report in September 2017.





**WHAT IS JOB
POSTING ANALYSIS?**

What Is Job Posting Analysis?

- Spiders or bots crawl across the web and collect job ad information. This process usually follows a fixed schedule, spidering a predetermined bucket of websites.
- Once the data is located, they are extracted and coded into specific elements. The focus is on the context and sentence structure to determine the form, subject and meaning of each job ad.
- Algorithms that identify environmental employment, environmental sub-sectors and environmental National Occupational Standards (NOS) are applied to the job ad database. Jobs that match these criteria are tagged and summarized into a quarterly time series.
- From here, we can analyze some environmental trends in job advertisements.



**WHY IS JOB POSTING
DATA USEFUL?**

Why Is Job Posting Data Useful?

Good for job seekers

- Good source of information on skills in demand and companies that are hiring.



Good for policymakers

- Real-time data that enables early detection of labour demand trends.



Good for researchers

- Only way to link environmental jobs to the existing NOC codes.



Challenges with Job Scraping

- Not all jobs are advertised, and not all job ads are fully translated into jobs. Job ads do, however, serve as a leading indicator of ensuing hiring trends, and it is possible to discern relationships between the number of jobs ads compared to the actual number of hires.
- The common practice of posting the same job ads on multiple websites can lead to considerable over-estimation of job ads. (The process to identify and remove duplicate jobs as is known as *deduplication*). For this reason, it is important to impose time frames. ECO Canada considers that after 60 days, the same job ad is considered to be new.
- Job ads collected every quarter can be irregular due to the following reasons:
 - **Seasonality:** Q1 and Q2 typically have higher number of job ads, while Q4 is typically the lowest
 - **Sources:** More sources (employer websites/aggregators) are added each quarter to increase the number of job ads collected
 - **Spidering technology:** Some job aggregators try to prevent bots from scraping their website, leading to a drop in collected job ads
- In order to overcome variations in the data attributed to data collection difficulties, the proportion of environmental job ads compared to total job ads is used for trend analysis.



WHAT WE DID

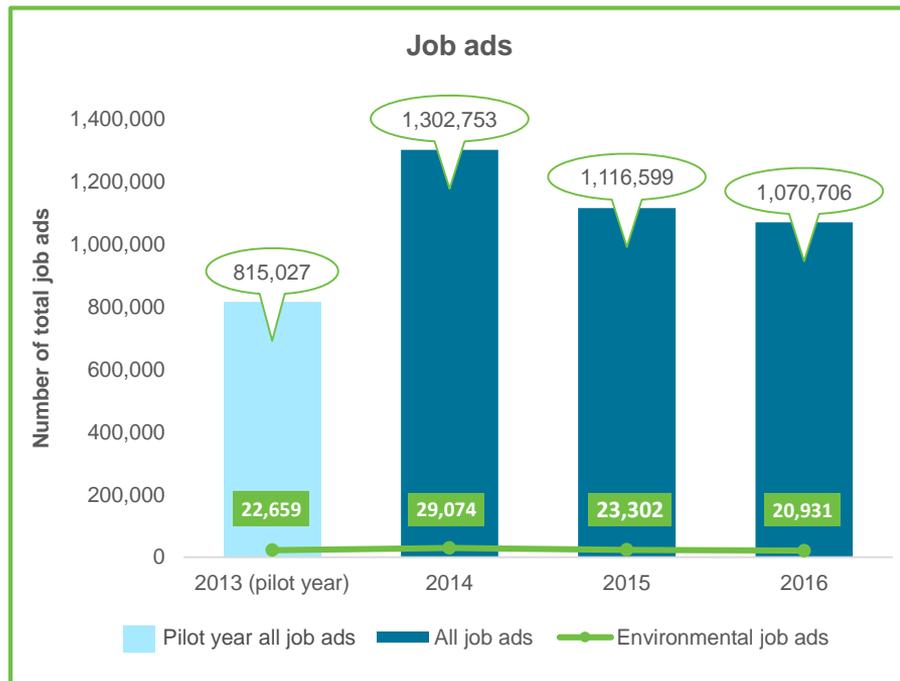
What We Did

- Job ad data is provided by Burning Glass Technologies, an online job ads aggregator, and analyzed and tagged by Field Guide Consulting to identify environmental job ads.
- Between Q1 2013 and Q4 2016, a large subset of online job postings were scraped and analysed to see if they required environmental skills (competencies as defined by ECO Canada).
- Those postings were further analysed to classify them according to the NOC and ECO Canada subsector. Matching is done at 1, 2 and 3-digit NOC levels to make sure all environmental jobs are scraped.
- The data presented here was recorded on a national level by quarter.



