Evaluating the Coquitlam River Watershed Roundtable Planning Process and the Open Standards for the Practice of Conservation Framework

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Abstract

This study uses an evaluative framework synthesized from the literature on collaborative planning, integrated water resource management, and adaptive governance to evaluate the Coquitlam River Watershed Roundtable's planning process and its application of the Open Standards for the Practice of Conservation framework. The Coquitlam River Watershed Roundtable was the first organization in Canada to apply the Open Standards framework in developing a multi-jurisdictional collaborative watershed plan, and among the first in the world to apply the Open Standards in a way that integrated ecological and human well-being goals. The evaluative framework consists of criteria in four broad categories: (1) Collaborative Planning; (2) Holistic Approach; (3) Authority and Control; and (4) Learning and Adjusting with Experience. The Roundtable performed well on most criteria. I make seven recommendations to improve the planning process and discuss four key considerations to guide similar community-based initiatives seeking to apply the Open Standards framework for watershed planning.

Keywords: community-based watershed management; integrated watershed management; British Columbia; adaptive governance; collaborative planning

Dedication

To my niece, Layla Arlene Austen, your eternal curiosity and love for nature inspires me.

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List of Acronyms

BC	British Columbia
CMP	Conservation Measures Partnership
CRWR	Coquitlam River Watershed Roundtable
GWP	Global Water Partnership
IWRM	Integrated Water Resource Management
PAR	Participatory-action Research
TOR	Terms of Reference

Chapter 1. Introduction

1.1. Research Context

Sustainable water resource management has become an issue of major concern over the last few decades. Globally, severe water shortages affect millions of people, while vulnerability to water related hazards and climate change impacts is increasing, and the resilience of many ecosystems is in decline (Biswas et al., 2012; Pahl-Wostl et al., 2012). The problems of water resource management have become increasingly urgent and complex, as rapid and pervasive land-use changes mount, industrial and agricultural productivity intensifies, and urban populations become more concentrated (Jonch-Clausen and Fugl, 2001; Pahl-Wostl et al., 2007; Pahl-Wostl., 2012). In the past, the dominant, traditional paradigm for water resource management was a science-based "command-and-control" approach. This "command-and-control" approach is characterized by centralized, sectoral institutions, limited stakeholder involvement and expert-led problem solving focused on technical engineering solutions (Schoeman et al., 2014; Pahl-Wostl et al., 2007). Traditional water management often dealt with problems in isolation, without sufficiently accounting for interconnections and potentially undesirable long-term consequences (Pahl-Wostl et al., 2007; Schoeman et al., 2014). This approach may have been effective in dealing with well-defined technical problems, but it is inadequate for the complex problems of water management today. An absence of integration in water management has resulted in governing bodies being unable to reconcile conflicting interests, the development of policies without adequate consideration of the implications for other water users, and poor consultation across sectoral and institutional boundaries (Bakker and Cook, 2011; Jonch-Clausen and Fugl, 2001; Schoeman et al., 2014).

Over the past two decades, new holistic and integrated approaches to water resource management have emerged to address the perceived shortcomings of the conventional "command-and control" approach (Ferreyra et al., 2008; Kramer and Pahl-Wostl, 2014). An integrated approach to water resource management calls for the consideration of economic, ecological, social and cultural values of water, inclusion of different forms of knowledge,

integration of issues, sectors and disciplines and involvement of a broader range of stakeholders (GWP-TAC, 2000; Schoeman et al., 2014). The view that governments act as the central ruler through top-down bureaucracies and scientific expertise is replaced by decentralized, participatory bottom-up regimes (Brunner, 2002; Brunner and Steelman, 2005; Ferreyra et al., 2008). A particularly pertinent example of this approach is the rapid growth of community-based watershed initiatives, acting as locally based decision-making organizations (Brunner, 2002; Brunner and Steelman, 2005; Lurie and Hibbard, 2008).

Community-based initiatives are composed of participants representing multiple interests who interact directly over a period of time in an effort to address and solve collective issues in their community (Brunner, 2002; Brunner and Steelman, 2005; Lurie and Hibbard, 2008). Brunner and Steelman (2005), argue that it is the place-based and problem-oriented qualities of such initiatives that allow for the balancing and integration of diverse interests into policies that seek to advance the common interest. Community-based watershed initiatives are typically self-organized local groups that are largely dependent on voluntary labor (Lurie and Hibbard, 2008). They generally utilize collaborative decision-making processes, and possess no regulatory authority of their own (Lurie and Hibbard, 2008). The increasing popularity of this approach among watershed communities at a global scale aligns with the broader emergence of adaptive governance in environmental decision-making and implementation (Brunner and Steelman, 2005). In adaptive governance, various forms of knowledge and science are integrated into policies that seek to advance the common interest, particularly through open decision-making processes, allowing space for flexibility in order to adapt policies based on experiences and opportunities (Brunner, 2002; Brunner and Steelman, 2005).

Notwithstanding the genuine enthusiasm and good intent of many community-based initiatives, they often face significant operational challenges (Lurie and Hibbard, 2008). In a review of the empirical literature on community-based watershed initiatives, Leach and Pelkey (2001) found that sufficient, reliable funding was the most commonly cited barrier to successful planning and implementation. Limited technical expertise and human capacity may also impede an organization's ability to meet its planning objectives (Lurie and Hibbard, 2008). Other social and institutional factors such as the development of trust among stakeholders can also affect performance (Lurie and Hibbard, 2008). Given these challenges, it is critical to evaluate the effectiveness of planning processes applied by community-based initiatives and their resulting effects on the physical, biological, and social aspects of watershed-related problems, in order to

enhance our collective knowledge of these problems and understand how to improve the capacity of planning processes to address them. In this research project, I propose an evaluative framework drawn from the literature on collaborative planning, integrated watershed resource management (IWRM), and adaptive governance to assess the strengths and weaknesses of community-based watershed processes of collaboration and integration for watershed management and planning. I apply the evaluative framework in a case study of the Coquitlam River Watershed Roundtable planning process and its draft watershed management plan.

The Coquitlam River Watershed Roundtable (referred to hereafter as the CRWR or the Roundtable), in Coquitlam, British Columbia (BC) formed in 2011 as an outcome of a multi-phased Coquitlam River Watershed Strategy (CRWR, 2015a). The Coquitlam River Watershed Strategy, led by the City of Coquitlam in partnership with Kwikwetlem First Nation and with the support of the Coquitlam River Aggregate Committee, engaged community members and stakeholders associated with the watershed to complete a four-phased Watershed Management Plan Initiative (CRWR, 2015a) (Section 2.4.2). The CRWR is guided by an administrative body called the Core Committee. The Core Committee is comprised of 18 members representing various sectors of the watershed (CRWR, 2015b) (Section 2.4.2). Early in its visioning process, the Core Committee recognized the importance of developing an integrated watershed management plan to characterize existing conditions and potential pressures on the watershed, and to identify strategies required to promote the watershed's long term health and sustainability.

The Core Committee collectively agreed that the Roundtable's watershed planning process would follow the "Open Standards for the Practice of Conservation" framework (referred to hereafter as the Open Standards). Developed by the Conservation Measures Partnership (CMP) (a group of international non-governmental and governmental agencies) in 2002, the Open Standards is used to plan and prioritize conservation actions based on project priorities, assumed links between actions and outcomes, likelihood of success and the cost of implementation for conservation projects (CMP, 2015). The Open Standards has been applied by various groups worldwide; for example, within five years of its development, it was downloaded by over 5500 users in 167 countries, and implemented in over 115 projects managed by The Nature Conservancy (Schwartz et al., 2012). However, despite its global popularity, few evaluations of the structure and effectiveness of the Open Standards as a conservation tool have been attempted (Schwartz et al., 2012).

The Roundtable is the first organization in Canada to apply the Open Standards in developing a collaborative watershed plan, and among the first applications worldwide that explicitly integrated both ecological and human well-being goals into its management planning. As such, the CRWR has an opportunity to develop a unique and innovative integrated watershed management plan and set a precedent for community-based watershed planning in Canada (at the time of writing this report, the CRWR had completed the *Conceptualize* phase of the Open Standards and was in the process of developing their *Plan Actions and Monitoring* phase (Section 2.5)). In addition to evaluating the Roundtable's planning process, this study examines the role, and strengths and weaknesses of the Open Standards in structuring integrated watershed management plans by community-based organizations. This research contributes to the broader discussion concerning the shift to decentralized, participatory approaches for environmental decision making and implementation.

1.2. Research Collaboration

The engagement of university researchers with communities has often involved a non-reciprocal relationship where researchers take away from communities without meaningfully giving back (Kassam and Tettey, 2002). Critics of this research approach have encouraged the repair and strengthening of university-community relations through the development of equitable and collaborative research partnerships that lead to knowledge creation and direct action (Kassam and Tettey, 2002). The rapid growth and acceptance of action-oriented research is one response that is designed to change and strengthen the researcher-community partnership (Kassam and Tettey, 2002). Action-oriented research aims to solve specific problems within a community by fully engaging community members in analyzing the problems and creating their own solutions (Patton, 2002). I adopted an action-oriented approach to my research with the CRWR (Chapter 3).

The research collaboration began when the CRWR enquired about possible research partners with the Water Research Group at Simon Fraser University. I responded with a proposal to do a research project focused on the CRWR's watershed management planning process. After initial discussions with the CRWR Coordinator (Krista Englund) and the Environmental Services Coordinator at the City of Coquitlam (Margaret Birch), we agreed that I would begin by volunteering with the CRWR Core Committee so I could learn about the organization, build rapport with Core Committee members, and develop my project in collaboration with them.

During my time volunteering, the CRWR Coordinator and I developed my areas of inquiry and methods. To ensure that research outputs would be geared towards a practical application for the CRWR, Core Committee members were also directly involved and contributed significantly to the identification of the problem to be addressed, the research purpose and objectives, and the research design. We decided together that the project would focus on evaluating the CRWR's planning process and its practical application of the Open Standards in developing a watershed management plan. I interned with the CRWR Core Committee over the summer (May 2013-August 2013), and my data collection and analysis spanned February 2014 – March 2015. This included providing participants the opportunity to review and provide feedback on my analysis and preliminary results, as I detail in Chapter 3.

1.3. Research Purpose and Objectives

The purpose of this research is to evaluate the CRWR's planning process based on broadly promoted principles of collaborative planning, IWRM, and adaptive governance, and to examine the role, and the strengths and weaknesses of the Open Standards for structuring watershed management plans. The research objectives are as follows:

a) Develop an evaluative framework based on broadly promoted principles of collaborative planning, IWRM, and adaptive governance;

b) Perform an evaluation of the CRWR's planning process;

c) Generate recommendations to improve the CRWR's planning process as it moves forward;

d) Examine the role of the Open Standards in structuring watershed management plans within the broader context of integrated watershed management; and

e) Identify the strengths and weaknesses of the Open Standards as a guide for integrated watershed management planning by community-based organizations.

1.4. Structure of Report

This report is divided into six additional chapters. The second chapter provides background information about collaborative planning, IWRM, and adaptive governance. The second chapter also introduces the study area, the CRWR, and the Open Standards. Chapter three

describes the methodology I employed in the research, and chapter four describes the evaluative framework I developed to evaluate the CRWR planning process and the Open Standards. The fifth chapter reports the results of the research and the final chapter discusses those results, outlines recommendations to improve the CRWR's planning process, identifies the strengths and weaknesses of the Open Standards as a guide for integrated watershed management planning and suggests possible future research.

Chapter 2. Literature Review and Case Study Description

This chapter provides a brief review of the literature on collaborative planning (e.g., Frame et al., 2004; Morton, 2009), integrated water resource management (IWRM) (e.g., GWP-TAC, 2000; Jonch-Clausen, 2004; Ramin, 2004), and adaptive governance (e.g., Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2014) that I used in constructing my evaluative framework. These bodies of literature were chosen as they specifically relate to the goals and principles of the CRWR (Section 3.2), but are broad enough to apply to other community-based watershed management and planning initiatives with similar goals. I also provide a brief geographic description and overview of the study area, introduce the CRWR, and a synopsis of the Open Standards framework.

2.1. Collaborative Planning

One of the primary challenges in natural resource management is to resolve conflict among competing stakeholders. The "value-laden" nature of resource management decisions tends to polarize groups, leading to adversarial "position-based" bargaining, often resulting in outcomes that leave many parties unsatisfied (Morton, 2009). Collaborative planning or shared decision-making processes offer an alternative way to resolve disputes and prepare natural resource management plans. The foundations of collaborative planning stem from the idea that those best suited to participate in decision-making processes are the individuals or groups who will be most impacted by the planning outcomes (Gunton et al., 2006). The primary difference between collaborative planning and other conventional planning approaches is that it uses a higher level of collaboration through the direct delegation of authority and control of the planning process to stakeholders who work together in face-to-face negotiations in order to reach a consensus agreement that better meets the interests of all stakeholders (Frame et al., 2004; Gunton et al., 2006; Gunton and Day, 2003; Susskind et al., 2003). Typically, collaborative planning approaches use an independent facilitator, consensus rules of agreement, interest-based negotiation techniques, and joint fact finding to develop management plans that are then recommended to statutory agencies to obtain final approval authority (Frame et al., 2004; Gunton

et al., 2006). Collaborative planning has been formally adopted as a preferred planning approach in forest and land-use planning, watershed planning, and urban planning in various settings in Australia, Canada, and the United States (Gunton and Day, 2003; Leach et al., 2002). In particular, in 1992, the province of BC was one of the first jurisdictions to formally adopt a collaborative planning model for the development of land and resource management plans in regions experiencing environmental conflict (Gunton et al., 2006). Although each process is unique to some extent, the collaborative planning literature provides a clear pathway for the recommended phases and steps in a collaborative approach.

The collaborative planning approach typically consists of three phases: *pre-negotiation*, *negotiation*, and *post-negotiation* (Gunton and Day, 2003; Susskind et al., 2003). The first phase, *pre-negotiation*, begins by identifying and recruiting the relevant stakeholder representatives, completing a conflict assessment to highlight the nature of the conflict and options for resolution, and identifying a core planning team responsible for guiding the process and collecting all relevant information and data. A draft terms of reference (TOR) document is often prepared during this phase, outlining objectives, procedural rules, roles and responsibilities and timelines. The draft TOR is then reviewed and approved by the stakeholder table prior to formal adoption (Gunton and Day, 2003; Susskind et al., 2003). Phase two, *negotiation*, includes the identification of all stakeholder interests, the formal adoption of the TOR, and setting general rules of conduct. As all interests are now presumed to be present at the table, stakeholders can begin brainstorming multiple scenarios that provide opportunities for collective gains. During this stage, gaps in information are identified and stakeholders may convene in sub-committees dedicated to joint fact finding or developing solutions which require specific expertise. Once a set of scenarios is identified, each option is evaluated and a selection is made by consensus (Gunton and Day, 2003; Susskind et al., 2003). The last phase, *post-negotiation*, involves obtaining the required approvals necessary to implement the plan. For example, stakeholder agreements typically require ratification by a legally designated approval authority. During this final phase, stakeholders create a monitoring and evaluation plan, followed by renegotiation of components of the agreement that may be necessary due to changing information or circumstances (Gunton and Day, 2003; Susskind et al., 2003).

Advocates of collaborative planning highlight numerous benefits of this approach over other planning models. First, collaborative planning is more likely to resolve conflict among competing stakeholders because it identifies mutually acceptable solutions (Gunton and Day,

2003; Frame et al., 2004). Second, through the inclusion of all stakeholders throughout the decision-making process, collaborative planning processes are more likely to result in a plan that speaks to the common interest of the community at large (Gunton and Day, 2003). Third, planning outcomes are typically of higher quality because they incorporate a broader array of unique experiences and knowledge (Frame et al., 2004; Gunton and Day, 2003; Morton, 2009). Agreements are also more likely to produce innovative ideas as a result of generating new options that may not have been considered previously by central planners (Frame et al., 2004; Innes and Booher, 1999). Fourth, outcomes are more likely to result in successful implementation because stakeholders are less likely to oppose decisions that they were involved in from the beginning (Gunton and Day, 2003). For the same reason, stakeholders are more likely to be committed to the results of the process (Frame et al., 2004). Last, collaborative planning approaches can result in second-order effects such as increased social and political capital by building new and stronger relationships amongst participants through increasing understanding, trust, and co-operation (Innes and Booher, 1999).

Despite the wide ranging benefits of collaborative planning, both advocates and critics of this approach have identified weaknesses and challenges. First, although collaborative planning attempts to address power imbalances by providing stakeholders with decision-making authority and using consensus-based decision making techniques, all participants do not have equal capacity to participate effectively. Even when stakeholders are motivated to negotiate, stakeholder groups typically have disparities in the skills and resources that they bring to the table (Gunton and Day, 2003; Susskind et al., 2003). These power imbalances can result in certain stakeholder groups being denied the opportunity to make meaningful contributions to the planning process, allowing more powerful stakeholders to manipulate the process to their advantage (Gunton and Day, 2003; Frame et al., 2004). Imbalances in power can also result in more powerful stakeholders having the ability to achieve their objectives without engaging in collaborative planning with less powerful stakeholders. If this occurs, weaker stakeholders may withdraw from the process, reducing the likelihood of a mutually beneficial outcome (Gunton and Day, 2003; Susskind et al., 2003). Second, collaborative approaches can result in elected officials abdicating their legal obligations and authority when they shift decision-making power to non-elected stakeholders (Frame et al., 2004). Stakeholders may have weak accountability to their constituents and to the public, and officials may not be fully accountable for any negative impacts of the planning process and outcomes (Frame et al., 2004). Third, critics have argued that collaborative approaches can result in second-best solutions, or the lowest common denominator

being adopted in order to avoid difficulties in reaching consensus (Gunton and Day, 2003; Susskind et al., 2003). This can result in poor choices, or recommendations that are too vague to guide implementation. Fourth, the resources and time required to complete a collaborative planning process are often substantial and may result in participants exiting the process prior to completion (Gunton and Day, 2003; Frame et al., 2004). Last, stakeholder groups that are willing and able to participate in the process may represent a narrow spectrum of special interests that exclude affected interest groups who chose not to participate because they are unable to organize themselves or unable to define their interests clearly (Gunton and Day, 2003; Frame et al., 2004). Delegating planning responsibilities to stakeholders who do not represent the common interest of the community at large can result in outcomes that are not mutually acceptable or beneficial.

Collaborative planning has both advantages and limitations. Advocates of this approach acknowledge the challenges and emphasize that such processes must be well designed to mitigate the potential problems. Gunton and Day (2003) provide ten key design and management practices for successful collaborative planning processes: (1) determine if collaborative planning is appropriate; (2) ensure inclusive representation; (3) provide clear ground rules; (4) reduce inequities among stakeholders; (5) ensure process accountability; (6) remain flexible and adaptive; (7) provide sound process management; (8) provide realistic timelines; (9) provide implementation and monitoring processes; and (10) use multiple-objective evaluation. In addition, through a multi-stage analysis of collaborative planning processes in land use planning initiatives in BC, the Collaborative Planning Lab at the School of Resource and Environmental Management at Simon Fraser University produced a comprehensive set of best practices for collaborative planning (Frame et al., 2004; Morton, 2009). These best practices have been incorporated into my evaluative framework and are described in detail in Section 3.2 and in the Collaborative Planning criteria category of the evaluative framework (Section 4.1).

2.2. Integrated Water Resource Management

In response to the inability of the traditional command-and-control approach to deal adequately with the increasing complexity, uncertainty, and conflict ridden problems associated with water resource management, integrated water resource management (IWRM) has been widely adopted, in principle, as a guiding management paradigm (Ferreyra et al., 2008; Kramer and Pahl-Wostl, 2014). IWRM is one of the major bottom-up alternatives that emerged as part of a larger trend towards more decentralized and participatory styles of environmental governance.

The principles and ideals embodied in the IWRM paradigm are not new, and can be traced back to the early 1900's. In North America, two of the most commonly cited historical examples of IWRM are the Tennessee Valley Authority and Ontario's Conservation Authorities. The Tennessee Valley Authority, often cited as an early model for an integrated approach to natural resource management, was established in 1933 following the enactment of a state law for comprehensive and integrated planning and development of the Tennessee River Basin (Bandaragoda and Babel, 2010). With a mandate to develop the Tennessee River for navigation, flood control, and power production, the Tennessee Valley Authority was also responsible for addressing erosion control, recreation, public health and welfare, and planning, as well as providing rural housing, rural libraries and public utility services. Unfortunately, many of the promises for an integrated planning approach were not fulfilled, and over time the authority focused on power production and flood control as their primary responsibilities. Despite the unfulfilled promises of the Tennessee Valley Authority, many American regional water authorities modeled their approach to water resource management on the Tennessee Valley Authority (Bandaragoda and Babel, 2010).

In Canada, the earliest recognized example of IWRM is Ontario's Conservation Authorities. Ontario's Conversation Authorities Act, passed in 1946, was enacted in response to a perceived need to provide jobs for returning World War II veterans, and to address the increasingly degraded state of the province's natural resources (Mitchell et al., 2014). The mandate of this initiative was "to ensure the conservation, restoration and responsible management of Ontario's water, land, and natural habitats through programmes that balance human, environmental, and economic needs" (Mitchell et al., 2014: p. 461). The Conservation Authorities have four core objectives: "(1) ensure that Ontario's rivers, lakes, and streams are properly safeguarded, managed and restored; (2) protect, manage and respect Ontario's woodlands, wetlands and natural habitat; (3) develop and maintain programmes that will protect life and property from natural hazards such as flooding and erosion; and (4) provide opportunities for the public to enjoy, learn from and respect Ontario's natural environment" (Mitchell et al., 2014: p. 461). Other elements of the legislative mandate include developing local initiatives and fostering provincial-municipal partnerships. Following the passage of the Conservation Authorities Act, several municipalities across Ontario formed Conservation Authorities that ranged in size from 490 km^2 to 6800 km^2. As of 2014, Conservation Authorities manage watersheds containing 90% of Ontario's 11 million people (Mitchell et al., 2014). The effectiveness of these authorities has, however, been contested. For example, fragmentation of

resource management responsibilities among various agencies in the province has limited the role of Conservation Authorities primarily to flood and erosion control, and as a result planning is more operational than strategic in nature (Mitchell et al., 2014). Authorities have also been criticized for being unaccountable and inconsistent in their delivery of resource programmes across the province, and for lacking effective conflict resolution mechanisms, hindering attempts to integrate land and water resource management (Mitchell et al., 2014).

Over the past three decades, international summits and conferences have formulated and operationalized the principles and ideals of IWRM. In 1977, the United Nations Conference on Water held in Mar del Plata in Argentina marked a major milestone in the development of the IWRM concept. The goals of the conference were two-fold: (1) assess the status of water resources to ensure that an adequate supply is readily available to meet socioeconomic needs; and (2) proactively avoid a global water crisis by promoting preparedness, nationally and internationally (Bandaragoda and Babel, 2010; Rahaman and Varis, 2005). A key outcome of the conference was the development and approval of the Mar del Plata Action Plan, the first international coordinated effort to promote IWRM (Bandaragoda and Babel, 2010; Rahaman and Varis, 2005).

During the 1980's international discussions on water resource management subsided. For example, the 1987 Bruntland Commission report did not specifically address water resource management issues, nor did it follow up on the Mar del Plata Action Plan (Bandaragoda and Babel, 2010; Rahaman and Varis, 2005). However, by 1992, fifteen years after the Mar del Plata conference, water resource issues were once again on the international agenda through the International Conference on Water and the Environment in Dublin. The Dublin conference brought together more than 500 individuals from 114 countries, 28 United Nations agencies and organizations and 58 non-governmental and intergovernmental organizations to focus on the necessity of adopting an integrated approach to water resource management (Mitchell, 2005). With respect to water resource management issues, the conference was designed to serve as a preparatory event to the United Nations Conference on Environment and Development, held later that year in Rio de Janiero. The Dublin conference resulted in the development of four guiding principles associated with water resource management:

1. "Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment;

2. Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels;

3. Women play a central part in the provision, management and safeguarding of water; and

4. Water has an economic value in all its competing uses and should be recognized as an economic good" (GWP-TAC, 2000: p. 14).

The principles that emerged from the Dublin conference (referred to as the Dublin-Rio principles) were subsequently included in the Agenda 21 recommendations for sustainable development (Chapter 18 on freshwater resources) adopted by the United Nations (UN DESA, 1992). Since then, these principles have received broad support among the international community as the core foundations underpinning IWRM (GWP-TAC, 2000). Over the past two decades additional international conferences have reinforced the idea of IWRM, including the 2001 International Conference on Freshwater in Bonn, the 2002 World Summit on Sustainable Development in Johannesburg, and the 2003 Third World Water Forum in Kyoto. These conferences contributed to the current emphasis and promotion of IWRM and were essential to keeping water on the international political agenda (Rahaman and Varis, 2005).

While the need for an integrated approach to water management is widely acknowledged, the literature reveals that no single definition of IWRM exists. One of the most commonly used definitions is from the Global Water Partnership (GWP), a global organization created in 1996 through collaboration among the World Bank, the United Nations Development Program, and the Swedish International Development Agency, committed to the Rio-Dublin principles and shaping the IWRM concept. The GWP defines IWRM as:

> "*A process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"* (GWP-TAC, 2000: p. 22).

This definition emphasizes that IWRM is a process, not an end goal in itself. It is a process of balancing multiple objectives from competing interests, and making trade-offs between different goals and values in an informed way. The GWP provides basic social, economic, and environmental goals implicit in its definition of IWRM:

- *"Economic efficiency in water use*: because of the increasing scarcity of water and financial resources, the finite and vulnerable nature of water as a resource and the increasing demands upon it, water must be used with the maximum possible

economic efficiency in order to ensure social welfare and contribute to the elimination of poverty;

- *Social equity*: the basic right for all people to have access to water of adequate quantity and quality for the sustenance of human well-being must be universally recognized; and
- *Environmental and ecological sustainability*: the present use of the resource should be managed in a way that sustains the vital life-support systems, thereby not compromising use by future generations of the same resource" (GWP-TAC, 2000: p. 30).

Accordingly, in theory, water should be managed to provide economic well-being to people, without compromising social equity or ecological sustainability. Within this paradigm, decision making encompasses a participatory approach whereby all stakeholders at all levels of the social structure have an impact on decisions, different types of knowledge are incorporated, and integration occurs both within and between natural and human systems (GWP-TAC, 2000).

The GWP provides an initial framework to facilitate the implementation of IWRM. In this framework, the concurrent development and strengthening of three key areas is required: an enabling environment, appropriate institutional roles, and practical management instruments (GWP-TAC, 2000). The enabling environment consists of setting national, provincial, and local policies and goals to drive the process (AWRA, 2012; GWP-TAC, 2000; Jonch-Clausen and Fugl, 2001). Institutional roles involve developing an organizational structure and the institutional capacity necessary to coordinate water resource management effectively (AWRA, 2012). This includes developing clearly articulated roles and responsibilities of actors, designing effective co-ordination mechanisms, addressing jurisdictional gaps and overlaps and aligning responsibilities with capacities for action (AWRA, 2012; GWP-TAC, 2000; Jonch-Clausen and Fugl, 2001). Last, management instruments encompass the tools and methods that enable and assist decision makers, such as: (1) assessing the availability of, and need for, water resources; (2) developing IWRM plans that balance economic, social, and environmental needs; (3) resolving multiple-user conflicts; (4) implementing economic tools that promote social equity and efficiency; and (5) improving knowledge within and across sectors and agencies to manage water more effectively (AWRA, 2012; GWP-TAC, 2000; Jonch-Clausen and Fugl, 2001).

