



FINAL REPORT

Yukon Water and Wastewater Sector Profile Report

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Yukon
Government

Executive Summary

The Government of Yukon is leading a five-year Yukon Water Strategy which includes priorities related to the protection and improvement of drinking water and wastewater. Essential to the nature of the drinking water and wastewater sector, a clear picture of the current state of the sector, including number and types of systems and workforce demographics, is required. Similar studies have been conducted by other jurisdictions, including a National level labour report undertaken by the Environmental Careers Organisation in 2010, and a Provincial level labour report undertaken by R.A. Malatest & Associates Ltd on behalf of the British Columbia Water and Wastewater Association in 2015. Both reports identified gaps in supply and demand of qualified workers experienced due to retirements, competition with other sectors, changing technology and consequent training demands, and evolving regulation.

The objective of this report is to support the Government of Yukon by providing a current profile of the sector developed through original, research conducted in the Yukon. Data collection included a Water and Wastewater Workshop to seek information from those actively working or contributing to the sector. This original data was then used to identify trends in the Yukon sector that relate to the sector profile seen across Canada. The findings of this report are intended to help guide next steps to address gaps and challenges faced by the water and wastewater sector

Findings and conclusions drawn from this study include:

Market Size and Composition:

- Remote location and smaller populations result in a limited labour supply
- Currently, the Yukon has a top heavy and maturing workforce
- The majority of the workforce is male
- Recruitment of new operators is a challenge

Compensation

- Wages are perceived as a recruitment and retention issue

Competencies and Skills:

- Training to advance skills beyond technical requirements is desired
- There is a lack of a local support network and communication
- 6 of 46 certified facilities in the Yukon do not have operators in good certification standing, or who meet the required certification level

Yukon's remote communities encourages the opportunity for direct community engagement, both with possible improved recruitment possibilities and developing linkages to high school students. Improving awareness of the industry was seen as a necessary element to workforce planning, as was restructuring the qualification process to be equivalent to traditional trades qualification. The unique challenges faced by the water and waste water sector in Yukon can be resolved with innovative northern solutions. Through further engagement with all contributors (regulators, owners, Operators, First Nations and communities) many of these challenges can be overcome to create a thriving and sustainable sector.

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1.0 Introduction

Government of Yukon is leading a five-year Yukon Water Strategy (GY, 2014) which is guided by the following priorities:

- Better Understand and Manage Yukon's Groundwater
- Plan for Water Needs Now and in the Future
- Improve Water Management Programs
- Maintain/Improve Access to Safe Drinking Water
- Promote the Sustainable Use of Water

The strategy includes an action plan to ensure the Yukon will always have water for nature and water for people, and identifies more than 50 actions the Government of Yukon will undertake to meet these goals. As part of the Yukon Water Strategy, a Yukon Water Forum was held in 2016 that brought people together to discuss water in the Yukon. During the forum, a variety of topics were discussed, including those specific to drinking water and wastewater such as the status of certification for drinking water and wastewater operators, support for water and wastewater operators, and ongoing training of operators to maintain and upgrade their skills.

Government of Yukon, Community Services, Operations and Programs branch (GY-OP) provides municipal services, including operation and maintenance of drinking water and wastewater facilities, to unincorporated communities and rural areas throughout the Yukon. The branch oversees the operation and maintenance of community infrastructure and service delivery programs for solid waste and water management (GY, 2016). GY-OP has been tasked as a lead, co-lead and/or participant on several of the Yukon Water Strategy actions that are focused on drinking water and wastewater.

Yukon's drinking water and wastewater systems are essential public utilities that contribute to the health and safety of residents. To ensure the on-going operation

and maintenance of drinking water and wastewater systems vital to residents, it is important to understand the workforce that maintains the systems on a daily basis. Without skilled workers that have proper training and certification, there is a risk of communities being exposed to waterborne diseases.

Further, understanding labour trends in the Yukon water and wastewater workforce provides opportunities for effective planning and to improve the support for operation and maintenance of drinking water and wastewater systems. In the Yukon, the water and wastewater treatment systems are managed by GY-OP, municipalities, unincorporated communities, and/or First Nation communities. GY-OP plays an active role in the sector, in some cases the systems are managed and operated by GY-OP and in others GY-OP provides support to municipalities and communities. Classification of drinking water and wastewater systems and certification requirements for operators is administered through the Environmental Operators Certification Program (EOCP) based in British Columbia (BC). Training and professional development opportunities are provided through EOCP, Yukon College and the British Columbia Water and Wastewater Association (BCWWA).

GY-OP is actively involved in identifying current challenges and short and long term solutions for recruiting and retaining water and wastewater operators through information gathering, stakeholder collaboration, data analysis and development of next steps. The objective of this report is to support the GY-OP by providing a current profile of the sector developed through original, research conducted in the Yukon. Data collection included a Water and Wastewater Workshop to seek information from those actively working or contributing to the sector. This original data was then used to identify trends in the Yukon sector that relate to the sector profile seen across Canada. The findings of this report are intended to help guide next steps to address gaps and challenges faced by the water and wastewater sector.



2.0 Background

In 2010, Environmental Careers Organisation (ECO) completed the Municipal Water & Waste Management Labour Market Study. The study identified and investigated critical human resource issues facing Canadian municipalities in regard to environmental practitioners employed in municipal water, wastewater, and solid waste facilities (ECO, 2010). The information provided in the report was intended to provide a better understanding of labour supply patterns and trends which ultimately could enhance retention and improve recruitment because of clearer career pathways.

In 2015, the BCWWA and EOCP commissioned an independent study to develop a comprehensive profile of BC's water and wastewater operations workforce (supply and demand) for present conditions and forecasted conditions until at least 2025. The results of the study were intended to identify crucial program changes that may be needed over five years to address shifting market conditions. The study confirmed and quantified the anticipated demand for certified operators and provided data about the magnitude of the human resources gaps in various regions of the BC (Malatest, 2015).

In 2016 GY-OP commissioned a cross-jurisdictional review of the drinking water and wastewater operator's certification processes and requirements in British Columbia, Alberta, Northwest Territories and the Yukon. The review was completed to better understand the certification environment for operators working within Canada, and to also better understand the certification environment from a northern perspective,

which is influenced by potential challenges experienced uniquely in northern jurisdictions, including:

- Remote location for operations
- Smaller population size
- Availability of trained operators
- Resources for education, certification and professional development
- Operator retention
- Varying complexity of treatment systems
- Varying roles and responsibilities for community operators (unlike larger jurisdictions, often in small communities the operator looks after many tasks related to water and wastewater, increasing the training and certification requirements)

These unique challenges risk compounding the overarching sector changes seen in BC and across Canada. The following subsections provide background on the Yukon water and wastewater sector, a summary of some of the trends identified in Canada as outlined by the ECO (2010) and the BCWWA (Malatest, 2015). Infrastructure Canada developed the Building Canada Fund to support municipalities in upgrading and replacing existing water and wastewater infrastructure. Understanding that this new infrastructure would require qualified employees, ECO completed a comprehensive labour review which was designed to:

"...identify and investigate critical human resource issues facing Canadian municipalities in regards to environmental practitioners employed in municipal water, wastewater, and solid waste facilities" (ECO, 2010).

In BC BCWWA and EOCP (Malatest, 2015), identified similar trends to ECO with gaps in supply and demand of qualified, experienced workers due to retirements, competition with other sectors, changing technology and consequent training demands, and evolving regulation.

2.1 Yukon Water and Wastewater Certification

Certification of operators for large public drinking water and bulk delivery systems is a regulated requirement within the Yukon Territory, whereas certification for wastewater and small water systems is a voluntary program. The operator certification program is administered by the EOCP which also serves as a registration body for water and wastewater facilities and training programs. Training for the program is provided by Yukon College, as well as variety of other training providers not located in the territory. Presently, there is not a Yukon-based operators’ association. The BCWWA currently provides services in the Yukon.

Figure 2.1 Summary of Yukon Territory Water & Wastewater Operator Certification Framework



¹ A small system serves a population of less than 500 people, there are four types of Small System Facility Classification certificates (ECOP, 2017b):

- Small Water System
- Small Wastewater System – Lagoons
- Small Wastewater Systems – Mechanical
- Bulk Water Delivery

2.1.1 Regulatory Requirements

Water and wastewater operations within the Yukon Territory are regulated by the Yukon Public Health and Safety Act (PHSA, 2002). The PHSA gives the Commissioner in Executive Council the right to make regulations respecting the location, construction, maintenance, purification, and treatment of water supplies and systems (Section 2).

Regulations under the PHSA, specifically the Drinking Water Regulation (O.I.C. 2007/139), provide further detail concerning certification requirements for water supply and water delivery operators. The Drinking Water Regulation specifies that an owner of a large public drinking water system shall ensure that the operator holds a valid operator certification certificate of a classification rating that is equivalent to or greater than facility class assigned to a water system (Section 33). Large drinking water systems are defined under the Drinking Water Regulation (2007) as any system which has 15 or more service connections to a piped distribution system; or five or more delivery sites on a trucked distribution system.

The Yukon Drinking Water Regulation (2007) defines an operator certification certificate as a certificate issued by the British Columbia Environmental Operators Certification Program (EOCP) or a comparable facility classification issued by a Canadian certification jurisdiction signatory. Bulk water delivery is also included under the Drinking Water Regulation, with similar certification requirements for all bulk water delivery operators (Section 75).

Operator certification for small water treatment and distribution systems¹, as well as wastewater treatment and collection services is currently not a regulated requirement within the Yukon. Although, operators are encouraged to become certified voluntarily.

2.1.2 Certification Requirements

Large water system and bulk delivery operators within the Yukon are required to obtain an operators certificate issued by the EOCP or a comparable Canadian certificate. All public water systems in the Yukon are required to obtain an operations permit issued by the Government of Yukon - Environmental Health Services, and must conform to the requirements of the Public Health Act and its regulations. Although each facility must be permitted through Environmental Health Services, the responsibility of ensuring operator certification and facility classification falls on the owner of the facility, and operators are not currently required to be registered with the Government of Yukon.

2.1.3 Facility Classification

Waterworks and wastewater facilities are classified by the EOCP according to a facility classification points system. Facilities are classified into five (5) levels, from Small Systems to Levels I through IV, with Level IV systems

being the most complex. The EOCP classification system includes: small water systems (SWS), small wastewater systems (SWWS), water distribution and treatment systems (WD - Levels I to IV), wastewater collection and treatment systems (WWC - Levels I to IV), and industrial wastewater treatment systems (WWT - Levels I to IV). With a total of 29 systems, currently the Yukon has the following numbers of facilities by EOCP certification (EOCP, 2016):

- SWS: 19 facilities
- SWWS: 1
- WD: 4
- WWC: 2
- WWT: 3

2.1.4 Operator Certification

The EOCP offers four (4) types of water and wastewater operator certification, including an entry level Operator-in-Training certification. Certification types include Small Systems, Multi-Unit operators, and the standard certification type (Levels I-IV). To qualify to write an

Table 2.1: Environmental Operators Certification Program – Education and Experience Requirements

Operator Type	Operator Level	Education	Minimum Certification	Operating Experience	DRC Operation
Entry Level	Operator-in-Training	Grade 12 or GED ¹	-	-	-
Small Systems	Small Water System	1.2 CEUs ²	SWS ³	0.5	-
	Small Wastewater System - Lagoons	1.2 CEUs	SWS-L ⁴	0.5	-
	Small Wastewater System - Mechanical	1.2 CEUs	SWS-M ⁵	0.5	-
Level I-IV	Level I	Grade 12 or GED	-	1	-
	Level II	Grade 12 or GED	Level I	3	-
	Level III	2 years post-secondary or 90 CEUs	Level II	4	2
	Level IV	4 years post-secondary or 180 CEUs	Level III	4	2
Multi-Unit	Level I	Grade 12 or GED	-	1	-
	Level II	Completion of approved training course (0.6 CEUs)	Level I -MU	3	-

Note:

¹ General Education Development ⁴ Small Water System – Lagoon
² Continuing Educational Units ⁵ Small Wastewater System - Mechanical
³ Small Water Systems

EOCP operator exam, applicants must meet the specified education and experience requirements.

