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LABOUR MARKET INFORMATION

Blue Occupation Pathways: From Vulnerable Jobs to Rapid-Growth Careers

SUMMARY REPORT

September 2022

Acknowledgements

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Canada

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The Sustainable Blue Economy

The sustainable blue economy encompasses an ocean sector that functions with healthy oceans and sustainable business practices at the forefront. The relationship between healthy ocean economies and sustainable oceans is central to a sustainable blue economy.

The global ocean economy is expected to double in size between 2016 and 2030 to $3 trillion.[1] Given the increase in activity and Canada's enormous coastline, the sustainable blue economy is an area of high economic potential for Canada. For this potential to be realized, additional workers are needed in a wide variety of occupations that will be critical to the sustainable growth of Canada's oceans sector. Overall, we identified 71 occupations in the sustainable blue economy, but the focus of this analysis is on the 15 occupations that are most highly concentrated in this sector, are rapidly growing, and contribute to the social and environmental sustainability of the oceans and ocean communities.[2]

The sustainable blue economy includes the environmental, social, and economic sustainability of the ocean.

1 Organisation for Economic Co-operation and Development, *The Ocean Economy in 2030*.
2 For more information, see Appendix B: Sustainable Blue Economy Occupations in *Blue Occupational Pathways: From Vulnerable Jobs to High-Growth Careers (Technical Paper)*, The Conference Board of Canada and ECO Canada, September 2022.

High Growth Occupations in the Sustainable Blue Economy

- Computer and information systems managers
- Contractors and supervisors, oil and gas drilling and services
- Civil engineers
- Database analysts and data administrators
- Electrical and electronics engineers
- Geological engineers
- Longshore workers
- Mechanical engineers
- Metallurgical and materials engineers
- Program leaders and instructors in recreation, sport and fitness
- Software engineers and designers
- Technical occupations in geomatics and meteorology
- Tour and travel guides
- Urban and land use planners
- Water transport deck and engine room crew

Many of the occupations that are essential to the sustainable growth of Canada's blue economy are Science, Technology, Engineering and Mathematics (STEM) roles, which are also in high demand in other industries across Canada.

As Canada's sustainable blue economy grows and evolves, increasing numbers of workers in these occupations will be needed in the ocean sector. One option available to ocean sector employers needing workers is to attempt to attract them from other sectors of Canada's economy. However, competing for scarce workers is difficult when other industries provide higher compensation than the employers in the ocean sector can offer.

An alternative approach is to collaborate with governments and post-secondary and training institutions to train workers in at-risk jobs so that they can transition into these, and other, high growth blue economy occupations. This study highlights the training needed and costs incurred by those in high-risk, low-mobility (HRLM) occupations who want to transition to in-demand sustainable blue economy occupations.

Spotlight: High-Risk, Low-Mobility (HRLM) Jobs

As technology becomes more embedded in our lives and innovation changes the way we do business, workers across all industries are finding it necessary to adapt. Unfortunately, for some occupations, automation can transform the workplace so dramatically that workers face job losses. These are occupations which tend to have repetitive tasks, do not involve significant interaction with other people or do not require higher levels of education.

At the same time, workers in many of these occupations have few low-risk employment alternatives to choose from, due to lower levels of education and training. Transitioning into higher-growth occupations requires a hefty cost in terms of time and money for retraining workers, resulting in low job mobility.

Nearly 20% of workers are in these high-risk, low mobility (HRLM) occupations, which include (but are not limited to):

Accommodation and food services	Manufacturing	Retail Trade	Construction	Health Care and Social Assistance
Food counter attendants, kitchen helpers and related support occupations	Motor vehicle assemblers, inspectors and testers	Cashiers	Construction trades helpers and labourers	Receptionists
Cooks	Welders and related machine operators	Other customer and information services representatives	Painters and decorators (except interior decorators)	General office support workers
Cashiers	Other labourers in processing, manufacturing and utilities	Other medical technologists and technicians (except dental health)	Contractors and supervisors, heavy equipment operator crews	Food counter attendants, kitchen helpers, and related support occupations
Hotel front desk clerks	Machinists and machining and tooling inspectors	General office support workers	Administrative assistants	Cooks
Other customer and information services representatives	Process control and machine operators, food and beverage processing	Food counter attendants, kitchen helpers and related support occupations	General office support workers	Medical laboratory technologists

Source: Darren Gresch, Responding to Automation, The Conference Board of Canada, March 2020.