ENVIRONMENT SECTOR TRENDS

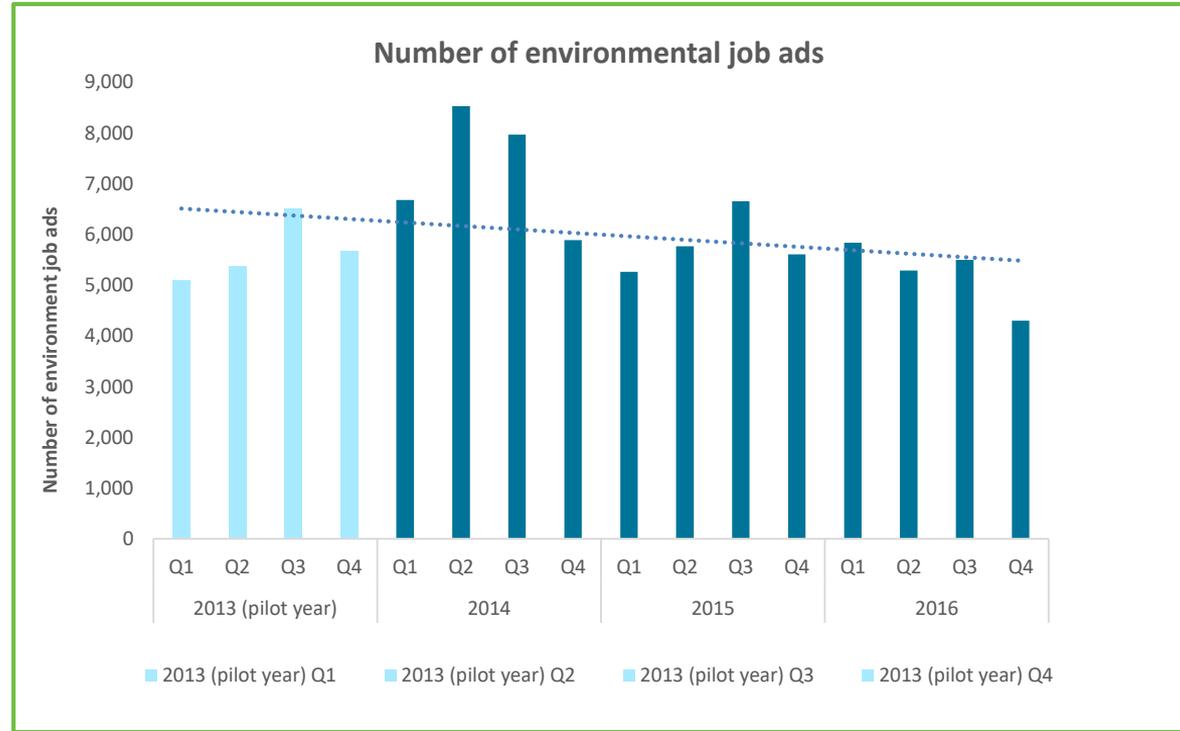
Total vs Environmental Canadian Job Ads, Annual



- Data collection started in 2013, so as more sources (employer website/ aggregators) were added, an increase in job ad numbers was seen between 2013 and 2014.
- **Total job ads peaked in 2014 at 1.3 million** and dropped to 1 million by 2016 as economy slowed down in 2015/2016.
- Environmental job ads mirrored total job ads in that they **peaked in 2014 with nearly 29,000 environmental job postings** and dropped to nearly 21,000 in 2016.

Environmental Job Ads, Quarterly

- Q2 and Q3 2014 experienced the highest number of postings for environmental jobs at nearly 8,500 and 8,000 respectively.**
- Quarterly, the number of job ads appears to be quite erratic, and more data needs to be gathered for trends; however, we can see that Q3 has the highest number of job postings in 3 out of the 4 years shown, and Q4 2016 is the only year to see fewer than 5,000 job postings.

