Governing Water, Deliberative Institutions and Adaptation

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Report for "Water Governance and Climate Change: the engagement of civil society" Project

SSHRC Grant
File: 410-2010-1510
Council Identification Number: 160596

May 1, 2015

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1. Introduction

1.1 Intro

This research focuses on the reduction of people's vulnerability to climate change specifically in relation to water and societal decisions respecting water. Globally and locally “the water crisis,” accentuated by climate change, is increasingly recognized as a crisis of water governance. In other words it is a crisis of decision-making processes -- of people, government, and business in respect to water and activities affecting water. There is a significant body of literature which contends that bottom-up water governance through the engagement of local people in decisions affecting their water resources offers solutions to vulnerability and governance challenges. In the case of the Canadian Prairies, expected climate change impacts include greater climate variability and the risk of a severe multi-year drought and floods. Failing to anticipate and plan for changes in our future climate and its effects on Canadians' use of water increases the vulnerability of Canadians. How Canadians make decisions about water and water governance, is an important component in planning for climate change and reducing future harm.

In Canada, water governance has traditionally occurred in a centralized manner whereby government departments or agencies manage water resources. However, in the Prairie Provinces participation by agencies from civil society in water governance has been increasing over the past decade or so. There are "Watershed Advisory Committees" in Saskatchewan, "Watershed Planning and Advisory Councils" in Alberta and "Conservation Districts" in Manitoba (generically referred to herein as Local Watershed Councils or LWCs). Indeed LWCs are tasked with setting and implementing source water protection plans in many provinces in Canada. Literature respecting adaptation to climate change refers to this sort of local or watershed-based participation in water governance systems. Local participation has been described as an effective approach to improving adaptation and reducing the vulnerability of communities to climate change. The benefits of participation by civil society in water governance described in the academic literature include: commitment of the participants to the implementation of decisions; the incorporation of local community practices, values and knowledge into decisions; the internalizing of economic externalities (or having decisions represent the true value to the community of all impacts of a decision); interaction of economic interventions with non-economic values such as health benefits from increased water quality; and adaptive, quick and flexible response to issues reducing local vulnerabilities to climate change.

1.2 Problem definition

During the past two decades water governance issues have received considerable attention in Canada due to incidents in which poor water quality affected public health and safety (Laing, 2003; O’Connor, 2002) and because of contentious quantity decisions (Glenn, 1999) which have eroded the trust of people in the water management capacities of governments (Conference Board of Canada, 2005; Pollution Probe, 2007). The Canadian reports issued as a response to illnesses in North Battleford and

deaths in Walkerton confirmed the proposition that water issues and the water "crisis" are often crises of governance, not of natural conditions (GWP, 2000; Laing, 2003; O'Connor, 2002; SSCAF, 2003:47-48). In the Prairie Provinces many of these water governance issues could be exacerbated by the impacts of climate change on the regional water resources (CCIAD, 2002; Sauchyn and Kulshreshtha, 2008; SSCAF, 2003:47-48). Greater climate variability is predicted with more severe prolonged droughts in many areas of the prairies which will affect water quantity and quality (Henderson and Sauchyn, 2008; IPCC 2007; Sauchyn and Kulshreshtha, 2008; Richardson, 2009:12).

One of the responses of provincial governments to these incidents has been to improve water governance by integrating civil society organizations into the process on a watershed basis (Moss, 2008; WWCWAU, 2003:23). This effort conformed to the recommendations of international bodies including the Global Water Partnership (GWP) and the United Nations (GWP, 2000, 2006; UNWWDR, 2006). This integration has involved the establishment of LWCs (called 'Watershed Councils" in Alberta, "Watershed Advisory Committees" in Saskatchewan, and "Conservation Districts" in Manitoba) on the basis of the proposition that the watershed is an optimal geographic area upon which to organize local engagement in water governance. These groups' mandates, structures, and memberships vary amongst provinces, but they are generally made up of volunteer members of the public; Conservation Area Authorities, Irrigation District representatives, stewardship associations, producer groups, and/or rural, urban and Aboriginal governments. The novelty of the LWCs, the peculiarities of their organization in each of the Prairie Provinces, and their potential role in reducing the adverse impacts of climate change has not been subject to focused academic assessment.

Given the potential for LWCs to play an important role in water governance and climate change preparedness we contend that it is valuable to assess their actual contributions in these areas. For example, are the LWCs successful in performing their prescribed roles? What are the factors that contribute to success and what are the barriers to success? And, are there valuable insights we might identify by comparing the different governance frameworks employed in each of the Prairie Provinces? This project endeavours to understand the benefits of incorporating civil society into government decision-making on a local watershed basis, including decisions related to people's vulnerability to climate change. In these terms, this project– Water Governance and Climate Change – The Engagement of Civil Society is timely; it seeks to evaluate the presence of the LWCs in the governance system and the LWCs contribution to the reduction of vulnerability of communities to climate change in each Prairie Province.

1.3 Research objective

The goal of this research was to assess the contribution of new water governance institutions, the Local Watershed Councils (LWCs) in the three Prairie Provinces - Manitoba, Saskatchewan, and Alberta - in reducing the vulnerability of rural communities to the impacts of climate change on water resources. Governance plays an important part in determining a community's vulnerability to water related hazards such as drought by setting the institutional framework for accessing, using, and managing

water resources. Over the last decade the Prairie Provinces have made significant efforts to improve the management of water resources by integrating LWCs in the provincial structure of water governance. LWCs putatively give local meaning and practicality to governance decisions relating to uncertain climate change futures by offering cooperative approaches that resonate with a multiplicity of actors (de Loë and Kreutzwiser, 2007). Given the novelty of the experience and increasing challenges that climate change is imposing on the management of water, it is relevant to assess the experience of these councils. In order to assess that experience the following four principal research objectives were identified:

1) to discover how the LWCs are structured and how effectively they operate as democratic/deliberative organizations;
2) to describe both the way the LWCs integrate into water governance and how the three provincial water governance arrangements deal with climate change (e.g. what are the factors that contribute to successful outcomes and what are the barriers to success?);
3) to determine whether the LWCs have integrated climate change into their plans and strategies;
4) to do a comparative analysis of the LWC institutional framework between the three Prairie Provinces to determine the relative effectiveness of the LWCs in influencing water governance and climate change preparedness and to develop recommendations for improving outcomes.

1.4 The research questions

This research project focuses on the emerging area of civil society engagement or bottom-up governance in relation to water. The principal lines of inquiry employed include:

(a) exploring the role of LWCs and how the three provincial water governance arrangements are dealing with climate change;
(b) exploring how LWCs have integrated climate change into their planning and strategy;
(c) comparing and analyzing the three provincial models and developing a strategy to improve adaptation.

This research is important as it explores different models of bottom-up water governance and the integration of local people into water management decision making. Given increased water scarcity and the impacts on Canadian society, this research is highly topical. It examines the adaptation capacities of Canadians in relation to water governance and the reduction of harm which might otherwise occur due to climate change.

1.5 Focus and Limits

The focus of this research was on local watershed groups in the three Prairie Provinces. The research questions listed above were explored and this report provides the information obtained through the interviews and review of secondary sources.

The information contained in this report may not always be factually accurate as much of the information came from interviews with people and is based on their perceptions and beliefs. As well, funds were provided by the Social Sciences and Humanities Research Council to conduct this research but the interviews and writing of the report occurred from 2011 to 2014. Interviews were conducted in different years in different watersheds and the information may have changed since the interviews. Further, as different students conducted semi-structured qualitative interviews using the same guide, but exploring issues in slightly different manners, sometimes the information is difficult to compare and contrast. Each section of the report was also written by a different person; although some attempt was made to coherently unite all section. This research is further complicated by the very different structures of the local watershed groups in each province.

1.6 Theoretical Framework

The research is focused on water governance, an institution considered to be an important determinant of adaptive capacity and vulnerability to climate change. It is informed by social theories of risk (specifically the construction of risk), deliberative democracy (engagement of civil society in decision making) and post-normal science (science which is uncertain and based on assumptions of unpredictability, incomplete control of research tests, and a plurality of legitimate perspectives). The theoretical and methodological core of this research approach is the relationship and interchange between ecological conditions (water) and social patterns (the institution of bottom-up water governance). This approach is consistent with those facets of a critical realist perspective (Archer et al., 1998; Danermark et al., 2002; Sayer, 1992) which recognize the mutual constraints imposed by social and biophysical conditions and the presence of a structured agency. It recognizes the social construction of risk associated with climate change and is able to recognize and foster adaptive plans in response to climate change.

In the Canadian Prairies, one of the most important impacts of climate change on water resources will be an increase in the frequency and intensity of water related hazards, both droughts and floods (Bates, 2008; IPCC, 2007; Henderson and Sauchyn, 2008; Sauchyn and Kulshreshtha, 2008). In this context the conceptual and methodological framework of the project is the vulnerability approach. The Intergovernmental Panel on Climate Change (IPCC, 2001) defines vulnerability as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including increasing climate variability and extremes. Vulnerability, in this definition, is a function of the exposure and sensitivity (the degree to which a system will respond to a change in climatic conditions) and the adaptive capacity of a system to absorb, cope, manage, deal with, adapt, or recover from stress. Both exposure and adaptive capacity are defined not only by the magnitude of the biophysical phenomenon but also by a myriad of differential social conditions that expose people to the phenomenon and/or increase their capacity to reduce its negative impacts (Blaikie et al., 2005; Birkmann, 2006; Hilhorst, 2004; Smit and Wandel, 2006). These social conditions include economic resources, technology, information and skills, and also well-developed institutions (IPCC, 2001; IPCC, 2007; O'Connor, 2002).

Institutions, or conventions, norms and formally sanctioned rules of society (Young, 2008) are central to successful adaptation. They structure impacts and vulnerability, they mediate between individual and collective responses to climate impacts, thereby shaping outcomes of adaptation, and they act as vehicles for the delivery of external resources to facilitate adaptation and thus govern access to such resources (Agrawal, 2008). Water governance is in essence a set of these institutions (Matthews, 2009; Oberthur (umlaut over the u), 2006). Having an appropriate institution of governance – a flexible system able to manage climate change stresses and opportunities – is defined as one of the main determinants of adaptive capacity (IPCC WGII, 2007; Keskitalo, 2009).

There is a substantial body of literature which examines water law and governance in Canada (Bakker, 2007; Boyd, 2003; Conference Board of Canada, 2007; Hurlbert, 2006a; Hurlbert 2006b; Kennett, 1991; Lucas, 1990; La Forest, 1973; Tyler, 1982; Pollution Probe, 2007; Rueggeberg and Thompson, 1984), and elsewhere (Blomquist, 2004; Bruch, 2005; Hall, 2005; Scholz, 2005). However, there is very little research on water law and governance in the context of climate change (Hurlbert, 2009a; Hurlbert, 2009b). Governance can be defined in terms of institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and mediate their differences (Armitage et al., 2009). In relation to water, governance refers to the range of political, social, economic and administrative systems that develop, manage, and distribute water resources (GWP, 2002:14). It involves public and civil society organizations and comprises of norms, programs, regulations, and laws that are relevant to the management of water resources (Hall, 2005; See also Conference Board of Canada, 2007; UNDP, 2007).

There are several models of water governance described in the literature which range from authoritarian or top-down water governance to bottom-up or decentralized water governance. Traditional forms of governance, characterized by centralized and top-down decision-making, are increasingly being viewed as ineffective and in many cases reducing the sustainability of resources and people's livelihoods (Postel and Richter, 2003; Tsing et al., 2005). Thus, these more traditional forms of governance fail to address risk and vulnerability to water crises. The combination of top-down water management, future water scarcity, and water quality problems due to climate change reflect a burgeoning area of risk or vulnerability for Canadian society. Linkages are made in the literature surrounding the social construction of risk and the reduction of vulnerability to climate change (Schneider et al., 2007). This research links the social construction of risk of climate change by individuals involved in LWCs as a potential obstacle of adaptive capacity and thus a factor of vulnerability. Risk is both local and global. It includes features that can be empirically tested such as the probability of suffering from a water borne illness based on past occurrences. It also encompasses risks for which we do not have empirical knowledge and measures of certainty such as many aspects of climate change and the exact climate conditions and their impacts on the extent and duration of water shortages and floods which will occur over the next 50 years (Beck, 1992, 1999:30 also characteristics of Funtowicz's post-normal science 2008).

Literature from a variety of disciplines, including deliberative democracy (Dryzek, 2000:165; Fischer, 2000), post-normal science (Funtowicz, 2008), environmental

governance (Durant, 2004; Hampton, 1999; Omohundro, 2004; Schlosberg, 1999) and social reflexivity (Beck 1999:234), conclude that in order to respond to risks an opening up to democratic scrutiny of the previously centralized realms of decision making, such as traditional top-down governance, is required. This theme is particularized in the water governance literature (Brooks, 2002; Figueres, 2003; de Loe, 2007; Perret, 2006; Rahaman & Varis, 2005; WWCWAU, 2003 and 2006) and often termed "integrated water resources management" recommended by the United Nations since 1977 (Tortajada, 2003; Wellstead, 2007). Integrated water resource management (IWRM) is a form of bottom-up governance defined as "a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2000). This process of opening up water governance - a traditionally depoliticized realm managed by government departments or agents - to democratic scrutiny is occurring with the advent of LWCs.

The benefits of bottom-up governance and engaging civil society in water governance in the literature include: a commitment by civil society to the implementation of adopted decisions (Fischer, 2000); informing science of local knowledge and as a result advancing science (Funtowicz, 2008); the incorporation of local community practices, values and knowledge into decisions respecting the use of water resources (or internalization of economic externalities); and the adaptive, quick and flexible response to issues (Brooks, 2002; Hickey, 2004). The process of engaging civil society in governance, however, also has identified obstacles in relation to tokenism, difficulty defining and engaging "community," lack of resources, and accountability (Burroughs, 1999:799, Dryzek, 2000; Few 2006; Figueres et al, 2003; Fischer, 2000; Gleick et al., 2006; Hillman, 2008; Smith, 2008; Weber, 2003).

In assessing the LWCs, the decision making of individuals and policy decision-makers in respect of climate change is an important area of study in respect of adaptation. Central to this exercise is the construction of risk of climate change and its consequences by these individuals. If these individuals don't construct climate change and its effects on water as significant and impactful, adaptive decisions will not be made. This notion of the construction of risk is recognized by the IPCC as a determinant of choices about what vulnerabilities are key and to be addressed by policy. Thus the construction of risk is potentially a practical, institutional, or technical obstacle to adaptation (IPCC, 2001; IPCC, 2007:735; Schneider et al., 2007). Informing this research will be theories and studies of risk perception exploring the role of scientific experts (De Marchi, 1999; Giddens, 1990), ambiguities in the scientific literature surrounding temporal and spatial expressions in particular regions and places (Etkin and Ho, 2007; Few, 2007; Moser and Dilling, 2007) as well as signal events (Slovic and Weber, 2002), local knowledge, and trust (Boholm and Lofstedt (umlaut over the o), 2005; Gurabardhi et al., 2004; Giddens, 1990:89; Midden, 2009; Stringer et al., 2006).

1.7 The methodology

Our research effort included archival review, analysis of secondary data, and in-depth interviews. In addition we selected several LWCs and their areas of influence in each Prairie Province (Manitoba, Saskatchewan, and Alberta) as case studies. The LWCs selected from Alberta were the Oldman Watershed Council and the Athabasca Watershed Council, in Saskatchewan the Wascana and Upper Qu'Appelle Watersheds Association Taking Responsibility, Moose Jaw River Watershed Stewards Inc., Upper Souris Watershed Association, and Assiniboine Watershed Stewardship Association were studied; In Manitoba the Pembina Valley Conservation District, Little Saskatchewan River Conservation District, Seine-Rat River Conservation District and Alonsa Conservation District were studied. The first stage of the research effort consisted of secondary data collection activities which informed a baseline appreciation of water governance frameworks in each province, including the formal legislated roles and structures of LWCs secondary sources. This information formed the basis of a report and can be found at www.parc.ca.

The second stage of the research effort consisted of open ended qualitative interviews with the members of the LWCs and selected representatives of water governance agencies. A field guide was organized to provide a thematic foundation for interviews which explored water governance frameworks and issues relevant to LWCs in each province. A central area of thematic focus involves understanding the institutional structures in which LWCs operate and how the characteristics of those structures relate to our principal research objectives. This required lines of inquiry which would identify five features of LWC structures and activities. The lines of inquiry we selected conform to those employed by other researchers and reported in the literature.

The five lines of inquiry employed to identify institutional characteristics relevant to our objectives are:

a) how community representation is reflected in LWC governance frameworks (Conde, 2005:50);
b) what the level of LWC participation in integrated water resource management actually is (including the provision of information to government officials, consultation, functional interaction, and self-mobilization [Conde, 2005:52]);
c) how comprehensive LWC mandates are (do they reflect all of the community water issues, environmental issues, and climate change science obtained in the research of Stage One and interviews) balancing diverse interests in the satisfaction of needs and resolution of problems and reflected in action plans or decisions of LWCs;
d) whether decisions informed by LWC engagement are implemented and, if so, does implementation occur in a timely manner, does the decision making system afford the flexibility required for meaningful LWC participation (Brooks, 2002; Hickey, 2004; World Bank, 2002); and
e) whether decision-making and problem resolution processes are informed by best practices for deliberative democracy (Chambers, 2003; Fischer, 2000).

Additional areas of focus included: the degree to which climate change knowledge is incorporated into plans and strategies; identification of the vulnerabilities of the case

study communities (based on the Preliminary Assessment and identified by the Interviewees); identification of response plans of the LWCs to identified vulnerabilities; and barriers and bridges to responding to climate variability and climate change. Some of the questions covered in the interview related to the degree that water and environmental issues are important to the respondents, what issues are germane in respect of water and the environment in the community, perceptions of climate change and its local effects, vulnerability of the community to climate change, trust in climate change science, how these issues relate to decisions surrounding agriculture, development and the economy including conflicts that have arisen and their resolution or status, the relevance of the LWC for the governance of water resources, the obstacles that LWCs face, and what might improve adaptation to climate change in the community.

The following interviews took place in each province:

Table 1: Interviews by Province

Province	Number of Interviews
Alberta	31
Saskatchewan	43
Manitoba	15
Other	1
Total	90

1.8 The structure of the report

The report on our research findings which follows (in chapters 2, 3 and 4) provides reports for the institutional arrangements, “Provincial Models,” which characterize LWC activities in each Prairie Province. This is followed by an integrative discussion in Chapter 5 which provides a conclusion and integrative discussion.

2. Alberta

2.1 Intro

This chapter will introduce the Alberta governance model for Watershed Planning and Advisory Councils ("WPACS") and water, provide the mandate, structure and governance challenges of WPACs, an overview of their finances, and recount the participation of First Nations in WPACs. Some of the key themes arising from the interviews will be discussed: politics and economics, implementation of WPACs activities, and then finally a synthesis will be made of the future of WPACs.

2.2 Provincial governance model

A purported goal of the Alberta government's water governance and management strategy , referred to as the Water for Life Strategy (2003), has been to foster the creation of local (watershed-based) organizations and to incorporate their advice within the policy making process. However, as the discussion provided below demonstrates, the local watershed-based organizations have limited mandates and are restricted to an advisory role. The activities of these local groups are nested within a provincial regulatory framework which grants substantive decision making authority to branches of executive government, primarily the provincial ministry of Environment and Sustainable Resource Development (ESRD).

Most of Alberta's legislation relating to water reflects either the explicit or implicit purpose of balancing competing goals of promoting environmentally sustainable practices and encouraging economic development (see Alberta's Water Act (2000), Alberta Land Stewardship Act (2009), Energy Resources Conservation Act (2009), and the Environmental Protection and Enhancement Act (2000)). The Environmental Protection and Enhancement Act (EPEA) acknowledges "the need for Alberta's economic growth and prosperity [to occur] in an environmentally responsible manner and the need to integrate environmental protection and economic decisions in the earliest stages of planning" (EPEA, 2000:s. 2(b)).

Alberta's Water Act focuses on water usage and planning under the dual purview of environmental and economic goals. The Act states that its purpose is to:

> Support and promote the conservation and management of water, including the wise allocation and use of water, while recognizing:
>
> a) The need to manage and conserve water resources to sustain our environment and high quality of life in the present and in the future ;
> b) The need for Alberta's economic growth and prosperity;
> c) The need for an integrated approach and comprehensive, flexible administration and management systems based on sound planning, regulatory actions and market forces;
> d) The shared responsibility of all residents of Alberta for the conservation and wise use of water and their role in providing

advice with respect to water management planning and decision-making;

e) The importance of working cooperatively with the governments and other jurisdictions with respect to trans-boundary [sic] water management;

f) The important role of comprehensive and responsive action in administering this Act. (s.2)

Alberta's Water Act requires the development of a provincial planning framework and codifies a water rights regime. The Act creates a linkage between law, policy and action by directing the development of water management plans that employ an integrated approach (s.7). As indicated in several of the bullet points provided above, the Act calls for an integrated approach to water governance and management. This is reflected in the Act's creation of a comprehensive policy framework -- *Alberta's Water for Life Strategy*.

The water rights regime codified in the Water Act determines how use rights are obtained for both surface and groundwater (see s.19, s.21, s.31, s.46, s.52, and s.56). Because the Act deals with both water planning and water rights, it has the effect of simultaneously providing for integrated watershed management planning as well as providing limitations to water management decision-making through a complex water rights prioritization system.

Alberta's water legislation aligns to the principle of encouraging economic development, while promoting environmentally sustainable practices (Alberta Water Act, 2000). As a result, a suite of market and regulatory instruments governs the property interest in Alberta's water. The Alberta Environmental Protection and Enhancement Act sets one of its purposes in s. 2(b) as acknowledging, "the need for Alberta's economic growth and prosperity in an environmentally responsible manner and the need to integrate environmental protection and economic decisions in the earliest stages of planning." These sentiments also appear in the Alberta Land Stewardship Act. Alberta's Water Act focuses on **water** usage and planning and legislates the priority system relating to surface and ground water as a first in time, first in right scheme (ss. 19, 21, 31, 46, 52 and 56). The Alberta Irrigation Projects Association (AIPA) has declared that human use of water will take priority over irrigation licenses (regardless of legal priority) (AIPA, 2010), however, this has never been put to the test. The following table outlines the "principles" of water governance in Alberta. Alberta states that the purpose of its water legislation is, "to support and promote the conservation and management of water, balanced with the need to manage and conserve water resources to sustain a healthy environment and support Alberta's economic growth and prosperity (s. 2 Water Act 2000). Because transfers of water interests are allowed (a water market has been created), this legislation has been described herein as predominately valuing and supporting the, "most beneficial use" of water.

Table 2.1 Institutional legal water structures of Alberta

Principle	Description
Principle under which water is managed	Most beneficial use
Allocation of water rights	Statutorily legislated model with some water trading
Priorities	First in time, first in right principles

Water Market	Transfers of water independent of land allowed in study area of SSRB
Water allocation dispute resolution	Alberta Environment to Minister responsible, then court litigation
Potable water accountability	Local providers
Governance Accountability	Environmental Appeal Board hears drinking water disputes
Water price	Regulated by Alberta Utilities Commission

(Water Act, 2000; Hurlbert, 2009)

Alberta water users are all treated the same. Water licenses grant a cap on maximum use, regardless if the user is a municipality or an oil company. The oil company may take water and inject it into deep wells while the municipality returns 80 percent (Querengesser, 2014).

Alberta's Water for Life Strategy

The Water for Life Strategy (2003) identifies three main goals: to ensure that Albertans have access to "safe, secure drinking water," that Alberta's aquatic systems are healthy and that Alberta maintains reliable, quality water supplies for a sustainable economy (Government of Alberta, Environment, 2003:7). Stemming from these goals, the strategy is operationalized through a set of outcome-based objectives. For example, deriving from the goal that Albertans should have "safe, secure drinking water", one outcome is that "Albertans have real-time access to information about drinking water quality in their community" (Ibid:7). The framework for activity based on these objectives is focused in three directions: 1) knowledge and research, 2) partnerships, and 3) water conservation. Activities in each area of focus are classified in terms of their planning horizons: short, medium and long. Responsibility for managing the implementation of the strategy and assessing the achievement of its objectives falls primarily under the purview of Alberta Environment. However, the strategy also calls for the establishment of non-governmental agencies with the capacity to advise government on water matters. These agencies include the Alberta Water Council and several Watershed Planning and Advisory Councils (WPACs).

The Alberta Water Council

The Alberta Water Council was established by the environment ministry in 2007, largely in response to the participation objectives identified in Alberta's Water for Life Strategy. The Water Council's bylaws state that its mandate includes developing recommendations and advice on government policies "to ensure integrated and comprehensive support for effective watershed management systems in Alberta" (Alberta Water Council 2007:Article 1. a).

The Water Council's membership and governance structure, in certain respects, reflect the principles of bottom-up participatory water governance suggested by both the Water for Life Strategy and Integrated Water Resource Management principles. Membership in the Water Council is available to representatives of organizations which have been approved for membership by its thirty-two member Board of Directors. The types of organizations from which members may be selected include:

- industry, including corporations or industry organizations;
- NGOs, with a demonstrated interest in water or water use management in Alberta;
- federal or Aboriginal governance agencies with a water related mandate;

- Government of Alberta and provincial authorities with a mandate that encompasses and interest in water use management in Alberta (AWC 2007: Article III)

The Alberta Water Council's bylaws stipulate that each organization represented on the council is expected to contribute value in terms of its level of participation and engagement "which may include money, property and/or services" (AWC 2007:Article 3.08).

The principal activity of the Alberta Water Council has been to review the effectiveness of the Water for Life Strategy. It has participated in two such reviews since 2007. In those instances it recommended policy adjustments, some of which were integrated into the strategy's renewal. However, further review has been taken over by Alberta Environment and Sustainable Resource Development and their review in 2012 indicated that most of the short term goals that were originally planned to be complete at the time of review were incomplete and/or falling behind. One notable conclusion of the latest review, which is relevant to this research, is that the establishment of the Watershed Planning and Advisory Councils (WPACs) was one of the strategy's priorities which was successfully being met.

Both the water council and the WPACs were provided with the operational funding and technical support required to get them established and to assist them in meeting a specific list of objectives. In the case of the Water Council, the principal objectives were to provide assessments of the performance of the Water for Life Strategy and to help establish WPACs. The WPACs were assigned the tasks of producing assessments of conditions in their respective watersheds and producing plans to address watershed issues (a form of source water protection plans). As will be discussed later in this report, now that the initial set of objectives have been met, it is unclear whether the government will continue to fund these organizations. Indeed, both the Alberta Water Council and the WPACs have been encouraged since their inception to seek funding sources independent of the provincial government.

The fact that the roles of the Alberta Water Council and the WPACs are deemed *advisory only* prompts questions about the degree to which local, decentralized decision making is actually in operation within Alberta's water governance framework. Notwithstanding its establishment of these organizations, the Alberta government does not have a statutory duty to take their advice or continue to fund their operations. That being said, the legitimacy provided to the Water Council and the WPACs under the Water for Life Strategy suggests the government might encounter political challenges by acting contrary to their advice or leaving them starved for funds. The discussion of research findings presented later this report discuss these issues in greater detail.