Skills Matching, Feasible Transitions and Desirable Transitions[3]

To identify viable avenues that workers in HRLM occupations can take to transition to sustainable blue economy jobs, our study considers three aspects of each potential pathway:

- How similar are the skills in the two occupations?
- How much training is required to shift from one skill level to another?
- Does the new occupation pay comparable wages to the old occupation?

Figure 1

Three Conditions Define Feasible and Desirable Occupational Transitions

Source: The Conference Board of Canada.

3 For additional information, see Appendix A: Methodology in *Blue Occupational Pathways: From Vulnerable Jobs to High-Growth Careers (Technical Paper)*, The Conference Board of Canada and ECO Canada, September 2022.

Skills Similarity Score

Skills are classified into two broad categories: cognitive skills (general human capital) and task-based skills (specific human capital). A skills similarity score for each pair of occupations (old vs. new) has been estimated using information from O*NET and Vicinity Jobs. The skills similarity score ranges from 0 (completely dissimilar) to 1 (completely similar).

Skill Level Progression

Skill levels are determined by the amount of training, education, and experience required and the complexity of work involved compared to other occupations. Moving from a lower to a higher skill level category almost always requires on-the-job training or additional formal education.

Our study assumes that any upward progression is proportional to the training effort.

- A minor training effort (6 months or less) results in no skill level progression[4]
- A moderate training effort (1 year) leads to one level of progression
- A major training effort (3 years) yields two levels of progression

Feasible transitions require the skills similarity score between the two occupations to be greater than 0.85 and the skills progression to be two levels or less. For a **feasible transition** to be considered a **desirable transition**, any reduction in wages due to the transition must be less than 10% of the pre-transition wage.

4 The minor training effort is necessary to transition to different occupations with the same skill level but is insufficient upward mobility on the skill ladder.

More Sustainable Blue Economy Career Transitions Become Desirable With More Training

We identified 92 HRLM occupations that we tried to match to the 15 high-growth sustainable blue economy occupations, for a total of 1,380 potential transitions between HRLM and sustainable blue economy occupations. Not all of these are feasible or desirable.

