POTENTIALS FOR PUBLIC ENGAGEMENT IN SOURCE WATER PROTECTION IN NEWFOUNDLAND AND LABRADOR A LITERATURE REVIEW

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FEBRUARY 2015

2014-15 STUDENT RESEARCH FUND

THE HARRIS CENTRE
Memorial University

Potentials for Public Engagement in Source Water Protection in Newfoundland and Labrador

A Literature Review

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Student Research Fund, February 2015

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This research was supported by the Harris Centre Student Research Fund. The author would like to acknowledge the financial support of the Harris Centre Student Research Fund, and thank the Harris Centre and the Provincial Government's Office of Public Engagement for their help and support during this research. The author would also like to thank Dr. Kelly Vodden for providing encouragement and support to write this piece, as well as Kim Olson who graciously volunteered her advice and editorial skills.

Abstract

This literature review explores the role of citizen engagement in watershed planning, governance, and management, and more specifically the implications for increased citizen engagement in source water protection efforts in Newfoundland and Labrador. This is particularly of concern for rural Newfoundland and Labrador, which suffers from a lack of capacity to adequately manage source water supplies that contribute to their drinking water systems. It has been found in other areas of Canada and beyond that increased citizen engagement can have a myriad of benefits for watershed stewardship in general, and can help to address the lack of human and financial capacity to sustainably plan, govern and manage source water supplies. Potentials for more opportunities for public engagement and better methods of public engagement in source water protection have been provided, according to the literature, as well as potential areas for future research related to this topic.

Recommendations include:

- Employment of better engagement strategies that facilitate meaningful public engagement using the enablers listed in Section 4 and avoiding the barriers outlined in Section 5 of this report.
- More opportunities for education and outreach events relating to source water protection at either the local and/or regional level.
- Greater support for the local/regional level (where appropriate) to create source water protection plans.
- Amendments to the *A Municipal Guide to the Development of a Watershed Management Plan* document to include public consultation in every stage of watershed planning and governance, and outline community based monitoring activities for watershed monitoring efforts.
- More technical and financial support at the provincial, municipal and non-governmental organization level for the involvement of the public in community based monitoring efforts.
- Creation of a provincial wide water stewardship strategy that emphasizes and explains efforts for public engagement as part of the stewardship process.
- Collaboration between the Office of Public engagement, the Department of Environment and Conservation, and local governments to create better ways to involve citizens in source water protection planning, governance and management.
- Strengthen efforts of Memorial University of Newfoundland faculty to engage the public in academic research and community based monitoring activities. The Memorial University Office of Public Engagement could aid in the facilitation of a *Memorial University of Newfoundland Water Network*, with a mandate to engage the public in water research.

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List of Abbreviations

CBM	Community based monitoring
IWRM	Integrated Watershed Resource Management
LTWC	Long Tom Watershed Council
NGO	Non-governmental organization
NL	Newfoundland and Labrador
PPWSA	Protected public water supply area

1. Introduction

Rural communities face unique challenges in planning and managing communities due to both internal and external stresses, such as aging demographics, declining populations due to loss of jobs and shifting investments in traditional industries, and an overall lack of capacity (technical, financial, social, political, etc) (Beckley, Martz, Wall, & Reimer, 2008; Minnes & Vodden, 2014). One critical issue rural communities face is the management of drinking water sources (Kot, Castleden, & Gagnon, 2011; Minnes & Vodden, 2014). Globally, management of water resources is seen as a "wicked problem" as water management issues are, "often embedded in seemingly endless ecological, social and political interactions across temporal and spatial scales, are context-dependent, socially constructed and technically uncertain" (Ferreyra, de Loe, & Kreutzwiser, 2008, pp. 304–305). Given the pre-existing challenges in rural areas, protecting drinking water supplies can pose a problem. Particularly, in rural Newfoundland and Labrador (NL) there is a clear lack of capacity for managing drinking water systems. In rural NL, concerns linked to a lack of human capacity have been specifically raised in connection with the implementation of source water protection measures, including limited watershed planning and monitoring of water supplies (Minnes & Vodden, 2014). This is an important issue to address as studies have shown that source water protection is an essential component of a holistic approach to drinking water management (Canadian Municipal Water Consortium, 2014; Christensen, 2011; Ontario Ministry of the Environment, 2004; Rawlyk & Patrick, 2013). Source water protection reduces costs of treatment and enhances drinking water safety (de Loë & Kreutzwiser, 2005) but it has been found that implementation of source water protection policies and plans require a great deal of technical, institutional, financial, human and social capacity (Minnes & Vodden, 2014; Rawlyk & Patrick, 2013).

Increasing financial capacity in rural communities is not always an option. Creating effective and implementable policies that meet the needs and goals of all stakeholders, including the general public, and that can be created in a cost efficient manner, has been a problem for planners and activists in watershed planning (Webler & Tuler, 2001). Engaging the public[1] in watershed planning, governance, and management has been proven to get local level actors better involved in the management of their water, thus increasing the technical capacity and number of people (i.e. human capacity) involved in watershed management efforts (de Loë & Kreutzwiser, 2005; Robins, 2007). Furthermore, others have found that engaging the public in water management is an essential part of both governing and managing water systems (Conrad & Daoust, 2008; Hamstead, Baldwin, & Keefe, 2008; Hardy & Koontz, 2008; Özerol & Newig, 2008; Rouillard, Benson, & Gain, 2014; Sharpe & Conrad, 2006)

Improving how existing human resources (e.g. active citizens, environmental groups, youth, etc) in rural NL communities are engaged in source water protection efforts and more generally watershed planning, not only addresses issues of labour shortages (Conrad & Hilchey, 2011; Healey, 2014; Pollock & Whitelaw, 2005; Shelton, 2013), but also relates to topics of education and training. Strategies such as community based monitoring programs can also alleviate

[1] For the purposes of this literature review public engagement, citizen engagement and public participation are all used interchangeably.

problems with the implementation of policies, as when the public is involved in the policy and planning process and understand the reasons behind the policies, there is greater ownership of the protection measures stipulated under regulations (e.g. the banning of cabin development or motorized vehicles in protected public water supply areas) (Minnes & Vodden, 2014; Robins, 2007) .

Though the best practices for source water protection are numerous, the focus of this literature review is specifically the role of public engagement in source water protection. This literature review tackles the following research goals: a) Determine what the literature indicates is needed for successful public engagement in watershed planning, governance, and management and; b) Explore the benefits of public engagement in source water protection planning, governance, and management and how this can contribute to the successful implementation of water policies. This review also outlines what other places nationally and internationally are doing to engage their citizens in watershed planning efforts that are either related to source water protection or could be translated to source water protection efforts. Lastly, recommendations for NL as well as areas for future research are provided in Section 8. Due to the overlap in literature regarding source water protection and public engagement specifically, and best practices for more generally watershed planning and public engagement, best practices for watershed planning have been transferred to also apply to specifically source water protection for the purposes of this literature review.

2. History of Public Engagement in Watershed Planning, Governance and Management

It was said by (Arnstein, 1969) that, "the idea of citizen participation is a little like eating spinach: no one is against it in principle because it is good for you" (Arnstein, 1969, p. 216). There has been a shift in thinking that has recognized the importance of public participation in environmental governance and particularly water and watershed planning activities such as integrated watershed resource management (IWRM) and river basin management planning (Benson, Jordan, & Huitema, 2012; Robins, 2007). Though the effectiveness of public participation in environmental governance is a constant source of debate, the need for participatory environmental governance is strong. Drivers for public participation rise out of issues with scientific uncertainties and the need for empowerment of marginalized society in the top-down scientifically elitist nature of traditional environmental governance (Benson et al., 2012). It is clear that there is a declining legitimacy to centralized government, and though the state remains a central actor in environmental governance, roles and capabilities of non-state actors are growing (Bulkeley & Mol, 2003).

Historically, water issues were more technical and well-defined problems that gained attention due to densely populated urban areas and the rise in agricultural and industrial pollution. In the nineteenth and twentieth centuries efforts were focused on providing clean drinking water to urban areas and in preventing the flooding of cities and agricultural productions (Pahl-Wostl, Jeffrey, Isendahl, & Brugnach, 2010). The 1960's saw an increase in citizen's concerns and awareness of environmental issues, which led to input from the public being included in regulatory structures (Wagenet & Pfeffer, 2007). The recent growth of public participation in environmental planning, decision making and monitoring can be linked to an increase in the late

20th century of public environmental awareness, multilateral institutions, and the rise of civil society organizations (Conrad & Daoust, 2008; Zadek & Radovich, 2006). Public participation in environmental governance has become a normative goal through international and supra-national policies and decisions such as those made at the 1992 United Nations Rio Declaration, and the 1998 UN Aarhus Convention. For example the 1992 Dublin Principles emphasize the need for a participatory approach for water policy. According to the Dublin Principles this means that "…decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects" (United Nations, 1992).

Collective actions on environmental issues are now achieved through a coordinated non-hierarchical process that involves multilevel networks of public, private and civil society actors. In North America and elsewhere, this type of governance as been influenced by ongoing demands for decentralization in environmental decision making and implementation through devolution to the local level and the requirement of public participation (Ferreyra et al., 2008). Policy in environmental governance in general has moved towards more cooperative models of collaboration, rather than regulatory control (Plummer & Armitage, 2007).

It was stated in 2007, that water governance in Canada has changed since even the late 20th century, and is now characterized by the following key trends:

- The introduction of new watershed-based delegated governance management models in a number of Canadian provinces;
- Legislative and policy reform setting higher standards for drinking water supply in a number of Canadian jurisdictions; and
- Greater citizen involvement in environmental policy-making and environmental management.

(Nowlan & Bakker, 2007, p. 9)

This move towards greater citizen involvement in environmental policy making and management have occurred due to: a shifting role of the government; new legal requirements to consult in environmental and First Nation legislation; new concepts in management such as integrated watershed resource management (IWRM); concerns with the quality and quantity of water in a changing climate; non-governmental organizations (NGOs) and public concern regarding government's capacity to monitor environmental programs (Nowlan & Bakker, 2007; Pollock & Whitelaw, 2005).

Due to cuts in environmental programs and ecological monitoring by government agencies, increasing mistrust of government and the realization of the complexity of environmental problems, there has been an increase in stewardship initiatives such as community based monitoring (CBM) that engages volunteer citizens, community groups, government, local institutions, industry, and academia to monitor, track and respond to environmental issues (Conrad & Daoust, 2008; Sharpe & Conrad, 2006). Forms of citizen science as well as CBM monitoring activities and the number of CBM groups have, "increased worldwide, with a few shifts in focus over the last few years (e.g. increase in relationships with universities, move from

commodity to non-commodity-based monitoring, and move to process-based monitoring), which seem to have only strengthened the capability and capacity of these groups" (Conrad & Hilchey, 2011, p. 283). Public engagement in water planning, governance and management activities has found in some cases to not only improve the public's understanding of ecological systems but also involves those who are often causing the problem (e.g. industry, the public, etc) in nonpoint sources of pollution, as part of the solution (Shandas & Messer, 2008). Evidently, now the involvement of the public in water governance has made a historical progression to being an integral part of modern day planning, decision making and monitoring of water supplies.

