2016

A Reflexive Legal Framework for Bridging Organizations in Regional Environmental Governance and Management

Stewart, Judy

UNIVERSITY OF CALGARY

A Reflexive Legal Framework for Bridging Organizations in Regional Environmental Governance and Management

by

Judy Mary Mattie Stewart

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

GRADUATE PROGRAM IN ENVIRONMENTAL DESIGN

CALGARY, ALBERTA

APRIL, 2016

Abstract

In Canadian provinces, municipalities are responsible for most land use management on private lands, and are encouraged to protect provincially owned natural resources from local land use impacts. Policy and regulatory gaps exist at the regional-scale for managing municipal land use impacts on natural resources, such as air, water and ecological resources that cross multiple municipal boundaries and jurisdictions. In the Calgary Metropolitan Area, a social-spatial region of approximately 17,000 km^2 in southern Alberta, Canada, (the Region) three multi-stakeholder environmental governance organizations (the Calgary Regional Partnership (CRP), Bow River Basin Council (BRBC) and Calgary Regional Airshed Zone (CRAZ) emerged, connecting municipal, public and private stakeholders with shared interests in land use, watershed and airshed management, respectively. These organizations co-created natural resource management plans (co-created plans) to address transboundary and interjurisdictional issues not addressed through provincial laws or municipal bylaws. The Region provided a demonstration context for conducting transdisciplinary research, combining emerging theories in environmental governance, social-ecological systems, networks, organizations and law.

In 2014, interviews were conducted with eighteen municipalities in the Region and Directors of CRP, BRBC and CRAZ. Social network mapping and analysis (SNA) were used to analyze interview data, and identify a collaborative municipal environmental management network. SNA illustrated the strategic 'bridging' functions of CRP, BRBC and CRAZ in influencing increased municipal participation in thirty resource management activities selected from the co-created plans. Municipal respondents identified the primary land use, watershed and air quality management issues in the Region, and results were used to select twenty-eight environmental policies, laws, regulations, plans, directives, guidelines, (legal instruments) existing in Alberta in 2014-2015 that addressed the identified issues. These legal instruments and the three co-created plans were assessed for reflexivity using a 'reflexivity assessment matrix tool'

designed for this purpose that was based on reflexive legal theory, principles and criteria found in the literature.

The interview data, SNA, legal research and reflexivity assessment informed the design of a ‘reflexive legal framework’ intended to clarify, support and legitimize the role of multi-stakeholder environmental governance organizations in ‘bridging’ policy and regulatory gaps between provincial and municipal authorities at a regional-scale.

Preface

My original thoughts about the dissertation began in 2008 while I was completing my Master of Laws thesis at the University of Calgary about municipal tools to protect Alberta's wetlands and riparian lands during development on private lands. Municipal participation in environmental management activities to protect and manage natural resources, such as wetlands seemed to be limited and inconsistent in Alberta.

At the time I began my PhD research, my PhD Supervisor, Dr. Mary-Ellen Tyler and my PhD Supervisory Committee Member, Dr. Michael Quinn, held a SSHRC Partnership Development Grant and were actively engaged with the Calgary Regional Partnership in understanding the relationships between land use and water management for regional land use planning policy purposes. I was an active volunteer stakeholder with both the Bow River Basin Council and the Calgary Regional Airshed Zone, which are voluntary multi-stakeholder environmental governance organizations with municipal, public and private members who work together to co-create watershed and airshed management plans, respectively. Additionally, I had been involved in the formation years of the Calgary Regional Partnership from 2001-2004 as the former mayor of the Town of Cochrane.

It was becoming apparent to me that implementation of the co-created natural resource management plans was increasingly problematic, because the organizations had no formal mandate to co-create the plans, and the co-created plans had no legal authority in local land use decision-making processes. While municipalities participated in co-creating the plans, no mechanisms compelled them to participate in implementation activities. Therefore, motivated by my personal volunteer experience, my professional experience as a lawyer practicing primarily in the areas of municipal and water law, and my academic training in law, I engaged in this PhD research to explore legal processes that might clarify, support and legitimize voluntary collaboration in regional-scale environmental governance.

Acknowledgements

Without the inspiration and guidance of Dr. Mary-Ellen Tyler, this dissertation would never have emerged from multi-disciplinary study that connected social network theory and analysis and regional-scale governance and management of air, land and water, with reflexive law. Dr. Tyler's generous time, wisdom and kindness taught me perseverance, and to approach academic study with mixed confidence and humility.

Dr. Michael Quinn and Professor Alistair Lucas, Q.C. shaped and refined the research. Their combined fields of knowledge framed the theoretical exploration of complexity; emergence; self-organizing holistic systems; and environmental law as a subsystem of a complex, evolving social-ecological system. Their time spent on my Supervisory Committee, reading 'drafts,' and providing valuable insights and feedback is appreciated. Professor Sharon Mascher and Dr. Harry Vredenburg contributed valued time and insights for my candidacy examinations, and I appreciate both Dr. Vredenburg and Dr. Daniel Fiorino's careful questions as examiners during the defense session.

I gratefully acknowledge funding received for my research through the Social Sciences and Humanities Research Council of Canada (SSHRC) Partnership Development Grant held by Drs. Tyler and Quinn.

Dr. Pablo Pino helped me with *Pajek* software, social network analysis and mapping. My daughter, Marlene Stewart, a nursing student at University of Calgary helped me with computer technology, and reviewed hours of transcribed interviews for accuracy to offset my hearing disability. My colleague, Truper McBride helped me create graphics. The municipal respondents and the Directors of the environmental governance organizations in the Region who agreed to be interviewed are especially appreciated for their time and commitment to helping me understand the social fabric of the Region.

Faculty and students in EVDS taught me design concepts, and participated with me in graduate student project work. I learned that place is important to people from all over the world and that knowledge from several fields of academia can be enhanced through integration. We are all connected through design. With pride and struggle, we all strive to create a more livable and sustainable society for ourselves and future generations.

To my husband Bruce Stewart, who got me through these years of study. while sustaining relative sanity for both of us on the home front;

To my late parents Leah St. James and Herbert Dubeau, farmers from Lost Nation, Quebec
for teaching me, in both official languages that non-human nature needed educated people - somehow both were connected and equally important; and

To Phread-the-dog who has kept me company during extensive reading and writing sessions and, from time to time made me take time to smell the wild roses and everything else on Cochrane's hillsides. Over the last sixteen years, Phread and I have walked together to the top of the Big Hill to watch the Bow River meander through the valley as Cochrane grew. Phread no longer meets stray coyotes, pricks her ears to herds of whitetail and mule deer as they pass in the ravines, sniffs out the field mice under tufts of native fescue, or startles grouse as they make nests. Fields that were once grazed by wildlife are now over-grown with shrubs. Every hillside, plateau, and valley is crammed with houses. The riverbanks no longer boast lush riparian vegetation, and almost all Cochrane's prairie pothole wetlands have been stripped and graded to provide more land for houses, replaced with gigantic storm drainage collection and treatment facilities. Even the air has been impacted by increased economic activity and the introduction of literally thousands of cars and trucks. Phread is still with me as I write.

Table of Contents

List of Tables

List of Figures and Illustrations

List of Symbols, Abbreviations and Nomenclature

AEMERA	Alberta Environmental Monitoring, Evaluating and Reporting Agency
AEP	Alberta Environment and Parks
BRBC	Bow River Basin Council
BRBC Watershed Plans	BRBC Watershed Management Plans
CHANS	Coupled human and natural systems
CRAZ	Calgary Region Airshed Zone
CMP (2009;2012;2014)	*Calgary Metropolitan Plan* - versions
CRP	Calgary Regional Partnership
ELC	Environmental Law Center
Framework	Reflexive Legal Framework
Matrix	Reflexivity Assessment Matrix Tool
Municipal Network	Municipal environmental collaboration network
PMO3 Plan	*Particulate Matter and Ozone Management Plan*
RASE	Regional assessment of social-ecological systems
Region	Calgary Metropolitan Area and connected social-spatial landscape in southwestern Alberta, Canada
Province	Province of Alberta
SES	Social ecological system
SNA	Social network analysis
WPAC	Watershed Planning and Advisory Council
ALSA	*Alberta Land Stewardship Act*
Clearing the Air	*Clearing the Air: Alberta's Clean Air Strategy*
CEM	*Cumulative Effects Management*
EPEA	*Environmental Protection and Enhancement Act*
IRMS	*Integrated Resource Management System*
LARP	*Lower Athabasca Regional Plan*
LUF	*Land-use Framework*
MGA	*Municipal Government Act*
SSRP	*South Saskatchewan Regional Plan, 2014-2024*
SSRP management frameworks	*SSRP Air Quality Management Framework* and *SSRP Surface Water Quality Management Framework*
Water For Life	*Water For Life: Alberta's Strategy for Sustainability*

Epigraph

The collective self is not set in stone in the founding deed of a nation, regime, or formal organization, understood in the substantive sense, but is an ongoing process during which
its identity changes through a series of reflexive actions, through alternating questions and answers. Constitution is thus a living process: the self-identification of a social system
with the assistance of the law.

Gunther Teubner. 2012. *Constitutional Fragments: Societal Constitutionalism and Globalization.* United Kingdom: Oxford University Press, p.71.

Chapter 1:

Introduction to the Research Problem

1.1 Background to the research

Ostrom's (1990:90) eight "design principles for long-enduring common pool resource institutions" are reflected in the desire among municipal governments in the Calgary Metropolitan Area, a social-spatial area in southwestern Alberta, Canada (the Region[1]), to collaborate in growth-related environmental management activities related to the nexus of land use and water supply (Humber, 2011). Ostrom (2005) confirmed that institutional structure and function matter when stakeholders self-organize to manage land use impacts on natural resources that are common to all, such as water and air. As such, the research questions identified later in this chapter were initially framed to examine necessary and sufficient voluntary multi-stakeholder institutional arrangements for natural resource governance and management, using the Region as the demonstration context. However, the following sequence of events contributed to the shaping of the research questions and processes that finally unfolded.

In 1999, Mayors, Reeves and administrative staff of several urban and rural municipalities in the Region started meeting informally to discuss transboundary issues related to rapid growth and urbanization, for example water and wastewater distribution systems, waste management, transportation systems and joint economic development

[1] Along with over eighteen municipalities, including the City of Calgary, and one improvement district, there are three First Nations Reserves, the Banff National Park and several provincial parks in the Region. In the Calgary Regional Partnership's (CRP) *Calgary Metropolitan Plan, 2009*, the Region was mapped and included all the lands within the municipal boundaries of the member municipalities of CRP, *circa* 2007. That is the geo-political area known as the Region for the purpose of the research. Within the Region, there are four identified "natural regions" Government of Alberta. 2006: online at: http://www.albertaparks.ca/media/2942026/nrsrcomplete_may_06.pdf that converge in Calgary along with transportation corridors, the Bow River and its tributaries, and a growing, mobile urban population. Calgary is the ecological, social, and economic hub of the Region. Small urban centers are connected to Calgary along transportation corridors that function like spokes on a wheel, connecting the city-hub to centers of urban population growth and economic expansion. The research done in 2014 presented the Region in a "snapshot in time."

opportunities (Calgary Regional Partnership, 2009). Eventually, a "voluntary network of municipalities" (Calgary Regional Partnership, 2014:1) formalized as an association known as the Calgary Regional Partnership (CRP) operating under Alberta's *Companies Act.* [2]

Like local governments in other "city-regions" (Evans, 2007:7) in the world, also facing potential water shortages during rapid population growth and urbanization, CRP's municipal members were quickly immersed in an institutional design problem. Specifically, Alberta's municipalities are created through statute by the Government of Alberta (the Province) and have a narrowly prescribed mandate to regulate and control land use development on private lands located within discrete municipal boundaries. Two or more municipalities are enabled to adopt by bylaw "an intermunicipal development plan to include those areas of land lying within boundaries of the municipalities as they consider necessary," through section 631 of the *Municipal Government Act* [3] (the MGA) to provide for future land use within the plan boundaries and proposals for future growth and "any other matter relating to the physical, social or economic development of the area." However, there are no specific provincial mechanisms that authorize or enable municipalities to take legitimate collective action to address emergent transboundary and transjurisdictional land use, water scarcity and air quality management issues at a regional-scale.

In 2009, CRP members consensually adopted their co-created Calgary Metropolitan Plan (CMP 2009) that contained regional-scale policies to protect the regional landscape while accommodating growth (Humber, 2011:33). However, between 2009 and 2012, when a new CMP (CMP 2012) was adopted by CRP members, three large rural municipalities and two small urban municipalities had withdrawn from the voluntary association due to unresolved governance issues. Strategies for addressing potential

[2] *Companies Act*, R.S.A. 2000, c.C-21.
[3] *Municipal Government Act*, R.S.A. 2000, c.M-26, sections 631 – 631.1. In 2013, the Province enacted Part 17.1 of the MGA that provided for two or more municipalities to form voluntary "growth management boards," that could, ostensibly, address these regional-scale natural resource management issues, but CRP has rejected the opportunity to date in February, 2016.

impacts of urban growth in the Region, as set out in the CMP 2012, could not be fully implemented, because CRP members had no formal authority or collective legal mandate to co-create or adopt the co-created plan. Subsequently, in 2014 while the dissertation was being completed, a revised CMP 2014 emerged.

While CRP is a legal entity, having been formalized as an association through Alberta law, it has no legislated mandate to regulate and control municipal land use decision-making by its municipal members – it merely provides a forum in which local government representatives meet voluntarily to collaborate on potential solutions to shared growth-related land use management problems. This role was explained in the CMP 2014 (CRP, 2014: 10), as follows:

> The CRP is a voluntary association of municipalities in the Calgary region that has come together to plan for long-term growth in the region and address issues of a regional interest. The CRP is not another level of government. **Local jurisdictions must align their statutory plans to the overarching provincial legislation and the CMP**. However, the Partnership does not have any jurisdiction on local land use decisions (e.g. zoning, development, subdivision authority); to approve municipal or intermunicipal plans; or to undertake annexations or inter-municipal negotiations.
>
> The Calgary Metropolitan Plan is the blueprint for accommodating growth over the next 60 years. The municipal members of the CRP have committed to the CMP by aligning their local plans. Regional Context Statements will be included in CRP members' Municipal Development Plans (MDPs) to set out the relationship between the local MDPs and the CMP. Regional Context Statements are policy tools that enable municipalities to develop locally appropriate approaches to aligning with the CMP. (Emphasis added.)

While the above statement is accurate in stating that municipalities "must align their statutory plans to overarching provincial legislation," it is incorrect to say that they must also align their statutory plans to the CMP 2014. Such alignment and so-called "regional context statements" are purely voluntary processes with no oversight by any level of government or authority: for example, no entity enforces against non-compliance.

The CRP and the CMP 2014 can only reflect consensually identified and shared municipal values, principles, goals and agreed strategies for managing land use within the Region's complex, dynamic social-political and ecological realities. According to Tyler et al., (2008:10), those realities center on water scarcity: "the region receives relatively

low amounts of precipitation, typically varying between 40 and 50 cm annually", and is considered semi-arid. Tyler and Quinn (2013:183) pointed out that "[f]rom social, economic and political perspectives, the availability of water for human use (growth) constitutes the most challenging and contentious arena of debate in the region." In fact, the preface of the CMP 2014 identifies that "water is essential," and the first foundational principle of the plan is "[p]rotecting the natural environment and watershed" in the Region (Calgary Regional Partnership, 2014:preface). As Humber (2011:35) concluded when studying the Region's ecohydrology, "understanding the relationship between land use and water use in a semi-arid regional context is increasingly necessary in the [Region] in order to reconcile population growth, water availability and regional economic development."

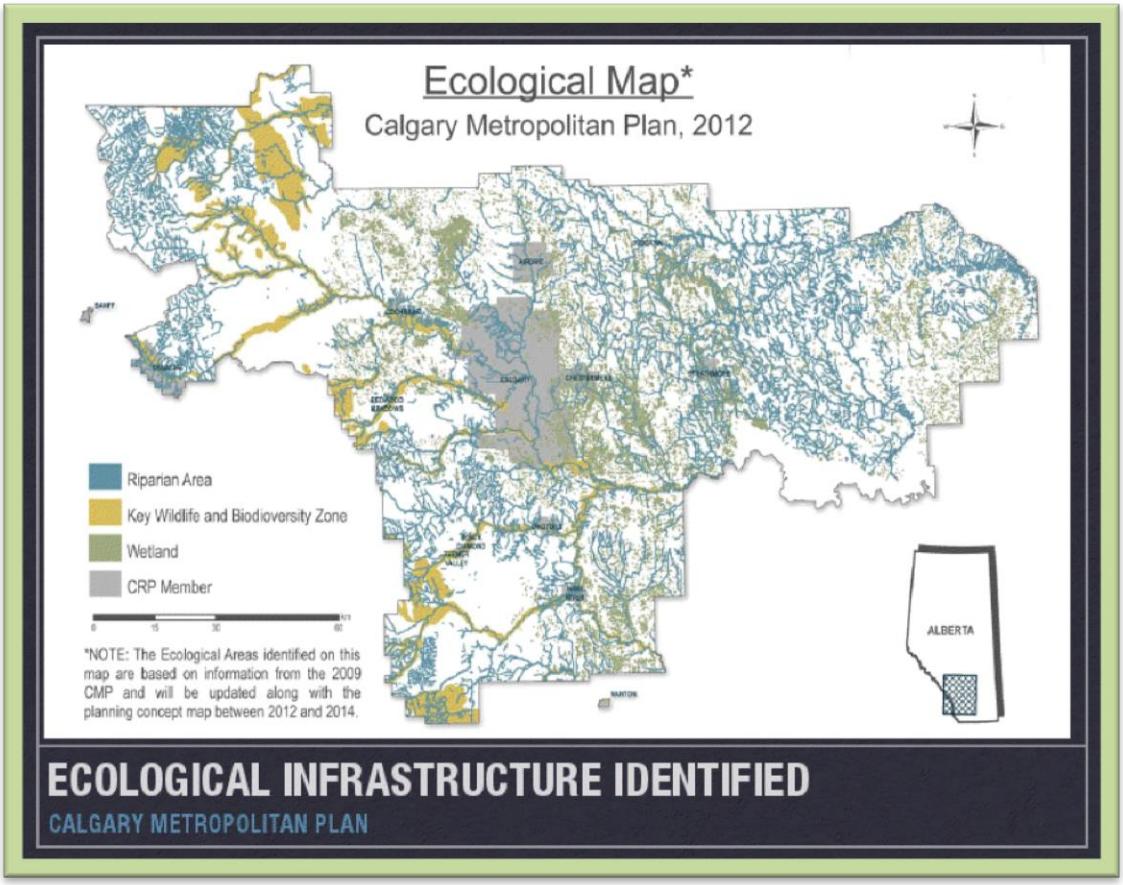
In 2009, CRP prepared an ecological map of the Region, which bounds "an area of approximately 17, 000 square kilometers," from the Rocky Mountains in the west to Wheatland County in the east, and from Airdrie in the north to Nanton in the south (Humber, 2011; Tyler et al., 2008). The ecological map identified landscapes of significant ecological value within the municipal boundaries of CRP's members as constituted in 2007. Figure 1.1 illustrates the spatial definition of the Region for the purpose of this dissertation.

In 2008, the Province adopted the *Land-use Framework* (LUF) (Government of Alberta, 2008), followed by the enactment of the *Alberta Land Stewardship Act* (ALSA)[4] in 2009 that provided for the creation of provincially administered regional land use plans for each of the major watersheds in Alberta. The Region is part of the South Saskatchewan River watershed, and all of the municipalities in the Region (except Banff) are located within that watershed planning area. Most of the Bow River main stem, a major tributary to the South Saskatchewan River, is located within the Region. In 2014, while research for the dissertation was being finalized, the *South Saskatchewan Regional Plan, 2014-2024* (SSRP) (Government of Alberta, 2014a) was enacted as a regulation

[4] S.A. 2009, c-A-26.8 (ALSA).

under ALSA. ALSA required amendments to a number of Alberta's environmental laws and regulations, and municipalities in the Region are expected to consider the provincial policies set out in the SSRP when making land use decisions, and they are regulated to comply with provisions in ALSA through "compliance declarations" by 2019 (Government of Alberta, 2014a:161).

Figure 1.1: The Region's geo-political landscape boundaries.



Source: Used with permission from Calgary Regional Partnership. 2012. *The Calgary Metropolitan Plan*, presenting the "ecological map" within the municipal boundaries of CRP members (*circa* 2007).

Through a complex web of substantive environmental policies, laws, regulations, etc.,[5] and a number of plans, frameworks, codes, guidelines, etc., the Province regulates and manages, as follows:

- land uses on Alberta's public lands, and natural resource development on private lands, including but not limited to oil and gas development; energy development; mining; forestry; intensive livestock operations; hunting and fishing; wildlife and species at risk; and invasive species;
- diversion and use of water;
- activities that negatively impact public lands, water resources, the air, and biodiversity; and
- releases and emissions of pollutants that may negatively impact the environment.

The Province's environmental regulatory regime stems from the British common-law legal system based on, among other things the rule of law (Watson, 2015; Luhmann, ([1993],2004) and three pre-dominant principles: protecting legal rights (Fiorino, 2006); ensuring legal certainty (Rijswick and Tappeneir, 2014); and ensuring procedural fairness by decision-makers charged with administration of the law (Teubner, 1983).

Before the 1990s, when supplies of natural resources seemed to be abundant, and before rapid population growth began in the Region (Urban Futures, 2012),[6] the Province's environmental regulatory regime may have been adequate for managing transboundary and transjurisdictional natural resources. However, by 1992 the Province recognized a need for specific environmental regulation, and introduced the *Environmental Protection and Enhancement Act*[7] (EPEA), which defined the

[5] See Appendix B, which is a list of legal instruments that are part of this complex environmental regulatory regime.
[6] Between 1986 and 2011, the population in the "Calgary Region Partnership Area" (as defined in Urban Futures, 2012) grew from 763,000 to 1,357,667, an increase of 36%, with two growth spurts; first in 1990, and second in 1998. This was the same time period when environmental laws were introduced in Alberta, along with major changes to the MGA, and introduction of the *Water Act*, R.S.A. 2000, W-6 (Water Act).
[7] R.S.A. 2000, c.E-12, (EPEA) ss.1 (t) and 2(f), respectively.

"environment," and noted "the shared responsibility of all Alberta citizens for ensuring the protection, enhancement and wise use of the environment through individual actions."

> EPEA, s.1(t) "environment" means the components of the earth and includes (i) air, land and water, (ii) all layers of the atmosphere, (iii) all organic and inorganic matter and living organisms, and (iv) **the interacting natural systems** that include components referred to in subclauses (i) to (iii). (Emphasis added.)

This fourth component, "the interacting natural systems" seemed to describe "ecological systems" or "ecosystems" as defined in the *Convention on the Biological Diversity* (United Nations, 1992: Article 2) as: "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit." However, the Province did not prescribe a regulatory system for managing human impacts on ecological systems. Instead, specific natural resources continued to be regulated and managed through various laws and regulations administered through different government departments and agencies.[8]

In 1994, the Province also introduced a new MGA which enabled new broad municipal powers to pass bylaws to "enhance the ability of councils to respond to present and future issues in their municipalities," recognizing that emergent "future issues" might require municipal response at a local scale. In 1999, the purpose of the new *Water Act*[9] echoed EPEA's broad purpose statement, and introduced water management planning.

In the new MGA, the Province reiterated the need to delegate authority for land use planning and development on private land to local governments "to achieve the orderly, economical and beneficial development, use of land and patterns of human settlement,

---

[8] While EPEA introduced a "co-ordinating council," that was empowered to make recommendations to the Minister of the Environment on interdepartmental matters related the protection of the environment, not much happened under those provisions for a number of years. Over time, the name of the council changed to the "Sustainable Development Coordinating Council": see EPEA sections *5 The Natural Resources Co-ordinating Council is continued as the Sustainable Development Co-ordinating Council,* and *6(1) The Co-ordinating Council may co-ordinate, review and make recommendations to the Minister on interdepartmental matters related to sustainable development and the protection of the environment. (2) The Co-ordinating Council shall make its recommendations and reports to the Minister, who shall submit copies in a timely manner to the members of the Executive Council.*

[9] *Water Act,* note 6, *supra,* see sections 7-15.

and to maintain and improve the quality of the physical environment within which patterns of human settlement are situated in Alberta."[10] Since 1996, when the *Alberta Land Use Policies* (Government of Alberta, 1996) were adopted by the Province, municipalities have been encouraged to regulate land use on private lands, with some exceptions,[11] while managing local impacts on provincial natural resources. However, by as early as 2008 it was apparent to the author that municipal participation in environmental management activities in the Region appeared to be fragmented, uncoordinated, and inconsistent. This was evident, even though CRP had been in existence for over 10 years in an informal attempt to address this gap between provincial laws and municipal bylaws for regulating and controlling the impacts of land use changes on the natural biophysical environment, specific natural resources and ecosystem services of a transboundary and transjurisdictional nature.

1.2 Defining regional-scale for the purpose of the dissertation

By 2014 when research was conducted, social-spatial relationships in the Region had been studied (Tyler et al., 2008; Tyler and Quinn, 2010; 2013) with land use and water management identified as a critical coupling. As Tyler and Quinn (2010:75) pointed out, in reference to the Region as a social-ecological system (SES): "Human activities do not just exist 'outside' of ecological systems and have impacts upon them; they are an integral part of ecological systems and are becoming increasingly dominant… Human and natural systems co-evolve and co-regulate change, instability, and mutual adaption across scales." As such, the Region had the potential to provide a demonstration context for exploring how SES might be co-evolving and co-regulating the land-water nexus across scales.

---

[10] MGA, note 3, *supra*, Part 17: s. 617: Purpose of Planning.

[11] *Ibid*. Sections 618-620. Also see Government of Alberta. 1996. *Alberta Land Use Policies*, Edmonton: Alberta Municipal Affairs for provincial policy on municipal management of provincial resources, such as natural resources and water resources, which includes, for example, river and stream corridors, ravine systems and wetlands, and beds and shores of provincially owned waterbodies. Similar policies now appear in regional land use plans in Alberta, for example the SSRP.

Generally, there is far greater emphasis in the environmental research literature on the physical environment and natural resources at the landscape level than on the social dimensions of regional resource systems and resource use. Therefore, the evolving legal and social subsystems in the Region was of special interest, because the appearance of multi-stakeholder environmental governance organizations, such as CRP operated informally outside Alberta's environmental regulatory regime, while engaged in parallel regional-scale collaborative processes.

Busch and Trexler (2003) noted that an international commitment to managing ecosystems at a regional scale had developed between 1980 and 2000, starting in the European Union. When referring to Alberta's LUF and regional land use plans developed at the watershed scale, Cohen and Bakker (2007:134) explained that a social-political decision to re-orient decision-making about land uses and water governance based on ecosystem criteria, such as a "watershed" was a "well-established trend:"

> In reorganizing land and water governance around watershed scales, the Alberta government is following a well-established trend. The last two decades have seen a dramatic increase in the number of jurisdictions that have undertaken to carry out some form of decision making along hydrologic lines. (References in original omitted.)

A watershed, such as the SSRP planning area is a vast spatial area that may embed several discrete SES functioning at different nested scales. Thus, for the purpose of this dissertation, "regional-scale" means the transboundary and transjurisdictional social-spatial scale where people and the ecosystem interact and co-evolve, co-regulating change, instability and mutual adaption across scales. This interpretation is supported by Gunderson and Holling (2002:15), who stated:

> At scales less than [tens of kilometers], biotic processes, interacting with abiotic ones, can control structure and variability. They produce volumes and patterns of vegetation and soil, for example that moderate external extremes of temperature, conserve moisture and nutrients, and even affect regional climate and the timing of seasons. **These are also the scale ranges where human land use transformations occur so that the arena where plant-and animal-controlling interactions unfold is the same arena where human activities interact with the landscape.** (Emphasis added.)

1.3 How policy development, governance and management differ

In the literature, natural resource policy development, governance and management refer to different social-political processes. Kooiman, (2008:3) provided valuable insights about the differences:

> … governance considers longer term trends and requirements with regard to natural resources, basing itself on an assessment of institutions and a discussion of the values to be attained. Policy deals with specific subjects in tighter time frames, whereas management grapples with the practical dimensions of its implementation.

Pahl-Wostl (2009: 355) explained the differences in the context of natural resource governance and management:

> Resource "management" refers to the activities of analysing and monitoring, developing and implementing measures to keep the state of a resource within desirable bounds. The notion of "resource governance" takes into account the different actors and networks that help formulate and implement environmental policy and/or policy instruments. Governance embraces the full complexity of regulatory processes and their interaction.

Table 1.1 below describes the fundamental difference between environmental governance and environmental management, based on Pahl-Wostl's (2009) work.

Table 1.1: Differences between environmental governance and environmental management

Environmental Governance	Environmental Management
Government and non-government actors and networks that help formulate and implement environmental policy and/or policy instruments. Governance embraces the full complexity of regulatory processes and their interaction.	Activities of analysing and monitoring, developing and implementing measures to keep the state of a resource within desirable bounds.

Source: Judy Stewart, June, 2014 adapted from Pahl-Wostl (2009:355)

Biermann (2004:5) summarized "governance" as "notions of self-regulation by societal actors, or private-public cooperation in the solving of societal problems, and of new forms of multilevel policy." Chapter 2 provides further literature results related to environmental regulation, the evolution of governance, network governance, governance networks, and environmental governance networks.

1.4 Primary theses

Two interconnected theses framed the research. First, it was posited that environmental governance organizations, such as CRP are effective institutional arrangements for influencing increased municipal participation in environmental governance and management activities, when they perform strategic bridging functions as bridging organizations (Brown, 1983; 1991; 1993; Westley and Vredenburg, 1991; Reid, 2004; Rathwell and Peterson, 2012; Crona and Parker, 2012).

Table 1.2: Primary theses

Thesis 1	Thesis 2
Regional-scale environmental governance organizations are effective institutional arrangements for influencing municipal participation in environmental governance and management activities, when they perform strategic bridging functions as bridging organizations.	***Reflexive legal processes and institutions are necessary to support and legitimize bridging organizations and influence increased municipal participation in environmental governance and management activities.***

Source: Judy Stewart, August, 2015

Crona and Parker (2012:34) provided a working definition of bridging organizations as follows:

> Given the lack of a generally accepted definition of bridging organizations, and our aim to delineate a framework for systematically investigating such organizations, we propose a working definition that builds on Westley and Vredenburg (1991): bridging organizations are organizations that link diverse actors or groups through some form of strategic bridging process. They are organizations in their own right and are relatively distinct in terms of resources and personnel from the parties they seek to integrate. This degree of formalization distinguishes bridging organizations from informal social networks revolving around a few individuals that can also provide a bridging function in adaptive governance contexts.

In Canada, there are no formally recognized legal frameworks for bridging organizations, because they are emergent hybrid public and private bodies operating on a voluntary basis. Bridging organizations can evolve to become legal entities, such as associations and societies under provincial laws, with shared objectives in achieving a common public purpose – however, they have no legislated mandate to participate with

government bodies and agencies in natural resource governance or management activities.

Regarding the role of bridging organizations in natural resource governance, Crona and Parker (2012) found that they connect different levels of government, such as provincial and municipal authorities with various stakeholders, such as industry, academia, environmental non-government organizations and members of the public with shared interests in the natural resources and working collaboratively to solve complex problems. Without the strategic bridging functions of bridging organizations, stakeholders with common interests may not have a venue to connect and participate in environmental governance or management activities (Crona and Parker, 2012; Rathwell and Peterson, 2012). However, not all voluntary environmental governance organizations function as bridging organizations. Therefore, the author posited that social network analysis (SNA) (Wasserman and Faust, 1994, de Nooy et al., 2011) and social network mapping could be used to discover whether a network had the necessary structure to perform strategic bridging processes.

The second primary thesis was that reflexive legal processes and reflexive institutions (referred to as reflexive law) (Luhmann [1993], 2004; Teubner, 1983; Lobel, 2004; Ruhl, 2005; Fiorino, 2006) are necessary to support and legitimize bridging organizations. Some legal and political theorists claim that the legal subsystem of society is evolving from a substantive or regulatory stage to a "reflexive" stage (Nobles and Schiff, 2013; 2006; Ruhl and Fischman, 2010; Trubek and Trubek, 2006; Fiorino, 2006; Lobel, 2004; Ruhl, 2005; Gunningham and Sinclair, 2002;1999; Mayntz, 1993).

Fiorino (2006:19) explained the evolution of reflexive law in the context of "new environmental regulation," as follows:

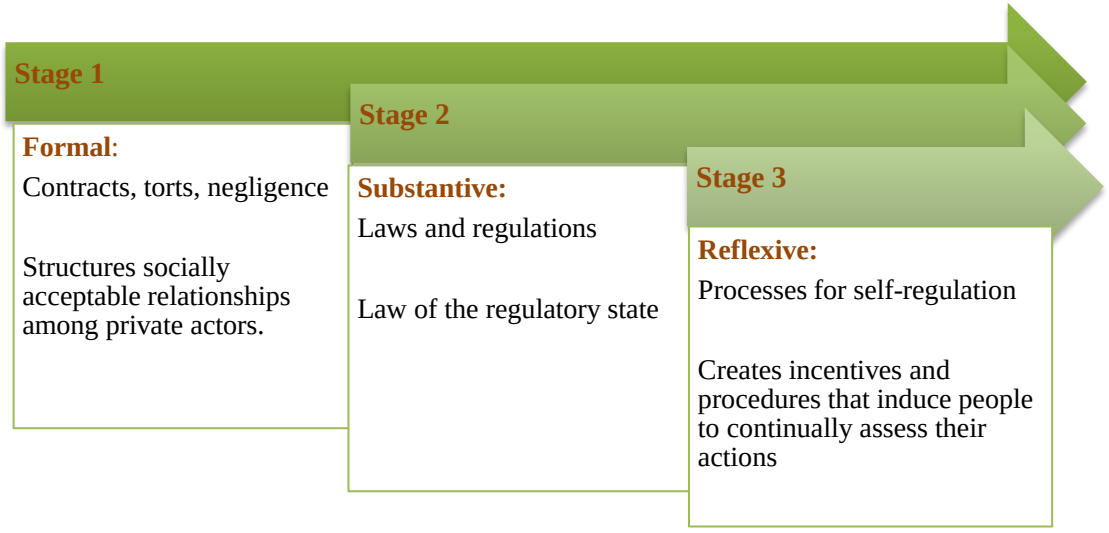
> The existing regulatory system is based largely on what Gunther Teubner terms substantive law, which is the law of the regulatory state. Governments use substantive law to intervene in private social and economic arrangements and promote collective goals, such as safety, environmental quality, and equity. It differs from the more traditional formal law, such as contracts and torts, by which government defines relationships among private actors in order to structure social and economic arrangements. **Reflexive law is a third stage, after formal and substantive law**. It has social purposes, like substantive law, but achieves them differently. The aim of a reflexive legal strategy is to create incentives and

procedures that induce people to continually assess their actions (hence the "reflexivity") and adjust them to society's goals, for example, by creating less pollution, using fewer resources or protecting endangered species. (Emphasis added.)

The theoretical evolution of the legal subsystem of society is illustrated in Figure 1.2, where the darker shade of green illustrates the most evolved theories and characteristics of the legal subsystem of society and the lighter shades of green illustrate the less evolved theories and characteristics.

In theory, reflexive legal processes and institutions that support self-regulation of new forms of social-political governance, might be used to legitimize and "stabilize the normative expectations" (Luhmann, [1993], 2004:148) of social actors participating in environmental governance through bridging organizations, when there is no legislated mandate. The author posited that a reflexive legal framework (the Framework) might be designed to support and legitimize bridging organizations engaged across scales in environmental governance, because governance, social networks, bridging organizations, and reflexive law can all be thought of as complementary, co-evolving, social-political processes necessary for managing complex, dynamic SES. A full discussion of reflexive legal theory is presented in Chapter 5.

Figure 1.2: Theoretical evolution of the legal subsystem of society



Source: Judy Stewart, November, 2015, based on Fiorino (2006).

1.5 Research purpose, objectives and overview of methodology

1.5.1 Purpose

Rathwell and Peterson (2012) identified a positive correlation between bridging organizations and successful watershed management in a transboundary municipal context. The purpose of this dissertation is to develop the Framework to provide legal processes to support and legitimize the function of bridging organizations in inter-municipal and transboundary environmental governance related to land use, water and air at a regional-scale.

In order to develop the Framework, cross-disciplinary literature review was required involving the areas of: governance, governance networks and environmental governance; complex, dynamic systems and social-ecological systems; organizational theory of bridging organizations in environmental governance; network theory and social network analysis; and, reflexive law and reflexivity analysis.

There were four research objectives:

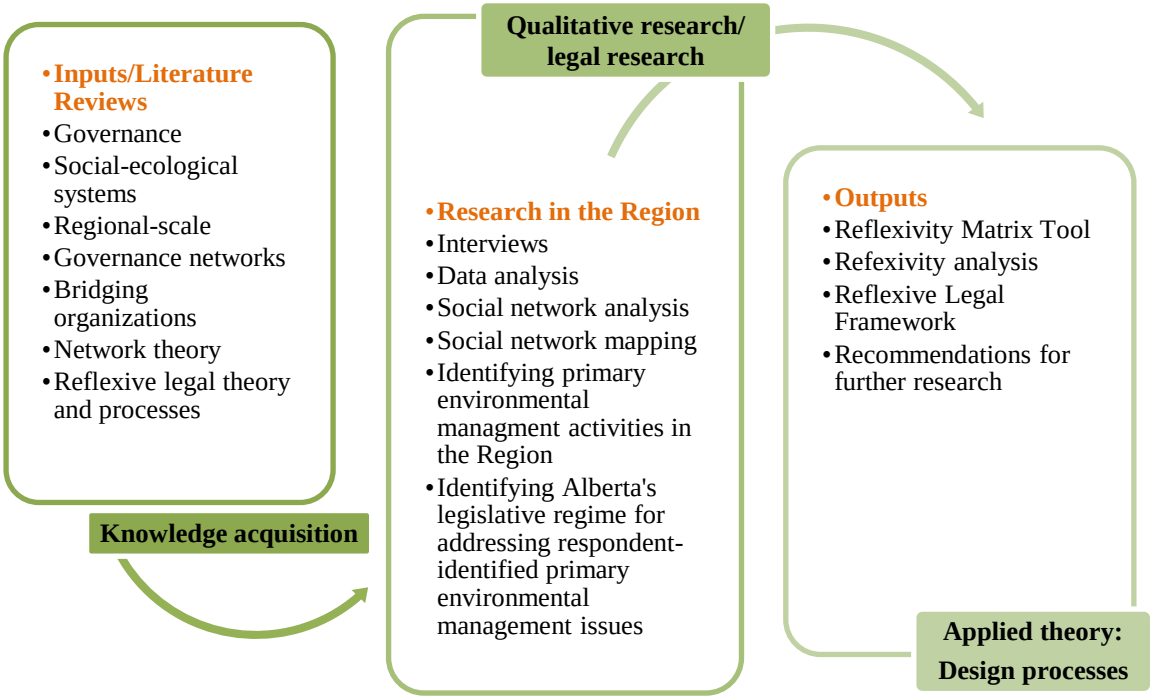
- to identify the characteristics of bridging organizations involved in environmental governance;
- to identify the principles and criteria of reflexive legal theory;
- to apply network analysis as a mechanism for identifying the social networks involved in environmental governance in the Region;
- to evaluate reflexivity of Alberta's existing environmental regulatory regime.

For the purpose of the dissertation, three existing multi-stakeholder environmental governance organizations were identified in the Region: CRP, the Calgary Region Airshed Zone (CRAZ) and the Bow River Basin Council (BRBC). These three organizations were author-selected because they were engaged in regional-scale land use, water and airshed management activities involving municipal stakeholders in the Region. More detailed information about these organizations is provided in Chapter 6. While other local, regional-scale and provincial-scale multi-actor environmental governance organizations existed, the selected organizations operated at a similar social-spatial scale and addressed municipal land use impacts related to land, water and air, and had been active in the Region for at least five years. There were also some

spatial and operational overlap among these three organizations involving the CRP member municipality boundaries, the Bow River watershed boundaries, and CRAZ' airshed boundaries.

The research approach involved two components, as illustrated in Figure 1.3 below: a qualitative research component using a structured interview process, and a legal research component that examined Alberta's environmental regulatory regime and management processes in the context of reflexive legal theory.

Figure 1.3: Overview of methodologySource: Judy Stewart, August, 2015.



1.5.1.1 The qualitative research component overview

First, a structured interview process (See Appendix A: Interview Questionnaire and Activities) was used to identify social and collaborative relationships and key land use, watershed and airshed management issues in the Region. Approval to conduct the interviews was granted in 2013 by the University of Calgary Conjoint Faculties Ethics Board. The eighteen municipalities in the Region that were selected to be interviewed were members of one or more of CRP, BRBC or CRAZ. Interview questions were

based on thirty resource management activities chosen from the existing co-created natural resource management plans for land use, watershed and airshed management which had been produced by each of the three organizations. These thirty selected activities (the Activities) are provided in Appendix A.

The purpose of the interviews was to explore social network connections and collaborations among the municipalities and the three organizations in the Region. The interview questions were provided to the respondents by email about two weeks in advance of the scheduled interview time to encourage consideration of the questions. The questions were open-ended, and the interviews took, on average one hour to complete. Each respondent was assigned a code with a letter/number combination to ensure confidentiality, and only the codes and names of municipalities were used in data analysis and social network mapping. Interviews were recorded and transcribed. A heuristic qualitative analysis approach was used to organize, chart, describe and compare response content. Appendices C-F include examples of survey response content analysis.

1.5.1.2 The legal research component overview

Legal research was necessary to determine the reflexivity of Alberta's legal institutions with respect to respondent-identified primary land use, watershed and airshed management issues. In order to evaluate the reflexivity of Alberta's current environmental policy and regulatory system, an initial list of environmental legislation, regulations, policies, plans, and guidelines was compiled (see Appendix B). As research progressed, emerging legislation, regulations, etc. were added to the list for analysis. A reflexivity assessment matrix tool (the Matrix) was developed using criteria from the literature on reflexive legal theory including the combined works of Lobel (2004); Fiorino (2006), Ruhl (2005) and Teubner (1983), and emerging concepts provided by others, such as Gunningham and Sinclair (2002), and Brousseau et al. (2012).

1.6 Legal perspective and significance of the research

The author has unique knowledge and experience as a practicing lawyer in water and municipal law in the Region, and has been an active volunteer collaborator in all of

the CRP, BRBC and CRAZ at some time since 1992, serving in different capacities, such as a Vice-Chair, Director, member or chair of a standing committee.

Alberta's legal processes and institutions have not been previously analyzed from a reflexive legal perspective. The research, the Matrix, and the Framework developed in this dissertation have potential for further application in other areas of Alberta, and throughout Canada where multi-actor environmental governance organizations are functioning as bridging organizations in rapidly growing urban regions.

1.7 Organization of the dissertation

The dissertation chapters are sequenced as follows. Chapter 2 examines the concept and literature on environmental governance. Chapter 3 examines the literature on complex, dynamic SES and coupled human and natural systems (CHANS), and applies these ideas in the context of the Region. Chapter 4 explores the concepts and literature on bridging organizations, and examines strategic bridging processes and functions in the context of environmental governance. The defining characteristics of bridging organizations are presented along with identified strategic bridging and brokering functions.

The emergence of reflexive legal theory, processes and institutions that have a role in supporting and legitimizing bridging organizations in environmental governance is presented in Chapter 5. Chapter 6 applies the theory of bridging organizations to environmental governance in the Region, while Chapter 7 presents the reflexivity assessment of Alberta's environmental legal instruments using the Matrix. Chapter 8 provides the Framework, and identifies processes for supporting and legitimizing the strategic bridging functions of bridging organizations engaged in environmental governance. The chapter concludes with recommendations for further research.

Chapter 2:

Environmental Regulation, Environmental Governance, and Governance Networks

2.1 Environmental regulation

Environmental regulation and environmental governance are not the same conceptually, structurally or functionally. Environmental regulation by various levels of government in the British common-law tradition is authority-based. Governments and government institutions use formal and substantive laws (common law, constitutional, and statutory laws and regulations) to regulate human activities related to the use and management of the natural biophysical environment, specific natural resources, and ecosystem services. Depending on the mandate and level of authority, environmental regulation accords with government policy and legislation, and involves the use of coercive powers based in executive privilege and substantive laws.

In Canada, federal and provincial levels of government have different constitutional powers to enact environmental and specific natural resource laws and regulations.[12] Federal and provincial laws are enacted and enforced by governments through the legal system which performs constitutionally framed legal-political functions, as historically ascribed by society. As van Rijswick and Tappeiner (2014: 276-277) stated: "the law is meant to offer a stable basis for organization, as well as legal certainty and protection against unlawful or arbitrary behavior."

In an extensive review of the concept of the "rule of law" in the Canadian context, Watson (2015:955) recently summarized the importance of legal certainty and protection against unlawful or arbitrary behaviours in promulgated laws:

---

[12] *The Constitution Act*, 1982, Schedule B to the Canada Act 1982 (UK), 1982, c 11.

> To be laws in the rule of law sense, the requirements, prohibitions, authorities, or directions in promulgated laws must be rational, objective, accessible, understandable, impartial, and reasonably fit (not more than necessary) to the purposes sought to be achieved by the laws. They must be capable of being applied even-handedly. Their future application must be reasonably predictable. No individuals should be able to cherry pick the ones that apply to themselves.

Rationality, objectivity, certainty, predictability, etc. are core principles underlying Alberta's environmental policy and promulgated laws, which makes them difficult to change. As Fiorino (2006:11) pointed out, government "policy is usually changed incrementally," adding that:

> Policy change more typically occurs in small steps, as a series of marginal adjustments to the status quo. When change occurs, it is piecemeal, as a response to a perceived need for action. Policy makers build closely on what already exists, As a general rule, policy making in an incremental system is reactive, pragmatic, and specific rather than anticipatory, visionary and comprehensive.

2.2 Limitations of environmental regulation for environmental management

Incrementalism in policy and regulatory change can be problematic when addressing environmental governance and management issues that arise from complex, dynamic SES processes that are characteristically dynamic and unpredictable, with uncertain results that may be transformative (Bodin and Crona, 2009; Gunderson and Holling, 2002).

Bodin and Crona (2009:366) summarized the inherent difficulty in governing ecosystems where humans and natural systems are interconnected:

> Governance of ecosystems is inherently difficult since both the natural environment and human societies are characterized by uncertainties, complex dynamics, natural variations and scale dependencies. Furthermore, they do not abide by human-made jurisdictions and administrative borders, and it is not possible to divide them into separate, self-supporting, autonomous components. Many of the services they provide are common pool resources with multiple actors competing for use, often leading to resource depletion or management conflicts. (References in original omitted.)

Fiorino (2006:20) stated that environmental regulation is "essentially modern in its design." He explained that environmental regulation "relies on a strategy of bureaucratic

rationality to define and organize problems." As such, Fiorino (ibid) identified key structural and functional aspects of modern environmental regulation, as follows:

> Modern regulation assumes that scientific and technical expertise is sufficient to solve complex problems. Hierarchy - defined as the exercise of control by higher over subordinate levels - is the appropriate organizational design for achieving social goals. Law, backed by the coercive authority of government, is seen to be the principal way to influence behavior.

Fiorino (2006:71) concluded that modern regulation "impedes innovation; it is legalistic, inflexible, and fragmented; it is expensive, it is increasingly irrelevant and ineffective for many issues; and it faces an implementation deficit."

Regulatory authorities, such as provincial government departments and municipal administrations provide stable systems of laws, regulations, bylaws, codes, guidelines, etc. administered through complex bureaucracies, sometimes referred to as departmental silos or "stovepipes" (Pinkerton, 2007:154) that attempt to govern and manage specific natural resources in "separate, self-supporting, autonomous components" (Bodin and Crona, 2009:366).

Government departments are necessarily slow-moving and cautious. As Hatch (2011:33) pointed out, the "bureaucratic form promises reliable decision-making, merit-based selection and promotion, and impersonal, and therefore, fair application of rules." Further, as Bason (2010:17) stated, public institutions "intuitively do not seek to be at the forefront of a change agenda. Risk-taking is typically not embraced, but discouraged. Individuals are left without resources, backing or incentives to develop, embrace and realize good ideas." According to Bason (2010: 16), society may actually expect and want public institutions, such as government departments and agencies and municipal administrations to be slow and bureaucratic to maintain social stability.

However, a slow-moving governmental department or municipal administration may not be the most suitable institutional structure to address rapid change in a complex, dynamic SES, like the Region. Provincial bureaucracies and municipal administrations do not have built-in flexibility or access to human or financial resources necessary to respond to rapid feedback in the system (Bason, 2010:16-17). For example, during the

2013 flood in the Region, regulatory agencies were ill-equipped to respond rapidly to social and ecological changes in the SES (WaterSmart, 2013). In 2004, Haas (2004:7) speculated that strong, centralized government regulatory institutions are not structured to deal with "complex and uncertain policy environments," and are "fundamentally unecological:"

> The best institutional structure for dealing with complex and uncertain policy environments is loose, decentralized, dense networks of institutions and actors that are able to quickly relay information, and provide sufficient redundancies in the performance of functions so that the elimination or inactivity by one institution does not jeopardize the entire network. Decentralized "information-rich" systems are the best design for addressing highly complex and tightly-coupled problems. In short, strong centralized institutions are fundamentally unecological. They run counter to the ecological principle of requisite diversity and flexibility; inhibit random mutation, or policy innovation; and are easily captured by single powerful parties.

This perception that environmental regulation through government departments and bureaucracies is ineffective for environmental management may be more complex than just slow moving, inherently cautious governments hemmed in by the rule of law. For example, thirty-two years ago, Teubner (1983:239) concluded that we "live in a time of increasing disenchantment with the goals, structures and performance of the regulatory state." Relying on Habermas' (1975:50) discussions of the significant limits of substantive law due to the "rationality crisis," Teubner (1983:268) supported his conclusion, as follows:

> Social processes and economic arrangements are simply too dense, complex, and potentially contradictory to be adequately accounted for in the kinds of interventionist control mechanisms that have been created. Legal and bureaucratic structures cannot incorporate models of social reality that are sufficiently rich to allow them to cope effectively with crises of economic management and similar challenges.

Related to Teubner's (1983) rationality crisis, he cited the emergence of a "legitimation crisis" in organized capitalism, and a "motivation crisis" among citizens in the social-political system. Collectively, these crises worked together to limit the effectiveness of the regulatory system. Specifically, relying on Habermas (1975:95), Teubner (1983:269) suggested: "A discursive rationality emerg[es] from autonomous

evolutionary processes in the normative sphere" such that "modern principles of legitimization must be procedural."

Teubner (1983:270) noted that "reflexive rationality in law obeys a logic of procedural legitimization" which "reflects the emerging organizational principle of post-modern society." Teubner's (1983:271) identification of "legal formalism: strict rule-orientation; professional (artificial) reasoning; and the prominence of procedure" is characteristic of a legal system that "has not yet adapted to the exigencies of a highly differentiated society. Legal doctrine is still bound to the classical model of law as a body of rules enforceable through adjudication."

Luhmann (1972:190) attributed the current crisis in the legitimacy of the regulatory state to the "modern functional differentiation of society," whereby each societal function (economics, politics, science, religion, law) operates by its own set of substantive rules, such that "radical system conflicts are inevitable" in a world riddled with legal pluralism.

Legal pluralism provides an interesting explanation of how municipal governments in a provincial context participate in environmental governance and management. For example, land use decision-making for private lands in a municipal context becomes a complex process of trying to satisfy a variety of local interests and values within provincial and federal statutory and policy frameworks that regulate the use of specific natural resources within municipal boundaries. Questions of jurisdiction arise. Specifically, who has authority to impose their own set of rules to regulate and control human activities on the landscape and specific natural resources, and whose rules may be considered *ultra vires* if a court is asked to adjudicate?

According to Teubner (1983:272), to address the authority problem presented by legal pluralism and "achieve reintegration [of society] under conditions of extreme functional differentiation" the different subsystems of society must be "mutually supportive." Such potentially integrative mechanisms emerge at the subsystem level, in terms of awareness and development of subsystem "functions;" including "output performances;" and "internal reflexion" (Teubner (1983:272). Teubner stated that these patterns and conceptualizations are emerging across disciplines to avert social crises

through collaborative processes. Paquet (1999:8) agreed that in post-modern society "[d]eliberation and negotiation are everywhere, moving away from goals and controls and deeply into intelligence and innovation."

Teubner (1983:274) stressed that a "reflexive orientation (of the legal system) does not ask whether there are social problems to which the law must be responsive. Instead, it seeks to identify opportunity structures that allow legal regulation to cope with social problems without, at the same time, irreversibly destroying valued patterns of social life."

In a valuable critique of Teubner's (1983) reflexive legal theory, Blankenburg (1984:275) suggested that reflexive law actually promotes increased regulation in some arenas of social life that were not previously regulated at all:

> While reflexive forms of law might be becoming more common, these forms add to existing legal regulation without replacing them. It is my thesis that any observed increase in the use of reflexive law indicates increasing regulation of formerly unregulated social arenas rather than attempts at deregulation.

As Blankenburg (1984) cautioned, reflexive law may be touted as an evolutionary legal theory, but it may have unintended consequences in its application, whereby the intention to create less regulation to help social actors address rapid feedbacks in complex, dynamic systems may result in more regulation in parts of society where no regulatory system previously existed, for example, environmental regulation at the regional-scale, or regulation of the composition, structure and functions of voluntary environmental organizations.

On the other hand, reflexive legal processes and institutions may be co-evolving with the post-modern social-political reality so that the legal system is able to co-manage and mutually adapt to other social-political subsystems of society. Reflexive legal theory may provide a resolution to what appears to be society's growing disenchantment with the regulatory system when governments attempt to regulate and manage human behaviours in complex systems where society and the ecosystem are inextricably connected.

2.3 Governance as an emergent phenomenon

Paquet (1999) noted that governance has been conceptualized and explored by academics as early as the 1960s when developing general systems theory (Boulding, 1970), and when addressing "wicked problems" (Rittel and Webber, 1973). In the early 1990s, Breuillard (1993:131) explained that society was already moving "from the static description of political and governmental functions or responsibilities, as laws and statutes enact them, to the dynamic analysis of mechanisms and processes at work which determine actions but also re-actions within socio-political systems." He raised the problem that one law or regulation at any level of government or nation-state does not address the complexity of social-ecological interdependencies. Breuillard (1993:111) suggested that a "target group strategy" to overcome such complexity through consultation and negotiation might be a solution, citing: "a preventative and source-oriented approach of environmental problems, which is not enforceable by a unilateral rule-making government but which depends on the cooperation and the (partial) responsibility of the main relevant social and economic sectors."

Twenty-two years ago, Kooiman (1993:2) noted that new "social-political arrangements" for governing had become necessary when working within social complexity. Kooiman (1993:2) defined "governance" as "the patterns that emerge from governing activities of social, political and administrative actors," and he referred to new patterns of interaction between government and society as "social-political forms of governing,"

Stoker (1998:17-18) said that governance processes "do not rest on recourse to the authority or sanctions of government," and he provided five "governance propositions" that have been widely used in governance literature:

- Governance refers to **a set of institutions and actors** that are drawn from but also beyond government.
- Governance identifies the **blurring of boundaries** and responsibilities for tackling social and economic issues.
- Governance identifies **the power dependence involved in the relationships** between institutions involved in collective action.
- Governance is about **autonomous self-governing networks** of actors.

- Governance recognizes the capacity to get things done which **does not rest on the power of government command or use of its authority.** It sees government as able to use new tools and techniques **to steer and guide.** (Emphasis added.)

Stoker (1998:18) described institutions and actors representing government and non-government who formed autonomous self-governing networks. A blurring of boundaries and responsibilities for tackling issues occurred, with recognition of power dependencies involved in relationships among actors. However, the capacity to get things done did not rest on government command or authority. Government's primary goal was to steer and guide.

In 2001, Scott and Trubek (2001:8) examined traditional conceptions of law and new approaches to governance in the European Union, and summarized distinctions, as follows:

> …whereas a traditional conception of law looks for a unitary source of ultimate authority, new governance is predicated upon a dispersal and fragmentation of authority, and rests upon fluid systems of power sharing. Whereas a traditional conception of law posits hierarchies, and places courts at the centre of systems of accountability, new governance posits heterarchy, and often looks outside of the courts in seeking to secure real accountability. A traditional conception of law appears to rest upon a clear distinction between rule making on the one hand, and rule application and implementation on the other. New governance, on the contrary, accepts that this distinction must break down as indeterminate and flexible rules are adapted to meet new challenges and resolve unexpected problems. Related to this, while a traditional conception of law might see itself as predicated upon existing knowledge, new governance places emphasis upon the need to facilitate the continuous generation of new knowledge(s).

More recently, in 2006 when describing "the characteristics of social-political governance," Fiorino (2006:20) said that "government will steer more than it will row. Law will be used less to tell people exactly what to do (which assumes that lawmakers and implementers always know best) than to create conditions that induce them to do what should be done." In 2013, when discussing strategic partnerships and inter-organizational relationships between public and private actors, Conteh (2013:25) stated that: "[r]ather than delivering and directing, the legitimate role of government becomes

facilitating and empowering." Paquet (2013:1) summarized the need for collaboration among key stakeholder in governance processes, as follows:

> [W]e live in a society of complex adaptive systems characterized by "a large number of interacting and interdependent elements in which there is no central control; self-organizing and emergent behaviours based on sophisticated information-processing generate learning, evolution and development… (an environment) in which what we do to solve problems is uncertain and key stakeholders are in conflict about how to proceed. In such contexts, governing is the most daunting task: pragmatically, it cannot be done without the collaboration of key stakeholders (who have part of the information, resources and power) and the consent to be governed. (References in original omitted.)

A few examples of governance institutions and processes found in the literature include: facilitating or creating processes for co-generation of knowledge (Ostrom, 1990, 2005; Paquet, 1999); negotiated rule-making (Fiorino, 1988; 1999; 2006; Gunningham and Sinclair, 1999); resource management planning; and self-monitoring and enforcement processes (Ostrom, 2005; Bulkeley, 2005; Lobel, 2004). Based on the literature, key differences between government regulation and governance are illustrated in Table 2.1 below.

Table 2.1: Key differences between government regulation and governance

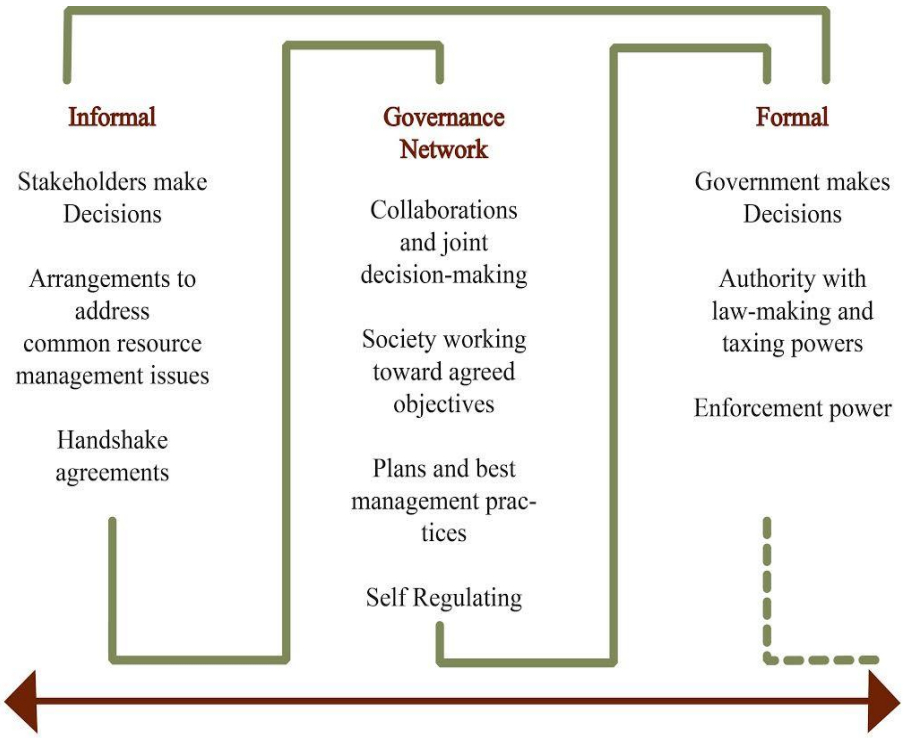
Government regulation	Governance
State actors and government	Government, industry, NGOS, public, etc.
Government authorizes	Government participates, steers and guides
Command and control regulation	Collaboration and negotiation
Minimal actors/administrators	Many actors/stakeholders
Homogenous information	Heterogeneous information
One size fits all	Different jurisdictional and spatial scales
Knowledge flows from the top	Knowledge flows between actors
Predicated on existing knowledge	Emphasizes generation of new knowledge
Change is slow	Dynamic, evolving, iterative planning processes
Static management plans/policies	Adaptive co-management plans
Plans take years to change	Plans respond to feedback
Reactive to crisis or political change	Social learning, problem solving
Coercion and punishment	Innovative forms of conflict resolution
Third party resolution of conflict	Affected parties resolve their own conflict

Source: Judy Stewart, June, 2014

2.4 A continuum of systems of governing

Bulkeley (2005:877) said that "rather than seeing government and governance as necessarily opposite, this interpretation (of governance) suggests a continuum of systems of governing, in which state and non-state actors play a variety of roles." Other governance theorists, such as Stoker (1998) and legal theorists, such as Lobel (2004) also agreed that government and governance are not mutually exclusive forms of governing. This is because the laws and regulations of the nation-state frame the constitution (the rule of law) in which stakeholders organize for their shared public purpose. The concept of a continuum of systems of governing is illustrated in Figure 2.1 below.

Figure 2.1: Continuum of systems of governing where state and non-state actors play roles.



Source: Judy Stewart, May, 2014, based on Bulkeley (2005).