Table 1

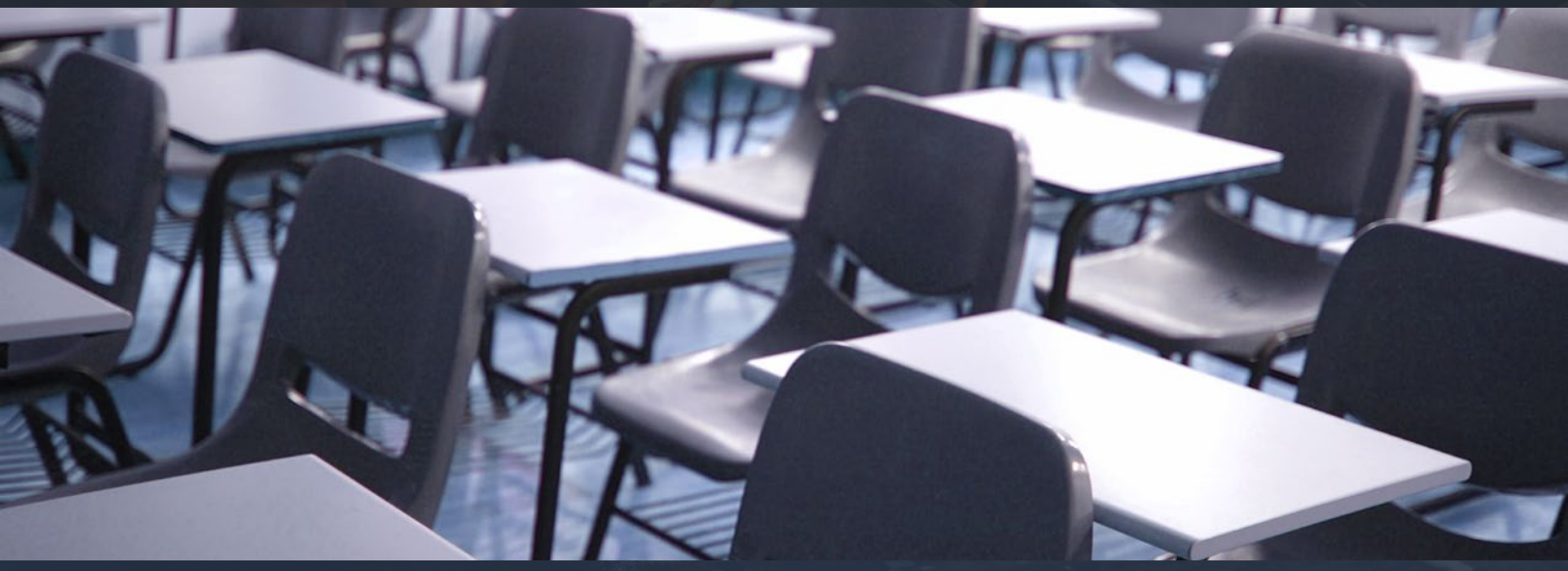
The Number of Transition Pathways Increases Substantially With More Training

Training Scenario	Feasible Transition Pathways	Desirable Transition Pathways
Minor training (6 months)	308	192
Moderate training (1 year)	687	500
Major training (3 years)	1,203	1,005

Sources: The Conference Board of Canada; O*NET; Vicinity Jobs.

Moving from one year to three years of training does not make all transitions feasible because the skills are either too dissimilar or the difference between skill levels is unrealistically large (i.e., greater than two). Many rapid-growth sustainable blue economy occupations are dominated by science, technology, engineering, and mathematics (STEM), with highly specialized skills, which may explain why it is difficult to fully close this gap.

Moreover, the drop in transitions from adding our desirability requirement demonstrates that many rapid-growth occupations in the sustainable blue economy would pay too little for HRLM workers.



SPOTLIGHT: Examples of Desirable Transitions

Top 10 HRLM Occupations That Can Transition to "Technical Occupations in Geomatics and Meteorology"

1	Medical laboratory technologists
2	Forestry technologists and technicians
3	Financial auditors and accountants
4	Inspectors and testers, mineral and metal processing
5	Court reporters, medical transcriptionists and related occupations
6	Administrative assistants
7	General office support workers
8	Other medical technologists and technicians (except dental health)
9	Machine operators and inspectors, electrical apparatus manufacturing
10	Collectors

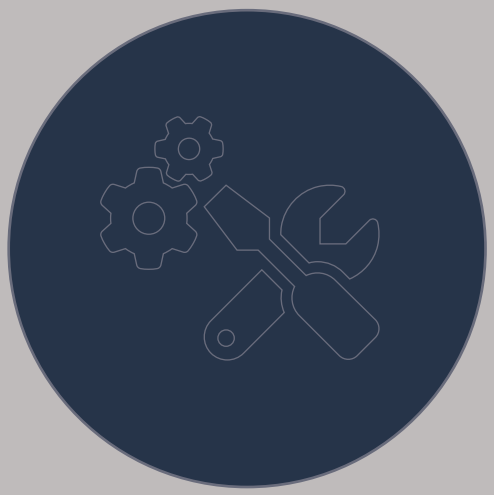
Sources: The Conference Board of Canada; O*NET; Vicinity Jobs. Occupations are in descending order in terms of the ease of transition based on skills similarity.