3. Importance of Public Engagement in Watershed Planning

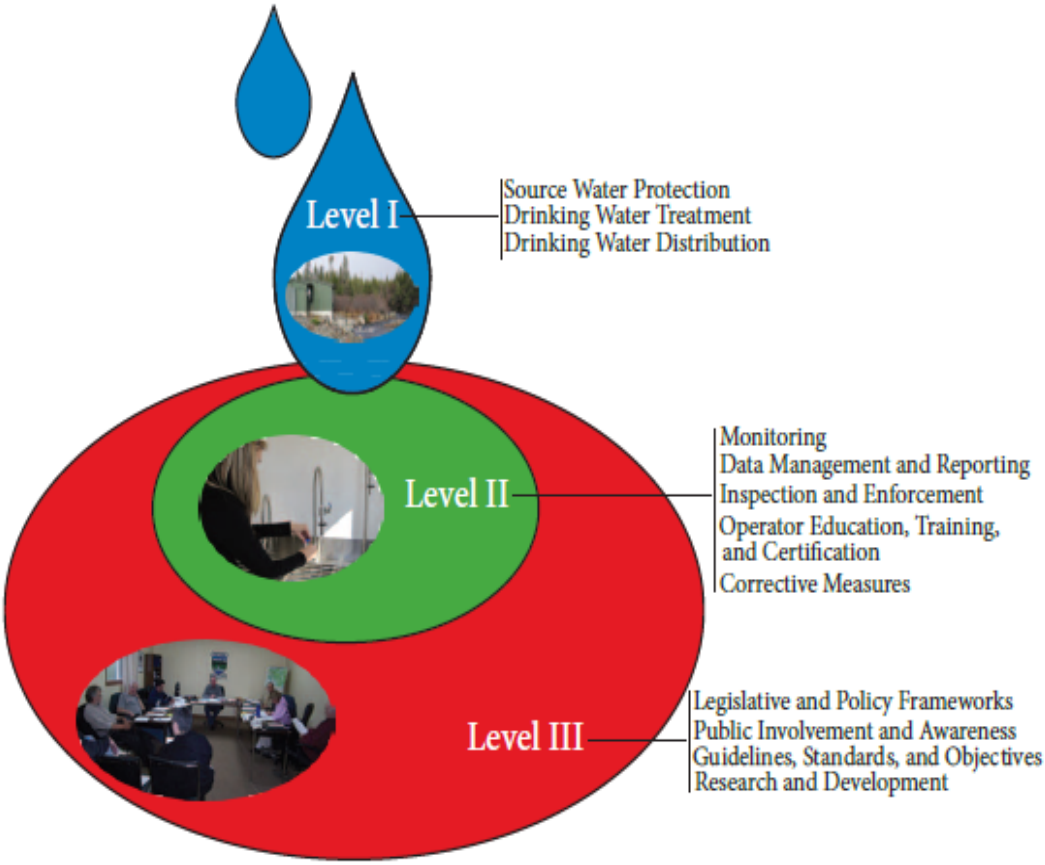
3.1 What is Source Water Protection?

It is widely accepted that there is a need to manage water resources in a holistic manner that considers a range of factors such as planning, ecosystem health, community growth patterns and climate change (Canadian Municipal Water Consortium, 2014). One part of the intricate and complex puzzle of a "multi-barrier approach" to the governance management of drinking water is source water protection (Canadian Municipal Water Consortium, 2014; Ministry of the Environment, 2004). Following tragedies such as in Walkerton, Ontario, where seven people died and thousands became seriously ill due to e-coli contamination in the town water supply (Ferreyra et al., 2008) and the contamination of drinking water in North Battleford, Saskatchewan with the parasite cryptosporidium, source water protection has become an important policy development in Canada in order to prevent contamination of drinking water (Ferreyra et al., 2008; Ministry of the Environment, 2004; Rawlyk & Patrick, 2013). It has been found that the benefits of avoiding contamination at the source are far greater than the financial and social costs (e.g. death, loss of trust in government, etc) of implementing protective measures (Simpson & de Loë, 2014). Source water protection is the first barrier (see Figure 1) in the commonly used multi-barrier approach to ensuring safe drinking water, which protects the source water in lakes, rivers and aquifers (Ministry of the Environment, 2004). Source water protection ensures the quality and quantity of drinking water is not reduced by land use activities, which vary depending on the watershed (J L Ivey, de Loe, & Kreutzwiser, 2006; Simpson & de Loë, 2014). Examples of source water protection efforts include: mapping of aquifers or recharge areas; assessing potential contaminants; creating regulations to restrict potential contaminants in sensitive areas; and the education of citizens (De Loë, Di Giantomasso, & Kreutzwiser, 2002).

Most source water protection models take on an IWRM framework which in short protects surface and groundwater sources (Ferreyra et al., 2008) by "the integrated and coordinated management of water and land as a means of balancing resource protection while meeting social and ecological needs and promoting economic development" (Medema, Mcintosh, & Jeffrey, 2008, p. 30). Though there are debates about the concept of IWRM which is outside the purview of this review (Biswas, 2004, 2008; Blomquist & Schlager, 2005; Cohen & Davidson, 2011; Mitchell, 2004), there are concerns with watershed based plans, with one of the main challenges being a mismatch of watershed and political/jurisdictional boundaries (Cohen & Davidson, 2011). To combat the operational and implementation issues of IWRM approaches, the creation of multi-stakeholder watershed partnerships that involve citizen engagement, collaboration and

dialogue has been seen as beneficial (Ferreyra et al., 2008; Fish, Ioris, & Watson, 2010; Jonsson, 2005).

Figure 1: NL's Multi- Barrier Strategic Action Plan (Government of Newfoundland and Labrador, 2014)



It has been found that source water protection requires a great deal of technical, financial, institutional, political and social capacity (De Loë et al., 2002; Rawlyk & Patrick, 2013; Robins, 2007). Though citizen engagement is not a magic bullet to improve all capacity (see Table 1 for the definition of types of capacity), it does increase social capacity for the planning, governance and implementation of source water protection measures (Timmer, de Loë, & Kreutzwiser, 2007). It was explained that in regards to participatory forms of source water protection planning that, "…the formation of new relationships and strengthening of existing ones helped build social capital by promoting connectedness, common rules, equity, mutual empowerment, shared values, trust and reciprocity" (Simpson & de Loë, 2014, p. 236). This demonstrates a clear link between the role of the public and source water protection and other sustainable watershed management concepts such as IWRM.

Table 1: Types of Capacity (Adapted from Rawlyk & Patrick, 2013)

Types of Capacity	Description
Institutional	The policies, regulations, legislation, protocol and the delineation

	of responsibility to provide safe drinking water.
Technical	The physical and operational ability of an organization to perform source protection adequately.
Financial	The ability to acquire adequate funds to pay for the operation and maintenance of planning and management of source water protection programs.
Social	Social agents of capacity, public awareness, stakeholder involvement, community support, public and private partnerships, and communication between and among different groups and interests.

In NL, source water protection is given legal teeth by the *Water Resources Act,* where protected public water supply areas (PPWSAs) are regulated under section 39 of the Act. Development within PPWSAs is regulated using several different tools to monitor activities, including: referrals from the Interdepartmental Land Use Committee, Crowns Lands, Natural Resources, MIGA and other agencies; permits for development; watershed sensitivity classification system; watershed management plans; and watershed management committees. Unpermitted activities in a PPWSA include but are not limited to: swimming, boating and fishing within drinking water supplies. In the fiscal year of 2012-13, 256 out of 299 public surface water supplies were designated as PPWSAs, and 59 out of 179 groundwater sources were designated (Government of Newfoundland and Labrador, 2014). Communities have to apply to have their water supply designated as a PPWSA and it costs $100 to do so (Government of Newfoundland and Labrador, 2013). Therefore, having a PPWSA is not mandatory in the province, and enforcement of regulations is the responsibility of local governments. It was found that this poses a problem in especially rural communities with limited human resources to conduct inspections of watersheds (Minnes & Vodden, 2014). Monitoring of water supplies for example, would be a perfect source water protection activity that citizens could be engaged with. Further examples are given throughout this report.

3.2 Definitions of Public Engagement

In the literature there is no single universal definition of what public or citizen or community engagement[2] means (Mirza, Vodden, & Collins, 2012). However, public participation is seen as an essential component to sustainable watershed management (Jonsson, 2005; Sharpe & Conrad, 2006). By involving a wide range of participants in watershed planning, governance and management activities (specific ways to engage will be discussed later in this paper), decision makers can get an accurate picture of the issues to be considered and gauge the severity of certain issues from a wide range of views. Public or citizen engagement should mean a distribution of power to allow the "have-nots" who typically would not have a place in political or economic processes to be deliberately included (Arnstein, 1969).

The watershed has been pointed to as the ideal scale to enhance citizen involvement in environmental decision making (Cohen, 2012). The benefits of participation in environmental governance such as watershed planning are numerous. These include but are not limited to:

[2] Public engagement, community engagement, citizen engagement, and public participation are used interchangeably for the purposes of this paper.

- **Data/information exchange:** Bridges the gap between scientifically-defined environmental problems and data related to those problems with traditional knowledge, experiences, values and practices of actors who are contributing to the cause or solution to identified problems.
- **Problem definition:** Participation often clarifies the differing opinions and opposing interests regarding the problem in order to make problem definition more broadly supported and ensures values of the broader community are understood and considered.
- **Learning:** Engagement of the public creates learning opportunities for participants and decision makers, enhancing the quality of decisions.
- **Implementation and accountability:** Connecting the public with the decision making process can address implementation problems, establishing commitment among stakeholders towards reform measures.
- **Support:** Support of source water protection actions need to be approved by citizens especially when it involves re-allocating tax dollars or a change in behaviours. Engagement avoids the likelihood of future public opposition.
- **Good governance**: Increasing the democratic nature of the planning, decision making and monitoring process, increases policy legitimacy and assists with compromises as multiple perspectives are at least understood by all parties.
- **Transparency and trust:** Meaningful public engagement can improve transparency in decision-making and instil confidence and trust among stakeholders and in the decisions made.
- **Capacity**: Involving citizens can improve all stakeholder's (governmental and non-governmental) capacity, including providing services on a volunteer basis (e.g. monitoring and the collection of data) that were typically done by government who may be experiencing diminishing human and financial resources.