Interestingly, the Alberta Water Council's membership bylaws do not specifically refer to Alberta's Watershed Planning and Advisory Councils. There are indeed similarities in the structures of the boards of the WPACs and the Water Council. They each offer membership to organizations representing water use and protection stakeholder communities such as industry and environmental NGOs. The principal differences between the constitution of the Water council board and WPAC boards is that

WPAC bylaws reserve seats for representatives from municipal government and individuals. The Alberta Water Council's Bylaws do not require representation from municipalities or by individuals. The Alberta Water Council lists the WPACs as "partners" along with Watershed Stewardship Groups.

There are no formal arrangements linking the two organizational levels. In other words, the Alberta Water Council does not constitute an umbrella organization for the various WPACs in the province. A question for future research may be whether the integration of local involvement within the water governance process would benefit from reconfiguring the Alberta Water Council as a confederation of the province's WPACs. Given that some of the original objectives of the Alberta Water Council have been met, this sort of arrangement might provide a rationale for ongoing activity on the part of the organization. The WPACs interviewed did not think there was much appetite for this at the moment.

Watershed Planning and Advisory Councils (WPACs)
The principal roles of the Watershed Planning and Advisory Councils (WPACs) are to develop a local organization representing important stakeholder communities and to produce assessments of watershed conditions and integrated watershed management plans for their respective watersheds. At present there are 11 WPACs operating in the province, representing each of Alberta's major watersheds. The assessments and management plans being developed by the WPACs conform to the Water for Life Strategy's goal of adopting "a multi-barrier; source-to-tap approach at all drinking water facilities" and the goal of updating "water quality programs to support source protection information and planning" (Government of Alberta, Environment, 2008:11, Government of Alberta, Environment, 2003:19). Notwithstanding their official tasks as developers of assessments and management plans, the WPACs take a somewhat broader view of their role and are engaged in a variety of additional activities. They provide water management education at the local level and manage various projects designed to enhance source water protection and the condition of riparian and in-stream ecosystems in their respective watersheds.

WPACs are the principal form of local watershed council (LWC) investigated under the WGCC project for Alberta. The discussion provided below describes key facets their operations in detail. However, local influences and activity in relation to water governance and management extend beyond WPACs, encompassing the province's land use planning system and numerous organizations located in civil society at the watershed and provincial levels.

Alberta Land use framework advisory councils
In 2008, the Alberta government launched the Alberta Land Use Framework (ALUF), a land use planning system. The ALUF reflects principles of bottom up governance contained in Alberta's water governance model (Water for Life Strategy). The ALUF divides the province into seven land use planning regions. Each region has a local advisory council (Government of Alberta, 2008b). While the implications of land use and development on the province's water resources fall under the purview of ALUF, there are no formal linkages between the regional advisory committees established under the ALUF and those that operate in association with the WPACs established under the Water for Life Strategy. However, the memberships of

the two advisory systems sometimes overlap. Both systems encourage the participation of municipal governments, industry and agriculture. It is perhaps reasonable to ask how effectively integrated water management can be in Alberta given that the land use and water governance systems operate within two distinct organizational frameworks. While there may be overlap in the organizations and individuals participating in watershed and land use advisory committees, it is unclear as to how the two systems integrate each other's activities into their planning.

The challenges associated with the integration of the activities of the Watershed Planning and Advisory Councils and the land use advisory system were reflected in comments made by a provincial government representative on the Oldman Watershed Council. "That question has to come up with regard to these regional planning exercises under a land use framework. If you are doing that planning then what are the WPACs and the watershed plan supposed to be doing and how do the two interact" (OW12: 20).

According to another respondent, the question has been answered – the land use framework is far more influential than the WPACs. "…as I said the fact that whatever advisory [role] they [WPACs] might have had they have been completely subsumed under the Land Use Framework" (AW9: 4).

Additional watershed and conservation organizations

The establishment of WPACs sometimes occurred through the re-labelling and re-mandating of pre-existing local watershed organizations. For example, there were precursor organizations operating in association with the Oldman River that were absorbed by the Oldman Watershed Council (which is a WPAC) (see OW13:5). However, not all of the pre-existing water related NGOs operating at the time were formally incorporated into WPACs. There are tributary watersheds associated with the larger Oldman River watershed for which there are NGOs that continue to operate independently from the Oldman Watershed Council. The bylaws of the Oldman Watershed provide seats for individuals representing these groups, but groups do not always take advantage of the opportunity.

The field research conducted in association with this project demonstrates that there are many volunteer organizations in Alberta with interests in source water and riparian ecosystem protection and water management issues. There were two dozen such groups identified in the interviews for the two Alberta watersheds we studied.[1]

These organizations include groups which fashion themselves as "friends" or conservation stewards of a particular watershed or stream as well as groups with a broader environmental missions that include water.

In some instances members of these groups are also active in their respective WPACs. Indeed, as noted previously, some of these groups provided an organizational base from which WPACs were subsequently launched. There are numerous examples provided in the WGCC interviews indicating there is considerable cooperation between local groups and WPACs, including the sharing of information and mutual promotion (AW5:2; AW7:2; AW8:1,2; OW9:9,19; OW17:4). However, this is not always the case. There are instances in which there is very little interaction between a local group and the WPAC (OW10:15,16). And, there was one instance in which a local conservation group remained intentionally detached from the activities of the WPAC. Comments provided later in this report indicate that there is sometimes competition between WPACs and other local groups for funding available through various government programs.

Other agencies

Two additional agency categories, irrigation associations and municipalities, are heavily involved in water use and management in the province. Both municipal governments and irrigators appear to be well represented in the Oldman Watershed Planning and Advisory Council. Irrigation is not as significant an activity in the Athabasca watershed, but there is representation on the Athabasca Watershed Council for general agriculture as well as municipal governments.

A table of the organizations involved in water follows.

Table 2.2 Water Institutions in Alberta

PROVINCE OF ALBERTA:	
Alberta Environment and Sustaina-	Water allocations; licensing; oversees municipal treatment of drinking water and wastewater; watershed management in partnership with watershed groups, planning, monitoring and protection of water quantity and quality in surface and ground water systems

[1] The organizations based in civil society with an interest in water governance and environmental protection which were mentioned by interview respondents include the following local, provincial and national organizations as well as various projects which were managed by local groups (brackets indicate associated interviews): Alberta Conservation Association (AW9:11), Alberta Stewardship Network, Castle Crown Wilderness Association (OW3, OW16), Central Athabasca Stewardship Society (AW5), Chinook Area Land Users Association. (OW5), Community Riparian Program (OW10), Cows and Fish, Crooked Creek Conservancy Society (AW9, AW10), Crow's Nest Conservation Society, Drywood Yarrow Conservation Watershed, Ducks Unlimited (OW16), Jasper Environmental Association (AW4), Keepers of the Athabasca (AW7), Lac La Nonne Enhancement Protection Association. (AW6), Lee Creek Watershed Group, Livingstone Landowners, Mighty Peace Watershed Alliance (AW1), Oldman Dam Environmental Advisory Committee (OW13), Oldman South Saskatchewan Basin Advisory Committee (OW13) (not the OWC, this was a group evaluating allocations), Oldman Water Quality Initiative (OW13), OWC rural teams and urban teams – sub groups of the OWC (WPAC), Peigan Friends Along the River (Oldman), (OW4), Sierra Club (OW16), Trout Unlimited, Water's Edge Resource Group (AW8), Waterton Watershed Group, Yellowstone to Yukon (OW16)

ble Resource Development (AESRD) (AESRD, n.d.)	the environment. This entity is responsible for the provincial policies regarding climate change.
Alberta Health	Protection of public health (e.g. drinking water, wastewater management); decentralized authority to Regional Health Authorities.
Alberta Agriculture	Irrigation, drought management, encourages adoption of Agricultural BMPS to protect water supplies from agricultural contamination, assistance for on-farm agricultural and domestic water supplies.
Municipal Districts	Pincher Creek, Taber, and Lethbridge are all rural municipalities incorporated as municipal districts in the study region. Created by provincial statute with delegated authority.
Special Areas Board	A board created in 1938 by the amalgamation of 34 municipalities and improvement districts, eliminating local government and vesting legal and governmental control in the board.
Extreme Events	
Alberta Emergency Management Agency	Coordinates, collaborates, and cooperates with all organizations in prevention, preparedness and response to disasters
Alberta Drought Management Committee (ADMC)	This committee (which includes representative of Alberta Agriculture, Environment, Alberta Financial Services Corporation and Association of Municipal Districts) monitors, plans for, and alerts in relation to drought conditions; this committee focuses on reporting, monitoring and response actions.
GOVERNMENT OF CANADA	
Environment Canada	Surveys and monitors water quality and quantity, trans-boundary flow regulation, enforcement and protection of the aquatic environment, water and climate research. Environment Canada and provincial ministers of the environment set the *Canadian Environmental Quality Guidelines*. (Guidelines pertinent to water include limits established for the protection of aquatic ecosystems, municipal uses of water (community supplies), recreational uses of water, and agricultural uses of water (Canadian Council of Ministers of the Environment, or CCME). Leads the Prairie Provinces Water Board.
Health Canada	Sets Guidelines for Canadian Drinking Water in partnership with provinces. Sets health-based standards for materials in contact with drinking water, assists First Nations with drinking water safety on their lands, and provides drinking water guidance to other departments, governments and citizens. Regulates the manufacture and sale of pesticides in the *Pest Control Products Act.* Co-leads the *Canadian Environmental Protection Act* with Environment Canada.
Agriculture Canada	Encourages adoption of agricultural Best Management Practices (BMPs) to protect water from agricultural contamination.
Natural Resources Canada	Ground water mapping and monitoring, water and climate research. Responsible for climate programs and activities with Environment Canada (e.g. lead for Canada's now defunct *Climate Change Secretariat.*)
Fisheries and Oceans	Responsible for the protections, management and control of inland and marine fisheries, conservation, protection and restoration of fish and fish habitat, prevention and response to pollution, and navigation. (Government of Canada, 2013)
Extreme Events	
Public Safety Canada	Responsible for disaster planning, recovery and response
CO-ORDINATING WATER MANAGEMENT INSTITUTIONS	
Prairie Provinces Water Board	Federal-Provincial Board to manage inter-jurisdictional water issues in the Prairie Provinces (Alberta, Saskatchewan, and Manitoba). Environment Canada, Agriculture Canada – PFRA, Alberta Environment, Saskatchewan Watershed Authority, Manitoba Water Stewardship. The board address issues related to inter-provincial water issues (allocations, flows, water quality)
Watershed Advisory Councils and Boards	A variety of watershed councils and groups exist in each province. The key basis is water management by landscape boundary (defined as a watershed for surface water and an aquifer for ground water). Watershed groups involve all water users, local government, provincial and federal government, each working to identify and address water management issues unique to each watershed.
Irrigation Districts	Irrigation Districts in the SSRB manage water for irrigated agriculture for scale field crops. Because these are large water users, the districts play a key role in water management in the SSRB, and work in concert with provincial agencies. Irrigation in the SSRB accounts for 90% of the consumptive water used in the SSRB.
LOCAL ORGANIZATIONS	

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Watershed Advisory Committees	The key basis is water management by landscape boundary (defined as a watershed for surface water and an aquifer for ground water). Watershed groups involve all water users, local government, provincial and federal government, each working to identify and address water management issues unique to each watershed.
Castle River Watershed Co-op Pincher Creek Watershed Co-op	Member based water allocation system for agricultural purposes
Southwest Alberta Sustainable Community Initiative	Community led group established by the Chamber of Commerce in 2002 focusing on dialogue, information sharing, and long term community sustainability.
Battersea Drain Watershed group	Informal group of ag producers implementing BMPs to help with water quality.
Extreme Events	
Pincher Creek Emergency Management Agency	Agency funded by three municipalities to provide emergency management services in Pincher Creek (fire, rescue, emergency medical services)
PROVINCIAL ORGANIZATIONS	
Alberta Water Council	Non-profit council tasked with implementation of Alberta's Water for Life Strategy and advising Alberta Environment (Andrews, n.d.).
Alberta Irrigation Projects Association	Irrigation Districts incorporated under the Irrigation Districts Act are members of this corporation which seeks to increase knowledge about irrigation and promote progressive water management practices (AIPA, 2014).
Federation of Alberta Naturalists	Lobby group for appreciation and conservation of Alberta's natural environment representing 29 clubs (>3,500 members)
Extreme Events	
Red Cross/Red Crescent Society	Emergency response services; education and advocacy about climate change related disasters
CANADIAN ORGANIZATIONS	
Prairie Adaptation Research Collaborative	Partnership of Canada, Alberta, Saskatchewan and Manitoba government mandated to pursue climate change impacts and adaptation research in the Prairie provinces.
Canadian Water Network	Established by the National Centers of Excellence program, the Network's mandate is to link water researchers with decision-makers.
South Saskatchewan River Basin Advisory Committee	Senior government (Saskatchewan and Alberta) managers involved in ensuring the water basin is managed in a coordinated fashion.
Ducks Unlimited Canada (DUC)	Committed to wetland restoration and preservation of habitat for waterfowl.
Canadian Water and Wastewater Association	Non-profit national body representing common interests of Canada's public sector municipal water and wastewater services/private sector suppliers and partners.
Forum for Leadership on Water	National lobby group funded by Walter and Duncan Gordon Foundation and Royal Bank of Canada
Extreme Events	
Institute for Catastrophic Loss Reduction	A center for multi-disciplinary disaster prevention research and communications established by Canada's property and casualty insurance industry (ICLR, n.d.)

(Adapted from Hurlbert, forthcoming, Fletcher et al., 2013)

In Alberta **climate change** legislation has been in existence since the Climate Change and Emissions Management Act (2003), a precursor for Alberta's Climate Change Strategy (2008). In addition to establishing a carbon offset market and providing consumer rebates in relation to energy efficient products, two programs

were also introduced, a greenhouse gas reporting program and a greenhouse gas reduction program. These relate to the establishment of a greenhouse gas limit. Large emitters are required to reduce their emissions by 12% using an average of 2003 as a baseline. These requirements apply to emitters making up 70% of Alberta's emissions. Alberta's climate change strategy focuses on carbon capture and storage, conservation and energy efficiency and greening energy production; no plans exist in relation to climate change adaptation. There is a stated goal to reduce emission 14% below 2005 levels. Although an **adaptation** strategy was to follow, it has yet to be developed (Alberta Government, 2008). As discussed in chapter 4, Canada has one limitation of GHG emissions for coal fired power generation, but has withdrawn from the Kyoto protocol, and has a confusing position in respect of carbon pricing. Federal regulatory instruments mitigating GHG emissions for coal fired power generation also apply to Alberta (Environment Canada, 2012).

2.3 WPAC mandate, structure and governance challenges

Alberta's 11 Watershed Planning and Advisory Committees (WPACs) are the principal local agencies established under the Water for Life Strategy to provide for decentralized participation by a broad cross section of community stakeholders in water governance and management. The assessment of WPACs which follows is based on the lengthy interviews (generally over one hour each) conducted with WPAC staff, board members, individual members and members of other organizations from within a watershed who have a stake or interest in WPAC related activities. The field work focused on two watersheds and their respective WPACs—the Athabasca River watershed and the Athabasca Watershed Council (11 interviews); the Oldman River Watershed and the Oldman Watershed Council (20 interviews).

The WPAC mandate

In its publication, *Enabling Partnerships, A Framework in Support of Water for Life: Alberta's Strategy for Sustainability* (2004), Alberta Environment and Sustainable Resource Management describes the purpose and core activities of local watershed councils which, in Alberta, are known as Watershed Planning and Advisory Councils (WPACs). The watershed councils are expected to "to engage governments, stakeholders, other partnerships, and the public in watershed assessment and watershed management planning, considering existing land and resource management planning processes and decision-making authorities" (Alberta Environment, 2004:8). According to the Alberta Water Council (2008), the key activities assigned to WPACs are the development of State of the Watershed Reports, holding stakeholder meetings and coordinating the multi-phase processes required to develop integrated watershed management plans with a focus on planning in order to resolve watershed issues (source water protection). The plans are deemed to be "integrated" in that their development involves the integration of input from a broad range of water-use stakeholder sectors, and because they treat water management and conservation as integrated processes involving upstream-downstream relationships, withdrawals of water for various uses and the return of used, often altered, water back into nature (AW3:1).

Most, but not all, of the WPAC board members interviewed acknowledged the constraints of their official mandate. The following comments made by an Athabasca Watershed Council (AWC) board member are representative of WPAC officials we interviewed.

> *So the WPAC has two mandates. The first mandate is the creation of a State of the Watershed report and we are in the middle of that right now. Out of that State of the Watershed report we have to identify items of concern and then come up with an integrated [watershed] management plan [for the Athabasca Basin] to manage those concerns."(AW 3:2) (See also AW10: 5 and OW13:4)*

Advisory role

Officially, WPACs are restricted to an advisory role. While they are assigned to develop watershed reports and integrated watershed management plans (also referred to by some respondents as source water protection plans) through broad community consultation, the government of Alberta is not officially obliged to adopt their recommendations. In other words WPACs lack the capacity to regulate or manage water use and protection on their own authority.

A board member for the Athabasca Watershed Council (a WPAC) described the constraints of the advisory role as follows:

> *You see the group is an advisory group so we are only allowed to advise the provincial government on how they are going to manage the resource. So we don't have any regulatory teeth and we can't make a rule so there is no authority associated with a WPAC. (AW3:6)*

Those comments were echoed by an official with the Oldman Watershed Council, "… we have a very limited role… we actually have no direct authority on anything. We are not a legislative group. All we can do is make [recommendations]" (OW13:4).

The limited role prescribed for WPACs means that while these groups may have advice to give government regarding important watershed management decisions such as use allocations, pollution regulations and riparian and in-stream environmental conservation, they cannot make regulatory decisions in their own right.

Expanded role

Some WPAC participants take a broader view of their role and capacity to influence water governance and management than their official mandate would suggest. These participants have interpreted their consultative activities in association with the development of integrated water protection plans as providing them with a mandate to educate watershed residents on water management and source water protection issues (e.g. AW5:2, OW13:4).

An official with the Oldman Watershed Council described the opportunities for WPACs to influence water management through education, citizen engagement and cooperative activities. This respondent suggested that the OWC's educational and

networking activities could contribute to a critical mass of local knowledge and sentiment on some issues that would be difficult for the provincial government to ignore.

> *There [are three] ways in which we can influence what happens in the watershed [outside of developing source water protection plans]… One is simply education on all sorts of levels, everything from school programs to posters to television ads or any kind of education (pamphlets). The second is recruiting people to participate in best management practices. We work very much with some government agencies to do that but also just with local stewardship groups and the third thing that we can do is ultimately make recommendations to government and ask that they adopt either guidelines or legislation depending on what seems to be appropriate. We are currently in the process of putting together our integrated watershed management plan and out of that will come all of those things: education, recruitment of cooperation in management practices and there will most certainly be recommendations to government. We can't make government adopt those recommendation but my hope is, because this is sort of a shared governance model, that I hope that we recruit enough people to participate in this process that they really will represent broadly the interest of most of the residents in the watershed that essentially government will have to adopt our recommendations because it really does come from the people. (OW13:4)*

Another respondent described how the Oldman Watershed Council provided an important information coordination function. Through its educational activities and local watershed management projects the WPAC supports a network of individuals and organizations with a shared appreciation of the water management issues in their watershed. This respondent indicated that this is why his urban municipality participated actively in the Oldman Watershed Council.

> *…just so that we can understand what is going on in the watershed and have some influence, though not control, but some influence over activities just by…through education and being heard and understanding the other stakeholders within the watershed. And so it is sort of a partnership sort of arrangement….when rural users of the land are concerned about the watershed, we appreciate what their interests are and they can appreciate ours but….and occasionally there may be activities within the watershed that are risky enough or that there is enough concern that it would become political and city council might have a voice and [represent a] public opinion on logging or oil and gas or something like that (OW14:3).*

Later in this report, we will discuss the concerns expressed by some WPAC participants as to whether the limited advisory role prescribed for WPACs constitutes meaningful or effective shared water governance.

WPAC governance

Each of Alberta's 11 Watershed Planning and Advisory Councils (WPACs) operates under its own set of bylaws which define its governance structure and membership eligibility. While the specific details of each WPAC's governance model may differ, all of them strive to incorporate representation from each of the major water use communities (referred to as sectors) within their respective watershed. Accordingly,

Boards of Directors are structured to include representation from the agricultural community (including irrigators), municipal governments and non-agricultural industries, including energy and forestry companies. WPAC boards also allow for representation from the provincial and federal governments and for the participation of interested individuals from the watershed community.

Oldman Watershed Council (OWC)
The Oldman Watershed Council (OWC) was established in 2004. It is one of the two Alberta LWCs/WPACs for which interviews were conducted in support of this project. Under the OWC's bylaws, membership is open to board-approved representatives of organizations working and/or residing in the watershed as well as individual members of the public living in the watershed (OWC 2010:Article1.a,b,c,). Membership is purportedly open to all significant water use constituencies within the watershed. Irrigation agriculture is a prominent water use activity in the watershed. Accordingly, the OWC's bylaws provide for representation by irrigators as well as for producers involved in conventional agriculture. In the case of the Athabasca Watershed Council, which will be described shortly, irrigation agriculture is less prominent in the watershed and there is no seat on the board for irrigators per se but there is representation for agriculture in general. The distribution of the two-year term seats on the 18 member OWC Board of Directors is as follows:

- two seats for representatives chosen by the provincial government
- two seats for representatives chosen by municipal governments
- two seats for representatives chosen by environmental NGOs
- one seat for a representative of the federal government
- one seat for a health sector representative
- one seat for a representative from the commercial/industrial sector
- one seat for an irrigators representative
- one seat for an agricultural producers organization representative
- one seat for a representative from the Piikani First Nation
- one seat for a representative from the Kenai First Nation
- one seat for a representative from academia
- four seats for individual OWC members (OWC 2010:Articles 10, 11, 12)

A member of the OWC Board of Directors described how the organization's bylaws are intended to provide for inclusivity and how various stakeholder groups decide who their representatives will be.

> *We have made a serious attempt for wide representation…so first of all the council itself is open to anybody who lives or works in the watershed. Membership is free. You just have to sign up every year and if you sign up every year, you can vote at the AGM. The Board of Directors is… carefully chosen…we have four members of the community at large and they are elected every two years. That's staggered. So there is basic representation. Anybody can put their name forward for that. We have irrigation. We have cultivation [conventional dryland agriculture]. We have livestock at the table. We have First Nations. We have two provincial government reps… We decided to limit that to two and they work that out amongst themselves in terms of rotation in terms. We have a federal government rep. We have environmental*

> *NGOs…We have a spot for industry which is not filled despite our multiple and frequent requests… and we have municipal governments. So, we have a rep from the City of Lethbridge… and we have someone from Pincher Creek. (OW13:4) (see also OW16)*

Notwithstanding the availability of seats on the board for various sectors, some organizations choose to pass on the opportunity to participate. As indicated in the comments provided above, despite the presence of major food processing operations (which can be major water users) in the Oldman watershed, the OWC lacks a representative from industry. One of our respondents reported that the Municipal District (MD) of Taber "is thinking about revoking their membership with the Oldman Watershed Council. They feel like it's not really doing anything. They feel like…they are not really benefiting in Taber from what the council does" OW16:18, 19). This support was felt by the WPACs to ebb and flow often based on who the municipal counsellors were elected every four years.

The lack of enthusiasm among some agencies for WPAC participation, prompts a number of questions about participation levels and the long-term viability of WPACs. For instance, does the restricted advisory role of WPACs influence participation rates? Would participation be more avidly sought if the WPACs performed official monitoring, regulatory and enforcement functions? Without the capacity to engage in these sorts of functions will participation rates decline further – to the point where WPACs lack legitimacy as representatives of a broad range of watershed stakeholders?

Athabasca Watershed Council (AWC)

The Athabasca Watershed Council (AWC) was established in August 2009 and is the second of the two Alberta-based LWCs studied under this project. The AWC's governance structure is similar to that of the Oldman Watershed Council and the Alberta Water Council in that it includes representation from the major water use communities' resident in the watershed. Its Board of Directors consists of 16 members including the immediate Past President and three representatives from each of the following five water use sectors: government, non-governmental organizations, industry, Aboriginal communities and "other." The government sector includes local, provincial and federal governments. The industry sector includes businesses such as energy and forestry companies as well as agriculture. The "other" category includes individual members of the Council (see AWC website).

A member of the AWC board provided comments about the inclusive nature of the organization which echo the statement on inclusivity provided above in connection with the OWC.

> *There is no one missing. That is just how we integrate our interests. So there is no voice missing at the table. We have oil sands, we have forestry, we have agriculture, municipalities, provincial government, Aboriginal groups and various other voices at the table representing watershed stewardship groups, I guess what I will call the public. No, there are no voices missing. (AW 3:1)*

A WPAC board member, who sits as a representative for the industrial sector, supported the inclusive board structure and explained that the benefits of participation

are bidirectional. He works for a forest products company that produces pulp and discharges effluent into the Athabasca River. He claimed that by participating on the WPAC board his company gains awareness about sustainable water use and protection issues, while at the same time making other WPAC members aware of the water use and protection activities of the forestry sector. One might also infer from his comments that forestry industry participation contributes to that industry's economic sustainability and public image.

> *Well, the forest products sector in Alberta, we are an important player on the landscape so we have to demonstrate that we are engaged, we are active listeners as well as participants. We also want to ensure that if there are management plans coming out of [WPAC] activities, that we are engaged at the ground level -- in helping to formulate those management plans. So we want to protect our interests but at the same time we need to understand what other people's needs and concerns and what the issues are (AW 3:2).*

2.4 WPAC finances

Alberta's WPACs are funded through a combination of annual grants from the provincial government, donations from organizations resident in their respective watersheds and project-based grants available from foundations, corporations and the federal and provincial governments. Individual membership fees are nominal and do not constitute a significant revenue stream.

Notwithstanding the various funding opportunities that might be available to WPACs, the majority of their funding is provided by annual provincial government grants. WPAC officials we interviewed reported that Alberta's 11 WPACs receive approximately $200,000 - $250,000 each in annual provincial grants in support of their core operations (OW1, AW1). According to these respondents, the provincial funding recognizes the role that WPACs play in support of the province's Water for Life Strategy. That being said, the funding arrangement is not permanent. An official with the Athabasca Watershed Council (AWC) official noted that since funding is allocated annually, the councils have no assurance as to how much, if any, money will be available from year to year (AW1). She made a case on behalf of a longer-term funding commitment on the part of the provincial government.

> *The government needs to make long-term funding [for WPACs] a goal. Right now it [WPAC financial planning] is a challenge. The funding is on an annual basis…and people are seeing that it is not reliable. We cannot make plans for three years – or long-term plans…The WPACs are asking government for some kind of assurance for the long-term. They question over the long-term if the government is going to fund them and it is a worry. (AW 1:7)*

As noted above, WPACs are encouraged by the province to develop their own "sustainable" funding sources at the watershed level. The OWC's activities in this regard include asking each municipal government in the watershed to contribute $0.30 per resident. Irrigators are asked to contribute $0.30 for every acre of land they have under irrigation. Not all municipalities or irrigators provide the suggested contributions. (OW16:18, 19)

In order to engage in what they see as an appropriate range of watershed planning and source water protection activities, watershed councils are required to fund raise. Investing time and effort in raising money can detract from their ability to devote time and effort to their central mandate – i.e. watershed stewardship. Another problem associated with the WPAC's quest for non-governmental funding is they are placed in the position of competing for financial resources with other groups with similar goals, such as local water stewardship groups within their respective watersheds.