Although IWRM has gained broad international support, and has been largely promoted by experts as the most appropriate mechanism for achieving sustainable water resource management in the 21st century (Jonch-Clausen and Fugl, 2001; Ramin, 2004), efforts to successfully implement IWRM have encountered significant barriers. First, one of the most

commonly cited barriers to IWRM is the mismatch of jurisdictional boundaries to watershed boundaries. Blomquist and Schlager (2005) suggest that integration cannot be realized when water resource management is organized around watershed boundaries due to the resulting political tension and challenges in identifying the most appropriate and accountable decision-makers. Such challenges can lead to difficulties in assessing problems and determining ecologically and politically sustainable solutions (Cervoni et al., 2008). Second, many scholars have also identified institutional weaknesses as one of the most significant barriers to the practical implementation of IWRM. According to GWP-TAC (2000), for water to be managed effectively, complex or cross-boundary problems typically require newly created mechanisms that foster coordination and cooperation among stakeholders that share water management responsibilities. This can create significant challenges. For example, in Canada the constitutional division of responsibilities for water management has resulted in an institutionally fragmented organizational structure in which incentives for integration are weak (Ramin, 2004). Last, beyond the most commonly defined resource constraints of time and funding, a widely discussed barrier is inadequate data availability. Pursuing water resource management under an integrated approach requires addressing a greater number of systems and interactions, therefore a broader variety and amount of information is necessary for effective decision-making, as opposed to a more narrow technically focused approach (Ramin, 2004; Roy, 2009). There exist several barriers to meeting this demand. First, integrative science requires the inclusion and interaction of scientists in both natural and social science disciplines. However, academic structures create a barrier to achieving a multi-disciplinary approach as these institutions largely emphasize specialization, restricting our understanding of system relationships (Ramin, 2004). Second, in Canada in particular, federal and provincial government budget cut-backs have resulted in gaps in the type and amount of scientific information available pertaining to water resources. For example, between 1990 and 1998, the number of hydrometric and meteorological network stations (which provide basic support to inform decision making related to water quantity) across Canada decreased by 21 percent (from 3, 374 to 2, 650) (Shrubsole and Draper, 2012).

In light of these barriers, researchers and practitioners continue to stress that there is no single blueprint for implementing IWRM. Ongoing experience indicates that an effective approach to IWRM requires continual adaptation and modification to suit different social, economic, cultural and physical contexts, in accordance with new information, understanding, and evaluation of costs and benefits. IWRM is an ecosystem-based approach with a central aim to promote coordination and integration among stakeholders in order to manage water more

holistically and sustainably (Medema et al., 2008; Mitchell et al., 2014). The literature emphasizes five substantive principles of IWRM: (1) the management unit is the catchment or river basin rather than a jurisdictional unit; (2) attention is directed to upstream-downstream, surface-groundwater and water quality-quantity interactions; (3) interconnections of water with other natural resources and the environment are considered; (4) environmental, economic, and social aspects receive attention; and (5) all stakeholders are actively engaged in decision making processes (Ferreyra et al., 2008; GWP-TAC, 2000; Mitchell et al., 2014; Rouillard et al., 2014). I incorporated the five substantive principles of IWRM into my evaluative framework to capture best practices for integrated watershed management in the context of community-based natural resource management initiatives. These principles are described in detail in Section 3.2 and are largely embedded in the Holistic Approach, Authority and Control, and Learning and Adjusting with Experience criteria categories of my evaluative framework (Section 4.2, 4.3, and 4.4).

2.3. Adaptive Governance

Many natural resource management challenges are "messy and wicked problems", characterized by complexity, uncertainty, conflicting values, contestation and fragmented institutional settings (Lockwood et al., 2010). These challenges require novel policy and institutional responses (Lockwood et al., 2010), including adaptive and locally relevant governance initiatives. Governance refers to the interactions among structures, processes and traditions that determine how power and responsibilities are exercised and how decisions are made (Brunner and Steelman, 2005; Lockwood et al., 2010). The continuing task of governance in any democratic community is finding common ground on policies that seek to advance the common interest (Brunner and Steelman, 2005). As previously emphasized in this chapter, governments alone can no longer be considered the most important source of decision-making authority in natural resource management. Traditional, centralized authoritative approaches have often failed to clarify and secure the common interest, due to the inherent complexity and multiscale dimensions of current resource management problems, the inability of single actors to resolve these problems, and the increased demands of citizens for direct inclusion in policy processes (Lurie and Hibbard, 2008). It is now widely acknowledged that decision-making must integrate and accommodate diverse views, incorporate partnerships among government and non-governmental actors, include multiscale (spatial and temporal) phenomena and provide opportunities for shared learning (Armitage et al., 2012; Brunner and Steelman, 2005; Lockwood

et al., 2010). In response, new actors are playing critical decision-making roles, and new mechanisms of governance are increasingly emerging.

The rapid rise of community-based initiatives, acting as locally based decision-making authorities, over the past two decades represents a promising governance approach to address the perceived shortcomings of traditional expert-driven, centralized resource management. Community-based initiatives are composed of participants representing multiple interests who interact directly over a period of time in an effort to address and solve collective issues in their community (Brunner, 2002; Brunner and Steelman, 2005; Lurie and Hibbard, 2008). The place-based and problem-oriented qualities of such initiatives have opened up opportunities for balancing and integrating diverse interests into policies that seek to advance the common interest (Brunner, 2002; Brunner and Steelman, 2005).

Brunner and Lynch (2010: p. 23) define the common interest as "…interests widely shared by members of a community. It would benefit the community as whole and be supported by most community members". Brunner and Lynch (2010) stress that the common interest must not be assumed or taken for granted, rather it must be developed in each community, on the basis of the valid and appropriate interests of community members. Not all interests are equally valid and appropriate in clarifying the common interest. Interests are considered invalid if they are not supported by the evidence available, and inappropriate if not consistent with broad societal goals such as democracy and equity (Brunner, 2002; Rutherford and Clark, 2014). Advancing the common interest of a community requires the integration and balancing of multiple valid and appropriate interests of community members.

The increasing popularity of community-based resource management initiatives aligns with the broader emergence of adaptive approaches to governance. Adaptive governance integrates scientific and other forms of knowledge into policies to advance the common interest through open decision-making processes that are flexible, and that adapt management decisions to on-the-ground experiences (Brunner and Steelman, 2005). Policy decisions should not be considered to be permanent solutions, because interests, knowledge, and other significant details of the context are subject to change (Brunner, 2002; Brunner and Steelman, 2005). In the face of inherent complexity and uncertainty, there must be adequate provisions and capacity for monitoring, evaluating, and terminating or adjusting management strategies (Brunner and Steelman, 2005). Community-based initiatives should ensure that mechanisms are in place to

continuously improve management decisions by learning from the outcomes of implemented strategies and adjusting as necessary. Systematic reflection should be valued and rewarded, and opportunities should be established where learning can be shared and explored (Allan et al., 2008). Furthermore, case studies of what successfully worked on the ground should be harvested and diffused from local contexts for possible adaptation by other communities experiencing similar issues (Brunner and Lynch, 2010).

Brunner et al. (2002) provide three tests to determine if a decision-making process is likely to advance the common interest: *procedural*, *substantive*, and *practical*. The *procedural* test recognizes that inclusive and responsible participation in the decision making process serves the common interest. To apply this test Brunner et al. (2002) advise considering whether: (a) the effective participants (officials and non-officials alike) are representative of the community as a whole; and (b) the effective participants are responsible (are they willing and able to serve the community as a whole, and can they be held accountable for the consequences of their decisions). If the participants are not representative of the community as whole, the decision making process may not reflect the interests of those excluded (Brunner, 2002). If the participants are not responsible, they may serve parts of the community at the expense of the community as whole (Brunner, 2002). The *substantive* test recognizes that the common interest depends on whether the interests of participating community members are valid and appropriate (Brunner, 2002). This test includes considering whether: (a) a person's or group's expectations about what will be accomplished are reasonable given the available evidence; (b) all valid and appropriate concerns have been taken into account; (c) the outcomes have been approved by participants representative of the community as a whole, indicating that they believe the outcomes are in the common interest; (d) the outcomes are compatible with broad societal goals (*e.g.*, democracy, equity); and (e) the outcomes address the problem (Brunner, 2002; Rutherford and Clark, 2014). According to Brunner et al. (2002), if a person's or group's expectations about what will be accomplished are not warranted by the evidence available, the interest should be discounted as invalid. Furthermore, if any participants representative of the community as a whole do not sign off on the final plan or policy, the reasons for rejection potentially indicate a need for improvement from a common interest standpoint (Brunner, 2002). Last, the *practical* test recognizes that outcomes must meet the expectations of the community members who approved the process (Brunner, 2002). For example, even if management decisions are formulated through an inclusive process, the community as a whole may be mistaken about the expected consequences of their decisions, and the mistakes may only become apparent through implementation (Brunner, 2002). To apply

this test consider if: (a) the outcomes work in practice, and uphold the reasonable expectations of those who participated in the decision-making process; and (b) management decisions are adapted over time to deal with changing circumstances (Brunner, 2002; Rutherford and Clark, 2014). I drew upon these three tests to incorporate criteria into my evaluative framework that capture best practices for adaptive governance in community-based natural resource management settings. These best practices are described in detail in Section 3.2 and are largely embedded in the Collaborative Planning, Authority and Control, and Learning and Adjusting with Experience criteria categories of my evaluative framework (Section 4.1, 4.3, and 4.4).

2.4. The Coquitlam River Watershed and Roundtable

2.4.1. The Coquitlam River Watershed

The Coquitlam River Watershed covers an area of 261 km^2, and is one of several watersheds on the northern side of the Fraser River's lower reaches in southwestern BC (Figure 1) (Quadra Planning Consultants Ltd. et al., 2003). These watersheds run in a north-south direction, with their headwaters and the majority of their drainage areas located in the terrain of the Coast Mountains. To the west of the Coquitlam River Watershed are the major drainage systems of the Capilano, Seymour, and Indian Rivers. To the east are the Pitt, Alouette, Stave and Harrison River watersheds. The western portion of the Coquitlam River Watershed drains into Indian Arm and Burrard Inlet, while the remainder of the watershed to the east of Indian Arm drains into the Fraser River and is part of the largest watershed in BC, the Fraser River Watershed. The Lower Coquitlam River watershed (below the Coquitlam Lake Dam) encompasses at least 30 watercourses (Quadra Planning Consultants Ltd. et al., 2003). The two largest tributaries of the Coquitlam River are Or Creek with a catchment area of roughly 22 km^2 and the Hoy/Scott/Pinnacle Creek catchment area with a catchment area of approximately 17.5 km^2 (Quadra Planning Consultants Ltd. et al., 2003) .

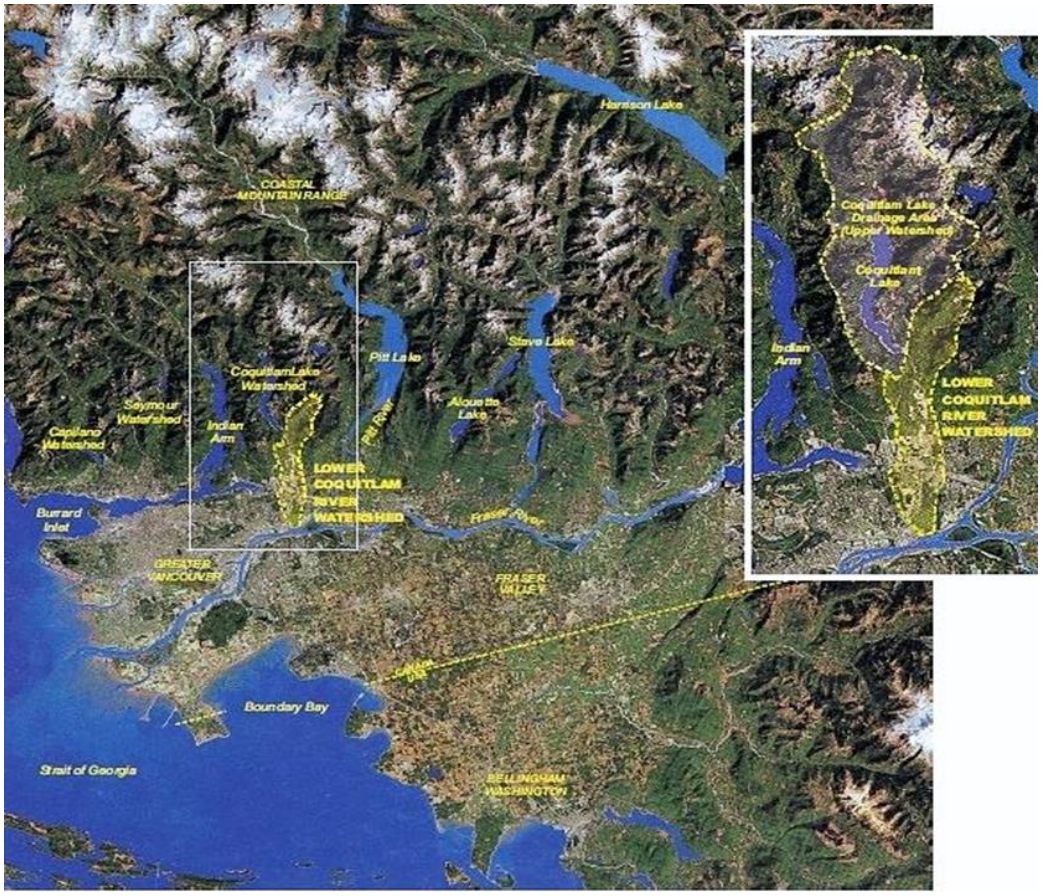

Figure 1. The Coquitlam River Watershed

Source: Ministry of Environment, Lands and Parks, 1992

Like many watersheds in the Lower Mainland region of BC, the Lower Coquitlam River watershed is heavily urbanized, and has been impacted by industrial and agricultural activities, and land-use changes. The cities of Coquitlam and Port Coquitlam share municipal jurisdiction in the Lower Coquitlam River watershed. Urban development in the lower reaches spans 75% of the lands within the two city boundaries, and the urban growth rate is high (Quadra Planning Consultants Ltd. et al., 2003). In 1996, approximately 63,000 people were living in the lower watershed (Quadra Planning Consultants Ltd. et al., 2003). By 2001, the population had increased by 13% to approximately 74, 800 individuals (Quadra Planning Consultants Ltd. et al., 2003). Today, an estimated 156,700 people reside in the lower portion of the watershed.

In 1887, the Coquitlam Water Works Company secured water rights to draw water from Coquitlam Lake to provide drinking water to New Westminister, BC and the surrounding area (Quadra Planning Consultants Ltd. et al., 2003). By 1889, the city of New Westminister

purchased the company to supply water to residents in and around New Westminister Junction, in areas now known as Coquitlam, Port Coquitlam, and parts of Maple Ridge. Currently, the Coquitlam Lake Reservoir is one of three major drinking water supply sources for Metro Vancouver (the others are the Capilano and Seymour Watersheds). In 1902, a tunnel diversion was constructed at the outflow of Coquitlam Lake to deliver additional water to Buntzen Lake (previously known as Beautiful Lake, in the Coquitlam watershed) for hydroelectric power generation (Quadra Planning Consultants Ltd. et al., 2003). Dam construction began in 1904 at the lower end of Coquitlam Lake and was completed, along with the tunnel, by 1905 (Quadra Planning Consultants Ltd. et al., 2003). From 1911-1914 a larger dam was constructed, and in 1985 it was rehabilitated and remains in place today to retain and divert water for power generation by BC Hydro (Quadra Planning Consultants Ltd. et al., 2003).

Gravel mining operations first began along the Coquitlam River in the late 1950s (Quadra Planning Consultants Ltd. et al., 2003). During this time period, gravel removal occurred both in and along the river, leading to the eventual removal of approximately 200 acres of vegetation in the watershed (Quadra Planning Consultants Ltd. et al., 2003). In 1965 the federal government issued the B.C. Gravel Removal Order, regulating gravel removal in the Coquitlam River and several other rivers in BC.

Historical records demonstrate that commercial logging also occurred in the watershed beginning in the early 1900's (Quadra Planning Consultants Ltd. et al., 2003). The logging industry intensified across BC in the 1960's – 1970's, and approximately 3458 acres of land were logged throughout the Coquitlam watershed, amounting to 82 cut-blocks and roughly 100 km of road construction (Quadra Planning Consultants Ltd. et al., 2003). Metro Vancouver has maintained a moratorium on logging in the watershed since 1994. The upper reaches of the Coquitlam watershed are now controlled by the Greater Vancouver Water District (part of Metro Vancouver) under a long-term lease from the provincial government, and are protected from industrial development as a valuable drinking water source.

The Lower Coquitlam River Watershed encompasses the municipalities of Coquitlam and Port Coquitlam, east of the City of Vancouver, and is part of the traditional territory of the Kwikwetlem First Nation. The Kwikwetlem First Nation, Coast Salish tribe, asserts Aboriginal rights and interests in all lands, waters, and resources within Kwikwetlem traditional territory (Kwikwetlem First Nation, 2016). The Coquitlam River Watershed constitutes the ancient

territory of the Kwikwetlem Nation (Kwikwetlem First Nation, 2016). Currently, two Kwikwetlem First Nation reserves are located along the banks of the Coquitlam River.

2.4.2. The Coquitlam River Watershed Roundtable Planning Process

Given the numerous diverse environmental values as described above, and the natural and anthropogenic adverse impacts to the watershed over the last century, concerned individuals began forming a variety of environmental initiatives in attempts to mitigate impacts and to restore the watershed. The complexity of governmental jurisdictions and competing mandates in the Coquitlam River watershed resulted in a lack of communication and mistrust among the many stakeholders. Various parties expressed the desire to engage in a watershed management planning process, as at this time the Coquitlam River watershed lacked any formal integrated stormwater management plan given that it was not mandatory under the requirements of Metro Vancouver's Liquid Waste Management Plan. In an attempt to address this concern, the Coquitlam River Watershed Strategy was launched in 2007.

The Coquitlam River Watershed Strategy process was overseen by the City of Coquitlam, in partnership with Kwikwetlem First Nation, and with the support of the Coquitlam River Aggregate Committee (formed in 1999, when the City of Coquitlam Environment Committee identified the need to address concerns regarding the accumulation of silt and sediment in the Coquitlam River) (CRWR, 2015a). The purpose of the Coquitlam River Watershed Strategy process was to engage community members and stakeholders associated with the watershed to complete a four-phased watershed management planning initiative to improve problem-solving in the watershed (Golder Associates Ltd., 2009).

The first phase, which began in 2007 and ended in 2008, consisted of a preliminary research phase. In Phase I of the strategy, the City of Coquitlam and the Kwikwetlem First Nation, and the Coquitlam River Aggregate Committee collaborated with a Project Team to coordinate a review of existing information on environmental activities previously conducted in the watershed. The Project Team consisted of representatives from Kwikwetlem First Nation, Watershed Watch, City of Coquitlam and Fisheries and Oceans Canada. Phase I did not include public engagement. A key deliverable of Phase I was a document entitled "*The Story of the Coquitlam River Watershed Past, Present and Future*", prepared by JR Environmental in October 2008 (JR Environmental, 2008). This document included the identification of all stakeholders and

their respective legislation and mandates in the watershed, and guidelines and recommendations for Phase II of the Coquitlam River Watershed Strategy.

The purpose of Phase II of the Coquitlam River Watershed Strategy, which began in 2008 and ended in 2009, was to bring together a multifaceted group of stakeholders to engage in a series of community workshops to establish a common vision and values for the Coquitlam River. A common vision statement and values were drafted and signed by all participants. The common vision was documented as: "*A healthy watershed supported and enjoyed by the community in a manner that respects our common values through partnerships and collaboration; education, stewardship, and monitoring; conservation and green economics; and responsible decision making, in perpetuity*" (Golder Associates Ltd., 2009). Values for the watershed were documented as: "*spiritual qualities; ecosystem integrity; natural beauty; native biodiversity; natural resources; public access; home/heritage/culture; responsibility to protect; recreation; protected areas; and sustainability*" (Golder Associates Ltd., 2009). Phase II also resulted in a draft mission statement and a preliminary discussion of guiding principles and governance frameworks. The draft mission statement was documented as: "*Our mission is to restore and improve the health of the Coquitlam River Watershed by creating and supporting a community that recognizes and promotes [the watershed] through communication, coordination, collaboration and education*" (Golder Associates Ltd., 2009).

The primary objective of Phase III, which began in 2009 and ended in 2010, was to reach agreement on a formalized governance structure and a terms of reference (TOR) to guide a watershed team in order to develop a watershed plan consistent with the common vision, values, and draft mission statement developed in Phase II. Similar to Phase II, public engagement was an integral component of Phase III. Three public meetings were held and attendance ranged from 45-65 participants (Dovetail Consulting Group, 2010). Participants included representatives from local, regional, provincial, federal and First Nations governments, stewardship and recreation groups, industry, development, business and the local community. Through the three public meetings and numerous workshops, the governance structure that was endorsed by the Project Team and all participants in attendance was a Roundtable. It was collectively agreed that the Roundtable would be an independent entity and accountable for following the direction set in the vision, values and mission statement (Dovetail Consulting Group, 2010). Additionally, participants agreed that the Roundtable would be unable to make decisions related to jurisdictional authority or legislative responsibility, rather the newly created body would make

recommendations and attempt to influence decisions that are the responsibility of the governments with authority in the watershed (Dovetail Consulting Group, 2010). The Roundtable is comprised of a Core Committee (administrative body), a coordinator, and a funders group. The Core Committee consists of representatives from the Roundtable, including representatives from key government representatives involved with the watershed. The Committee acts as an administrative body to ensure the Roundtable remains accountable to its vision, values and mission, to provide continuity to the Roundtable, and to manage funds used for Roundtable initiatives (Dovetail Consulting Group, 2010). Seats on the Core Committee are assigned by each sector. The funders group is made of representatives of governments, businesses and utilities that invest in the Coquitlam River Watershed Roundtable. The funders group's role is to ensure stable funding is available for the coordinator's salary and to maximize funding opportunities and access resources sustainably (Dovetail Consulting Group, 2010). Membership in the Roundtable is open, to encourage inclusive participation. However, provisions have been established to promote continuity of participation, such as requiring individuals to formally join the Roundtable as members.

The final phase of the Coquitlam River Watershed Strategy, Phase IV, which began in 2010 and ended in 2011, resulted in the formation and establishment of the Roundtable and finalization of TOR and guiding principles. To establish the Roundtable, a transition planning team including key government and non-government sectors in the watershed assisted in forming the Core Committee. Currently, the Core Committee is comprised of 18 members representing various sectors of the watershed, including the municipal, regional, provincial, federal and First Nations governments, the private sector, non-profit organizations and environmental stewards (Table 1) (CRWR, 2015b). The Coquitlam River Watershed Roundtable was formally launched in February 2011 at an inaugural meeting of partners and the community.

Table 1. Coquitlam River Watershed Roundtable Core Committee Sector Representatives and Associated Organization

Sector	Organization
Local Government	City of Coquitlam
	City of Port Coquitlam
First Nations	Kwikwetlem First Nation
Regional Government	Metro Vancouver, Water Management
Utilities	BC Hydro
Federal Government	Fisheries and Oceans Canada
Provincial Government	BC Ministry of Energy and Mines
Aggregate Industry	Jack Cewe Limited
Real Estate Development	Brook Pooni Associates, Urban Development Institute
Outdoor Recreation	Riverside Fly and Tackle
Stewardship	North Fraser Salmon Associate Program
	Tri-City Green Council
	Port Coquitlam and District Hunting and Fishing Club
Education	BC Institute of Technology (BCIT)
Arts and Culture	ArtsConnect

Upon establishment, the Roundtable Core Committee finalized formal Coquitlam River Watershed Roundtable guiding principles, operating procedures and TOR. The TOR indicate that the Roundtable will meet twice a year. Guiding principles for the Roundtable include: (1) Take a proactive approach; (2) Be accountable; (3) Be influential and responsible; (4) Be inclusive and respectful; (5) Build relationships; (6) Be collaborative; (7) Be effective and credible; (8) Be efficient with capacity; and (9) Be adaptive. The Core Committee meets approximately six times a year, to move Roundtable projects forward between Roundtable meetings, supported by a Roundtable Coordinator. The Core Committee TOR also include provisions for selecting sector designates and alternates, and establishing task groups and standing committees. In addition, the TOR establish norms for meetings, and consensus-based decision making procedures.

Early in the Core Committee's visioning process, the Committee recognized the importance of developing an integrated watershed management plan (CRWR, 2015c). In 2012, the Roundtable received funding to begin a watershed management planning process. To develop the watershed plan, the Roundtable followed the Open Standards framework. A Watershed Plan Task Group of the Core Committee was established to lead the process, comprised of individuals from the City of Coquitlam, Watershed Watch Salmon Society, Fisheries and Ocean Canada, the Urban Development Institute and local stewards. The Roundtable completed "*Step 1: Conceptualize*" of the Open Standards framework for their watershed plan during spring 2014, and has recently completed and launched "*Step 2: Developing an Action Plan*" at a community Roundtable meeting held on April 22, 2015 in Coquitlam BC.

2.5. The Open Standards for the Practice of Conservation

In 2002, the Open Standards for the Practice of Conservation framework was developed by the Conservation Measures Partnership (CMP). The CMP is a consortium of international conservation organizations whose mission is to advance the practice of conservation by developing, testing, and promoting principles and tools to credibly assess and improve the effectiveness of conservation actions (CMP, 2015). The CMP developed the Open Standards to provide practitioners with the tools necessary to plan and prioritize conservation actions based on project priorities, assumed links between actions and outcomes, likelihood of success, and the cost of implementation for conservation projects (CMP, 2015). In developing the Open Standards, the CMP used the results of the Measuring Conservation Impact (MCI) Initiative, a 2002 study that reviewed experiences in seven fields – conservation, public health, family planning, international development, social services, education, and business – in order to determine best practices and principles across disciplines in adaptive management and results-based management (CMP, 2015). Building on these preliminary results, individual CMP member organizations also contributed their experience in project implementation to refine the Open Standards and focus them more specifically on biodiversity conservation (CMP, 2015). The proposed key benefits of the Open Standards include the ability to:

- Better link actions to desired impacts;
- Build in an evaluation framework from the beginning;
- Synthesize all different types of information;
- Use an iterative process that allows for faster implementation; and
- Account for ecological goals and human goals, which are linked through the provision of ecosystem services (CMP, 2015).

Following an adaptive cycle, the Open Standards consists of five-steps (Figure 2):

1. Conceptualize the Project Vision and Context;
2. Plan Actions and Monitoring;
3. Implement Actions and Monitoring;
4. Analyze Data, Use the Results, and Adapt; and
5. Capture and Share Learning.