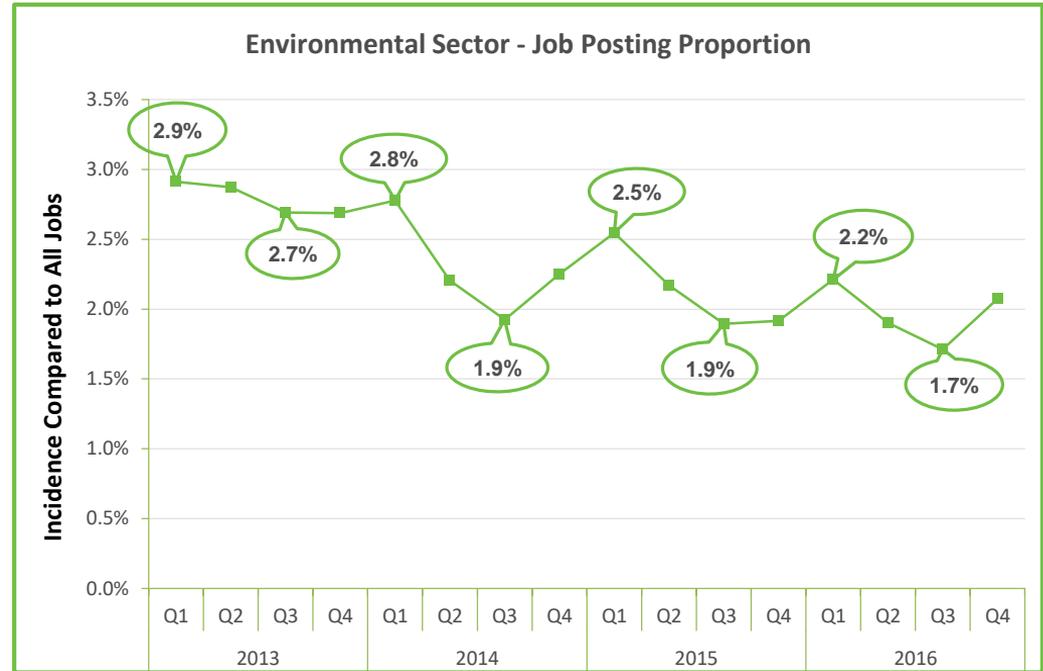


Proportion of Canadian Environmental Job Ads

- The proportion of environmental job ads is defined as the percentage of total job ads that require environmental competencies.
- The environmental sector in this report refers to the total number of job ads that contained at least one environmental competency.