> *The problem…is that you have watershed stewardship groups out there saying "you don't apply on this [grant] because you have already got government funding and how dare you take our funding away from us." So it puts us in direct competition with the people that we are trying to help… It is a terrible dilemma" (AW2:6). (See also OW20:14)*

An official from the AWC indicated that there is significant energy sector and forestry activity underway in the Athabasca watershed and that these industries have representatives on the AWC's Board of Directors. Given the financial capacity of large pulp companies and the huge energy companies operating in the tar sands, one might assume there are opportunities for the AWC to obtain corporate donations. According to our interviewees, the AWC has not yet received significant corporate support but some participants are hopeful that it may be forthcoming. Indeed, "SUNCOR [a major player in the Oil Sands] has definitely signaled…that there may be funding available for stewardship groups" (AW 2:3). Another AWC official stated that while there were large forestry and oil sands companies operating in the Athabasca watershed, they were not always willing to financially support WPACs, in part, because they were already investing in many other activities in support of the environment (AW3).

There are instances in which local watershed and environmental groups have managed to capture corporate sponsorships for their projects that potentially diminish the capacity of the respective WPAC to obtain a similar level of support from the same companies. For example, the Drywood-Yarrow Conservation Partnership, which operates within the boundaries of the Oldman River watershed, has managed to garner funding support from Shell while the OWC has not (OW9:4).
Notwithstanding how available non-governmental funding support might be, WPAC officials claimed that without government funding the AWC and OWC would cease to exist (AW3, OW1). One WPAC official reported that in the absence of government funding for her council's core operations, the organization "would be totally shut down" (OW1:13). A member of the AWC board described the limitations of funding arrangements and predicted that without government funding for the WPAC's core operations it would fold up in matter of a few weeks.

> *…we have three people on staff and that staffing takes up a great deal of our operational budget, in fact pretty much all of it, so between the staffing and the office and some other residual stuff like our board meetings and everything, there is no money left. So if the province was to stop writing cheques tomorrow, I think it would fold up. I don't think it would stand very long maybe a few weeks at the most and then it would be done.*
> *(AW3:6)*

Implications of financial issues
A significant amount of the time and effort expended by WPAC staff is devoted to fund raising (AW2, OW1). This is said to be necessary due to perceived shortfalls in the amount of annual government funding support relative to the range of activities that WPACs assume are required to effectively operationalize their mandates (see, for example, OW15:15). The need to fund raise is also driven by concern that there is no guarantee that the province will make financial support available over the long-term. As was noted above, the province has been encouraging WPACs to develop alternative funding sources, presumably to reduce the obligation on the government to provide them with permanent financial support (or possibly to encourage local stakeholders to assume greater ownership over water management in their respective watersheds). Staff time devoted to fundraising is conceivably lost to other efforts which are more in line with source water protection and education. In other words it is reasonable to assume that the capacity of WPACs to perform their core functions is diminished by uncertainty over their short and long-term financial prospects.
The lack of access to financial resources has implications for the ability of some local stakeholders to participate in WPAC activities. It also prompts questions about the inordinate influence that donors and sponsors could have over the positions taken by WPAC boards on certain issues.

Finances and participation
The capacity of WPAC board members to afford the expense of participating in meetings and events may have an effect on participation; especially for low income individuals, environmental NGOs and First Nations. Travel in the Athabasca watershed can be especially expensive – the watershed is huge – covering approximately 20% of the province and larger than Scotland by way of comparison (AW8:13).

On the other hand, representatives from government and some industry sectors are not always similarly challenged – their employers tend to consider their participation to be a normal job function. Under the current funding system the WPACs are able to provide some Board members with, what one official described as, a small per diem and some reimbursement for travel expenses (AWC:1). One might reasonably infer that the capacity of WPACs to fund the participation of members from some sectors helps ensure that a plurality of user groups and stakeholders are represented in their deliberations. If cuts in funding support from government were translated into reduced travel assistance for less wealthy participants one might reasonably imagine WPAC Boards becoming dominated by government and industry representatives.
The various subsidiarity watershed and stream-focused NGOs operating within the boundaries of larger watersheds represented by WPACs, rarely receive government funding for their core operations (basic staffing and office expenses). These groups rely on member donations, donations from other organizations and government funding directed at specific project activities. It is conceivable that since these groups manage to survive in the absence of government support for their core operations so too could WPACs. It is conceivable that in the absence of long-term funding support from government or some other reliable revenue stream, WPACs might indeed survive as locally-based volunteer organizations restricted to those activities for which they can garner funding support. Whether they could at the same time retain partici-

pation by the range of organizations and interests reflected in their Board membership bylaws is another matter. The research shows that retaining interest from all relevant groups is sometimes a challenge under the existing system.

Financing with strings attached?

The lack of an independent source of funding requires WPACs to rely on the generosity of others. Some of our respondents indicated that financial dependency limited the capacity of WPACs to take positions that offended their contributors. A government representative on the OWC Board suggested that the heavy reliance on government support encouraged WPACs to pull their punches when critiquing government policy. (We apologize that the transcription is not entirely legible)

> *So to have the government at the table, everybody watches and if we speak against something, they tend to say: no point in doing that because that's where we get the money from. They are not going to support it so what's the point. If we [government] are in support of, it's one of those [places WPACs] will not go there because we will probably get the money and it's not necessarily reflective of their genuine needs. It's a reflection of what they think we are going to or not going to support… (OW17:16)*

An AWC official reported that her WPAC had not yet approached energy or forestry companies for funding support because of the possibility that the money would "come with caveats" (AW: 2). Another AWC member indicated that a resource company had indeed made funds available for at least one special project. However, the lesson one might take from this example is that the goals of corporations and the WPACs are not always well aligned. His comments indicate that while corporate money was provided, it was clearly associated with meeting the corporation's public relations agenda. He added that this incident led to some conflict among WPAC officials. His description of the incident is provided below.

> *There was a canoe brigade last year from Jasper to Hinton or something like that. So they jump in these huge voyageur type canoes and they float down. So one of the industry partners paid for the boat…it is a few thousand dollars to rent this thing and bring it up from Blue River, BC So they paid for it as part of their giving to the WPAC, so an in-kind contribution to the thing. And as part of that the industry sector person wanted a group photo for their needs and the person representing this company was told to do this by their PR people…they gave them all hats and they had the company's name on the hats. Our [WPAC] Executive Director who is a staff member wouldn't put the hat on because it had the company's logo. She said "I am not wearing that" right in front of the industry person who had gone to these lengths and given of her time to do all this stuff. I wasn't there for that event I was somewhere else but I remember hearing about it after and thinking well how are you supposed to work with people and it doesn't matter what you think of the company, it is just a company but you are not going to put their hat on just because you want to make a political point. That is all it boiled down to and for a person in that role I felt it set the group back and it shouldn't have been done that way. It is bad enough it was the Executive Director, but the Board did not act on that. What the Board should have done after is act on that and say to the Executive Director hey if you want to retain your employment as a*

> *non-biased individual representing this watershed group, maybe you had better shelf your personal, political feelings and do the job of an executive (AW3:10,11).*

The development of a predictable long-term revenue stream, independent of government or industry largesse, could reduce the impacts on organizational capacity, participation and outside influence on the activities of Alberta's WPACs. Future research efforts might explore the sorts of mechanisms that could facilitate financial independence for WPACs. Perhaps granting them a degree of fee-for-service regulatory monitoring and/or allocation licensing capacity would accomplish this. There may indeed be a reasonable case to be made in favour of a modest water royalty made available to WPACs for water use monitoring and management within their boundaries. The discussion around the adoption of these sorts of measures would complement questions about the utility of WPACs within Alberta's water governance frame work. For example, will WPACs continue to have a vital long-term role in water governance management and conservation once their source water protection plans have been produced?

2.5 First Nations participation

A member of the AWC maintained the ability of First Nations representatives to participate in WPACs is essential given that social justice issues are increasingly relevant to watershed management (AW2:13-15). And, indeed, WPAC bylaws provide seats for First Nations and other Aboriginal representation on their Boards of Directors. That being said, the WPACs have not always enjoyed a high level of First Nations participation. Respondent AW2 (Ibid.) reported that some First Nations have become "so jaded" in the face of ongoing government intransigence on their water related issues that their participation in the AWC is virtually nil. They have essentially given up on public information processes, consultation and negotiation and, instead, are now taking the province and the federal government to court. It is also reasonable to speculate that First Nations facing budgetary challenges in their efforts to deal with housing, education, health and social welfare problems, as well as drinking water quality issues might lack the human resources or financial capacity to fund their participation on WPAC Boards.

One of our First Nations respondents reported that government promises to involve First Nations in meaningful consultation on a range of issues had resulted in disappointment and distrust on the part of First Nations. He suggested that that historical experience accounted for skepticism and low levels of participation by First Nations in the WPAC process.

> *Because…if you listen, you know, the glib talk from the politicians is always about First Nations involvement/First Nations consultation. Well you would be surprised at the [pathetic] form that First Nations consultation takes. So we are not going to put our necks on the line and say we are doing that in the watershed. It is very, very political. So we have tried to do it another [e.g. via treaty rights and litigation] way but I just don't think they are plugged in [to the WPAC system] right now. (AW10:4)*

The rather lengthy quotation taken from an interview with an AWC Board member which follows, similarly describes the political issues attached to Aboriginal participation in WPAC activities. It also describes the overlap between land use and economic development issues with both Aboriginal and watershed stewardship issues.

> *The whole Aboriginal consultation component gets very confusing and politicized really quickly and even the Aboriginal representatives are dismayed at how the process works sometimes even within their organizations because of issues regarding consultation between the province and the First Nations groups in particular. It gets really, really messy but there are some people in our group that don't want to move ahead because they are afraid that the Aboriginal groups are going to somehow throw up a brick wall because we failed to get the proper consultation and it is a real shame and at the same time if we keep waiting for the consultation issue, that politicized consultation issue, to work itself out because that is kind of what we said all the time so we are trying to find ways around how First Nations deals with the Province of Alberta. If they deal with us and create recommendations through the WPAC the government will view that as consultation and engagement and I can see their point of view because the First Nations want to deal with the province as a political entity and not through this back door consultation process. At the same time they don't want to leave the table because they recognize that it is important but at the same time it is tough to reach agreement sometimes because the reps from the Aboriginal groups are not going to say anything one way or the other because they are not allowed to and actually some of the people that we had as direct representation representing Treaty Eight and Treaty Six they are not really at the table anymore so we have an independent guy out of Slave Lake and he sits because he is there and interested to be there and he cares about the basin and everything. We have the Metis rep out but their politics is a little bit different than the First Nations politics. It just gets very confusing and messy. So shared governance I really, really like it, I think it will work but what everybody has to do is realize that they all need to work together and get out of their silos. That is tough because really some of the stuff is like talking religion or politics in the room. (AW3:8)*

2.6 Complexity and overlap

Decentralized participation in water governance and management activities at the local community and watershed levels is accomplished through a somewhat complex web of organizations and interests involving overlapping spheres of authority, competence and interest. Indeed, the preceding section on Aboriginal involvement in WPACs touched on the issues of overlapping authority. In important respects, the complexity reflects a vigorous interest in water issues and a significant degree of activity among individuals and organizations rooted in both civil society and government. In this sense complexity and overlapping activities constitute signs of a broad-based community interest in water and reflect the reality that water issues affect such a wide range of human activity.

At their inception, WPACs benefited from the fact there were pre-existing organizations and a pool of individuals with an interest in water management active in their

respective watersheds. A member of the OWC Board who was active in previous watershed activities, which involved the engagement of a cross section of civil society and government, reported that the OWC was a beneficiary of that history of engagement.

> *I have also been involved with the Oldman Dam Environmental Advisory Committee. That was a committee that examined the success of the mitigation efforts that went into place on damming and flooding the river valley and from there I was shunted to the Oldman South Saskatchewan Basin Advisory Committee. So that occurred about 2000 and 2001 and at that point we were trying to decide whether we could allocate any more water by license in the basin and the decision was no. So essentially we closed the basin to further allocation. And then…people who served on that group, people who had served previously on the Oldman Water Quality Initiative, so we are dealing with quantity and quality [became active in the new WPAC]. When the province started the Water for Life Strategy and wanted WPACs, people were recruited from both of those groups. Essentially those groups merged to become the Oldman Watershed Council. And the really good thing about that of course was we started as a WPAC with some people with knowledge about water quality and/or water quantity and I think that let us get going a little faster than we might have. (OW13:5) (See also OW12:5)*

Nonetheless, there are challenges associated with complexity and overlap. These include the confusion that arises because networking and communications linkages between organizations are not always strong. Messages don't always make it to all the relevant stakeholders. This prevents some participants from having the input they might wish to have. It can result in wasteful duplication of effort and can be a barrier to wider based joint efforts to meet particular challenges or engage in useful joint projects. And, as noted above, WPACs can find themselves competing with other watershed groups for funding. The following comments reflect the frustration that can accompany system complexity.

> *[There] are just six or eight bodies [WPACs (actually, there are 11)] or people that give a shit and there is no way we can fix it and there are so many government bodies and agencies that ESRD and DFO and the MD have their own [agenda]…everybody has…there are just way too many government Boards and agencies and laws and rules about water that everybody wants a piece of that pie and they have no regard for how they affect the other one. They are just concerned about covering their ass and their department. (OW10:10) (See also OW17:4)*

Most of the WPAC participants we interviewed assumed that providing a communications conduit between groups was one of their more important functions. Some respondents reported on the beneficial outcomes generated by the WPAC performing this sort of information coordination role (OW12:2; OW14: 8,9). That being said, we found some examples in which there was a lack of awareness among some water and environment NGOs about WPAC activities and vice versa (AW8:1, 2; AW10:9; OW9:9). For example, a WPAC Board member reported that the level of activity that WPACs tended to focus on was not always relevant to local stream-based groups. However, notwithstanding their limited mandate, WPACs can play a role in helping other groups negotiate the regulatory and grant application processes.

> *…to be honest. We are working at such a high level that all we can hope to do is encourage the local watershed groups. So this summer, for example, and this is very common, we were out at Lac La Biche doing something, we had just finished a meeting and we were visiting the old mission. This woman found out what I did and started talking to me about the condition of the lake. The lakes here are a real big one, huge, huge issue. There was really nothing I could do for her other than to say call your county. (AW10:9) (See also AW8:1, 2 for a description of how the AWC steered local groups and individuals to relevant agencies and programs such as the PFRA)*

2.7 Politics, economics and the WPACs

Not surprisingly, some respondents reported that WPAC operations are affected by conditions which dominate political and economic life in Alberta. Some WPAC members expressed concern that the province's neoliberal political culture tended to favour development over conservation (AW7:3). One respondent said, "I think we [Albertans] are getting hard, hard right," and that economic and corporate interests often trump environmental sustainability and source water protection (AW2:1). Another WPAC official echoed these comments and suggested that when economic activity was in decline and unemployment on the rise, the environment took a backseat to the economy and development, "any time you have an economic downturn, environmental issues get pushed aside because we have to save the economy" (OW13: 12).

A member of a watershed group representing the interests of tributary watershed within the Athabasca River watershed said,

> *WPACs … [represent] sectors and everybody that has an interest, which means a legal or industrial interest, and basically see the river as an industrial resource, they don't see rivers and water and land and chickadees and things as having intrinsic value. They see them as potential resource for capitalist exploitation (AW7:4)*

Some respondents who were concerned that source water protection and sustainable watershed management were overshadowed by economic interests pointed to two additional challenges which exacerbate the situation. The first challenge being a general lack of public awareness about threats to sustainable water management. As one respondent put it, "ecological literacy is not high in this province" (AW2:1).
The second challenge involves both a lack of awareness among policymakers (one word) about environmental issues and the tendency for that lack of awareness to enable default decisions in favour of development over environmental concerns. This was seen to be the case particularly in relation to the energy sector (including tar sands development). For example, WPAC members who are aware of the possible impacts of climate change on source water quality and quantity might wish to study whether activity in the energy sector should be adjusted accordingly. However, an official with the AWC reported that climate change simply hadn't made it onto the organization's agenda, "climate change hasn't brought any attraction, I'm sorry"

(AW2:7). The WGCC interviews took place prior to the most recent provincial election in Alberta (2012) and one respondent predicted that dealing with sustainability issues including climate change would become increasingly difficult if the opposition Wildrose Alliance defeated the incumbent Progressive Conservatives.

> *Danielle Smith from the Wildrose Party has just come out as being a climate change denier. We don't have a sure science in this she is saying so you know we still have to do a lot more study before we can actually say that is a reality. So if that [party] gets in I am sorry conversation is going to be damn difficult... (AW2:8)*

While the Wildrose Alliance Party did not win the election, they are the province's official opposition. Their leader's position on climate change reflects a widely shared opinion in Alberta. Furthermore, efforts to limit greenhouse gas emissions present uncomfortable prospects for the province's powerful energy sector.

Smoke and mirrors

Notwithstanding the various contributions that WPACs are making to enhance source water management and protection in Alberta, some respondents reported that the WPAC model served to provide the government with a mantle of environmental friendliness while allowing development to proceed on what amounted to a business as usual basis. In other words, some respondents were skeptical as to whether the WPACs had the capacity to affect much of anything of real significance other than to provide the government with artificial legitimacy. A municipal government representative on the AWC Board reported that the lack of attention to the possible impacts of oil sands development amounted to "greenwashing" (AW10:6). Despite the lack of science on potential deleterious effects, the WPACs' source water protection plans appear to give development their seal of approval.

Another respondent suggested that given the lack of authority vested in WPACs some participants were questioning whether the term shared governance could be legitimately applied to their activities. "Well that is the problem…they [the provincial government] are not thinking about shared governance. A lot of people think shared governance is we have to give the watershed stewardship groups more say" (AW3:6). One respondent suggested that in practice, shared water governance in Alberta was really an exercise in government public relations.

> *…having dealt with other issues different than watersheds this [shared governance] is a very good method used by government to whitewash. If you can get a number of people involved in this group and seem to be involving them in the decision making, it makes you, as the government, look good and in reality their decisions are already made and they will only tolerate these groups functioning as long as they are not causing problems for the decisions they have already made. This province has a multitude of examples of that. (AW 4:10)*

Retail politics, policy windows and election cycles

The advice that WPACs might offer to government can be subject to the balancing of interests that often affect the making of public policy. As was noted above in reference to the oil sands and other forms of economic development WPACs may lack the power and influence of other organizations with a stake in policy decisions. A member of the OWC Board who was active in predecessor organization described how

difficult it was to introduce sustainability issues and science-based research into deliberations around the construction of the Oldman
River Dam.

> *The Oldman Environmental Advisory Committee asked the government for a cost-benefit analysis of the Oldman Dam and they refused to do it. Because of course there is a lot of politics involved, there are sectors. There are ridings in which people really, really want some more stuff and if you as a politician promote that, you will get re-elected type of thing …you know (OW13:16)*

Water issues had become increasingly notorious in Canada in the early 2000s. There were a number of infamous drinking water contamination events on First Nations reserves and in Walkerton, Ontario and North Battleford, Saskatchewan. In Alberta, water users and managers were coping with severe drought conditions in the context of rising urban populations. Alberta's Water for Life Strategy was launched at a time when water issues were highly topical, providing what Kingdon (2003) famously referred to as a policy window – a complacency disruption event.

One of our respondents proposed that WPACs were established at a time when water management was a top-of-mind public issue. Considerable effort was put into launching WPACs and completing watershed assessments and management plans. However, with their initial mandates fulfilled and the shifting of public attention to other issues, the role and importance of WPACs in the policy development process had waned. "This flurry of activity that happened in the Alberta Water Council and all this flurry of activity that happened about five years ago, it is just like everything else, it has all dissipated" (AW9:4).

Another respondent reported that despite the fact the same political party has been in office for three decades, the direction of public policy in Alberta was nonetheless influenced by election campaigns and cabinet shuffles. He claimed that new ministers with different agendas can have an effect on priorities and programs. Accordingly, the province's decentralized shared governance initiatives from the early 2000s have been subject to this process.

> *"Here is our new big plan about how we are going to handle water or land uses and unfortunately government is always doing that. As soon as you elect, not even a new party because we haven't had a different party in power here for 30 odd years, but every time the government turns and you get new ministers in they change the way their ministry works. So we have this long history of…pick a ministry, somebody comes in and if its centrally run then the new minister decentralizes it and two years later a new minister is assigned and if its decentralized, and they centralize it. Back and forth, back and forth, to me this is the worst example of government waste that you can come up with. You have all those people in that ministry. They have important jobs. Most of them are dedicated to doing their jobs and they are having to deal with these reorganizations all the time because a new minister comes in and says, "I want things to run this way." And I think that's a horrible, horrible waste and so I have some fear. (OW13:11,12)*

2.8 Implementation: the efficacy of the WPAC model - Conflict

This section of the report deals with the lines of inquiry which ask whether WPAC decisions find their way into government policy and/or action at the watershed and/or provincial level. A principle objective of this research project is to understand what the role of WPACs is in dealing with the effects of climate change on water use, governance and management on the Canadian Prairies. The discussion which follows addresses that objective. It also discusses how a series of additional water governance and management challenges, such as source water quality, pollution, use allocation, droughts and flooding are addressed through WPAC engagement and activity. Clearly, several of these additional challenges have climate change dimensions. This is evident when we consider that climate change is expected to exacerbate the intensity and impacts of variable conditions such as drought and flooding which the region periodically experiences

The interviews suggest that WPACs form a bridge and buffer between what might reasonably be described as the two solitudes that exist in Alberta with respect to environmental issues (including source water protection). On the one hand, there is a segment of the population which grants economic growth and employment opportunities privilege over more rigorous environmental protection (see AW2:1, AW7:3, AW10:6, OW13:12, OW17: 4). Members of this group may indeed profess an affinity for Alberta's natural environment but at the same time view it as something to exploit through unfettered recreational enjoyment and for profit. On the other hand, there is a vigorous environmentalist community in Alberta with dozens of organizations working at the local and provincial levels. These organizations are not infrequently pitted against what they view as environmentally harmful activities associated with the energy and forestry industries, agriculture, recreational and urban development (OW17:20).

The discussion which follows indicates that developing policy around climate change and other environmental concerns which affect water use and management can at times be a difficult uphill battle given the divisions in Alberta on environmental issues. However, as the comments provided by a hydrologist serving the OWC Board indicate, given their local focus and membership, WPACs are uniquely positioned to bridge the environment-development divide. He proposed that they indeed have the capacity to be a fora for effective deliberative democracy. He suggests that their efficacy is due to their being grassroots community-based organizations.

> *Some people will say, "Yeah, I want jobs but only if it doesn't hurt the environment," or some will say, "Yeah, I want the environment but only if it doesn't affect their jobs." They will qualify but they don't know how to manage that qualification…how to make the difference. What is the optimum point? People that are good community people that are good at working with [this contradiction] are the ones that have a good sense of where the optimum point might be and that is usually culturally, socially-based. So if you bring in researchers [policy analysts] from outside of the community who attempt to find the optimum point through studying things …they are not as likely to get it as close to right as the people who live here. (OW17:4)*

Some respondents were less optimistic about the capacity of WPACs to successfully bridge the development-environment divide. As one put it, "It [source water protection and integrated water management] is being set up as a dichotomy between environment and jobs. So you know who wins" (AW10:6).

The quad wars

An illustration of the depth of the cultural divide between environmentalists and other sections of the Alberta community is provided by the challenges that confront environmentalists and officials attempting to regulate off-road vehicle use. Several respondents indicated that outdoor enthusiasts who enjoyed nature from the seat of an all-terrain recreational vehicle (referred to generically as quads) were wreaking havoc with riparian and in-stream ecosystems in Alberta (e.g. AW9:3, 8; AW11:15; OW2:9; OW5:9, 10; OW12:7). Opponents of unregulated *quading* allege that quads tear up the grass, shrubs, soil structure and tree roots that stabilize stream banks. They drive ruts into stream beds and riparian areas and leave streams laden with silt. The effects of unrestricted quading are, in other words, threatening water quality in the provinces' watersheds – an issue well within the purview of WPACs. Indeed, local environmental and watershed stewardship groups are sometimes involved in riparian area restoration projects that include repairing damage done by quading (OW16:1).

For some environmentalists, quading enthusiasts seem to epitomize the high level of ecological illiteracy noted in the comments by respondent AW2 quoted earlier in this report. (AW2:1). Comments provided by a member of the AWC's Board were typical for those respondents concerned about the adverse impacts of quading.

> *This town [Hinton] is a very wealthy town and people recreate in it. Ten years ago you never saw quads (all-terrain vehicles) and that has become a major thing that has to be addressed by the government…I have seen some horror shows with [regard to what] people will do in rivers and creeks with them. It just blows me away. Well first of all how stupid they are and what little regard they have for water – like none. (AW11:15)*

A member of the Chinook Land Users Association [located in the Oldman watershed] reported that despite the appeals of ranchers and environmentalists, and information provided by its own environment ministry staff, the government was unwilling to place effective restrictions on off-road vehicle use. He describes how his local MLA and cabinet ministers backed away from toughening up the legislation despite a petition from "7,000 – 10, 000," area residents asking for greater restrictions (OW5:9, 10). The reluctance to regulate in this area may be attributable to a general antipathy toward red tape and overly zealous environmental regulation within Alberta's political culture and the fact that users of off- road vehicles constitute an intimidating lobby in their own right.

To say feelings run high in relation to off-road vehicle use is probably an understatement. A member of a Crowsnest Pass conservation association and former municipal councillor who was instrumental in having a bylaw passed which limited where quads could legally be driven reported the following:

> *…just before I moved I did get their bylaw changed so that they couldn't run [quads] on streets in town anymore. But they poisoned my dog and slit all the*

> *tires on my car. [They made] threatening phone calls. They were tracked by the RCMP and they did trace the calls and [found] that it was the Quad Squad. I mean they did everything they could to force me out of the Pass. So yeah they have a lot of pull. (OW2:9)*

Given the foregoing, establishing WPACs with a governance structure that provides for broad stakeholder participation and then assuming that this will inexorably lead to a water governance and management consensus would appear to be somewhat Pollyanna-like. That's not to say that progress won't be made, just that it would be a bit much to expect universal harmony any time soon. At least, the Kumbaya moment does not appear to be close at hand with respect to quading. The interviews suggest that it may also be difficult to get agreement around incorporating anthropogenic climate change issues into integrated water management in Alberta.

2.9 Implementation: the efficacy of the WPAC model – Climate Change

Some of our respondents agreed that anthropogenic climate change was a significant threat to source water and traditional water use practices in Alberta. By the same token, climate change skeptics and agnostics can be found on WPAC Boards (where they constitute a small minority) and among watershed residents (where they appear in more significant numbers). The ranchers and farmers we interviewed had personal experience with what they described as climate change which might more accurately be termed variability. And, there was disagreement as to whether recent extreme events were surpassing normal variability.

The comments provided below are from a respondent who assumes that past levels of variability have been exceeded.