Figure 2. Conservation Measures Partnership Open Standards Project Management Cycle Version 3.0

Source: CMP, 2013

Chapter 3. Research Methodology

In this chapter I discuss my approach to this research project, the methodologies I employed, and the limitations of the research. The first section explains the research design, including the use of a case study approach and qualitative methods. The second section discusses the process I followed to select criteria and indicators for the evaluative framework, the data sources I used for the evaluation, and the analysis I conducted to evaluate the CRWR's planning process and their application of the Open Standards framework. The chapter concludes with a discussion of participatory-action research, and validity and limitations of my research.

3.1. Research Design

3.1.1. Case Study

The case study approach is a research strategy that allows researchers to develop a rich understanding of the dynamics present within a single setting (Eisenhardt, 1989). In a case study the researcher becomes intimately familiar with the individual case as a stand-alone entity, allowing unique patterns to emerge prior to the development of generalized patterns across cases (Eisenhardt, 1989). My community research partner and I decided to design this project as a single case study largely because my initial investigation indicated that the CRWR was the first organization in Canada to apply the Open Standards framework in the development of its watershed plan. A single case study was also considered appropriate given the nature of my research partnership with the CRWR and their desire for outputs to be specific to the context of the Coquitlam River watershed. The case study approach is well-suited to settings where there is limited existing research, the variables cannot easily be manipulated, and the context is of critical importance (Patton, 2002). My research is an empirical inquiry that investigates a contemporary phenomenon within a real-life context (Yin, 2003).

Conley and Moote (2003) argue that detailed case studies play an essential role in developing theory about collaborative planning efforts and identifying specific issues and

dynamics that warrant further study. Given that the CRWR was the first organization in Canada to apply the Open Standards in developing its watershed plan, there was a unique opportunity to investigate the particularities and complexities of this specific setting and establish a foundation for future research. Individual case study findings may have limitations in broader application, but my comprehensive evaluation of the application of the Open Standards by a community-based watershed organization in a Canadian setting should be a valuable resource for other initiatives seeking to undertake a similar approach to watershed management.

3.1.2. Qualitative Methods

Qualitative research methods are appropriate for this research because of the emergent properties of the case, and because there is very little published literature examining the utility of the Open Standards for community-based watershed management and planning. Qualitative methods are exploratory in nature, providing the flexibility necessary to investigate emerging and understudied topics, and to capture the contextual details required to improve understanding of the subject's social realities and the perceptions of participants (Land-Murphy, 2009; Patton, 2002). A qualitative approach to inquiry also allows the researcher to inductively generate theory from observations in the real world (Patton, 2002).

3.2. Evaluative Framework

The choice of appropriate criteria for an evaluation depends on the objectives of the evaluation, the values and perspectives of the evaluators, and the context and characteristics of the effort being evaluated (Conley and Moote, 2003). Early in the visioning process for the CRWR, individuals and organizations representing various interests and perspectives on the watershed developed a mission statement and a set of values and guiding principles. These foundational documents show that the intent of the CRWR is to facilitate collaborative resolution of problems arising from urban growth and natural resource use pressures, inform and educate people about these matters, and promote and support conservation of a sustainable, healthy watershed environment through the development of a watershed management plan (CRWR, 2015c). I developed an evaluative framework that is specific to the goals and principles of the CRWR, but broad enough that it can be applied to other community-based watershed management and planning initiatives with similar goals. The framework consists of criteria drawn

from the literature on collaborative planning, integrated water resource management (IWRM), and adaptive governance.

I chose to base my evaluative framework on principles of collaborative planning, because one of the main goals of the Roundtable is to facilitate collaborative planning for the watershed. To identify criteria specific to this goal, I drew on papers published by the Collaborative Planning Lab at the School of Resource and Environmental Management at Simon Fraser University. In 1990, the Collaborative Planning Lab began a multi-stage analysis of collaborative planning processes, which included reviews of existing literature on collaborative planning and evaluations of recent land use planning initiatives in British Columbia. The lab's research efforts produced a comprehensive set of best practices for collaborative planning (Frame et al., 2004; Morton, 2009).

I also chose to incorporate internationally recognized and promoted principles for IWRM into my evaluative framework, as another major goal of the CRWR is to develop an integrated watershed management plan. To identify these principles I reviewed literature published by the Global Water Partnership (GWP) concerning IWRM. I also reviewed a number of case studies of IWRM in practice across North America, including "*Case Studies in Integrated Water Resources Management: From Local Stewardship to National Vision*," published by the American Water Resource Association (2012), and "*Canadian Perspectives on Integrated Water Resource Management*," published by the Canadian Water Resource Association (2004).

As the Roundtable is a community-based organization, I also chose to incorporate criteria drawn from the literature concerning adaptive governance in community-based natural resource management initiatives, as articulated by Brunner et al. (2002), Brunner et al. (2005) and Rutherford and Clark (2014). This body of literature focuses on the rise of local community-based initiatives that seek to advance the common interest through innovative and adaptive approaches to place-based issues. The literature on IWRM and collaborative planning does not focus on this particular aspect of community-based governance. Drawing on these three sources allowed me to develop a comprehensive set of criteria that is directly applicable to the Roundtable.

To derive criteria from my analysis of the IWRM and adaptive governance literature, I first identified a number of common themes. Through an iterative process, I categorized the different themes into criteria. I then created a checklist which included each criterion, and cross-checked each piece of literature against the checklist to determine which criteria were most

commonly mentioned, and to determine when I had reached a point of saturation. Next, I analyzed the criteria for overlap and consolidated them into a manageable number. In regard to the collaborative planning literature, I incorporated the process criteria developed by Frame et al. (2004) into the evaluative framework. Frame et al. (2004) relied on past efforts, (Wilson, 1995; Penrose, 1996; Tamblyn, 1996) and an analysis of the literature to develop 25 evaluative criteria, including 17 process criteria and 11 outcome criteria. I did not include the outcome criteria because the CRWR's planning process was not complete at the time of my research (see section 3.7). Frame et al. (2004), and subsequently Morton (2009), applied the full set of criteria to analyze recent land use planning efforts in BC. As the framework I developed was specifically tailored to evaluate integrated watershed management and planning efforts, I cross-checked the Frame et al. (2004) criteria against the IWRM and adaptive governance criteria for overlap and again consolidated criteria into a manageable number. This process resulted in 24 criteria, which I organized into four broad categories:

1. Collaborative Planning;
2. Holistic Approach;
3. Authority and Control; and
4. Learning and Adjusting with Experience.

After deriving the 24 criteria for the evaluative framework, I reviewed the literature again in order to identify indicators for each criterion. This review yielded 52 indicators. The 24 evaluative criteria and 52 indicators are summarized in Table 2.

Table 2. Summary of Criteria and Associated Indicators Included in the Evaluative Framework.

		Collaborative Planning		Adaptive Governance			Integrated Watershed Management		
Evaluative Criterion	**Indicator(s)**	Frame et al. (2004)	Morton (2009)	Brunner (2002)	Brunner & Steelman (2005)	Rutherford & Clark (2014)	GWP-TAC (2000)	Ramin (2004)	Jonch-Clausen (2004)
Collaborative Planning Criteria									
Shared Purpose and Goals	Participants collectively identify and agree upon a clear purpose and goals.	X	X	X	X	X	X	X	X
	The issues being dealt with during the process are considered to be significant problems requiring timely resolutions.	X	X	X	X	X			
	The process is viewed by stakeholders as the best way to achieve their goals with respect to watershed planning.	X	X						
Inclusive Representation	All significant interests and values are represented in the process.	X	X	X	X	X	X	X	X
Voluntary Participation and Commitment	Stakeholders participate in the process of their own volition.	X	X						
	Stakeholders are genuinely committed to the process.	X	X	X	X	X			
Equitable	Every participant has the opportunity to participate effectively throughout the process.	X	X	X	X	X	X	X	X
	The process reduces power imbalances among participants.	X	X	X	X	X	X		X
Self-design	Participants work collectively to design the process.	X	X						
Clear Ground Rules	Terms of reference are developed collectively by participants.	X	X						
	Operating procedures are clearly defined.	X	X						
	Roles and responsibilities of participants are clearly defined.	X	X						
Conflict Resolution	Consensus-based conflict resolution techniques are	X	X				X		X

		Collaborative Planning		Adaptive Governance			Integrated Watershed Management		
Evaluative Criterion	**Indicator(s)**	Frame et al. (2004)	Morton (2009)	Brunner (2002)	Brunner & Steelman (2005)	Rutherford & Clark (2014)	GWP-TAC (2000)	Ramin (2004)	Jonch-Clausen (2004)
Techniques	designed early in the process.								
	Conflict resolution techniques are applied when required.						**X**		**X**
Independent Facilitation	An independent facilitator is used at major decision making points.	**X**	**X**						
	Facilitator(s) acts in an unbiased manner.	**X**	**X**						
Effective Process Management	Process staff act in a neutral and unbiased manner.	**X**	**X**						
	The process is coordinated and managed effectively.	**X**	**X**						
Mutual Trust	Open communication about participant's perspectives and interests is encouraged throughout the process.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	Participants demonstrate a clear understanding of one another's interests.	**X**	**X**	**X**	**X**	**X**			
	Relationships amongst participants improve during the process.	**X**	**X**						
Transparency	Information is freely accessible to participants and the public, except where confidentiality is justified.			**X**	**X**	**X**	**X**		**X**
Accountability	The process and plan is approved by participants' representative of the community as a whole, indicating that they believe the process and plan is in the common interest.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	The process includes an effective strategy for communicating with the community.	**X**	**X**						
	Participants are held accountable to their constituencies.	**X**	**X**						
	Participants are held accountable to the process.	**X**	**X**	**X**	**X**	**X**	**X**		**X**
	Participants are held accountable for the consequences of their decisions.			**X**	**X**	**X**			

		Collaborative Planning		Adaptive Governance			Integrated Watershed Management		
Evaluative Criterion	**Indicator(s)**	Frame et al. (2004)	Morton (2009)	Brunner (2002)	Brunner & Steelman (2005)	Rutherford & Clark (2014)	GWP-TAC (2000)	Ramin (2004)	Jonch-Clausen (2004)
Reasonable Expectations	Participant's expectations are reasonable and realistic given the goals and objectives of the process.	**X**	**X**	**X**	**X**	**X**			
	Participant's expectations are compatible with broad societal goals. (e.g. democracy, equity)	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Time Limits	The process has a detailed plan, including clear milestones and deadlines to keep it moving forward.	**X**	**X**						
Commitment to Implementation and Monitoring	The plan includes a clear strategy for implementation and monitoring.	**X**	**X**				**X**		**X**
	Participants share a strong commitment to plan implementation.	**X**	**X**	**X**	**X**	**X**	**X**		**X**
Holistic Approach Criteria									
Commitment to Sustainability Over Multiple Generations	The process and plan includes a temporal dimension indicating that the resource(s) will be managed in a way that allows future generations to meet their needs.			**X**	**X**	**X**	**X**	**X**	**X**
Integration	The process and plan consider interactions between water and land-based resources.						**X**	**X**	**X**
	The process and plan consider interactions between water and social development.						**X**	**X**	**X**
	The process and plan consider interactions between water and economic development.						**X**	**X**	**X**
Diverse Knowledge Sources are Used	High-quality natural science is used to inform decisions.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	High-quality social science is used to inform decisions.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	High quality local knowledge is used to inform decisions.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	High-quality traditional ecological knowledge is used to inform decisions.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

		Collaborative Planning		Adaptive Governance			Integrated Watershed Management		
Evaluative Criterion	**Indicator(s)**	Frame et al. (2004)	Morton (2009)	Brunner (2002)	Brunner & Steelman (2005)	Rutherford & Clark (2014)	GWP-TAC (2000)	Ramin (2004)	Jonch-Clausen (2004)
Planning and Management is Set At the Watershed Scale	The planning process and the plan itself encompass the entire catchment area.						**X**	**X**	**X**
Authority and Control Criteria									
Capacity	*Human Resources:* The knowledge, perspectives, and skills of the staff are sufficient for the process and provide a range of expertise.	**X**	**X**	**X**	**X**	**X**	**X**		**X**
	Financial Resources: Reliable and sustained financial resources are available during the process	**X**	**X**	**X**	**X**	**X**	**X**		**X**
	Technical Resources: Scientific, local and traditional knowledge are sufficient and reliable in order to make well-informed decisions regarding the management of the resource.	**X**	**X**	**X**	**X**	**X**	**X**		**X**
Legitimacy and Political Influence	The process generates consensus around a vision, which is supported by the stakeholders.			**X**	**X**	**X**	**X**		**X**
	The organization is viewed by stakeholders and the broader public as a leader in watershed planning.						**X**		**X**
	A legislative mandate is in place which gives authority to the organization to govern the resource.						**X**		**X**
	The process and plan includes the availability of the necessary policy tools required to achieve goals and objectives.						**X**		**X**
Multijurisdictional Cooperation	All government agencies with jurisdictional authority in the watershed, including those who are responsible for activities that impact the resource(s) are represented.			**X**	**X**	**X**	**X**		**X**
	All government agencies with jurisdictional authority in			**X**	**X**	**X**	**X**		**X**

Evaluative Criterion	Indicator(s)	Collaborative Planning		Adaptive Governance			Integrated Watershed Management		
		Frame et al. (2004)	Morton (2009)	Brunner (2002)	Brunner & Steelman (2005)	Rutherford & Clark (2014)	GWP-TAC (2000)	Ramin (2004)	Jonch-Clausen (2004)
	the watershed participate during the process, including those responsible for activities that impact the resource(s).								
Learning and Adjusting with Experience Criteria									
Flexible and Adaptive	The process is flexible enough, and provides sufficient opportunities, for participants to periodically assess the process and make adjustments as needed, given new information or changing circumstances.	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Learning from Experience	The process includes provisions to adapt decisions through monitoring, evaluating, terminating or adjusting management decisions.			**X**	**X**	**X**	**X**	**X**	**X**

Source: Criteria and indicators were derived through an iterative review of the literature described by Frame et al. (2004), Morton (2009), Brunner (2002), Brunner and Steelman (2005), Rutherford and Clark (2014), GWP-TAC (2000), Ramin (2004) and Jonch-Clausen (2004).

3.3. Data Sources

This section describes the data sources I used for evaluating the CRWR's planning process and for evaluating the Open Standards as a tool for watershed management and planning by community-based initiatives.

3.3.1. Data Sources for the CRWR Planning Process Evaluation

For the evaluation of the CRWR's planning process I relied on interview and documentary data. The latter consisted of primary documents, such as meeting agendas, minutes and notes, the CRWR website and publicly available reports published by the CRWR Core Committee. Yin (2003) suggests that the most important use of documents in case studies is to cross-check evidence from other sources, such as interviews. I used documentary data to provide specific details to verify information from other sources, to make inferences regarding specific aspects of the organization, and to learn about the historical and political settings (Yin, 2003).

I conducted interviews with members of the CRWR Core Committee. The Core Committee consists of 18 members representing various sectors of the watershed. Core Committee members are responsible for performing administrative tasks related to the ongoing coordination of the Roundtable's activities, providing continuity for the Roundtable, and any business arising out of the Roundtable that requires formal approval (*e.g.*, new projects for the Roundtable, changes in Core Committee sector representation, revisions to operational guidelines/terms of reference). The Core Committee is also responsible for establishing subgroups to perform specific functions on behalf of the Roundtable. The Core Committee is guided by the common vision, values, and guiding principles of the Roundtable. As such, Core Committee members are familiar with and knowledgeable of the CRWR's planning process. I had established a good relationship and rapport with Core Committee members by volunteering and through a Mitacs Internship with the Roundtable. To recruit Core Committee members for interviews, I personally contacted each individual member. Thirteen of the 18 Core Committee members agreed to be interviewed for my research. This group of respondents included representatives from municipal, regional, First Nations and federal governments, the private sector, non-profit organizations and environmental stewards. Members representing the utilities

sector, provincial government, outdoor recreation, fishing and hunting and education did not agree to participate in the project.

Interviews were semi-structured in order to capture a wide range of information by directing discussions to the extent necessary, while providing the flexibility needed to adjust as the conversation flowed (Huntington, 1998). Semi-structured interviews with open-ended questions are the most common type of interview design in case study research (Yin, 2003). This approach can assist the researcher in understanding the perceived facts of a situation while leaving room for the respondent to express his or her own opinion about a particular event (Yin, 2003). I conducted interviews in person at Coquitlam City Hall, Coquitlam, BC, or at the residence of the interviewee. Each interview was approximately one to two hours in duration, and was digitally recorded and later transcribed by myself. At the beginning of each interview, I discussed the informed consent process with the participant and obtained their signed consent. Participants had the option of remaining anonymous. As suggested by Spradley (1979), I then provided the interviewee with explanations of the project, the recording process, the interview process and the interview questions. I prepared an interview guide in advance, informed by my integrated watershed planning evaluative framework. Questions and probes were designed to ensure that the same basic lines of inquiry were explored with each interviewee. The interview questions consisted largely of descriptive, exploratory, and structural questions. I designed the interview in this way because I was committed to asking questions that would provide the interviewees with an opportunity to respond in their own words and to express their perspectives (Spradley, 1979).

3.3.2. Data Sources for the Open Standards Framework Evaluation

I also used interview and documentary data in my examination of the role, and the strengths and weaknesses, of the Open Standards in structuring integrated watershed management plans. In my interview guide, I incorporated a sub-section of questions which addressed each interviewee's opinions, experiences, and views concerning the CRWR's application of the Open Standards framework and of the Open Standards itself. Documentary data consisted of primary documents. As previously mentioned, little is published regarding the Open Standards. Therefore, primary documents were limited to promotional material found on the CMP website and the Open Standards training manual (Version 3.0, released April 2013).

3.4. Analysis

In this section I describe the process I followed to analyze the interview and documentary data, and evaluate the CRWR planning process and the role of the Open Standards for integrated watershed management and planning.

3.4.1. Data Analysis for the CRWR Planning Process Evaluation

I used qualitative content analysis to analyze the interview data for the evaluation of the CRWR planning process. In general, qualitative content analysis refers to any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings (Patton, 2002). In this part of the analysis, I used a deductive approach. I began by reviewing the interview and documentary data for concepts and statements relevant to the 24 criteria and associated indicators within the evaluative framework. I then categorized these excerpts into a synthesis table according to their relevance to the evaluative criteria and indicators (Land-Murphy, 2009). I reviewed the table for themes and patterns in the data. In searching for patterns and themes, I remained open to seeing added evidence of the same pattern (recurring regularities) and to seeing disconfirming evidence when it appeared (Miles and Huberman, 1994). When interview data conflicted, I paid particular attention to whether the respondent had been a member of the Core Committee since inception, how active they were in the Committee (judged by attendance to Core Committee and public Roundtable meetings), what sector they represented and the consistency of the conflicting statement with other statements throughout their interview. For example, the opinions and perspectives of a recent or less active member might be more critical of the Roundtable and its planning process than those of a long-term, active member who had invested significant time and energy, and had been socialized into the process. Recent or less active members might also be unable to address interview questions that pertain to historical events. I considered these aspects in interpreting the responses, but I also attempted to give fair weight to each perspective.

Upon completion of the content analysis, I evaluated the CRWR's planning process based on a performance rating system employed by Ellis et al. (2010) and Land-Murphy (2009). In this system, the evaluator assigns each indicator a performance rating. I used the following characters to represent individual indicator performance ratings:

- ✓= the indicator is fully satisfied;

- ✓/ X = the indicator is partially satisfied;
- X = the indicator is not satisfied; and
- ? = unable to attribute a performance rating to the indicator.

After each indicator is assigned a rating, an overall performance rating for each criterion is determined by compiling the ratings of all indicators associated with it, using the following scale:

- Fully met = all indicators for the criterion are satisfied;
- Largely met = more than 50 per cent of the indicators for the criterion are satisfied;
- Partially met = 50 per cent or less of the indicators for the criterion are satisfied; and
- Not met = none of the indicators for the criterion are satisfied.

In order to maintain consistency and ensure transparency, when an indicator received a partially satisfied rating (✓/X), I treated it as ½ when calculating the overall performance rating.

3.4.2. Data Analysis for the Open Standards Framework Evaluation

To examine the role of the Open Standards in structuring watershed management plans within the broader context of integrated watershed management, I reviewed the sub-section of interview questions concerning the Open Standards and documentary data to determine if any concepts or statements were made that were relevant to the 24 criteria within my evaluative framework. Where applicable, I included a section describing how the Open Standards contributed to the CRWR planning process performance rating for each criterion and how the Open Standards training manual addressed each criterion. To further investigate the role and the strengths and weaknesses of the Open Standards I also included a section at the end of Chapter 5 discussing any themes and/or patterns that emerged from my analysis that were not originally captured by the criteria in the evaluative framework.

3.5. Participatory-action Research

In Chapter 1 I described how an action-oriented research approach aims to solve specific problems within a community by fully engaging community members in analyzing problems and creating their own solutions through the development of equitable and collaborative research partnerships that can lead to knowledge creation and direct action (Kassam and Tettey, 2002;

Patton, 2002). Participatory-action research (PAR) is one of the most commonly employed forms of action-oriented research (Patton, 2002). PAR is a tool that when designed and executed properly by researchers, can lead to gaining reliable community data, building levels of trust and engagement, and revealing local knowledge which may otherwise be kept hidden (Elliott, 2011). As suggested by Elliott (2011), the principles of PAR include: (1) problem identification by the community; (2) building trust and engaging with the community; (3) open discussion of research planning with community members; (4) participation by community members continuously throughout the process; (5) solidarity – the researcher is an advocate for the community; (6) generating local knowledge; (7) empowering the community to have the confidence and skills necessary to put local knowledge into action; (8) ownership of the results to the community; (9) the researcher is accountable to the community; and (10) action for change – fundamentally changing and challenging the problem.

From the onset of this research I adopted an action-oriented approach to my research with the CRWR, by incorporating principles of the PAR approach where feasible. For example, in order to ensure that research outputs were geared towards a practical application for the CRWR, Core Committee members were directly involved and contributed significantly to the identification of the problem to be addressed, the purpose and objectives of the research, and the research design. I also provided the opportunity for respondents to review and provide feedback on their respective transcripts. Furthermore, I presented my preliminary results and analysis at a Roundtable Core Committee meeting. This opportunity allowed all participants, including those who did not directly participate in the research, to consider my findings and interpretations and offer additional insights. The research project was also translated into a report intended for the CRWR. The report included recommendations that the CRWR can implement to improve its planning process as it moves forward, demonstrating my accountability to the community and to ensure that the CRWR can take ownership of the results and apply the results to create action for change.

Given the exploratory nature of this research project, uncovering local knowledge was an essential component. As such, it was critical to build trust and engage with the community. My experience volunteering and interning with the CRWR provided me with the opportunity to create a strong researcher-community partnership and rapport. Rapport refers to a harmonious relationship between the researcher and informant, allowing a sense of trust and the free flow of information (Spradley, 1979). The established sense of trust and respect and the subsequent free

flow of information resulted in the generation of local knowledge throughout this research project. Generating local knowledge further enabled the Roundtable and the community at large to take ownership of the results, empowering the organization to have the confidence and skills necessary to put local knowledge into action.

3.6. Validity and Verification

Internal validity refers to whether the findings make sense, whether they are credible to the participants of the study, and whether they represent an authentic portrait of what is being explored (Miles and Huberman, 1994). External validity refers to whether or not the conclusions of a study are transferable to other contexts (Miles and Huberman, 1994). My primary method to maintain validity was to verify my results and receive feedback from the interviewee participants. I achieved this in two ways. First, upon completion of transcribing each interview, I returned the transcripts to each individual respondent for review and comment. This gave each interviewee the opportunity to offer additional comments and insights and to clarify any interpretations. Second, I presented my preliminary findings at an open Core Committee meeting to receive additional feedback, and to provide an opportunity for Roundtable members who did not participate in the study to consider my findings and interpretations and offer additional insights. Employing these verification techniques with the Core Committee provided me the opportunity to learn about the accuracy, completeness, fairness and perceived validity of my data analysis. Using multiple sources of data, explicitly and transparently describing my research design, cross-checking concepts across respondents with notably different perspectives and background, remaining open to negative or conflicting evidence and including my personal observations of the Roundtable's planning process were also important elements of my verification strategy (Miles and Huberman, 1994; Yin, 2003).

3.7. Research Limitations

At the time of my research the CRWR had not yet completed its watershed management plan, therefore my evaluation was limited to evaluating characteristics of the process and not its outcomes. Outcome evaluation typically compares the actual plan or program outcomes with desired outcomes, such as ecological health and community well-being (Conley and Moote, 2003). In contrast, process evaluation evaluates the planning process relative to best practices

criteria or other standards (Ellis et al., 2010). Incorporating outcome evaluation was not considered possible for this research due to the stage of the planning process at the time the evaluation was conducted, the inherent variability in ecological data, the long time frame required for ecological changes to occur and the problems that arise in making causal links between specific planning and management activities and outcomes (Conley and Moote, 2003). However, process evaluations of collaborative efforts can lead to progress towards goals, provide recommendations and feedback for guiding future directions, and identify large scale issues that may be hindering specific efforts (Conley and Moote, 2003).

A second possible limitation of this research is that membership of the CRWR has changed to some extent since inception of the organization, particularly for members representing local governments and First Nations. As such, some members were unable to answer interview questions pertaining to events that had occurred prior to their involvement. Also, some questions I posed during the interviews concerned events that had occurred more than ten years prior to the interviews. As such, the validity of some interviewee's responses may be jeopardized due to errors in their recollection of historical events (Blaikie, 2000). Last, members representing the utilities sector, provincial government, outdoor recreation, fishing and hunting and education did not agree to participate in this research project. As such, I was unable to capture their particular views and opinions.

Another research limitation pertains to the challenging task of applying evaluative criteria and indicators in an objective and transparent manner. Qualitative approaches to evaluation have been criticized because the interpretation applied by the evaluator may be subjective and not always transparent (Zeiger, 2012). To address this problem, I used a performance rating system developed by Ellis et al. (2010). The performance rating system allows for the use of a more transparent and quantitative approach by the evaluator where possible. This approach has been used in studies with a similar design and goals such as Land-Murphy (2009) and Zeiger (2012). Some indicators are assessed through a dichotomous assessment (yes or no), while others are rated with a more qualitative approach.

A fourth limitation is that I refined and made some revisions to my evaluative framework after interviews were completed. The opportunity for me to conduct interviews with Core Committee members arose before I had finalized my evaluative framework. My initial review of the interview transcripts and further reading suggested areas in which the evaluative framework

could be refined and expanded. As a consequence, not all criteria and indicators were explicitly addressed during the interviews. To assign ratings to indicators which were not directly addressed in the interviews, I relied on documentary evidence and qualitative interpretation of interview responses. When this occurred, I explain the logic and justification of each assessment in the results.