As Luhmann ([1993], 2004) pointed out, the locale (environment) in which a governance process takes place provides the political and legal context for stabilizing normative expectations of people involved in the process. In this context, authority for a governance processes emerges, not from substantive laws, such as legislation but from

stakeholders reaching collective agreement about objectives and desired outcomes using peer influence, relationship and trust-building, co-generation of knowledge, and social learning (Crona and Parker, 2012; Conteh, 2013; Pahl-Wostl, 2006; Paquet, 1999).

Watson (2015:987) clarified that "the "rule of law" means that "every man should be governed by the law in their individual conduct as well as the government." Watson concluded that voluntary governance networks (at the public-private nexus of social-political institutions) must also meet "requirements for the assurance of legality," and described this as follows:

> In our free democracy, there are many forms of private associations and collectivities where interests or functions or objectives are shared, notably in commercial and economic activities such as labour unions or professional societies or social or religious organizations. These associations also must function consistently and predictably in service of their members on the one hand, and with due regard to the implications of such organizational activity on the rest of society on the other.
>
> As a consequence, here too can be found requirements for the assurance of legality not only in the internal operations of such organizations, but in their relationship with others. *The requirements of legality often are initially addressed by executive branch regulation under the authority of legislated law, and then finally evaluated with the lens of judicial review.* (Emphasis added.)

2.5 Environmental governance and environmental management

Lobel (2004:285) promoted the "governance model as a natural successor to the regulatory model" (or the substantive legal regime) for environmental management:

> It addresses the changes in both the goals and capabilities of legal regulation, and avoids the central deficiencies of substantive law. The governance stage fundamentally transforms legal control into a dynamic, reflexive, and flexible regime. Its principles promote the internal self-regulatory capacities of other social fields (or subsystems) with which it interacts.

Governance models may be emerging in managing complex human interactions within ecosystems. Like ecological systems, social systems are also complex, adaptive and evolving in response to feedbacks from within, and from outside the system (Gunderson and Holling, 2002). As Bodin and Crona, (2009), and Ebbesson (2009) and

Ebbesson and Hey (2013) pointed out, ecosystems do not respect human-made political boundaries, laws, and regulatory regimes. As Bodin and Prell (2011:6) offered:

> Ecosystems stretch across human-made jurisdictions and administrative boundaries such as municipalities, provinces, and states. As a result of this and other factors, **natural resources are often characterized by ineffective institutional arrangements and with multiple actors and stakeholders competing for resource use often leading to overexploitation and the inability to account for dynamic ecosystem processes.** As a consequence, scholars nowadays typically refer to governance of natural resources instead of management or government. (Italics in original. Emphasis added).

Crona and Hubacek (2010:18) agreed with "the assumption that a move away from command-and-control implies a move from government to governance, and from political administrative hierarchy to various types of collaborative structures that are more attuned to the requirement of ecosystems operating at various spatial scales."

In the literature, several processes were identified as necessary for effective environmental governance, such as continuous learning; trust and relationship building; shared environmental issue identification; cumulative effects assessment; and resource use conflict resolution (Crona and Parker, 2012; Conteh, 2013; Pahl-Wostl, 2006; Paquet, 1999; Ostrom, 1990; 2005; Bulkeley, 2005; Lobel, 2004; Fiorino, 1988; 1999; 2006; Crona and Hubacek, 2010; Newig et al., 2010).

2.6 Governance networks and bridging organizations

In 1993, while studying the "emerging governance paradigm," van Vliet (1993:106) proposed that researchers must acknowledge "the existence of *networks* of organizations that are centered around societal problems or public programs." (Emphasis in original.) Further, van Vliet (1993:106) suggested that:

> these networks, in which different public and private actors play a role and in which processes of problem-solving, planning and policy-making take place, are characterized by:
> - The complexity of the problems, which have to be dealt with;
> - The interdependence of the actors involved;
> - The negotiational or "game-like" character of the developments within the network; (and)
> - The learning processes which can take place within and between the involved actors. (References in original omitted.)

When describing complexity within natural resource management systems, van Vliet (1993:107) expanded on why governance networks are necessary to address issues of environmental degradation:

> In addition to the ecological system dynamics, the diversity of human activities involved in environmental degradation and, therefore, the diversity of social interests involved, make environmental problems complex ones. This complexity on the one hand limits the practical range of formal laws and rules and as a result the capacity of unilateral government intervention and on the other hand it suggests that a part of the governing capacity has to be found within the target groups of public intervention.

According to Bulkeley (2005:877) "hybrid forms of environmental governance" where government and non-government actors self-regulate and collaborate to resolve environmental problems create a "new sphere of authority" organized in "network terms." Building on a body of network theory and analysis (Granovetter, 1973; Wasserman and Faust, 1994; Janssen et al, 2006), Newig et al. (2010:3) referred to self-organizing governance institutions as governance networks engaged in "network governance."

Jones et al. (1997:912) suggested that the concept of "network governance" was not new in coordinating economic activities among competing firms when they were "adapting, coordinating, and safeguarding exchanges" in complex, changing environments. Based on seminal research by Granovetter (1973:1370-71) related to the strength of weak ties in social and exchange networks, Jones et al. (1997:914) outlined nine different conceptual frameworks and definitions of network governance that had emerged between 1986 and 1996. All nine centered around "two key concepts: (1) patterns of interaction in exchange and relationships and (2) flows of resources between independent units." After studying the network governance literature, Jones et al. (1997: 914), explained the nature of network governance as follows:

> Network governance involves a select, persistent, and structured set of autonomous firms (as well as nonprofit agencies) engaged in creating products or services based on implicit and open-ended contracts to adapt to environmental contingencies and to coordinate and safeguard exchanges. These contracts are socially – not legally binding.

Newig, et al. (2010:1) found that network governance was an emerging concept in the field of environmental governance with potential to integrate government and other stakeholder actions to better govern complex, dynamic SES through co-creation of knowledge and social learning. Newig et al. (2010:3) defined network governance as "those governance processes that draw on networks as a relatively stable form of coordination." Newig et al. (2010) discovered that network structure was important for information, value and norm diffusion throughout the network, and that networks with strong central cores of actors with strong ties, but with weak ties in the periphery were more conducive to social learning processes.

"Governance networks" were defined by Torfing (2005: 307), and more recently, Newig et al. (2010:3) adopted Torfing's definition, explaining governance networks to be:

> relatively stable horizontal articulations of interdependent, but operationally autonomous actors who interact with one another… within a regulative, normative, [and cognitive]…framework that is self-regulating within limits set by external forces and which contribute to the production of public purpose.

The term "governance network" refers to the "boundaries" and "conditions" within which actors involved in the network contribute to the production of a "public purpose." Governance network boundaries are delineated by "the members who commit themselves to the governance task at hand" (Newig et al., 2010:3), and this identifies stakeholders with their locale, and promotes cooperation. Newig et al. (2010:2) explained that governance networks are formally or informally institutionalized and are not the same as *ad hoc* collaborations or participatory gatherings.

Newig et al. (2010:3) studied how governance networks foster collective learning and how collective learning alters network structure over time. They found that "shared professional norms, and a joint interest in problem solving, rather than identical interests, have fostered the formation of these networks" in the first place. Newig et al. (2010) explained that, among other things knowledge gaps are filled through integration of information provided by actors with varying degrees of

expertise. Competing interests and societal values require effective venues and means of communication to resolve conflicts, and governance networks function to transmit information and foster deliberation (ibid). As an emerging concept, governance networks integrate government and other stakeholder actions and could provide an institutional structure for effectively governing complex SES processes through co-creation of knowledge and social learning (ibid).

Pahl-Wostl, (2006; 2009) and other environmental governance researchers (Pahl-Wostl et al., 2007; 2008; Reed et al., 2010) identified the importance of social learning processes. As Pahl-Wostl, (2006:12) said: "Social learning processes are codified in shared practices, tools, concepts, symbols, or material artifacts embedded in a context of meaning." (While social learning processes are discussed throughout the dissertation, they are not the primary focus, but are identified as an area for further research in the Region.)

In recent studies, social networks of stakeholders engaged in environmental governance networks have been associated with improved natural resource management (Crona and Parker, 2012; Rathwell and Peterson, 2012; Bodin and Prell, 2011; Crona and Hubacek, 2010; Bodin and Crona, 2009). Several researchers have discovered that social networks, and the degree of collaboration and communication among actors in the periphery of the network were keys to the success of multi-actor governance of natural resources (Agrawal et al., 2013; Rathwell and Pederson, 2012; Crona and Hubacek, 2010; Bodin and Crona, 2009).

For the purpose of the research, the author considered CRP, BRBC and CRAZ to be functioning as environmental governance networks according to the literature, but it was unclear if they were structured and functioning as bridging organizations. The literature on bridging organizations is provided in Chapter 4.

Chapter 3:

Applying Complex, Dynamic Systems and Social-Ecological Systems Theory

3.1 Theories of general systems and complex, dynamic systems

Complex, dynamic systems theory lies at the heart of both social network theory and reflexive legal theory. Society is a complex, dynamic system. A social network evolves as an open system over time and is in a constant state of flux as boundaries of the network expand and contract with the addition of new people and exit of others. The dynamic interactions among actors in a network at any one time are complex, but it is the actors and their interactions that create the network's identity and structure, and enable its complex functions.

As explained by von Bertalanffy (1972: 420), systems can be described both internally and externally: "Internal description is essentially "structural," that is, it tries to describe the system behavior in terms of state variables and their interdependence." Internal description describes the inner workings of the system and inter-relationships among the various system components that create the system's structure. von Bertalanffy (1972: 420) clarified that internal description is a reflexive process leading to system adaption and evolution over time. However, he said that external description is "functional;" the system's behavior is described in terms of its interactions with the environment" – a system is externally described by what it does in its environment. A subsystem's structure enables the functions it can perform within the system that forms its environment.

As early as 1930, von Bertalanffy had recognized that general systems theory was inherently multi-disciplinary in application. He noted that the "notion of system is as old as European philosophy," referring to Aristotle's statement that "the whole is more than the sum of its parts." According to von Bertalanffy (1972: 417): "A system may be defined as a set of elements standing in interrelation among themselves and with the environment."

von Bertalanffy (1972:411) explained that in 1947 he had envisioned the then emergent general systems theory, as follows:

> There exist models, principles and laws that apply to generalized systems or their subclasses irrespective of their particular kind, the nature of the component elements, and the relations or "forces" between them. We postulate a new discipline called General System Theory. General System Theory is a logic-mathematical field whose task is the formulation and derivation of those general principles that are applicable to "systems" in general. In this way, exact formulations of terms such as wholeness and sum differentiation, progressive mechanization, centralization, hierarchical order, finality and equifinality, etc., become possible terms which occur in all sciences dealing with "systems" and imply their logical homology.

Reflexive legal theory emerged from general systems theory. Relying on general systems theory, Luhmann (1986:172) recognized that "[a]utopoiesis is a general form of system building using self-referential closure," and that not only living systems were autopoietic, but that social systems and subsystems of society also used self-referential closure (reflexive processes) to self-regulate and adapt and evolve over time. Luhmann ([1993], 2004:81) considered the legal system to be an autopoietic subsystem of society evolving over time through communication or feedback from both within the internal structure of the legal subsystem, and from the functions or interactions between the legal subsystem and society that is the legal subsystem's environment.

As in social networks, boundaries of the legal subsystem are in a continual state of flux as the subsystem evolves through stages along with society as a whole. For example, Fiorino (2006:19) states that reflexive law is the third stage of legal system's evolution, following the formal and then substantive stages.

Reflexive legal theory resembles "control theory" as stated by von Bertalanffy (1972:419), where "external description, typically is given in terms of communication (exchange of information between system and environment and within the system) and control of the system's function with respect to the environment (feedback)…" Luhmann ([1993]2004:263) called this control the "structural coupling of the legal and political subsystems of society," where the legal subsystem is described externally and essentially controlled through perturbations in the nation-state's political subsystem.

von Bertalanffy, 1972:416) said that, essentially, the multi-disciplinary problem that general systems theory addresses is "problems of interrelationships within the superordinate "whole":

> … System-theoretical approaches include general system theory (in the narrower sense), cybernetics, theory of automata, control theory, information theory, set, graph and network theory, relational mathematics, game decision theory, computerization and simulation, and so forth. The somewhat loose term "approaches" is used deliberately because the list contains rather different things, for example, models (such as those of open system, feedback, logical automaton), mathematical techniques (e.g., theory of differential equations, computer methods, set, graph theory), and newly formed concepts or parameters (information, rational game, decision, etc.). These approaches concur, however, in that, in one way or the other, they relate to "system problems," that is, problems of interrelations within the superordinate "whole."

Both social network theory and reflexive legal theory share origins in general systems theory and dynamic systems theory. Both social networks and legal systems are structured to adapt to communications or feedback both internally and externally from the environment in which they function. Both are complex, self-organizing subsystems in a continual state of flux, adaption and evolution within the superordinate whole of society.

3.2 Complex dynamic systems

von Bertalanffy (1972:418) explained "dynamic system theory" as the study of changes of systems in time, from stable states at near equilibrium to unstable states that followed perturbations, and he posed that dynamical system theory had an apparent relation to control theory: "control means essentially that a system which is not asymptomatically stable is made so by a controller, counteracting the motion of a system away from the stable state. For this reason, the theory of stability in internal description or dynamical system theory converges with the system of (linear) control or feedback systems in external description."

3.3 SES theory

Social networks, and the society from which they emerge, are inextricably linked to the natural biophysical environment, specific natural resources and ecosystem services that support them (Kay and Regier, 2000), creating complex SES. Human actions are embedded in these systems: for example, human survival is not possible without ecosystem provisioning services from land for food and shelter, air, water and energy.

According to Folke et al. (2005:443) the term "social-ecological system" is used "to emphasize the integrated concept of humans in nature and to stress that the delineation between social and ecological systems is artificial and arbitrary." Researchers suggest that SES have powerful reciprocal feedbacks and act as self-organizing, adaptive systems (Costanza, et al., 2001; Gunderson and Holling, 2002; Berkes and Colding, 2003; Janssen et al., 2006; Waltner-Toews and Kay, 2005).

A SES was defined by Redman et al. (2004:163), as follows:

1. a coherent system of biophysical and social factors that regularly interact in a resilient, sustained manner;
2. a system that is defined at several spatial, temporal, and organizational scales, which may be hierarchically linked;
3. a set of critical resources (natural, socioeconomic, and cultural) whose flow and use is regulated by a combination of ecological and social systems; and
2. a perpetually dynamic, complex system with continuous adaption. (Original references deleted).

Redman et al. (2004:161-2) explained that "humans are an integral part of virtually all ecosystems," claiming an "urgent need to construct new approaches that emphasize an integrated framework….to increase the understanding of the interrelationships and reciprocal impacts of natural ecosystems and human systems with the aim of better informing environmental policy."

3.4 The Region as a complex, dynamic SES

Alberta's current regulatory land use and natural resource management systems do not reflect an understanding that the Region is a complex SES characterized by inherent "change, uncertainty, and surprise" (Redman et al., 2004:164; Gunderson et al., 2010; Bodin and Crona, 2009; Walker et al., 2006; Berkes and Colding, 2003; Gunderson and Holling, 2002). For example, municipal land use bylaws perpetuate land use patterns that fragment the structural and functional connectivity of regional-scale landscapes necessary for flows of water, air and biodiversity, with social networks for communication, mobility and trade, thereby ignoring temporal dissipative processes of both society and the ecosystem (Waltner-Toews and Kay, 2005). The June 2013 flood in the Bow River Basin shocked the Region (WaterSmart, 2013): the provincial and local governments' collective

failure to prepare for floods illustrates the critical need to operationalize[13] the Region's social-ecological interface or coupled human and natural systems (CHANS) (Lui et al., 2007).

A major challenge to design institutional arrangements to operationalize CHANs, such as adaptive management and co-management through collaboration and social learning (Ruhl and Fischman, 2010; Pahl-Wostl, 2009; 2006; Pahl-Wostl et al., 2007; 2008; Schultz, 2009; Schultz et al., 2007; Armitage et al., 2007; Olsson et al., 2006; 2004; Fiorino, 2006; 2001; Ruhl, 2005; Paquet, 1999) is to identify and consider the critical couplings between the social and ecological. Specialists may be adept at focusing on specific elements of the social or the ecological, but there is far less expertise at understanding the interface between the two (Westley et al., 2002). Understanding that interface and operationalizing CHANS in the Region are critical next steps (Tyler and Quinn, 2010).

3.5 Operationalizing critical CHANS

Redman et al., (2004:161) emphasized: "It is no longer tenable to study ecological and social systems in isolation from one another," because social networks are inextricably linked to natural systems (Kay and Regier, 2000) creating complex, dynamic CHANS (Lui et al., 2007). Core areas of study by Redman, et al. (2004) were "long term dynamics of ecological systems" including both "ecological drivers" and "drivers associated with human activities." Redman et al. (2004) started with the landscape in its current state, with a look backward to examine both social and ecological changes to date, and with a look forward to recommend responses to those changes and recognizable trends in critical CHANS. They found that a social system is comprised of social institutions, social circles, and social order, and is spatially, temporally and culturally

[13] "Operationalize" means to express or define (something) in terms of the operations used to determine or prove it.

framed, and therefore complex. Redman et al.'s (2004) research remains relevant to operationalizing CHANS.

Tyler and Quinn (2010:75) posed that, "management of (SES) begs a set of fundamental questions," including "what exactly is to be managed?" Without basic conceptualization of critical CHANS within a SES, people cannot communicate or frame normative expectations about human interactions within them (Westley et al., 2002). At a municipal scale, land use decision-makers and citizens alike need to understand when refinement of "mental models, management practices and institutions" (Schultz, 2009:19) are required to respond to SES dynamics. Further, they need to understand the best scale to locate, monitor, and manage critical CHANS for resilience (Walker and Salt, 2012; 2006).

By reviewing the literature, the author identified three challenges to identifying critical CHANS in the Region, summarized as follows: 1) the importance of the emergent properties of critical CHANS; 2) the variety of methodology; and 3) the Region's entrenched mental model.

3.5.1 The importance of the emergent properties of CHANs

Lui et al. (2007:641) explained that: "Coupled human and natural systems exhibit many emergent properties, unique properties not belonging to human or natural systems separately but emerging from the interactions between them." Emergent phenomena that exhibit these properties are distinct from the original social and ecological interaction, and cannot be predicted in advance. Emergent properties that make identification of critical CHANs challenging may be framed as system complexity, dynamics, scales and levels of interactions, and system transformations.

Walker et al. (2006:13) discussed emergent properties inherent in SES as a "handful of heuristics": the *adaptive cycle* that changes SES structures and functions; *panarchy,* where nonlinearities arise from processes and structures interacting across scales and levels; *resilience*, that diminishes when thresholds are exceeded and system feedbacks lead to changes in SES function and structure; *adaptability,* "the capacity of actors in a system to manage resilience" e.g. humans can use foresight and deliberate action to

intervene; and *transformability*, wherein a system transforms to an entirely new state when the existing system is untenable. These emergent properties challenge operationalization of critical CHANS, which is exacerbated when researchers use various identification methodologies.

3.5.2. Methods for dealing with CHANS

Varying methodologies make it difficult to identify critical CHANs from study to study, and processes used in one study may not apply in the next. Three methodologies are considered, as follows: a) looking for patterns and processes on landscapes; b) looking for human influences that transform landscapes; and c) looking for structural and functional relationships that define social-ecological relationships on the landscape, or a social-spatial network approach (Tyler and Quinn, 2013).

a) Looking for patterns and processes

Redman et al. (2004:164) conceptualized SES as "interactions at the interface of the system's social and ecological components" and identified five couplings where *patterns and processes* might be monitored for adaptive management over time, as follows:

1. Land-use decisions, especially those relating to the built environment;
2. Changes in land-cover, land surface, and biodiversity;
3. Production systems;
4. Consumption patterns; and
5. Disposal networks.

With these CHANs in mind, Redman et al, (2004) identified well-known ecological and social patterns and processes, and created a framework for researching SES which involved collecting background information about external conditions to the SES; describing and monitoring patterns and processes that drive the system; and investigating and monitoring interactions resulting from the patterns and processes observed (Redman et al., 2004:165). The complexity of Redman et al.'s (2004) SES framework was further complicated by the need for multi-scale approaches because both ecological and social processes operate at different scales, and connect across scales. While Redman et al.'s (2004) framework has been reviewed by other researchers, it has

not been adopted in local land use or regional-scale natural resource management systems in Alberta or Canada.

More recently, Bourgeron et al. (2009: 185) developed methodology for "regional analysis of social-ecological systems" or "RASE." As Bourgeron et al. (2009:185) stated:

> The process of regional analysis of socio-ecological systems (RASE) has evolved in the last 20 years to provide a comprehensive description of the ecosystem patterns, processes and functions, including relevant social and political factors, needed to synthesize our knowledge of coupled natural-human systems, or social-ecological systems and the interactions among their components. (References in original omitted.)

Similar to Redman et al.'s (2004) complex system of data collection, mapping, integration and interpretation processes, the identification of critical CHANS emerged through RASE processes, explained by Bourgeron et al. (2009:188), as follows:

> Knowledge about SES in a region is needed in five areas to conduct RASE: (1) characterization of biological component(s); (2) characterization of physical components; (3) characterization of biological-physical interactions; (4) characterization of social components; and (5) characterization of SES as a whole, including coupling of components and system properties, such as disturbances and resilience. This knowledge is acquired via the analysis and interpretation of hierarchical databases and maps that describe biophysical environments and the current and historical status of biological and human ecosystem components (*e.g.* individual species, vegetation, road density, etc.
>
> Information integration involves a threefold challenge: (1) integrating information about different kinds of attributes, *i.e.* across domains (*e.g.* integrating geomorphology and human values concerning the environment); (2) integrating information across different sources (*e.g.* scientific surveys and administrative records); and (3) integrating information across different formats (*e.g.* qualitative and quantitative surveys). (References in original omitted.)

While hypothetical, the RASE approach "has regional to local cross-scalar application" (Tyler and Quinn 2013:178), which is important because a SES "functions as a nested, hierarchical structure, with processes clustered within subsystems at several scales" (Walker et al., 2002:20). The RASE approach to identifying critical CHANS incorporates inter-disciplinary monitoring and adaptive management as one of four

iterative, dynamic phases. As such, RASE addresses emergent properties of critical CHANS, which requires iterative processes of data collection, mapping, interpretation, and scenario planning for managing the SES for desired outcomes at both the local and regional-scales. RASE is process-oriented, built on best-available knowledge, feedbacks in the SES, and changing normative expectations over time. RASE would provide a good framework for identifying and operationalizing critical CHANS in required cross-scalar assessments for land-use decision-making.

The RASE approach provides opportunities for social learning and co-creation of knowledge required for transformation of land use and natural resource management systems in the Region, however, it is posited that RASE would be difficult to implement in the Region with its current environmental legal system and mental model, and it is a very expensive enterprise, in terms of time, energy spent, expertise and monetary expenditures over time.

b) Looking for human influences that transform landscapes

Lui et al. (2007: 643) cautioned: "Over the past 50 years, humans have changed ecosystems more than in any other period of human history and have rapidly increased ecological footprints, and these impacts have been projected to grow by about 2% per year between 2001 and 2015." Trombulak et al. (2010) used the "Global Human Footprint" (Sanderson, 2002) as a conservation planning tool to *assess human influences* that transform landscapes. They used ten datasets to represent four categories of human influence to assess whether the Northern Appalachian/Acadian Ecoregion landscape had been transformed. Human influences included 1) human settlement; 2) human access; 3) human land use; and 4) energy infrastructure, such as utility corridors. Assessment results were used to develop "scenarios" for planning the preferred future development for the eco-region. Like Redman's SES framework, and RASE, the Global Human Footprint's categories of human influence have not been widely applied in Canada to identify critical CHANS.

c) Looking for structural and functional relationships

In 2006, Tyler and Quinn (2010) began framing a "social-spatial approach" to regional land-use planning for the CRP. Tyler and Quinn (2010:74) discovered that "thinking about land-use in the Calgary region literally means thinking about water." They found a structural hole in policy development, regulation, and management practices that integrate land use and water management in the Region, concluding that the "spatial dimensions of *structural and functional couplings* in [SES] need to be incorporated into land-use and development patterns at the regional landscape level." In 2013, Tyler and Quinn (2013:183-84) applied network theory and analysis (Janssen et al., 2006; Bodin and Prell, 2011; Bodin and Crona; 2009) looking for social-ecohydrological connections, and identified two critical CHANs in the Region: first, the withdrawal of water for domestic, agricultural and industrial purposes in the regional hydrological cycle; and second, the link between ecohydrology and land use. They used "connectivity as a tool to illustrate the essential nexus of [SES] processes" (Tyler and Quinn, 2013:185), and employed a "method to explore the structural and functional connectivity of the Calgary regional landscape based on the intersection of anthropocentric infrastructure or human "footprint" with the natural features in a GIS environment." However, identifying critical CHANS through social-spatial network approaches is complicated by issues of scale (Ernston et al., 2010). Lui et al. (2007:645): explained that:

> the new approach to studying CHANS (coupled human and natural systems) integrates methods at multiple scales and continually evaluates how small-scale phenomena are embedded in broad-scale processes and how broad-scale phenomena emerge from and influence the small-scale structure and functioning of CHANS. Understanding even the most local human-nature interactions requires ''progressive contextualization'' in which local actions are understood in terms of landscape, regional, and national factors, which in turn depend on global forces.

No matter what methods researchers employ to identify critical CHANS in the Region, their work is made challenging by the Region's entrenched neo-liberal mental model.

3.5.3 Viewing the Region in a CHANS framework

The author posited that how people in the Region, including elected municipal officials and staff understand the CHANS concept affects their willingness to engage in social learning processes (Pahl-Wostl et al., 2007; 2008) for transformation in land use and natural resource management. It was only about 140 years ago that the Canadian Pacific Railway opened up the Region to European settlers, and pioneers imported a neo-liberal mental model which includes the anthropocentric perspective that nature exists for human exploitation. This mental model connects people to nature only insofar as nature provides resources, and people are resource owners, users, and stewards with legally protected rights and entitlements. Historically, this ideology has pervaded Alberta's environmental regulation and management system. Environmental regulation has largely been viewed as "a paradigm based on planning for efficiency, standardizing for greater social control, and reducing variability" and "environmental problems are framed as technical and administrative challenges devoid of politics" (Lebel et al., 2006:19).

Social learning processes are necessary for transforming this mental model to one where people in the Region see themselves as integral components of the SES, and understand how they are co-evolving, co-managing and adapting with ecosystem processes over time (Biggs et al., 2102; Pahl-Wostl, 2009). It is posited that until that happens, normative expectations about social interactions in ecosystem processes are not likely to change. Rather than identifying critical CHANS that need to be managed through adaptive co-management and new forms of social-political governance, the author posits that people will continue to protect entitlements to exploit what they own. The author believes that unless the Region's historical mental model changes, identifying critical CHANS will not be incorporated into regional land use and environmental management systems.

This is exemplified in the most recent Alberta Integrated Resource Management System (IRMS) information found on the government website for the oilsands (Government of Alberta, 2015c) which perpetuates a "rights-based" approach to environmental regulation and management, as follows:

Property Rights

As government makes long-term development decisions, we must be certain that Albertans feel that their property rights are respected. We must strive to find a fair balance between respecting and upholding the individual rights of Albertans and the need for developments that will benefit the public as a whole.

With this in mind, government continues to make property rights a priority. We are establishing a Property Rights Advocate Office to work closely with landowners, industry and expropriating authorities on property rights issues and in supporting landowners.

3.5.4 Operationalizing a CHANS approach

The author posited that network theory and SNA offered opportunities to operationalize a CHANS approach in adaptive management and co-management in the Region. Network theory provides a "uniform language with which to describe complex systems in terms of nodes and links" (Janssen et al., 2006:15). Nodes in a network can represent both human and ecological actors, and links represent relationships between them. Network analysis enables a researcher to better understand the structure of a CHANS and functionally identify strong connections and structural holes. Janssen et al. (2006:21) explained how network theory and analysis could be used to assess resilience of CHANS and inform adaptive co-management through new social-political forms of governance. They provided three "archetypical social-ecological networks" that could be explored to identify regional scale CHANS:

- ecosystem networks that are connected to people via information and physical flows;
- ecosystem networks that are disconnected and fragmented by people; and
- ecosystem networks that connect people.

Janssen et al. (2006:18) claimed that "by using just connectivity and centrality (network measures) we can capture the essential functional implications for the resilience of the structure of a given social-ecological network." Adaptive management and co-management (Armitage et al., 2007; Folke et al., 2005), and resilience thinking and practice (Walker and Salt, 2012; 2006) are two opportunities found in the literature to resolve identified functional and structural holes or SES network holes.

Tyler and Quinn (2013:188) applied the network theory and analysis approach (social-spatial approach) to identify two couplings in the Region and concluded that the "interface of human water use and regional ecohydrology is a critical system coupling." In effect, the Region, which includes a large part of the Bow River watershed, provides all three ecosystem network types identified by Janssen et al. (2006): it is connected to people via physical flows; it has been reconfigured dramatically by hydropower and irrigation networks; and it connects people throughout the Region, as discovered during the 2013 flood (WaterSmart, 2013). As SNA is refined to inform environmental governance and management systems (Bodin and Prell, 2011; Rathwell and Petersen, 2012) social networks may be substituted for ecosystem networks in Janssen et al.'s (2006) framework to identify critical CHANS, for example:

- social networks that are connected to ecosystems via information and physical flows;
- social networks that are disconnected and fragmented by ecosystems; and
- social networks that connect ecosystems.

The author posited that the social networks of the environmental governance organizations in the Region could be explored to determine whether they were structured and functioning as bridging organizations, brokering information and physical flows of people, resources, trade etc. that were critically coupled to the ecosystem. Those internal and external relationships among municipalities, CRP, BRBC and CRAZ might be creating appropriate social networks that are structured and functioning at appropriate scales and levels of human interaction within the regional-scale ecosystem to identify critical CHANs. It might be possible to manage critical CHANS within the existing regulatory system in the Region if legitimizing processes were put in place to support the work of bridging organizations.

To understand how to identify, govern and manage critical CHANS in the Region, a greater understanding of the complex, dynamic interactions among actors in the social networks of municipalities, CRP, BRBC and CRAZ became necessary: those actors and their interactions were creating the social-political environmental governance and

management system that was embedded in, and responsive to the evolving SES. In turn, feedback from the ecosystem was driving various stakeholders to the environmental governance organizations to solve emergent complex resource governance and management issues at the regional-scale where no provincial or municipal laws or bylaws existed. But, the organizations were not necessarily working together and creating resource management plans that reflected an understanding of critical CHANS and the interconnectness of society and all components of the ecosystem.

It became increasingly important to understand the environmental governance and management system as a whole and determine where social network collaborations were occurring cross-specific resource management system, cross-jurisdictions and cross-scales in order to identify and manage critical CHANS in the Region.

Chapter 4:
Bridging Organizations and Strategic Bridging Functions

4.1 Defining characteristics and functions of bridging organizations

In this chapter, the defining characteristics of bridging organizations are presented along with identified strategic bridging (Reid, 2006; 2004) and "brokerage" functions (de Nooy et al., 2011:173). Researchers link bridging organizations with improved environmental governance because they increase information and resource flows and innovation between previously unconnected network actors (Crona and Parker, 2012; Bodin and Prell, 2011; Crona and Hubacek, 2010; Newig et al., 2010; Bodin and Crona, 2009; Berkes, 2009; Olsson et al., 2007; 2006; 2004a; 2004b; Schultz et al. 2007; Ayles et al. 2007; Eamer, 2006; Hahn et al., 2006). Information and knowledge, values, power and influence are brokered mainly through network actors who perform "gatekeeper" and "representative" brokerage functions (de Nooy et al., 2011) in the network periphery, enabling the network as a whole to function as a bridge.

The concept of bridging organizations and the "strategic bridging functions" they perform (Reid, 2006; 2004) was originally conceptualized by Brown (1983; 1991) when studying conflict between interacting organizations. Westley and Vredenburg (1991) expanded on the concept in the context of social innovations and multi-sector collaborations, and created a framework of strategic bridging functions that was used by others in multi-sector collaboration studies in Africa and Asia (Sharma et al, 1994; Ashman et al., 1998;) in other contexts of international development (Brown and Ashman, 1999), and refugee assistance (Lawrence and Hardy, 1999).

Reid (2004:48) discovered that Westley and Vredenburg's (1991) "framework for strategic bridging" had been expanded upon by Sharma et al. (1994); Brown and Ashman (1999); and Lawrence and Hardy (1999), and he compiled the different strategic bridging frameworks, listing the "purposes of the bridges," as nine distinct functions, paraphrased below:

- to maintain the status quo of an arrangement;
- for problem solving and transformation;

- to facilitate collective action;
- to facilitate capacity building;
- to increase impact or autonomy;
- to gain legitimacy or resources;
- to mediate norms among actors;
- to develop compromises; and
- to support activists voices in negotiations with dominant actors.

The concept of bridging organizations and strategic bridging functions continues to evolve with better understanding of organizational structure through SNA (Wasserman and Faust, 1994; de Nooy et al., 2011). Using SNA, Crona and Parker (2012:34) provided a working definition of bridging organizations (see Chapter 1) that clarifies that a bridging organization must be formalized to the degree necessary to support its own personnel and resources to sustain its bridging functions. It must develop a "strategic bridging process" to link and "seek to integrate" parties who would otherwise not be connected to the network. The bridging process is not incidental or contingent, but is the organization's primary objective or strategy to achieve its objectives. As noted by Crona and Parker (2012), the bridging function can be performed by individuals and informal groups, but it is the degree of formalization that an organization undergoes to achieve the bridging function and the degree of interpenetration between the actors in the organization that distinguishes it as a bridging organization from an *ad hoc* group of social actors. Crona and Parker (2012:33) provided that not all multi-actor collaborations in an environmental governance context are designed to perform the bridging function:

> Westley and Vredenburg (1991) came closest by attempting to delineate the bridging role from other types of multiparty collaborations, such as roundtables and task forces, joint ventures, and strategic alliances *on the basis of the degree of interpenetration between actors involved.* They contend that "bridging is characterized by the presence of a third party [the bridging organization], which is historically separate and distinct in terms of resources and personnel from the 'island' organizations *it seeks to link*" (Westley and Vredenburg 1991:68). (Italics added.)

Bridging organizations are third parties to the organizations they intend to connect to a network. They may have varying levels of stakeholder diversity, but there should be a high degree of "interpenetration" among their stakeholders. Crona and Parker (2012:34) concluded that:

> The goal of bridging organizations in adaptive environmental governance is principally to provide an arena for learning as well as a space where trust building and conflict resolution can be achieved and where bridges can be built between science, other forms of knowledge, government, and nongovernmental actors.

The "production of public purpose" within formalized governance networks is a critical aspect of their organization, as stated in their incorporation bylaws, vision, mission, objectives and strategies. However, the bridging function is not usually stated in formation documents as a critical function, nor as an objective or strategy to achieve objectives. While CRP, BRBC and CRAZ perform bridging functions, they were not necessarily constituted to achieve those functions: actors in those organizations may not understand or value the bridging function they perform while achieving other stated objectives. Table 4.1 below summarizes defining criteria for bridging organizations.

Table 4.1: Criteria that define a bridging organization

Organizational Structure	Membership	Primary Objective	Goals
Formalized organization with own resources and personnel	Varying levels of stakeholder diversity with high degree of actor interpenetration	Develop a strategic bridging process to connect otherwise unconnected actors to a network Third party to those it seeks to connect	1. Provide an arena for: • Learning • Co-creation of knowledge • Building trust • Conflict resolution 2. Act as facilitators, mediators, and negotiators 3. Attract expertise, knowledge, and resources.

Source: Judy Stewart, September, 2014, based on Crona and Parker (2012).

When discussing resilience thinking and practice applied to environmental governance, Walter and Salt (2012: 2006) stated that:

> Bridging organizations play crucial roles in natural resource governance: they build local institutions; horizontal linkages; vertical linkages; and increase public

> education and innovations. They mediate connections between otherwise unconnected actors, attract new knowledge and resources from outside the natural resource management system required for social learning and transformation, and, in doing so, increase the system's adaptability and resilience.

Rathwell and Peterson (2012) researched the role bridging organizations played in improving municipal participation in water management activities in the Montégérie region of Quebec. In that region, government and non-government organizations were investing in developing bridging organizations to connect stakeholders in the watersheds for collaborative governance activities. Rathwell and Peterson (2012:1) hypothesized that in "a mediating position, bridging organizations can facilitate coordinated and consistent management action between actors/actor groups who lack resources, mandates, or interest in connecting directly with each other." Rathwell and Peterson's (2012:2) research "made explicit connections between social network structures and the ecological landscape managed by municipalities in the region," and considered "to what extent [municipalities] engage[d] in municipal water management activities and they collaborate[d] with each other and bridging organizations in social networks to manage water." The analysis of the social-ecological landscape allowed Rathwell and Peterson (2012:2) to understand "how the region's social network shape, and in turn are shaped by the social-ecological landscape within which they are embedded."

Rathwell and Peterson (2012) discovered that bridging organizations did connect some amenity-based (or urban/ tourist) municipalities in water management activities, where the local governments had high investment in tourism. There were few direct links among municipalities with respect to joint or coordinated water management activities. They discovered little or no coordination among the agricultural-based municipalities (rural producers), which in three cases had no links at all to any other municipality or bridging organization in the region. Amenity-based municipalities were more likely to have links to bridging organizations and to be influenced by them to pursue water management activities than were agriculture-based municipalities. Rathwell and Peterson (2012:6) discovered that the activities of twenty bridging organizations in the study were "spatially clustered" and that seven of the twenty

organizations provided over half of the connections. The results demonstrated that the lack of coordinated water management activities in the Montégérie region of Quebec is predictable given the lack of bridging organizations with connections cross-scale and cross-sector and the lack of trust between those in municipal government and provincial government. Rathwell and Peterson (2012:11) summarized that:

- where links did exist between municipalities with respect to water management, that municipal water management activities were not spatially clustered;
- bridging organizations did not work within agricultural municipalities who tended to pollute water with pesticides and fertilizers;
- some agriculture-based municipalities did not engage in any water quality management activities;
- water management activities are highly correlated with collaborative ties and suggest improving water management collaborations could yield further improvements in water quality.

An environmental governance network may have a social network structure that makes it possible for it to perform strategic bridging functions and facilitate municipal collaboration and increased municipal participation in environmental management activities (Rathwell and Peterson, 2012).

4.2 SNA in environmental governance

SNA was identified as a method for identifying the membership and structure of social network relationships within and among environmental management organizations performing strategic functions as bridging organizations in the Region. The results of this application and analysis are presented in detail in Chapter 6. Wasserman and Faust (1994:3) said that SNA focuses on "relationships among social entities, and on the patterns and implications of those relationships," which reveals the network's structure. Janssen et al. (2006:2) added that SNA "provides methodology for understanding the structure of a system based on graph theory and statistics." Graphs, such as sociometric matrices or sociograms (Wasserman and Faust, 1994; de Nooy et al., 2011) make social network structures visible. Actors are represented as vertices (nodes) and their relationships to other actors are represented as lines (ties) between vertices (de Nooy, 2011:7). Generally, the shorter a line is between two vertices, the closer the relationship.

In 2009, Bodin and Crona (2009: 367) maintained that SNA enables discovery of how "different stakeholders have come together to effectively deal with natural resource problems and dilemmas." Armitage et al. (2012:139) explained that the "importance of social networks, defined as groups of actors linked by repeated interactions allowing information and resource sharing, competition, and cooperation over time has been broadly recognized in the work on development and natural resource governance."

An actor's position in a social network and the actor's "ego-network" (de Nooy, 2011) or relationships with other network actors determines how successful he or she will be in accessing and disseminating information, resources, influence, and power. Literature on social capital addressed the linking aspect or connectedness and emphasizes the importance of norms and networks for enabling people to act collectively, and differentiates between bonding (strong) and bridging (weak) links or ties.

According to Olsson et al. (2007:30) the concept of "weak ties" and "bridges" in social networks arose from "social capital" research, originating in 1973 with Granovetter's classic monograph, *The Strength of Weak Ties*." Granovetter (1973: 1370-71) hypothesized that networks composed of bridging or weak links to a diverse web of resources could strengthen a community's ability to adapt to change, but networks composed only of local bonding or strong links, which impose constraining social norms and foster group homophily, can reduce adaptability. He argued that weak ties, i.e. the bridges between different stakeholder groups, may be the most valuable for generating new knowledge and identifying new opportunities, and thus create a macro effect: "those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive." (References in original omitted.)

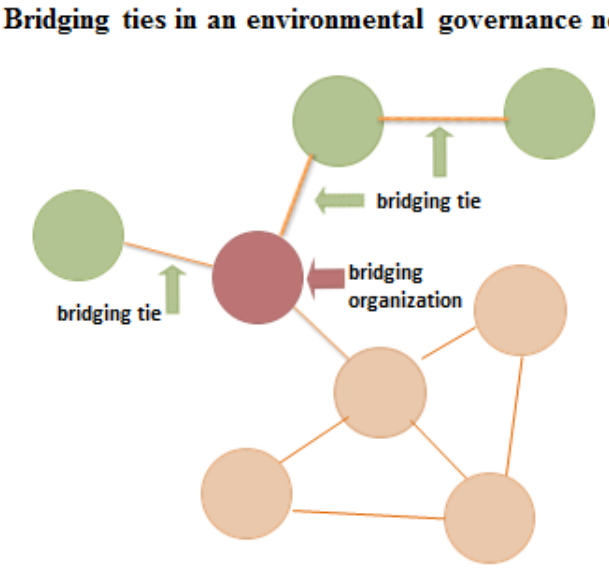
de Nooy et al., (2011:162) defined a network bridge or weak tie as a "line whose removal increases the number of components in a network." If a relationship deteriorates, the network structure is affected. The removal of certain vertexes (nodes) in a network has the same effect. A vertex whose removal increases the number of components in a network is called a cut-vertex. A cut-vertex is crucial for the flow of information between

central actors in a network's core and weakly connected members in the periphery. If an actor in the position of a cut-vertex leaves the network, and bridging or weak ties are broken, the network will deteriorate into several unconnected components, disrupting the flow of information from the core to the periphery, and the from the periphery back to the core.

Cut-vertices and bridging or weak ties are crucial to brokerage of information and diffusion of innovations necessary for social learning required to transform how municipalities in the Region participate in the Activities. de Nooy et al. (2011:173) explained that "an opportunity to broker depends not only on the position of people in the network but also on their group affiliation." An actor that represents an organization (has a group affiliation) in the position of a cut-vertex may have an extensive affiliated ego-network and act as a knowledge broker to others who would otherwise not be connected. Rathwell and Petersen (2012) refer to these types of organizations as bridging organizations within networks. Their position in a network makes them invaluable for brokering information both to and from the network.

A network, as a whole may function as a bridging organization, forming bridging or weak ties between the Province and municipalities, and providing a forum where governments can link up with or develop trusting relationships with industry, environmental groups, etc. Without networks functioning as bridging organizations, the environmental governance and management system in the Region would break into several different components, or silos, for example, government, industry, environmental groups, etc., as illustrated in Figure 4.1 below.

Figure 4.1: An environmental governance network with a bridging organization that is positioned as a cut-vertex. If the bridging organization leaves the governance network, it will break into three disconnected components.



Source: Judy Stewart, May, 2014.

An actor may play up to five different "brokerage roles" in a network: a coordinator; an itinerant broker; a representative; a gatekeeper; and a liaison (de Nooy, et al., 2011:174). In a directed network, where the direction of information flow is made visible, each of these brokerage roles is identifiable as a pattern of relationships, paraphrased below from de Nooy et al. (2011:174):

- ***Coordinator****:* a mediator who is a member of the group;
- ***Gatekeeper*****:** regulates the flow of information and resources **<u>to</u>** his/her own group;
- ***Itinerant broker****:* two members of a group use a mediator from outside;
- ***Liaisons:*** mediates between members of different groups but does not belong to groups; and
- ***Representative:*** Regulates the flow of information and resources **<u>from</u>** his/her own group.

Playing the role of coordinator, a broker will act as a mediator between network actors. An itinerant broker is a mediator brought in from outside the core to mediate between two network actors, or between two components in a network. A gatekeeper regulates the flow of information in to the network from the environment. A liaison mediates between members of two different groups in a network, for example, BRBC and CRP, but does not belong to either of them. A representative regulates the flow of information from the network out to the environment. Brokers in any of these roles gain influence and power by controlling the flow of information and resources. They may also see opportunities to broker information and the co-created knowledge and values of the network, and use the position of power and influence for personal gain.

4.3 The environmental governance organizations as brokers and bridging organizations

Based on information provided on their websites and the author's personal knowledge of the three environmental governance organizations in the Region, it is posited that they play a crucial role in environmental policy development in the Region: they accomplish this through multi-stakeholder collaborations based on relationships of trust and shared values. They bridge the environmental policy gap between provincial and municipal governments at the regional-scale, and co-create natural resource management plans and prepare practice guidelines for their members. Through written submissions to the Province and municipal members, such as the City of Calgary they make recommendations for provincial and municipal policies, laws, regulations, codes of practice, and standards that are sometimes adopted by provincial and municipal land use, water use and air quality decision-makers. Further, it is posited that they provide strategic bridging functions as brokers of a) information and knowledge; b) values; and c) power and influence.

4.3.1 Brokers of information and knowledge

The organizations act as knowledge brokers, providing opportunities for information sharing, co-generation of knowledge, development of shared values and norms, creation of management plan objectives and strategies, monitoring, policy

development, and sometimes mediating between stakeholders in the Region. Annual general meetings, workshops, committee projects and programs bring stakeholders together to work through complex resource management issues. For example, BRBC holds a quarterly forum where emergent information and knowledge are shared about water management technology, water and watershed management planning and implementation, watershed stewardship activities, and new provincial-scale policy and legislation. CRP and CRAZ hold annual general meetings with guest speakers where the general membership of the organizations is invited to learn about programs and projects and ongoing operations of the organizations. Both BRBC and CRAZ have standing committees for communications, policy development and technical advancement. Generally, the organizations can be said to broker "knowledge, expertise, and the willingness [and] possibilities for negotiation, conflict resolution, collaboration, and coordinated actions among various stakeholders" (Bodin and Prell, 2011:6; Folke et al., 2005).

4.3.2 Brokers of values

The organizations provide spaces and resources to mediate between values, negotiate desired outcomes, create agreed upon management scenarios, and reach consensus on strategies to improve regional-scale natural resource management. Shared regional-scale community values emerge from relationships built on communication and trust. For example, a subcommittee of BRBC was invited by the Province to participate in developing the water conservation objective during the creation of the *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)* (Government of Alberta, 2004). The water conservation objective was arrived at through complex negotiations and trade-offs, founded on shared community values of the BRBC subcommittee members. All the organizations use consensus decision making processes to develop shared values and desired outcomes, and approaches for natural resource management that reflect those shared values and outcomes.

4.3.3 Brokers of power and influence

The organizations influence both provincial and municipal government policy and decision-making through interactions, presentations, and written submissions. They play crucial roles in social learning and system transformation by connecting people and organizations to provincial and municipal decision-makers: for example, the SSRP does reflect some of the shared community values for regional scale land use, watershed, and airshed management as developed in the co-created natural resource management plans. CRAZ' written submission during provincial consultations with the Province on SSRP about air quality management was largely incorporated into the regional plan (Government of Alberta, 2014:53).

4.4 The role of the environmental governance organizations in social learning

Social learning was defined by Schusler et al. (2003:311) as "learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action." It is posited that social learning could help to bring about systemic transformation in how municipalities throughout the Region regulate and control human activities that may negatively impact the ecosystem. That is because when the organizations function as bridging organizations, they increase social learning and potentially influence increased participation in environmental management activities. Chapter 6 provides a detailed review of how municipalities in the Region participate in thirty identified natural resource management Activities.

Bourgeron et al. (2009) suggested that a transformation in municipal land use regulation was required, because local land use decisions affect regional SES. Without a transformation, municipal land uses will continue to fragment "the structural and functional connectivity" (Tyler and Quinn, 2013) of the Region's ecosystem. Bodin and Crona (2011:76) noted that:

> social networks largely provide the vehicle through which successful leaders spread their ideas, garner support, and ultimately move the system through a transformation. Hence, how the leaders are positioned within such networks becomes important since occupying favourable positions gives these individuals some means to exert influence.

de Nooy et al. (2011:139) said that social relations are "structures that allow for the exchange of information:"

> … social relations are considered channels that transport information, services, or goods between people and organizations. In this perspective, social structure helps explain how information, goods, or even attitudes and behavior diffuse within a social system. Network analysis reveals social structure and helps to trace the routes that goods and information may follow. **Some social structures permit rapid diffusion of information, whereas others contain sections that are difficult to reach.** (Emphasis added.)

Bodin and Crona (2011:76) stated that "being well connected or highly central within your own group of peers can be a good way to influence those close to you, but without links to other groups your ideas are unlikely to spread very far, and it is unlikely any great system transformation will be achieved." Identifying and building capacity for strategically positioned actors in social networks to increase information flows for social learning is positively correlated with improved natural resource governance and management systems (Rathwell and Petersen, 2012; Crona and Parker, 2012; Bodin and Prell, 2011).

The Region's Municipal Network remains largely unexplored. But, SNA is a tool to identify municipal actors who are structurally well-positioned in the organizations to broker information for social learning, and influence diffusion of innovations and knowledge to increase municipal participation in the Activities. Through SNA, it may be possible to determine if the organizations are structured to enable rapid diffusion of information throughout the Region, and contribute to social learning about environmental governance and management in the Region.

4.5 The legitimacy of the environmental governance organizations

Sandstrom et al. (2013: 61) studied the "impact of preexisting structures, social networks and governance strategies" on stakeholder acceptance (the legitimacy) of co-management processes in five coastal and marine areas in Sweden, and explained that:

> Legitimacy denotes the fairness, correctness or rightfulness of power relations and is considered a necessary prerequisite for effective institutions, as the difference between people accepting or objecting to the 'rules of the game'. It is a key concept in the study of institutions and natural resources, and studies on

> collaborative management commonly refer to it as the central factor affecting the collaborative performance. Legitimacy can be a matter of accepting the decision-making power in itself, the particular procedure of decision-making, or what is decided. (Original references omitted.)

First, Sandstrom et al. (2013:62) said that "[c]o-management processes could be perceived as networks, composed of actors that are connected through different types and strengths of relationship." Their first proposition was that "the institutional landscape and actors' experiences with previous processes affect stakeholder acceptance." Sandstrom et al. (2013: 61) tested four other propositions for legitimacy of network governance strategies for managing network structure, network substance, and network process. Sandstrom et al.'s (2013: 63) four propositions of strategies that affect stakeholder acceptance of co-management processes are listed below:

- Strategies to influence the diversity of actors involved in co-management…;
- Strategies aiming to influence the involvement and commitment of relevant government representatives in co-management…;
- Strategies to (re) frame the co-management process, so as to align with stakeholder goals and/or pre-existing organizational structures…; and
- Strategies to facilitate stakeholder interactions through organizational arrangements and process design…

According to Sandstrom et al. (2013:73) their empirical results demonstrate how "the past and the present institutional landscape set the underlying conditions and affect stakeholder acceptance of new co-management initiatives, and they say that "the results point to the critical function of network governance. In particular, the inclusion and commitment of formal government actors and deliberative efforts to reframe the process are critical factors." Sandstrom et al.'s (2013) conclusions are helpful in understanding how problems with legitimacy and stakeholder acceptance of co-created natural resource management plans have arisen in the Region.

CMP 2014, BRBC Watershed Management Plan Phase 1 and Phase II (BRBC Watershed Plans), and CRAZ' PM03 Plan were co-created by the organizations and could be questioned for democratic anchorage and legitimacy. The plans were crafted by self-selecting, self-organizing, and self-interested volunteers with no mandate or legal

authority provided through the pre-existing institutional landscape to participate in environmental governance or creation of natural resource management plans.

Alberta's legal institutions for formalizing as a legal entity include the traditional statutory regime that the organizations might explore to achieve their public purpose objectives, for example, the *Societies Act, Companies Act;* the *Partnership Act*; the *Business Corporations Act*; and the *Cooperatives Act*.[14] Alberta's MGA also enables formation of regional services commissions that allow municipalities to share management of some CHANS (Lui et al., 2007) like water and wastewater distribution systems that are better governed at a regional-scale. As well, in 2013, while research was underway, the MGA was amended to enable formation of growth management boards.[15] The Province deemed the Capital Region Board in the Edmonton region to be a growth management board under the enabling provisions while the dissertation was being written, but the Capital Region Board is the only such board in the Province in February, 2016. While the MGA now provides for legal institutional arrangements for structuring and legitimizing growth management boards and creation of growth plans, no legal institutions existed in 2014 when the research was finalized for regional-scale land use, watershed or airshed management plans in the Region.

It is posited by the author that Alberta's legislative or substantive legal system. and the recently adopted IRMS (Government of Alberta, 2015c), reflect a "liberal "political philosophy that Scharpf (2009:6) described in his discussion of legitimacy in the multilevel European polity, as follows:

> Here, priority is assigned to the individual rather than to the polity; the state is justified by the need to protect individual interests; and individual self-determination replaces the value of collective self-determination, What matters, once the state has established basic security, are strict limitations on its governing

[14] *Societies Act*, R.S.A. 2000, c. S-14; *Partnership Act*, R.S.A. 2000, c.P-3; *Companies Act*, R.S.A. 2000, c.C-21; *Business Corporations Act*; R.S.A. 2000, c.B-9; *Cooperatives Act*, S.A. 2001, c.C-28.1.
[15] MGA, *supra*, note 3, Part 17.1: ss. 708.01-708.15. Also see Stewart. J. 2015. Growth management boards support and legitimize voluntary governance networks, in the *Cochrane Times*, Tuesday, November 10, 2015: 42.

> powers in order to protect the fundamental value of "negative liberty," which – in the tradition of John Locke and Adam Smith – should be understood as the "freedom of pursuing our own good in our own way."

Within this liberal institutional framework for legalizing private organizations, CRP, BRBC, and CRAZ initially formed in the Region as informal arrangements among individuals, organizations, local governments, and the Province to address common natural resource management issues arising at the regional-scale. As noted, CRP chose to formalize as a loose association of municipalities under the *Companies Act*, and, to date in February, 2016, it has rejected becoming a growth management board under the new provisions of the MGA.

When BRBC and CRAZ formalized to share information, co-create knowledge, deliberate and plan, they institutionalized as "societies" under the *Societies Act*, without full consideration of the necessary constitution to achieve the public purpose objectives they set for themselves. In all cases, the formal institutional arrangements chosen by the organizations do not allow them to create wealth for their members or for future network operations, nor can they provide services to their members or others for profit. While the organizations are institutionalized pursuant to Alberta's legislative system for private organizations, and are therefore grounded in legal social organizational processes, the members of the organizations are not necessarily elected representatives. As such, they may be perceived as lacking the legitimacy to influence municipal implementation of the co-created plans. As voluntary networks they may lack "democratic anchorage" (Fotel et al., 2008; Sorensen and Torfing, 2010; Kooiman, 2000).

Sandstrom et al.'s (2013) research in Sweden supports Fotel et al.'s (2008:4) four criteria for determining democratic anchorage. These are presented as follows in Table 4.2 below, which compares the democratic anchorage of the CRP, BRBC and CRAZ.

Table 4.2: Democratic anchorage criteria comparing CRP, BRBC and CRAZ

Democratic anchorage criteria	CRP	BRBC	CRAZ
Controlled by democratically elected politician	Yes	No	No
Represent the membership basis of participating groups and organizations	Yes	Yes	Yes
Accountable to a territorially defined citizenry	Yes	No	No
Facilitate interaction in accordance with a commonly accepted democratic grammar of conduct	Yes	Yes	Yes

Source: Judy Stewart, September, 2014, based on Fotel et al., (2008:4).

While only CRP meets all the identified democratic anchorage criteria, BRBC and CRAZ meet two. However, both BRBC and CRAZ have membership to whom they are accountable within a defined and mapped "territory." All the organizations represent their membership and facilitate interaction according to "commonly accepted democratic grammar of conduct" in the liberal tradition, as prescribed in Alberta's *Companies Act* or the *Societies Act,* and through consensus decision making processes and protocols.

Fotel (2008:4) said that the criteria "re-invoke classical themes in liberal theories of democracy." However, Alberta's current legal system is the result of structural coupling with the political system (Luhmann, [1993] 2004) within what Sorensen and Torfing, (2005) described to be a traditional liberal democracy. The author posits that the Framework to provide reflexive legal processes for bridging organizations in regional-scale environmental governance and management should recognize the need for liberal democratic anchorage to stabilize the organizations' self-organizing and self-regulatory processes. Four reflexive legal processes that could anchor the environmental organizations in necessary stakeholder acceptance and democratic legitimacy are presented in more detail in Chapter 7.

Chapter 5:

Legal Pluralism and Reflexive Legal Theory in Regional-Scale Environmental Governance

5.1 The problem of legal pluralism in the Region

In the Region, the environmental governance organizations may be performing strategic bridging functions within nested processes of legal pluralism: an un-coordinated array of overlapping and sometimes conflicting policies, laws, regulations, bylaws, codes of practice, guidelines, operating protocols, negotiated rules, statutory planning documents, co-created management plans, etc.

Teubner (1983:125) explained that "legal pluralism is non-legalistic, non-hierarchical, and non-institutional. It focuses on a multitude of "legal orders" within one social field," for example, the field of environmental governance and management. Teubner (1983:119) referred to legal pluralism as being "at the same time both: social norms and legal rules, law and society, formal and informal, rule-oriented and spontaneous. And the relations between the legal and the social in legal pluralism are highly ambiguous, almost paradoxical: separate but intertwined; autonomous but interdependent, closed but open." (Emphasis in original.) Tamanaha (2008:375) explained that conflicts arise from legal pluralism, as follows:

> What makes this pluralism noteworthy is not merely the fact that there are multiple uncoordinated, coexisting or overlapping bodies of law, but that there is diversity amongst them. They may make competing claims of authority; they may impose conflicting demands or norms; they may have different styles and orientations. This potential conflict can generate uncertainty or jeopardy for individuals and groups in society who cannot be sure in advance which legal regime will be applied to their situation. This state of conflict also creates opportunities for individuals and groups within society, who can opportunistically select from among coexisting legal authorities to advance their aims. This state of conflict, moreover, poses a challenge to the legal authorities themselves, for it means that they have rivals. Law characteristically claims to rule whatever it addresses, but the fact of legal pluralism challenges this claim.

Luhmann ([1993] 2004) posed that the legal system is an autopoietic subsystem of society, that stabilizes normative expectations of society's subsystems, for example, politics; government; the economy; mass media; science; education, etc. (Nobles and

Schiff, 2013; 2006). According to Luhmann, ([1993] 2004), the legal system is operationally closed, but functionally open to the rest of society and structurally coupled to the political system: it draws a circle around itself and everything inside is "law," and everything outside is "not law." What is "not law" is the legal system's environment, which is society with all its perturbations that the legal system must address internally and respond and adapt to over time.

It is posited that new social-political arrangements for environmental governance, such as the environmental governance organizations in the Region operate at the nexus of law and politics, and bridge what is law and what is not law. These hybrid institutions for collaboration operate in oscillating spaces where legal pluralism dominates, but where no law is definitive. For example, to achieve the environmental management outcomes as stated in Water For Life, LUF, and *Clearing the Air: Alberta's Renewed Clear Air Strategy* (Government of Alberta, 2012 (Clearing the Air), the Province recommended collaboration and partnerships between all levels of government and non-government actors at a watershed or airshed scale. However, the Province did not require or recommend that the organizations in the Region adhere to or adopt the provincial policy or strategy documents when co-creating regional-scale natural resource management plans, even though provincial representatives are actively engaged in the organizations. The organizations rarely function as true "partners" or collaborators in any legal sense of the term with the Province. Rather, they function more like weak associations of actors that are constantly adapting and evolving as both society and the ecosystem adapt to SES feedback.

In the environmental governance organizations, local and provincial decision-makers are connected with those who benefit from licensed resource use and approved levels of substance releases into the environment, and other stakeholders who are affected by licensed uses or approvals. But, the organizations have no delegated authority to make rules or decisions about resource allocation, to enforce rules preventing resource degradation, or to resolve conflicts. At best, they advise the Province about emergent environmental management issues and propose strategies to address them. They co-create

resource management plans, monitor the state of the resource, and periodically report their findings to their own stakeholders. Their operations "do not rest on recourse to the authority or sanctions of government," and, as such reflect Stoker's (1998:17) five governance propositions presented in Chapter 2. However, the organizations are grounded in legality as legal entities formalized through provincial statutes and statutory processes, and they must function within legal pluralism as described by Teubner (1983: 119) when engaged in environmental governance and management in the Region.

5.2 Emergence of reflexive law

Recently, Walter and Salt (2012; 2006) acknowledged that society is a complex, dynamic system of communications and interrelationships. In the 1980s, Teubner (1983) framed reflexive law as an emergent form of legal proceduralism necessary to support complex dynamic systems as they respond to communications or feedbacks that drive system adaption and evolution over time. Teubner's (1983:241-242) reflexive legal theory emerged from an analysis of "evolutionary approaches to explaining changes in law and society" promoted from 1974 to1982 in both the US and Europe's by social-legal theorists, as follows:

- Habermas (1976) – a proponent of critical theory, where law is presented as the institutional embodiment of an historical sequence of "rationality structures;
- Nonet and Selznick(1978) – proponents of responsive law that combines purposeness and participation; and
- Luhmann (1982) – a proponent of systems theory and self-reflection, who saw the need for a transition in law to parallel society's shift from a stratified to functionally differentiated society.

