

MUNICIPAL-LEVEL SERVICE DELIVERY IN LABRADOR

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NEWFOUNDLAND AND LABRADOR IN TRANSITION

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The Population Project: Newfoundland and Labrador in Transition

In 2015, Newfoundland and Labrador had the most rapidly aging population in the country – which when combined with high rates of youth out-migration, declining birth rates, and an increasing number of people moving from rural parts of the province to more urban centres, means that the province is facing an unprecedented population challenge. Without intervention, this trend will have a drastic impact on the economy, governance, and the overall quality of life for the people of the province. Planning for this change and developing strategies to adjust and adapt to it is paramount.

The Harris Centre's Population Project has developed potential demographic scenarios for the province and its regions for the next 20 years and will explore a number of the issues arising. These include, but are not limited to, those concerning:

- **Labour markets** – how will future demands for labour be met given a shrinking labour supply?
- **Service demands** – what are the implications of an aging and a geographically shifting population on the demand for public, private and non-government sector services?
- **Service provision** – what are the implications of a declining rural population for the costs and delivery of services to an increasingly smaller and older, but still geographically dispersed population?
- **Governance** – how will local and senior levels of government respond to changing governance issues in the light of these demographic changes and challenges?

Utilizing expertise from both inside and outside the university, the project employs a combined research and debate approach to inform and contribute to government policy, as well as to develop strategies for the private and non-profit sectors to respond to the broad range of issues resulting from the anticipated population shifts.

This report, by a group directed by Dr. Tony Fang, Department of Economics and Stephen Jarislowsky Chair of Cultural and Economic Transformation, Memorial University, offers an analysis of municipal-level service provision in Labrador. Communities in Labrador face a number of significant constraints in terms of municipal public service delivery, including scarce and scattered population distributions that preclude economies of scale; great distances that make it hard for both service users and service providers to receive and offer services; a limited range and depth of services; a challenge to provide services for diverse populations such as the elderly and the youth; and extreme weather conditions. As the report notes, these conditions may contribute to and aggravate the high levels of net out-migration from many Labrador regions, which in turn adversely affects the funds available to meet community needs. This report reviews current municipal service provision issues, specifically those relating to water services, waste collection and disposal, fire and emergency services, road maintenance and snow clearing, and recreation, and offers policy recommendations that could benefit Labrador communities.

Funded by the International Grenfell Association (IGA), this report is the third published through the Population Project. This and all other reports generated through the Population Project are available online at www.mun.ca/harriscentre/populationproject. More information about the project can be obtained by contacting the Project Director. Comments on the Project and reports generated are welcomed.

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LIST OF ACRONYMS

BWA – Boil Water Advisory
DBP – Disinfection By-Product
DHCS – Department of Health and Community Services
DWQI – Drinking Water Quality Index
EPR – Extended Producer Responsibility
EPRA – Electronic Products Recycling Association
FES-NL – Fire and Emergency Services - Newfoundland and Labrador
GCDWQ – Government of Canada Drinking Water Quality
GHG – Greenhouse Gas
HAA – Haloacetic Acid
HVGB – Happy Valley-Goose Bay
ISWM – Integrated Solid Waste Management
LSD – Local Service District
MMSB – Multi-Materials Stewardship Board
NGO – Non-Governmental Organization
NL-AFS – Newfoundland and Labrador Association of Fire Services
NMIA – Naskapi Montagnais Innu Association
PCA – Product Care Association
PWDU – Potable Water Dispensing Unit
PWMS – Provincial Waste Management Strategy
SSO – Sanitary Sewer Overflow
TCU – True Colour Unit
THM – Trihalomethanes
WEEE – Waste Electrical and Electronic Equipment
WSER – Wastewater Systems Effluent Regulations
WTP – Water Treatment Plant

EXECUTIVE SUMMARY

Public service delivery at the municipal/local level pertains to services that are delivered by a municipality. Municipal services can have a significant impact on communities and the quality of life they offer. This report reviews the five main services provided by municipalities in Labrador: water services, waste collection, road maintenance, fire and emergency services, and recreation, and examines how they are delivered. This study shows discrepancies between the levels of service in different parts of the region and provides a set of recommendations on how to improve service delivery.

These recommendations include improved communications and consultation between municipalities and residents and between municipalities and the provincial government to better address critical issues.

Recommendation: Municipalities should hold community consultations to hear from residents what issues they think need to be urgently addressed. These consultations should be published and made available to government, researchers and interested stakeholders.

Recommendation: There should be more formal channels for municipalities to speak with provincial officials about municipal issues. Interdepartmental committees that include municipalities are important to gaining local knowledge and create a space to voice concerns.

Water is one of the most vital resources because of the large role it plays in personal health and hygiene. Having clean drinking water is a human right recognized by the United Nations and yet many communities in Labrador do not have access to clean water. Boil water advisories, brown water, and high amounts of chlorine disinfectant by-products are a common occurrence in communities along the coast from Natuashish to L'Anse au Loup. This issue deserves high priority consideration because of its significant impact on residents' lives.

Recommendation: The provincial government's Interdepartmental Working Group developing policies and guidelines for drinking water safety should invite representatives of Labrador communities to attend their meetings and join their discussions.

Recommendation: The Drinking Water Quality Index should be modified so that all communities receive a water quality ranking.

Recommendation: A cost-benefit analysis of residential water metering in Newfoundland and Labrador should be undertaken as a method of funding water maintenance and enhancing water conservation. Implementation should consider income and substitution effects of higher water costs. While this recommendation may not be a priority in the light of other required measures and urgent responses, the province is lagging behind other jurisdictions in the adoption of such measures and will eventually have to address this issue.

Recommendation: The provincial government could allocate funding so that each community has a part-time certified water operator to perform daily disinfectant residual testing and maintenance of water distribution and disinfectant systems. As per the Permit to Operate clause, every community should have a certified water operator, however many cannot afford this expense. Water operators would help municipalities manage their existing infrastructure, control disinfectant by-products, organize leak detection systems, and develop solutions to issues of run-off where rain and melting snow are prone to flooding basements and roads. At the same time, the sustainability of the provincial funding approach is under question given that several attempts to employ shared water operators in Newfoundland ended as soon as the external funding ended. Without a regional administrative structure in place, such as a regional

government or regional service board, this approach may not be feasible. Regional service-sharing arrangements could be examined to address these needs.

Recommendation: Where communities cannot afford or attract a certified water operator, Newfoundland and Labrador's Department of Municipal Affairs and Environment should use the Mobile Training Unit for certified water operators to show municipal workers how to collect water and send it to the proper NL Services lab for testing to reduce waiting times of BWA removals. This is a short-term solution, as many water issues require the expertise of a water operator to understand their infrastructure and structural issues, but could help mitigate immediate issues with BWAs.

Recommendation: The classification of BWAs should be changed to reflect their severity and time length to better inform the public about water quality. Emphasis on removing BWAs should be given to those communities who have more serious or long-term BWAs.

Recommendation: Sharing a water supply can reduce filtration costs. While this will only work where there is close proximity between towns, there are situations where this could be introduced. Labrador City, for example, uses Beverly Pond for its water source while Wabush uses a series of wells. Happy Valley-Goose Bay's water comes from Spring Gulch, while Sheshatshiu and North West River both use well fields. The communities along the Labrador Straits each have their own water source. While this may not be an immediate issue, a further study into the feasibility of sharing water sources in these areas should be conducted.

Recommendation: Given that communities in Labrador continue to struggle with high levels of THM and HAAs in their water, Newfoundland and Labrador's Department of Municipal Affairs and Environment should consider alternative treatment systems to find solutions to poor water quality in the region. A concerted effort to raise awareness of these alternatives, such as available private sector solutions, would be useful, as well as the facilitation of pilot efforts by the provincial government.

Recommendation: Where PWDUs are in place, communities should receive full funding from the provincial government to make them free to ensure maximum usage. Given that PWDUs are installed in areas where existing infrastructure delivers poor quality water, PWDUs should be made available for free use to ensure community members can access higher quality water, until a better long-term solution to the issue is developed.

Recommendation: The provincial government of Newfoundland and Labrador should allocate permanent funds for a certified water operator in Black Tickle-Domino because of daily maintenance required given the murky water source.

Recommendation: A plan to connect all residents in Black Tickle-Domino to a central water distribution system should be considered.

Recommendation: Every Labrador community or group of communities with a shared water resource should investigate a possibility of a wastewater treatment plant to prevent sewage from entering local water supplies. At the same time, the question of sustainability should be examined. Even with full funding for the construction of such facilities, most municipalities do not have the financial capacity to operate them under their current structure.

Waste disposal services in some regions of Labrador are in critical condition as landfills are overflowing and catching on fire, and individual municipalities cannot afford to upgrade them. For most parts of Labrador, a regional solution is possible and viable but given the diversity of waste, a provincial solution would be more effective. If properly managed, waste disposal can create new businesses and generate a revenue stream, but this would require partnerships between government, industry and non-profit organizations. There are many examples of these partnerships already, but there are few in Labrador specifically where better waste disposal solutions are seriously needed.

Recommendation: Before implementing regional waste solutions, Regional Waste Management Authorities for Labrador should be created through consultations with municipalities, relevant stakeholders and the Multi-Materials Stewardship Board (MMSB).

Recommendation: Any municipal or provincial waste management strategy should include partnering with firms that collect waste, such as beverage containers, compost, scrap metal and paint, for a reward.

Recommendation: Newfoundland and Labrador's provincial government should consider ways of reducing the use of single-use plastic bags through a surcharge on plastic bags or through a complete ban on the product.

Recommendation: Based on the 2002 Provincial Waste Management Strategy, there should be a regional landfill for Labrador West, Central Labrador, Southeast Labrador, and the Labrador Straits. These regional landfills should include a scrap metal yard, a composter, cardboard recycling, and a space for hazardous wastes.

Recommendation: Given the great distance from Cartwright to L'Anse au Clair (408 km), rather than one landfill to serve the entire region, two regional landfills in this area are recommended as originally proposed in the PWMS.

Recommendation: Where a regional waste management strategy is not feasible, such as along the Northern Coast and in Black Tickle-Domino, communities should receive funding to maintain their individual landfill sites.

Recommendation: A regional waste management plan must be implemented in the Labrador Straits quickly to deal with the overflowing landfill issue there.

Recommendation: Communities with overflowing landfills need new spaces to dispose of their garbage that would include spaces for composting, paper and cardboard recycling, beverage containers, hazardous waste, scrap metal, and paint. Given that some of these categories of waste can be recycled for an economic reward, it may be feasible to work with private firms or other regional landfills to send this waste to other places. However, some of these activities are not proving economically viable for the province as a whole and therefore further research needs to be done on the feasibility of profitable recycling methods for the region.

Recommendation: Communities in Labrador should conduct community waste audits to better understand economic opportunities and environmental issues associated with their waste. This can be done by working with community partners such as Ever Green Recycling who offer expertise to conduct waste audits and create waste management solutions. Working with the Multi-Materials Stewardship Board (MMSB) might prove useful, as they have completed several waste audits.

Recommendation: Municipalities should work with organizations such as Scout Environmental to show communities how they can recycle different materials in their landfills and reduce pressure on overflowing landfills.

Recommendation: Communities that continue to open burn their garbage because of local land conditions or cold winters should consider alternatives such as installing incinerators to reap benefits such as energy production and lower negative environmental effects from burning waste.

Recommendation: MMSB should work with municipalities in the Labrador Straits to put a green depot in each community. This could be done with a model similar to that of Southeast Labrador where extra space in town halls and schools are utilized for collecting beverage containers.

Recommendation: Proper disposal of hazardous waste is vital to environmental sustainability and rather than hazardous waste being kept in each regional landfill, a provincial solution to removing this waste should be considered. A regional solution to collecting household hazardous waste through centralized drop-off locations and mobile collection events should be implemented in Labrador.

Proper fire and emergency services are expensive to maintain, not often used, but potentially life-saving when required. As with most of the province, communities in Labrador often rely on volunteer fire brigades that are not properly trained or resourced. A regional solution could be highly effective by having a centralized, staffed fire department that is complemented with smaller, volunteer brigades.

Recommendation: Clustered communities should pool their resources to hire a few trained firefighters and thus improve firefighting services in the area.

Recommendation: Clustered communities, e.g. those along the Labrador Straits, should make use of other regional firefighting solutions, such as sharing the cost of firefighting equipment.

Recommendation: Since many Labrador communities are generally too remote to share services, in these cases each community should have a basic fire department and the necessary equipment, such as a portable water pump and hose.

Recommendation: The provincial government should meet with Local Service Districts to create a shared cost plan to purchase basic firefighting equipment such as portable water pumps and hoses. Moreover, they should have regional government arrangements in place to effectively entrain all residents in the cost-sharing of these services.

Recommendation: The provincial government should create an online fire reporting system where fire and emergency teams can report fires, losses and other relevant statistics. This will allow the NL Association of Fire Services to assess which areas have the greatest demand for fire and emergency services and which fire departments are the most effective at mitigating emergency situations.

Road maintenance is a common problem for communities across the province. However, most communities on the island at least have paved roads. That is not the case for many municipalities in Labrador, where gravel roads create dust and the quality of roads is reduced because of ruts.

Recommendation: The provincial government should explore funding opportunities such as the federal Infrastructure Funding Program to pave and maintain roads in communities with gravel roads to alleviate health concerns arising from dust.

Many communities in Labrador prefer not to plow their roads and travel using snowmobiles in the winter. With a changing climate, this is becoming riskier as sea ice is melting at different rates and real-time monitoring is required to ensure safe travel.

Recommendation: Technology used in the Nain Research Centre’s SmartICE System (Sea-ice Monitoring and Real-Time Information for Coastal Environments) should be extended to communities along the southern coast and other areas where residents travel over ice in winter.

Recreation can take a variety of forms and can be offered by the private, non-profit or government sector. In the great open spaces of Labrador, there are also many recreational activities that do not require outside involvement. To create a welcoming, active community, many municipalities provide recreational services, programming and special events through a community centre. Most communities in Labrador have a recreation centre, community gym or community centre. These centres are generally multipurpose spaces that allow for common gym activities, but may also be used for community events as well.

Recommendation: The provincial government should explore funding opportunities for a new community space in communities that rely solely on a school gym for recreational activities.

Municipalities may offer a range of innovative services for residents of their community but sharing information about those services can be difficult. Employing modern technology, such as a community website or social media page, is a cost-effective way for communities to share information to their residents and to visitors.

Recommendation: Regional websites should include information on municipal services for residents, business services for commercial enterprises, and accommodations and attractions for tourists. These websites should include online forms for municipal applications and be updated annually at least to ensure information is up to date.

Recommendation: Every community should have a Facebook Page to update members on municipal services and events.

Recommendation: Expand the Rural Broadband Initiative to improve broadband access in underserved areas in Labrador.

Our report highlights some pressing issues facing communities in Labrador and the difficulty individual communities have addressing them. Our recommendations seek to focus on problems of concern and provide solutions based on good practices found in other parts of the province or the country. A key contribution of this report has been extracting and synthesizing the literature on the province to map out what services exist in Labrador. Such a report will allow government bodies and interested citizens to identify what services exist in the region and how their quality is measured based on provincial guidelines. We hope that this will be a valuable tool for communities in Labrador to understand how their services measure up and what solutions are necessary to improve any issues.

RESEARCH TEAM

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1.0 INTRODUCTION

1.1 Project Background

The public service sector has increased tremendously in importance in advanced economies over the last several decades (OECD, 2010). Rural areas have shifted from self-contained communities to highly dependent environments, and governments at all levels have become major guarantors for the quality of most public services (OECD, 2008). Public services are distinguished not only from private services but also from services that community members provide voluntarily for themselves. Public services are by definition services in which the government plays a role in provision (OECD, 2010).

Rural and remote communities around the world face a number of constraints in terms of public service delivery. Among them are scarce and scattered population distributions that preclude economies of scale; great distances that make it hard for both service users and service providers to receive and offer services; a limited range and depth of services and a challenge to provide services for diverse populations such as the elderly and the youth; unemployment and poverty; behavioural problems such as domestic violence and alcohol and substance abuse; and extreme weather conditions (OECD, 2010; Gutierrez et al., 2010; Nielsen, Thuesen, and Hjalager, 2012).

Fewer economies of scale and the larger distances that have to be travelled by service users and service providers mean that the costs of public services tend to be much higher in rural than in urban areas (OECD, 2008). Due to the low density of population, many services that are provided by private companies in rural areas show low returns on investment. The incentives for private providers are weak and the services must therefore be offered with government support (Kitchen et al., 2006).

Rural and remote areas often lack specialized services that are standard in urban settings. Service providers may lack sufficiently specialized knowledge and those services that are available can be of poor quality. Together this contributes to and further aggravates the high levels of net out-migration in these regions (both due to the out-migration of local citizens and disincentives to in-migration). It also accelerates the ageing trend as the lack of opportunities forces the younger cohorts in the population to leave to find jobs. The mix of required services therefore shifts further towards the more expensive ones that are required by the elderly, which again raises the costs of public services and so the difficulties grow. At the same time, as many public services are financed according to people-based policy criteria, the funds available are substantially reduced (Gutierrez et al., 2010).

Isolation also hinders possibilities of profitable collaborations between urban places in providing public services and it discourages specialized workers from both staying in and migrating to these regions. Extreme weather conditions substantially raise the costs of infrastructure maintenance as well as the travel expenses between individual communities (Gutierrez et al., 2010). Another problem is a lack of organization. Due to the vast geographical area and low population density, rural remote areas very often do not share historical bonds, and low funding does not offer enough incentives for the creation of active self-organization.

Rural areas in Newfoundland and Labrador also have specific governance constraints: the lack of formal regional governments; the divide between formally organized incorporated municipalities, local service districts and unincorporated communities; volunteer municipal councils with very few paid staff; the lack of incentive for collaboration between communities for shared service delivery; shift of the provincial

government from subsidizing economic development to promoting agglomerations; provision of only basic services; and financial constraints (Simms and Greenwood, 2015).

There have been studies worldwide that have tried to identify potential solutions to the challenges faced by rural and remote areas that have identified some shared themes relating to good practices. Among them are place-based approaches (focusing on the outputs instead of the inputs), local ownership and management; regional service integration and coordination centres; the need for a physical centre for service delivery; and using information and communication technologies for service provision (Rennie, Greller, and Mackay, 2002; OECD, 2010; Gutierrez et al., 2010; Nielsen, Thuesen, and Hjalager, 2012).

With regard to Labrador, existing research suggests that public service delivery should shift its focus from the question of whether all populations receive the same services delivered in the same way towards the question of whether the people and businesses have services that provide the appropriate outcomes for their needs (Simms and Greenwood, 2015). Service provision also needs to be set in the context of the demographic structure and the changes being anticipated in Labrador over the next twenty years.

This research project attempts to explore policy approaches that would contribute to improved service delivery at the municipal/local level in Labrador and develop a service delivery strategy framework appropriate to the region.

Public service delivery at the municipal/local level pertains to services that are delivered by a municipality. This typically includes water services, waste collection, fire and emergency services, road maintenance, snow clearing, and recreation. In municipalities, these services are generally financed through a property tax, though there may be user fees for services such as recreation. In local service districts, these services are financed completely by user fees.

Services provided by municipalities often have a high impact on communities and the quality of life they offer. Services like water, waste collection and local roads are heavily relied upon and are used daily by residents. While they may be used less often, having reliable, accessible fire and emergency services can be vital in critical situations. Recreational programs and services are important to a person's well-being and help facilitate a sense of belonging to the community. Altogether these services are highly valued by local residents and having reliable access to these services is important to an individual's quality of life.

1.2 Research Objectives

The overarching goal of the study is to develop a framework that would improve service delivery in Labrador. To achieve this goal, the following steps were taken:

- Mapping out the current public service delivery systems in Labrador and identifying their weaknesses and strengths.
- Developing a service delivery strategy and key recommendations for implementation based on the Labrador context and input from service providers.

1.3 Methodology

Several methods were employed to achieve the research objectives and create a more robust and reliable study including a content analysis of public service delivery systems in Labrador and participatory research (survey and/or phone interviews).

1.3.1. BACKGROUND RESEARCH

The current service delivery systems in Labrador regions were examined using provincial and local government online resources and publications, research and media reports. The findings contributed to creating a preliminary overview of service delivery systems in different parts of Labrador, which included categories of public services and modes of delivery, and highlight common and specific challenges faced by Labrador regions. As well, background research helped identify knowledge gaps and inform the survey research.

1.3.2. PARTICIPATORY RESEARCH (FIELDWORK)

The project used participatory research for a two-fold objective: to complete the overview of the current service delivery systems and provide input for developing a service delivery strategy framework. The design of the questionnaire followed strict procedures according to the Interdisciplinary Committee on Ethics in Human Research at Memorial University in St. John's. It followed the guidelines as set out under the Policy on Ethics involving Human Participants. The questions were informed by the background research on public service delivery systems undertaken in the weeks preceding the design. The survey included both quantitative and qualitative questions.

The sampling frame included members of town councils (mayors/AngajukKaks, deputy mayors, and councillors), chairs of local service districts, and town office employees in Labrador. The list was compiled using the directory of the Municipalities Newfoundland & Labrador and local government websites. A special effort was made to ensure that all Labrador regions were represented.

An invitation to complete the questionnaire was sent out via e-mail and fax. It was first administered by email and fax and then orally over the phone. If no one was available to complete the entire survey, town clerks were interviewed for general information about the town. The sample size for these information interviews was $n=23$ (out of 30 Labrador communities, each respondent representing a community in Labrador). The sample size for more in-depth survey interviews was $n=7$ (representatives of 7 communities from Labrador West, Central Labrador, Southeast Labrador and Labrador Straits). Participation in the study

was voluntary. Participants received the informed consent form, which explicitly specified that they were free to decide whether to take part in the study and that there would be no negative consequences if they chose not to participate or to withdraw from the study once it had started. Every reasonable effort was made to ensure anonymity of participants.

1.3.3. MAPS

Maps of public services were created using both background and participatory research. The maps in Section 2.0 provide a general overview of the types of municipalities and the population in Labrador. In Section 3.0 each map highlights a different component of a municipal service and community names are listed only for those areas that are relevant to the specific services indicated for each map. Black dot symbols indicate a community that is not affected by the issue or does not offer the specific service in question.

2.0 DIVERSE LANDSCAPE OF COMMUNITIES IN LABRADOR

2.1 Overview

Labrador is a complex area characterized by relatively small, highly dispersed, population clusters distributed over a large geographic area. These clusters vary considerably from those with young and growing aboriginal populations on the north-east coast, the ageing and shrinking population in the Labrador Straits area, volatile population numbers in the mineral resource region of western Labrador and a mix of many of these elements in the central area of Happy Valley-Goose Bay.

From 2001 to 2016 the population of Labrador declined 2.1% and the population of Nunatsiavut grew 0.7%. While some more rural regions in Newfoundland experienced 15 to 25% population decline during this time, the province's population grew by 1.6% on average. This was fuelled by high growth in the Avalon region, and specifically in the St. John's Census Metropolitan Area (Statistics Canada, 2017b). The proportion of seniors aged 65 and over in Labrador and Nunatsiavut was 8.1% and 6.3%, respectively, in 2011. This was much lower than the provincial average of 16.0%. Similarly, the proportion of youth aged 0 to 14 was much higher than the provincial average, equalling 19.6% in Labrador and 22.7% in Nunatsiavut compared to 14.9% across the province (Statistics Canada, 2016). While representing only 5.2% of the province's total population, Labrador and Nunatsiavut are home to 25.8% of its Aboriginal population. The population of Nunatsiavut is primarily Inuit and this group represents 88.9% of the census division's population. The population of Labrador is more varied, but is home to 53.9% of the Metis population, 41.5% of the Inuit population and 12.0% of the First Nation population in the province (Statistics Canada, 2017a).

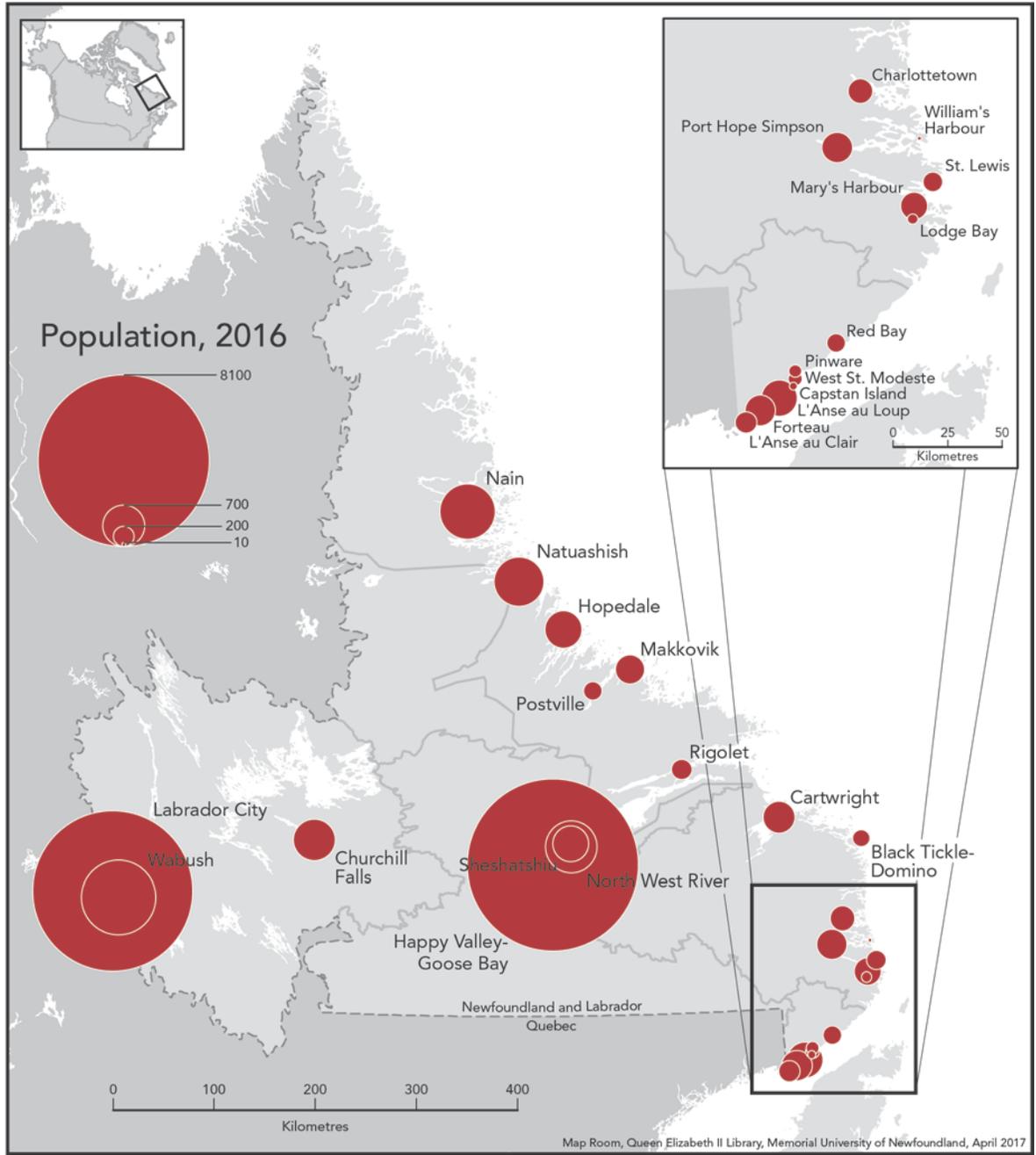


Figure 1: Labrador Communities by Population Size

Communities in Labrador have changed significantly over the past forty years. In the 1974 report of the Royal Commission on Labrador there were 39 identified year-round communities and 9 summer fishing communities (Snowden et al., 1974). Since that report the definition of community has expanded to include several subcategories such as Local Service District, Inuit Community Government, and Aboriginal Reserve, but this notwithstanding, the total number of communities has declined to 30.

The 2016 Premier's Forum on Local Government identified 14 municipalities, 5 local service districts, 5 Inuit community governments, 2 Aboriginal reserves and 4 unincorporated areas in Labrador (Department of Municipal Affairs, 2016c) (Figure 2). There are also several smaller communities in Labrador that are not recognized by Municipalities NL or the Canadian Census and which are not included in this report.

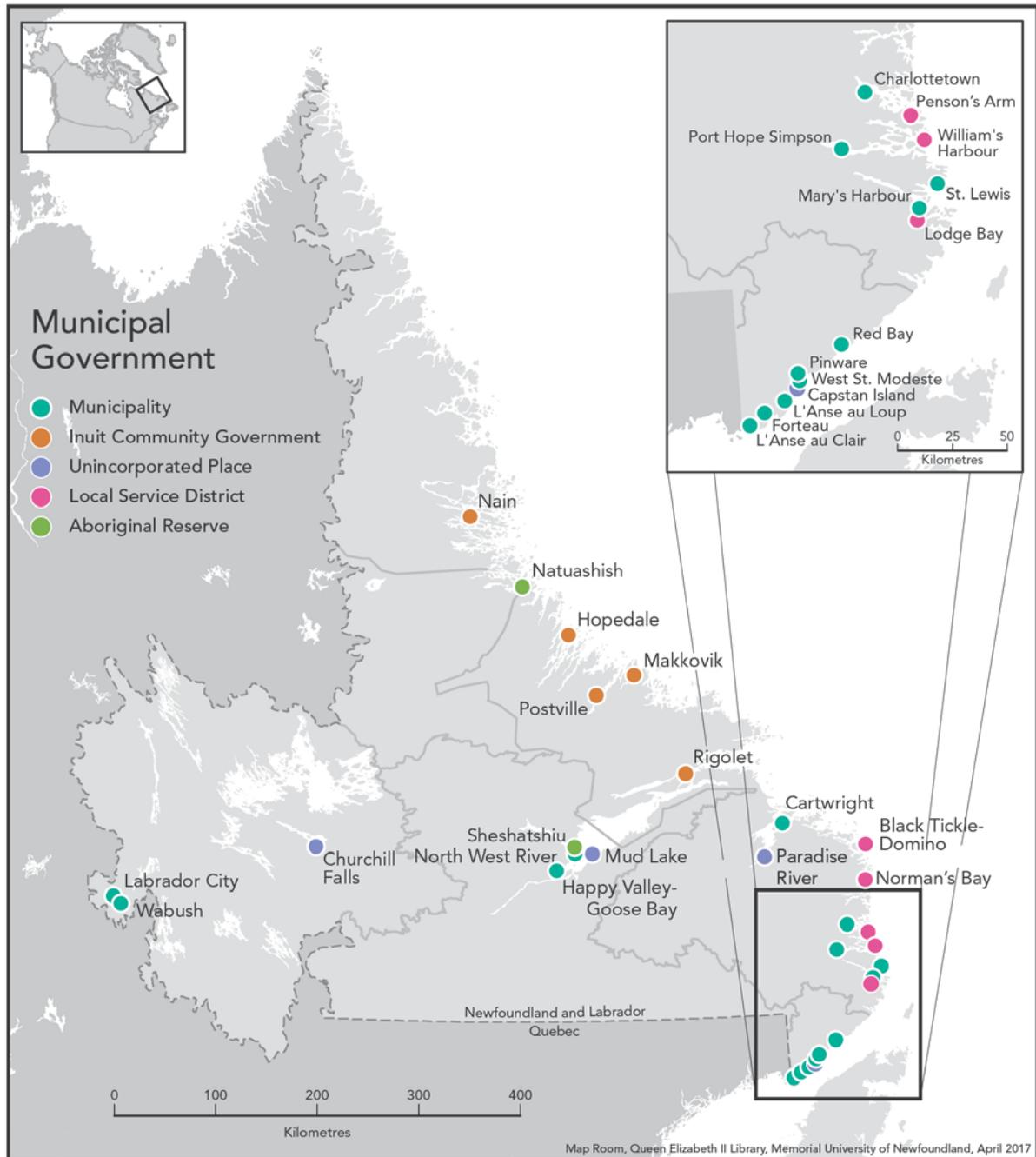


Figure 2: Labrador Communities by Type of Government

Municipalities are incorporated towns under the *Municipalities Act, 1999*, with elected councils that provide a variety of services to their community including fire protection, water supply, sewage collection and disposal, recreation and cultural programs, solid waste collection and disposal, snow removal, and transportation infrastructure (*Municipalities Act, 1999a*).

Local Service Districts (LSDs) are also incorporated towns under the *Municipalities Act, 1999* and have an elected committee that governs local affairs. LSDs, however, can only provide up to seven services (water supply, sewer systems, fire services, garbage collection/disposal, street lighting, animal control, snow clearing/maintenance of some roads within the LSD) and these are financed through a fee-for-service system rather than a property tax (*Municipalities Act, 1999a*).

Unincorporated towns have no form of local government and do not have to provide municipal services. These communities tend to be small and remote, often without road links to major centres. Churchill Falls and Capstan Island are the only unincorporated places in Labrador recognized in the Canadian Census. Churchill Falls is a company town and provides a range of municipal and provincial services to its residents.

Inuit Community Governments consist of an elected AngajukKak and councillors who preside over each community. All Inuit Community Governments are part of the Nunatsiavut government and have the power to make bylaws that are as extensive as the jurisdiction of municipalities under the *Municipalities Act, 1999* (Labrador Inuit Land Claims Agreement, 2010). The Nunatsiavut government covers most of the cost of municipal services, but receives some funding from the provincial government (Minnes and Vodden, 2014).