SPOTLIGHT: Examples of Desirable Transitions

Top 10 HRLM Occupations That Can Transition to "Mining, Geological and Petroleum Engineers"

1	Financial auditors and accountants
2	Medical laboratory technologists
3	Forestry technologists and technicians
4	Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations
5	Administrative assistants
6	Other medical technologists and technicians (except dental health)
7	Collectors
8	Inspectors and testers, mineral and metal processing
9	General office support workers
10	Other customer and information services representatives

Sources: The Conference Board of Canada; O*NET; Vicinity Jobs. Occupations are in descending order in terms of the ease of transition based on skills similarity.

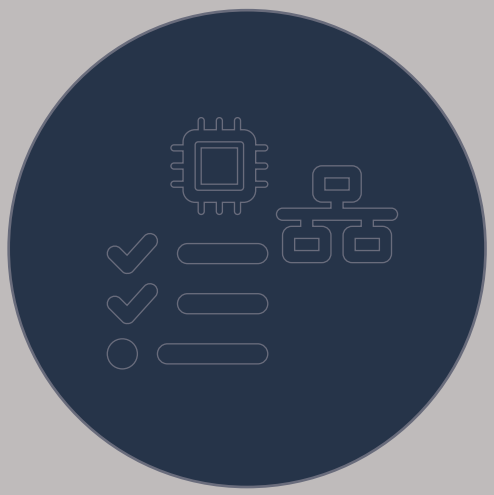


SPOTLIGHT: Examples of Desirable Transitions

Top 10 HRLM Occupations That Can Transition to "Computer and Information Systems Managers"

1	Financial auditors and accountants
2	Medical laboratory technologists
3	Contractors and supervisors, machining, metal forming, shaping and erecting trades and related occupations
4	Forestry technologists and technicians
5	Administrative assistants
6	Other medical technologists and technicians (except dental health)
7	Contractors and supervisors, heavy equipment operator crews
8	Court reporters, medical transcriptionists and related occupations
9	Power engineers and power systems operators
10	Cooks

Sources: The Conference Board of Canada; O*NET; Vicinity Jobs.
Occupations are in descending order in terms of the ease of transition based on skills similarity.



The Cost to Transition Varies by Region[5]

Although the major training scenario has the most potential career paths between HRLM and rapid-growth sustainable blue economy occupations, it is also the most expensive option. This is especially true in Alberta where there are high indirect costs because of the relatively high wages for HRLM positions in the province. In the Atlantic provinces, the indirect costs of training are relatively low, but the direct costs are high.

Table 2

The Cost of Transitioning Into Rapid-Growth Sustainable Blue Economy Occupations Varies Greatly by Training Effort and Province

Province/Territory	Minor training (6 months)	Moderate training (1 year)	Major training (3 years)
Alberta	$35,800	$72,800	$208,400
Saskatchewan	$32,800	$66,800	$190,700
Nunavut	$37,000	$69,900	$182,800
Prince Edward Island	$31,900	$63,900	$185,400
Northwest Territories	$33,100	$64,300	$182,700
British Columbia	$29,300	$59,700	$172,700
Newfoundland and Labrador	$29,500	$61,300	$169,700
Manitoba	$28,900	$58,700	$168,800
New Brunswick	$28,500	$57,900	$167,100
Canada	$28,200	$57,400	$165,000
Yukon	$28,900	$57,000	$163,400
Ontario	$28,100	$57,200	$163,600
Nova Scotia	$27,300	$55,800	$161,200
Quebec	$23,800	$48,300	$139,200

Note: Costs do not increase proportionally between training scenarios because each comprises different pathways (i.e. transition pairs), and each pathway is associated with different costs. Numbers are rounded to the nearest $100.

Sources: The Conference Board of Canada; O*NET; Vicinity Jobs; Statistics Canada.

5 For more information, see Appendix B: Detailed Results in *Blue Occupational Pathways: From Vulnerable Jobs to High-Growth Careers (Technical Paper)*, The Conference Board of Canada and ECO Canada, September 2022.