In Teubner's (1983:245) words, the three different theories and models "do not conflict but instead speak to different aspects of the same problem "which is the "crisis of formal rationality" in a post-modern world. Teubner drew on Luhmann's ([1993] 2004) hypotheses about autonomous social processes that evolve in all subsystems of society through communications, social learning processes, and transformations. Communications necessary for internal operations within a subsystem define the

subsystems' boundaries, distinguishing it from its environment. The legal subsystem's self-referential communications for internal operations are "closed" to the rest of society. However, to function within society, the legal subsystem must communicate with and respond to feedback or perturbations from other subsystems. Functionally, the legal system remains "open" to its environment, because the rest of society describes and is affected by the legal system's operations. The legal system receives and interprets external communications as inputs for legal operations, and delivers outputs, such as judicial decisions. Society's response and feedbacks to legal outputs are external drivers for further internal self-reference and change in the legal system, and vice versa.

Influenced by Luhmann's ([1993] 2004) theories, Teubner (1983:277) posed that the "role of law is... not substantive regulation but the procedural and organizational structuring of "autonomous' social processes." Teubner (1983:249) stated:

> The concept of self-reference of the legal system is a vital aspect of neo-evolutionary thought. It presents the legal system as, at the same time, both a 'closed' and an 'open' system. In this way, neo-evolutionary thought avoids the fallacies of theories which see legal change as either purely internal and independent or exclusively the result of external events. Legal and social changes are, for the neo-evolutionist, related yet distinct processes. Legal change reflects an internal dynamic, which, nevertheless, is affected by external stimuli and, in return, influences the external environment.

As Teubner (1983:251-55) explained it, reflexive law is the "process-oriented structuring of institutions and organizing of participation" in the aftermath crisis of the regulatory or welfare state. Teubner (1983:254-255) said that: "It seeks to design self-regulating social systems through norms of organization and procedure" and "tends to rely on procedural norms that regulate processes, organization, and the distribution of rights and competencies."

In recent years, the legal subsystem of society has been studied within complex, dynamic SES (Nobles and Schiff, 2013). In that context, feedbacks from within both the legal and political subsystems, functioning in the broad social context affect the evolution of legal institutions to address emergent social-ecological phenomena. The emergence of governance networks; bridging organizations; environmental adaptive co-management

(Armitage et al., 2007); resilience thinking and practice (Walter and Salt, 2006; 2012); as well as public sector co-creation of knowledge (Bason, 2010) seem to embed reflexive legal processes (Lobel, 2004; Fiorino, 2006).

5.3 Reflexive environmental governance

In response to the emergence of the environmental governance organizations in the Region, the author posited that Alberta may need to shift from a system of environmental government regulation to reflexive governance of SES. According to Brousseau, et al. (2012:4) reflexive governance is "democratic, reflexive and knowledge-based." As Fiorino (1999:464) explained:

> Where society demands flexibility and dynamism, the state offers bureaucracy and rules. Where society requires legal instruments that are almost self-implementing, the state builds an elaborate oversight apparatus. While societies need a legal system that induces self-reflection toward "sustainable" behavior, the state maintains a legal strategy of forcing desired behavior from outside the firm, through threats of exposure and punishment.

Breuillard (1993:131) recognized that society was shifting "from the static description of political and governmental functions or responsibilities, as laws and statutes enact them, to the dynamic analysis of mechanisms and processes at work which determine actions but also re-actions within socio-political systems." van Vliet (1993:111) proposed "a preventative and source-oriented approach to environmental problems, which is not enforceable by a unilateral rule-making government but which depends on the cooperation and responsibility of the main relevant social and economic sectors."

More recently, Lobel (2004:265) summarized how reflexive lawmaking, "which is process oriented and tailored to local circumstances" might be applied:

> Lawmaking shifts from a top-down, command-and-control framework to a reflexive approach, which is process oriented and tailored to local circumstances. At the same time, by linking together geographically and materially dispersed law reform efforts, the model provides innovative ways to coordinate local efforts and to prevent the isolation of problems. Scaling up, facilitating innovation, standardizing good practices, and encouraging the replication of success stories from local or private levels become central goals of government. **Legal orchestration is achieved through interpenetration of policy boundaries, new public/private**

> **partnerships, and next-generation policy strategies such as negotiated rulemaking, audited self-regulation, performance-based rules, decentralized and dynamic problem solving, disclosure regimes, and coordinated information collection.** (Emphasis added.)

Even without a major overhaul of Alberta's environmental regulatory regime, it was posited that Lobel's (2004:265) "next-generation policy strategies" could be implemented at the regional-scale. If applied to bridging organizations, these policy strategies could legitimize planning, monitoring and reporting programs, and provide feedback to the political system for regulatory change that might be needed to address unintended consequences of next-generation policy interventions (Gunningham and Sinclair, 2002; 1999).

When considered legitimate partners to government decision-makers, bridging organizations could gain social legitimacy to operate and influence social learning for transformation in municipal natural resource management. Using Luhmann's ([1993]; 2004) terms, the author suggested that the normative expectations of volunteer actors in the bridging organizations about their roles in regional-scale environmental governance and management could be "stabilized" through Lobel's (2004:265) interpenetration of policy boundaries, new public/private partnerships, and next-generation policy strategies.

5.4 Using reflexive legal theory to anchor bridging organizations in legitimacy

According to Teubner (1983:239), reflexive law is "legal self-restraint" where the legal system restricts itself to the installation, correction, and redefinition of democratic, self-regulatory mechanisms." Based on the literature of reflexive legal theorists (Fiorino, 2006; Lobel, 2004, Ruhl, 2005; Ruhl and Fischman, 2010), and Teubner's (1983: 266-281) description of the characteristics of reflexive law, the Matrix was compiled to analyze the reflexivity of Alberta's legal institutions.

The Matrix and the results of the analysis of Alberta's environmental legal regime (presented in Chapter 7 and Appendices G-I) inform four reflexive legal processes that the author posited could anchor bridging organizations, and their co-created natural

resource management plans in necessary stakeholder acceptance and democratic legitimacy:

1) regulating bridging organization design and internal governance to ensure democratic anchorage and appropriate self-regulation and reporting protocols are in place;
2) officially recognizing the value of bridging organizations by requiring that relevant co-generated plans be considered by provincial and municipal land use and natural resource decision-makers;
3) delegating some provincial and municipal powers to bridging organizations for adaptive co-management of natural resources at both local and regional scales; and
4) introducing policy learning opportunities to be explored through bridging processes, such as negotiated rule-making, audited self-regulation, performance based rules, decentralized and dynamic problem solving, disclosure regimes, and coordinated information collection (Fiorino, 2006; Lobel, 2004; Gunningham and Sinclair, 2002; Walker and Salt, 2012).

5.4.1 Regulating bridging organization design and internal governance

As brokers of information and influence, bridging organizations need a regulatory design and internal governance framework to build legitimacy and improve democratic anchorage. Fiorino (2006: 161) suggested that several dimensions of new forms of social-political interactions, such as bridging organizations need to be recognized in any attempt to provide a new regulatory framework to legitimize their operations. First, these forms are not temporary but structural and enduring, and are institutionalized in some way. Second, "distinctions between the public (the state, regulatory agencies) and the private (society, markets) are blurred as the boundaries between them become fluid and permeable." Third, government "acts not on, but with non-governmental and commercial entities. There is a shift from governance as one-way traffic toward a two-way traffic in which the 'aspects, qualities, problems and opportunities' of those governing and of those being governed are considered."

If bridging organizations are to be considered legitimate partners of government and other sectors, they must satisfy "primary and secondary start conditions" (Kouwenhouven, 1993: 125-6). These start conditions may not be inherent in an association or a society formalized under Alberta's laws for private social organizations.

Kouwenhouven (1993: 125-126) maintained that "primary start conditions" for private-public-partnerships (which describe connections made through bridging organizations) are "interdependence of actors" with respect to a resource, coupled with "convergence of objectives" for resolution of a problem. Secondary start conditions are the "presence of a network", and "presence of a broker." Kouwenhouven cautioned that a number of "process conditions" must be present before acting, for example co-creating a natural resource management plan. These process conditions include:

> mutual trust; unambiguity and recording of objectives and strategy; …the division of costs, risks and returns; …the division of responsibilities and authorities; phasing of the project; conflict regulation laid down beforehand; legality; protection of third parties' interests and rights; adequate support and control facilities; business and market oriented thinking and acting; internal coordination; and adequate project organization.

Echoing Kouwenhouven (1993), Pomeroy (2007:175) stated:

> …government action to establish supportive legislation, policies, rights, and authority structures must be addressed. Policy and legislation need to spell out jurisdiction and control; provide legitimacy to property rights and decision-making arrangements; define and clarify local responsibility and authority; clarify the rights and responsibilities of partners; support local enforcement and accountability mechanisms; and provide … groups or organizations the legal right to organize and make arrangements related to their needs. The legal process formalizes rights and rules and legitimizes local participation in co-management arrangements.

Fiorino (2006: 190-191) stressed that several elements of "old regulation" are essential to ground new forms of social-political interactions in legitimacy: these are:

1) "a system of core normative standards;"
2) "government must have legal authority and enforcement capability to hold firms accountable for meeting core standards;"
3) "transparency;" and
4) "credible, accurate information and independent advocacy."

These elements might be used by bridging organizations to frame the basic collaborative processes and contents of co-created regional-scale natural resource management plans in order for them to be considered legitimate decision support tools by provincial and municipal law-makers and decision-makers,

5.4.2 Officially recognizing co-created natural resource management plans

A regulation, such as the SSRP could be used to officially recognize plans co-created through strategic bridging processes, requiring that Provincial and municipal decision-makers "consider" these plans when making decisions that may affect the natural resource management systems. For example, the CMP 2014, which was co-created by the CRP could be considered a subregional plan under provisions of ALSA that must be considered by all land use decision makers in the Region. The Province might also recognize BRBC's Watershed Plans, and CRAZ' PM03 Plan, and require that all land use, water use, and air quality regulatory agencies and decision-makers consider the plans as decision-support tools. This would add an extra layer to decision-making, but would ensure that co-created plans are officially recognized and legitimized by the Province and municipalities.

The MGA provisions enabling growth management boards and growth plans provide formal structures, planning protocols, and prescribe the effect of co-created growth plans, such as the CRP's CMP 2014. Although the growth management board provisions were untested in the Region in February, 2016, the provisions provide a good example of reflexive legal institutions that recognize, support and legitimize the work of voluntary environmental governance organizations.

5.4.3 Delegating powers for adaptive co-management

Unlike adaptive management arrangements or "learning by doing' in the United States (Ruhl and Fischman, 2010; Ruhl, 2005) or adaptive co-management (Armitage et al., 2007; Walker and Salt, 2012), there is no delegation of decision-making authority from the Province or municipalities to the CRP, BRBC or CRAZ: they are tacitly supported to recommend natural resource policy, co-create natural resource management plans, and monitor the state of the resource. The Province is involved in

social learning processes through the organizations' strategic bridging processes, but they still regulate through command-and-control legislation that ignores the parallel governance processes of the bridging organizations, and the co-created regional-scale natural resource management plans. For example, the Region's bridging organizations were not consulted while the Province was conceptualizing or developing the IRMS, which considers the environmental governance organizations to be partners to government in the system. The co-created natural resource management plans are clearly not adaptive management or co-management plans as studied by researchers, such as Armitage et al. (2007).

Ruhl and Fischman (2010) studied how co-created adaptive management plans were being interpreted by judiciary in the United States. They found that when adaptive management plans were framed by legality and normative expectations of third parties, that the courts were more likely to uphold plan objectives and implementation strategies. When describing an ideal adaptive management system for natural resource management Ruhl and Fischman (2010:424) stated:

> Adaptive management has become the tonic of natural resources policy. With its core idea of "learning while doing," adaptive management has breathed life and hope into a policy realm beset by controversy, uncertainty, and complexity. It offers what many believe is needed most in a world bombarded by ecological deterioration of massive scales - expert agencies exercising professional judgment through an iterative decision making process emphasizing definition of goals, description of policy decision models, active experimentation with monitoring of conditions, and adjustment of implementation decisions as suggested by performance results.

Ruhl and Fischman (2010:470) cautioned: "In their haste to complete plans and to describe adaptive management procedures, agencies too often neglect the establishment of site-specific standards for measuring compliance with statutory or regulatory criteria…. Adaptive plans, to be effective, must translate the substantive standards of statutes, rules, and manuals into place-based objectives." Further, Ruhl and Fischman (2010:238; discovered that while "environmental managers and stakeholders approve of adaptive management in theory; disagreements focus on application in practice." The application in practice problem was also raised in research by Johnson (1999) when

studying adaptive management of waterfowl harvests. Ruhl and Fischman (2010:296) recommended that state governments, for example the Alberta government, regulate contents of adaptive management plans for legitimacy, interpretation, and reducing uncertainty:

> Congress should explicitly require adaptive management plans to (1) clearly articulate measurable goals, (2) identify testable hypotheses (or some other method of structured learning from conceptual models), and (3) state exactly what criteria should apply in evaluating the management experiments. …These elements would provide judicially enforceable benchmarks for oversight of natural resources planning and management.

These findings support Fiorino (2006) statements above about necessary elements of old regulation that must be articulated in new reflexive institutions designed to support the work of social-political actors in new governance arrangements.

5.4.4. Introducing policy learning opportunities

Canada's environmental regulatory system still relies heavily on *formal legal institutions*, like contracts, torts etc. which, according to Fiorino (2006:19) help governments "define and structure relationships among private actors to preserve economic and social order." However, in the mid to late 1900s, governments created *substantive laws* like environmental statutes, regulations and codes of practice to regulate how citizens use natural resources and interact with each other in the ecosystem. Legal theorists, like Fiorino (2006) and Lobel (2004) suggested that as society continues to evolve, it might need to add reflexive legal processes and institutions to the substantive legal system to support social-political governance and opportunities for policy learning.

Mayntz (1993:15) posed that "particular procedural rules and reflexive law aim to enhance the independent adaptive, reactive, and problem-solving capacity of societal actors, which means to motivate and enable them to react purposefully at any moment to changing conditions." Fiorino (2006:159) confirmed: "The aim of reflexive law is creating incentives and procedures that induce people and organizations to assess their actions… and adjust them to achieve socially desirable goals, rather than tell them directly what to do in all cases."

Currently, CRP, BRBC and CRAZ have no delegated authority for ensuring that co-created plans are implemented by their own members. However, recent MGA amendments that enable growth management boards and give co-created growth plans authority are opportunities for voluntary collective action and policy learning that is officially recognized and supported by the Province.

Chapter 6:

Exploring Bridging Organizations in Environmental Governance in the Region

6.1 Bridging organizations in the Region

Research was required to answer two research questions about CRP, BRBC and CRAZ: whether the organizations performed the strategic bridging functions of bridging organizations, and whether the municipalities in the Region that were members of the organizations were influenced by them to participate in regional-scale environmental management activities (Rathwell and Pederson, 2012).

A number of key factors and questions drove the qualitative research in the Region:

- All municipalities in the Region seemed to share similar environmental issues related to growth. Regional-scale natural resource management plans were co-created outputs of governance processes. The co-created plans had no legal authority or sanction, and municipalities could choose to adopt the regional outcomes and management strategies in local statutory planning documents, or enact bylaws to achieve the outcomes. The organizations communicated the outcomes and strategies in the plans, but relied on municipal members to voluntarily implement outcomes at the local level.
- Regional-scale environmental management was important because landscapes, watersheds and airsheds are transboundary and transjurisdictional, and do not respect municipal boundaries or jurisdictions. Research was necessary to determine whether municipalities were collaborating with other municipalities or the organizations in the Activities that would improve regional-scale environmental governance and management.
- The structural and functional integrity of the organizations were unknown. SNA was required to determine whether the organizations had sufficient structural integrity to perform strategic bridging functions that might influence increased municipal participation in the Activities and improve municipal management of land, water and air in the Region.

- It was unclear if the organizations functioned strategically as bridging organizations, or as *ad hoc* organizations addressing specific natural resource issues.
- There was a need to identify the primary environmental management issues in the Region and understand what municipalities had done to address those issues collaboratively.
- If collaboration was a necessary process to effectively identify critical CHANS and govern and manage the SES, research was required to uncover factors that facilitate or prevent municipal collaboration.
- Research was needed to understand if provincial environmental policy and regulatory system and management processes enabled, supported and legitimized the collaborative work being done by municipal members in the organizations.

With no legal mandate or authority, the organizations can be characterized as self-organizing multi-actor networks of volunteers engaged in social learning processes for environmental governance and management (Newig et al., 2010; Crona and Parker, 2012; Newell et al., 2012). Walker and Salt (2012:132) explained that organizations such as these are part of polycentric natural resource adaptive management systems:

> Self-organized resource governance systems within a polycentric system may be organized as special districts, nongovernmental organizations, or parts of local governments. These are nested in several levels of general-purpose governments that provide civil equity, as well as criminal courts. The smallest units can be viewed as parallel adaptive systems that are nested within ever-larger units that are themselves parallel adaptive systems.

According to Noble and Baset (2015:192), who recently studied the capacity for implementing and sustaining watershed cumulative effects assessment and management programs in the South Saskatchewan River watershed, out of eight possible requisites for capacity, multi-stakeholder collaboration was rated among 73 surveyed individuals as "the most important requisite:"

> Multi-stakeholder collaboration was identified as the most important requisite, with the highest total points assigned, followed by the presence of a lead agency for

> watershed [cumulative effects assessment and management], and available financial and human resources.

The organizations, such as BRBC in watershed management are important requisites for capacity, and they build necessary redundancy in the social capital of the Region: both Nelitz et al. (2013) and Swanson et al. (2009) explained that the social capital provided by the organizations adds to the Region's social-ecological resiliency. But, did the organizations have the necessary structure to perform strategic bridging functions? Were they bridging organizations according to the criteria established in the literature?

While a brief overview of the organizations was presented in Chapter 1, more detailed external description of the organizations is required to frame the qualitative research. The following external descriptions are based on information provided on CRP's, BRBC's and CRAZ' websites and the author's active participation in each of the organizations in different roles, and at different times since 1992. All the organizations self-organized to address perceived policy gaps in effective natural resource management at the regional-scale.

As briefly discussed in Chapter 1, CRP incorporated as an association in 2004 to manage land use management issues related to population and economic growth. BRBC is an Alberta charitable non-profit society first incorporated in 1992, to manage water quality and quantity, and CRAZ is an Alberta non-profit society first incorporated in 2007, to monitor and manage air quality. The organizations have different organizational objectives, structures, and operations, but all are multi-actor organizations as described by Newell et al. (2012), where volunteers work together to address regional-scale natural resource management issues which are not appropriately managed at the provincial or municipal scale.

BRBC and CRAZ include provincial and municipal government members that voluntarily collaborate with private industry, non-government organizations, and members of the public to achieve a public purpose. CRP's membership is composed only

of municipal members, but each of them represents diverse stakeholder interests from within their municipal boundaries.

Actors in all the organizations have personal or business interests at stake, but they volunteer to manage natural resources in everyone's best interests. It is intended that each sector with representation in the organizations manage transboundary and transjurisdictional natural resources using co-generated policy, knowledge, and best management practices, as best they can (Ostrom, 1990). Generally, the organizations' websites provide information about opportunities and places for activities such as information sharing, relationship and trust-building, collaboration, co-generation of knowledge, deliberation and planning, monitoring the state of the resource, local and regional policy development, and making policy recommendations to the Province. Detailed external description for each of the organizations is provided below.

6.1.1 CRP

When CRP formalized as an association under Alberta's *Companies Act* in 2004, both urban and rural municipalities in the Region came together to discuss and share information about growth related issues, such as water servicing, waste management, transportation corridors, and economic development. Initially, funding for operations and projects came through membership fees and provincial grant contributions, but over time significant provincial funds were provided for both operations and regional-scale projects.

CRP created the CMP 2009 that included land use management objectives that were adopted in principle by all its members. In 2012, a new social-spatial CMP 2012 was adopted that connected issues of water scarcity and management to land use in the Region. Proposed density requirements and governance arrangements in the CMP 2012 led to the withdrawal of the rural municipalities and two small urban municipalities that disagreed with those aspects and the perceived veto powers given to Calgary regarding land use development in the Region.

While research was underway for the dissertation, CRP was affected by two new provincial regulatory schemes. First, the Province outright rejected the CMP as a "sub-regional plan" under provisions of ALSA and the SSRP. That meant that the CMP did

not become a regulation under ALSA, and the plan continued to have no legal force and effect in the Region: adoption of strategies and actions to achieve the objectives of the CMP remained voluntary. Second, the MGA was amended to include enabling provisions for "growth management boards."[16]

According to section 708.011 of the MGA, two or more Alberta municipalities are now enabled to "initiate, *on a voluntary basis*, the establishment of a growth management board to provide for integrated and strategic planning for future growth in those municipalities" (Emphasis added.) The municipalities can establish a "growth region," defined in subsection 708.01(1)(c) of the MGA as "all or part of the land lying within the boundaries of the participating municipalities of a growth management board that is designated by regulation under section 708.02 as the growth region for that growth management board." Provisions are included for establishing and operating growth management boards; prescribing what a regulation establishing a growth management board *must* specify and designate; and what matters the regulation *may deal with* on a discretionary basis, including growth plans. A "growth plan," is defined in subsection 708.01(1) (b) of the MGA to mean "an integrated growth management plan, including any amendments to the plan approved by the Minister…"

The legislative scheme for growth management boards is comprehensive, and clearly would put the mandate, operations, and effect of co-created growth management plans under provincial administrative direction and oversight while recognizing the voluntary contributions of municipal collaborators. However, in 2014, after reviewing the MGA provisions for growth management boards and growth plans, the CRP opted not to become a growth management board under the legislation, and continues in February, 2016 as a voluntary governance network under its original constitution as an association of municipalities. No reasons for the CRP's rejection of the opportunity to become a

---

[16] MGA, *supra*, note Part 17.1, s.708.011: "the Purpose of this part is to enable 2 or more municipalities to initiate, on a voluntary basis, the establishment of a growth management board to provide for integrated and strategic planning for future growth in those municipalities."

growth management board and create a growth plan with legislative effect (see MGA section 708.12) has been publicly released. [17]

The current CMP addresses regional-scale sustainability and environmental management issues, such as water quality and supply and the management of riparian lands and wetlands, and CHANs such as waste, water and wastewater infrastructure distribution systems, as well as population and economic development growth-related issues, such as the need for a regional transit system that was piloted in September, 2015 while the dissertation was being finalized (no results of the pilot were available in February, 2016).

6.1.2 BRBC

As water scarcity and degraded water quality in the Region were identified in the late 1980s (BRBC, 2016), it is not surprising that BRBC formed in 1992. Initially, the group of volunteers was appointed to the predecessor Bow River Basin Water Quality Council by Order of the Minister of the Environment to address water quality issues south of the Calgary's wastewater treatment plant. After a number of transformations, BRBC emerged as an arm's length charitable non-profit society to address not only water quality issues, but watershed issues throughout the basin. BRBC (2012) developed a BRBC *Phase 1 Water Management Plan* to address water quantity issues, and a BRBC *Phase 2 Watershed Management Plan* (collectively BRBC Watershed Plans) to address regional-scale water quality issues arising from various land uses. In 2014, BRBC developed an implementation plan and, in February, 2016, the Implementation Committee is in the process of getting sign off from member municipalities and stakeholders to begin implementing actions. Watershed management plans, co-created through voluntary governance processes, are mentioned in the SSRP, but municipal and provincial land use

[17] See "Growth management board being discussed by municipalities," in Cochrane Times, Wednesday, October 14, 2015:4. Also see, Judy Stewart, Growth management boards support and legitimize voluntary governance networks," in Cochrane Times, Tuesday, November 10, 2015:42-5.

and natural resource decision-makers are not required to consider watershed management plans as decision-support tools.

BRBC was recognized as Alberta's first Watershed Planning and Advisory Council (WPAC) under *Alberta's Water For Life: Alberta's Strategy for Sustainability* (Government of Alberta, 2003) (Water For Life). In many ways, BRBC was the prototype WPAC in the Province. In its role as a WPAC, BRBC is a partner to the Province under Water For Life. A guidance document released with Water For Life, called *Enabling Partnerships* (Government of Alberta, 2004:3) (*Enabling Partnerships*), defined "partnerships," as follows:

> "Partnership" is used to define a voluntary organization of provincial, watershed, community and/or individual stakeholders who agree to undertake common or complementary activities, enter into agreements, and work together for the orderly, efficient and accountable achievement of results. While these partnerships do not have regulatory authority, they can make recommendations to those bodies that do, to improve watershed management.

In *Enabling Partnerships*, the Province (Government of Alberta, 2004:2) clarified Alberta's evolving "partnership approach," and how "partnerships" reflected the "shared responsibility" of all Albertans to participate in watershed management, while listing the benefits that partnerships provide in the environmental management system, as follows:

- Encouraging greater responsibility to those who have an impact on the environment and empowering them to take action;
- Encouraging innovation through sharing information and expertise;
- Helping public and private efforts come together for better results;
- Helping to integrate competing interests while reducing friction, overlap and redundancy; and
- Better decisions overall.

However, there is no indication that decision-makers and bodies with regulatory authority will adopt or act upon partnership recommendations, and municipalities are not even mentioned in the document. *Enabling Partnerships* is not generally noted by WPACs, such as BRBC when they engage in watershed management activities, and the document is not referenced as the mandating document for WPAC planning processes.

While Alberta's extensive policy and regulatory regime for water and watershed management is analyzed for reflexivity in Chapter 7, *Enabling Partnerships* is probably the best example of a reflexive provincial policy document flowing from Water For Life: it empowered WPACs, steering and guiding their ongoing work, while recognizing the role of local watershed stewardship groups engaged in watershed management planning. It explained how the Province would participate and fund ongoing watershed management planning activities under the *Framework for Water Management Planning* (Government of Alberta, 2003). The difference between "water" and "watershed" management planning was clearly articulated, and the Province identified the role of WPACS in "an adaptive approach to watershed management." *Enabling Partnerships* (Government of Alberta, 2004:12-13) also drove the formation of the provincial Alberta Water Council, a non-profit society engaged at the provincial level in co-creating knowledge and making policy recommendations to the provincial government on water resource governance and management. The Alberta Water Council appears to be a good example of a provincial-scale environmental governance network that functions as a bridging organization according to the criteria in the literature, however, it is not discussed further.

6.1.3 CRAZ

As population and economic growth continued in the Region throughout the late 1990s and early 2000s, air quality issues emerged throughout the Bow River corridor. CRAZ formed as a society in 2007 as an "airshed zone," using the (now defunct) Calgary Health Authority geo-political boundaries, to address shared air quality monitoring and management issues. Air quality degradation presented a potential human health risk, so the provincial departments of Alberta Health, Alberta Environment and Alberta Energy (as they were then) were major stakeholders, along with Calgary and the Municipal District of Big Horn on the first Board of Directors. CRAZ took over operations of the Province's three continuous air quality monitoring stations in Calgary and developed the PMO3 Plan for the airshed zone, which takes in all the lands in the Region and some

lands beyond those boundaries. In February 2016, CRAZ is working with the Province to locate a fourth continuous monitoring station in Airdrie.

Early on, CRAZ recognized that air quality monitoring was required throughout the airshed zone, and they created a network of passive monitors to locate hotspots and look for air quality degradation trends for placement of continuous monitors in the future. In 2014, CRAZ revised the PMO3 Plan to update objectives, strategies and performance measures to reflect the *SSRP Air Quality Management Framework* (Government of Alberta, 2014b) requirements, and address increases in particulate matter 2.5 in the Region, because that substance was not addressed in the original plan. The PMO3 Plan is recognized in the SSRP, but not considered a sub-regional plan under ALSA, even though the new PMO3 Plan has been adopted by the Province and the *SSRP Air Quality Management Framework* explains the role of airshed zones in monitoring and managing regional-scale air quality. CRAZ is an acknowledged airshed zone in the complex federal-provincial air quality monitoring and management system. However, there is no guidance document like *Enabling Partnerships* for airshed zones, although CRAZ receives operational and project funding from the Province.

6.2 CRP, BRBC and CRAZ purposes, memberships and funding mechanisms

The organizations' websites provide information that suggests CRP, BRBC and CRAZ have some level of stability, allowing mutual trust, reciprocity, and collaboration to develop among actors. They reflect Newig et al.'s (2005:3) description of "institutionalized relations" involving knowledge transfer and social learning for a public purpose. However, individual members within the organizations come and go, and do not all play the same structural (node or link) roles in the social network with respect to co-creation of knowledge, deliberation, and information diffusion. A comparison of functions among the organizations is shown in Table 6.1 below.

BRBC and CRAZ appear to be true "multiactor governance networks" as defined by Newell et al. (2012), while CRP is comprised solely of municipal elected officials.

Table 6.1: Comparison of functions of BRBC, CRP, and CRAZ

Comparison of function criteria	BRBC	CRP	CRAZ
Operate at a regional scale	•	•	•
Address transboundary and transjusridictional issues	•	•	•
Engage in and contribute to governance of the regional scale SES	•	•	•
Co-create knowledge and resource management plans	•	•	•
Monitor and report on state of the resource at regional scale	•	•	•
Members are volunteer collaborators	•	•	•
Members are self-selecting and self-organizing	•	•	•
Members represent diverse sectors	•		•
Members includes both municipalities and the Province	•		•
Formally constituted under Alberta's laws	•	•	•
No legislative authority but recognized as advisors to municipal and provincial governments	•	•	•
Funded through government grants and member contributions	•	•	•
Membership fees		•	•
Board of Directors responsible for administration	•	•	•
Several standing committees formed to address projects and programs	•	•	•
Paid Executive Director and other personnel	•	•	•

Source: Judy Stewart, July, 2014.

According to information posted on their websites, all three organizations are emergent institutions with flexibility and adaptability to facilitate stakeholder cooperation. They seem to play roles in connecting people and organizations to provincial and municipal decision-makers, mediating and brokering knowledge and expertise, and bringing diverse stakeholder interests together to collaborate and coordinate actions to improve natural resource governance and management in the Region. However, the organizations have different organizational purposes, memberships and funding mechanisms as illustrated in Table 6.2 below.

Table 6.2: Comparison of organizational purpose, membership and funding mechanisms for BRBC, CRP and CRAZ

Network and year of formalization	Purpose	Membership	Organizational form	Funding
BRBC 1992	Collaborate on water quality water quantity and watershed issues	• Volunteers • Sectoral designations : (Province; other government; municipalities; industry and commerce; ENGOs, and individuals)	Society under *Societies Act* Board of Directors Chair is an industry member **Recognized** WPAC under *Water For Life: Alberta's Strategy for Sustainability*	**Province, municipal grants**; member donations No membership fees **Charitable organization:** qualifies for funding through volunteer casino
CRP 2004	Collaborate on regional land-use issues related to growth and sustainability	• Volunteers • Municipal officials	Association under *Companies Act:* Board of Directors Chair is a Municipal Mayor Recognized in SSRP as a "partner," but the CMP was rejected as a "sub-regional plan" under ALSA. CRP is not a growth management board under provisions of the MGA.	**Province, and municipalities** who pay membership fees based on population
CRAZ 2007	Collaborate on monitoring and managing air quality in regional airshed	• Volunteers • Sectoral designations : (Province; municipalities; industry and commerce; ENGOs, and individuals)	Society under *Societies Act* Board of Directors Chair was a public member in 2014. Industry member in 2015. **Recognized** as a "monitoring organization" under *Alberta's Air Monitoring Directive*	**Provincial grants;** membership fees by sector; **municipal membership fee** based on population Have proposed several funding mechanisms to government.

Source: Judy Stewart, September, 2014

6.3 Research interview methodology

Using qualitative research methodology similar to that used by Rathwell and Peterson (2012) in their exploration of water management activities in Quebec, structured interviews were conducted with eighteen municipal representatives in the Region. Research objectives were expanded to learn about municipal collaboration with each other and the environmental governance organizations in the Region, and whether they were participating in the Activities. To be included in the study, municipalities had to be a member of at least one of the organizations in 2014. The Mayor, Reeve or delegated representative was interviewed from:

- two cities: Airdrie and Calgary;
- twelve towns: Banff, Black Diamond, Canmore, Chestermere, Cochrane, Crossfield, High River, Irricana, Nanton, Okotoks, Strathmore, and Turner Valley;
- one county: Rocky View County; and
- three municipal districts (MDs): Big Horn (MD), Foothills (MD), and Wheatland (MD).

Interviews were also conducted with Board members of CRP, BRBC, and CRAZ. Only one Board member of CRAZ representing the industrial sector declined to be interviewed, otherwise all Board members of CRP, BRBC and CRAZ participated. Interviews were conducted in accordance with pre-established ethics approval in person or by telephone, and typically lasted one to two hours. All interviews were recorded and transcribed for heuristic data analysis in charts and tables, and SNA using *Pajek*.

All charts, tables and graphs presented in the remainder of this Chapter were prepared by the author in July, 2014 based on information provided through the structured interviews. The data and analysis provides a snapshot of the social aspect of the SES for environmental governance and management in the Region as it was between September 2013, and June 2014.

Interview recordings were coded with letter and number combinations, and the names of municipalities were the only identifiable entities in the SNA mapping that emerged. The coding used to differentiate between the different sector representations on BRBC and CRAZ were:

- M = municipal;
- G = other government;
- I = industry;
- N = non-government organization;
- P = public.

BRBC actors coded within the 100 range, from 101 – 113. This same coding system is used for CRAZ, where the 200 range is applied from 201 – 215. Codes were applied systematically, for example, I102 was a code for an industrial representative on BRBC, while I202 was a code for an industrial representative on CRAZ. Board members of CRP were all municipal members, and in that case the name of the municipality was used in the graphs, as this was agreed to by all municipal respondents.

Generally, counties and municipal districts represented rural municipalities (or agricultural producing local governments) and cities and towns represented urban municipalities (or amenity local governments). Representatives from twelve municipalities were interviewed as members of CRP, along with six additional municipalities that were members of either BRBC or CRAZ, but not CRP.

Appendix C provides a series of network maps, graphs, and tables that provide data roll up for CRP, BRBC and CRAZ that was too extensive to include in the body of the dissertation.

Table 6.3: Municipal membership on Boards of Directors

Calgary Regional Partnership – for land-use

- **Board of Directors N = 12**
- **12 municipal members on Board**
- **12 municipal members on CRP**

Bow River Basin Council – for water/watershed

- **Board of Directors N=13**
- **2 municipal members on Board**
- **13 municipal members on BRBC**

Calgary Region Airshed Zone – for air quality

- **Board of Directors N= 16**
- **3 municipal members on Board**
- **12 municipal members on CRAZ**

Municipal membership on BRBC and CRAZ remained stable in 2015-2016, however, CRP lost 3 urban members (Banff, Canmore), and Nanton) gained one back (High River). The membership changes in CRP occurred in late 2015, and are directly related to discussions about the organization being forced by the Province to become a growth management board.

As shown in Table 6.4 below, of all eighteen municipalities, six were members on just one of the organizations; five were members of two; and seven were members of all three. Four out of the five members that were on just two of the organizations were rural municipalities and not members of CRP. If a municipality was only on one of the organizations it was more likely to be a member of CRP.

Table 6.4: Municipal membership in the environmental governance organizations

	Airdrie	Banff	Big Horn	Black Diamond	Canmore	Calgary	Chestermere	Cochrane	Crossfield	Foothills	High River	Irricana	Nanton	Okotoks	Rocky View	Strathmore	Turner Valley	Wheatland	Total
CRP	•	•		•	•	•	•	•				•	•	•		•	•		12
BRBC		•	•	•	•	•		•	•	•	•			•	•		•	•	13
CRAZ		•	•	•	•	•		•		•		•		•	•		•	•	12

Four municipalities were only members of CRP; three were only members of BRBC, and there were no cases where a municipality was only a member of CRAZ. Table 6.4 illustrates that all three organizations had members from between 12 and 13 municipalities in the Region. In 2014, all four rural municipalities, Big Horn, Foothills, Rocky View and Wheatland were members on BRBC and CRAZ, but not CRP.

Seven municipalities were members of all the organizations: Banff; Black Diamond; Canmore; Calgary; Cochrane; Okotoks; and Turner Valley. Five municipalities were members of two of the organizations: Bighorn; Foothills; Rocky View; Wheatland and Irricana. The remaining municipalities were members of only one of the CRP (Airdrie; Chestermere; Nanton; and Strathmore), or BRBC (Crossfield and High River).

6.4 Interview data collection

Information was gathered about municipal environmental collaboration and participation in the Activities, and patterns of collaboration emerged between the Municipal Network, and CRP, BRBC and CRAZ. Data was tabulated and analyzed to determine strategic bridging functions performed by certain actors in CRP, BRBC and CRAZ in connecting municipalities, the Province and other stakeholders who would otherwise not be connected in natural resource governance or management. Table 6.5 below illustrates how municipal respondents identified the resources, assets, and attributes of their community, and why a person would move to their communities.

Table 6.5: What are the resources, assets and attributes of your community?

Resource, assets, and attributes	**Respondents with similar responses N=18**
Natural setting/open space/clean air/beauty	**10**
Liveability	8
Parks and pathways	8
In Rocky Mountains and Eastern Slopes	7
Amenities and social programs	6
Close to major city	6
Outdoor lifestyle	5
Family friendly and oriented	5
The people and volunteers	4
Sense of community	4
Other – identified by 1-3 respondents	10

When asked which assets, resources, and attributes were dependent on the state of the physical environment, respondents had some similar answers, as shown in Table 6.6.

Table 6.6: Which identified assets, resources, and attributes depend on the state of the physical environment?

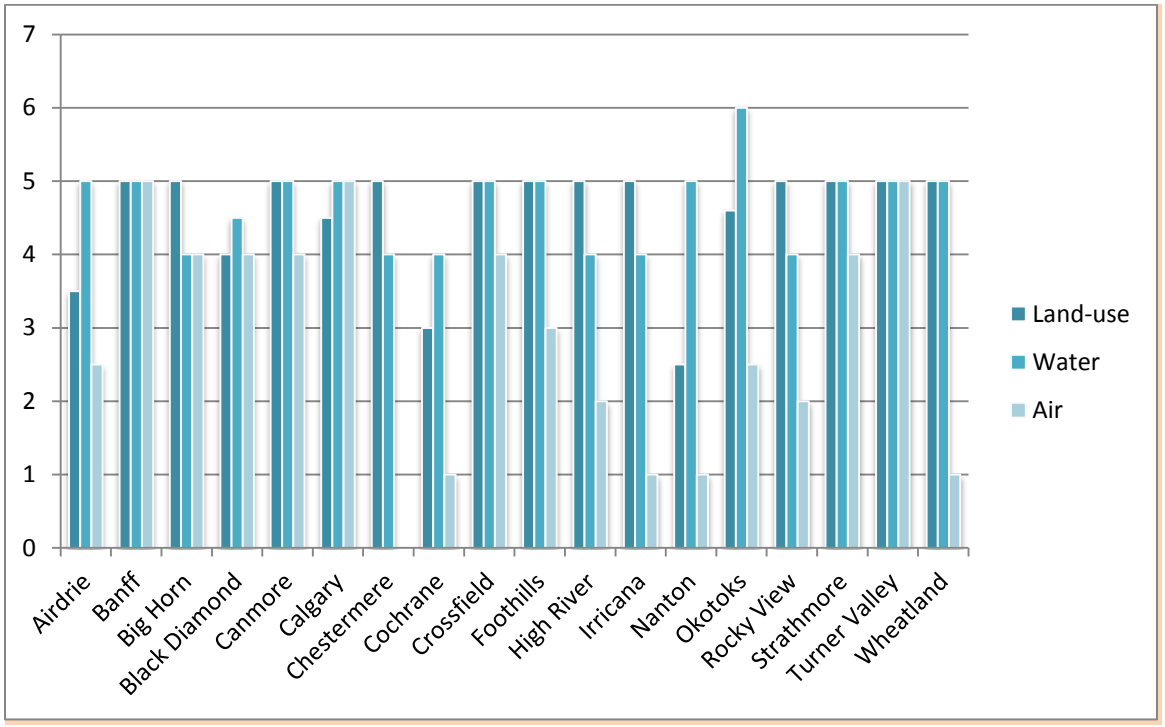
Assets, resources, and attributes dependent on state of the physical environment	Number of respondents who said something similar
Natural areas and beauty	7
Provincial and national parks	7
River, creek/lake/wetland	6
Biotic dynamic, wildlife and forests	4
Large significant spaces for walking and bike paths	3
Liveability	3
Other – Identified by 1-2 respondents only	10

Municipal respondents were asked to rate the importance that each thought the people in their communities put on land-use, water resource, and airshed management on a scale from 1-5, where 1 = no importance, and 5 = significant importance. Results are shown in Table 6.7 below.

Urban municipal respondents stated that air quality management was not important in their communities more often than did their rural counterparts. Chestermere's respondent stressed that there were "absolutely no air quality issues" in that community, even though the community is downwind of Calgary. They also consistently rated water resource management as very important to significantly important in their communities.

Banff, Canmore, Strathmore, and Turner Valley were the only municipal respondents that rated all three resource management categories as important or significantly important to their communities. These results were interesting because Banff, Canmore, Strathmore and Turner Valley are all members of CRP and have helped develop the policies in the CMP. However, Strathmore was only a member of CRP, while Banff, Canmore and Turner Valley were members of all three environmental governance organizations in the Region.

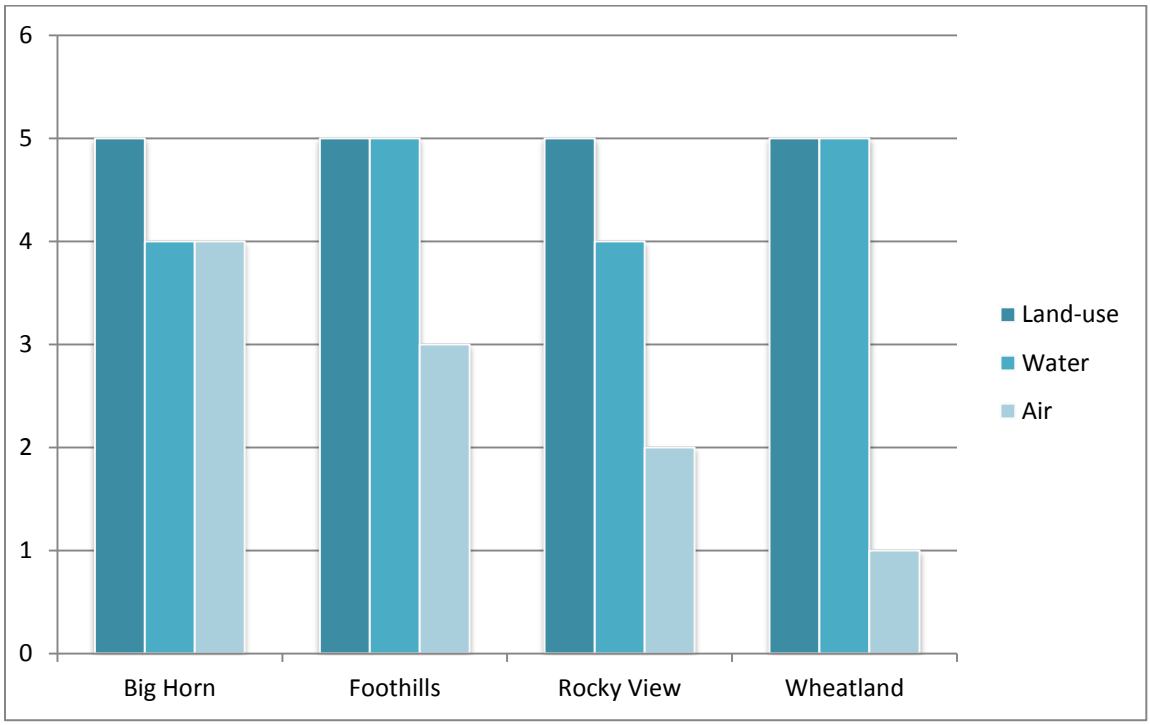
Table 6.7: Municipal respondents' rating of the importance their community put on land use, water resource and air quality management, on scale from 1-5.



As illustrated in Table 6.8 below, all four rural municipalities (counties and MDs) said that people in their communities thought land use management and water resource management were important or of significant importance, but there was no consistency with respect to the importance of managing air quality.

While Wheatland rated air quality as not important, Rocky View and Foothills rated it as somewhat important, and Big Horn rated it as very important. They were more likely to identify emissions from industry as primary air quality issues. Dust and smells associated with agricultural operations were considered normal in rural municipalities, and rural municipal respondents attributed any complaints about these air quality issues to influx of acreage landowners who did not understand the rural lifestyle. Rural municipal respondents consistently rated land use management as significantly important in their communities, and water resource management as significantly or very important.

Table 6.8: Rural municipal respondent's' ratings of the importance their community put on land use, water resource and air quality management, on scale from 1-5.

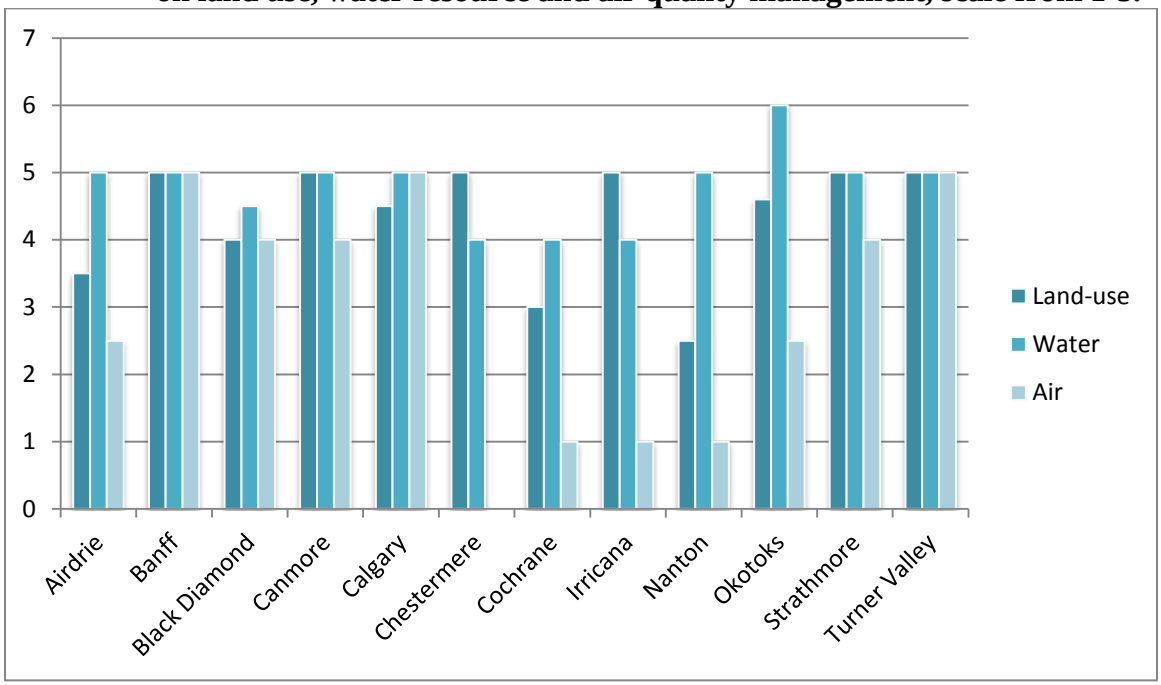


There was significant agreement about the level of importance people in their communities put on land use, water resource and air quality management among urban municipal members of CRP, as shown in Table 6.9 below. Generally, municipal respondents who were members of CRP said people in their communities thought water resource management was very important to significantly important. While land use and water resource management were important to significantly important, air quality management was not as important to people in most communities in the Region, or by people in urban municipalities who were members of CRP.

Most of the water resource management issues identified by CRP members were centered on water scarcity and security for water supply in high population and economic growth conditions. Top of mind were water servicing agreements between the small urban centers and Calgary. These results were not surprising, because the CMP 2014

identifies water resource management as the primary driver for municipal collaboration in the Region.

Table 6.9: CRP municipal member's ratings of the importance their community put on land use, water resource and air quality management, scale from 1-5.



6.5 Analyzing municipal participation

Municipal respondents were asked to identify whether their municipality participated in any of the organizations, and whether the municipality engaged in any of the identified Activities. Full responses are presented in Appendix C. Table 6:10 below provides a summary of the responses, including municipal membership in the organizations, and their participation in the Activities. Municipal responses were recorded as Y=yes; N=No; and LP = Limited participation. For example, Airdrie was a member of CRP only (1), and actively participated in nine land use, ten water resource, and eight air quality management activities (27), and had limited participation in one air quality management activity. Airdrie did not participate in one of the land use activities, and one of the air quality management activities. As an example, Airdrie's participation, where N=3:30, is 1:27.

Table 6:10: Summary of municipal participation in CRP, BRBC and CRAZ and <u>active participation</u> in the Activities, 2014.

				Municipal active participation in Activities			
Municipality N=18	**BRBC**	**CRAZ**	**CRP**	**Land Y-N-LP**	**Water Y-N-LP**	**Air Y-N-LP**	**Correlation N=3:30**
Airdrie			•	9-1-0	10-0-0	8-1-1	**1:27**
Banff	•	•	•	9-1-0	8-2-0	8-2-0	**3:25**
Bighorn	•	•		4-5-1	5-2-3	5-2-3	**2:14**
Black Diamond	•	•	•	9-0-1	6-3-1	7-1-2	**3:22**
Canmore	•	•	•	9-1-0	9-1-0	7-1-2	**3:25**
Calgary	•	•	•	8-0-2	8-1-1	7-2-1	**3:23**
Chestermere			•	5-0-5	8-0-2	4-5-1	**1:17**
Cochrane	•	•	•	10-0-0	3-4-3	4-4-2	**3:17**
Crossfield	•			5-4-1	9-0-1	3-5-2	**1:17**
Foothills	•	•		3-3-4	3-4-3	2-4-4	**2:8**
High River	•			6-0-4	2-4-4	2-4-4	**1:10**
Irricana		•	•	0-5-5	2-4-4	2-8-0	**2:4**
Nanton			•	4-5-1	6-2-2	1-9-0	**1:11**
Okotoks	•	•	•				**3:****
Rocky View	•	•		4-2-4	5-0-5	2-5-2	**2:11**
Strathmore			•	10-0-0	9-0-1	2-5-3	**1:21**
Turner Valley	•	•	•	9-0-1	7-1-2	6-3-1	**3:22**
Wheatland	•	•		6-3-1	5-4-1	1-7-2	**2:12**

**** Okotoks did not participate in this aspect of the interview.**

Generally, municipalities that belonged to all three organizations actively participated in more of the Activities than those who were members of only one or two, for example, Banff, Black Diamond, Calgary, Canmore, Cochrane, and Turner Valley. Rural municipalities were not members of CRP, and actively participated in fewer of the Activities. However, rural municipalities had been members of CRP from 2004-2012 and had been influenced by CRP governance processes, as shown. Big Horn, Rocky View, and Wheatland actively participated in eight to twelve of the thirty Activities.

When a municipality was a member of CRP, but not BRBC or CRAZ it still actively participated in more Activities, for example, Airdrie, Chestermere, Nanton and Strathmore. Even though not members of BRBC or CRAZ, their collaborations through CRP influenced active participation in regional scale water resource and air quality management activities. This pattern of relationships supports the hypothesis that CRP

influences municipal participation in environmental management in the Region. Table 6.11 below provides analysis of the data and reveals average municipal active participation in the Activities.

Table 6.11: Average municipal active participation in Activities when N=10

Land use and 3 network memberships = 54/6=	**9**
Land use and 2 network memberships = 17/5 =	3.4 - most are rural
Land use and 1 network membership = 43/6 =	**7.1** - all are or have been CRP members
Water resources and 3 memberships = 41/6 =	**6.8**
Water resources and 2 memberships = 20/5=	4 - most are rural
Water resources and 1 membership = 44/6=	**7.3** - all are or have been CRP members
Air quality and all three memberships = 39/6=	**6.5**
Air quality and 2 memberships = 12/5=	2.4 - most are rural
Air quality and 1 membership =20/6=	**3.3** - all are or have been CRP members

A similar picture unfolded when active and limited participation were tallied together, as shown in Table 6.12 below.

Table 6:12: Municipal active and limited participation in the Activities

Municipality N=18	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=3:30
Airdrie			•	9-1-0	10-0-0	8-1-1	**1:28 CRP**
Banff	•	•	•	9-1-0	8-2-0	8-2-0	**3:25**
Bighorn		•		4-5-1	5-2-3	5-2-3	**2:21**
Black Diamond	•	•	•	9-0-1	6-3-1	7-1-2	**3:25**
Canmore	•	•	•	9-1-0	9-1-0	7-1-2	**3:27**
Calgary	•	•	•	8-0-2	8-1-1	7-2-1	**3:27**
Chestermere			•	5-0-5	8-0-2	4-5-1	**1:25 CRP**
Cochrane	•	•	•	10-0-0	3-4-3	4-4-2	**3:22**
Crossfield	•			5-4-1	9-0-1	3-5-2	**1:21**
Foothills	•	•		3-3-4	3-4-3	2-4-4	**2:19**
High River	•			6-0-4	2-4-4	2-4-4	**1:10**
Irricana		•	•	0-5-5	2-4-4	2-8-0	**2:13**
Nanton			•	4-5-1	6-2-2	1-9-0	**1:15 CRP**
Okotoks	•	•	•				**3:****
Rocky View	•	•		4-2-4	5-0-5	2-5-2	**2:22**
Strathmore			•	10-0-0	9-0-1	2-5-3	**1:25 CRP**
Turner Valley	•	•	•	9-0-1	7-1-2	6-3-1	**3:26**
Wheatland	•	•		6-3-1	5-4-1	1-7-2	**2:20**

**** Okotoks did not participate in this aspect of the interview**

All seventeen municipalities in the Municipal Network that responded to this interview question participated either actively or in a limited manner in at least ten of the thirty Activities. Municipalities that were members in all three organizations participated actively or in a limited manner in between 22 and 27 of the Activities. Tables 6:11 to 6:13 above support that CRP's focus on "ecological systems" introduced in the CMP 2012 had significant influence on municipal participation in the Activities. Even though some municipalities were only members of CRP, they participated actively or in a limited manner in between 25 and 28 of the Activities, for example Airdrie, Chestermere, and Strathmore. Appendix C provides a series of network maps, graphs, and tables that provide data roll up for CRP, BRBC and CRAZ that was too extensive to include in the body of the dissertation.

6.6 Exploring the Municipal Network in the Region

Municipal respondents were asked to name three municipalities in the Region with whom they collaborated on any of the thirty Activities, and to explain the nature of the collaboration. The question was open-ended and responses were wide-ranging and detailed: the Municipal Network that emerged included several municipalities in southern Alberta that were not members of any of the environmental governance organizations in the Region, but that were connected through municipal bridges in the periphery of the Municipal Network collaborated in a number of the Activities. Municipal respondents were also asked to identify any other stakeholder or organization that connected them to other municipalities who they would otherwise not have learned about or collaborated with in the past.

Collaboration was explained to the respondents as a continuum of processes as illustrated in Table 6:13 below. "Collaboration" was defined as cooperating or working jointly to achieve a common goal or purpose. Collaboration processes were grouped in three categories on the continuum, as follows:

a. sharing information, experience, distributing government rules, and exchanging advice;

b. working together to solve technical problems, establishing rules, and developing strategic management plans; and
c. collaborating to organize joint activities and common projects.

Responses ranged across the collaboration continuum, and were used to create the Municipal Network graphs and maps, where the municipal respondents were the actors (nodes) in the network, and collaboration was the relationship (tie or line) between actors in the Municipal Network. *Pajek* was used to create a one-mode directed network map, because every actor in the Municipal Network could collaborate with every other actor, but the actors chose or "directed" the relationship between themselves and other actors in the network.

Table 6.13: Continuum of collaborative processes

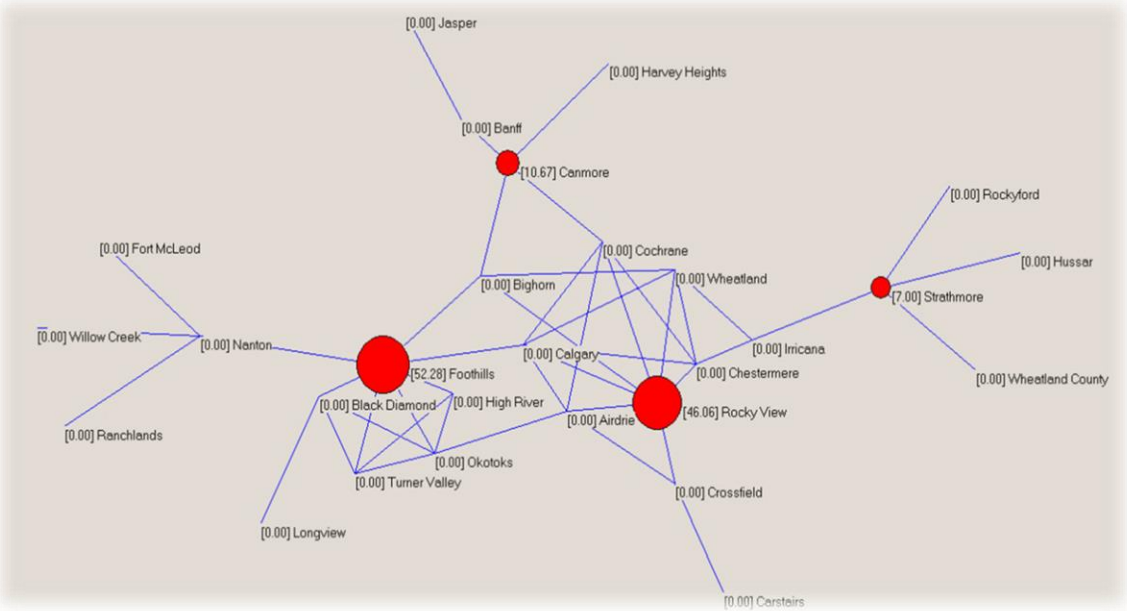
We share information and experience, distribute government rules, and exchange advice.	We work together to solve technical problems, establish rules, and develop strategic management plans.	We collaborate to organize joint activities and common projects.

The Municipal Network was analyzed for structural integrity; network centers; betweenness centrality of vectors; hubs and authorities; closeness centrality values; and municipal actor brokerage roles. Municipal Network SNA data is presented in a series of graphs and tables in Appendix D. Municipal Network actors do not all play the same structural roles with respect to information flows, nor do they have the same temporal impact on network structure. This is illustrated in Figure 6.1 below.

In the analysis, it was assumed that information was exchanged both ways between linked actors in the Municipal Network, because collaboration is not "a system of one way streets" (de Nooy et al., 2011:145). Examining the structure of the Municipal Network showed whether it permitted rapid diffusion of information, or contained bottlenecks or structural holes that could be removed or filled to speed up information flows for social learning.

The Municipal Network had strong structural integrity with strong central actors in a centralized core necessary for relationship and trust building, and cut-vertices in the periphery with ties to other municipalities in the greater southern Alberta context. The network cohesiveness, with rural municipalities at the center playing brokerage roles, displays an entirely different scenario than that discovered by Rathwell and Pedersen (2012) in the Montérégie Region of Quebec, where rural municipalities did not communicate with each other or amenity-based urban centers about watershed management activities.

Figure 6.1: The Municipal Network with centrality scores and centers



Foothills received the highest centrality score, followed closely by Rocky View, which confirms their central positions in the network. Information flows through the network, and collaborations in the Activities are common between urban and rural municipalities – indeed, when respondents from small urban municipalities asked who they collaborated with in the Activities or related projects, most named the adjacent rural community.

As centers, the rural municipalities of Foothills and Rocky View are able to function as "gatekeepers and representatives" (de Nooy et al., 2011) controlling the flow

of information about Activities from the environment outside the network, and from inside the network back to the environment. In those roles, theoretically, both Foothills and Rocky View might be able to form bottlenecks to information flows as well. Given the central roles that both Rocky View and Foothills play in the Municipal Network, and Bighorn's closeness centrality as shown in Appendix D, CRP might want to incent and encourage rural municipalities to reinstate as members of CRP to ensure that the objectives and strategies for natural resource management contained in the CMP are communicated widely throughout the Region.

Foothills and Bighorn could each perform an itinerant brokerage role with respect to providing for processes for conflict resolution between network components. It was interesting to note that only the rural municipalities were positioned to provide itinerant brokerage roles. None of the municipalities in the network were positioned to act as "liaisons," and only Calgary and Strathmore were positioned to perform the "mediator" brokerage role. Foothills received the highest betweenness centrality score (.44): it formed a link in the chain of information flow, making its position more central in the network.

Bighorn, (.43) Calgary (.42) and Foothills (.41) demonstrated highest closeness centrality, followed closely by Cochrane, Chestermere, Rocky View and Wheatland (.39). These actors were closer to all other actors in the network, and it would be easier for information to reach them making them the important conduits for information flow in the network. However, the maximum closeness centrality score is 1, and no municipality came close to receiving that score, as shown in Appendix D.

While there were ten hubs with equal weightings, Calgary and Rocky View received the authority rating of (.41), followed by Chestermere (.34), Airdrie (.32), and Foothills (.31) making those important hubs for information flow in the network. The Municipal Network is not strongly centralized, but has a well-connected core with bridged relationships in the periphery, connecting municipalities that would otherwise not be connected to the network in the Region. As a result, information flows easily through several channels in the Municipal Network.

In this 2014 snapshot of the Municipal Network, both Canmore and Strathmore received higher centrality scores than all other urban municipalities in the Municipal Network. Canmore, Crossfield, Black Diamond, Nanton, and Strathmore all were positioned as cut-vertices, with "weak ties," to municipalities in the periphery, and if they left the Municipal Network, it would disintegrate into several components effecting structural integrity, information flows and collaboration. Weakened structural integrity would restrict Municipal Network functions and longevity, because the Municipal Network would lose the ability to attract knowledge and resources from outside the network, for example, from Fort McLeod, Jasper, Hussar, Carstairs, and Longview that were connected by cut-vertices to the Municipal Network.

6.7 SNA and the environmental governance organizations in the Region

Board members of CRP, BRBC and CRAZ were asked to identify which of their Board colleagues they collaborated with on relevant land use, water resource, and air quality management Activities, respectively. The organizations' internal network structures were explored using concepts of 1) *centrality; 2*) *brokers and bridges*, and 3) *diffusion*.