Aboriginal Reserves are land designated for the exclusive use of an Indigenous band as negotiated under the *Indian Act, 1867* and treaty agreements. Reserves receive funding from the federal government and the Minister of Indigenous and Northern Affairs oversees their activities. However, because Indigenous people were not included in the 1948 Terms of Union between Newfoundland and Canada, the provincial government is responsible for municipal affairs in Indigenous communities in this province (Minnes and Vodden, 2014). The Innu of Labrador have been negotiating with the federal government since 1978 for a land claims agreement and self-government (Labrador and Aboriginal Affairs, 2017). Canada, Newfoundland and Labrador, and the Innu Nation signed a Labrador Innu Land Claims Agreement-in-Principle in 2011, but the law-making authorities of the Innu Government and Innu Community Governments are still being negotiated. Therefore, municipal service delivery in Sheshatshiu and Natuashish continues to be the responsibility of the provincial government (Labrador Innu Land Claims Agreement-in-Principle, 2012; Labrador and Aboriginal Affairs, 2017). However, the Auditor General of Canada (2011) found there was a “lack of clarity about service levels” and “lack of an appropriate funding mechanism” for this service delivery. The Sheshatshiu council website outlines its many operations that range from provincial services like “Social Health” and “Primary Health” to municipal services such as “Public Works” and “Recreation.” The Public Works department is responsible for road maintenance, water and sewage, and the fire department (Sheshatshiu Innu First Nation, n.d.). While the funding structure of service delivery in reserves is unclear, it appears that community councils deliver programs with funding from the provincial government rather than through municipal taxes.

Newfoundland and Labrador has a billion-dollar municipal infrastructure deficit and many municipalities do not have the means to address the many infrastructure concerns. To pay for services municipalities charge a property tax on homes in their community, which makes up 98% of all municipal tax revenue. 80% of municipalities have reported serious problems with collecting property taxes, suggesting taxes are too high; populations are unable to afford them; people are unwilling to pay for a variety of reasons, such as poor quality of services, or a combination of all three and other factors. Enforcing property taxes can be

difficult, especially in smaller communities, as it may require harsh measures such as cutting off the water supply of family or friends (Keenan and Whalen, 2010).

Municipalities may avail of Municipal Operating Grants, but funding for these grants has been cut significantly since the 1990s and on average only account for 20% of all municipal revenue, though this can range to up to 55% for some municipalities. The provincial government also offers a Municipal Capital Works program to help municipalities upgrade aging infrastructure, but this program requires municipalities to match funding, which can be a considerable constraint. Gas Tax funding is also available and due to recent changes, municipalities are able to use this funding as part of their Capital Works obligations. This means that some municipal projects are funded entirely by outside sources, which is helpful as many municipalities are unable to afford larger capital projects (Keenan and Whalen, 2010).

All communities in Labrador participate in the Combined Councils of Labrador, which works to “acknowledge municipal governance as the vehicle of choice for economic development, community living, social challenges, infrastructure activities and thrives for leadership in advocacy, policy development, research and municipal training” (Combined Council of Labrador, 2011a). This council has the semblance of a regional government representing the needs of Labradorians, but is not formally recognized as such.

While the Report of the Royal Commission on Labrador (Snowden et al., 1974) is now out-dated, it remains the most comprehensive report on Labrador to date and provides an interesting point of comparison for this report. The 1974 report found that many in Labrador lived in extreme poverty, residing in overcrowded, dilapidated housing and without proper water, sewage or waste disposal systems. There was also a clear divide between the people employed by government, such as schoolteachers, or those working in company towns, and the rest of the region (Snowden et al., 1974:4-5). Following the report there were some important changes made to service provision for Labrador communities including the Labrador Interim Agreement, the Native Peoples of Labrador Agreement and the Community Development Subsidiary Agreement for Coastal Labrador. These agreements were meant to improve water and sewer systems, housing conditions, firefighting equipment and recreational facilities. Considerable progress has been made in these areas, but as this report will show, several challenges remain.

Some issues raised in the 1974 report still exist. For instance, as part of the Federal-Provincial Agreement the Inuit of the North were recognized as eligible for federal funding – but the Inuit of the South were not. In the commission this was identified as creating an inequality of services, despite the fact that these were “two areas in which life styles and basic needs are almost identical” (Snowden et al., 1974: 7). The exclusion of Inuit outside the Labrador Inuit Settlement Area remains a challenge for those residents in Labrador, and the Southern Inuit of NunatuKavut continue to fight for recognition by the federal government.² This is discussed further in Section 2.4.

The following sections provide some background information on communities in Labrador.

² Southern Inuit is the term used by the NunatuKavut Community Council:
<http://www.nunatukavut.ca/home/home.htm>

2.2 Nunatsiavut

The Labrador Inuit Land Claims Agreement was signed in 2005 and marked the creation of self-government for the Inuit people – the Nunatsiavut government. Nunatsiavut covers the north coast of Labrador and includes the communities of Nain, Hopedale, Postville, Makkovik and Rigolet. The government has a Legislative Assembly based in Hopedale and both Inuit and non-Inuit living in the communities can vote. The larger community of Nain serves as the administrative centre for Nunatsiavut. Each community also has its own community government headed by an AngajukKâk (chairperson) and elected councillors (Labrador Inuit Land Claims Agreement, 2010). There are no roads connecting the communities and residents rely on a ferry service to travel in the summer and snowmobiles to cross the sea ice in the winter.

2.3 Innu Nation

In 1976 the Naskapi Montagnais Innu Association (NMIA) was formed “to protect their interests, their land and their rights from outside forces.” The association changed its name to “Innu Nation” in 1990. The Innu Nation’s mandate is “to provide a unified political voice to protect the Innu people’s interests against outside threats, as well as to pursue land claim negotiations and help deliver education, health-care, and other social services to its membership” (Higgins, 2008a).

The Innu Nation was formally recognized under the *Indian Act* of Canada in 2006, and is continuing to work on land claims and self-governance negotiations. Each community has its own band council and chiefs of councils are members of the Executive Council of the Innu Nation (Innu Nation, n.d.).

The Innu have a long history in Nitassinan³, the people migrating across the country with the seasons, and a shorter history in Canada. First formal contact with the colonial government took place in the 1930s through the Newfoundland Ranger Force, which policed Labrador and distributed government relief payments (Higgins, 2008a). In the 1960s Innu were forced to stop their nomadic way of life and settle into government-built communities. These communities were often underfunded and had few amenities that were enjoyed by most of the Canadian population at that time, such as running water, sewage systems or garbage collection (Snowden et al., 1974; Samson, 2003; Higgins, 2008a; Truth and Reconciliation Commission, 2015).

The community of Natuashish was resettled in 2002 from Davis Inlet, a remote island with a serious lack of public services, housing, or economic opportunities for residents (Snowden et al., 1974, 345; Tanner, 2016). Sheshatshiu, or Tshishe-shasthshit, is also a relatively new community. Previously a part of North West River, residents on the south side of the river were subject to severe discrimination in service delivery as many residents on the north side river had access to municipal services such as indoor hot water and plumbing, while residents on the south side had none of these basic amenities (Snowden et al., 1974:357). The two communities are now split along the river, with the south side incorporated as Sheshatshiu and the north side as North West River (Tanner, 2016). This context is important for understanding regionalization in northern and central Labrador, as there are historic, cultural barriers to sharing services between the nearby communities of North West River and Sheshatshiu.

³ ‘Nitassinan’ is how the Innu identified the land that is currently known as the Quebec-Labrador peninsula.

The Innu Nation have made progress in working together on issues like education policy and child, youth and family services, but face geographic and political challenges. Natuashish and Sheshatshiu are very far apart and accessible only by air or a 30.5-hour ferry ride that operates for only half the year (Department of Transportation and Works, 2016). The Innu Nation also includes 10 communities in Quebec (Tipatshumuna, 2005), and this cross-provincial nature of their network may hamper regionalization and the sharing of services. Currently, each community has its own band council, which delivers provincial and municipal services to their individual communities, and therefore, the Innu Nation does not regionalize services in the same way as the Nunatsiavut government, which has taken regional approaches to municipal service delivery through comprehensive community consultations and regional solutions to common problems.

2.4 NunatuKavut

After being ignored in Canada and Newfoundland's Terms of Union, the rights of Aboriginal peoples were recognized under the Federal-Provincial Agreement signed in 1965, which included commitment from the federal government to cover 90% of the costs of expenditures of the Innu and Inuit recognized by the agreement (Snowden et al., 1974:1176). However, the agreement applied only to northern communities and named specific towns (originally including those in Nain, Hopedale, Makkovik, with Postville, Black Tickle and Rigolet being added later) (Snowden et al., 1974:1176). This worked against the Innu and Inuit living in other communities at the time, including Davis Inlet, North West River, and the Inuit on the south coast (Snowden et al., 1974:1182). While the Innu formed the Naskapi Montagnais Innu Association in 1976, the Southern Inuit were slower to organize as they were defined primarily as Métis and considered to live too far south to be represented in organizations such as the Labrador Inuit Association.

To protect their culture and heritage the Labrador Métis Association was formed in 1985. After the Royal Commission on Aboriginal Peoples reported in favour of nationhood for the Southern Inuit, the association changed its name to Labrador Métis Nation in 1998 and to better reflect their Inuit connection, the organization was renamed NunatuKavut Community Council in 2010. These changing names reflect the growing Inuit identity in Southern Labrador (Kennedy, 2015).

The NunatuKavut Community Council is a not-for-profit organization that represents 6,000 Southern Inuit living in 23 communities in southern Labrador. The organization has an elected council and five departments covering typically provincial and federal services such as natural resources, business development and a social sector. Municipal services in this region continue to be administered by municipal town councils as per the *Municipalities Act, 1999*. The group is working towards recognition and self-governance for the Southern Inuit and filed a land claim in 1991. The federal government has been slow to respond to this land claim, but a 2016 decision by the Supreme Court that the federal government must treat all Indigenous people in Canada equally – including Métis and Non-Status Indians – was celebrated as a victory towards recognition by the NunatuKavut Community Council (Higgins, 2008b; Combined Councils of Labrador, 2011b; NunatuKavut, 2013a, NunatuKavut, 2013b; Kennedy, 2015).

2.5 Western Labrador

Western Labrador is defined by its industry towns and includes the communities of Labrador City, Wabush and Churchill Falls. While Labrador City and Wabush have since grown into multi-dimensional municipalities, Churchill Falls remains an unincorporated town with a single employer.

Despite being just a few kilometers apart, Labrador City and Wabush have remained two distinct municipalities. This may be because of competition between mining companies as the Iron Ore Company of Canada operates Labrador City's mine and Wabush's mine (now closed) was operated by Wabush Mines (Department of Natural Resources, n.d.). Given the immense influence these companies had over public service delivery, the towns have preferred to operate independently. However, the current town councils of Labrador City and Wabush have recently agreed to pool funding for a commission on amalgamation of the towns (Combined Councils of Labrador, 2011c; CBC News, 2017a).

Churchill Falls was built to service the hydroelectric facility constructed on the Churchill River in the 1960s. The project continues to employ about 250 people and delivers a wide variety of municipal and provincial services, including water services, waste disposal, and fire and emergency services (Nalcor Energy, n.d.). Churchill Falls offers municipal services as a private company town. Some of these services are innovative, such as having separate landfills for winter and summer. To keep wildlife at a distance, particularly black bears, the summer landfill is further from the community to deter animals from wandering near the town.

2.6 Central Labrador

The town of Goose Bay was constructed during the Second World War as a US Air Force Base (Webb, 2000). The military built a community for their workers including housing and recreational facilities, but there were some civilian employees who started a "squatters' settlement" a few miles away as they were "barred from building close to the base itself" (Snowden et al., 1974: 371). In this way, Happy Valley grew as an unplanned community, and became governed by Canada's Ministry of Transport, who had also taken over the air base at Goose Bay. Goose Bay had its own elected town council until 1974 when the communities were amalgamated into a single community. Happy Valley-Goose Bay has since become an important regional centre.

Central Labrador is also home to North West River and Sheshatshiu, and discussion of these communities can be found in Section 2.3. It should be noted that there are Inuit living in North West River who are not recognized under the Federal-Provincial Agreement and therefore do not receive the type of funding offered to other Inuit communities (Kennedy, 2015).

2.7 Southeast Labrador

Communities in this area receive the highest remoteness index ratings because of the distance between towns in the area and from regional hubs like Happy Valley-Goose Bay and the Labrador Straits (Department of Municipal Affairs, 2017). The Trans-Labrador Highway connects Cartwright and the southern coast starting at Port Hope Simpson to Happy Valley-Goose Bay, but is not extended to towns like Charlottetown or St. Lewis, and parts remain unpaved (Destination Labrador, 2017).

Starting as a Pinetree Station, part of a network of radar stations across the country, in the early 1950s, Cartwright has since become the regional hub for the northern area of Southeast Labrador as many communities in Sandwich Bay were voluntarily or assisted to resettle to the community (Snowden et al, 1974; Canadian Civil Defence Museum Association, 2012).

Black Tickle-Domino is one of the few remaining communities in Labrador located on an island. In the heyday of the fishery, there were many such island communities along the southern coast of the region and many residents would live on the islands in the summer and move inland – closer to trees and hunting - during the winter. Many of these communities have since resettled, but Black Tickle-Domino has remained. The two communities, both located on Spotted Island, were amalgamated into a local service district in 2006 (Municipalities Act, 1999b). Residents of Black Tickle-Domino rely on Cartwright as their main shopping centre, a 4.5 hour ferry away, and occasionally travel to Happy Valley-Goose Bay, a 16.5 hour ferry ride (Department of Transportation and Works, 2016).

There is a cluster of communities further down the coast including the municipalities of Charlottetown, Port Hope Simpson, St. Lewis and Mary's Harbour. There are also two Local Service Districts, Lodge Bay and William's Harbour, though the latter has voted to resettle (CBC News, 2015b, 2017b).

2.8 Labrador Straits

Historically an area of French fishing settlement (as evident in the community names) the Labrador Straits still relies heavily on the fishing industry for employment. The community of L'Anse au Loup is home to the area's only seafood processing plant – the Labrador Fishermen's Union Shrimp Co. Ltd. – and is the largest community in the region (Combined Councils of Labrador, 2011d; Normore, 2014). Besides the community of Red Bay, most communities in this region are very close together and are connected by roads.

3.0 CURRENT PUBLIC SERVICE DELIVERY IN LABRADOR

3.1 Water Services

3.1.1. OVERVIEW

Access to safe, clean drinking water is a fundamental human right recognized by the United Nations (United Nations General Assembly, 2010). In Canada the establishment and operation of a public water supply system is the responsibility of municipalities and LSDs (Professional Municipal Administrators, 2012) while the provincial and federal government play a regulatory role through the Department of Environment and Climate Change, the Department of Health and Community Services, the Municipal and Intergovernmental Affairs, Service NL and Health Canada (Minnes and Vodden, 2014). Water distribution systems and water treatment plants are regulated by the Department of Environment and Conservation through 'Permits to Operate' under Section 38 of the *Water Resources Act* (Department of Environment and Conservation, 2014). These permits consider a variety of water management aspects such as water quality monitoring, operator certification and source protection.

In Canada, municipal affairs such as water supply in Indigenous communities are solely a matter of federal jurisdiction, but because Indigenous people were not mentioned in the 1948 Terms of Union between Newfoundland and Canada, the provincial government is responsible for water system management in the province, though the Nunatsiavut government covers a significant portion of the costs of water systems in their communities (Minnes and Vodden, 2014).

The provision of indoor water and sewage systems is a relatively recent responsibility for many communities in Labrador. The Royal Commission on Labrador (Snowden, 1974) highlighted how most communities along the eastern shore were without such indoor services and community members were forced to gather their own water from brooks and many dumped their sewage in ditches close to their homes. More recent reports have found positive change in this regard but gaps remain (Hanrahan 2014; Minnes and Vodden, 2014). Black Tickle remains the only community in Labrador that has no piped water and instead relies on a potable water-dispensing unit (PWDU) that is one mile away for the furthest members of the community (Hanrahan, 2014).

A project by Rural Resilience published in 2014 investigated water services throughout the province and found several areas of concern including: "a lack of appropriate mechanisms to monitor and report on the state of drinking water systems, including drinking water quality measures and improved management of boil water advisories; a need for more integration and coordination of actors; an implementation gap in policies and regulations; and a need for increased incentives and support for regional approaches" (Minnes and Vodden, 2014).

Municipalities Newfoundland and Labrador 2009 Municipal Self-Assessment Survey found that a third of municipalities' water systems did not meet provincial water quality standards (Quinton and Lane, 2009). The provincial government uses the Drinking Water Quality Index (DWQI) to assess water sources and tap water in communities throughout the province. The DWQI is based on Health Canada's Government of Canada Drinking Water Quality (GCDWQ) guidelines, which was formulated by the Canadian Council of Ministers of the Environment. The index assesses a variety of water quality metrics including True Colour Units (TCUs), pH levels and disinfectant by-products (DPB) (Department of Environment and Conservation, 2009).

DWQI scores for water sources around the province tend to be Excellent and Very Good, but Speed (2014a) found that 70% of public drinking water systems were not ranked because they are on a Boil Water Advisory (BWA) and/or had high Trihalomethanes (THM) and/or Haloacetic acid (HAA) levels.⁴ This makes the DWQI a poor metric for water quality. Rather than continue publishing the DWQI, Minnes and Vodden (2014) recommend the province instead borrow indicators from the Government of Nova Scotia that measure the effectiveness of water infrastructure and the quality of drinking water.

Recommendation: The Drinking Water Quality Index should be modified so that all communities receive a water quality ranking.

Aging and degrading infrastructure is a major issue for many communities and while most municipalities report a need for repairs or upgrades to their drinking water infrastructure, few indicated they could afford such repairs or upgrades with their current budgets (Minnes et al., 2014; Cooper, 2013; Keenan and Whalen, 2010). Minnes and Vodden (2014) also found that new infrastructure was not always appropriate to a community's climate or landscape.

Under the Capital Works program, small communities are required to contribute 10% of a project's costs. Acquiring the funding necessary for capital upgrades can be difficult for many municipalities and most require provincial or federal assistance to deal with water quality issues. From 2008 to 2014 Municipal and Intergovernmental Affairs spent more than \$230 million on drinking water infrastructure projects and more than \$130 million on water and sewer joint projects in the province. In 2016, there were funding announcements to improve water and sewer systems throughout the province as part of the federal government's Clean Water and Wastewater Fund (Department of Municipal Affairs, 2016b). It is expected that communities of 1,000 residents or less will require more than \$280 million over the next ten years to meet anticipated needs (Minnes et al., 2014).

Many municipalities are unable to manage their assets as they have a lack of knowledge of existing infrastructure. There are many small communities in the province that do not have maps of their community's infrastructure, which makes it very difficult to manage water systems. Furthermore, very few communities have organized leak detection programs, without which communities have difficulties reducing water leakage and loss (Minnes et al., 2014).

The installation of centralized water systems, however, does not ensure clean water quality and not all residents in all communities are connected to water distribution systems. Poor drinking water is common in northern regions where water sources are negatively affected by seasonal changes and generically designed distribution systems that are not adapted to the cold climates (Goldhar et al., 2013). Many towns report frequent BWAs, discoloured water and high levels of DPBs. Several studies have found people prefer to fetch their own water from local water sources rather than drink their tap water (Goldhar et al., 2013; Hanrahan, 2014). The Nunatsiavummiut⁵ have collected their own water for generations and many continue the tradition today using all-terrain vehicles (ATVs) and plastic buckets. Residents in Rigolet and Nain described water on the land as "alive," "natural," and "healthy" and were very aware of the effect of weather and water levels on water quality in ponds and brooks (Goldhar et al., 2013). While 53% of residents in Nain and 41% in Rigolet believe their tap water is safe, 75% in Nain and 57% in Rigolet believe land water is safe. Elders and those without vehicles rely on other community members to collect water

⁴ THMs and HAAs are chlorination disinfect by-products created during water treatment.

⁵ Nunatsiavut Inuit

for them and most store large quantities of water in their homes. A study of stored water in Nunavik found that such water was more contaminated than the raw water source (Martin et al., 2007).

While capital works projects will require large amounts of funding to fix, some issues may simply need long-term commitments and regional perspectives. Given limited knowledge of water infrastructure, lack of leak detection programs, and no strategic planning or full-cost accounting of water systems in many communities, certified operators are necessary to address water issues. Certified water operators are in high demand but are difficult to retain because many are part-time positions and offer low salaries with no benefits. Furthermore, funding for these positions is not guaranteed, which makes them temporary and risky. The Department of Environment and Conservation (2009) recommends communities employ certified water operators to help control THM levels in their water supply. While they found operator certification level did not have a statistically significant effect on THM levels, they stressed the “importance of having a knowledgeable and reliable operator cannot be underestimated” (Department of Environment and Conservation, 2009: 112). Despite recent provincial mandates, many communities do not have certified operators and rely on volunteers to maintain systems, which can create problems and prolong BWAs.

As per the Permit to Operate clause, every community should have a certified water operator, however many cannot afford this expense. **A potential solution would be for the provincial government to allocate funding so that each community has a part-time certified water operator to perform daily disinfectant residual testing and maintenance of water distribution and disinfectant systems.** Water operators would also help municipalities manage their existing infrastructure, control disinfectant by-products, organize leak detection systems, and develop solutions to issues of run-off where rain and melting snow are prone to flooding basements and roads. At the same time, the sustainability of the provincial funding approach is under question given that several attempts to employ shared water operators in Newfoundland ended as soon as the external funding ended (Municipalities Newfoundland and Labrador pers. com. 2017). Without a regional administrative structure in place, such as regional government or regional service board, this approach may not be feasible. Regional service-sharing arrangements could be examined to address these needs.

The Newfoundland and Labrador government offers operator education courses ranging from one to three days that cost from \$100 to \$300 depending on certification levels (Department of Environment and Climate Change, 2017a). Certification levels vary based on size of the population (Department of Environment and Conservation, 2009, 112). Courses are offered across the province, including one in Labrador City. The province also offers on-site training for water operators with their Mobile Training Units (Department of Environment and Climate Change, 2017b). Minnes and Vodden (2014), however, found that municipalities were largely unaware of this service.

Recommendation: Where communities cannot afford or attract a certified water operator, Newfoundland and Labrador’s Department of Municipal Affairs and Environment should use the Mobile Training Unit for certified water operators to show municipal workers how to collect water and send it to the proper NL Services lab for testing to reduce waiting times of BWA removals. This is a short-term solution, as many water issues require the expertise of a water operator to understand their infrastructure and structural issues, but could help mitigate immediate issues with BWAs.

To cover costs of upgrades and water system maintenance communities charge municipal utility fees ranging from \$100 to \$600 but this is often not enough to cover full costs. Conestoga-Rovers & Associates (2010) estimated that the full cost of treating water could range from \$61 to \$1,688 per household (National Collaborating Centre for Environmental Health, 2014). Water metering is one way to cover such

costs and improve conservation but is rare in Newfoundland and Labrador. Minnes et al (2014) found that no LSDs and only 7% of municipalities of a 1,000 residents or less use a metering fee-for-service and that water and sewer taxes barely meet water operation costs. These costs are higher in smaller communities and it is estimated that water capital costs and operation will amount to almost 20% of municipal expenditures in the next three years (Minnes and Vodden, 2014, 41). Residential metering could also help improve water conservation in the province, but would need substantial infrastructure and expertise to be provided by the provincial government. Given fixed costs of installation and operating, particular attention would need to be given to whether such a system is feasible for smaller communities.

Recommendation: A cost-benefit analysis of residential water metering in Newfoundland and Labrador should be undertaken to determine its value as a method of funding water maintenance and enhancing water conservation. Implementation should consider income and substitution effects of higher water costs. While this recommendation may not be a priority in the light of other required measures and urgent responses, the province is lagging behind other jurisdictions in the adoption of such measures and will eventually have to address this issue.

Water conservation is not a priority for many communities who believe that water is abundant. Newfoundlanders and Labradorians use approximately 804 liters of water a day each – the second highest usage rate in Canada (Environment Canada, 2011). However, such high consumption is unique to communities with easy access to water. In contrast, the residents of remote communities such as Black Tickle are very conscious of their water usage and must reuse or share water (Hanrahan, 2014).

Along with infrastructure and water quality issues, there appear to be several policy issues in public water services as well. Minnes and Vodden (2014) found there were few formal channels for municipalities to speak with provincial officials about issues with water supply or to work with other communities to create a multi-level governance approach. The province currently has an interdepartmental working group developing policies and guidelines for drinking water safety, but local governments are not involved in this process (Department of Environment and Conservation, 2014).

Recommendation: The provincial government's Interdepartmental Working Group developing policies and guidelines for drinking water safety should invite representatives of Labrador communities to attend their meetings and join their discussions.

Regional approaches are necessary for municipalities with small tax bases to deliver quality services. Insufficient financial resources can be a problem for many communities trying to improve their water quality. Sharing a water supply can reduce filtration costs, as done for communities around Gander Lake. Greenspond and surrounding communities, for example, collectively purchased leak detection equipment, which helped reduce the cost of this equipment (Minnes and Vodden, 2014, 42). Sharing equipment, tools and employing regional certified operators are other ways to help reduce costs by partnering with neighbouring communities.

Recommendation: Sharing a water supply can reduce filtration costs. While this will only work where there is close proximity between towns, there are situations where this could be introduced. Labrador City, for example, uses Beverly Pond for its water source while Wabush uses a series of wells. Happy Valley-Goose Bay's water comes from Spring Gulch, while Sheshatshiu and North West River both use well fields. The communities along the Labrador Straits each have their own water source. While this may not be an immediate issue, a further study into the feasibility of sharing water sources in these areas should be conducted.

3.1.2. REGIONAL WATER QUALITY

There are approximately 536 public drinking water systems in Newfoundland and Labrador (Department of Environment and Conservation, 2009). Regional water quality maps use data from the Newfoundland and Labrador Water Resources Portal. Community Resource Reports are available at <http://maps.gov.nl.ca/water/index.aspx> and data is current to December 21, 2016. Communities are required to perform daily disinfectant residual testing to ensure water quality, while the provincial Department of Environment does chemical and physical water quality monitoring and Service NL and the DHCS are jointly responsible for bacteriological monitoring (National Collaborating Centre for Environmental Health, 2014).

Since 1986 there has been a marked decrease in the quality of water throughout the province linked to climate change and increased precipitation causing increased stream flow in water sources. This has caused an “observed increase in colour and turbidity throughout water bodies” (Department of Environment and Conservation, 2009: 9). Such aesthetic characteristics are coupled with increased chlorine concentrations and hence, DBPs in water sources (Department of Environment and Conservation, 2009). There have also been declines in the quantity of water sources over the past thirty years. In Labrador, for example, of those surveyed, 43% of residents of Rigolet and 48% of residents in Nain reported decreasing water levels in the region (Goldhar et al., 2013).

Seasonal changes can also affect water quality. To ensure the community has high quality water throughout the year, the provincial Department of Environment suggests storing treated or untreated water in a tank, pond or groundwater aquifer to maintain water supply. This type of long-term planning is used in only a few communities and appears to have limited potential for reducing DBPs (Department of Environment and Conservation, 2009: 67).

Trihalomethanes (THMs) and Haloacetic acids (HAAs) are chlorination disinfectant by-products created during water treatment. Guidelines for Canadian Drinking Water Quality are HAAs- 80 µg/L and THMs- 100 µg/L. Concentration above these levels can have negative health effects such as cancer and reproductive issues (Morris et al., 1992; Mills et al., 1998). In 2009 the province identified 124 communities with THM issues ranging from minor where exceedance averaged less than 120 µg/L to major with exceedance averages above 150 µg/L (Department of Environment and Conservation, 2009: 32). The Department of Environment and Conservation released a strategy to reduce THM levels in public water supplies in 2000 and have since expanded this to include 11 corrective measures ranging from policy measures, to source water treatment, to operator education and training (Department of Environment and Conservation, 2009: 56).

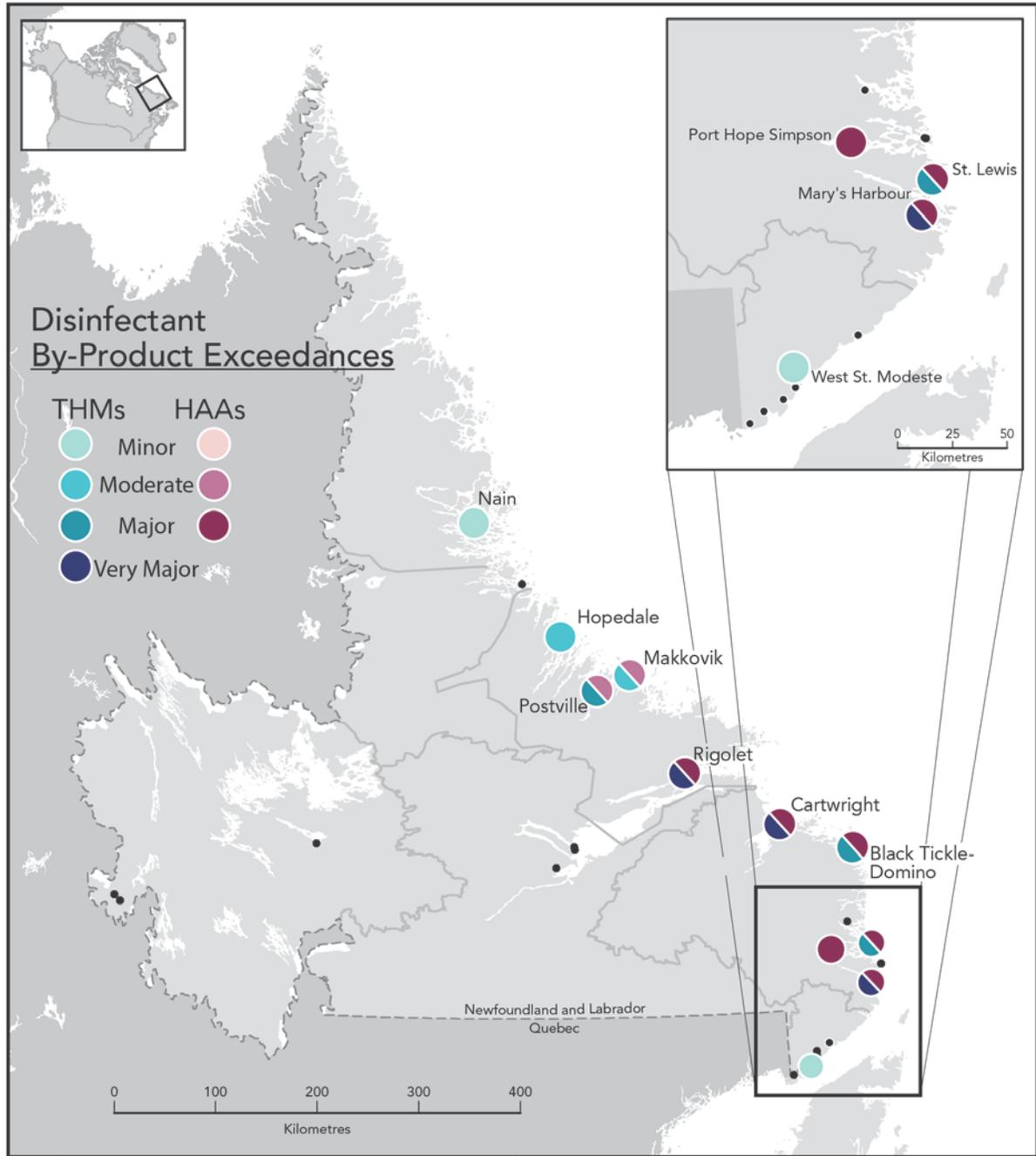


Figure 3: Labrador Communities with High Levels of Disinfectant By-Products

Across Labrador many communities have both HAA and THM exceedances (Figure 3). The highest exceedances tend to be in communities on the east coast from Rigolet to Mary's Harbour. Communities further north have slightly lower HAA and THM levels but these levels vary. Only one community in the Labrador Straits had a DPB exceedance and it was fairly low. No communities in central or western Labrador had water supplies with HAA or THM exceedances.

Water treatment plants (WTP) are a relatively new addition to the province's water distribution systems. Treatment plants provide both chemical disinfection and mechanical treatment. There is one water treatment plant in Labrador, located in Happy Valley-Goose Bay (Department of Environment and Conservation, 2017a). The Department of Environment and Conservation (2009) found that only 40% of water treatment plants tested had a statistically significant negative effect on THM levels in water sources, but that there was actually an increase in THM levels in Happy Valley Goose Bay after installation of the water treatment plant. This may be because the WTP was not specifically designed to remove DPB precursors, the WTP is the wrong size, or because of the pre-chlorination used to disinfect the WTP infrastructure (Department of Environment and Conservation, 2009). More recent data, shown in the map above, shows that there are currently no issues with disinfectant by-products in the Happy Valley-Goose Bay region, though a 2016 report found water from the municipality's treatment facility was of lower quality than water supplied from other areas of town. This was because of a higher concentration of minerals such as lead, while levels of THMs varied (Fonkwe, 2016).

Cartwright has a relatively larger water demand due to the local fish plant operated by Labrador Shrimp Co. Ltd and the water system was designed to accommodate the higher demand (Department of Environment and Conservation, 2009). When the fish plant is not in operation, the chlorine in the water can decay and create DPBs. To prevent this, residents in their homes must manually flush water, which is wasteful of resources. Water in the community is metered, which encourages water conservation and discourages manual flushing. The Department of Environment and Conservation (2009) found 53.8% of communities tested had statistically significant declines in THM levels after installing a chlorine booster, but that there was no statistically significant difference in Cartwright. This may be due to the low number of samples for Cartwright compared to the other 12 communities tested. Cartwright has a System Operator who regularly conducts chlorine tests (Department of Environment and Conservation, 2009). Given the high levels of THM and HAA in Cartwright shown in Figure 3, the issue appears to be unresolved.