Proportion of Canadian Environmental Jobs

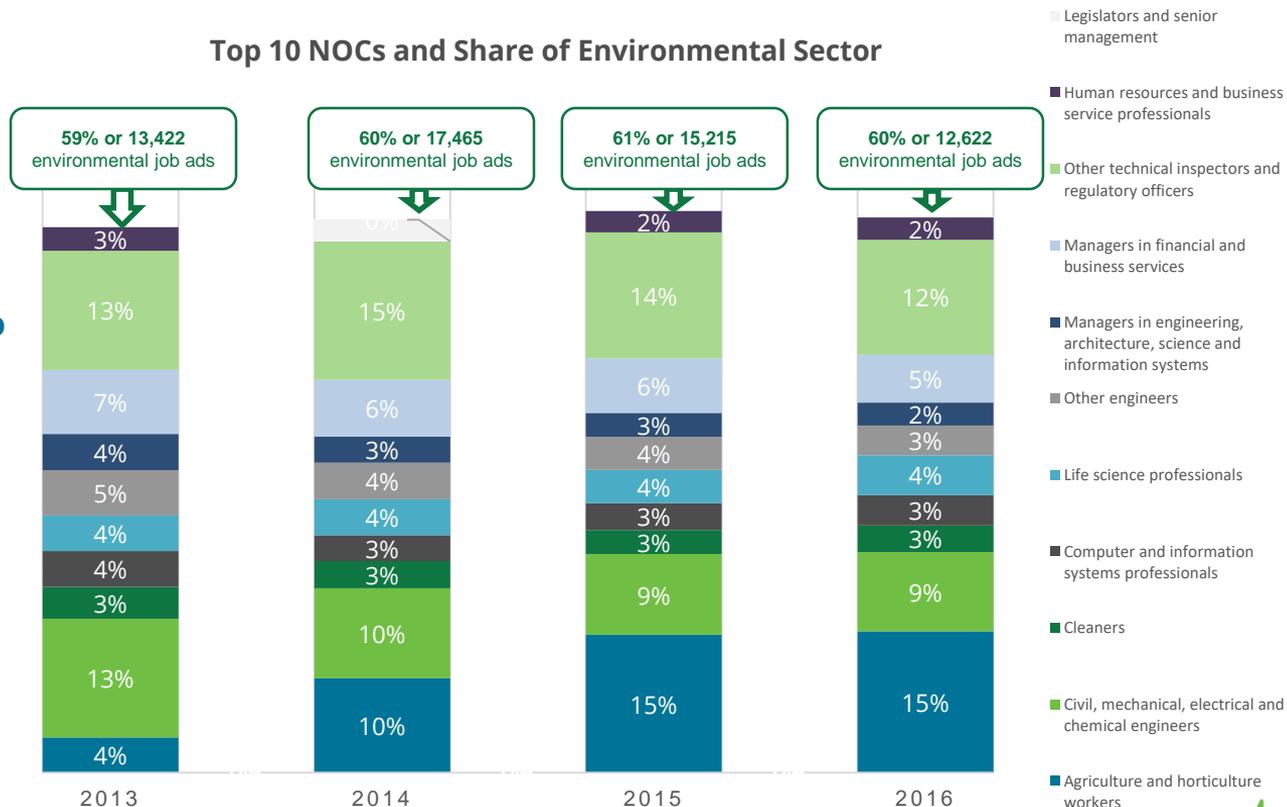
- **Q1** saw the **highest** proportion of environmental job ads in each of the years presented.
- **Q3** saw the **lowest** proportion of environmental job ads in each of the years presented.
- The highest environmental proportion (**2.9%**) was experienced in **2013**, which was the pilot year and before commodity prices collapsed.
- Even though Q2 and Q3 2014 had the highest number of environmental job postings, the proportion of job ads, compared to total job ads was among the lowest.



Top 10 NOCs in the Environmental Sector (Share)

- The top 10 NOCs in terms of share of job ads remain consistent over the 4 years with only one difference in 2014. **Agriculture and horticulture workers steadily increase in share to become the top ranked NOC by 2016**, followed by other technical inspectors and regulatory officers, and civil, mechanical, electrical and chemical engineers.
- The 10 NOCs make up approximately 60% of the total sector.

Top 10 NOCs and Share of Environmental Sector



Top 3 NOCs in the Environmental Sector

- Discounting the pilot year, three NOCs have consistently maintained the top-three largest shares of the environmental job ads.
- Agriculture and horticulture workers is the only NOC to consistently increase its share of the sector over the four years of job ads.

	2013		2014		2015		2016	
Rank	NOC	Share	NOC	Share	NOC	Share	NOC	Share
1	(NOC 213) Civil, mechanical, electrical and chemical engineers	12.9%	(NOC 226) Other technical inspectors and regulatory officers	15.0%	(NOC 843) Agriculture and horticulture workers	15.0%	(NOC 843) Agriculture and horticulture workers	15.4%
2	(NOC 226) Other technical inspectors and regulatory officers	12.9%	(NOC 843) Agriculture and horticulture workers	10.2%	(NOC 226) Other technical inspectors and regulatory officers	13.7%	(NOC 226) Other technical inspectors and regulatory officers	12.5%
3	(NOC 012) Managers in financial and business services	7.0%	(NOC 213) Civil, mechanical, electrical and chemical engineers	9.8%	(NOC 213) Civil, mechanical, electrical and chemical engineers	8.8%	(NOC 213) Civil, mechanical, electrical and chemical engineers	8.6%