Actor centrality and network centralization are discussed below in the context of CRP's network structure. BRBC's network structure provided context for further discussion about the importance of network *brokers and bridges*, and CRAZ's network structure lent context to the concept of information *diffusion*. All three organizations had unique but similar network structures that enabled them to perform strategic bridging functions as illustrated in Figures 6.2 to 6.4 below.

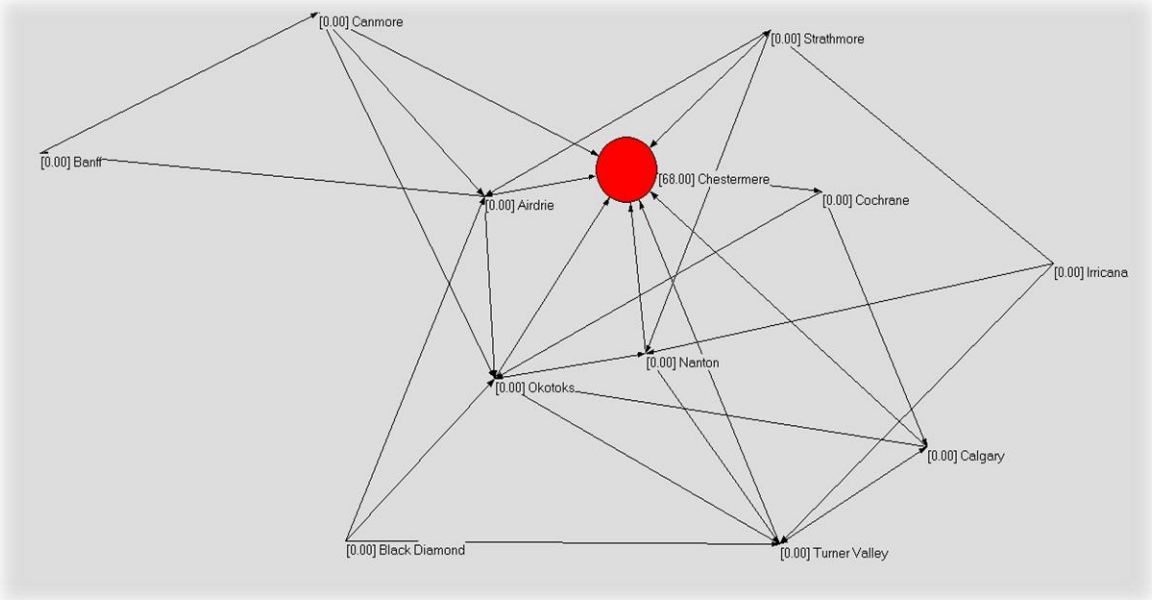
6.7.1 Exploring centrality and centralization through the CRP network

CRP's Board of Directors (CRP's Board) was composed of municipal elected officials, who served four-year terms of office. Some members of CRP were central to the network, giving them access to information from other members and better opportunities to spread information or influence innovations. As SNA had not been used to explore the CRP previously, members may not have realized the important functions they performed in the CRP network.

Pajek software was used to map and analyze CRP as a one-mode directed "collaboration" network. An ego-centric approach to centrality examined the position of certain actors (de Nooy et al., 2011:141) in the CRP network, for example, Chestermere and Airdrie. The CRP network was highly centralized.

From a sociocentered perspective, a network is centralized if there is a clear boundary between the center (core) and the periphery of the network. According to de Nooy et al. (2011:141), in a highly centralized network "information spreads easily but the center is indispensable for the transmission of information." A measure of an actor's centrality is his/her number of neighbours in the network, which is referred to as the actor's degree centrality. An actor with high degree centrality is said to have more sources of information within a network and more channels for information flow (de Nooy et al., 2011).

Figure 6.2: CRP network with centrality scores and Chestermere as center



Sometimes, a central actor is a star - that means that he/she is connected to other actors in the network who are not connected to each other. The star acts as a "hub" for information flows to all other members. Information transfer between a star and other

actors in a network is direct, fast and easy: no chain of contacts is required, so "betweenness centrality" becomes less relevant.

The betweenness centrality of a CRP actor "depends on the extent to which he or she is needed as a link in the chain of contacts that facilitate the spread of information in the network" (de Nooy et al., 2011:150). A star has a maximum betweenness centrality because all other actors rely on the star for information. The loss of the star ends the flow of information: all communication ties in the network are destroyed, and the network fragments into many components. The closer one municipality is to all other municipalities in the CRP network, the higher its closeness centrality, and the faster information will reach it. Closeness centrality of CRP actors is measured using distance data about all actors in CRP. A star has maximum closeness centrality because it is directly linked to all other actors in the network.

The CRP network in 2014 would be vulnerable if Chestermere left, as any star-network would be if a star leaves, as shown in Figure 6.2 above. In 2014, Chestermere was central to the integrity of the CRP network. For example, in a less centralized network, if one central municipality were to leave the network, information would still flow between other municipalities who remain well-connected to each other. CRP's centralized structure was important because municipalities come and go. As elected officials hold prescribed terms of office, if a central elected official were not re-elected or left office, information flows may be disrupted until the CRP network structure reconfigured. Brokerage roles performed by CRP members are shown in Table 6.14:

Table 6.14: Actors in the CRP network positioned to perform brokerage functions

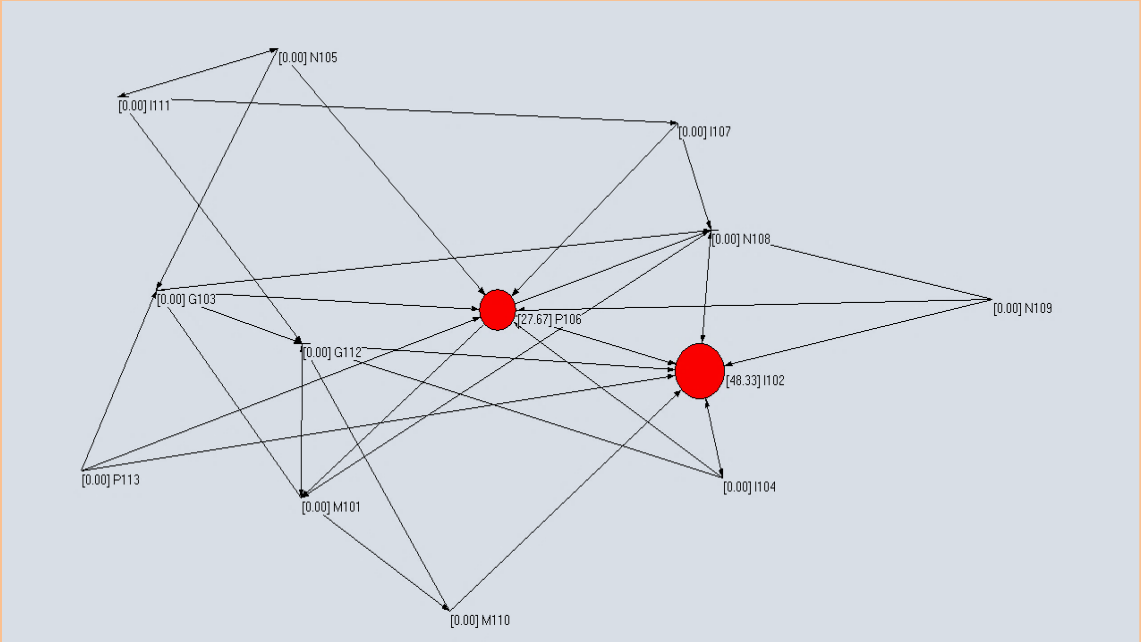
Brokerage role	Municipal actor	Score
Coordinator	**Okotoks**	**8**
	Nanton	2
	Airdrie, Turner Valley, Calgary	1
Gatekeeper	**Turner Valley**	**3**
	Okotoks, Canmore, Strathmore, Nanton	1
Itinerant broker	**Chestermere**	**14**
	Airdrie, Canmore	1
Liaisons	**Airdrie, Turner Valley**	**2**
	Okotoks, Strathmore, Nanton	1
Representative	**Airdrie**	**2**

6.7.2 Exploring brokers and bridges in the BRBC

The "core" of BRBC was the Executive Committee of the Board of Directors (BRBC's Board) which was loosely connected to other Board members who played less central roles in the periphery. Board members were elected as representatives from within each sector's membership and some had served lengthy terms of office, whereby they acquired power and influence among stakeholders in the watershed.

BRBC's Board was the "hub" of the network, overseeing information flows, watershed management plan creation, and regional watershed management policy development. BRBC's network structure had not been previously explored, and SNA helped discover that different members held various network positions, including those of brokers and bridges, or "weak ties" in the network. BRBC's network had both bonding and weak ties as illustrated in Figure 6.3 below.

Figure 6.3: BRBC network with centrality scores showing centers: I102 and P106.



As previously discussed, BRBC respondents were all attributed codes between 101-112, with letter designations for representative capacity, for example, I - industry; G - government; P -public, etc. While a representative from industry had the highest centrality score in the BRBC network, a member of the public also played a central role.

BRBC's collaboration network was highly centralized. Bridges and cut-vertices in the BRBC network were crucial for the flow of information between BRBCs central actors and weakly connected actors in the periphery. If bridging ties were broken, the network would deteriorate into several components.

According to de Nooy et al. (2011:159-78), members with "ties outside one's group yield more diverse information that is worth passing on or retaining to make a profit…. A person who is connected to people who are themselves not directly connected has opportunities to mediate between them and profit from his or her mediation. The ties of this person bridge the structural holes between others." Unfortunately, although bridging ties were invaluable for bringing new information, resources and innovations into BRBC, they could create "bottlenecks" for information flows to the periphery. BRBC network actors who strategically exploited bridging ties could control information flows for personal gain and influence. However, these same actors would enable flows of new information, resources and innovations from outside BRBC's core that is necessary for social learning required for transformation (Bodin and Prell, 2011). Fortunately, there were no identified cut-vertices in the BRBC network, and it appeared to be a highly connected and centralized network.

While betweenness centrality scores were relatively low, (scores were all .15 or less), closeness centrality scores were significant for several actors, including I102 (.71); P106 (.71); N108 (.63); M101 (.60); G112 (.57); and G103 (.52). All sectors had Board actors who played central roles as chains for information flow in the network. See Appendix D for SNA maps, graphs and charts for BRBC's network.

Not all of BRBC's actors were positioned to perform the same brokerage roles in the network. P106, a public member, was positioned as center in the network with the highest closeness centrality, with potential to perform all brokerage roles, except "itinerant broker." Industrial member I102 was also positioned as a network center, with the second highest closeness centrality and potential to perform strong coordinator functions and act as a gatekeeper. Non-profit sector member N108 had high closeness centrality with potential to perform minor functions in all brokerage roles, except itinerant

broker. Last, G112, a government member had some betweenness centrality, and moderate closeness centrality and potential to perform all brokerage roles, except liaison.

Table 6.15 below illustrates brokerage roles that could be performed by actors in the BRBC network. It shows that several of BRBC's actors, from all sectors were positioned to perform the role of gatekeeper, controlling the flow of information into BRBC. An actor from the each of the public, nonprofit and government sectors was positioned to perform the role of representative and control the flow of information from the network. This illustrates an entirely different scenario for information flow and collaboration than what was shown in CRP's network.

With its strong history and recognition as a WPAC under Water For Life, BRBC's network had strong structural integrity and was positioned to perform strategic bridging functions as a bridging organization in the Region with respect to water and watershed governance and management.

Table 6.15: Actors in the BRBC network positioned to perform brokerage functions

Brokerage role	BRBC actor	Score
Coordinator	**Industry I102**	**7**
	Non-profit N108	4
	Public P106; Government GII2	3
	Government G103	2
Gatekeeper	**Government G103**	**4**
	Government G112; Industry I102; Public P106;	3
	Industry I107	2
	Non-profit N108; Municipality M110	1
Itinerant broker	**Municipality M101**	**5**
	Government G112	1
Liaisons	**Public P106**	**3**
	Non-profit N105; Industry I111	2
	Non-profit N108	1
Representative	**Public P106**	**3**
	Non-profit N108	2
	Government G112	1

6.7.3 Exploring information diffusion through CRAZ' network

Similar to BRBC, CRAZ was a multi-actor governance network. CRAZ' Board of Directors (CRAZ' Board) had proportional representation from four identified sectors: government, which included municipalities; industry; non-profit; and the public. CRAZ' Board was central to the organization, although CRAZ' Executive Committee and standing committees provided social learning opportunities for all members. Information was dispersed from the central core of CRAZ's Board through members with high centrality in a dense network. However, central actors were not always the primary channels of communication to the periphery of the network, where committee representatives played central communication roles. CRAZ' network provided context to discuss information "diffusion" in a network.

de Nooy et al. (2011:186) said that diffusion is a social process: "a special case of brokerage with a time dimension." Information is passed from one person to another over time. The assumption is that social relations in a network are important to diffusion: de Nooy et al. (2011:191) said that social relations act as "channels of social contagion and persuasion."

A municipal actor's structural position and ego-network within CRAZ were both important for information diffusion because central actors receive information first and then pass it on to the periphery through a chain of connected actors. Diffusion takes time, and de Nooy et al. (2011:191) said that "when contagion drives the diffusion process, the structure of an information or contact network conditions the diffusion of information, innovations, diseases, and so on." Graphs can also be prepared to illustrate the diffusion curve, or the time required to adopt certain innovations in municipal air quality monitoring and management activities in the Region, but that concept was not explored.

de Nooy et al. (2011:191) derived six broad hypotheses about information diffusion important in CRAZ's network. These hypotheses are presented in Table 6.16 below with discoveries about CRAZ' network structure to explain why information and innovations about air quality monitoring and management systems seemed to diffuse quickly throughout the Region. CRAZ' network graphs and tables in Appendix D illustrate how

information was diffused in the Region, and how innovations for social learning (Pahl-Wostl, 2006; 2009; Pahl-Wostl et al., 2007; 2008; Reed et al., 2010) might be diffused among CRAZ's actors.

Structural positions of certain actors, such as central actors and cut-vertices may identify them as crucial for diffusion of innovations for improved air quality management and governance, and brokerage for social learning required for transformation.

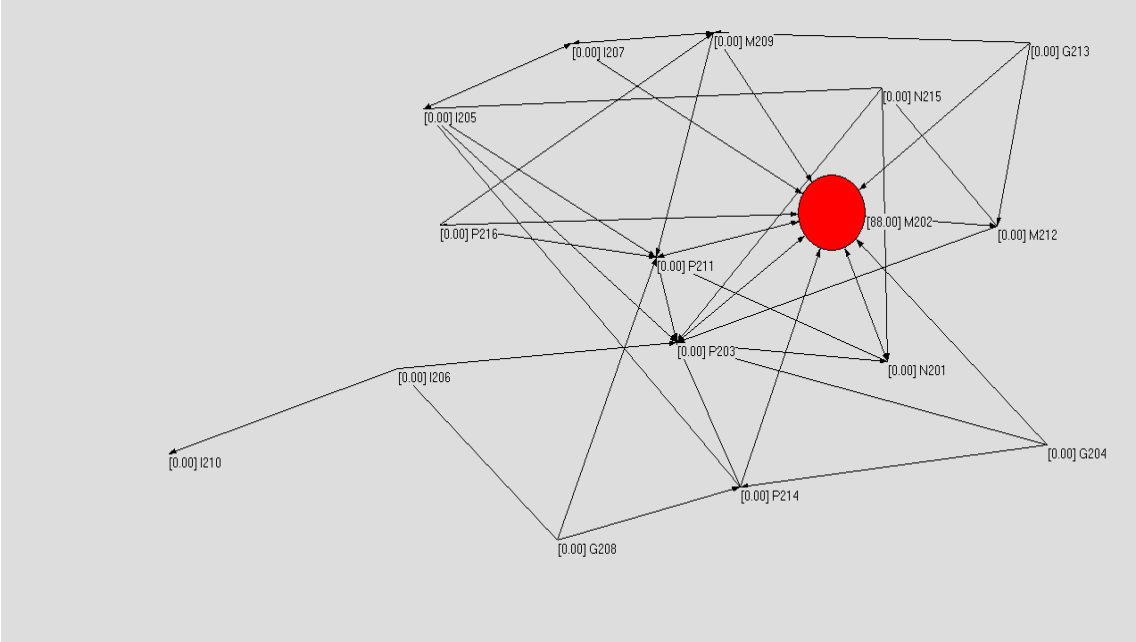
Table 6.16: de Nooy et al.'s "Diffusion Hypotheses" compared with CRAZ' network structure

Diffusion Hypotheses	CRAZ' network structure
In a dense network, an innovation spreads more easily and faster than in a sparse network	• Dense
In an unconnected network, diffusion will be slower and less comprehensive than in a connected network	• Connected
In a bi-component, diffusion will be faster that in components with cut-points or bridges.	• Many bi-components
The larger the neighbourhood of a person within the network, the earlier she or he will adopt an innovation.	• High member betweenness centrality
A central position is likely to lead to early adoption.	• Many connected central actors are early adopters and members of CRAZ since 2007
Diffusion from a central vertex is faster than from a vertex in the margins of the network.	• Distance between actors is minimized with few structural holes

See Figure 6.4 below that maps CRAZ' network with municipal actor, M202 as center with the potential to influence municipal participation in the Activities.

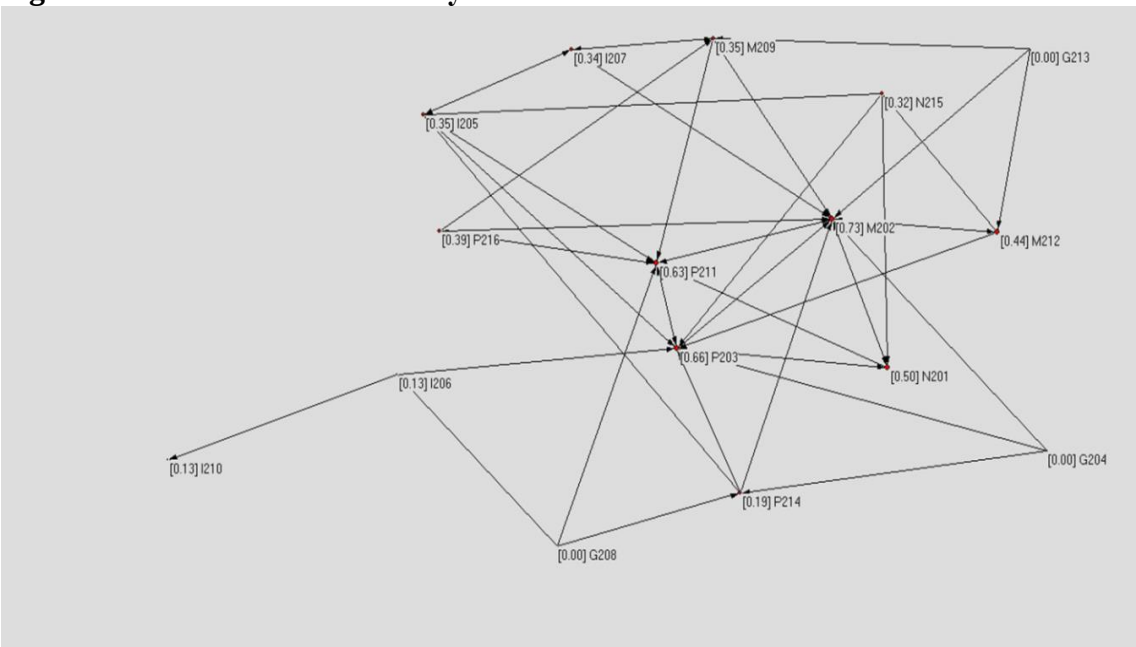
As in CRP and BRBC, not all actors in CRAZ's network were positioned to perform the same functions. Network maps, graphs and charts are presented in Appendix D, but some highlights of the SNA are included below. First, the high closeness centrality of a number of actors in CRAZ's network is mapped in Figure 6.5 below. Municipal actor M202 collaborated with most other actors in the network, and was a central link in a chain of communications, with an overall centrality score of (.88), and a closeness centrality score of (.73). Next in closeness centrality was a public actor P203 with a score of (.66), followed by another public actor, P211 with a score of (.63).

Figure 6.4: CRAZ' network with centrality scores and M202 as center **



**** Industry member I210 did not participate in the interview process, but was identified as a collaborator as illustrated in the network map.**

Figure 6.5: Closeness centrality scores in CRAZ's network



In CRAZ' network, public and industry members were positioned to perform the roles of coordinator, gatekeepers and representatives, while municipalities and non-profits

were positioned as itinerant brokers and liaisons. Municipal actor M202 was central to collaborations in the network, and municipal actors M209 and M212 were also positioned as brokers in the periphery connecting less well-connected actors to the center. Unlike in BRBC, municipalities were core stakeholders in the CRAZ network, influencing how information flows both in and out of the network.

Municipal actors M202 and M209 were both from rural municipalities, while M212 was from an urban center. Of all the actors in the CRAZ network, it was noteworthy that in the center of the network, the rural municipal member M202 was strategically positioned to perform the roles of itinerant broker and liaison. As was illustrated in the Municipal Network, rural municipalities were integral to environmental governance in the Region, and this was especially true in CRAZ.

In CRAZ's network, information flows quickly, and municipal actors and public members were positioned to perform brokerage roles, as is illustrated in Table 6.17 below.

Table 6.17: Actors in the CRAZ network positioned to perform brokerage functions

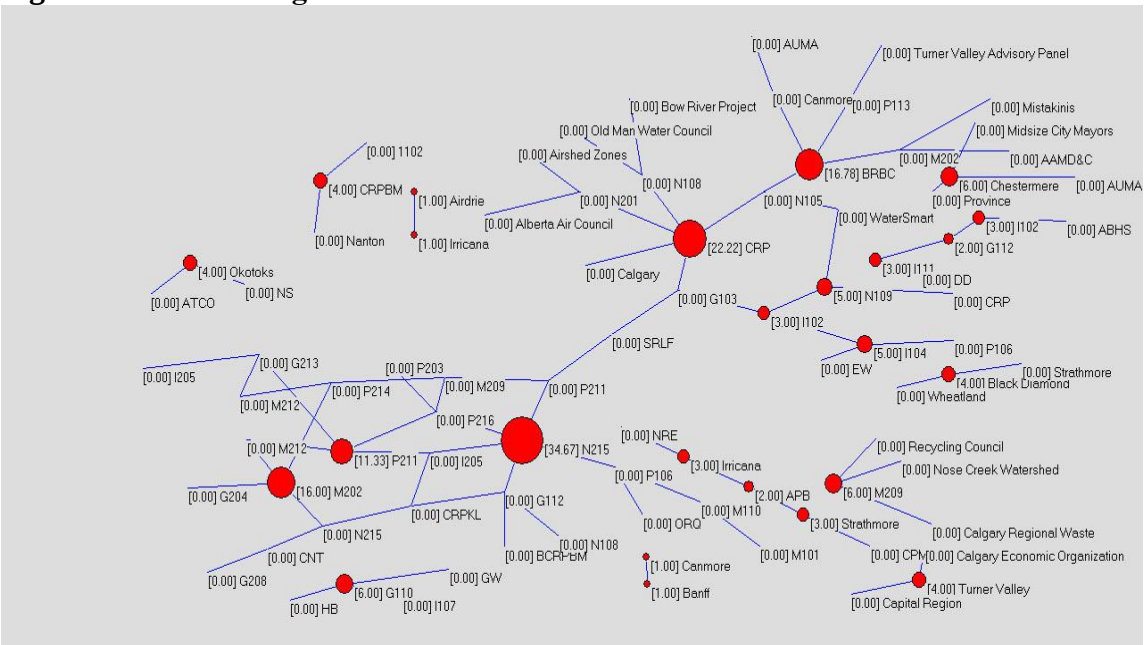
Brokerage role	CRAZ actor	Score
Coordinator	**Public P203; Public P211**	**5**
	Industry I205	4
	Industry I207; Municipality M209	2
	Industry I206	1
Gatekeeper	**Public P203**	**5**
	Public P214	3
	Public P211; Industry I205; Municipality M209	2
	Municipality M212; Non-profit N201	1
Itinerant broker	**Municipality M202**	**14**
	Non-profit N215	2
	Municipality M212	1
Liaisons	**Municipality M202**	**5**
	Public P203	2
	Public 211; Municipality M212; Public P214; Non-profit N201	1
Representative	**Public P203;Public P211; Industry I207; Industry I 206**	**1**

6.8 Stakeholders who connect CRP, BRBC and CRAZ to municipalities in the Region

Municipal respondents and Board members from the environmental governance organizations in the Region were asked to identify stakeholders (individuals or other organizations) in their networks who "connected" them to municipalities. They were asked to consider municipalities that they had learned more about, connected with, or collaborated with through the identified stakeholder or organization.

Figure 6.6 provides the "stakeholder connector network" with centrality scores and centers. This network graph was created as a two-mode graph. The stakeholder connector network included all the "connecting stakeholders" identified, and provides insight into stakeholders and organizations that performed strategic bridging functions in environmental governance in the Region. There were some interesting outcomes: for example, Respondent N215, was a Board member on CRAZ who was also well connected to the BRBC Board members and was central to the stakeholder connector network in the Region. Respondent N215 participated on standing committees in both CRAZ and BRBC.

Figure 6.6: The Region's stakeholder connector network



Respondent P211 was in the position of a cut-vertex in the stakeholder connector network, and connected the CRAZ component in the network to the BRBC component through SRLF. In the position of cut-vertex, P211 could be encouraged to perform strategic bridging functions in the Region to provide information to municipalities about land use, water resources and air quality management issues.

Of strategic importance, stakeholder connector SRLF was positioned as a cut-vertex in the stakeholder connector network, connecting P211from CRAZ with G103 from BRBC. If SRLF were to leave the stakeholder connector network, then the two large components of municipalities might no longer be connected. In the author's experience working within the organizations, SRLF did exploit its unique position in the stakeholder connector network and gained financially for sharing information acquired from the organizations.

Of greater significance for this dissertation, both CRP and BRBC were central to the stakeholder connector network, while CRAZ was not identified as a stakeholder connector by any of the respondents interviewed. Both CRP and BRBC functioned as bridging organizations, as illustrated in Figure 6.6 above.

Not surprising, of all municipalities in the Region, Chestermere was identified as a stakeholder who connected others to municipalities, supporting earlier discussion of Chestermere's strategic bridging function in CRP. Respondent M202 was a municipal member on CRAZ' Board, as was P211 who sits on the CRAZ Board as a public member. These two Board members are central to the CRAZ component in the stakeholder connector network. They are highly influential on the CRAZ Board as stakeholder connectors. Without them, many CRAZ Board members would not have learned about, connected with or collaborated with other municipalities in the Region. Respondent M209 also sat on CRAZ' Board and was highly influential in the CRAZ air quality monitoring and management community, as well as the environmental community in the Region, connecting both rural and urban municipalities to collaborate on regional-scale natural resource management issues. Therefore, it was surprising to the author that

CRAZ, as an organization was not identified by respondents as a stakeholder connector in the Region.

It was also interesting that CRP and BRBC were positioned as cut-vertices for two large components of the stakeholder connector network, and connect a number of other volunteer networks and government agencies that collaborate to perform the Activities in the Region, and elsewhere in Alberta.

6.9 Stakeholders that influenced municipal participation in the Activities

When asked who were the most influential people or organizations in their communities with respect to influencing municipal participation in the Activities, municipal respondents provided the names of a variety of stakeholders, most commonly their planning staff and their municipal directors of environmental management systems. However, as illustrated in Table 6:18 below, seven municipal respondents identified that BRBC and CRAZ influenced their participation in the water and air quality management Activities, while only two municipalities said that CRP influenced their participation in the land use management Activities.

The following coding system was used to analyze the responses, to attempt to visualize the people and organizations that were most influential municipality by municipality and determine the role of CRP, BRBC and CRAZ. The organizations were identified by their acronyms. Capital letters identified the corporate, government (AEP), municipal, non-profits, public citizens and planning or environmental staff, as follows:

- C = corporations
- G = AEP
- M = other municipality or municipal commissions
- NGO = non-profit organizations
- P = public citizens
- S = planning, operational, or environmental staff

The red colour P in Table 6:18 indicates that the identified public citizen was also a director of CRP, BRBC or CRAZ when it was also identified as an influential organization. The light green shading shows that municipalities were less likely to be

influenced to participate in the Activities by the organizations than by public citizens and NGOs in their communities. It also shows that only Airdrie, Banff, Irricana and Wheatland were not influenced to participate in the Activities by citizens and NGOs.

It seemed fair to say that municipal staff influenced municipal participation in the land use management Activities, and, to some extent the air quality management Activities, but were not as influential with respect to water resource management. These results were not surprising, because many of the municipal respondents expressed that they did not think the municipality had jurisdiction or authority to participate in the water resource or air quality management Activities, while they are mandated to make land use management decisions.

Table 6.18 People or organizations that influenced municipal environmental management

Municipality N=18	Stakeholder Land	Stakeholder Water	Stakeholder Air	Influenced by Networks	Influenced by citizens and NGOs
Airdrie	S	S	S	No	No
Banff	S	S	S	No	No
Bighorn	S	P: BRBC	P: CRAZ	Yes - 2/3	Yes
Black Diamond	S; NGO	M	NGO	No	Yes
Canmore	S; NGO	C; BRBC	CRAZ	Yes - 2/3	Yes
Calgary	S; C	S; BRBC	CRAZ	Yes - 2/3	Yes
Chestermere	P	NGO	S	No	Yes
Cochrane	NGO; CRP	P:BRBC NGO	CRAZ	Yes – 3/3	Yes
Crossfield	S, P	P;G;C	S;G	No	Yes
Foothills	P	P:BRBC	None	Yes – 1/3	Yes
High River	S;P	S	G;P	No	Yes
Irricana	S	M	None	No	No
Nanton	S	P	None	No	Yes
Okotoks	P; NGO	NGO	S	No	Yes
Rocky View	C; CRP;	P; NGOs; BRBC	P:CRAZ	Yes – 3/3	Yes
Strathmore	S	P	P	No	Yes
Turner Valley	S	P;M;BRBC	P; CRAZ	Yes – 2/3	Yes
Wheatland	S	C	CRAZ	Yes – 1/3	No

It was also not surprising that municipal staff had more influence than the public on whether the municipality participated in the land use management Activities, as that was

their job, while the public usually played only a minor role in high level land use planning or public hearing events. However, while BRBC and the public did influence municipal participation in the water resource management Activities, CRAZ influenced municipal participation in the air quality Activities, but the public did not have as much influence.

Interesting findings were that, first, other municipalities and the government (AEP) did not have much influence on municipal participation in the land use, water resource or air quality management Activities. Second, that rural municipal respondents all indicated that at least one of the environmental governance organizations in the Region influenced their participation in some of the Activities: for example, Bighorn was influenced by BRBC for water resources and CRAZ for air quality; Foothills was influenced by BRBC for water resources; Rocky View by CRP, BRBC and CRAZ; and Wheatland by CRAZ. Only the municipal respondents for Cochrane and Rocky View said that their participation in the Activities was influenced by all three organizations. The summary Table 6.19 is provided below.

Table 6:19 Summary of influential people and organizations

Number of municipalities influenced by CRP for land use	**= 2**
NGO influence on land use	**= 4**
Staff influence on land use	**=13**
Corporate influence on land use	**= 2**
Other municipal influence on land use	**= 0**
Government (AEP) influence on land use	**= 0**
Public influence on land use	**= 5**
Number of municipalities influenced by BRBC for water resources	**= 7**
NGO influence on water resources	**= 4**
Staff influence on water resources	**= 4**
Corporate influence on water resources	**= 3**
Other municipal influence on water resources	**= 3**
Government (AEP) influence on water resources	**= 1**
Public influence on water resources	**= 8**
Number of municipalities influenced by CRAZ for air quality	**= 7**
NGO influence on air quality	**= 1**
Staff influence on air quality	**= 5**
Corporate influence on air quality	**= 0**
Other municipal influence on air quality	**= 0**
Government (AEP) influence on air quality	**= 2**
Public influence on air quality	**= 2**

6.10 CRP, BRBC and CRAZ as bridging organizations

The author posited that CRP, BRBC and CRAZ were performing strategic bridging functions as bridging organizations, connecting otherwise unconnected provincial and municipal actors to industry, non-profits and members of the public and increasing social learning required for transforming municipal land-use decision-making and regional-scale natural resource management systems. Interview data was mapped and analyzed to determine first, the key function of the organizations according to the specific respondent; and second, whether the organizations' key functions, as identified by respondents aligned with the strategic bridging functions discussed in Chapter 4.

Table 6.20 below summarizes how respondent-identified key functions of CRP aligned with strategic bridging functions, followed by Table 6.21 for BRBC; and finally Table 6.22 for CRAZ. Interview respondents were asked to explain the purpose or objective of the organization, and the tables were compiled heuristically using a set of key words developed by the author for each strategic function based on the literature, and matching the key words consistently to interview responses. The tables provide good evidence that all the organizations are performing strategic bridging functions as bridging organizations, but probably not consciously or by design.

All twelve municipal members of CRP said they thought CRP seeks to connect those who would otherwise not be connected to address issues of growth and regional planning or regional challenges, by bringing people together to cooperate or collaborate. Five respondents identified that CRP was put in place to address growth, while six said the purpose of CRP was to engage in regional planning, and one respondent said CRP addressed "regional challenges."

In that same context, eight respondents said CRP provides an arena for learning, co-creation of knowledge, trust building or conflict resolution. Seven thought that CRP acts as facilitator, mediator or negotiator, but only four thought that CRP attracts expertise, knowledge and resources to address regional scale growth, regional planning, and regional scale planning challenges. This was surprising. According to CRP respondents, CRP performs most if not all of the strategic bridging functions described in the literature.

Table 6.20: Correlation of identified purposes of CRP with strategic bridging functions (Based on Crona and Parker, 2012)

	Purpose	Strategic Bridging Functions			
CRP Responders N=12	**Seeks to connect those who would otherwise not be connected** **Key words**: Bring together; interactions; connections, coordinate; collaboration; partnership; multi-stakeholder	**Provides an arena for learning, co-creation of knowledge, trust building or conflict resolution** **Key words:** Forums for education; advise; recommend; relations	**Acts as facilitators, mediators or negotiators** **Key words:** Facilitates; fosters; initiates; encourages; makes possible, enables; coordinates	**Attracts expertise, knowledge and resources** **Key words:** Experts; resources; funding; third party	**CRP Purpose or Objective**
Airdrie	•	•	•	•	Growth
Banff	•	•		•	Regional challenges
Black Diamond	•	•	•	•	Growth
Canmore	•	•	•		Regional planning
Calgary	•	•	•		Growth
Chestermere	•	•			Regional planning
Cochrane	•			•	Regional planning
Irricana	•				Growth
Nanton	•	•			Growth
Okotoks	•		•		Regional planning
Strathmore	•		•		Regional planning
Turner Valley	•	•	•		Regional planning

A different picture emerged when BRBC's actors were asked to describe the purpose or objective of BRBC, as illustrated in Table 6.21 below. However, unlike CRP, BRBC was provided with a mandate through Water For Life when they were approved as a WPAC. BRBC has been around in one form or another since 1992, and two of the original Board members were still on BRBC's Board for the 2014 to 2015 year.

Table 6.21: Correlation of identified purposes of BRBC with strategic bridging functions (Based on Crona and Parker, 2012)

	BRBC's Purpose		Strategic Bridging Functions		
BRBC Responders N=13	**Purpose or objective of BRBC**	**Seeks to connect those who would otherwise not be connected** **Key words:** **Bring together; interactions; connections, coordinate; collaboration; partnership; multi-stakeholder**	**Provides an arena for learning, co-creation of knowledge, trust building or conflict resolution** **Key words:** **Forums for education; advise; recommend; relations**	**Acts as facilitators, mediators or negotiators** **Key words:** **Facilitates; fosters; initiates; encourages; makes possible, enables; coordinates**	**Attracts expertise, knowledge and resources** **Key words:** **Experts resources research funding third party**
M101	Planning Forum Influencing	•	•	•	•
I102	Forum Advisors	•	•	•	
G103	Forum Facilitator Intervenors	•	•	•	
I104	Forum Collaborators Advisors	•	•	•	•
N105	Advisors		•		•
P106	Managers				•
I107	Advisors Managers	•			•
N108	Advisors Educators	•	•	•	•
N109	Forum	•	•	•	
M110	Managers				•
I111	Collaborators Information collectors Advisors Forum	•	•	•	•
G112	Managers	•			•
P113	Collaborators Planning Advisors Forums	•	•	•	•

Unlike respondents from CRP, respondents from BRBC did not agree about the purpose or objective of BRBC or why it arose in the Region. Most provided more than one purpose statement, but many indicated that one purpose could not be achieved without achieving others that were just as important, for example, providing a quarterly education forum, workshops, and advising the Province of emergent technology and gaps in policy.

BRBC's Board was made up of different sectors, with only two directors representing municipal governments, one who represented a municipality outside the Region. BRBC's Board members provided an array of purposes or objectives for BRBC in regional scale watershed governance, as follows: advising government (7); providing a forum (7); managing the watershed (4); collaborating (3); watershed planning (2); influencing (1); facilitating(1); intervening(1); information collation(1); and education (1). Almost all BRBC respondents had more than one purpose that they saw as inextricably connected: "you can't do one without the other" (Respondent P106).

A slightly different pattern emerged in BRBC when compared to CRP. Out of the thirteen respondents, ten thought that BRBC seeks to connect those who would otherwise not be connected. Nine respondents thought BRBC provides an arena for learning, co-creation of knowledge, trust building or conflict resolution, while eight thought that BRBC acts as facilitators, mediators or negotiators. Unlike CRP, the majority (ten) of the BRBC Board members thought that BRBC attracts expertise, knowledge and resources. The majority of BRBC respondents confirmed that they perform all the strategic bridging functions as a bridging organization in the Region.

CRAZ' Board members confirmed that CRAZ also functions as a bridging organization, but not to the same extent as either BRBC or CRP. This is illustrated in Table 6:22 below. When asked what is the purpose or objective of CRAZ, the overwhelming majority of the sixteen CRAZ respondents included "monitoring" (13) in their responses, but there were a variety of connected activities to monitoring that some CRAZ respondents felt were just as important. Some identified "data collection" as the objective (3), while others considered the "reporting" function as the most important (5).

A few respondents saw "awareness" of air quality issues as a primary function (3); while two (2) thought CRAZ's purpose was "air quality management." Other respondents thought "providing a roundtable for information exchange ;"(1); "influencing decision-making" (1) and "air management planning processes" (1) were primary objectives.

CRAZ' Board member purpose statements correlated to the strategic bridging functions in a completely different pattern than either CRP or BRBC. Of the fifteen respondents, seven said that CRAZ seeks to connect those who would otherwise not be connected. Nine said that CRAZ provides an arena for learning, co-creation of knowledge, trust building or conflict resolution, and only one respondent said that CRAZ acts as a facilitator, mediator or negotiator. However, unlike CRP or BRBC, **all** of CRAZ' respondents said that CRAZ attracts expertise, knowledge and resources.

CRAZ considered itself a purveyor of scientifically determined, defensible air quality monitoring data that is collected on behalf of the Province. CRAZ had a Technical Committee, and a Policy and Research Committee composed of experts who advised the Board and the Province about all aspects of air quality monitoring and management systems in the Region. CRAZ' Technical Committee included a part-time air quality analyst employed by CRAZ, as well as industry, municipal and government experts, such as Alberta Energy Regulator (AER), AEP and Alberta Health. The Policy and Research Committee was comprised of a retired policy analyst (volunteer), a lawyer (volunteer), and members from industry, municipalities and the general public. In February 2016, CRAZ remains the only one of nine airshed zones in Alberta with a Policy and Research Committee, providing policy advice to airsheds and the Province.

It is not surprising that CRAZ respondents did not identify CRAZ as a facilitator or mediator, because the Board was highly cohesive. Solutions to regional scale air quality management issues, if any, were resolved by the Technical Committee that worked closely with the Province, including AER and AEP. Conflict resolution was not required, because decisions were made by consensus. While the strategic bridging functions identified by CRAZ had a different focus than the other environmental governance organizations in the Region, CRAZ also functions as a bridging organization.

Table 6.22: Correlation of identified purposes of CRAZ with strategic bridging functions

	Strategic bridging functions				Purpose
CRAZ Responders N=12	**Seeks to connect those who would otherwise not be connected** **Key words**: bring together; interactions; connections, coordinate; collaboration; partnership; multi-stakeholder	**Provides an arena for learning, co-creation of knowledge, trust building or conflict resolution** **Key words:** Forums for education; advise; Recommend; relations	**Acts as facilitators, mediators/ negotiators** **Key words:** Facilitates; fosters; initiates; encourages; makes possible, enables; coordinates	**Attracts expertise, knowledge and resources** **Key words:** Experts Resources Funding Third party Data collection Analysis	**Purpose or objective of CRAZ**
P201	•			•	Monitoring
M202				•	Monitoring
P203		•		•	Monitoring Awareness
G204	•	•		•	Monitoring
I205		•		•	Monitoring Management
I206		•		•	Monitoring
I207		•		•	Awareness Data collection
G208				•	Monitoring Data collection
M209				•	Management Monitoring Reporting
P211	•	•		•	Roundtable Information Data collection
M212	•			•	Monitoring Reporting
G213	•	•	•	•	Monitoring Awareness Influencing
P214	•	•		•	Monitoring Reporting Management
N215	•	•		•	Process for monitoring, planning and reporting
P216				•	Monitor and report

6.11 Factors that facilitate or create obstacles to municipal collaboration

The eighteen respondents in the Municipal Network were asked what factors facilitated or created obstacles to municipal collaboration to address the identified primary environmental management issues. Factors that facilitated municipal collaboration are presented along with the number of municipalities who identified the same factor, or said something similar, followed by the factors that created obstacles to municipal collaboration in Table 6.23. See Appendix E for full details.

Clearly, having common goals and problems and money or grants for municipal collaboration were factors that facilitate municipal collaboration, while competition and costs created obstacles. While having different needs, conflicts due to personalities, and protectionist views created obstacles to municipal collaboration, network communications, geography and proximity, and the connections between landscapes and people were factors that facilitated collaboration.

Two municipal respondents stressed that municipal collaboration was facilitated by relationships built on credibility, respect and personal integrity, while previous dealings with other municipalities with poor relations definitely created obstacles to future collaboration.

Table 6.23: Factors that facilitate or create obstacles to municipal collaboration

Factors that facilitate municipal collaboration	**N=18**
• Common goals and problems	7
• Money/grants	6
• Networking and communications	5
• Geography and proximity	5
• Connections between people and landscape	5
• Willingness to collaborate	4
• Economies of scale	4
• History and sense of larger community	3
• Shared resources and degradation	3
• Openness/open mindedness	3
• Personalities and need for respect, integrity and credibility	2
Factors that create obstacles to municipal collaboration	
• Competition	7
• Money/costs/resources	6
• Size and different needs	4
• Personalities/ego/pride	4
• Protectionism/don't want to share	4
• Focus on different priorities	3
• No shared interest	2
• Lack of consensus	2
• Lack of respect, credibility or integrity based on past experiences	2

When respondents in the Municipal Network were asked what factors facilitated or created obstacles to participation in CRP, BRBC and CRAZ, the factors in Table 6.24 were provided. (See Appendix E.) Factors that facilitated municipal collaboration with the Networks included when common concerns and common goals were being addressed, as well as when the organizations provided a forum for knowledge acquisition. The two greatest obstacles to municipal collaboration with the organizations were when projects were not specific to municipal interests, and the time commitments required by municipal volunteers.

Table 6.24: Factors that facilitate or create obstacles to municipal collaboration with the environmental governance organizations

Factors that facilitate municipal collaboration with the Networks	**N=18**
• Addresses common concerns and future goals	6
• Access to knowledge	6
• Good understanding of different municipalities and their needs	3
• Common goals to manage growth	3
• Understanding purpose and outcomes	2
• Need for transit	2
• Interest of key personnel	2
• Provincial grants	2
• Access to experts	2
• Relationships	2
Factors that create obstacles to municipal collaboration with the Networks	
• Projects not specific to municipal interests	5
• Time	5
• Low priority among other municipal objectives	3
• Resources	3
• No obstacles	2
• Driven only by provincial interests	2
• Comes with strings attached	2
• Lack of communication	2
• Get nothing out of it	2

6.12 The Region's primary environmental management issues

The primary environmental management issues identified by Municipal Network respondents were the same issues that initially led to the emergence of CRP to address regional growth and regional-scale land use and water use issues; BRBC to address watershed issues, including security of supply, and more recently, water quality; and CRAZ to address air quality issues, such as emissions from regulated industry, and, more recently non-point source emissions from transportation systems (CRAZ, 2014).

Each respondent in the Municipal Network was asked to identify his or her community's primary land-use, water resource, and air quality management issues. Some respondents named more than one issue in each category. Primary issues were rolled up, and are shown in Table 6.25 below. Where only one respondent identified an issue that is noted in the "other" category.

Table 6.25: Primary environmental management issues in the Region, 2014

Land use management	Water quantity and quality management	Air quality management	Number who said something similar	Total number of respondents
Growth management			**4**	**N=18**
Need for more urban growth			3	
Protecting the environment during land development			2	
Fragmentation of agricultural lands			2	
Other – identified by 1 respondent				
	Security of water supply		**10**	**N=18**
	Servicing agreement/regional water supply		7	
	Flood protection		6	
	Water conservation		3	
	Capacity of water/wastewater treatment facility to accommodate growth		3	
	Managing storm drainage		2	
	Managing wetlands and riparian lands		2	
	Other –identified by 1 respondent			
		Emissions from agriculture, manufacturing and oil and gas	**8**	**N = 18**
		There is no issue	7	
		Idling	6	
		Controlling municipal GHG emissions	3	
		Monitoring and management	3	
		Dust from industry and transportation	3	
		Other –identified by 1 respondent.		

The respondent-identified primary land use, watershed, and airshed management issues are, respectively:

a) growth management,
b) security of water supply, and
c) emissions from agriculture and industry.

In February 2016, the same natural resource management issues that were identified in the late 2000's are largely unresolved by provincial and municipal decision-makers, but some best management practices have been developed and included in co-created natural resource management plans. Unfortunately, the co-created plans are implemented inconsistently on a voluntary basis by stakeholders and municipal members.

These primary natural resource management issues were used to select Alberta's environmental policies and legislation, plans, management frameworks, strategies, etc. (legal instruments) that municipalities would ordinarily rely on to find solutions to these problems in collaboration with the Province. Chapter 7 provides a list of the selected legal instruments, providing a rationale for their inclusion in the reflexivity analysis, and the reflexivity rating assigned to each legal instrument.

Chapter 7:

Reflexive Legal Analysis

7.1 Analyzing Alberta's environmental governance and management regime for reflexivity

Reflexive legal institutions and processes were reviewed to determine if they might be useful mechanisms for clarifying, legitimizing and supporting the work of bridging organizations in regional-scale environmental governance and management systems. The hypothesis was that, among other things Alberta's emergent legal institutions and instruments clarify, support and legitimize bridging organizations in their dual functions of:

- bridging environmental management policy gaps at the regional scale, and
- influencing municipal participation in environmental management systems.

As Ebbesson and Hey, (2013:25) explain, the legal subsystem of society plays a significant role in how people govern themselves (self-regulate) with respect to activities and interactions within an SES, and how both society and the ecosystem responds:

> Legal structures, principles, and processes, as well as core concepts of the rule of law, impinge on the capacity of societies to manage ecosystems, withstand environmental degradation as well as economic shocks, and rebuild and renew themselves afterwards. Law thus affects the resilience of social-ecological systems, positively or negatively, and it may more or less adequately match important notions of environmental and health governance and ecosystems management, such as:
>
> - dealing with uncertainties and surprises,
> - sustaining and absorbing stress, external interference, and complex change, whether human-made or not,
> - managing nonlinear effects and tipping points, and
> - adapting to new circumstances.

Ebbesson and Hey (2013: 25) also identified a number of factors for society to consider when developing laws and rules to control human behaviours in complex SES:

Resilience literature, while not homogenous, has identified a number of factors that foster our capacity to sustainably engage with social-ecological systems (e.g., Folke, 2006; Walter and Salt 2006; Ebbesson 2010; Biggs et al., 2012). Among these factors are:

- flexibility in social systems and institutions to deal with change;
- openness of institutions so as to provide for extensive public participation; and
- effective multi-level governance social structures that promote learning and adaptability without limiting options for future development.

Based on the qualitative research findings, and the author's experience, it appears that the bridging organizations in the Region address these factors both internally through adopted governance structures, and externally through interactions with governments, industry, non-profits, and members of the public. For example, the bridging organizations are flexible, inclusive and open with broad public participation, providing what Ebbesson and Hey (2013:25) promote as "effective multi-level governance social structures that promote learning and adaptability." They perform the necessary strategic bridging functions for successful implementation of natural resource adaptive management processes, programs and practices as described in the literature (Armitage et al., 2007; Fiorino, 2006; Ruhl, 2005; Walter and Salt, 2012). The CRP, BRBC and CRAZ will be referred to as bridging organizations for the remainder of the dissertation.

7.1.1 Developing the Matrix

Qualitative research interview data, as presented in Chapter 6, was used to identify municipal-respondent primary land use, water resource and air quality management issues in the Region. Those issues were then used to initially select 26 of Alberta's environmental laws, policies, plans and strategies etc. (the legal instruments) that municipalities would expect the Province to refer to when trying to resolve the issues, as shown in Table 7.1 below. Coincidentally, many of these same legal instruments were listed in the SSRP surface water and air quality management frameworks (the SSRP management frameworks) released by the Province (Government of Alberta, 2015b; 2015c) while the dissertation was being finalized. Each of the legal instruments listed in

Table 7.1 were examined against a list of 32 distinct reflexivity criteria compiled from the literature using the uniquely designed Matrix (Appendix G).

Table 7.1: List of legal instruments selected for reflexivity analysis

Document	Year	Type of legal instrument	Reason for inclusion
Legal instruments for land-use growth issues			
Municipal Government Act (MGA)	1994	Legislation	Land-use planning and development on private lands is regulated and controlled by local governments under Part 17 of the MGA.
Part 17.1: Growth management boards	2013	Legislation	Provides for incorporation of voluntary networks of participating municipalities "to provide for integrated and strategic planning for future growth in those municipalities" and gives effect to co-created "growth plans."
Alberta Land Use Policies (LUPS)	1996	Policy- Order in Council	Provincial policies to guide local government decision-making when matters of provincial concern, such as water and natural resources, transportation, etc. were considered during land-use planning and development.
Subdivision and Development Regulation (SDR)	2002	Regulation (MGA)	Regulation requires consultation with province with respect to provincially owned or regulated resources, such as bed and shores and land-uses regulated under EPEA or PLA.
Public Lands Act (PLA)	1980	Legislation	Planning and land development on public lands, including the beds and shores of permanent and naturally occurring water bodies is regulated and controlled through the PLA.
Public Lands Act Regulation (PLAR)	2011	Regulation (PLA)	New regulations flowing from impact of ALSA
Environmental Protection and Enhancement Act (EPEA)	1992	Legislation	Original environmental legislation to "protect and enhance" and ensure "wise use' all components of the environment, including land, water, and air.
Responsible Energy Development Act (REDA)	2013	Legislation	Provides a mandate to energy regulator (AER) for "efficient, safe, orderly and environmentally responsible development of energy resources" and to regulate disposition of public lands, protection of the environment and conservation and management of waver and wise allocation and use of water" in respect of energy development. Growth in oil and gas operations is identified as land use; water resource; and air quality issues in Region.

Document	Year	Type of legal instrument	Reason for inclusion
Agricultural Operations Practices Act (AOPA) and regulations	2000	Legislation and regulations	Agricultural land uses regulated and controlled under AOPA impact land, water and air. Agricultural emissions were identified as a primary air quality management issue in the Region.
Land-use Framework (LUF)	2008	Policy	First public consultation on cumulative impacts of land use on land base, water, air and biodiversity led to creation of LUF.
Alberta Land Stewardship Act (ALSA)	2010	Legislation	Reintroduces regional planning on a watershed-scale and provincial oversight. Land use decision-makers, such as municipal councils and Directors under provincial laws are required to comply with regional plans, such as SSRP.
Alberta Land Stewardship Regulation (ALSR)	2011	Regulation (ALSA)	Processes for reviews, variances and compensation based on rights of individual landowners.
South Saskatchewan Regional Plan 2014-2024 (SSRP)	2014	Regulation (Regional Plan ALSA)	Watershed-scale regional land use plan for Region.
Calgary Metropolitan Plan	2012	Regional-scale growth management plan	Does a bridging organization take a reflexive approach to planning? The plan was reviewed using reflexivity analysis.
Legislative scheme for Water Quality and Quantity – scarcity of supply			
Water Act	1999	Legislation	Security of water supply is addressed through licensing agreements and provincial water allocation system.
Framework for Water Management Planning	2001	Management Framework (*Water Act* requirement)	Security of water supply is addressed through managements framework
Irrigation Districts Act	1999	Legislation	Irrigation districts have licenses that allow them to supply water to municipalities.
Strategy for Protecting the Aquatic Environment	2001	Implementation tool (*Water Act* requirement)	Security of water quality-drinking water supply-addressed through healthy aquatic environment
Wastewater and Storm Drainage Regulation (AR 119/1993)	1993	Regulation	Security of water quality is addressed at the municipal scale through this regulation
Water For Life: Alberta's Strategy for Sustainability (W4L)	2003	Policy	The strategy for sustainability affects how water supply to meet the needs of Albertans will be achieved. Strategies to achieve the outcomes are partnerships, knowledge and conservation.

Document	Year	Type of legal instrument	Reason for inclusion
Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)	2006	Plan	Water management in the SSRB is done in accordance with the approved plan which affects municipal water supply.
SSRP Surface Water Quality Management Framework (WQMF)	2014	Management Framework /SSRP	Security of water quality is addressed through the SSRP Framework providing regional scale triggers, thresholds and limits.
Bow River Basin Watershed Management Plan Phase 2, 2012	2012	Phase 2 Bow Watershed Management Plan	Important governance document prepared by BRBC based on agreements among sectors.
Legislative scheme for Air Quality			
Clearing the Air: Alberta's Renewed Clean Air Strategy	2012	Policy	Emissions from agriculture and oil and gas at provincial and regional scales are addressed through EPEA and this policy document.
SSRP Air Quality Management Framework (AQMF)	2014	Management Framework (SSRP)	Regional scale triggers and limits are established through this policy for Nitrogen Dioxide, Ozone and Fine Particulate Matter
Protecting Alberta's Environment Act (PAEA)	2013	Established AEMERA	Applies to air and water monitoring, evaluating and annual reporting on identified indicators.
PMO3 Management Plan, 2008 (Revised in 2014)	2008	Management Plan for CRAZ	Identifies management strategies for all sectors in the Region: Managing PM 2.5 and O3

Source: Judy Stewart, November, 2014.

The Matrix organized 32 reflexivity criteria from Teubner's (1983) characteristics of reflexive law (see Table 7.3, below); Lobel's (2004:265) reflexive approaches to law-making; Fiorino's (2006:18-21) components of new environmental regulation and design principles; and Ruhl's (2005) alternatives to prescriptive regulation.

These 32 reflexivity criteria were cross-referenced with studies done by Cunningham and Sinclair (2002) about next-generation environmental regulation, and Brousseau et al.'s (2012) compilation of research papers addressing reflexive governance of global public goods, to ensure completeness and that the selected criteria were considered significant indicators of reflexivity in the literature.

Table 7.2: Characteristics of reflexive law: "new proceduralism" (Teubner, 1983:272-79)

Characteristics of reflexive law or "new proceduralism"
Law facilitates self-regulatory processes of communication and learning.
Law mediates between performance and function.
Law fosters mechanisms to further reflexion structures.
Law acts to install, correct and redefine democratic self-regulatory mechanisms.
Law guarantees coordination processes and compels agreement.
Law stimulates processes of social self-regulation.
Law's goal is to design organizational structures that have effective internal control.
Law utilizes and develops knowledge necessary to control self-regulatory processes.

Source: Judy Stewart, May, 2014.

First, the three identified major categories of reflexive approaches to law-making identified by Lobel (2004:265) as being "process orientation and tailoring to local circumstances" were correlated with Fiorino's (2006:18-21) components of new environmental regulation that Fiorino grouped into three categories: "reflexive law;" "the emergence of social-political governance;" and "the trend toward policy learning," as shown in Table 7.3 below.

Table 7.3: Correlation of Lobel's (2004) reflexive approaches to law-making and Fiorino's (2006) components of new environmental regulation

Lobel – 2004	Fiorino - 2006
Interpenetration of policy boundaries	Reflexive legal processes
New public/private partnerships	Social-political governance
Next generation policy strategies	Policy learning

Source: Judy Stewart, March, 2014.

Second, the Matrix organized the 32 reflexivity criteria under four major categories, and each criterion was assigned 3 possible points for a total of 96 possible points, as follows:

- **Interpretation of policy boundaries**: 11 criteria for a total possible 33 points;
- **New public/private partnerships**: 7 criteria for a total possible 21 points;
- **Next-generation policy strategies**: 6 criteria for a total possible 18 points; and
- **Teubner's new proceduralism**: 8 criteria for a total possible 24 points.

The author applied a heuristically developed evaluation metric to assign 1 to 3 points to each legal instrument measuring against each criterion, as shown in Table 7.4 below.

Table 7.4: Evaluation metrics for each major category of reflexivity criteria

General evaluation criteria

0. No indication
1. Reference to interpenetration of policy boundaries (e.g. policy integration is mentioned)
2. Process articulated that requires some interpenetration of policy boundaries to develop policy or environmental management plans (e.g. requires a multi-sectorial and /or multi-level team)
3. Statutory provision requiring interpenetration of policy boundaries to develop policy or environmental management plans (e.g. must ensure that cross ministry group is consulted before management system is changed

Evaluation criteria for allocation of resources

0. No allocation
1. Resources allocated project by project but no overall scheme
2. Resources allocated for some operations and project work as part of a scheme for prescribed operations and project work upon application through clearly established scheme that requires monitoring and reporting of how the funds will be used
3. Resources allocated through funding mechanism for overall operations and projects without application-it is formalized with annual audit and reporting mechanisms with presentations to government.

Evaluation criteria for "next-generation policy"

0. None
1. Limited
2. Some opportunities for most, where improvements can be shown
3. Codified as a standard practice

Evaluation criteria for Teubner

0. No reflexivity
1. Limited reflexivity
2. Mostly reflexive
3. Reflexive

Ratings were given a final score based on total score out of possible 96 points and rated in equal increments of 24 points

0 - 24	Least reflexive
25 - 47	Limited reflexivity
48 - 71	Moderately reflexive
72 – 96	Most reflexive

(Criteria compiled from literature. Lobel, 2004; Fiorino, 2006; Ruhl, 2004; Teubner, 1983.)

Source: Judy Stewart, December, 2014.

As new legislation, policies, plans, strategies emerged for environmental regulation and management between September 2014 (such as SSRP) and December, 2015 (the SSRP management frameworks), those emergent instruments were also rated for reflexivity using the same criteria and evaluation metrics. Reflexivity ratings for each instrument were assigned a numerical value on a 0-96 point scale. Instruments that received a rating of 0-24 were considered the least reflexive, while those that received a rating of 72-96 were considered most reflexive. Instruments that received a score of 25-47 were rated as having limited reflexivity, and scores of 48-71 were rated as moderately reflexive. Most of Alberta's current legislation and regulations for natural resource management rated between 0-24, and are the least reflexive environmental legal instruments in Alberta. The Matrix was also useful for identifying emerging policies and laws where the Province has incorporated reflexive legal processes that require partnerships with bridging organizations.

7.1.2 Using the Matrix to rate reflexivity

The following five tables present the reflexivity analysis results for Alberta's policies, laws, regulations, plans, strategies, etc. that municipalities would expect the Province to rely upon to address the identified primary environmental management issues. First, Table 7.5 provides the colour scheme and numbering system used in the Matrix and reflexivity analysis. The least reflective laws and policies have the lightest shading, and the most reflexive are darkest.