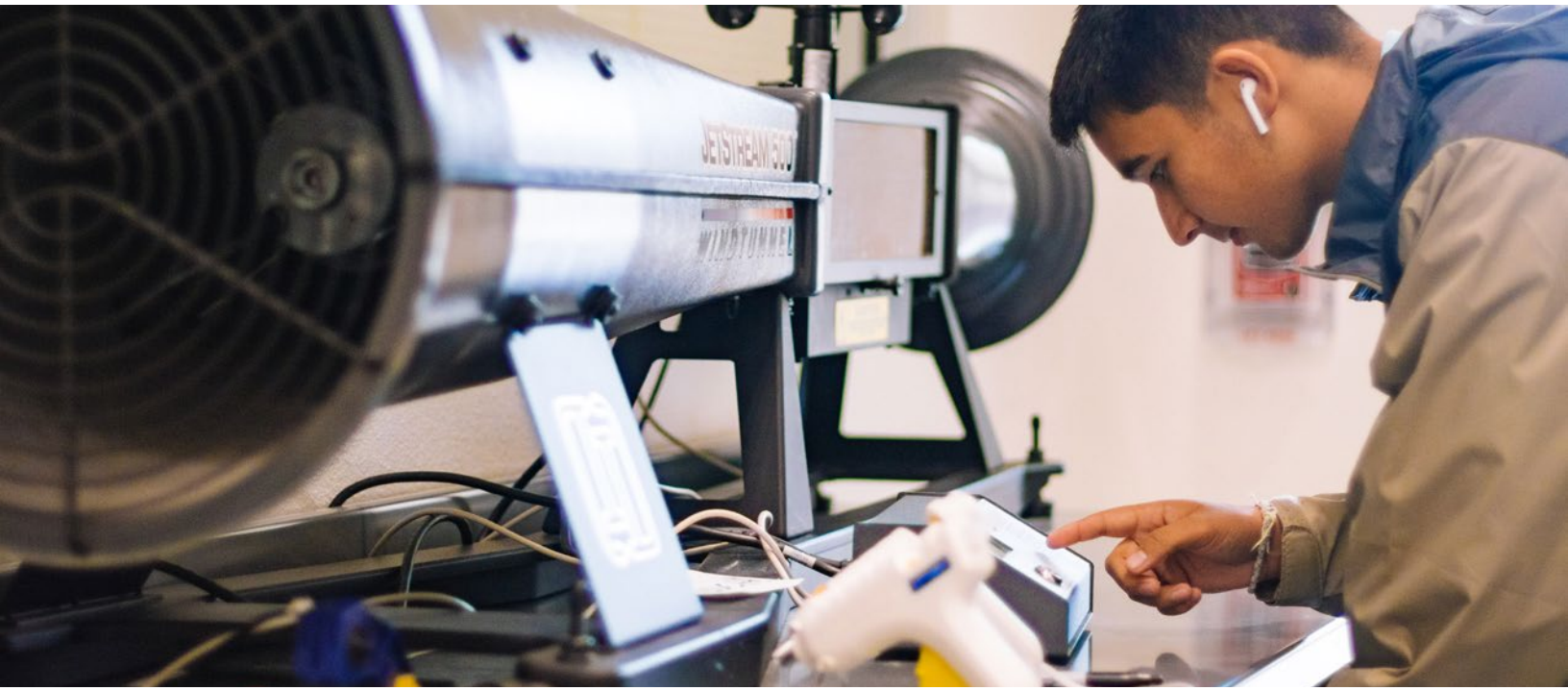
Understanding Specific Transition Gaps

Identifying desirable occupation pathways and the associated training effort to realize these transitions is only one component of the equation. Workers and training providers must also know the specific knowledge, abilities, and skills upgrades needed to make those paths viable.[6] Using the same occupational survey data from O*NET and job postings data from Vicinity Jobs, we examine detailed gaps between rapid growth occupations in the sustainable blue economy and HRLM jobs.