> *Well you know that two years ago the spring winters, I call them…so in May and in April when calving season is going on, the ranchers were losing their calves because they were freezing, and so I fully anticipate our spring hasn't come yet. We haven't had one you know, this is extreme weather. This is not normal. I have been an Albertan all my life and I have never had a winter like this. Here there is no snow. You go up to Calgary right now and they are warming. It's isolated and it's bizarre. (OW16:10)*

Conversely, some respondents assume that the climate has always been highly variable and claim that recent experience with droughts and flooding is within that normal range of variability. A rancher from the Oldman watershed said the following:

> *My biggest concern is that they swallow this line of BS [anthropogenic global warming]. Climate has been changing forever and it will continue to change and there is little to nothing mankind can do about it. We can mitigate some of the effects of drought or flood by making sure we have off-stream storage, making sure we have opportunities to repair infrastructure when it's destroyed. For us to affect either precipitation or temperature is bogus and we have wasted a lot of time and money on this BS. It's a crock. And provincially for us to spend two billion dollars on carbon capture is an absolute travesty. Carbon dioxide is necessary for plant growth and human activity. The best*

> *years of this planet have been under much higher carbon dioxide and the carbon dioxide regime has been much higher than what we've done. (OW19:12)*

Skepticism on the part of policymakers and supporters of economic growth is seen as a significant challenge by WPAC participants hoping to address climate change issues. A member of the AWC Board reported, "We can't get the decision makers to even consider climate change. They have a hard enough time getting their heads around the immediate impacts [of extreme weather events]" (AW5:2).
Another respondent offered this assessment of the challenge presented by climate change skepticism.

> *They [skeptical government officials] start from a flatter philosophy that there is no such thing as global climate change or whatever and so yes we need to do something with these troublesome activists, keep them busy and out of our hair and in the most factious, cynical perspective that is what I see multi-stakeholder processes. They are a way to take the energy out of the system. You know take the air out of the balloon. (AW7:1)*

An industrial sector representative on the AWC Board suggested that if climate change was actually happening it was hardly an urgent issue.

> *I don't know enough about climate change to say there is going to be a big issue in the long term. I don't know. There might be, there might not be, I don't know. Glaciers are receding that is a fact so I can see where maybe in 40 or 50 years if you ask me the same question I might change my tune and say yes huge concern. But right now and just looking out I don't see a major concern right now. (AW3:4)*

This respondent added that severe drought as a consequence of climate change (if such a thing were possible), would not necessarily affect the continued operations of the pulp industry. He proposed that additional technology and adaptation strategies could be brought to bear on water shortages.

> *Well we do that all the time anyway [conserve and ration water]. It is just a matter of if we got to the point where we had to go close loop [engage in water recycling] that is just a matter of money and technology. So if we felt it was in our best interest to go closed loop or bring water reduction down to a miniscule level and if we felt that the company could survive doing that we would put the money into doing that. We would adapt and we have a plan going into the future. (AW3:4)*

Confidence in the science around climate change appears to be higher among those respondents who have become familiar with the scientific research. According to one of the respondents who was familiar with the research, climate change threatens major impacts on stream flow levels in Alberta's watersheds.

> *Schindler and Donahue put out a wonderful paper in 2004 or 2005 called "The Impending Water Crisis of Western Prairie Provinces" and what they talked about was what we are going to be looking at with climate change and increased initial flows like a pulse off the glaciers but then nothing after and then increased transformation and evaporation and kind of a little bit so that*

> *is what is sort of heading us down to that lower overall flow issue but as far as weather events I mean they are so unpredictable especially in this area. I think you need to look at obviously with climate change it is not one or two years, you are looking at major trends over many, many years. (AW2:12)*

However, there was at least one apparently well informed WPAC member with a science background who suggested that there may be a certain degree of hyperbole associated with some predictions of the effects of climate change.

> *Glaciers have been retreating for the last 10,000 years. I get that question all the time. Are the glaciers really retreating and what are you going to do about it? They have been retreating for the last 10,000 years and that's how you can live here today. How do you like that part? The glaciers…retreated in the Oldman basin a long time ago. They are gone. They have not formed part of the summertime river flow in this basin for years. We have adapted. We built three dams. They are retreating on the Bow, yes, 4 %. It's not a large proportion. So because this area evolved and evolved with fire as a natural thing, which would wipe out large stands of things and then things would grow back again, by leaving a lot of stuff alone we have messed up some of that balance. (OW17:18)*

Understanding how LWCs incorporate climate change issues into water governance and management is a major objective of this study. The research demonstrates that Alberta's WPACs have not been able to give climate change mitigation and adaptation measures the prominence that some environmentalists and WPAC activists might hope for. At the same time, WPACs appear to be performing a valuable deliberative function. They bring skeptics and the less-skeptical together under the same organizational umbrella. It is clearly preferable for debate about water governance issues to occur within the collegial atmosphere provided by WPACs as opposed to the Wild West conditions associated with the quading debate. And, as noted earlier in this report, WPACs have expanded upon their official role as advisory groups by undertaking various educational activities (e.g. OW8:2, 9; OW10:1) envisions in the Water for Life Strategy. (One interviewee of the WPACs wasn't convinced this was an expansion). For people hoping to move the climate change mitigation and adaptation agenda forward, considerable education needs to occur.

Notwithstanding the potential benefits of educational efforts, the interviews suggest that the introduction of policy measures to reduce greenhouse gas emission or water pollution at the expense of the employment and profitability in the energy and forestry sector will be a significant challenge. The promotion of climate change adaptation measures will be less challenging since these sorts of actions (e.g. dam building and regulated allocations) often reflect measures traditionally employed in Alberta to deal with extreme climate conditions affecting water levels and use patterns.

Pollution

The source water protection issue generating the most comment in the interviews conducted in the Athabasca watershed was not climate change, but rather pollution. Pollution issues noted by respondents included the effects of urban sewage effluent

and livestock waste and the impacts of industry, in particular energy sector development (OW11, OW12:2). The research suggests that there has been considerable effort in Alberta to monitor and mitigate the impacts of urban effluent on ecosystems (e.g. nutrient pollution). Municipal officials, including those who are WPAC Board members, reported on a number of expensive upgrades to municipal wastewater systems intended to improve the quality of surface water (AW6:3; OW14:3, 4; OW20:3, 7). Respondents also reported considerable activity in the area of livestock waste management (AW8:3, AW8:10). Local watershed and environmental groups (e.g. Cows and Fish) as well as WPACs cooperated with environmentally conscious ranchers to limit the access of cattle to streams and riparian areas. Federal and provincial funding has been made available to assist agricultural producers develop environmental farm plans and group plans designed to enhance ecological sustainability (AW8:3). It appears less progress has been made in relation to industrial cattle feeding and the impact of waste produced by intensive livestock operations (cattle feedlots) on surface and groundwater quality. This is particularly topical in the South Saskatchewan River watershed (in which the Oldman River is located) given the high concentration of operations in "feedlot alley" located north of Lethbridge (OW14:3, 4).

Less progress appears to be evident in the area of industrial pollution emanating from the energy sector. Respondents indicated concern over the effects of fracking, seismic testing, abandoned oil and gas wells and oil sands processing. While forestry industry officials appear to have been making technological improvements that limit pollution and unrestricted harvesting, there appears to be much less progress in the energy sector.

There is considerable debate and confusion surrounding the downstream impacts of oil sands processing on the Athabasca watershed. Arguments abound regarding the quality of the data currently available and the need for additional data (AW4:5, 6). Respondents expecting the precautionary principle to apply have been disappointed despite the publication of research that suggests that the oil sands are generating significant downstream pollution and adverse effects on human and ecosystem health (AW2:10, AW7:3). Notwithstanding the efforts of WPACs to develop integrated water management plans, it appears that the plan developed by the AWC will have much immediate impact on oil sands activity. About the best to be expected is that WPACs will call for increased monitoring and assessment of the effects of these activities – with remedial and mitigation measure to supposedly follow sometime in the future.

It is conceivable that the privileged position granted to economic development within Alberta's political culture stands as one of the principal barriers to enhanced environmental protection in the oil sands. At the same time, it may be reasonable to assume that the province lacks the monitoring capacity and data required to initiate greater activity. Regardless of the specific causes, one might reasonably suggest that the lack of monitoring and data facilitates a business as usual approach to energy sector activity.

Monitoring and water data

Interestingly, this does not appear to be viewed as a significant problem in relation to flood protection and conservation measures associated with drought. The province is viewed as having fairly effective strategies available in these areas, notwithstanding the occasional unpredicted extreme event. However, an apparent lack of adequate data and monitoring has been identified as a problem in relation to Alberta's groundwater resources.

A university hydrologist and member of the OWC made the following comments about the lack of sufficient monitoring.

> *I guess the thing that I think our most serious issue right now is monitoring. I am very, very critical and even to the point of feeling cynical about the monitoring that has occurred over the last two or three decades. The locations have changed with time and what is recorded has changed with time and therefore it's very hard for us to identify trends and I am quite unashamed to criticize government on this. They have really fallen short of their responsibilities here. I am afraid that some days I am very cynical and I have some concerns that there is some purpose in this poor monitoring which is basically to be able to detect real problems and try to pretend that there is nothing really going on…I think at a higher level the people who make funding decisions have let us down and created a situation possibly purposefully in which we do not have good background information. (OW13:17)*

The need for groundwater monitoring has been stressed due to the potential impacts of intensive livestock operations, and oil and gas extraction. The need for monitoring is also associated with the current use of groundwater as a source of supply for some urban communities and the possibility that those supplies could be exhausted due to drought or over-exploitation (AW2:10, OW1:8, OW6:23,OW16:17). Indeed, one respondent suggested that groundwater supplies are likely to be viewed as a backup supply in the event of a severe protracted drought that reduced surface water supplies.

Before groundwater can be incorporated into a long range water management plan, it needs to be understood. According to our respondents little is known about the extent of the province's aquifers, the amount of water they contain and their natural recharge rates. This may be particularly important in making decisions about whether groundwater can be employed for high use rate purposes such as irrigation during a surface water supply emergency.

> *I think one thing that's going to happen in the future is we are going to find that we are running out of water and that we think we have loads of groundwater to back us up, but we don't. And that it's going to be contaminated because we aren't monitoring it and not too many extent and actually planning around it. It's basically a free for all. And so that's a huge concern. We just don't know and we are possibly…likely abusing it without realizing it…. We just did this groundwater study and we tried to compile all the existing data to come up with…okay this is what we have. And a lot of government places won't even give us the data. It's like top secret. And so that's a big problem. If we can't use all this data then we're going to go collect more data. It's going to cost more and more and more… (OW1:8)*

No less troubling is the potential effect of inadequate monitoring and a lack of data on the efforts of WPACs to prepare integrated water management plans which can effectively address source water protection issues (AW3:12, AW9:5). If there is a lack of baseline data on the state of the province's water resources, it becomes difficult to determine what the extent of problems requiring legislative or regulatory action might be. A municipal councillor and AWC Board member reported that despite the publication of a handful of studies, virtually no action has been taken by the province to address pollution issues related to oil sands activity. The reluctance to act is apparently linked to the absence of the sort of critical mass of scientific data required to make the case for regulatory action. In the absence of more rigorous monitoring it is unlikely the required data threshold can be met.

> *So there has been no legislation [enacted in response to two studies]. There has been rampant development and it has been proved by the two studies – one was done by federal scientists and then there was another one done provincially. I don't know if you have heard about them… The big one from the feds I forget the name of the top level scientist. They haven't been monitoring. All that money industry has put into regional aquatics monitoring programs. It was not well designed, it was not proving anything, and they don't have data. So we don't even have baseline data so we don't know how much the river has already been altered and no one can keep up with the growth down there [in the Fort McMurray area]. (AW10:6, 7)*

Flooding and drought

Our assessment of the interview data suggests that the challenges presented by flooding and drought are generally not the most urgent problems on the minds of WPAC members and source water protection activists. That finding should be qualified, however, by noting that it applies to flooding and drought which conforms to past experience. Notwithstanding the traditional knowledge of Aboriginal peoples, past experience in the case of Alberta is limited to the approximately 115 year period following significant European settlement. We also note that the interviews took place prior to the record flooding that occurred in southern Alberta in 2013.

This is not to say that respondents did not report adverse consequences in association with flooding and drought. They identified the challenges that flooding and drought present to municipalities, agriculture and industry but also indicated that adaptations have been made and systems are in place to enhance peoples' capacity to cope. For example, while there have been a number of drought years experienced in southern Alberta over the past five decades, the system of dams and reservoirs in place have generally prevented shortages for human uses. Indeed the only drought event, that threatened use rates on a large scale, to occur in the Oldman River watershed since the Second World War was the drought of 2000-2001. The efforts made to conserve water during that drought will be discussed below. And, while drought is typically more of a problem in southern Alberta than in the north, respondents from the WAC noted that low stream flows due to drought are experienced some years (AW5:4, AW8:18). Indeed, some WAC participants were concerned that use rates associated with the pulp and oil sands industries might not be sustainable under severe drought conditions (AW7:14, AW8:18).

Respondents active in the Oldman Watershed Council reported that significant measures have been undertaken to protect municipalities in the watershed from the

impacts of flooding (OW12: 21, OW13:13). The city of Lethbridge, for example, was commended by respondents for its foresight in removing housing and businesses developments from the flood-prone river valley bottom.

> *In my opinion we don't do a good job of planning decisions with regard to activities, development activities within known floodplains. The City of Lethbridge has done a pretty good job in that it decided following a flood event back in the '50s that they weren't going to develop their river valley for residential, commercial, that kind of thing and so that's why, compared to other communities, there is fairly minimal development in the river valley of Lethbridge and that's a good thing but that's not necessarily true for communities outside of Lethbridge and particularly rural communities. Some of that is related to Alberta Environment which hasn't had the resources to necessarily map floodplains to the same standard we use within urban areas and so as a result of that we are now looking at how we can provide something based on satellite imagery or some lesser amount of known data to identify some flood-risk areas. (OW12:21)*

Lethbridge's adaptation efforts were compared to less proactive communities downstream, such as Medicine Hat, which has continued to allow people to live on the flood plain of the South Saskatchewan River. In looking for the benefits that WPACs provide their communities one might identify the educational capacity of the system. Participants in the OWC are aware of the best practices developed by participating municipalities because the process provides a forum for knowledge sharing.

Drought and community-based allocation

As noted above, the drought experienced in the Oldman River watershed and a large surrounding area of the prairies in 2000 and 2001 exceeded the experience of area residents dating back to the late 1940s. While previous droughts may have been more severe in hydrological terms, water use rates in the Oldman River watershed have increased since WWII due to increased irrigation, higher urban populations and greater industrial demand for water. The development of solutions to the water shortages presented by the drought involved the cooperation of all major use sectors ant the community/watershed level. Irrigators, urban municipalities and industry met to discuss how they would allocate the water that remained available in area streams and reservoirs. They developed a voluntary rationing system whereby all sectors would use less water. In 2001, outdoor urban watering was prohibited and irrigation allocations were reduced by about one half the normal allotment. In addition, irrigators were allowed to trade water use rights. Under the system that developed, a farmer with a low value crop might sell some of his allocation to a neighbor with a higher value crop (OW12:14, OW14:8). The remarkable details surrounding the community-based solutions developed in the Oldman watershed in 2001 are provided by a rather lengthy quotation from interview transcript OW12 located in Appendix 6.4 of this report.

The community-made arrangements for water sharing in 2001 actually overrode the allocation provisions available under Alberta's existing water law. According to rules which had been in place since at least the 1950s, water allocation rights are prioritized according to the time an allocation was first awarded. This is referred to as the first in time, first in right principle. Under this principle, if allocations cannot be met

due to a water shortage, whatever water is available should go first to those with the earliest acquired rights. Had the letter of the law been followed, there may have been irrigators able to water their crops while some urban residents lacked tap water.

Community members concluded that depriving anyone of access to the water required to sustain life and sanitation is something that would appear patently absurd in this day and age. And, rather than await direction from the province on how to handle the situation, the community's water users chose to develop their own locally appropriate solution.
It is true that Alberta's WPAC system did not exist in 2001. However the lessons provided by the community-based drought solutions developed in the Oldman watershed demonstrate the value of devolved decision making and local input into water governance and management. If indeed, community institutions were capable of addressing the major challenges presented by the drought of 2001, perhaps we can look to WPACs as organizations with the potential to contribute to similar solutions in the future.

Measuring effectiveness
Perhaps the ultimate test of the effectiveness of WPACs would be to assess whether the water management and source water protection benchmarks established in each of their integrated water management reports have been met at some point in the future. If a few years from today we were to find that WPACs had ceased to exist and very few of their recommendations have been adopted we could have our answer. Such a scenario would undoubtedly prove disappointing for the hundreds of people involved in source water protection and the promotion of sustainable water use policies in Alberta.

> *A lot of people are putting a lot of work into hopefully improving our watershed management but you know it comes down to whether the political will is really there to make the changes that need to happen. The WPACs don't actually have any authority and so we don't really know where all the work with the WPACs is going and the Water Council has made a lot of recommendations to government and very few have gone anywhere. So a lot of people are putting a lot of work into this but if the politicians don't have the will to make changes – I just don't know. [People are already becoming discouraged by the process]. (AW5:3)*

WPAC achievements
Notwithstanding that the challenges confronting WPAC participants, the interviews refer to numerous contributions of WPACs to enhancing sustainable water management in their respective watersheds. Those contributions extend beyond the core functions identified in their official mandates (i.e. watershed assessments and integrated water management plans).

The WPACs have expanded the scope of their mandates (based on the Water for Life Strategy) to include: educational activities promoting sustainable water use and management; coordinating efforts in support of community-based projects that enhance riparian and in-stream ecosystems; and, coordinating the efforts of farmers and ranchers engaged in best water management practices (AW8:1). They provide an important information brokering service (OW20:6). For example, the OWC has made

best practices information available to municipal governments (e.g. storm water management). And, municipalities which have adopted these practices report their success to the WPAC through their representatives.

There are literally dozens of projects being led and/or coordinated by WPAC officials and active members. Members attend home and garden shows to promote xeriscaping (OW8:2). They are involved in riparian recovery initiatives for streams and riparian areas affected by invasive species (OW10:13). It is fair to say that WPACs are an important vehicle for the provision of sustainable water use and conservation education in their respective watersheds (OW8:3).

While we encountered respondents who felt that WPACs were too weak to counter the preferences for development, those who were opposed to the pace of development at least have a seat at the table. A few respondents from environmental NGOs argued that being at the table with corporations potentially responsible for water pollution (e.g. pulp mills and energy companies) produced undesirable pressure to make environmentally inimical compromises. Others held that holding broad based discussions among all relevant stakeholders was integral to effective watershed management.

A member of the AWC Board who works in the pulp industry claimed that the shared governance process was bound to generate disagreements. However, by being at the table with representatives from various sectors with varying points of view, WPAC board members have the opportunity to influence outcomes. They may not get all of what they want, but they will obtain more than they might by not being involved at all.

> *…the forest products sector in Alberta are an important player on the landscape so we have to demonstrate that we are engaged, we are active listeners as well as participants. We also want to ensure that there are management plans that come out of [WPAC] activities so we are engaged at the ground level on helping to formulate those management plans. We want to protect our interests but at the same time we need to understand what other people's needs concerns and issues are….You can go on and on and on and on at meetings saying that "our government sold us down the tar sands pipe and we are in this mess and now they are expecting the WPAC to dig us out of it. And the oil sands don't give a crap. And the government doesn't give a crap. And we are ruining the planet." You have got to get out of that mold and start thinking "well maybe I have to work with the oil sands to help improve things and maybe the oil sands need to work with NGOs to resolve some of their issues." I like to think that the forestry industry, I am biased by the way because I work for them, but we learned our lesson a number of years ago because we were in the same trouble that the oil sands are in right now and we had to change the way that we think and operate and deal with the public and we had become very open, transparent with public regulators ourselves and acknowledged that we do have issues that were resulting in pollution in the river and we had to come up with ideas on how to mitigate those and to improve and we are still in that process but the pulp and paper sector in Alberta I will say the forestry sector as a whole, when we tackle an issue let's say in the Athabasca River, we tackle it as a group. So we are not running*

> *around contradicting each other, we work together in a collective to try and fix the problem… So we all understand that [disagreements will arise] and we all agree on that and you know after a meeting we can all go out for supper with each other and we get along. We are really, really good at leaving our differences at the table and then getting along after, which I think is really, really good. AW3:2, 3, 8, 9)*

2.10 The Future of WPACs

Alberta's WPACs are well on their way to fulfilling their official mandates. Some have completed their state of the watershed reports and integrated water management plans. (At the time we conducted our interviews the AWC and OWC were still in the process of developing their integrated watershed management plans.) The WPACs have voluntarily expanded their role to include a range of educational and programming activities. These are activities which conceivably provide them with a permanent long-term mission. However, there is no guarantee that the funding support WPACs received from the provincial government will extend beyond the period in which they were engaged in their initial official mandates.

We interviewed people in senior positions with the AWC and OWC who maintained that their organizations would cease to operate if provincial government funding were withheld (AW2, OW1). One might challenge their assumptions by referring to the examples provided by the dozens of water-related community-based volunteer organizations currently operating in the watersheds who lack government funding for their core operations. If these organizations can survive, why couldn't WPACs? Perhaps they could, but could they continue to perform vital inter-stakeholder coordination and watershed-wide educational activities without government funding? And, could they retain participation from the range of stakeholder sectors required to be characterized as truly inclusive integrated water management organizations? Another characteristic of the WPAC system which militates against longevity is the WPACs' lack of authority and the lack of meaningful impact on water issues that their lack of authority suggests. We found evidence of a municipality and some local watershed groups who have already determined that involvement in their respective WPACs was unproductive. Their principal objection being that the WPACs had no authority and couldn't get anything significant done. One respondent, who was skeptical as to whether the Alberta government ever intended the shared water governance process to achieve anything of consequence described WPAC participation as "mental masturbation" – an all-round waste of effort (AW7:3,4).

Notwithstanding these challenges, there is evidence to suggest that the integrative functions available through WPACs can play a beneficial role in water governance and management. In the case of the Oldman watershed, we observed how stakeholder communities took a cooperative approach to managing water allocations during a severe drought in 2000 and 2001. While this process occurred outside of the WPAC system (the OWC wasn't established until 2004), the sorts of inter-stakeholder cooperation, communication and education that occurred was eminently consistent with the WPAC governance model. Having a functioning WPAC organization

in place could be of tremendous benefit to communities attempting to deal with similar events in the future.

Events such as drought are expected to increase in frequency and intensity due to climate change. This suggests that the type of cooperative community-based solutions developed for the Oldman River watershed in 2000-2001 could be useful adaptation strategies in the future. It is perhaps reasonable to propose that the institutionalization of that process through the WPAC model could facilitate adaptation and enhance resilience in the face of climate change.

In the case of the Athabasca watershed, there are significant water use, allocation and pollution issues that remain unaddressed. There is a lack of agreement on the utility of the available science and demands for additional research. WPACs can play a role in lobbying for additional research and/or the adoption of measures in response to existing science-based information. While there is skepticism on the part of some WPAC participants about their capacity to influence governments and corporate behavior, it could reasonably be argued that having conservation-minded groups and other community-based stakeholders engaged in an integrated deliberative process could make decision making more transparent and potentially have some beneficial impact on outcomes.

3. Saskatchewan

3.1 Intro

This chapter will provide an overview of Saskatchewan water and watershed advisory committee (WACs)[2] mandate. The mandate, structure and governance challenges of the WACs will be discussed as well as their finances and the participation of First Nations. Some of the themes arising from the interviews will be recounted, namely how these groups have dealt with climate change and extreme weather events, wetland issues and drainage, and property tax issues.

3.2 Provincial governance model

Saskatchewan maintains a centralized approach to water law and policy through the Saskatchewan's Water Security Agency, formerly the Saskatchewan Watershed Authority, but the governance structure has many bottom-up governance characteristics evidenced by public participation in the planning process. Water Security Agency Act, SS 2005, c. W-8.1, formerly the Saskatchewan Watershed Authority Act (2005) is the main piece of legislation pertaining to water management. Within the area of water management, issues such as surface and groundwater permitting, the establishment of reservoir development and special flood hazard areas, and how to lodge complaints regarding unauthorized drainage works are covered within this legislation. The Act also deals with water diversions, limiting the right to divert water to those licensees granted under the Act, grandfathering in any water rights established previously to this legislations enactment. Most importantly, the Act reaffirms the Water Security Agency as the main water governance body in Saskatchewan.

Two other important pieces of legislation further define the water governance arrangement in Saskatchewan, the Watershed Associations Act and the Water Power Act. The Water Power Act (1978) establishes a water power crown corporation by which all provincial water powers are owned (s.5). The creates the water power crown corporation now known as Sask Power, defining Sask Power's powers, for example, in relation to access to provincial water powers and lands required for the delivery of hydroelectric power. The Watershed Associations Act (1978) defines the process of creating a provincial government recognized watershed association. In addition, it defines the relationships among crown works corporations and watershed associations, and watershed associations and municipalities. For example, one of these relationship dimensions is the ability of a watershed association to impose levies on its municipal members.

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[2]In Alberta the nomenclature of the watershed groups is Watershed Planning and Advisory Councils (WPACs). In Saskatchewan, the term "Watershed Advisory Committees" (WACs) has been used. This is further complicated by the existence of recognized Local Watershed Committees (LWCs) within the province that are legislatively created under the Watershed Associations Act (1978). This distinction will be explained in section 3.3. It is the former, the WACs that this research is pertaining to.

Water legislation in Saskatchewan grants the Water Security Agency the management of Saskatchewan's water for economic and efficient use (Water Security Agency Act, SS 2005, c. W-8.1). Saskatchewan has primarily adopted a regulatory approach to the management of the property interest in **water**. The Crown owns all water. Interests in water are issued by way of license with very specific terms and conditions overseen by the Water Security Agency.

The following table is organized around the norms by which water is managed. Saskatchewan's vision of water is that it is "a finite resource requiring a long term perspective managed adaptively through collaborative processes" and that water is important for "supporting economic growth, quality of life, and environmental well-being" (Water Security Agency, 2012). There is one reference to the interests of future generations, but no effective operationalization of this in the legislation.

Table 3.1 Institutional legal water structures of Saskatchewan

Principle	Description
Principle under which water is managed	Common property
Allocation of water rights	Licensed interests allocated by the Water Security Agency on conditions considered appropriate
Priorities	No statutory priority scheme
Water Market	None
Water allocation dispute resolution	Water Appeals Board – internal government entity
Potable water accountability	Local level
Governance Accountability	A Provincial Crown Corporation (The Water Security Agency) is vested with management of water. Its board reports to a Provincial Crown Investment Corporation of the Government.
Water price	Set by municipal water supplier for water and sanitation services.

(Water Security Agency Act, SS 2005, c. W-8.1; Hurlbert, 2009)

The quantity of water allocated under a licence is measured by volume on an annual basis as (dam3 or 1,000 m3) (Halliday et al., 2009). Non-agricultural industrial users are assessed water use charges (highest for surface water from the SSRB and Qu'Appelle basin) (ibid.).

Beyond defining the role of the Saskatchewan Water Security Agency, Sask Power and other water-related agencies, Saskatchewan's water legislation promotes water management, conservation and protection through the Conservation and Development Act (1978) and the Environmental Management and Protection Act, 2010. The Conservation and Development Act contains provisions describing how to establish a conservation and development area. This Act also allows for the development of works on a given area that are deemed necessary to conserve or develop any land or water resources. The Environmental Management and Protection Act deals with issues relating to source water protection, pollution of water resources, and Its main focus is water quality and source water protection. In addition, it contains regulation that discusses subjects such as wastewater treatment and birth control. Source water protection in relation to drinking water treatment is regulated within the Water Regulations (2002).