Environmental Sector Summary

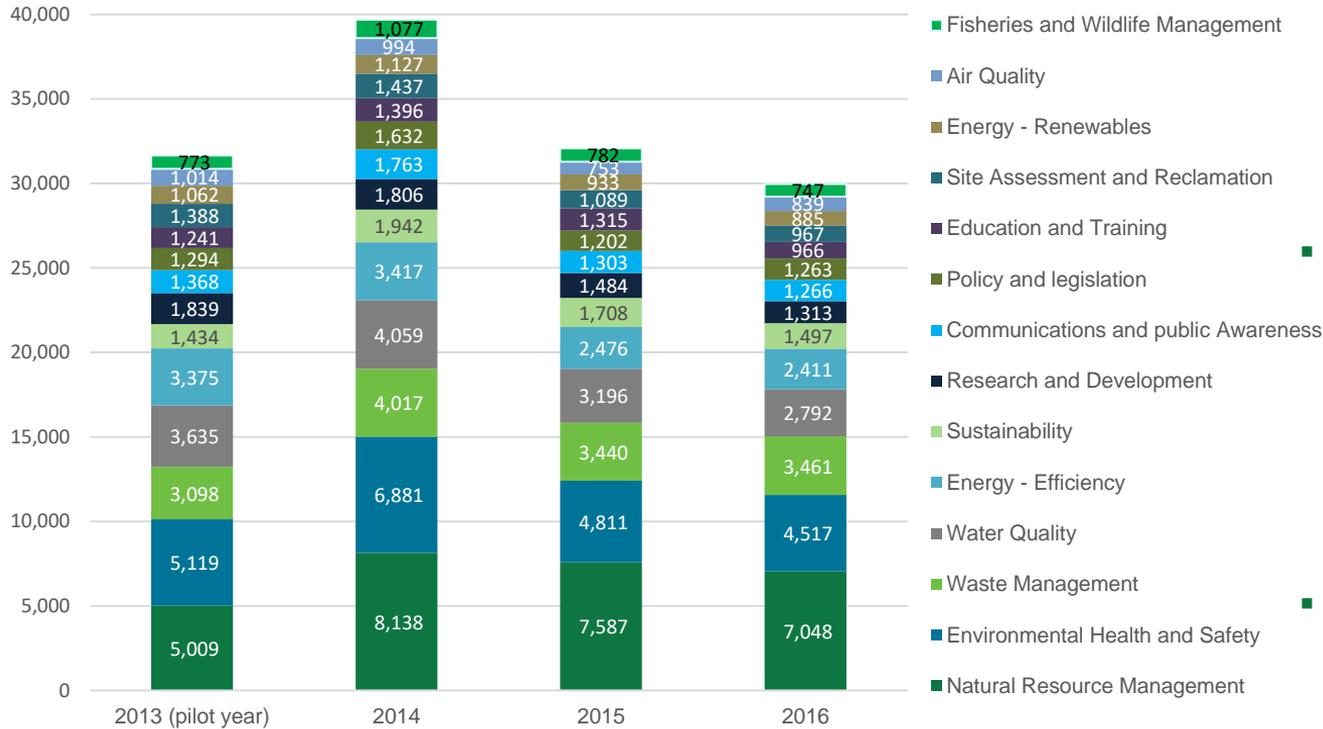
- 1 All job ads peaked in 2014 at 1.3 million and dropped to 1 million in 2016
- 2 Environmental job ads also peaked in 2014 at 30,000 dropped to 21,000 by 2016.
- 3 Q1 consistently saw the highest proportion of environmental jobs and Q3 saw the lowest.
- 4 Agriculture and horticulture workers, Other technical inspectors and regulatory officers, and Civil, mechanical, electrical and chemical engineers were consistently in the top 3 NOCs from 2014 to 2016.