Port Hope Simpson is one of only two communities in the province that use iron and manganese removal systems for their water treatment. Iron and manganese are not toxic contaminants but can darken the water and stain clothes. Many water sources in the province have natural high iron and manganese levels. Department of Environment and Conservation (2009) used a very limited sample to test the difference in THM levels before and after installation of the iron and manganese removal systems and found a large difference in THM levels (from 4.0 to 203.5) but the difference was not statistically significant. This may be because the community did not chlorinate its water prior to installing the filter (Department of Environment and Conservation, 2009).

Recommendation: Given that communities in Labrador continue to struggle with high levels of THM and HAAs in their water, Newfoundland and Labrador's Department of Municipal Affairs and Environment should consider alternative treatment systems to find solutions to poor water quality in the region. A concerted effort to raise awareness of these alternatives, such as available private sector solutions, would be useful, as well as the facilitation of pilot efforts by the provincial government.

In 2009 the Department of Environment and Conservation analyzed the effectiveness of individual water chlorination systems in the province but results from Labrador tended to be inconclusive because of low sample sizes. This new study could begin by considering the difference in water quality between Western and Central Labrador with the rest of the region. The water distribution systems in other cold climates should also be considered as an avenue to innovative solutions to structural problems of poor water quality in Northern Labrador, Southeast Labrador and Labrador Straits. This study should also consider the future effect of climate change on water sources.

True Color Units (TCU) is an important measurement of water as well. While color may not imply contamination (Health Canada, 1995), people's perceptions of their water quality are influenced by color (Nova Scotia Environment, 2008; Department of Environment and Conservation, 2009). Residents of Black Tickle – Domino add coloured sugar crystals to their water to make it more palatable and are more likely to buy cheaper alternatives to drinking water such as soda pop, which increases their daily sugar intake and can have negative effects on their health (Hanrahan, 2014: 14). In their definition of water security, Goldhar et al. (2013) included preference as a measure of people's willingness to accept their water. The GCDWQ recommends a TCU maximum of 15. The Department of Environment and Conservation (2009) found that TCUs in the province ranged from 0 to 282 with an average of 24.5.

From Figure 4 we can see that western and central Labrador tends to have clear water, while eastern Labrador tends to have darker or more opaque water. Along the north and south coast, results were more mixed as some communities had low TCUs, while others had high TCUs.

Nain was the only community in Nunatsiavut to receive a DWQI rating, as the other communities were not ranked because of boil water advisories (Hopedale, Natuashish, Rigolet), high THM concentration (Makkovik) or high THM and HAA concentrations (Postville). Most communities had slightly higher than recommended TCUs except Natuashish and Nain. Rigolet had the highest TCU of 90 units (Department of Environment and Conservation, 2017).

All the communities in Western Labrador received Excellent DWQI ratings and had clear water (Figure 4) (Department of Environment and Conservation, 2017).

All the communities in Central Labrador received Excellent or Very Good DWQI ratings and had clear water (Figure 4) (Department of Environment and Conservation, 2017). Despite these results, there have been concerns in Happy Valley-Goose Bay of brown water and that the water supply system operated by the Department of National Defense is of better quality than municipal water (Fonkwe, 2016). CBCL Limited (2010) found that water quality met stipulated regulations and was not dangerous, but did have unpleasant aesthetic characteristics.

Across Southeast Labrador, TCUs exceed the recommended maximum of 15 and average at 69 TCUs. Williams' Harbour has the lowest TCU of 32 while Cartwright has the highest TCU of 110. These communities were not ranked for drinking water quality because of a BWA (William's Harbour), BWAs and high HAA levels (Cartwright, Charlottetown), a BWA, high THM and high HAA levels (Port Hope Simpson), or high HAA levels (Black Tickle-Domino) (Department of Environment and Conservation, 2017).

The provision of water services has tended to be better in the Labrador Straits compared to communities further up the coast. L'Anse au Clair, Forteau and West St. Modeste all had low TCUs, while Red Bay and L'Anse au Loup had high TCUs that exceed 15. L'Anse au Clair and Forteau received high DWQI ratings, while the other communities were not ranked because of BWAs (L'Anse au Loup, Red Bay) or high THM and high HAA levels (West St. Modeste) (Department of Environment and Conservation, 2017).

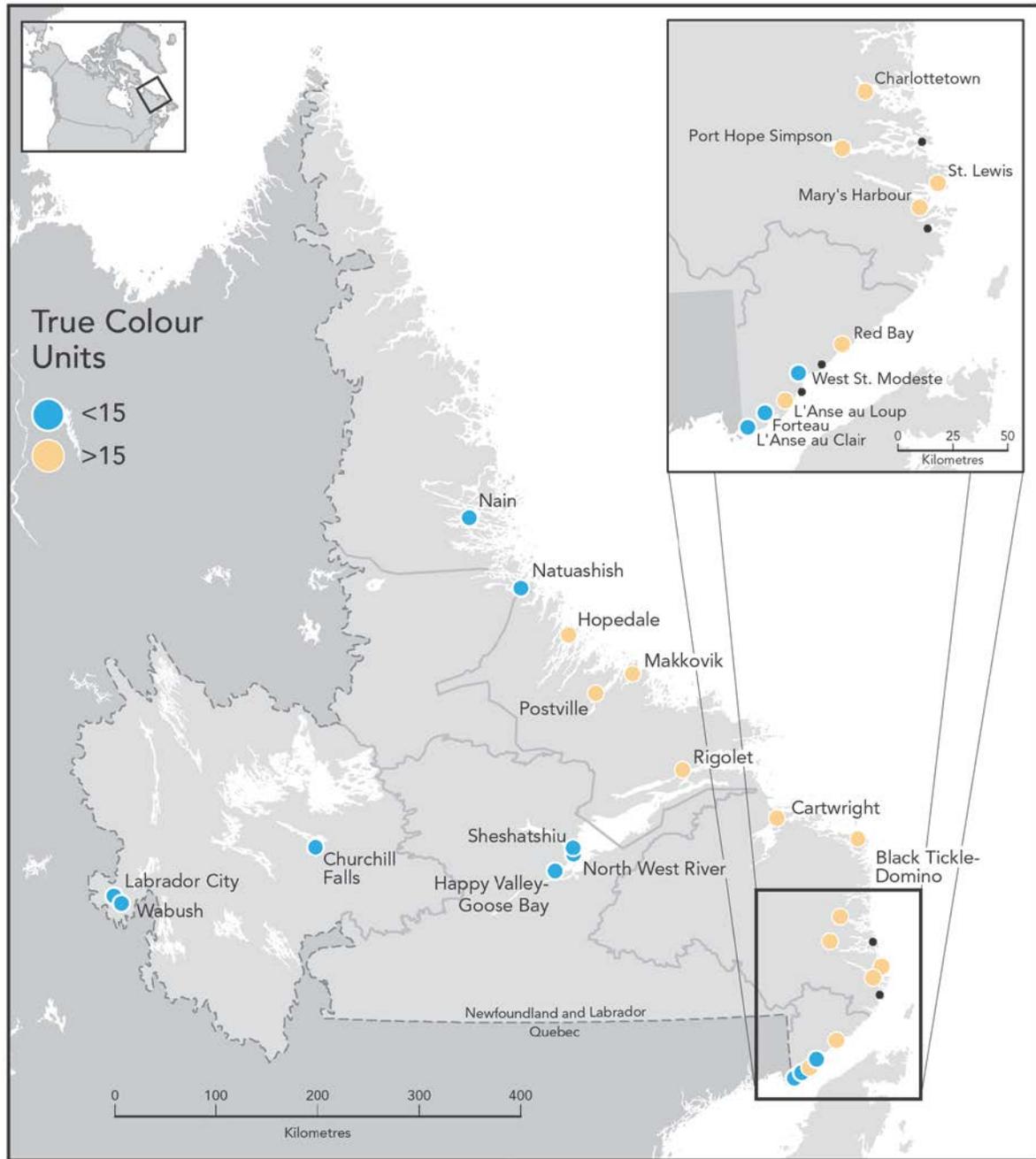


Figure 4: Water Quality in Labrador (True Color Units)

3.1.3. BOIL WATER ADVISORY (BWA)

Labrador has the highest proportion of BWAs in the four Department of Environment and Conservation regions in the province. The high number of BWAs is exacerbated by the small number of waste treatment systems (6 for 93 communities), and the isolation of many communities (Conestoga-Rovers & Associates, 2010). BWAs are precautionary measures used in Newfoundland and Labrador to warn residents of potential contaminants in their drinking water. While they are not direct measures of water quality, they can lower public confidence in the water system. Threats to water quality may be caused by “operational deficiencies (such as inadequate chlorine residual), no disinfection system, or the water in a community’s water system is contaminated with bacteriological indicators (such as total coliforms)” (Department of Environment and Conservation, 2014: 4).

Updated lists of BWA by community are published by the Department of Environment and Climate Change (Department of Environment and Climate Change, 2016a). On December 21, 2016 there were more than 160 BWAs for communities across the province and maps were created based on BWAs on this date. BWAs refer to source water and a single community may draw water from multiple sources. Because of this some communities have more than one BWA. Minnes and Vodden (2014) found the most common reasons given for a BWA were infrastructural issues including “lack of chlorine residual in the system, followed by absence of a disinfection system, and then by a disinfection system that was not operating due to maintenance or mechanical failure” (Minnes and Vodden, 2014, 25).

BWAs are not good measurements of water quality because they are issued sometimes as precautionary measures or prolonged because municipalities do not have the capacity to test their water. Some communities are more precautionary and may have longer or more BWAs. To remove BWAs, communities require a provincial health inspector to test the water, which can protract the BWA. Minnes and Vodden (2014) suggest that communities be allowed to take their own water samples and have them mailed to an NL Services lab to reduce waiting times while ensuring quality inspections.

Given that BWAs do not necessarily indicate that water is contaminated, Minnes and Vodden (2014: 61) suggest creating a hierarchy of BWAs to enhance understanding of water quality risk. The provincial government provides information on the length of BWAs and classifies them based on the reason given for putting the BWA in place (Department of Environment and Climate Change, 2017c). These grades and alternate BWA schema are used to create the BWA maps below.

Dolter (2014) created a classification system dividing BWAs into (1) Red, for determined health risk and (2) Amber, for possible risks. Based on Dolter’s classification system and the provincial government’s grading of BWAs, Figure 5 divides BWAs into (1) Pink for less serious A to E reason codes (infrastructure or filtration issues) and (2) Red for more dangerous F to H reason codes (contaminants found in water).

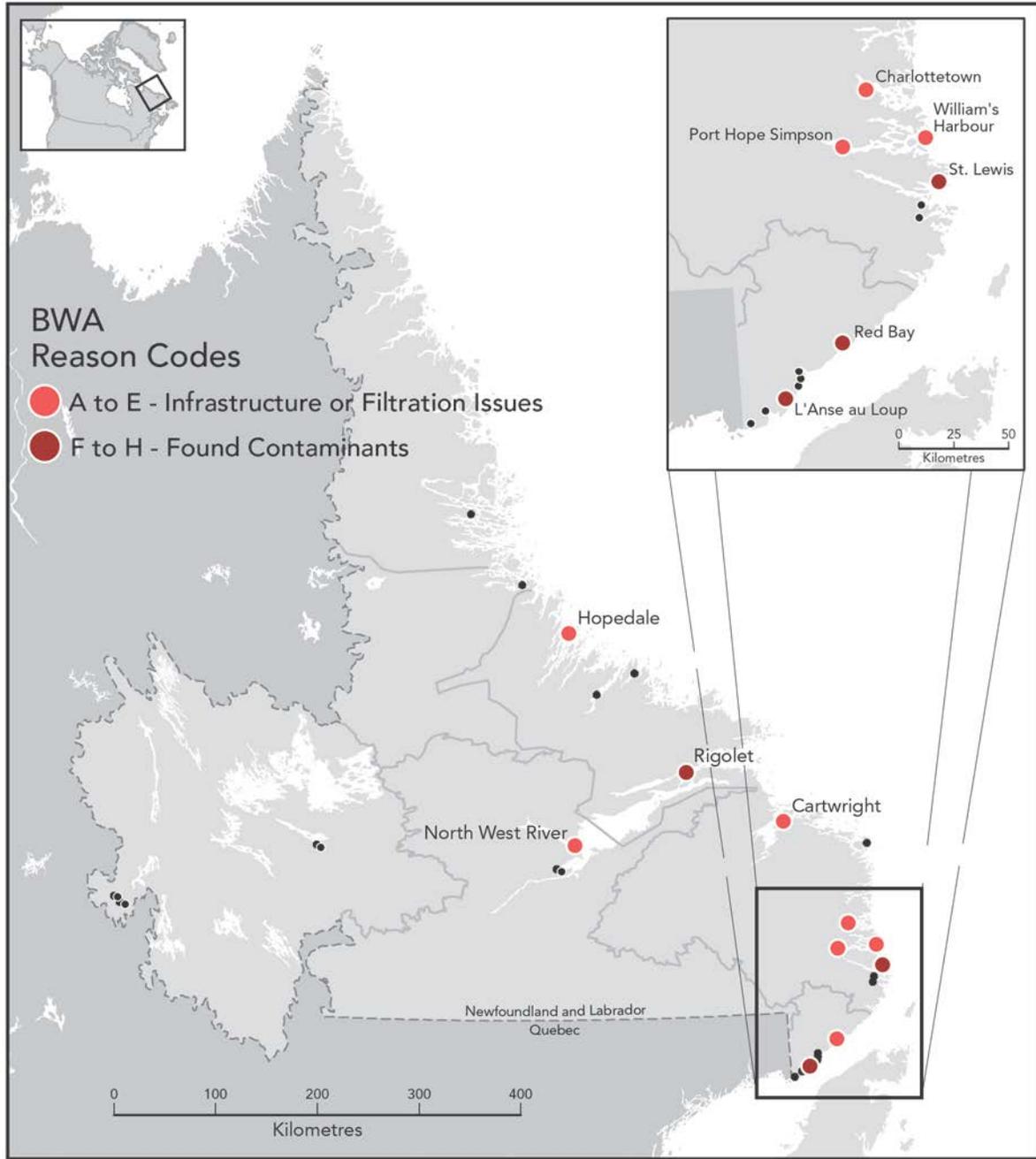


Figure 5: Boil Water Advisories in Labrador

As can be seen from Figure 5, most BWAs are deemed less serious and due to inadequately treated water introduced into the system (Cartwright), the water distribution system was undergoing maintenance or repairs (Charlottetown, North West River), the disinfection system is off due to maintenance or mechanical reasons (Hopedale), or because there were no free chlorine residuals detected in the water distribution system (Red Bay, Williams Harbour). Some of the BWAs are more serious and received higher grades because total coliforms were detected in the system (Rigolet, St. Lewis, L'Anse au Loup). While infrastructural issues caused most of these BWAs, the significance of these problems can increase. For example, L'Anse au Loup had been on a BWA since 2005 because of infrastructure issues but in 2016 bacterial containments were found in the water, which made the BWA more serious (Department of Environment and Climate Change, 2016a). Given these results, priority for removing BWAs should be given to communities who are on more serious BWAs.

Long-term and very long-term BWAs are common in rural areas of the province, where some communities have been on a BWA since 1984 (Ramalho et al., 2014). While BWAs can be proactive tools to communicate with the public about water quality concerns, long-term BWAs suggest structural problems with water systems and should be taken more seriously. Minnes and Vodden (2014) found that LSDs and communities of 1,000 residents or less were more likely to experience long-term BWAs than municipalities and larger communities. Keenan and Whalen (2010) suggest including length of BWAs in performance measurements for municipalities. Minnes and Vodden's (2014) research team created four different classifications of BWAs in NL to differentiate BWAs by time length: "Short term BWA: Less than one month; Medium term BWA: Up to 364 days; Long term BWA: 1-5 years; and Very long term BWA: More than 5 years" (Minnes and Vodden, 2014, 25).

With consideration to Minnes and Vodden's (2014) classification by time, BWAs in Labrador were differentiated by time length. As Figure 6 shows, most BWAs have been in place for more than 5 years. While BWAs in communities like Charlottetown and Port Hope Simpson have been in place for just over 5 years, Cartwright and L'Anse au Loup have had BWAs for more than 10 years, and Red Bay has been on a BWA since 1992. Rigolet, and William's Harbour have been on BWAs for just over a year or two. St. Lewis has been on a BWA for just a few months, and North West River for just a few weeks. Given these results, priority for removing BWAs should be given to communities who are on long-term BWAs.

Recommendation: The classification of BWAs should be changed to reflect their severity and time length to better inform the public about water quality. Emphasis on removing BWAs should be given to those communities that have more serious or long-term BWAs.

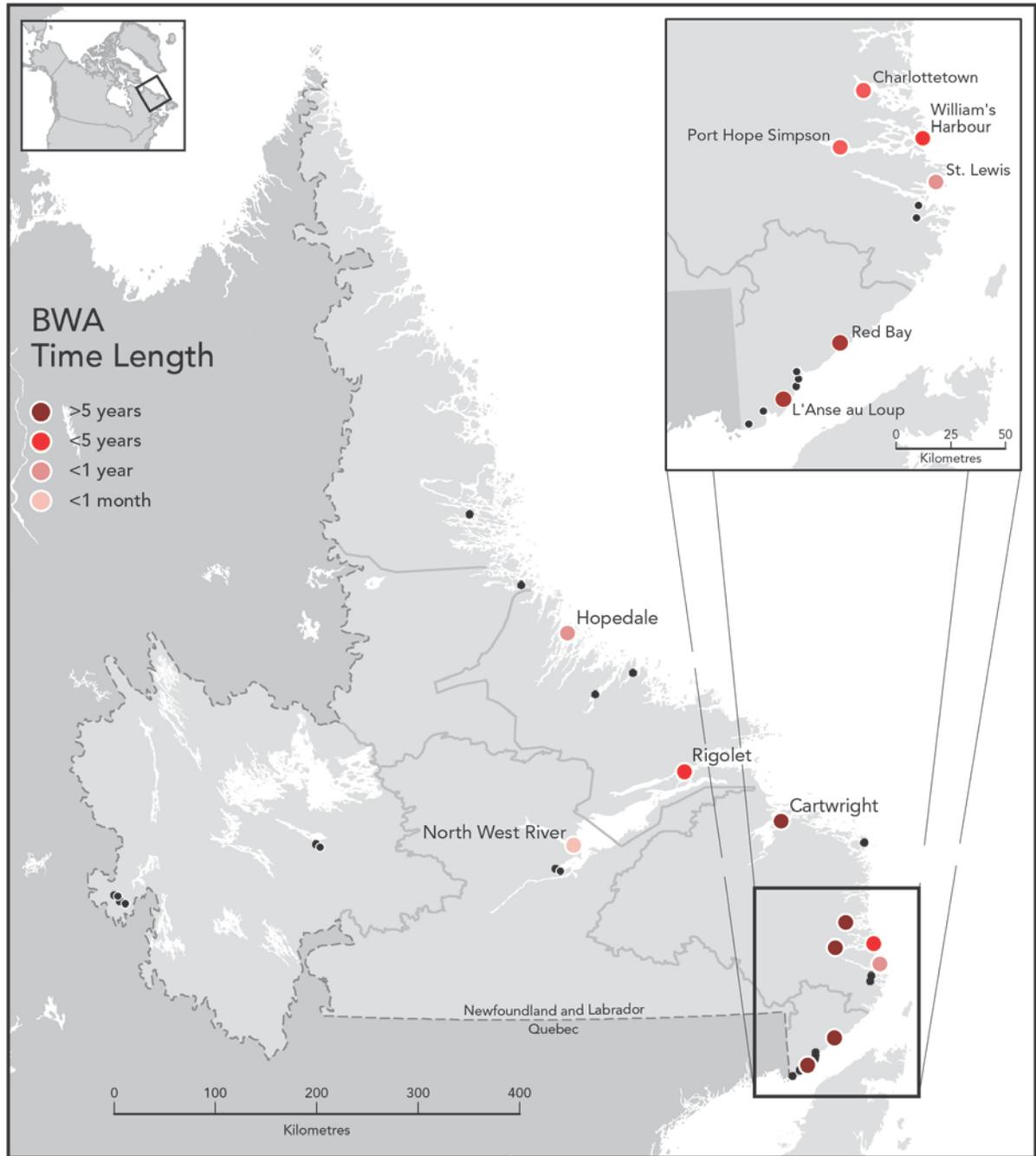


Figure 6: Boil Water Advisories in Labrador by Time Length

3.1.4. POTABLE WATER DISPENSING UNITS (PWDU)

There are 27 Potable Water Dispensing Units (PWDUs) in the province with six in Labrador (Figure 7) (Department of Environment and Climate Change, 2016b). PWDUs are small packaged water treatment plants that use a combination of water filtration techniques that are used by larger treatment plants (Department of Environment and Conservation, 2009). This technology is more sophisticated than the water treatment processes typically used by communities of 1,000 residents or less in the province (Speed, 2014b). The Department of Environment and Conservation and the Department of Municipal Affairs started the “Drinking Water Safety Initiative” in May 2008, which installs drinking water systems (aka PWDUs) in small communities. The initiative is targeted at communities with populations of less than 500 that have “demonstrated multiple high risk drinking water quality issues” including long term BWAs, high levels of DPBs or other health related parameters (Department of Municipal Affairs, 2016a).

PWDUs deliver higher quality water, but have been described as a “‘Band-Aid’ solution” (Minnes and Vodden, 2014: 48). Rather than improving the piped systems in people’s homes, communities are reverting to systems that require manual labour and hauling water. In towns such as Black Tickle – Domino, this has been a frustration for residents who may have to walk up to a mile to fetch water. The community has also found the PWDU to be expensive and difficult to operate given the cold conditions and murky source water (Hanrahan, 2014).

While Minnes and Vodden (2014) found that PWDUs addressed many of the health concerns and chronic BWA issues in rural areas, they did not consider the units to be a sustainable long-term solution for water quality concerns. Keenen and Whalen (2010) similarly found PWDUs did “not build sustainability” and would reduce the retention of young people, but were “the best option available to many towns and the provincial government” (Keenen and Whalen, 2010: 15).

There were some concerns raised in our interviews about the risks of having to haul water as well:

Can be dangerous in the wintertime [to] have to haul water. Only this past year where they put a road by the PWDU. In the dark, [you’re] sitting duck for the bears. The way the snow drifts around the building, you’re down in the ground, filling up the water buckets.

For most communities PWDUs are used as a complement to existing water distribution systems. Black Tickle – Domino is the only community in the province that uses a PWDU and has no distribution system (Department of Environment and Conservation, 2009: 105). The Black Tickle – Domino LSD installed a PWDU in 2004 when concerns were raised that residents were drinking water from unmonitored and untreated sources such as brooks and ponds (Hanrahan, 2014: 8). Initially the water was free, but the LSD was unable to afford the power bills associated with the system and now charges \$2/litre for potable water and provides non-potable water for free. In the first quarter of 2013 there was an average of 2.53 liters of potable water sold to each community member suggesting that residents are relying on untreated water sources for their daily activities (Hanrahan, 2014: 9). This may be because of the cultural attachment to untreated water sources and Hanrahan (2014) found that some residents had been using the same water supply for generations and were very attuned to potential contaminants.

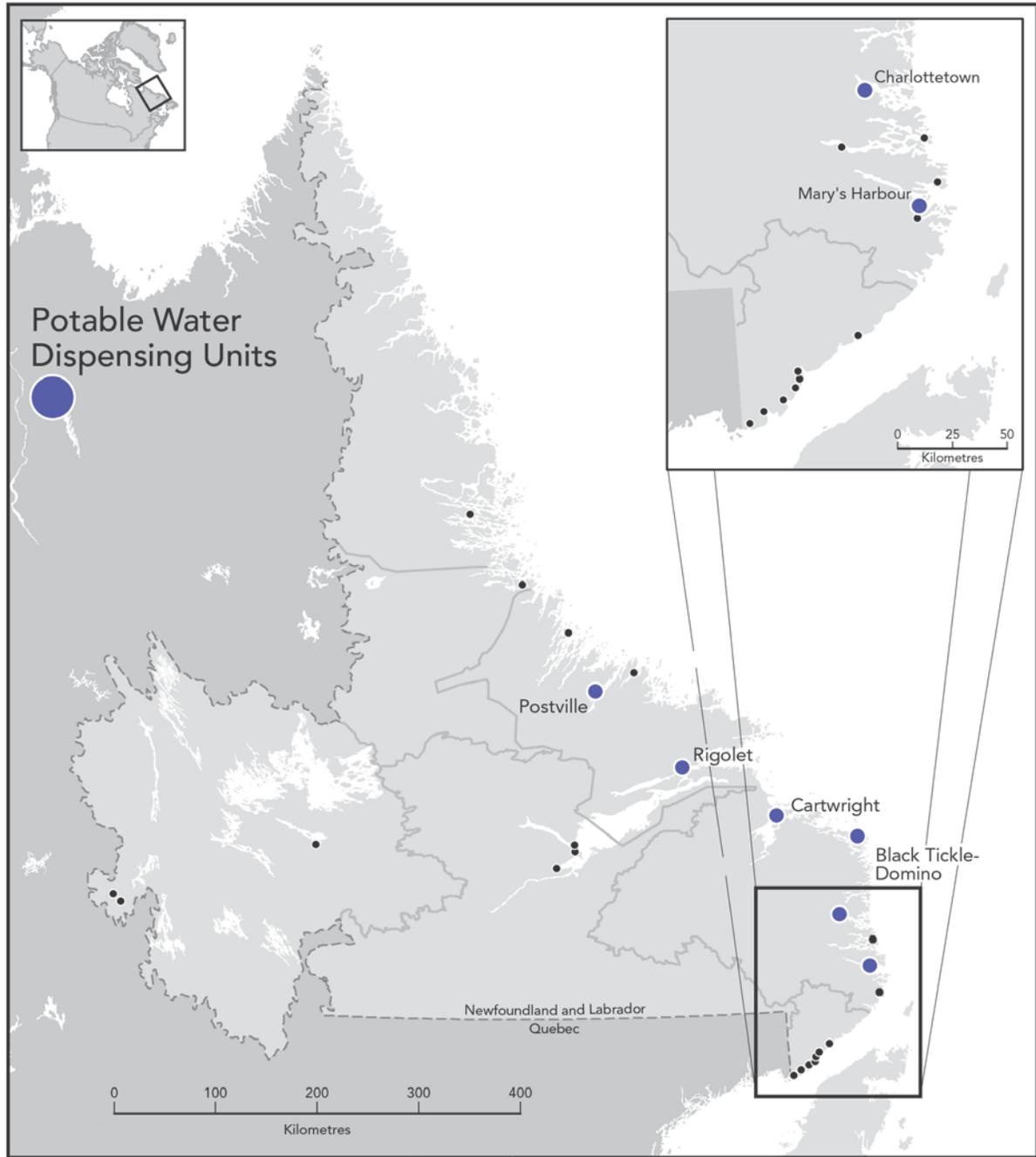


Figure 7: Potable Water Dispensing Units in Labrador

The poor quality of the source water puts considerable strain on the filtration system. Rather than lasting a month, as they should, filters must be changed almost daily. In 2014 the community did not have water for a week because they ran out of filters for the PWDU. During such crises the residents of Black Tickle must haul water from unmonitored sources. Because of its isolation, bottled water is not always available in the community and is too expensive for many residents as a reliable water source (Hanrahan et al., 2016: 22). The cold weather can also freeze the flushing system, which prolongs the process. Water insecurity is also increased by winter storms and Hanrahan (2014) found that most residents had stockpiled water reserves and were very conscientious about their water use. Some residents even shared their bath water, which Hanrahan warned could spread disease.

After the closure of the Labrador Sea's crab processing plant in Black Tickle in 2012 (Canadian Press, 2012), there has been mass unemployment in the community and the LSD cannot afford the \$30,000 annual operating costs of the PWDU. To fund the PWDU the LSD must apply for grants from the provincial government every year and grants are not always guaranteed. Grants have been awarded in recent years, but the uncertainty and added workload of the volunteer LSD increases stress and water insecurity (Hanrahan et al., 2016, 22).

Recommendation: The provincial government of Newfoundland and Labrador should allocate permanent funds for a certified water operator in Black Tickle-Domino because of daily maintenance required given the murky water source.

Recommendation: A plan to connect all residents in Black Tickle-Domino to a central water distribution system should be considered.

The province is recommending the installation of PWDUs as a cost-saving measure for communities with populations less than 500 to improve their water supply. Rather than these short-term solutions, the incapacity of municipal governments to raise revenue for proper water treatment systems suggests a regional approach is necessary for water service delivery (Keenan and Whalen, 2010), but based on the distance between most communities, a regional approach may not be appropriate for much of Labrador. There are certain communities that are close enough to work together on shared solutions, but as seen in Figure 7 those with PWDUs tend to be more isolated.

Recommendation: Where PWDUs are in place, communities should receive full funding from the provincial government to make them free to ensure maximum usage. Given that PWDUs are installed in areas where existing infrastructure delivers poor quality water, PWDUs should be made available for free use to ensure community members can access higher quality water, until a better long-term solution to the issue is developed.

3.1.5. WASTEWATER

Municipalities are responsible for the construction and operation of public sewer systems, which may be independent or joined to the public wastewater system. This also includes maintenance of sewer and storm mains, manholes and catch basins.

There are 12 wastewater treatment plants in Labrador (Figure 8) (Department of Environment and Climate Change, 2017d). Many communities in the province have reported Sanitary Sewer Overflows (SSOs) including Mary's Harbour and Rigolet. In a survey conducted by the Department of Environment and Conservation, feedback from the Labrador region was fairly low but it is believed there are seven other towns in the region that have sewer outflows as well (Hatch Mott Macdonald, 2012). The federal Wastewater Systems Effluent Regulations (WSER) are newly in place and municipalities have 2020 as the deadline for compliance (Wastewater Systems Effluent Regulations, 2012) However, only three municipalities in the province (St. John's, Gander, and Springdale) are currently in compliance (Northern Pen, 2017).

There is little information available on wastewater treatment and such systems seem rare. Some communities rely on private septic systems, such as Black Tickle-Domino where residents do not have indoor sewer systems. Some residents have built their own plumbing systems, but these tend to have low water pressure and can be ineffective (Hanrahan, 2014: 14). Other communities release their untreated waste back into the waters where they fish. Nain's sewage is disposed of in Unity Bay, where many residents fish for rock cod. The community has demanded research into the impacts of this sewage disposal on human health and the environment (Goldhar et al., 2012).

Recommendation: Every Labrador community or group of communities with a shared water resource should investigate a possibility of a wastewater treatment plant to prevent sewage from entering local water supplies. At the same time, the question of sustainability should be examined. Even with full funding for the construction of such facilities, most municipalities do not have the financial capacity to operate them under their current structure.