(Bulkeley & Mol, 2003; Cohen, 2012; Conrad & Daoust, 2008; External Advisory Committee on Cities and Communities, 2006; Ferreyra et al., 2008; Fraser Basin Council, 2011; Hamstead et al., 2008; Hardy & Koontz, 2008; Larson & Lach, 2008; Mckinney & Johnson, 2009; Sharpe & Conrad, 2006; Timmer et al., 2007; Wagenet & Pfeffer, 2007)

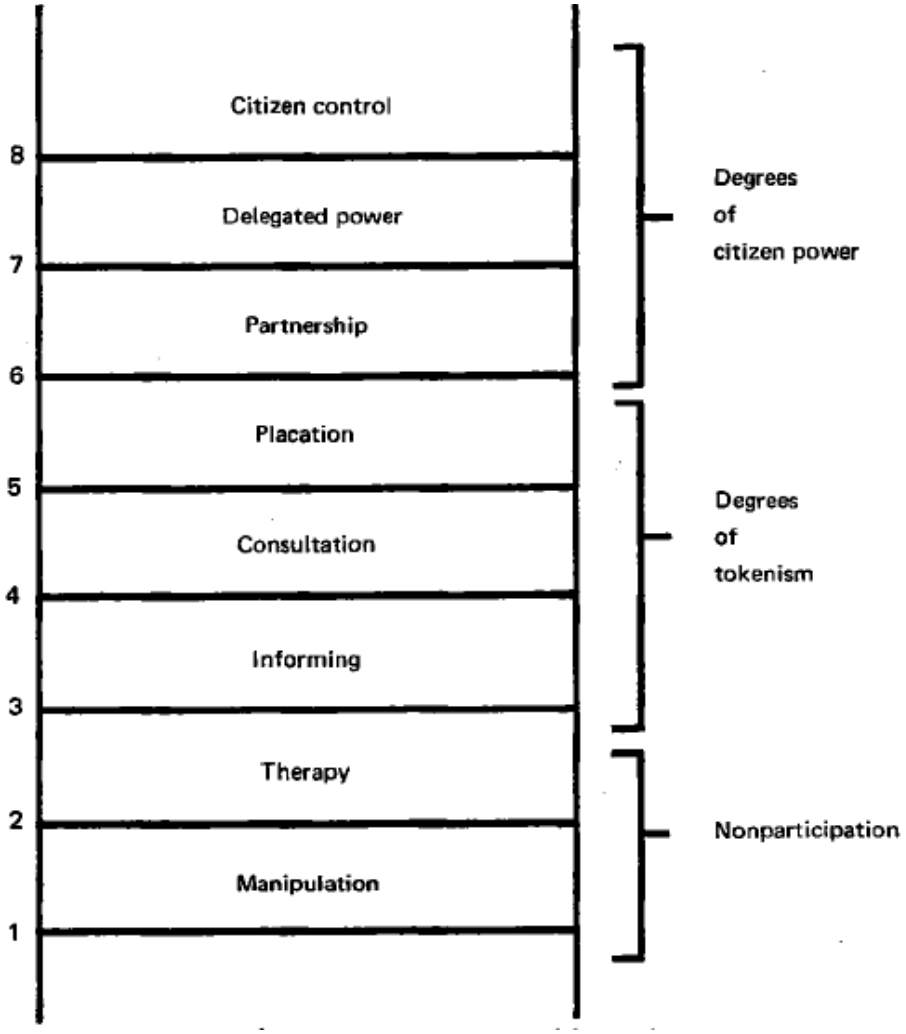
There can be engagement in the planning and governance of watershed planning and management activities such as the monitoring of water supplies. When creating context appropriate plans for watershed planning, processes for governing watersheds should take into account the public's current capacity in terms of knowledge, experience, institutions, and organizational capabilities, and plan to increase capacity for implementation (Conrad & Daoust, 2008). For example, when citizens participate in decision making and are actually given the opportunity to have their interests and values taken into account in plans, this improves the probability that local actors who use the watershed will actually adhere to regulations and plans made (De Loë et al., 2002). It should be noted that not all public engagement or collaboration with the public and citizen groups is the same. For example, Himmelman discusses the differences between different forms of interactions on a continuum (see Table 2).

Table 2: A Developmental Continuum of Change Strategies (Adapted from Himmelman, 2002)

Networking	Exchanging information for mutual benefit. Networking is the most informal of the inter-organizational linkages and often reflects an initial level of trust, limited time availability, and a reluctance to share turf.
Coordinating	Exchanging information and altering activities for mutual benefit and to achieve a common purpose. Coordinating requires more organizational involvement than networking and is a very crucial change strategy. Coordinated services are "user-friendly" and eliminate or reduce barriers for those seeking access to them. Compared to networking, coordinating involves more time, higher levels of trust yet little or no access to each other's turf.
Cooperating	Exchanging information, altering activities, and sharing resources for mutual benefit and to achieve a common purpose. Cooperating requires greater organizational commitments than networking or coordinating and, in some cases, may involve written (perhaps, even legal) agreements. Shared resources can encompass a variety of human, financial, and technical contributions, including knowledge, staffing, physical property, access to people, money, and others. Cooperating can require a substantial amount of time, high levels of trust, and significant access to each other's turf.
Collaborating	Exchanging information, altering activities, sharing resources, and enhancing the capacity of another for mutual benefit and to achieve a common purpose. Organizational collaboration is a process in which organizations exchange information, alter activities, share resources, and enhance each other's capacity for mutual benefit and a common purpose by sharing risks, responsibilities, and rewards.

Some methods of public engagement are formal face-to- face processes such as watershed committees, town hall meetings, and public meetings and other engagement methods are informal in nature in order to reach a larger audience (e.g. websites, flyers, community awareness booths, public meetings) (Huck, 2012). It has been stated that the "…the general public often regards engagement as unrepresentative or tokenistic. Therefore, it is important to be clear on what is meant by community engagement in a particular circumstance, and to plan and implement engagement processes carefully" (Mirza et al., 2012, p. 5). Public participation has been described in Arnstein (1969)'s Ladder of Citizen Participation as a spectrum from citizens having no power or influence to citizens having complete control (see Figure 2 below).

Figure 2: Eight Rungs on a Ladder of Citizen Participation (Arnstein, 1969)

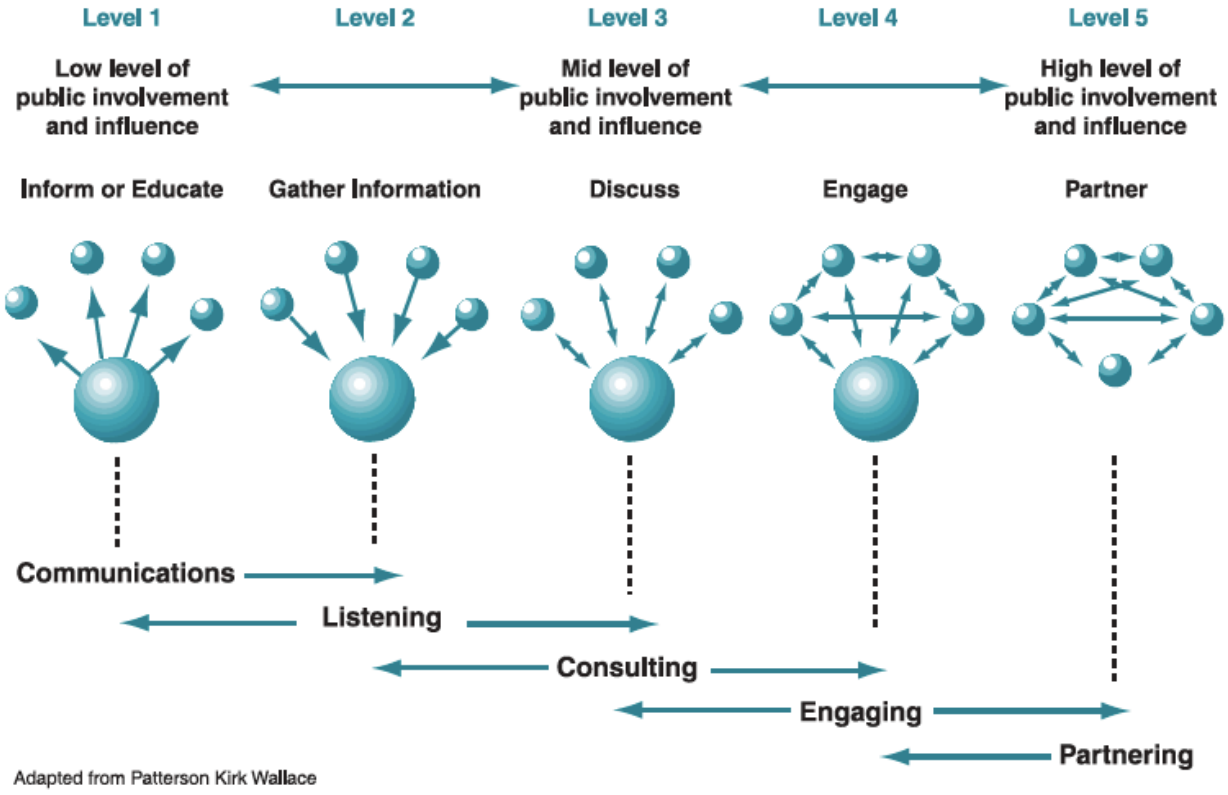


Similar to Himmelman's (2002) continuum for collaboration, engagement continuums have also been created. For example, Health Canada's Public Involvement Spectrum shows how community engagement can take place at various levels (see Figure 3), with each level being appropriate for various types of engagement. Though it is generally considered best practice to engage citizens in decision-making processes, meaningful public engagement can pose a challenge (Mirza et al., 2012). Overall, though there are many definitions of meaningful engagement (Huck, 2012), generally it is when communities feel that they can make a difference in the planning and management process, and that the process is fair, equitable and trustworthy (Ansell & Gash, 2008; Larson & Lach, 2008; Rouillard et al., 2014). Below in Figure 4, displays the degrees of public engagement as outlined in Huck (2012).

Depending on the involvement of the public in the problem definition and planning stages of watershed planning, this can impact the public's role in solutions or implementation of policies, programs and regulations. It has been argued that watershed planning in general has more emphasis on plan making, rather than implementation and evaluation (Rawlyk & Patrick, 2013). This brings the idea of adaptive planning into focus. Adaptive planning should bring together

different disciplines and stakeholders, and have flexibility in the process to evolve and change in the light of feedback (Plummer & Armitage, 2007). The involvement of citizen participation is seen as "good governance", that increases adaptive capacity (Rouillard et al., 2014). It has been proven most effective when collaboratively (Himmelman, 2002), solutions are shared among sectors and organizations. For example, monitoring, evaluation and implementation of plans, policies and programs can be done by citizens. Community based monitoring (CBM) has been found to fill the void of inadequate, incomplete, data and monitoring initiatives by professional scientists and government agencies (Conrad & Hilchey, 2011). CBM is a form a citizen science and can include activities conducted by citizens such as collecting data about species and habitats and can also include water quality monitoring (Conrad & Hilchey, 2011; Healey, 2014). In general CBM is a process where a wide range of concerned citizens, government agencies, industry, academia, community groups, and local institutions work together to monitor, track and respond to environmental issues (Conrad & Hilchey, 2011).