Some Skills Gaps Are More Important Than Others

In aggregate, the top knowledge areas in need of upgrading are mostly associated with STEM fields. In terms of abilities, sustainable blue economy occupations require workers to have **more original ideas and robust mathematical and deductive reasoning skills** than workers in HRLM jobs. In terms of specific work activities, employment in the sustainable blue economy requires **strong creative thinking, data analysis, knowledge development, and provision of consultation and advice**.

Overall, better targeting of training and upskilling efforts has the potential to increase participation in training programs and completion rates, ultimately helping Canadians with vulnerable jobs make the best career and training choices. Understanding what skills and abilities are most needed and where to acquire them will allow workers to quickly identify and take advantage of emerging opportunities. This will improve their resilience in a labour market that is constantly evolving in the face of technological changes.



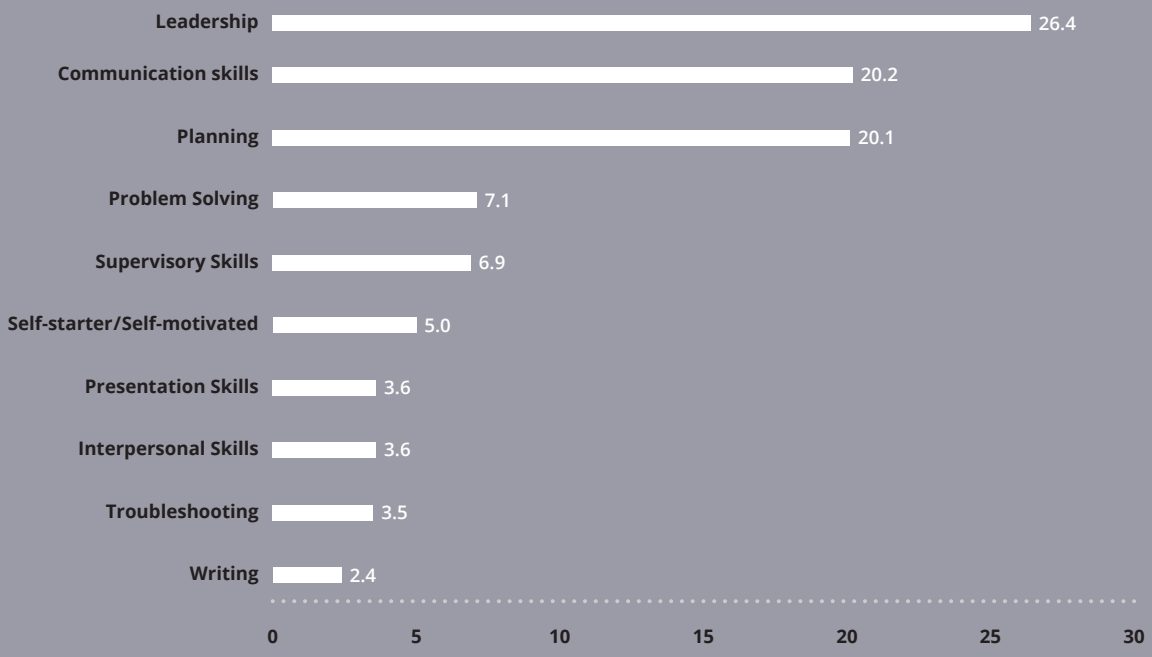
6 Oschinski and Nguyen, *Finding the Right Job*.

General Skills

Among general skills, **leadership** is the most important skill that HRLM workers transitioning into the sustainable blue economy must acquire, reflecting the importance of leading by example and inspiring co-workers with creative thinking. **Communication** is also an important skill to obtain as sustainable blue economy workers are expected to convey insights from complex analytical research.