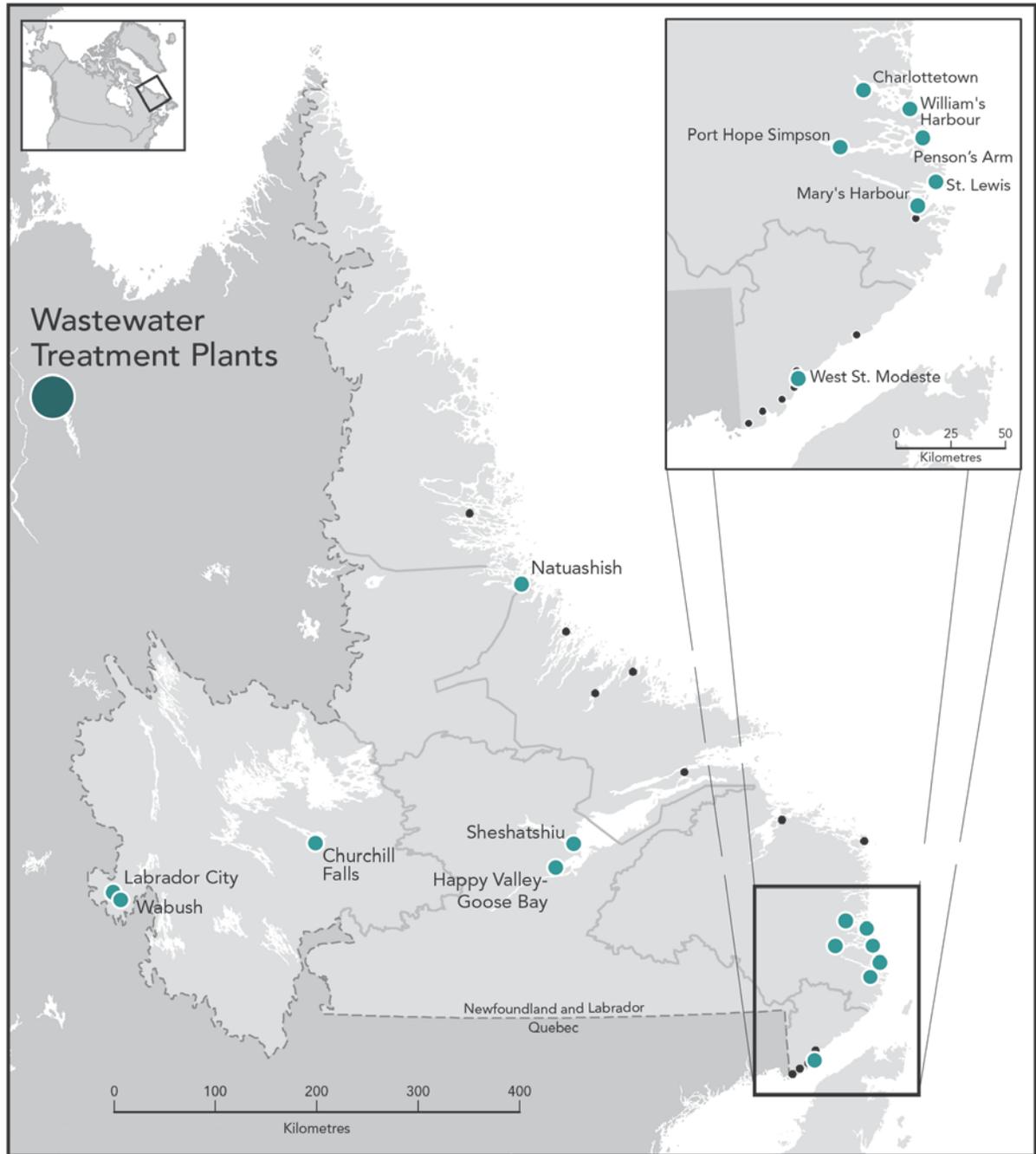


Figure 8: Wastewater Treatment Plants

3.2 Waste Collection and Disposal

3.2.1. OVERVIEW

Municipalities are responsible for providing regular garbage collection and may provide other services including bulk garbage collection, landfills and collection of recyclables. The provincial government is responsible for ensuring waste disposal meets provincial environmental requirements, implementing the Provincial Waste Management Strategy and administering Certificates of Approval to municipalities for various types of waste materials (McDonald, 2013). There are 23 active Certificates of Approval currently listed on the Waste Management website that are held by towns operating regional landfills and private companies that perform wastewater treatment, liquid waste collection, treatment of contaminated soil, etc. None are specifically listed for Labrador, though some private operators operate at multiple locations, including in Labrador (McDonald, 2013). Recognizing the environmental implications of proper waste management, the federal government has also been involved in formulating policies for waste disposal and recycling. In 1989 Canada and the provinces agreed on a policy to reduce waste by 50% by 2000 (Federation of Canadian Municipalities, n.d.). The federal government maintains this policy through its emphasis on the 3Rs – Reduce, Reuse and Recycle – in its solid waste policies (Environment and Climate Change Canada, 2017c) and financially through programs such as the Green Municipal Fund and Sustainable Development Technology Canada (Environment and Climate Change Canada, 2017b). In their review of municipalities successfully diverting waste, the Federation of Canadian Municipalities (2009) found that a regional waste management master plan is key to creating effective and efficient waste reduction for rural communities. The provincial government has a role in facilitating these regional strategies as well as helping municipalities offset the costs of waste disposal and recycling. It was also suggested that the private sector could be an important partner for creating a business model for waste.

Besides government, there are non-profit and industry organizations that work to reduce waste in Canada. Many of these organizations operate in the province including the Newfoundland and Labrador Environmental Industry Association, Ever Green Recycling, Avalon Recycling Services, Broadening Horizons Recycling, Dominion Recycling Ltd., Extended Products Recycling Association, Provincial Metals Recycling Ltd., EWaste NL, Island Compost, EnviroSystems, Multi-Materials Stewardship Board (MMSB), Newco Metal & Auto Recycling Ltd., Newfoundland Disposal Systems, Pardy's Waste Management & Industrial Services, Scotia Recycling and NLL Recycling Ltd. There are also several social enterprises in Newfoundland and Labrador that utilize recycling to create businesses and jobs for those who face barriers. The Broadening Horizons Recycling Program in Gander has partnered with government and private businesses to provide curbside collection and create employment for those with intellectual disabilities in a supported environment (Broadening Horizons Recycling, n.d.). Ever Green Recycling in St. John's operates four recycling depots and fibre recycling facility and is focused on creating employment for individuals recovering from serious mental illness (Ever Green Recycling, 2011a).

Recommendation: The waste management strategy should include partnering with firms who will collect waste such as beverage containers, compost, scrap metal and paint. There is much potential for adding value to waste and many examples of private and non-profit organizations that generate revenue by recycling and reusing waste. Where there may not be a direct economic incentive for firms to participate in waste management, there is potential for government policies like Extended Producer Responsibility to enforce companies who create waste to recycle it as well. It has been indicated that the current approach to solid waste management will be subject to review in the near future (Municipalities Newfoundland and Labrador pers. com, 2017), which could include these issues as well as potential business arrangements and appropriate new technologies.

Modern waste management requires an Integrated Solid Waste Management (ISWM) strategy that takes into account the environmental effects and economic opportunities of waste. This policy includes all types of solid waste materials (metals, plastics, organic, hazardous) as well as all sources (domestic, commercial, industrial). An integrated system will use one or more of the following options: (1) Materials recycling, (2) Biological treatment of organic materials, (3) Thermal treatment, or (4) Landfill. Once processed, material is ready to be reused and any system must include a market-oriented strategy for its end product that involves business and community partners. Altogether, ISWM requires a holistic approach that is greater than any one municipality and requires provincial and federal support to implement (McDougall et al., 2001). Given the increasing emphasis on waste minimization and new waste management technology innovations, Cant (2006) predicts the end of sanitary landfills as they exist today as efforts to fully utilize waste improve, though this may take longer to achieve in rural environments, such as Labrador, with small, dispersed populations.

Recycling waste has profound environmental and economic impacts. Environmentally, recycling significantly reduces the amount of greenhouse gases (GHGs) emitted by industry, as most GHGs are produced in the extraction and production of raw material (ICF Consulting, 2005). By diverting waste, recycling also reduces strain on landfills and the need to expand and create new landfills. Economically, recycling materials eliminates the cost of extracting and processing raw materials for industry and creates new businesses and jobs based on processing recycling material (Brisson, 1997; Kinnaman, 2009). However, these indirect benefits and costs are not immediately shared with the municipality and rather, the costs of recycling can be greater for an individual municipality than the costs of disposal (Lavee, 2007). This creates a disincentive for municipalities to invest in waste management technologies. Even if residents in a community may prefer to recycle, their willingness to pay is likely less than the cost required for an individual municipality to manage a fully integrated waste management system (Kinnaman, 2009).

To better incorporate the externalities of waste management and allow for partnerships that can coordinate the many actors that are involved in waste production, there have been many national and provincial policies regarding waste management. These policies often take the form of disposal bans, mandatory or voluntary extended producer responsibility, product stewardship, and shared responsibility program policies. At the national level, Canada has a Battery Recycling Program, Mercury Switch Recovery Program, Mobile Device Recycling Program, Obsolete Pesticide Collection Programs, and Refrigerants Management – Ozone Depleting Substances. Newfoundland and Labrador also has a Beverage Container Recycling Program, Used Oil Recycling Program, Used Tire Recycling Program and a Paint Stewardship Program. In addition to these more common programs, other provinces have programs such as Electronic Waste Recycling Program (ON, BC, NS, PEI, SK), Lead-Acid Battery Stewardship Program (BC, PEI, MB) Household Hazardous Waste Program (ON), Mercury-Containing Fluorescent Lamp Recycling Program (ON), Packaging and Printed Materials Stewardship Program (MB, ON, QC), Pharmaceutical Stewardship Program (BC, NS, PEI, AB, MB, SK), Solvents/Flammable Liquids, Gasoline, Pesticides Stewardship Program (BC), Sharps Stewardship Program (NS), Single-Use Retail Reduction Program (NWT), and a Milk Container Recycling Program (SK) (Environment and Climate Change Canada, 2014a). From these examples, we may draw inspiration for programs that could be adopted in this province, as size of the province does not seem to be a factor in waste management leadership at the provincial level.

As environmental concerns and economic opportunities from waste grow, governments and researchers have considered a variety of ways to create effective and efficient waste management systems. There are many policy options for managing waste such as disposal bans, deposit-refund systems, taxation, user pay systems, extended producer responsibility, product stewardship programs, solid waste franchising, green

procurement and zero-waste communities. There are also technological innovations such as thermal generation that can be used to generate energy by incinerating waste.

A disposal ban is a regulatory policy that prevents certain materials from being disposed of in a landfill. These are most commonly used for hazardous waste but are also used for recyclable goods to ensure that they are not sent to the landfill. Newfoundland and Labrador has a province wide disposal bans on tires, oil, corrugated cardboard, newsprint, bond paper, and organic material (Department of Environment, 2002). Individual municipalities can also impose disposal bans. Happy Valley Goose Bay, for example, prohibits disposal of items with an original deposit in their landfill (CBCL Ltd, 2010).

While disposal bans can raise administrative costs, as it requires staff at the landfill to check for waste, it can also promote economic opportunity. In Nova Scotia, for example, thousands of new jobs have been created through new value-added waste processing after a ban was placed on disposing certain recyclable materials (Federation of Canadian Municipalities, n.d.).

Where disposal bans are in place, government has taken steps to create alternative programs to help residents dispose of these products. All highway tires with a rim size of 24.5 inches or less have been banned from landfills in Newfoundland and Labrador since 2002. Individuals can return their tires to a local tire retailer for recycling or MMSB offers collection services for a minimum of 30 tires (Multi-Materials Stewardship Board, n.d.h). Since 2003 lubricating oil has been banned from waste disposal sites in Newfoundland and Labrador. To facilitate this ban the Used Oil Recycling Program was developed by the MMSB to ensure proper disposal of used oil that can be recycled and reprocessed for reuse as a lubricant or fuel. Residents can return lubricating, crankcase and gear oil, and transmission fluid to their local oil retailer. Other automobile fluids, waste from refining operations, and animal or vegetable oils cannot be recycled under this program and are instead referred to a household hazardous waste depot (Multi-Materials Stewardship Board, n.d.g).

The lack of appropriate waste disposal services for certain oils created a business opportunity for one Newfoundland and Labrador company. Eco Oil Ltd based in Conception Bay South was established in 2005 originally to collect cooking oil from restaurants, hotels and corporate kitchens, and transport it to a recycling facility in Nova Scotia where it was reprocessed for use in animal feed and biodiesel. In 2009 the company received a grant through the Newfoundland and Labrador Green Fund to expand its operation and catchment area. In this way government was able to support an eco-friendly business that generated revenue by adding value to waste (Department of Environment and Conservation, 2009).

While there are recycling programs for all goods that are subject to the disposal ban, not all exist in Labrador. For example, there is no service to recycle paper or corrugated cardboard in Labrador and these products are instead sent to local landfills.

Rather than focusing on the end-of-life-cycle, some disposal bans seek to prevent the production of certain materials. Through funding from the Newfoundland and Labrador Community Waste Diversion Fund, every community in Nunatsiavut has banned the use of single-use plastic bags in their communities. The Community Waste Diversion Fund was a key part of the success of this ban as it was used to distribute reusable bags to residents and educate community members about waste management (CBC News, 2015c; Tourism Nunatsiavut, n.d.b). Plastic bags have been a particular focus of environmental groups because they are commonly used, slow to decompose and widely found as litter in forests and oceans. Municipalities Newfoundland and Labrador has a long-standing position that a provincially-mandated ban on the use and sale of single use plastic bags is the only workable solution to this issue. The organization

has recently begun a campaign to encourage communities to #BanTheBag to help protect the province's land and marine areas from environmental degradation (Barker, 2017c).

Recommendation: Newfoundland and Labrador's provincial government should consider ways of reducing the use of single-use plastic bags through a surcharge on plastic bags or through a complete ban on the product.

A deposit-refund system applies an advanced disposal fee on a product at either the point of production or purchase. Kinnaman (2000) finds that this is the most efficient policy in promoting recycling, as residents have an economic incentive to recycle their waste, but its use tends to be limited in Canada to beverage containers. Newfoundland and Labrador introduced a deposit on beverage containers in 1997 and this policy is used in some form all across the country. Newfoundland and Labrador has a deposit on every beverage container except milk cartons. This creates an economic incentive for residents to recycle and a revenue stream for waste management, as unredeemed deposits are invested in the province's Waste Management Trust Fund (Multi-Materials Stewardship Board, n.d.a).

With the current cost of waste management hidden in property taxes, residents may not be fully aware of the full cost of their waste. If residents underestimate the cost of waste, they will not have a financial incentive to reduce the volume of waste that they produce. Clear waste taxation policies can help municipalities fully account for and reap the costs of waste management, as well as inform residents on the cost of their waste, which can work to change their behaviour and reduce the amount of waste that they produce. Prince Edward Island adopted utility-style billing in 2002 as part of their waste management strategy. The Waste Watch Program Levy is added to residents' annual property tax bill and is based on the actual cost of running their waste management system (Federation of Canadian Municipalities, n.d.). Reviewing environmental taxation in OECD countries, Kirakoziyan (2015) found that progressive taxation based on the weight of garbage was the most efficient method as it encourages recycling and reducing waste. However, these economic policies may result in increased illegal dumping or be difficult to administer, as it would require weighing each resident's garbage.

Municipal user pay systems, also known as "pay as you throw," are a form of taxation where residents are charged for each bag of garbage and have been found to reduce waste as well. These policies can be discrete, where a level of service is provided by the tax base or a service fee and residents are charged for anything above (e.g. a limit of two bags) or blended, where each bag of waste has a per unit cost but some of the cost is covered by taxes (Federation of Canadian Municipalities, n.d.). Kinnaman (2009) estimated that a price of \$0.75 a bag would be cost-effective. However, the high cost of monitoring these systems suggests they may be more practical for larger, urban centers rather than rural areas (Kinnaman, 2000). Rather than applying this fee at the curb, it may be more easily administered at the landfill where residents are charged a tipping fee for depositing waste materials. This policy can have high economic and environmental benefits, as municipalities usually charge more than is required to generate a source of income and it is an economic incentive to recycle, reuse or reduce individual waste. Similar to taxation, these policies can work as a disincentive to using proper landfills and may increase illegal dumping (Federation of Canadian Municipalities, n.d.). This problem has been raised in Labrador, where city councillors raised concerns that a nearby construction site began burning their garbage after tipping fees were raised by 25% (Barker, 2017b).

The *Canadian Environmental Protection Act 1999* includes a "Polluter Pays Principle" whereby "companies or people that pollute should pay the costs they impose on society." This principle is incorporated in Extended Producer Responsibility (EPR) policies. Rather than focusing solely on end users as waste managers, Extended Producer Responsibility (EPR) policies put costs of managing waste on the producer

of the product and provide a direct economic incentive for producers to reduce the amount of waste they create. Product stewardship programs are similarly used to manage products at their end-of-life but put responsibility on the provincial or municipal government rather than industry. Therefore, in product stewardship programs the government pays for waste management, while in EPR the industry does. These policies bring the expertise and knowledge of industry into the waste management systems, which can improve the design and maintenance of such systems. Given that this program requires a high degree of coordination between government and industry, many of these programs take the form of national policies such as Germany's Green Dot Program and France's Eco-Emballages program (Federation of Canadian Municipalities, n.d.). The Canada-Wide Action Plan for Extended Producer Responsibility supports the move from product stewardship policies into full EPR programs (Environment and Climate Change Canada, 2013) and there are several such programs in Canada including the Battery Recycling Program and Mobile Device Recycling Program. In 2012 Newfoundland and Labrador introduced Extended Producer Responsibility policies that were aimed at the electronics industry (Multi-Materials Stewardship Board, n.d.b). The electronics industry is a common target for this policy because of the difficulty recycling electrical and electronic equipment (Toffel et al., 2008; Schlupe, 2014).

Landfills, if properly designed, can generate economic activity for a municipality through the production of electricity. Methane gas generated by the decomposition of organic materials can be captured and combusted to generate electricity. This has both positive environmental and economic effects by preventing methane from releasing into the atmosphere and replacing non-renewable sources of energy, such as diesel used in Northern Labrador communities (Environment and Climate Change Canada, 2014b). In their analysis of the net impact of GHG emissions of different waste management strategies, ICF Consulting (2005) found that the combustion of some materials (steel, tires, cardboard, other paper, food scraps) produced lower GHG emissions than if they were decomposed in a landfill. This could also be an alternative way for northern communities that rely on non-renewable resources for energy to produce their own electricity.

Solid Waste Franchising has emerged in the United States as an alternative private-sector option to waste management. This policy grants solid-waste management rights to a private-sector firm who bills and collects from households and businesses and pays the municipality a percentage of their revenues. This option highlights the economic opportunities involved in waste management, as it is able to attract interest from the private sector (Federation of Canadian Municipalities, n.d.).

There is also space in waste management for long-term policies. Green procurement is a policy whereby government pledges to buy products containing recycled content (Federation of Canadian Municipalities, n.d.). Several municipalities have also implemented "zero-waste" policies, giving themselves personal goals of reusing, reducing, and recycling all waste in their communities (Federation of Canadian Municipalities, 2009). These are goodwill moves by government to support businesses that use recycled products and commit to waste management goals, but are more long-term solutions as they do little to address current problems such as overflowing landfills.

A key element of waste management strategies is education and information. To encourage residents to utilize services, they must be informed about the environmental benefits as well as the many access points. There are many types of waste and they may require different methods of disposal. Evidence suggests that part of the success of a well-utilized waste management strategy is the public education and awareness component that is paired with it (Evison 2001; Kirakozian, 2015). At the federal level, Canada has created a national environmental campaign through Waste Reduction Week to raise awareness about

waste consumption and reduction (Recycling Council of Ontario, n.d.). This campaign is promoted in Newfoundland and Labrador through the MMSB (Rethink Waste NL, n.d.a.).

Rural and remote communities face particular problems when it comes to incentives for recycling. Not having a road to connect communities to regional hubs, as in northern Labrador, can significantly raise the transportation costs of waste management. In their Planning and Technical Guidance Document for solid waste management in northern and remote communities, Environment and Climate Change Canada (2017b) suggest that these communities perform a community waste audit to better understand what opportunities there may be to partner with non-profit organizations or businesses to reduce and reuse waste.

Recommendation: Communities in Labrador should conduct community waste audits to better understand economic opportunities and environmental issues associated with their waste. This can be done by working with community partners such as Ever Green Recycling, which offer expertise in conducting waste audits and in creating waste management solutions. Waste audits require significant effort. Working with the Multi-Materials Stewardship Board (MMSB) might prove useful in this regard as they have completed several waste audits.

There are also issues with residential participation in communities that lack curbside collection. Curbside programs can instil a certain peer pressure on neighbourhoods to recycle, but this peer pressure is not exerted in areas where residents bring their recycling to a green depot because few, if any, people can see the resident recycle. Furthermore, there is the inconvenience of bringing recyclables to a depot. Together, this tends to reduce recycle rates in these communities (Nigbur et al., 2010).

The Multi-Materials Stewardship Board administers waste management in Newfoundland and Labrador. This is a Crown agency established in 1995 to develop, implement and manage waste in the province. The agency is self-financed through levies applied on beverage containers and tires, and the resale of collected recyclable materials. In 2002 the Department of Environment introduced a Provincial Waste Management Strategy (PWMS) for the province. This PWMS takes the form of Integrated Solid Waste Management and includes strategies to reduce the amount of materials going to landfills, limit the number of waste disposal sites, eliminate open burning at landfills by 2005, phase out incinerators, and regionalize waste management services (Department of Environment, 2002). Such leadership by the provincial government to develop a regional solution to waste management was necessary to help municipalities manage new environmental standards and save on costs. The PWMS has since been extended with a plan to complete the province-wide network of transfer stations and waste recovery facilities by 2020 and implement regional organic waste management infrastructure by 2025 (Department of Municipal and Intergovernmental Affairs, 2015).

To reduce the amount of materials going to landfills, waste diversion programs were created to collect recyclable materials. This involved enhancing Green Depots, implementing a program for recovery of used oil and disposal bans on tires, oil, corrugated cardboard, newsprint, bond paper, and organic material. Green Depots are privately owned businesses that collect used beverage containers and refund consumers. There are 56 Green Depots across the province, two of which are in Labrador – one in HVGB and one in Wabush (Multi-Materials Stewardship Board, n.d.d). More isolated communities in Southern and Northern Labrador have set up their own beverage container collection sites in publicly owned buildings such as schools and community centres (Rethink Waste NL, n.d.b; Rethink Waste NL, n.d.c).

To limit the number of waste disposal sites, the Department of Environment proposed 15 waste management regions across the province – with three in Labrador. These regions would have both waste

diversion programs and services, as well as waste handling facilities, services and operations. This would include “waste separation and collection; central composting; recyclables collection centres; specific disposal sites for construction and demolition debris and metals; and household hazardous waste management and disposal facilities” (Department of Environment, 2002: 15).

To begin regionalizing services MMSB has worked with municipalities and various stakeholders to create Regional Waste Management Authorities that cover various regions across the island but there are none listed that are active in Labrador (Multi-Materials Stewardship Board, n.d.f). There is a sub-regional waste management committee for Labrador that was formed through the Labrador Joint Councils (CBCL Limited, 2010). The Labrador Straits communities collaborate on waste management through the Labrador Straits Waste Disposal Committee, and Labrador City and Wabush work closely on waste disposal and share a landfill.

Recommendation: Before implementing regional waste solutions, Regional Waste Management Authorities for Labrador should be created through consultations with municipalities, relevant stakeholders and the Multi-Materials Stewardship Board (MMSB).

Recommendation: Based on the 2002 Provincial Waste Management Strategy, there should a regional landfill for Labrador West, Central Labrador, Southeast Labrador, and the Labrador Straits. These regional landfills should include a scrap metal yard, a composter, cardboard recycling, and a space for hazardous wastes. There may be potential for some regional landfills to specialize. For example, Happy Valley-Goose Bay’s landfill has a wood chipper. Other regions, if properly, organized could utilize this.

Recommendation: Given the great distance from Cartwright to L’Anse au Clair (408 km), rather than one landfill to serve the entire region, two regional landfills in this area are recommended as originally proposed in the PWMS. It may be preferable to have one near Cartwright that could service Paradise River and potentially Black Tickle-Domino, and one landfill for the more southern region. A more central community such as Port Hope Simpson may be a good location for such a landfill.

Implementing a regional waste management strategy was a key component of reducing the number of landfills and the Department of Environment and Conservation (2002) proposed that upon being sorted, residual waste would be sent to one of several final waste disposal facilities and a system of transfer stations would be used for holding waste before it reached its final destination. For the northern region of Labrador, a garbage collection system by ferry would be necessary as there are no roads to connect the towns. This is impractical and individual solutions would be necessary for this region.

The implementation of a regional waste management strategy in Labrador has not yet been realized and municipal leaders in the area feel that the geography, distance between towns, and complexity of the coastal regions will make the program difficult to administer. In consultations, communities felt that they could not be serviced by one committee for the whole area, but would need several smaller committees. They also reported lack of training and funding for staff at landfill sites, which has resulted in 90% of hazardous waste being disposed of in landfills (Municipalities NL, 2011).

From 2015 to 2020, the provincial government has announced that it will redevelop the Happy Valley Goose Bay landfill to become a regional landfill, that a new landfill will be developed to serve Southern Labrador from Cartwright to L’Anse au Clair, and that more research and analysis will be conducted to identify solutions for waste management in Northern Labrador (Department of Municipal and Intergovernmental Affairs, 2015). However, a 2012 regional workshop in Hopedale found that the town

had not been asked to participate in the PWMS suggesting consultations had not yet begun (Goldhar et al., 2012).

The Labrador Straits landfill, located outside Forteau, has been overflowing for several years (CBC News, 2016a). In dire circumstances, the local town council sent an ultimatum to the province that they would block access to the landfill if they did not receive funding to improve the landfill within days (Breen, 2017). The province did respond with funding, but a new landfill and regional waste management strategy that works for all communities along the Straits is imperative to solving this situation (Barker, 2017a).

Recommendation: A regional waste management plan must be implemented in the Labrador Straits quickly to deal with the overflowing landfill issue there.

Generally, there have been problems with the PWMS. The closure of local landfills has increased illegal dumping in some areas, and in some instances landfills have been closed before transfer sites have been constructed, which has further increased illegal dumping. Communities felt the PWMS was a large financial burden for small municipal budgets and that implementation was not complemented with provincial funding. They also thought that waste diversion activities should reduce costs and that the implementation of a waste management system should be equal for all residents across the province. In the Western region of the province it was noted that a lack of direction and assistance from the provincial government caused tension between municipalities trying to regionalize their services (Municipalities NL, 2011).

As part of the Provincial Waste Management Strategy, the provincial government has made efforts to reduce the number of tee-pee (or tepee) incinerators and open burning. In 2016 there were still five incinerators in operation primarily in areas accessible only by boat such as Mud Lake and in remote areas such as Voisey's Bay (Department of Municipal Affairs and Environment, 2016; Goldhar et al., 2012). These facilities have remained in place because of the difficulty transporting garbage from these facilities, and in the case of Mud Lake, the marshy landscape that prevents the installation of a landfill (CBC News, 2009). Along the North and South Coast of Labrador, many communities continue to open burn their garbage during the winter months because they are unable to bury it (Municipalities NL, 2011; Department of Municipal Affairs and Environment, 2016).

Recommendation: Communities that continue to open burn their garbage because of local land conditions or cold winters should consider alternatives such as installing incinerators to reap benefits such as energy production and lower negative environmental effects from burning waste.

There are concerns for Labrador residents about bears at landfills. Churchill Falls has two landfills – one for the winter that is closer, and one for the summer that is further away because it attracts wildlife (Churchill Falls, 2017a). For communities without curbside collection, going to a landfill to bring residential garbage can be a risky venture.

Everything done here is done in pairs. Like going to the dump. Or people will be very aware of how long it takes to go places. Will call people I'm safe after going to the dump. If he's gone or more than 30 minutes to bring out the garbage I'm calling looking for people. Polar bears get into the dump.

Issues about waste management will continue without a strategy that reduces waste from both the producer and the consumer end. Municipalities need the force of the federal and provincial governments to make policy changes directed at businesses, and to create effective, efficient strategies for sharing the

costs and reaping the benefits of waste management. If municipalities could connect to firms processing and utilizing material that is currently taking up valuable space in our landfills and in our environments, better recycling would not only be accessible, but economical. At the minimum municipalities would need to regionalize waste management to effectively utilize economic opportunities nearby, but the guidance of the provincial and federal governments is necessary to create an overarching map of waste management. For Labrador, shipping waste to the Island might be less economical than driving it to Quebec. Given the geography of the region, an inter-provincial plan may be more effective in managing waste, but that would require serious leadership from government.

The Multi-Materials Stewardship Board provides information on the waste disposal of seven different types of waste to help residents remove their garbage, promote sustainability and protect the environment from harmful chemicals (Multi-Materials Stewardship Board, n.d.i). Collection services for these recyclables can be found on the maps below [Beverage containers (Section 3.2.3); Electronics (Section 3.2.4); Hazardous Wastes (Section 3.2.5); Organic Waste (Section 3.2.6); Paint (3.2.7) and Scrap Metals (3.2.8)]. These disposal services are complemented by Rethink Waste NL's regional guide to disposing of waste in your area (Rethink Waste NL, n.d.a). Depending on the type of waste, waste disposal is offered by private businesses, municipal governments or both. There are several types of waste, such as plastic containers and paper that can be recycled on parts of the Island but there are no facilities for them to be recycled in Labrador and they are therefore considered as garbage.

3.2.2. WASTE DISPOSAL SERVICES BY REGION

Municipalities are responsible for the collection and disposal of waste from residents often through weekly curbside collection and the operation of a landfill. Figure 9 shows waste collection by municipalities in Labrador and is divided into four categories: (1) 'Landfill' - communities who utilize a nearby landfill and do not have curbside waste collection; (2) 'Curbside' - communities who have weekly curbside garbage collection and do not have a nearby landfill; (3) 'Both' - communities who have weekly curbside garbage collection and a nearby landfill; (4) 'Incinerator' - communities that use an incinerator to dispose of their waste.

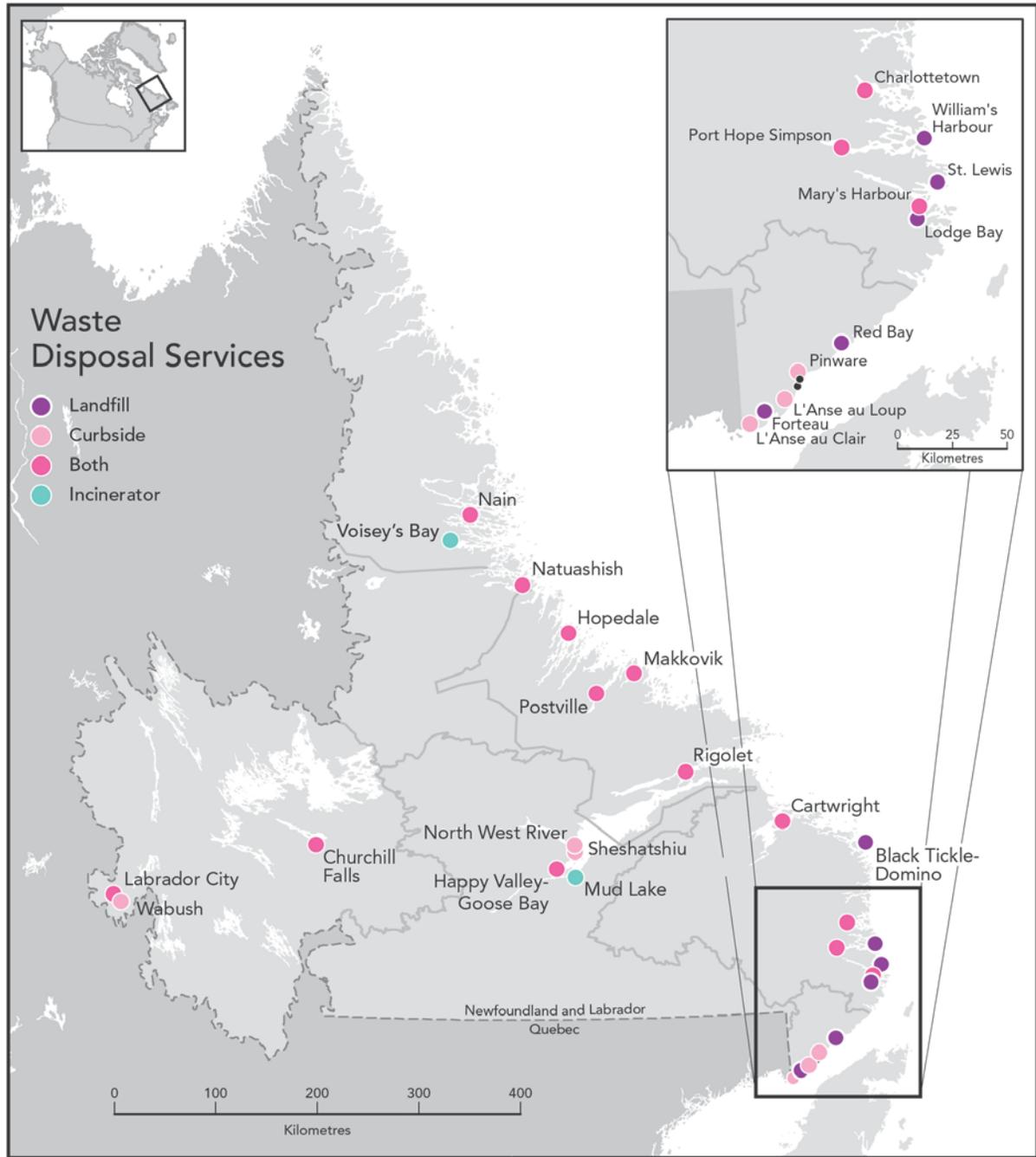


Figure 9: Waste Disposal Services in Labrador

As shown in Figure 9, most communities have both a nearby landfill and curbside waste collection. Several communities utilize curbside collection to share a landfill, specifically in Labrador West, Central Labrador and Labrador Straits, while residents in some communities on the Labrador South Coast and the Labrador Straits must bring their waste to a nearby landfill. Most remote communities in Labrador have their own landfill while some rely on incinerators to dispose of their waste.

The majority of landfills in Hopedale, Nain and Makkovik have reached capacity and community members have requested a regional waste management strategy (Goldhar et al., 2012). Without roads to connect communities along the northern coastline, regional waste management is not feasible. Rigolet continues to bury and open burn their garbage. High winds in the area can also result in much of the garbage being blown into the ocean. Nain's landfill is running out of space and is expected to soon be in crisis. Residents in Hopedale feel their dump is too close to town and are worried that burning garbage has a negative effect on their health. Furthermore, the landfill is close to capacity and expansion is difficult as the dump is located very close to the cemetery. Makkovik's dump has reached capacity and despite community regulations on air pollution, they are now forced to burn much of their waste to reduce space. The community is considering waste diversion techniques such as cardboard recycling and composting. The landfill in Nain is at capacity, and the community burns much of their garbage to create space, but have no effective way to remove hazardous waste, and scrap metal and oil drums are accumulating. The landfill uses sand and gravel to bury their waste, which requires a quarry that many residents feel is too close to town and creates unhealthy dust (Municipalities NL, 2011).

Happy Valley Goose Bay's landfill currently serves as an informal regional landfill that is also used by North West River and Sheshatshiu (Municipalities NL, 2011), with plans to develop it into a more formal regional landfill. The town is seeking measures to improve waste diversion including a waste reduction education campaign, community composting and a wood chipper program (CBCL Limited, 2010).