Chapter 4. Evaluative Framework

The evaluative framework I developed for this research project was influenced by literature on collaborative planning, integrated water resource management (IWRM), and adaptive governance. The framework includes 24 criteria and 52 associated indicators (Section 3.2). I organized the criteria and indicators into four broad categories: (1) Collaborative Planning; (2) Holistic Approach; (3) Authority and Control; and (4) Learning and Adjusting with Experience. The collaborative planning criteria and indicators were drawn from papers published by the Collaborative Planning Lab at the School of Resource and Environmental Management at Simon Fraser University, the holistic approach criteria and indicators were largely drawn from literature concerning IWRM, and the authority and control and learning and adjusting with experience criteria and indicators were both drawn from literature on adaptive governance. In this chapter I describe the criteria and indicators, and draw upon the above mentioned three bodies of literature to explain and justify why I chose these criteria and indicators to evaluate the Coquitlam River Watershed Roundtable's planning process and the Open Standards framework.

4.1. Collaborative Planning Criteria

4.1.1. Shared Purpose and Goals

The process is driven by a shared purpose and goals which provide incentives to participate and to work towards reaching consensus.

A key determinant of a successful collaborative planning process is whether the process is driven by a shared purpose and mutually-acceptable goals (Morton, 2009; Ramin, 2004). In the absence of a defined collective purpose and clearly articulated goals, initiatives can become reactive and crisis-oriented (Ramin, 2004). For example, in a comparative review of natural resource management planning processes in the Rocky Mountains of the United States, Lachapelle et al., (2003) found that inadequate goal definition was an important barrier to successful problem solving. Bonnell and Koontz (2007) found that the inability of stakeholders in the Little Miami River Partnership to define and operationalize their collective purpose and goals,

even after four years of operation, resulted in little progress made in developing a comprehensive watershed action plan or completing restoration projects. Accordingly, it is essential that stakeholders invest the time required to establish a shared understanding of purpose and define mutually-acceptable goals at the onset of the planning process, and that they re-examine these goals from time to time to ensure that they continue to be appropriate and acceptable as the process evolves (Frame et al., 2004; Lachapelle et al., 2003; Morton, 2009).

The indicators I selected for this criterion are: (1) participants collectively identify and agree upon a clear purpose and goals; (2) the issues being dealt with during the process are considered to be significant problems requiring timely resolutions; and (3) the process is viewed by stakeholders as the best way to achieve their goals with respect to watershed planning.

4.1.2. Inclusive Representation

All participants with a significant interest in the issues and outcomes are involved throughout the process.

A core principle of collaborative planning, IWRM, and adaptive governance is that the process embodies a participatory approach in which all concerned and potentially affected stakeholders, at all levels of the social structure, are represented, actively participate, and can influence the decision-making process (Brunner, 2002; Frame et al., 2004; GWP-TAC, 2000). According to the best practices literature, inclusive representation means that at least the following stakeholders are present: (a) those that are directly affected by or that have a significant interest in the outcome; (b) those that are necessary to implement the final plan; (c) those that may challenge or destabilize the final plan; and (d) all relevant government agencies (GWP-TAC, 2000; Morton, 2009).

The potential benefits of inclusive representation are wide-reaching. First, the process is more likely to resolve conflict among diverse stakeholders with competing interests as it provides a platform to identify solutions that meet mutual interests (Frame et al., 2004; Morton, 2009). Second, final agreements are often of higher quality because they incorporate a broad array of experiences and knowledge (Frame et al., 2004; Morton, 2009). Third, the incorporation of a diverse range of interests, values, skills and resources can strengthen an organization's capacity to address complex water management issues in innovative and cost-effective ways (Ferreyra and Beard, 2007). Fourth, comprehensive stakeholder involvement can result in increased public

support and legitimacy (AWRA, 2012). Last, and perhaps the most significant benefit of inclusive representation, is that if participants represent the broader public the process is more likely to result in an outcome that advances the common interest of the entire community (Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2014).

The indicator I selected for this criterion is: all significant interests and values are represented in the process.

4.1.3. Voluntary Participation and Commitment

Stakeholders are participating in the process of their own volition and are genuinely committed to the process. No stakeholder is required to remain involved in the process if they feel the process is not serving them adequately.

In collaborative planning processes stakeholders should participate of their own volition, be genuinely committed to the process, and not be required to remain involved if they feel the process does not adequately serve them (Frame et al, 2004; Morton, 2009). Voluntary participation plays an essential role in ensuring that stakeholders respect one another and that all appropriate interests are incorporated throughout the planning process (Morton, 2009).

The indicators I selected for this criterion are: (1) stakeholders participate in the process of their own volition; and (2) stakeholders are genuinely committed to the process.

4.1.4. Equitable

All participants have an equal opportunity to effectively participate throughout the process and to influence decisions.

Collaborative-based planning processes aim to address power imbalances by providing all stakeholders with an equal opportunity to influence decisions, often by using consensus-based decision making techniques (GWP-TAC, 2000; Morton, 2009). However, collaborative approaches are often criticized for problems related to power as stakeholder groups inevitably have disparities in the skills and resources that they bring to the table (Gunton and Day, 2003). For example, government and industry representatives typically have access to high-quality information and are paid for their participation (Morton, 2009). In contrast, First Nations, non-governmental organizations, and community groups may be disadvantaged as they often do not have access to such resources (Morton, 2009). These power imbalances can result in certain

stakeholder groups being denied the opportunity to make meaningful contributions to the planning process, allowing more powerful stakeholders to manipulate the process to their advantage (Gunton and Day, 2003). To mitigate these potential problems the process should adhere to principles of fairness to ensure that decisions and resource allocations are not biased in favor of any particular participant or sector (Lockwood et al., 2010). For example, all stakeholders should have equal access to adequate participant funding and relevant information (Gunton and Day, 2003; Morton, 2009). Power imbalances can be further minimized by having independent facilitation (Gunton and Day, 2003; Morton, 2009). Employing a range of participation mechanisms appropriate to stakeholders' cultural and communication preferences can also assist in fostering an environment in which participants' views are given equal respect and attention, thus providing them with an equal opportunity to effectively participate and impact decisions (Gunton and Day, 2003; Lockwood et al., 2010).

The indicators I selected for this criterion are: (1) every participant has the opportunity to participate effectively throughout the process; and (2) the process reduces power imbalances among participants.

4.1.5. Self-design

Involved participants work together to design a process and institute the ground rules and objectives that are best suited to the needs of the particular process and its participants.

Due to the unique challenges and differences in context among collaborative-based initiatives, there is no one uniform organizational framework to address management problems (Brunner, 2002). As such, a principle of collaborative planning is the promotion of flexibility that allows participants to design a process that best suits the needs of their particular organization (Morton, 2009). Self-designed processes actively engage interested and affected parties by providing an equal opportunity for all participants to influence the design of the process (Calbick et al., 2004; Frame et al., 2004; Morton, 2009). This includes encouraging participants to decide on the ground rules, objectives, tasks, working groups and discussion topics (Calbick et al., 2004). Theoretically, self-designed processes can facilitate plan implementation as participants are more likely to be committed because of their involvement from the onset, thus creating a sense of ownership (Calbick et al., 2004; GWP-TAC, 2000).

The indicator I selected for this criterion is: participants work collectively to design the process.

4.1.6. Clear Ground Rules

As the process is initiated, a procedural framework is established, including clear terms of reference that address the scope and mandate of the process, operating procedures, the roles and responsibilities of participants and the use of sub-groups.

As the process is initiated, clear and comprehensive ground rules should be adopted by the organization (Frame et al., 2004). Ground rules should be incorporated into terms of reference and should include the following aspects: the scope and mandate of the process, the roles and responsibilities of participants, a code of conduct for interaction between participants, a process for adding and removing participants, the use of sub-groups and a clear method for resolving disputes (Gunton and Day, 2003; Morton, 2009). Clarity and transparency of ground rules are essential to avoid inaccurate expectations and reduce potential disagreements (Gunton and Day, 2003). However, in a review of the empirical literature on factors contributing to the successful design of watershed partnerships, Leach and Pelkey (2001) found that a watershed partnership's strength lies in its ability to employ a flexible partnership structure. As such, process rules should allow space for flexibility and adaptation as they may need to be adjusted over time (Leach and Pelkey, 2001).

The indicators I selected for this criterion are: (1) terms of reference are developed collectively by participants; (2) operations procedures are clearly defined; and (3) roles and responsibilities of participants are clearly defined.

4.1.7. Conflict Resolution Techniques

Consensus-based conflict-resolution mechanisms are designed early in the process and applied when needed in order to allow participants to work together and maximize their ability to resolve their differences.

Implementing consensus-based decision making techniques encourages power sharing among participants and increases the likelihood of reaching an agreement (Morton, 2009; Leach et al., 2002; Ramin, 2004). In the context of integrated watershed management, consensus-based decision making is defined as, "a process in which all those who have a stake in the outcome aim to reach agreements on actions and outcomes that resolve or advance issues related to environmental, social, and economic sustainability" (Ramin, 2004: p.8). In a comparative review of 44 watershed partnerships in California and Washington, Leach et al. (2002) found that 84% of survey respondents either agreed or strongly agreed that consensus-based decision making was the best strategy for resolving complex watershed problems. To encourage participants to work together and maximize their ability to resolve their differences, consensus-based conflict resolution mechanisms should be designed early in the process (GWP-TAC, 2000; Ramin, 2004). Potential benefits of consensus-based decision making include better informed decisions through the incorporation of a broader array of stakeholder values and perspectives, increased opportunities for traditionally marginalized groups to be involved in decision making (i.e., First Nations' groups, not-for-profit organizations), reduced adversarial environments and mutual benefits for all participants (Ramin, 2004).

The indicators I selected for this criterion are: (1) consensus-based conflict resolution techniques are designed early in the process; and (2) conflict resolution techniques are applied when required.

4.1.8. Independent Facilitator

An independent facilitator is used at major decision making points.

Collaborative processes should use an independent and unbiased facilitator at major decision making points (Cullen et al., 2010; Frame et al., 2004; Morton, 2009). In a review of the empirical literature on factors contributing to the successful design of watershed partnerships, Leach and Pelkey (2001) found that one of the most important steps a partnership can take is to hire a skilled and impartial facilitator. The use of a neutral facilitator can potentially assist in achieving consensus among participants by ensuring that all parties feel respected and have an

equal opportunity to voice their concerns and ideas (Frame et al., 2004; Morton, 2009). In addition, independent facilitators may seek to reduce power imbalances among participants by encouraging interest-based negotiation as opposed to positional bargaining (Frame et al., 2004; Morton, 2009).

The indicators I selected for this criterion are: (1) an independent facilitator is used at major decision making points; and (2) facilitator(s) acts in an unbiased manner.

4.1.9. Effective Process Management

The process is coordinated and managed effectively in a neutral manner.

Management of a collaborative planning process by a skilled individual, independent of any specific interest, is essential (Gunton and Day, 2003). The most frequently identified significant attribute to successful watershed partnerships, in a review of 37 watershed initiatives, was the importance of managerial assets, such as effective coordination by impartial staff members (Leach and Pelkey, 2001). Effective process management can increase the likelihood of successfully executing the process and management plan, can lead to improved coordination and communication, and can ensure the provision of adequate financial and logistical assistance (Gunton and Day, 2003; Morton, 2009). Sound management has also been shown to reduce the risk of participant burnout, a common criticism of collaborative planning processes (Gunton and Day, 2003).

The indicators I selected for this criterion are: (1) process staff act in a neutral and unbiased manner; and (2) the process is coordinated and managed effectively.

4.1.10. Mutual Trust

The process encourages open communication about participant interests, fosters teamwork, and generates trust among participants.

Interpersonal trust is widely recognized in the literature as a key element of successful collaborative planning processes (Frame et al., 2002; Morton, 2009; Lachapelle et al., 2003; Leach et al., 2001). In a study designed to assess barriers to effectiveness in four western U.S. natural resource planning processes, participants cited a lack of trust among stakeholders as the most fundamental barrier (Lachapelle et al., 2003). For mutual trust to be established, diverse

values and knowledge of all stakeholders must be respected, and open communication about stakeholders' perspectives and interests must be encouraged (Lachapelle et al., 2003; Morton, 2009). Additional factors in establishing mutual trust include the use of an independent facilitator or coordinator, the design of clear ground rules, and ensuring transparency throughout the process (Leach et al., 2001). Establishing a sense of mutual trust amongst participants can lead to improved relationships which can in turn have a positive effect on shared learning, decision-making, future planning and satisfaction with outcomes (Gunton and Day, 2003; Frame et al., 2004).

The indicators I selected for this criterion are: (1) participants demonstrate a clear understanding of one another's interests; and (2) relationships amongst participants improve during the process.

4.1.11. Transparency

All information is freely available to the participants and public, except where confidentiality is justified based on the obligation and right not to disclose information to unauthorized individuals, entities, or processes if it would legitimately and unfairly harm an organization or an individual.

In order to achieve the ideals of IWRM, the GWP advocates for decision-making to occur in an open and transparent manner, with full public access to all relevant information (GWP-TAC, 2000). Lockwood et al. (2010) also identify transparency and openness as key governance principles for sustainable natural resource management. In this context, transparency refers to ensuring the visibility of decision making processes, clearly communicating the reasoning behind decisions, and ensuring the availability of all relevant information to stakeholders and the broader public (Lockwood et al. 2010). Community-based initiatives that embody the principles of transparency and openness foster an environment where participants are able to develop mutual respect and trust for one another, which can potentially lead to successful outcomes (Brunner and Steelman, 2005). For example, the Atlantic Coastal Action Program, a 1991 Green Plan initiative of Environment Canada in the Atlantic region, embodies the principles of openness and transparency (Hawboldt, 2004). Guided by these two principles, the Atlantic Coastal Action Program's planning process is open to all stakeholders and the broader public, and all information is freely available to every participant. Hawboldt (2004) considered the organization's dedication to being open and transparent as a key determinant of its success, because it enhanced the initiative's ability to encourage broad stakeholder participation and helped create an environment

where community members discussed both dissenting and supportive views in a trusting forum. Although transparency is encouraged, exceptions do exist in circumstances where confidentiality is justified based on the obligation and right not to disclose information to unauthorized individuals, entities, or processes if it would legitimately harm the organization or an individual.

The indicator I selected for this criterion is: information is freely accessible to participants and the public, except where confidentiality is justified.

4.1.12. Accountability

Participants are held accountable to the process, their constituents, and the public. This includes mechanisms to confirm that the decisions of the stakeholder table are representative of the interests of the broader community, as well as the interests of stakeholders participating directly.

Collaborative planning process need to be accountable in several ways. First, the process must be accountable to the broader community (Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2013). To determine if a planning process is accountable to the broader community Brunner (2002) suggests applying the procedural test. The procedural test recognizes that inclusive and responsible participation in the planning process serves the common interest of the broader community. To apply this test, the organization must consider whether the effective participants (officials and non-officials alike) are representative of the community as a whole to confirm that the planning process itself and the final plan are representative of the interests of the broader community. If not, outcomes of the planning process are less likely to reflect the interests of those excluded from the process, and thus are not accountable to the broader community (Brunner, 2002). Concrete and effective strategies for communicating with the broader public and enhancing opportunities for active participation are also essential to ensure accountability to the broader public by keeping community members up to date on the process (Frame et al., 2004; Gunton and Day, 2003; Lockwood et al., 2010). Second, participants must be accountable to their respective constituencies to ensure that their affiliated organizations support the final plan (Gunton and Day, 2003; Frame et al., 2004). This can be accomplished by requiring affiliated constituencies, as well as their representatives, to approve all major decisions (Gunton and Day, 2003). Last, participants must be responsible, in the sense that they demonstrate their willingness and ability to serve the community as a whole, and can be held accountable for the consequences of their decisions (Brunner, 2002; Rutherford and Clark, 2013). If not, these participants may serve special interests, at the expense of the interest of the community as a whole. The small-scale

and issues-focused nature of many community-based initiatives typically results in participants being more likely to accept responsibility for outcomes of the planning process, and to be held accountable by others within and outside the community (Brunner, 2002).

The indicators I selected for this criterion are: (1) the process and plan is approved by participants' representative of the community as a whole, indicating that they believe the process and plan is in the common interest; (2) the process includes an effective strategy for communicating with the community; (3) participants are held accountable to their constituencies; (4) participants are held accountable to the process; and (5) participants are held accountable for the consequences of their decisions.

4.1.13. Reasonable Expectations

Expectations of participants about the process and potential outcomes are reasonable and reflect the common interest of the greater public.

Outcomes of a collaborative planning process should serve to advance the common interest of a community (Brunner, 2002; Brunner and Steelman, 2005; Morton, 2009). According to Brunner (2002), the common interest is composed of interests that are widely shared by members of a community, that benefit the community as a whole, and that are supported by the majority of community members. In contrast, special interests are considered incompatible with the common interest, as they are pursued at a net cost to the community as a whole (Brunner and Steelman, 2005). A key component in determining whether a decision process serves the common interest is to consider whether participants' expectations about the process and potential outcomes are reasonable given the evidence available (Brunner, 2002; Rutherford and Clark, 2014). For example, it would be unreasonable for a participant or a group to expect that a watershed management planning process will restore an urban watershed to its pre-colonial state. In addition, participants' expectations of the process and potential outcomes must be compatible with broad societal goals such as democracy and equity (Brunner, 2002; Rutherford and Clark, 2014). If a participant's expectations do not meet these two criteria, the interest is deemed invalid in the context of the process and is identified as an inappropriate special interest (Brunner, 2002).

The indicators I selected for this criterion are: (1) participant's expectations are reasonable and realistic given the goals and objectives of the process; and (2) participant's expectations are compatible with broad societal goals (e.g. democracy, equity).

4.1.14. Time Limits

Realistic milestones and deadlines are established and managed throughout the process.

Participant burnout is a common critique of collaborative planning processes as these processes often require extensive time commitments, and in many cases participants (especially those representing not-for-profit organizations or community groups) do not receive compensation (Frame et al., 2004; Morton, 2009). For example, in an evaluative study of 44 collaborative-based watershed initiatives in California and Washington, Leach et al., (2002) found that in general it took four to six years for initiatives to achieve their desired outcomes. Because these processes require a significant investment of time, participants may choose to withdraw from the process if the demands become too great. To encourage continuous participation the objectives of the planning process should be met in a timely manner. The process should include a detailed work plan with milestones and deadlines to keep it moving forward (Frame et al, 2004; Morton, 2009). Participants should also ensure that the time limits they impose are reasonable and realistic.

The indicator I selected for this criterion is: the process has a detailed plan, including clear milestones and deadlines to keep it moving forward.

4.1.15. Commitment to Implementation and Monitoring

Participants feel ownership and commitment towards the plan, and feel a responsibility towards implementing the final plan.

The success of a collaborative planning process depends on effective implementation of the plan (Gunton and Day, 2003). To foster successful implementation and monitoring and to ensure that the plan will advance the common interest, Brunner (2002) suggests examining whether outcomes have been approved by participants representing the community as a whole, whether the outcomes of the plan work in practice, and whether the plan is adapted and improved over time to deal with new knowledge and changing circumstances. If participants are a part of the process from inception, they are more likely to be committed and feel responsible towards implementing the final plan (Frame et al., 2004).

The indicators I selected for this criterion are: (1) the plan includes a clear strategy for implementation and monitoring; and (2) participants share a strong commitment to plan implementation.

4.2. Holistic Approach Criteria

4.2.1. Commitment to Sustainability over Multiple Generations

The process balances multiple objectives of different interests with consideration for economic, social, and environmental dimensions, as well as current and future generations.

The overarching goal of the IWRM framework is to enable the management of water resources in a sustainable manner by balancing multiple and diverse objectives and interests, integrating economic, social, and environmental systems, and taking into account current and future generations (GWP-TAC, 2000). This approach and level of integration aligns with the Bruntland Commission's conception of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987: p. 41). Sustainable water resource management requires long-term objectives to help ensure the availability of water resources for future generations (Carter et al., 2005). Long-term objectives should take into account the long-term demand on the resource and the potential changes in water availability based on climate change and changes in human use (Carter et al., 2005). The concept of sustainability in the context of IWRM reinforces the need for adopting a holistic management approach at the watershed or basin scale, including interactions between land and water, incorporating both natural and social sciences, traditional ecological knowledge and local knowledge and emphasizing partnerships that include a diverse range of stakeholder values and perspectives (Ramin, 20004).

The indicator I selected for this criterion is: the process and plan includes an extended temporal dimension indicating that the resource(s) will be managed in a way that allows future generations to meet their needs.

4.2.2. Diverse Knowledge Sources are used

Various sources of information are used to inform decisions, including natural and social sciences, community-based and local knowledge, and traditional ecological knowledge.

Due to the complex and dynamic political, economic, and social settings of water resource management challenges, traditional scientific management and technical expertise, albeit highly relevant, should not dominate and dictate planning processes and outcomes (Armitage et al., 2012; Brunner and Steelman, 2005; van TolSmit et al., 2015). By drawing on multiple forms and sources of knowledge, planners can increase the likelihood of achieving desirable social and ecological outcomes (Armitage et al., 2012). A defining characteristic of collaborative-based planning approaches is the integration of diverse actors with different values, perspectives, and experiences, which results in the availability of a more heterogeneous pool of knowledge (Ferreyra and Beard, 2007; van TolSmit et al., 2015). Such diverse knowledge can better inform the development of water resource management plans.

In my evaluative framework I included three main types of knowledge described in the environmental governance literature: (1) scientific or expert knowledge; (2) community-based or local knowledge; and (3) traditional ecological knowledge. Scientific knowledge can be defined as formal, explicit, structured knowledge gained through academic training and professional practice (van TolSmit et al., 2015). In contrast, community-based or local knowledge is characterised as informal and personal knowledge that is often considered as place-based, situated in a particular context and tested through experience (Armitage et al., 2012; van TolSmit et al, 2015). As watershed planning in BC typically occurs in the traditional territory of Indigenous peoples, their own distinct systems of knowledge should also be incorporated into decision making processes (van der Porten and de Loe, 2013). Berkes (2008: p. 7) defines traditional ecological knowledge as, "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission about the relationship of living beings (including humans) with one another and with their environments."

Multiple benefits can be derived from including diverse knowledge sources in decision-making processes, such as the emergence and co-production of new knowledge from the interaction of formerly disconnected actors, the reduction of power held by those with technical expertise, greater stakeholder involvement and the creation of more context-specific, holistic, and implementable management plans (Armitage et al., 2012; Brunner and Steelman, 2005; van TolSmit et al., 2015). Initiatives should actively design and incorporate processes that foster and

support the mobilisation and effective use of diverse types of knowledge that participants bring to the table, including supporting decision making processes that involve meaningful participation, and that do not privilege formal western science over other valid forms of knowledge (Armitage et al., 2012; van TolSmit et al., 2015).

The indicators I selected for this criterion are: (1) high-quality natural science is used to inform decisions; (2) high-quality social science is used to inform decisions; (3) high quality local knowledge is used to inform decisions; and (4) high-quality traditional ecological knowledge is used to inform decisions.

4.2.3. Planning and Management is set at the Watershed Scale

The planning process and the management plan itself encompass the entire catchment area, both land and water, drained by a watercourse and its tributaries.

Watersheds or river basins are commonly identified as the most appropriate spatial unit for IWRM, and have been used for this purpose by several jurisdictions across Canada such as the federal government and the provinces of Ontario, Manitoba, and Alberta (Cervoni et al., 2008; Ramin, 2004). A watershed can be defined as, "the entire catchment area, both land and water, drained by a watercourse and its tributaries" (Cervoni et al., 2008: p. 335). The rationale for using the watershed as the spatial management unit is that it provides several advantages for integration and it promotes a more holistic approach to management and planning. Ramin (2004: p. 6-7) argues that watersheds are, "natural integrators of water quality and quantity, land-water-air interactions, and upstream and downstream effects… [and] provide a nested hierarchy to examine cumulative impacts over time and space". In addition, Mitchell et al., (2014: p. 462) states that adopting the watershed as the spatial management unit allows for the examination of "values of a watershed in supporting ecosystems and economies… [and] promotes effective decision making".

Adopting a watershed approach, however, does have some disadvantages. The most commonly cited shortcoming of this approach is that watershed boundaries often do not match social, economic, political or administrative boundaries (Blomquist and Schlager, 2005). Blomquist and Schlager (2005), suggest that the promise that integration will be promoted when management is organized around watershed boundaries cannot be realized because it results in basic political tension and challenges in identifying the most appropriate or accountable decision-makers. Such challenges can lead to difficulties in assessing problems and determining

ecologically and politically sustainable solutions (Cervoni et al., 2008). For watershed-based management to be effective in situations of overlapping jurisdiction, mechanisms and processes to promote cooperation and coordination amongst parties that share management responsibilities must be established (Ramin, 2004).

The indicator I selected for this criterion is: the planning process and the plan itself encompass the entire catchment area.

4.2.4. Integration

The process and plan include the integration of natural and human systems.

A central aim of IWRM is to promote the integration of various systems as a means of achieving holistic and sustainable water resource management (Jonch-Clausen, 2004; Medema et al., 2008). The GWP-TAC (2000: p. 23) asserts that for IWRM to be effective, integration must be considered under two categories: "the natural system (with its critical importance for resource availability and quality), and the human system (which fundamentally determines the resource use, waste production and pollution of the resource and which must also set development priorities)."

My evaluation framework assesses integration within the natural system by examining whether planning processes consider interactions between water and land-based resources. As water quality and quantity is a key determinant of ecosystem health, land use activities and practices must be explicitly addressed and taken into account throughout the process (Carter et al., 2005; GWP-TAC, 2000). Human systems integration is assessed by examining whether the plan and process consider interactions between water and economic and social development. Economic and social development must be evaluated for possible impacts on water resources, and these evaluations should be considered when designing and prioritizing development projects (GWP-TAC, 2000). This includes taking into account the implications for water resources development, water-related risks, water use and availability and ensuring that adequate water quantity and quality is available for the sustenance of human well-being (GWP-TAC, 2000; Jonch-Clausen and Fugl, 2001).

The indicators I selected for this criterion are: (1) the process and plan consider interactions between water and land-based resources; (2) the process and plan consider

interactions between water and social development; and (3) the process and plan consider interactions between water and economic development.

4.3. Authority and Control Criteria

4.3.1. Capacity

The process has sufficient capacity in the following categories: (a) financial resources; (b) human resources; and (c) technical resources.

I define "capacity" as encompassing three elements: financial resources, human resources, and technical resources. Sufficient availability of all three elements is critical for successful water resource management and planning (Ananda and Proctor, 2013; Lurie and Hibbard, 2008). Many community-based initiatives and non-profit entities rely heavily on grant funding, and the increasingly competitive nature and unpredictability of such funding creates a challenge for long-term planning by these initiatives (Lurie and Hibbard, 2008). For example, in a comprehensive survey of the empirical literature on watershed partnerships, Leach and Pelkey (2001) found that stable funding was the most frequently cited key to successful watershed management and planning. Cervoni et al., (2008) also found that the importance of sustained and long-term funding was emphasized by the study's participants as a key determinant to ensure continued and consistent management of water resources across Ontario and Nova Scotia.