The first ***Saskatchewan's Safe Drinking Water Strategy*** was a result of the Walkerton, Ontario and North Battleford water outbreaks which resulted in deaths and illness, and Saskatchewan's drinking water contamination events. The province released the *Saskatchewan's Safe Drinking Water Strategy* in 2003, a document that builds on an earlier document known as the *Water Management Framework, 1999*. This strategy's vision is "a sustainable, reliable, safe and clean supply of drinking water that is valued by the citizens of Saskatchewan" (Government of Saskatchewan, Environment, 2003: 2). Under this vision and guided by several principles, this strategy contains 4 key goals:

1) Waterworks systems provide safe, clean and sustainable drinking water.
2) The drinking water regulatory system is clear and effective
3) Source waters are protected now and into the future
4) Citizens and consumers trust and value their drinking water and the operations that produce. Ibid.

The strategy defines the roles and responsibilities with regards to the implementation of the strategy. The goals of this strategy are reviewed within annual reporting produced in the past by the Ministry of Environment and supported by the Ministry of Health's Saskatchewan Disease Control.

Watershed Advisory Councils

Saskatchewan's Safe Drinking Water Strategy (Government of Saskatchewan, 2003) built on the Water Management Framework, 1999 which provided for improvement to the safety of drinking water in Saskatchewan. The Strategy responded to the needs identified in the North Battleford Water Inquiry (O.Connor, 2002). In this strategy the predecessor of the Water Security Agency, Saskatchewan Watershed Authority, was tasked to:

> Work with municipalities, conservation and development authorities, stewardship groups and other interested citizens or groups to develop comprehensive and appropriate watershed management plans, including all aspects of source protection; (Government of Saskatchewan, 2003: 5).

As a result, local watershed councils, or "Watershed Advisory Councils" were formed in the province in order to develop source water protection plans. These are detailed in the next section.

Nomenclature is confusing as some of the WACs have the word "steward" within their names, and some do not. For instance, the South Saskatchewan River Watershed Stewards Inc. is a WAC which is responsible for the South Saskatchewan River Watershed Source Water Protection Plan.

There is also a separate set of water groups called, "Local Watershed Groups" or LWCs within the province are legislatively created under the Watershed Associations Act (1978). Their powers are subject to the Watershed Associations Act (1978) and include:

a) plan, undertake, construct, alter, improve, repair and operation projects in

> which the agencies constituting the association have a common interest;
>
> i) for the purpose of storing, conserving, using, controlling, protecting or developing the water or water resources available to the association; and
>
> ii) for the purpose of conserving, controlling, protecting or developing land, forest recreation resources available to the association. s.21.

Another set of local watershed groups that used to exist in Saskatchewan were the Saskatchewan Network of Watershed Stewards (SNOWS). This network started operating in 2002 and consisted of a network of provincial, federal and NGOs which coordinated and supported watershed stewardship programs in Saskatchewan. Its assets were distributed to local lake stewardship organizations.

25 Year Saskatchewan Water Security Plan. Developed by a process led by the Saskatchewan Watershed Authority and implemented by the newly formed Saskatchewan Water Security Agency, the *25 Year Saskatchewan Water Security Plan* is a comprehensive water strategy. Like Alberta's Water for Life Strategy, it identifies several priority areas and recommends actions to address those priority areas. The plan acknowledges that many water management initiatives may take many years to complete and identifies uncertainty as a significant challenge. But it maintains a 25-year planning horizon to represent long-term water management initiatives and to "ensure consideration of future generations" (Water Security Agency, 2012: 1). This plan marks the first official document produced by the Government of Saskatchewan that uses the terminology "water security".

The development of the plan started with consultation sessions that engaged 174 individuals representing 92 organizations. After a push for a new plan from these consultations, a second round of consultations occurred with 78 individuals representing 56 organizations or governance groups. The plan was published after the formation of the Water Security Agency on October 15, 2012.

The plan contains a vision, 7 principles and 7 goals and 29 action areas. The overall vision of the strategy is of "water supporting economic growth, quality of life and environmental well-being" (Water Security Agency, 2012: 3). It has 7 overarching principles:

1) Long-Term Perspective- Water management decisions will be undertaken within the context of a 25-year time horizon.

2) Water for Future Generations- A sustainable approach to water use will protect the quality and quantity of water now and for the future.

3) Integrated Approach to Management- Water decisions will integrate the multiple objectives and information pertaining to the economic development, ecological, hydrological, human health, and social aspects of water, considering circumstances and needs that may be unique to a watershed or region, to achieve a balanced outcome

4) Partnerships and Participation- The provincial government will facilitate collaboration in the development and implementation of water management decisions.

5) Shared Responsibility- All residents, communities and levels of government share responsibility for the wise use and management of water.

6) Value of Water- Water is essential to life and will be treated as a finite resource that is used efficiently and effectively to best reflect its economic, social, and environmental importance.

7) Continuous Improvement- Water management will be adaptive and supported by sound monitoring, risk assessment, evaluation, research, innovation and best practices. Water Security Agency, 2012: 3.

Guided by these principles, the strategy contains 7 goals under which 29 action areas:

1) Sustainable supplies- Ensure the sustainability of our surface and groundwater supplies.

2) Safe drinking water- Ensure our drinking water is safe by protecting supplies from the source to the tap.

3) Protection of water resources- Ensure water quality and ecosystem functions are sustained.

4) Safe dams-Ensure dams safely meet water supply and management needs.

5) Flood and drought damage reduction- Ensure measures are in place to effectively respond to floods and drought.

6) Adequate data, information and knowledge- Ensure adequate water data, information and knowledge are available to support decision making.

7) Effective governance and engagement- Ensure water management and decision-making processes are coordinated, comprehensive and collaborative. Water Security Agency, 2013: 4.

Provincial Governance Model. Saskatchewan`s water governance arrangement is centralized through the legislatively created Water Security Agency. However, the role of stakeholder engagement in directing the Agency's water security plan and the emphasis of public participation in the LWCs' planning is representative of a bottom-up structure. The agency obtains its mandate through powers that are legislatively defined. The agency then manages The Saskatchewan Water Security Agency mandates that they:

> Lead management of the province's water resources to ensure safe sources for drinking water and reliable water supplies for economic, environmental and social benefits for Saskatchewan people. Saskatchewan Watershed Authority, 2012: 1.

The Water Security Agency maintains an organizational structure which includes: Integrated Water Services, Engineering and Geoscience, Policy and Communications, Corporate Services and Aboriginal Affairs. The Water Security Agency is involved in delivering several services and programs. These include programs relating to drainage approval and licensing and water conservation programs such as toilet rebate programs and flood prevention programs. The Water Security Agency is also responsible for regulating all water control projects, such as reservoirs and dams, within the province. Through its Operations Division, the agency collects information pertaining to environmental flow and water level data from hydrometric gauging stations located throughout the province. The agency also monitors and operates several flood control areas within the province. Relating to water licensing, the

Water Security Agency is responsible for allocating permits for surface water diversions and groundwater investigation. In addition, the multi-stakeholder Water Security Advisory Committee supports the Water Security Agency`s board of directors by evaluating and assessing a range of water security issues. As a result, the Agency centralizes its services and resources but allows for stakeholder engagement in its planning. By centralizing its resources it provides stable resource support, financial, service and information-based, for watershed advisory committees who are performing regional planning that is in turn directed by public engagement.
Table 3.1 lists all of the applicable water institutions.

Table 3.2 Water Institutions in Saskatchewan

PROVINCE OF SASKATCHEWAN	
Saskatchewan (Sk) Water Security Agency	Water allocations, licensing, and watershed management.
Sk Ministry of Health	Protection of public health (e.g. drinking water, wastewater management). Conducts water quality testing services at the Saskatchewan Provincial Laboratory Decentralized authority to Regional Health Authorities.
Sk Ministry of Environment	Oversees municipal treatment of drinking water and wastewater; monitoring and protection of water quantity and quality in surface and ground water systems the environment.
Sk Ministry of Agriculture	Irrigation, drought management, encourages adoption of Agricultural Beneficial Management Practices to protect water supplies from agricultural contamination.
SaskWater	Provincial fee-for-service crown corporation which provides services for water supply sourcing and treatment of water and wastewater for interested Saskatchewan communities.
Sk Crop Insurance Corporation	A treasury board crown corporation responsible for administering Crop Insurance (AgriInsurance), AgriStability.
Municipalities (communities)	Created by provincial statute (Municipalities Act) and delegated authority by the provincial government.
Extreme Events	
Ministry of Government Relations	Responsible for assisting local communities with formulating their disaster plans, coordinating with all disaster and emergency response institutions and coordinating response to extreme events. Oversee the Provincial Disaster Assistance Program. (Government of Saskatchewan, 2012)
Drought and Excess Moisture Committee	Inter-ministry and crown corporation committee exchanging information in relation to events of drought and excess moisture lead my Sk Ministry of Agriculture
GOVERNMENT OF CANADA	
Environment Canada	Surveys and monitors water quality and quantity, trans-boundary flow regulation, enforcement and protection of the aquatic environment, water and climate research. Environment Canada and provincial ministers of the environment set the *Canadian Environmental Quality Guidelines*. (Guidelines pertinent to water include limits established for the protection of aquatic ecosystems, municipal uses of water (community supplies), recreational uses of water, and agricultural uses of water (Canadian Council of Ministers of the Environment, or CCME). Leads the Prairie Provinces Water Board.
Health Canada	Sets Guidelines for Canadian Drinking Water in partnership with provinces. Sets health-based standards for materials in contact with drinking water, assists First Nations with drinking water safety on their lands, and provides drinking water guidance to other departments, governments and citizens. Regulates the manufacture and sale of pesticides in the *Pest Control Products Act.* Co-leads the *Canadian Environmental Protection Act* with Environment Canada.
Agriculture Canada	Encourages adoption of agricultural Best Management Practices (BMPs) to protect water from agricultural contamination; PFRA responsible for applied research and rural water management (water supply/quality, irrigation, climate, drought adaptations).
Natural Resources Canada	Ground water mapping and monitoring, water and climate research. Responsible for climate programs and activities with Environment Canada (e.g. lead for Canada's now defunct *Climate Change Secretariat*.)
Fisheries and Oceans	Responsible for the protections, management and control of inland and marine fisheries, conservation, protection and restoration of fish and fish habitat, prevention and response to pollution, and navigation.
Extreme Events	
Public Safety Canada	Responsible for disaster planning, recovery and response
CO-ORDINATING WATER MANAGEMENT INSTITUTIONS	

Prairie Provinces Water Board	Federal-Provincial Board to manage inter-jurisdictional water issues in the Prairie Provinces (Alberta, Saskatchewan, and Manitoba). Environment Canada, Agriculture Canada – PFRA, Alberta Environment, Saskatchewan Watershed Authority, Manitoba Water Stewardship. The board address issues related to inter-provincial water issues (allocations, flows, water quality)
LOCAL ORGANIZATIONS	
Irrigation Districts	Irrigation Districts in the SSRB manage water for irrigated agriculture. Because these are large water users, the districts play a key role in water management in the SSRB, and work in concert with provincial agencies. Irrigation in the SSRB accounts for 90% of the consumptive water used in the SSRB.
Watershed Advisory Committees	The key basis is water management by landscape boundary (defined as a watershed for surface water and an aquifer for ground water). Watershed groups involve all water users, local government, provincial and federal government, each working to identify and address water management issues unique to each watershed. The Swift Current Creek Watershed Advisory Committee is the local committee.
Wheatland Conservation Area Inc.	Non-profit organization conducting research and extension services for producers in southwest Saskatchewan.
Extreme Events	
Southwest Public Safety Region Inc.	A non-profit organization focusing on mitigation, preparedness, response and recovery to disaster.
Southwest Search and Rescue	Volunteer based organization formed in 2007 to provide search and rescue services.
PROVINCIAL ORGANIZATIONS	
Saskatchewan Eco Network	Affiliated with Canadian Environmental Network (non-profit) lobbying organization of environmentalists.
Saskatchewan River Basin	Non-profit organization to promote stewardship and sustainability of the Sk River Basin
Saskatchewan Network of Watershed Stewards	A network of watershed stewardship groups fostering better communication, coordination, and cooperation amongst each other and promoting interaction and partnerships with other local groups, government, NGOs, and the scientific community.
Saskatchewan Association of Watersheds (SAW)	An association of watershed planning committees providing networking support for committees and assistance.
Saskatchewan Association of Rural Water Pipelines, Inc.	Provides practical service to individual pipeline groups, acts as one voice for such groups, and collaborates with other organizations in relation to rural water pipelines.
Saskatchewan Urban and Rural Municipalities Association	Federation of urban and rural municipalities which advocates policy positions and delivers programs and services to volunteer member municipalities.
Saskatchewan Environmental Society Inc.	Advocates for the supported sustainable living and sustainable resource use in Saskatchewan.
Saskatchewan Irrigation Producers Association	Represents the interests of irrigation in Saskatchewan.
Nature Saskatchewan	A group striving to protect Saskatchewan's natural ecosystem.
Extreme Events	
Red Cross/Red Crescent Society	Emergency response services; education and advocacy about climate change related disasters
CANADIAN ORGANIZATIONS	
Prairie Adaptation Research Collaborative	Partnership of Canada, Alberta, Saskatchewan and Manitoba government mandated to pursue climate change impacts and adaptation research in the Prairie provinces.
Canadian Water Network	Established by the National Centers of Excellence program, the Network's mandate is to link water researchers with decision-makers.
Canadian Water Resources Association (CWRA)	Individuals and organizations from public, private and academic sectors committed to responsible and effective water resource management in Canada
Ducks Unlimited Canada (DUC)	Committed to wetland restoration and preservation of habitat for waterfowl.
Canadian Water and Wastewater Association	Non-profit national body representing common interests of Canada's public sector municipal water and wastewater services/private sector suppliers and partners.
Forum for Leadership on Water	National lobby group funded by Walter and Duncan Gordon Foundation and Royal Bank of Canada

International Institute for Sustainable Development	A Canadian based international public policy research institute that advances sustainable develo0pment through research, communication and engagement (IISD, n.d., C8)
Extreme Events	
Institute for Catastrophic Loss Reduction	A center for multi-disciplinary disaster prevention research and communications established by Canada's property and casualty insurance industry (ICLR, n.d.)

(Adapted from Hurlbert, forthcoming, Fletcher et al., 2012).

Saskatchewan's environmental legislation has undergone a transformation in the past five years. A "Results-based regulation" system has been adopted. The old "command and control" legislation of the past became regarded as a, "Barrier to economic growth and innovation", "Requiring significant resource", and "Not sustainable" (Saskatchewan Ministry of the Environment, 2010). The new model, was legislated with The Environmental Management and Protection Act, 2010, S.S., c. E-10.22 and the passing of an environmental code (still in draft, Saskatchewan Ministry of Environment, n.d.). The new model seeks to deliver environmental protection as a routine business system supported by qualified professionals. Environmental objectives are established and qualified persons are responsible for signoff, design and operation (Ministry of the Environment, 2010). Operators are now accountable to the ministry to achieve objectives, and in turn the ministry is accountable to the public (ibid.).

Saskatchewan land use planning is required in respect of Saskatchewan's Crown lands and provincial forests. Saskatchewan's Ministry of Environment states that land use planning is an ecosystem-based tool that "integrate(s) environmental, social, and economic values, solve(s) all conflict, build(s) common land use objectives, ensure(s) openness and inclusiveness as well as adapt(s) to global, national and local needs and preferences" (Saskatchewan Environment, n.d.). Land use plans exist for special areas like the Great Sand Hills, Nisbet Provincial Forest, and La Ronge (ibid.). The Planning and Development Act, 2007, S.S. 2010 C. N-5.2 provides for community and district community plans but are only required if deemed so by the Minister.

Saskatchewan has had specific policies surrounding climate change and adaptation for the past several years. Saskatchewan's previous New Democrat Party Government issued an Energy and Climate Change Plan which was a cross-governmental vision in response to climate change and the development of a province-wide climate change adaptation strategy which included working with research organizations and supporting critical local research on climate change and adaptation (Government of Saskatchewan, 2007). These goals have been reiterated in the 25 Year Saskatchewan Water Security Plan (2012). Currently, climate legislation relating to mitigation remains on the legislative agenda, but is yet to be proclaimed. As a result, other than a few initiatives such as contributing funding for carbon sequestration and cleaning coal (prior to burning it in a coal plant) there are no substantive climate change regulatory measures (Couture, 2014).

3.3 WAC mandate, structure and governance challenges

The initial development of WACs as a result of Saskatchewan's Safe Drinking Water Strategy envisioned community-based watershed committees which facilitated ongoing stakeholder feedback and participation in Source Water Protection (SaskWater 2002). Elements of integrated water resource management were incorporated so environmental activates, municipal planners, and others could all participate.
There are currently twelve WACs with source water protection plans in the province (WSA, n.d.). Some of the WACS have smaller sub-watershed groups represented within their groups. This allows for stronger representative group within the larger scale watershed while retaining a smaller, more manageable group for local communities. The main mechanisms for the dissemination of regional information and for the development of regional water management plans, in Saskatchewan, are referred to as Source Water Protection Plans. There are these groups who are mainly watershed stewardship groups and also some groups which are Watershed implementation agencies through the Saskatchewan Conservation District Act incorporated for drainage.

The Saskatchewan Association of Watersheds (SAW) is an incorporated provincial umbrella group for the 12 WACs in the province. SAW coordinates all of the watershed groups. WSA started coordinating community-based watershed advisory planning in 2002, however, several of the WACs existed prior to this date. Swift Current Creek Watershed existed prior to this because of concerns in Swift Current and its surrounding area relating to water quality. Moose Jaw River watershed was also preexisting. Some of the WACs have incorporated under the province's non-profit corporation's legislation.

WAC mandate

It is clear the main role of the WACs is in relation to source water protection planning. Each of the twelve in the province are listed on the WSA website in relation to water planning and a clear link is made to their source water protection plan (WSA, n.d.). In relation to the WSA, the WACs have a primary role in relation to source water protection planning. This role is reconfirmed in the 25 year Saskatchewan Water Security Plan.

However, many of the WACs in Saskatchewan formed for a reason other than source water protection planning:

- The Swift Current Creek Watershed Stewards was formed as a result of a water quality issue in 2000. The lagoon wastewater treatment plant accidentally released effluent after a heavy rain. Because of this and a disagreement surrounding it the group was formed to enhance water quality and stream health. The organization is run by local people who volunteer.
- The Lower Souris Watershed committee was formed by a conglomeration of local stakeholders and conservation groups coming together with water issues in 1999. In 1998 there was water shortage, in 1999 the issues surrounded flooding and drainage; however in other years there are issues of flooding. Then in 2004 the local sub-watershed committees, Four Creeks, Pipestone, and Antler Advisory committees were designated as local watershed advisory committees at the request of WSA.

- The MooseJaw River Watershed Stewards was constituted by a group called the Thunder Creek Committee that was already in existence.

The WACS play a significant role in delivering extensive on the ground programming that is described in their Source Water protection plans.

The Assiniboine Watershed Stewardship Association (AWSA) is a good example of an institution that pre-existed the source water protection planning.
In October 1996, the governments of Saskatchewan (Sask Water), Manitoba (Manitoba Conservation) and Canada (Environment Canada) agreed to conduct the Upper Assiniboine River Basin Study. The study was initiated as a result of the 1995 flood and other issues, including drainage and flood control and the disappearance of valuable wetland habitat. In addition, there was uncertainty regarding sustainable water supplies for municipal, industrial, agricultural and recreational purposes and a lack of knowledge regarding the hydrologic and ecological processes and their affects within the watershed. There was also growing concern that the quality of water was deteriorating, and uncertainty existed about appropriate measures for aquifer management and protection. The Upper Assiniboine River Basin Study provided information regarding the Basin's water resources, and information and recommendations on which to base decisions affecting future water management. The study was organized into the Upper Assiniboine River Basin Study in August, 2000 (ASWA, n.d.:n.p).

Following their establishment in October, 2002, the Saskatchewan Watershed Authority began a watershed management and aquifer planning initiative across the province. In 2004, two Watershed Advisory Committees were established within the Assiniboine River Watershed to lead the planning and decision-making process, the Assiniboine River Advisory Committee and the Yorkton Area Aquifers Advisory Committee. The two committees were made up of local representatives from Rural and Urban Municipalities, First Nations, as well as stewardship, agricultural and other interest groups. Their work built upon the Upper Assiniboine River Basin Study as well as extensive groundwater studies conducted in the Yorkton Aquifer Area, summarized in the report entitled, Groundwater Resources in the Yorkton Aquifer Management Plan Area Final Report (Maathuis and Simpson, 2006). Ultimately, these activities lead to the creation of the Assiniboine River Watershed Source Water Protection Plan and the Yorkton Area Aquifers Source Water Protection Plan in August, 2006 (Ibid.).

A bigger picture than the WACs is provided by other institutions. For instance, the Meewasin Valley Authority initiated Partners for the Saskatchewan River Basin as an institution that was established for partners to come together and see issues and respond to them in the water world (S22). This institution works on the bigger picture for the Saskatchewan River basin of which several WACs are involved. Examples of the stated mandates and missions of the WACs are:

WUQWATR is a NGO formed by local residents to support and direct the implementation of the Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan. It became incorporated after the plan was developed. The community members came up with the plan. As the plan was completed, implementation groups were set up to implement the plan (the 82 action plan). WUQWATR

exists for the implementation of Watersheds Source Water Protection Plan*: "Getting To The Source"* This Plan was developed by community members from four watershed advisory committees working with the SWA and the support of technical experts. This plan was completed and published in March 2008, and WUQWATR was created to ensure that the recommendations developed by the community are implemented. WUQWATR also exists to act as a community voice on water issues within the watersheds, and to promote stewardship by individuals, businesses and local communities.

The WUQWATR organization works with all levels of government, with other stewardship groups, and non-governmental and private agencies, to complete the key actions contained in Source Water Protection Plan (SWPP). They want to work with everyone in their watershed area to make sure that every person has a safe and reliable source of drinking water. "Getting to the Source" has been developed by the public. It is a living document intended to develop and evolve as water issues in the watersheds change. The plan was developed over three years of hard work, and they would like to acknowledge the many volunteers that worked to refine the 82 recommendations, and the dedicated members of the technical committee. They would also like to recognize the contributions of many members of the public at local consultation meetings "Getting to the Source" is organized into 10 sections: Each of the recommendations identifies the agencies responsible for implementing the action, and a timeline for each action. (1) Aquifer and Ground Water Management; (2) Communication and Information; (3) Economics; (4) Governance; (5) Legislations and Policy; (6) One-Stop Services; (7) Research; (8) Water Conveyance; (9) Water Management & (10) Water Quality. (WUQWATR, 2008).

The **MJRWS** is dedicated to protecting our watershed and our goal is to educate the public on the impacts human activities have on the water supplies. A newsletter regularly distributed throughout the watershed as well as filed days, workshops and news articles supply information on the various impacts while also providing solutions. Addressing water quantity and quality issues is important for agricultural producers and residents of the City of Moose Jaw and surrounding rural municipalities (MJRWS, n.d: n.p.).
MJRWS along with urban and rural municipalities, water user groups and many environmentally conscious organizations in the Moose Jaw River and Thunder Creek sub-watershed, began work on a Source Water Protection Plan that was released in April 2006 which contains a series of objectives, recommendations and key actions created to protect both surface and groundwater supplies. The key actions identified in the plan, which include both rural and urban water quality and quantity issues, will help to ensure a sustainable and safe water supply now and for future generations (Ibid.).

Since the plan's release, the MJRWS has been actively working on the initiatives and have successfully completed many of the key actions. Some of our accomplishments include:
Agriculture Plastic Recycling Collection, Habitat Stewardship for Species at Risk, Storm Sewer Awareness, Agri-Environmental Group Planning, upstream Efforts, Student Education, well Decommissioning, Hazardous Waste Collection, Native Seeding, Weed Control, and Fish Inventory and Habitat Assessment (Ibid.).

AWSA is an independent, non-profit organization that is dedicated to protecting and enhancing source water in the Assiniboine River Watershed. AWSA became incorporated in 2007. Prior to that it was in establishing and planning stages for the Source Water Protection Plans.

Advisory Role

The WACs do not have any regulatory powers. There is some disagreement on whether this is a good or bad thing. Many believe there is already too much bureaucracy and regulation in the province and do not want another layer of governance applies to an already complex system. Existing provincial regulation and municipal governance structures are more than sufficient, and therefore the watered groups should focus on public education and consultation along with providing advice to local government and senior water governance agencies (R2). One person did think that the current role of WACs should be expanded and should include a taxing and revenue capacity (S18). Another thought that after a period of providing advice only, further powers could be considered (S25).

The source water protection plans are in essence suasive instruments aimed at persuading municipalities, businesses, residents, and government ministries to take actions to facilitate the plan.

Writing source water protection plans involved a great number of stakeholders and involved extensive intensive consultations over several months or years. For instance in respect of the Upper Souris Watershed:

> *This watershed group was formed, was officially incorporated in 2010. But there were basically two years of planning, collaborative planning and meetings with all the different stakeholders for two years previous to incorporating. And who was involved with these initial collaborative meetings was basically anybody within the watershed that represented a group of some sort, so if you represented urban city, town, or rural municipality, Non-Profit Organization (NGO), or industry. They all had chances to get involved, as well as the First Nations and Métis people. So everybody was identified in the beginning as who would be a potential stakeholder. And information was sent out to them about meetings and informing people about meetings. Public notice of public meeting was held. So at these various meetings they discussed different issues concerns within the watershed, around source water, groundwater, and surface water. Everybody kind of have the chance to discuss the issue. That happened for two years. A lot of different varieties were involved that way we tried to get and capture the local people views on what the main issues are. From those meetings information was summarized presented as the main priorities and concerns the watershed and those kind of generate a big list and they had open public house where the public was invited to come give their opinion rate the priorities. That was how the main objectives for the watershed plan was formed, and key actions and stuff like that. Yeah, it was pretty good; all those different groups are represented. I am trying to think of who is*

> *missing I don't think we missed anybody, actually one group was missing, the universities and researchers they weren't sitting around as stakeholders in planning meetings. They basically brought in as technical support on specific issues so such as questions on water quality; the idea to get involved with researchers and scientists were to bring them as expertise to answer questions. They were not involved I don't think as stakeholders, initial stakeholders (S36: 1).*

Some of these groups from specifically for the writing of a source water protection plan; others are conglomerates of pre-existing organizations which come together to write the source water protection plan. An example is the MJRWSs.