The Labrador West Regional Landfill serves the communities of Labrador City and Wabush. A private company, Hodge Bros Ltd, provides curbside collection services to these towns. The Labrador West landfill is regarded as temporary, which has limited its funding opportunities. The landfill is considered to be in crisis, as the site has no running water or electricity for staff, is not qualified to handle the high volume of waste it receives and has no litter fence, which allows waste to blow away (Municipalities NL, 2011a).

Churchill Falls has two landfills – one that is closer and used in the winter months, and one that is further away and used in the summer months. This is done because of the prevalence of black bears in the area, which are attracted to the landfills in the summer. Materials such as household hazardous wastes and scrap metal are prohibited from both landfills and the community has prepared alternative methods to dispose of these materials. Churchill Falls has a specific scrap yard, the only community in Labrador to do so, and the town offers a drop-off space in their town hall for household hazardous wastes on a specific date each month (Churchill Falls, 2017a).

Every community in Eastern Labrador has its own landfill, suggesting a high duplication of services and the opportunity for regionalization. However, the distance between towns in this area must be considered carefully as there are 258 km between Cartwright and Lodge Bay and parts of the highway are unpaved, which limits connectivity and increases shipping costs.

The landfill in Forteau, which also services the nearby communities of L'Anse au Clair, L'Anse au Loup and Pinware, is overflowing and catching fire as toxic waste is being added and the community cannot afford to pay for staff to monitor the facility on a regular basis. The landfill has no compacter to save space and the situation is being exacerbated by the development of Muskrat Falls, as companies like Valard and

Nalcor are using the landfill as well. Residents have also expressed concerns that the proposed regional landfill near Mary's Harbour will be too far away for residential use, and residents will instead choose to illegally dump their waste (CBC News, 2016a).

To improve the quality and reduce the costs of waste disposal, a regional solution to waste management is necessary. Such a solution, however, must consider the unique geographical and environmental constraints of each region.

Recommendation: Communities with overflowing landfills need new spaces to dispose of their garbage that would include spaces for composting, paper and cardboard recycling, beverage containers, hazardous waste, scrap metal, and paint. Given that some of these categories of waste can be recycled for an economic reward, it may be feasible to work with private firms or other regional landfills to send this waste to other places. However, some of these activities are not proving economically viable for the province as a whole and therefore further research needs to be done on the feasibility of profitable recycling methods for the region.

Recommendation: Where a regional waste management strategy is not feasible, such as along the Northern Coast and in Black Tickle-Domino, communities should receive funding to maintain their individual landfill sites.

3.2.3. BEVERAGE CONTAINERS

The Beverage Container Recycling Program is a deposit-refund system that has been operated by the MMSB since 1997. The collection services for a community depend on their location. Curbside recycling is currently limited to those towns relatively closed to the Material Recovery Facility at Robin Hood Bay, St. John's, which was opened in 2010. Other communities in the province rely on Green Depots to recycle their beverage containers (Municipalities NL, 2011). Green Depots are independently owned and operated businesses that are contracted by the MMSB to recycle beverage containers. The program excludes beer bottles and milk cartons.

Once collected, beverage containers are sent all across the continent to be processed. Plastic is sent to the Novapet recycling plant in Amherst, Nova Scotia; glass is sent to the RAYAN recycling plant in Moncton, New Brunswick; tetra and gable are sent to the Great Northern Recycling plant in Hantsport, Nova Scotia; aluminum is sent to the Evermore Recycling facility in Oswego, New York; and steel is sent to Newco Metal in St. John's, NL.

Given the delicate nature of glass bottles, many that are sent to be recycled end up broken and in landfills (Morawski, 2009). MMSB does not accept glass bottles, likely because of the difficulty and danger of dealing with glass. Local beer brewers, such as Labatt, Molson and Quidi Vidi, operate independent deposit-refund systems and residents can return their bottles to beer retail stores. Green Depots may also accept beer and wine bottles (Multi Materials-Stewardship Board, n.d.d). Ever Green Recycling has a verified sanitizing process for de-labelling and cleaning glass bottles for reuse (Ever Green Recycling, 2011b). By selling these bottles back to producers, the company is able to generate a revenue stream as well as reduce the carbon footprint of transporting these bottles out of province. Solutions like this may be possible at a centralized location in Labrador.

Milk cartons are exempt from the Beverage Container Recycling Program because milk is considered an essential nutritional food product. They can be recycled where curbside collection exists, but these services are not offered in Labrador (Multi-Materials Stewardship Board, n.d.j).

As shown in Figure 10, most communities in Labrador have a Green Depot for collecting beverage containers with the exception of many in the Labrador Straits region. More isolated communities in Southern and Northern Labrador have set up their own beverage container collection sites in publicly owned buildings such as schools and community centres (Rethink Waste NL, n.d.b; Rethink Waste NL, n.d.c). There is no recycling depot in Churchill Falls but the town does offer drop-off donation opportunities to encourage recycling in the community (Churchill Falls, 2017a). Happy Valley Goose Bay's Recyclable Regulations, implemented in 2003, prohibits disposal of items with an original deposit in their landfill and this practice may be considered for the PWMS (CBCL Ltd, 2010).

Recommendation: MMSB should work with municipalities in the Labrador Straits to put a green depot in each community. This could be done with a model similar to that of Southeast Labrador where extra space in town halls and schools are utilized for collecting beverage containers.

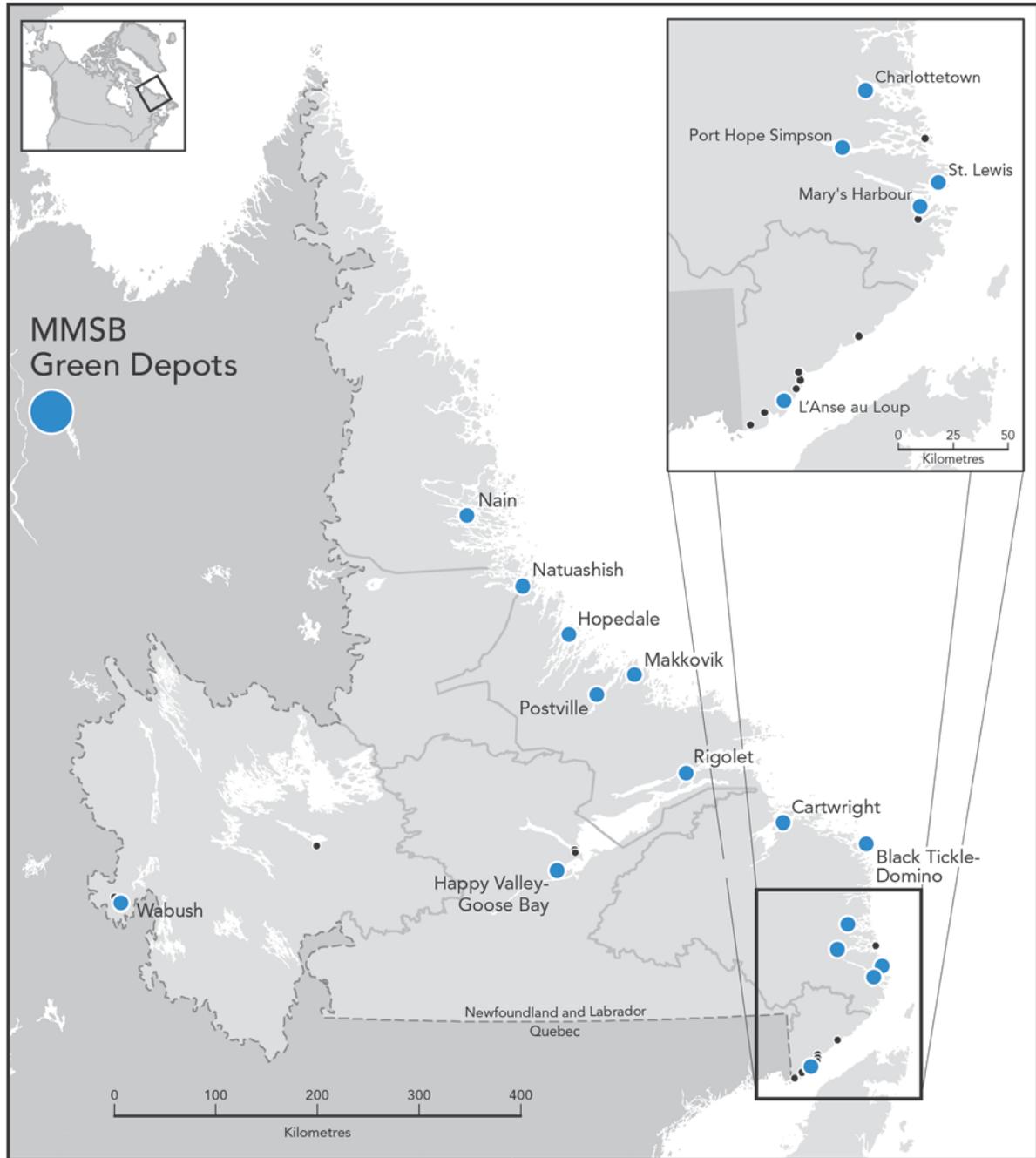


Figure 10: MMSB Green Depots in Labrador

3.2.4. ELECTRONIC EQUIPMENT

Waste electrical and electronic equipment (WEEE) are some of the hardest materials to recycle because many municipalities are not well-equipped to handle this type of waste (Schluep, 2014). In 2012 Newfoundland and Labrador introduced Extended Producer Responsibility policies that were aimed at the electronics industry (Multi-Materials Stewardship Board, n.d.b). The policy adds an Environmental Handling Fee at the time of sale of all new electronic products that are regulated in the province. Revenue from this policy is used for the collection, transportation and responsible recycling of these products and is administered by the Electronic Products Recycling Association (EPRA), a not-for-profit, industry-led organization (Extended Products Recycling Association, 2016). EPRA manages drop-off points for electronics all across the province with three in Labrador: Wabush, Happy Valley-Goose Bay, and L'Anse au Loup. These Labrador locations are all in Green Depots, an excellent example of multi-purposing centralized recycled facilities (Extended Products Recycling Association, 2016).

In addition to this comprehensive program, private industry may also offer select recycling services. Recycle My Cell is national industry initiative led by the Canadian Wireless Telecommunications Association to promote the recycling of cellular devices. Cable television service providers such as Bell Aliant, Eastlink and Rogers, collect set top boxes and PVRs for recycling (Multi-Materials Stewardship Board, n.d.b). Most ink cartridge manufacturers offer free postage-paid labels for cartridges that are sent back to the manufacturer for reuse or to be recycled (Every Cartridge, 2017).

3.2.5. HAZARDOUS WASTE

Municipalities may collect household hazardous waste, but are not approved to dispose of it. On their website, MMSB advises that residents consult their Regional Waste Management Authority on information about disposing of household hazardous waste, but no such authority has been established in Labrador. Residents in Labrador instead rely on private industry to collect hazardous waste, but only one company is based in Labrador (Rethink Waste NL, n.d). McDonald (2013) found that there were no licensed waste disposal facilities for hazardous waste in the province. The industrial, commercial and institutional sectors are responsible for the collection, processing and disposal of their own waste. A regional approach to such collection would help cut costs for municipalities and ensure that such waste is properly disposed of (Goldhar et al., 2012).

There is little information available about how municipalities are managing this waste. Residents of Hopedale have suggested partnering with Voisey's Bay to remove their hazardous wastes, but there is fear that transportation of this waste will pollute fishing grounds (Goldhar et al., 2012). Hazardous waste is not collected in Makkovik because the community has no holding facility. The municipality ships such waste to Goose Bay for \$75 a barrel or members of the community must store their own hazardous waste (Goldhar et al., 2012).

There are national policies regarding some components of hazardous waste such as the Battery Recycling Program and the Mercury Switch Recovery Program. While the recycle rate for lead acid batteries (used in cars) is 99% and utilized by Canadian lead smelters, the recycle rates for other batteries is less than 10%. There are consumer battery recycling facilities in British Columbia, Ontario and in the United States, but only British Columbia, Manitoba and Quebec have mandatory extended producer responsibility policies (Kelleher Environmental, 2008; Environment and Climate Change Canada, 2017a).

Recommendation: Proper disposal of hazardous waste is vital to environmental sustainability and rather than hazardous waste being kept in each regional landfill, a provincial solution to removing this waste should be considered. A regional solution to collecting household hazardous waste through centralized drop-off locations and mobile collection events should be implemented in Labrador.

3.2.6. ORGANIC WASTE

Composting in the province tends to be an individual choice and venture. The City of St. John's, for example, offers workshops on how to compost and offers home composting bins for sale to its residents. The PWMS does plan to implement regional organic waste management infrastructure by 2025, but there is little information available about the progress or implementation of the program (Department of Municipal and Intergovernmental Affairs, 2015). In 2012 the Town of Grand Bank began a Curbside Composting Pilot Program that has since expanded to include all 1,200 households, and grocery stores and fish processing centres on the Burin Peninsula. By composting organic waste and paper fibre, the town has diverted over 112 tonnes of waste and is producing Grade A compost (Multi-Materials Stewardship Board, n.d.f).

Composting can increase the lifespan of a landfill and reduce GHGs with only a small increase in unit costs of waste management (Cant, 2006). While there are more advanced technologies to efficiently break down organic material, community composting can be a simple process. Community composting is based on creating a central composting site that is managed by the municipal government and can be utilized by residents through a drop-off site or curbside pick-up. The compost can be maintained for low-cost through a design of long, triangulated piles of organic waste that is piled and regularly turned by a front-end loader (Multi-Materials Stewardship Board, n.d.k). Zhang et al. (2013) did a study investigating the feasibility of composting in northern communities in Newfoundland and Labrador. They found that while the cold climate slowed down the composting process, a composting system could work in small communities.

Through funding from the MMSB, Happy Valley-Goose Bay recently acquired a wood chipper that can be used by residents to dispose of yard waste. Once processed the waste is reused for landscaping and beautification of the community (Happy Valley-Goose Bay, 2017).

The MMSB provides funding for not-for-profit organizations and private businesses that engage in composting including Memorial University's Botanical Garden, Island Composting, the Autism Society of Newfoundland and Labrador and the Anchor Inn Hotel and Suites (Multi-Materials Stewardship Board, n.d.c).

3.2.7. PAINT

The Newfoundland and Labrador Paint Stewardship Program offers collection services for leftover household paint throughout the province. Product Care Association, a federally incorporated, not-for-profit stewardship association manages the program and is also involved in revenue management, communications and administration.

The Product Care Association utilizes the private sector in their paint collection by contracting out to haulers who supply and maintain communities with standard reusable collection bins (tub skids). Once collected, through permanent sites or collection events, the leftover paint is then shipped to a processor for recycling. Some communities also offer a Paint Exchange Program to reuse paint that does not require transportation or reprocessing (Product Care Association, 2015). As shown in Figure 11, many communities in Labrador have permanent collection sites and several are serviced with mobile events.

Collection services tend to be in community centres or fire halls though some private businesses contribute as well. In 2014, 132,951 liters of residual paint were collected. This was estimated to be 3.48% of total paint sales for that year, which is a small proportion but shows some growth from previous years. In 2014 PCA hosted thirteen “paint-only” collection events across the province, including six in Labrador. These mobile collection events were promoted through MMSB’s social media and the Product Care Association’s website, as well as through fliers sent to fire halls and communication with town halls. The volume of paint gathered at mobile collection events tends to be low, averaging less than one tub skid from each community. In 2014 there were zero tub skids gathered from four out of the six communities in Labrador (Product Care Association, 2015).

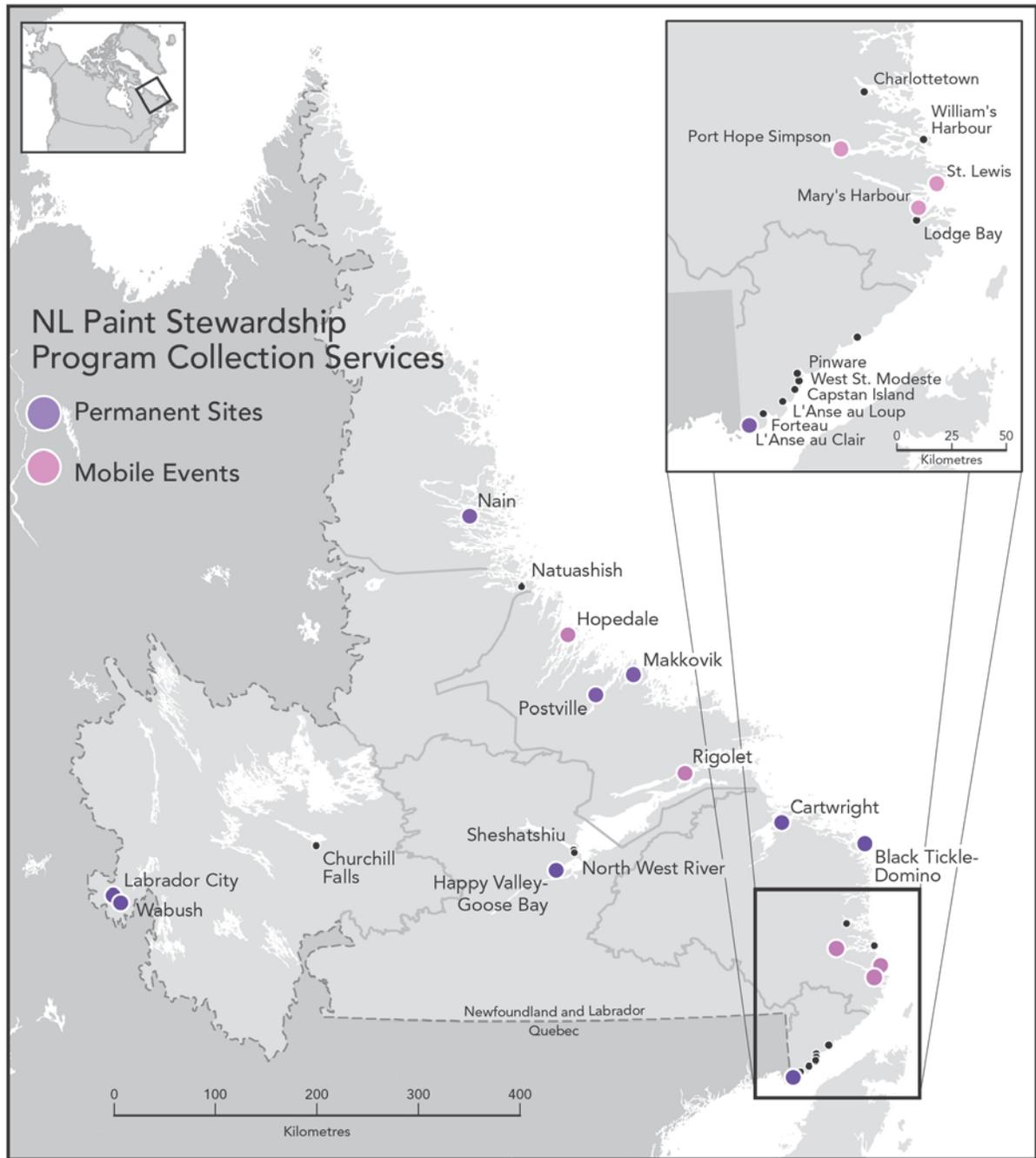


Figure 11: NL Paint Stewardship Program Collection Services in Labrador

3.2.8. SCRAP METAL COLLECTION

A regional scrap metal collection service has been proposed by several communities to increase waste diversion programs, improve waste sustainability and maximize the use of existing landfills. Partnering with Voisey's Bay or finding companies who will collect scrap metal for a reward may be potential alternatives (Goldhar et al., 2012). Churchill Falls has a scrap metal yard for recycling purposes and appears to be the only town in Labrador with a specific space for scrap metal (Churchill Falls, 2017a). Scout Environmental, a Toronto-based not-for-profit organization, has partnered with the town of Postville to remove old vehicles and appliances from their landfill that can be taken apart for scrap metal. The organization brings in professionals who teach locals the process of depolluting and recycling different materials, which can allow the process to continue without supervision (Barker, 2016). This model could potentially be expanded to other communities with overflowing landfills.

Recommendation: Municipalities should work with organizations such as Scout Environmental to show communities how they can recycle different materials in their landfills and reduce pressure on overflowing landfills.

Steel is a commonly recycled material and most developed parts of the world have functional and efficient systems for collecting, processing and utilizing this scrap metal. This system allows steel plants to operate using lower cost materials and generates lower emissions into the environment (Björkman and Samuelsson, 2014). Copper is slightly more difficult to recycle because it is often mixed with other materials in products. Europe, for example, has a well-functioning system for collecting, treating and processing high-grade scrap, though challenges of more complex mixed materials can be foreseen (Samuelsson and Björkman, 2014). There are businesses in Labrador that collect waste for an economic reward, such as Dominion Recycling Limited, but a provincial strategy to collecting and reaping the economic benefits of this waste is necessary for efficient waste disposal.

3.3 Fire and Emergency Services

Fire services are the responsibility of municipalities and local service districts (LSDs) and are regulated by the provincial government, with the exception of those on First Nations reserves, which fall under federal jurisdiction (Fire and Emergency Services NL, 2015). Municipalities and LSDs provide the majority of the functional work of fire departments including providing funding, conducting needs-assessments and applying for cost-based sharing with the provincial government. The provincial government has a more regulatory role under Fire and Emergency Services (FES-NL). FES-NL provides fire and emergency support services including training, certification, and intervention and compensation in cases of large-scale natural disasters (Fire and Emergency Services NL, 2017). The federal government does play a role in fire and emergency services through the Canadian Rangers.

Canadian Rangers are here for natural disasters or if someone goes missing. No RCMP in community. If anything comes up that the RCMP can't get here from Cartwright, [we're] depending on Canadian Rangers to go look for someone if they're lost or if there's a house fire the Canadian Rangers and members of the community pitch in with a bucket brigade.

There are 271 fire departments across Newfoundland and Labrador ranging from full staff, direct line stations to small, volunteer brigades. There are 19 fire departments serving communities across Labrador as shown in Figure 12. This map is based on the report completed by FES-NL (2015) where communities are defined by their staff and are either "Career" consisting entirely of salary staff, "Combination" of salary and volunteer staff, or entirely "Volunteer." There are several fire departments that are not regulated by FES-NL which have been classified as "Not Applicable." The fire departments in Happy Valley–Goose Bay and Labrador City are managed by a combination of paid and volunteer staff, while the rest rely on volunteers. Half of the population is protected by the fire departments of the eight largest municipalities, while 77% of fire departments serve populations of fewer than 1,000 people. The high proportion of volunteer fire departments is common across the province. The LSDs of Paradise River and Black Tickle-Domino do not have proper firefighting equipment and instead rely on "bucket brigades" of local volunteers during such crises. Some respondents from these communities cited a desire to raise funds for a hose but it would require government matching to purchase such equipment.

Here we are in a community that's isolated, we have no fire services, and the provincial government won't help us. I went to the provincial government 15 years ago to put up half the money to buy a pump and a couple hundred feet of arctic hose so we don't have to use buckets and they won't.

Recommendation: The provincial government should meet with Local Service Districts to create a shared cost plan to purchase basic firefighting equipment such as portable water pumps and hoses. Moreover, they should have regional government arrangements in place to effectively entrain all residents in the cost-sharing of these services.

There are several communities that have overlapping fire departments including the neighbouring Labrador West towns of Labrador City and Wabush, the central towns of North West River and Sheshatshiu, and the south coast towns of L'Anse au Clair and Forteau. Such a high density of fire departments is a fairly common phenomenon in the province, where almost every municipality and local service district has its own fire department (Fire and Emergency Services NL, 2015). In our survey, we did find examples of communities sharing fire equipment and services. Fire prevention equipment is shared among Pinware,

Capstan Island and West St. Modeste, and firefighters and equipment between Sheshatshiu and North West River. Labrador City and Wabush frequently organize joint training sessions for both fire departments.

The northern climate of Labrador does require specific firefighting equipment to suit the region's specific needs. Some fire departments in Labrador, for instance, have tracks instead of wheels on their trucks, which facilitate driving on snow-covered roads (NL Fire Services, 2017).

In their 2013 brief to the provincial government, the Newfoundland and Labrador Association of Fire Services (NL-AFS) presented twelve challenges that fire services were facing in this province, including recruiting and retaining firefighters; increased training requirements; difficulty in attracting volunteers to participate in training without remuneration; and lack of funding available from government. NL-AFS was also concerned about how demographic changes could affect fire services, particularly in regard to the sustainability of fire services in areas with aging and shrinking populations and in fast-growing areas. The solution the association presented to these challenges was regionalization, as cooperation between municipalities and local service districts could allow for more sustainable fire services and improve the quality of fire protection (Mackenzie, 2012).

In Newfoundland and Labrador there are four models of regionalized fire protection services that serve more than one municipality or LSD (Fire and Emergency Services NL, 2015), where:

- municipal amalgamation has occurred under the *Municipalities Act, 1999*;
- prerequisite structures of regional governance are established;
- communities elect to purchase fire protection service from a neighbouring community on a fee for service basis;
- groups of communities voluntarily pool resources to provide services on a regional basis.

The above models highlight different ways fire services can be regionalized. While the provincial government has a policy not to force amalgamation, such regionalization sharing models are supported by FES-NL in partnership with the Newfoundland and Labrador Association of Fire Services (NL-AFS) and other stakeholders, such as Municipalities Newfoundland and Labrador and the Professional Municipal Administrators. Such examples of regionalization of fire and emergency services should be considered by municipalities in Labrador that are reasonably close together such as in Labrador West, Central Labrador and along the Labrador Straits. We did find examples of communities sharing equipment, firefighters and training sessions in our survey, but these were limited and potential for expansion remains.

A shared model of service delivery could reduce the operating costs of fire services in rural areas. FES-NL did a small case study on four rural fire departments serving towns with an average population of 825 and found that a shared model of service delivery for those fire departments would cost approximately \$32,000 annually. This includes mandatory services such as offensive interior fire protection, but not specialized services such as ice water rescue. FES-NL does offer services to meet with communities interested in a shared service model and discuss potential frameworks for such a model (Fire and Emergency Services NL, n.d.).

Recommendation: Clustered communities, e.g. those along the Labrador Straits, should pool their resources to hire a few trained firefighters and thus improve firefighting services in the area. This may not be feasible for eastern and northern communities given the significant distance between communities and road conditions (or lack thereof).

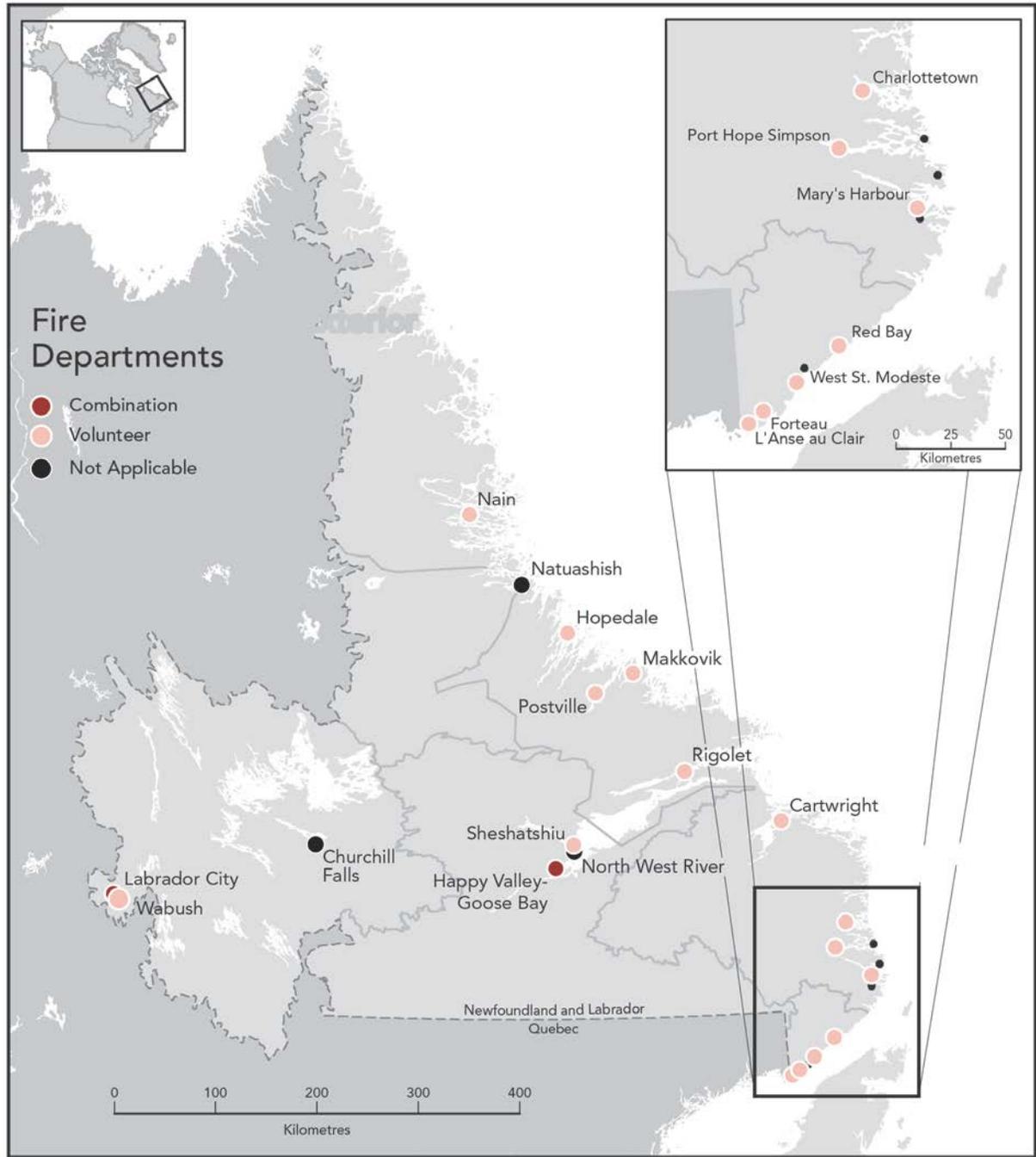


Figure 12: Fire Departments in Labrador

Recommendation: Clustered communities, e.g. those along the Labrador Straits, should make use of other regional firefighting solutions, such as sharing the cost of firefighting equipment. For example, fire prevention equipment is shared among Pinware, Capstan Island and West St. Modeste. This model could be expanded to other communities.

Recommendation: Since many Labrador communities are generally too remote to share services, in these cases each community should have a basic fire department and the necessary equipment, such as a portable water pump and hose. In our qualitative survey, we found some communities do not have this basic equipment and rely instead on “bucket brigades” of residents hauling buckets of water to put out fires. This is a risky and inefficient way to deal with the dangers associated with a fire outbreak.

FES-NL conduct regular reports on the operational readiness of fire departments across the province. They use two major classifications: defensive exterior fire suppression and offensive interior fire suppression/rescue. The former is a less risky and less effective form of fire protection where firefighters have Defensive Fire Fighter certification and can quickly put out a fire from the outside. In these cases, the structure is almost always lost and firefighters are not technically permitted to rescue anyone trapped inside. The latter is a more rigorous and faster service that requires firefighters to have a higher degree of training, minimum of six respondents on scene within 14 minutes, full equipment capabilities and direct communication with Incident Command (Fire and Emergency Services NL, 2015). The Conne River, Sheshatshiu Innu First Nations and Natuashish fire departments were not assessed in the 2015 FES-NL report because they fall under federal jurisdiction. The Churchill Falls Fire & Security Department is not discussed in the document at all, but the town’s website assures that they have 24 hour emergency service (Churchill Falls, 2017b).

Generally, offensive interior fire suppression services require more funding, and a larger population that can support the higher costs and provide a pool of labour supply to draw from. 27% of all fire departments in Newfoundland and Labrador do not have offensive interior capabilities, and for those that do, just 14% are classified as “acceptable,” 36% need improvement and 23% were unacceptable (Fire and Emergency Services NL, 2015).

In Labrador only the three largest, most industrial towns have acceptable offensive fire services: Happy Valley-Goose Bay, Labrador City and Wabush (Figure 13). Almost 50% of Labrador communities do not provide any such services, 29% had unacceptable services and one needed improvement. Several communities are not able to offer offensive fire services at all and are classified as “Not Applicable.” Therefore, there are relatively fewer offensive exterior fire suppression services in Labrador than in the province as a whole.

In contrast, most communities in Labrador offer defensive exterior fire suppression services as shown in Figure 14. Across the province, 52% of all defensive fire services were certified as “Acceptable,” 32% as “Needs Improvement” and 10% as unacceptable (Fire and Emergency Services NL, 2015). In Labrador, nine of the fire departments were certified as “Acceptable” - also 52%, seven needed improvements and one (Charlottetown population 350) was deemed unacceptable (Figure 14). This suggests there are relatively better defensive exterior fire services in Labrador compared to the province as a whole.