Adequate availability of technical resources is also fundamental to support an integrated approach, as an integrated approach to watershed management requires a broader range in the type and amount of information necessary for effective decision making as opposed to a more narrowly focused approach (Ramin, 2004; Roy, 2009). Scientific, local, and traditional ecological knowledge must be sufficient and reliable in order to make well-informed decisions regarding the management of the resource (Lurie and Hibbard, 2008). Information gaps can present a significant barrier to effective management of resources, and may lead to difficulties in reaching consensus if participants are unsatisfied with the quality and quantity of information available (Morton, 2009). Last, community-based organizations may not have sufficient expertise and skilled staff members to meet planning objectives as they typically rely on volunteers who may not have the specific skill sets necessary to carry out management and planning activities (Lurie and Hibbard, 2008). The expertise, skills, and perspectives available to an organization through its members are not only important for plan development, but also for plan implementation (Roy,

2009). Organizations may rely on intermittent or part-time technical and scientific support staff and in-kind support from key partners, which can lead to difficulties maintaining continuity (Roy, 2009).

In summary, a collaborative and integrated approach for water resource management and planning requires sustained and reliable financial, human, and technical resources. A lack of these resources may lead to community-based initiatives being limited to less complicated or shorter-term projects, thereby decreasing their potential to contribute to place-based sustainability and IWRM (Lurie and Hibbard, 2008). Overall, these initiatives should ensure that their available resources align with their mandate and the scope of their planning objectives (Leach and Pelkey, 2001).

The indicators I selected for this criterion are: (1) human resources: the knowledge, perspectives, and skills of the staff are sufficient for the process and provide a range of expertise; (2) financial resources: reliable and sustained financial resources are available during the process; and (3) technical resources: scientific, local, and traditional knowledge are sufficient and reliable in order to make well-informed decisions regarding the management of the resource.

4.3.2. Legitimacy and Political Influence

The process has sufficient power, control, and perceived validity to implement its decisions.

Legitimacy refers to the perceived validity of an organization's authority to govern a resource. Legitimacy in natural resource planning has traditionally been acquired through legislation and supporting regulations and formal agency mandates (Lockwood et al., 2010). However, with the emergence of new models of governance that include non-governmental as well as governmental actors, organizations may also earn legitimacy through the acceptance by stakeholders of an organization's authority to govern the resource (Armitage et al., 2012). This authority can be acquired indirectly through an organization's leadership efforts or by generating consensus around a vision supported by stakeholders and the broader public (Armitage et al., 2012; Lockwood et al., 2010). For IWRM, the GWP emphasizes the importance of a proper enabling environment, including the creation of the appropriate policies, strategies, and legislation (GWP-TAC, 2000; Jonch-Clausen, 2004). From this perspective, a clear legislative mandate should be in place to give authority to the organization to govern the resource, and the

process and plan should include the availability of the necessary policy tools required to achieve goals and objectives.

Community-based management requires devolution of decision making power and authority to communities and community-based organizations. When these bodies lack a clear legislative mandate they may have difficulty acquiring sufficient legitimacy to function effectively (Armitage, 2005; Lockwood et al., 2010). Under such circumstances, community-based initiatives need to develop strategies that enable them to earn legitimacy from stakeholders. Strategies to acquire legitimacy include representativeness, the creation of protocols to ensure integrity of decision-making, implementing active trust-building measures, mobilizing support to reflect the voice of the broader public and seeking out strong and committed champions who possess political acumen (Brunner, 2002; Lockwood et al., 2010).

The indicators I selected for this criterion are: (1) the process generates consensus around a vision, which is supported by the stakeholders; (2) the organization is viewed by stakeholders and the broader public as a leader in watershed planning; (3) a legislative mandate is in place which gives authority to the organization to govern the resource; and (4) the process and plan includes the availability of the necessary policy tools required to achieve goals and objectives.

4.3.3. Multijurisdictional Cooperation

Effective representation and participation by all levels of government with jurisdictional authority in the watershed, including all government agencies responsible for activities that impact the resource(s).

In Canada, constitutional responsibility for water management is divided and shared among various levels of government, and between agencies and departments at the same levels (Ramin, 2004). Inter-jurisdictional challenges present a significant barrier to effective water resource management as this fragmentation of responsibilities does not foster integration among participants that operate under sometimes conflicting or competing objectives and interests (GWP-TAC, 2000; Ramin, 2004). Managing water resources on a sector by sector basis may be acceptable for addressing simple and isolated issues, however, this approach is inadequate for addressing problems where environmental, social, and economic systems interact and multiple interests and values require consideration (Ramin, 2004). For IWRM to be effective, the planning process should involve more than one jurisdiction and transgress political boundaries (AWRA, 2012; Calbick et al., 2004; Carter et al., 2005; GWP-TAC, 2000). In a comprehensive assessment

of water resource management initiatives across Canada, Roy et al. (2009) found that effective multi-sectoral representation and participation was the most important criterion for successful IWRM, as it resulted in broad-based support and buy-in. Multijurisdictional cooperation is also a critical component of successful plan implementation, as it fosters a combination of efforts and the pooling of resources, creating a shared sense of responsibility and joint ownership (AWRA, 2012; Calbick et al., 2004).

The indicators I selected for this criterion are: (1) all government agencies with jurisdictional authority in the watershed are represented, including those responsible for activities that impact the resource(s); and (2) all government agencies with jurisdictional authority in the watershed participate during the process, including those responsible for activities that impact the resource(s).

4.4. Learning and Adjusting with Experience Criteria

4.4.1. Flexible and Adaptive

The process is designed to be flexible and adaptable, allowing for decisions to be altered over time in order to deal with complexity, uncertainty and changing circumstances and social values.

The literature on natural resource management and governance highlights the importance of an organization's ability to respond to change (Armitage, 2012). Flexibility is essential to facilitate progress towards natural resource management goals in the face of complexity, uncertainty, and changing circumstances and social values (Armitage, 2012; Brunner, 2002; Brunner and Steelman, 2005). An organization's ability to be flexible enough and adaptive enough to allow for adjustments as circumstances change and/or as stakeholders move through the planning process is essential for ongoing social learning (Armitage, 2012; Morton, 2009). Learning and reflection must be valued and rewarded, and opportunities must be established where learning can be shared and explored (Allan et al., 2008). This involves allowing space for systematic reflection on individual and organizational performance, periodic assessments of the process, integrating new and varied sources of knowledge into management plans and decision making processes, and making adjustments as needed (Armitage, 2012; Lockwood et al., 2010).

The indicator I selected for this criterion is: the process is flexible enough, and provides sufficient opportunities, for participants to periodically assess the process and make adjustments as needed, given new information or changing circumstances.

4.4.2. Learning from Experience

The process is designed to adapt management decisions by learning from the outcomes of implemented strategies.

No management decision should be considered a permanent solution because interests, knowledge, and other significant details of the context are subject to change. Planning processes can potentially lead to improved management strategies, but in the face of complexity and uncertainty there must be adequate provisions and capacity for monitoring, evaluating, and terminating or adjusting management strategies to on-the-ground experiences (Brunner and Steelman, 2005). This critical component of adaptive management involves ensuring that organizations have mechanisms in place to continuously improve management decisions by learning from the outcomes of implemented strategies (Pahl-Wostl, 2007).

The indicator I selected for this criterion is: the process includes provisions to adapt decisions through monitoring, evaluating, and terminating or adjusting management decisions.

Chapter 5. Evaluation Results

In this chapter I present the results of my evaluation of the CRWR's planning process and their application of the Open Standards framework, according to the 24 evaluative criteria and associated indicators described in chapter four. I used the following characters to represent individual indicator performance ratings:

- ✓ = the indicator is fully satisfied;
- ✓/ X = the indicator is partially satisfied;
- X = the indicator is not satisfied; and
- ? = unable to attribute a performance rating to the indicator.

I assigned an overall performance rating for each criterion by compiling the ratings of all individual indicators associated with it, using the following scale (Section 3.4.1):

- Fully met = all indicators for the criterion are satisfied;
- Largely met = more than 50 per cent of the indicators for the criterion are satisfied;
- Partially met = 50 per cent or less of the indicators for the criterion are satisfied; and
- Not met = none of the indicators for the criterion are satisfied.

In order to maintain consistency and ensure transparency, when an indicator received a partially satisfied rating (✓/X), I treated it as ½ when calculating the overall performance rating (Section 3.4.1).

My evaluation reveals the following:

- **Collaborative Planning:** six criteria are fully met, four criteria are largely met, two criteria are partially met and three criteria could not be assessed;
- **Holistic Approach:** one criterion is fully met, one criterion is largely met, one criterion is not met and one criterion could not be assessed;
- **Authority and Control:** all three criteria are partially met; and
- **Learning and Adjusting with Experience:** one criterion is partially met and the other criterion could not be assessed.

5.1. Collaborative Planning Criteria Results

5.1.1. Shared Purpose and Goals

Indicators	
✓/ X	Participants collectively identify and agree upon a clear purpose and goals.
✓	The issues being dealt with during the process are considered to be significant problems requiring timely resolutions.
✓/ X	The process is viewed by stakeholders as the best way to achieve their goals with respect to watershed planning.

The CRWR Planning Process

The CRWR planning process largely satisfies the evaluative criterion of "shared purpose and goals". All interviewees identified and agreed on the shared purpose of the Roundtable. Eleven of the 13 interviewees described the collective process through which the shared purpose and goals were developed: *Coquitlam River Watershed Strategy Community Engagement and Visioning Phase II: Seeking a Common Vision for the Coquitlam River Watershed* (Golder Associates Ltd., 2009). *Phase II* was part of a multi-phased watershed management plan initiative for the Coquitlam River, led by the City of Coquitlam in partnership with the Kwikwetlem First Nation and with the support of the Coquitlam River Aggregate Committee. The two interviewees that did not describe this visioning process stated that they were not actively involved with the CRWR at that time.

The Phase II visioning process brought together a multifaceted group of stakeholders in a series of community workshops, with the goal of establishing a common vision, values and guiding principles for the Coquitlam River watershed (Golder Associates Ltd., 2009). There were 168 participants representing local, regional, provincial, federal and First Nations governments, environmental stewardship and recreational groups, industry, development and business sectors and the general public (Golder Associates Ltd., 2009). The common vision was documented by the CRWR as, "a healthy watershed supported and enjoyed by the community in a manner that respects our common values through partnerships and collaboration; education, stewardship, and monitoring; conservation and green economics; and responsible decision-making, in perpetuity" (CRWR, 2015c). All of the interviewees who were present during Phase II expressed the view that they were satisfied with the process. For example, one of these interviewees stated that:

> *...it was a long collaborative process led by a facilitator.*
> *We did a lot of word-smithing to get it right. It was consensus*

> *-based and everyone eventually bought into it. Buy-in is essential so we took our time on it. I was part of the process, so yes I agree with it.*

When I asked interviewees to discuss the specific goals of the Roundtable, however, the majority of respondents were unable to articulate specific established goals. Two respondents did express the view that the Core Committee translated their mission statement into goals. The mission statement is documented as follows:

> The Coquitlam River Watershed Roundtable will:
>
> - Facilitate collaborative resolution of urban growth and natural resource use pressures consistent with agreed upon community objectives and values;
> - Inform and educate people about these matters and the watershed; and
> - Promote and support conservation of a sustainable healthy watershed environment. (CRWR, 2015c).

One of these two respondents stated that establishing specific goals was a challenging task for the Roundtable. This interviewee also expressed concern with the inability of the Core Committee to define measureable targets that could have been used to evaluate goal achievement.

All but one of the interviewees were of the view that the planning issues at stake were significant and required timely resolutions. The one interviewee who did not share this view stated that there was no critical need to form a Roundtable for the Coquitlam River watershed. In contrast, an interviewee who felt that the planning issues at stake were significant and required timely resolutions said that:

> *People don't get together unless they perceive some kind of crisis. So a lot of it is crisis driven, having Coquitlam River appear on the top 10 endangered rivers list consistently from the British Columbia Outdoor Recreation Council really brought a lot of people together.*

In regard to the third indicator, I did not directly ask interviewees if they felt that the planning process was viewed by stakeholders as the best way to achieve their goals with respect to watershed planning, as this indicator was added to my evaluative framework after the time of the interviews. Regardless, eight interviewees expressed the view that the CRWR planning process was necessary to manage diverging goals among stakeholder groups because the process improved communication and cross-sector coordination. These eight interviewees stated that an

integrated approach was lacking in past attempts, as evident by the history of conflict among stakeholders. The remaining five interviewees did not provide comments on this subject.

The Role of the Open Standards for the Practice of Conservation

The CRWR did not formally adopt the Open Standards until after they had collectively agreed to develop a watershed management plan. As such, the Open Standards did not directly influence the initial visioning phase. However, the Open Standards training manual provides project teams with detailed instructions for establishing a common vision and formal goal statements. The first step in the Open Standards project management cycle*, "Conceptualize",* involves specifying basic parameters of the project. Outputs of this phase include the development of a common vision and the establishment of specific goals. The training manual defines a common vision as, "a description of the desired state or ultimate condition that you are working to achieve" (CMP, 2013, p.10). According to the Open Standards, a vision statement should be relatively general, visionary, and brief (CMP, 2013). Goals are formal statements of the ultimate impacts the organization aspires to achieve. The training manual also specifies that goal statements should be measurable, impact-oriented, realistic and time limited (CMP, 2013).

5.1.2. Inclusive Representation

Indicator	
✓/ X	All significant interests and values are represented in the process.

The CRWR Planning Process

The CRWR planning process partially satisfies the evaluative criterion of "inclusive representation". All but three of the respondents expressed the opinion that all appropriate interests and values were represented. Three interviewees stated that the planning process could have been improved if adequate representation from diverse cultural communities existed on the Roundtable. In addition, all interviewees expressed the view that the inclusive representation found on the Roundtable was one of the greatest strengths of the process. For example, one interviewee said that:

> *...it is a very diverse group of people, and I do believe we have all the interests represented which is rare. I haven't seen anything quite like it in terms of the diversity.*

Notably, 12 of the 13 respondents stated that the CRWR planning process was open to any interest group with a stake in the health of the watershed. One of these respondents stated that:

> *In some of our Core Committee meetings it did come up that it would be important to have representation from a particular sector that isn't currently represented but should be because they have an important stake in the health of the watershed and can have an influence in it. Each addition is welcome because in order to be valid the committee needs to try to represent all the various interests of the watershed. Otherwise it doesn't have validity.*

One interviewee expressed the view that the process was not open to all interest groups. This particular respondent stated that it was difficult for interests groups who were not already represented on the Roundtable to join.

The Role of the Open Standards for the Practice of Conservation

The Roundtable structure was established prior to the formal adoption of the Open Standards, therefore the Open Standards did not play an apparent role in ensuring that all significant interests and values were included. However, as advocated by the CMP, a general principle for implementing the Open Standards is to involve the appropriate stakeholders throughout the process. The training manual defines appropriate stakeholders as, "individuals, groups, or institutions that have an interest in, will be affected by or may influence your project's activities and results" (CMP, 2013: p. 14). According to the Open Standards, appropriate stakeholder representation includes involving both internal and external stakeholders throughout every step of the process. Internal stakeholders are individuals on the project team that are directly responsible for the planning and implementation of the project (CMP, 2013). In contrast, external stakeholders are, "individuals and institutions that have some interest in, connection to or potential influence on the project, but who are not directly responsible for implementing it" (CMP, 2013: p. 14).

5.1.3. Voluntary Participation and Commitment

Indicators	
✓	Stakeholders participate in the process of their own volition.
✓	Stakeholders are genuinely committed to the process.

The CRWR Planning Process

The CRWR planning process fully satisfies the evaluative criterion of "voluntary participation and commitment". Stakeholders participated in the planning process of their own volition, and no stakeholder was required to remain involved in the process if they felt it did not serve them adequately. Furthermore, all interviewees expressed the opinion that they were committed to the planning process. In particular, six interviewees stated that consistent participation and commitment from Core Committee members was one of the greatest strengths of the organization. For example, one of these interviewees said that:

> *...the commitment from the group is admirable.*

White another stated that:

> *...the greatest strength is the consistency of the participants, the longevity of members.*

Notably, three respondents attributed the continued participation and commitment of stakeholders to their prior experience with BC Hydro's Coquitlam River Water Use Planning process. For example, one of these interviewees said that:

> *One of the interesting things is you see a lot of the same members here that you saw at the Coquitlam Water Use Planning process which started in September 1999 and was completed in March 2003. A lot of the same people got to know each other and know what everybody can deliver and a lot of those people are still rolling up their sleeves and working on the Roundtable today. I think that was an extremely important catalyst.*

The Role of the Open Standards for the Practice of Conservation

The Open Standards do not directly address the evaluative criterion of "voluntary participation and commitment".

5.1.4. Equitable

Indicator	
✓	Every participant has the opportunity to participate effectively throughout the process.
✓/ **X**	The process reduces power imbalances among participants.

The CRWR Planning Process

Interview and documentary data indicate that the CRWR planning process is equitable. The CRWR's Terms of Reference (TOR) include provisions to encourage effective participation from stakeholders throughout the process. For example, operating procedures include: ensuring all stakeholders and broad interests are involved; operating as a collective, without dependency on, or obligations to a single Roundtable sector or member; being open and transparent in all processes; and following consensus-oriented decision making. These principles of inclusivity, openness, and transparency appear to have been designed to ensure that all participants would have the opportunity to participate effectively throughout the process. Furthermore, implementing consensus-based decision making probably assisted in managing power imbalances among participants.

The CRWR TOR indicate that each Core Committee member had one vote during formal voting processes. However, it is important to note that municipal governments (City of Coquitlam and Port Coquitlam) and First Nations (Kwikwetlem) held greater voting power as they each had two designates on the Core Committee, whereas all other sectors had one. Seven interviewees were of the view that for the planning process to be successful, leadership from municipal governments and First Nations was necessary. In particular, six of these respondents stated that the continued support and leadership provided by the City of Coquitlam in particular was one of the greatest strengths of the organization, as it increased the Roundtable's legitimacy and combined influence. However, one of these respondents also expressed the opinion that it was essential to ensure that the City of Coquitlam did not ultimately drive the process. This interviewee stated that:

> *…this is very much a bottom up approach, but it still needs the municipalities to lead it in order to implement our management plan. That may or may not be a good thing. It is a worry that I have, but it can be a worry in any organization.*

Another interviewee said that:

> *Someone needs to make sure the process moves forward and you know you can't have complete equality on the governance of the Roundtable or else it is going to collapse. We recognize that the City of Coquitlam has really been behind this. There was some trepidation of that before, because folks thought it would become a project of the city but I don't think it has landed in that spot.*

The Role of the Open Standards for the Practice of Conservation

The CRWR did not formally adopt the Open Standards until after they had collectively developed their TOR and established their governance structure. As such, the Open Standards did not influence the degree of equality found on the CRWR. The Open Standards does not explicitly address the "equitable" evaluative criterion. However, as previously mentioned, a general principle for implementing the Open Standards is to involve all the appropriate internal and external stakeholders throughout the entire planning process. This suggests that the Open Standards support the principle that each participant should have the opportunity to participate effectively throughout the process. Furthermore, the training manual advocates for practitioners to conduct a stakeholder analysis at the onset of a planning process. A stakeholder analysis is designed to clarify relationships that may warrant attention or may influence the success or failure of the project by considering both powerful and influential stakeholders, and those that might be disadvantaged or marginalized (CMP, 2013). According to the Open Standards, clarifying and assessing relationships at the beginning of a planning process assists in reducing power imbalances among participants, and limiting unnecessary conflict. As the CRWR did not formally adopt the Open Standards until after they had collectively established their governance structure, the Roundtable did not conduct a stakeholder analysis as outlined in the training manual.

5.1.5. Self-design

Indicator
✓ Participants work collectively to design the process.

The CRWR Planning Process

Interview and documentary data indicate that participants worked collectively to design the CRWR planning process. All but one interviewee described and expressed their satisfaction

with the consensus-based process that was undertaken in order to establish a governance framework best suited to their needs: *Phase III: Governance Strategy and Direction Setting* (Dovetail Consulting Group, 2010). The one interviewee who did not describe this process indicated that they were not affiliated with the Roundtable during that particular undertaking. The primary objective of Phase III was to collectively formalize a governance framework and terms of reference in order to collaboratively develop a watershed management plan consistent with the common vision, values, and mission statement developed in Phase II (Dovetail Consulting Group, 2010). Phase III consisted of a series of public workshops led by an independent facilitator. Attendees included representatives of local, regional, provincial, federal, and First Nations governments, environmental stewardship groups and recreational groups, industry, development interests, businesses and the public (Dovetail Consulting Group, 2010). Phase III resulted in the establishment of a Roundtable governance structure and operational guidelines, endorsed by all participants. For example, participants agreed that representation on the Roundtable would include all stakeholders with an interest in the watershed and all levels of government with jurisdictional authority in the watershed, but that the Roundtable itself would be independent of government (Dovetail Consulting Group, 2010). Participants also collectively agreed that:

- a Core Committee would serve as the administrative body to support and provide continuity for the Roundtable;
- the Roundtable would be accountable to its agreed-upon vision, values, mission and guiding principles;
- the Roundtable itself would be unable to make decisions related to jurisdictional authority and legislative responsibilities; and
- participation in the Roundtable would be open in order to ensure inclusive representation. (Dovetail Consulting Group, 2010).

The Role of the Open Standards for the Practice of Conservation

The *Phase III: Governance Strategy and Direction Setting* process was undertaken prior to the formal adoption of the Open Standards by the Roundtable. As such, the Open Standards did not play an apparent role in establishing the Roundtable's governance framework or terms of reference. However, the Open Standards does support self-design as the training manual repeatedly promotes creativity and flexibility, and encourages the adaptation and modification of guidelines in order to serve individual applications.

5.1.6. Clear Ground Rules

Indicators	
✓	Terms of reference are developed collectively by participants.
✓/ X	Operating procedures are clearly defined.
✓	Roles and responsibilities of participants are clearly defined.

The CRWR Planning Process

The evaluative criterion of "clear ground rules" is largely met by the CRWR's planning process. Interview and documentary data indicate that the CRWR TOR were developed through community consultation, and finalized by the Core Committee during the *Phase III: Governance Strategy and Direction Setting* process. The TOR include Roundtable and Core Committee member operational guidelines, guiding principles, roles and responsibilities of participants and the use of sub-groups. All respondents expressed general satisfaction with the above described points; nevertheless, six interviewees provided specific criticisms. I categorized the criticisms into three broad themes: (1) improper formation of sub-groups; (2) undefined time commitment for Core Committee members; and (3) lack of an adequate process for replacing Core Committee members. Two interviewees stated that instances had occurred where sub-groups lacked specific interests and/or expertise that should have been present. For example, one of these interviewees said that:

> *...in terms of forming a task group, we should ensure that everyone that needs to be there should be there. Otherwise there shouldn't be a task group and it should be a project of the entire committee.*

Three interviewees expressed concern with the potential loss of institutional memory, expertise, and knowledge upon replacement of Core Committee members. These three interviewees stated that the TOR lacked a clearly articulated process for replacing Core Committee members after an 18 month commitment. Last, although all respondents indicated that the range of responsibilities for Core Committee members was clearly defined, one interviewee stated that the level of time commitment was not.

The Role of the Open Standards for the Practice of Conservation

As previously mentioned, the Open Standards did not play an essential role in developing clear ground rules for the CRWR as this process was undertaken prior to the formal adoption of

the Open Standards framework. Regardless, clearly defining the roles and responsibilities of participants is an essential output of Step 1 of the Open Standards*: Conceptualize*. The training manual does not include provisions for collectively developing a terms of reference document or defining operating procedures.

5.1.7. Conflict Resolution Techniques

Indicators	
✓	Consensus-based conflict resolution techniques are designed early in the process.
✓	Conflict resolution techniques are applied when required.

The CRWR Planning Process

The CRWR planning process fully satisfies the evaluative criterion of "conflict resolution techniques". All interviewees expressed the opinion that the Roundtable implemented consensus-based conflict resolution techniques. Four interviewees further stated that in the event that consensus could not be achieved, a formal vote would proceed with a requirement that 80% of the Core Committee members must vote in the affirmative for a measure to be approved. Furthermore, specific details of conflict resolution techniques are clearly articulated in the CRWR's TOR, indicating that participants collaboratively designed this technique early in the process. Two interviewees described situations where the Roundtable had implemented the 80% decision making rule (during Phase II and Phase III), suggesting that conflict resolution techniques were applied when required.

The Role of the Open Standards for the Practice of Conservation

The Open Standards does not address the evaluative criterion of "conflict resolution techniques".

5.1.8. Independent Facilitation

Indicators	
✓	An independent facilitator is used at major decision making points.
?	Facilitator(s) acts in an unbiased manner.

The CRWR Planning Process

I was unable to assign an overall performance rating for the evaluative criterion of "independent facilitation", as this criterion was not included in my evaluative framework at the time of the interviews. I did not specifically ask respondents if facilitators were used at major decision making points or if they were perceived as unbiased, Regardless, two interviewees indicated that independent facilitators guided the Phase II and Phase III processes. Documentary data further supports the conclusion that independent facilitators were used at major decision making points. The remaining 11 interviewees did not provide comments. For the purpose of this research, I considered Phase II and Phase III to be major decision making points as outcomes included consensus on a common vision, mission statement and values, guiding principles and a terms of reference. Although I did not ask specifically, respondents did not provide statements that directly or indirectly suggested that facilitators acted in a biased manner.

The Role of the Open Standards for the Practice of Conservation

The Open Standards does not specifically address the evaluative criterion of "independent facilitation". However, upon adopting the Open Standards to guide the development of their watershed management plan, the Core Committee hired an independent consultant that had been implementing the Open Standards for watershed-based planning in the Pacific Northwest since 2008 to facilitate the planning process. Notably, six interviewees expressed the opinion that without the guidance of expert consultants trained in implementing the Open Standards, the CRWR would not have been able to properly apply the framework.

5.1.9. Effective Process Management

Indicator	
?	Process staff acts in a neutral and unbiased manner.
✓/ X	The process is coordinated and managed effectively

The CRWR Planning Process

I was unable to assign a performance rating for the evaluative criterion of "effective process management". In particular, I could not assess whether process staff acted in a neutral and unbiased manner, as this indicator was not included in my evaluative framework at the time of interviews. However, documentary data and participant observation suggest that the CRWR planning process was coordinated and managed effectively. In the CRWR TOR, Core Committee operational guidelines include detailed provisions for Core Committee meetings. For example, operational guidelines indicate that Core Committee meetings are to be held six times a year and facilitated using a rotating Chairperson and Co-Chairperson. Operational guidelines also articulate the responsibilities of the Chairperson and Co-Chairperson: developing and circulating draft agendas and available relevant information to participants; posting draft agendas to the Coquitlam River Watershed website for review by other Roundtable members; ensuring an efficient and effective meeting; keeping a record of attendance, meeting notes, and action items; sending meeting notes in electronic format to all members of the Core Committee for review and feedback; and posting notes to the website within 14 days following a meeting. In addition, I personally attended Roundtable and Core Committee member meetings over the course of two years. My personal observations attest that Core Committee members consistently followed their operational guidelines. However, it is important to note that at the time my interviews were conducted, the Core Committee was in the process of hiring a part time coordinator. Due to limited funding, the Roundtable did not have a coordinator for approximately six months. Ten interviewees expressed the opinion that the CRWR planning process was hindered due the organization's inability to fund a year round permanent coordinator.