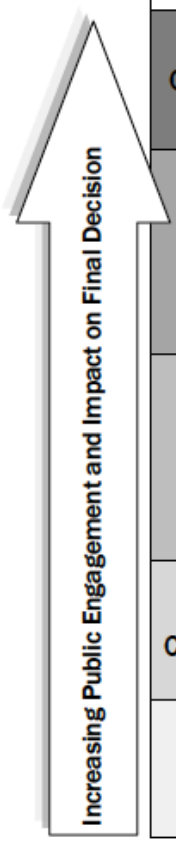
Figure 3: Health Canada's Public Involvement Continuum (Health Canada, 2000, p. 12)



Examples of CBM activities are increasing in Canada due to concerns by non-governmental organizations (NGOs) about the government's capacity or lack of capacity to monitor ecosystems due to ongoing cutbacks to environmental programs (Pollock & Whitelaw, 2005). It has been said that, "Community based monitoring may increase citizen engagement in ecosystem management, contribute to participatory community development, and enhance community influence on policy directions" (Pollock & Whitelaw, 2005, p. 212). There are pros (e.g. contribution to long term data sets, transformative in nature, collection of "free" data) and cons (e.g. insufficient monitoring expertise, bias in the data, fragmentation of data) for CBM (Conrad

& Hilchey, 2011). However, it has been found that in relation to water quality data, citizens are able to collect data that is comparable to data collected by a trained professional (Healey, 2014; Shelton, 2013).

Figure 4: Degrees of Public Engagement (Huck, 2012, p. 25)



Degrees of Engagement	Characteristics
Citizen Control	– Public has complete authority or power over decision making process – Public is accountable for final outcome
Public Participation	– Information is exchanged between both process sponsors and members of the public – Dialogue based on informed engagement and negotiation of decision outcomes – Public involvement influences decision outcomes but final decision is not made by public.
Public Consultation	– Purpose is to identify potential public concerns or level of consent for a proposed decision. – Public provides opinions, comments or other feedback to the process sponsors regarding a final decision. – Flow of information is primarily to the process sponsors by the public.
Public Communication	– Intent is to inform the public of a decision and provide an explanation for the decision – Information is provided from the process sponsors to the public – No active dialogue or feedback requested from the public
Non-Participation	– Public is not included in nor made aware of the decision making process.

4. Enabling Factors

The literature states numerous ways that citizen engagement can be enabled. These factors are summarized below in Table 3. These factors are in no way mutually exclusive, and should be seen as interdependent. An overarching finding is that proactive environmental management of any kind is best when the public supports the communal goals of the initiative (Bunch et al., 2014). These goals should be created collaboratively through learning opportunities, negotiation and debate (Ansell & Gash, 2008; Howlett & Rayner, 2006; Plummer & Armitage, 2007; Rhodes, 1996).

Table 3: Enabling Factors to Citizen Engagement

Enabler	**Description**
Financing of participation	Make sure there is a plan or budget from the outset that facilitates public participation.
Provision of information	Citizens know how to be involved, the issues at hand, and how they can improve their own technical capacity. This can be done through the use of information packets, websites, collection of various data sources, as well as at public meetings.
Timely engagement	Engagement should be done early in the planning process, to ensure no sector or participant is missed and that all stakeholders' needs are taken into account. This increases legitimacy and improves quality of management scenarios.
Transparency	Transparency of process, intent, and data is important throughout engagement, so the planning process, outcomes and those involved facilitating or leading the engagement, do not lose trust or credibility from the public.
Power evening	Equity should be of the utmost concern. It should be ensured that the most marginalized groups have a chance to influence planning and decision-making, as much as groups who are more vocal or have greater resources. There should be mechanisms in place to encourage sharing of resources and power.
Consensus building	For planning and management processes that involve public participation on decision-making or planning committees, decisions should be made on a consensus basis or in a process that strives for consensus. This ensures that every major stakeholder at the table has the power to influence decisions.
Capacity	Delegated authority must be backed up by capacity. There should be ways in place to develop citizen's technical, social, financial, and institutional capacity. This could include educational programs and funding available in order to facilitate reform measures.
Empowering policies and incentives	The public must feel like they are making a difference and have the power to change the decision making process. There should be mechanisms in place to improve the public's self-efficacy, knowledge and skills, and opportunities to make change. The public must feel there is seriousness in the process and there will be results from their participation. The state should act as a facilitator rather than a controller in the process.
Appropriate engagement methods	There should be mixed methods used to engage citizens (e.g. use of social media, webinar series, teleconferences, newsletters, etc), as well as the use of arts and media in different ways to decrease costs of engaging larger

	audiences. Furthermore face-to-face dialogue must be an integral part of the engagement process. In general, it is important to go to the people, instead of expecting them to come to you.
Engagement is inclusive and accessible	To ensure all relevant stakeholders are present, there is a need to identify appropriate stakeholders. There should be a balanced membership. Inclusion of Indigenous representation in water planning is important, as well as incorporating Indigenous social, spiritual and customary objectives and strategies in water plans. Special attention should be paid to involving marginalized groups such as youth, the socio-economically disadvantaged and the elderly who may have barriers to being involved in the process (e.g. transportation and childcare issues). Barriers should be mitigated.
Trust building, integrity and accountability	The planning, decision-making and/or monitoring process should encourage respect and diversity of values and perspectives, and demonstrate mutual accountability in addressing common purposes and goals.
Linking issue to socially relevant topics	When talking about source water protection, it has been found beneficial to link to topics that are relevant to the stakeholder and go beyond the sometimes seemingly abstract concept of sustainability (e.g. discussing health or economic impacts). For example, it was found citizens are more likely to engage when they feel their neighbourhood/well being is threatened.
Learning venues and collaborative dialogue	There should be a development of commitment and shared understanding. Sharing different types of information will reduce informational biases. This helps internalize knowledge and reduces conflict.
Respect and fairness	Effective listening skills and respect for diverse opinions helps anticipate and deal with conflict. There should be venues where fair and open dialogue can occur.
Leaders and partnerships with local organizations	Partnering with influential community leaders can help to motivate others to become engaged. Partnerships with local organizations can also aid in engaging the right stakeholders. Youth engagement should be a priority, as it contributes to succession planning.
Feedback	There should be opportunities for feedback throughout the process on how the public has perceived engagement strategies and the perceived influence the public has had on decisions. This also aids in accountability.
Evaluation and monitoring methods	Evaluation and monitoring ensures learning, assessment and accountability to the public. There should not only be the evaluation of the success of public engagement efforts but evaluations of the decisions made or outputs (e.g.

	program, policy, etc) of the public engagement. There should be opportunities for the public to respond to evaluations and be part of monitoring processes. This also produces long -term ownership in communities to engagement processes.

(Ananda & Proctor, 2013; Ansell & Gash, 2008; Beierle & Konisky, 2000; Benson et al., 2012; Bunch et al., 2014; Connelly, Markey, & Roseland, 2009; Conrad & Daoust, 2008; De Loë et al., 2002; Hamstead et al., 2008; Hearne & Powell, 2014; Huck, 2012; Innes & Booher, 1999; Jöborn et al., 2005; Kastens & Newig, 2008; Koontz, 2006; Larson & Lach, 2008; Mirza et al., 2012; Mitchell, 2005; Özerol & Newig, 2008; Plummer & Armitage, 2007; Rawlyk & Patrick, 2013; Rouillard et al., 2014; Rydin & Pennington, 2000; Timmer et al., 2007; Wagenet & Pfeffer, 2007)

As explained in Table 3, communities must feel empowered by engagement and that they are actually being heard, rather than simply consulted with no real intention for their input to make a difference in already predetermined decisions. Empowering communities often involves the use of tools such as social learning and capacity building (Conrad & Daoust, 2008; De Loë et al., 2002; Hamstead et al., 2008). Citizens aptitude to become involved may vary depending on both the individual and the issue (Larson & Lach, 2008), however it is clear it is best practice to make every effort possible to involve citizens in meaningful engagement by using the best practices outlined in Table 3. It should be noted that simply expanding public participation does not always result in equitable opportunities for participation. It should be critically evaluated who is at the table for planning and management, who's values are represented, and who or what values are missing (Beierle & Konisky, 2000). The "facilitator" (whomever is initiating the planning or management process, usually is the state) must be aware of "rent seekers" who are there for their own self-interest and not the good of the community, and usually have both financial resources and power behind them (Rydin & Pennington, 2000). Every effort should be made to include those who have been traditionally excluded to the participatory process. For example, it has been suggested that further research is needed on how to incorporate Indigenous values and interests into water planning and water plans as well as how to ensure procedural fairness and equity (e.g. consideration of plan appeal mechanisms) (Hamstead et al., 2008, p. 172).

Stakeholder definition can be difficult. Stakeholders in watershed management in NL are defined as, "all stakeholders, that is, all those affected by the management plan. This would include those with resource utilization interests, municipal councils or private incorporated communities, local non- governmental organizations/individuals, and government agencies" (Hearn, 2007, p. 4). The Newfoundland and Labrador Office of Public engagement at the provincial level provide the method of stakeholder mapping in order to identify the organizations, groups and individuals who have an interest in the issue at hand. Stakeholder mapping efforts are said to be, "particularly useful for public engagement because they allow for the identification of key actors while simultaneously generating information about stakeholders' positions and knowledge-levels"(Government of Newfoundland and Labrador, n.d.-b, p. 16). The process of identifying stakeholders for a stakeholder map can involve a number of activities such as:

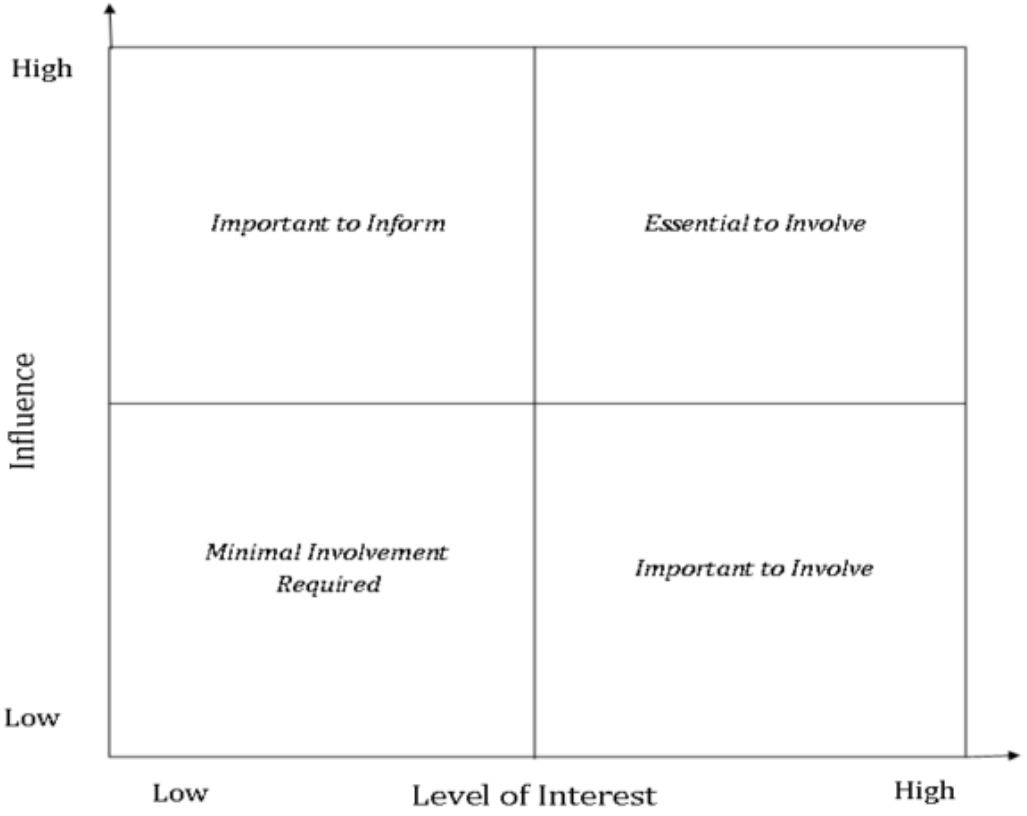
- Collective discussion;
- Gather suggestions from community members;

- Gather suggestions from organizations who are involved in the policy area or issue under consideration; and,
- Gather suggestions from identified stakeholders.

(Government of Newfoundland and Labrador, n.d.-b, p. 17).

A matrix used for determining the amount of involvement a stakeholder should be engaged in is provided in Figure 5 below.

Figure 5: Stakeholder Mapping (Government of Newfoundland and Labrador, n.d.-a, p. 16)



The state should play a facilitators role in promoting collective action from the public. When creating ways to engage in watershed planning, governance and management, it has been stated that government should give the local level autonomy while providing a supportive framework, and enough information and capacity to enforce decisions made. The role of the state as a facilitator rather than a controller or top down dictator, provides individuals and groups with institutional arrangements that can facilitate collective action towards problems, rather than the state dictating solutions that may not fit with the local context (Rydin & Pennington, 2000). As Ostrom (1990) argues, "if someone else agrees to pay the costs of supplying new institutions then it is difficult to overcome the temptation to free-ride"(Ostrom, 1990, p. 213). When the state acts as a controller, the community does not become as actively engaged in the process, and this does not provide an environment where social capital is built upon or mutual trust is developed

(Rydin & Pennington, 2000). The lessons from this social capital literature appear quite clear. If positive social capital is to be developed, local communities must be encouraged to build up their own institutional arrangements for environmental planning and not have these institutions imposed from above.

5. Barriers

It can be seen that a great deal of the barriers to public engagement in environmental governance refer to absence of the aforementioned enablers in Section 4. For example, if governments are relying on outdated methods for community engagement, and there is no evaluation process for the engagement of citizens, then problems can arise (Mirza et al., 2012). Further barriers to successful public engagement in relation to watershed planning and specifically source water protection were found in the literature, and are listed below in Table 4.

Table 4: Barriers to Citizen Engagement

Barrier	**Description**
Institutional factors	Can the desires or concerns of the public be properly addressed given the current authority of the water planning process? Does the watershed planning authority have the power to actually implement water management?
Time and money	Meaningful engagement requires a great deal of time and money. Many governments do not have the patience or funding for this.
Lack of incentives	If there are no incentives for citizens to participate then participants are less likely to participate
Complexity and lack of knowledge	Some environmental governance problems such as water issues are very complex and therefore require a great deal of educational opportunities so the public can fully understand the issue(s) at hand. Citizens need to understand how decisions, policies, programs or whatever else they are asked to participant in can impact them.
Tokenism	Citizens often do not want to engage and commit time to something they cannot change. Citizens need to know they are not simply being consulted and that decisions have not already taken place without their influence. This can create distrust and disinterest in the process.
Volunteer burnout	Volunteer burnout refers to when volunteers are asked to do too much, and are not able to sustain their commitment due to other life commitments. Also, when interest or meaningfulness is lost in the cause, this can cause volunteers to re-evaluate their involvement in the collaboration/ process/program.
Distrust in government	In some areas historical distrust of government can

	impede willingness to engage. This distrust should be acknowledged and discussed as part of the engagement process.
Apathetic public	Citizens may have different priorities than the issue at hand, or may feel their presence will not make a difference in the process.
The excluded	Unequal opportunities for involvement can be a barrier in engagement. It is often easier to engage NGOs, already engaged citizens and the 'loudest' citizens. Every effort should be made to engage those who have traditionally been excluded. This often includes youth, those in remote or very rural communities, and those not in a leadership position. Do not expect the most marginalized citizens to come to you, go to regular congregation areas such as the local Legion, community centers, libraries, etc. These locations would change depending on the community.
Reaching public consensus	Through mechanisms such as consensus based decision-making, there may be divisive topics, where consensus will never be met. Striving toward consensus, rather than requiring consensus could be a way to alleviate this issue, especially if it impedes on the ability to come to an agreement.
Poor communication	When citizens are not provided enough information about events, the process, feedback opportunities, or follow up on their engagement, this can create a low participation level.
Never ending process	Complicated issues such as source water protection require long-term commitment and support by all levels of government, non-governmental organizations and the public. Engagement essentially should have no end, so this may further lead to volunteer burnout.

(Ananda & Proctor, 2013; Arnstein, 1969; Cohen, 2012; Conrad & Daoust, 2008; Daniels, 2014; Hamstead et al., 2008; Huck, 2012; Kastens & Newig, 2008; Mirza et al., 2012; Özerol & Newig, 2008; Robins, 2007; Sharpe & Conrad, 2006; Simpson & de Loë, 2014)

Evidently, there are numerous barriers that can impede the engagement of citizens in watershed planning, governance and management efforts such as source water protection. Every effort should be made by public managers and those leading engagement exercises to reduce these barriers.

6. Evaluation Mechanisms

It is impossible to read the literature on public participation without also discovering the literature on evaluating public participation/engagement (Webler & Tuler, 2001). The literature is clear in outlining that not all engagement is the same (see Section 3.2). To measure and/or

evaluate the success of efforts in public engagement there are several models that were found that are appropriate for the engagement of citizens in source water protection.

Connick and Innes (2001) define the engagement of the public as one component of collaborative dialogue that is needed for water policy making. Collaborative dialogue among stakeholders has been explained as being, "… the most productive way to address complex and controversial policy questions" (Connick & Innes, 2001, p. 5). Evaluation of these collaborative processes is necessary, however complex and difficult. Table 5 lists outcomes that can be used to evaluate collaborative policy dialogues.

Table 5: Outcomes for Evaluation of Collaborative Policy Dialogues (Connick & Innes, 2001, pp. 9–11)

Outcome	**Description**
Social and political capital	Formerly competing, or even warring, stakeholders can develop new personal and professional networks among themselves and, as a result, change the dynamic within the dialogue as well as outside it. Instead of demonizing or stereotyping each other, they can contact each other to sort out issues before they come to a head. They can find their common interests and trust each other sufficiently to work together toward ends that require political coalitions. Social and political capital is the essence of building an adaptive, higher performing system.
Agreed-on information and shared understanding	At the beginning of a process, data presented by any stakeholder is typically regarded with suspicion. During a collaborative dialogue, one of the main points of discussion is normally about the "facts," about what can be regarded as true and unbiased in scientific terms. Dialogue also revolves around the meaning and applicability of any information as participants test it against what they know and have experienced. Such shared knowledge then becomes part of the thinking and actions of the stakeholders as they go about their business in many arenas beyond that of the particular dialogue.
End to stalemate	In many cases, powerful players have been at loggerheads for years, with little improvement in their situations, much less action to protect a resource or change a counterproductive policy or pattern of action. Even when formal agreements are not reached, a collaborative dialogue can produce changes in behavior and actions, allowing policies to move in new directions and players to move off of their collision course.
High quality agreements	High quality agreements genuinely alleviate, if not solve, problems; they are widely acceptable among the parties whose support is needed and among the public; and they are practical and implementable.

Cost effective decision making	A good collaborative dialogue can produce its results in a way that can be more cost effective, in terms of many types of resources including time and money, than a process characterized by continuous rancor, litigation and competing legislative and citizens' initiatives.
Learning and change beyond the original stakeholders	In collaborative dialogues, stakeholders and the agencies or interests they represent can learn about one another's interests and the problem, and they can change the way they view their own interests. They may change some of their own actions quite independently of anything agreed to by the group simply because they have concluded it is in their interest to do so. This learning also can transfer to those they work with outside of the process and after it has been completed.
Innovation	The dynamic of a self-organizing, learning group of stakeholders trying to solve a policy problem in a consensual way often can lead to innovative ideas. Overcoming the long-term impasses often requires out-of-the-box thinking. This sort of thinking does not emerge from bureaucratic decision making almost by definition; the rigidity of rules and positions is often the source of the original conflict. Innovation is the essential element in creating a truly adaptive system that can move to higher levels of performance.
A cascade of changes in attitudes, behaviors and actions	The first-order effects that take place among stakeholders during and immediately as a consequence of the dialogues are followed by second- and third-order effects that take place in the years after the process is over. This cascade of effects can include the influence that the stakeholders have on others not at the table, and the choices players make to work collaboratively rather than bring lawsuits or work in other arenas for their own purposes. These changes may include spin-off partnerships, collaborative implementation efforts, and new practices by players who were not even at the table as they follow the example of a successful effort.
Institutions and practices that involve flexibility and networks	As the ideas and experience of collaborative dialogues spread, it becomes clearer that such face-to-face dialogue allows for greater creativity and responsiveness to crises and opportunities. It becomes clearer that the mechanical model of the world is not serving us well in a period where change is so rapid and systems are complex. Increasingly, and in great part as a result of collaborative dialogues, the idea is spreading that networks are the most rapid and flexible way to work and the most effective way of gathering and using information flows among many nodes.

	An outcome of collaborative dialogues can be the institutionalization of the norms, heuristics, and practices used to build and function within networks to respond to societal needs. As these institutions develop, they result in increasing collaboration, and more importantly coevolution among the participants. Top-down regulation and management using blueprints are increasingly replaced by distributed intelligence and information gathering, rapid information flows among players, and distributed action.

Particularly relating to source water protection, when assessing if factors such as social capacity have been improved, Rawlyk and Patrick (2013), provide 'indicator' questions to determine the effectiveness of source water protection efforts:

- To what extent, and how, have stakeholders participated in the selection and development of source water protection tools?
- Has community awareness and support for watershed protection been developed? How has this happened?
- Are there active relationships among organizations that share source water protection as a common goal?