MJRWS in 2003-2004 the SWA approached a group called the Thunder Creek Committee. And the Thunder Creek Committee was already a legal existing committee and they expanded the group to include for source water protection purposes, to include water users, interest groups, urban and rural communities along the Moose Jaw River. There was already a representative group in one sub-watershed in the pink area there (see map of Moose Jaw Source Water Protection). Once they got the Thunder Creek Committee on board, then they started incorporating committee members from the Moose Jaw River. A committee then was struck with the initiatives from Saskatchewan Watershed Authority for Source Water Protection after North Battleford. The watershed group was initially the Moose Jaw Creek Association and then it became legal entity in 2006. It became the Moose Jaw River Watershed Stewards (MJRWS). It is incorporated non-profit charity. It is the only charitable Watershed in Saskatchewan. Everyone else is non-profit. It has a charity status. The members got involved purely out of water interest, so they are already part of the Rural Municipality (RM). There is a subcommittee that went around and recruited people. And then the Agro-Environmental Group Plan (AEGP) also was struck-up at the same time with the same borders. And that created some core funding since 2005 in order for the organization to build capacity, hire a person to help go around and create membership. It wasn't a membership initially because they weren't legally incorporated. It was more of a recruitment to come to the table to discuss SWPP.

There was a huge amount of engagement in the planning process for the source protection by urban, rural, irrigators and recreational users in the MJCWSs. Now once the protection plan was formed everybody dropped off. It actually looks like a reverse process. Now the organization is going out again and again trying to recruit people for membership.

In respect of the **USWA** group the level of activity involved in develo0ping the source water protection plan is detailed as follows:

> *"This watershed group was formed, was officially incorporated in 2010. But there were basically two years of planning, collaborative planning and meetings with all the different stakeholders for two years previous to incorporating. And who was involved with these initial collaborative meetings was basically anybody within the watershed that represented a group of some sort, so if [they] represented urban city, town, or rural municipality, NGO, or industry. They all had chances to get involved, as well as the First Nations and*

> *Métis people. So everybody was identified in the beginning as who would be a potential stakeholder. And information was sent out to them about meetings and informing people about meetings. Public notice of public meeting was held. So at these various meetings they discussed different issues concerns within the watershed, around source water, groundwater, and surface water. Everybody kind of [had] the chance to discuss the issue. That happened for two years. A lot of different varieties were involved that way [they] tried to get and capture the local people views on what the main issues are. From those meetings information was summarized presented as the main priorities and concerns the watershed and those kind of generate a big list and they had open public house where the public was invited to come give their opinion rate the priorities. That was how the main objectives for the watershed plan was formed, and key actions and stuff like that* (S36: 1)

> *Yeah, it was pretty good; all those different groups are represented. I am trying to think of who is missing I don't think we missed anybody, actually one group was missing, the universities and researchers they weren't sitting around as stakeholders in planning meetings. They basically brought in as technical support on specific issues so such as questions on water quality; the idea to get involved with researchers and scientists were to bring them as expertise to answer questions. They were not involved I don't think as stakeholders, initial stakeholders (S36: 1).*

Many groups experienced the same dynamics. Incredible activity, engagement, and membership during the months and years of writing source water protection plans, followed by a decline after completion.

Expanded Role

Many of the WACs have a role that is more expansive than that of just creating source water protection plans. One respondent expressed it well:

> *I think it's initially education about potential threats to the watershed and identification of existing problems. And when we get to that a little more strategic planning for the long term in terms of how we lay out the future so that the sustainability of the watershed is taken into account through any changes we make economically. So right now it is identifying problems and doing education. That will be the very first thing. But very quickly looking at strategic planning (S18*).

The South Saskatchewan River Stewards have a mission to, "inspire and empower individuals, groups, communities and industry, and to participate in stewardship initiatives and activities that will protect the beauty, diversity and integrity of the watershed, while encouraging environmentally sustainable economic and cultural activities" (SSRS, n.d.). Their goals then include protecting and preserving water quality and quantity, encouraging watershed residents to make sound environmental choices, and emphasizing the economic importance and value of preserving the natural environment and particularly watercourses, aquifers, riparian areas, and wetlands (ibid.).

The Swift Current Creek Watershed Stewards have a mission of enhancing water quality and stream health by promoting awareness and understanding among water users (Swift Current Creek Watershed, 2014). It has set goals to educate users in the

watershed about issues and impacts affecting water quality, to monitor water quality and riparian health in order to assist in cooperative solutions to water management issues and foster an attitude of individual responsibility toward watershed stewardship (ibid.). This WAC runs programs that advance these goals including a Yellow Fish Road program to help people understand storm drains and their link to rivers, lakes and streams, an invasive plan species control program to curb leafy spurge and dame's rockets which are not good for the watershed. This WAC has also a qualified agrologist who assists agricultural producers in implementing beneficial management practices to reduce the environmental impact of farming activities on the landscape. Activities such as forage seeding, riparian fencing, corral relocations and improved stream crossings can be funded through the federal government's Farm Stewardship Program. The Swift Current Creek Watershed Stewards also partner in research initiatives with the universities in the province.

The Upper Qu'Appelle River and Wascana Creek Watersheds Advisory Committees (Lanigan/Manitou Watershed Advisory Committee, Last Mountain Lake Watershed Advisory Committee, Qu'Appelle River Watershed Advisory Committee, Wascana Creek Watershed Advisory Committee, and Upper Qu'Appelle River and Wascana Creek Technical Committee) formed the "Wascana Upper Qu'Appelle Watershed Association Taking Responsibility" ("WUQWATR"). The source water protection plan prepared in March 2008 is titled, "Getting to the Source, Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan" (Saskatchewan Watershed Authority, 2008) and contains 82 recommendations and actions.

WUQWATR has also an agrologist who coordinates an Agricultural Environmental Group Plan facilitating projects with agricultural producers in the area to improve environmental practices such as farmyard runoff control, protection of riparian areas, variable rate fertilizer technology, and protection of high risk erodible and saline soils, manure storage enhancement etc. (WUQWATR, 2014). WUQWATR also undertakes riparian heal assessment, community education and information on water issues, engages in water planning including providing information on the drafting of the Official Community Plan for the City of Regina, input into the 25 year WSA Strategic plan, and partnering in studies relating to best practices of water management in extreme climate situations by the potash industry.

The Upper Souris Watershed and the Lower Souris River Watershed Advisory Committees each interface with neighbouring jurisdictions. For the Lower Souris River Watershed Advisory committees interface is with people and entities in Manitoba (S35). For the Upper Souris Watershed two people from North Dakota come to watershed advisory committee meetings on a regular basis.

The USWA has undertaken planning for climate change. The watershed group has gone through the planning process for drought and excessive moisture plan. Thus from that plan hopefully there is going to be key things to focus on and to make sure it can handle variable events in an effective way. The plan was officially launched in October 2010. There are some points in the plan about drought preparedness. It is one of the key actions, not so much for flooding but drought. So there is no mention

of flooding in the plan, which is actually missing. It can be incorporated under different action items as a component. It might just be something like the group integrates in conjunction with drought planning

In interviews some respondents saw roles for the WACs in managing water levels. This role wouldn't be the sole, or a major decision maker, but at least contribute an important perspective (S25).

The MJWS has been an umbrella organization like a go-to agency to help direct traffic. If producers, towns and villages have concerns over capacity of water, waste water and excess moisture and if they are trying to build beaver dams, backing up water, culverts and bridges, they communicate it with the watershed group which then directs them to government grants and government agencies that respond appropriately. The watershed group tried to strike up a stakeholder group that is willing to plan for drought and excessive moisture and it holds meetings, create discussion around it, bring technical expertise and/or take certain key action that they feel are priority and also try to apply for funding

WAC Governance

All of the WACs are incorporated under the provincial non-profit corporations act and, in addition, Moose Jaw is a registered charity. Almost all are structured as membership non-profits with municipalities paying significant membership fees. In the case of WUQWATR 51 members pay $25,000 annually.

Finding people to participate in WACs is a challenge. One member stated, "It seems to be hard to get enough interest and enough interested people in your immediate area. By immediate area I mean within 100 or 75 mile radius (S25). Also, many of the members belonged to several water, environment, or municipal organizations. This creates good opportunities for networking amongst these organizations, but raises concerns of member burnout. Interviewees indicated that rural people involved in community activities are often spread quite thin with a lot of time devoted to a variety of organizations.

In the Lower Souris Watershed Committees, members include Villages and RMs, and Towns in the watershed. The Board of Directors are representatives of the four sub-watersheds and a long list of advisors are on the technical committees from the WSA, Ducks Unlimited, Environment Canada, etc. Board members generally serve four to five years. There is some frustration with the lack of participation of urban centers on the Board and within the WAC.

Members of WUQWATR so far have been municipal governments and groups and now individuals have just started to be involved after opportunity for individual membership has been granted. This group is more biased towards municipal representatives, older men, farmers, retired people who come to volunteer. Fewer younger people, few Aboriginal people and fewer urban residents are involved. Effort is being exerted to make this group available for wider membership but people still don't know it exists. The organization tries to promote itself with trade shows, public events, sponsorship and public education.

In MJWS members are RMs and cities. The city of Moose Jaw sometimes is a member. The reason for this lack of involvement from the city of Moose-Jaw probably stems from their high employee turnover. The funding that the watershed group got usually came from the city engineering budget. And city engineering budget has been highly taxed. And in the last two years they have got an environmental committee with some funding attached to it. Now that there is an environmental committee with funding attached to it they are willing to work with the watershed group on membership bases in order to develop projects and develop initiatives in the city. The watershed group does work in the city because it is part of the overall source water protection plan that it needs to implement. It does not do take on larger projects like inner city Blue bin recycling projects or waste management because they may or may not be members.

In the USWA at the annual general meeting public notice is given because technically anybody can come and sit in on and find out the happenings of the group. But as far as voting on an issue is concerned; only a paid member can vote. The USWA is an independent, non-profit organization that has been developed to implement the key action items from the Watershed Protection Plan. Sun Country health region is identified as one of the partners in the group's action plan and USWA has to go to them and ask them how they can work together in this and if they have any resources to put in it. Those types of organizations sit around on the group's technical committee and are engaged to a degree. Thus they did a really good job setting this plan up as far as getting those partners to the table is concerned, so that people know what is going on quickly. Government agencies are not essentially members, so they are partners. So Ministry of Agriculture, Ministry of Environment, Sun Country Health Region, Agriculture Canada they are not paid members but they sit as a technical committee, technical advisors. So they get pulled on specific projects but they do not get to really direct the running up of the organization. But as far as an organization pay membership, it can be involved with direction of the board advisors. But organizations like Saskatchewan Wildlife Federation they are paid members they can sit in the board and help run decisions.

In respect of the AWSA essentially each rural and urban municipality in the area was invited to attend meetings to then become a part of the association. At the time of the study, the AWSA had 38 members, a little more than half are rural municipalities and the other half are urban municipalities' cities, towns, and villages. They had 25 rural municipalities 8 towns, 2 cities and 3 villages, for a total of 38. The board structure is also manageable. There are twelve boards of directors and the watershed association didn't want to get any larger than that, because twelve individuals at the table is time consuming at a meeting. As a result, for the last five years the board structure seems to be working well for size. And as for representation, it is even split half urban and half rural. It is a fair representation for both urban and rural municipalities. There are more RM's congregated around the urban center in Yorkton, where the office is. There are some questions from some more Northern RM's on how they can get representation on the board. The process to get a representation is fair. Advisory committee meetings are held at the annual general meeting and at the advisory committee meetings people can be elected to the board. But those municipalities mentioned above did not put their name forward at recent meetings. And yet

after bringing that concern up there was no step up and did not wanted to come on to the board either.

3.4 WAC Finance

Different WACs have different roles with respect to funding. Some groups actively seek funding through other opportunities, others help smaller groups or sub watershed groups to seek funding. Challenges were expressed about getting funding during extreme weather events and linking funding to person power. By this people meant that sometimes they can obtain funding but then have a hard time attracting a person to work for the lower wages and short term time frame attached to the funding. There was an overarching theme in interviews that it was getting harder and harder to obtain funding for projects.

WACs receive core funding from the Saskatchewan Water Security Agency. Funding is generally enough to employ one staff person. Thereafter, additional funding must be sought through additional programs and funding opportunities. The coordinators for the Agri-environmental group plans are funded through the Growing Forward program of the federal government and related projects. The level of funding that a group is successful in attracting determines the number of staff.
Some interviewees questioned whether "grant chasing" was an appropriate use of their staff resources particularly when relationship between the program objectives and the goals of the stewardship groups do not always align (S18).

In addition to annual financial support, WACs also receive from WSA technical support for the development of source water protection plans that are unique to each watershed and ongoing issues. This technical support relates to many aspects including policy, government, water, infrastructure information and assistance.
Specific examples are:

WUQWATR gets financial support from the province (as detailed above) and it has memberships from the municipal governments. 51 members contribute $25,000.00 annually. But it doesn't get direct support from the federal government financially. It administers some projects, because funding comes on project bases, there is no long term, stable, core funding. Thus it has project funding from the federal government though it is not known how long that is going to last.

MJWS settles membership annually. It typically gets approximately anywhere from $6000 to $15,000 dollars a year in membership give or take the city's participation (the city of Moose Jaw does not always participate.) This means they don't always pay their membership fee. Initially the membership fee was set at about thirty cents per capita. And some RM through in much more than that and sit at the table as board of directors for the last six years. Some RM'S contribute $1500 dollars and some RM's a $100. The watershed group always attempts to get from the city of Moose Jaw a membership fee of about $10,000 dollars. But it consistently gets between $6,000 and $15,000. And if the city of Moose Jaw comes on that almost doubles. The lack of engagement is more evident on small towns, villages and the city of Moose Jaw.

The AWSA relies for all of its projects and its programs on both federal and provincial sources. About 85% of its funding is from federal/provincial funding and the remainder is from local member municipalities. The city of Yorkton is heavily involved in supporting the watershed. When it first started it was offered office base within the city hall to help established the watershed organization. It was also allowed to use all the equipment, the meeting rooms and on top of that it was provided with membership fees as well. At the present the staff membership of this organization has increased from just one person to four in two years. Now it has opened its own office.

According to the coordinator the reason it has strong support is because it was able to do a lot of projects with the municipalities annually,

> *Because they see the value in ourselves and we keep doing the projects. So in the city we have done $175,000 for the projects in 5 years. So for their membership fees it is good bank for a buck. They are bringing projects into our community that is why they are very supportive. (S44: 12)*

Every year it has grown in membership. It started with 24 members and now grew up to 30.

3.5 First Nations participation

WAC respondents are explicit about their desire for First Nations and Metis people to be involved with decision-making, planning processes, and strategic implementation. This desire is particularly evident when watershed boundaries encompass reserve lands (S42: 1). Respondent S42 explained that greater representation would provide a chance to "provide direction and bring forth local issues" (1). Representation is needed for a more robust coordinated development and management approach in WAC decision-making.

Representation patterns emerge that illustrate both the benefits of and challenges to WAC institutions as deliberate civil society groups that include First Nations and Metis peoples. One pattern involves the desire for "diversity at the table" (S45: 17). Challenges of First Nation and Metis participation surround defining and engaging communities.

> *[A]s a whole group they haven't [participated]. We have a seat on the board for them but they haven't filled it. And I guess we should be trying to encourage them to fill it because it does leave a void. (S37: 1).*

> *They did have someone sit there for a while and then I haven't heard anymore. Unfortunately they are not involved. It would have been nice if they were. (S37: 2)*

The challenge of defining communities acts as a barrier for desired diverse decision-making.

> *We have no First Nations in our watershed. I mean there are some First Nations [people] in the land but all leased out, rented out, farmed out. So there are no*

> *First Nation communities so to speak of probably they are the only ones... How do we get them consistently at the table with the membership? (S45: 17).*

Defining communities involves misconceptions about what kind of First Nation representation means. The distinction among forms of representation is important: First Nations and Metis individuals who represent a non-First Nation/Metis community, First Nations and Metis individuals who represent a band, and First Nations and Metis individuals who carry with their participation no representation. A lack of precision with respect to this distinction can presumably lead to tokenism. Terminology used by respondents illustrates the conflation of representation and the expectations from the WAC about that representation.

> *Getting buy in from First Nation is a challenge. Not sure it is a barrier. North Sask has done a good job; other areas can't seem to crack that nut. There are reserves in the south…. On the provincial scale this is the biggest challenge. Wish I knew why it is such a challenge. In some cases they only want to be recognized at the federal government level. They view themselves as separate nations and don't put as much stock in dealing with provincial organizations. (S33 16; authors' emphasis)*

Terminology used by respondents illustrates the conflation of representational expectations. The question remains about what type of representation would satisfy the expectation of representation. Attempts to engage is further problematic because active targeting of rights holder groups, and presumably any specific stakeholder groups, takes resources. A lack of resources provides a barrier to any WAC seeking to widen their active stakeholder or rights holder pool.

> *I have trouble getting in touch with the right person. It seems like you got to find the right person… (S36, 1,2)*

> *Actually we just trying to keep our head above the water, we haven't done anything unfortunately. I know when we started we sent them questioners and tried to get them involved. I wish we could because we are trying to get [a project] going. So far they haven't been involved. (S37: 2)*

The reasons behind a lack of engagement were not explored in the interviews. However, if actively searching to widening the rights holder and stakeholder pool requires resources, it is reasonable that participation requires resources from the participant and the community, if they are representing one. As mentioned with First Nations and Metis participation in Alberta, a suite of community-specific conditions could be restricting this participation. When the form of representation is clear – communities are defined – and representation is active – communities are engaged – there are clear benefits to participation. These benefits involve bridging links between communities and allowing the flow of Traditional Knowledge. Respondent S37 discussed how one board member who is First Nations who contemporaneously represents her band led to greater involvement from members in her community in WAC projects (1). This membership bridging can lead to knowledge bridging.

> *[She] was very prominent in the First Nations' culture and they have a stake in [the land]. Like you know we shouldn't live in the past but we should remember the past. When they come down, they tell us a legend. I am sure you have heard the legends how the valley was formed. They came down and they told us that story. (S37: 2)*

3.6 Complexity and Overlap

This section discusses the inter relationship of WACs and other entities. As in Alberta, participants believed that providing communications between groups was one of their most important functions

3.7 Implementation: the efficacy of the WPAC model – Conflict

The Lower Souris River Watershed group has had a long history since 1998 of dealing with both water scarcity (not getting water from Manitoba) and with water excess. There have been disagreements and conflicts. Blame is sometimes placed on farmers, mines, oil industry, etc. As one interviewee stated:

> *Goals aren't always the same. It took some time to build the trust amongst diverse groups. Once you are there, understand that the oil industry isn't the only industry on the landscape having effect on the environment or the department of highways etc. and salt is the biggest impact on soil (S34: 5).*

3.8 Implementation: the efficacy of the WAC model – Climate Change

This section reports on whether the decisions of the WAC are implemented of whether they find their way into government policy or action at the local, watershed, or provincial level. As an important objective was to understand the role of the WACs in dealing with the effects of climate change on water use, governance and management on the Canadian prairies this theme is pursued here.

Water issues

People in the watersheds studied used water in many ways. Water is used for residential, agricultural, commercial and industrial consumption. Residential consumption includes domestic use and meeting larger municipal needs such as sanitation. Agricultural consumption relates to irrigative and livestock watering. Industrial consumption includes consumption relating to potash mining extraction and energy production such as coal and oil and gas.

For drinking water, people rely on several different sources. The Moose Jaw River Watershed drains towards the Qu'Appelle River. The majority of drinking water, as part of the relatively larger urban residential needs within the watershed, is sourced from the Buffalo Pound Lake and treated in the Buffalo Pound Treatment Plant. Other uses stemming from agricultural needs and the non-potable residential needs

from the majority of rural populations are sourced from groundwater. Non-rural populations who are also relying on groundwater include some of the towns and villages within the watershed. There is one community, Avonlea that relies on surface water. Their water is at the headwaters of the Avonlea Creek which is at the headwaters of the Moose Jaw River. In the Assiniboine Watershed, about 90% of residents rely on groundwater within the watershed.

Some respondents are concerned about water quantity in their area in relation to both surface and groundwater resources. Even though many of the interviewees say there is enough water for all purposes, some are concerned about a shortage of water to satisfy the competing demands of the mining industry in relation to the basic residential needs within their watershed. Since the interviews the WSA has completed water assessments (Kulshreshtha et al., 2012).

Exposure to extreme events mainly drought & flood.

Respondents from the watersheds reported prominent drought and flood events as early as 1974, occurring off and on until the present time and some predicted drought in the coming year (2012). Respondents reported severe and sustained periods of drought and flood, lasting anywhere from one to three seasons. The severity of these events varied throughout watersheds and among respondents' perspectives.

In the Moose Jaw area, drought has been reported as occurring more often than periods of excessive moisture. Starting in the 1980s and most notably during the 2000-2001 period, droughts with high level of severity were observed. Some respondents described how the area has not seen anything like that with the same level of severity. The drought combined with other external factors such as a beef import problem from the United States threatened the financial stability of livestock producers. There were also periods of excessive moisture. The years of 1974, 1995, 2010 and 2011 were noted for their prominence. Beyond droughts the other severe weather events that are seen in this watershed are flooding, hail storm and tornadoes.

Respondents from the Assiniboine Watershed Stewardship Association (AWSA) and watershed area observed that floods occur less often and with less severity than droughts. Recently, there were some floods in 2010 and in 2011, lasting throughout the non-winter seasons. And in 2011 in the Southeast corner of the watershed, excess moisture from heavy spring run-offs were severe, occurring during those two consecutive springs.

Respondents from the Upper Souris Watershed Association (USWA) and watershed area have reported that they have experienced several different types of severe weather events including droughts and floods. Most of the possible extreme weather events that can occur in the area (floods, droughts. high winds, hail storms, etc.) have occurred, including flooding in 2011that affected the entirety of the watershed. While respondents did not report sustained weather events (longer than one year), they did report the severity of these events as being high. These events have caused damage to agricultural production and equipment, urban and rural infrastructure and residential residencies. Showing the climate variability in this area, it was reported that drought preceded and followed flooding in 2011.

In the years when drought was prevalent, there was some severe crop loss across the province.

> The main thing would be the crops, there were crop failures because of the dry conditions and that has tremendous financial impact on the whole province. (S39: 2).

> It really hurt the yield of crops. It made it pretty trying for farmers to continue farming when farmers do not have money to fix all the other businesses. (S40: 3)

The area has not seen anything like that with the same level of severity. The drought combined with a beef import problem from the United States caused a lot of livestock producers to go out of business. They sold their cattle and just left the business.

I. Drought

Respondents observed that Saskatchewan has had severe droughts on and off since the 1980's. They explained that they had experienced major crop loss and other negative drought effects. While some respondents remembered droughts beginning in the 1980's, some mentioned drought occurring in late 1990's and early 2000's and explained that these extreme climate events seriously lowered the water table over a large time-span and leading to sustained and severe crop loss across the province. In response, interviewees described how livestock producers sold their cattle and were consequently pushed out of their agricultural businesses. This in turn had substantial negative impacts on the area's agricultural economy. In addition, there was also some soil erosion due to the interaction of drought and high wind in some areas. The interaction of drought and high winds, respondents reported, led to grass fires in northern areas such as in the RM of McKillop.

II. Flooding

Respondents described how flooding affected them through property and infrastructural damage and how the agricultural economy was made the most vulnerable as a result of periods of flooding. Other vulnerability stemmed from resource and planning issues. Between 2010 and 2011 record amounts of moisture caused spring melting/run off contributing to summers when many acres of agricultural lands were submerged, rendering those acres unfarmable. In addition, homes were destroyed. For example, a lot of property damage occurred in towns and villages, notably in the village of Roche Percee. Lake shorelines were damaged along with shore-based recreational properties. In addition, a lot of the changes that were made of the landscape worsened the vulnerability to future flooding.

Overall, interviewees expressed a lack of preparation for flooding. High moisture periods caused major damage to infrastructure. The damaged infrastructure was amplified, respondents described, because of the lack of resources and planning/preparedness. Road systems depended upon by residents for agricultural transportation, travel among towns and villages, and travel to and from schools and other services, including roads used by emergency services. Local communities/RMs and watershed

groups lacked the resources to deal with the enormity of impacts relating to flooding events and identified that planning and planning implementation was needed.

> *I think one of the things that became evident with the floods last year is that while every municipality is required to have an emergency plan. It turns out many smaller municipalities do not have municipal emergency plans. And if they do have them, they kind of stale. There is nobody that had practiced them. So they kind of on the shelf. So I think that is one thing that has become evident in the last year is that municipalities have to do a better job of emergency planning and that has to be a living document. (S41: 16).*

3). The way the local watershed groups and local communities have dealt with these extreme weather (drought or flood) events in the past.

In reporting regarding past drought and flood events, it was observed that watershed groups and local communities coped with drought and floods on several levels and with varying degrees of success. In relation to droughts, farmers were reported to have used different cultivating methods, crop and agricultural diversification and have developed different water sources. In relation to the effects of floods on urbanized contexts, respondents reported activities relating to draining the water from infrastructure sites and to repairing or rebuilding infrastructure such as roadways and bridges. It was also reported that the level of civic engagement, including engagement with and by local watershed groups increased surrounding drought and flood events. Although efforts have been made to limit the vulnerability in these areas it was noted that these areas remain very vulnerable to extreme climate events. They point to a lack of resources and planning that causes this vulnerability to persist.

I. Coping with drought

Respondents spoke about coping with drought at the producer level. Farmers have coped with drought using adaptive methods relating to cultivating and crop diversification. Farmers no longer cultivate soil or plough their fields. They seed directly into the ground, also known as zero-till or no-till farming. While this has an added benefit of being more efficient and cost effective, it is a method of drought-proofing as it increases the soils capacity to hold water and decreases soil erosion. It was reported that farmers tried different cultivating methods like continuous cropping and summer fallowing with different varieties of crops in an effort to build drought resistance. Some farmers sold their farms, livestock and reduced farming capacity to cope, notably during the last several years. Some often appealed to the government for assistance.

It was observed that maintaining livestock and healthy crops were indicators of reduced vulnerability to drought and as such, an indicator of the amount of drought related damage that those livestock producers had to cope with. In addition, a reduction in vulnerability for livestock and agricultural producers to drought was associated with agronomic preparation in addition to careful financial planning. Some of these practices that were reported were proper grass management, not overusing and utilizing, and purchasing hay when it is cheap. However, in certain geographical areas

some used alternating climate events to promote a balance that led to greater preparedness for drought. For example, when there are dry periods the quality of hay is quite high but the yield is low and when there is excess moisture, the quality of hay is low but there is a lot more of it. Using these two ideas, during alternating dry and wet periods, livestock producers were able to use this balance to build hay reserves for dry periods.

For some grain producers, it was observed that there was an emergency program available and they kept on with whatever crop rotation they planned and emergency plans kicked-in for crop insurance. Also, in response to drought people tend to look to other groundwater resources, tanks or storage. Because farmers have to source ground water, the variation in water quality and the variability of the cost of sourcing that well to be developed is huge. It could be 30 feet well, it could be 400 feet well and that could mean tens of thousands of dollars difference. If they are digging 30 feet well verses a couple of 100 feet. One has to pay for that investigation as well. So a lot of infrastructure was built and a lot of money was spent. In general, there is less money spent on excessive moisture preparations, but more money spent on drought.