As previously mentioned, I was unable to assess whether the process staff acted in a neutral and unbiased manner. The CRWR had one paid employee, a part time coordinator position. The coordinator position was paid through external funding received by the Roundtable, with the exception of one period when funding was exhausted. During this period, the City of Coquitlam provided additional part time staff support over four months to ensure that the Watershed Plan work and the Core Committee meetings would continue to meet deliverables to

external funding members. None of the respondents suggested that the coordinator acted in a biased manner.

The Role of the Open Standards for the Practice of Conservation

The Open Standards training manual explicitly states that it is not designed to fully address administrative processes and functions such as human resource management or finances. The training manual does include provisions to guide the development of an operational plan for implementing and monitoring a management plan. According to the Open Standards, key components of an operational plan include analyses of financial and human resources, an estimation of the lifespan of the project, and an exit strategy (CMP, 2013). Upon completion of an operational plan, the training manual suggests that the project team should develop a detailed short-term work plan and timeline. The manual also suggests that if project teams abide by these guidelines it will ensure that the process is coordinated and managed effectively. At the time of writing these results, the CRWR had not yet developed an operational plan as they had not yet completed their implementation and monitoring plan. As such, I am unable to assess whether the CRWR followed the suggested provisions in the Open Standards for effective process management. However, documentary data and participant observation reveal that the CRWR created work-plans specific to the watershed management plan annually based on the provisions provided in the Open Standards training manual. Detailed short-term work plans for the development of the watershed management plan were created by the CRWR coordinator, in conjunction with the Watershed Plan Task Group (a sub-group of the Roundtable Core Committee and selected external experts from Metro Vancouver, BC Hydro, and municipal government representatives), and included key deliverables, milestones, and deadlines.

5.1.10. Mutual Trust

Indicator	
✓	Open communication about participants' perspectives and interests is encouraged throughout the process.
✓	Participants demonstrate a clear understanding of one another's interests.
✓	Relationships amongst participants improve during the process.

The CRWR Planning Process

The CRWR planning process fully satisfies the evaluative criterion of mutual trust. The CRWR's guiding principles encourage open communication about participants' perspectives and interests. Guiding principles include: be influential and responsible, be inclusive and respectful, build relationships and be collaborative (CRWR, 2015c). All interviewees expressed the view that they understood one another's respective interests based on the fact that they had established long-term relationships with stakeholders, and due to the inclusive representation on the Roundtable. Two interviewees provided statements that attest to their understanding of one another's interests:

> *…due to the extensive representation in the group, I think it has provided an opportunity for people to understand where other people's motivations are. It has been a really great learning opportunity.*

and

> *…the greatest strength of the Roundtable is the ability for people to foster relationships with different sectors that they may not normally rub elbows with and to understand where each individual is coming from.*

In terms of the third indicator, 11 interviewees provided specific examples where they perceived that relationships had improved during the process. Two interviewees attributed the improvement of relationships to the collaborative establishment of a common vision, values, and mission for the watershed. For example, one of these interviewees stated that:

> *In my opinion, I think we've actually found ways to be more cooperative rather than combative. I never really heard anybody really having conflict. There have been arguments but there hasn't really been anything that would be combative. I think because we are all concerned about the same thing. There is just the commonality of the river. While the reasons for why we are at the table could differ, the commonality of the river brings us together.*

Another respondent said that:

> *We use to have conflict. We had certain interest groups leave in the middle of meetings, we use to have to take breaks because people were hot under the collar. We actually had meetings that went till 10:30pm because they were so wrapped up in it. But we just don't see that anymore. I say that our success can be attributed to finishing the process and writing down our vision, values, and mission.*

Six interviewees attributed the improvement of relationships to collaboratively developing their watershed management plan. One of these interviewees stated that:

> *There is respect now that each individual member is a sector interest that makes up our watershed. Undergoing this whole watershed planning exercise and agreeing on our ecological and human well-being components, it resonates that resource industries and salmon are both part of the watershed, part of the make-up.*

Last, three interviewees attributed the strength of the relationships on the Roundtable to their past involvement with BC Hydro's Water Use Planning process for the Coquitlam River watershed. For example, one of these interviewees stated that:

> *A lot of these people on the Roundtable were also involved with BC Hydro's Water Use Planning process. I think that was really important because during the Water Use Planning process we spent the first year or two just figuring out everyone's position. When we came to the Roundtable, the positions still had to be massaged a bit but everyone had a sense where each person was coming from. The Roundtable really benefitted from that process.*

The Role of the Open Standards for the Practice of Conservation

Six interviewees expressed the view that adopting the Open Standards for the development of their watershed management plan played an essential role in fostering mutual trust among CRWR members. Four of these interviewees stated that the Open Standards assisted in fostering mutual trust due to its holistic nature, and requirement to focus on ecosystem services and health and human well-being. In this regard, the Open Standards encompasses broader interests and values in comparison to traditional, technically driven, and narrowly focused management plans. One of these interviewees expressed the view that the Open Standards encouraged open communication about participant's perspectives and interests throughout the entire process, thus allowing for an understanding of one another's interests. Last, one of these interviewees indicated that because the Open Standards provided a clear structure and planning

process to follow, conflict among participants was reduced, resulting in improved relationships. The remaining seven participants did not attribute the adoption of the Open Standards as a key determinate in fostering mutual trust among CRWR members.

5.1.11. Transparency

Indicator	
✓	Information is freely available to the participants and public, except where confidentiality is justified.

The CRWR Planning Process

The CRWR planning process fully satisfies the evaluative criterion of transparency. Documentary data indicate that information was freely available to participants and the public through the CRWR's website and public Roundtable meetings. The website provided general information and status reports on current and previous projects, meeting times, locations, agendas and meeting minutes. In addition, the Core Committee hosted two public Roundtable meetings per year with the purpose of providing participants with additional opportunities to access and review information, and provide feedback. Furthermore, the CRWR's TOR clearly indicate that Core Committee meetings are to be open to all participants and the public, except in the event that Core Committee members will be discussing matters that have legal implications or personal issues.

The Role of the Open Standards for the Practice of Conservation

The Open Standards played an important role in fostering transparency during the development of the CRWR watershed management plan. A general principle of the Open Standards is to maintain transparency throughout the planning process. The training manual repeatedly stresses the importance of being clear and transparent throughout each step in the planning process, by documenting decisions and decision-making processes, as well as openly sharing assessments with project team members and the public. Interview and documentary data and participant observation reveal that the CRWR followed the Open Standard's principle of transparency throughout the planning process.

5.1.12. Accountability

Indicators	
✓/ **X**	The process and plan are approved by participants representative of the community as a whole, indicating that they believe the process and plan are in the common interest.
✓/ **X**	The process includes an effective strategy for communicating with the community.
✓	Participants are held accountable to their constituencies.
✓	Participants are held accountable to the process.
✓	Participants are held accountable for the consequences of their decisions.

The CRWR Planning Process

The CRWR planning process largely satisfies the evaluative criterion of accountability. The indicator of, "the process and plan are approved by participants representative of the community as a whole, indicating that they believe the process and plan are in the common interest" was largely met by the CRWR planning process. I assigned the indicator this rating based on three pieces of evidence. First, as previously mentioned, 11 of the 13 respondents were of the view that all valid interests and values were represented on the Roundtable. In addition, all but one of the interviewees stated that the Roundtable was open to any interests and values that had a stake in the watershed. These results suggest that participants were largely representative of the community as a whole. Second, all respondents expressed the view that decisions were made using consensus-based conflict resolution techniques, indicating that participants worked together to design the process and reach an agreement on the actions and outcomes incorporated in the management plan. Third, the Core Committee hosted two public Roundtable meetings per year. Public Roundtable meetings were meant to provide stakeholders and the broader public with an additional opportunity for input, suggesting that the broader community had an opportunity to directly influence the process and plan. As one respondent stated:

> *...it is their [the community's] process really, we are just representatives of the greater community.*

The indicator of, "the process includes an effective strategy for communicating with the community" was also largely met by the CRWR planning process. All interviewees indicated that the Roundtable communicated with the community through public Roundtable meetings, outreach initiatives, the CRWR website and social media. However, four respondents stated that the process could have been improved if a formal communications strategy was developed.

The CRWR planning process fully satisfied the remaining three indicators. Members of the Core Committee were formal representatives of their respective organizations and had an obligation to inform their constituencies of the Roundtable's actions. The CRWR TOR include a clause that Core Committee members were to be accountable to the process by ensuring that each member is responsive and communicative, while taking ownership and respecting aboriginal rights and title. The CRWR TOR also indicate that Core Committee members were to be accountable for the consequences of their decisions, as any business arising out of the Core Committee that required formal approval would be brought forward to the Roundtable as a whole for ratification. Furthermore, because participants formally represented their respective organizations, it is unlikely that members would support decisions that went against the mandates of their organizations.

The Role of the Open Standards for the Practice of Conservation

The Open Standards played an important role in ensuring that accountability was achieved throughout the planning process. As previously mentioned, one of the general principles of the framework is to involve the appropriate stakeholders, including all individuals, groups or institutions that have an interest, will be affected by, or may influence the project's activities and results (CMP, 2013). This principle suggests that stakeholders should be representative of the community as a whole. In terms of the second indicator, the training manual emphasizes the importance of developing a clear communications and dissemination strategy in order to effectively communicate results and other project information to a variety of audiences (CMP, 2013). However, at the time of writing these results, a formal communications strategy had not been developed by the Core Committee. A second general principle of the framework is to maintain transparency throughout the planning process. This includes documenting decisions and decision making processes, openly sharing assessments with all participants and the public, and assigning roles and responsibilities to individuals. If this principle is applied throughout the planning process it suggests that participants will be held accountable to the process, their constituencies, and the consequences of their decisions.

5.1.13. Reasonable Expectations

Indicators	
✓	Participant's expectations are reasonable and realistic given the goals and objectives of the process.
✓	Participant's expectations are compatible with broad societal goals (e.g. democracy, equity).

The CRWR Planning Process

The CRWR planning process fully satisfies the evaluative criterion of "reasonable expectations". Interview data indicate that each respondent's expectations of the CRWR planning process were reasonable and realistic given the goals and objectives of the process. During interviews, I asked respondents to specifically identify what they expected the Roundtable to achieve. Although responses varied, each interviewee's response directly aligned with the Roundtable's mission statement and values. For example, four respondents expressed the opinion that they expected the Roundtable to inform and educate the broader public about the Coquitlam River watershed. One of these interviewees stated that:

> *...I want the Roundtable to be able to provide people with an opportunity to receive information about the watershed and to understand the competing interests in the watershed, to see how it is moving towards a healthy ecosystem for future generations.*

Five interviewees expressed the opinion that they expected the Roundtable to complete, implement, and monitor the watershed management plan with support from local governments. An interviewee of this view said that:

> *I expect to see more buy-in and endorsement of the results from the watershed plan from local governments, and more of a process to actually monitor, not only the plan, but the various parts of the plan as time goes on.*

Last, three interviewees expressed the opinion that they expected the Roundtable to have a stable source of funding and capacity in order to achieve its mission and vision. With regard to the second indicator, all interviewee's expressed expectations that were compatible with broad societal goals such as democracy and equity.

The Role of the Open Standards for the Practice of Conservation

The Open Standards framework does not address the evaluative criterion of "reasonable expectations".

5.1.14. Time Limits

Indicators
✓/ X The process has a detailed plan, including clear milestones and deadlines to keep it moving forward.

The CRWR Planning Process

Based on documentary data, the CRWR planning process partially satisfies the evaluative criterion of "time limits". The CRWR developed a detailed work plan for each calendar year. Annual work plans were organized under the Roundtable's mission statements. Under each mission statement, tasks and designated roles of the coordinator, sub-groups, and Core Committee members were assigned. Draft work plans also included detailed strategies of how to achieve organizational and project goals. Organizational and project goals were dependent on funding availability for each calendar year. Each goal included key deliverables, milestones, and associated deadlines. Regardless of these efforts, however, four interviewees expressed the opinion that too much time was allotted to the planning process.

The Role of the Open Standards for the Practice of Conservation

As previously mentioned, the Open Standards training manual indicates that it is not intended to fully address administrative processes and functions. However, it provides guidance to practitioners for the development of a detailed short-term work plan and timeline. The training manual suggests that a detailed work plan should form the basis for the development of a project timeline and that project timelines must include key deliverables and deadlines (CMP, 2013). The CRWR created work-plans specific to the watershed management plan annually based on the provisions provided in the Open Standards training manual. For example, detailed short-term work plans for the development of the watershed management plan were created by the CRWR coordinator and included key deliverables, milestones, and deadlines.

5.1.15. Commitment to Implementation and Monitoring

Indicators	
?	The plan includes a clear strategy for implementation and monitoring.
✓	Participants share a strong commitment to plan implementation.

The CRWR Planning Process

At the time of writing these results, the CRWR had not yet completed its final watershed management plan. As such, I was unable to directly assess whether the plan included a clear strategy for implementation and monitoring. However, the CRWR was in the process of developing an *Action* and *Monitoring Plan*, guided by the Open Standards. In May 2014, the Core Committee hosted a public Roundtable meeting during which input provided by 59 participants resulted in the development of 17 draft strategies to address the top eight pressures affecting the health of the watershed, as identified through a public consultation event held by the Roundtable in May, 2014. Pressures affecting the health of the watershed included: storm-water; development; invasive species; vandalism/illegal activities; recreation; mainstream cultural norms; water extraction; and mining. The Core Committee has since identified the top three strategies that they believe have the greatest potential for successful implementation. In the context of the Open Standards, the term "strategies" refers to project teams identifying how they will intervene to accomplish their management goals. Currently, the Core Committee is in the process of developing a detailed action plan based on the provisions in the Open Standards. The Core Committee committed to launching their *Action Plan* in April, 2015. Furthermore, the Core Committee committed to identifying the appropriate partners to champion and implement each strategy included in the plan. These results suggest that participants share a strong commitment to plan implementation.

The Role of the Open Standards for the Practice of Conservation

The Open Standards emphasizes the importance of a clear strategy for plan implementation and monitoring, and fosters a commitment to plan implementation and monitoring. The framework includes specific, detailed provisions for plan implementation and monitoring. In *Step 2: Plan Actions and Monitoring*, the project team is required to define and develop project goals, strategies and objectives and identify any assumptions the team made regarding how strategies will achieve the teams' overall goals and objectives. Project goals are linked to conservation and human well-being components, identified in the previous step of the

project management cycle. Upon goal establishment, the project team is directed to prioritize which components they will act on. The training manual suggests identifying key intervention points, developing potential strategies that address intervention points and then selecting those with the greatest potential to achieve project goals (CMP, 2013). At the time of writing, the CRWR had just begun consultation for their *Action Plan.*

The next step in the Open Standards is the development of a formal monitoring plan. The monitoring plan should include a timeline for data collection and analysis, a reflection of potential risks, and specific indicators to determine if objectives and goals are being met (CMP, 2013). Upon completion of an action and monitoring plan, project teams must develop an operational plan. Key components of an operational plan include: an analysis of funding and human capacity required to implement the project; risk assessment and mitigation; an estimated lifespan of the project; and an exit strategy (CMP, 2013). The last step is for project teams to design an implementation plan. The training manual stresses that an implementation plan is the most critical aspect in an adaptive management cycle. This step involves converting planning efforts into actions and includes developing and implementing specific work plans while ensuring sufficient resources, capacity and partners (CMP, 2013). Detailed short-term and long-term work plans must include specific activities and tasks required to complete each planning strategy, designating responsibilities to ensure accountability that tasks are completed and determining financial and human resources required to complete each task (CMP, 2013).

5.2. Holistic Approach

5.2.1. Commitment to Sustainability Over Multiple Generations

Indicators	
?	The plan and process includes a temporal dimension indicating that the resource(s) will be managed in a way that allows future generations to meet their needs.

The CRWR Planning Process

At the time of writing, the CRWR had not yet completed their final watershed management plan. As such, I was unable to assess if the plan included temporal dimensions indicating that the resource(s) will be managed in a way that allows future generations to meet their needs. However, the Roundtable's common vision and mission statement related to

sustainability. For example, the common vision was documented as, "a healthy watershed supported and enjoyed by the community in a manner that respects our common values in perpetuity" (CRWR, 2015c). In addition, goal statements for conservation and human well-being components included in the watershed management plan pertain to sustainability. For example, the goal statement for the conservation component *salmon* is to, "ensure resilient, healthy populations of native salmon for current and future generations", and the goal statement for the human well-being component *resource industries* is to, "promote sustainable use of renewable resources and monitored, prudent use of non-renewable resources" (CRWR, 2013).

The Role of the Open Standards for the Practice of Conservation

Conservation projects are often designed with the ultimate goal of achieving sustainability of the conservation action or result. To this end, the Open Standards includes principles for achieving sustainability by reinforcing the need for adopting a holistic management approach, fostering the inclusion of interactions between different systems, incorporating both natural and social sciences, traditional ecological knowledge and local knowledge and emphasizing partnerships that include a diverse range of stakeholder values and perspectives. Additionally, in Version 3.0 of the Open Standards climate change is explicitly addressed, including suggestions for how to develop proactive projects with respect to climate adaptation. However, the training manual does not explicitly provide guidance for including temporal dimensions into the plan indicating that the resource(s) will be managed in a way that allows future generations to meet their needs.

5.2.2. Diverse Knowledge Sources are Used

Indicators	
✓	High-quality natural science is used to inform decisions.
✓/ **X**	High-quality social science is used to inform decisions.
✓	High-quality local knowledge is used to inform decisions.
X	High-quality traditional ecology knowledge is used to inform decisions.

The CRWR Planning Process

The CRWR planning process largely satisfies the evaluative criterion of "diverse knowledge sources are used". Ten interviewees expressed the opinion that the watershed management plan was informed by diverse sources of knowledge. In contrast, three respondents

were of the view that the watershed management plan was largely informed by natural sciences. For example, one of these interviewees stated that:

> *...in order to be respected as a plan that is different from a typical storm-water management plan, we needed to show the natural science.*

Two of these interviewees provided specific examples of high-quality natural science information directly informing management decisions such as BC Hydro's Water Use Planning process and the Coquitlam River Water Quality Monitoring Program. Documentary data further reveals that the watershed management plan was largely informed by natural sciences.

Opinions varied among interviewees in regards to the extent to which social sciences, community-based and local knowledge, and traditional ecological knowledge were used to inform decisions. Three interviewees were of the view that high-quality social science information was unavailable to the Roundtable, specifically for recreational and human well-being data. One of these interviewees stated that:

> *...we are still in the dark with regards to measuring human well-being. Largely because it is something that is difficult to measure and it hasn't been done for this watershed. It was a challenge but we moved forward with what we had.*

Notably, ten interviewees stated that high-quality community-based and local knowledge was consistently used to inform decisions. The following excerpts from three of these interviewees attest to the incorporation of high-quality community-based and local knowledge:

> *..there is an extensive amount of anecdotal knowledge being integrated into the plan, also feedback from public Roundtable events capture additional local knowledge.*

and

> *..the information is largely local knowledge. There is quite a bit of talent in the room with respect to knowledge about various aspects of the watershed through the representatives that participate.*

and

> *..everyone who is there has a strong local knowledge in what they represent. A lot of the members are forever from the river. They just have the knowledge.*

Last, four interviewees expressed the opinion that the Roundtable did not incorporate traditional ecological knowledge into the watershed management plan. One of these respondents was of the view that opportunities existed for such knowledge to inform decisions but was not utilized. This interviewee stated that:

> *..it was always scientific to me in nature. I think the Nation has a strong cultural and spiritual connection to the river but in general the information we used was always scientific. I think there is a lot to learn from First Nations about fisheries and about the concerns of the environment.*

The Role of the Open Standards for the Practice of Conservation

The CMP developed the Open Standards framework for broad applicability. It is based on adopting a structured approach to making the best decisions given an operational problem and the available information (Schwartz et al., 2012). The training manual instructs practitioners to create conceptual models of goals, threats, and potential strategies to alleviate threats and achieve project objectives. Conceptual models are meant to illustrate the main cause and effect relationships that are assumed to exist by the project team within the geographic scope of the project (CMP, 2013). To this end, the Open Standards encouraged the incorporation of diverse sources of knowledge into the watershed management plan, because the framework itself favours and values the exploratory nature of creating conceptual models based on diverse perspectives. Notably, five respondents expressed the opinion that the greatest appeal in implementing the Open Standards was its ability to incorporate diverse sources of knowledge. One interviewee stated that:

> *The fact that the Open Standards would handle different types of data, you know we didn't have to be talking just about numbers. We could be reading things based on other types of information and that helped even the playing field a bit because there is such a strong interest of other types of values on the Roundtable.*

5.2.3. Planning and Management is Set at the Watershed Scale

Indicators	
X	The planning process and the plan itself encompass the entire catchment area.

The CRWR Planning Process

The CRWR planning process did not satisfy the evaluative criterion of "planning and management is set at the watershed scale". The geographic scope of the CRWR watershed management plan was limited to the lower Coquitlam watershed, and therefore did not encompass the entire catchment area. The Lower Coquitlam River watershed encompasses all tributaries and upland areas below the Coquitlam Lake Reservoir to the mouth of the Coquitlam River, where it enters the Fraser River.

The full Coquitlam River watershed represents a highly complex management setting due to jurisdictional authority and regional government requirements, as it is a source of drinking water for Metro Vancouver, and because the watershed contains a hydroelectric power dam operated by BC Hydro. The Coquitlam Lake Reservoir is one of three sources for drinking water in Vancouver. Metro-Vancouver, a regional level government, is responsible for the operation and maintenance of the Coquitlam Lake Reservoir, while BC Hydro is responsible for the Coquitlam Lake Dam. The Coquitlam Lake Dam divides the watershed. North of the dam is undeveloped wilderness. South of the dam, urban development in the watershed covers approximately 45% of the land within the City of Coquitlam and 30% of the land within the City of Port Coquitlam (Quadra Planning Consultants Ltd. et al., 2003). Prior to the inception of the Roundtable, the Coquitlam River watershed lacked any formal integrated storm-water management plan as it was not compulsory under the requirements of Metro Vancouver's Liquid Waste Management Plan, which is based on the overall percentage of undeveloped lands. One interviewee explained how the highly complex management setting within the Coquitlam River watershed impacted the scope of the watershed management plan. This interviewee stated that:

> *The majority of the watershed is undeveloped green-field, in order to get an approved watershed plan or direct funding you have to have a watershed where 70% or more is developed. The Coquitlam River watershed is highly developed but only in approximately 40% of the watershed. It is common knowledge that above the dam will never be developed because it is a drinking water reservoir. Therefore, we had to focus our efforts on the lower Coquitlam watershed.*

The Role of the Open Standards for the Practice of Conservation

An essential output of *Step 1: Conceptualize*, is defining the project's geographic scope. The Open Standards defines a project's scope as, "what the project intends to affect" (CMP, 2013, p. 10). However, the training manual does not provide practitioners with further guidance on identifying and defining the appropriate geographic scope of a particular project.

5.2.4. Integration

Indicators	
✓	The process and plan considers interactions between water and land-based resources.
✓	The process and plan considers interactions between water and social development.
✓	The process and plan considers interactions between water and economic development.

The CRWR Planning Process

Based on documentary data, the CRWR planning process fully satisfies the evaluative criterion of integration. Following the Open Standards planning cycle, the CRWR identified conservation components during *Step 1: Conceptualize*. Defined by the CMP, conservation components are, "specific species or ecological systems/habitats that are chosen to represent and encompass the full suite of biodiversity in the project area for place-based conservation" (CMP, 2013: p. 11). The training manual also provides guidance for the inclusion of human well-being components into management plans. As defined by the Millennium Ecosystem Assessment, human well-being components include five dimensions: (1) necessary material for a good life; (2) health; (3) good social relations; (4) security; and (5) freedom and choice (CMP, 2012: p. 2). According to the Open Standards, conservation and human well-being components represent the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. The CRWR watershed management plan includes both conservation components and human well-being components.

In order to initially identify components, the Core Committee held a public Roundtable meeting in November, 2012. The meeting was attended by approximately 80 individuals, including myself. Led by an independent facilitator, participants were asked to provide two conservation and two human well-being components they felt were most important in the

Coquitlam River watershed. Participants provided 211 suggestions. The Core Committee reviewed this feedback and through an iterative process developed a manageable number of components that best reflected participant feedback. This process influenced the inclusion of four conservation and six human well-being components into the watershed management plan. The four conservation components are defined by the CRWR as follows:

> 1. The Coquitlam River System: Ensure management of water flows, water quality and habitat in order to support productivity and other ecological and human well-being values;
>
> 2. Salmon: Ensure resilient, healthy populations of native salmon for current and future generations;
>
> 3. Riparian Areas: Maintain and where possible, maximize the width and connectivity of intact and healthy riparian areas for proper ecological functioning along the Coquitlam River and tributaries; and
>
> 4. Natural Areas: Maintain an interconnected network of land and water resources to support functioning natural systems, recreational opportunities and aesthetic values. (CRWR, 2013).

The six human well-being components are defined by the CRWR as follows:

> 1. Liveable Communities: Promote sustainable, liveable communities;
>
> 2. Resource Industries: Promote sustainable use of renewable resources and monitored, prudent use of non-renewable resources;
>
> 3. Human Health and Safety: Promote a watershed environment that contributes to human health, well-being and safety;
>
> 4. Stewardship: Foster a stewardship ethic in all who interact with the watershed;
>
> 5. Cultural and Spiritual Values: Support opportunities for people to connect in the watershed through personal spiritual experiences, heritage conservation and the arts; and
>
> 6. Recreation: Promote passive and active recreation that respects other users and the watershed. (CRWR, 2013).

Based on the selection of conservation and human well-being components, the CRWR's management plan included interactions between water and land-based resources and social and economic development.

The Role of the Open Standards for the Practice of Conservation

The CMP developed the Open Standards framework to improve results-based project planning, management, and monitoring within the conservation community (CMP, 2012). As such, the initial training manual clearly articulates that components must be biodiversity targets or ecological systems/habitat targets. However, over time as the application of the Open Standards broadened, practitioners called upon the CMP to provide explicit direction to incorporate human well-being components into the framework (CMP, 2012). In 2012, the partnership answered this call by providing guidance on the inclusion of human well-being targets and ecosystem services into the latest training manual (April, 2013). Drawing upon the Millennium Ecosystem Assessment's framework and in the context of a conservation project, human well-being targets focus on components of human well-being derived directly from, or dependent on, biodiversity conservation (CMP, 2012). In the development of conceptual models, human well-being components are influenced by the status of conservation components and the ecosystem services that depend on biodiversity conservation (CMP, 2012).

Although the training manual does not explicitly emphasize the necessity of integrating ecological, social and economic systems into project plans, interview data revealed that the Open Standards played an important role in ensuring that the process and plan considered interactions between systems. Six interviewees expressed the opinion that one of the greatest strengths of the Open Standards was its ability to incorporate human well-being values and ecosystem services into a management plan. These interviewees were of the view that incorporating such aspects into the watershed management plan not only assisted in the integration of human and natural systems, but also fostered a culture of learning across sector representatives within the organization. For example, one of these interviewees stated that:

> *It has really helped hone in on the efforts of the Roundtable on developing a watershed plan that is measuring something about the health of ecosystem services in the watershed and going on step further and looking at measures of human well-being that are associated with that. I ultimately think it is going to promote an understanding of how healthy watersheds are linked to healthy humans.*

The remaining seven interviewees did not provide comments on this issue.