(Rawlyk & Patrick, 2013, p. 28)

In the case of community based monitoring (CBM) programs, evaluation and monitoring is very important. Participating stakeholders should conduct the evaluation at each step of the monitoring partnership, and all participants must be aware of the activities and processes of each step of CBM. Figure 6 provides a framework for a functional community based environmental monitoring framework, which was created to increase operational efficiency of CBM groups, and is meant to be adapted to fit the context of the group using it (Conrad & Daoust, 2008). Each box in Figure 6 can be seen as a step in the CBM partnership.

When working with communities, indicators for evaluation of success should be created in a collaborative process at the beginning of engagement (Özerol & Newig, 2008). It is essential when evaluation of public engagement efforts are done that results are presented to the public in a transparent way that allows for further dialogue and the ability to adapt or change methods if necessary (Özerol & Newig, 2008). Feedback and evaluation can be solicited through techniques such as surveys at the beginning of engagement and at the end or later on in the engagement process (Ansell & Gash, 2008).

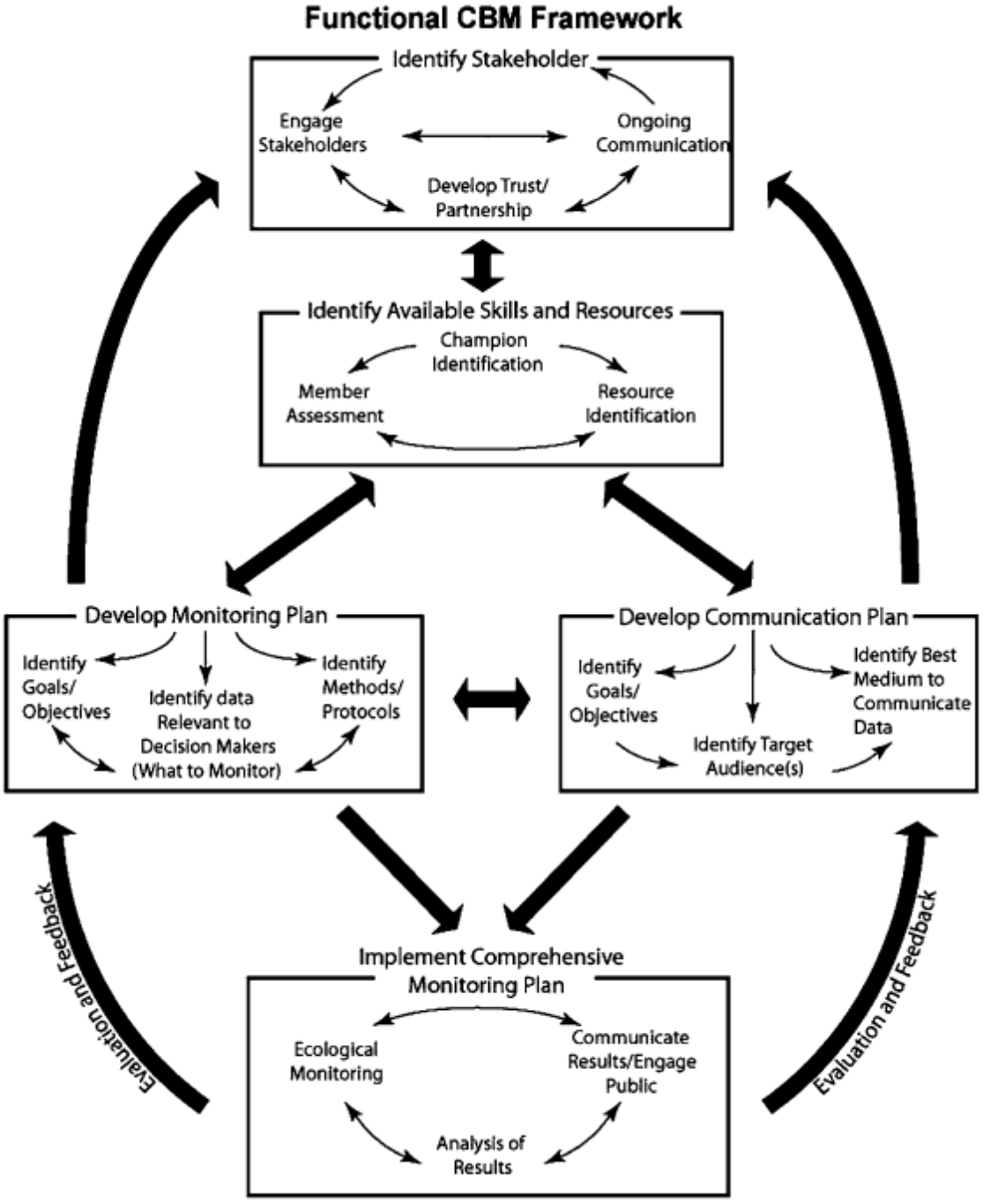
Taking the list of enablers listed in Table 3 and determining if they were present can also aid in evaluation. Beierle & Konisky (2000) deteremined there are two types of evaluations. The first type evaluates the quality of the participatory process rather than outcomes. This type of evaluation would ask questions such as:

- Were participants representative of the wider public?
- Was membership balanced?
- Was participation early in the decision making process?

- Were there face-to-face discussions between the public and agency representatives?
- Was agency committed to a participatory process?

(Beierle & Konisky, 2000)

Figure 6: Functional Community Based Environmental Monitoring Framework (Conrad & Daoust, 2008)



The second type of evaluation is interest oriented, asking questions related to if particular parties have achieved their own goals, which are ideally set out at the early stages of the planning process. Beierle & Konisky (2000) evaluate participation programs against three more broad goals linked to society's interest for better functioning environmental management systems. These three goals include:

- Incorporating public values into decision making
- Resolving conflict among competing interests
- Restoring a degree of trust in public agencies

(Beierle & Konisky, 2000)

Though the above broad questions may not be very useful for technical monitoring efforts, it is clear that some sort of evaluation and monitoring is key for both the process of public participation in environmental management efforts such as source water protection, as well as the outcomes, which refer more directly to evaluative frameworks similar to the one provided in Figure 6 by Conrad & Daust (2008).

7. Potentials for NL

7.1 Public Engagement in NL

As previously explained, many small communities in NL are lacking in human and technical capacity at the local level which is preventing the adequate management of their drinking water supplies (Minnes & Vodden, 2014). This section will outline examples of relatively recent public engagement activities that could be used as learning opportunities for how to improve public engagement in NL as well as the feasibility of strategically engaging the public in source water protection efforts.

The Newfoundland and Labrador provincial government is ahead in public engagement by having an Office of Public Engagement. This office has created an excellent Public Engagement Guide, that lays out when and how to engage citizens, and guiding principles used by the Office of Public Engagement in order to implement successful public engagement (Government of Newfoundland and Labrador, n.d.-b). For example, Figure 7 outlines the different spectrums of public engagement, as defined by the Office of Public Engagement. The guide also outlines what type of engagement is appropriate for the reason for engagement, suggesting that you do not always have to be on the "co-create" side of the spectrum, and that simply partaking in "informing" activities is suitable for some public engagement efforts (Government of Newfoundland and Labrador, n.d.-b).

Though the Office of Public Engagement is doing good work, studies have shown there are still improvements to be made in NL. In a 2012 report specifically about community engagement in the Grand Falls-Windsor, Baie Verte and Harbour Breton region of NL it was said,

"Effective community engagement should be a first step towards creating the circumstances and opportunities to ensure that rural communities will thrive economically, socially and culturally. Further, community engagement will enable rural Newfoundlanders and Labradorians to take responsibility for collaboratively establishing goals and working together to achieve them."

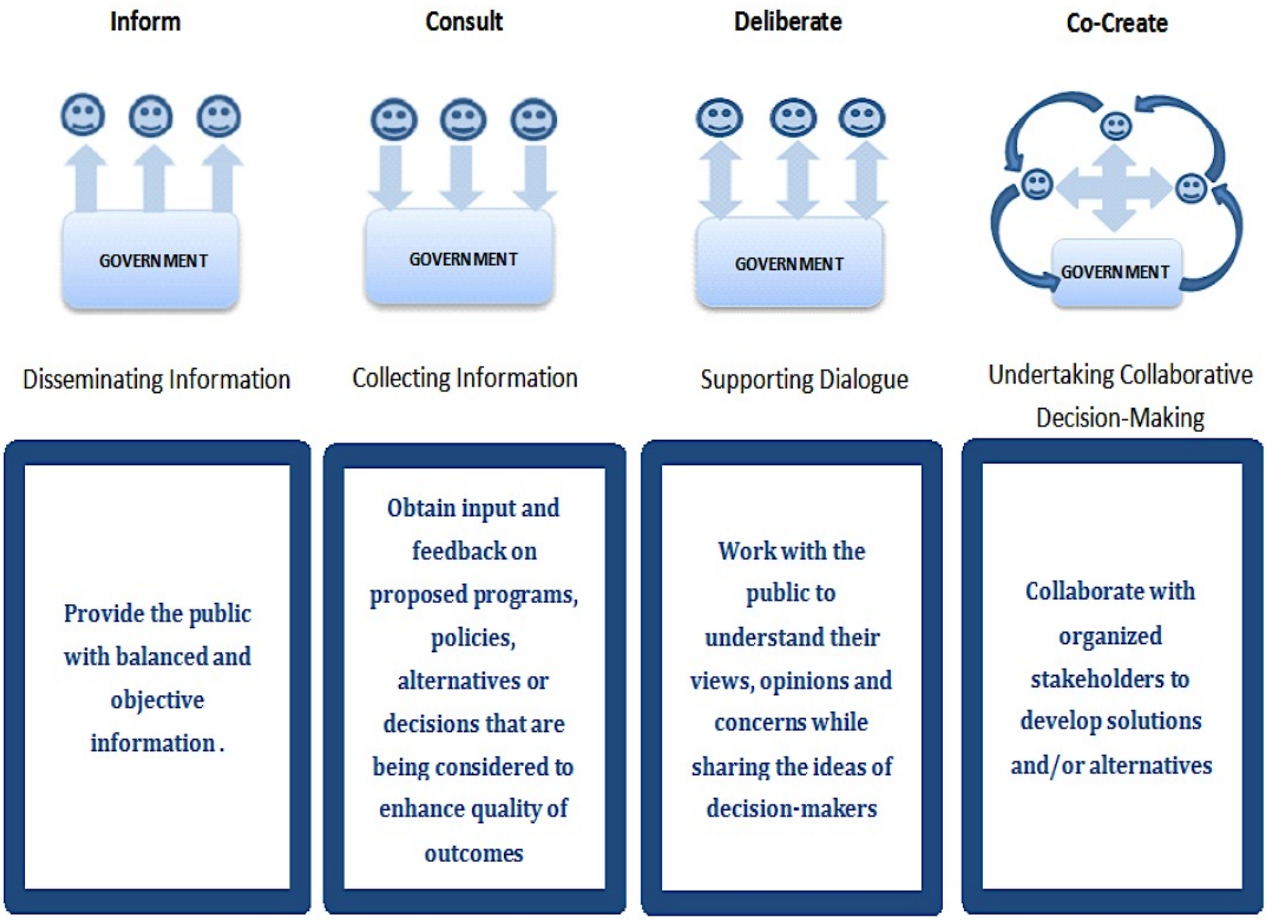
(Mirza et al., 2012, p. 3)

This study found that with regard to community engagement in the Grand Falls-Windsor - Harbour Breton - Baie Verte Region, there were barriers to community engagement that included:

- Volunteer burnout among aging populations and the need for greater youth involvement;
- Transient workers whose schedules prevent engagement;
- Provincial government does not do public engagement well, despite the willingness of citizens to engage; and
- New ways to engage are needed.