Within the Small Systems certification type, the EOCP offers three (3) additional specializations for small system operators. This includes Small Water System, Small Wastewater System – Lagoons, and Small Wastewater System – Mechanical. To qualify to write an EOCP small systems certification exam, applicants must have a minimum of six (6) months operating experience and 1.2 Continuing Education Units (CEUs). A single CEU is equal to ten (10) contract hours of participation in an organized, continuing education experience under responsible sponsorship, capable direction, and qualified instruction (EOCP, 2016).

The EOCP also offers Multi-Unit operators certification. This type of certification is suitable for operators working with two (2) or more utilities, or in municipalities with smaller populations (less than 10,000). The certification was created out of the recognition that some operators are exposed to many situations where skill and experience can be applied across multiple utilities. The Multi-Unit certification is also well suited for facilities that do not require a full-time operator but do require an operator to be available at all times.

Although the EOCP offers some additional certification types and specializations, the general framework of the program reflects Canadian national standards (CWWOC, 2014).

2.1.5 Training and Support

Training and educational requirements are specified by the certifying body, and therefore depend on which certification was obtained. Yukon College does provide an entry-level training option designed to fulfill the required training for certification through EOCP. Courses are offered either as a complete Yukon Water and Waster Operator Program, or can be taken individually for EOCP Continued Education Unit (CEU) credit. Courses vary in length from single day technical courses such as Iron and Manganese Removal or

Wellhead Protection Planning, to more generalized training such as a five-day courses on water distribution, collection, or bulk delivery. Yukon College also offers a four-day Basic Small Water Systems Operations course, designed to prepare small system operators to write their EOCP exam. In addition, Yukon College is currently offering a two-day course designed specifically for Little Salmon Carmacks Water Treatment Plant operators. Most courses are offered as a classroom-based option, hosted at the Yukon College campus in Whitehorse, Yukon.

Although there is no association currently active within the Yukon, water and wastewater operators in the Yukon are encouraged to become members of the BC Water and Waste Association. The BC Water and Waste Association provides support to Yukon and BC based operators, through professional development, networking events, as well as operator education and training opportunities.

2.2 Management and Operation of Systems

In the Yukon, water and wastewater systems are in First Nation communities, unincorporated communities and municipalities. The systems are owned and operated by First Nation governments, GY-OPS and municipalities or villages and are summarised in Figure 2.2 and Table 2.2.

Figure 2.2: Location of Systems in the Yukon



Table 2.2: Yukon Wide System Operation

Community Information		Drinking Water System				Wastewater System	
Community	Population ¹	GW/SW ²	Drinking Water Systems/Water Users ³	Distribution ⁴	Owner /Operator	Type of Wastewater System	Owner/Operator
Beaver Creek	93	GW	2 SPDWS	Piped	White River First Nation	Septic Systems	
			Fire Hall	Public fill station and piped directly to building	Government of Yukon, Property Management		
Burwash Landing	72	GW	LPDWS	Trucked	Kluane First Nation	Septic systems pumped and wastewater trucked to facultative lagoon	
Carcross	301	SW	LPDWS	Trucked Piped to school and ambulance bay Self-serve fill point	Government of Yukon, Community Services	Septic systems pumped and wastewater trucked to facultative lagoon	Government of Yukon, Community Services
Carmacks	493	GW	LPDWS	Trucked	Little Salmon Carmacks First Nation	Mechanical treatment plant	Village of Carmacks
Champagne & Takhini Subdivision	90*	GW	SPDWS	Trucked from Takhini plant	Champagne Ashiak First Nation		
Dawson City	1,375	GW	LPDWS	Piped and trucked	City of Dawson	Mechanical treatment plant	Community Services (treatment + discharge) City of Dawson (collection)
Deep Creek		GW	SPDWS	Self serve	Government of Yukon, Community Services	Septic Systems	

Table 2.2: Yukon Wide System Operation (cont.)

Community Information		Drinking Water System				Wastewater System	
Community	Population ¹	GW/SW ²	Drinking Water Systems / Water Sources ³	Distribution ⁴	Owner /Operator	Type of Wastewater System	Owner/Operator
Destruction Bay	55	GW	Three different systems: Kluane School, Health Care Centre and Fire Hall	Direct connection or piped	Government of Yukon	Septic systems pumped and wastewater trucked to facultative lagoon in Burwash Landing	
Faro	448	GW	LPDWS	Piped	Town of Faro	Septic systems pumped and wastewater trucked to facultative lagoon	Town of Faro
Haines Junction	613	GW	LPDWS	Piped	Village of Haines Junction	Piped distribution and Septic systems pumped and wastewater trucked to facultative lagoon	Village of Haines Junction
		GW	Trucked distribution system (source Haines Junction LPDWS)	Trucked	Champagne and Aishihik First Nations		
Ibex Valley	20-30*	GW	Ibex Valley Fire Hall	Direct connection to fire hall Self-serve	Government of Yukon		
Keno City	20	GW	No Public DWS	Trucked from Mayo	Government, of Yukon, Community Services	Septic systems	
Klondike Valley Firehall	20-30*	GW	SPDWS	Direct connection to fire hall self-serve	Government of Yukon, Community Services		
Marsh Lake	696	SW	Army Beach WTP	Self-serve	Government of Yukon, Community Services	Septic systems	
		GW	SPDWS (Firehall)	Piped to firehall building Self-serve	Government of Yukon, Community Services		
		GW	Community Centre	Piped building	Government of Yukon, Community Services		
		SW/ GW	Delivered water from AB or WH LPDWS)	Trucked	Other		

Table 2.2: Yukon Wide System Operation (cont.)

Community Information		Drinking Water System				Wastewater System	
Community	Population ¹	GW/SW ²	Drinking Water Systems / Water Sources ³	Distribution ⁴	Owner /Operator	Type of Wastewater System	Owner/Operator
Mayo	200	GW	LPDWS	Piped Trucked	Village of Mayo	Piped distribution and Septic systems pumped and wastewater trucked to facultative lagoon	Village of Mayo
		GW	LPDWS	Trucked Piped connection to Government building	First Nation of Nacho Nyak Dun		
Mendenhall	165*	GW	SPDWS	Self-serve	Government of Yukon, Community Services	Septic systems	
Old Crow	221	GW	LPDWS	Trucked	Government of Yukon, Community Services	Septic systems pumped and wastewater trucked to facultative lagoon	Community Services
Pelly Crossing	353	GW	LPDWS	Piped & Trucked	Selkirk First Nation	Septic systems pumped and wastewater trucked to sewage disposal facility	Selkirk First Nation
Ross River	293	GW	LPDWS	Trucked	Government of Yukon, Community Services	Septic systems pumped and wastewater trucked to sewage disposal facility	Community Services
Tagish	249	GW	SPDWS	Self-serve	Government of Yukon, Community Services		
		GW	SPDWS	Trucked	Carcross Tagish First Nation		
Teslin	124	GW	LPDWS	Trucked	Village of Teslin	Wastewater piped and deposited into lagoon system	Village of Teslin

Table 2.2: Yukon Wide System Operation (cont.)

Community Information		Drinking Water System				Wastewater System		
Community	Population ¹	GW/SW ²	Drinking Water Systems /z Water Sources ³	Distribution ⁴	Owner /Operator	Type of Wastewater System	Owner/Operator	
Watson Lake	790	GW	LPDWS	Piped	Town of Watson Lake	Wastewater piped and deposited into lagoon system	Town of Watson Lake	
		GW	Delivered from LFN Lower Post WTP (DWS regulated in BC)					
Whitehorse	25,085	GW	LPDWS	Piped	City of Whitehorse	Wastewater piped and deposited into lagoon system	COW	
		GW	2 Trucked distribution systems (source Whitehorse LPDWS)	Trucked	Commercial			
		GW	Trucked distribution systems (source WH LPDWS)	Trucked	KDFN			

Community information and drinking water system source: http://www.env.gov.yk.ca/publications-maps/documents/yukonwater_climatechange_report.pdf and Yukon Source Water Supply Protection Study (Tetra Tech, 2017)

Notes:

Table includes public water supply systems and is not inclusive of systems servicing individual public buildings such as schools, health care centers, airports, etc.

1 Population based on 2017 census data from Statistics Canada, unless otherwise noted

2 GW – groundwater source, SW – surface water source

3 Drinking Water System is community or source of water provision:

LPDWS – Large Public Drinking Water System

SPDWS – Small Public Drinking Water System

Delivered water – No local source, delivered from a drinking water system in another community

Trucked Distribution System – Registered trucked system, delivering water from another drinking water system in the same community

4 Distribution:

Piped – Distributed to users through a piped system

Trucked – Distributed to users through truck delivery

Self-serve – Location where the public can access drinking water

*Source Tetra Tech, 2017

Does not include private wells

2.3 Succession Planning

Nationwide, there are difficulties with aging infrastructure associated with water and wastewater treatment systems and an aging workforce. As of 2000, water and wastewater systems² made up approximately 30 per cent (%) of Canada's municipal infrastructure stock, the Canadian Water and Wastewater Association (CWWA) estimated that Canada would need \$88.5 billion to upgrade existing infrastructure and build new water and sewer systems between 1997 and 2012 (Mirza, 2007). There remains a major need to rehabilitate water and sewage infrastructure, especially in larger, older cities, and in smaller municipalities with populations smaller than 10,000, where water-supply systems may not exist and large investments will be needed to build the system from scratch (Mirza, 2007).

Investment in water and wastewater systems in Yukon have been collaboratively funded with Federal funding programs; more than \$18 million has been spent on water treatment plants for unincorporated communities from 2008 to 2013 (Government of Yukon, 2013). More than \$32 million was identified in the Department of Community Services' 2012-13 budget for planning and construction of key drinking water projects across the territory. Drinking water projects underway in 2012-13 through joint investment from Canada and Yukon under the Building Canada Fund include upgrades to water treatment in Carcross, Mayo, Old Crow, Ross River, Teslin, Tagish and Haines Junction and water system upgrades in Faro, Watson Lake, Deep Creek, Rock Creek and Mendenhall. Further water and wastewater infrastructure upgrades are being undertaken through the Gas Tax Fund with \$7.875 million for 48 local infrastructure projects. An agreement signed June 2016 between the federal and Yukon governments includes over \$60 million in funding from Canada and Yukon for 21 projects in the territory through the Clean Water and Wastewater Fund. The funding is to support water and wastewater projects in Yukon communities such as the

Town of Faro where pump houses will be rehabilitated, upgrades to water, wastewater lines and the reservoir will be made (GY, 2016).