> *The grain producers I would say there was an emergency program available, so I would say they just keep-on keeping-on with whatever crop rotation they planned on doing and emergency plans kick-in for crop insurance. So if they don't get it because of excess moisture, they get insurance on that. So that their way of preparing was with livestock guys they had to prepare for drought. (S45: 5).*

> *In response to drought people tend to look to other groundwater resources, tanks, storage. A lot of people had to dig new wells. So we are talking about tens, hundreds of thousands of dollars of infrastructure that had to go up in 07, 08 and 09 before the excessive moisture came through in 2010 & 2011. The problem, because they have to source ground water the variability of the quality of waters and the variability of the cost of that well to be developed is huge. It could be a thirty feet well, it could be a four hundred feet well and that could mean tens of thousands of dollars difference. If they are digging a thirty feet well verses a couple of hundred feet. You have to pay for that investigation as well. So a lot of infrastructure, a lot of money was spent. So I guess there is less money spent on excessive moisture but more money spent on drought. (S45: 4)*

II. **Coping with flooding**

Extreme events like heavy rains in June, observed by some respondents in across some watersheds, as typically 3 to 7 inches over the basin can create some significant issues, thereby creating some real barriers to coping. Respondents observed that farmers have to use mechanical means to coping including building drainage ditches. Respondents also observed that hundreds of thousands of dollars of infrastructure was built due to floods in 2007, 2008 and 2009 and then those very same areas suffered from excessive moisture in 2010 and 2011. Also, with the excessive moisture that occurred in the last year, people tried to cope by significantly increased level of

communication between watershed authority, watershed groups and stewardship groups. As a result, the level of civic engagement increased.

When coping became difficult, as respondents reported, it was because of limited resources and because of a limited preparedness beyond basic preparedness strategies such as sand-bagging. They tried to cope with the flooding by draining their land legally or illegally. It was observed that some of the damage to the infrastructure was attributable to the illegal drainage that caused extreme flow to the culverts resulting in road wash out. Also, respondents reported that in some places some monitoring points were situated to keep track of water levels and to try to determine what potential there was for flooding but those stations did result in adequate data for their intended purposes. It was observed that the inadequate preparation work and inadequate planning together with an unsatisfactory repairing of the damaged infrastructure after flooding were some of the major barriers in coping with flooding. In spite of these barriers, respondents stated that those who were most affected by the aforementioned barriers to coping were able to rely on the recently introduced provincial government financial compensation program.

> *A lot of infrastructure was affected by flooding. Roads and bridges were washed out and underwater. If it came to the compromising of the town the entire local area would get behind the effort and do sandbagging. The town of Benson was at risk of completely getting flooded. The oil community got behind it and sent down water-pump trucks. They pumped water from the town and across the highway to "save" the town. Respondents commented that it was quite phenomenal to see how a community comes together in time of crisis and help out.*

> *A lot of them were fixed in the fall, when it was finally dried out. But again in summer it was fixed last fall but now this spring everything is wet and the gravel road and stuff are in bad shape everywhere. They are worse than last year, I don't know why but everything [is] so saturated that a little bit of rain just turns into mess again. There are a few bridges that need to be rebuilt in the Souris River Valley itself. The issue with that is the cost of rebuilding. There is government assistance through the disaster assistance program but the rules around that they only compensate for what was existing. So there are a lot of people in the Souris Valley what they are saying is that the flooding changed the river, changed a lot of stuff about the river so the building what they had before is not going to be adequate. They are going to make wider bridges for example stuff like that. So that would be the main issue right now was finding how these things are going to be fixed and who is going to pay for them* (S36: 5).

Participants commented that Saskatchewan was blamed for flooding coming through North Dakota. Minot lost a good portion of that town. There were comments with respect to the negative impacts of media coverage.

> *But a lot of that was just media hype. People realized it was not really the fault of Saskatchewan. But when one is in a flooding situation and is emotionally impacted, then they are looking for someone to blame and people rushed to blame people upstream. It became a blame game even though it was caused by an event that one couldn't control the amount of rain was so huge and it was beyond control but the people that sit at the watershed advisory committee from the American side were obviously more level-headed and they just like to keep the watershed group informed what is going on down there. So it is good communication as far as the watershed advisory committees are concerned. (S36: 4)*

It was observed that there is the International Souris River Board that actually looks at apportionment and the management of the Rafferty Dam and Almatti Dam in the Souris River. A participant commented further that one of the watershed action plans is to get engaged with that board as far as trying to get local representation around the watershed.

> *That is kind of some big players involved with that and big politics involved with that so the watershed group still are working trying to get involved with that (S36:4)*

> *This watershed we didn't really touch media stuff. All media relation is basically handled by SWA, through provincial government. And that is the best route too; it is not the watershed group's place to get involved with media stuff….[The SWA] presented the facts as they are, facts concerning the rainfall and how they operated the dam. The SWA was very upfront in telling, in making sure everyone know the real fact around it. That is all they could do as far as media is concerned (S36: 4)*

III. The role of the local watershed groups in dealing with extreme weather events

Wascana & Upper Qu'Appelle Watersheds Association Taking Responsibility (WUQWATR)

Respondents commented that WUQWATR's role has been limited to raising awareness and promoting discussion rather than "hands-on" action because of a lack of financial and human resources. This has left some with the sense that responding to those extreme weather events is left to individual municipalities and the city. Some respondents, however, commented on the appreciation of advocacy work done by this LWC for people who have concerns about water is shortages due to potash mining. Overall, this LWC was very clear in reporting that they lack the authority, the expertise, and the capacity to be involved in or to deal with extreme climate conditions in the way that some people expected of them.

Moose Jaw Watershed Stewards (MJWS)

Respondents consider MJWS taking as a sort of network -lead acting as a go-to agency to help direct the concerns of producers or towns and villages over issues surrounding water and waste water. Concerns are first communicated to the group who

in turn directs those with concerns toward government agencies in order to help with those with concerns respond appropriately. The MJWS has a plan in place that was developed with the surrounding community's participation to deal with excessive moisture. It is also trying to address some of its own organizational key actions by holding meetings, creating decisions, bringing technical expertise and applying for grants to address the key actions with the highest priorities.

Some respondents argued that ability of the MJWS to take "hands-on" action has been, at least in one particular climate event, hampered by a lack of communication with the municipal government. In the flooding occurring between 2010 and 2011, there was a large increase in the cumulating water moving through the City of Moose Jaw. It was observed that this LWC took pictures and tried to document as much as they could. The group was not involved in sand-bagging. The municipal government organized the sand-bagging effort and the watershed group was unclear as to how they would help. When it communicated with and asked questions to the City of Moose Jaw representatives, it was not invited to respond.

Assiniboine Watershed Stewardship Association (AWSA)

The AWSA has also been observed by group members to take a network-leading role.

> *Basically we act as coordinators and we try to direct those affected toward programs…a sort of directing them to act and they can go to the watershed authority. But we offer agro-environmental group plans. So we have funding available through those group plans to decommission old wells and to protect existing ones (to protect it from future flooding (S44:4)*

Upper Souris Watershed Association (USWA)

The USWA has taken a frontline communication role backed-up by planning efforts when extreme weather events occurred. Interviewees reported that the USWA received many telephone calls and met with many individuals within their watershed during and shortly after extreme weather events. In preparation for extreme weather events, respondents stated the USWA usually refers them to the Saskatchewan Watershed Authority or makes them aware of the Provincial Disaster Assistance Program (PDAP).

In reference to planning and reported by the USWA chairperson, environmental planning is a large part of their mandate as they collaborate with other stakeholders on planning and projects. First they work on the Souris Erosion Control Project, involving the Yellow Grass Marshes north of Weyburn. Also, they collaborate with stakeholders on the Souris River Restoration Project, with the goal of stabilizing the riparian areas along the waterways. This also includes encouraging farmers to water their livestock away from the creeks and away from dug outs. Last they are involved with the Agro-Environmental Group Plan (AEGP) that works to educate people to conserve water and learn about better water management practices.

Planning for Climate Change (Whether Climate Change is included in their main watershed protection plan)

WUQWATR

> *The basic part of the plan [Getting to the Source (2008)] deals with the climate change, as there are several different recommendations that address it. But the general idea would be adaptation and preparation, doing inventory, infrastructure that is at risk, drought proofing, all these kinds of things were included in the plan. It is pretty much covered there. Including flooding, they were thinking ahead when they developed the plan (S38:2).*

MJWS

This watershed group is just beginning and held extension events for *Drought and Excessive Moisture Preparedness Plan*. The year in 2010 it held a series of workshops around the entire watershed to create the *State of the Watershed Report*. Because the communities hadn't been visited since the membership drive of 2006, four years later in 2010 the group coordinator went around and said ok this is the plan, this is what we are doing with it, if you were part of that initial process, where did you see that going? Is it going in the direction you thought it was going? Is there any other issue you would like us to deal with? A lot of the stakeholder, grassroots plan and the people around the board room table actually had been there since 2003-2004. Thus it was taken back out to the community, revisited by the community to see what other concerns and key actions that they would like to talk about. At the time when the group went out to the communities, it wasn't dealing with excess moisture or drought. They are a little bit more open to talk about it in those two categories. The watershed group is just beginning, just starting. There are key actions and hopefully it can create some implementation out of it (S45: 15).

USWA

The plan in this watershed does not include climate change. It includes in the drought and excessive moisture plans the group is working on at the present.

ASWA

> *Future climate variability is incorporated into the watershed's next water source protection plan. The watershed group is doing some of that work right now, even though it is not in its source water protection plan.*
>
> *We are doing some of that work right now, even though it is not in our water source protection plan but that LIRA project that we are working now, there is a lot that we stick to our water source protection plan. But there are some things that are extended or expanded, you know it ties into our water source protection plan but it is a lot more diverse than our plan a sort of originally was drawn up I guess. (S44: 11)*

4). The roles of external institutions such as provincial government, the federal government and other NGOs have played in reducing the exposure or stress to climate or water conditions of local watershed groups and communities?

During recent flooding events in the province, it was observed that government put into action its Disaster Reduction Program, but that this program was perceived to be

ad hoc emergency response. It was reported that the provincial government predicted flooding events in a reasonable time. In addition, their response involved encouraging individual preparedness right before the flooding by meeting with communities to ensure their flood-proofing was done. During flooding, the government prepared its constituents through meetings and the utilization of the media, but lacked the staff to address individual issues. Responding to a lack of resources in relation to the magnitude of some flooding events, the government hired consulting engineers. In general, the response from the government to the flooding was considered as sort of an ad hoc emergency (e.g. insurance and crop insurance).

It was reported that watershed groups were collaborating with other groups and institutions in various capacities to promote watershed health. Watershed groups were communicating and partnering with various NGOs such as Ducks Unlimited, Delta Waterfall, and the provincial and federal governments to obtain funds for environmental and water-related projects such as those that involve the restoration of wetlands, agriculture extension, and the decommissioning of old wells and the protection of new ones. Some associations such as the Agriculture Producers Association of Saskatchewan (APAS), The Water Security Agency (WSA) and the Saskatchewan Urban Municipalities Association (SUMA) were mentioned as playing some roles together with WUQWATR in Alternate Land-Use Services (ALUS) projects and in sponsoring workshops. The SWA has been described as “quite good” at coming up with different support programs or money to put towards projects. Some local industries also financially supported different projects.

Overall, there seems to be a relative consensus that collaboration with governmental institutions and other NGOs is required because of the limited capacity of the local watershed groups to deal with more serious possible changes to water and/or climate conditions in the future. Members of the watershed groups interviewed sometimes believed their groups are unclear on or not well organized to meet the future challenges of weather impacts and to mitigate the effects of extreme weather events in the future. It was observed by respondents that efforts need to be made to assist and enable them by capacity building such as growing human and financial resources and encouraging them to develop plans and a clear mandate.

Valuing eco-system services

3.9 Valuing Eco-System Services

Wetland issues not done

DUC participants explained that drainage is nothing new in Saskatchewan and that it has been going on since the era when people have settled here for the purposes of land clearing and cultivation. Every day one continues to see wetland loss and native natural area being cultivated which is driven primarily by economics and the desire for the farming community to grow more crops, make better income and take advantage of the big equipment farmers own at the present. Now there is definitely a tremendous increase in the scale and the amount of draining in the last ten years despite the legislation called the SWA Act which says that one cannot move water off of a quarter sections without first obtaining a permit from the SWA. (S46: 5).

Another similar comment:

> *A lot of it is illegal drainage. And what we are hearing a lot is soil erosion, flooding really eroded fields big gullies and you know complete washing out fields so that is a huge issue for agriculture (S44:07)*

It was observed that the Watershed Authority does not actually police drainage: "The only time that the Watershed Authority will take action is when they get a complaint from a land owner affected by drainage. The Watershed Authority basically steps in as a mediator and will determine if one is suffering damages and then they may or may not order the works closed."

> *Basically [drainage] was very excessive in the last couple of years and I guess the lack of enforcement it is hard for us as a watershed group because we have no authority to step in. But a lot of people come to us and we have to hand them off to the watershed authority and they are a bit overwhelmed with all the calls that come into their office. It appears that not much has been done to reduce illegal drainage (S44: 7)*

It was observed further that with the advent of the Water Security Agency, things may be getting better. One participant commented, "However, now there are some encouraging signs because a new Water Security Agency is formed with a mandate to address the illegal drainage issue and the enforcement which has been critically lacking. There is also another piece of legislation that comes into play in Saskatchewan that is called the Environmental Protection Act, under this act anybody working in and around water where they were going to alter a stream bed, or a bank, a marsh or a wetland needs an approval from the Ministry of Environment. The Ministry of Environment will lay charges where Watershed Authority won't. So it's a kind of a different piece of legislation that addresses the same thing but which can be triggered by different activities." (S38: 4). One person observed that actually the Watershed Authority is within its mandate as it was to assist farmers in draining wetlands and so they would provide engineering advice and design work for farmers that wanted to get together and drain large areas so there was government assistance for the drainage. But that participant contended that recently when budgets got tight they stopped providing those services to producers but still encouraged them to continue draining.

Farmers and Environmental Protection

One participant was skeptical surrounding the level of environmental protection embedded within farming practices, "It is not generally believed there is much of a conservation ethics these days. This is partly because there is a lot less connection to the land than there used to be. Producers used to live on the land and rely on the land to sustain them. Now land is primarily a vehicle to generate revenue." (S40: 6). Participants observed that at the present there is a lot of charm and prestige associated with having big equipment and clean cultivated fields. One participant commented that "if water, trees or grass is seen sitting on the field apparently doing nothing, it makes the land owner less of a farmer especially with the big equipment farmers have today. Stewards of the resort have a huge role to play. Their action is determined basically by how much of the environment is left." (S40: 6).

It was observed that resources become scarcer as environmental areas become smaller and as more and more land gets brought in to cultivation. “More stretches on the environment will be seen and this will result in more willingness and more need to conserve the areas that are left and to restore those areas that have been degraded,” (S46:4). Participants observed. It was also noted that “unless there is some kind of a national or a provincial policy that would reward producers for ecological goods and services the trend towards the environmental loss continues. Landowners are going to weigh their options which is going to get them the most money and even though they could be paid for the environmental goods and services. Unless the payment is significant enough more than they can make growing a crop it’s not going to happen.” (S46:5). That participant explained further that “there was a program here in Saskatchewan and still is where land would be leased for ten years through Ducks Unlimited and farmers get paid based on what they could make for growing a crop. Even though it was a very successful program (it was able to sign up thousands of acres every year) most of the producers still chose to grow a crop. They still like to farm, there is a perception of land not in cultivation and sitting there idle (as they would call it) they saw that as a big waste.” They commented that there would be that perception to deal with as well in terms of paying for EGNS. “The other issue is illegal drainage and enforcing legislation. The government actually saw a need to do something which they’re starting to because they’re recognizing that it’s costing them tens of millions of dollars in terms of downstream flooding impacts, roads being washed out and crop being lost.”(S46: 6).

Another person commented:

> *This has really escalated the awareness around illegal drainage problems. And there have been a lot of people that are putting pressure on the government of Saskatchewan to step it up essentially. They are getting a lot of pressure from both organizations and individual people to do something about it. (S44: 9)*

3.10 Property Tax

It was observed that there was a pilot project done to see if property taxes were potentially a way of paying for EGNS and in retaining wetlands and natural areas. The goal was to get approximately 75% of the landowners in two RMs signed up under the program within three years, and the program would pay their taxes through the RM for any natural areas and wetlands that farmers signed up. It was commented that the program “was a one year term so that farmers can get out of at any time if they want; they weren’t locked to it as a long term commitment.” (S46: 5). Further comments towards the program were made that their areas were mapped out to determine the acreage and the appropriate taxation for those areas they pay on those portions. The findings were that when people look at their tax bill, they don’t look at the various tax rates on their lands. “Wetlands are taxed on a significantly lower rate than cultivated areas, but when a producer gets the bill he doesn’t take the time to break out how much is costing him for his wetlands, how much is costing him for his cultivated land. It’s all one payment. That was a bit of an eye opener for most farmers

when they were told the taxes on their wetlands was pretty trivial amount and they were very surprised that it was so low because they've never taken the time to really look at their tax assessments and see how their taxes work." (S46:6). The other issue that was found was that the assessment system does not really reflect what wetland farmers have on their land, it kind of looks at it from a potential to cultivate. A cultivated field may have 10 or 15 seasonal or temporary wetlands in it but those are typically classified as cultivated lands, they are not separated out. Only the large bodies of water are separated. Everything that is separated out is classified as waste but not identified as wetlands per se. As a result the land assessment cannot be used as the true measure of how many wetlands farmers have or how much taxes they're paying on their wetlands because it's not a true representation of what they actually have on their lands.(S46:6). It was observed further that this gives farmers the feeling that they are paying taxes for which they are not getting any benefit even though the taxes are pretty marginal. The other thing that the pilot project found out was that people were very happy when taxes are paid for them by the project.

Participants commented that the program worked exceptionally well with over 80% enrollment within the first year. They noted that "It was a very successful program but when the producers were visited after three years to evaluate how things went, two things came out very loud and clear. The first was, for most of the farmers what they were getting paid was not enough to stop them from cultivating or draining their wetlands and they could see clearly the economic benefit of draining and cultivating these areas. The other thing was that the producers that were enrolled in the program had higher wetland loss rates than the producers that didn't. And part of the reason for this was believed to be the pilot project showed farmers how many wetlands they actually had on their property. Farmers figured out they had too much wetlands and then they went ahead and started draining some of them." It was commented that "in the end it was assessed as a very successful program in terms of being able to deliver. But in terms of achieving any desirable results in long term wetland protection it didn't work." (S46:2). One participant commented that the system itself worked very well in terms of working with the RMs and the producers through a taxation system that already existed. It would be a very easy program to deliver on a large scale but just didn't achieve the results that were anticipated.

3.11 Drainage

Saskatchewan has been building its expertise in the past several years surrounding drainage. With the significant flooding over the past few years, drainage has been a focus of the Water Security Agency and the Ministry of Environment. Stakeholders have been surveyed and the public was consulted from October 2013 to April 2014 over the issue (the Leader Post, 2014). The drainage system in Saskatchewan is not well known by residents as 44% of people surveyed didn't realize that a permit was needed to conduct drainage (ibid.). There is general agreement that unauthorized drainage projects must be more closely regulated, although the Minister is quoted as saying, "It's not so much the regulation, but it's more the enforcement of that regulation that needs to be there" (ibid., D3).

One person believed that the word "not permitted" should be used instead of illegal. If prior to 1981 drainage was practiced then it was grandfathered in. Otherwise permit was required:

> *I prefer the term not permitted because if it was prior to 1981, if that projected existed prior to 1981, it's grandfathered in. Are there drainage projects that exist in this area? I say the vast majority of them existed before 1981. Like thirty years ago. Are there additional channels that have been connected to those major channels? Probably over the last two years. Otherwise it wasn't an issue because it's so flat they just cropped through year to year. It doesn't hold water. I guess how we are dealing with the drainage problem we see on those that do exist, don't have easement on the land in order to maintain in order to maintain a grassed waterway . So we are seeing sedimentation and nutrient loading in the major channel of Moose Jaw River. It is not that there is no new drainage, is that the drainage system that already exist need to be made better (S45: 8).*

There was a concern expressed by many interviewees about drainage:

> *I think each one of these are important. Like I said as far as watershed goes there is a lot of damage can be done by as far as environment goes with the poor drainage, illegal drainage. It is making the watershed which filters down to the RM's and towns more aware of that. You have to make sure that you have a proper proof before you go ahead with any ditching. That is quite a concern now that with illegal drainage people used to go out and drain their water and whatever and not worry where it ended up (S40: 3).*

It was also expressed that the amount of drainage was increasing:

> *Didn't have much choice as far as the heavy rainfall events, probably what has happened though because the last two wet years there has been more unpermitted illegal drainage going on. And probably the one thing that a lot of people don't recognize is tillage operations that have occurred over the last fifty years or even tillage operations that have occurred in the last five years with the minimum till. All the action tends to level the landscape. So the little swells that were six inches deep because of the agricultural practice those of were tended to fill in. So even if six inches swell fills into two inches that in our part of this country can back up water quite ways. Can put a lot acre underwater. So a lot of those small drainage systems, I guess that is what they technical would be that were in place have been lost. So trying to redefine those then really becomes illegal or unpermitted drainage. So trying to balance that off is the issue. And because of where we are generally trying to get rid of excess moisture is more of an issue than worrying about not having enough. Because if you get the acres seeded, then hopefully you can get some rainfall and you will get some sort of a crop. But if you don't get it seeded because of it is too wet or dries out you get no chance of getting a crop (S41: P6).*

The above statement refers to drainage increasing partly because of heavy rainfall, and partly because of minimum till practices. Drainage was though by the following interviewee to be increasing because of the flooding that was occurring and also because of greed:

> *We can take the 2011 flooding as an example, what was the coping mechanism?*
>
> *The big thing that farmers want to do is be able to go on and be on their land and put their seed in. So they got to drain their land. Are they doing it legally or illegally? I know that there were a lot of instances of illegal drainage. When the drainage patterns were changed, that affects the way that rural municipality operate their maintenance for their roads in their area. So if there is a lot of extra flow that is coming up to a culvert. If there is a lot of extra flow that is coming up to culvert is designed for this much flow and that much flow and culvert doesn't carry it all and the road washes out. So there was a lot of damage to public infrastructure last year and some of that is attributable to illegal drainage.*
> *Q, Why did the farmers choose to do the illegal drainage?*
>
> *Greed (S42: 2).*

The larger farms were also attributed with increasing the drainage problem:

> *Yeah, and it almost appears that like farming has really changed in the last 10 years too, a lot of less small farms, a lot of big farms now. It is really big industry, it is big business, we are talking millions of dollars right? You know it is their industry, so you can understand in a way why they are doing it because there is zero enforcement so they get away with it. That is why they are doing it. So they go out I mean they are big machinery now and then cutting twenty foot ditches rather than just two foot ditch to get rid of a little pothole there draining thirty acres of wetland like huge acres so. All that ware is going somewhere and it is not recharging groundwater and it is not improving the water quality either, plus habitat and biodiversity (S44: 7).*

Drainage was seen as impacting water quality and contributing to increased flooding:

> *I guess there are a few things say like water pollution and water quality, a lot of wetlands in our area, being lost or being drained. So there is more risk of nutrient flowing downstream plus so many other things with wetland loss. And as for abandoned well decommissioning we do have that program through our agro-environmental group plans. We have worked with municipalities in the past, with some funding through Environment Canada, so decommission those wells.*
>
> *Those wetlands serve a purpose; they have storage capacity in those smaller type years. They have the potential to maybe mitigate against lesser year floods and also what is that in turn in water quality and then that water is going downstream is it flooding out our neighbours in Manitoba and that sort of thing. It has been both the positive and a negative because there is future planning but there is a lot of future development (S44: 6).*

The current drainage system in Saskatchewan was generally regarded as reactive and not proactive at all. At the time of the interviews the waiting list was two and a half and three years before a complaint was even looked at (S33, 4). It was regarded by most interviewees that adjustment to the current system was needed, something with "teeth" was needed (S33; S44), but many acknowledged the difficulty in doing this. Some expressed the view that government should take this on, or perhaps it should be handled at the watershed scale.

One watershed council member expressed dissatisfaction with the WACs taking on a role in relation to drainage because this watershed council had a significant presence of local government on the council, and the politics of enforcing drainage would be difficult, especially in relation to re-election (S33). The problem of taking on a regulatory job in relation to drainage would detract from the current local government and facilitation roles of the WACs. One interviewee expressed the sentiment that either one role, or the other should be chosen.

Although the WACS have no role in relation to drainage, the lack of enforcement, and the increase in drainage issues because of recent excessive moisture was increasing the workload of WACs:

> *Basically [drainage] was very excessive in the last couple of years and I guess the lack of enforcement it is hard for us as a watershed group because we have no authority to step in. But a lot of people come to us and we have to hand them off to the watershed authority and they are a bit overwhelmed with all the calls that come into their office. It appears that not much has been done to reduce illegal drainage (S44: 6).*

In one Saskatchewan WAC the issue of drainage was regarded as one of ongoing conflict:

> *Well on drainage let us talk about that one that has caused debate and disagreement about the effect of drainage. It is basically an ongoing conflict. It doesn't cause huge disagreement or fighting but it is a cause of water discussion and different opinion. So you basically have the purist conservation minded people against the progress of grain farming, agriculture development and progress people. You have got all these types of people sitting on the board so I guess for some interesting debate. But eventually after people discussed things realize it is an issue maybe for different reasons but they do recognize it is obviously an issue to work around. So you ask on ongoing things as far as people against drainage and other ones are recognizing that it is going to happen or it does happen, it is the line of business and we really need to learn how to deal with it from environmental perspective. So we are basically stuck in the middle, we have got both sides (S36: 13).*

3.12 The Future of WACs

Interviewees believed that WACs are really important at facilitating discussion at the community level and trying to encourage cooperation and participation between communities (which has often been lacking as everybody is in it for themselves when there is an emergency). One watershed group would like to promote the idea that people should be planning more. Certain land needs restoring and recreating and other land needs some water storage capacity. The watershed plan is responding by being the forum for discussion. Some of the board members have helped to coordinate some local meetings between municipalities to discuss some of these issues and to give some recommendations to governments on how they can work together with the government, and then to provide some capacity at a local level so that people can deal with their own situation. Having capacity locally to deal with those situations would definitely make things more effective. Thus the watershed group doesn't have the funding or the staff capacity to actually do the work. There are some watersheds in Manitoba who actually have more infrastructure responsibility and more hands-on activities. In the future it would be the province's decision.

WAC members interviewed had a diversity of opinion surrounding the long-term role of the WACs. Some believed that these bodies should be granted regulatory authority over some aspects of water use and management within their respective watershed (S6. S18). With this regulatory authority, some ability to raise revenue through levies or charges would accrue assisting the groups with their financial stability. Others were adamant that there should be no regulatory authority and the groups should be advisory only. This would only create an addition layer of quasi-governmental bureaucracy (S7) adding to the already fragmented water governance system (Hurlbert, 2009).

Participation in the WACs is thought to be a challenge to many members of the WACs (S25). Traditional levels of volunteerism are declining in rural Saskatchewan. This is attributed to both an aging population, reduced numbers of agricultural producers living in rural areas, and increasingly busy schedules with both family members have occupations outside of the farm. Having to travel to WAC meetings (sometimes greater than 100 kms) was cited as a challenge (S30).

4. Manitoba

4.1 Intro

This chapter will provide an overview of Manitoba water and watershed advisory committees – in Manitoba "Conservation Districts" (CDs). The mandate, structure and governance challenges of the CDs will be discussed as well as their finances and the participation of First Nations. Some of the themes arising from the interviews will be recounted, namely how these groups have dealt with climate change and extreme weather events, wetland issues and drainage, and property tax issues.