5.3. Authority and Control

5.3.1. Capacity to Conduct Good Decision Making, Implement Decision and Influence Behaviour

Indicators	
✓/ X	Human Resources: The knowledge, perspectives, and skills of the staff are sufficient for the process and provide a range of expertise.
X	Financial Resources: Reliable and sustained financial resources are available during the process.
✓/ X	Technical Resources: Scientific, local and traditional knowledge are sufficient and reliable in order to make well-informed decisions regarding the management of the resource.

The CRWR Planning Process

The CRWR planning process partially satisfies the evaluative criterion of, "capacity to conduct good decision making, implement decisions and influence behaviour". Eight of the 13 interviewees were of the view that the knowledge, perspectives, and skills of the CRWR were sufficient for the process and provided a range of expertise, particularly on the Core Committee. One of these respondents stated that:

> *...the broad representation on the Core Committee brings an extensive amount of expertise in diverse subject matters to the table, and what doesn't exist directly on the Core Committee exists by the interested public who attend the public Roundtable events.*

In contrast, two interviewees were of the view that a gap in expertise existed due to a lack of consistent participation from the provincial government and BC Hydro, and two interviewees expressed the opinion that a lack of expertise existed due to limited human resources. One interviewee did not comment.

The CRWR did not satisfy the indicator of, "financial resources". Interview data indicates that all respondents were of the view that stable and consistent funding was the largest challenge that the CRWR planning process endured, as it operated substantially by in-kind support and external grants. Although the CRWR received considerable funding from the Real Estate Foundation of British Columbia, Metro-Vancouver, the Bullitt Foundation and Watershed Watch Salmon Society, all interviewees were of the view that the process was hindered due to the lack of consistent funding for administrative support. A particular concern was the Roundtables' inability to fund a year-round permanent coordinator. One interviewee stated that:

> *It is a well-known fact with collaborative organizations, that if you don't have a full time or permanent part time coordinator position, reliably funded and based as a regional district staff person or a municipal staff person, you could fall off the radar. This group needs a full year-round permanent coordinator commitment.*

The CRWR planning process largely satisfies the technical resources indicator. Although each respondent expressed the opinion that the available scientific, local, and traditional knowledge were sufficient and reliable in order to make well-informed decisions, three interviewees were of the view that gaps in information existed in regard to recreational statistics, cultural and spiritual values, and direct measures of human well-being. However, these three interviewees stated that these specific information gaps did not hinder the planning process.

The Role of the Open Standards for the Practice of Conservation

As previously mentioned, the Open Standards training manual explicitly states that it is not designed to fully address administrative processes and functions related to financial resources or human resource management. Regardless, it addresses the importance of recognizing and making use of the existing skills and expertise that each project team member brings to the organization, to ensure that the project moves forward with the best available knowledge. The training manual suggests that project teams should identify gaps in skills and expertise and remain flexible and open to adding new members, if required. Documentary data and participant observation reveals that the CRWR followed these provisions outlined in the training manual for ensuring that the knowledge, perspectives, and skills of the CRWR were sufficient for the process and provided a range of expertise. Furthermore, the Open Standards outlines steps for project teams to follow in developing an operational plan. As previously mentioned, key components of an operational plan include an analysis of funding and human capacity required to implement the project; risk assessment and mitigation; an estimated lifespan of the project; and an exit strategy (CMP, 2013). At the time of writing these results the CRWR had not yet completed an operational plan, and therefore I was unable to determine the role that the Open Standards played in ensuring that financial resources are reliable and sustained throughout the planning process.

As previously mentioned, the Open Standards framework was developed for broad applicability, and is based on adopting a structured approach to making the best decisions about an operational problem, given the information available (Schwartz et al., 2012). The training manual instructs practitioners to ground-truth any assumptions made by the project team with key

stakeholders and partners both inside and outside of the project team to ensure that the management plan reflects their understanding of the situation. Project teams are further advised to keep track of what they do not know and what might require further research or analysis. Documentary data and participant observation reveal that the CRWR followed these guidelines throughout the development of their watershed management plan. As such, the Open Standards played an important role in ensuring that the knowledge being incorporated into the watershed management planning process was sufficient and reliable in order to make well-informed decisions regarding the management of the resource, as it provided project teams with a clear process for doing so. For example, one interviewee stated that:

> *One of the greatest strengths of the Open Standards is that it provides a clear structure and process for moving forward without all the information. That was essential because we have a limited ability to collect new information. I've been involved in processes before where people get hung up on wanting to collect new information and not wanting to plan until you have it all in place. I mean you never have enough information, you never do. To me that was one of the things that I really liked.*

5.3.2. Legitimacy and Political Influence

Indicators	
✓	The process generates consensus around a vision, which is supported by the stakeholders.
✓	The organization is viewed by stakeholders and the broader public as a leader in watershed planning.
X	A legislative mandate is in place which gives authority to the organization to govern the resource.
X	The process and plan includes the availability of the necessary policy tools required to achieve goals and objectives.

The CRWR Planning Process

The CRWR planning process partially satisfies the evaluative criterion of "legitimacy and political influence". The CRWR planning process fully satisfies the indicator of "the process generates consensus around a vision, which is supported by the stakeholders". As previously discussed, all interviewees identified and agreed upon the shared purpose and vision of the Roundtable, and respondents expressed their satisfaction with the collective process that was undertaken to generate consensus around a vision. One interviewee stated that:

> *..there was considerable effort made to engage the*

> *public as well as all the stakeholders involved to do the word-smithing around our vision so that everyone could agree to it on a consensus-based approach. By taking this approach, the community at large really owned it as much as the Core Committee would.*

All interviewees expressed the opinion that the CRWR planning process was viewed by the broader public as a leader in watershed planning. One respondent indicated that the provincial government had identified the CRWR as an example of a successful collaborative organization based on the Roundtable's inter-jurisdictional watershed based governance framework. This respondent also stated that the CRWR had been showcased as a successful collaborative organization at a watershed governance conference led by the University of Victoria in 2014.

Although the CRWR planning process was able to generate consensus around a vision and has been viewed as a leader in watershed planning by stakeholders and the broader public, the CRWR did not have a legislative mandate in place that gave the organization authority to govern the resource. Furthermore, the watershed management plan did not include the availability of the necessary policy tools required to achieve their goals and objectives. Interview data reveals divided perceptions amongst interviewees regarding the lack of a legislative mandate and policy tools. Eight interviewees expressed the opinion that they were unsure as to whether or not the watershed management plan would influence decision making at a higher level. These interviewees were of the view that implementation of the watershed management plan would be a major challenge for the Roundtable, due to the organizations' lack of authority to govern the resource. However, seven interviewees expressed the opinion that the Roundtable's watershed management plan had the potential to influence decision making at a higher level due to the combined influence of the members of the organization. One of these respondents stated that

> *...although there isn't authority in the group, there is considerable influence through the representation found in the organization. We have a combined influence, should we choose to exert it.*

Another interviewee expressed this opinion by stating that:

> *The additions and endorsement for the process by the local and regional governments including Metro-Vancouver, First Nations, City of Coquitlam and Port Coquitlam have given the process considerable legitimacy for moving forward and has also probably influenced a lot more people to roll up their sleeves because they think their input has more of an effect in terms of reaching government.*

The Role of the Open Standards for the Practice of Conservation

The Open Standards framework does not directly address the evaluative criterion of "legitimacy and political influence". However, as previously discussed, an essential output of the framework is the development of a common vision. In addition, one of the general principles for implementing the Open Standards is to define and involve all internal and external stakeholders throughout the entire planning process. Thus, the Open Standards promotes the development of a common vision that is supported by all stakeholders. Regardless, the CRWR had established their common vision and the structure of the Roundtable prior to the adoption of the Open Standards.

Interview data reveal that the Open Standards played an important role in the CRWR being viewed by stakeholders and the broader public as a leader in watershed planning. For example, one interviewee expressed the opinion that the CRWR was viewed as a leader in watershed management planning by being the first organization in Canada to apply the Open Standards for the development of its watershed management plan. The Open Standards framework is the product of a collaborative initiative by the CMP, consisting of organizations internationally recognized as leaders in conservation management and planning such as the World Wildlife Fund, The Nature Conservancy, and the World Commission on Protected Areas. Although the training manual does not address legislative mandates, or required policy tools to implement management plans, it recommends that practitioners perform a situation analysis at the onset of the planning process. A situation analysis creates a common understanding of the project's context – including describing the relationships between the biological environment and the social, economic, political and institutional systems and drivers that affect the conservation targets – in order to be better equipped for strategy selection and identifying activities that will achieve the project's goals and objectives (CMP, 2013).

5.3.3. Multijurisdictional Cooperation

Indicators	
✓	All government agencies with jurisdictional authority in the watershed are represented, including those responsible for activities that impact the resource(s).
X	All government agencies with jurisdictional authority in the watershed participate during the process, including those responsible for activities that impact the resource(s).

The CRWR Planning Process

The CRWR planning process partially satisfies the evaluative criterion of multijurisdictional cooperation. Documentary and interview data reveal that all government agencies with jurisdictional authority in the watershed were represented throughout the CRWR planning process, including those responsible for activities that impact the resource(s). Governmental representation included local government (City of Coquitlam and City of Port Coquitlam), First Nations (Kwikwetlem First Nation), regional government (Metro-Vancouver), provincial government (British Columbia Ministry of Energy and Mines), and federal government (Fisheries and Oceans Canada). Furthermore, the utilities sector was represented by BC Hydro and the aggregate industry sector by Jack Cewe Limited.

All interviewees expressed the view that local, regional, and federal government participation was consistent throughout the process, as well as participation from the aggregate industry representatives. In contrast, all but one of the respondents stated that the process could have been improved if the provincial government and BC Hydro participated consistently throughout the process. One of these interviewees stated that:

> *…I think BC Hydro is largely missing. They need to be there on a regular basis because they have control over the Coquitlam River Water Use Planning process and the hydro-operations on the watershed.*

Notably, four interviewees acknowledged that the lack of participation from the provincial government and BC Hydro was largely due to capacity issues within their respective organizations. The one interviewee who disagreed with the majority was of the view that the lack of participation from BC Hydro did not hinder the process. This interviewee said that:

> *…it is difficult for them (BC Hydro) at this point, but in all honesty I think BC Hydro has done the work already*

> *from the Water Use Planning process. They can be there and we can draw on them and they can come occasionally, but I don't think they need to be there full time.*

In addition, four respondents expressed concern with regard to participation by the Kwikwetlem First Nation. Two of these interviewees discussed how elections at the Nation resulted in past participants being replaced by new councillors who did not consistently participate in the process. One of these interviewees stated that:

> *...for successful engagement in the watershed, where the conversation of fisheries is involved, it is key that local First Nations representation is included in the dialogue.*

It is important to note that active participation by the Kwikwetlem First Nation has largely been based on their internal capacity, and that the Nation has been a consistent funding source to the Roundtable over the past two years.

The Role of the Open Standards for the Practice of Conservation

As previously mentioned, the structure of the Roundtable was established prior to the adoption of the Open Standards, and therefore the framework did not play an essential role in ensuring that all government agencies with jurisdictional authority in the watershed were represented and participated consistently throughout the planning process. However, the Open Standards emphasizes for the inclusion of all appropriate internal and external stakeholders throughout the planning process, suggesting that the framework advocates for multijurisdictional cooperation.

5.4. Learning and Adjusting with Experience

5.4.1. Flexible and Adaptive

Indicator	
✓/ X	The process is flexible enough to give participants the opportunity to periodically assess the process and make adjustments as needed, given new information or changing circumstances.

The CRWR Planning Process

The CRWR planning process partially satisfies the evaluative criterion of, "flexible and adaptive". All respondents expressed the view that the CRWR planning process was flexible and allowed participants to reflect and make adjustments as needed. However, it is important to note that four interviewees expressed concern with the ability of the Roundtable to make adjustments once the planning process is complete, due to limited capacity and the inability to fund a permanent coordinator position. For example, one interviewee stated that:

> *A mechanism is needed to keep the circle going. You need to have the financial and human capacity to get new information in order to update the plan as we move forward. It is something that worries me, in 2015 we will have this plan completed and then what if all of a sudden new information comes in that changes a pressure but we don't have the capacity to keep up with it, what happens then?*

The Open Standards for the Practice of Conservation

The Open Standards framework was developed based on the foundational principles of adaptive management (FOS, 2009), and thus played an important role in cultivating a flexible and adaptive planning process. The CMP define adaptive management as, "the integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn" (FOS, 2009: p.7). The training manual repeatedly promotes creativity and flexibility, and encourages the adaptation and modification of guidelines in order to serve individual applications. In particular, *Step 4*: *Analyze, Use, Adapt* recommends that project teams revisit and adjust project parameters, core assumptions, action, monitoring and operational plans continuously in order to improve the effectiveness of the project. Furthermore, the final step in the Open Standards framework, *Step 5: Capture and Share Learning*, involves capturing a project team's lessons learned on a regular basis and sharing these lessons with the broader conservation

community. The CMP suggests that capturing and sharing lessons will assist the project team over the long term as it develops institutional memory within the organization (CMP, 2013). However, at the time of writing the CRWR had not yet completed Step 4 or 5 of the Open Standards. The framework also provides opportunities for practitioners working under similar conditions and dealing with similar threats to learn from and benefit from the experiences of other practitioners through an online forum (CMP, 2013).

5.4.2. Learning from Experience

Indicator	
?	The process includes provisions to adapt decisions through monitoring, evaluating, terminating or adjusting management decisions**.**

The CRWR Planning Process

At the time of writing, the CRWR planning process had not yet developed a monitoring plan. Therefore, I could not assess whether the Roundtable included detailed provisions to adapt decisions through monitoring, evaluating, terminating or adjusting, and I was unable to assign a performance rating for the evaluative criterion of "learning from experience".

The Open Standards for the Practice of Conservation

The Open Standards plays an essential role in directing that the process should include adequate provisions and capacity to adapt decisions through monitoring, evaluating, and terminating or adjusting management strategies as required. The CMP advocates that a critical component of an adaptive management cycle is the development of a monitoring plan. The training manual provides detailed guidelines for project teams to follow to develop a formal monitoring plan. The manual suggests that a monitoring plan provides the basis for learning by allowing project teams to evaluate, terminate, and adjust management strategies as needed (CMP, 2013). The training manual suggests that monitoring data should provide project teams with the necessary information to analyze whether expected results are being achieved. Collecting and analyzing data as part of routine monitoring activities is an essential step in determining the effectiveness of interventions and whether project teams need to adjust (CMP, 2013). I was unable to determine the role that the Open Standards played in fostering opportunities for learning from on the ground experience for the Roundtable specifically, as at the time of writing the Roundtable had not yet completed a monitoring plan.

5.5. Additional Comments

In this final section of this chapter, I describe additional themes and patterns pertaining to the Open Standards that emerged from my analysis of interviews that were not captured by the criteria in the evaluative framework. I identified two dominant themes in interviewee's perspectives on the Open Standards for watershed planning: (1) degree of complexity; and (2) standardized approach for watershed planning.

5.5.1. Degree of Complexity

The most frequently cited weakness of the Open Standards from respondents was the complexity of the framework. Nine of the 13 interviewees expressed the opinion that the Roundtable's ability to implement the Open Standards was inhibited due to the conceptually difficult structure of the framework, which resulted in an extensive time commitment from participants. For example, one interviewee stated that:

> *…one of the challenges is spending enough time to read all the materials, fully understand the concepts and then contribute to the process to the extent necessary.*

It is important to note, however, that one respondent expressed the opinion that the degree of complexity was due to the amount of components that the Roundtable included within the watershed management plan. This interviewee stated that:

> *I don't know if a smaller more local stewardship group would be able to follow the Open Standards. I guess it would depend on how big they made the plan. The Roundtable really wanted to see the plan include a lot of different aspects. A group that had a more narrow focus would have had an easier time.*

In addition, four of these respondents stated that without the guidance from consultants trained in the Open Standards, the Roundtable would not have been able to complete the planning process due to its complex nature. For example, one interviewee said that

> *…without the guidance provided by the consultants I'm not sure one or two individuals might be able to give the time necessary to bring it together, and that is a vulnerability of the framework.*

Another respondent who shared this sentiment stated that:

> *…the framework is challenging, especially if you don't have*

the resources to hire a trained facilitator. I think there needs to be more simplified guidelines.

The remaining four interviewees did not provide comment.

5.5.2. Standardized Approach for Watershed Planning

Four of the 13 respondents were of the opinion that implementing the Open Standards framework was beneficial because it provided a standardized approach for watershed management and planning. For example, one of these interviewees said that:

> *…I think it's a great planning process for coming up with a standardized way of doing a watershed plan, and to define priorities and key issues to focus on.*

Another one of these interviewees stated that:

> *I think this type of standardization is great. A thing like the Open Standards, if it was used by all sorts of different watershed groups you would have a huge amount of data that is evidence based, you would have this huge list of some of the benefits that have happened as a result of certain strategies that were proposed then you could actually compare apples to apples.*

In addition, three of the 13 interviewees were of the opinion that implementing the Open Standards for the development of the watershed management plan provided the Roundtable with a distinct process to follow. For example, one interviewee said that:

> *Using the Open Standards kept our focus, our decision making is more focused and our vision is focused. It is keeping us moving forward and narrowing down parts that need to be looked at for the watershed. This kind of structure have been extremely useful, not only for our watershed plan but also for making the Roundtable more effective.*

Another interviewee stated that:

> *Honestly, I don't know if we would have been able to do a watershed plan if we didn't follow the Open Standards. I think that we would still be debating what we are doing and how we are going to do it, or it just would have turned into something very narrowly focused that not everyone would have fully brought into and fully supported.*

And last, one interviewee stated that:

> *It gave us a process to follow in order to complete a watershed plan. I think otherwise we would still be fumbling all over the place trying to figure out how to put it all together.*

Chapter 6. Summary, Discussion and Recommendations

6.1. Introduction

The main objective of this research was to evaluate the planning process of the Coquitlam River Watershed Roundtable (CRWR), based on broadly promoted principles of collaborative planning, integrated water resource management (IWRM) and adaptive governance. In order to achieve this objective, I developed an evaluative framework drawn from the literature on collaborative planning, IWRM and adaptive governance. The framework consisted of 24 criteria and 52 associated indicators, organized into four broad categories: (1) Collaborative Planning; (2) Holistic Approach; (3) Authority and Control; and (4) Learning and Adjusting with Experience. I used interview and documentary data to conduct an evaluation of the CRWR's planning process and its draft watershed management plan.

This research also examined the role, and strengths and weaknesses, of the Open Standards for the Practice of Conservation framework in structuring watershed management planning by community-based initiatives. The CRWR's planning process and draft watershed management plan presented a unique opportunity as the Roundtable was the first organization in Canada to apply the Open Standards in developing a multi-jurisdictional collaborative watershed-based plan, and among the first in the world to apply the Open Standards in a way that explicitly integrated both ecological and human well-being goals into its management plan. To examine the role of the Open Standards within the broader context of integrated watershed management, I analyzed interview and documentary data to evaluate how the Open Standards contributed to the CRWR planning process and how the Open Standards addressed each criterion in the evaluative framework.

In the following sections I summarize the results of the evaluation of the CRWR's planning process and its draft watershed management plan, identify the organization's strengths and describe where specific areas for improvement exist. I then summarize the role, and the strengths and weaknesses, of the Open Standards framework when applied in integrated

watershed management planning. Drawing on insights from this case study and the relevant literature, I provide seven recommendations geared towards further strengthening the Roundtable's planning process as it moves forward, and four key considerations to guide similar community-based initiatives seeking to apply the Open Standards framework for watershed management and planning. While the generalizability of some findings is limited by the fact that this research involved a single case study, other findings are more broad and of interest to a wide-ranging audience involved in community-based planning processes for natural resource management. I conclude this chapter by providing recommendations for future research.

6.2. Summary of the Evaluation of the Coquitlam River Watershed Roundtable Planning Process

This section provides a summary of the results of the evaluation for the CRWR's planning process and its draft watershed management plan. I present the strengths of the organization and describe where specific deficiencies exist.

6.2.1. Collaborative Planning Criteria

Under the Collaborative Planning category, the CRWR fully met six criteria – *Voluntary Participation and Commitment, Self-design, Conflict Resolution Techniques, Mutual Trust, Transparency*, and *Reasonable Expectations*; largely met four criteria – *Shared Purpose and Goals, Equitable, Clear Ground Rules*, and *Accountability*; and partially met two criteria – *Inclusive Representation*, and *Time Limits*. I was unable to assess three criteria – *Independent Facilitation, Effective Process Management*, and *Commitment to Implementation and Monitoring* (Section 5.1 and Table 3).

The CRWR performed exceptionally well in the Collaborative Planning category. The overall high rating of the CRWR process in my evaluation was largely a result of the high and moderate performance ratings for the majority of the evaluation criteria under this category (Table 3). A key strength of the Roundtable, which laid the foundation for successful collaboration, was that participants were able to collectively define a shared vision at the outset of the planning process. By investing sufficient time and effort at the beginning of the process, participants were able to clearly define a common purpose, which led to uncovering shared interests, recognizing interdependencies, and creating a positive environment for collaboration to

unfold. A second foundational strength of the CRWR was the inclusive representation found on the Roundtable. Most participants indicated that all valid interests and values were represented on the Roundtable, and that the process was open to any interest group with a stake in the health of the watershed. Inclusive representation has repeatedly been demonstrated as an important factor for successful collaboration, and has been directly linked to five potential benefits: (1) the process is more likely to resolve conflict among diverse stakeholders with competing interests as it provides a platform to identify solutions that meet mutual interests (Frame et al., 2004; Morton, 2009); (2) final agreements are often of higher quality because they incorporate a broad array of experiences and knowledge (Frame et al., 2004; Morton, 2009); (3) the incorporation of a diverse range of interests, values, skills and resources can contribute to an organization's capacity to address complex water management issues in innovative and cost-effective ways (Ferreyra and Beard, 2007); (4) comprehensive stakeholder involvement can result in increased public support and legitimacy (AWRA, 2012); and (5) if participants represent the broader community of affected and interested parties, the process is more likely to result in an outcome that advances the common interest of the entire community (Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2014). A third key strength of the Roundtable was the continued support and leadership provided by the City of Coquitlam. Leadership from the City of Coquitlam contributed to the Roundtable's legitimacy and combined influence, and assisted in ensuring that outcomes of the planning process were achievable. Over half of the respondents were of the view that for the planning process to be successful, leadership from government was necessary. Fourth, participants collectively worked together to design a process and institute ground rules that were well suited to their needs, including developing terms of reference, operating procedures, defining roles and responsibilities of participants and creating an equitable environment whereby all participants had an opportunity to actively engage in the process. Self-designed processes have been shown to facilitate plan implementation as participants create a sense of ownership (Calbick et al., 2004; GWP-TAC, 2000; Morton, 2009). Last, the findings demonstrate that all respondents' expectations of the CRWR planning process were reasonable and realistic given the goals and objectives of the process, indicating that theoretically the outcomes of the process could serve to advance the common interest of the community (Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2014).

In addition to the above-described key strengths of the CRWR, four mechanisms were important in fostering a collaborative planning approach. First, all of the respondents indicated and demonstrated that they were fully committed to the planning process, showing their

commitment through voluntary participation, willingness to collaborate, and championing the process. Furthermore, respondents had an incentive to participate because they felt the issues at stake were significant and required timely resolution, thus creating a strong foundation for stakeholders to work together. Second, the Roundtable promoted an equitable environment by implementing consensus-based conflict resolution techniques. Consensus-based decision making has been shown to improve complex problem-solving by harnessing diverse ideas, broadening options, and focusing on interests rather than positions, thereby reducing adversarial environments (Morton, 2009; Leach et al., 2002; Ramin, 2004). Third, by establishing mutual trust among participants, the Roundtable was well positioned to collaborate. Mutual trust was established through consistent and open communication about stakeholders' perspectives and interests, collectively designing clear ground rules, and ensuring transparency throughout the process. Long-term relationships among stakeholders, the inclusive representation found on the CRWR, and collectively undergoing the process of developing an integrated watershed management plan were also found to be important in establishing and maintaining mutual trust. Last, participants demonstrated their shared accountability for the consequences and outcomes of the planning process. They sought to ensure that the planning process itself and the final plan were representative of the interests of the broader community, they confirmed that affiliated organizations supported the final plan, and they required that major decisions be approved by all participants.

The CRWR had the following specific deficiencies in the Collaborative Planning criteria category. First, although the Roundtable collectively identified a shared purpose, individual participants had difficulty articulating specific established goals. Second, three interviewees expressed the opinion that adequate representation from diverse cultures was lacking. Third, the Roundtable could improve its operating procedures. Last, interviewees stated that the CRWR planning process could be improved if a formal communications strategy was developed in order to clearly and consistently communicate with the public.

Table 3. Key Strengths and Weaknesses of the Coquitlam River Watershed Roundtable Planning Process under the Collaborative Planning Criteria

Collaborative Planning Criteria			
Evaluative Criterion	**Performance Rating**	**Strengths**	**Weaknesses**
Shared Purpose and Goals	Largely Met	• Clearly defined shared purpose; and • Participants expressed that the planning process was the best way to achieve their respective goals.	• Individuals had difficulty in clearly articulating specific goals.
Inclusive Representation	Partially Met	• Majority indicated that all significant interests and values were represented; and • The planning process was open to any interest group with a stake in the health of the watershed.	• Lack of sufficient representation from culturally diverse communities.
Voluntary Participation and Commitment	Fully Met	• Voluntary participation; and • Commitment of stakeholders to the process.	• None identified.
Equitable	Largely Met	• Terms of reference included provisions that encouraged effective participation from stakeholders; • Guiding principles fostered inclusivity, openness and transparency; • Consensus-based decision making techniques were designed and applied; and • Strong sense of leadership from municipal governments.	• Municipal and First Nations governments held greater voting power.
Self-design	Fully Met	• Process designed by participants.	• None identified.
Clear Ground Rules	Largely Met	• Terms of reference collectively designed by participants; • Clear rules of procedure; and • Clearly articulated roles and responsibilities of participants.	• Operational procedures could be improved.
Conflict Resolution Techniques	Fully Met	• Consensus-based decision making techniques designed early in the process, and applied when necessary; and • Conflict resolution techniques were clearly articulated in the terms of reference.	• None identified.
Independent Facilitation	Unable to assess	n/a	n/a

Collaborative Planning Criteria			
Evaluative Criterion	**Performance Rating**	**Strengths**	**Weaknesses**
Effective Process Management	Unable to assess	n/a	n/a
Mutual Trust	Fully Met	• Guiding principles encouraged open communication; • Clear understanding of interests (self and others); and • Evidence of improved relationships.	• None identified.
Transparency	Fully Met	• Information freely available to participants and the public through several media; • Two public Roundtable meetings were held per year; and • Roundtable meetings open to all participants and the public, except in warranted circumstances.	• None identified.
Accountability	Largely Met	• Representative of the community as a whole; • Participants worked together to design the process and reach an agreement on actions and outcomes; • The broader community had opportunities to directly influence the process and plan; and • Accountability of representation to their constituencies.	• Lack of representation from culturally diverse communities on the Roundtable; and • Lack of a formal communications strategy.
Reasonable Expectations	Fully Met	• Participant expectations aligned with mission and values; and • Expectations were compatible with broad societal goals.	• None identified.
Time Limits	Partially Met	• Detailed work plans, including key deliverables and milestones.	• Substantial time commitment required from participants.
Commitment to Implementation and Monitoring	Unable to assess	n/a	n/a

6.2.2. Holistic Approach Criteria

Under the Holistic Approach category, the CRWR fully met the *Integration* criterion, largely met the *Diverse Knowledge Sources are Used* criterion, and did not met the *Planning and*

Management is Set at the Watershed Scale criterion (Section 5.2 and Table 4). I was unable to assess the *Commitment to Sustainability over Multiple Generations* criterion, as at the time of research analysis the CRWR had not yet completed their final watershed management plan (Section 5.2.1).