In addition to aging infrastructure, there is a national trend of an aging workforce. According to ECO Canada's Municipal Water and Waste Management: Labour Market Study (2010), 42% of managers for Canadian public water/wastewater treatment facilities are over 50 years of age and the sector is experiencing difficulties recruiting operators at intermediate levels, as well as operators-in-training (OITs). With the expected retirements of many senior personnel, municipalities will have to work actively on succession planning and recruitment strategies to ensure that the experienced-based knowledge is not lost. The BCWWA (Malatest, 2015) suggests that in addition to an aging workforce, employees in trade/ technical positions are increasingly being recruited to work in the expanding resource sectors, including oil and gas, mining, and pulp and paper. The lack of young employees was also noted by BC interviewees, with multiple individuals remarking on the "aging workforce" as well as knowledge loss due to retirements. However, results from BCWWA (Malatest, 2015) suggest retirement was not perceived as a primary workforce issue for the water sector. Indeed, key informants in BC reported that plans to address anticipated retirements and associated knowledge loss had already been established.

2.4 Training and Employee Turnover

ECO Canada (2010) concluded that public water and wastewater facility operators found it very challenging to recruit and retain candidates for critical positions, such as intermediate operators or OITs. The report found that one-third of the public facilities surveyed experienced difficulties retaining workers at the intermediate experience level. The issue of recruitment and retention is heightened for Level III and IV facilities

² Assets in this area include: Water treatment, supply and distribution systems (water mains, distribution pipes, pressure reducing stations, water meters, treatment plants, storage capacity and pumping stations); and sanitary and storm sewers and related treatment facilities (sewage pipes and interceptors, storm water pipes and interceptors, combined sewage pipes and interceptors, manholes, treatment plants and associated facilities and equipment, retention basins, septic tanks and lift stations (Mirza, 2007)

(requiring a higher certification level) and for facilities in small, remote communities; smaller municipalities also tend to lose talent to larger municipalities that offer greater career growth and better pay.

To fill the training gap, research completed by ECO in 2010 identified:

- an urgent need and opportunity to promote training in the sector by either encouraging the expansion of such training in education institutions or the development of new programs to meet the gap in training needs;
 - the importance of a review of conditions that might be contributing to employee turnover, since turnover was higher in public water and wastewater treatment facilities than in the public waste management facilities.
- that the surveyed municipal employers felt that available training resources were insufficient for workers to maintain skills and certifications; that there is a lack of appropriate training courses to satisfy the professional development needs of practitioners; and that many practitioners were lacking training in leadership, communication, and computer skills to enable them to advance in the workforce.



3.0 Methods

This study was informed through three overarching methodological processes:

1. Background research which included reviewing sector specific research (ECO, 2010; Malatest, 2015; Hemmera, 2016), Statistics Canada (StatCan, 2011), Government of Yukon press releases (GY, 2012; GY, 2016) and non-profit sector research (Ecojustice, 2014; Mirza, 2007)
2. Primary research to collect original data from training institutions, relevant government departments, system operators and system managers. An interview protocol was developed in January 2017. However, due to poor participating rates, resources were refocused on alternative methods of primary data collection. Ultimately, this primary research involved three components:
 - Collating data sets provided by GY-OP;
 - Collecting qualitative data from participants (n=42) at a Water and Wastewater Workshop held 15 March 2017 and
 - Collecting survey results from a comprehensive survey (n=31) which were completed during the Workshop.
3. Analysis of research to identify themes and trends. Analysis involved three processes:
 - A basic quantitative analysis of prescriptive survey questions;
 - A compilation of open ended survey questions; and
 - Discourse analysis on all data collected during the Workshop was undertaken using inductive coding processes (Lune and Berg, 2017).

3.1 Key Research Issues and Questions

The following key research issues and questions were developed based on background research and collaboration with GY-OP:

- Establishment of the size and composition of Yukon’s water and wastewater sector workforce;
- Determining the economic outlook for the water sector;
- Analysis of compensation data;
- Identifying the necessary competencies and skills to grow and sustain the water sector;
- Analysis of market sustainability; and
- Yukon specific challenges faced by the sector.

3.2 Key Occupational Groups

The BCWWA (Malatest, 2015) defines the water sector workforce as those workers involved in the day-to-day operations and maintenance of water and wastewater collections and maintenance of water and wastewater collections, treatment, and distribution; construction and capital projects are not included. As such, four occupational groups were considered for this report within the water and wastewater sector: Manager, Supervisor, Operator, Technical support, which are detailed in Table 3.1.

Table 3.1 Key Occupational Groups

Occupational Group	Example Job Titles	Corresponding NOC code(s)
Manager	Operations Manager, Public Works Manager, Superintendent, Waterworks/ Sewer Director, Utility Manager	0912 – Utilities manager
Supervisor	Senior Operator, Foreman, Chief Operator, Lead Hand, Utility Supervisor	9212 – Supervisors in petroleum, gas, and chemical processing and utilities
Operator	Operator, OIT, Maintenance Worker, Public Works Employee, Operators Worker, Construction Inspector	9243 – Water and waste treatment plant operators 7442 – Waterworks Maintenance Workers
Technical Support	Engineer, Water Technician, Cross Connection Control Coordinator, Laboratory Technician, Water Conservation Coordinator, Spill Response Technician, SCADA technician	2131 – Civil Engineers 2243 – Industrial Instrument Technicians and Mechanics 2211 – Civil Engineering Technologist and Technicians

Source: Government of Canada. 2011. <http://noc.esdc.gc.ca/English/noc/welcome.aspx?ver=11>

The National Occupation Code 9243 provides detail for the role of water and wastewater plant operators as: “those who monitor and operate computerized control systems and related equipment in water filtration and treatment plants to regulate the treatment and distribution of water. Liquid waste plant operators monitor and operate computerized control systems and related equipment in wastewater, sewage treatment and liquid waste plants to regulate the treatment and disposal of sewage and wastes. They are employed by municipal governments and industrial facilities” (StatCan, 2011).

3.2.1 Sample Development

A survey comprising prescriptive and open ended questions was developed based on the research questions. The original intent was to deliver the survey over the telephone to a range of water and wastewater stakeholders across the Yukon as an interview. However, due to poor uptake, resources were refocused on delivering the survey during the Water and Wastewater Workshop. A total of 31 completed surveys were returned. This sample size did not allow for statistical significance analysis, but provided a data set which allowed for the triangulation of background research and qualitative data (Lune and Berg, 2017).

3.2.2 Survey Administration

Participants were encouraged to complete a hardcopy of the survey during scheduled times at the Water and Wastewater Workshop.

3.2.3 Survey Response Breakdown

31 completed surveys were returned from a potential respondent population of 42. All questions had an above 50% response rate.

3.3 Key Survey Participants

3.3.1 List of Key Informants

- Yukon Government Community Services representatives (Environmental Health, Operations and Programs and Infrastructure Development branches)
- Educators (Yukon College)
- Regulators (Yukon Environmental Health)
- First Nation Government Representatives
- Municipal Chief Administration Officers
- Operators of drinking water and wastewater treatment systems

3.3.2 Survey and Interview Structure

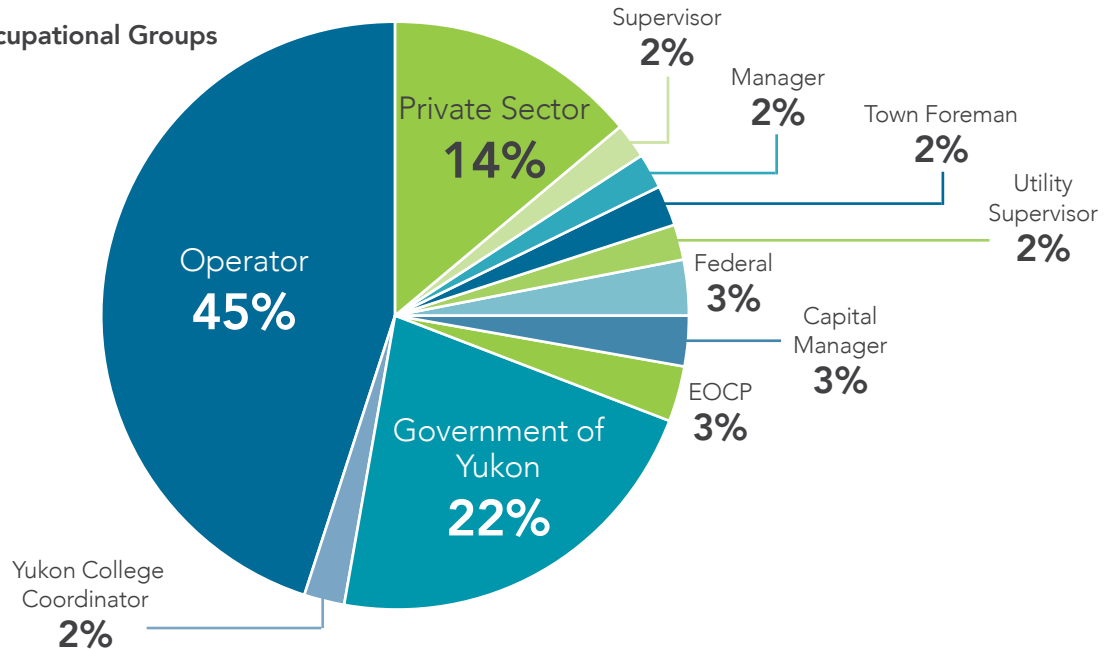
The survey was structured around four themes. See **Appendix A** for the full Survey:

- Questions 1 through 6 – workforce demographics
- Questions 7 through 12 and question 20 – qualities of water and wastewater positions
- Questions 13 through 19 – certification
- Questions 21 through 34 – attraction, retention and sector growth

3.4 Workshop

A Water and Wastewater Workshop was held 15 March 2017 in Whitehorse, Yukon. A total of 42 people attended representing eleven roles within the sector, including Federal and Yukon Government. Most attendees were Government of Yukon representatives and system operators from Whitehorse, Old Crow, Mayo, and Carmacks as shown in Figure 3.1.

Figure 3.1 Key Occupational Groups



The Workshop involved two phases: a morning of presentations and an afternoon of break-out facilitated discussion. Presentations from EOCP, Yukon College, Government of Yukon Department of Health and Community Services provided an overview of the role of each organisation and an overview of initiatives progressing under the Yukon Water Strategy. Break-out sessions were facilitated in small group discussion formats. Facilitators asked participants an open-ended questions (one at each discussion table) and recorded the dialogue using hard copy notes:

- What challenges are you facing?
- What can be done to attract and retain Water and Wastewater Operators?
- With regards to water and wastewater sector what support is needed?

3.5 Assumptions

To estimate the size of the BC water and wastewater sector workforce for the BCWWA report (Malatest, 2015), it was necessary to extrapolate from the survey data to encompass all employers, including those who did not complete the survey.

The valid approach to measuring water workforce employment used by Malatest (2015) was to develop ratios of EOCP-certified workers and other water sector workers to develop an estimate of the likely size of the BC water sector workforce. In that context, if employers who responded to the survey accounted for 60% of EOCP-certified workers, there was an assumption that the ratio of water sector workers to EOCP certified staff would remain constant, and from there, the number of workers associated with the 40% of EOCP-certified workers who were not reflected in the study could be calculated.

Similarly, not all workers in the Yukon were represented in primary data collection, therefore, there was a need to make assumptions to extrapolate an estimate of workforce size and estimate the subsequent number of possible retirements.

4.0 Results

Results are compiled from background research and primary research. Where necessary, primary data collected for this program is aggregated to protect sensitive personal information and ensure anonymity.

4.1 Market Size and Composition

Key indicators of size and composition discussed below include indicative numbers of current employees; demographic indicators including gender, First Nation representation and age. Further, a detailed look at retirement, recruitment and retention are provided from which an employment outlook is discussed.