SUB-SECTOR TRENDS

Sub-sector Trends

Number of job advertisements by ECO sub-sector



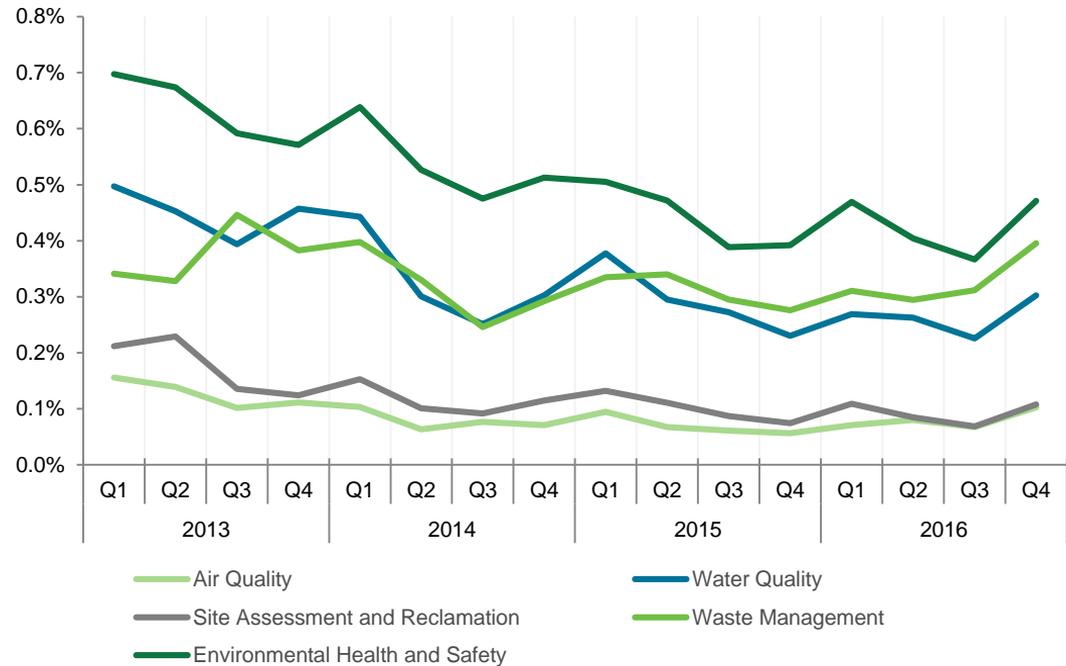
- From 2014-2016, **Natural Resource Management has the highest number of job ads**, followed by environmental health and safety.
- NOCs, such as agriculture and horticulture, that have a high number of job ads within these larger sub-sectors exhibited a large share of the environment sector as a whole.
- The sub-sector with the lowest number of job ads is Fisheries and Wildlife Management.

NOTE: The sum of job ads by sub-sector may or may not match the total for the environmental sector since there can be a single job ad that is mapped to in multiple sub-sectors.

Sub-sector Trends – Environmental Protection

- Within the Environmental Protection Sector, **Environmental Health and Safety has the highest proportion of environmental job ads**, followed by Waste Management and Water Quality.
- Waste Management is the only sub-sector to experience a higher environmental percentage at the end of the analysis period (Q4 2016) than at the beginning.
- However, all sub-sectors in Environmental Protection started to recover in Q4 2016 as economy began to improve.

Environmental Protection sub-sector job ads as percentage of all job ads



Sub-sector Trends – Environmental Protection

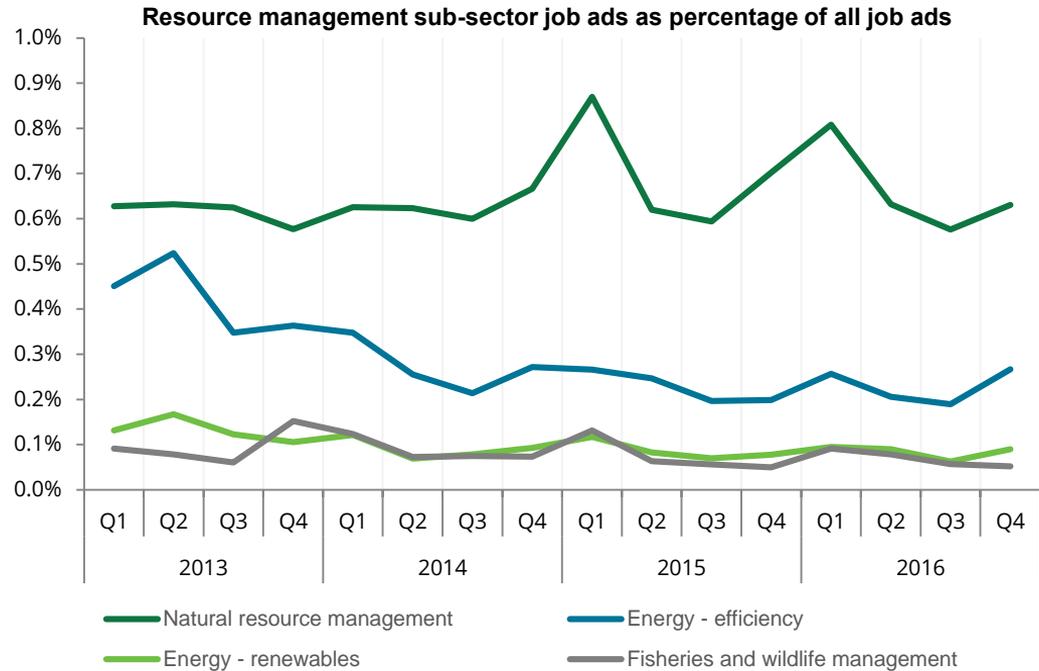
Table of top 3 NOCs with the highest number of jobs in each sub-sector by year