(Mirza et al., 2012)

Figure 7: Spectrum of Public Engagement (Government of Newfoundland and Labrador, n.d.-b, p. 3)



It was stated in this study that the survival of rural communities depends on public involvement as a valuable tool to make sure decision-makers are making the right decisions for their communities. It was explained that in NL engagement is more than just informing and consulting but should involve education and capacity building for developing local leadership. Furthermore, incentives to reduce barriers of engagement should be provided, such as subsidizing or paying for transportation costs and offering daycare at engagement events (Mirza et al., 2012). Many disadvantaged groups do not participate in formal public engagement activities for reasons such as: "…mobility issues, a lack of money for transportation, a lack of time, or a fear that they don't adequately understand the issues and will be ridiculed or harassed when speaking in public"(Mirza et al., 2012, p. 8). Therefore, formal and informal consultations and engagement opportunities should be utilized, linking back to the best practice of going to where people are, rather than them coming to you (Mirza et al., 2012).

7.2 Watershed Management in NL

In NL there are five local watershed management committees (Clarenville, Corner Brook, Gander, Grand Falls-Windsor, and Steady Brook) and three of these committees have watershed management plans (Corner Brook, Gander, and Steady Brook) (Government of Newfoundland and Labrador, 2014). These committees and plans are called watershed management plans, however they directly oversee land use management, development, and conflict resolution activities that take place within a PPWSA (Government of Newfoundland and Labrador, 2014). Therefore, these plans are specifically source water protection plans. Other local communities could benefit from watershed management plans, however it has been found at the provincial level, there is not enough technical or human support available to assist every community in having a watershed management plan (Minnes & Vodden, 2014). Making watershed planning more complicated is situations where multiple communities derive their drinking water supplies from the same watershed, meaning regional, inter-community plans are required (Minnes & Vodden, 2014). An example of this is the *Watershed Management Plan for Gander Lake and its Catchment*, which provides a technical report and recommendations for management for the Gander Lake. The Gander Lake provides drinking water supplies to the Towns of Gander, Glenwood and Appleton (Environmental Design and Management Ltd., 1996). Though this very technical report does not emphasize public engagement in planning or governance activities, it does recommend that citizen volunteers be organized to collect water samples, perform simple water chemistry analysis and be active in monitoring the watershed (Environmental Design and Management Ltd., 1996). This suggests a strong appetite for citizen science, and community based monitoring approaches in the region.

Flowing northeast of Gander Lake and on to Gander Bay, it was found in the Gander River region, that a lack of community cohesion was a barrier to public engagement in management of the Gander River. Daniels (2014) calls for greater attention to building higher levels of a form of social capital called "bridging capital". Bridging capital is,

> "…the process whereby stronger relationships are developed with individuals and groups from outside the region- and community cohesion in places where residents are more civically and otherwise socially engaged with issues pertaining to the community and the broader societal relevance"
>
> (Daniels, 2014, pp. 86–87).

In the management of the Gander River there is a need for greater attention to consensus-based decision-making, increased recognition of all stakeholders within the watershed, as well as emphasis on the value of traditional knowledge. It was noted that many citizens did not want to become engaged in watershed management processes as they felt they were only being consulted by the authorities running the sessions (Gander River Management Association, Department of Fisheries and Oceans, the local band council) (Daniels, 2014). If the management of the Gander River is any indicator on how public engagement in watershed planning in NL is conducted, there is clearly a great deal of work to be done in improving public engagement strategies and the utilization of previously discussed best practices for meaningful engagement, such as being more inclusive while paying particular attention to power imbalances as well as diverse cultural values, beliefs and knowledge's (Daniels, 2014).

In NL, in the *Municipal Guide to the Development of Watershed Management Plan,* councils and members of the public are listed as representatives of the interested parties that will form the Watershed Management Advisory Committee. However, in the public consultation section of this report the following is described as the time in which to consult the public:

> "All of the components of a watershed management plan have been covered at this point. The watershed has been described in terms of location, physical characteristics, and natural and historic resources. Watershed uses have been determined, with the help of residents and other users, and the jurisdiction of watershed protection and use have been clarified. Next, potential contaminants resulting from all possible uses were identified, and a risk assessment was conducted on these contaminants and their causes, in order to create a priority ranking for addressing issues. And using all of the information above, a sensitivity analysis was conducted to divide the watershed into areas suitable for different levels of development activity (development zones). The goals and objectives of the management plan have been determined, and management strategies developed to ensure these objectives are met. A monitoring and reporting program has been outlined to make sure the watershed management plan will be followed, and that the plan is effective in protecting drinking water quality.
>
> The next step is to consult with the public."
>
> (Hearn, 2007, p. 74)

According to best practice, involving the public once the watershed has been defined and the plan and decisions have already been made, it is not ideal. The public should be able to give input on every stage of the planning process (Wagenet & Pfeffer, 2007). This document could be improved to better involve the public and to also strategically use volunteers in monitoring processes. Furthermore, other documents such as the Department of Environment and Conservation report entitled, *Protect Your Water Source: A Guide to Managing Surface Water Drinking Sources*(Government of Newfoundland and Labrador, n.d.-a) could be improved to be more strategic about public engagement. This document very briefly mentions the need for community involvement and awareness, however the suggestions are based upon community awareness opposed to any suggestions for involving community members in any meaningful way in the planning, governance or management of watersheds that contribute to drinking water supplies.

7.3 Community Based Monitoring in NL

In relation to the management of watersheds, there has been indication that there is in an appetite for community based monitoring (CBM) activities in rural NL. For example, in the Towns of Indian Bay and Centreville-Wareham-Trinity, due to issues with the drinking water, the distrust of public drinking water, and the prevalent use of roadside springs and bottled water, there is a demonstrated need for public education, outreach, participation and awareness when it comes to drinking water issues (Holisko et al., 2014). During a survey posed to residents in the area it was found that users of the Indian Bay Watershed (providing drinking water to the town of Indian Bay) were knowledgeable about the watershed, however enforcement of restrictions under the PPWSA regulations was low. It was found through the survey that citizens would be willing to modify their practices, however education and public dialogue is needed to improve the general knowledge of watershed issues, which would increase likelihood of source water protection best practices being employed by users (e.g. adhering to shoreline buffer, not snowmobiling over the water supply). It was suggested that the Indian Bay Ecosystem Corporation could fill a role for both educating the public on proper stewardship actions to protect their drinking water, as well as in monitoring water sources such as roadside springs. It was also suggested that the public could be better engaged through methods such as Town newsletters, mail outs, and educational events, as well as the involvement of school groups in water quality monitoring and education (Holisko et al., 2014).

Though a comprehensive list of all public engagement activities in NL has not been illustrated, by examining these public engagement examples in NL, it can be derived that there is potential for improving public engagement as well as potential for public engagement in source water protection. It can be speculated that the Office of Public engagement could play a role in improving public engagement in source water protection by working with the Department of Environment and Conservation and local governments in their source water protection efforts.

7.4 Public Engagement Examples from Outside NL

Given the exemplified potential and need for more and better public engagement in source water protection in NL and particularly in rural NL, there are some examples from outside NL that may provide some ideas for ways of engaging the public in source water protection efforts. For example, the following provinces have formalized public engagement for provincial wide watershed planning and/or management efforts: Alberta, British Columbia, Manitoba, Ontario, Prince Edward Island, and Quebec (Huck, 2012). Thus far the *Water Resources Act* in NL does include provisions for public involvement in the development of watershed management plans, however these actions are voluntary (Huck, 2012). Many provinces in Canada are experimenting with collaborative governance that require active citizen engagement in water planning and management, these examples include Québec's watershed organizations, Ontario's source water protection committees, Alberta's water planning advisory committees, British Columbia's Fraser River Basin Council, as well as Water Boards in the Northwest Territories, Nunavut and Yukon (Canadian Municipal Water Consortium, 2014). Some specific examples of citizen engagement in watershed management efforts (that could be used for source water protection more specifically) are discussed below.

Prince Edward Island, Canada – Watershed Management Plans

Prince Edward Island's watershed planning initiative includes locally led watershed planning that involves stakeholders and public participation in the planning and implementation process.

There are over 30 watershed organizations in the small province, that have been established since the 1970's (Huck, 2012). The province's *Guide to Watershed Planning in Prince Edward Island* provides a manual of ideas and strategies on how to engage local people in watershed planning, and how to create a watershed management plan based on this input. Watershed committees in the province are community based but are supported by Watershed Coordinators and a Watershed Management supervisor at the provincial level, in providing technical advice and in assessing services needed from other departments, divisions and agencies outside the Department of Environment, Labour and Justice. Funds are available through the provincially supported Watershed Management Fund for community-based organizations involved in watershed management and planning. Engaging the community and the general public in watershed planning efforts is a key part of this program (Department of Environment Labour and Justice, n.d.). The creation of a similar guide as Prince Edward Island emphasizing the importance of public engagement in watershed planning could be beneficial for NL, as well as support for more watershed committees.

Manitoba, Canada- Conservation Districts as Water Planning Authorities

In Manitoba, Conservation Districts act as Water Planning Authorities. Watershed Management Plans are created under the principles of IWRM, in accordance with The Water Protection Act. The plans involve significant engagement of the public. Unlike what is suggested in NL, public consultation is a key part of the planning process, being one of the first steps in the planning process, even before technical work begins, and happening throughout the planning stages. Also, unlike NL the Conservation Districts have $25, 000 worth of funding to support watershed planning (Water Stewardship Division, n.d.). It was found that the public was being genuinely engaged by Water Planning Authorities and that Authorities see public engagement as fundamental to the overall success of IWRM (Huck, 2012). It was stated that,

> "As a result of these efforts, watershed planning in Manitoba has reduced fragmentation of authority and responsibility at the watershed scale and improved the integration of limited financial resources, expertise, local knowledge and partnerships to move forward on improving watershed conditions."
>
> (Huck, 2012, p. 207)

Clearly, involving the public in watershed management has improved water governance in Manitoba (Huck, 2012). Though increased financial resources for watershed planning may be unlikely in NL's current political and financial conditions, as in Manitoba, creating partnerships in water management can be a way to maximize scarce financial resources and expertise.