4.1.1 Size of Workforce

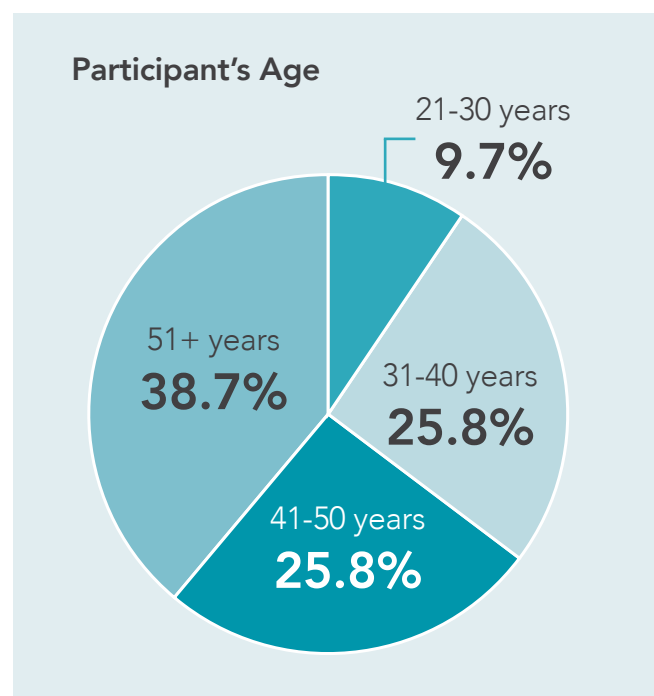
There are currently 118 certified Operators in the Yukon registered on the EOCP training registry (EOCP, 2017). Survey results demonstrate that from a sample size of 30, 73.3% of respondents are currently EOCP certified and 26.7% are not. Using the Malatest (2015) methodology and assuming the ratio of EOCP certification to remain static, there is an assumed workforce size of 162 in the Yukon.

4.1.2 Workforce Demographics

The labour force working in water/wastewater facilities across Canada, including the Yukon, is nearing retirement and many of the most critical positions are going to be particularly affected. The ECO (2010) report generally stated the sector is “top heavy” with

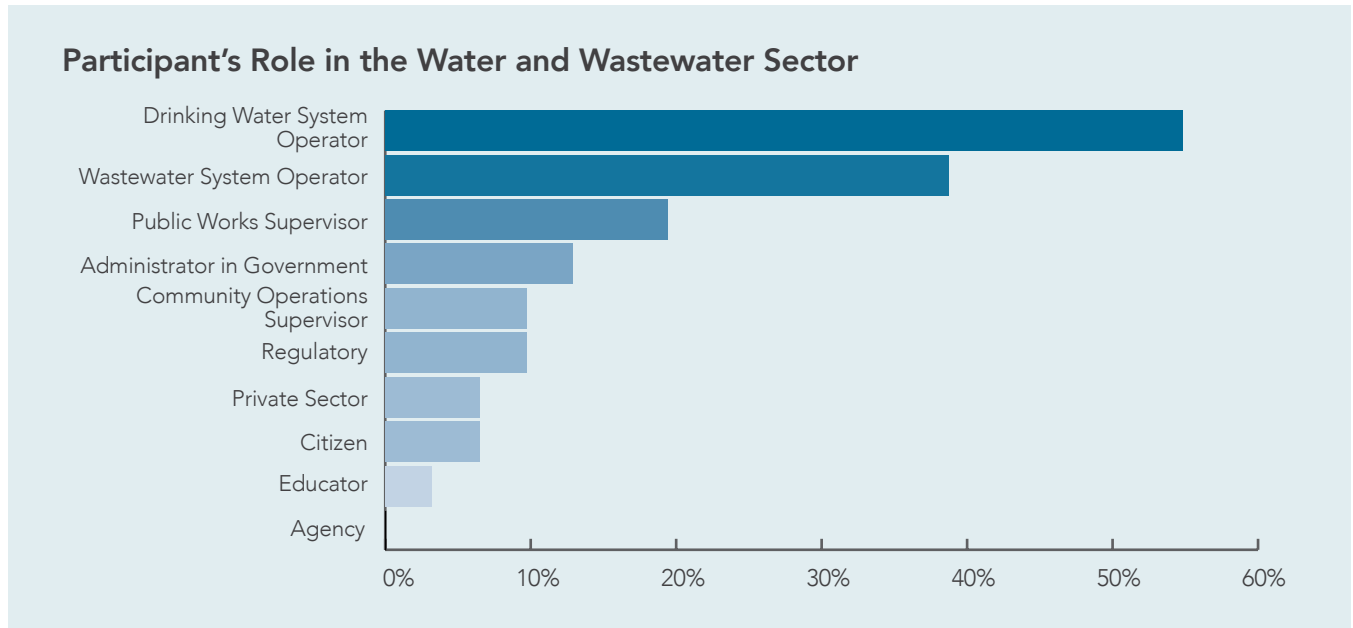
a large portion of managers and senior personnel over the age of 50 years old. These national results were similar to data collected by BCWWA (Malatest, 2015) where the water and wastewater sector presented a mature workforce with a little over 36.3% in the 50 years and over age range, and 40.4% in the 35 to 49 years of age category. Yukon reflected similar data with over 35% of survey respondents being over the age of 50, and 25.8% being between the ages of 41 and 50 (Figure 4.1).

Figure 4.1



The BCWWA (Malatest, 2015) describes most employees are employed as operators (55.4%) or technical support staff (21.7%), smaller proportions of the workforce are employed as supervisors (12.4%) or as management (10.5%). Similar distributions were noted through primary data collection for the Yukon, with 50% of survey respondents being currently employed as Operators, with slightly higher representation in drinking water systems (Figure 4.2).

Figure 4.2



Both the ECO (2010) and the BCWWA (Malatest, 2015) reports and primary data collection in Yukon show the labour force working in water/wastewater facilities is primarily composed of men. Across Canada, the sector workforce is composed on average of 94% male and 6% female. The BC water sector workforce is characterised by a significant male population at 87.2%, while females account for one-eighth at 12.9% (Malatest, 2015).

Primary data collection for the Yukon indicates that careers in water/wastewater treatment are male-dominated jobs. ECO (2010) indicated a possibility that women have the skills to do the job, but many are not aware of the career possibilities. The Yukon data set, reflects a dramatically higher level of male representation (Figure 4.5).

Most survey respondents in Yukon did not self-identify as First Nation. Participants who did self-identify through the survey as First Nation were from Kluane First Nation, First Nation Nacho Nyak Dun, Carcross Tagish First Nation, Kwanlin Dun First Nation and White River First Nation (Figure 4.6).

Figure 4.5 Participants Gender

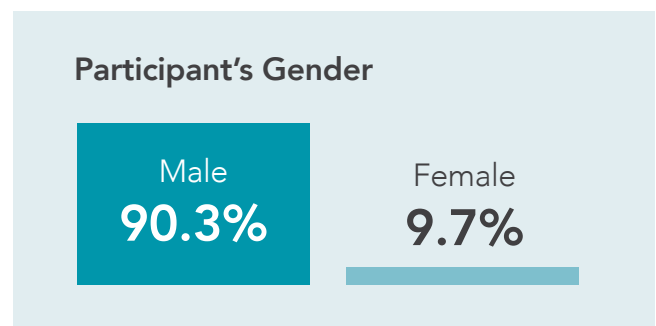
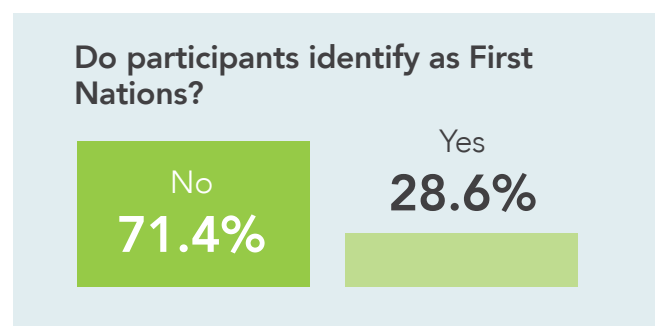


Figure 4.6 Participants Gender



4.1.3 Retirement

As discussed above in Section 2.4, succession planning is already being implemented in some BC systems in response to retirements. However, despite concerns expressed about impending retirements and the associated knowledge loss, only 27.4% of BC employers surveyed have established career development programs, and only 18.4% of BC employers have instituted succession planning for senior management positions. Future retirements in the Yukon water sector were estimated based on the age profile of the workforce. As employees in the 50 years of age and over category move toward retirement, it can be inferred that a possible 57 current employees out of an estimated total of 162, will be retiring within the next ten years.

4.1.4 Recruitment and Retention

Recruitment and retention difficulties were identified in both the background research and primary research. This section will discuss the difficulties in recruitment and retention in small communities.

4.1.4.1 Recruitment

At a national level, the ECO (2010) reported lower turnover in the water and wastewater sector in 2009 than the previous two years which was attributed primarily to the economic conditions at the time. Many older practitioners who were close to retirement were staying in their positions to recover some lost retirement income, and younger practitioners were not moving around as much due to fewer opportunities in both the public and private sectors. The BCWWA (Malatest, 2015) further found that facility level, geographic location, and provincial and federal government policies also play a role in the recruitment challenges of operators in the following ways:

- A shortage of workers who have Level III or IV certification for the larger municipality Level III and IV facilities;
- Smaller municipalities lose top talent to larger municipalities that offer greater career growth and better pay;

- Lack of a federal level certificate prevents mobility between provinces and territories. Many provinces do not recognize certificates and experience earned in other provinces. This is also true of international applicants, where similar experience and certifications in other countries often is not considered even when applying for entry-level positions.

Additional recruitment challenges were noted in data collection in the Yukon, including:

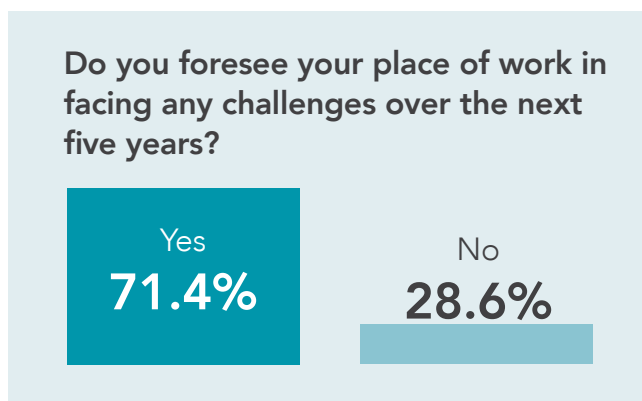
- Intimidating level of responsibility for potential new Operators;
- The sector is currently poorly marketed, especially to current high school level students;
- Small population numbers in communities outside of Whitehorse;
- Small number of qualified employees; and
- Lack of community based recruitment.

In the 2015 BCWWA study, employers interviewed described the main characteristics of their newly hired staff as being young, inexperienced, uncertified, upwardly mobile, enthusiastic, and male. Over one-quarter (27.5%) of BC survey contributors identified recruitment and retention challenges or staffing issues as the largest water sector workforce barrier that their organization will be facing over the next five years.