Table 7.5: Colour scheme and numbering for reflexivity analysis

0 Least Reflexive **Most reflexive 96**

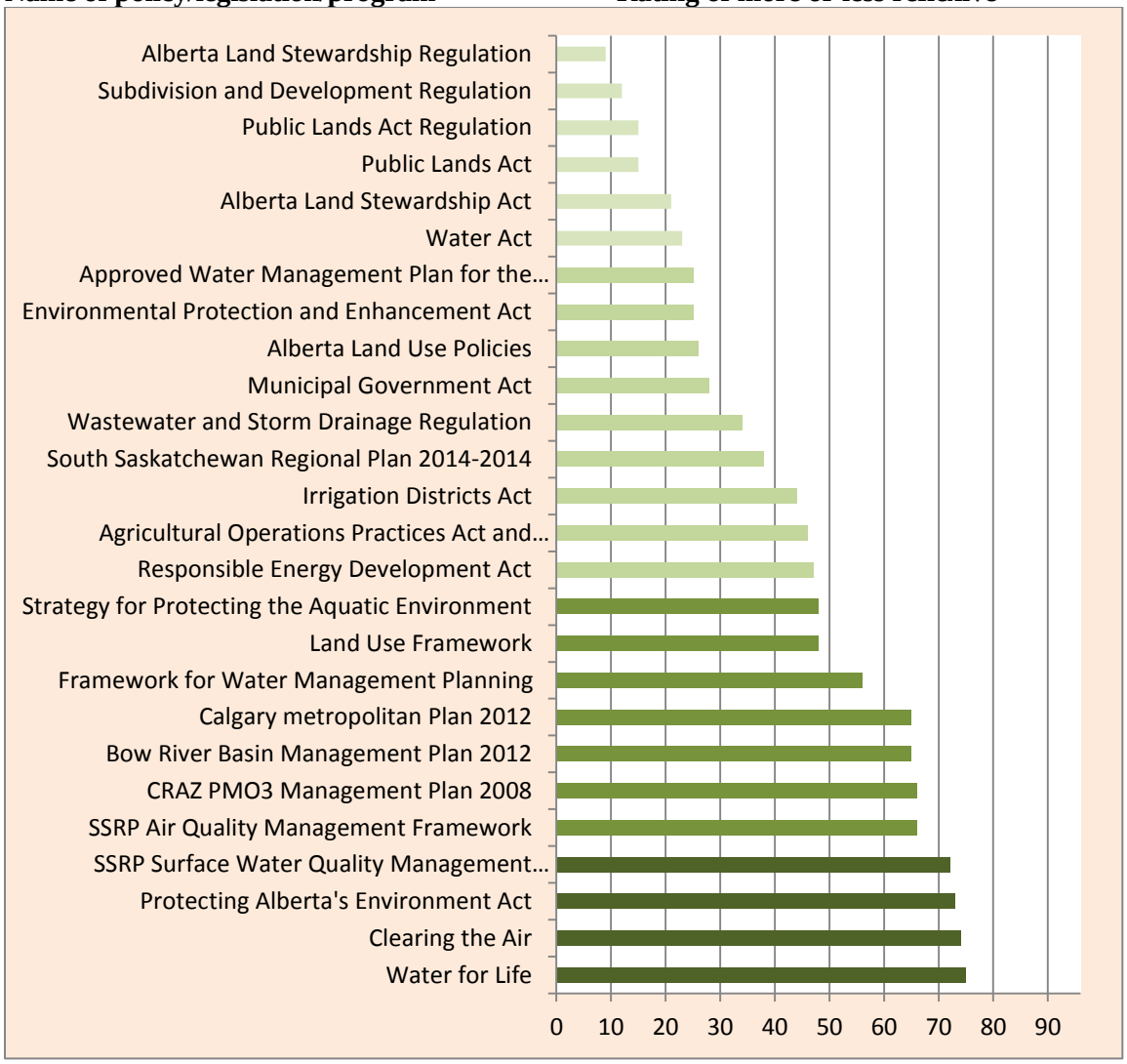
Source: Judy Stewart, December, 2014.

Second, Table 7.6 provides the reflexivity analysis for the Alberta's environmental legislative regime for managing the respondent-identified primary land use, watershed,

and airshed management issues in the Region. As illustrated in Table 7.6, there was no correlation with respect to date of adoption of a policy or enactment of a law and the reflexivity rating: for example, Water For Life adopted in 2004 was more reflexive than ALSA which was enacted five years later in 2009: more recently adopted or enacted instruments were not necessarily more reflexive than those enacted or adopted in the early 2000's. Alberta's "strategy" documents, like Water For Life, Clearing the Air, and the SSRP management frameworks received the rating of most reflexive.

Table 7.6: Reflexivity analysis of legislative regime for environmental management in the Region

Name of policy/legislation/program **Rating of more or less reflexive**

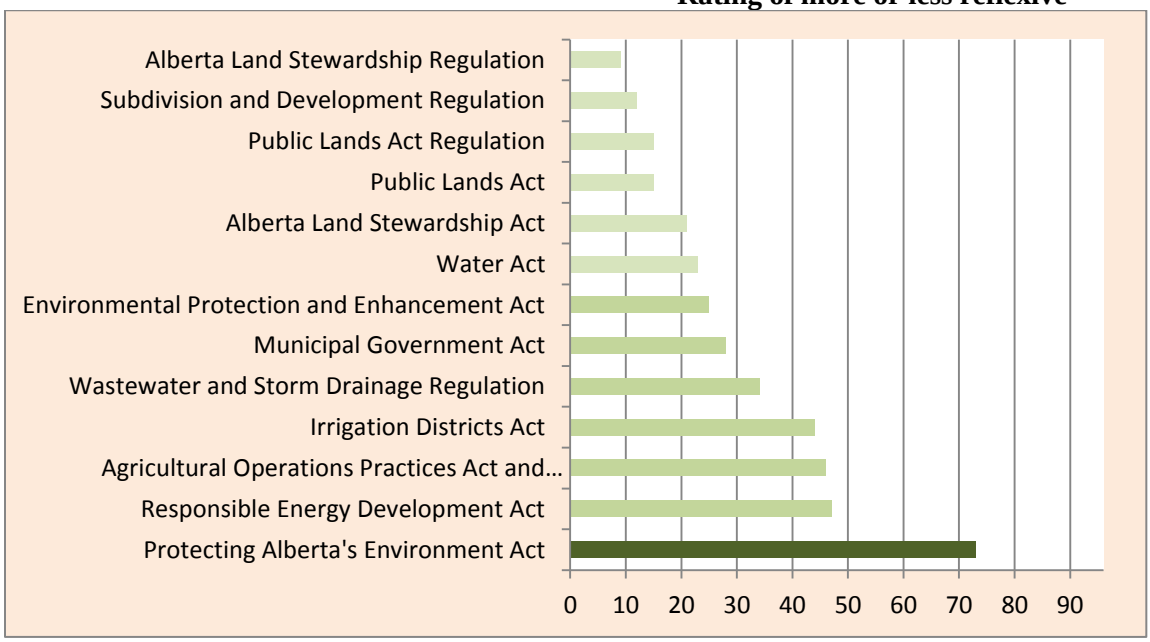


Source: Judy Stewart, December, 2014.

Of all the Alberta policies and laws analyzed through the Matrix, Water For life, adopted as policy in 2004 was the most reflexive instrument, and the *Alberta Land Stewardship Regulation*, enacted in 2011 was the least reflexive. Both LUF and SSRP, adopted between 2008 and 2014, were only moderately reflexive, and ALSA, enacted in 2009 was even less reflexive than the *Water Act* enacted ten years earlier in 1999. The *Alberta Land Stewardship Regulation*, that operationalizes ALSA, was the least reflexive document analyzed, even less reflexive than the *Public Lands Act* and regulation.

Third, Table 7.7 provides reflexivity analysis for environmental laws and regulations only. Generally, laws and regulations received a lower reflexivity rating than policies, strategies and plans, except for the *Protecting Alberta's Environment Act* that was enacted in 2014 to create the Alberta Monitoring Evaluating and Reporting Agency (AEMERA).

Table 7.7: Reflexivity analysis of environmental laws and regulations



Source: Judy Stewart, December, 2014.

Alberta regulations were the least reflexive of all legal instruments analyzed, and this made sense because they require compliance and rely on the coercive powers of the Province for enforcement against non-compliance.

The *Water Act*, enacted in 1999 was one of the least reflexive legal instruments, even though water management planning was enabled by that legislation. EPEA, enacted in 1992 was more reflexive than the *Water Act* and so were the MGA, enacted in 1994, and the *Irrigation Districts Act* enacted in 1999. Of all the regulations, the *Wastewater and Storm Drainage Regulation*, enacted in 1993 received the highest reflexivity score, however overall it was rated as only having limited reflexivity.

Fourth, Table 7.8 provides reflexivity ratings for provincial policies, strategies, programs and regional plans, such as SSRP.

Table 7.8: Reflexivity analysis of policies, strategies, frameworks and plans

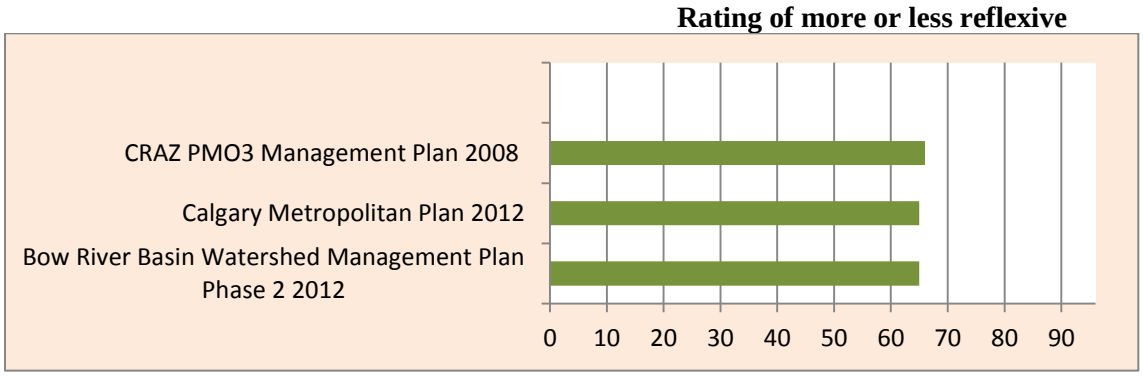
Source: Judy Stewart, December, 2014.

Alberta's environmental policies, strategies and management frameworks received the highest reflexivity scores. Even the *Alberta Land Use Policies*, adopted by the Department of Municipal Affairs in 1996 to provide guidance to municipalities when making decisions about land development on private lands received a higher reflexivity score than the *Water Act*.

Finally, Table 7.9 below illustrates that the environmental governance organizations' co-created natural resource management plans received similar moderately reflexive ratings. The original co-created plans were used for analysis, and after the research data was compiled the CMP and the PMO3 Plan were both revised. The 2014

versions were also analyzed for reflexivity, and retained the same reflexivity ratings as the original plans.

Table 7.9: Reflexivity analysis of co-created natural resource management plans



Source: Judy Stewart, December, 2014.

Table 7.10 provides a breakdown of the reflexivity scoring of the selected environmental legal instruments for addressing the primary resource management issues, presenting the instruments in chronological order from oldest to most recent. The ratings are broken down in the four major 'reflexivity criteria ' categories, illustrating an evolution in Alberta's application of reflexive theory. Generally, environmental laws and regulations demonstrate few characteristics of reflexive law and reflexive approaches to law-making, while policies strategies, plans and guidance documents, especially those adopted since 2000 demonstrate many of reflexive characteristics and approaches to law-making.

Alberta's most reflexive environmental legal instruments are highlighted in Table 7.10, illustrating that Water For Life and the strategy's guidance document, *Enabling Partnerships*, adopted by the Province in the early 2000s were rated as most reflexive. Of all the environmental laws selected to be assessed, only the *Protecting Alberta's Environment Act* enacted in 2013 to enable the constitution of AEMERA was rated as most reflexive.

Generally, many of Alberta's environmental legal instruments illustrated an evolutionary trend toward incorporation of reflexive approaches to law-making. The criteria used to assess whether the legal instrument reflected 'interpenetration of policy

boundaries', or what Fiorino (2006) refers to as 'reflexive law,' were incorporated in Alberta's environmental legal instruments more often and to a greater extent than 'next-generation policy strategies' or what Fiorino (2006) refers to as 'policy learning.' These illustrated trends are reflected in the Framework in Chapter 8.

Table 7.10: Summary of reflexive legal characteristics and approaches to law-making

	Most evolved →				**Least evolved**
Instrument and year of adoption or enactment	**Characteristics of reflexive law** **Law as proceduralism** Teubner (1983)	**Reflexive approaches to law-making** Lobel (2004) Fiorino (2006) **Process oriented and tailored to local circumstances**			**Least** **Limited** **Moderate** **Most** **Rating**
Legislative scheme for land-use growth issues		**Interpenetration of Policy Boundaries (Reflexive Law)** **Possible score 33**	**New public /private partnerships (Social-political governance)** **Possible score 21**	**Next-generation policy strategies (Policy learning)** **Possible score 18**	**Total score /96**
***Public Lands Act (PLA)* 1980**	5/24	2/33	7/21	1/18	15/96 Least
***Environmental Protection and Enhancement Act (EPEA* 1992**	5/24	4/33	11/21	5/18	25/96 Limited
***Municipal Government Act* 1994**	14/24	4/33	5/21	5/18	28/96 Limited
***Alberta Land Use Policies (LUPS)* 1996**	10/24	4/33	7/21	5/18	26/96 Limited
***Agricultural Operations Practices Act (AOPA) and regulations* 2000**	14/24	16/33	11/21	5/18	46/96 Limited

Instrument and year of adoption or enactment	Characteristics of reflexive law	Reflexive approaches to law-making			Rating
Subdivision and Development Regulation (SDR) **2002**	6/24	3/33	3/21	0/18	12/96 Least
Land-use Framework (LUF) **2008**	7/24	22/33	10/21	9/18	48/96 Moderate
Alberta Land Stewardship Act (ALSA) **2010**	8/24	6/33	4/21	3/18	21/96 Least
Alberta Land Stewardship Regulation (ALSR) **2011**	3/24	3/33	3/21	0/18	9/96 Least
Public Lands Act Regulation (PLAR) **2011**	5/24	2/33	7/21	1/18	15/96 Least
Calgary Metropolitan Plan 2012	21/24	15/33	16/21	13/18	65/96 Moderate
Responsible Energy Development Act (REDA) **2013**	16/24	11/33	13/21	7/18	47/96 Limited
Growth management board provisions MGA, Part 17.1 **2013**	24/24	19/33	15/21	11/18	69/96 Moderate

Instrument and year of enactment or adoption	Characteristics of reflexive law	Reflexive approaches to law-making			Rating
Legislative scheme for water quality and scarcity of supply					
Wastewater and Storm Drainage Regulation (AR 119/1993) **1993**	13/24	7/33	8/21	6/18	34/96 Limited
Water Act **1999**	6/24	7/33	7/21	3/18	23/96 Least
Irrigation Districts Act **1999**	16/24	11/33	9/21	8/18	44/96 Limited
Framework for Water Management Planning **2001**	21/24	21/33	11/21	3/18	56/96 Moderate
Strategy for Protecting the Aquatic Environment **2001**	12/24	22/33	11/21	3/18	48/96 Moderate
Water For Life: Alberta's Strategy for Sustainability (W4L) **2003**	24/24	26/33	15/21	10/18	75/96 Most
Enabling Partnerships 2004	24/24	28/33	18/21	8/18	78/96 Most **
Approved Water Management Plan for the South Saskatchewan River Basin (Alberta) **2006**	7/24	11/33	6/21	1/18	25/96 Limited

Instrument and year of adoption or enactment	Characteristics of reflexive law	Reflexive approaches to law-making			Rating
Bow River Basin Watershed Management Plan Phase 2, 2012	17/24	25/33	12/21	11/18	65/96 Moderate
***SSRP Surface Water Quality Management Framework (WQMF)* 2014**	16/24	28/33	17/21	9/18	72/96 Most
Legislative scheme for air quality					
PMO3 Management Plan 2008 Revised in 2014	18/24	27/33	12/21	9/18	66/96 Moderate
Clearing the Air: Alberta's Renewed Clean Air Strategy **2012**	16/24	28/33	19/21	11/18	74/96 Most
Protecting Alberta's Environment Act (PAEA) **2013**	19/24	27/33	18/21	9/18	73/96 Most
SSRP Air Quality Management Framework (AQMF) **2014**	14/24	28/33	13/21	11/18	66/96 Moderate

Source: Judy Stewart, December, 2015.

In 2013, the MGA was amended to add provisions to enable municipalities to voluntarily participate in formation of growth management boards. Those boards were enabled to co-create growth plans that have statutory effect on land use decision-making for lands within the boundaries of the participating municipalities. The provisions were

analyzed for reflexivity and received a score of 69/96, and a moderately reflexive rating. While those provisions met all of Teubner's 'characteristics of reflexive law', and satisfied many of the criteria of 'reflexive approaches to law-making' in all three areas, there were no provisions that mandated opportunities for public involvement in creating the growth plans or amending the plans. While there were provisions for passing a bylaw to establish rules for appeals or protocols for dispute resolution concerning growth management board decisions, it was unclear who would have standing to appeal or launch such a dispute.

7.2 Principles of environmental policy and law in Alberta

The Framework to support and legitimize bridging organizations in regional-scale environmental governance will need to reflect society's values, and generally accepted principles of environmental policy and law that have evolved in the Alberta liberal democratic context. To determine what these might be, the author looked to Alberta's Environmental Law Centre (hereinafter ELC), a non-profit environmental organization that provides critique and makes recommendations to improve Alberta's environmental legal system. Working within the natural resource regulation and management system in Alberta, the ELC released a brief entitled *Core Environmental Principles for Environmental Laws, Policies and Legal Process* (ELC, 2012:1). These principles are, as follows:

- sustainability;
- precautionary principle;
- pollution prevention;
- polluter pays;
- cumulative impacts;
- intergenerational equity; and
- public participation.

According to the ELC (2012:1), "in addition to these core environmental principles, environmental laws, policies and processes must be: constantly improving; reflect and contribute to evidence based best practices, and be open, transparent, and accountable." The principle of subsidiarity might be added to this list to recognize legal pluralism that exists in every region of the Province (see Armitage et al., 2007: 33). But subsidiarity as

a foundational principle of environmental law has never caught on in Alberta, except in the context of nested scales of jurisdiction and decision-making, for example, local, regional, provincial, federal scales and corresponding hierarchies of laws and institutional arrangements. The ELC (2012:1) was careful to note that the brief did "not provide analysis of how successfully these core environmental principles have been implemented in Alberta."[18] What follows is an attempt to provide such an analysis.

To date, Alberta's legal system for regulating and managing human interactions in and with the ecosystem and use of natural resources does not reflect all these core principles, but an evolving pattern of principles embedded in Alberta's policies and laws can be discovered. To illustrate this evolution, Table 7.11 below compares ELC's core environmental principles with the principles articulated in a small sample of seven of Alberta's environmental policy and regulatory instruments. The colours (from lighter to darker shades) indicate the evolution of reflexivity principles over time. Lighter shades are the earliest stages of development and darker shades represent more evolved system principles. For example, the ELC's core principles of sustainability, public participation, and evidence-based or knowledge based decision-making have been entrenched in Alberta's environmental policy and regulatory instruments together with principles of policy integration and flexible implementation. However many of the ELC's so-called core principles have never been part of Alberta's environmental legal system, for example, the precautionary principle; while others have emerged only recently such as cumulative impacts assessment and management, transparency and continuous improvement.

Water For Life provides the only policy where the Province has recognized limits to supply. The LUF recognized limits to land supply in background materials distributed

[18] For an example of how these core principles have been enacted in law, see the Quebec *Sustainable Development Act*, CQLR, c D-8.1.1

during public consultation,[19] but this principle was not stated as an overarching principle for land use management for either private or public lands in Alberta.

Table 7.11: Comparing ELC's list to the evolution of Alberta's environmental legal principles

Core principle/ Policy. law, strategy	EPEA 1992	Water Act 1999	Framework for Water Management Planning 2001	Water For Life 2003	LUF 2008	Clean Air Strategy 2012	IRMS 2014
Sustainability	•	•			•	•	
Precautionary principle							
Pollution prevention	•			•			
Polluter pays	•						
Cumulative impacts							•
Intergenerational equity		•					
Public participation/ Consultative	•		•			•	
Continuous improvement/ adaption						•	•
Evidence or knowledge based	•		•	•	•		•
Open							
Transparent					•	•	
Accountable			•		•		
Integrated	•	•	•		•	•	
Government leadership	•			•			
Shared responsibility	•	•		•	•		
Cooperation with other governments transboundary	•	•					
Comprehensive	•	•	•				•
Responsive	•		•				
Flexible		•	•				•
Need for economic growth and prosperity	•	•		•			
Sound planning, regulatory action and market forces		•					
Proactive and predictable			•				

[19] The author was a member of the *Land-use Framework* governance working group during public consultations, and the concept of limits to land supply were discussed in depth and in discussion draft documents during the working group sessions.

Core principle/ Policy. law, strategy	EPEA 1992	Water Act 1999	Framework for Water Management Planning 2001	Water For Life 2003	LUF 2008	Clean Air Strategy 2012	IRMS 2014
Fairness			•		•		
Timely			•		•		
Results oriented			•				
Clear and understandable			•				
Responsibility					•		•
Land stewardship ethic					•		
Collaborative					•		•
Equitable					•		
Respectful of rights				•	•		
Limits to supply				•			
Regional scale				•			•
Outcomes driven							•
Future focused							•

Source: Judy Stewart. December, 2014.

A transition of principles underlying Alberta's environmental legal system is also evident. For example, principles of polluter pays and shared responsibility have been replaced with principles of collaboration, continuous improvement, and place-based decision-making at the watershed-scale. While principles underlying Alberta's environmental legal system seem to be still evolving incrementally, the author suggests that the Province has come a long way in recognizing that SES are unpredictable and uncertain, and therefore need flexibility in policy implementation.

As Table 7.11 illustrates, there has been a progression of principles entrenched in policy and law. For example, in 2001 the Province released the *Framework for Water Management Planning* (Government of Alberta, 2001) which provided the following key principles for integrated resource management: comprehensive and integrated; proactive and predictable; responsive and flexible; consultative; fairness; knowledge-based; timely and results oriented; accountable; and clear and understandable. In 2008, the LUF key principles for regional land-use policy were listed as sustainability; accountability and responsibility; land stewardship ethic; collaborative and transparent; integrated; knowledge-based; responsive; fair, equitable and timely; respectful of private property rights; and respectful of the constitutionally protected rights of aboriginal communities.

In 2012, the Clearing the Air strategy streamlined core principles, as follows: sustainability; continuous improvement; inclusiveness; policy efficiency; and transparency. Since 2000, an evolution of core principles with respect to integrated resource management can be tracked, showing a trend moving away from predictability and certainty and moving toward sustainability, knowledge-based decision-making, policy integration, collaboration, and continuous improvement. (Continuous improvement has sometimes been used in the context of adaption and adaptive systems and as part of a CEM system.) The Province has not defined sustainability or CEM in any law or developed any procedures to enable citizens to participate in sustainability or CEM systems. Only recently, the Province (Government of Alberta 2013a) explained what it meant by CEM, but CEM activities are not clearly understood or implemented on a regular basis by stakeholders at any scale.

The Province remains consultative rather than collaborative when working with environmental governance organizations, such as CRP, BRBC and CRAZ, retaining total authority and control over resource management, and resource allocation and use. This is evident in a recently released document entitled *"Working With Others in Integrated Resource Management: Multi-Stakeholder Organization Review Final Report and Recommendations"* (Government of Alberta, 2014d) which illustrates the Province's dilemma with respect to partnering and working with emergent regional-scale voluntary multi-stakeholder groups. While the Province has had representation on environmental governance organizations throughout the Province since the early 1990s, the government may be trying to articulate their distinct roles and responsibilities in provincial and regional-scale environmental governance and management. The emergence of provisions to enable growth management boards under the MGA is a recent example of incremental steps the Province is taking to legitimize voluntary collaboration among municipalities to co-create growth plans for lands within the boundaries of participating municipalities.

7.3 Alberta's use of systems theory in environmental regulation and management

In 2014, the Province redefined its legal institutions for natural resource management as "systems:" for example, the IRMS and CEM system. On the Province's

"Alberta Oil Sands" website (Government of Alberta, 2015c), "integrated resource management" means that:

> Instead of looking at impacts on a project-by-project basis, Alberta's new Integrated Resource Management System is all about ensuring we understand the impact our growth has on our communities, our environment and each other as a whole. This coordinated approach includes setting and achieving environmental, economic, and social outcomes Albertans expect from resource development, while maintaining the social license to develop these resources.

On the Alberta Oil Sands website, four emergent legal institutions were provided that are expected to achieve integrated resource management, primarily in the oil and gas sector, as follows:

- **A Single Energy Regulator (Alberta Energy Regulator)**
  Legislation has passed to create an arm's length single body to regulate oil, gas, oil sands and coal development. Having a one-window, transparent approach will improve regulatory standards, monitoring and enforcement.
- **Environmental Monitoring (Alberta Environmental Monitoring, Evaluating and Reporting Agency)**
  Alberta is firmly committed to an integrated resource management framework with a world-class monitoring system as its foundation. We are building a credible, transparent and science-based environmental monitoring system...
- **Land-use Planning (Land Use Secretariat)**
  Alberta is developing seven long-term Land-use plans based on the province's major watersheds under our Land-use Framework. Land-use plans are about the priorities that Albertans value and share—economic growth that brings good jobs, vibrant communities, and a clean and healthy environment.
- **Aboriginal Consultation (Aboriginal Consultation Office)**
  Aboriginal people are uniquely positioned to inform integrated resource management initiatives like environmental monitoring due to their close connection with the ecosystem…

These components of IRMS reflect Alberta's incremental steps from top-down substantive law to prohibit or regulate and control human activities that are known to negatively impact the environment, to more reflexive legal institutions. However, to date in February 2016, information about IRMS is only provided on the Alberta's Oil Sands website, and not the Alberta Environment and Parks (AEP) website.

The Province's IRMS incorporates a mixture of substantive law and regulation and next-generation policy, regulation, and information tools (Gunningham and Sinclair, 1999; Ruhl, 2005; Lobel, 2004; Fiorino, 2006; Brousseau, et al., 2012; Conteh, 2013; Hatch and Cunliffe, 2013). In the past, top-down regulatory intervention may have worked relatively well to control point-source pollutants, such as end of pipe emissions into the air, and total loading of contaminants into water resources from sewage treatment plants. But, as in other countries in the world, there are no existing regulations to control the cumulative effects of non-point sources of pollution, such as emissions from day to day use of construction or off-road recreational vehicles, or urban and rural spring runoff that causes significant sedimentation and erosion within receiving waterbodies (Ruhl, 2005: 21-23; Lobel, 2004; Fiorino, 2006; Brousseau, et al., 2012; Conteh, 2013; Hatch and Cunliffe, 2013).

Table 7.12 below illustrates new legal institutions and instruments recently put in place by the Province under the IRMS umbrella for the energy sector. Environmental monitoring at a watershed-scale appears to be the new order of the day along with watershed-scale land use planning (SSRP, 2014), and CEM, (Government of Alberta, 2014e). CEM seems to be the new management concept for how the Province will use environmental management systems and monitoring feedback to regulate and control the environmental impacts of continued population and economic growth. While the Province provided some clarity around CEM, it is still not known among stakeholders engaged in the bridging organizations how CEM will be implemented, by whom, where, and when. Currently, all that can be gathered is that CEM is to be implemented by the Province when issuing licenses and approvals, while they try to manage feedbacks in complex, dynamic SES at a watershed-scale (Government of Alberta, 2014e). CEM seems to be based on provincially set limits, with triggers to different levels of natural resource management response when thresholds are close to being reached. For example, the SSRP management frameworks both require four different levels of management responses, illustrating an adaptive approach to managing natural resources in complex, dynamic SES. In both of SSRP's management frameworks, municipal bylaws are

identified as appropriate management responses at all four levels. In reality, there are no existing municipal bylaws because municipalities have no jurisdiction to pass bylaws for natural resource management, *per se*, although they do have general jurisdiction to regulate human activities that may impact local public health and welfare.

Table 7.12: Alberta's IRMS components, with detailed legislation, regulations, polices and institutions

Component	Legislation	Regulation(s)	Policy Instrument (s)	New Institutions
Single energy regulator	***Responsible Energy Development Act***, SA 2012, c R-17.3 (REDA)	*Alberta Energy Regulator Administration Fees Rules*, Alta Reg 98/2013 *Alberta Energy Regulator Rules of Practice*, Alta Reg 99/2013 *Responsible Energy Development Act General Regulation*, Alta Reg 90/2013 *Security Management for Critical Upstream Petroleum and Coal Infrastructure Regulation*, Alta Reg 91/2013	***2013-2016 Alberta Strategic Plan*** ***Provincial Energy Strategy*** **Alberta Responsible Energy Policy System (AREPS)** "The AREPS is an information portal which allows interested Albertans to view policies that affect their area. Initially, policies and procedures in this system are specific to upstream oil, gas, oil sands and coal will be fully searchable on the policy owner's domain. Future enhancements will include policies related to public lands, seismic activities, the environment and water, as well as location-specific information."	**Alberta Energy Regulator:** **Replaces:** Energy Resources Conservation Board **Regulated Procedural Rules:** *Alberta Energy Regulator Rules of Practice*, Alta Reg 99/2013 **Application of Rules:** These Rules apply to all proceedings of the Regulator, other than appeals under (a) the *Alberta Energy Regulator Administration Fees Rules*, or (b) section 76 of the *Oil and Gas Conservation Act*. **Appointment of Hearing Commissioners** *Alternative Dispute Resolution Guidelines*

Component	Legislation	Regulation(s)	Policy Instrument (s)	New Institutions
Environmental monitoring system	***Alberta Land Stewardship Act,*** S.A. 2009, c. A-26 (ALSA) REDA	***Alberta Land Stewardship Regulation***, Alta Reg 179/2011 ***Conservation Easement Registration Regulation***, Alta Reg 129/2010	***Land-use Framework*** *Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring* Federal *Integrated Oil Sands Environment Monitoring Plan* **Regulatory Enhancement Project**	**Environmental Monitoring Agency** **Alberta Environmental Management Board to develop agency.**
Land-use planning	ALSA	*Alberta Land Stewardship Regulation*, Alta Reg 179/2011 *Conservation Easement Registration Regulation*, Alta Reg 129/2010 *Lower Athabasca Regional Plan* (LARP) *South Saskatchewan Regional Plan* (draft) (SSRP)	*Land-use Framework* https://landuse.alberta.ca/LandUse%20Documents/Landuse%20Framework%20-%202008-12.pdf *Water For Life: Alberta's Strategy for Sustainability and Water For Life Renewal* http://environment.gov.ab.ca/info/library/8035.pdf ***Clearing the Air: Alberta's Renewed Clean Air Strategy, 2012*** http://www.environment.alberta.ca/03839.html *Cumulative Effects Policy Paper:* http://environment.alberta.ca/03343.html	**Regionalism and Plans** **Regional Advisory Councils** (to recommend regional planning considerations) **Land Use Secretariat** **Cumulative Effects Management Frameworks** https://landuse.alberta.ca/CumulativeEffects/EnvronmentalMgmtFrameworks/Pages/default.aspx Environmental Management System
Aboriginal consultation	ALSA	*Alberta Land Stewardship Regulation*, Alta Reg 179/2011	*Land-use Framework* *The Government of Alberta's Policy on Consultation with First Nations on Land and Natural Resource Management, 2013.*	**Procedures** *The Government of Alberta's Corporate Guidelines for First Nations Consultation Activities, 2013* *First Nation Consultation Matrix*

Source: Judy Stewart, November, 2014, based on Government of Alberta websites.

CEM emerged as one of the Province's key legal institutions for watershed-scale land use management (LUF and ALSA), but, oddly, CEM is not mentioned within the IRMS for regulating bitumen, oil, gas and coal production. ALSA includes management of "cumulative effect of human endeavour and other events" in its purpose statement, but does not define the term, and there is no regulation to provide direction as to who is responsible for CEM, or how it will be achieved at the watershed-scale. As it stands, the Province is the only entity engaged in CEM.

ALSA: Purposes of Act[20]

1(1) In carrying out the purposes of this Act as specified in subsection (2), the Government must respect the property and other rights of individuals and must not infringe on those rights except with due process of law and to the extent necessary for the overall greater public interest.

(2) The purposes of this Act are

(a) to provide a means by which the Government can give direction and provide leadership in identifying the objectives of the Province of Alberta, including economic, environmental and social objectives;

(b) to provide a means to plan for the future, recognizing the need to manage activity to meet the reasonably foreseeable needs of current and future generations of Albertans, including aboriginal peoples;

(c) to provide for the co-ordination of decisions by decision-makers concerning land, species, human settlement, natural resources and the environment;

(d) to create legislation and policy that enable sustainable development by taking account of and responding to **the cumulative effect of human endeavour and other events**. (Emphasis added,)

On the AEP website (2016), CEM is explained and included the development of "management frameworks" as a strategy for managing "cumulative impacts and multiple activities (and parties) in a particular area." The website information provided is as follows:

> Cumulative effects are the combined effects of past, present and foreseeable human activities, over time, on the environment, economy and society in a particular place.

[20] *Alberta Land Stewardship Act*, SA 2009, c.A- 26.8 s.1; 2011 c.9 s.2.

Currently in Alberta, development that requires provincial approval is generally reviewed on a case-by-case basis. While this has allowed regulators to understand individual impacts, over time this approach has become inefficient and less responsive to place-based challenges.

Alberta needs a more effective and efficient management system that considers the cumulative effects of all activities. The current system is evolving and adapting to place-based challenges, which allows decision-makers to see the big picture and help those on the landscape to be more strategic and responsible in their development activities.

What is Cumulative Effects Management?

Cumulative Effects Management is an approach that establishes outcomes for an area by balancing environmental, economic and social considerations and implementing appropriate plans and tools to ensure those outcomes are met.

Cumulative effects management is:

- **Outcomes-based:** clearly defining, desired end-state
- **Place-based:** meeting the differing needs of regions within the province
- **Performance management-based:** using adaptive approaches to ensure results are measured and achieved
- **Collaborative:** building on a culture of shared stewardship, using a shared knowledge base
- **Comprehensively implemented:** using both regulatory and non-regulatory approaches.

With respect to "environmental management frameworks," the Provincial LUF website (Government of Alberta, 2015c) provided that:

> Alberta Environment is pursuing Management Frameworks as an important instrument for assessing and managing cumulative impacts and multiple activities (and parties) in a particular area. Management Frameworks are not necessarily new, but their use in Alberta is somewhat limited. For example, a provincial air management framework does exist in specific to particulate matter and ozone.
>
> The intent of Management Frameworks is to bring all contributing parties together in a particular area into solution development for issues at an early stage. They may be focused on air, land, water and/or bio-diversity issues, will incorporate social and economic considerations, and must align with other scales of planning (provincial to site-specific).

> The process for developing Management Frameworks (sic) is evolving. At present, Alberta Environment is developing Management Frameworks that support regional plans under the *Land-use Framework*. When a Management Framework is completed, some of its key components will include:
>
> - place-based and/or issue-specific outcomes and objectives for a particular area;
> - early response triggers for when these objectives are being threatened;
> - agreed-to management actions for all parties in accordance with these triggers; and,
> - performance measurement requirements.

The Province released both SSRP management frameworks in late 2015 that demonstrate that the Province is experimenting with legal institutional reform that recognizes the critical role of governance partners, such as CRP, BRBC and CRAZ in CEM and in so-called continuous improvement. On the AEP website (2015), the transition to CEM is explained further:

> The transition to a cumulative effects management approach is continuing to evolve in Alberta. The shift will require integration and discussion with and between government ministries, other governments, industry sectors, municipalities, non-government organizations and all Albertans.

However, in the LARP planning region of Alberta, the government is reforming government processes and institutions for environmental regulation to accommodate economic and population growth at a watershed scale, while continuing to exploit bitumen, oil and gas reserves, and other natural resources. Monitoring, and regulating and controlling the "cumulative effect of human endeavour and other activities" on air quality, water quality, the land, and biodiversity reflects the Province's chosen legal institutions for improving environmental conditions by directing watershed-scale land use decision-making.

While IRMS uses a range of regulatory tools and agencies directed primarily at the bitumen, oil, gas and coal sectors from the traditional top-down command and control perspective, the description of CEM reflects the need for the Province to work with and within environmental governance networks, cross-scales and cross-watersheds. Provincial environmental policies and regulations are not always spatially or temporally appropriate

when applied at the watershed-scale, given Alberta's diverse landscape, bioregions, resource availability, economy, people and politics. For example, water managers in the LARP planning region do not face the same water scarcity issues that face the SSRP planning area. Land use managers in the SSRP planning area, do not have to address the magnitude of industrial development that land use managers face in the LARP planning area, and so on.

It was posited that emerging provincial legal institutions reflect Alberta's incremental shift to a new legal regime based on reflexive approaches to law-making, social-political governance, and policy learning, as presented a decade ago by Lobel (2004) and Fiorino (2006). The legal institutions are being "crafted or modified" (Ostrom, 2005:3) in response to the emergence of an "autonomous social process" (Teubner, 1983:277) identified here as the emergent phenomena of environmental governance networks and bridging organizations. Exploring the reflexivity of Alberta's legal instruments for managing respondent - identified environmental management issues in the Region provided greater understanding of "how particular combinations of rules affect actions and outcomes in a particular ecological and cultural environment," (Teubner, 1983: 242; Gunningham and Sinclair, 1999), in this case, the Region. Alberta's emerging legal institutions and instruments include a "mix of policy tools," that seem to be comparable to Lobel's (2004) "next generation policy strategies." Gunningham and Sinclair (1999:53-4) claim that combinations of policy mixes are necessary to ensure optimal environmental performance by actors, and that some combinations are complementary, while other policy combinations are counterproductive. These include command and control regulation; economic instruments; self-regulation; voluntarism; and information strategies. Determining whether Alberta's policy mixes are "complementary" or "counterproductive" to effective natural resource management in the SES of the Region could be done using the approach designed by Gunningham and Sinclair (1999), and is recommended as an area for future research.

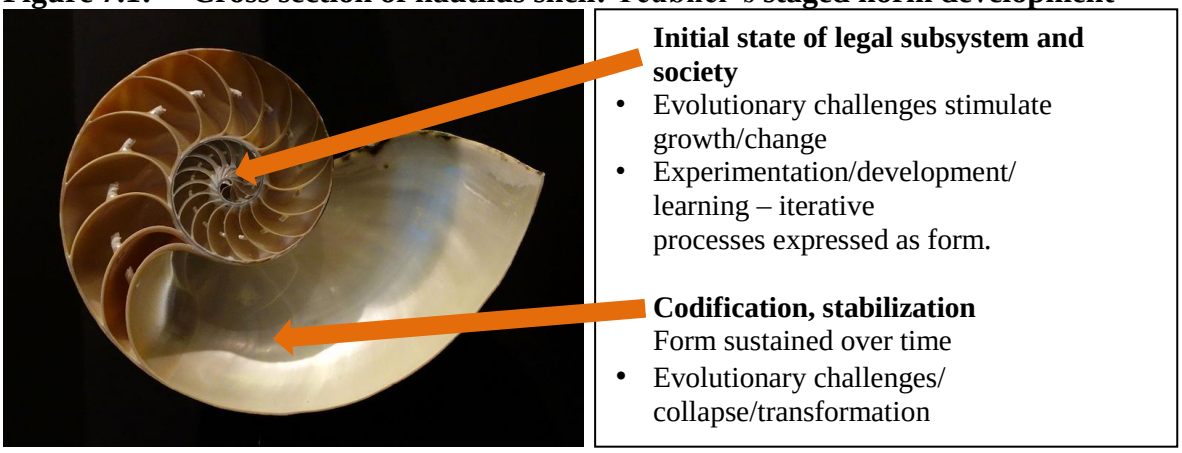
7.4 Understanding the evolutionary model of norm development in society

The reflexivity analysis of Alberta's legislative regime to address the respondent-identified primary natural resource management issues in the Region, illustrates an evolutionary norm development pattern similar to Teubner's (1983:261) four stages in the development of norms in society, as paraphrased below:

- the initial state of both the legal system and society;
- evolutionary challenge as society evolves;
- experimentation with new norms and models for strategic action; and
- stabilization with incorporation of new legal structures, which, through an iterative, evolutionary process would become the transformed state, until the next evolutionary challenge "perturbs" the system.

Evolutionary patterns can be sudden; however each stage in an evolutionary pattern may last for significant amounts of time. Teubner's (1983) evolutionary model of norm development could be conceptualized by examining a cross section of a nautilus shell where each stage of growth from onset to transformation to a new initial stage is recorded in the structure (form) that develops iteratively, and eventually transforms to a completely different state, again expressed as form. Each iteration begins at a different structural level, demonstrating iteration, growth and progression until eventual collapse and transformation. Luhmann (1975:150) had identified similar "evolutionary mechanisms for variation, selection and stabilization" in the legal subsystem of society necessary for adaption to occur, for example when society is facing a crisis in "formal rationality," or, as in the Region's case where government regulation loses its effectiveness in managing human behaviours that have the potential to degrade or deplete shared natural resources.

Figure 7.1: Cross section of nautilus shell: Teubner's staged norm development



Source: Daderot. 2012. *Shells in the Fernbank Museum of Natural History: Nautilus pompilius,* online: https://commons.wikimedia.org/wiki/File:Nautilus_pompilius_-_Fernbank_Museum_of_Natural_History_-_DSC00294.JPG

The author posited that Alberta's environmental legal system is at Teubner's (1983) "experimentation with new norms and models for strategic action" stage of norm development, or Luhmann's (1975) "variation" stage, and that Alberta has a long way to go in experimentation with legislation and court processes before "stabilization" or "selection" of new norms occurs and is encoded in new environmental policies, laws, etc.

Chapter 8:

A Reflexive Legal Framework for Bridging Organizations in Regional-Scale Environmental Governance and Management

8.1 The regional-scale environmental governance and management dilemma

The traditional adversarial approach to legal regulation and enforcement is based on rights, competition and court processes, and it creates obstacles for government officials and other stakeholders who want to engage in collaborative adaptive management and co-management processes, where voluntary commitments are key features of the system (Ruhl, 2006; Ruhl and Fischman, 2010). Voluntary collaboration is usually based on a mutual unstated agreement that court processes are not in the best interests of any of the parties, and that is why stakeholders self-organize to resolve issues among themselves in the first place.

Bridging organizations are a post-modern emergent phenomenon in the Region, and as they evolve within Alberta's coupled legal-political subsystem of society, they create a governance and management dilemma. As Fiorino (2006:158) summarized, bridging organizations are embedded in a regulatory "system that is modern in design and operation" that "needs to be adapted to a post-modern era." Fiorino (2006:126) said that voluntary networks, such as the Region's bridging organizations:

> offer many advantages as "stepping stones" to a new system because they provide experience for transforming relationships and building trust, allow us to explore new kinds and combinations of policy instruments, offer practical lessons on measuring performance, enable policy makers to respond to new issues flexibly and collaboratively, spread information and tools across organizations and settings, and allow government to experiment with new roles.

Rather than seeking penalties to be imposed by a government official on those who free-ride (Ostrom 1990, 2003) on the environmental management system, bridging organizations are better positioned to pool resources and provide services, such that all those who commit to management plans are able to adopt and implement and continue to collaborate over time, while adapting to changes in the SES. Bridging organizations do not rely on courts or coercive powers of government to resolve competition or

disagreement among their members, avoiding long drawn out court battles that impede trusting relationships. As Fiorino (2006:123) stated, voluntary governance networks "may be more goal oriented than regulation and leave the details of meeting the goals to participants. They ask for effort or results that go beyond compliance and typically carry no legal sanctions for nonperformance."

The author posited that an approach to overcoming the regional-scale environmental governance and management dilemma was to deliberately strive toward "adaptive co-management" (Armitage et al., 2007; Ruhl, 2005, Ruhl and Fischman, 2010) of natural resources in the Region by supporting and legitimizing the role of bridging organizations.

8.2 Potential for adaptive co-management in the Region

As Benson and Craig (2015:778) stated: "The realities of current and emerging social-ecological systems (SES) dynamics warrant a new set of tools and approaches to governance." Benson and Craig (2014:779) presented valid arguments for taking a "resilience thinking" approach to governance and adaptive management of complex SES:

> Resilience can be characterized in three ways: (1) the amount of change the system can undergo and still retain the same controls on function and structure; (2) the degree to which he system is capable of self-organization; and (3) the ability to build and increase capacity for learning and adaption. The dynamics and complexities of SESs are embraced, certainty is not required, and the emphasis is on adaptive capacity and adaptive management rather than on stationarity.

Adaptive management processes and co-created natural resource management plans have been adjudicated in the United States. Ruhl (2006:25-7) suggested that several approaches to regulation have challenged implementation of various adaptive management programs and processes in the Unites States, which he identified as

- "market based programs;"
- "information-based programs;"
- "negotiated project–specific licensing;"
- "ecosystem-scaled land management programs;"
- "multi-party collaborative planning efforts;" and

- "government-private-quasi-partnerships" that "tap into decentralized behavior-coordinating mechanisms."

Ruhl (2006:36-7) examined barriers to implementing adaptive management plans that emerged from new forms of social-political governance, when the legal subsystem and the courts rely on traditional environmental regulatory systems to "adjudicate" in accordance with the "rule of law" when things go sideways. Traditional rights-based legal processes for public notice, public and court hearings, court orders and binding decisions, trigger administrative procedures and judicial decision-making that were never intended to apply to a system comprised of "a continuous cycle of decisions," that Ruhl (2006:37) stated do not depend on regulatory oversight or implementation through coercive powers of government. Ruhl and Fischman (2010:427) pointed out that "although courts genuinely and often enthusiastically endorse adaptive management theoretically, they frequently are underwhelmed by how agencies implement adaptive management in the field."

In an effort to condense a small amount of adaptive management case law from the United States, Ruhl and Fischman (2010:427) extracted three themes where problems arose in the courts when adjudicating on adaptive management plans: these were issues of scale; processes for tiering environmental impact analyzes; and meeting substantive legal requirements, as follows:

1. larger-scale plans are more likely to incorporate adaptive management plans that withstand judicial scrutiny than are smaller-scale ones;
2. the practice of tiering site-specific environmental impact analyses to an earlier, overarching, cumulative study is well suited to adaptive management, and adaptive management can reduce the need for supplemental analyses; and
3. adaptive management procedures, no matter how finely crafted, cannot substitute for showing that a plan will meet substantive management criteria required by law.

According to Ruhl (2006) and Ruhl and Fischman (2010) the problem with requiring adaptive management as a required process for regional-scale natural resource management is that no third party judiciary knows what such a process must include, how such a process ought to be implemented, or what criteria a court should

apply to evaluate whether the process was successful or a complete failure in achieving plan objectives. While Ruhl and Fischman (2010:429) said that "adaptive management has evolved well beyond an idea," and while they provided an outline of "key steps to adaptive management" that provided some increased knowledge about "what" is to be done, they stated that there remains very little understanding of "how" these key steps are to be implemented within the current North American environmental management rights-based legal system, and by whom. They said that governments cannot do this work in isolation from stakeholders who collaborate to manage natural resources that the stakeholders depend on for their daily well-being, employment and recreational pursuits.

Ruhl and Fischman (2010:424) provided the following eight key steps to adaptive management:

1) Definition of the problem;
2) Determination of goals and objectives for management of ecosystems;
3) Determination of the ecosystem baseline
4) Development of conceptual models;
5) Selection of future restorative actions;
6) Implementation of and management actions;
7) Monitoring and ecosystem response; and
8) Evaluation of restorative efforts and proposals for remedial action.

Echoing Ruhl and Fischman's (2010) findings, Benson and Craig (2014:781) stated that:

> Discussions among scientists, policymakers, and others are needed to design and implement environmental policies that promote and build adaptive capacity while also providing stronger, more legally enforceable, and institutionally supported goals – goals that reflect the adaption strategies necessary to anticipate and negotiate the complex, nonlinear, and rapidly changing world.

The author posited that adaptive management may be better coordinated and implemented by regional-scale bridging organizations under an enabling provincial regulatory system that shares decision-making authority with them to achieve adaptive co-management outcomes.

Folke et al., (2002: 20) defined adaptive co-management as a "process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, on-going, self-organized process of "learning-by-doing." This definition is consistent with Ruhl (2005) and Ruhl and Fischman (2010, and Armitage et al.'s (2007:5) statement that adaptive co-management "may represent an important innovation in natural resource governance under conditions of change, uncertainty, and complexity." As stated by Armitage et al, (2007:5). "a key feature of adaptive co-management is the combination of the iterative learning dimension of adaptive management and the linkage dimension of collaborative management in which rights and responsibilities are jointly shared."

Adaptive co-management is both adaptive and collaborative (Armitage et al., 2007), and necessarily requires sharing of decision-making authority with collaborators who are most affected by the decisions being made. It recognizes liberal democratic principles and legal rights, but ties individual rights to individual responsibility for decisions that are in the best interests of government and all stakeholders affected at a regional-scale. The author posited that adaptive co-management is necessarily a place-specific governance approach to natural resource management, for example in the Region's SES. Strategies are developed through collaborative processes to respond to both social and ecological feedback in the SES and enable stakeholders to intervene as required to sustain the critical functions and resilience (Walker and Salt, 2012; Benson and Craig, 2014) of the SES as a whole, and the evolving social system and ecosystem attributes that stakeholders value.

Armitage et al. (2007:6) list a number of features for effective systems of adaptive co-management, as follows:

- Shared vision, goal, and/or problem definition to provide a common focus among actors and interests;
- A high degree of dialogue, interaction, and collaboration among multi-scaled actors;
- **Distributed or joint control across multiple levels, with shared responsibility for actions and decision-making;**
- A degree of autonomy for different actors at different levels;
- Commitment to the pluralistic generation and sharing of knowledge and

- A flexible and negotiated learning orientation with an inherent recognition of uncertainty. (Emphasis added.)

Except for Armitage et al.'s (2007:6) "distributed or joint control across multiple levels, with shared responsibility for actions and decision-making," the bridging organizations in the Region are actively engaged in adaptive co-management processes, as was illustrated in the qualitative research presented in Chapter 6.

The author posited that the greatest barrier to regional-scale natural resource management through adaptive co-management processes in the Region has been the inability or unwillingness of the Province to "share responsibility for actions and decision-making" (Armitage et al. (2007:6) with the bridging organizations or any of the agencies that are actively engaged in environmental governance, including municipal governments.

The implementation gap to effective regional-scale natural resource governance and management in the Region is made visible in the Framework presented later in this chapter, and perhaps could be closed through an IRMS that is founded on adaption, resilience of the SES (Walker and Salt, 2012; Benson and Craig, 2014), collaborative processes and some joint decision-making processes.

8.3 Using reflexivity to anchor bridging organizations in democratic legitimacy

Using the Region as the demonstration context, the Province could provide organizational and procedural structuring for CRP, BRBC and CRAZ that would anchor these bridging organizations in stakeholder acceptance and democratic legitimacy by using the following four reflexive legal processes:

- regulating bridging organization design and internal governance;
- officially recognizing regional scale natural resource management plans;
- delegating some provincial and municipal powers to bridging organizations for adaptive co-management; and
- introducing policy learning opportunities.

Alberta may already have a policy precedent in place for such doing this. Specifically, ten years ago, similar reflexive legal processes were put forward in *Enabling*

Partnerships (Government of Alberta, 2004) a policy and guidance document that accompanied the Water For Life strategy. In *Enabling Partnerships*, the government established clear roles and responsibilities for WPACs - volunteer multi-stakeholder organizations at a watershed-scale, under the heading "Government of Alberta Roles." The Province identified how it would work with WPACs to ensure beneficial watershed management outcomes. A correlation between the four processes for anchoring bridging organizations in democratic legitimacy and the provincial roles in *Enabling Partnerships* is provided in Table 8.1 below to demonstrate the potential usefulness of this precedent.

Table 8.1: Correlation of suggested reflexive legal processes to legitimize bridging organizations with provincial roles in *Enabling Partnerships*

Suggested Reflexive Legal Processes	***Enabling Partnerships***	**Correlation**
Regulate bridging organization design and internal governance	Formally identify an organization or a group of stakeholders as a WPAC.	✓ Yes
Officially recognize regional natural resource management plans	In accordance with the *Framework for Water Management Planning*, review and take into consideration the recommendations put forward in a water management plan.	✓ Yes
Delegate some provincial and municipal powers to bridging organizations for adaptive co-management		No
Introduce policy learning opportunities.	Provide time for Councils to organize; raise the level of shared awareness, understanding and trust; and build capacity to take on the state of the watershed reporting and watershed management planning.	✓ Yes
	Provide partial administrative and/or project funding for maintaining a secretariat and/or carrying out specific activities	No
	Assign staff to each Council with the time, resources, and skills to participate as a partner. Assign technical staff to support state of the watershed reporting and watershed management planning.	No
	Encourage Councils to include all stakeholders in the watershed and make decisions based on consensus.	No
	Create guidelines for state of the watershed reporting so reports are meaningful and comparable over time.	No

Source: Judy Stewart, January, 2015.

Reid's (2004) list of strategic bridging functions correlate with some of the functions listed as the benefits of partnerships in *Enabling Partnerships*. Crona and Parker's (2012) characteristics of bridging organizations are also closely aligned. Table 8.2 below illustrates how strategic bridging functions and characteristics of bridging organizations correlate or align with the benefits of partnership listed in *Enabling Partnerships*.

Table 8.2: Correlation of Reid's (2004) strategic bridging functions and Crona and Parker's (2012) characteristics of bridging organizations with benefits of partnerships in *Enabling Partnerships.*

Reid (2004) "strategic bridging functions"	**Crona and Parker (2012) "characteristics of bridging organizations"**	***Enabling Partnerships* (2004:2) "benefits of partnerships"**
To maintain the status quo of an arrangement		
For problem solving and transformation	Provide an arena for learning, co-creation of knowledge, building trust and conflict resolution	Helping public and private efforts come together for better results
To facilitate collective action		Empowering greater responsibility of those who have an impact on the environment and empowering them to take action
To facilitate capacity building	Attract expertise, knowledge, and resources	Encouraging innovation through sharing of information and expertise
To increase impact or autonomy		
To gain legitimacy or resources		
To mediate norms among actors		Better decisions overall
To develop compromises	Act as facilitators, mediators and negotiators	Helping to integrate competing interests while reducing friction, overlap and redundancy
To support activists voices in negotiations with dominant actors.		

Source: Judy Stewart, November, 2014.

As noted by Ruhl and Fischman (2010), it is important to pay attention to regulatory context and ensure that processes for adaptive co-management of land, water and air are closely aligned and consistent with Alberta's existing legal system. In the context of the reflexive legal analysis provided in Chapter 7, *Enabling Partnerships* illustrates that the Alberta legal subsystem is evolving to provide reflexive legal processes with respect to establishing roles and responsibilities of partners like BRBC in watershed management, and this could be extrapolated to regional-scale land use and air quality management partners such as CRP and CRAZ.

The author participated in stakeholder discussions and workshops before Water For Life was adopted, and is aware that the strategy did not emerge from legislation: it emerged as a stand-alone strategy for sustainability in Alberta. Along with Water For Life, the Province provided several policy and guidance documents, such as *Enabling Partnerships*, that were necessary to implement the strategy. Contemporaneously, the *Framework for Water Management Planning* and the *Strategy to Protect the Aquatic Environment* were delivered to Cabinet as required under provisions of the *Water Act*. Water For Life was adopted and implemented, thereby enabling and providing WPAC partners with clarified roles in watershed management planning. While state of the watershed reporting and watershed management planning were funded. and provincial personnel and other resources were provided to get tasks done, only one approved water management plan was developed under the legislated *Framework for Water Management Planning*. In the author's experience as a volunteer collaborator on BRBC and several watershed stewardship groups in Alberta, the *Strategy for Protecting the Aquatic Environment* is rarely referred to by WPACS or the Province, and is not well understood: for example, it was not even referred to in the *Alberta Wetland Policy* (Government of Alberta: 2013a). In the author's experience, the *Framework for Water Management Planning* is not understood or implemented because the Province retained all the decision-making roles and functions for water management, and the *Alberta Wetland Policy* repeats this institutional flaw.

Water For Life, as designed, and as it has unfolded provided reflexive legal processes to achieve adaptive co-management of water resources, and, as demonstrated in Chapter 7, the strategy remains the most reflexive legal instrument in Alberta's environmental governance and management system. In many ways, Water For Life introduced Albertans to adaptive co-management of the water-land interface - or the watershed - in recognition that land and water resources must be managed together with iterative plans that need to be responsive to system feedback over time. In the author's recent experience, there has been an increased awareness that what we do on the land and water also affects air quality and biodiversity in the watershed (SSRP and the SSRP management frameworks). There is a growing awareness, as illustrated in the SSRP management frameworks, that municipalities, with delegated responsibility to regulate and control land use on private lands in Alberta, have a significant role to play in regional-scale natural resource governance and management within their municipal boundaries, and in collaboration with other municipalities at the regional-scale (Calgary Regional Partnership, 2014).

However, also in the author's recent experience, the biggest gap to effective watershed management in Alberta was also created through the Water For Life strategy when the Province retained all authority and responsibility for decision-making about watershed management for itself and did not delegate any provincial and municipal powers to WPACs functioning as bridging organizations to engage in adaptive co-management processes. The gap remains open in February, 2016 and is being perpetuated in recent environmental policy documents, such as the *Alberta Wetland Policy.*

The 2013 growth management board provisions in the MGA also provide precedent legislation that supports and legitimizes not only the voluntary aspect of municipal collaborators, such as CRP with clear organization form and legislated mandates. It also gives effect to growth plans that networks such as CRP co-create to address growth management issues at a regional-scale. However, as demonstrated in

Chapter 7, the growth management board provisions do not satisfy as many reflexivity criteria as Water For Life and *Enabling Partnerships*.

8.4 The Framework

The Framework, as illustrated in Figure 8.1 below has adaptive co-management of regional-scale natural resources by bridging organizations at the system's core, reflecting the emergent "basin of attraction" (Gunderson and Holling, 2002) evolving in the SES. The Framework is conceptualized as a series of basins embedded in a reflexive coupled legal-political environment, which is further embedded in the evolving SES. The legal-political subsystems are necessarily structurally coupled, co-regulating, co-evolving and mutually adapting over time.

The Framework attempts to illustrate that adaptive co-management will only be possible if the legal subsystem of society fulfills the "integrated function" of providing "the structural premises for reflexive processes in other social subsystems" (Teubner, 1983:275), for example by installing, correcting and redefining "the self-regulatory mechanisms" used by bridging organizations in their strategic bridging functions and interrelationships with the Province and municipalities. The Framework shows that bridging organizations are necessary actors for implementing adaptive co-management, processes, however, they are currently operating outside the system as the most recent emergent phenomenon in the SES. Bridging organizations need to be supported and legitimized for the strategic bridging functions they currently perform in environmental governance and management, and potentially in adaptive co-management.

The Framework reflects close attention to Ruhl and Fischman's (2010) identified barriers to implementation of adaptive management plans in North American society. Those barriers were considered as opportunities to design more effective processes to implement co-created adaptive natural resource management plans, recognizing that implementation to achieve desired outcomes is not the sole responsibility of the Province or municipalities, but of all stakeholders involved in environmental governance and management systems.

The Framework is based on Teubner's (1983) "new proceduralism," Lobel's (2004) "process orientation and tailoring to local circumstance," Fiorino's (2006) design principles, and Ruhl and Fischman's (2010) approaches to adaptive management. It incorporates and illustrates the interconnections between evolving system components, as follows:

- the legal-political subsystem
- characteristics of reflexive law
- reflexive approaches to law-making,
- processes to legitimize bridging organizations, and
- adaptive co-management.

Each of the Framework basins is explained in detail, following a general description of the Framework. In the SES of the Region, the basins shown in Figure 8.1 should not be circular and closed, but should be irregular shaped with perforated edges to illustrate that each basin continues to evolve as an open system over time and is in a continual state of flux. Each basin is open to its environment, responding to feedback, interacting and mutually evolving and adapting with all other basins in the Framework. While the Framework basins are artificially round and seemingly closed, they allowed the author to illustrate embeddedness and evolutionary stages of reflexive legal concepts and processes.

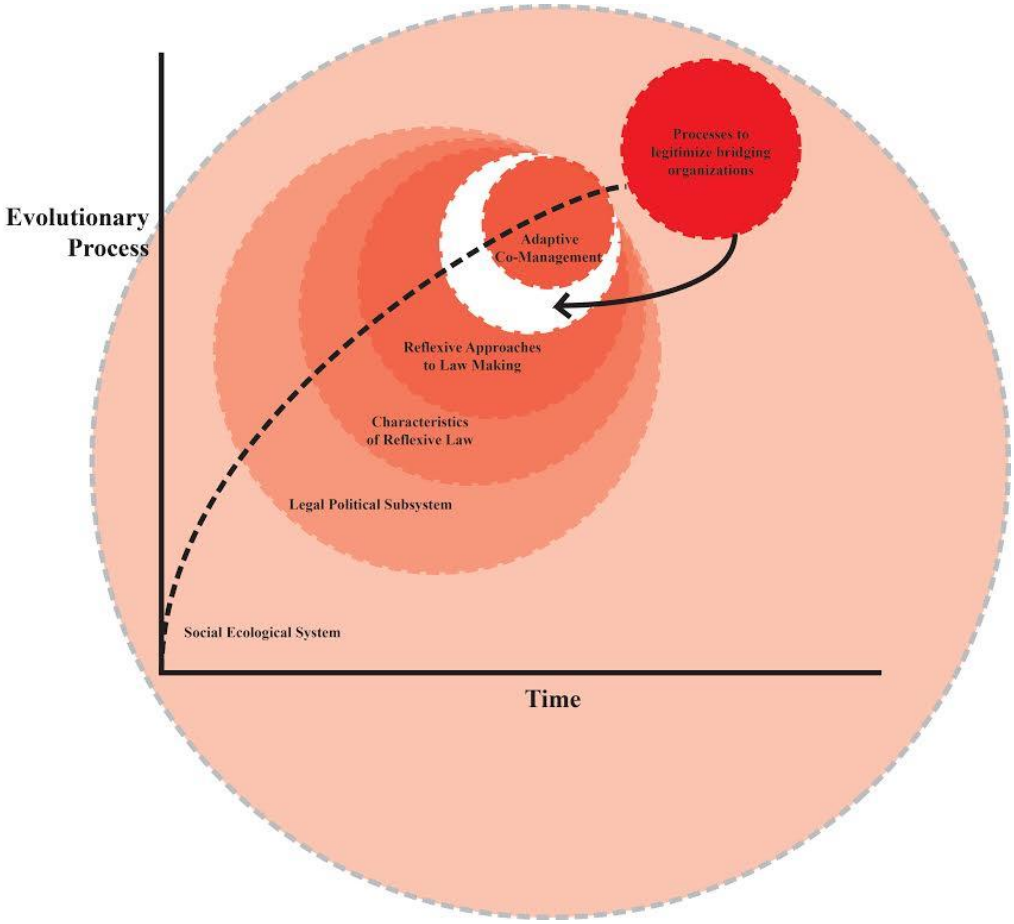
The post-modern reflexive law aspect of the Framework replaces the modern regulatory system that fragmented systems to make them easier to manage through bureaucratic rationality. Reflexive approaches to law-making are processes that reintegrate and coordinate functions cross-media, cross-levels and cross-scales.