The majority of interviewees indicated that the watershed management plan was informed by diverse sources of knowledge such as natural sciences, social sciences, community-based and local knowledge and traditional ecological knowledge. This demonstrated the Roundtable's collective recognition that water resource management issues are complex problems that require a heterogeneous pool of complementary knowledge to inform decision making processes, and to create a context-specific, holistic and implementable management plan. In addition, the CRWR's management plan included the integration of natural and human systems, including interactions between water and land-based resources, and social development and economic development.

The results revealed two specific deficiencies in this category that highlight opportunities for improvement. First, although the majority of respondents expressed the opinion that the watershed management plan was informed by diverse sources of knowledge, opportunities existed to further utilize and integrate traditional ecological knowledge to inform decision making processes. Second, the geographic scope of the CRWR watershed management plan was limited to the lower Coquitlam watershed rather than the entire catchment area.

Table 4. Key Strengths and Weaknesses of the Coquitlam River Watershed Roundtable Planning Process under the Holistic Approach Criteria

Category: Holistic Approach Criteria			
Evaluative Criterion	**Performance Rating**	**Strengths**	**Weaknesses**
Commitment to Sustainability Over Multiple Generations	Unable to assess	n/a	n/a
Diverse Knowledge Sources are Used	Largely Met	• Diverse sources of knowledge were used; and • Community-based knowledge incorporated.	• Largely informed by natural sciences; • Scarcity of high-quality social science data available to the Roundtable; and • Opportunities to further incorporate traditional ecological knowledge existed.
Planning and Management Is Set At the Watershed Scale	Not met	• None identified.	• Limited geographic scope due to complex governance setting.
Integration	Fully Met	• Process and plan considered interactions between water and land-based resources, social development and economic development.	n/a

6.2.3. Authority and Control Criteria

The CRWR partially met all three criteria under the Authority and Control category – *Capacity*, *Legitimacy* and *Political Influence and Multijurisdictional Cooperation* (Section 5.3 and Table 5). Many respondents expressed the view that a fundamental strength of the Roundtable was the extensive expertise and knowledge that existed among Core Committee members. Respondents largely attributed this strength to the inclusive representation that existed on the Core Committee. Involving formerly disconnected actors with diverse backgrounds, livelihoods and roles in decision making resulted in the availability and mobilization of a broad base of knowledge, spanning beyond traditionally dominant scientific and technical knowledge, and thus increasing the capacity and effectiveness of the organization. In terms of representation,

the Roundtable successfully achieved multijurisdictional cooperation as all government agencies with jurisdiction in the watershed were formally represented on the Roundtable, spanning political boundaries, thereby increasing the political influence of the organization. In addition, the Roundtable attained legitimacy through the combined influence of the organizations' participants, and the acceptance by stakeholders and the broader public of the organization's authority to govern the resource. This sense of authority was acquired indirectly through multiple means, such as: the Roundtable's creative leadership efforts; representing the community at large; generating a common vision supported by stakeholders and the broader public; and securing strong committed champions who possessed political acumen.

There were three main deficiencies in this category. First, the CRWR's planning process was hampered by unreliable and unstable funding. All respondents indicated that the single largest challenge the CRWR planning process endured was a lack of consistent funding for administration to support operations. Second, although the Roundtable was able to successfully achieve multijurisdictional cooperation through membership and representation, not all government agencies with jurisdiction in the watershed participated consistently throughout the planning process. Last, whether or not the CRWR planning process and subsequent watershed management plan will directly impact provincial and local government policy making remains uncertain as there is no legislative basis for the CRWR planning process or for implementing the outcomes of the process. Therefore, implementation of the watershed management plan will remain subject to government's discretion.

Table 5. Key Strengths and Weaknesses of the Coquitlam River Watershed Roundtable Planning Process under the Authority and Control Criteria

Category: Authority and Control Criteria			
Evaluative Criterion	**Performance Rating**	**Strengths**	**Weaknesses**
Capacity	Partially Met	• Extensive range of expertise and knowledge; and • Sufficient and reliable technical resources.	• Difficulty maintaining stable and consistent funding.
Legitimacy and Political Influence	Partially Met	• Consensus around a vision, supported by all stakeholders; • Recognized as a leader in watershed planning by the broader public; and • Extensive combined influence.	• Lack of legislative authority to govern the resource.
Multijurisdictional Cooperation	Partially Met	• All government agencies with jurisdictional authority were represented.	• Lack of consistent participation from all government agencies.

6.2.4. Learning and Adjusting with Experience Criteria

Under the Learning and Adjusting with Experience category, the CRWR partially met the *Flexible and Adaptive* criterion, and I was unable to assess the *Learning from Experience* criterion (Section 5.4 and Table 6). All respondents expressed the view that the CRWR planning process was flexible enough to allow participants to reflect and make adjustments as needed. The Roundtable demonstrated a commitment to maintaining flexibility within the organization by purposefully creating opportunities for systematic reflection and assessment on individual and organizational performance throughout the process, integrating new and varied sources of knowledge into the management plan and decision-making process, and making adjustments when required. It is important to note, however, that four interviewees expressed concern about the ability of the Roundtable to make adjustments in the future once the planning process is complete, due to limited capacity. I was unable to attribute a performance rating to the second indicator in this category, as at the time of writing the CRWR had not yet developed a monitoring plan. Given the limited data available for evaluating this criterion, no specific deficiencies are highlighted.

Table 6. Key Strengths and Weaknesses of the Coquitlam River Watershed Roundtable Planning Process under the Learning and Adjusting with Experience Criteria

Category: Learning and Adjusting with Experience Criteria			
Evaluative Criterion	**Performance Rating**	**Strengths**	**Weaknesses**
Flexible and Adaptive	Partially Met	• Process was flexible and adaptive.	• Potentially limited capacity in the future.
Learning from Experience	Unable to assess	n/a	n/a

6.3. Strengths and Weaknesses of the Open Standards for the Practice of Conservation Framework for Watershed Management and Planning

In this section I describe the role, and the strengths and weaknesses of, the Open Standards framework when applied for integrated watershed management and planning. I summarize how the Open Standards contributed to the CRWR planning process and how the Open Standards addressed each criterion in the evaluative framework.

6.3.1. Collaborative Planning

The findings of this research demonstrate that the Open Standards has the potential to contribute to successful collaborative planning through five main avenues. First, the Open Standards training manual provides project teams with detailed provisions and guidance for establishing a common vision and clearly articulating goal statements at the onset of the process (Step 1: *Conceptualize*). In the case of the CRWR, however, the organization had already established their common vision prior to the formal adoption of the Open Standards. Second, the training manual strongly advocates for the inclusion of all appropriate stakeholders throughout the planning process, including those that are directly responsible for the planning and implementation of the project, and any individuals that have an interest in, connection to or potential influence on the project. Again, for the CRWR, the Roundtable had already established its governance structure prior to adopting the Open Standards. Third, the Open Standards framework promotes self-design, as the training manual repeatedly stresses the importance of providing the space necessary for creativity to unfold, and encourages the adaptation and modification of guidelines in order to serve individual applications. Similar to the first two criteria, the CRWR carried out a collective process to develop operational guidelines prior to initiating the Open Standards planning process. Fourth, the framework contributes to fostering

accountability of participants by advocating for project teams to maintain transparency across all decisions and decision making processes, openly share assessments with all participants and the public and assigning roles and responsibilities to individual participants. The training manual also emphasizes the importance of developing a clear communications and dissemination strategy in order to effectively communicate results and relevant project information to a variety of audiences, further enhancing stakeholder's accountability to the process. At the time of my research and analysis, a formal communications strategy had not been developed by the CRWR. However, the Core Committee had adopted the practice of hosting two public Roundtable meetings each year, to provide stakeholders and the broader public with an opportunity for input to the watershed management planning process. In addition, the CRWR followed the Open Standard's principle of transparency throughout the planning process. Last, findings from this study reveal that the Open Standards played an important role in fostering trust among stakeholders due to its holistic nature, and requirement to focus on ecosystem services and health, and human well-being. In this regard, the Open Standards encompasses broader interests and values, in contrast with traditional, technically driven and narrowly focused management plans.

In addition to fostering a collaborative planning approach, the Open Standards also played an important role in ensuring that the process was managed effectively. Detailed provisions are provided in the training manual to guide the development of an operational plan, including the analyses of financial and human resources, an estimation of the lifespan of the project, an exit strategy and the development of short-term work plans that include key deliverables, milestones, and deadlines. The CRWR created work-plans specific to the watershed management plan based on the instructions provided in the Open Standards training manual. The Open Standards also emphasizes the importance of, and provides detailed step-by-step guidelines for developing a clear strategy for plan implementation and a formal monitoring plan (Step 2: *Plan Actions and Monitoring*). As previously mentioned, at the time interviews took place the CRWR had not yet developed their implementation and monitoring plan. However, based on the experiences of the CRWR to date, it seems likely that the Open Standards will play an important role in its development.

Although the results of this research reveal that the Open Standards framework can meaningfully contribute to building a successful foundation for a collaborative planning approach to unfold, the framework itself should not be considered by project teams as a sufficient stand-alone tool, as it does not address several specific collaborative planning criteria. First, although

the Open Standards advocates for self-design and for project teams to clearly define roles and responsibilities of participants, the training manual does not include provisions for collectively developing terms of reference or clearly defining operating procedures. Second, the collective design and implementation of consensus-based conflict resolution techniques are not addressed in the training manual. Third, the Open Standards does not directly address the importance of voluntary participation and commitment. Last, the criterion of "reasonable expectations" is not addressed in the training manual; the framework does not include this means of ensuring that the outcomes of the planning process will serve to advance the common interest of a community (Brunner, 2002; Brunner and Steelman, 2005; Rutherford and Clark, 2014) (Section 2.4).

6.3.2. Holistic Approach

Results demonstrate that the application of the Open Standards framework by a community-based initiative can act as a catalyst for the integration of multiple systems in natural resource management. Version 2.0 of the Open Standards training manual (issued in 2007) clearly articulated that the components included within the management plan must have a biodiversity or ecosystem focus. However, over time as the application of the Open Standards broadened, practitioners called upon the Conservation Measures Partnership (CMP) (a group of international non-governmental and governmental agencies) to provide explicit direction to incorporate human well-being components into the framework (CMP, 2012). In 2012, the partnership answered this call by developing provisions for the inclusion of human well-being targets and ecosystem services into an updated version of the framework (Version 3.0, released April, 2013). My research revealed that the Open Standards supported the CRWR process and the consideration of interactions between natural and human systems. Half of the interviewees expressed the opinion that the greatest strength of the Open Standards was its ability to incorporate human well-being values and ecosystem services into a management plan. These interviewees were of the view that incorporating such aspects into the watershed management plan not only assisted in creating a holistic management plan, but also reduced conflict and fostered a culture of learning across sector representatives within the organization.

In addition to playing a foundational role in fostering the integration of systems, the Open Standards encouraged the incorporation of diverse sources of knowledge into the management plan. Advocates of integrated watershed management emphasize the critical importance of drawing on multiple forms of knowledge to increase the likelihood of achieving desirable social

and ecological outcomes (Armitage et al., 2012; Brunner and Steelman, 2005; van TolSmit et al., 2015). Because the Open Standards was developed with the intention of broad applicability, it favours and values the exploratory nature of creating conceptual models based on diverse perspectives. Notably, five respondents expressed the opinion that the greatest strength of the Open Standards was its ability to incorporate diverse sources of knowledge.

The findings of this research highlight two main weaknesses, under the Holistic Approach criteria category, of the Open Standards framework when applied for integrated watershed management. First, although the Open Standards requires project teams to define the project's geographic scope, the training manual does not include provisions for identifying and defining what the appropriate geographic scope of a particular project should be. For watershed management in particular, using the watershed as the spatial management unit is preferred as it can provide several advantages for integration, thereby promoting a more holistic approach to management and planning (Ramin, 2004; Mitchell et al., 2014). Second, although the Open Standards is based on principles for achieving sustainability, the training manual lacks specific guidance for the inclusion of temporal dimensions into a management plan. Sustainable water resource management requires long-term objectives to help ensure the availability of water resources for future generations (Carter et al., 2005).

6.3.3. Authority and Control

For the *Capacity* criterion of the Authority and Control category, the application of the Open Standards by the CRWR contributed most significantly in three areas. First, the Open Standards addresses human resources by encouraging project teams to recognize and make use of the existing skills and expertise that each member brings to the organization, to ensure that the project moves forward with the best available knowledge. The training manual suggests that project teams should identify gaps in skills and expertise and remain flexible and open to adding new members, if required. Documentary data and participant observation revealed that the CRWR followed these provisions outlined in the training manual. Second, the Open Standards addresses technical resources by guiding practitioners to develop conceptual models that illustrate the main cause and effect relationships identified by the project team within the geographic scope of the project, and to ground-truth models with key stakeholders and partners both inside and outside of the project team to ensure that the models reflect different understandings of the situation. In theory, these steps allow project teams to identify what they do not know and what

might require further research or analysis. Documentary data and participant observation revealed that the CRWR followed these guidelines during the development of their watershed management plan. As such, the Open Standards helped to ensure that the knowledge being incorporated into the watershed management planning process was sufficient and reliable in order to make well-informed decisions. Last, the Open Standards addresses financial resources by outlining steps for project teams to follow in developing an operational plan as a mechanism for analysing the financial capacity within, and required of, an organization throughout the planning process. At the time of analysis, the CRWR had not yet completed an operational plan, so I was unable to determine the role that the Open Standards played in ensuring that financial resources are reliable and sustained throughout the planning process.

The Open Standards framework does not directly address the criterion of *Legitimacy and Political Influence*. However, the results of this research demonstrate that the application of the Open Standards indirectly contributed to the process having sufficient power, control and perceived validity to implement decisions by directing the generation of a common vision, and by being recognized internationally as an innovative tool in conservation management and planning, thereby contributing to the CRWR being viewed as a leader in watershed management and planning. In terms of the last criterion, *Multijurisdictional Cooperation*, the Open Standards emphasizes the inclusion of all appropriate internal and external stakeholders throughout the planning process, suggesting that the framework encourages project teams to ensure that all government agencies with jurisdictional authority in the watershed are represented and participate throughout the planning process.

The most frequently cited weakness of the Open Standards from respondents was the complexity of the framework. The majority of interviewees expressed the opinion that the Roundtable's ability to implement the Open Standards was inhibited due to the conceptually difficult structure of the framework, which resulted in the need to allocate substantial funding to hire an independent facilitator well versed in the Open Standards process, and onerous time commitments from participants. In addition, the Open Standards training manual does not directly address legislative mandates, or the availability of the necessary policy tools required to implement conservation management plans. Given that the Open Standards was developed for implementation by a broad range of practitioners, addressing policy tools and legislative mandates may be beyond the scope of the framework.

6.3.4. Learning and Adjusting with Experience

The results of this research demonstrate that one of the strengths of the Open Standards framework is its ability to provide project teams with a process for learning and adjusting with experience. The Open Standards was developed based on principles of adaptive management (FOS, 2009) and is embedded with flexibility, providing project teams with the opportunity to periodically assess the process and make adjustments as needed, given new information or changing circumstances. In this sense, the Open Standards provides practitioners with an objective driven decision making process, where management actions at a given decision point are informed by what is known at that time and can be adjusted based on incoming information. Furthermore, the final step in the Open Standards involves capturing a project team's lessons learned on a regular basis and sharing these lessons with the broader conservation community. At the time of interviews and research analysis, the CRWR had not yet completed Step 4 or 5 of the Open Standards. It is likely that the successful completion of these steps will largely depend on whether the CRWR has sufficient human, technical, and financial capacity.

Results also show that the Open Standards played an important role in creating opportunities for project teams to learn from experiences as the framework includes provisions for adapting decisions through monitoring, evaluating, terminating and adjusting management strategies as required. Again, however, I was unable to determine the role that the Open Standards played in fostering opportunities for learning from on-the-ground experiences for the Roundtable specifically, as at the time of writing the Roundtable had not yet completed a formal monitoring plan.

6.4. Recommendations for the Coquitlam River Watershed Planning Process

Based on the strengths and deficiencies outlined in the previous section (and summarized in Tables 3, 4, 5 and 6), the following seven actions are recommended to further strengthen the CRWR planning process as it moves forward. By adopting these recommendations, the CRWR can advance its leadership in community-based watershed management and better position itself for successful implementation of its watershed management plan.

6.4.1. Develop Clearly Articulated, Mutually-Acceptable Goals with Measurable Targets

Integrated watershed management and planning requires a long-term vision. The best practices literature suggests that for initiatives to avoid becoming reactive and crisis-oriented they should develop clearly articulated and mutually-acceptable goals with achievable timelines, and an implementation strategy with measureable targets to evaluate their progress.

6.4.2. Address and Clarify Gaps in Current Operating Procedures

To improve transparency and accountability, the CRWR should address and clarify gaps that exist in their current operating procedures. The findings reveal three core areas the Roundtable should revisit, and where necessary revise their operating procedures to further strengthen their process, and safeguard the momentum and sustainability of the initiative: (1) ensure all necessary expertise exists and is represented when forming sub-groups; (2) clearly define a level of time commitment expected from Core Committee members; and (3) define an explicit succession process for Core Committee members, to ensure institutional memory, expertise and knowledge persists upon their replacement. Revised and newly created operating procedures should be incorporated into the CRWR Terms of Reference.

6.4.3. Identify Opportunities to Represent and Advance the Common Interest

The Roundtable should capitalize on specific opportunities that have been identified through this research to further advance the common interest. Although inclusive representation was considered to be a foundational strength of the CRWR by many interviewees, some stated that the planning process could have been improved if cultural diversity was better represented on the Roundtable. This represents a significant opportunity for the CRWR to make participation in the decision making process even more representative of the broader community, and thus more responsible to the community as a whole.

6.4.4. Sustain Adequate Financial Capacity for Administrative Support

The findings of this research demonstrate that the lack of consistent funding, especially for administrative support, was the single largest challenge the CRWR planning process endured. The CRWR is not unusual in this respect. The literature demonstrates that many community-

based initiatives and non-profit entities rely heavily on grant funding, and the increasingly competitive nature and unpredictability of such funding creates a challenge for long-term planning by these initiatives (Lurie and Hibbard, 2008). This finding is not a criticism of the Roundtable itself, but rather it highlights the reality of operational difficulties experienced by community-based initiatives and the subsequent challenges for long-term planning by these organizations.

6.4.5. Design a Process that Fosters and Supports the Mobilisation and the Effective and Appropriate Use of Traditional Ecological Knowledge

A defining characteristic of collaborative-based planning approaches is the integration of diverse actors with different values, perspectives, and experiences, which results in the availability of a more heterogeneous pool of knowledge (Ferreyra and Beard, 2007; van TolSmit et al., 2015). As watershed management and planning in BC typically occurs in the traditional territory of Indigenous peoples, collaborative initiatives should incorporate systems of knowledge that are distinct to Indigenous peoples (van der Porten and de Loe, 2013). Opportunities exist in the CRWR planning process to further utilize and integrate traditional ecological knowledge to inform decision making processes. The Roundtable should design a process to ensure that this knowledge is mobilised and incorporated into decision making processes in an effective and appropriate manner. Indigenous representatives should be fully engaged in designing such a process.

6.4.6. Develop a Concrete and Effective Communications Strategy

To increase the likelihood of success, collaborative planning processes need to be accountable to the broader public. For the CRWR, strong accountability is essential to the organization's authority and credibility. Concrete and effective strategies for communicating with the broader public and enhancing opportunities for active participation are necessary avenues to ensure accountability to the broader public (Frame et al., 2004; Gunton and Day, 2003; Lockwood et al., 2010). The findings of this research show that the CRWR planning process could be further strengthened through the development of a formal communications strategy.

6.4.7. Set Planning and Management at the Watershed Scale

Given the complex governance setting in the Coquitlam River watershed, the geographic scope of the CRWR watershed management plan was limited to the lower reaches of the watershed. By restricting the scope of the watershed management plan, the Roundtable limited their ability to promote a holistic approach to watershed management and planning. Watersheds are commonly identified as the most appropriate spatial unit for integrated watershed management, as they are considered natural integrators of water quality and quantity, land-use, and upstream and downstream effects (Cervoni et al., 2008; Ramin, 2004). Results demonstrate that the Coquitlam River watershed does represent a highly complex management setting due to jurisdictional authority and regional government requirements, however, the Roundtable should seek to further engage BC Hydro and Metro-Vancouver as the CRWR planning process moves forward to promote management cooperation and coordination among these parties. Additionally, a significant opportunity to expand the lower Coquitlam River Watershed management plan to include the entire watershed presents itself as the Coquitlam-Buntzen Project Water Use Plan is up for renewal in 2020. The Roundtable should capitalize on this opportunity going forward.

6.5. Key Considerations for Implementing the Open Standards for the Practice of Conservation Framework for Watershed Management Planning by Community-Based Initiatives

Based on the CRWR's experience in applying the Open Standards framework for the development of an integrated watershed management plan, I present four key factors that community-based initiatives should take into consideration if they decide to apply the Open Standards for integrated watershed management and planning.

6.5.1. Ensure Adequate Capacity is Available, Reliable and Sustained

As mentioned above, the most frequently cited weakness of the Open Standards from CRWR respondents was the complexity of the framework. The Roundtable's ability to implement the Open Standards was inhibited due to the conceptually difficult nature of the framework. As a result, the Roundtable devoted substantial funding to hire an independent facilitator with expert knowledge in the Open Standards to guide the organization through the process. Additionally, as the Open Standards is rooted in adaptive management, adequate capacity to implement the plan, monitor, and make adjustments as needed once the planning process is complete must also be

considered by project teams. To foster a successful planning process through the implementation of the Open Standards, community-based initiatives should ensure that sustainable funding is available, identify an expert independent facilitator to draw on if required, and address time commitments expected of participants.

The CMP has acknowledged concerns about complexity and has undertaken several initiatives to foster a community of practice around the Open Standards framework. For example, the Foundations of Success coordinates training for students and conservation practitioners in the Open Standards, over a dozen academic institutions have engaged in Open Standards training, and the CMP has sponsored two Measures Summits with the purpose of bringing together practitioners to integrate and review results-based management in conservation (Schwartz et al., 2012). Additionally, the Open Standards web-site offers guidance, tools and training materials designed to assist practitioners and project teams in successfully implementing the Open Standards. The Conservation Coaches Network (CCNet) has also been recently launched by the CMP and is made up of coaches trained in the Open Standards. The CCNet seeks to improve the effectiveness of the implementation of the Open Standards for conservation management and planning by empowering and supporting project teams, and building capacity in adaptive management (CCNet, 2015). Recently, a North American CCNet is available, consisting of more than 100 conservation professionals and individuals from the US and Canada (CCNet, 2015).

6.5.2. Integrate Collaborative Planning Tools with the Open Standards Framework

Findings of this research reveal that the application of the Open Standards framework by the CRWR contributed to a successful foundation for collaborative planning. However, results also show that the framework itself should not be considered by project teams as a sufficient stand-alone tool for collaborative planning. When applying the Open Standards planning process, community-based organizations should also ensure that they fully meet each criterion under the Collaborative Planning criteria category of the evaluative framework implemented in this research project. By doing so, organizations can increase the likelihood of developing and implementing a management plan that advances the common interest.

6.5.3. Promote the Integration of Natural and Human Systems into Watershed Management and Planning

The Open Standards was not developed specifically for integrated watershed management and planning. As a consequence, the training manual does not emphasize the necessity of integrating various systems into project plans. A central aim of integrated watershed management is to promote the integration of natural and human systems as a means of achieving holistic and sustainable water resource management (Jonch-Clausen, 2004; Medema et al., 2008). As promoted by the Global Water Partnership (GWP), integrated watershed management should consider, at a minimum, interactions between water and land-based resources, economic and social development.

The CRWR was able to develop a holistic watershed management plan. Interviewees indicated that implementing the Open Standards framework for their watershed management planning process acted as a catalyst to ensure that the process and plan considered interactions of various systems. However, this can also be attributed to the extensive expertise that existed on the Core Committee as well as the inclusive representation found on the Roundtable. Community-based initiatives aspiring to apply the Open Standards framework for watershed management and planning must consider interactions between natural and human systems in order to develop a holistic and sustainable watershed management plan. Having the necessary expertise and inclusive representation can increase the likelihood of developing a holistic, integrated watershed management plan while using the Open Standards framework as a guiding tool for planning.

6.5.4. Incorporate Long-Term Objectives into the Planning Process

The Open Standards training manual includes principles for achieving sustainability such as the need for a holistic management approach, incorporating both natural and social sciences, traditional ecological knowledge and local knowledge, emphasizing partnerships that include a diverse range of stakeholder values and perspectives and (in Version 3.0) explicitly addressing how climate change can be addressed in the planning process to develop proactive projects with respect to climate change. However, this research has demonstrated that the Open Standards training manual lacks explicit guidance for including temporal dimensions into the plan indicating that the resource(s) will be managed in a way that allows future generations to meet their needs. Sustainable water resource management requires long-term objectives to help ensure the availability of water resources for future generations (Carter et al., 2005). Project teams should

address this shortfall of the Open Standards framework by ensuring that long-term objectives that take into account long-term demands on the resource and potential changes in water availability due to climate change, changes in human use, and other changes are explicitly addressed and included in the watershed management plan.

6.6. Recommendations for Future Research

This research project focused on an individual case of community-based watershed management and planning in BC. As this research was mainly limited to a process evaluation, there would be value in conducting an outcome evaluation of the CRWR's watershed management plan to compare actual planning outcomes with desired outcomes, such as ecological health and community well-being. This would provide valuable insight into factors inhibiting or facilitating the successful implementation, monitoring and adaptive capacity of the CRWR watershed management plan.

There would be additional value in conducting a similar study of other community-based initiatives undergoing watershed management and planning using the Open Standards framework in BC. Such research could test whether the considerations I presented in this research for community-based initiatives seeking to implement the Open Standards framework for integrated watershed management and planning can be more broadly generalized. Such research would also allow for comparisons across community-based initiatives implementing the Open Standards for integrated watershed management planning in Canada. Important further insights will emerge from comparisons across community-based initiatives implementing the Open Standards. Harvesting experiences across regional social, cultural, political and economic differences will be valuable in order to share lessons learned and further develop and improve guidance for those actively engaged in resolving watershed management issues for the common interest.

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