Yukon data reflected a similar trend: survey respondents had been in their current role for an average of 9 years, and observed little turn over in their respective communities. Over 70% of survey respondents indicated that the sector would face challenges in the future (Figure 4.7), specifically, recruiting new operators. Respondents indicated that recruiting within communities and promoting the lifestyle choices the sector accommodates, including outdoor work and a wide variety of responsibilities, will be key factors in addressing this universal challenge. One Workshop participant noted that “Mayo’s five operators were born and raised in Mayo”. Yukon respondents also noted that social challenges created an added layer of difficulty for

community based recruitment, for example, not having a driver's license is a barrier to achieving employment and that "the certification requirements of graduation limit resource pool". The development of a pre-employment course to support those in the community with social challenges which may interfere with employment was suggested by Workshop participants.

Figure 4.7



When discussing the strengths the water and wastewater sector has to recruit and retain workers, all stakeholders, both in BC (Malatest, 2015) mentioned: the diversity of the work involved; municipal employment; competitive compensation; challenging environment; job stability and recession-proof work; pension, health care, and other benefits; impactful, community-driven, and significant work; and opportunities for training and advancement.

Figure 4.8



In the Yukon, the location of where the water or wastewater facility was situated served as an incentive – respondents generally wanted to stay in their communities and enjoy full time employment. To further encourage community based recruitment, Workshop participants indicated a gap in the water and wastewater sector outreach to high school level students. As Yukon communities provide a limited labour supply, Workshop participants noted a need to communicate the benefits of the sector to "technically minded" high school students.

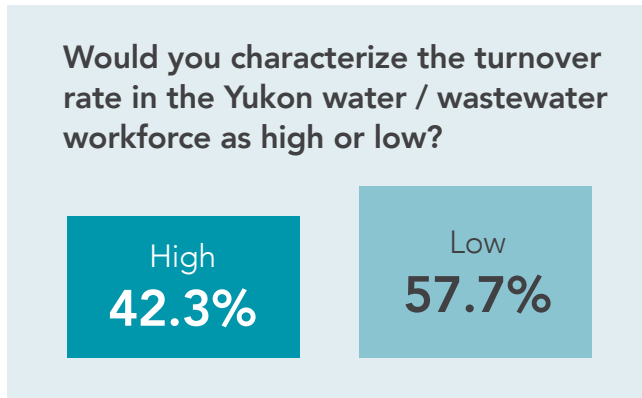
4.1.4.2 Retention

According to ECO (2010) retention is a secondary challenge to recruitment for the municipal water and wastewater sector. The specific challenges that were examined are:

- Workers being lured by other municipalities or private industry for higher wages. Many remote municipalities in BC that have industries like mining or oil nearby also report losing employees to these industries;
- Operator's disdain for shift work and on-call responsibilities;
- As their workforce nears retirement, municipalities are not only in danger of losing a large majority of their staff, many of them are in danger of losing a wealth of experience-based knowledge as much of this knowledge is not documented or retained.

In the Yukon, primary data indicates that retention is also a secondary challenge to recruitment. Yukon respondents indicated almost an even split between those who felt there was a low or a high turn over of employees (Figure 4.8). Respondents described retention in smaller communities as less challenging than the BCWWA report would indicate as people generally want to stay in their communities (Figure 4.9).

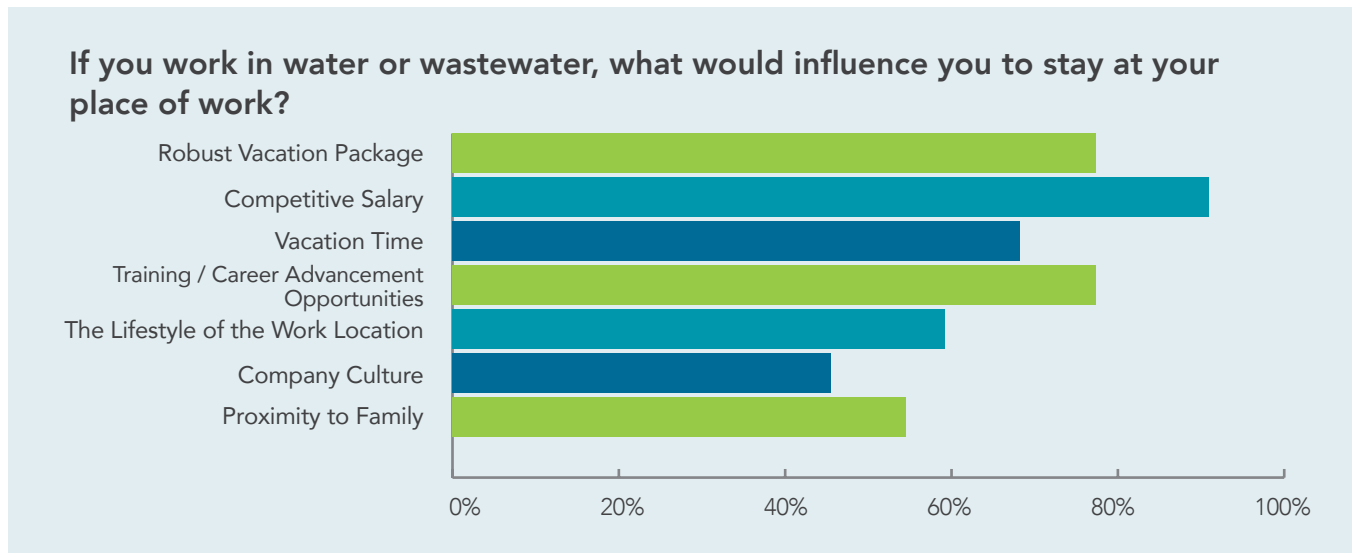
Figure 4.9



Further, workshop participants indicated that while there was some uncertainty among respondents, the majority did not feel that employees were leaving positions for other communities. However, in a 2014 report sponsored by the Resources and Sustainable Development in the Arctic, it was acknowledged that Yukon has seen a continuing trend toward urbanization, with Whitehorse receiving approximately 80% of the Yukon population growth between 2005 and 2010. Similarly, migration within the territory between 2005 and 2010 saw smaller communities, such as Dawson, experiencing declining populations as community members increasingly moved to Whitehorse (Jones 2014).

To ensure this trend does not erode the observations of respondents that workers stay in the communities, respondents identified incentives to remain in community based roles in the water and wastewater sector. The highest-ranking incentive was increased wages and a robust vacation package (Figure 4.10).

Figure 4.10



4.1.5 Employee Outlook

The current and projected water and wastewater workforce numbers are dependant on community growth, new facilities construction and facility upgrades. The Yukon Bureau of Statistics (YBS) estimates population changes from 2011 to 2021 independent of future changes in business or government projects. Its three potential growth scenarios are based on births, deaths, immigration and emigration. The three scenarios -- which were created in 2011, the last year that such projections were made public -- are:

- **Scenario 1:** Uses the shortest and most recent time period (2009 to 2011) as the reference point, and assumes that the population growth that took place during that period will continue until 2021. Under Scenario 1, Yukon's population will have grown 18.5%, or 6,523 people, between 2011 and 2021.
- **Scenario 2:** Uses a mid-range time period of 2006 to 2011 as the reference point, and assumes that the population growth that took place during that period will continue until 2021. Under Scenario 2, Yukon's population will have grown by 8,013 people, or 22.8%, between 2011 and 2021.
- **Scenario 3:** Uses the longest time period of 2001 to 2011 as the reference point, and assumes that the population growth that took place during that period will continue until 2021. Under Scenario 3, Yukon's population will have grown by 4,955 people, or 14.1%, between 2011 and 2021 (YBS 2011b).

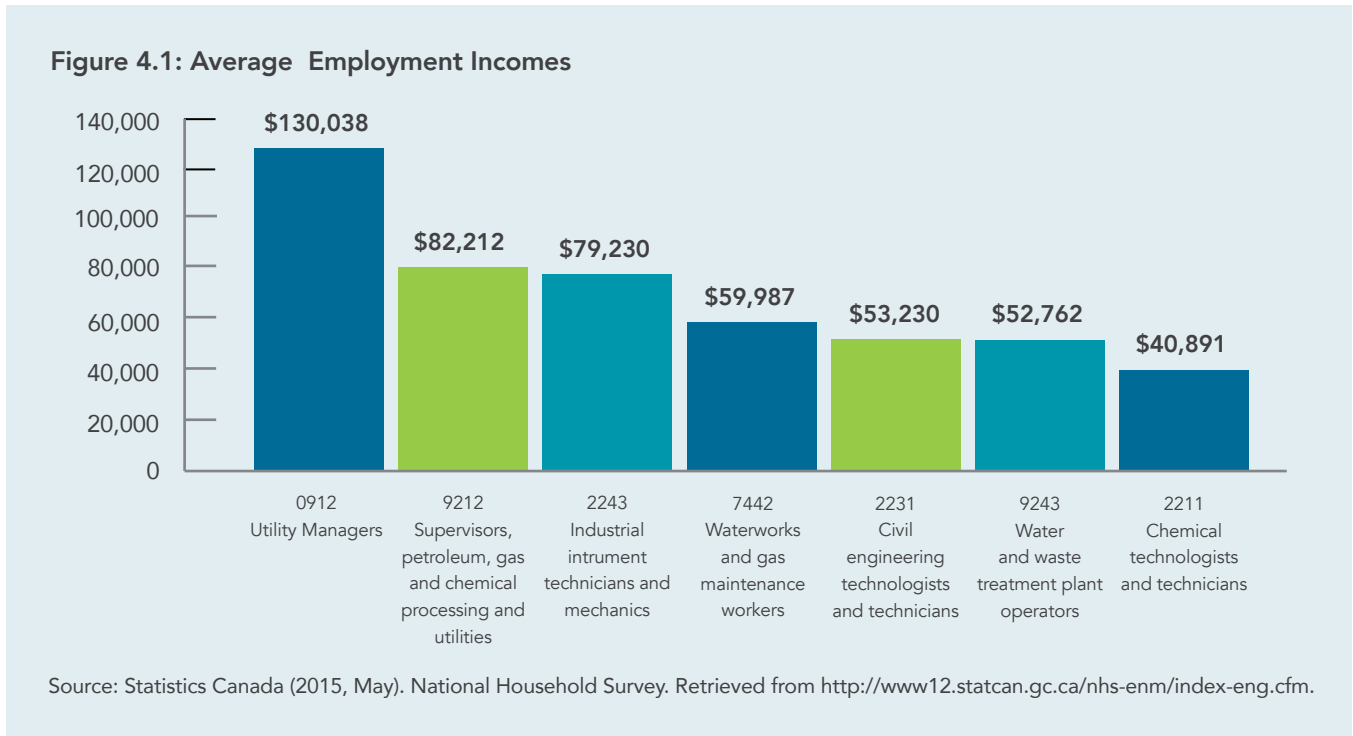
Under all three scenarios, the number of senior citizens is likely to almost double, and the number of youth is likely to remain relatively steady at about 15% of the population. The working-age population (aged 15 to 64) is likely to be 68.9% to 70.3% of the population, compared to 75.2% in 2011, as Yukon-based baby boomers reach retirement. The YBS notes that Yukon is more sensitive than other jurisdictions in Canada to migration-driven changes to population because economic growth is a primary driver of migration, and is more difficult to predict than birth and death rates (YBS 2011b).

These population projections indicate consistent population growth for both rural and urban communities in the Yukon. With increasing populations, an assumption can be made towards a positive employment outlook for the water and wastewater sector. However, as indicated by the YBS, migration in the Yukon is driven by economic growth. Therefore, competing rural industries, such as mining, may erode the potential workforce for the water and wastewater sector in future years. Human resource representatives in BC were asked to estimate their current (2015) workforce and expected workforce in 2020. Results from the survey show that water and wastewater facility owners anticipate a 6.0% increase in the workforce between 2015 and 2020. During key informant interviews, employers confirmed that they expected low levels of labour force growth regardless of operational expansion due to new technology creating efficiencies in work processes.