Chart 1

A Variety of General Skills Are Needed to Transition to Sustainable Blue Economy Occupations, but the Top Skills Are Leadership, Communication, and Planning (percentage difference; top 10 skill differences)



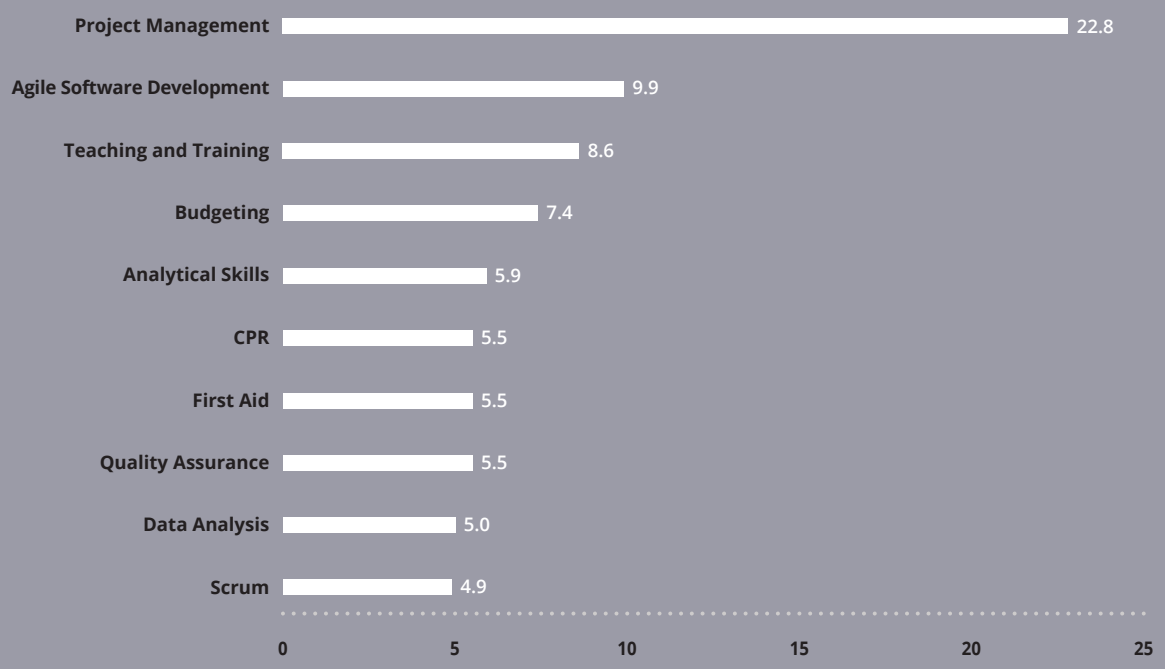
Note: Differences in general skills correspond to the percentage difference of job postings between origin and destination occupations containing a given skill. For example, 26.4 percent more job postings contained leadership for sustainable blue economy occupations than for HRLM occupations.

Specialized Skills

In terms of specialized skills, **project management** is the most important to acquire, reflecting the importance of assembling and leading a team to success. Given the fast-evolving nature of quantitative tasks, **software development and training** are also important skills for sustainable blue economy occupations.

Chart 2

Project Management is the Most Needed Specialized Skill
(percentage difference; top 10 skill differences)