The lighter colour shading illustrates that Teubner's (1983) reflexive legal characteristics are the most evolved reflexive legal concepts in the Framework, while the progressively darker shading shows that Lobel's (2004) reflexive approaches to law-making emerged to address new forms of social-political governance, while Fiorino (2006) and Ruhl and Fischman (2010) continued to promote reflexive alternatives to court processes. Adaptive co-management (learning by doing) (Ruhl, 2005) is the most

evolved concept in the Framework, but cannot be achieved by governments and through court processes – bridging organizations, as new forms of social-political governance are evolving to bridge the implementation gap, and need to be supported and legitimized and inserted back into the Framework to implement adaptive co-management processes.

The darkest colouring, or most recent evolutionary aspect of the Framework is the proposed processes to support and legitimize bridging organizations. The Framework illustrates that processes to implement adaptive co-management are embedded in reflexive legal processes to support and legitimize bridging organizations and their strategic functions.

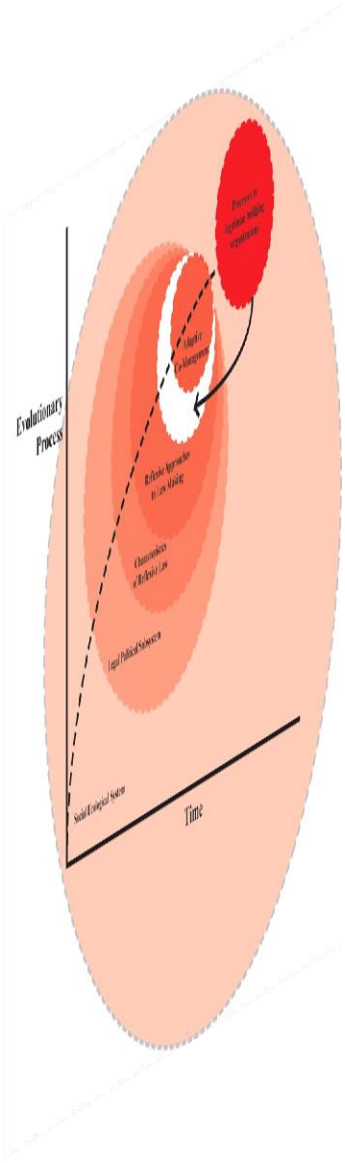
Figure 8.1: The Framework for bridging organizations in regional-scale environmental governance and management



Source: Judy Stewart, January, 2015.

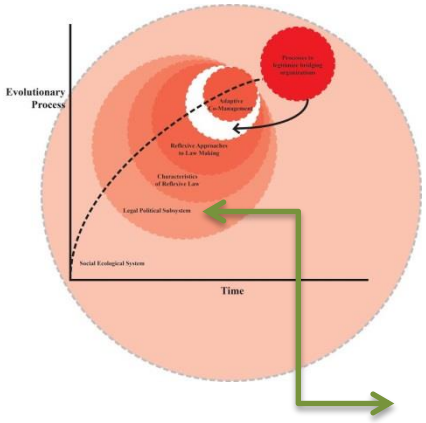
The policy and legislation gap for supporting and legitimizing bridging organizations and their strategic bridging roles in adaptive co-management of regional-scale natural resources is best illustrated by turning the Framework diagram on its side, as is illustrated in Figure 8.2 below.

Figure 8.2: A different view of the Framework illustrating the policy and legislative gap: The need for reflexive legal processes to support and legitimize bridging organizations to implement adaptive co-management processes



Source:
Judy Stewart, January, 2015.

8.4.1 The structurally coupled legal-political system of society



It has been suggested that the rule of law structurally couples the autopoietic legal subsystem of society (Luhmann, [1993] 2004; Teubner, 1993; Nobles and Schiff, 2006; Nobles and Schiff, 2013) to the political subsystem. As Nobles and Schiff (2013) stressed, it is the role of the political subsystem of society to develop and enact the law in Canadian society, and the role of the legal subsystem to interpret and apply the law. While this structural coupling ensures that the legal subsystem interprets what the law is at any given time, decisions of courts and tribunals also provide feedback to the political subsystem about what the law is in new contexts.

Substantive environmental policies, laws, and regulations are created and enacted through political government law-making processes. Substantive laws frame the development of co-created natural resource management plans and implementation of strategies and actions agreed upon by stakeholders engaged in voluntary environmental governance through bridging organizations.

Environmental governance is generally thought of as collaborative processes engaged in by networks of self-selecting stakeholders who agree among themselves, at least in principle to work with each other to resolve common issues at the time and scale where they are affected. While collaborative problem solving and co-creation of knowledge has advantages (Bason, 2010), the informal nature of bridging organizations has disadvantages because the organizations lack legal authority, and therefore

legitimacy. The Framework demonstrates how bridging organizations working at the regional-scale might retain the advantages of their informal, voluntary and collaborative structures and operations while acquiring legitimacy in the sense of social sanctioning through the structurally coupled legal-political subsystem of society. Sanctioning processes for bridging organizations may already be evolving, for example, there is a perceptible shift to the governance paradigm in North American society (Fiorino; 1999; 2006; Ruhl, 2006; Ruhl and Fischman, 2010; Lobel, 2004).

Reflexive law reflects the post-modern stage of society's evolution (Luhmann, [1993] 2004) and provides for the "installation, correction, and redefinition of democratic, self-regulatory mechanisms" (Teubner, 1983:242). Or, as Teubner (1983:277) further explained: "The role of law is not substantive regulation, but the procedural or organizational structuring of "autonomous" social processes."

Fiorino (2006:159) wrote: "The aim of reflexive law is creating incentives and procedures that induce people and organizations to assess their actions… and adjust them to achieve socially desirable goals, rather than tell them directly what to do in all cases." Mayntz (1993:15) summarized the aim of "new legal instruments" for environmental governance as follows: "the new legal instruments which are suggested to solve the governing problem, in particular procedural rules and reflexive law aim to enhance the independent adaptive, reactive, and problem-solving capacity of societal actors, which means to motivate and enable them to react purposefully at any moment to changing conditions."

Lobel (2004) suggested that there has been a paradigm shift from top-down government to a governance network model in lawmaking in the United States, while Fiorino's (2006:196) design principles for creating new institutional arrangements for reflexive law, social-political governance, and policy learning provide foundational principles for the Framework, and are paraphrased below:

- Leverage the multiple factors that influence behaviour;
- Use reflexive law to complement substantive law;
- Focus negative sanctions on performance failures that matter;
- Create opportunities for learning, dialogue, and repeated interaction;
- Build accountability into regulatory designs;

- Adapt structures and relationships to account for compliance and performance history;
- Recognize positives in firm and facility performance;
- Create mechanisms, procedures, and structures that encourage critical self-reflection;
- Maximize opportunities for learning and building capacity;
- Create performance tiers and tailor regulatory strategies to them;
- Expand assistance for those with good intentions but limited capacity;
- Create pressures, tools, and incentives that leverage internal dynamics in firms;
- Define core performance objectives that apply to similar actors;
- Link voluntary programs with accountability for results; and
- Create networks and other mechanisms that facilitate learning.

Pomeroy, (2007:173-174) outlined the conditions for successful management of common pool resources, based on common property theory (Berkes et al. 2001) and the research of Ostrom (1990; 1992; 1994) and Pinkerton (1989), as follows:

- Clearly defined boundaries;
- Clearly defined membership;
- Group cohesion;
- Existing organizations;
- Benefits that exceed costs;
- Participation by those effected;
- Management rules that are enforced;
- Legal rights to organize and make management arrangements;
- Cooperation and leadership at the community level;
- Decentralization and delegation of authority;
- Coordination between government and community.

Fiorino's (2006) design principles and Pomeroy's conditions flow intuitively from Ostrom's design principles for creating institutional arrangements for collective action by common pool resource users (Ostrom, 1990:90):

- Clearly defined boundaries;
- Congruence between appropriation and provision rules and local conditions;
- Collective-choice arrangements;
- Monitoring;
- Graduated sanctions;
- Conflict-resolution mechanisms;
- Recognition of rights to organize by external government authorities; and
- Nested enterprises.

Ruhl and Fischman (2010; Ruhl, 2006) grouped new institutional arrangements as alternatives to prescriptive regulation or as tools to achieve adaptive management, which they claim is a ubiquitous approach to environmental management in the United States. Fiorino (2006:199) also provided "design objectives" for a "next-generation" regulatory framework for managing human behaviours within firms with respect to the environment that mirror Ruhl's alternatives. Fiorino (2006:199) states that new regulation should be designed to:

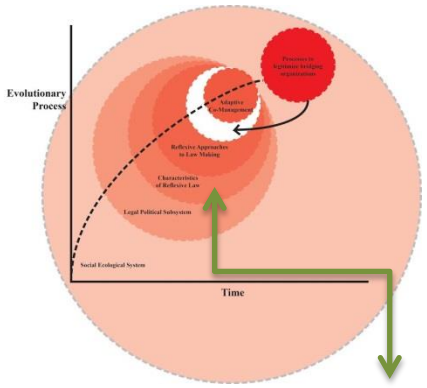
(1) Establish and maintain legally enforceable, demanding performance standards;
(2) Differentiate regulated firms based on past and expected future performance;
(3) Incorporate mechanisms and incentives that promote continuous improvements in performance, including market incentives;
(4) Build a capacity for policy learning;
(5) Measure performance at the facility, firm, and sector levels; and
(6) Create mechanisms and relationships that build trust.

These sets of design principles, conditions, alternatives, and objectives illustrate an incremental evolution between 1989 and 2007 from modern to postmodern thought with respect to institutional design for collective action when managing human behaviours and interactions in the ecosystem. Fiorino (2006:217) saw "emerging islands of trust in the larger sea of adversarial legalism." He noted that "[p]artnerships among communities, activists, and businesses are showing measurable results at the ecosystem level." The evolutionary development of these key components of institutional design for post-modern forms of social-political governance, from Ostrom the pioneer to Fiorino (2006) and Pomeroy (2007), illustrates that government needs to share power and responsibility for regional-scale natural resource governance and management. It is no longer optional.

As stated by Lobel (2004:265), approaches to law-making have shifted from command-and-control to a reflexive approach that is "process oriented and tailored to local circumstances." According to Lobel (2004:265), government's role is to standardize good practices, and encourage "the replication of success stories from local or private levels."

The Framework components that emerged from the evolving legal-political subsystem are further bounded by Teubner's (1983) characteristics of reflexive law. These characteristics were presented in Chapter 5. Teubner (1983:280) stressed that "the legal system is a "system-in-an-environment." A reflexive legal system would necessarily be a subsystem of the SES in the Region, reflecting society's shared norms for regulating or managing human inter-relationships and activities with respect to natural resource allocation, use, and degradation on particular landscapes. These shared norms can be found in the regional-scale natural resource management plans co-created by bridging organizations.

8.4.2 Characteristics of reflexive law

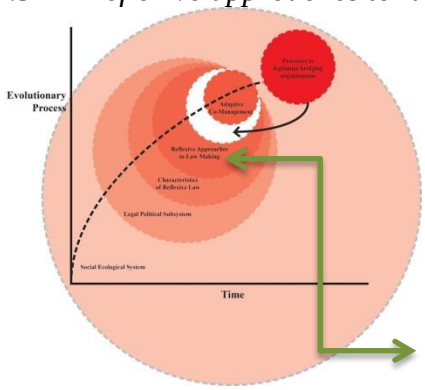


Teubner's (1983) characteristics of reflexive law (see Table 7.2) unfolded further in what Lobel (2004:265) called reflexive approaches to law-making. If applied in Alberta, Lobel's approaches to law-making would deliberately steer and guide strategic functions performed by bridging organizations in regional-scale environmental adaptive co-management processes.

The characteristics of reflexive law frame or embed post-modern reflexive legal rationality or "legal self-restraint" (Teubner, 1983:276-279), where, for example the Province's role with respect to bridging organizations would not be "substantive regulations but procedural and organizational structuring" of bridging organizations to lend them legitimacy and transparency, and make them more accountable to the stakeholders in the regional-scale natural resource governance and management system.

For example, the growth management board provisions in the MGA demonstrate all Teubner's (1983) characteristics of reflexive law, but not all the reflexive approaches to law-making.

8.4.3 Reflexive approaches to law-making



As demonstrated in Chapter 7, Lobel's (2004:265) reflexive approaches to law-making that illustrate "process orientation and tailoring to local circumstances," and Fiorino's (2006:196) approaches to new environmental regulation are functionally consistent. The three approaches to law-making over-lap, as new public/private partnerships drive interpenetration of policy boundaries, development of next generation policy strategies, and facilitate policy learning.

Ebbesson (2009:1) confirmed that reflexive approaches to law-making are necessary to "govern socio-ecological systems and common pool resources, and to cope with surprises and unpredicted and complex changes." Ebbesson (2009:1) said that effective governance of complex SES depends on:

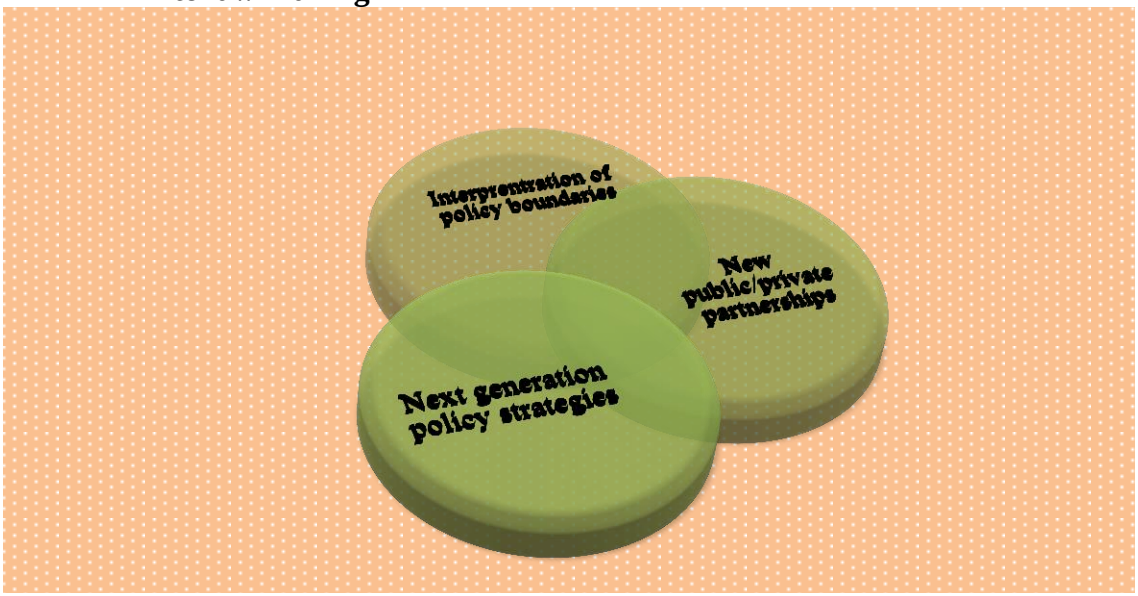
1. *Flexibility* in social systems and institutions to deal with changes;
2. *Openness* of institutions so as to provide for *broad participation*, not least in local decision-making and administration;
3. Effectiveness of *multi-level governance*; and
4. Social structures that promote *learning and adaptability* without limiting the options for future development. (Emphasis in original.)

As Ebbesson (2009:1) illustrated, social structures, like bridging organizations can be designed to "promote learning and adaptability." While Lobel (2004) and Fiorino (2006) identified new public/private partnerships, and social-political governance as one

of the reflexive approaches to law-making, neither offered recommendations for how partners in governance, like CRP, BRBC and CRAZ might be supported and legitimized to perform strategic bridging functions through reflexive legal institutional arrangements or processes.

At the regional-scale, bridging organizations function in interconnected and overlapping spheres of approaches to law-making, providing Ebbesson's (2009) flexibility, openness, broad participation, multilevel governance, and structures that promote learning and adaptability. In the overlapping spheres, the absence of legitimizing provincial policies and laws creates a reflexive legal process gap (the darker green area in Figure 8.3 below). In that territory bridging organizations could legitimately fill the gap through programs, projects and agreed-upon best management practices, developed through what might be recognized as reflexive governance or adaptive co-management processes.

Figure 8.3: Lobel's (2004) interconnected and overlapping reflexive approaches to law-making



Source: Judy Stewart, January, 2015.

While the identified reflexive approaches to law-making necessarily demonstrate characteristics of reflexive laws, the next generation policy strategies could be implemented and monitored for effectiveness and unintended consequences by bridging

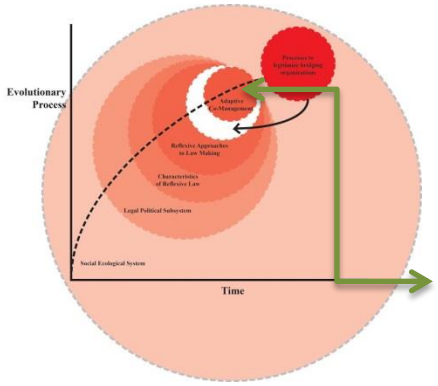
organizations through delegated authority. These processes would democratically anchor bridging organizations as legitimate partners to the Province and recognize their strategic role in implementing adaptive co-management plans. Table 8.3 below breaks down the three major categories of identified reflexive approaches to law-making into processes, programs, and practices that were compiled in the Matrix in Chapter 7.

Table 8.3: Lobel's (2004) reflexive approaches to law-making, and processes, programs and practices of adaptive co-management

Interpenetration of policy boundaries (Reflexive Law)
Institution evolved through co-management or collaboration with provincial or regional environmental governance networks
Information sharing as a requirement
Co-generation of knowledge as a requirement or by-product
Programs and institutional arrangements for corporate and civil society interactions
Appeal mechanisms for addressing private and sectorial challenges to government decisions
Mechanisms for adaption and responding to feedback
Programs for diffusion of innovation and technological advances
Requires scientific studies or processes at regular intervals
Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws
Iterative public participation component to change fundamental components
Adaptive to system feedback-system has built in government process for internalizing feedback
New public/private partnerships (Social-political governance)
Allocation of resources
Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.
Sharing of decision-making and authority
Projects and programs apply sector-wide
Co-creation of best or beneficial management practices
Monitoring of agreed performance measures
Public reporting at regular intervals
Next-generation policy strategies (Policy learning)
Negotiated rule-making
Audited self-regulation
Performance-based rules
Decentralized and dynamic problem solving
Disclosure regime
Coordinated information collection

Source: Judy Stewart, July, 2014.

8.4.4 Processes for adaptive co-management



The processes, programs, and practices provided under the heading of "public/private partnerships" or "social/political governance," all appear in *Enabling Partnerships* when describing the roles of WPACs, except sharing decision-making and authority which the Province retains for the provincial government alone. As stated in *Enabling Partnerships*: the provincial government "will uphold its mandated responsibility, accountability and authority for water and land use management and continue to provide the technical, monitoring, and regulatory and enforcement activities for which it is responsible for" (sic) (Government of Alberta, 2004:11). Table 8.4 below correlates "public/private partnerships" as a reflexive approach to law-making with WPAC and "Government of Alberta Roles" in *Enabling Partnerships.*

Adaptive co-management plans must be consistent with the existing substantive legal regime. As Ruhl and Fischman (2010:470) cautioned, it is necessary to translate substantive provincial statutory and regulatory criteria to measurable site-specific standards at the regional or local scale. An effective co-created management plan must be placed-based, but consistent with existing substantive law for the Region.

To provide legitimacy, and reduce uncertainty for all stakeholders affected by co-created plans, Ruhl and Fischman (2010:296) recommended that governments regulate basic required contents of plans, and identify the following key "benchmarks" of adaptive management that they claim could be examined by jurists in the North American court system:

(1) clearly articulated measurable goals,
(2) testable hypotheses (or some method of structured learning from conceptual models), and
(3) what criteria should apply in evaluating performance and outcomes of adaptive management experiments.

Table 8.4: Correlation of "public private partnerships" with WPAC and the Province's roles in Enabling *Partnerships*

Reflexive approaches to law-making: Public/private partnerships	***Enabling Partnerships:* Water For Life**
Allocation of resources	✓ Administrative support, project funding, technical support provided by Province
Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	✓ Province formally recognizes WPACs as partners. Must be "formalized" or legal entities to receive designation.
Sharing of decision-making and authority	
Projects and programs apply sector-wide	✓ Build capacity for participation by stakeholders and use of consensus
Co-creation of best or beneficial management practices	✓ Promote awareness and implementation of BMPs
Monitoring of agreed performance measures	✓ Water monitoring, state of the watershed reports: Guidelines for state of watershed reporting
Public reporting at regular intervals	✓ Produce annual reports on activities and accomplishments

Source: Judy Stewart, January, 2015.

Adaptive co-management plans that include the benchmarks, as baseline data, measurable goals, objectives and desired outcomes of intervention, make possible more rigorous judicial analysis of whether plans have been implemented, or implemented in ways that go against formal or substantive laws, or principles of justice and fairness. If adaptive co-management plans throughout the Province consistently include these benchmarks of legitimacy, Alberta courts could become adept at reflexive legal analysis, which would be "full-fledged social policy analysis which requires an adequate description of the real situation, the perception of problems, the definition of goals, the selection of legal norms, and the implementation of norms in social reality" (Teubner, 1983:280).

The *Framework for Water Management Planning* in Alberta does provide reflexive legal processes and clear direction as to what must be included in a "water management plan," and what a WPAC or watershed stewardship group must do to receive authorization to create such a plan.

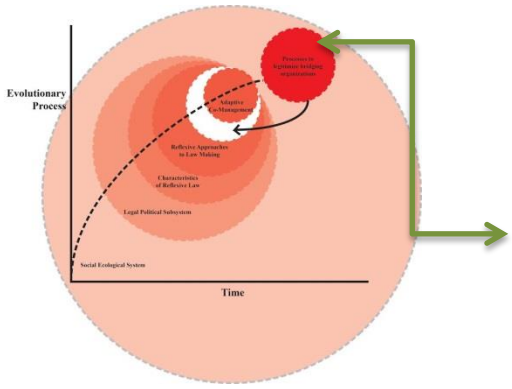
Enabling Partnerships recognizes that "watershed management plans" might also emerge from the same planning processes set out in the *Framework for Water Management Planning*. In *Enabling Partnerships* (Government of Alberta, 2004:11), the Province commits to support watershed management planning if WPACs enter into a partnership with the government and commit to "a watershed approach and the principles of inclusiveness and consensus-based decision-making." An adaptive management cycle, as illustrated in *Enabling Partnerships* has five iterative steps: a Trigger for planning and four processes: Plan; Implement; Monitor and Report; Review and Evaluate. Unfortunately, this adaptive management cycle is not an adaptive co-management cycle, and bridging organizations, such as BRBC are caught in the implementation stage because only the Province and municipalities have any authority to implement the objectives and strategies outlined in "watershed management plans." Allocation of water and licensing diversion and use is a provincial responsibility, while land use on private lands in the Region is a municipal responsibility. But, implementing watershed management plans to achieve desired outcomes is not the responsibility of either level of government. However, as bridging organizations, both CRP and BRBC have influenced voluntary municipal participation in the Activities to achieve the watershed management plan outcomes.

Bridging organizations, are crucial participants in the proposed adaptive management cycle identified in *Enabling Partnerships*, because through their strategic bridging functions, they can broker information, knowledge, resources, values, power and influence, and encourage voluntary participation and plan implementation by municipalities.

Bridging organizations are strategically positioned to move the Province from systems thinking, adaptive management, and CEM to an effective natural resource

adaptive co-management system. It is only through processes to legitimize bridging organizations that processes, programs and practices for adaptive co-management will emerge. Processes to support and legitimize bridging organizations must be inserted into the Framework.

8.4.5 Processes to legitimize bridging organizations in environmental governance and management



According to Teubner (1983), reflexive law stimulates processes of social self-regulation, and would encourage bridging organizations to address internal decision-making structures, and self-regulatory and conflict resolution processes. A provincial policy or regulation to steer and guide the strategic functions of bridging organizations would guarantee coordination processes, compel agreement, and might arbitrate claims across sectors and settle boundary problems.

Policies or regulations to guide and steer a self-regulated bridging organization would not allow for provincial intervention or reliance on the coercive powers of the state to resolve internal disputes. For example, all three bridging organizations in the Region have internalized dispute resolution mechanisms agreed to by all member stakeholders: those who disagree are free to try to influence change, or are free to leave the voluntary network. This occurred in the Region in 2012, when the rural municipalities left CRP over issues of internal governance. It was not the Province's role to intervene or force change on CRP at the behest of the urban municipalities in the Region, and any attempts to do so have failed to date. (Note: as the dissertation was being finalized in 2016, there are rumours that the Province will force rural municipalities in the Region to join CRP

and force CRP to become a growth management board. The voluntary aspect embedded in the growth management board provisions would be undermined by this unilateral provincial action.)

As mentioned, the best example of an emergent reflexive legal policy/strategy document in Alberta is Water For Life that fulfils the characteristics of reflexive law. Water For Life does not provide legal mandates; rather it sets parameters for decision-making about water throughout the Province. It provides the "structural premises for future decisions in terms of organization, procedure and competencies (Teubner, 183:275) and is framed as goals to be achieved through partnerships; knowledge; and resource conservation. However, Water For Life reiterates that the Province retains sole responsibility for managing water resources, wherever found and clarifies that the partnerships created through Water For Life are not co-managers.

Bridging organizations provide the institutional arrangement for successful implementation of adaptive co-management objectives and processes. While bridging organizations emerge over time and in particular places to address gaps in provincial and municipal environmental policy, they institutionalize as legal entities in the form that they understand will enable them to achieve their objectives.

Table 8.5 provides four strategic or high level processes to legitimize bridging organizations as described by Crona and Parker (2012). Each of these processes requires further elaboration that appears as sub-headings in the table, followed by an estimation of effectiveness in achieving legitimization.

The author posited that once processes to legitimize bridging organizations are in place, the Province could logically engage with bridging organizations in the Region to develop and encourage all engaged stakeholders to take responsibility to implement objectives and strategies included in co-created adaptive co-management plans. Adaptive co-management of natural resources will only be possible when bridging organizations are legitimate partners to government, actively engaged in all aspects of complex decision-making processes.

Table 8.5: Provincial processes to legitimize bridging organizations

Processes to legitimize bridging organization functions	Subheadings	Effectiveness in legitimizing bridging organization functions
Regulating bridging organization form and internal governance processes: Province recommends organizational form **(society or corporation)**; guidance on minimum requirements in internal governance structure and processes to create internal governance policy; procedures for reaching agreement and conflict resolution; procedures for annual reporting to stakeholders and government; and processes for amending self-regulatory mechanisms. Province recommends a process for establishing boundaries and attracting memberships on a multi-sectoral and multi-level basis. Province recognizes bridges and brokers through Alberta stewardship awards. Province gives standing to bridging organizations to appeal Directors' decisions to issue approvals and licenses.	**Furthering reflection:** Foster mechanisms to further reflection. **Embed environmental law principles:** inclusion, openness, flexibility, broad participation, and democratic decision-making processes (consensus) **Membership roles and responsibilities:** Embed process for attracting and retaining members, defining roles and benefits of membership, and whether membership requires payment of fees, or contributions of capital. Brokers are recognized for furthering stewardship of natural resources.	**Recognition:** Recognizes bridging organizations as formal institutional arrangements under Alberta's legal regime and provides guidance to all societies formed under the provincial protocol. **Democratic anchorage:** Democratic anchorage in regional-scale environmental governance and management. Brokers are recognized as valued stewards of Alberta's natural resources. Bridging organizations are able to ensure that approvals and licenses reflect regional co-created plans.
Public purposes, objectives or functions: Province recommends a range of strategic bridging functions that the organization might strive to achieve.	**Introduced policy learning opportunities.** • Provide an arena for learning, co-creation of knowledge, building trust and conflict resolution • Attract expertise, knowledge, and resources • Act as facilitators, mediators and negotiators. •	Strategic bridging functions are valued and legitimized as a "public purpose."

Processes to legitimize bridging organization functions	Subheadings	Effectiveness in legitimizing bridging organization functions

Province officially recognizes planning processes and co-created plans:
Province recommends processes and minimum substantive requirements for adaptive co-management plans, planning processes; and plan implementation.
 	
Province has a process for authorizing Terms of Reference for plans and approving and reviewing plans.
 	
Province requires that plans be considered by all land use and natural resource management decision-makers in the applicable region.
	• Planning Processes
	• Terms of Reference
	• Substantive requirements
	  • Clearly articulated measurable goals,
	  • Stable hypotheses (or some method of structured learning from conceptual models), and
	  • What criteria should apply in evaluating performance and outcomes of adaptive co-management experiments?
	• Effects of plans
	• Matters and factors that a decision-maker must consider when making land use or natural resource allocation or impact decisions.
	• Processes for plan review
		Stakeholders engaged in regional-scale environmental governance and management and co-creation of plans will see the value in planning processes and outcomes. Plans will be implemented according to a standardized process that bridging organizations can refine or improve within the applicable region.
		
		Plans will be recognized as decision-support tools and decision-makers will have to account for how the plans were considered during their decision-making processes, as is the case with Approved Water Management Plans under the *Water Act*.

Co –creation of knowledge: Province recommends how to compile baseline data sets, and how to monitor and evaluate trends over time. Province provides data sets online that can be accessed by bridging organizations. Bridging organizations are legitimate partners in co-creation of knowledge and providing feedback.	**Access to provincial data:** • Processes for compiling baseline data sets; monitoring; data analysis; data storage • Processes for accessing provincial data banks.	Bridging organizations have access to provincial data to assist in co-creation of knowledge that will also be used by the Province in regional-scale environmental governance and management in a feedback loop. Monitoring data over time leads to processes for data analysis, trend identification, identification of

		triggers, thresholds, etc. that require management responses. Dialogue among networked stakeholders creates mechanisms to adapt to feedback in the system.
Processes to legitimize bridging organization functions	**Subheadings**	**Effectiveness in legitimizing bridging organization functions**
Delegating some provincial and municipal powers to bridging organizations for adaptive co-management: Province creates decision-making capacity criteria. Province enables bridging organizations to educate stakeholders about, implement, and monitor and report on implementation of next generation "soft" regulations. Province delegates authority for co-creation of adaptive co-management plans to bridging organizations, and to report on implementation and feedback in the SES, and create processes, programs and practices to continuously improve the plans.	• Bridging organizations that meet decision criteria are delegated some decision-making authority, and ability to implement next generation policies among members to move beyond mere compliance. • Programs apply sector wide • Co-creation of best management practices • Monitoring of agreed to performance measures • Public reporting at regular intervals • Negotiated rules in Region • Performance based rules apply to stakeholders • Stakeholders engage in audited self-regulation • Regional scale problem solving introduced as formal function • Disclosure/ monitoring results of stakeholders is shared • Information co-created or collected is shared • Preparation and implementation of adaptive co-management plans in partnership with the Province.	Authority is shared for adaptive co-management processes, programs and practices based on capacity of bridging organization. Moving beyond mere compliance. Plans are more than decision-support tools for government; stakeholders take responsibility for implementing objectives and strategies in adaptive co-management plans that they have co-created.

Processes to legitimize bridging organization functions	Subheadings	Effectiveness in legitimizing bridging organization functions
Funding arrangements: Province establishes sustainable funding model for bridging organizations that satisfy criteria. The funding comes from resource management fees and fines directly related to the work being done at local and regional-scales by the organizations. The Province establishes a process to apply for government funding and grants that are accessible to bridging organizations that meet satisfy criteria.	• Partners bring something to the society and "co-own" the product. • Mechanisms to acquire funds to achieve regional scale public purposes, including strategic bridging functions. • Funding follows form, function, and performance	Bridging organizations have sustainable funding if they meet the criteria established by the Province to qualify for grants and operational funding. Legitimized strategic functions are valued and considered during provincial budget deliberations. Funding is less of a political process and is tied to form, function and performance criteria.

Source: Judy Stewart, January, 2015.

8.5 Conclusions

Two interconnected primary theses initially drove this dissertation research. Specifically, that the CRP was functioning as a bridging organization; and, that reflexive legal theory provides a framework for legitimizing bridging organizations involved in environmental governance.

8.5.1 Contributions to bridging organization theory

Crona and Parker's (2012) definition of bridging organizations, and the combined works of Westley and Vredenburg (1991; 1997), Brown (1991; 1993), Reid (2004), provided several structural and functional characteristics of bridging organizations. These characteristics were applied to the structure and function of the CRP as well as two other regional-scale voluntary cross-sectoral organizations involved in environmental governance (BRBC and CRAZ). SNA was used to confirm that: 1) all three organizations had the necessary network structure to perform brokerage roles and strategic bridging functions; and, 2) all three were influencing municipal environmental

policy and decision-making to some extent. The dense cores of the networks demonstrated strong trust relationships among diverse stakeholders which have facilitated the co-creation of new transdisciplinary knowledge related to shared environmental management objectives and values. SNA results demonstrated that loosely tied stakeholders (bridges) in the peripheries of the three networks attracted knowledge, innovations and resources from outside the network. As well, they provided strategic bridging processes for information exchange, collaboration, and diffusion of co-created knowledge from the core of the network to others who would otherwise not be connected. Both the CRP and BRBC functioned to connect municipalities in the Region who would otherwise not be connected: they were noted as influencers of municipal participation in the Activities and were identified by municipal respondents as playing significant roles in land use and watershed management decision-making. CRAZ was not identified as a municipal connector in the Region, but several CRAZ members were identified as 'bridges' that provided connections to municipalities as well as BRBC and CRP. According to municipal respondents, CRAZ influenced municipal decision-making about air quality management in seven of the eighteen municipalities.

It is worth noting that by February 2016, at the conclusion of this dissertation, none of the rural municipalities in the original Municipal Network were currently members of CRP, but CRP's boundaries remain open and in a constant state of flux with on-going dialogue about the need to collaborate on growth-related land use issues involving all current and past members. Even though the geo-political spatial boundaries of CRP are in dynamic flux, the CRP has had, and continues to have a perceptible influence on municipal collaboration at a regional-scale.

This dissertation adds to the current bridging organizations literature by demonstrating the emergent phenomena of bridging organizations in environmental governance and management, and the importance of these social networks at the regional-scale. Specifically, the results of the dissertation support earlier theories and research results which found that if the structure and function of strong social networks is built on relationships of shared values and trust, then more effective collective action results (for

example: Ostrom (1990;2005), Pinkerton (1989; 2007), and Pomeroy (2007)). Dissertation results also add to the literature by identifying: 1) the critical role of bridging organizations in providing the necessary social capital for adaptive co-management within a reflexive legal framework; and, 2) the importance of reflexive legal theory and processes in providing a framework to legitimize the function of bridging organizations in liberal democracies.

8.5.2 Contributions to reflexive legal theory.

This dissertation has contributed to reflexive legal theory by framing adaptive co-management by bridging organizations as environmental governance in so far as it is an evolutionary social-political process. For example, Luhmann ([1993]2004) described the legal system as an evolving subsystem of society that is structurally coupled to the political subsystem, where both the legal and political subsystems of society are sensitive and adapt to feedback from each other. Lobel (2004) identified a perceptible evolutionary trend toward reflexive law in the United States that was tied to the emergent phenomenon of 'governance', and what Ruhl (2004) described as 'adaptive management' of natural resources or 'learning by doing.' The dissertation applied reflexive legal theory in an environmental governance demonstration context, which has not been previously attempted.

Reflexive law is relevant to bridging organizations because it is a form of legal self-restraint – "where the legal system restricts itself to the installation, correction, and redefinition of democratic, self-regulatory mechanisms" Teubner (1983:239). In this context, bridging organizations are emergent social phenomena which are self-organizing and self-regulating dynamic organizations that operate parallel to the to the substantive legal regulatory system and at the nexus of what is law and what is not law, where there is often a blurring of boundaries. Bridging organization operations rely on trust relationships and collaboration rather than coercive substantive legal powers. This dissertation contributes to reflexive legal theory by illustrating why the emergent phenomena of bridging organizations require an evolutionary legal framework that supports and legitimizes self-organization and self-regulation.

Reflexive legal processes and institutions that support and legitimize bridging organizations are needed because without the dynamic social capital provided by bridging organizations adaptive co-management may not be successful. For example, Alberta's recent IRMS, which launched while this dissertation was underway, was examined in Chapter 7 in the context of reflexive legal theory, and demonstrates reflexive processes which could support and legitimize bridging organizations as partners with the Province in environmental governance and management. Criteria from the reflexive legal theory literature was used to create the Matrix that was used to assess Alberta's environmental legal instruments pursuant to regulating and managing land use, air quality and water in the Region. The results of the Matrix assessment of reflexivity demonstrate that reflexive legal processes and institutions are being incorporated into parts of Alberta's environmental regulatory and management system. Specifically, reflexive processes requiring partnerships with bridging organizations, such as CRP, BRBC and CRAZ are embedded in policy and regulatory instruments such as Water For Life, *Enabling Partnerships*, Clearing the Air, as well as the new growth management board provisions in the MGA and the SSRP management frameworks for surface water and air quality. In particular, the SSRP management frameworks reflect a perceptible shift from command-and-control regulation to more social-political forms of environmental governance. This supports the crucial roles played by municipalities and bridging organizations in implementing strategies to achieve all four levels of the SSRP's identified management responses, and demonstrates the evolutionary nature of Lobel's (2004) reflexive approaches to law-making. While many of Alberta's legal instruments have incorporated 'interpenetration of policy boundaries' and 'private-public-partnerships', they have not as yet incorporated Lobel's (2004) 'next generation policy strategies' to any great extent.

The reflexivity assessment of Alberta's environmental legal instruments using the Matrix (Chapter 7) demonstrated that Alberta's Water For Life and Clearing the Air policy documents and the SSRP surface water and air quality management frameworks <u>required</u> partnerships with municipalities and bridging organizations in order to implement the complex provincial-scale and watershed-scale policy and regulatory

schemes. Environmental governance approaches, and regional-scale bridging organizations, such as CRP, BRBC and CRAZ are already recognized and partially funded by the Province as 'partners.' As the Province moves forward in implementing regional land use plans (such as the SSRP) under the ALSA, understanding reflexive legal theory and reflexive legal processes will assist in administration of and long term management of regional plans.

8.5.3 Applications to regional-scale environmental governance practice

Recently, the Alberta Minister of Municipal Affairs confirmed that the Province will establish a mandatory growth management board for the 'Calgary metropolitan region.[21] This would effectively define and close the boundaries of the region for growth management planning purposes. The rationale for doing so is stated as "to ensure efficient and effective regional planning and service delivery, and to promote economic prosperity."[22] However, based on the results of this dissertation, such unilateral action could seriously undermine the existing trust relationships between municipalities that CRP has developed. Specifically, the existing voluntary collaborative Municipal Network (identified in Chapter 6) may be broken into several components and functionally undermined by new provincially imposed closed boundaries. These possible outcomes are supported by the work of Westley and Vredenburg (1997) in which they explored a complex global network of voluntary collaborators engaged successfully in preserving global biodiversity. Westley and Vredenburg (1997:392) described the network's structure and function as a loosely structured network with no boundaries, no defined membership, no centralization, and with operations "based on knowledge rather than policies, norms, rules, or authority." An operating principle espoused by the network's

---

[21] Paragraph from a letter from Honourable Minister Danielle Larivee, Minister of Municipal Affairs to Judy Stewart, dated March 4, 2016: "*Our government has concluded that growth management boards for the two metropolitan regions must be mandatory to ensure efficient and effective regional planning and service delivery, and to promote economic prosperity."*

[22] *Ibid.*

founder was “to avoid centralized control and structuring,” and to maintain the network “without boundaries and open to anyone who wanted to join.” (ibid). He believed that artificial bounding would curtail growth and innovative responsiveness to emergent problems in preserving global biodiversity. That fundamental operating principle is supported by Granovetter’s (1976) premise that weakly linked actors in a network’s periphery would strengthen and lead to successful outcomes for the network as a whole, because those actors provided for the influx of knowledge, innovation, and resources. Westley and Vredenburg (1997:394-5) concluded that network institutionalization by a formal authority does not necessarily correlate with successful problem resolution in complex system “domains”. Similarly, if the Province proceeds with creating a growth management board in the Region as currently proposed, it may destroy the social network that made CRP’s co-creation of the CMP possible in the first place.

Furthermore, if the Province regulates the formation of a growth management board in the Region, the reflexive legal nature of the MGA’s current growth management board provisions will be replaced with substantive legal institutions and processes that will effectively destroy the CRP and its critical environmental governance bridging functions.

As Blankenburg (1984) predicted in his critique of Teubner’s (1983) reflexive legal theory, the reflexive processes that led to the current growth management board provisions in the MGA might introduce new regulation over the voluntary Municipal Network in the Region that had not been previously regulated. However, until the law is changed, the current MGA provisions stress that the decision by each municipality to become a participating member of a growth management board is still voluntary, and the growth plans they co-create are intended to have an effect only on those municipalities who participate in their co-creation. The author’s response to Blankenburg’s (1984) critique is that reflexive legal processes and institutions are co-evolving with the post-modern social-political reality that includes new social-political forms of environmental governance. The structurally coupled legal-political subsystem of society may be responding to feedback and putting necessary organizational structures and procedures in place to co-manage and mutually adapt to other subsystems of society, as society as a

whole responds to feedback in the SES. It may be that the incorporation of reflexive legal processes and institutions has simply become necessary when attempting to regulate and manage complex, dynamic SES where society and the ecosystem are inextricably connected.

8.5.4 Areas for further research

The following seven research areas were identified in the course of this research which would incorporate the results of this dissertation and further develop the understanding and application of regional-scale environmental governance, bridging organization theory and reflexive legal theory. While some aspects of these areas might be more effectively explored through case study demonstration, others may be well suited to developing and advancing theory through practice. Regardless, the following areas are important next steps in taking the results of this dissertation further.

1. Network analysis should be conducted to identify functional, structural, and spatial regional-scale SES linkages and to test Janssen et al.'s (2006) theories.
2. Transdisciplinary research would assist in determining appropriate types of co-created decision-support tools for linking municipal land use decision-making with provincial water management and air quality management policies and regulation.
3. Using the approach designed by Gunningham and Sinclair (1999), an exploration of implementation alternatives for the new *Alberta Wetland Policy*[23] (2013) would assist in creating greater consistency and compatibility with the regional land use plans created under ALSA, such as the SSRP. Currently the policy is implemented exclusively by the Province, and regional-scale bridging organizations such as the CRP and BRBC do not appear to have a role in implementing the policy in a local context.

[23] Government of Alberta. 2013. *Alberta Wetland Policy*, online: http://aep.alberta.ca/water/programs-and-services/wetlands/documents/AlbertaWetlandPolicy-Sep2013.pdf.

4. As the IRMS and CEM unfold in Alberta, a better understanding of regional-scale SES is needed to inform integrated and strategic management. Currently, the so-called land use management 'regions', such as the landscape area addressed through the SSRP are vast spatial areas that embed multiple nested SES.
5. Given concerns in the literature (Ruhl, 2004) about the legitimacy of adaptive management plans, further exploration is required, such as a comparative examination of Canadian adaptive management and co-management case studies.
6. A better understanding of the nature and role of social learning in bridging organizations involved in environmental governance is necessary to better enable their effective function in reflexive legal contexts.
7. The Matrix can be developed further as a useful tool to assess the reflexivity of environmental legal instruments in other Canadian provinces in order to identify whether there is an evolutionary trend toward reflexive legal processes in the country's environmental regulatory system.

References

Books and journals:

Agrawal, A., D.G. Brown, G. Roa, R. Riolo, D. T. Robinson, M. Bommarito II. 2012. Interactions between organizations and networks in common-pool resource governance. *Environmental Science and Policy* 25: 138-46.

Armitage, D, F. Berkes and N. Doubleday (eds). 2007. *Adaptive Co-Management: Collaborations, Learning and Multi-Level Governance.* Vancouver: UBC Press.

Ashman, D., L.D. Brown and E. Zwick. 1998. *The strength of strong and weak ties: Building social capital for the formation and governance of civil society*. Civil Society Research Organizations. Institute for Development Research Reports, 14 (IDR Report No. 2).

Bason, C. 2010. *Leading Public Sector Innovation*. Bristol, UK: The Policy Press.

Benson, M.H. and R.K. Craig. 2014. The End of Sustainability. *Society & Natural Resources: An International Journal* 27(7):777-82.

Berkes, F. 2002. Cross-scale institutional linkages for commons management: Perspectives from the bottom up, in E. Ostrom, T. Dietz, N. Dolsak, P.C. Stern, S. Stonich, and E. U. Weber (eds). *The Drama of the Commons*. National Academy Press: Washington, D.C.: National Academy Press: 293-321.

_____ 2009. Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management* 90:1692-702.

Berkes F. and J. Colding (eds.) 2003. *Navigating Social-Ecological Systems: Building Resilience for Complexity and Change*. Cambridge: Cambridge University Press.

Biermann, F. 2004. *Global Environmental Governance. Conceptualization and Examples.* Global Governance Working Paper No. 12, Amsterdam, Berlin, Oldenburg, Postdam: The Global Governance Project. Available at www.glogov.org. Last visited January, 2015.

Biggs, R., M. Schluter, D. Biggs, E. L. Bohensky, S. BurnSilver, G. Cundill, V. Dakos, T. M. Daw. L. S. Evans. K. Kotschy, A. M. Leitch, C. Meek, A. Quinlan, C. Raudsepp-Hearne, M. D. Robards, M.L. Schoon, L. Schultz, and P. C. West. 2012. Towards Principles for Enhancing Resilience of Ecosystem Services. *Annual Review Environmental* 37:421-48.

Blankenburg, E. 1984. The Poverty of Evolutionism: A Critique of Teubner's Case for 'Reflexive Law.' *Law & Society Review* 18(2):273-90.

Bodin, O., and B. I. Crona. 2009. The role of social networks in natural resource governance: what relational patterns make a difference? *Global Environmental Change* 19:366-74.

_____ 2011. Barriers and opportunities in transforming to sustainable governance: the role of key individuals, in O. Bodin and C. Prell (eds). *Social Networks and Natural Resource*

Management: Uncovering the Social Fabric of Environmental Governance. New York: Cambridge University Press.

Bodin, O. and C. Prell (eds). 2011. *Social Networks and Natural Resource Management: Uncovering the Social Fabric of Environmental Governance*. New York: Cambridge University Press.

Boulding, K.E. 1956. General Systems Theory – The Skeleton of Science. *Management Science*. 2(3):197-208.

_____1970. *A Primer on Social Dynamics*. New York: The Free Press.

Bourgeron , P.S., H.C. Humphries, and L. Riboli-Sasco. 2009. Regional analysis of social-ecological systems. *Natural Sciences Sociétés* 17:188-93.

Breuillard. M. 1993. Dynamics and Room to Maneuver in Governance: The Channel Tunnel Decision in France and Britain, in J. Kooiman (ed). *Modern Governance: New Government-Society Interactions.* London: Sage Publications.

Brousseau, E., T. Dedeurwaerdere, and B. Siebenhuner. 2012. *Reflexive Governance for Global Public Goods*. Massachusetts:Massachusetts Institute of Technology.

Brown, L.D. 1983. *Managing conflict at organizational interfaces*. Massachusetts: Addison-Wesley Publishing Company,

_____ 1991. Bridging organizations and sustainable development. *Human Relations* 44:807-31.

_____ 1993. *Development bridging organizations and strategic management of social change.* Institute for Development Research Reports Vol. 10.3. IDR, Boston, Massachusetts, USA.

Brown, L. D., and D. Ashman.1999. Social capital, mutual influence, and social learning in intersectoral problem-solving, in D. Cooperrider and J. Dutton (eds.). *Organizational Dimensions of Global Change*. Thousand Oak, CA,: Sage.

Bulkeley, H. 2005. Reconfiguring environmental governance: Towards a politics of scales and networks. *Political Geography* 24: 875-901.

Busch, D. E. and J. C. Trexler. 2003. *Monitoring Ecosystems: Interdisciplinary Approaches for Evaluating Ecoregional Initiatives*. Washington. D.C.: Island Press.

Cohen, A and K. Bakker. 2014. The eco-scalar fix: rescaling environmental governance and the politics of ecological boundaries in Alberta, Canada. *Environment and Planning D: Society and Space*. 32:128-46.

Conteh, C., 2013. *Policy Governance in Multi-Level Systems: Economic Development & Policy Implementation in Canada*. Montreal: McGill-Queen's University Press.

Costanza, R. F. Andrade, P. Antunes, M, van den Belt, D. Boesch, D. Boersma, F. Catarino, S. Hanna, K. Limburg, B. Low, M. Molitor, J.G. Pereira, S. Rayner, R. Santos, J. Wilson, and M. Young. 1999. Ecological economics and sustainable governance of oceans. *Ecological Economics* 31:171-87.

Crona, B., and J. Parker. 2011. Network determinants of knowledge utilization: preliminary lessons from a boundary organization. *Science Communication* 33(4):448–71.

_____ 2012. Learning in support of governance: theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. *Ecology and Society* 17(1): 32.

Crona, B. and K. Hubacek. 2010. The Right Connections: How do Social Networks Lubricate the Machinery of Natural Resource Governance? *Ecology and Society* 15(4):18.

de Nooy, W, A. Mrvar, and V. Batagelj. 2011. (2nd Ed.) *Exploratory Social Network Analysis with Pajek*. Cambridge: Cambridge University Press.

Eamer, J. 2006. Keep it simple and be relevant: the first ten years of the Arctic Borderlands Ecological Knowledge Co-op, in W. V. Reid, F. Berkes, T. Wilbanks, and D. Capistrano, (eds). *Bridging scales and knowledge systems.* Washington, D.C., USA.:Millennium Ecosystem Assessment and Island Press: 185-206.

Ebbesson, J. 2009. The rule of law in governance of complex social-ecological change. *Global Environmental Change* (2010), online: doi:10.1016/i.gloenvcha.2009.10.009. Last visited, November, 2015.

Ebbesson, J., and E Hey. 2013. Introduction: Where in Law is Social-Ecological Resilience? *Ecology and Society* 18(3)25, online: http//dx.doi.org/10.5751/ES-0570-180325. Last visited November, 2015.

Ernston H., S. Barthel, E. Andersson, and S.T. Borgstrom. 2010. Scale-Crossing Borders and Network Governance in Urban Ecosystem Services: The Case of Stockholm. *Ecology and Society* 15(4):28.

Environmental Law Centre. 2012. *Core Environmental Principles for Environmental Laws, Policies and Legal Processes*. Edmonton: Environmental Law Centre.

Evans, L. 2007. *Moving Towards Sustainability: City-Regions and Their Infrastructure*. Ottawa: Canadian Policy Research Networks.

Fiorino, D.J. 1999. Rethinking Environmental Regulation: Perspectives on Law and Governance. *Harvard Environmental Law Review* 23: 441.

_____ 2001. Environmental policy as learning: a new view of an old landscape. *Public Administration Review.* 61(3): 322-24.

_____ 2006. *The New Environmental Regulation*. Massachusetts: Massachusetts Institute of Technology.

Folke, C., T. Hahn, P, Olsson and J. Norberg. 2005. Adaptive Governance of Social-Ecological Systems. *Annual Review of Environmental Resources* 30:441-73.

Fotel, T., E. Sorensen, and J. Torfing. 2008. *Measuring the Democratic Anchorage of Governance Networks: the case of the Femern Belt Forum*. Working Paper 2008/1. Center for Democratic Network Governance, Roskilde, Denmark, 1-31.

Granovetter, M. 1973. The strength of weak ties. *American Journal of Sociology* 78:1360–80

Gunderson, L. H., C. R. Allen and C. S. Holling. (eds.) 2010. *Foundations of Ecological Resilience*. Washington. D.C.: Island Press.

Gunderson, L. H. and C. S. Holling. (eds.) 2002. *Panarchy. Understanding Transformations in Human and Natural Systems*. Washington. D.C.: Island Press.

Gunn, J.H. and B.F. Noble.2009. A conceptual basis and methodological framework for regional strategic environmental assessment (R-SEA). *Impact Assessment and Project Appraisal*, 27(4):258-70.

Gunningham, N. and D. Sinclair. 1999. Regulatory Pluralism: Designing Policy Mixes for Environmental Protection. *Law & Policy* 21(1): 49-76.

_____ 2002. *Leaders and Laggards: Next-Generation Environmental Regulation*. Sheffield, U.K.: Greenleaf Publishing:

Haas, P. 2004. Addressing the Global Governance Deficit. *Global Environmental Politics* 4(4)1-15.

Habermas, J. 1975. *Legitimization Crisis*. Boston:Beacon.

Hahn, T., P. Olsson, C. Folke, and K. Johansson. 2006. Trust-building, knowledge generation and organizational innovations: the role of a bridging organization for adaptive comanagement of a wetland landscape around Kristianstad, Sweden. *Human Ecology* 34(4):573-92.

Hatch, M.J. 2011. *Organizations: A Very Short Introduction*. Oxford. UK: Oxford University Press.

_____ 2013. *Organization Theory*. Oxford. UK: Oxford University Press.

Humber, L. L. 2011. *An Ecohydrology Approach to Linking Land Use Planning with Water Management in the Calgary Region*. Master's Thesis, University of Calgary, Faculty of Environmental Design.

Isaac, M., and E. Dawoe. 2011. Agrarian communication networks: consequences for agroforestry, in O. Bodin and C. Prell (eds). 2011. *Social Networks and Natural Resource*

Management: Uncovering the Social Fabric of Environmental Governance. New York: Cambridge University Press.

Janssen, M. A., O. Bodin, J. M. Anderies, T. Elmqvist, H. Ernston, R. R.J. McAllister, P. Olsson, and P. Ryan. 2006. Toward a Network Perspective of the Study of Resilience in Social-Ecological Systems. *Ecology and Society* 1(1):15.

Johnson, F. 1999. Protocol and Practice in the Adaptive Management Waterfowl Harvests. *Conservation Ecology* 3:8.

Jones, C., W.S. Hesterly, and S.P Borgatti. 1997. A General Theory of Network Governance : Exchange Conditions and Social Mechanisms. *The Academy of Management* 22(4) : 911-45.

Kay. J. and H. Regier. 2000. Uncertainty, Complexity, and Ecological Integrity: Insights from an Ecosystem Approach, in P. Crabbe, A Holland, L. Ryszkowski and L. Westra (eds). *Implementing Ecological Integrity: Restoring Regional and Global Environmental and Human Health.* Kluwer, NATO Science Series, Environmental Security. 121-56.

Kooiman, J., (ed). 1993. *Modern Governance: New Government-Society Interactions.* London : Sage Publications.

_____2000. Societal Governance: Levels, Modes and Orders of Social-Political Interaction, in Pierre (ed). *Debating Governance, Authority, Steering and Democracy*. Oxford: Oxford University Press.

_____ 2003. *Governing as Governance.* London: Sage Publications.

Kooiman, J., M. Bavinck, R. Chuenpagdee, R. Mahon, R. Pullin. 2008. Interactive Governance and Governability: An Introduction. *The Journal of Transdisciplinary Environmental Studies* 7(1):1-11.

Kouwenhouven, V. 1993. Public-Private Partnership: A Model for the Management of Public-Private Cooperation in J. Kooiman (ed). *Modern Governance: New Government-Society Interactions.* London:Sage Publications: 119-31.

Lawrence, T. B., and C. Hardy. 1999. Building bridges for refugees: toward a typology of bridging organizations. *Journal of Applied Behavioral Science* 35(1):48-70.

Lemos, M.C. and A Agrawal. 2006. Environmental governance. *Annual Review of Environmental Resources 31*:297-325.

Lebel, L., J.M. Anderies, B. Campbell, C. Folke, S. Hatfield-Dodds, T.P. Hughes, and J. Wilson. 2006. Governance and the Capacity to Manage Resilience in Regional Social-Ecological Systems. *Ecology and Society* 11(1):19.

Lobel, O. 2004. The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought. *Minnesota Law Review* 89: 262-390.

Liu, J., T. Dietz, S. R. Carpenter, C. Folke, M. Alberti, C. L. Redman, S. H. Schneider, E. Ostrom, A. N. Pell, J. Lubchenco, W. W. Taylor, Z. Ouyang, P. Deadman, T. Kratz and W. Provencher. 2007. Coupled Human and Natural Systems. *Ambio* 36(8): 639-49.

Luhmann. N. 1982. *The Differentiation of Society*. New York: Columbia University Press.

Luhmann, N. [1993] (Klaus Zeiger trans.). 2004. *Law as a Social System.* New York: Oxford University Press.

Mayntz, R. 1993. Governing Failures and the Problem of Governability: Some Comments on a Theoretical Paradigm, in J. Kooiman (ed). 1993. *Modern Governance: New Government-Society Interactions.* London:Sage Publications.

Nelitz, M. S. Boardley, and R. Smith. 2013. *Tools for Climate Change Vulnerability: Assessments for Watersheds.* Ottawa: Canadian Council for Ministers of the Environment.

Newell, P., P. Pattberg and H. Schroeder. 2012. Multiactor Governance and the Environment. *Annual Review Environment* 37:365-87.

Newig, J., D. Gunther, and C. Pahl-Wostl. 2010. Synapses in the Network: Learning in Governance Networks in the Context of Environmental Management. *Ecology and Society* 15(4):24.

Noble, B. and P. Basnet. 2015. Capacity for watershed cumulative effects assessment and management in the South Saskatchewan Watershed, Canada. *Canadian Water Resources Journal* 40(2):187-203.

Nobles, R., and D. Schiff. 2006. *A Sociology of Jurisprudence.* Portland, Oregon: Hart Publishing.

_____ 2013. *Observing Law Through Systems Theory.* Portland, Oregon: Hart Publishing.

Nonet, P., and P. Selznick.1978. *Law and Society in Transition: Toward Responsive Law*. New York: Harper.

Novus. 2012. All Source Pollutants Emissions Inventory for the Calgary Region Airshed Zone (CRAZ). Report prepared for the Calgary Region Airshed Zone. May, 2012.

Olsson, P., C. Folke, and F. Berkes. 2004. Adaptive co-management for building resilience in social-ecological systems. *Environmental Management* 34(1):75-90.

Olsson, P., C. Folke, V. Galaz, T. Hahn, and L. Schultz. 2007. Enhancing the fit through adaptive co-management: creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve, Sweden. *Ecology and Society* 12(1): 28.

Olsson, P., C. Folke, and T. Hahn. 2004. Social-ecological transformation for ecosystem management: the development of adaptive co -management of a wetland landscape in southern Sweden. *Ecology and Society* 9(4): 2.

Olsson, P., L. H. Gunderson, S. R. Carpenter, P. Ryan, L. Lebel, C. Folke, and C. S. Holling. 2006. Shooting the rapids: navigating transitions to adaptive governance of social-ecological systems. *Ecology and Society* 11(1):18

Ostrom, Elinor, 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press:.

_____2005. *Understanding Institutional Diversity.* Princeton, NJ: Princeton University Press.

_____2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325: 419-22.

Pahl-Wostl, C. 2006. The Importance of Social Learning in Restoring the Multifunctionality of Rivers and Floodplains. *Ecology and Society* 11(1):10.

_____2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. *Global Environmental Change* 19: 354-365.

Pahl-Wostl, C., M. Craps, A. Dewulf, E. Mostert, D. Tabara, and T. Taillieu. 2007. Social learning and water resources management. *Ecology and Society* 12(2): 5.

Pahl-Wostl, C., D. Tàbara, R. Bouwen, M. Craps, A. Dewulf, E. Mostert, D. Ridder, and T. Taillieu. 2008. The importance of social learning and culture for sustainable water management. *Ecological Economics* 64:484-95.

Paquet, G. 1999. *Governance Through Social Learning*. Ottawa. University of Ottawa Press.

_____ 2005. *The New Geo-Governance*. Ottawa: University of Ottawa Press.

Patton, M.Q. 2011. *Developmental Evaluation –Applying Complexity to Enhance Innovation and Use*. New York: The Guilford Press.

Pinkerton, E. 2007. Integrating Holism and Segmentalism: Overcoming Barriers to Adaptive Co-Management between Management Agencies and Multi-Sector Bodies, in D. Armitage, F. Berkes and N. Doubleday (eds.). *Adaptive Co-Management: Collaboration, Learning and Multi-Level Governance*. Vancouver: UBC Press.

Pomeroy, R. 2007. Conditions for Successful Fisheries and Coastal Resources Co-Management: Lessons Learned in Asia, Africa, and the Wider Caribbean, in D. Armitage, F. Berkes and N. Doubleday (eds.). *Adaptive Co-management: Collaboration, Learning, and Multi-Level Governance.* Vancouver: University of British Columbia Press.

Prell, C. K. Hubacek and M. Reed. 2007. Stakeholder Analysis and Social Network Analysis in Natural Resource Management. Sustainability Research Institute, University of Leeds, UK, online:<http//:www.see.leeds.ac.uk/sri>. Last visited, November, 2015.

Prell, C., M. Reed, L. Racin, and K. Hubacek. 2010. Competing Structure, Competing Views: The Role of Formal and Informal Social Structures in Shaping Stakeholder Perceptions. *Ecology and Society* 15(4):34.

Rathwell, K. J., and G. D. Peterson. 2012. Connecting Social Networks with Ecosystem Services for Watershed Governance: a Social-Ecological Network Perspective Highlights the Critical Role of Bridging Organizations. *Ecology and Society* 17(2):24.

Redman, C. L., J. M. Grove and L, H. Kuby, 2004. Integrating Social Science into the Long Term Ecological Research (LTER) Network: Social Dimensions of Ecological Change and Ecological Dimensions of Social Change. *Ecosystems* 7: 161-171.

Reed, M. S., A. C. Evely, G. Cundill, I. Fazey, J. Glass, A. Laing, J. Newig, B. Parrish, C. Prell, C. Raymond, and L. C. Stringer. 2010. What is social learning? *Ecology and Society* 15(4): r1.

Reid, K. E. 2004. *Building a Framework for Institutional Change,* (PhD Dissertation). University of Texas, Austin.

Reid, W.V., F. Berkes, T. Wilbanks and D.Capistrano (eds.). 2006. *Bridging Scales and Knowledge Systems: Linked Global Science and Local Knowledge in Assessments*. Washington. D.C:
Millennium Ecosystem Assessment and Island Press.

Rittel, H.W.J. and M.M. Webber. 1973. Dilemmas in a General Theory of Planning. *Policy Sciences* 4:155-69.