	Air Quality				Water Quality				Site Assessment and Reclamation				Waste Management				Environmental Health and Safety				
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	
Civil, mechanical, electrical and chemical engineers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Life science professionals	✓		✓						✓	✓	✓	✓									
Managers in financial and business services				✓			✓	✓	✓	✓	✓	✓						✓	✓		
Other engineers		✓																	✓	✓	
Managers in engineering, architecture, science and information systems					✓																
Longshore workers and material handlers																	✓	✓		✓	
Motor vehicle and transit drivers													✓	✓	✓	✓					
Cleaners														✓							
Utilities equipment operators and controllers					✓	✓	✓	✓													
Harvesting, landscaping and natural resources labourers													✓		✓						
Plumbers, pipefitters and gas fitters						✓															
Sales and account representatives - wholesale trade (non-technical)																✓					
Other technical inspectors and regulatory officers	✓	✓	✓	✓													✓	✓	✓	✓	

- Civil, mechanical, electrical and chemical engineers appear at some point in the top 3 NOCs for all Environmental Protection sub-sectors.
- Site Assessment and Reclamation has the most consistent top 3 NOCs over the four years.

Sub-sector Trends – Resource Management

- Among the Resource Management sector, **Natural Resource Management has the largest proportion of environmental jobs**, followed by Energy - Efficiency.
- All sub-sectors recovered somewhat in Q4 2016 except Fisheries and Wildlife Management. The price of fish continued to drop in 2016, partially accounting for lower industry investment.



Sub-sector Trends – Resource Management

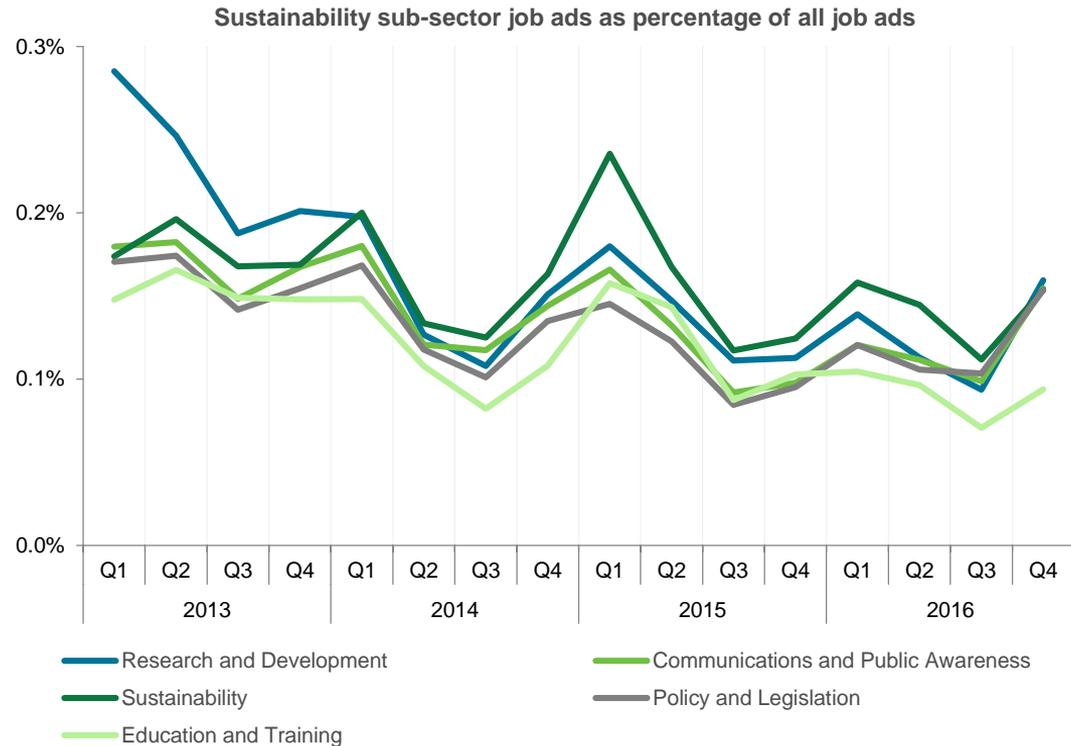
Table of top 3 NOCs with the highest number of jobs in each sub-sector by year