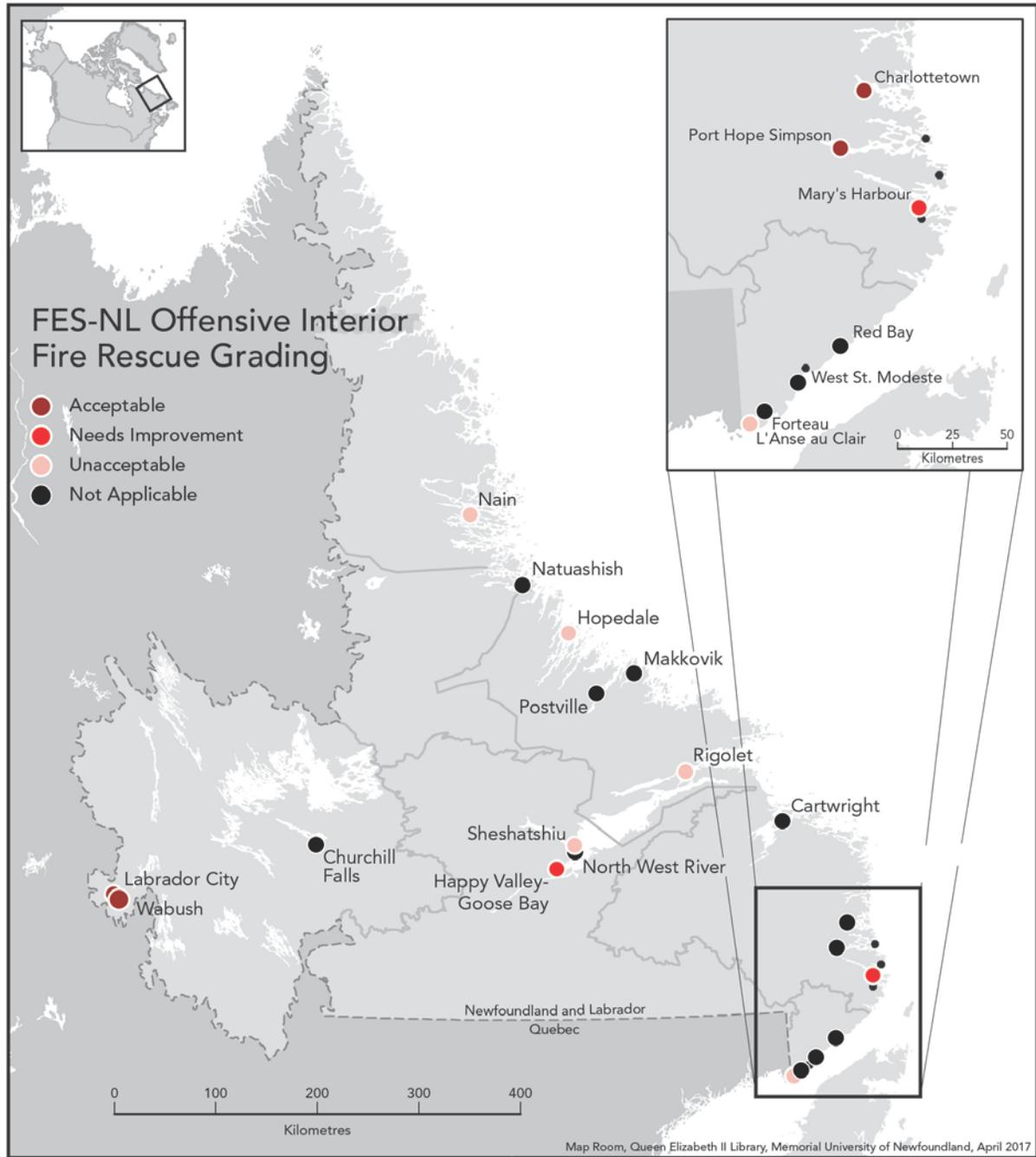


Figure 13: Offensive Fire Services in Labrador

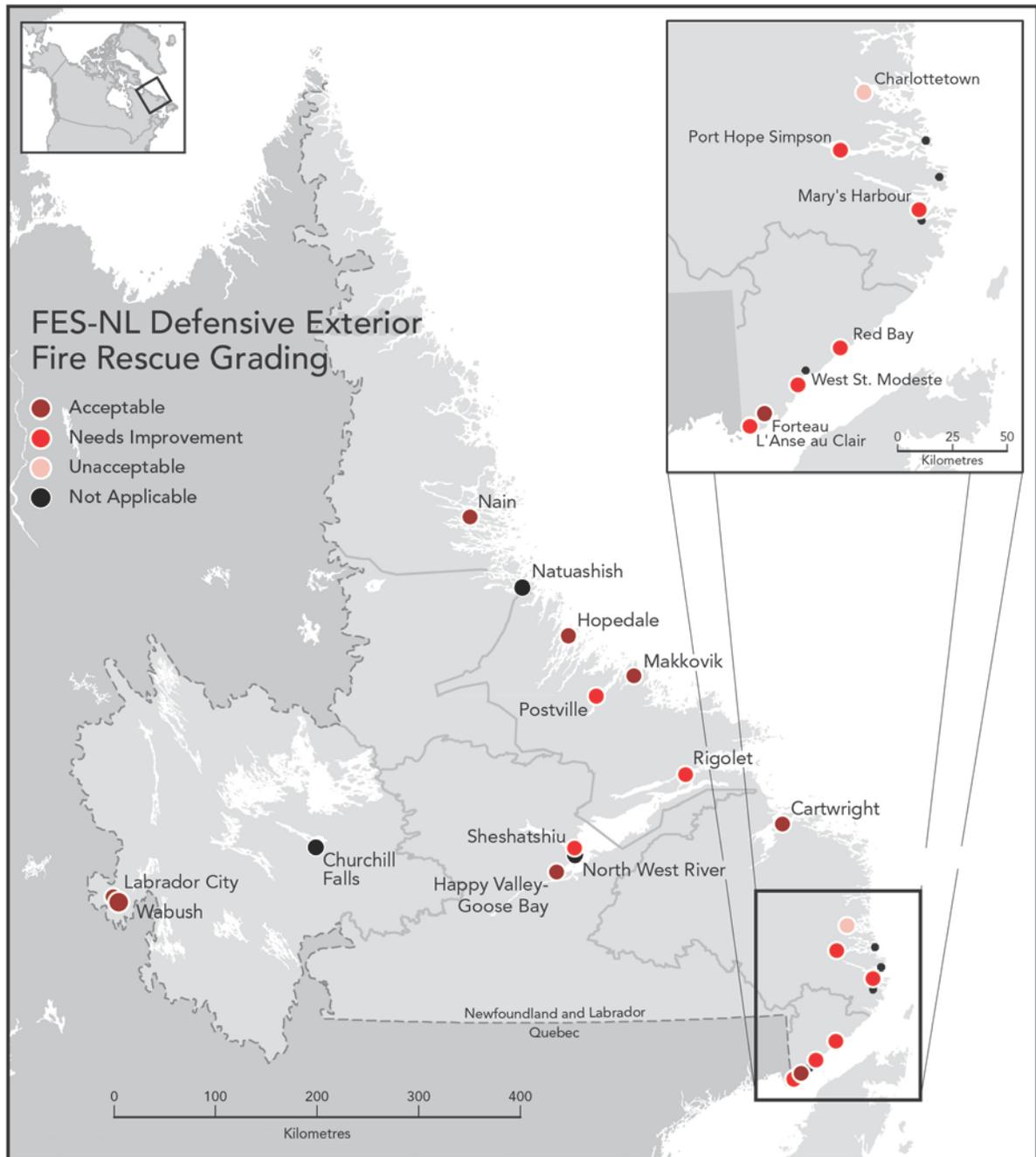


Figure 14: Defensive Exterior Fire Services in Labrador

As Figures 12, 13 and 14 show, most communities in Labrador have their own fire department. While it is important to have such emergency services nearby, some communities that are very close together have a duplication of services that can be a drain on municipal resources. Maintaining fire equipment and volunteers can be expensive and in areas with a cluster of communities, sharing such services could ease municipal service delivery (Keenan and Whalen, 2010).

Besides assessments of firefighting training conducted by FES-NL, it is difficult to measure the effectiveness of firefighting units because of a lack of data. In their 2015 annual brief presented to the provincial government, the NL Association of Fire Services urged the government to create an online fire reporting system where fire departments could log and report fires, losses and other relevant statistics. This would allow for accurate and current statistics on which areas have the greatest demand for fire and emergency services and the effectiveness of these services (Mackenzie, 2014).

Recommendation: The provincial government should create an online fire reporting system where fire and emergency teams can report fires, losses and other relevant statistics. This will allow the NL Association of Fire Services to assess which areas have the greatest demand for fire and emergency services and which fire departments are the most effective at mitigating emergency situations.

3.4 Road Maintenance and Snow Clearing

Municipalities develop and maintain transportation infrastructure including road repair, sidewalk maintenance, street marking, street and traffic signs, grading of roads and street cleaning. In the winter, such road maintenance may also include snow removal from streets (Professional Municipal Administrators, 2012). For LSDs such road maintenance is performed by the provincial government through the Department of Transportation and Works (Department of Transportation and Works, 2017). This department is also responsible for maintaining provincial highways, marine services and air services. Through our survey we found that the Department of Transportation and Works also does road maintenance in some smaller municipalities.

Communities along the north coast are not connected by roads and to travel between towns, residents use motorboats in the summer and snowmobiles in the winter. Despite having no road connections, residents are very mobile and travel in and out of their towns fairly frequently to gather firewood and drinking water, or making trips to the cabin or the bush to hunt, fish or participate in other land-based activities (Goldhar et al., 2013).

Without a road link to Goose Bay, however, opportunities for economic development or access to emergency infrastructure are limited. When asked whether they would want a road link, residents in Makkovik, Rigolet and Postville had mixed feelings. Some were in strong support of a road as it would reduce the cost of travel and feelings of isolation as well as increase visitors to the region and job opportunities for those who would commute to Goose Bay. Others worried that a road would increase hunting in the area, thereby decreasing the animal and bird populations, and increase drug and alcohol problems (Goldhar et al., 2012).

Communities in Labrador have a range of road surfaces. Larger communities such as those in Labrador West and Central Labrador have all of their roads paved, while many communities along the coast have gravel roads only (Figure 15). Traffic on these roads can produce dust, which was discussed as a concern of residents in Postville, Rigolet and Nain as it creates discomfort and breathing problems, particularly for those with asthma. This has been exacerbated by road upgrades that use a finer grade of sand. To control the dust, communities put calcium on the road. This does reduce dust, but works best when the road is damp and can be less effective during dry spells. The town of Nain applies calcium every two to three days but finds this treatment expensive. Community members suggested watering the roads and having contractors apply a treatment to the roads as they drive around. Residents in Rigolet were worried about the negative effects on their respiratory health that dust caused and reported being unable to dry their laundry outdoors because of the dust. The town stopped using calcium on their roads because they found it did not make a difference. In Postville residents said they would prefer paved roads but cannot afford the costs. The town of Makkovik also uses calcium to reduce dust and while residents were less concerned when surveyed, fine dust particles continue to present a health risk for residents (Goldhar et al., 2012).

Federal and provincial funding is available for road paving. However, the cost sharing ratio for road work has recently been changed to 50/50 for municipalities irrespective of size (Municipal Affairs and Environment, 2017). This puts road work out of the reach of most small communities, especially when their small budgets are also used to maintain clean drinking water and wastewater treatment projects.

Recommendation: The provincial government should explore funding opportunities such as the federal Infrastructure Funding Program to pave and maintain roads in communities with gravel roads to alleviate health concerns arising from dust.

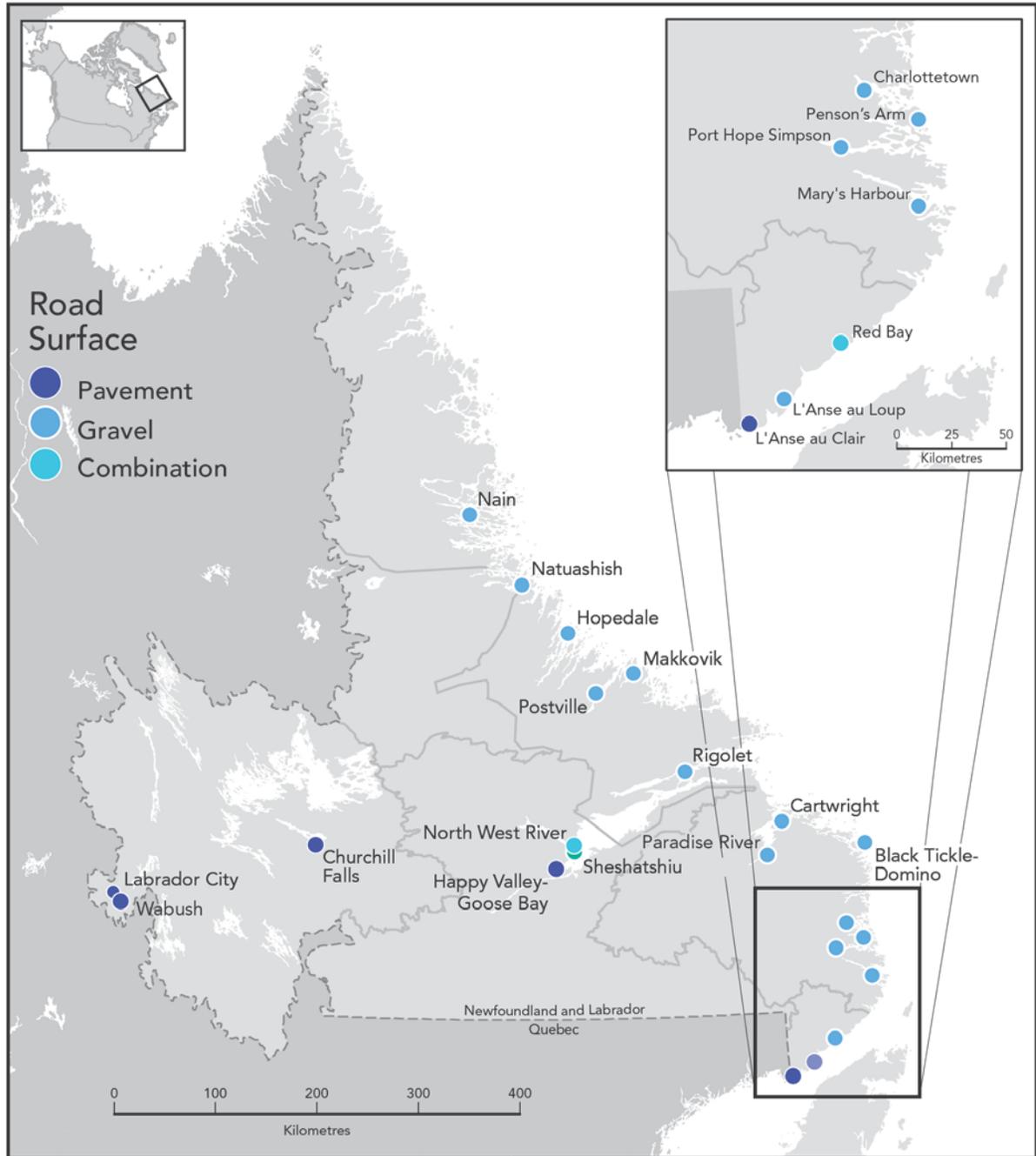


Figure 15: Road Surface in Labrador

Residents in Rigolet complained of roads in need of constant repair, as they were prone to washing out and potholes. Roads are uneven and have deep pockets of loose gravel making walking difficult and driving dangerous, especially around corners. The community is in need of a rock crusher to pack down smaller gravel and grade the roads (Goldhar et al., 2012). The town of Nain has experienced issues with runoff and drainage in the spring. When the snow melts, large amounts of water floods basements and washout the roads, which need to be frequently graded. Flooding is particularly bad in areas where vegetation has been removed for development. Community members suggested that the town map drainage patterns and develop a plan to better manage water flow to reduce these issues (Goldhar et al., 2012). In 2002 the provincial government announced that it would provide funding for two graders that would be shared between Nain, Hopedale, Postville, Makkovik and Rigolet. These five communities share responsibility for maintaining the equipment and transportation of the materials necessary for grading the roads (Truck News, 2002). Given that there are no roads to connect these towns, it is unclear how effectively the graders are shared or whether this is a current solution given the graders would now be more than a decade old.

Sidewalks are rare in Labrador. While some sidewalks are plowed in the winter in Labrador City, none are plowed in Wabush (Parsons, 2017). Most communities surveyed reported not having sidewalks at all.

In Labrador, snow removal may be more of an urban rather than rural concern, as many residents use snowmobiles in the winter and therefore snow removal is unnecessary. As shown in Figure 16, only about half of communities offer snowclearing services in the winter. Many communities in fact rely on snow coverage to insulate their water pipes (Goldhar et al., 2012). In northern communities, such as Nain, roads are plowed only while the ferry service is running because members of the community prefer to travel using snowmobiles. For many communities along the coastline, transportation between communities is facilitated in the winter months as the coastline freezes over and people are able to travel over the ice via snowmobile. Residents in Black Tickle-Domino reported that it was easier to travel in the winter via snowmobiles relative to summer travel (Hanrahan, 2014).

With warming temperatures associated with climate change, traveling by ice has become more dangerous as ice may not be as solid as expected. To ensure safe and efficient winter travel for residents, the Nain Research Centre is developing SmartICE – Sea-ice Monitoring and Real-Time Information for Coastal Environments. The SmartICE System will use sensors to measure ice thickness, satellite imagery to map out sea-ice surface conditions and information technology to generate raw and processed digital products for user groups including ice navigation managers, Inuit ice experts and recreational ice users (Goldhar et al., 2012). The project coordinators plan to make this information available as a printed map and as an app for the relevant communities to access (*The Labradorian*, 2017).

Recommendation: Technology used in Nain Research Centre’s SmartICE System should be extended to communities along the southern coast and other areas where residents travel over ice in winter.

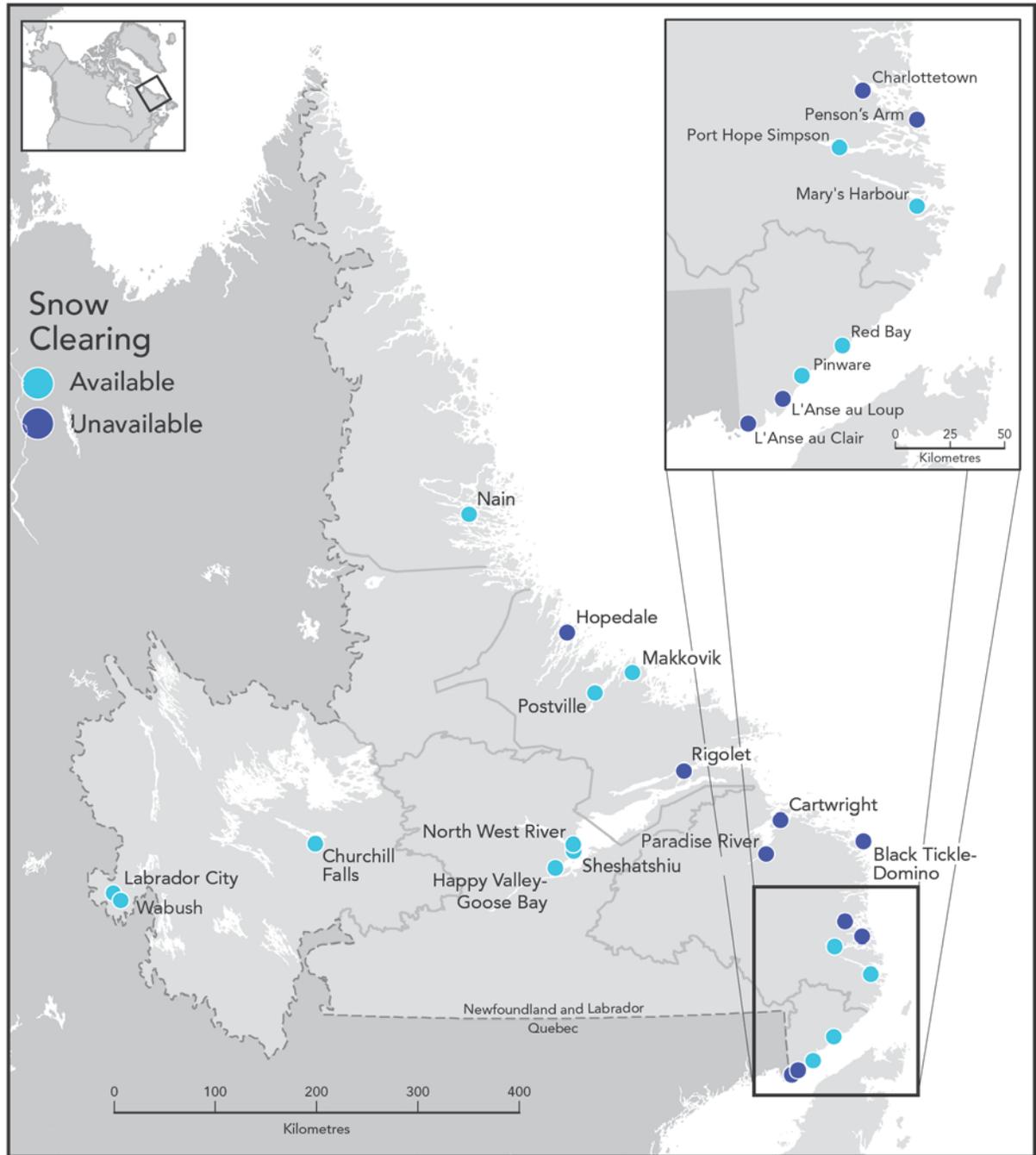


Figure 16: Snow Clearing in Labrador

3.5 Recreation

3.5.1. OVERVIEW

"The ultimate aim of sport and recreation of all kinds, is of course, the pursuit of happiness. Side benefits of this main aim are social development and interaction, group and community spirit, and physical fitness."
Snowden et al., 1974

Municipalities are responsible for the operation of recreation facilities such as recreation centres, outdoor sports facilities and walking trails. They may also offer recreational programs aimed at specific demographics or activities (Professional Municipal Administrator, 2012). The provincial government has a key role in recreation program development and coordination specific to Labrador through the Labrador Regional Sport and Recreation Consultant with the Department of Business, Tourism, Culture and Recreation, and the Coordinator of the Provincial Aboriginal Sport and Recreation Circle, who organize sport and recreation events with Aboriginal groups across the province (Hatch Mott Macdonald, 2008). The federal government has a more collaborative role as it works to develop and support policies that "enable all Canadians to participate in recreation" (Canadian Parks and Recreation Association, 2015). In 2015 the federal and provincial governments, through the Interprovincial Sport and Recreation Committee, released the "Framework for Recreation in Canada: Pathways to Well-Being" (Canadian Parks and Recreation Association, 2015). This framework has five goals, which focus on active, healthy living, connecting with nature, and improving the inclusivity and accessibility of recreation. The framework outlines the benefits of recreation as a proactive measure to enhance mental, physical and social wellbeing and is to be promoted and funded to improve community health. IndigenACTION is a complementary policy to the framework that has been adopted by the national Assembly of First Nations (Assembly of First Nations, n.d.)

Across Labrador there is a wide range of recreational programs and facilities for every season. Most communities have a recreation centre, a playground and walking trails. Larger communities tend to have a wider range of facilities and programming. Funding for such programs are derived from provincial grants and user fees. There are also many private firms and non-profit organizations that provide recreational programming and often have their own spaces. These organizations tend to be focused on certain demographics (e.g. seniors, youth) or interests (e.g. hunting, sports) and are funded through provincial grants, donations, or the private sector. Examples of these organizations in Labrador are 50+ Clubs, Girl Guides, Labrador Trap & Skeet Club, Twin Cities Seniors Group, Hams of Western Labrador – Radio, Labrador West Badminton Club, Labrador West Craft Guild, Anglican Youth Group, the Smokey Mountain Ski Club and Junior Rangers (Southern Labrador, 2010a; Labrador West, 2017a; Labrador West, 2017b).

Communities recognize recreational facilities as key resources designed to promote fitness and community engagement, especially among youth. In their community consultations in northern Labrador Goldhar et al. (2012) found that sports and recreation activities were highly valued by residents and there was demand for more and larger spaces to accommodate demand. Most communities in this region offer programs for youth at their community centre, but only Makkovik has a dedicated youth centre. Creating a teen recreation centre or small theatre space was recently discussed as a solution to the ongoing gas-sniffing problems among youth in Natuashish (Bailey, 2017). However, in some communities there was concern that participation in community events was declining due in part to the aging population and smaller youth population, and there was also concern that "community spirit is missing" (Goldhar et al., 2012: 67). This highlights the importance of an active community in recreational programming and events, and to issues of community capacity, as it may be mitigated by demographic and social factors.

Besides more formal recreational facilities, many communities across Labrador also enjoy and utilize the natural landscape that surrounds them. While some communities spend more money and have better equipment to groom their trails, all communities have some form of trail system that is used all year long. Residents often venture out into the woods or barrens to camp, hunt, pick berries, snowshoe, go sledding, cross-country or downhill skiing, snowboarding, or simply enjoy the natural landscape on foot, ATV or snowmobile. Many residents of Labrador feel a strong connection to their land and participate in outdoor activities.

There are also a wide variety of community events across Labrador such as the Labrador West Regatta, Cain's Quest, Labrador City Winter Carnival, Winter Lights, the South Coast Labrador Regional Games, the Salmon Festival, Trout Festival, and the Easter Games. These events rely heavily on community involvement to organize, participate in and attend such events and are key for creating healthy, vibrant communities.

Mills (2013) reported on recreation provision in Newfoundland and Labrador. This study had a fairly large response rate, but did not specify whether all regions were represented. The report indicated that most communities have an outdoor sports field and playground, while 46% had a community or youth centre and 35% had hiking or walking trails. The top challenges identified for recreation providers were budget, staffing and facilities. Many communities reported that they were struggling to provide programming due to lack of funding and resources, and that finding and applying for grants was a considerable strain on their resources. Most funding comes from grant applications, which requires staff that can write a successful application. Recreation programming is also financed by user fees, but pricing recreation programs can be a delicate process, as communities try to be inclusive of those of all income levels, while at the same time offering quality programs. Responding communities felt that while they struggled financially, raising user fees would not increase revenue because it would reduce usage, but that they would benefit from additional grant funding.

The report found that the majority of communities have a small recreation department with staff who run the daily programming, and often rely on volunteers to deliver a wide range of quality programming. 73% of respondents stated that they did not have enough staff or volunteers to deliver quality programs and services. As communities tend to provide mainly seasonal programming, many departments face high staff turnover and are finding it increasingly difficult to recruit volunteers for program delivery.

Many communities also reported that their facilities were aging, in need of repair and required upgrades. Respondents suggested that partnerships with other organizations in their community such as schools, or with other communities to build or share regional facilities, could increase service provision and reduce costs of service delivery.

A regional recreational facilities strategy was developed for the Central Labrador region (including Happy Valley – Goose Bay, Sheshatshiu, North West River, and Mud Lake) in 2008 (Hatch Mott Macdonald, 2008). This report advocates the centralization of recreation facilities in Happy Valley-Goose Bay as residents of nearby communities regularly commute to the town. It was also predicted that with the extension of the Trans Labrador Highway to the South Coast, communities in that region might be able to avail of services in Happy Valley-Goose Bay. While they found a large range of recreation facilities in Happy Valley-Goose Bay including community centres, swimming pools, and an arena, these facilities were spread out around the community, which caused inefficiencies in service delivery. The report recommended that future development be focused on creating a more centralized, multi-use recreation district to improve facility utilization and accessibility. This type of centralized urban planning should be considered by other communities expanding their recreational services.

The following sections review the more common recreational facilities across the region such as recreation centres, outdoor fields and swimming pools, but there is a wide variety of other recreational facilities that are not included in the maps. These include:

- Golf courses in Labrador City, and Happy Valley-Goose Bay
- The skateboard park in Labrador City,
- A bowling alley in Wabush,
- Curling rinks in Labrador City and Churchill Falls,
- Judo room in Happy Valley-Goose Bay's Training Centre
- Arts and Culture Centre in Labrador City,
- A theatre in Churchill Falls.

In addition to these recreational facilities, most communities also have a playground either attached to the local school or at an independent site. These playgrounds vary in size and typically have a slide, swings, teeter-totter and various other outdoor play equipment items. The largest playground in the region is the Centennial Park in Labrador City, which includes a Splash Park that is very popular on hot days (Gateway Labrador, n.d.).

Maps were constructed using information available online and through fieldwork. The following maps show existing facilities that are operated by municipalities, but there are plans to construct more as demand for recreational activities rise. Wabush and Labrador City will be working together to plan and construct a new regional recreation complex that will include an indoor turf soccer field, a curling rink and an indoor track, but it could be several years before the project is completed (CBC News, 2014; Dunham, 2016). The curling rink will replace the current Carol Lake Curling Club. The willingness of these two communities to work together to deliver services for their residents bodes positively for the future of regionalization in Labrador West. There are also plans for a Wellness Centre that will offer spaces for aquatics, fitness and ice sports in Happy Valley-Goose Bay (Labrador Wellness Centre, 2017). Hopedale is planning to build a multipurpose building that will allow for more recreational programs, as the community is currently limited to using the small community hall and outdoor facilities. After losing their community centre in a fire in 2016, L'Anse au Clair is planning to build a new centre through funding from all three levels of government that will include not only a community room and multi-purpose space, but also a kitchen, family resource office and space for the town council (Roberts, 2017).

3.5.2. RECREATION CENTRES

Most communities in Labrador have a recreation centre, community gym or community centre (Figure 17). These centres are generally multipurpose spaces that allow for common gym activities such as ball hockey, volleyball, badminton and table tennis, but may also be used for community events as well.

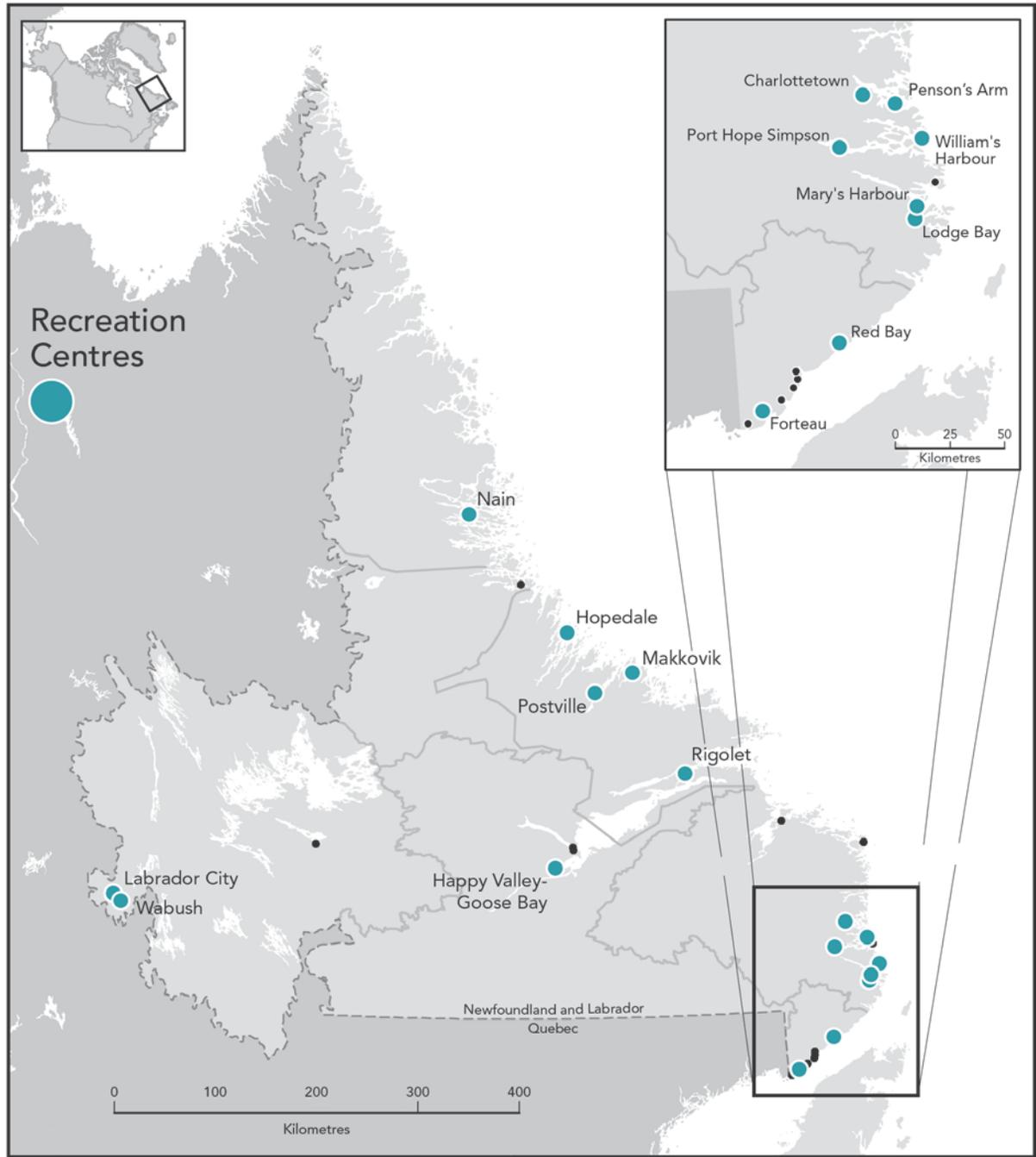


Figure 17: Recreation Centres

3.5.3. SCHOOL GYMS

Communities without a proper recreational centre or a need for greater space tend to rely on their school's gym to deliver recreational services and programming. These are not ideal spaces as school programming gets first priority and this can limit recreational use by the general public. The school gym in Sheshatshiu, for example, is only available after 9PM for adult sports (Hatch Mott Macdonald, 2008). Figure 18 maps out communities in Labrador that do not have a community recreation centre and instead rely on their school gym for recreation programs for adults.

Recommendation: The provincial government should explore funding opportunities for a new community space in communities that rely solely on a school gym for recreational activities.