Ruhl, J.B. 2005. Regulation by Adaptive Management-Is It Possible? *Minnesota Journal of Law, Science & Technology* 7(1): 21-44.

Ruhl, J.B. and R. L Fischman. 2010. Adaptive Management in the Courts. *Minnesota Law Review* 95:424.

Sanderson, E., M. Jaiteh, M.A. Levy, K.H. Redford, A.V. Wannebo, and G. Woolmer. 2002. The Human Footprint and the Last of the Wild. *BioScience* 52(10):891-904.

Sandström, A., Crona, B., & Bodin, Ö. (2014). Legitimacy in Co-Management: The Impact of Preexisting Structures, Social Networks and Governance Strategies. *Environmental Policy and Governance*, *24*(1), 60-76.

Schultz, L. 2009. *Nurturing resilience in social-ecological systems: Lessons learned from bridging organizations.* (PhD Thesis) Stockholm University: Stockholm, online:

http://issuu.com/gfbertini/docs/nurturing_resilience_in_socioecological_systems/1?zoomed=&zoomPercent=&zoomX=&zoomY=&noteText=&noteX=&noteY=&viewMode=magazine. Last visited, June, 2014.

Schultz, L., C. Folke, and P. Olsson. 2007. Enhancing ecosystem management through social-ecological inventories: lessons from Kristianstad Vattenrike, Sweden. Environmental Conservation. 34(2):140-52.

Schusler, T.M., D.J. Decker and M.J. Pfeffer. 2003. Social learning for collaborative natural resource management. *Society and Natural Resources* 16(4):309-26.

Scott, J. and Trubek, D.M. 2002. Mind the Gap : Law and New Approaches to Governance in the European Union. *European Law Journal* 8(1) : 1-18.

Sharma, S. H. Vrendenburg, and F. Westley. 1994. Strategic bridging: A role for the multinational corporation in Third World Development. *Journal of Applied Behavioral Science* 30(4):458-76.

Sorensen, E., and J. Torfing.2005. Network Governance and Post-Liberal Democracy, *Administrative Theory & Praxis* 27(2) 197-237.

_____ 2010. *Collaborative Innovation in the Public Sector: An Analytical Framework.* Working Paper 1/2010. Studies in Collaborative Innovation. Roskilde, Denmark.

Stoker, G. 1998. Governance as theory: five propositions. *International Social Science Journal* 50:17-28.

Swanson D., J. Hiley, H.D. Venema, and R. Grosshans. 2009. *Indicators of Adaptive Capacity to Climate Change for Agriculture in the Prairie Region of Canada.* International Institute for Sustainable Development: Winnipeg.

Teubner, G. 1983. Substantive and Reflexive Elements in Modern Law. *Law & Society Review* 17:2: 239-86.

____ 1993. *Law as an Autopoietic System.* Oxford: Blackwell Publishers.

____ 2012. *Constitutional Fragments.* Oxford : Oxford University Press.

Torfing. 2005. Governance network theory: towards a second generation. *European Political Science* 4:305-15.

Trombulak, S.C., R. E Baldwin and G. Woolmer. 2010. The Human Footprint as a Conservation Planning Tool, in S.C. Trombulak and R.F. Baldwin (eds). Landscape-scale Conservation Planning, Springer Science + Business Media B.V.

Trubek, D.M. and L.G. Trubek. 2006. New Governance & Legal Regulation: Complementarity, Rivalry, and Transformation. *Columbia Journal of European Law* 13(1):1-26.

Tyler, M.E. and M. Quinn. 2010. A Social-Spatial Approach to Ecological Governance. *International Journal of Interdisciplinary Social Sciences* 5(6): 73-86.

____ 2013. Identifying social-ecological couplings for regional sustainability in a rapidly urbanizing water-limited area of western Canada, in C.A. Brebbia (ed.), *Wessex Sustainability Development and Planning VI*, Southampton, UK: WITPress.

Tyler M.E.,M. Quinn, E. Barchard, J. Cecchetto, L. Humber, C. Selvig, N. Woodhouse 2008. What We Know Ecological Infrastructure in the Calgary Region "What We Know Now" Final Report, prepared for the Calgary Regional Partnership, Calgary, AB, online: http://www.rockies.ca/files/reports/Ecological%20Infrastructure%20in%20the%20Calgary%20Region%20-%20What%20we%20know%20now.pdf. Last visited, August, 2015.

United Nations. 1992. *Convention on Biological Diversity*, online, https://www.cbd.int/convention/. Last visited, August, 2015.

Urban Futures. 2012. *A Context for Change Management in the Calgary Regional Partnership Area Future Population, Housing, Labour Force, and Employment*, prepared for the Calgary Regional Partnership, Calgary, AB, online: http://calgaryregion.ca/dam/Website/reports/General/Regional-servicing-and-CMP-Implementation/Urban-Futures--A-context-to-change-management-in-the-Calgary-Regional-Partnership-area---February-2012/Urban%20Futures-%20A%20context%20to%20change%20management%20in%20the%20Calgary%20Regional%20Partnership%20area%20-%20February%202012.pdf. Last visited, January, 2016.

van Rijswick M. and I.U. Tappeiner. 2014. Developing an institutional legal framework for sustainable regional water management in times of climate change, in M.Kidd, L.Feris, T. Murombo, and A. Iza (eds.) *Water and the Law: Towards Sustainablility*. Massachusetts, USA: Edward Elgar Publishing, Inc.

van Vliet, M. 1993. Environmental Regulation of Business: Options and Constraints for Communicative Governance, in J. Kooiman (ed). *Modern Governance: New Government-Society Interactions.* London: Sage Publications.

von Bertalanffy, L. 1950. General Systems Theory: A New Approach to Unity in Science. *Human Biology* 23: 303-61.

_____1972. The History and Status of General Systems Theory. *Academy of Management Journal* 15(4) 407-26.

Walker, B.H., A.P. Kinzig, L.H. Gunderson, C.Folke, S.R, Carpenter and L. Schultz. 2006. A handful of heuristics: propositions for understanding resilience in social-ecological systems. *Ecology and Society* (2006) 11(1):13.

Walker, B.H., A. Kinzig, J. Anderies, and P. Ryan (eds). 2006. *Exploring Resilience in Social-ecological Systems: Comparative Studies and Theory Development*, online:

<http://www.ecologyandsociety.org/issues/view.php?sf=22> Social-Ecological Systems Edition. Last visited June, 2014.

Walker, B. and D. Salt. 2006. *Resilience Thinking: Sustaining Ecosystems and People in a Changing World.* Washington. D.C.: Island Press.

_____ 2012. *Resilience Practice*. Washington, D.C.: Island Press.

Waltner-Toews, D. and J. Kay. 2005. The Evolution of an Ecosystem Approach: The Diamond Schematic and an Adaptive Methodology for Ecosystem Sustainability and Health. *Ecology and Society* (10) 1:38.

Wasserman, S., and K. Faust. 1994. *Social network analysis: methods and applications.* Cambridge.UK: Cambridge University Press.

Watson, J. 2015. You Don't Know What You've Got 'Til It's Gone : The Rule of Law in Canada – Part II. *Alberta Law Review* 52 (4):949-88.

WaterSmart. 2013. The 2013 Great Alberta Flood. Actions to Mitigate, Manage, and Control Future Floods, online: https://www.google.ca/?gws_rd=cr&ei=QEWBUsnyHOnSiwKxjIHoBQ#q=future+floods+in+teh+bow+basin+predictions. Last visited, September, 2014.

Westley, F., S. R. Carpenter, W.A. Brock, C.S. Holling, and L.H. Gunderson. 2002. Why Systems of People and Nature are not Just Social and Ecological Systems, in L.H. Gunderson and C. S. Holling (eds). 2002. *Panarchy. Understanding Transformations in Human and Natural Systems*. Washington. D.C.: Island Press.

Westley, F., and H. Vredenburg. 1991. Strategic bridging: the collaboration between environmentalists and business in the marketing of green products. *Journal of Applied Behavioral Science* 27(1):65-90.

_____ 1997. Interorganizational collaboration and the preservation of global biodiversity. *Organization Science* 8(4):381-403. http://dx.doi.org/10.1287/ orsc.8.4.381.

Government documents:

Government of Alberta. 2015a. *Cumulative Effects*, online: http://esrd.alberta.ca/focus/cumulative-effects/default.aspx. Last visited, February 5, 2015.

_____2015b. *Environmental Management Frameworks*, online: https://landuse.alberta.ca/CumulativeEffects/EnvronmentalMgmtFrameworks/Pages/default.aspx. Last visited, February 5, 2015.

_____2015c. *Integrated Resource Management System, online:* Edmonton: Government of Alberta, online: http://oilsands.alberta.ca/2827.html. Last visited, February 5, 2015.

_____2015d. Alberta Municipal Affairs: *The MGA Review: What We Heard*, online: http://mgareview.alberta.ca/. Last visited, February 5, 2015.

_____2014a. *South Saskatchewan Regional Plan 2014-2024*. Edmonton: Government of Alberta.

_____2014b. SSRP *Framework for Air Quality Management.* Edmonton: Government of Alberta.

_____2014c. SSRP *Framework for Surface Water Quality Management.* Edmonton:Government of Alberta.

_____2014d. *"Working With Others in Integrated Resource Management: Multi-Stakeholder Organization Review Final Report and Recommendations"* Edmonton: Government of Alberta.

_____2013. *Alberta Air Monitoring Directive.* Edmonton: Government of Alberta.

_____2013a. *Alberta Wetland Policy*. Edmonton: Government of Alberta.

_____2012. *Lower Athabasca Regional Plan.* Edmonton: Government of Alberta.

_____2008. *Alberta Land-use Framework.* Edmonton: Government of Alberta.

_____2006. *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta).* Edmonton: Alberta Environment.

_____2004. *Enabling Partnerships*. Edmonton: Alberta Environment.

_____2003. *Water For Life, Alberta's Strategy for Sustainability*. Edmonton: Government of Alberta.

_____1999. *Framework for Water Management Planning*. Edmonton: Government of Alberta.

_____1996. *Alberta Land Use Policies*. Edmonton: Municipal Affairs.

Legislation referred to in the body of the dissertation:

Alberta Land Stewardship Act, S.A. 2009, c.A-26.8.
Business Corporations Act, R.S.A. 2000, c.B-9.
Companies Act, R.S.A. 2000, c.C-21.
Cooperatives Act, S.A. 2001, c.-28.1.
Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12.
Municipal Government Act, R.S.A. 2000, c.M-26.
Partnership Act, R.S.A. 2000, c.P-3.
Public Lands Act, R.S.A. 2000, c.P-40.
Societies Act, R.S.A. 2000, c.S-14.
Water Act, R.S.A. 2000, c.W-3.
The Constitution Act, 1982. Schedule B to *The Canada Act 1982* (UK), 1982, c.11.

Governance networks reference materials:

Bow River Basin Council. 2012. *Bow Basin Watershed Management Plan* 2012, online: <http://brbc.ab.ca/index.php/resources/bbwmp>. Last visited November 10, 2015.

Calgary Regional Partnership. 2014. *Calgary Metropolitan Plan.* Calgary *:*Calgary Regional Partnership.

2012. *Calgary Metropolitan Plan*. Calgary Regional Partnership: Calgary, online, <http://calgaryregion.ca/cmp/bin1/pdf/CMP.pdf>. Last visited November 10. 2015.

_____2009. *Calgary Metropolitan Plan: As Revised and Approved the June 19, 2009 CRP General Assembly.* Unpublished.

Calgary Region Airshed Zone. 2008. *Particulate Matter and Ozone Management Plan* 2008, online: http://www.craz.ca/assets/fileManager/Management%20Plan/CRAZ_PMOMP_FINAL..pdf. Last visited November 10, 2015.

_____2014. *Particulate Matter and Ozone Management Plan.*

Regional Bridging Organization Websites:

Bow River Basin Council, online: http://www.brbc.ca. Last visited September, 2015.

Calgary Region Airshed Zone, online: http://www.craz.ca. Last visited September, 2015.

Calgary Regional Partnership, online: http://www.crp.ca. Last visited September, 2015.

APPENDIX A
Research Interview Materials and Methodology

1.0 Detailed Interview Methodology

The overall purpose of the structured interview of representatives from municipal governments and three regional governance networks in the Region, and the ensuing social network analysis was to enable the discovery of the relationships within governance networks and the influence the networks may have in increasing municipal participation in environmental management activities within the regional social-ecological system.

1.1 Urban versus rural municipalities

For the purpose of the interviews, cities, urban towns, villages, and hamlets in the Region were referred to as ***urban municipalities***, and municipal districts, counties, and improvement districts were referred to as ***rural municipalities***. Urban municipalities correlated to Rathwell and Peterson's (2012) "amenity" municipalities, and rural municipalities correlated with their "agricultural" municipalities.

The ***Interview for Municipal Representatives*** and ***Interview of Governance Network Board of Directors*** follows below a brief discussion of participant identification and selection. After conducting the interviews, which were recorded and transcribed, the interview data was tabulated heuristically, and analyzed with social network analysis software to determine the network structure of the municipal network within the Region, and the connectivity and centrality of municipal members. Social network analysis was used to identify the network structure of the three governance networks and the connectivity and centrality of municipal members within the three governance networks.

1.2 Participant Identification and Selection

Municipal representatives included one of the Mayor, Chief Administrative Office (hereinafter CAO), or the Environmental Manager of each municipal participant within the Region. These municipal representatives were similar to those interviewed by Rathwell and Peterson (2012), as they determined that the Mayor and CAO oversee all activities at the municipal level, and other than an environmental manager, they should be the best informed.

19 municipalities within the Region were identified to be interviewed: 2 cities; 12 urban towns; 2 municipal districts, 2 counties and 1 improvement district. (The representative from the improvement district answered many of the questions in the survey, but explained the differences between improvement districts and other municipalities and we both agreed that the district would not be included in the study.) All municipalities were members of at least one of the governance networks in 2014. For example, rural municipalities in the Region were not members of CRP but were members of either the BRBC or CRAZ, or both.

The protocol to discover the appropriate municipal representative for each municipal participant was through an ***Initial Mayors' interviews*** with the Mayor of each municipality who was asked to provide the name and contact information of the person he or she believed would be in the best position to provide information for the interview survey. The initial Mayors' interviews were carried out by telephone and email by Judy Stewart using contact information from municipal websites.

After the initial Mayor's interviews were conducted, a list of municipal representatives and their contact information for the purpose of interview surveys was created and used for the interviews, but not retained once the research was completed. The interview information gathered from each municipal representative was attributed to the municipality, not the representative.

The Board of Directors of the CRP, BRBC and CRAZ change periodically following Annual General Meetings, and the contact information for the Board of Directors was revised before interviews began, and was updated throughout the interview period.

2.0 Detailing the Purpose of Interview of Municipal Representatives

The purpose of interviewing municipal representatives was to discover as follows:

- The names of the three most influential people and their organizations within each municipality with respect to land use, water resource, and air quality management, the business they were engaged in, and how they influenced municipal decision-making.
- Whether the municipality actively participated in ten of each
    - identified land use management activities;
    - identified water resource management activities; and
    - identified air quality management activities (included at the end of these interview materials)
- Whether the municipality collaborated directly with any of the other listed municipalities within the Region in the ten identified land use, water resource and air quality management activities;
- Whether the municipality was a member of any of the three named governance networks;
- Whether the municipality collaborated with other municipalities in the ten identified land use, water resource of air quality management activities through the three named governance networks;
- Whether the municipality collaborated directly with any of the identified non-government organizations, government agencies, or other stakeholders of the three governance networks on the ten identified land use, water resource of air quality management (a list is provided); and
- Whether the municipality was the initiator of any local land use, water resource, or air quality programs or projects that have been adopted in practice by the other municipalities in the Calgary Region, or by a provincial agency.
- Factors that encouraged regional scale environmental management collaboration, and factors that were obstacles to collaboration.

The non-government organizations, government agencies (other than municipalities) and other stakeholders of each of the governance networks reflected membership on each of the governance networks as at March 8, 2013 and was amended prior to administration of the interview survey.

2.1 The interview is two-part:

After explaining the research, and providing the municipal representative with the Ethics Approval and participant's consent form, a written survey was provided by email to the municipal representative who was given two weeks to complete the written survey and email it back. Much of the survey data was accumulated in this way, and some municipal representatives preferred to write things down and organize their thoughts ahead of time. After two weeks, the municipal representative was asked to set a one- two hour time during which I met with him or her to refine the survey data through a one on one interview, either in person or over the telephone. The interviews were recorded and later transcribed using Windows Sound Organizer Software. Oral interviews enabled discovery of data that the municipal representative wanted to elaborate upon.

2.2 Interview of Municipal Representatives

Background Questions

Municipality: _____

Date: _____

Municipal representative's name: _____

1. What is your role in the municipality?

2. What are, in your opinion, the principal assets, resources or attributes of your municipality? For example, what would attract someone to move here?
3. More specifically, are there assets, resources or attributes that your municipality has that are dependent on the state of the physical environment?
4. Who do you think are the three most influential people in your community with respect to influencing municipal:
    a) land use management activities,
    b) water resource management activities, and
    c) air quality management activities?

    Do they belong to an organization?
    What business are they involved in?
    How do they influence municipal decision-making?

Person of influence	**Land use water resources or air quality**	**Their organization**	**Their business or organization**	**How they influence municipal decision making**

5. What is the principal land use, water resource or air quality management problem or issue in your municipality?
    Land use:
    Water resource:
    Air quality:
6. Has your municipality set any goals to address these land use, water resource or air quality management issues? If yes, please describe below:
    Goals to achieve land use objectives:
    Goals to achieve water resource objectives:
    Goals to achieve air quality objectives:
    a. If yes, on a scale of 1 to 5, how would you rate your municipality's achievement of these goals?
        (1 indicates not at all achieved, and 5 indicates completely achieved.)

Land-use	**1**	**2**	**3**	**4**	**5**
Water resource	**1**	**2**	**3**	**4**	**5**
Air quality	**1**	**2**	**3**	**4**	**5**

    b. On a scale of 1 to five, how would you evaluate the importance your municipality gives to land use management; water resource management and air quality management at a municipal level?
        (1 indicates no importance, and 5 indicates significant importance.)

Land use management	**1**	**2**	**3**	**4**	**5**
Water resource management	**1**	**2**	**3**	**4**	**5**
Air quality management	**1**	**2**	**3**	**4**	**5**

7. Does your municipality engage in any of the following land use, water resource or air quality management activities?

Land Use Activities	**Water Resource Activities**	**Air Quality Activities**	**Notes**

(This chart to be populated with information from Appendices A-C.)

8. If yes to any of the listed activities, do the people in your municipality who work in the listed management activities collaborate directly with other municipalities? If so which best describes the collaboration:

We collaborate directly with	Land Use Activity	Water Resource Activity	Air Quality Activity	We share information, and experience, distribute government rules, and exchange advice	We work together to solve technical problems, establish rules, and develop strategic management plans	We collaborate to organize joint activities and common projects

9. Is your municipality currently a member of
   CRP Yes___ No___
   BRBC Yes__ No___
   CRAZ Yes___ No___
10. Does your municipality collaborate in any of the ten identified land use, water resource of air quality management activities through membership on one of the three named governance networks?

Governance Network Collaboration We collaborate with	Land Use Activity	Water Resource Activity	Air Quality Activity	We share information and experience, distribute government rules, and exchange advice	We work together to solve technical problems, establish rules, and develop strategic management plans	We collaborate to organize joint activities and common projects
CRP						
BRBC						
CRAZ						

11. Does your municipality collaborate directly with any of the identified non-government organizations, government agencies, or other stakeholders of the three governance networks on the identified land use, water resource of air quality management activities?

Collaboration with non-government organizations (NGOs), government agencies, or other stakeholders of the three government networks	Land Use	Water Resource	Air Quality	We share information and experience, distribute government rules, and exchange advice	We work together to solve technical problems, establish rules, and develop strategic management plans	We collaborate to organize joint activities and common projects
NGOs						
Government agencies						
Other stakeholders						

12. Are there other land use, water resource and air quality management activities that your municipality initiated and currently practices that you can tell me about?
13. If so, has any other municipality or government agency adopted that activity in practice? In your opinion, how successful has that activity been in the other municipality or provincial agency?
14. What are the factors that encourage collaboration between your municipality and other municipalities, governance networks, government agencies, NGOs, or other stakeholders?
15. What are the factors that act as obstacles to collaboration between your municipality and other municipalities, governance networks, government agencies, NGOs, or other stakeholders?

Institution	**Factors that encourage collaboration**	**Factors that are obstacles to collaboration**
Other municipalities		
Governance networks		
Government agencies		
NGOs		
Other stakeholders		

3.0 Detailing the Interview of Governance Network Board of Directors

The purpose of interviewing the three governance network Boards of Directors was to discover as follows:

- Whether the governance network actively participated in the ten
  - identified land use management activities;
  - identified water resource management activities; and
  - identified air quality management activities.

  respective to their organizational objectives;
- The network structure of each of the governance networks;
- Whether the governance network collaborated directly with any of the listed municipalities within the Region in the respective ten identified land use, water resource and air quality management activities; and
- Whether the governance network collaborated indirectly with any of the listed municipalities through their member stakeholders.

After providing the Board of Directors of each of the three governance networks with the purpose of the research, the ethics approval and participant consent form, the interview surveys with governance network Board of Directors was done primarily through a written survey document, and followed up with a half hour telephone interview to clarify written data provided. If a municipal representative was also a Director of one of the governance networks, the opportunity was available to conduct both the municipal representative interview and governance network Director interview at the same time. This was especially significant with respect to CRP members who were the identified municipal representatives for the interview with municipalities.

3.1 Interview of Governance Network Board of Directors

Background

Name of Governance Organization: _____
Name of Director: _____
Date: _____

1. Which municipality, government agency, NGO or stakeholder do you represent on the governance network?
2. Does your governance network actively participate in any of the following ten activities?
   List activities from Schedules A, B, or C:
3. Which three directors of your Board do you most regularly choose to collaborate directly with concerning _____) (One of land use, water resource, or air quality management activities.) What municipality, government agency, NGO or stakeholder do they

represent in the governance network? (Directed network -one mode analysis for centrality, connectivity and reciprocity).

Name	**Director Choice**	**Representative Capacity**
1.		
2.		
3.		

4. Which three of the listed municipal members of your governance network do you choose to collaborate with directly concerning _____?
(One of land use, water resource, or air quality management activities)

Municipality	**Activity**
1.	
2.	
3.	

5. Which three municipal members of your governance network collaborate with you through other stakeholders in your organization? (Undirected two mode analysis.)

Municipality	**Stakeholder**	**Activity**
1.		
2.		
3.		

4.0 Interview materials Appendices A-C: The Activities:

4.1 Appendix A: Land Use Management Activities

Adopted from the *Calgary Metropolitan Plan, 2012*-see page numbers from plan.

1. Natural landscapes and ecologies are inventoried, protected and stewarded, including such features as:
   a. wetlands
   b. riparian lands
   c. regional corridors
   d. large patches of natural vegetation
   e. ridges
   f. escarpments Page 16

   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

2. Fragmentation and conversion of agricultural land is minimized. Page 32
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

3. The diversity of species and ecosystem types are maintained. Page 16
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

4. Landscape connectivity is promoted during development. Page 16
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

5. Open space plans are adopted to provide publicly accessible natural areas. Page 16
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

6. Higher densities are encouraged. Page 28
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

7. Urban development promotes compact mixed use of land. Page 28
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

8. Urban development is transit oriented. Page 30
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

9. Urban density targets achieve a minimum 8-10 units/gross developable acre. Page 28
   YES___ NO___ LIMITED PARTICIPATION___ (Explain)

10. Regional infrastructure design is encouraged. Page 31.
    YES___ NO___ LIMITED PARTICIPATION___ (Explain)

4.2 ***Appendix B: Water Resource Management Activities***
Adapted from Bow River Basin Watershed Management Plan Phase 2 and Rathwell and Peterson, 2012.

1. Water conservation policy and demand management bylaws are in place.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

2. Riparian lands and wetlands are conserved and managed.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

3. Drinking water is treated to provincial and federal standards.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

4. River and streams and their corridors are protected and adjacent natural areas conserved and managed.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

5. Wastewater treatment is state of the art with tertiary treatment before release.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

6. Invasive aquatic species are managed.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

7. Water quality is monitored in local water bodies.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

8. Master drainage plans are in place for whole community.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

9. Low impact development practices are used to minimize storm drainage runoff to receiving water bodies.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

10. Snow storage and salt application management plan is in place.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

4.3 ***Appendix C: Air Quality Management Activities***
Adapted from CRAZ 2009 PMO3 Management Plan

1. Air quality is considered during land use planning.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

2. Local Greenhouse Gas Emission Reduction Plan is in place for municipal operations.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

3. Energy efficiency is promoted in public buildings.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

4. An anti-idling bylaw or program is in place.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

5. Dust is controlled during land development.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

6. Gravel operations are not situated close to residential areas.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

7. Transit is promoted to reduce single vehicle use
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

8. Carpooling is encouraged.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

9. Biomass burning is discouraged.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

10. A local monitoring and reporting system is in place to advise citizens of health risks associated with poor air quality.
YES___ NO___ LIMITED PARTICIPATION___ (Explain)

5.0 Interview Materials: *Appendix D: List of participating municipalities*

1	City of Airdrie
2	Town of Banff
3	Municipal District of Bighorn
4	Town of Black Diamond
5	Town of Canmore
6	City of Calgary
7	Town of Chestermere
8	Town of Cochrane
9	Town of Crossfield
10	Municipal District of Foothills
11	Town of High River
12	Town of Irricana
13	Town of Nanton
14	Town of Okotoks
15	Rocky View County
16	Town of Strathmore
17	Town of Turner Valley
18	Wheatland County

APPENDIX B
List of Alberta's policies, laws, regulations, plans, guidelines, etc. that address land use growth issues, scarcity of water supply and air quality management issues

Legal instrument/document	N = 26
Legislative scheme for land use growth issues	
Municipal Government Act	1
Alberta Land Use Policies	2
Subdivision and Development Regulation	3
Public Lands Act	4
Public Lands Act Regulation	5
Environmental Protection and Enhancement Act	6
Responsible Energy Development Act	7
Agricultural Operations Practices Act and regulations	8
Land-use Framework	9
Alberta Land Stewardship Act	10
Alberta Land Stewardship Regulation	11
South Saskatchewan Regional Plan 2014-2024	12
Calgary Metropolitan Plan	13
Legislative scheme for Water Quality and Quantity – scarcity of supply	
Water Act	14
Framework for Water Management Planning	15
Irrigation Districts Act	16
Strategy for Protecting the Aquatic Environment	17
Wastewater and Storm Drainage Regulation (AR 119/1993)	18
Water For Life: Alberta's Strategy for Sustainability	19
Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)	20
SSRP Surface Water Quality Management Framework	21
Bow River Basin Watershed Management Plan Phase 2, 2012	22
Legislative scheme for Air Quality	
Clearing the Air: Alberta's Renewed Clean Air Strategy	23
SSRP Air Quality Management Framework	24
Protecting Alberta's Environment Act	25
CRAZ PMO3 Management Plan, 2008/2014	26

Also assessed *Enabling Partnerships* and MGA Growth Management Board Provisions

APPENDIX C
Compilation of interview data: tables and graphs
All data compiled and analyzed heuristically by Judy Stewart, June 2014.

1.0 Summary of municipal participation in the Activities

Municipal participation in regional-scale land use, water resource and air quality management activities in the Region (2014)

Network membership confirmed **Participation in Activities**

Municipality N=18	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=3:30
Airdrie			●	9-1-0	10-0-0	8-1-1	**1:27**
Banff	●	●	●	9-1-0	8-2-0	8-2-0	**3:25**
Bighorn	●	●		4-5-1	5-2-3	5-2-3	**2:14**
Black Diamond	●	●	●	9-0-1	6-3-1	7-1-2	**3:22**
Canmore	●	●	●	9-1-0	9-1-0	7-1-2	**3:25**
Calgary	●	●	●	8-0-2	8-1-1	7-2-1	**3:23**
Chestermere			●	5-0-5	8-0-2	4-5-1	**1:17**
Cochrane	●	●	●	10-0-0	3-4-3	4-4-2	**3:17**
Crossfield	●			5-4-1	9-0-1	3-5-2	**1:17**
Foothills	●	●		3-3-4	3-4-3	2-4-4	**2:8**
High River	●			6-0-4	2-4-4	2-4-4	**1:10**
Irricana		●	●	0-5-5	2-4-4	2-8-0	**2:4**
Nanton			●	4-5-1	6-2-2	1-9-0	**1:11**
Okotoks	●	●	●				
Rocky View	●	●		4-2-4	5-0-5	2-5-2	**2:11**
Strathmore			●	10-0-0	9-0-1	2-5-3	**1:21**
Turner Valley	●	●	●	9-0-1	7-1-2	6-3-1	**3:22**
Wheatland	●	●		6-3-1	5-4-1	1-7-2	**2:12**

The municipal respondent from Okotoks did not complete this part of the interview.

Average active engagement in Activities

Land use and all 3 memberships = 54/6=	9
Land use and 2 memberships =17/5 =	3.4 - most are rural
Land use and 1 membership 43/6 =	7.1 - all are or have been members of CRP
Water resources and all 3 memberships = 41/6=	6.8
Water resources and 2 memberships = 20/5=	4 - most are rural
Water resources and 1 membership = 44/6=	7.3 - all are or have been members of CRP
Air quality and all three memberships = 39/6=	6.5
Air quality and 2 memberships = 12/5=	2.4 - most are rural
Air quality and 1 membership =20/6	3.3 - all are or have been members of CRP

2.0 Active and limited participation in the Activities

Municipality N=18	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=30
Airdrie			•	9-1-0	10-0-0	8-1-1	**1:28**
Banff	•	•	•	9-1-0	8-2-0	8-2-0	**3:25**
Bighorn	•	•		4-5-1	5-2-3	5-2-3	**2:21**
Black Diamond	•	•	•	9-0-1	6-3-1	7-1-2	**3:25**
Canmore	•	•	•	9-1-0	9-1-0	7-1-2	**3:27**
Calgary	•	•	•	8-0-2	8-1-1	7-2-1	**3:27**
Chestermere			•	5-0-5	8-0-2	4-5-1	**1:25**
Cochrane	•	•	•	10-0-0	3-4-3	4-4-2	**3:22**
Crossfield	•			5-4-1	9-0-1	3-5-2	**1:21**
Foothills	•	•		3-3-4	3-4-3	2-4-4	**2:19**
High River	•			6-0-4	2-4-4	2-4-4	**1:10**
Irricana		•	•	0-5-5	2-4-4	2-8-0	**2:13**
Nanton			•	4-5-1	6-2-2	1-9-0	**1:15**
Okotoks	•	•	•				
Rocky View	•	•		4-2-4	5-0-5	2-5-2	**2:22**
Strathmore			•	10-0-0	9-0-1	2-5-3	**1:25**
Turner Valley	•	•	•	9-0-1	7-1-2	6-3-1	**3:26**
Wheatland	•	•		6-3-1	5-4-1	1-7-2	**2:20**

The municipal respondent from Okotoks did not complete this part of the interview.

3.0 No active participation in Activities

Municipality	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=30
Airdrie			•	9-1-0	10-0-0	8-1-1	**1:2**
Banff	•	•	•	9-1-0	8-2-0	8-2-0	**3:5**
Bighorn	•	•		4-5-1	5-2-3	5-2-3	**2:9**
Black Diamond	•	•	•	9-0-1	6-3-1	7-1-2	**3:4**
Canmore	•	•	•	9-1-0	9-1-0	7-1-2	**3:3**
Calgary	•	•	•	8-0-2	8-1-1	7-2-1	**3:3**
Chestermere			•	5-0-5	8-0-2	4-5-1	**1:5**
Cochrane	•	•	•	10-0-0	3-4-3	4-4-2	**3:8**
Crossfield	•			5-4-1	9-0-1	3-5-2	**1:9**
Foothills	•	•		3-3-4	3-4-3	2-4-4	**2:11**
High River	•			6-0-4	2-4-4	2-4-4	**1:8**
Irricana		•	•	0-5-5	2-4-4	2-8-0	**2:17**
Nanton			•	4-5-1	6-2-2	1-9-0	**1:16**
Okotoks	•	•	•				
Rocky View	•	•		4-2-4	5-0-5	2-5-2	**2:7**
Strathmore			•	10-0-0	9-0-1	2-5-3	**1:5**
Turner Valley	•	•	•	9-0-1	7-1-2	6-3-1	**3:4**
Wheatland	•	•		6-3-1	5-4-1	1-7-2	**2:12**

Municipalities that are members of only 1 network and average non-participation in activities = 7/1:2-5-5-16
Municipalities that are members of 2 networks and average non-participation in activities = 11/2.:7-9-11-17
These are rurals who are not members of CRP or those who live in small rural towns.

Municipalities that are members of 3 networks s and average non-participation in activities = 4.8/3:3-4-4-5-8

4.0 Matrices for network member perception of engagement in the Activities

BRBC perception of BRBC active participation in water or watershed management activities

Code Name	1	2	3	4	5	6	7	8	9	10
M101	Y	Y	N	Y	Y	Y	Y	Y	Y	L
I102	L	Y	L	Y	Y	Y	N	N	N	N
G103	Y	Y	Y	Y	Y	Y	Y	Y	Y	L
I104	L	L	L	L	L	L	L	L	L	L
N105	Y	L	N	Y	L	Y	Y	N	L	N
P106	Y	Y	L	Y	Y	Y	Y	L	L	N
I107	N	Y	N	Y	N	N	Y	L	Y	N
N108	L	L	N	L	N	N	L	N	L	N
N109	Y	Y	N	Y	L	Y	Y	L	L	L
M110	Y	Y	Y	Y	Y	L	L	N	N	N
I111	L	Y	N	Y	N	Y	Y	N	Y	L
G112	Y	Y	Y	Y	N	L	Y	L	Y	Y
P113	Y	Y	Y	L	Y	L	Y	Y	Y	Y
N=13	8-1-4	10-0-3	4-5-4	10-0-3	6-4-3	7-2-4	9-1-3	3-5-5	6-1-5	2-6-5

Most BRBC Board members agree that BRBC is actively engaged in the following water resource management activities:

1. Water conservation policy and demand management bylaws are in place. 8/13
2. Riparian lands and wetlands are conserved and managed. 10/13
4. Rivers and streams and their corridors are protected and adjacent natural areas are conserved and managed. 10/13
7. Water quality is monitored in local water bodies. 9/13

CRAZ perception of CRAZ active participation in air quality management activities

Code	1	2	3	4	5	6	7	8	9	10
P201	N	N	N	Y	N	Y	Y	Y	Y	Y
M202	N	N	N	Y	N	N	Y	Y	N	Y
P203	L	L	N	Y	N	Y	Y	L	N	Y
G204	Y	Y	N	Y	N	N	Y	Y	N	Y
I205	L	N	N	Y	Y	L	Y	L	Y	Y
I206	N	L	N	Y	N	L	N	N	N	Y
I207	Y	Y	L	Y	L	L	N	N	L	Y
M208	Y	N	N	N	N	N	Y	Y	L	Y
G210	Y	Y	L	Y	Y	Y	Y	Y	Y	Y
P211	L	N	N	Y	L	N	Y	Y	N	Y
M212	N	N	N	Y	N	N	N	N	N	L
G213	N	N	L	Y	N	N	L	Y	N	Y
P214	L	L	L	L	L	L	L	L	L	L
N215	L	N	N	L	N	N	Y	Y	N	L
P216	Y	N	L	Y	N	N	N	N	N	Y
N=15	5-5-5	3-9-3	0-10-5	12-1-2	2-10-3	3-8-4	9-4-2	8-4-3	3-9-3	12-0-3

Most CRAZ Board members agree that CRAZ is actively engaged in the following air quality management activities:

4. An anti-idling bylaw or program is in place. 12/15
7. Transit is promoted to reduce single vehicle use. 9/15
8. Carpooling is encouraged. 8/15
10. A local monitoring and reporting system is in place to advise citizens of health risks associated with poor air quality. 12/15

CRP perception of CRP active participation in land use management activities

Name of respondent/ Land use activities	1	2	3	4	5	6	7	8	9	10
Airdrie	N	N	N	L	L	Y	Y	Y	Y	Y
Banff	N	N	Y	Y	Y	Y	Y	Y	Y	Y
Black Diamond	Y	Y	Y	Y	L	Y	Y	Y	Y	Y
Calgary	N	N	N	N	N	N	Y	Y	N	Y
Canmore	L	L	L	L	L	L	L	L	L	L
Chestermere	L	Y	L	Y	L	Y	L	L	L	Y
Cochrane	Y	L	Y	Y	L	Y	Y	Y	Y	Y
Irricana	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nanton	N	N	N	Y	Y	Y	Y	Y	Y	Y
Okotoks	L	Y	Y	Y	Y	Y	Y	Y	L	Y
Strathmore	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Turner Valley	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N=12	5-4-3	6-4-2	7-3-2	9-1-2	6-1-5	10-1-1	10-0-2	10-0-2	8-1-3	11-0-1

Most agree that CRP is actively engaged in the following land use activities:

4. Landscape connectivity 9/12
6. Higher densities. 10/12
7. Compact mixed use of land. 10/12
8. Transit oriented. 10/12
9. Urban density targets 8/12
10. Regional infrastructure design. 11/12

5.0 Breakdown of CRP members responses

Municipality Belongs to CRP N=12	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=30
Airdrie			•	9-1-0	10-0-0	8-1-1	**1:27**
Banff	•	•	•	9-1-0	8-2-0	8-2-0	**3:25**
Black Diamond	•	•	•	9-0-1	6-3-1	7-1-2	**3:22**
Canmore	•	•	•	9-1-0	9-1-0	7-1-2	**3:25**
Calgary	•	•	•	8-0-2	8-1-1	7-2-1	**3:23**
Chestermere			•	5-0-5	8-0-2	4-5-1	**1:17**
Cochrane	•	•	•	10-0-0	3-4-3	4-4-2	**3:17**
Irricana		•	•	0-5-5	2-4-4	2-8-0	**2:4**
Nanton			•	4-5-1	6-2-2	1-9-0	**1:11**
Okotoks	•	•	•				
Strathmore			•	10-0-0	9-0-1	2-5-3	**1:21**
Turner Valley	•	•	•	9-0-1	7-1-2	6-3-1	**3:22**

Calgary Regional Partnership Members

Average number of Activities with active participation

Land-use management	9,9,9,9,8,5,10,0,4,10,9 =	7.4
Water resource management	10,8,6,9,8,8,3,2,6,9,7 =	6.5
Air quality management	8,8,7,7,7,4,4,2,1,2,6 =	5.1

Average number of Activities with active and limited participation

Land-use management	9,9,10,9,10,10,10,5,5,10,10 =	97/11 = 8.9
Water resource management	10,8,7,9,9,10,6,6,8,10,9=	92/11 = 8.4
Air quality management	9,8,9,9,8,5,6,2,1,5,7=	69/11 = 6.2

Average number of Activities with no participation

Land	1,1,0,1, 0,0,0,5,5,0,0=	13/11 = 1.1
Water	0,2,3,1,1,0,4,4,2,0,1=	18/11 = 1.6
Air	1,2,1,1,2,5,4,8,9,5,3=	41/11 = 3.7

6.0 Breakdown of municipalities not members of CRP

Municipality N=6	BRBC	CRAZ	CRP	Land Y-N-LP	Water Y-N-LP	Air Y-N-LP	Correlation N=30
Bighorn	•	•		4-5-1	5-2-3	5-2-3	**2:14**
Crossfield	•			5-4-1	9-0-1	3-5-2	**1:17**
Foothills	•	•		3-3-4	3-4-3	2-4-4	**2:8**
High River	•			6-0-4	2-4-4	2-4-4	**1:10**
Rocky View	•	•		4-2-4	5-0-5	2-5-2	**2:11**
Wheatland	•	•		6-3-1	5-4-1	1-7-2	**2:12**

Active participation in environmental management activities

Average number of activities with active participation

Land-use management	4,5,3,4,6,6=	4.7
Water resource management	5,9,3,5,5,2=	4.8
Air quality management	5,3,2,2,1,2=	2.5

Average number of activities with active and limited participation

Land-use management	5,6,7,10,8,7=	7.1
Water resource management	8,10,6,6,10,6=	6.7
Air quality management	8,5,6,6,4,3=	5.3

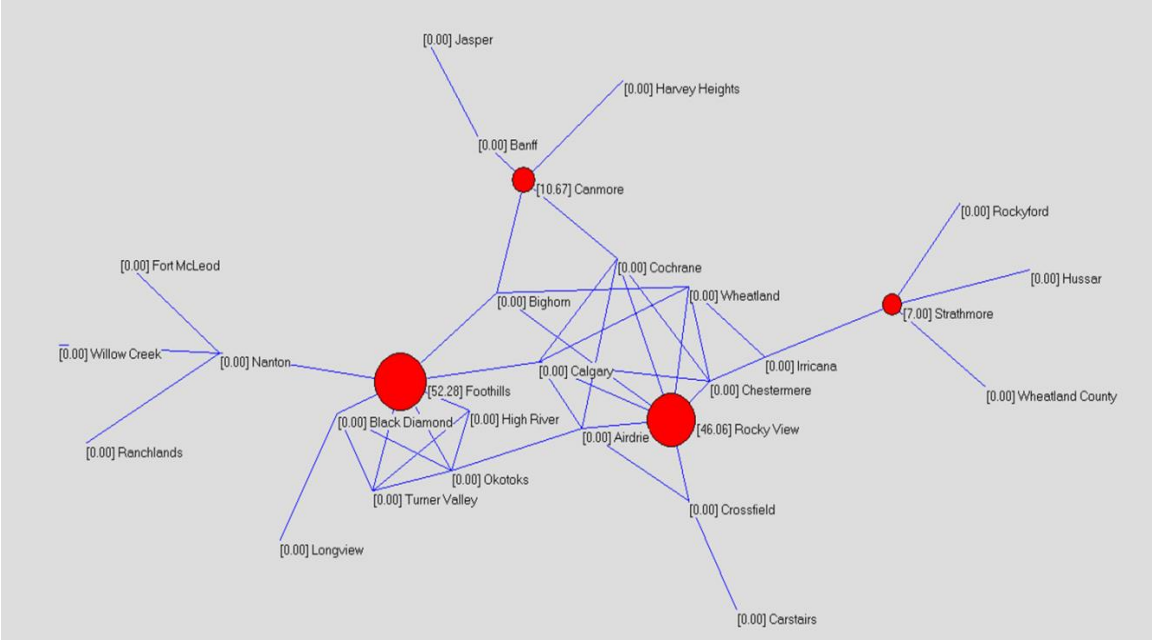
Average number of activities with no participation

Land	5,4,3,0,2,3=	2.8
Water	2,0,4,4,0,4=	2.3
Air	2,5,4,4,5,7=	4.5

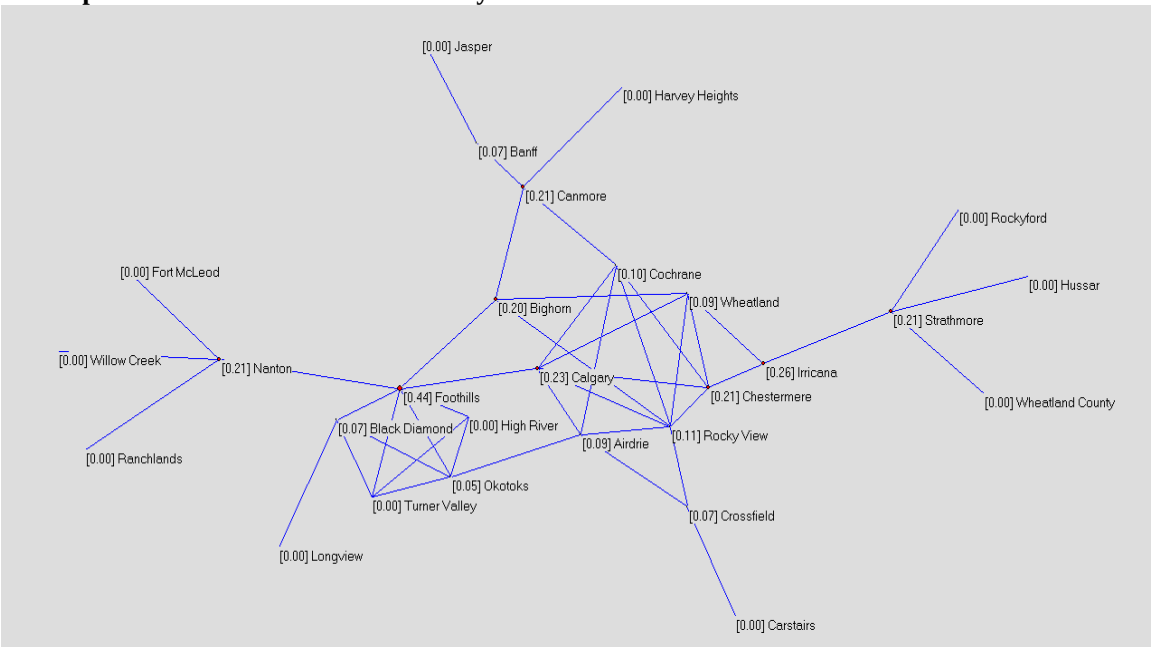
APPENDIX D
Social network analysis: maps, graphs and tables
Using *Pajek* (de Nooy et al. (2011) software

1.0 Municipal Network SNA maps, graphs and tables

Centrality scores and network centers of Municipal Network



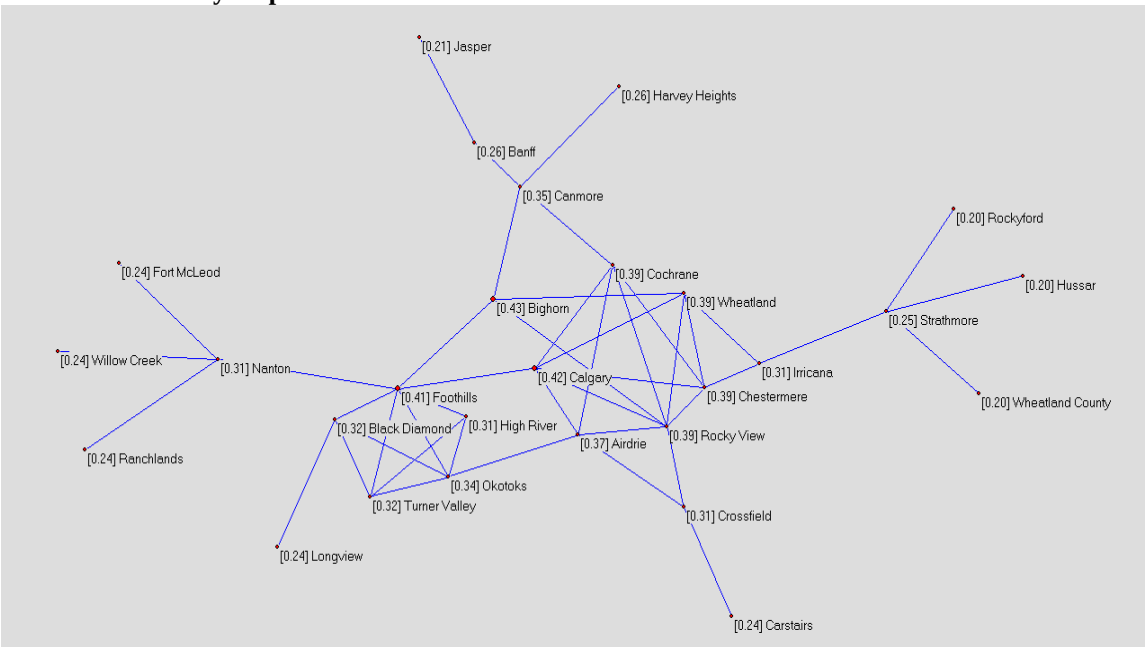
Municipal Network Betweenness centrality scores



Betweenness centrality scores-see map above

- ☐ 0.442174 – Foothills
- ☐ 0.262108 - Irricana
- ☐ 0.230032 - Calgary
- ☐ 0.213675 - Strathmore
- ☐ 0.213675 - Nanton
- ☐ 0.212251 - Canmore
- ☐ 0.207083 - Chestermere
- ☐ 0.199179 - Bighorn
- ☐ 0.105508 - Rocky View
- ☐ 0.101653 – Cochrane
- ☐ 0.094674 - Wheatland
- ☐ 0.093201 - Airdrie
- ☐ 0.074074 - Banff
- ☐ 0.074074 - Black Diamond
- ☐ 0.074074 - Crossfield
- ☐ 0.053561 - Okotoks
- ☐ 0.001425 - Turner Valley

Closeness centrality map and scores



Closeness centrality scores:

- ☐ Bighorn .43
- ☐ Calgary .42
- ☐ Foothills .41
- ☐ Cochrane .39
- ☐ Chestermere .39
- ☐ Rocky View .39
- ☐ Wheatland .39
- ☐ Airdrie .37
- ☐ Canmore .35
- ☐ Okotoks .34
- ☐ Black Diamond .32
- ☐ Turner Valley .32
- ☐ High River .31
- ☐ Crossfield .31
- ☐ Nanton .31
- ☐ Irricana .31

Regional municipal network

Coordinators

- **16 - Calgary**
- **12 - Strathmore**
- 6 - Airdrie
- 6 - Okotoks
- 6 - Rocky View
- 6 - Canmore
- 6 - Foothills
- 6 - Nanton
- 2 - Chestermere
- 2 - Cochrane
- 2 - Banff

Coordinator: mediator who is a member of the group

Regional municipal network

Gatekeepers

Foothills	**10**
Rocky View	**8**
Cochrane	4
Wheatland	4
Airdrie	3
Canmore	3
Bighorn	3
Black Diamond	3
Chestermere	3
Nanton	3
Okotoks	2
Irricana	2
Crossfield	2
Turner Valley	1

Gatekeeper: Regulates the flow of information and resources to his own group.

Regional municipal network

Itinerant brokers

- **6 - Foothills**
- 4 - Bighorn
- 2 – Wheatland
- 2 - Rocky View

Itinerant broker: two members of a group use a mediator from outside.

- **All are rural municipalities.**

Regional municipal network
Liaisons

- None

Liaisons:
mediates between members of different groups but does not belong to the groups himself.

Regional municipal network
Representatives

- **10 - Foothills**
- **8 - Rocky View**
- 4 - Wheatland
- 4 - Cochrane
- 3 - Airdrie
- 3 - Canmore
- 3 - Bighorn
- 3 - Black Diamond
- 3 - Chestermere
- 3 - Nanton
- 2 - Irricana
- 2 - Crossfield
- 2 - Okotoks
- 1 - Turner Valley

Representative:
Regulates the flow of information and resources **from** his own group

Brokerage roles

Foothills and **Rocky View** play significant **"brokerage roles"**

- **Representative**
- **Coordinator**
- **Gatekeeper**

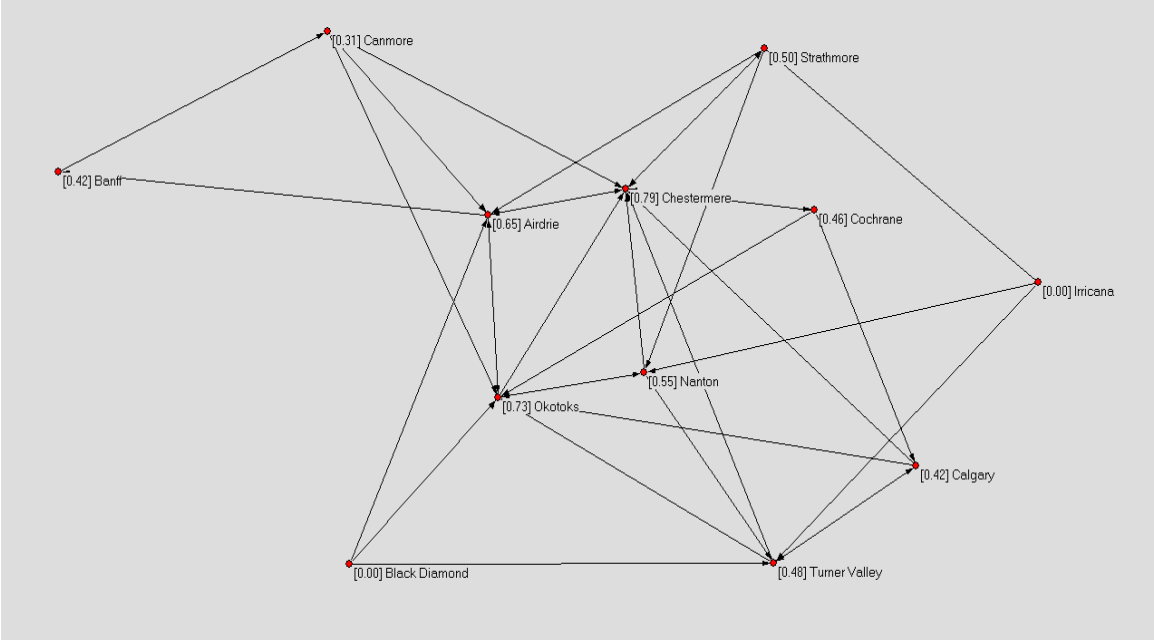
- Do not act as Liaisons

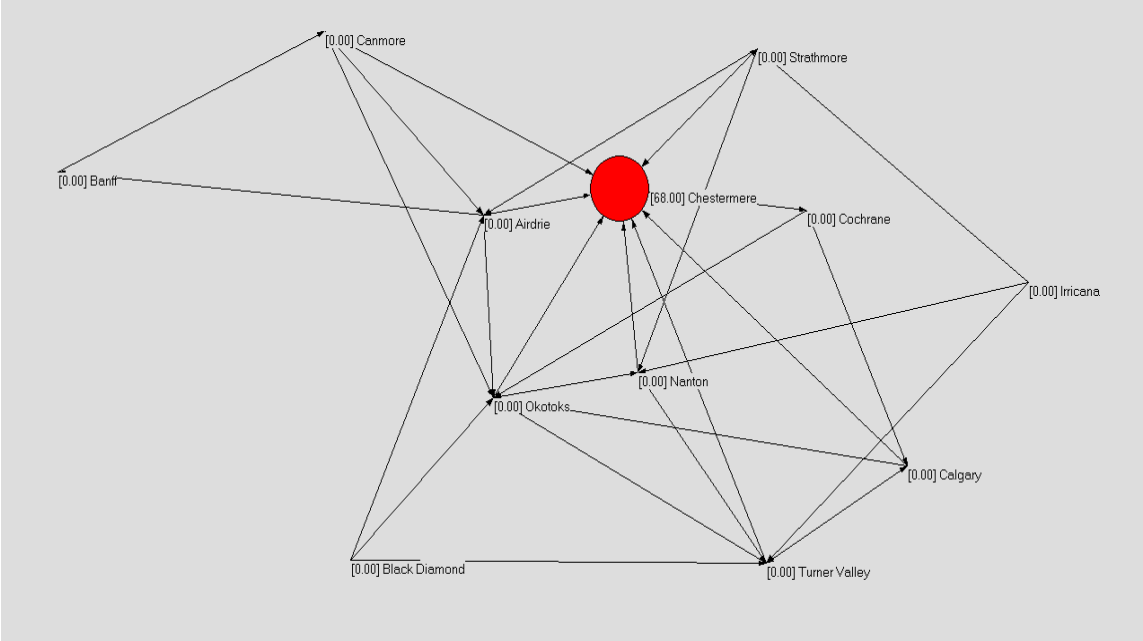
Regional municipal network summary

- Highly centralized network
- Strong central core with growing periphery
- Peripheral municipalities tied to core by "bridged relationships" through gatekeepers and representatives
- Gatekeepers and representatives could be encouraged to play brokerage roles in region for flows of
  - Information/knowledge
  - Values
  - Power/influence

2.0 CRP SNA graphs, tables and charts

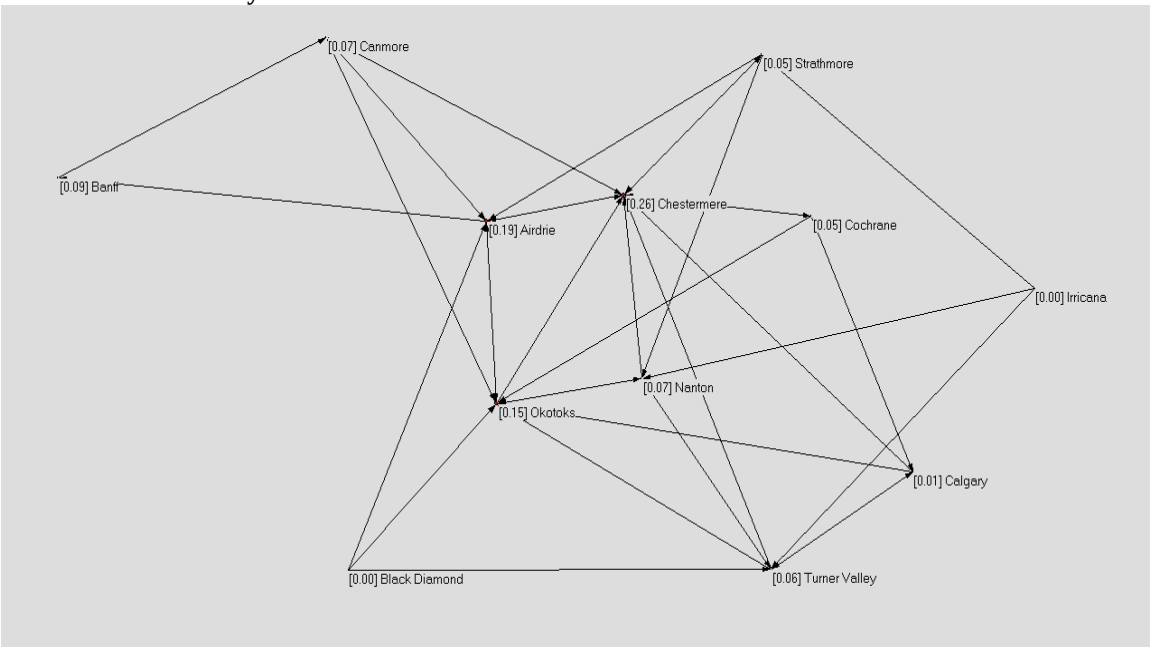
Centrality scores and centers





Chestermere as center of network.

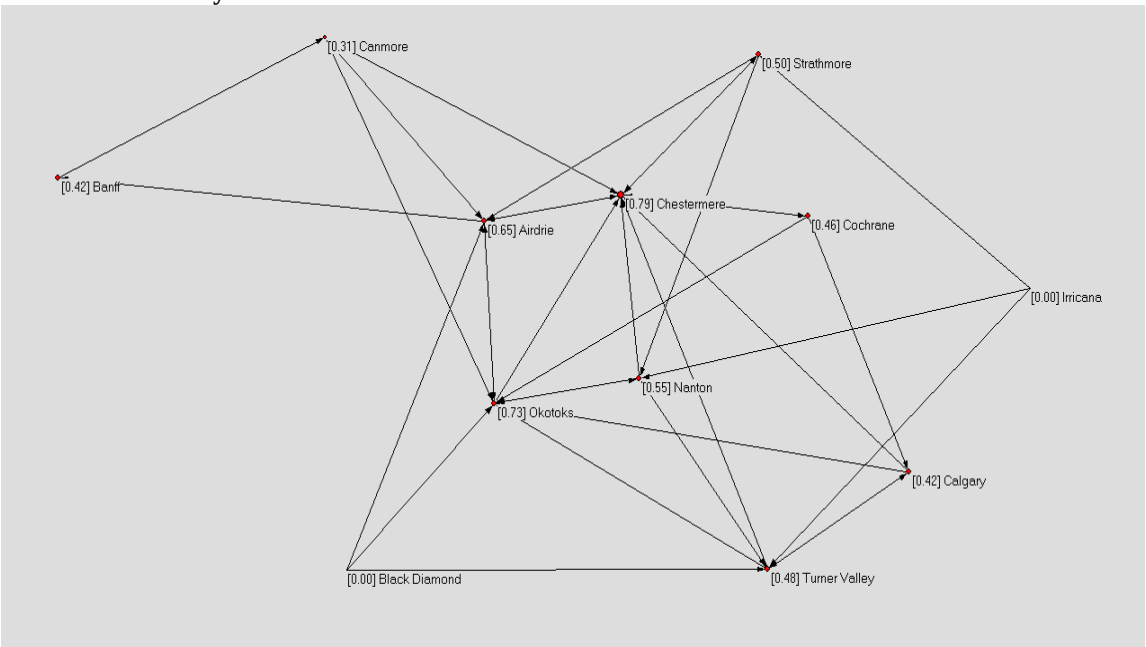
Betweenness centrality scores



Betweenness centrality scores

- ☐ 0.263636 - Chestermere
- ☐ 0.190909 - Airdrie
- ☐ 0.154545 - Okotoks
- ☐ 0.090909 - Banff
- ☐ 0.072727 - Canmore
- ☐ 0.074242 - Nanton
- ☐ 0.056061 - Turner Valley
- ☐ 0.054545 - Cochrane
- ☐ 0.046970 - Strathmore
- ☐ 0.013636 - Calgary
- ☐ 0.000000 - Black Diamond
- ☐ 0.000000 – Irricana

Closeness centrality



CRP's Gatekeepers

- **3 - Turner Valley**
- 1 - Okotoks
- 1 - Canmore
- 1 - Strathmore
- 1 – Nanton

CRP **Coordinators**

- **8 - Okotoks**
- 2 - Nanton
- 1 - Airdrie
- 1 - Turner Valley
- 1 - Calgary

CRP's Itinerant brokers

- **14 - Chestermere**
- 1 - Airdrie
- 1 - Canmore

CRP Liaisons

- **2 - Airdrie**
- **2 - Turner Valley**
- 1 - Okotoks
- 1 - Strathmore
- 1 - Nanton

CRP Representatives

- **Airdrie – 2**

Airdrie plays a small representative role in CRP controlling flow of information from CRP. This is a major function of CRP and should be supported.