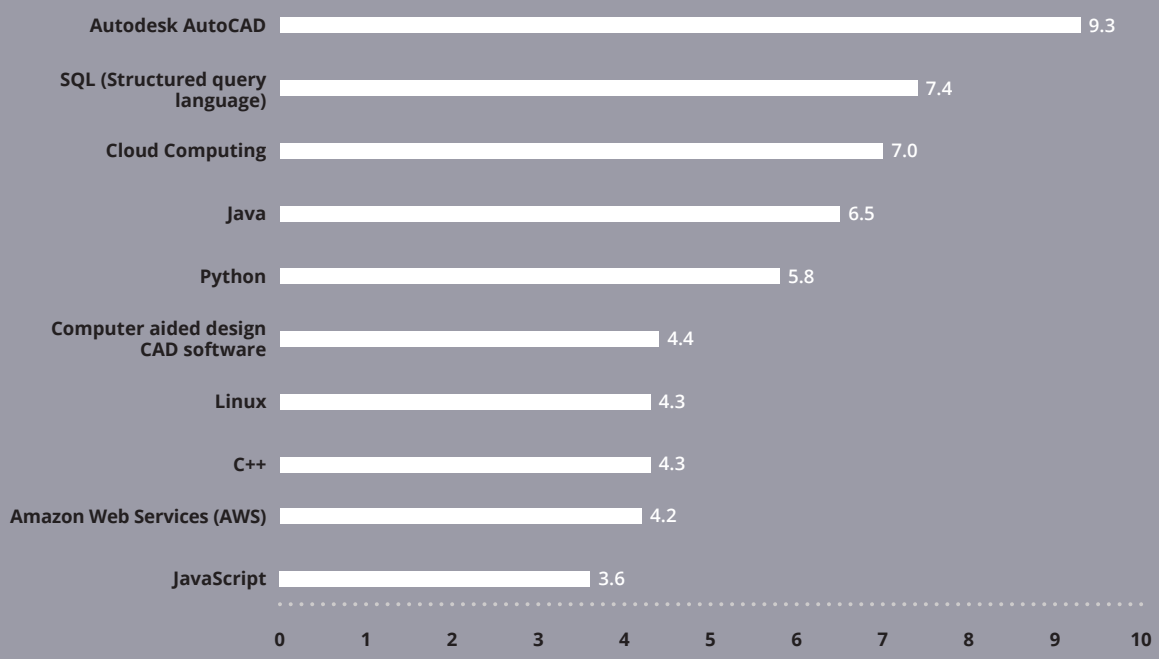
Note: Differences in specialized skills correspond to the percentage difference of job postings between origin and destination occupations containing a given skill. For example, 9.9 percent more job postings contained agile software development for sustainable blue economy occupations than for HRLM occupations.

Technology Skills and Tools

Technology skills and tools are the most specific among the three types of skills we focus on. It is worth noting that while some software will be useful for many different jobs (e.g., Python), some will be useful for a limited number of jobs (e.g., AutoCAD). Although some technology skills have transferability, ultimately, workers need to know different types of software depending on the job to which they want to transition.

Chart 3

Workers Transitioning to the Sustainable Blue Economy Need to Know Different Types of Software, Depending on the Job (percentage difference; top 10 skill differences)



Note: Differences in technology skills correspond to the percentage difference of job postings between origin and destination occupations containing a given skill. For example, 4.3 percent more job postings contained C++ for SBE occupations than for HRLM occupations.

Conclusion

Strengthening the sustainable blue economy can lead to stronger coastal communities, healthier oceans, and a more diverse workforce. There are many potential transitions from vulnerable occupations to rapidly growing ones in the sustainable blue economy.

The opportunity to transition is different across the country and organizations in the sustainable blue economy will have to compete for the same talent pool as many other sectors, including the digital and clean economies.

At the same time, there are different cost considerations when transitioning from vulnerable occupations to rapid growth ones in the sustainable blue economy. Workers in Quebec have a relatively lower cost of transition due to relatively low tuition and fees. In contrast, workers in Atlantic Canada face relatively high direct costs of training and Albertan workers have high indirect costs since HRLM occupations have higher wages in Alberta.

Lastly, there are significant skills gaps for HRLM workers to overcome to enter high-growth sustainable blue economy occupations, which are largely STEM-related occupations or require highly specialized skills.

Together, these results suggest that a collaborative effort between government, post-secondary and training institutions and employers will be needed to reduce the observed skills gaps and help more Canadians transition from HRLM roles into the sustainable blue economy.

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CONTACT US

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ECO Canada

Suite 400, 105 12 Avenue SE
Calgary, Alberta T2G 1A1

P : 1-800-890-1924

E : research@eco.ca

W : eco.ca

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