Ontario, Canada- Clean Water Act

In Ontario source protection committees under the Clean Water Act (2006) are comprised of representatives from municipal, and commercial/ industrial sectors as well as academic, professional, First Nations, NGO and/or general public members (Ontario Ministry of Environment, 2006). The act was a response to the Walkerton tragedy of 2000 where a small Ontario municipality's water source was contaminated, resulting in serious illnesses and seven deaths(Ferreyra et al., 2008). The planning process under the Act is part of Ontario's multi-barrier" approach to drinking water management (de Loë & Kreutzwiser, 2005). Under the Clean Water Act (2006), there are nineteen Source Protection Regions in Ontario, made up of one or more Conservation Authorities (with one being the lead). The Conservation Authorities are

required to act as scientific experts and provide the technical and administrative support that the source water protection committees need in order to respond to local conditions and develop new partnerships to address problems (Ontario Ministry of Environment, 2006). Municipalities are to act as the local experts, sharing data about their own source protection, existing local planning, wellhead protection, and water treatment. Municipalities are responsible for the implementation and enforcement of the source water protection plans, as they have control over land use planning, and the management of drinking water and wastewater treatment (Ivey, de Loë, & Kreutzwiser, 2006). For example, municipalities must update their Official Plan in accordance to the source protection plans for their area as well as hire a risk management official to monitor the enforcement. Furthermore, municipalities have the option of delegating enforcement authority to the board of health, planning board or source protection authority (the conservation authority) (Ontario Ministry of Environment, 2006). Implementation of plans is currently underway. This type of planning was designed to be collaborative in nature, and to build capacity for source water protection in the regions (Ontario Ministry of Environment, 2006). Regional watershed based source water protection committees such as those in Ontario could be a venue for this type of capacity building in NL, however due to the lack of supporting agencies such as Conservation Authorities, more research is needed to develop a model appropriate for the rural NL context.

North West Territories Water Stewardship Strategy

The North West Territories introduced a Water Stewardship Strategy in 2010, to "…guide the effective long-term stewardship of our water resources"(Miltenberger & Strahl, 2010, p. 1). The Strategy's development process has been led by a committee of Aboriginal and government representatives, that worked collaboratively to create a context appropriate water stewardship strategy that includes the values and input of residents on a wide range of topics related to ecosystem health, sustainable development and the socio-cultural importance of water. The plan emphasizes the importance of communication and cooperation amongst water partners. The premise of the plan being that water stewardship decisions are more effective with the best available knowledge. Traditional, local and western scientific knowledge's are all stressed as important. Since the North West Territories covers a large geographical scale and has a low population, capacity is an issue. Water monitoring efforts and decisions are stated as being collaborative processes involving all stakeholders. Continuous communication, education and awareness about water issues is also required in the strategy, which includes: regular public forums, workshops and meetings where information sharing and collaboration can occur; and the use of websites, the media, fact sheets and other plain language documents that can be distributed to insight engagement in interested residents (Miltenberger & Strahl, 2010). A Water Stewardship Strategy for the province of NL that strategically lays out public engagement efforts could be useful for NL. This could be an endeavor that the Office of Public Engagement and the Department of Environment and Conservation could collaborate on.

Long Tom Watershed Council, Oregon, United States

In Oregon, citizen volunteers, who have no legal authority, primarily govern Watershed Councils. With the example of the Long Tom Watershed Council (LTWC) in Oregon, it was found that when diverse parties are brought together to manage water that social infrastructure is built. Social infrastructure refers to the, "…management structure, membership, vision, priorities, partners, resources, and the acquisition of scientific knowledge, as well as the communication with and education of people associated with and affected by actions to protect and restore the watershed (Flitcroft, Dedrick, Smith, Thieman, & Bolte, 2009, p. 36). The

LTWC has focussed on building "social infrastructure" between individuals, volunteers, and landowners to participate in projects or cooperate with data-collection activities initiated by the LTWC. There has been many benefits found with the Watershed Councils including more holistic outcomes, the use of private and local funding, promoting of active learning through adult education programs, integrating science and practice. In the LTWC data collection, and other community based monitoring activities have also been used as a method of outreach. As trust was created and relationships built LTWC was able to do more (Flitcroft et al., 2009). Overall, the LTWC has been successful and able to do more within their watershed and sub-watersheds by involving the public. Though this type of involvement involved a great deal of interest and commitment by the residents of the area, it provides a positive example of what can be achieved by public engagement in watershed planning, governance and management efforts. If NL were to promote watershed councils or organizations, lessons learned from the LTWC could be employed.

European Water Framework Directive

In Europe, public participation has become of utmost importance in the creation of environmental policies. The European Water Framework Directive combines environmental policy goals related to water with public participation (Kastens & Newig, 2008). It is described in the directive that,"the success of this Directive relies on close cooperation and coherent action at Community, Member State and local levels as well as on information, consultation and involvement of the public, including users"(European Parliament and of the Council of the European Union, 2000, Sect. 14). For the directive, public participation is not a formality or an obligation, but an important tool for achieving the directive's goals (Kastens & Newig, 2008). It is clear that this type of strategic push towards participation in water and watershed management is becoming the norm in Europe. A similar strategy at the federal level in Canada or even at the provincial level could be beneficial in outlining the importance of engagement in watershed management activities in NL.

Academic Institutions

Academics can play a role in promoting better programs such as research involving communities and programs that involve community based research. Some examples of community based monitoring initiatives associated with academic institutions include:

- The Community-Based Environmental Monitoring Network, housed within the Department of Geography at Saint Mary's University in Halifax, Nova Scotia, Canada (http://cbemn.ca)
- The Nature Watch programs, which are in partnership with the University of Ottawa and Wilfred Laurier University in Ontario, Canada (https://www.naturewatch.ca)
- The Citizens' Environmental Watch in Toronto, Canada, was founded by academics in response to government cuts in environmental monitoring (http://www.citizensenvironmentwatch.org)
- The Alliance for Aquatic Resource Monitoring (ALLARM), housed within the Environmental Studies Department at Dickinson College in Pennsylvania (http://www.dickinson.edu/allarm)
- The University of Rhode Island Watershed Watch (www.uri.edu/ce/wq/ww)

(Conrad & Hilchey, 2011).

Though recent water related studies from Memorial University of Newfoundland have emphasized the engagement of residents (Holisko et al., 2014; Minnes & Vodden, 2014), having a university wide water network focused on community based research and engagement could be beneficial. The Memorial University Office of Public Engagement could provide aid in facilitating this network.

8. Conclusions, Recommendations and Areas for Future Research

This literature review has outlined best practices for the engagement of citizens in watershed planning, and more specifically how to apply these best practices to source water protection in NL. The goal of this literature review was to: a) Determine what the literature indicates is needed for successful public engagement in watershed planning, governance, and management and; b) Explore the benefits of public engagement in source water protection planning, governance, and management and how this can contribute to the successful implementation of water policies. It was found that public engagement is essential, according to the literature, for success in source water protection efforts. Engagement offers benefits, especially for rural, capacity deficient communities. Further possible examples were provided from outside NL to illustrate models of the types of ways citizens could be engaged in source water protection. It should be noted that public engagement in water planning, governance and management is not easy, and requires considerable time and money (Hamstead et al., 2008; Healey, 2014; Huck, 2012).

It has been explained that:

> "Participatory processes have emerged as a strategy to address seemingly endless court battles, local opposition to agency decisions, and a general decline in trust in governmental institutions. When done well, these processes can provide a new approach for reflecting public values in decisions, dealing with conflict, and building trust."
>
> (Beierle , 2000, p.599)

Public engagement in environmental governance is now seen as a normative process for democratic governance (Benson et al., 2012). The need for public engagement in watershed planning efforts such as source water protection is clear, with citizen engagement being a key part of making better policies and decisions for sustainability (Koontz, 2006). However, doing public engagement well seems to be the challenge. This literature review has given examples where NL could improve public engagement in source water protection, especially in regards to meaningful engagement, where citizens feel they have the power to make a real difference in the planning and management process (Ansell & Gash, 2008; Larson & Lach, 2008; Rouillard et al., 2014).

Many best practices have been provided in this literature review that should be carefully considered by both provincial and municipal governments in NL. The role that Memorial University of Newfoundland can play in engaging the community in academic research and monitoring programs should also be explored. The public should not just be engaged in defining problems, but should also be integral players in being part of solutions (Mirza et al., 2012). The public plays an imperative role in protecting drinking water supplies at the source due to the impacts that can be made through human activity. There is potential, as seen in other places in

Canada and beyond, for the engagement of the public in managing source water supplies to have a myriad of benefits such as maximizing limited financial and human resources. Furthermore, increased public awareness and involvement in source water protection efforts will help facilitate a culture of stewardship in NL and ownership of source water protection regulations. Public participation in source water protection planning, governance and management (including monitoring) has significant promise for NL, however it will take a great deal of support institutionally, financially and technically. The vitally important task of protecting NL's drinking water supplies should be a collaborative effort amongst federal, provincial, and local governments, as well as residents, industries, NGOs and academics, as it is in everyone's best interest to ensure the safety of NL's drinking water for current and future generations.

Below is a list of recommendations for NL (in no particular order) on ways to better engage the public in source water protection efforts, as well as areas for future research on this topic.

Recommendations for NL:

- Employment of better engagement strategies that facilitate meaningful public engagement using the enablers listed in Section 4 and avoiding the barriers outlined in Section 5 of this report.
- More opportunities for education and outreach events relating to source water protection at either the local and/or regional level.
- Greater support for the local/regional level (where appropriate) to create source water protection plans.
- Amendments to the *A Municipal Guide to the Development of a Watershed Management Plan* document to include public consultation in every stage of watershed planning and governance, and outline community based monitoring activities for watershed monitoring efforts.
- More technical and financial support at the provincial, municipal and non-governmental organization level for the involvement of the public in community based monitoring efforts.
- Creation of a provincial wide water stewardship strategy that emphasizes and explains efforts for public engagement as part of the stewardship process.
- Collaboration between the Office of Public engagement, the Department of Environment and Conservation, and local governments to create better ways to involve citizens in source water protection planning, governance and management.
- Strengthen efforts of Memorial University of Newfoundland faculty to engage the public in academic research and community based monitoring activities. The Memorial University Office of Public Engagement could aid in the facilitation of a *Memorial University of Newfoundland Water Network*, with a mandate to engage the public in water research.

Areas for Future Research:

- Determining appropriate new governance structures for source water protection in NL taking into account programs occurring nationally and internationally.
- More case study research on current public engagement examples in environmental governance and management efforts in NL.

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