Brokerage roles

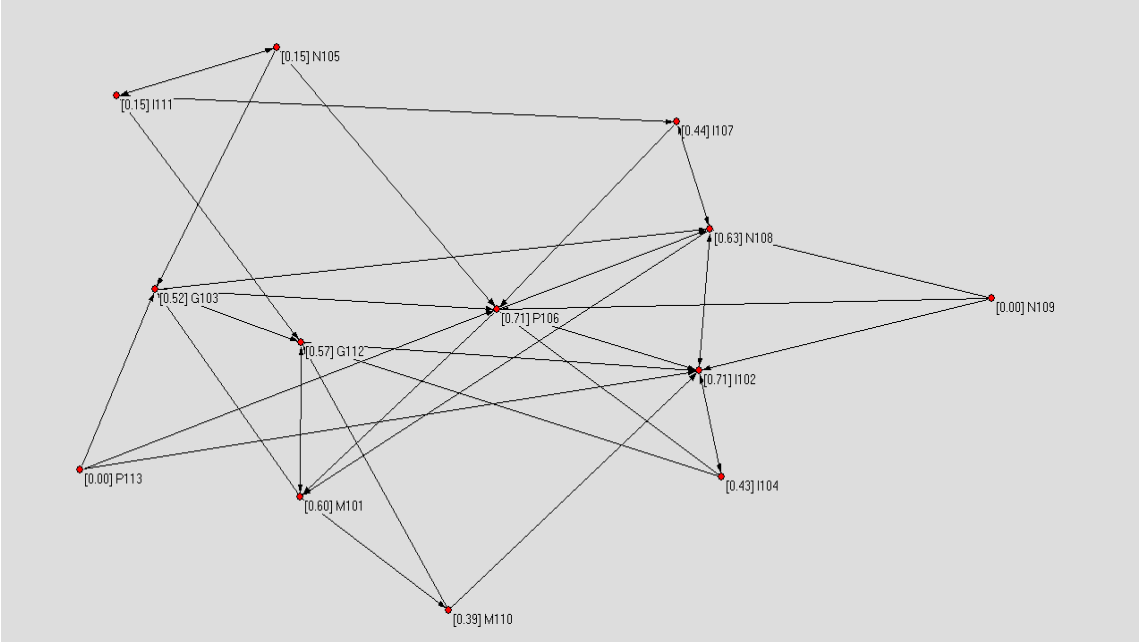
- **Chestermere** is positioned as center with high betweenness and closeness centrality and acts as a **strong itinerant broker.**
- **Okotoks** has high betweenness and closeness centrality and acts as coordinator, gatekeeper and liaison.
- **Airdrie** has high betweenness and closeness centrality and as coordinator, itinerant broker and representative.

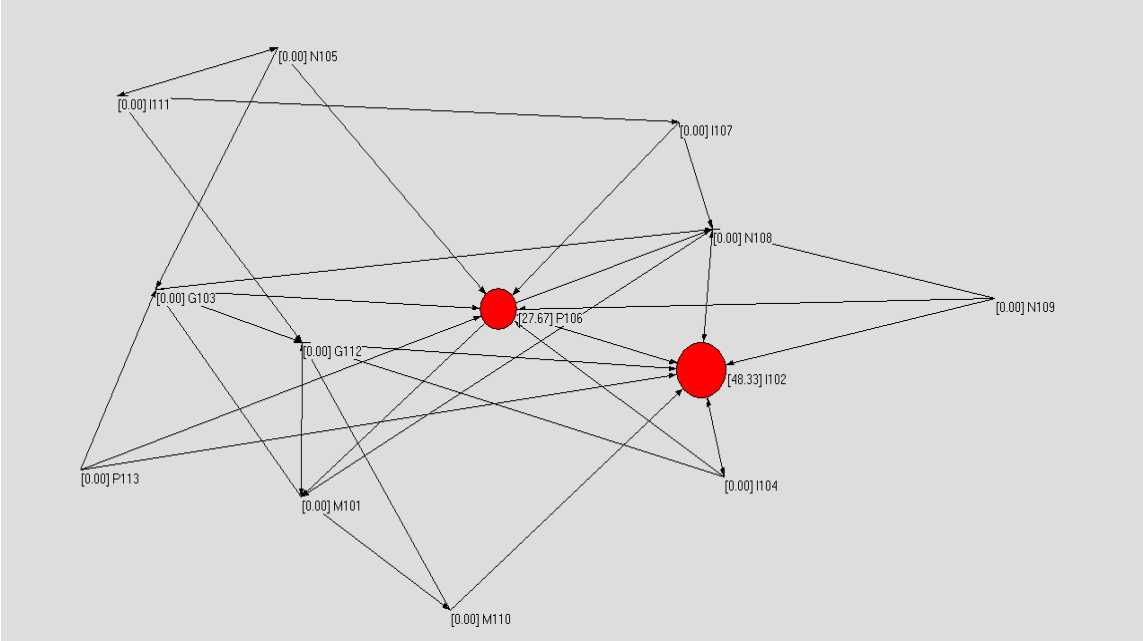
CRP Summary

- Highly centralized network
- Strong center and central core – one component.
- Peripheral municipalities tied to core by gatekeepers or "bridged relationships."
- Gatekeepers and representatives could be supported to play key brokerage roles in region
  - Information/knowledge
  - Values
  - Power/influence

3.0 BRBC network

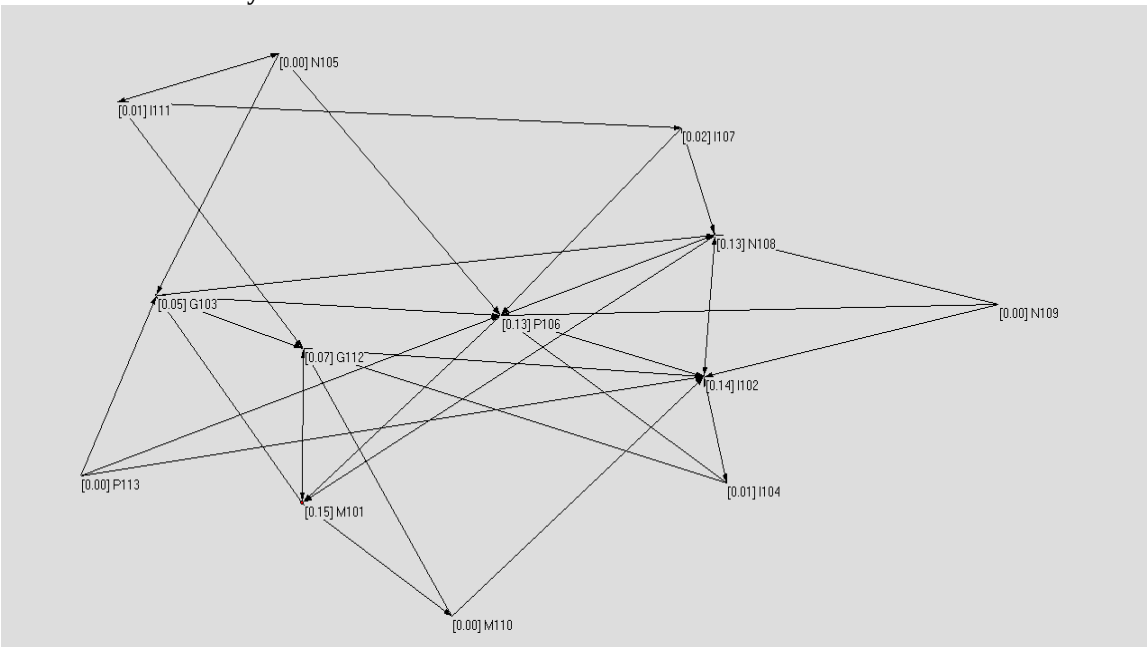
Network with centrality scores and centers





Centers

Betweenness centrality



BRBC Betweenness centrality scores

- ☐ 0.150253 - M101 Municipality
- ☐ 0.136364 - I102 Industry
- ☐ 0.126263 - P106 Public
- ☐ 0.125000 - N108 NGO
- ☐ 0.073232 - G112 Government
- ☐ 0.054293 - G103 Government
- ☐ 0.015152 - I107 Industry
- ☐ 0.012626 - I104 Industry
- ☐ 0.011364 - I111 Industry
- ☐ 0.007576 - M110 Municiplaity
- ☐ 0.007576 - N105 NGO

BRBC Closeness centrality scores

- ☐ 0.705882 - I102 Industry
- ☐ 0.705882 - P106 Public
- ☐ 0.631579 - N108 NGO
- ☐ 0.600000 - M101 Municipality
- ☐ 0.571429 - G112 Government
- ☐ 0.521739 - G103 Government
- ☐ 0.444444 - I107 Industry
- ☐ 0.428571 - I104 Industry
- ☐ 0.387097 - M110 Municipality
- ☐ 0.153846 - N105 NGO
- ☐ 0.153846 - I111 Industry

BRBC Gatekeepers

- **4 - G103** **Government**
- **3 - G112** **Government**
- **3 - I102** **Industry**
- **3 - P106** **Public**
- 2 - I107 Industry
- 1 - N108 NGO
- 1 - M110 Municipality

BRBC Itinerant brokers

- **5 - M101** **Municipality**
- 1 - G112 Government

BRBC Liaisons

- **3 - P106** **Public**
- 2 - N105 NGO
- 2 - I111 Industry
- 1 - N108 NGO

BRBC Representatives

- **3 - P106** **Public**
- 2 - N108 NGO
- 1 - G112 Government

Brokerage roles:

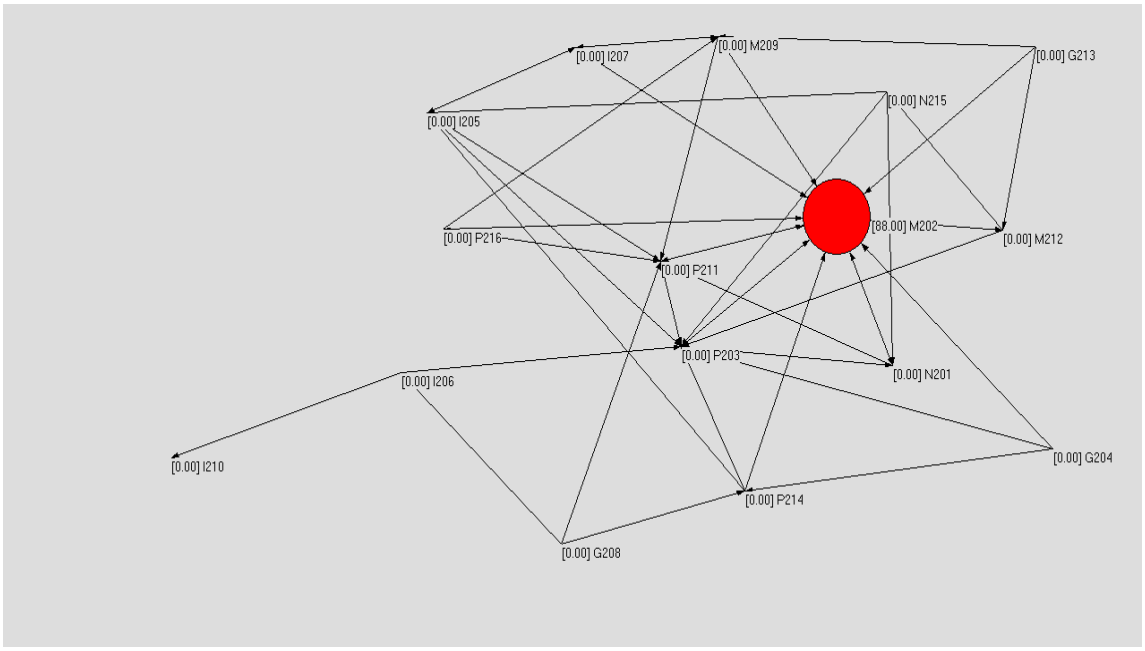
All sectors

- **P106** is positioned as center with high betweenness and closeness centrality and plays all brokerage roles, except itinerant broker.
- **I102** is positioned as center with high betweenness and closeness centrality and acts as is strong coordinator and gatekeeper.
- **N108** has high betweenness and closeness centrality and plays minor brokerage roles, except itinerant broker.
- **G112** has medium betweenness and closeness centrality and plays all brokerage roles, except liaison.

BRBC Summary

- Highly centralized dense network
- Strong centers and core
- Peripheral municipalities tied to core by "bridged relationships" through gatekeepers and representatives
- Gatekeepers and representatives could be supported to play brokerage roles in region for flows of
  - Information/knowledge
  - Values
  - Power/influence

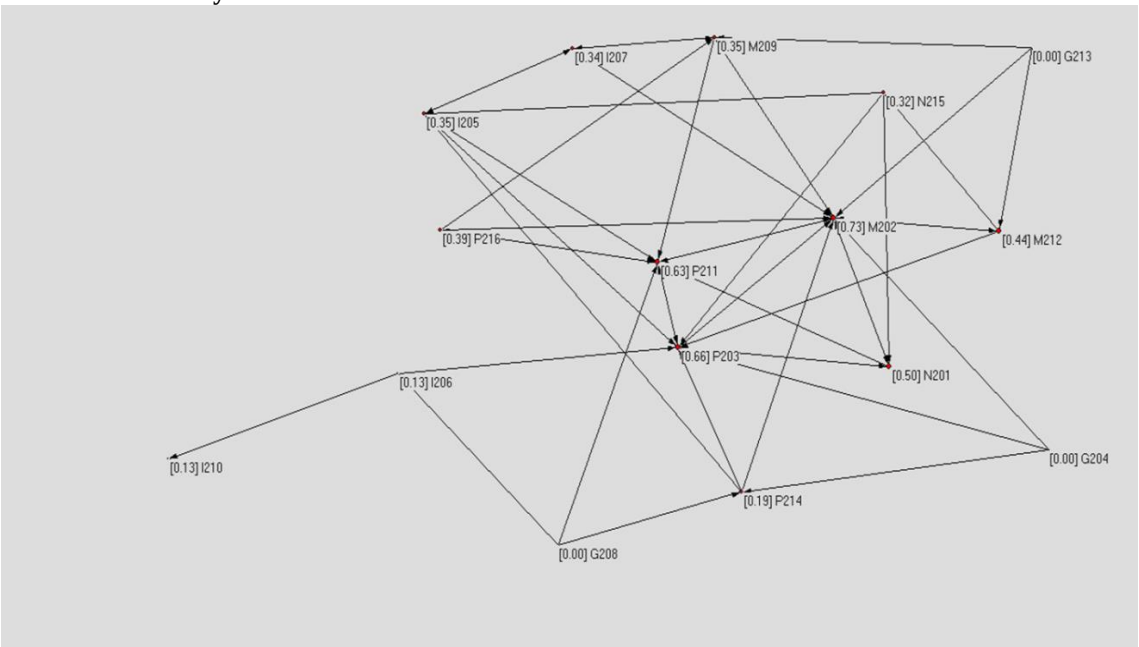
4.0: CRAZ network



Betweenness centrality scores

- ☐ 0.179683 - M202 Municipality
- ☐ 0.135238 - P211 Public
- ☐ 0.094444 - M212 Municipality
- ☐ 0.087778 - P203 Public
- ☐ 0.058730 - P216 Public
- ☐ 0.053175 - I205 Industry
- ☐ 0.048413 - M209 Municipality
- ☐ 0.038889 - N215 NGO
- ☐ 0.036508 - I207 Industry
- ☐ 0.031270 - P214 Public
- ☐ 0.009524 - N201 NGO
- ☐ 0.007302 - I206 Industry

Closeness centrality



- ☐ 0.729167 - M202 Municipality
- ☐ 0.656250 - P203 Public
- ☐ 0.625000 - P211 Public
- ☐ 0.504808 - N201 NGO
- ☐ 0.437500 - M212
- ☐ 0.386029 - P216
- ☐ 0.354730 - I205
- ☐ 0.354730 - M209
- ☐ 0.354730 - M209
- ☐ 0.336538 - I207
- ☐ 0.320122 - N215
- ☐ 0.187500 - P214
- ☐ 0.125000 - I206
- ☐ 0.125000 - I210

CRAZ Coordinators

5 - P203	**Public**
5 - P211	**Public**
4 - I205	Industry
2 - I207	Industry
2 - M209	Municipality
1 - I206	Industry

CRAZ gatekeepers

5 - P203	**Public**
3 - P214	Public
2 - P211	Public
2 - I205	Industry
2 - M209	Municipality
1 - M212	Municipality
1 – N201	NGO

CRAZ Itinerant brokers

- **14 - M202** **Municipality**
- 2 - N215 NGO
- 1 - M212 Municipality

CRAZ Liaisons

- **5 - M202** **Municipality**
- 2 - P203 Public
- 1 - P211 Public
- 1 - M212 Municipality
- 1 - P214 Public
- 1 - N201 NGO

CRAZ Representatives

- 1 - P203 Public
- 1 - P211 Public
- 1 - I207 Industry
- 1 - I206 Industry

Brokerage roles:
Municipalities and public

- **M202** is positioned as center and has high betweenness and closeness centrality and plays strong itinerant broker and liaison roles.
- **P211** has high betweenness and closeness centrality and plays significant brokerage roles as coordinator, gatekeeper, liaison and representative.
- **P203** plays significant brokerage roles as coordinator, gatekeeper, liaison and representative.
- **M212** plays minor brokerage roles as gatekeeper, itinerant broker, and liaison.

CRAZ summary

- Highly centralized dense network
- Strong center and central core
- Peripheral members tied to core by "bridged relationships" through gatekeepers and representatives
- Gatekeepers and representatives could play brokerage roles in region for flows of
  - Information/knowledge
  - Values
  - Power/influence

APPENDIX E

Factors that facilitate or create obstacles to collaboration

1.0 Factors that facilitate or create obstacles to collaboration between municipalities.

Factors encouraging collaboration	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Money/grants	*		*				*		*	*						*		
Networking and communications	*					*	*		*			*						
Geography and proximity	*						*	*		*		*						
Connections between people social capital or landscape								*		*	*				*			*
Fear of legislation	*																	
Common goals/problems		*	*			*				*	*		*		*			
Mutual obstacles		*																
Time			*															
Expertise			*															
Willingness to collaborate						*					*	*				*		
Personalities need for respect integrity and credibility						*								*				
Economy of scale/efficiencies				*			*	*			*							
Size of city and need for others to be heard					*													
Learning opportunities								*										
Opportunities for intermunicipal collaboration										*								
History and sense of larger community										*	*							*
Shared resources and degradation								*			*				*			
Openness											*	*		*				
Good governance																	*	
Conflict															*			
Best practices														*				
Sense of ownership of community																		*

Factors encouraging collaboration with other municipalities	Commonality
Money/grants	**6**
Networking and communications	**5**
Geography and proximity	**5**
Connections between people social capital or landscape	**5**
Fear of legislation	1
Common goals/problems	**7**
Mutual obstacles	1
Time	1
Expertise	1
Willingness to collaborate	**4**
Personalities need for respect integrity and credibility	2
Economy of scale/efficiencies	**4**
Size of city and need for others to be heard	1
Learning opportunities	1
Opportunities for intermunicipal collaboration	1
History and sense of larger community	**3**
Shared resources and degradation	**3**
Openness/openmindedness	**3**
Good governance	1
Conflict	1
Best practices	1
Sense of ownership of community	1

Common goals and problems	7
Money/grants	6
Networking and communications	5
Geography and proximity	5
Connections between people and landscape	5
Willingness to collaborate	4
Economies of scale	4
History and sense of larger community	3
Shared resources and degradation	3
Openness/open mindedness	2
Personalities and need for respect, integrity and credibility	2

Obstacles to municipal collaboration with other municipalities

Factors that are to collaboration with other municipalities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Money/costs/ resources	*			*				*					*		*			*
Competition	*			*					*		*	*		*				*
Lack of leadership	*																	
Focus on different priorities	*							*			*							
Size of municipality and different needs	*	*			*					*								
Lack of commitment				*														
Flood		*																
Personalities/Egos/ pride			*			*							*					*
Lack of communication						*												
No shared interest						*							*					
Lack of consensus				*				*										
Ownership of process				*														
Geography							*											
Lack of networking							*											
Lack of autonomy or control									*									
Distance										*								
Inequalities										*								
Protectionism Don't want to share									*	*				*				*
Political restrictions															*			
Lack of respect, credibility or integrity based on past relationships															*		*	
Lack of provincial regulation or support															*			
Obstacles we create for ourselves																*		
Elections and frequent turnovers																	*	
Lack of good governance model																	*	
Time													*					

Factors that are obstacles to collaboration with other municipalities	Commonality
Money/costs/resources	**6**
Competition	**7**
Lack of leadership	1
Focus on different priorities	**3**
Size of municipality and different needs	**4**
Lack of commitment	1
Flood	1
Personalities/Egos/pride	**4**
Lack of communication	1
No shared interest	2
Lack of consensus	2
Ownership of process	1
Geography	1
Lack of networking	1
Lack of autonomy or control	1
Distance	1
Inequalities	1
Protectionism **Don't want to share**	**4**
Political restrictions	1
Lack of respect, credibility or integrity based on past relationships	2
Lack of provincial regulation or support	1
Obstacles we create for ourselves	1
Elections and frequent turnovers	1
Lack of good governance model	1
Time	1

Competition	7
Money/costs/resources	6
Size and different needs	4
Personalities/ego/pride	4
Protectionism/don't want to share	4
Focus on different priorities	3
No shared interest	2
Lack of consensus	2
Lack of respect, credibility or integrity based on past experiences	2

Factors that facilitate municipal collaboration with the Networks

Factors that facilitate with Networks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Understand purpose and outcomes	*								*										2
Proactive agenda	*																		1
Good understanding of different municipalities and issues	*									*							*		3
Common goals to manage growth		*										*		*					3
Transit		*										*							2
Economic development		*																	1
Addresses common and future concerns			*	*		*				*	*		*						6
Provincial mandate					*														1
Interest of key personnel					*		*												2
Accessibility						*													1
Proximity						*													1
Geography						*													1
Emergency situations						*													1
Provincial grants							*							*					2
Cost savings							*												1
Access to experts							*								*				2
Access to knowledge							*		*			*			*	*		*	6
Broader network							*												1
Credibility								*											1
Trust								*											1
Relationships								*								*			2
Effectiveness									*										1
Visibility												*							1
Low fees for membership												*							1

Factors that facilitate with Networks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Better to be there than not													*						1
Political influence															*				1
Other perspective															*				1
Buy-in to implement															*				1

Summary

Factors that facilitate municipal collaboration with the networks

Addresses common and future concerns	6
Access to knowledge	6
Good understanding of different municipalities and issues	3
Common goals to address growth	3
Understand purpose and outcomes	2
Transit	2
Interest of key personnel	2
Provincial grants	2
Access to experts	2
Relationships	2

Factors that are obstacles to collaboration with Networks	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**N= 18**
Initiatives don't make sense	*																		1
Projects not specific to municipal interests		*			*			*								*	*		**5**
Growth		*																	1
Low priority			*		*									*					3
Nothing				*								*							2
Driven by provincial interests					*				*										2
Travel distance to meetings						*													1
Time							*	*					*		*			*	**5**
Credibility								*											1
Trust								*											1
Resources								*						*	*				3
Strings attached									*		*								2
Unreasonable									*										1
Ineffective									*										1
Give up local autonomy									*										1
Lack of communication										*						*			2
Not part of decision making										*									1
Residents don't see value												*							1
Get nothing out of it													*		*				2
Lack of enforcement																		*	1
Relationships																		*	1

Projects not specific to municipal interests	5
Time	5
Resources	3
Low priority	3
Nothing	2
Driven by provincial interests	2
Strings attached	2
Lack of communication	2
Get nothing out of it	2

APPENDIX F
Primary Natural Resource Management Issues

Matrices of primary resource management issues identified by municipal respondent

Primary issue: land use management	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total N=18
Growth management	*							*	*		*								4
Growth cap on industry		*																	1
Recreational impacts on forested area			*																1
Increased density				*															1
Transit oriented development				*															1
Protecting environment during land development					*			*											2
Assessing sustainability						*													1
Accessibility of downtown						*													1
Land development							*												1
Maintaining unique character							*												1
Urban sprawl								*											1
Need for growth									*			*	*						3
Fragmentation of rural land									*									*	2
Lack of daycare														*					1
Land use in residential														*					1
Costs of servicing development															*				1
Lack of school sites																*			1
Hydrocarbon footprint																	*		1
Impact of acreages																		*	1

Primary land use management issues:

1.	Growth management	4
2.	Need for urban growth:	3
3.	Protecting the environment during land development	2
4.	Fragmentation of agricultural lands	2

Matrix of primary water resource management issue by municipal respondent

Water Resource Issues	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	N= 18
Servicing agreement/ Regional water supply	*							*	*			*				*	*	*	7
Water pressure is too high		*																	1
Watershed: quality and quantity			*																1
Water conservation				*				*						*					3
Security of water supply	*			*		*		*	*		*	*		*	*		*		10
Flood protection		*			*	*					*	*					*		6
Drought						*													1
Managing storm drainage							*									*			2
Growth and capacity of water and wastewater facilities									*				*					*	3
Managing wetlands/ riparian lands										*	*								2

Most common water resource management issues

1. Security of water supply 10
2. Servicing agreement/regional water supply 7
3. Flood protection 6
4. Water conservation 3
5. Capacity of water/wastewater treatment facility to accommodate growth 3
6. Managing storm drainage 2
7. Managing wetlands and riparian lands 2

Matrix of primary air quality management issue by municipal respondent

Air quality issues	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	**N= 18**
Emissions from industry	*			*	*				*		*				*		*	*	**8**
No air quality problem	*	*					*	*		*		*	*						**7**
Idling		*		*	*		*				*			*					**6**
Controlling GHG emissions		*			*			*											**3**
Monitoring and management						*		*									*		**3**
Dust from industry	*		*												*				**3**
Spring pond odours																*			**1**

1. Emissions from industry 8
2. No air quality issues 7
3. Idling 6
4. Controlling GHC 3
5. Monitoring and management 3
6. Dust from industry 3
7. Spring pond odours 1

APPENDIX G
Reflexivity Matrix Tool and Scoring
Source: Judy Stewart, May, 2014

Name of Legal Instrument	Type of Instrument (policy/law)	Process orientation and tailoring to local circumstances	Score 1-3 based on scale	Comment on scoring /96
		Interpenetration of Policy Boundaries (Reflexive Law)	**Possible:33 Score:/33**	
		Institution evolved through co-management or collaboration with provincial or regional environmental governance networks	0/3	.
		Information sharing as a requirement	0/3	
		Co-generation of knowledge as a requirement or by-product	0/3	
		Programs and institutional arrangements for corporate and civil society interactions	0/3	
		Appeal mechanisms for addressing private and sectorial challenges to government decisions	0/3	
		Mechanisms for adaption and responding to feedback	0/3	
		Programs for diffusion of innovation and technological advances	0/3	
		Requires scientific studies or processes at regular intervals	0/3	
		Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws	0/3	
		Iterative public participation component to change fundamental components	0/3	
		Adaptive to system feedback-system has built in government process for internalizing feedback	0/3	
		New public/private partnerships (social-political governance)	**Possible:21 Score: /21**	
		Allocation of resources	0/3	
		Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	0/3	
		Sharing of decision-making and authority	0/3	
		Projects and programs apply sector-wide	0/3	
		Co-creation of best or beneficial management practices	0/3	
		Monitoring of agreed performance measures	0/3	
		Public reporting at regular intervals	0/3	
		Next-generation policy strategies (Policy learning)	**Possible:18 Score: /18**	
		Negotiated rule-making	0/3	

		Audited self-regulation	0/3	
		Performance-based rules	0/3	
		Decentralized and dynamic problem solving	0/3	
		Disclosure regime	0/3	
		Coordinated information collection	0/3	
		New proceduralism per Teubner	**Possible:24 Score: /24**	
		Law facilitates self-regulatory processes of communication and learning	0/3	
		Law mediates between performance and function	0/3	
		Law fosters mechanisms to further reflexion structures	0/3	
		Law acts to install, correct and redefine democratic self-regulatory mechanisms.	0/3	
		Law guarantees coordination processes and compels agreement	0/3	
		Law stimulates processes of social self-regulation	0/3	
		Law's goal is to design organizational structures that have effective internal control.	0/3	
		Law utilizes and develops knowledge necessary to control self-regulatory processes.	0/3	

Revised scoring August, 2014
Based on Appendix A of research proposal

General evaluation criteria

0. No indication
1. Reference to interpenetration of policy boundaries
   (e.g. policy integration is mentioned)
2. Process articulated that requires some interpenetration of policy boundaries to develop policy or environmental management plans
   (e.g. requires a multi-sectorial and /or multi-level team)
3. Statutory provision requiring interpenetration of policy boundaries to develop policy or environmental management plans (e.g. must ensure that cross ministry group is consulted before management system is changed

Evaluation criteria for allocation of resources

0. No allocation
1. Resources allocated project by project but no overall scheme
2. Resources allocated for some operations and project work as part of a scheme for prescribed operations and project work upon application through clearly established scheme that requires monitoring and reporting of how the funds will be used
3. Resources allocated through funding mechanism for overall operations and projects without application-it is formalized with annual audit and reporting mechanisms with presentations to government.

Evaluation criteria for "next-generation policy"

0. None
1. Limited
2. Some opportunities for most, where improvements can be shown
3. Codified as a standard practice

Evaluation criteria for Teubner

0. No reflexivity
1. Limited reflexivity
2. Mostly reflexive
3. Reflexive

Ratings were given a final score based on total score out of possible 96 points

0 - No reflexivity	0 - 24
1 - Limited reflexivity	25 - 49
2 - Mostly reflexive	50 - 74
3 - Reflexive	75 – 96

Criteria from literature. Lobel, 2004, Fiorino, 2006, Teubner, 1983

APPENDIX H
Samples of reflexivity scoring:
Water For Life; Land-use Framework; Enabling Partnerships; Growth Management Boards
Source: Judy Stewart, November, 2014 – November 2015

Name of Legal Instrument	Type of Instrument	Process orientation and tailoring to local circumstances	Score 1-3 based on scale	Comment on scoring
Water For Life: Alberta's Strategy for Sustainability	**Policy** **2003**	**Interpenetration of Policy Boundaries (Reflexive Law)**	**Score: 26**/33	**75/96**
Alberta's response to develop a new water management approach and outline specific strategies and actions to address these.		Institution evolved through co-management or collaboration with provincial or regional environmental governance networks	3/3	Policy created "partnerships" for watershed management and was informed by river basin councils and stewardship groups who were already in place in certain parts of the province. Albertans were broadly consulted before the policy was adopted by GOA. See p. 19 "partnership approach to watershed management"
		Information sharing as a requirement	3/3	Knowledge and research are key directions and actions of the policy. Water and watershed policy and procedures and information is widely available through AESTRD website.
		Co-generation of knowledge as a requirement or by-product	3/3	Investment in knowledge and research targets to achieving W4L goals and objects. See page 17-information sharing, advice and collaboration.
		Programs and institutional arrangements for corporate and civil society interactions	3/3	Created the three levels of stakeholder partnership with government: AWC; WPACS; and WSGs that are all populated by multi-stakeholders with diverse interests
		Appeal mechanisms for addressing private and sectorial challenges to government decisions	2/3	No appeal process addressed in policy – but based on collaboration where all sectors and parties are at the table to make plans and resolve conflict.

		Mechanisms for adaption and responding to feedback	0/3	No-adaptive co-management that adapts to feedback was not contemplated.
		Programs for diffusion of innovation and technological advances	3/3	One of the key directions of the policy
		Requires scientific studies or processes at regular intervals	1/3	Set short-medium-and long term goals but does not require scientific studies at regular intervals
		Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws.	2/3	GOA document where water was cornerstone to provincial sustainability. No alignment was done to create the policy, but the policy implementation required alignment.
		Iterative public participation component to change fundamental components	3/3	Water For Life has been reviewed and renewed several times through AWC and the review/renewal has been adopted by government p.23
		Adaptive to system feedback-system has built in government process for internalizing feedback	3/3	AWC works with government on policy development and there is an internal process worked out for providing advice to government departments
		New public/private partnerships (social-political governance)	**Score: 15/21**	
		Allocation of resources	3/3	Began 2004/2005
		Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	2/3	Set up the organizational structure as a matter of policy, and the individual groups self-organized as volunteer societies with province as a member and Director for AWC (provincially) and WPACs (watersheds). WSG are less formalized and they are local. Regular reporting to membership is a component of the AWC and WPACs and most WSGs.
		Sharing of decision-making and authority	0/3	None. Advisory nature of WPACs and WSGs who have no "authority" for or to implement the plans they co-create. Province retains sole responsibility and authority to implement the policy. P. 23

		Projects and programs apply sector-wide	3/3	Policy is implemented sector wide and cross sector.
		Co-creation of best or beneficial management practices	2/3	Policy implies that BMPs will be developed through partnerships: has occurred through AWC and WPACs.
		Monitoring of agreed performance measures	2/3	These were developed for drinking water, water quality and water use efficiency and productivity. WPACs are also involved in supporting water quality monitoring by WSGs and others. The performance measures were created by the province with input from watershed groups.
		Public reporting at regular intervals	3/3	AWC, WPACs, WSGs and the province all regularly report to the public on activities done under W4L. Also see the AESRD's 2013-201`4 Annual Report on the work undertaken under W4L.
		Next-generation policy strategies (Policy learning)	**Score: 10/18**	
		Negotiated rule-making	1/3	Implied, but all regulations and codes made by Province
		Audited self-regulation	1/3	See Conservation Productivity and Efficiency Plans by sector created through AWC. Not audited by government.
		Performance-based rules	1/3	Terms and conditions of licenses and approvals must be met-compliance regime. Performance measures are used by Province: high performance is not rewarded by government.
		Decentralized and dynamic problem solving	2/3	Devolved problem solving is the norm. All final decisions made by Province.
		Disclosure regime	2/3	Regular reporting but no disclosure regime built into the policy-falls under EPEA reporting regime. Falls under AEMERA.
		Coordinated information collection	3/3	Information collected by province is made available to public online. Rapid response to requests for information.
		New proceduralism per	**Score:**	

		Teubner	**24/24**	
		Law facilitates self-regulatory processes of communication and learning	3/3	Communication and learning are key directions of policy.
		Law mediates between performance and function	3/3	
		Law fosters mechanisms to further reflexion structures	3/3	
		Law acts to install, correct and redefine democratic self-regulatory mechanisms.	3/3	Policy creates a system within a system and provides structure for partners to develop self-regulatory schemes. There is no oversight by the Province.
		Law guarantees coordination processes and compels agreement	3/3	.
		Law stimulates processes of social self-regulation	3/3	
		Law's goal is to design organizational structures that have effective internal control.	3/3	
		Law utilizes and develops knowledge necessary to control self-regulatory processes.	3/3	
Name of Legal Instrument	**Type of Instrument**	**Process orientation and tailoring to local circumstances**	**Score 1-3 based on scale**	**Comment on scoring**
Land-use Framework (LUF)	**Policy** **2008**	**Interpenetration of Policy Boundaries (Reflexive Law)**	**Score: 22/33**	**48/96**
The purpose of LUF is "to manage growth, not stop it, and to sustain our growing economy, but balance this with Albertans' social and environmental goals. This is		Institution evolved through co-management or collaboration with provincial or regional environmental governance networks	2/3	Page 8-"The ideas and opinions of Albertans have played a vital role in developing the framework." Document evolved through collaboration with stakeholder networks wo asked for "greater provincial leadership on land-use issues." p.2. While members of networks participated, the province did not undertake the work as a

what the Land-use Framework is about- smart growth. Page 2.				result of collaboration with networks.
		Information sharing as a requirement	3/3	Strategy 6: "Establish an information, monitoring and knowledge system to contribute to continuous improvement of land-use planning and decision-making."
		Co-generation of knowledge as a requirement or by-product	3/3	See guiding principles on page 15. Also Strategy 6. The RACs for LARP and SSRP created "state of" reports as initial project before developing the plans.
		Programs and institutional arrangements for corporate and civil society interactions	1/3	RAC appointments to co-create advice to government but disbanded after advice to government. Perhaps through cumulative effects management system
		Appeal mechanisms for addressing private and sectoral challenges to government decisions	1/3	"Because they are approved by Cabinet, regional plans are government policies and cannot be appealed." p. 27 However provincial and local level government decisions can be appealed. Standing is difficult to achieve for "affected" or "directly affected" individuals. No mechanism to enable sectoral appeals.
		Mechanisms for adaption and responding to feedback	3/3	Page 39 Regular monitoring and reporting, five and 10 year review of plans and "continuous improvement" pp 37-39 "The Land-use Framework will foster the creation and sharing of knowledge for the continuous improvement of land management decisions and practices. The Government will facilitate the establishment of a network connecting researchers, practitioners, institutions and programs to address strategic

				needs and priorities for the Land-use Framework."
		Programs for diffusion of innovation and technological advances	2/3	See above re continuous improvement. No mechanisms to distribute or diffuse knowledge or scientific information.
		Requires scientific studies or processes at regular intervals	3/3	P.16 Knowledge-based. See also program for continuous improvement above and five and ten year reviews.
		Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws	3/3	Created by cross-ministry Government of Alberta group. Integrated –will coordinate land, air, water, biodiversity, economic development and social objectives within a region. p. 16 For both public and private lands-cumulative effects management system- p.31
		Iterative public participation component to change fundamental components	0/3	Cabinet level documents that will only be changed by Cabinet
		Adaptive to system feedback-system has built in government process for internalizing feedback	1/3	Five and ten year review of plans but no mechanism to change the LUF. Continuous improvement of Plans but not of LUF itself.
		New public/private partnerships (social-political governance)	**Score: 10/21**	
		Allocation of resources	0/3	None
		Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	0/3	None
		Sharing of decision-making and authority	0/3	
		Projects and programs apply sector-wide	2/3	No differentiation among sectors but not a sector by sector application of framework-it is intended to be implemented by provincial and local level government not by sectors.
		Co-creation of best or beneficial management	2/3	Continuous improvement

		practices		
		Monitoring of agreed performance measures	3/3	Program for monitoring of plan's performance measures
		Public reporting at regular intervals	3/3	Regular reporting required on plans
		Next-generation policy strategies (Policy learning)	**Score: 9/18**	
		Negotiated rule-making	1/3	Opportunity to comment on regulation/plans – not negotiated
		Audited self-regulation	0/3	
		Performance-based rules	3/3	
		Decentralized and dynamic problem solving	1/3	Cumulative effects management and continuous improvement suggest problem solving system
		Disclosure regime	1/3	Regular monitoring and reporting part of LUF but no requirement to disclose
		Coordinated information collection	3/3	LUF requires coordinated information sharing and knowledge creation
		New proceduralism per Teubner	**Score: 7/24**	
		Law facilitates self-regulatory processes of communication and learning	0/3	Self regulation is not promoted
		Law mediates between performance and function	0/3	No indication that ALSA or plans will mediate between performance and function
		Law fosters mechanisms to further reflexion structures	3/3	Continuous improvement and monitoring and reporting system .
		Law acts to install, correct and redefine democratic self-regulatory mechanisms.	0/3	No self regulation-imposition of regulation from provincial level
		Law guarantees coordination processes and compels agreement	3/3	Integration and coordination and cumulative effects management suggest coordination-also coordination cross-ministry and cross-levels of government
		Law stimulates processes of social self-regulation	0/3	Top down
		Law's goal is to design organizational structures that have effective internal control.	0/3	Top down

		Law utilizes and develops knowledge necessary to control self-regulatory processes.	1/3	Knowledge creation is used to create plans and to regulate, but top down.
Name of Legal Instrument	**Type of Instrument**	**Process orientation and tailoring to local circumstances**	**Score 1-3 based on scale**	**Comment on scoring**
Enabling Partnerships	**Guidance**	**Interpenetration of Policy Boundaries (Reflexive Law)**	**Score: 28/33**	**78/96**
The purpose of this document is to describe how landowners, communities, organizers, industry, and governments can get involved in timely and effective actions for the sustainable management of Alberta's watersheds. P.3		Institution evolved through co-management or collaboration with provincial or regional environmental governance networks	3/3	Province released document to explain partnerships under Water For Life. Input was sought from BRBC and many stewardship groups in the province. Province prepared guidance document to establish nested scales of activities describe roles and responsibilities of all actors.
		Information sharing as a requirement	3/3	Annual reports are required if the groups established through the described partnerships receive funding
		Co-generation of knowledge as a requirement or by-product	3/3	
		Programs and institutional arrangements for corporate and civil society interactions	3/3	See purpose statement- refers to shared responsibility for watershed management and collaborative activities cross-sector.
		Appeal mechanisms for addressing private and sectoral challenges to government decisions	0/3	None of the partners created under the instrument have any mechanism to appeal any of the government decisions. "does not confer or transfer any regulatory authorities" p2
		Mechanisms for adaption and responding to	3/3	See adaptive approach to watershed management p9

		feedback		
		Programs for diffusion of innovation and technological advances	3/3	WPACS are *to provide a forum to share information – promote awareness and best management practices.* p10
		Requires scientific studies or processes at regular intervals	2/3	Not at regular intervals. State of the Watershed reports and annual reports
		Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws	3/3	Stated at p.4 –alignment with other legislation is required.
		Iterative public participation component to change fundamental components	3/3	Introduced concepts of subsidiarity and nested scales – amending watershed management plans requires stakeholder input.
		Adaptive to system feedback-system has built in government process for internalizing feedback	2/3	Guidance is framed as processes for adaptive watershed management and shared responsibility
		New public/private partnerships (social-political governance)	**Score: 18/21**	
		Allocation of resources	3/3	
		Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	3/3	
		Sharing of decision-making and authority	0/3	Government does not share decision-making or authority – clearly stated that all partnerships will be advisory
		Projects and programs apply sector-wide	3/3	
		Co-creation of best or beneficial management practices	3/3	
		Monitoring of agreed performance measures	3/3	
		Public reporting at regular intervals	3/3	
		Next-generation policy strategies (Policy learning)	**Score: 8/18**	
		Negotiated rule-making	1/3	Recommendations for policies and laws are negotiated

				through partnership processes
		Audited self-regulation	1/3	Adaptive watershed management through consensus is promoted, but partners do not have any authority over decisions
		Performance-based rules	0/3	
		Decentralized and dynamic problem solving	3/3	
		Disclosure regime	03	
		Coordinated information collection	3/3	
		New proceduralism per Teubner	**Score: 24/24**	
		Law facilitates self-regulatory processes of communication and learning	3/3	
		Law mediates between performance and function	3/3	
		Law fosters mechanisms to further reflexion structures	3/3	
		Law acts to install, correct and redefine democratic self-regulatory mechanisms.	3/3	Purpose of guidance document is to facilitate and define relationships for self-regulation within partnerships, but does not enable self-regulation
		Law guarantees coordination processes and compels agreement	3/3	
		Law stimulates processes of social self-regulation	3/3	The WSGS, WPACs and the council are all provided with organizational structure and roles and responsibilities.
		Law's goal is to design organizational structures that have effective internal control.	3/3	
		Law utilizes and develops knowledge necessary to control self-regulatory processes.	3/3	

Name of Legal Instrument	Type of Instrument	Process orientation and tailoring to local circumstances	Score 1-3 based on scale	Comment on scoring 69 /96
Growth management boards –Part 17.1 of MGA	**Legislation and regulations**	**Interpenetration of Policy Boundaries (Reflexive Law)**	**Score: 19/33**	
The Capital Region Board was originally created by regulation under the MGA in 2010. In 2012 the regulation was restated. Both of these regulations pre-dated the enactment of the growth management board provisions of the MGA. Certain sections of the regulation were repealed in 2015. Unlike the stipulation that participation in a growth management board is "voluntary", municipal participation in the Capital Region Board was mandated under the 2010 regulation.		Institution evolved through co-management or collaboration with provincial or regional environmental governance networks	3/3	The 2013 provisions were created based on the Capital Region Board experience and in consultation with the Calgary Regional Partnership membership. **Transitional** **708.25(1)** The *Capital Region Board Regulation* (AR 38/2012), in addition to being declared valid under section 603.1, is deemed, on the coming into force of this section, to have been made under this Part. (2) If there is a conflict or inconsistency between a provision of the *Capital Region Board Regulation* (AR 38/2012) as it read on the date of the coming into force of this section and a provision of this Part, the *Capital Region Board Regulation* (AR 38/2012) prevails to the extent of the conflict or inconsistency. (3) For greater certainty but without limiting the generality of subsection (2), sections 708.011, 708.02(1) and 708.23 do not apply to the *Capital Region Board Regulation*(AR 38/2012).
		Information sharing as a requirement	3/3	Participating municipalities must share information with the GMB.
		Co-generation of	3/3	Annual report of a GMB is a

		knowledge as a requirement or by-product		requirement under section 708.09. Given the list of what a growth plan must and may contain, co-generation of knowledge would be a by-product.
		Programs and institutional arrangements for corporate and civil society interactions	3/3	GMB are corporations. Incorporation procedures are ascribed.
		Appeal mechanisms for addressing private and sectorial challenges to government decisions	3/3	GMBs must establish an appeal and conflict resolution process as part of incorporation (inception)
		Mechanisms for adaption and responding to feedback	1/3	Processes for amending a growth plan may be included in the incorporation documents
		Programs for diffusion of innovation and technological advances	0/3	None are included
		Requires scientific studies or processes at regular intervals	0/3	None are stipulated
		Aligns with other policy or legislation cross-ministry regulations or other levels of government laws or bylaws	3/3	Aligns with MGA, other enactments and ALSA. GMB bylaws for internal governance must be approved by the Minister of Municipal Affairs
		Iterative public participation component to change fundamental components	0/3	Not required. The representatives of the GMB are all municipal Reeves, Mayors, councillors or other designated representatives
		Adaptive to system feedback-system has built in government process for internalizing feedback	0/3	None-just requirement for annual reporting
		New public/private partnerships (social-political governance)	**Score: 15/21**	
		Allocation of	3/3	Requisitions of operating and capital

		resources		costs of GMB are prescribed by Ministerial Order.
		Requires formalization of partnerships through law/regulation for self-regulation and regular reporting to membership.	3/3	Annual reports are prescribed.
		Sharing of decision-making and authority	3/3	Government recognizes the voluntary nature of the boards
		Projects and programs apply sector-wide	3/3	
		Co-creation of best or beneficial management practices	0/3	However, the contents of a growth plan may include BMPs but they are not mandated
		Monitoring of agreed performance measures	0/3	None
		Public reporting at regular intervals	3/3	Annual reports are required
		Next-generation policy strategies (Policy learning)	**Score: 11/18**	
		Negotiated rule-making	3/3	
		Audited self-regulation	3/3	
		Performance-based rules	0/3	None that are prescribed
		Decentralized and dynamic problem solving	3/3	Voluntary participation by municipalities recognizes place and decentralizes problem solving to address growth-related issues. left up to the GMB what the contents of a growth plan may include – but may include whatever would fit the description of "integrated and strategic planning for future growth " in participating municipalities.
		Disclosure regime	1/3	Annual reports but does not stipulate what must be disclosed
		Coordinated information collection	1/3	Not required, but does compel a participating municipality to share information required by the Board.
		New proceduralism per Teubner	**Score: 24/24**	

		Law facilitates self-regulatory processes of communication and learning	3/3	
		Law mediates between performance and function	3/3	
		Law fosters mechanisms to further reflexion structures	3/3	
		Law acts to install, correct and redefine democratic self-regulatory mechanisms.	3/3	
		Law guarantees coordination processes and compels agreement	3/3	
		Law stimulates processes of social self-regulation	3/3	
		Law's goal is to design organizational structures that have effective internal control.	3/3	
		Law utilizes and develops knowledge necessary to control self-regulatory processes.	3/3	

APPENDIX I
Summary of reflexivity analysis and scores
Source: Judy Stewart, November, 2014

Document	Year	Type of Policy/ Legislation	Reason for inclusion	Reflexivity Rating /Scoring
Legislative scheme for land-use growth issues				
Municipal Government Act (MGA)	1994	Legislation	Land use planning and development on private lands is regulated and controlled by local governments under Part 17 of the MGA.	28/96
Alberta Land Use Policies (LUPS)	1996	Policy Order in Council (MGA)	Provincial policies to guide local government decision-making when matters of provincial concern, such as water and natural resources, transportation, etc., were considered during land use planning and development.	26/96
Subdivision and Development Regulation (SDR)	2002	Regulation (MGA)	Regulation requires consultation with province with respect to provincially owned or regulated resources, such as bed and shores and land uses regulated under EPEA and PLA	12/96
Public Lands Act (PLA)	1980	Legislation	Planning and development and land use on public lands, including the beds and shores of permanent and naturally occurring water bodies is regulated through the PLA.	15/99
Public Lands Act Regulation (PLAR)	2011	Regulation (PLA)	New regulations flowing from impact of ALSA.	15/96
Environmental Protection and Enhancement Act (EPEA)	1992	Legislation	Original environmental legislation to "protect and enhance" and ensure "wise use' all components of the environment, including land, water, and air.	25/96
Responsible Energy Development Act (REDA)	2013	Legislation	Provides a mandate to energy regulator (AER) for "efficient, safe, orderly and environmentally responsible development of energy resources" and to regulate disposition of public lands, protection of the environment and conservation and management of waver and wise allocation and use of water" in respect of energy development. Growth in oil and gas operations are identified as land use; water resource; air quality issues in the Region.	47/96

Document	Year	Type of Policy/ Legislation	Reason for inclusion	Reflexivity Rating/ Scoring
Agricultural Operations Practices Act (AOPA) and regulations	2000	Legislation and regulations	Agricultural land uses regulated AOPA impact land, water and air. Agricultural emissions were identified as a major air quality concern in Region.	46/96
Alberta Land Stewardship Act	2010	Legislation	Reintroduces regional planning and provincial oversight	21/96
Alberta Land Stewardship Regulation	2011	Regulation (ALSA)	Processes for reviews, variances and compensation based on rights of individual landowners.	9/96
South Saskatchewan Regional Plan 2014-2024	2014	Regulation (Regional Plan ALSA)	Regional land use plan for Region	38/96
Calgary Metropolitan Plan	2012	Regional-scale growth management plan	Assessing the reflexivity of a natural resource management plan co-created through bridging organization processes	65/96
Legislative scheme for Water Quality and Quantity – scarcity of supply				
Water Act	1999	Legislation	Security of water supply is addressed through licensing agreements and provincial water allocation system.	23/96
Framework for Water Management Planning	2001	Management Framework (*Water Act* requirement)	Security of water supply is addressed through managements framework	56/96
Irrigation Districts Act	1999	Legislation	Irrigation districts have licenses that allow them to supply water to municipalities	44/96
Strategy for Protecting the Aquatic Environment	2001	Implementing tool (*Water Act* requirement)	Security of water quality-drinking water supply-is addressed through healthy aquatic environment or ecosystem.	48/96
Wastewater and Storm Drainage Regulation (AR 119/1993)	1993	Regulation	Security of water quality is addressed at the municipal scale through this regulation	34/96
Water For Life: Alberta's Strategy for Sustainability	2003	Policy	As a strategy for sustainability of water supply to meet the needs of Albertans sets out the need for partnerships, knowledge and conservation	75/96
Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)	2006	Approved Plan Water Act	Water management in the SSRB is done in accordance with the approved plan-affects security of water supply.	25/96

Document	Year	Type of Policy/ Legislation	Reason for inclusion	Reflexivity Rating/ Scoring
SSRP Surface Water QualityManagement Framework	2014	Management Framework /SSRP	Security of water quality is addressed through the Framework under the SSRP providing regional scale triggers and limits. Based on 4 mainstems in Region.	72/96
Enabling Partnerships	2004	Guidance document	Provided description, roles and responsibilities and relationships for WSGs, WPACs, & Alberta Water Council.	78/96
Bow River Basin Watershed Management Plan Phase 2, 2012	2012	Bow River Basin Watershed Management Plan	Important governance document prepared by BRBC based on agreements among sectors and bridging organization processes.	65/96
Legislative scheme for Air Quality				
Clearing the Air: Alberta's Renewed Clean Air Strategy	2012	Policy	Emissions from agriculture and oil and gas at provincial and regional scales are addressed through EPEA and this policy.	74/96
SSRP Air Quality Management Framework	2014	Management Framework (SSRP)	Regional scale triggers and limits are established through this policy for Nitrogen Dioxide, Ozone and Fine Particulate Matter.	66/96
Protecting Alberta's Environment Act	2013	Established AEMERA	Applies to air and water monitoring, evaluating and annual reporting on identified indicators.	73/96
PMO3 Management Plan, 2008 Revised in 2014	2008	Air Quality Management Plan for CRAZ area	Identifies management strategies for all sectors in the Region: managing PM 2.5 and O3.	66/96

APPENDIX J
Copyright Permissions

ADDRESS
March 21, 2016

Colleen Shepherd
Executive Director
Calgary Regional Partnership
Via Email

Dear Ms. Shepherd:

Re: Permission to Use Copyright Material: Ecological Map in Calgary Metropolitan Plan

In a recent email to you in January, 2016, I requested that the Calgary Regional Partnership allow me to reproduce the attached ecological map taken from the Calgary Metropolitan Plan, 2012 in my doctorate dissertation. The exact citation it: Calgary Regional Partnership. 2012. *Calgary Metropolitan Plan.* Calgary Regional Partnership: Calgary. p.19: "Ecological Map". In my dissertation, the ecological map is used to illustrate the geo-political and ecological boundaries of the landscape that became the demonstration context for my research.

I received an email back from Shelley Armeneau from your office on January 27, 2016, that granted me permission "as long as I referenced the environmental report it was utilized in."

Once printed, my dissertation will be included in the institutional repository at the University of Calgary and the Library and Archives Canada. Links to those institutions are provided below:

- University of Calgary Theses Repository – The Vault http://theses.ucalgary.ca/

- Library and Archives Canada http://collectionscanada.gc.ca/obj/s4/f2/frm-nl59-2-e.pdf

I am now in the process of finalizing the paperwork to submit to the Faculty of Graduate Studies along with my successfully defended dissertation, and one of the requirements is that I provide the faculty with a written letter of permission to use the ecological map in my dissertation with an original signature from the grantor of permission.

Would you be so kind as to print off this letter, and date and sign below, granting your permission? It would be very much appreciated if you could please send the signed

document back to me by mail at the address above at your earliest convenience. I am truly indebted to you for your time and attention to this matter.

Yours truly,
Judy Stewart
PhD Candidate

I represent the copyright holder of the "ecological map" referred to in this letter, and I hereby grant permission for Judy Stewart to include the map in her dissertation, as long as she provides proper citation.

[redacted] Colleen Shepherd

MARCH 23/10
Date

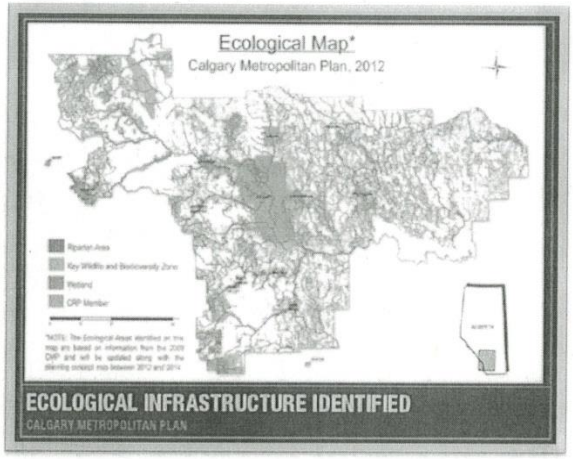
Gmail by Google

judy stewart <stewart.jmm@gmail.com>

Permission to use diagram in academic work

judy stewart <[redacted]> Mon, Jan 25, 2016 at 10:47 AM
To: [redacted]

Hello Colleen:
I would like to use the enclosed diagram in my PhD dissertation. I need permission from CRP to do so. Would you please provide me with the contact information where I can make an application to obtain such permission.

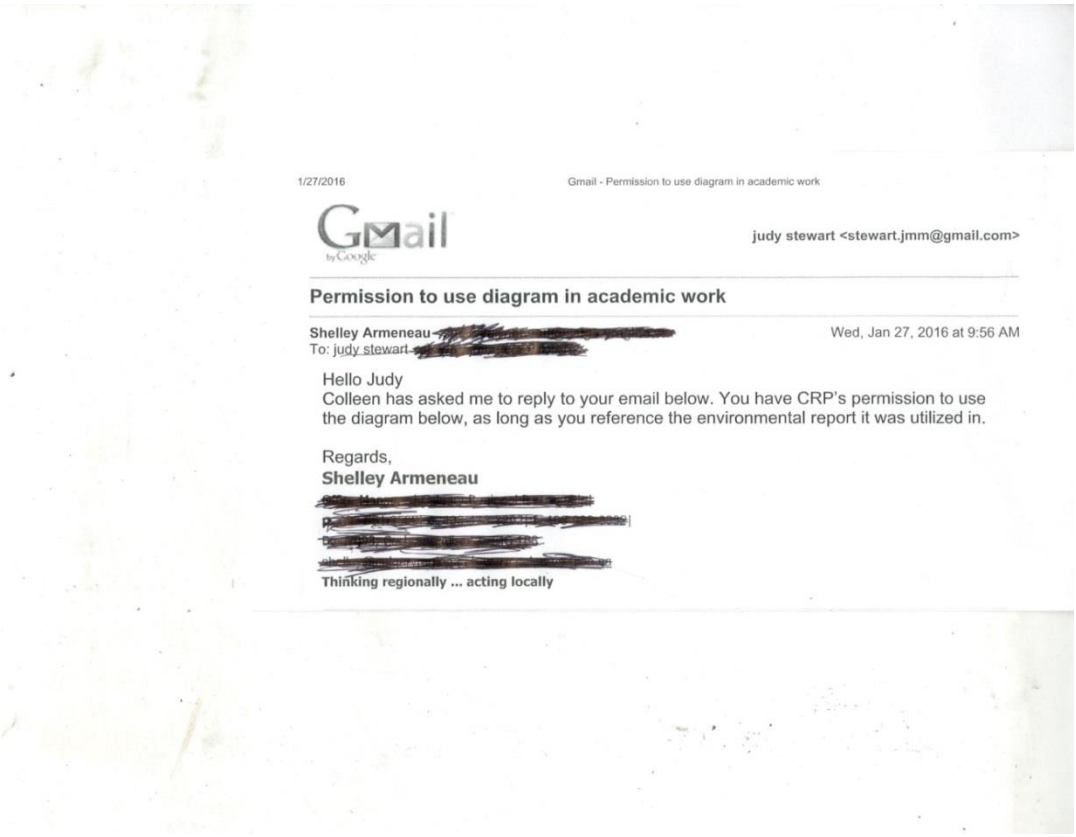


Thank you for your kind assistance.

In addition, I have complied and analyzed all the data from the interviews I completed with CRP Board members and municipalities in the Region, and the results may be of interest to your Board. Please let me know if a presentation of the results of my research would be welcomed by the Board.

Yours,

Judy Stewart, LL.M.



1/27/2016 Gmail - Permission to use diagram in academic work

Gmail by Google

judy stewart <stewart.jmm@gmail.com>

Permission to use diagram in academic work

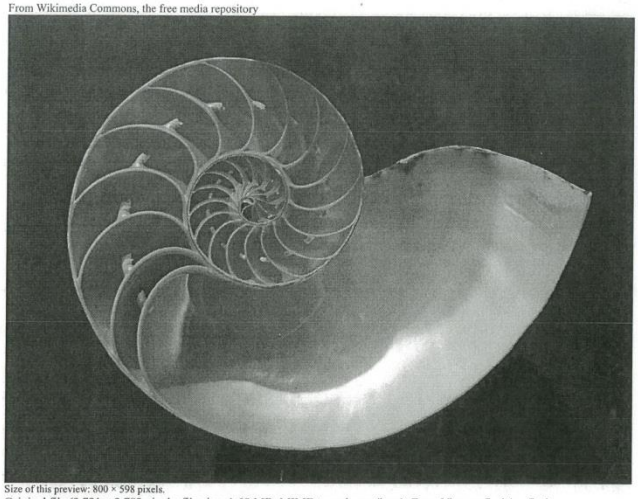
Shelley Armeneau [redacted] Wed, Jan 27, 2016 at 9:56 AM
To: judy stewart [redacted]

Hello Judy
Colleen has asked me to reply to your email below. You have CRP's permission to use the diagram below, as long as you reference the environmental report it was utilized in.

Regards,
Shelley Armeneau
[redacted]
Thinking regionally ... acting locally

File:Nautilus pompilius - Fernbank Museum of Natural History - DSC00294.JPG

From Wikimedia Commons, the free media repository



Download all sizes

Use this file on the web

Use this file on a wiki

Email a link to this file

Information about reusing

Size of this preview: 800 × 598 pixels.
Original file (3,721 × 2,782 pixels, file size: 1.69 MB, MIME type: image/jpeg); ZoomViewer: flash/no flash

Open in Media Viewer

Summary

Description	**English:** Exhibit in the Fernbank Museum of Natural History, Atlanta, Georgia, USA. Photography was permitted in the museum without restriction.
Date	17 March 2012, 01:36:08
Source	Own work
Author	Daderot

Licensing

I, the copyright holder of this work, hereby publish it under the following license:

	Date/Time	Thumbnail	Dimensions	User	Comment
current	**19:43, 21 March 2014**		3,721 × 2,782 (1.69 MB)	Daderot (talk | contribs)	User created page with UploadWizard

- You cannot overwrite this file.

File usage on Commons

There are no pages that link to this file.

Metadata

This file contains additional information, such as Exif metadata, probably added from the digital camera or scanner used to create or digitize it. If the file has been modified from its original state, some details may not fully reflect the modified file. The timestamp is only as accurate as the clock in the camera, and it may be completely wrong.

Camera manufacturer	SONY
Camera model	DSC-RX100
Author	Picasa
Exposure time	1/30 sec (0.033333333333333)
F-number	f/1.8
ISO speed rating	800
Date and time of data generation	01:36, 17 March 2012
Lens focal length	10.4 mm

Categories: Shells in the Fernbank Museum of Natural History | Nautilus pompilius