	Natural Resource Management (NRM)				Energy – Efficiency				Energy – Renewables				Fisheries and Wildlife Management (FWM)			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Agriculture and horticulture workers	✓	✓	✓	✓												
Civil, mechanical, electrical and chemical engineers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Life science professionals	✓	✓	✓	✓								✓	✓	✓	✓	✓
Managers in financial and business services					✓	✓	✓	✓	✓	✓	✓	✓	✓			
Other engineers									✓							
Technical occupations in life sciences													✓	✓	✓	✓
Computer and information systems professionals					✓	✓	✓	✓			✓					
Corporate sales managers										✓						
Managers in agriculture, horticulture and aquaculture														✓	✓	✓

- Agriculture is the top NOC for all 4 years in NRM, the largest sub-sector.
- Civil, mechanical, electrical and chemical engineers are in the top 3 NOCs for all Resource Management sub-sectors except FWM where life sciences are by far the most prevalent NOC.

Sub-sector Trends - Sustainability

- The sub-sectors in this category move in tandem. Most of the jobs in environmental Sustainability include a combination of education, research, policy/legislation and communications skill requirements.
- The spike in Q1 2015 is mainly due to recovery in energy prices in Q1 2015 that could not be sustained after oil prices dropped for the rest of 2015 and into 2016.
- All sub-sectors recovered somewhat in Q4 2016, however education and training did not rebound to the same level. It is not uncommon for training to experience a lag, even as the economy recovers.



Sub-sector Trends - Sustainability

Table of top 3 NOCs with the highest number of jobs in each sub-sector by year

	Policy and Legislation				Sustainability				Education and Training				Research and Development				Communications and Public Awareness			
	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016	2013	2014	2015	2016
Civil, mechanical, electrical and chemical engineers	✓	✓		✓	✓	✓		✓					✓	✓	✓	✓	✓	✓		✓
Life science professionals						✓	✓	✓					✓	✓	✓	✓				✓
Managers in financial and business services	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Legislators and senior management							✓													
Policy and program researchers, consultants and officers	✓	✓	✓	✓													✓	✓	✓	
Physical science professionals													✓							
University professors and post-secondary assistants									✓	✓	✓	✓								
Judges, lawyers and Quebec notaries			✓																	✓
Other technical inspectors and regulatory officers					✓				✓	✓	✓	✓								

- Managers in financial and business services are in the top 3 NOCs for all Sustainability sub-sectors, and Civil, mechanical engineers etc. are once again in the top 3 for almost all the sub-sectors.

Sub-sector Summary

- 1 Natural Resource Management had the largest proportion of environmental job ads among all ECO Canada's sub-sectors
- 2 Within NRM, agriculture and horticulture had the highest number of job ads (more than 3,000 in 2016), highlighting the need for workers in this field.
- 3 Waste Management had the highest number of NOCs.
- 4 Research and Development had the fewest number of NOCs.
- 5 Civil, mechanical, electrical and chemical engineers were in the top 3 NOCs in 12 out of 14 sub-sectors (the most of any NOC), suggesting the most transferability between sub-sectors is in this NOC.

Conclusion

- Overall environmental job ads increased from 2013 to 2014, but dropped considerably in 2015/2016.

Outlook is promising

- Q1 2016 was the bottom for commodity prices, and job ads data for most of sub-sectors have picked up in last quarter of 2016.
- Federal government supports clean technology and desires to address climate change and pollution.
- Canada's job creation in the first half of 2017 has been strong, including the latest increase in June according to the Conference Board of Canada. The labour market momentum aligns with other indicators suggesting that the Canadian economy grew by close to 3% in the 2nd quarter.