4.2 Compensation

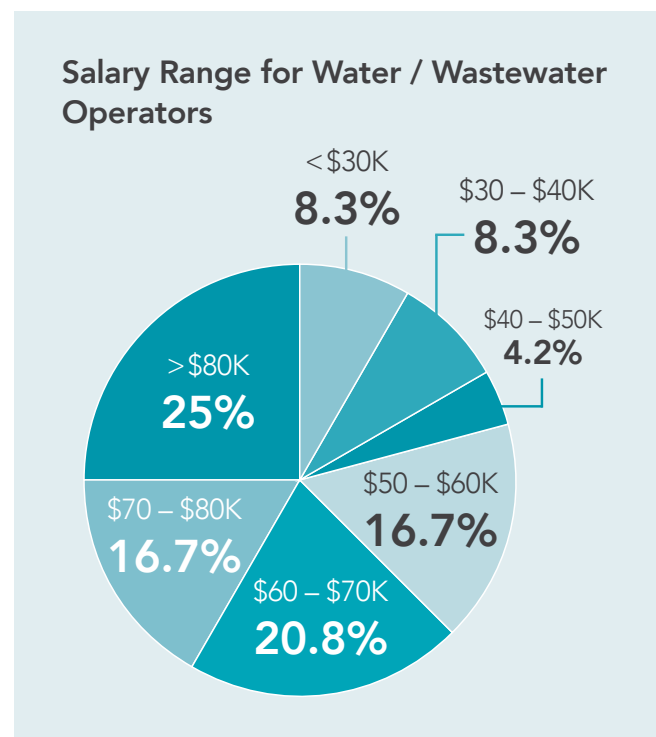
Compensation was consistently identified as a key component to effective recruitment and retention, in Yukon. According to the 2011 National Household Survey (NHS), employees in the priority occupational groups earn at least \$40,000 annually, ranging up to \$130,000. As compiled by the BCWWA, average employment incomes for the NOC codes can be compared (Figure 4.11).

Figure 4.11



This salary information can be compared with that collected through primary data collection 25% of respondents indicated a salary range over \$80,000 per year. However, a range of salaries were represented in the data set. The range of salaries represented in the survey data is consistent with workshop participants indicating potential significant discrepancies in wages between different systems (Figure 4.12).

Figure 4.12



4.3 Competencies and Skills

In *Waterproof 3: Canada's Drinking Water Report Card* (Ecojustice, 2014), Yukon merited a C- grade for water source and other drinking water protection. The Report Card awarded the grade for improved standards related to treatment and contaminants and that there are rules requiring separation of drinking water sources and potential contamination threats, but no Source Water Protection was in place. For drinking water protection, Ecojustice (2014) research indicates that the most improvements in the past ten years have been in operator certification.

4.3.1 Skills in Demand

Skills in demand within the sector were mostly determined through primary data collection. Many municipalities across Canada (ECO, 2010) indicated that hiring qualified operators was the biggest challenge they dealt with in their water and wastewater treatment facilities. Participants mentioned that response to job advertisements is generally favourable, but the number of qualified applicants who apply is small. While the certification that operators must obtain meets many of the technical needs for their positions, many human resource specialists and facility managers across Canada feel there are significant skill gaps within the municipal water/wastewater treatment labour market. Skills gaps generally fell into two categories:

- Computer skills;
- 'Soft' skills, which often refer to communication and human resources-based skills. While these skills are seen as important components of an ideal worker, they are rarely emphasized during the interview process and training (ECO, 2010).

The lack of these skills hinders a facility's ability to operate optimally as these skills are routinely part of the job (i.e. much of the data and reports are electronic, dealing with other employees and public relations, etc.). These skill gaps also hinder an employee's ability to progress their career, as many supervisor and management positions require these skills. Communication skills were noted as being important beyond career development. A Yukon respondent stated, "communication issues can

become safety issues". BCWWA (Malatest, 2015) found that all stakeholders interviewed noted that managers, supervisors, operators, and technicians need to have, at minimum, some post-secondary education (i.e., degree, certificate, or diploma), level I EOCP certification, and a transferrable set of skills that could be used sector-wide. Similar to the ECO (2010) other qualifications stakeholders noted included the following:

- Experience in public engagement and stakeholder relations;
- Experience with equipment and tools;
- Interpersonal and communication skills, collaboration, and teamwork;
- Mechanical, technical, and hands-on/practical skills;
- Leadership skills (of particular importance for managers and supervisors);
- Technical and IT skills (for those working on technical aspects of the water systems);
- Applied mathematics and scientific literacy;
- Project management (primarily for managers, supervisors, and senior technicians);
- Knowledge of environmental issues and law (e.g., water quality, water shortages, climate change, regulations, policies); and
- A keen interest in the field.

As in the Yukon, the BCWWA noted the plurality of employers interviewed who stated that the need for managers and supervisors to have leadership skills and the ability to earn respect from their staff. Furthermore, it was deemed important for operators to have both hands-on experience and theoretical knowledge of water and wastewater systems. Some employers discussed the importance for staff over the next five years to have communication and collaboration skills, as much of water sector work involves dealing with contractors and residents as well as resolving project conflicts or issues. Primary data collected in the Yukon reflected a coherent message of needing to improve internal communication. Poor communication between

operators, supervisors and management challenged operators to be effective in their jobs. Participants suggested that management learn about the day to day necessities of what is required to ensure sensitivity when it comes to budgeting. Workshop participants in the Yukon also noted that communication between communities challenged Operators as equipment is often shared between communities. One respondent suggested that “a website could be set up for communication between communities.”

Finally, a considerable proportion of the current workforce is not up-to-speed on the “mobile computing era” and educators interviewed in BC explained the pressing need to update skills sets as the water sector implements these mobile technologies. Employers, regulators, and educators interviewed showed a preference for more/higher education for new hires (i.e., college diploma). However, it was deemed difficult to find qualified Level III and IV operators in both the water and wastewater subsectors, especially in rural, northern, economically disadvantaged and First Nations communities because of the shortage of qualified operators and accessibility to training and education programs.

4.3.2 Procurement

Sector challenges specific to the Yukon involve local procurement. Respondents cited there were challenges in their roles due to a lack of local procurement which resulted in delays for key parts. Further, parts (the specific example was steamer trucks) are a shared resource, but are an essential ingredient when dealing with winter Yukon conditions.

4.3.3 Training Program Needs

As in BC, the EOCP is the recognized training body in the Yukon that provides four levels of certification based on the system size and the population it distributes to. EOCP levels are primarily based on the years of direct experience, education levels, the amount of CEU's, and the complexity of the systems. When BCWWA asked about what strategies the water and wastewater sector should adopt to meet current and future workforce needs, contributors' survey responses focused on training (Malatest, 2015). Access to training, certification

programs and opportunities for on the job training were identified as constant themes in both background research (ECO, 2010; and BCWWA, 2015) and primary data collection.

Many municipalities in Canada identified hands-on courses as the optimal method of professional development, but unfortunately these courses are not always available. Other Canadian municipalities have resorted to online courses to maintain their operators CEUs and certifications. While the courses have the benefit of being widely available and inexpensive, they cannot substitute for hands-on training and many workers do not possess the necessary computer skills (ECO, 2010). Most of the stakeholders interviewed for the BCWWA (Malatest, 2015) also reported similar concerns, barriers, gaps, and successes around the current training and certification programs, and on-the-job learning available to the water and wastewater sector workforce.

Barriers to relevant and effective training described by BCWWA (Malatest, 2015), ECO (2010) and primary data collected in Yukon were similar, however, primary data is further reflective of the unique northern perspective. In the Yukon, respondents noted challenges with training and certification. Although there are several course offerings at Yukon College, respondents noted that courses are cancelled when the minimum number of participants is not met. Workshop participants articulated that “tracking the CEUs and core programs can be challenging and then getting the people up in Dawson or people down to Whitehorse to get the courses sometimes doesn't line up”. Additional online offerings may minimise the challenges of distance, however, as noted by Malatest (2015) many workers do not possess the necessary computer skills.

Further the ECOP certification exam may only be taken in Whitehorse, which presents a challenge for those potential Operators living in remote communities. Travel to Whitehorse is a significant burden for the workforce living other communities. Yukon respondents also stressed a need for cross-training and hands on training opportunities. One respondent suggested that operators be offered cross training with other communities for one week, allowing for CEUs and experiencing how other communities operate.

Workshop participants were enthusiastic about the outdoor, physical nature of their work and were less enthusiastic about additional in-class work. Yukon data points to an interest to develop cross-training between roles, communities and systems. A further training need was identified by Workshop participants, which was that

it was “hard to find people with Level I certification to start work, as you can’t get Level I without working”. Participants stated training could begin for high school aged people through a co-op program supported by Yukon College.

Table 4.1 Barriers identified by stakeholders in providing relevant, useful, and appropriate training

<p>Environmental Careers Organization</p>	<ul style="list-style-type: none"> • Lack of available resources for training. With course fees, travel, accommodations and lost productivity, some respondents estimate the cost for employee professional development to be as high as 10% of their annual salary; • Course offerings address only CEU requirements. Training and development opportunities focus more around technical skills and fail to address to skills gaps in essential computer and communication skills.
<p>British Columbia Water and Wastewater Association</p>	<ul style="list-style-type: none"> • Cost: including the costs for an organization to design or update a course and the full cost (i.e., accommodation, travel, loss of work hours) an employer must bear to send their staff to courses, training, and certification. • Scheduling: this relates to when a given course is offered; employers and staff were not interested in weekend or evening courses. • Course relevance: some stakeholders noted that some of the course content was not particularly relevant to jobs in the water and wastewater sector. • Location: schools and instructors teaching CEUs were situated in areas not accessible to all students/candidates/operators • Instruction: a shortage of qualified senior instructors was reported. • Vendor-provided training: some training was specific to new technology and offered only by vendors in certain locations. • Regulatory changes: new regulations and policies mean additional training is needed. • Duration: the requirement of having one year of experience in order to obtain EOCP certification can be a barrier for workers in roles that have multiple functions where earning experience hours can take a long time, as can obtaining certification as a multi-utility operator. • Technological changes: new systems and technology require more training. • Classroom and coursework: operators need to acquire CEUs to maintain certification and the school/ classroom environment is a challenging setting for some. Some stakeholders stated that CEUs need to become more attainable and relevant, as tests may not reflect the ability in the field. Instead, they may create barriers to certifying operators who should be considered competent and create barriers to advancement. • Modifying the certification requirements to make it a Red Seal trade or require more education.
<p>Yukon</p>	<ul style="list-style-type: none"> • Modifying the certification requirements to make it a Red Seal trade • Co-op training: facilitate new operators to gain qualifications and on-the-job training. • Operator train operators: Support new operators in gaining confidence with a hands-on support. • Testing for certification can only be done at Yukon College. Train someone in the community to help deliver hands-on training and to supervising testing to reduce time operators must leave community. • Strengthen links to high school age people through co-op type program. • Support potential new Operators with a pre-employment training option to mitigate social challenges.

4.3.4 Operator Certification

Currently 6 of 46 EOCP certified facilities in the Yukon do not have operators in good certification standing, or who do not meet the required certification level.