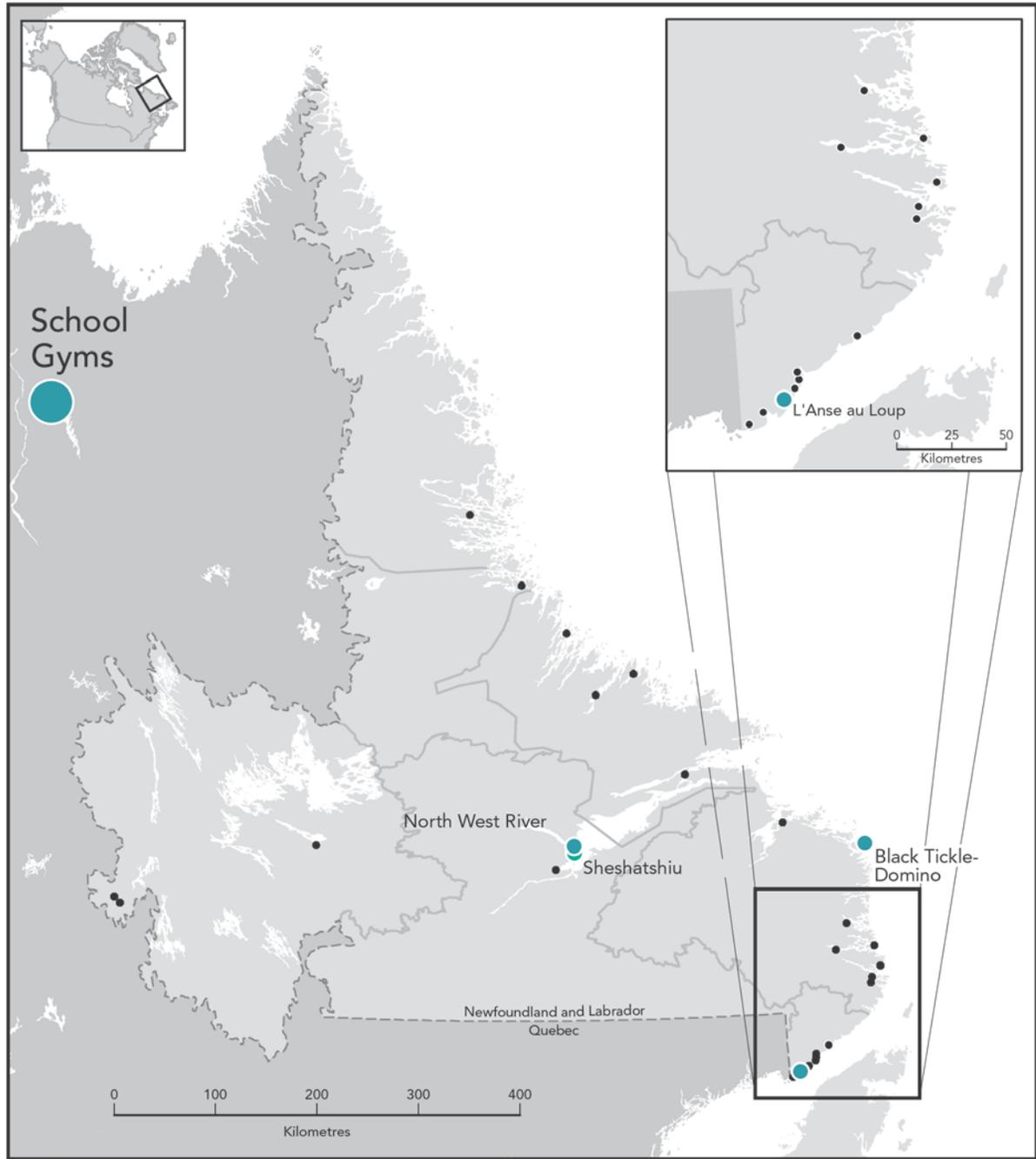


Figure 18: School Gyms in Labrador Used for Community Recreation

3.5.4. OUTDOOR FACILITIES

Many sports require specific facilities and while they may become multi-use once they are built, they tend to be constructed with a specific sport in mind. Outdoor facilities in Labrador include softball diamonds, basketball courts, soccer fields, and skating rinks. This map shown in Figure 19 may underestimate the number of outdoor facilities, as few soccer fields were mentioned, but general use open spaces are common, potentially overlooked, features of many communities.

Given the short summer in Labrador, these facilities are only accessible for a few months of the year. The new recreation complex in Labrador West is intended to overcome these environmental barriers and allow residents to play sports such as soccer all year round (CBC News, 2014).

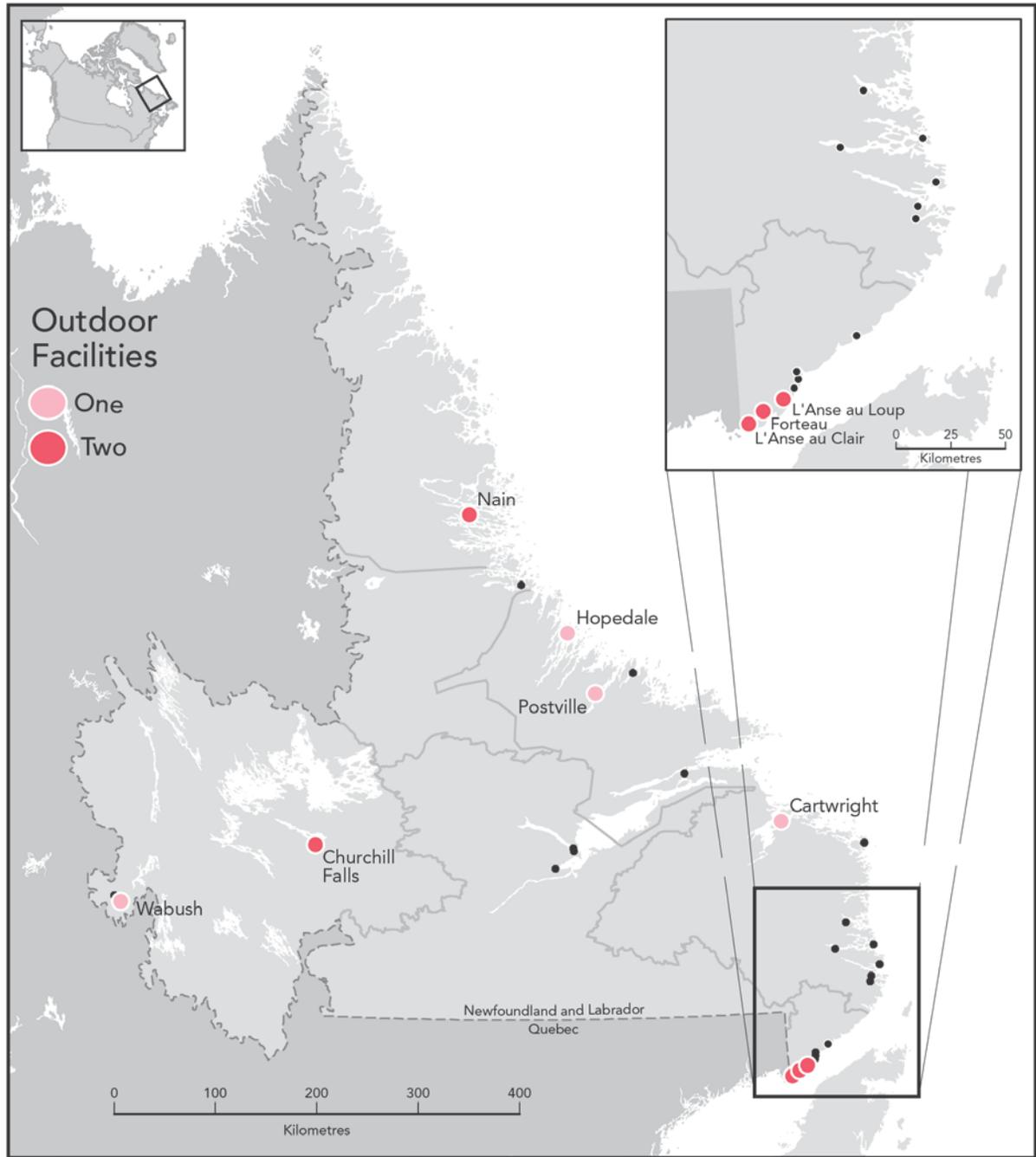


Figure 19: Outdoors Facilities in Labrador

3.5.5. SWIMMING POOLS

Swimming has many positive physical and mental health effects including reduced stress, improved flexibility, weight control, and improved asthma symptoms. For those recovering from an accident or experiencing joint pain, swimming can lighten the body and allow one to participate in exercises that may bring discomfort or pain otherwise (Franco, 2017). The Canadian government actively supports swimming through initiatives like “Canada’s Swim Team,” whose goal is to have every Canadian swim 25 meters non-stop by age 12 to impact “both the safety and fitness levels of Canadian kids” (Canada’s Swim Team, 2017).

In their review of recreation facilities in Central Labrador, Hatch Mott MacDonald (2008) found that the swimming pool in Happy Valley-Goose Bay is too small for the local demand and has limited therapeutic benefit for those with disability or injury because it is not easily accessible. There is also concern that the size limits locals’ ability to participate in competitive swimming and those interested must go to Labrador City for trials. The facility itself also has issues with maintaining temperature and the environmental conditions were described as highly variable and the control system is not up to today’s energy efficiency standards (Hatch Mott Macdonald, 2008).

There are several swimming pools in Labrador, though they tend to be concentrated in larger communities or more concentrated regions (Figure 20). As many communities in Labrador are on the coast, there are many beaches that are open for public use as well. However, given the short summer in Labrador these beaches and ponds are typically used only a few months out of the year.

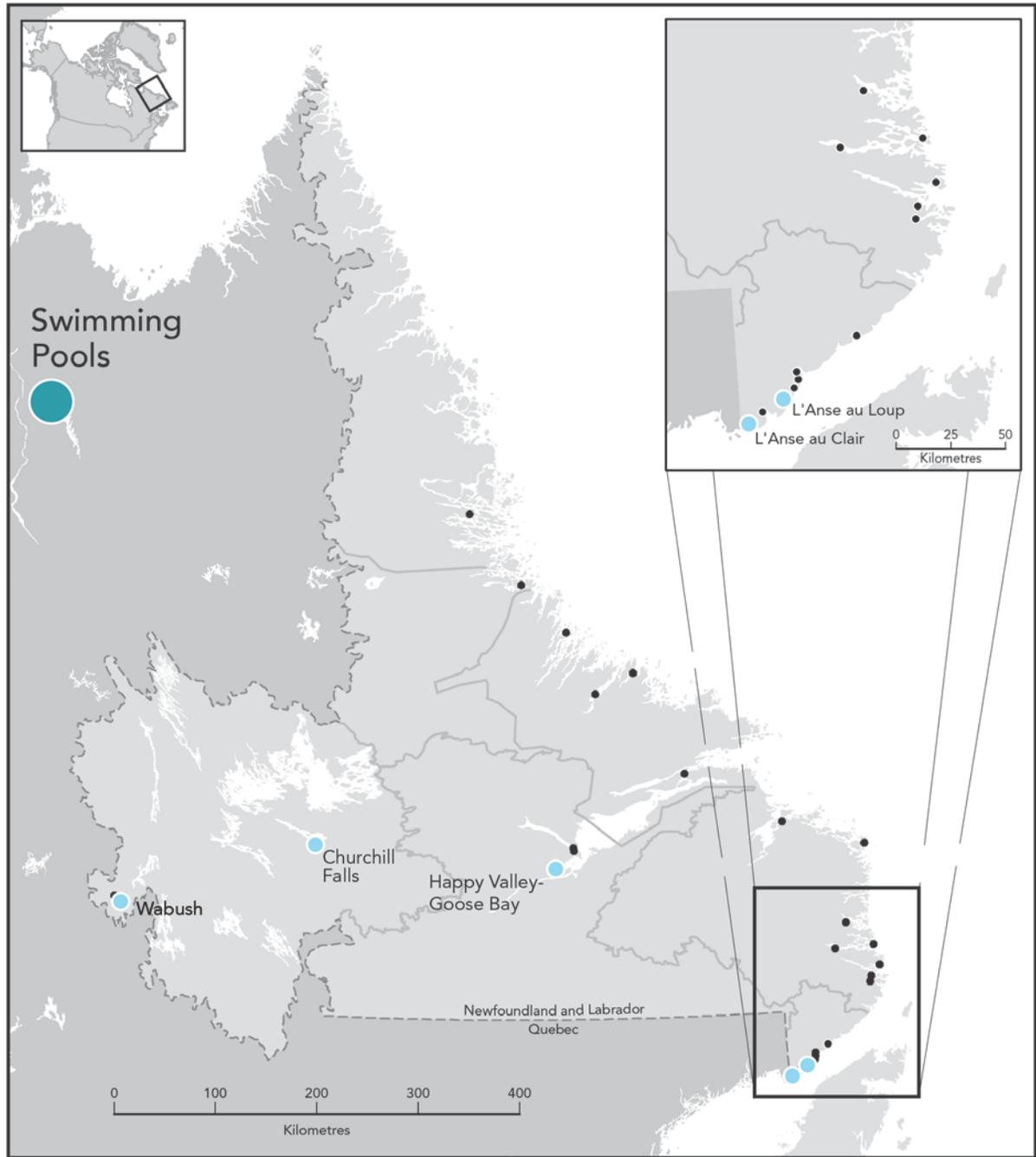


Figure 20: Swimming Pools in Labrador

3.5.6. ARENAS

Skating is a classic Canadian activity and whether in full-scale arenas or on near-by ponds, many Labrador residents participate in various aspects of the exercise including hockey, figure skating or general skating (Figure 21). The arenas in Labrador tend to vary in size (Labrador City Arena fits 1800 people and is the largest) and are used regularly for team sports, general skating, regional hockey tournaments and various community events (Gateway Labrador, n.d.). Labrador City also has a curling rink that is available in the winter and is used as a community space in the summer for other events. In the summer months, the arena in Happy Valley-Goose Bay and Sheshatshiu is used for minor soccer programs (Hatch Mott Macdonald, 2008).

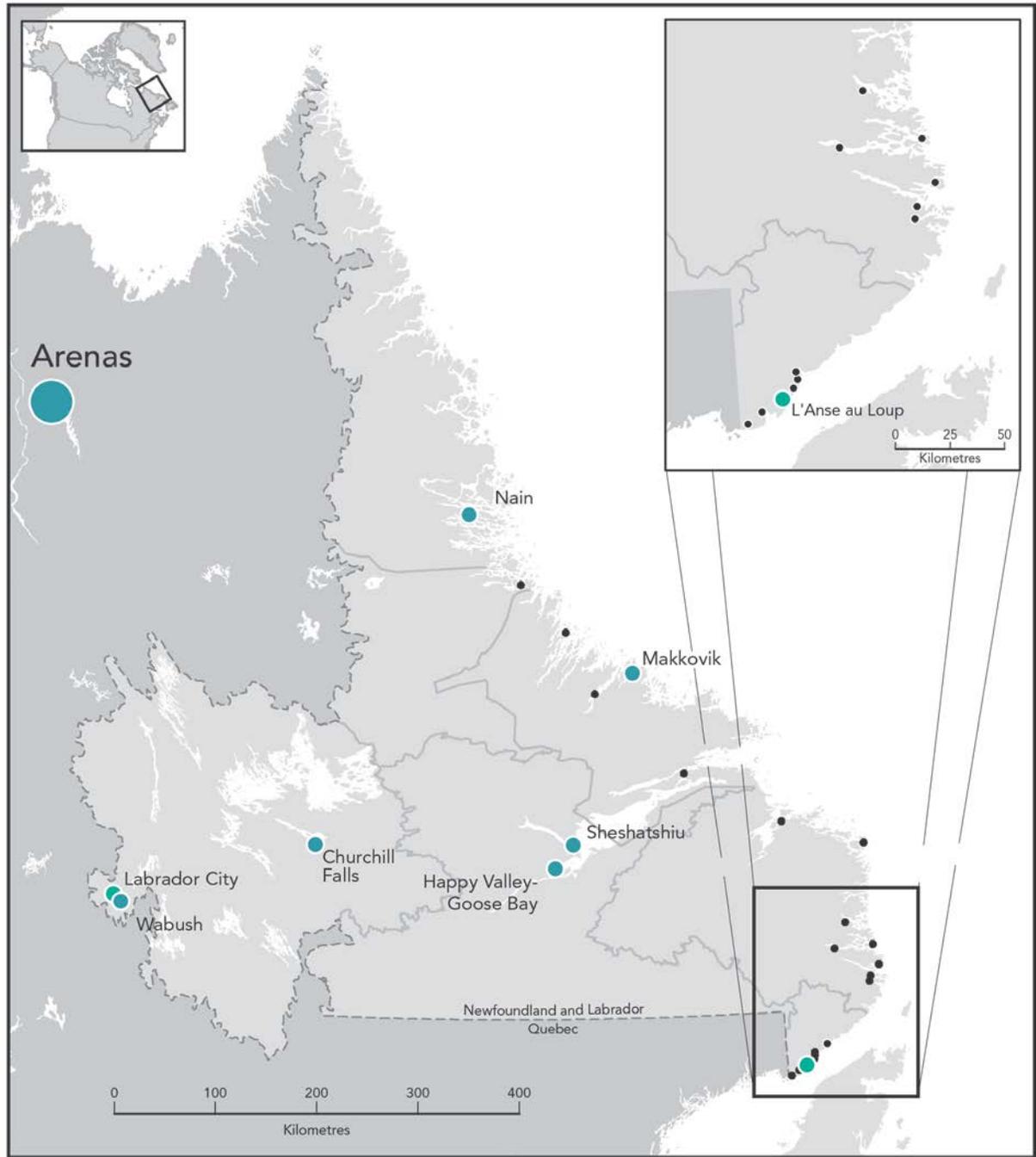


Figure 21: Arenas in Labrador

Recreational services and community events can have a high impact on community spirit and individual's sense of belonging. This can help with the retention of community members, an important consideration for the many communities in Labrador with declining populations. Recreation is one of the least studied services, and with more immediate concerns related to other services recreation is of relatively low priority to the provincial and federal governments. Recreation has many beneficial social and physical outcomes, and municipalities receive funding from provincial and federal departments that work in health and community to pursue these outcomes. However, in Newfoundland and Labrador, there are no clear goals set for these services and therefore it is difficult to measure their effectiveness. Some recreation services, primarily related to sport, are offered by municipalities, but many more are offered by private companies, not-for-profit and charitable organizations, and by individuals enjoying the natural landscape, which makes it difficult to isolate the impact of municipal-run services on community spirit and health.

Recreation can also spur economic activity. Hosting special events can attract residents from other communities and other parts of the world. The variety of events hosted by communities was not discussed in detail, but can be potential tourist attractions. With so much provincial investment in advertising Newfoundland and Labrador to the world this is a great time for communities in Labrador to seriously consider how recreation-related festivals and events can be used to enhance community spirit and stimulate economic growth.

3.6 Modern Technology

Modern technology can facilitate public service delivery in rural and remote areas. Internet access and email communications play an important role. Twitter, Facebook (e.g. Facebook community page, using Facebook page for feedback on community improvements and announcement of events), mass communication systems (Everbridge) for emergency notifications, Live Streams of town council meetings, Digital Outdoor PSA Signs, and Smartboard and iPads for council communication are examples of information and communication technologies used by Labrador communities. While the use of the Internet was not included in the 1999 *Municipalities Act*, the Internet has become an important tool for knowledge circulation of public services in communities across the province. With a low transaction cost, news about water advisories, waste collection services, road repair, and recreational programming can all be shared through a town's social media page (e.g., Facebook, Twitter) or website. Many communities have both a website to store information and a social media page to update followers on recent events. Many communities in Labrador utilize these tools - there are websites dividing Labrador into different regions and there are social media pages for individual municipalities (Figure 22). Many community groups (e.g., volunteer fire fighters, event volunteers, railway associations, textile groups) also have social media presences such as Facebook Groups or Pages.

In 2016, the provincial government launched the Government Renewal Initiative to identify measures to eliminate the provincial deficit (Government of Newfoundland and Labrador, 2016a, 2016b, 2016c). The use of technology was among the most frequently suggested solutions. Considering the great distances between many communities in Labrador and the remoteness of the region, improved broadband, especially in the most remote communities, and training in teleconference communications would make possible such cost-efficient ways of service delivery as online conferencing, video conferencing, and teleconferencing. Digitalization, e.g. installing scanners, could help reduce the use of paper and simplify service delivery.

Websites and a social media presence are also important for attracting tourists, a potentially lucrative economic opportunity for both small and large communities. Providing information about attractions and accommodations is important for potential visitors planning their trips to new destinations. Recreation also has an important part to play here, as people may travel for certain events offered by the community. Creating websites with information for both residents and visitors is an easy way for communities to spur economic activity in their town.

Nunatsiavut has a comprehensive, user-friendly website that covers all communities represented by the government with information on provincial-level services for residents (e.g., health, education, natural resources), employment and business opportunities, tourist attractions and recent news, but no information on municipal-level services or social media presence at a regional level. There is also a separate website dedicated to tourist attractions in the region (Tourism Nunatsiavut, n.d.a).

Only Rigolet and Makkovik have individual websites that include information on municipal services for residents and attractions for tourists, (Rigolet Inuit Community Government, 2016; Makkovik Inuit Community Government, 2013), but most communities have individual Facebook Pages or Groups.

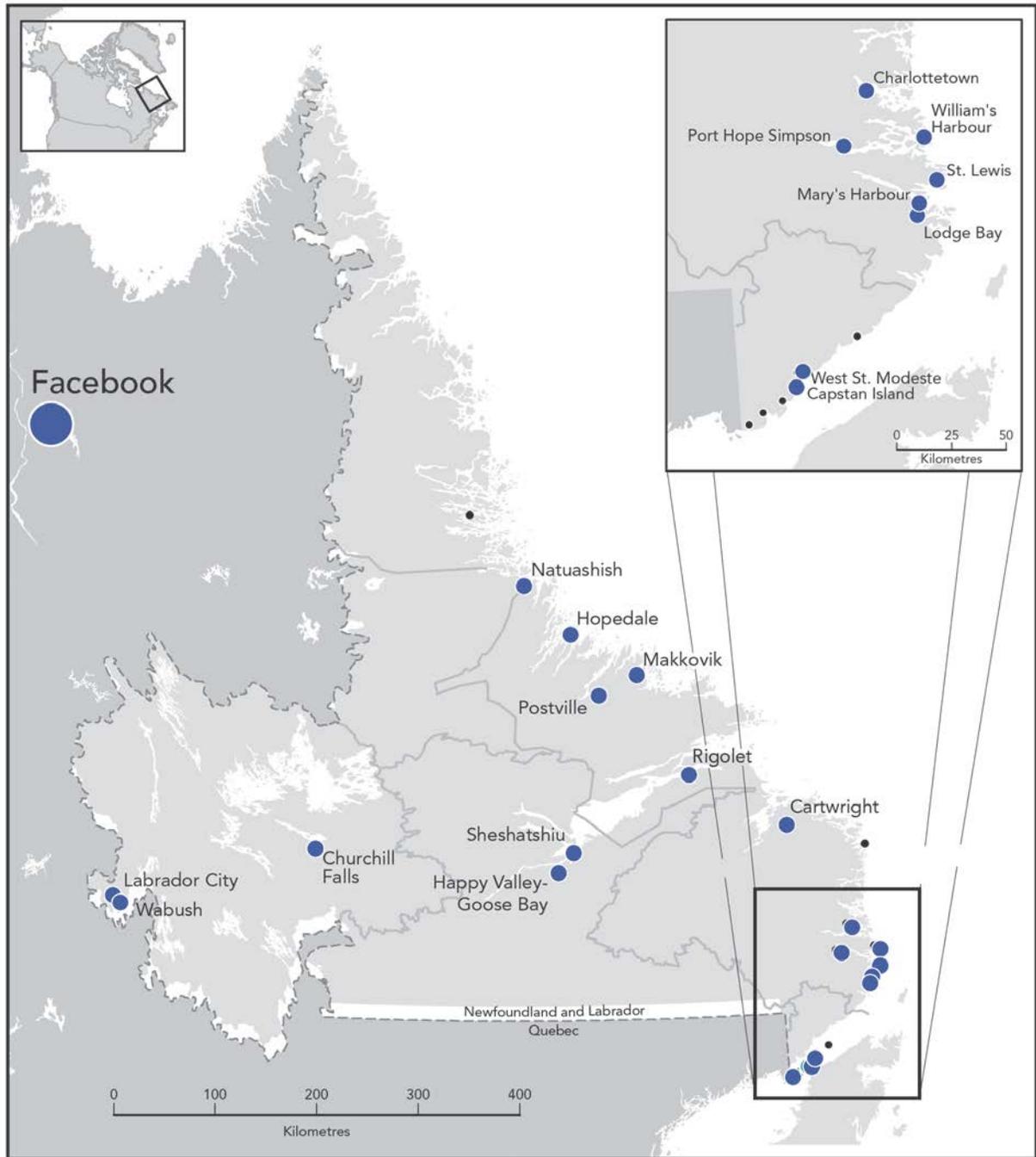


Figure 22: Communities with Facebook Presence

LabradorWest.com, the website for Labrador City and Wabush, is a compelling example of an attractive, comprehensive website that provides not only information for residents on local private and public services, but it also includes information for tourists and potential migrants. There are sections on recreational programming, waste management, fire and emergency services, business services, as well as economic investment and employment opportunities. Their website connects clearly to Labrador City and Wabush's social media pages, which are well-maintained and frequently updated. Both towns have Facebook and Twitter and Labrador City has gone a step further with their YouTube channel that features videos to attract tourists and potential migrants to the town.

The Internet presence in Central Labrador is more decentralized, as there are individual websites and social media pages for each municipality. Happy Valley-Goose Bay has the most comprehensive and attractive website with information for residents, business, tourists and potential migrants (Happy Valley Goose Bay, 2017b). The website includes detailed information about all municipal services offered and live streams town council meetings through a third-party webcast website. The municipality also runs an active Facebook and Twitter account that is clearly connected to their website. North West River's website is more directed at tourists as it emphasizes the town's history, location and attractions, but there is also information for residents including how to recycle and compost and town council meeting minutes (Town of North West River, 2015). The town does not have a social media presence.

The Innu Nation has its own website that provides information to the history and culture of the Innu and links to the Innu Business Development Centre, a separate website that includes a database of Innu-owned businesses (Innu Business Development Centre, 2017). Sheshatshiu has a website and a Facebook page with information on services offered for residents such as public works, recreation, social health, but the Facebook page is not linked on the website (Sheshatshiu Innu First Nation, n.d). Natuashish does not have its own website and information on the community is only formally available through the Innu Nation's website, however, there is an informal Facebook page for the community.

SouthernLabrador.ca covers the entire Southern Labrador region from Charlottetown to L'Anse au Loup and is primarily directed at tourists and potential migrants with the focus being on recreation and locational information about each community (Southern Labrador, 2010b). There is also a specific "How To Immigrate" page. Each community is briefly profiled and a list of business and government services offered is provided, but there is no information on municipal services such as waste disposal or water quality. The website is not linked to any social media page and no social media page is linked for individual communities. Most communities do have Facebook presences that range from Pages to Groups to Profiles. Interested, enthusiastic residents are primarily responsible for keeping Facebook Groups active. These pages include information on public meetings, upcoming events, waste disposal, water advisories and other announcements or information relevant to the community.

Use of technology is not limited to knowledge circulation but also has great potential for improving public service delivery. There is room to expand the use of technologies to electronic payment for taxation, permit fees and other applications online. For example, Labrador City is developing a new web page to include commonly used municipal applications such as permits, business licenses, etc., but it is recognized that there is room for improvement.

Need to expand to electronic payment for taxation, permit fees, other applications online.

However, some communities still face technological challenges, such as the lack of cell service or high speed Internet.

Cell service is non-existent.

Not many places have high speed internet and if you've got dial up you're probably better off typing it up in St. Johns and putting it in the mail before it will load. Internet is not fast enough to load a lot of websites... And that's on ExploreNet. If it was dial up it would be impossible.

The opposite problem is the lack of essential services while modern technology is available.

Big joke in [...] is people have high speed Internet but no running water or sewer system.

Having a regional website that includes information for residents, business and tourists is a cost-effective way for municipalities to share and store material on the area. Most regions have some form of this, though there is a range of website designs and type of material presented.

Recommendation: Regional websites should include information on municipal services for residents, business services for commercial enterprises, and accommodations and attractions for tourists. These websites should include online forms for municipal applications and be updated annually at least to ensure information is up to date.

As shown in Figure 22, most communities have a Facebook page or group. This is an easy, low-cost avenue for communities to share current information on municipal services and events. While all Facebook Pages were clearly managed by the municipality or local service district in question, Facebook Groups seemed to be created and updated by invested members of the community. This suggests that there was an unmet demand for a virtual community for residents to share and discuss information about their community. Facebook Pages are preferable to Groups as they open to anyone on Facebook who is interested in learning more about a specific community and present as a more legitimate source of information, as they are created and run by the governing community and not residents. Residents can post on the Page or message the Page about community events or services that may be of interest to the community at large but the manager of the Page has more control over what is posted. Facebook Pages are also able to livestream events, so that residents can, for example, watch town council meetings from the comfort of their home, which could help improve government transparency and community engagement.

Recommendation: Every community should have a Facebook Page to update members on municipal services and events.

As broadband services vary significantly throughout the region, the extent of which improved online resources will lead to greater citizen engagement and awareness is limited. However, the provincial government has recognized the value of a high-speed connection in today's social and economic environment and since 2011 have made significant investments in the Rural Broadband Initiative to improve broadband access in underserved areas (Business, Tourism and Rural Development, 2016). While larger communities in Labrador have already received some of these investments, the initiative should be expanded to ensure all communities have reliable internet access (Government of Canada, 2011).

Recommendation: Expand the Rural Broadband Initiative to improve broadband access in underserved areas in Labrador.

4.0 IMPROVING PUBLIC SERVICE DELIVERY IN LABRADOR

4.1 Overview

Our fieldwork aimed to explore respondents' attitudes towards sharing services and resources, centralization of services, amalgamation, resettlement, involvement of private sector in service provision, and the use of information and communication technologies in service delivery. Representatives of seven communities from Labrador West, Central Labrador, Southeast Labrador and the Labrador Straits participated in our in-depth survey.

Generally, those who responded to our questionnaire suggested that the measures proposed were likely to improve public service delivery or remained neutral about their impact. Several respondents felt that sharing services or resources was unlikely to improve services and these respondents tended to come from more remote communities.

Table 1: How likely are the following measures to help improve public service delivery in Labrador? (# of respondents)

	Very likely	Likely	Neutral	Unlikely	Very unlikely
Sharing services	1	2	1	2	0
Sharing resources	2	2	0	2	0
Involvement of the private sector	0	3	2	0	0
Involvement of voluntary organizations	2	3	0	0	0
Use of information and communication technologies	3	2	0	0	0
Centralization of services (same building)	2	1	2	0	0
Amalgamation of communities	0	2	2	1	0
Resettlement of communities	0	2	2	0	1

4.2 Sharing Services

Sharing services is already practiced in clustered communities. For example, communities in Labrador Straits share recreation and waste collection and disposal. Neighbouring communities such as Pinware, Capstan Island and West St. Modeste share fire and emergency services, as do Sheshatshiu and North West River. Happy Valley-Goose Bay, North West River and Sheshatshiu share the same landfill. Labrador City and Wabush share management of landfill and coordinate special events such as Canada Day. Some tenders (salt, calcium) are called for jointly by the two communities.

Service sharing has the potential to be increased in clustered communities: for instance, road maintenance, snow clearing, fire and emergency services and recreation in Labrador Straits; road maintenance and recreation services in Sheshatshiu and North West River; fire and emergency services, recreation, sewer and wastewater, planning and development, municipal enforcement, purchasing in Wabush and Labrador City.

Sharing services is not always an option for improving public service delivery, for example, in the case of isolated communities or those located on an island, where there is no road connection to other communities. The distance between communities is an important factor as it may be not economical to share services (or some of them) where distances are great.

Not economical to share other services as the nearest two communities are 32 km away.

Sharing services does not necessarily result in cost savings. While more than one third of respondents (36%) to the 2014 provincial government survey indicated that sharing services was saving their municipality a significant or modest amount of money, 41% said it was costing a little bit more or a lot more money (Department of Municipal and Intergovernmental Affairs, 2014). This view may be particularly prevalent among larger communities. Respondents from larger communities (5,000+) were more likely to report that sharing services cost them a little bit or a lot more (Department of Municipal and Intergovernmental Affairs, 2014:36). At the same time, a solid majority (82%) agreed that sharing services resulted in at least the same level of service or better (Department of Municipal and Intergovernmental Affairs, 2014). While cost effectiveness or cutting costs is an important consideration, maintaining existing services for residents is perceived as one of the main purposes of sharing services, especially for small municipalities (Municipalities NL, 2011).

Administrative or jurisdictional reasons can be an obstacle to sharing services. A specific example is the status of Sheshatshiu as a federal reserve, which is considered to limit the opportunities of sharing and partnerships in services between neighbouring Sheshatshiu and North West River.

... find a way to have aboriginal and non-aboriginal organizations and governments work together on key issues that would improve services and quality of life in Labrador.