In BC, a little over one-half (53.8%) of the workforce is EOCP certified. Publicly owned facilities are nearly evenly operated by EOCP certified employees (51.5%) and non-EOCP certified employees (48.5%), while about two-thirds (62.8%) of privately owned facilities are operated by EOCP certified employees. Most technical support staff (92.7%) and most managers (65.1%) did not have EOCP certification, in contrast with the 69.4% of operators and 74.6% of supervisors who did (Malatest, 2015). Within Yukon there are 118 EOCP certified Operators.

EOCP training is currently provided through Yukon College's Water and Wastewater Operator Program. Yukon College provides online course work, including accredited CEU courses and assists students in preparing for the EOCP Certification Exam. It is important that operators and other water sector employees develop professionally to advance in their careers. Primary data further indicated that most respondents feel Yukon College is effective in the current training programs (Figure 4.13).

There is a discrepancy between the certification of Level III systems and Level III certified Operators (Figure 4.14). Survey data indicates there 15.4% of facilities have an expected Level III certification for Operators. However, no respondents of the 73% who indicated EOCP certification (Figure 4.15) are currently Level III certified (Figure 4.16).

Figure 4.13

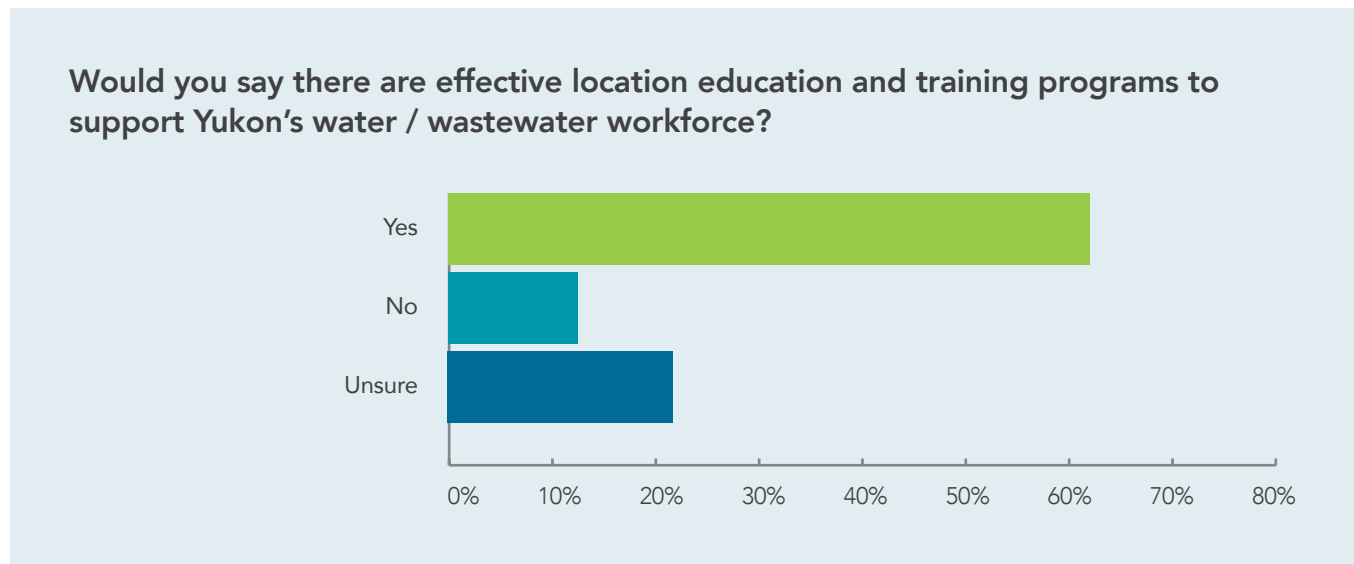


Figure 4.14

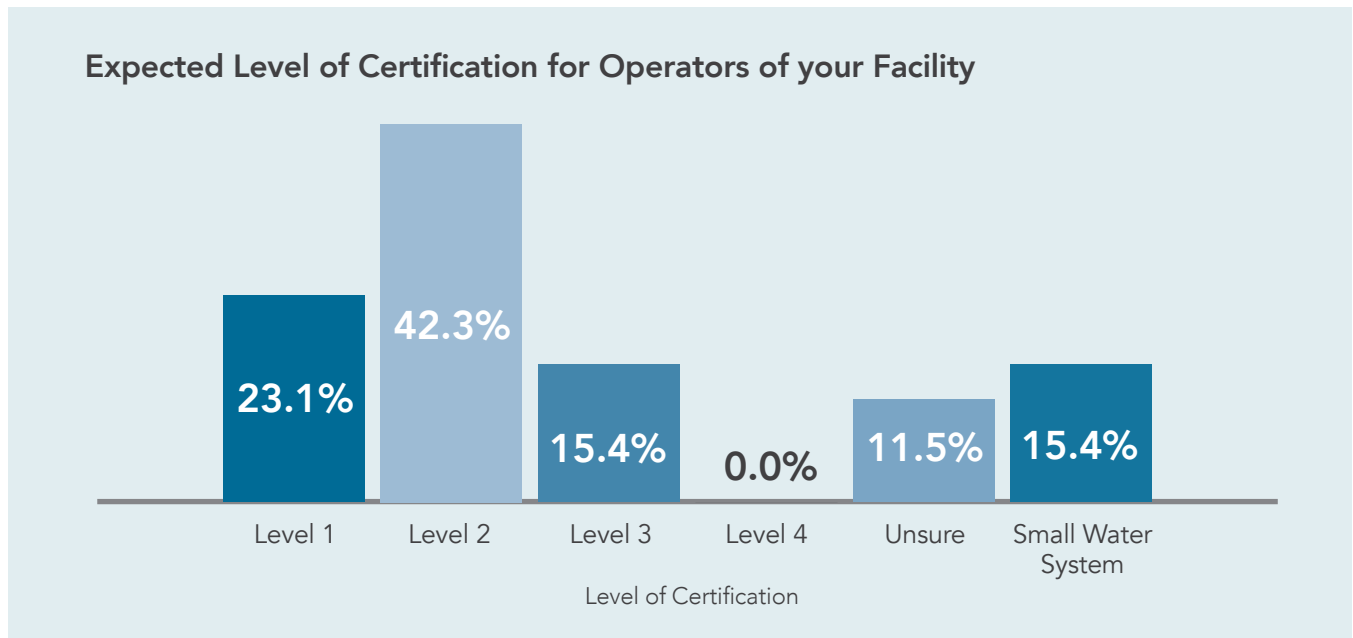
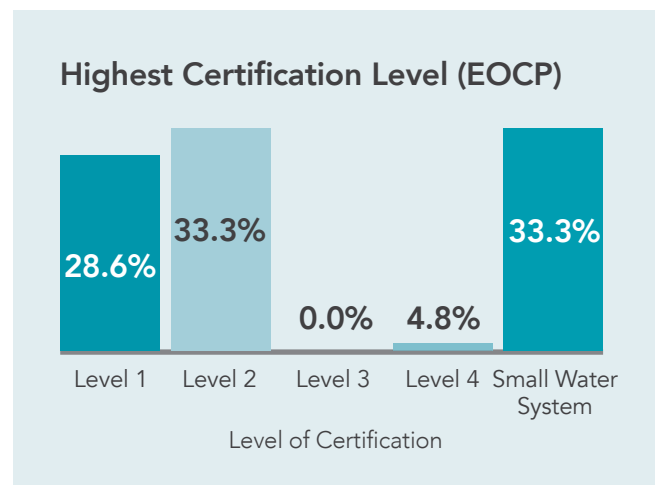


Figure 4.15



Figure 4.16



4.3.5 Financial Assistance for Training

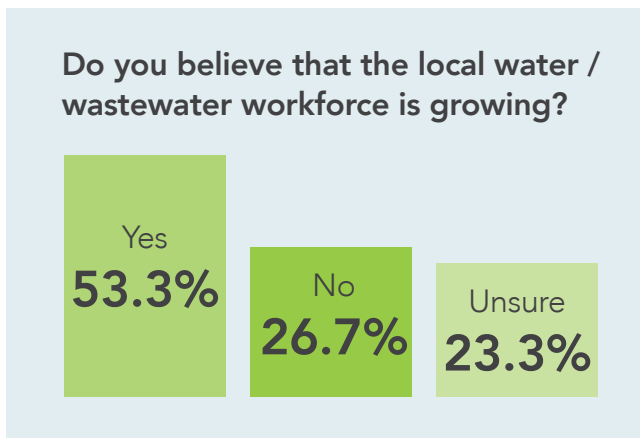
The financial burden of undertaking certification requirements was noted by both the ECO and BCWWA. Yukon respondents also noted that devoting resources both time and financial to either certification or CEUs was prohibitive in some cases. However, Yukon respondents also indicated that 95% had received financial assistance either from an agency, government or their employer.

4.4 Market Sustainability

WorkBC estimated demand for workers by selected NOC codes in 2015 and forecasted job openings for 2012 to 2027. The greatest areas of demand were for utilities managers and waterworks and gas maintenance workers, which is consistent with perspectives provided by BCWWA (Malatest, 2015). Indeed, WorkBC ranked the utilities industry number 10 out of 18 trending industries in BC as determined by growth rate. Of the positions reported by employers in BC as challenging to fill, over one-half (55.1%) were operator positions. Consistent with this finding, operation job duties were the most frequently required, closely followed by maintenance duties.

The current turnover rate for the BC sector is estimated at 9.3%. Turnover rates are highest for management (12.7%) and supervisor (11.5%) positions. While the turnover rate for operators (8.8%) is less than the overall sector turnover rate, the largest volume of employees to replace is in the operator occupation family (141 replacements needed in 2015) due to the higher proportion of operators in the sector. The water and wastewater sector's turnover rate of 9.9% from 2015 to 2020 is generally lower than that of workforce turnover in various regions of the province of BC and in other sectors.

Figure 4.17



Yukon respondents indicated the water and wastewater workforce is growing (Figure 4.17). This correlates with YBS' projected population increases. Respondents also indicated there were increasing demands for Operators certified at Level III or higher (Figure 4.18). No respondents indicated there was a decrease demand for any positions in the sector (Figure 4.19).

Figure 4.18

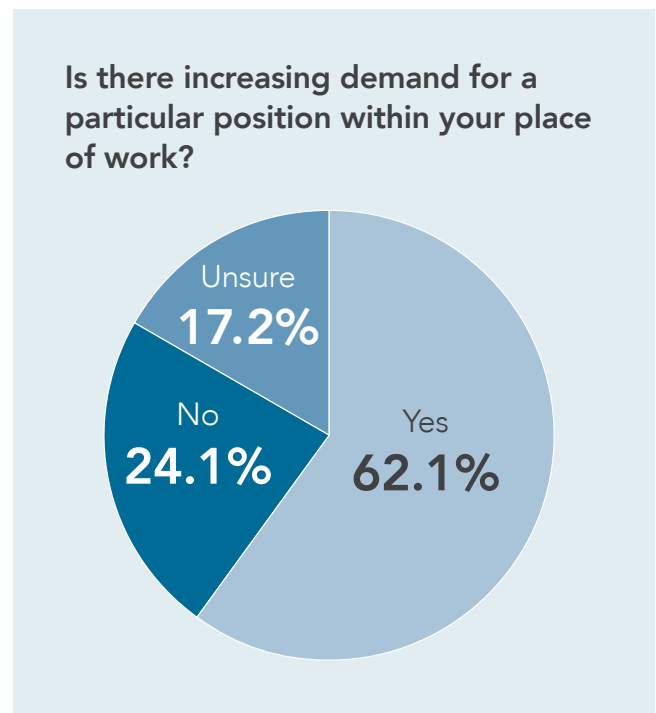
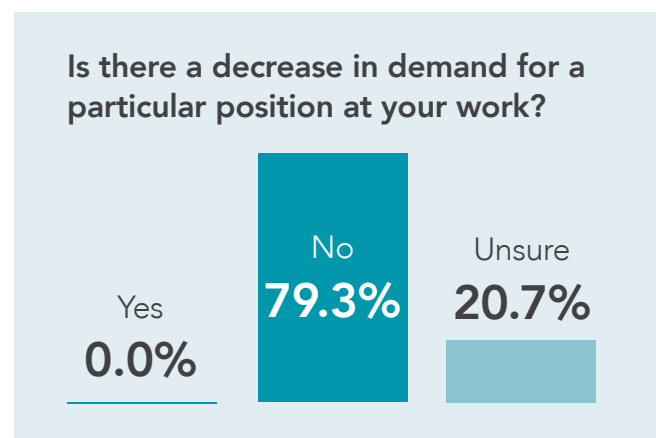


Figure 4.19





5.0 Conclusions

Based on the findings of this sector profile, challenges faced in the Yukon are typical across Canada and BC including recruitment, training and professional development. It is likely that these challenges will persist in the absence of mitigation and innovative solutions. As a northern jurisdiction, these core challenges are uniquely compounded in the Yukon by:

- Remote location of operations
- Smaller population size
- Limited availability of trained operators
- Limited (location and time) resources for education, certification and professional development
- Diverse types and complexity of treatment systems
- Varying roles and responsibilities for remote community operators (unlike larger jurisdictions often in small communities the operator looks after many tasks related to water and wastewater, increasing the training and certification requirements)

Specific conclusions and recommendations drawn from this report are provided below, with a focus on challenges and opportunities for the Yukon water and wastewater sector.

5.1 Market Size and Composition

Remote location and smaller populations result in a limited labour supply

Yukon's remotely distributed, smaller populations result in a limited labour supply. This is further compounded

by a trend towards inter-territorial migration to the urban centre of Whitehorse. While population projections show a growth trend across the territory driven from potential economic opportunities, this does not necessarily equate to a larger labour supply due to competing sectors (e.g. mining).

A top heavy and maturing workforce. The labour force working in water and/ or wastewater facilities across Canada, including the Yukon, is nearing retirement and many of the most critical positions are going to be particularly affected.

The current workforce of approximately 162 Operators is 90% male

- Primary data collection for the Yukon indicates that careers in water and/or wastewater treatment are male-dominated jobs. ECO (2010) indicated a possibility that women have the skills to do the job, but many are not aware of the career possibilities.
- Diversification could see an increased labour supply. Specifically communicating the benefits of the water and wastewater sector to women could see more women interested in the employment opportunities.

Recruitment of new Operators is a challenge

- While there are upcoming retirements as noted above, retention is not as pressing an issue as recruitment.

- All three comprehensive labour reviews (ECO, 2010; Malatest, 2015, and this Yukon-based study) indicate recruitment as a more pressing challenge than retention for the sector.
- In the Yukon, respondents indicated a preference for staying in their communities, and water and wastewater jobs creates this opportunity.
- Strengthening links to high school aged and people entering the workforce through public awareness and marketing programs, and providing support in mitigating social challenges through pre employment training (e.g. see co-op below) can help community based recruitment efforts.

5.2 Compensation

Wages were perceived as a recruitment and retention issue

- In the Yukon, there are discrepancies between wages between communities. Transparency and standardisation regarding wages for types of systems being operated and operator certification requirements was perceived as a needed change.
- Development of a consistent role profile across communities would help to standardize compensation discrepancies.
- Pay for on call work would create alternative job options with flexibility for both owners and operators to address labour needs.

5.3 Competencies and Skills

Training to advance skills beyond technical requirements is desired

- Across all three studies, lack of computer and soft skills (e.g. communication, conflict resolution, etc.) by Operators was indicated as career limiting and a potential threat to health and safety.
- Development of additional training resources for Operators through an accredited organization

would address training needs beyond core system operational and technical requirements.

Certification Requirements

- Currently, 6 of 46 EOCP certified facilities in the Yukon do not have operators in good certification standing, or who meet the required certification level. Specifically, there is a discrepancy between the percentage of Level III certified facilities and the number of Operators who have Level III certification.

Lack of a support network and communication

- Development of a Community of Practice to create communication at various levels (e.g. regulators, owners, Operators, community) and a support mechanism (e.g. cross-training opportunities)
- Organize an administrative support system for procurement coordination, and more local, community based CEU opportunities
- In addition to traditionally taught methodologies, more 'hands-on' training is a beneficial addition. The development of a co-op program in the Yukon was described as an effective way for new operators to get the hours required for certification.
- Cross-training opportunities between roles and communities were also seen as a necessary component to successful training;
- Increased communication between administration and operation staff associated with water and wastewater systems. Lack of communication was identified to contribute to challenges in implementing operation and maintenance budgets, addressing maintenance or upgrades that were not predicted and accounted for in operation and maintenance budgets, understanding technical and logistical challenges with systems, and providing robust back up systems to deal with emergencies.
- Workshop attendants reported that Yukon College courses are not being offered consistently enough due to minimum people

requirements, and the burden of traveling to Whitehorse is challenging for individuals and system owners.

- Training and on the job hours required for certification are difficult to secure. Testing can only be done at Yukon College.
- A travelling trainer who can go around to communities to administer training/tests could be considered.
- Identification of CEUs opportunities that can be completed on the job. For example, weekly, monthly, annual planning activities and maintenance checks can be used as ongoing upkeep and training opportunities that count as CEUs, cross over with other plants to get training on new systems.
- There are opportunities for Government of Yukon or sector associations to provide coordination and administrative support to operations in helping identify CEUs opportunities and assist with administrative paper work and processes to have the opportunities recognized and credit granted.

In summary, the Yukon water and wastewater sector is comprised of a workforce of 162 (majority male) with a possible 57 retirements over the next ten years. Despite forecasted retirements, retention was not seen as a major challenge in the sector, however, recruitment was. There are gaps in the supply and demand for Operators

with Level III or higher certification. Currently 6 of 46 EOCP certified facilities in the Yukon do not have operators in good certification standing, or who meet the required certification level. Training opportunities which include a focus on cross training, communication skills and computer literacy were identified as key components for ensuring a competent workforce. Further, Yukon's remote communities encourages the opportunity for direct community engagement, both with possible improved recruitment possibilities and developing linkages to high school students. Improving awareness of the industry was seen as a necessary element to workforce planning, as was restructuring the qualification process to be equivalent to traditional trades qualification.

The unique challenges faced by the water and waste water sector in Yukon can be resolved with innovative northern solutions. Through further engagement with all contributors (regulators, owners, Operators, First Nations and communities) many of these challenges can be overcome to create a thriving and sustainable sector.



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Appendix A: Survey

What is this survey for?

- **This survey is to gather information to include in a Drinking Water and Wastewater Sector Profile report that is being prepared by Hemmera for Yukon Government;**
- **We appreciate your input. Your participation is essential to the development of the Drinking Water and Wastewater Sector Profile.**

Instructions

Please answer all questions by ticking a box or filling in comments. If there are any questions that are unclear or you would rather not answer, please skip them.

1. What is your role in the Water and Wastewater Sector (tick one):
 - Administrator in government (First Nation, Yukon Government, Village or Municipality)
 - Public Works Supervisor
 - Community Operations Supervisor
 - Drinking Water System Operator
 - Wastewater System Operator
 - Educator
 - Regulatory
 - Agency
 - Private Sector
 - Citizen
2. Facility Location: _____
3. Please select your gender
 - Male
 - Female
 - Other
4. Please select your age
 - 20 or younger
 - 21 - 30
 - 31-40
 - 41-50
 - 51 or older
5. Are you a Yukon resident?
 - Yes
 - No

If not, what is your place of residence: _____

6. Do you identify as First Nation?

Yes

If so, which First Nation? _____

No

Unsure

Prefer not to answer

7. How long have you worked in the water/wastewater workforce?

Less than a year

1-4 years

5-9

10-14

+15

Not applicable

8. Have you always worked in Yukon's water/wastewater workforce?

Yes

No

Not applicable

9. How long have you been in your current position? _____

10. Which of the following categories best describes your employment status?

Full time

Part time

If so, on average how many hours do you work a week, or do you work seasonally? _____

11. Please select your specialty.

Drinking water systems

Wastewater systems

Other:

12. Please choose the role which best describes your work:

Operator

Technical support staff

Management

Supervisor

Other (please specify): _____

13. What is the expected level of certification for operators of your facility?

- Level I
- Level II
- Level III
- Level IV
- Unsure

14. Do you have any water and/or wastewater certification(s)?

- Yes
- No

If so, when and where did you obtain it? _____

15. If you are a certified operator, please select the option that best suits your certification level:

- Without ECOP certification
- Undergoing EOCB certification
- EOCB certified
- Multiple levels of certification
- Other:

16. If you do have EOCB certification, what is the highest level you possess?

- Level I
- Level II
- Level III
- Level IV

17. How did you obtain your EOCB training?

- On the job
- Through EOCB certification
- Yukon College
- All of the above
- Other:

18. Where did you receive your EOCB training?

- Yukon
- Outside the Yukon
Which province or territory: _____
- Outside of Canada

19. Was financial support from an agency, government or your employer provided for your training/education?

- Yes

No

20. If you work in a water and/or wastewater operation, please select the compensation range that best reflects your employment:

- <30K
- 30-40K
- 40-50K
- 50-60K
- 60-70K
- 70-80K
- >80K

21. Did you have difficulty obtaining a job in the Yukon water/wastewater workforce?

- Yes
- No
- Unsure

If so, could you please describe these challenges?

22. Would you say there are effective local education and training programs to support Yukon's water/wastewater workforce?

- Yes
- No
- Unsure

If not, please provide detail:

23. Do you believe that the local water/wastewater workforce is growing?

- Yes
- No
- Unsure

If so, what makes you think that:

24. Would you characterize the turn-over rate in the Yukon water/wastewater workforce as high or low?

- High
- Low

Can you add detail to why you think high or low?

25. Is there increasing demand for a particular position within your place of work?

- Yes
- No
- Unsure

If so, which position(s)?

26. Is there a decrease in demand for a particular position at your work?

- Yes
- No
- Unsure

If so, which position(s)?

27. Do you foresee your place of work facing any challenges over the next five years?

- Yes
- No
- Unsure

If so, what will they be?

28. Do you think local water/wastewater employees are moving out of your community for either related or different opportunities?

- Yes
- No
- Unsure

If so, why are people leaving?

If so, where are people going?

29. If you work in a water or wastewater department, what would influence you to stay at your place of work?

Please select all that apply.

- Robust Benefit package
- Competitive salary
- Vacation time
- Training/career advancement opportunities
- The lifestyle of the work location
- Company culture
- Proximity to family
- Other: _____

30. What are some of the challenges currently facing the growth of the sector?

- Limited training and education opportunities
- Lack of awareness of local water/wastewater jobs for young graduates
- Salary and/or benefits
- Location of work
- Lack of females in the industry
- Other: _____

31. What do you think can be done to attract and retain operators?

32. Do you have any ideas, concerns, or issues that you would like to see discussed further by educators, regulators and/or government?

33. What challenges do you face in your role?

34. With regards to the water and wastewater sector what support is needed?