4.3 Sharing Resources

Sharing resources is also common in clustered communities. For example, a youth centre is shared in the Labrador Straits; fire prevention equipment is shared among Pinware, Capstan Island and West St. Modeste; firefighters and equipment between Sheshatshiu and North West River. Labrador City and Wabush share some equipment, electricians, expertise on arena compressor/refrigeration plant; the two communities frequently organize joint training sessions for both fire departments.

There is potential for sharing resources related to fire and emergency services, regional recreation, planning and development between Wabush and Labrador City and recreation programs and facilities and animal control between Sheshatshiu and North West River. These two communities are developing a mutual aid agreement for the fire departments and a working agreement for joint animal control.

One respondent suggested sharing resources and services needs to happen together and that municipalities must be able to maintain their decision-making authority in these situations.

Can't just share 'expenses' without having say in how money spent.

Understandably, sharing resources is not likely to be a solution for isolated communities.

Probably [sharing resources] could [help improve public service delivery] in some ways, but we're isolated, when ice is frozen over [we] can connect better to other communities.

4.4 Involvement of Other Types of Providers

Snow clearing and garbage collection are the most common examples of private sector involvement in service delivery. Other examples include pest control/hygiene services, and professional services in Happy Valley-Goose Bay, and landscaping, trail development and landfill operations in Labrador City. Developing public-private partnerships was mentioned as a way to involve the private sector in service provision. In our survey, one community expressed interest in partnering with the YMCA to deliver recreational facilities. On the other hand, private sector involvement is perceived as limited when it comes to small communities. Small communities might not attract enough attention of private companies or the projects might be more costly than current solutions (Department of Municipal Affairs, 2016c).

There are not much private sector businesses within town aside from trucks with snowplows.

Technically there is no equipment out here to do anything with for the private sector, not an option – cannot see anyone bringing in heavy equipment, community members can't afford to bring in equipment.

In some cases, it would be very helpful but in most cases the geographical distances between communities it just doesn't make any sense.

Voluntary organizations play an important role in public service delivery, especially in small communities. Volunteer fire fighters and recreation services are common examples. More specific examples of recreation and cultural activities include the Women's Institute in Pinware; summer recreation programme, festivals, and programmes for seniors in North West River; ski hill, curling club, golf club, hosting of Canada Day, First Night and other community events in Labrador City. Volunteers operate a local museum and tourism facilities in North West River and in Happy Valley-Goose Bay they run the Canteen at the Arena, are developing the Wetlands Stewardship Area/park, and organize the Canoe Regatta. Labrador City has a memorandum of understanding with Gateway for walking trail development and Rotary is involved in development of one of the parks in the town. Local Service Districts are run on a voluntary basis.

Use of other organizations for delivery of services is quite often very cost effective as not bound by tendering act, you can have volunteers to get some things done. Also many of these organizations have access to other levels of government funding.

When asked whether the involvement of voluntary organizations improves public service delivery, one respondent explained:

It has and it continues to do so with the assistance of government programs and offices. But not every community has the support of the provincial government.

Community partnerships are important to help deliver cost effective services particularly in recreation and cultural activities.

4.5 Centralization/Regionalization

Centralization of services (when services are located in the same building) is already used by some communities to optimize public service delivery. For example, the council in North West River is establishing a command centre in the town office building and emergency shelter at the community centre as part of their regional emergency plan. In Labrador City, the majority of services are at the town hall except for the public works depot and recreation department, which are located in separate buildings associated with those functions.

Some communities would consider centralizing fire prevention; establishing a new recreational facility with a pool, exercise rooms, walking tracks, daycare facilities. Labrador City is planning a town hall that would be associated with a lifestyle centre. However, it is not always possible to fully centralize services, especially in larger communities with more diversified service provision.

Sometimes it works but there are other times. For example, if there was a community centre with a fire department and community liaison office where AA takes place, me personally would not want to go to a meeting at that building knowing there are other people there that are not attached to what I'm doing and gossiping. It has its benefits, financially, it's cheaper, depending on what the service is, but for the people involved in the services - some work fine together, but others would not work in the same building.

Some services tend to think they're better than other services and then you end up with unfriendly competition.

Amalgamation could be a potential solution for some neighbouring communities. It could provide cost effective services and reduce duplication of roles. Smaller towns are considered most likely to benefit from amalgamation due to the increase in the number of provided services. Amalgamation of close municipalities might look like an attractive measure given low population numbers and relatively high number of municipalities in the province in general and Labrador in particular; however, it could be hard to implement. For example, until recently (CBC News, 2017) Wabush has not considered amalgamation with Labrador City as an option (CBC News, 2015a).

When respondents were asked a question about Labrador communities that could benefit from amalgamation (a general question, not specifically about respondent's community), some pointed to Labrador Straits communities, as well as Labrador City and Wabush.

... any communities less than 5 km apart should be amalgamated/regionalized and if several communities in a certain radius, say, 10 km should be regionalized.

I have no issues with amalgamation when it is feasible and everybody benefits. Being from Northern Newfoundland, there are so many little tiny communities in the Northern peninsula and they're each their own, some are municipalities, some are LSDs, some don't have anybody, you can literally stand if you're a man and piss from one community to another but they're too head strong to amalgamate.

For whatever reason, it's beyond me, b'ys you're some stunned, the more people in the municipality, the more gas tax, the more services.

However, amalgamation is not feasible for isolated communities, which are located too far from other communities.

... who would we amalgamate with and how would that work? With amalgamation come taxes for services. How can our community avail of services 100 km away?

There's a big ignorance when it comes to small communities when it's isolated. [They are] completely different from small communities that are attached to bigger communities. [Communities] that are attached [but] that are choosing to be a smaller community where they could amalgamate and use more services.

Furthermore, the word "amalgamation" tends to have negative connotations.

A centralized administration/Council might be beneficial for all the Straits Communities. (Amalgamation is a bad word!)

Resettlement potentially could be a solution for small and isolated communities, for communities with declining and aging population, youth out-migration, little or no industry, where services are being downgraded.

... a number of communities have an aging and declining population with limited prospects of attracting businesses and it is expensive to provide services. Resettling programme would allow residents to get some value for the years spent in keeping their community alive, otherwise they would have nothing to start over with.

There are some communities that could benefit from resettlement. Like communities with 20 people and the provincial government is keeping the highway open to them 12 months a year - there's no infrastructure in those communities.

Several that have declining populations and little industry [could benefit from resettlement].

One respondent mentioned that maintaining adequate transport links could be an alternative to resettlement.

A recent example of resettlement is William's Harbour. The vast majority of its residents (96%) voted in favour of resettlement, which is likely to happen in 2017. When respondents were asked about Labrador communities that could benefit from resettlement (a general question, not specifically about respondent's community), it was mentioned that Norman's Bay and Black Tickle-Domino have been thinking about it. Other communities were staunchly against resettlement.

It kills me to know that our provincial government wants us out, we are too hedged in to leave, and we are going to prove that we can make it here.

5.0 CONCLUDING REMARKS AND SUMMARY OF RECOMMENDATIONS

5.1 General Remarks

With its vast landscape and often widely dispersed small communities, Labrador is a difficult region in which to deliver services. While there are some larger centres such as Happy Valley-Goose Bay, and Labrador City and Wabush, many communities are too remote to enjoy economies of scale in their service delivery. One solution to this problem has been migration. Many people have moved out of or within the region, and this trend is expected to continue into the future (Simms and Ward, 2016). Migration has been facilitated by incentivized resettlement policies financed by the provincial government. Resettlement policies make economic sense, as larger population centres are better able to offer services. However, these policies are voluntary and no matter how remote, not all communities are willing to move. Hence, in those communities where people prefer to stay, their wishes must be respected, but at the same time it may not be feasible to provide the same level of services available in larger communities.

The federal government has an equalization policy to try to ensure that all Canadians can have access to similar types and levels of services at comparable levels of taxation. Municipal services are not directly covered in these transfers, but depend on provincial government decisions regarding choices about the allocation of equalization funds. Such decisions may have significant impacts on people's quality of life. Access to clean drinking water is one such issue. The high prevalence of Boil Water Advisories and disinfectant by-products in drinking water is the most pressing issue raised in this report. Regardless of community size or location, access to clean drinking water is a basic human right. Employing certified water operators in communities facing this problem is an important first step to addressing this issue.

Waste disposal is the second biggest issue facing communities in Labrador. Most regions report overflowing landfills and difficulty managing their waste. This is exacerbated in those communities without roads connecting them to regional centres. To fix the waste problem the definition of waste must be rethought. If properly managed waste can be a valuable resource, but if ignored, it becomes a significant cost. Programs like those offered by Scout Environmental, showing residents how to manage waste in their landfills, represent one example of how communities can create space in and value from their existing landfills. However, to maximize profits from waste, provincial solutions are necessary and may involve working with other provinces, or other countries. For example, there may be more opportunities for Labrador to sell waste to firms in Quebec than to those on the Island. Separating waste and creating regional networks to move this waste efficiently to buyers will be imperative in reducing stress on current landfills and creating long-term solutions to waste disposal in Labrador.

Water quality and waste disposal were identified as the most pressing areas of concern in this report and were thus given the most attention, but other municipal services must be considered as well. Road maintenance is another clear concern for residents. On a provincial level, paving the Trans Labrador Highway has been a controversial topic as the government has been slow to meet targets. Many municipalities cannot afford the high cost of laying and maintaining pavement and residents complain of the dust this creates. Firefighting and emergency services can be an emotional topic, as residents want the security of knowing that there is equipment and volunteers nearby in the event of an incident. This service was the one most stressed by communities that lacked basic equipment such as a hose. However, having a volunteer fire department in every town is not efficient and many of these departments fare poorly

when assessed by NL Fire and Emergency Services. Having a regional fire department that is fully trained and equipped could offer better services and could co-exist with current volunteer departments. Recreation services were not a significant part of our survey, but their importance in the physical and mental wellbeing of residents is recognized in the literature and point to the importance of taking a holistic approach when developing policies regarding physical and mental health.

Regionalization, i.e. organizing municipalities into regions and organizing services from there, was one of the most discussed issues at the 2016 Premier's Forum on Local Government (Municipalities of Newfoundland and Labrador, 2016). Many municipalities hesitated to agree to it because it was not clear what exactly regionalization would mean and look like. A common suggestion was for the provincial government to define and organize the process since most municipalities did not believe that it would be possible to organize it themselves (Department of Municipal Affairs, 2016c). Regionalization of service delivery could potentially help avoid duplication of services by adjacent towns, allow sharing of resources, and lower costs. At the same time, small towns were worried about losing their identities if incorporated into regions, and having no voice.

Creating a regional governance model requires both local and technical knowledge to create, for example, shared water supplies and filtration systems, waste transfer networks and markets, and centralized fire, emergency and recreation services. A trained planning, engineering and recreation staff is outside the budget of Labrador's small towns, but the well-being of its residents requires action. Attempts at regionalization have failed in the past, but we can learn from those lessons and try again. Regionalization will not solve every community's problems and regions must be manageable and flexible. The regionalization of waste disposal, which could connect all of Labrador, will not be the same as the regionalization of water distribution and filtration, which may need only connect a few nearby towns. Some services, like a hockey arena or a fully-trained and equipped fire department, could be centralized, while others, like a volunteer fire department and community centre, need not be. A regional model will create space for communities to keep or amalgamate their town councils as they choose while providing the technical guidance to help communities plan for the long-term together.

There is evidence that municipalities in Labrador have particular difficulty delivering and sharing services (Municipalities NL, 2011). With its clusters of communities, the Labrador Straits have a lot of potential for regionalization and communities are working together on some solutions but there is space for more collaboration. Southeastern Labrador is a more difficult area to regionalize. The cluster of communities around St. Lewis has potential but further north, communities will need individual solutions. This is true too for the Northern region of the province, though both areas could be included in initiatives such as a Labrador waste management strategy. Central Labrador has a clear regional centre and has shown leadership in the amalgamation of Happy Valley-Goose Bay. The town already serves as the centre for recreation and waste disposal for the area, but still needs help with its service delivery and more recognition of its role as the regional centre. The landfill, for example, is almost at capacity and the town is pursuing ways to ease the load but has been frustrated with the greater demand put on its waste services by the Muskrat Falls project. This project has also put strain on the more distant Forteau landfill, highlighting the grand scale of the project and the lack of foresight into how the waste produced by construction would be managed. This design flaw emphasizes the need for an office within the provincial government that can assist with long-term planning of municipal services in Labrador. Labrador West is on the right path to regionalization. It is helped by the geographical simplicity of the area, defined by its two towns that are in close proximity, and years of operating in isolation seem to be coming to an end. The towns have collaborated on a website that presents the area as a defined region, with services offered by the two towns enmeshed and intertwined. The communities are coming together to develop a recreational

centre, train their firefighters and share equipment, and dispose of their waste. There is even talk of amalgamation, which could help the communities remove any duplication of services and widen their perspective on effective service delivery for the area.

Some issues in Labrador can be fixed with regional solutions, but structures must be created to facilitate this dialogue and it must be recognized that not all problems will have regional solutions. Some communities are too remote and will require individual solutions. Some solutions, such as improving water infrastructure or creating a network of transfer stations for waste, will have high upfront costs, but potentially provide long-term resolution to pressing problems. While capital works projects may require significant funding, some issues may simply need long-term commitments and regional perspectives. Changing the approach to service delivery, for instance purchasing higher quality equipment that is more durable, and sharing services among communities (e.g. fire protection, water, recreation and municipal equipment) have some potential for implementation. Many communities reported that their facilities were aging, in need of repair and required upgrades. Respondents suggested that partnerships with other facilities in their community such as schools, or with other communities to build or share regional facilities, could improve service provision and reduce costs of service delivery.

The use of technology was among the most frequently suggested solutions, which is in tune with international good practices. The Internet is an important tool for communities to share information about services to their residents as well as attract tourists and migrants to their town. Considering the distances within Labrador and remoteness of the region, improved broadband, especially in the most remote communities, and training in teleconference communications would make possible online conferencing, video conferencing, and teleconferencing and the possibility of more efficient delivery of some services. The use of social media to share information about municipal-level services is also a cost-efficient way to mobilize knowledge within the community.

Though we were unable to interview community representatives in Nunatsiavut for this report, it appears that the Nunatsiavut government has had considerable success in improving services to its communities' residents. Despite being the most remote region and its relative short span of self-governance, the Nunatsiavut government has taken a number of important steps in this regard. The Nain Research Centre has had a central role in this process through its town hall meetings where residents have been able to voice their concerns, and by creating innovative solutions to pressing problems, such as inviting an NGO to teach residents how to repurpose their waste. Water quality in the region is still poor, but progress is being made. Nain is one of the few coastal communities to receive a DWQI score. Having a clear regional outlook, a research centre focused on the area and the participation of residents in creating solutions are important components of their success.

Nevertheless, Indigenous communities still have issues with overflowing landfills and should be included in a regional transfer system if they want. Creating partnerships to include Nunatsiavut in regional service models could help improve services in the region and the relationship between the two governments. At the same time, we would like to acknowledge that we were unable to interview communities in Nunatsiavut for this report, which is a severe limitation.

The geographical separation of the Innu Nation communities of Sheshatshiu and Natuashish presents significant issues for coordination. That said, there could be benefits from working with non-Innu neighbours. Divided by only a bridge, Sheshatshiu and North West River could share services and equipment such as water supply and filtration, and fire equipment and services. The towns already share some services like recreation and road maintenance and are working with Happy Valley-Goose Bay on waste disposal, but there is room for more coordination. Recognizing Innu self-governance will be an

important step in that process, but the economic and social divide that the bridge has represented cannot be ignored and past history will require a great deal of effort and good will if barriers to collaboration are to be overcome.

We were able to find little research on Natuashish. Located within the northern Labrador Inuit Settlement Area regions it does not appear to share any services with its nearest (Inuit) community neighbours. The town has no website and little research has been done on service delivery in the area. Most media articles focus on social issues facing the town rather than municipal service delivery.

Coordination between municipal and provincial levels of government on public service delivery and support from the provincial government towards sharing services, were often described as insufficient in the 2016 Premier's Forum on Local Government (Department of Municipal Affairs, 2016c). Residents in remote regions of Labrador feel ignored by their provincial government. The Labrador Straits Waste Disposal complained of their overflowing landfill in 2015 but it was not until they send an ultimatum to the province that they would take matters into their own hands that the province reacted (CBC News, 2015; Barker, 2017a). Frustrated with poor road conditions and lack of communication with the provincial government, the mayor of L'Anse au Loup has suggested that the community would be better off joining Quebec rather than continue to struggle with the Newfoundland and Labrador government (Greenham, 2017). Creating pathways between municipalities and the provincial government is an important part of ensuring that the needs of communities are addressed. Making progress on land claims for the Innu Nation and NunatuKavut government could provide a platform for these communities to create the innovative, regional solutions they need to provide better municipal services, as has been the case in Nunatsiavut.

Overall, our report highlights a number of pressing issues facing communities in Labrador and the difficulty individual communities have in addressing them; issues and difficulties which are likely to be exacerbated by the demographic changes expected, particularly those associated with shrinking and aging populations and declining tax bases. Our recommendations seek to focus on problems of concern and provide solutions based on good practices found in other parts of the province or the country. A key contribution of this report has been extracting and synthesizing the literature on services that exist in Labrador. This information will allow government bodies, communities and interested citizens to identify what services exist in the region and how they measure up to other communities and regions in the province. We hope that this will be a valuable tool for communities in Labrador to better understand their situation and provide a basis for discussion on how to improve it where necessary.

5.2 Communication and Interaction

Our report was enriched by information from community consultations that had taken place across Nunatsiavut funded by the Nunatsiavut government. This model of open town halls to hear from locals about what issues they are having with municipal service delivery should be expanded to other regions for better data collection and analysis.

Recommendation: Municipalities should hold community consultations to hear from residents what issues they think need to be urgently addressed. These consultations should be published and made available to government, researchers and interested stakeholders.

Recommendation: There should be more formal channels for municipalities to speak with provincial officials about municipal issues. Interdepartmental committees that include municipalities are important to gaining local knowledge and create a space to voice concerns.

5.3 Water Services

Having clean drinking water is a human right recognized by the United Nations and yet many communities in Labrador do not have access to clean water. Boil water advisories, brown water, and high amounts of chlorine disinfectant by-products are a common occurrence in communities along the coast from Nain to L'Anse au Loup.

Recommendation: The provincial government's Interdepartmental Working Group developing policies and guidelines for drinking water safety should invite representatives of Labrador communities to attend their meetings and join their discussions.

Recommendation: The Drinking Water Quality Index should be modified so that all communities receive a water quality ranking.

Recommendation: A cost-benefit analysis of residential water metering in Newfoundland and Labrador should be undertaken as a method of funding water maintenance and enhancing water conservation. Implementation should consider income and substitution effects of higher water costs. While this recommendation may not be a priority in the light of other required measures and urgent responses, the province is lagging behind other jurisdictions in the adoption of such measures and will eventually have to address this issue.

Given limited knowledge of water infrastructure, lack of leak detection programs, and no strategic planning or full-cost accounting of water systems in many communities, certified operators are necessary to address water issues. Certified water operators are in high demand, but are difficult to retain because many are part-time positions and offer low salaries with no benefits. Furthermore, funding for these positions is not guaranteed, which makes them temporary and risky.

Recommendation: A potential solution would be for the provincial government to allocate funding so that each community has a part-time certified water operator to perform daily disinfectant residual testing and maintenance of water distribution and disinfectant systems. As per the Permit to Operate clause, every community should have a certified water operator, however many cannot afford this expense. Water operators would also help municipalities manage their existing infrastructure, control disinfectant

by-products, organize leak detection systems, and establish solutions to issues of run-off where rain and melting snow make basements and roads prone to flooding. At the same time, the sustainability of the provincial funding approach is under question given that several attempts to employ shared water operators in Newfoundland ended as soon as the external funding ended. Without a regional administrative structure in place, such as regional government or regional service board, this approach may not be feasible. Regional service-sharing arrangements could be examined to address these needs.

Communities within a 50-kilometre area may be able to share the costs of a professional operator. Making the position full-time through such regionalization may also improve retention of expertise and knowledge of water distribution systems, something that has been found to be a problem in many communities. Such regionalization may also facilitate the sharing of equipment and tools.

Recommendation: Where communities cannot afford or attract a certified water operator, Newfoundland and Labrador's Department of Municipal Affairs and Environment should use the Mobile Training Unit for certified water operators to show municipal workers how to collect water and send it to the proper NL Services lab for testing to reduce waiting times of BWA removals. This is a short-term solution, as many water issues require the expertise of a water operator to understand their infrastructure and structural issues, but could help mitigate immediate issues with BWAs.

Recommendation: Sharing a water supply can reduce filtration costs. While this would require close proximity between towns, there are examples where this could be introduced. Labrador City, for example, uses Beverly Pond for its water source while Wabush uses a series of wells. Happy Valley-Goose Bay's water comes from Spring Gulch, while Sheshatshiu and North West River both use well fields. The communities along the Labrador Straits each have their own water source. While this may not be an immediate issue, a further study into the feasibility of sharing water sources in these areas should be conducted.

Recommendation: The classification of BWAs should be changed to reflect their severity and time length to better inform the public about water quality. Emphasis on removing BWAs should be given to those communities who have more serious or long-term BWAs.

Recommendation: Given that communities in Labrador continue to struggle with high levels of THM and HAAs in their water, Newfoundland and Labrador's Department of Municipal Affairs and Environment should consider alternative treatment systems to find solutions to poor water quality in the region. A concerted effort to raise awareness of these alternatives, such as available private sector solutions, would be useful, as well as the facilitation of pilot efforts by the provincial government.

In 2009 the Department of Environment and Conservation analyzed the effectiveness of individual water chlorination systems in the province but results from Labrador tended to be inconclusive because of low sample sizes. This new study could begin by considering the differences in water quality between Western and Central Labrador with the rest of the region. The water distribution systems in other cold climates should also be considered as an avenue to innovative solutions to structural problems of poor water quality in Northern Labrador, Southeast Labrador and Labrador Straits. This study should also consider the future effect of climate change on water sources.

Recommendation: Every Labrador community or group of communities with a shared water resource should investigate a possibility of a wastewater treatment plant to prevent sewage from entering local water supplies. At the same time, the question of sustainability should be examined. Even with full

funding for the construction of such facilities, most municipalities do not have the financial capacity to operate them in their current structure.

Recommendation: The provincial government of Newfoundland and Labrador should allocate permanent funds for a certified water operator in Black Tickle-Domino because of daily maintenance required given the murky water source.

Recommendation: A plan to connect all residents in Black Tickle-Domino to a central water distribution system should be considered.

Recommendation: Where PWDUs are in place, communities should receive full funding from the provincial government to make them free to ensure maximum usage. Given that PWDUs are installed in areas where existing infrastructure delivers poor quality water, PWDUs should be made available for free use to ensure community members can access higher quality water, until a better long-term solution to the issue is developed.

5.4 Waste Collection and Disposal

To improve the quality and reduce the costs of waste disposal, a regional solution to waste management is necessary. Such a solution, however, must consider the unique geographical and environmental constraints of each region. Regional solutions to Labrador's waste management are feasible for most regions of the province, excluding Northern Labrador and isolated communities such as Black Tickle-Domino. Regional solutions like waste transfer networks and finding markets for waste as well as individual solutions that focus on creating space in landfills should be implemented post-haste to address the growing garbage crises in communities such as Forteau, Hopedale, Nain and Makkovik.

Recommendation: Before implementing regional waste solutions, Regional Waste Management Authorities for Labrador should be created through consultations with municipalities, relevant stakeholders and the Multi-Materials Stewardship Board (MMSB).

Recommendation: Based on the 2002 Provincial Waste Management Strategy, there should be regional landfills in Labrador West, Central Labrador, Southeast Labrador, and the Labrador Straits. These regional landfills should include a scrap metal yard, a composter, cardboard recycling, and a space for hazardous wastes. There may be potential for some regional landfills to specialize. For example, Happy Valley-Goose Bay's landfill has a wood chipper. Other regions if properly organized might also be able to utilize this.

Recommendation: Where a regional waste management strategy is not feasible, such as along the Northern Coast and in Black Tickle-Domino, communities should receive funding to maintain their individual landfill sites. Without roads to connect communities along the northern coastline, a regional waste management strategy may not be feasible. Given the cold climate, landfills in this area need to be re-evaluated to prevent residents from having to burn garbage to create space.

Recommendation: Given the great distance from Cartwright to L'Anse au Clair (408 km), rather than one landfill to serve the entire region, two regional landfills in this area are recommended as originally proposed in the PWMS. It may be preferable to have one near Cartwright that could service

Paradise River and potentially Black Tickle-Domino, and one landfill for the more southern region. A more central community such as Port Hope Simpson may be a good location for such a landfill.

Recommendation: A regional waste management plan must be implemented in the Labrador Straits quickly to deal with the overflowing landfill issue there. As there are many communities clustered in this region, a regional solution could be effective.

Recommendation: Communities with overflowing landfills need new spaces to dispose of their garbage that would include spaces for composting, paper and cardboard recycling, beverage containers, hazardous waste, scrap metal, and paint. Given that some of these categories of waste can be recycled for an economic reward, it may be feasible to work with private firms or other regional landfills to send this waste to other places. There may also be space here to have specialized landfills along the northern coast, but this may only be possible in the half-year while the ferry is running. However, some of these activities are not proving economically viable for the province as a whole and therefore further research needs to be done on the feasibility of profitable recycling methods for the region.

Recommendation: The waste management strategy should include partnering with firms who will collect waste such as beverage containers, compost, scrap metal and paint. There is much potential for adding value to waste and many examples of private and non-profit organizations that generate revenue by recycling and reusing waste. Where there may not be a direct economic incentive for firms to participate in waste management, there is potential for government policies like Extended Producer Responsibility to enforce companies who create waste to recycle it as well.

Recommendation: MMSB should work with municipalities in the Labrador Straits to put a green depot in each community. This could be done with a model similar to that of Southeast Labrador where extra space in town halls and schools are utilized for collecting beverage containers.

Recommendation: Proper disposal of hazardous waste is vital to environmental sustainability and rather than hazardous waste being kept in each regional landfill, a provincial solution to removing this waste should be considered. A regional solution to collecting household hazardous waste through centralized drop-off locations and mobile collection events should be implemented in Labrador.

Recommendation: Newfoundland and Labrador's provincial government should consider ways of reducing the use of single-use plastic bags through a surcharge on plastic bags or through a complete ban on the product. Given the success of this practice in Nunatsiavut and growing concern about the negative impact of plastic bags on the environment and wildlife, a ban on plastic bags is an effective, low-cost way to reduce strain on landfills.

Recommendation: Communities in Labrador should conduct community waste audits to better understand economic opportunities and environmental issues of their waste. This can be done by working with community partners such as Ever Green Recycling who offer expertise on how to conduct waste audits and create waste management solutions. Working with the Multi-Materials Stewardship Board (MMSB) might prove useful as they have completed several waste audits.

Recommendation: Municipalities should work with organizations such as Scout Environmental to show communities how they can recycle different materials in their landfills and reduce pressure on overflowing landfills.

Recommendation: Communities that continue to open burn their garbage because of local land conditions or cold winters should consider alternatives such as installing incinerators to reap benefits such as energy production and lower negative environmental effects from burning waste.

5.5 Fire and Emergency Services

While it is important to have emergency services nearby, some communities that are very close together have a duplication of services that can be drain on municipal resources. Maintaining fire equipment and volunteers can be expensive and in areas with a cluster of communities, sharing such services could ease municipal service delivery issues (Keenan and Whalen, 2010).

While offensive firefighting requires more training and better equipment, offensive firefighting services could be made available in many communities if they took a regional approach to fire services.

Recommendation: Clustered communities, e.g. those along the Labrador Straits, should pool their resources to hire a few trained firefighters and thus improve firefighting services in the area. This may not be feasible for eastern and northern communities given the significant distance and road conditions (or lack thereof).

Recommendation: Clustered communities, e.g. those along the Labrador Straits, should make use of other regional firefighting solutions, such as sharing the cost of firefighting equipment. For example, fire prevention equipment is shared among Pinware, Capstan Island and West St. Modeste. This model could be expanded to other communities.

Recommendation: Since many Labrador communities are generally too remote to share services, in these cases each community should have a basic fire department and the necessary equipment, such as a portable water pump and hose.

Recommendation: The provincial government should meet with Local Service Districts to create a shared cost plan to purchase basic firefighting equipment such as portable water pumps and hoses. Moreover, they should have regional government arrangements in place to effectively entrain all residents in the cost-sharing of these services.

Recommendation: The provincial government should create an online fire reporting system where fire and emergency teams can report fires, losses and other relevant statistics. This will allow the NL Association of Fire Services to assess which areas have the greatest demand for fire and emergency services and which fire departments are the most effective at mitigating emergency situations.

5.6 Roads Maintenance and Snow Clearing

Road maintenance is a common problem for communities across the province. However, most communities on the island at least have paved roads. That is not the case for many municipalities in Labrador, where gravel roads create dust and are more easily subject to ruts.

Recommendation: The provincial government should explore funding opportunities such as the federal Infrastructure Funding Program to pave and maintain roads in communities with gravel roads to alleviate health concerns arising from dust.

Many communities in Labrador prefer not to plow their roads and travel using snowmobiles on the sea ice in the winter. With a changing climate, this is becoming riskier as sea ice is melting at different rates and real-time monitoring is required to ensure safe travel.

Recommendation: Technology used in the Nain Research Centre’s SmartICE System (Sea-ice Monitoring and Real-Time Information for Coastal Environments) should be extended to communities along the southern coast and other areas where residents travel over ice in winter.

5.7 Recreation

Recreation can take a variety of forms and can be offered by the private, non-profit or government sectors. In the great open spaces of Labrador, there are also many recreational activities that do not require formal involvement by government or the involvement of other providers. To create a welcoming, active community, many municipalities provide recreational services through community centre programming and special events. Most communities in Labrador have a recreation centre, community gym or community centre. These centres are generally multipurpose spaces that allow for common gym activities but may also be used for community events as well.

Recommendation: The provincial government should explore funding opportunities for a new community space in communities that rely solely on a school gym for recreational activities.

5.8 Modern Technology

Creating a website and formal social media presence is a low-cost approach for communities to share information about municipal services that would benefit both residents and visitors. Taking a regional approach to website design would further reduce costs and ease access for tourists interested in visiting the area. A social media presence could be more individual to share information about municipal services for interested residents.

Recommendation: Regional websites should include information on municipal services for residents, business services for commercial enterprises, and accommodations and attractions for tourists. These websites should include online forms for municipal applications and be updated annually at least to ensure information is up to date.

Recommendation: Every community should have a Facebook Page to update members on municipal services and events.

Recommendation: Expand the Rural Broadband Initiative to improve broadband access in underserved areas in Labrador.

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APPENDIX I: Questionnaire

1.1. Your community:

1.2. What services does your community provide?

Road maintenance	Yes/No	Snow clearing	Yes/No
Drinking water	Yes/No	Fire and emergency services	Yes/No
Sewer and wastewater	Yes/No	Recreation	Yes/No
Waste collection and disposal	Yes/No	Other (please specify)	

1.3. Additional comments:

SHARING SERVICES

2.1. What services does your community share, if any, and with what community/ies?

Service	Shared with	Service	Shared with
Road maintenance		Snow clearing	
Drinking water		Fire and emergency services	
Sewer and wastewater		Recreation	
Waste collection and disposal		Other (please specify):	

2.2. What services would your community consider sharing and with what community/ies?

Service	To share with	Service	To share with
Road maintenance		Snow clearing	
Drinking water		Fire and emergency services	
Sewer and wastewater		Recreation	
Waste collection and disposal		Other (please specify):	

2.3. Additional comments on sharing services:

SHARING RESOURCES

3.1. What resources does your community share, if any, and with what community/ies?

3.2. What resources would your community consider sharing and with what community/ies?

3.3. Additional comments on sharing resources:

INVOLVEMENT OF OTHER TYPES OF PROVIDERS

4.1. Is the private sector involved in service provision in your community? Yes/No
 If yes, please provide examples (what services, nature of involvement, etc.):

4.2. Would you community consider involving the private sector in service provision? Yes/No
If yes, how?

5.1. Are voluntary organisations involved in service provision in your community? Yes/No
If yes, please provide examples (what services, nature of involvement, etc.):

5.2. Would you community consider involving voluntary organizations in service provision? Yes/No
If yes, how?

6. Additional comments on involvement of other types of providers:

USE OF TECHNOLOGY

7.1. Does your community use information and communication technologies and social media in service delivery? Yes/No
If yes, please provide examples:

7.2. How could your community use information and communication technologies and social media to improve public service delivery?

7.3. Additional comments on the use of technologies:

OTHER MEASURES

8.1. Are services centralized in your community (e.g. located in the same building): Yes/No

8.2. Would your community consider centralization of services? Yes/No
Please explain:

9.1. Would your community consider amalgamation with other communities? Yes/No/Not applicable
Please explain:

9.2. Are there communities in Labrador that could benefit from amalgamation?
Please explain:

10.1. Would your community consider resettlement? Yes/No/Not applicable
Please explain:

10.2. Are there communities in Labrador that could benefit from resettlement?
Please explain:

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11. How likely are the following measures to help improve public service delivery in Labrador?

	Very likely	Likely	Neutral	Unlikely	Very unlikely
Sharing services					
Sharing resources					
Involvement of the private sector					
Involvement of voluntary organizations					
Use of information and communication technologies					
Centralization of services (e.g. in the same building)					
Amalgamation of communities					
Resettlement of communities					
Other measures (please specify):					

12. What would be the best way/s to improve public service delivery in your community and Labrador?

13. Any additional comments:

Thank you very much!