4.2 Provincial governance model

Manitoba's approach to water governance has both characteristics of centralized and decentralized management that facilitates bottom-up planning. The main provincial department Manitoba Conservation and Water Stewardship advises conservation districts in their planning endeavors. Legislation supports this and the public engagement involved through the planning process. Manitoba's main pieces of water legislation that determine its governance arrangement are the Water Resources Conservation Act (2000), the Water Protection Act (2005) and the Conservation Districts Act (2006). These pieces of legislation are inclusive of a source water protection focus as a part of integrated watershed management planning. In addition, this legislation defines things such as water rights, water quality and quantity issues, and transboundary issues. The Water Resources Act acknowledges the use of water for social and economic well-being, but it limits the use of water to use that will not adversely affect the "ecological integrity" of water resources in Manitoba (s.1). Flowing from the idea of a sustainability entrenched within law, the Water Resources Conservation Act states people may not:

> (a) drill for, divert, extract, take or store water for removal;
> (b) sell or otherwise dispose of water to a person for removal;
> (c) convey or transport water for removal; or
> (d) remove water from a water basin or sub-water basin. s.2.

In addition, it prevents the manufacturing and processing of drinking water.

The legislation does envision the interests of future generations, but no effective operationalization of this is in the legislation.

Table 4.1 Institutional legal water structures of Manitoba

Principle	Description
Principle under which water is managed	Public property; future generations and precautionary principle included
Allocation of water rights	Licensed interests allocated by .Water Stewardship Division of Manitoba Government
Priorities	First in time, first in right. (s.* Water Rights Act) Legislated priority scheme to domestic, municipal, agricultural, industrial, irrigation, and other purposes, in that order (s. 9 ibid.).
Water Market	None

Water allocation dispute resolution	Municipal Board
Potable water accountability	Local level
Governance Accountability	Government department to Minister, ultimately Cabinet
Water price	Set by municipal water supplier for water and sanitation services.

The Water Protection Act legislates source water protection planning to be performed by watershed groups. It sets the focus of watershed planning surrounding source water protection in the Preamble:

> The Government of Manitoba is committed to watershed planning as an effective means to address risks to water resources and aquatic ecosystems, and believes that residents of watersheds should be consulted when watershed plans are developed.

The Act reiterates that watershed plans are to be integrative of source water protection. For example, the content of the watershed plans must include "the protection, conservation or restoration of water, aquatic ecosystems and drinking water sources" (s.16.1(b)(i)). Pertaining to the supervision of the implementation of this Act, the Act establishes a Manitoba Water Council that creates a feedback loop among the Minister of Conservation and Water Stewardship and other provincial bodies such as the Lake Manitoba Stewardship Board and the Lake Winnipeg Stewardship Board (Manitoba Water Council, 2010). Furthermore, the Act specifies water quality standards and a decentralized framework by designating water quality management zones based on ecological characteristics such as water sources. Conservation districts are positioned as the main planners within the framework. As emphasizes that conservation districts must be consulted when watershed management planning decisions are made within the conservation district's boundaries (s.17.1(a)).

The Conservation Districts Act (2006) provides a linkage between legislation that encourages watershed stewardship and the actual planning performed by conservation districts. It affords conservation districts a considerable amount of power by making them the authority of matters relating to land-use, water sustainability and conservation within the boundaries of the district. The Act outlines the powers of each conservation district board. The board may:

a) Study and investigate, or cause to be studied and investigated such resources of the district as may be necessary to prepare a scheme;

b) Implement a scheme;

c) Transfer, for the purposes of maintenance and operation, to an included municipality or other person, jurisdiction, authority, or control, over any works in the district;

d) Enter into an agreement with the owner of any land for the carrying out of any works considered necessary for the implementation and operation of a scheme;

e) Issue, subject to the provisions of *The Forest Act*¸ permits for cutting of forest from protected areas;

f) Issue, subject to provisions of the Water Rights Act, permits to alter surface water courses;

g) Recommend the acquisition by the Crown, of any real or personal property necessary for a scheme;

h) Sell, subject to the provisions of the Water Rights Act, water from reservoirs constructed or operated by the board;

i) Require the municipality to furnish to the board information pertinent to a

scheme (s.21).

In addition to these powers granted to the conservation districts, the Conservation Districts Act allows for conservation district boards to construct water diversion infrastructure for the purposes of holding back potable water (s.18). However, this power is subject to other legislation such as the Water Protection Act.

Manitoba Water Strategy. As a renewal of an earlier policy in 1990, the Manitoba Water Strategy is intended to tie together new legislation, such as the Drinking Water Safety Act and the Water Resources Conservation Act, with new funding sources to bring about change in six specific policy areas: water quality, conservation, use and allocation, water supply, flooding and drainage. There is a focus on issues relating to these six areas and the interjurisdictional issues surrounding Lake Winnipeg but through an integrated watershed management planning focus. Source water protection is again emphasized as part of the entire process from legislation through this strategy down to the work of the conservation districts. For example, under the area of water quality, the strategy states that the "preservation of drinking water sources is essential" (Government of Manitoba, Conservation and Water Stewardship, Water Stewardship Division, 2003: 10). As such, one of this strategy's actions is to complete source water protection plans for all the major bodies of water in the province and to look to the future to "further protect water quality through integrated planning of watersheds, aquifers and basins" (11).

This strategy extends beyond water quality to deal with issues of water quantity through topics such as conservation, use and allocation, water supply, and flooding all relate to this focus. Part of the strategy's actions in relation to the policy area of conservation has been to expand the number of conservation districts. Also, another action that has been emphasized in the area of conservation is the establishment of tax-based incentive programs. The Manitoba Water Strategy is comprehensive and reflects a decentralized emphasis on the work of watershed groups in the integrated watershed management planning process.

Manitoba's Conservation District Program Framework for the Future. The Manitoba Conservation Districts Association and Manitoba Water Stewardship developed a planning framework for the future of the Conservation Districts program. While this is not specifically a water policy, the contents of the policy relate to the ability to produce and implement integrated watershed management plans. This policy then provides another linkage between legislation and the work of the conservation districts. This policy emphasizes that the conservation districts are the main planning bodies pertaining to water-related decision-making. The framework also details the organizational structure and procedures of conservation districts groups in relation to watershed planning, reflecting the Conservation Districts Act. In addition, it integrates some principles in watershed planning that reflect the Manitoba Environment Act and the Water Protection Act. In an effort for more efficient watershed management planning, the framework specifies the need to realign district boundaries with watershed boundaries.

Provincial Governance Model. Manitoba's provincial water governance model can be characterized as having both centralized and decentralized features that support a primarily bottom-up approach wherein CDs have a significant amount of decision-making authority. Manitoba's planners include government departments and conservation districts but emphasize public participation. While legislation and policy creates and directs the type of planning being performed at the conservation district level and the conservation districts are accountable, both financially and organizationally to the provincial government (centralized), most planning is down through the conservation districts (decentralized). Authority in terms of planning is distributed among the main planners or the conservation districts and the model incorporates public participation to direct the planning (bottom-up).

Table 4.2 Water Institutions in Manitoba

PROVINCE OF MANITOBA	
Conservation and Water Stewardship	Government department responsible for water, fisheries, forestry, environmental compliance and programs.
Agriculture, Food and Rural Development	Government department dedicated to agriculture and food sector and building stronger communities.
Manitoba Water Services Board	Assists municipalities and water cooperatives in delivering sustainable water and wastewater infrastructure to enhance economic development and improve public health and environmental concerns.
Manitoba Water Council	An inter-government water coordination institution
Extreme Events	
Emergency Measures Organization	Government department that plans for and responds to emergencies such as flood.
GOVERNMENT OF CANADA	
Environment Canada	Surveys and monitors water quality and quantity, trans-boundary flow regulation, enforcement and protection of the aquatic environment, water and climate research. Environment Canada and provincial ministers of the environment set the *Canadian Environmental Quality Guidelines*. (Guidelines pertinent to water include limits established for the protection of aquatic ecosystems, municipal uses of water (community supplies), recreational uses of water, and agricultural uses of water (Canadian Council of Ministers of the Environment, or CCME). Leads the Prairie Provinces Water Board.
Health Canada	Sets Guidelines for Canadian Drinking Water in partnership with provinces. Sets health-based standards for materials in contact with drinking water, assists First Nations with drinking water safety on their lands, and provides drinking water guidance to other departments, governments and citizens. Regulates the manufacture and sale of pesticides in the *Pest Control Products Act.* Co-leads the *Canadian Environmental Protection Act* with Environment Canada.
Agriculture Canada	Encourages adoption of agricultural Best Management Practices (BMPs) to protect water from agricultural contamination; PFRA responsible for applied research and rural water management (water supply/quality, irrigation, climate, drought adaptations).
Natural Resources Canada	Ground water mapping and monitoring, water and climate research. Responsible for climate programs and activities with Environment Canada (e.g. lead for Canada's now defunct *Climate Change Secretariat*.)
Fisheries and Oceans	Responsible for the protections, management and control of inland and marine fisheries, conservation, protection and restoration of fish and fish habitat, prevention and response to pollution, and navigation.
Extreme Events	
Public Safety Canada	Responsible for disaster planning, recovery and response
CO-ORDINATING WATER MANAGEMENT INSTITUTIONS	
Prairie Provinces Water Board	Federal-Provincial Board to manage inter-jurisdictional water issues in the Prairie Provinces (Alberta, Saskatchewan, and Manitoba). Environment Canada, Agriculture Canada – PFRA, Alberta Environment, Saskatchewan Watershed Authority, Manitoba Water Stewardship. The board address issues related to inter-provincial water issues (allocations, flows, water quality)
LOCAL ORGANIZATIONS	

Conservation Districts	
Irrigation Districts	
Extreme Events	
PROVINCIAL ORGANIZATIONS	
Manitoba Conservation District Association	Non-profit organization advancing interests of conservation districts
Extreme Events	
Red Cross/Red Crescent Society	Emergency response services; education and advocacy about climate change related disasters
CANADIAN ORGANIZATIONS	
Prairie Adaptation Research Collaborative	Partnership of Canada, Alberta, Saskatchewan and Manitoba government mandated to pursue climate change impacts and adaptation research in the Prairie provinces.
Canadian Water Network	Established by the National Centers of Excellence program, the Network's mandate is to link water researchers with decision-makers.
Canadian Water Resources Association (CWRA)	Individuals and organizations from public, private and academic sectors committed to responsible and effective water resource management in Canada
Ducks Unlimited Canada (DUC)	Committed to wetland restoration and preservation of habitat for waterfowl.
Canadian Water and Wastewater Association	Non-profit national body representing common interests of Canada's public sector municipal water and wastewater services/private sector suppliers and partners.
Forum for Leadership on Water	National lobby group funded by Walter and Duncan Gordon Foundation and Royal Bank of Canada
International Institute for Sustainable Development	A Canadian based international public policy research institute that advances sustainable develo0pment through research, communication and engagement (IISD, n.d., C8)
Extreme Events	
Institute for Catastrophic Loss Reduction	A center for multi-disciplinary disaster prevention research and communications established by Canada's property and casualty insurance industry (ICLR, n.d.)

A more comprehensive list of water institutions can be found in the Water Directory, albeit it was last updated in 2005 (Manitoba Water Stewardship, 2005).

Manitoba developed a water strategy in 2003. The goal of this strategy was to develop watershed based planning across the entire province. It involved new legislation, improved financial foundation and management on a watershed basis (Manitoba Conservation and Water Stewardship, 2003). In 2009 a "Conservation Districts Program Framework for the Future "concluded that the Conservation District program was one of the most successful land and water conservation partnerships in Western Canada attributable to the provincial and municipal partnership, the governance of local boards and sustained annual funding. Provincial and municipal partners recognized the model as the preferred model for effective planning and delivery of land and water resource policies and programs into the future. In order to create healthy watersheds the Conservations Districts were to facilitate and support integrated development and stewardship of water and land resources within watersheds through engagement of local citizens. Many goals and objectives were set to achieve integrated watershed management planning including incentive programming (Government of Manitoba, 2009).

4.3 CDs mandate, structure and governance challenges

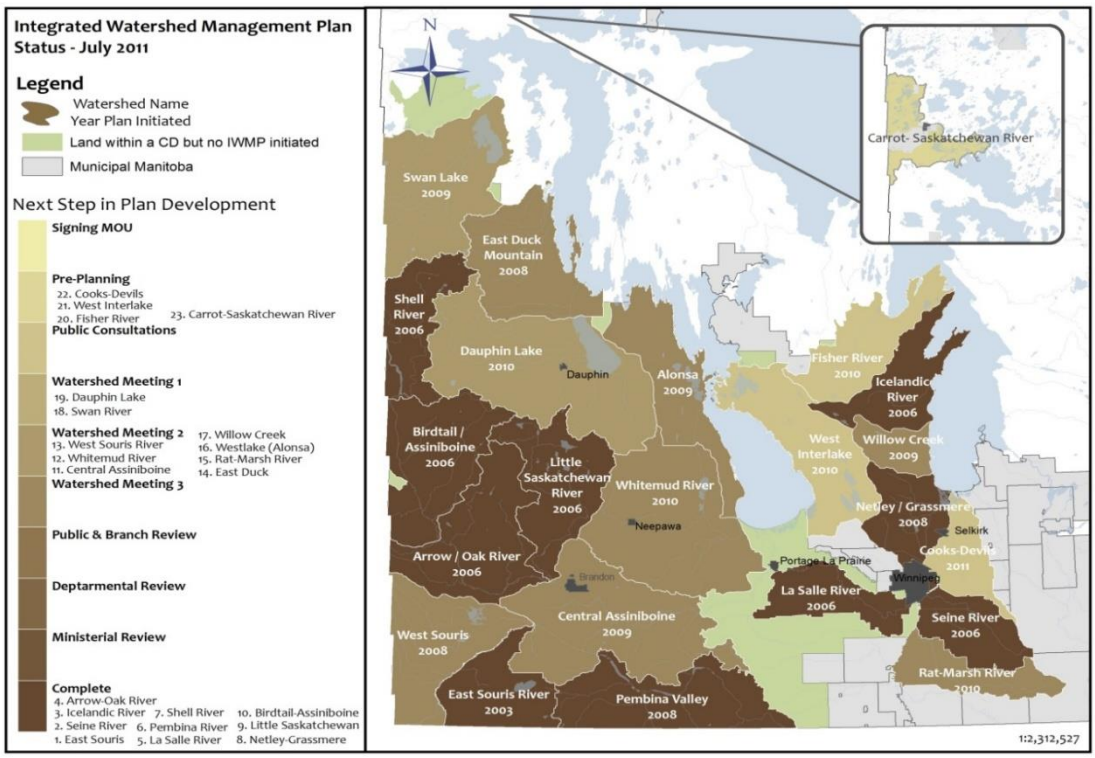
The conservation districts are the main environmental planning regions in Manitoba. According to the Manitoba Conservation and Water Stewardship Department (2010a), conservation districts are defined as:

> A group of neighboring rural municipalities (RMs) working in partnership with the Province of Manitoba to develop programs to effectively manage the natural resources of their area. Conservation Districts are established under the authority of The Conservation Districts Act (n.p).

Conservation Districts are organized to manage all natural resources within a given area. Resources such as soil, water, forests and wildlife are all interrelated. Altering any single resource may indirectly or directly affect other resources. CDs provide an overall, or "watershed" approach to effectively manage all resources as a unified system. It is useful to be able to view resource problems or opportunities within natural boundaries rather than man-made ones. For example, a problem in one municipality (such as flooding) may originate in another municipality (extensive land clearing). The CD, because it includes several municipalities, provides a means for people in different municipalities to cooperate in managing resources. Although the PVCD has been established on municipal boundaries, sub district boundaries within the CD have followed drainage basins or watersheds, to encourage resource management within natural boundaries.

Also, the Manitoba Conservation and Water Stewardship Department states that conservation districts are split into sub-districts along watershed boundaries (2010a); however, the conservation district's boundaries are not necessarily along watershed boundaries. As such, a conservation district can have two or more major watersheds within its boundaries. Conservation districts are partly funded through municipal levies and through provincial government grants. There are 18 conservation districts in Manitoba. Conservation district boards and their teams are the main planners of integrated watershed management plans. The integrated watershed management planning process involves the identification of a planning authority, such as a conservation district board, setting terms of reference, public consultation, gaining ministerial approval, and then implementing the plan (Government of Manitoba, Water Stewardship Division, 2010b). The level of planning within each conservation district varies.

Figure 1: Integrated Watershed Management Plan Status as of 2011



(MCDA, 2011)

Pembina Valley Conservation District (PVCD). The Pembina Valley Conservation District was established in 1989 as the 6th conservation district to be form in Manitoba. The CD was formed because of concerns regarding the loss of valuable topsoil through erosion, water shortages for local farmers, and erosion of municipal roads.

The PVCD has consistently spent more than 2/3 of its expenditures on water management, planning, and programming annually. It has partnered with other conservation districts to help develop and plan at least 7 IWMPs in the district, some of which are yet to be completed. In 2001, the CD developed an IWMP for the Coleman watershed. Also, the CD completed an IWMP for the Cypress Creek watershed.

In 2005, the CD worked with the Pembina Valley River Basin Board to develop the *Pembina River Basin Watershed Management Plan.* In 2005, the CD worked with the Pembina Valley River Basin Board to develop the *Pembina River Basin Watershed Management Plan.* The groups also produced an action plan and policies document that contains goals and actions towards achieving source water protection. In 2007, the PVCD published an action plan towards achieving source water protection and an IWMP in the Goudney watershed within the district. The source water protection plan was completed later that year. In 2010, the CD, in conjunction with the Assiniboine Hills and Turtle Mountain conservation districts, published the IWMP draft for the Pembina Valley Watershed.

In an effort to protect groundwater quality, this CD has an extensive abandoned well sealing program. Since at least 2004, the group has sealed 276 abandoned wells. Also, since that time the group has completed 160 back flood stabilization and water

retention projects. To prevent soil erosion and improve water quality some areas the PVCD has implemented stream bank stabilization projects.

As there is strong municipal representation and appointments by municipalities, and as there are farm groups and other stakeholders well represented then it could be safely concluded that there is no anybody missing from the group. The PVCD has 45 board members that are appointed by the municipalities with one provincial person representing the province on the board.

Future issues:

According to the IWMP, there has been an increase in nutrient levels throughout the Pembina River watershed that has caused large algal blooms in Killarney, Pelican, Rock and Swan Lakes. The result of these blooms has been the impairment of drinking water quality, significant fish kills and lowered recreational activities. Drinking water quality has been an issue, resulting in boil advisories in four sources in the last 5 years. The Rock Lake Beach campground draws from two wells which have been under long term boil water advisory. Strathcona Park and Pilot Mound have both been under temporary boil water advisories within the last 5 years. The community of Ninette, which is serviced by private or semi-private wells, is also under long-term boil water advisory.

Alonsa Conservation District (ACD). The Alonsa Conservation District originally encompassed 268,000 ha, being approximately 100 km in length and 50 km in breadth at its widest point, lying along the western shores of Lake Manitoba. The District has been involved in soil and water management since its inception in February, 1978. Soil and water management decisions are made up mostly on the basis of resource conservation and environmental awareness. As at April 1, 1999, most of the area of the Rural Municipality of Lawrence joined the existing Alonsa Conservation District. The District now encompasses 339, 745 ha and is 110 km in length, though it remains at 50 km in breadth. The landscape is a series of gentle undulations of ridges and sloughs and includes the major watersheds of Garrioch Creek, Sucker Creek, Reedy Creek, Hamlin Drain, Rorketon Drain, and Weiden Drain, along with several systems which drain into Lake Manitoba, Lake Ebb & Flow and Lonely Lake.

General Alonsa Conservation District information:
This District focuses on the upkeep and repair work of existing drains and projects, beaver damage control and cleanout of several overgrown drains formed the major part of the water management program for this year. Extensive survey work was also carried out in the northern portion of the district, as well as a student employment project which saw the listing of location, condition, cost, etc. of drains within the entire Alonsa Conservation District. Delays in Water Rights licensing continues to be a major factor in work progression on a number of projects. Well capping projects and water retention projects formed another area of the water management program of the district this year (ACD, n.d.: n.p.).

This conservation district has smaller of its budgetary capacity for watershed planning and water management and less planned or implemented water-related programs. Also, its educational programs focus less on watershed awareness and primarily on restoring and providing tours of nature trails, preserving Aboriginal spiritual sites, and maintaining and restoring a local church and museum. The group is leading the development of the Westlake Integrated Watershed Plan (WIWP). In their annual reports, the ACD indicated that they began work on a watershed management plan with the process of data collection that began in 2008. Outside of this, their water management planning includes compiling a surface water management plan and performing annual water quality testing. Currently, they have helped complete several documents relating to source water protection and the completion of their WIWP. They have helped to complete, in conjunction with Manitoba Water Stewardship, a *Groundwater Resources of the Westlake Integrated Conservation District* report, a *Water Use Licensing* report, and a *Surface Water Hydrology* report. The WIWP is expected to be completed within the year. They have also performed annual small-scale riparian health projects. In the *Groundwater Resources of the Westlake Integrated Conservation District* (2010) report, groundwater quality was identified as an issue because water quality deteriorates in the northern and southern regions of the watershed. Large-scale livestock operations and abandoned wells have been identified as possible sources of contamination.

Little Saskatchewan River Conservation District (LSRCD). The LSRCD was incorporated in 1999 as Manitoba's 12th conservation district. It was formed in response to a local need for practical solutions to a variety of resource conservation needs. For example, the area has unique challenges such as the protection of what is considered an important waterfowl development area. Also, some other challenges derive from the geographical makeup of the area, as the area contains distinctive pothole marshes, undulating lands, significant elevation changes, and carries challenges such as the difficulties associated with farming the steep valleys of the Oak and Little Saskatchewan Rivers. The LSRCD consists of the following municipalities; Park, Clanwilliam, Harrison, Strathclair, Blanshard, Saskatchewan, Minto, Odanah, Daly and contains the towns of Erickson, Minnedosa, Rapid City and Rivers.

Its vision is:

> The Little Saskatchewan River Conservation District envisions a strong committed grassroots movement of all stakeholders focused upon the land, the water and the other natural resources within its watersheds. The Little Saskatchewan River Conservation District as a group of stakeholders will protect these resources thereby providing an opportunity for future generations to enjoy and benefit from our watersheds. LSRCD, n.d., n.p.

Beyond its vision, its mission is to "encourage and support sustainable management of conservation practices that enhances quality of life and build sustainable communities through integrated land and water management" (Ibid.). Stemming from its vision and mission, the LSRCD's mandate is to "To facilitate and support integrated development and stewardship of water and land resources within watersheds, in ways that assure ecosystem health and sustainability through engagement of local citizens" (Ibid.).

There are six sub-districts within the district and they plan projects that address the goals of the watershed plans, including building a small dam as a water control structure that prevent roads downstream from washing out. As part of public awareness this year the district is doing a nutrient management showcases to highlight the good things going on within the watershed. It's about awareness but also a recognition that landowners do care and to make that connection between urban and rural.

In 2006, the Little Saskatchewan River and Upper Assiniboine River Conservation Districts were jointly designated the Water Planning Authority for the Arrow-Oak River Watershed with the purpose of completing integrated watershed management plans on the upper reaches of the Assiniboine River. In June of 2008, the collaboration between the two conservation districts produced the State of the Watershed report for the Arrow-Oak River Watershed. In October of 2009, the draft of the IWMP was completed. Also in 2006, the LSRCD was appointed the Water Planning Authority for the Little Saskatchewan River to complete its IWMP. In July of 2008, the State of the Watershed Report was completed for the Little Saskatchewan River Watershed. In December of 2009, a draft of the IWMP was completed. During this time the LSRCD also partnered with the Lake of the Prairies Conservation District to assist them with their IWMP.

In 2006, the Little Saskatchewan River Conservation District was designated as the Water Planning Authority for the Little Saskatchewan River watershed as part of a larger initiative to complete integrated watershed management plans (IWMPs) on the upper reaches of the Assiniboine River within Manitoba. Through the input of resource management professionals, local stakeholders, and watershed residents the Water Planning Authority developed five broad goals which serve as the foundation for this IWMP.

The LSRCD was established in 1999. The District covers approximately 4,200 km2 (420,000 ha) and is located in southwestern Manitoba. The District encompasses the majority of the Little Saskatchewan River watershed and a portion of the Arrow-Oak River watershed, which are both part of the larger Assiniboine River Basin. Unique features of our watersheds include the prairie pothole landscape, significant slopes, steep valley walls, and an abundance of wildlife.

General LSRCD Information:
At least since 2004, the district has been involved in groundwater protection, including implementing a coordinated well testing day and an abandoned well sealing program. Since that time, they have tested 62 wells and sealed 98 abandoned well. They have also done work in the area of riparian health, participating in the construction of 6 riparian fencing projects since 2004. In 2005, the western portion of the district experienced significant flooding. The flood was as a result of a large and fast snowmelt, damaging local infrastructure. This was followed by a significant rain which compounded the damage. Although this hampered program delivery for the 2005/2006 year, the district assisted local municipalities with regional planning that had a watershed focus and GIS support to better understand flooding issues. Also, the CD repaired 5 grassed waterways and small dams in the 2006/2007 year. In the 2009/2010 year the district initiated a partnership with Manitoba Water Stewardship

to establish a long term water quality monitoring station on the Little Saskatchewan River.

LSRCD purpose:
Since the district is considered an important waterfowl development area, the LSRCD in conjunction with the Delta Waterfowl Federation and Keystone Agricultural Producers developed a proposal for a 3 year pilot project called the Alternative Land Use Strategy (ALUS) to be implemented within the RM of Blanshard in the 2004/2005 year. While it is not clear how much funding the district received for the implementation of this program in its first year, during second year of implementation the district received $50,055.50 in external funding and $750.78 in such funding in the programs final year. While the LSRCD spends less than half of its expenditures annually on water-related projects, the LSRCD still performs a large amount of water management, planning and programming. In 2006, the Little Saskatchewan River and Upper Assiniboine River Conservation Districts were jointly designated the Water Planning Authority for the Arrow-Oak River Watershed for a larger initiative to complete IWMPs on the upper reaches of the Assiniboine River. In June of 2008, the collaboration between the two CDs produced the State of the Watershed report for the Arrow-Oak River Watershed. In October of 2009, the draft of the IWMP was completed. Also in 2006, the LSRCD was appointed the Water Planning Authority for the Little Saskatchewan River to complete its IWMP. In July of 2008, the State of the Watershed Report was completed for the Little Saskatchewan River Watershed. In December of 2009, a draft of the IWMP was completed. During this time the LSRCD also partnered with the Lake of the Prairies Conservation District to assist them with their IWMP.

Seine-Rat River Conservation District (SRRCD). The Seine-Rat River Conservation District was established in partnership with local area municipalities and the Province of Manitoba Conservation Districts Program in January of 2002. The SRRCD was formed to provide an avenue to local people to allow them to work together, set resource management priorities, develop and deliver land and water management programs, and assist partners with responding to local issues in a sustainable manner. In November 2005, the SRRCD officially received Registered Charitable Organization status.

SRRCD Purpose:
The SRRCD plans and undertakes projects within the Conservation District aimed at the long-term sustainable use and management of land and water resources. The SRRCD offers programs based on the priorities within each sub-watershed area. A full list of the SRRCD programs can be viewed on the Programs page of the website. The SRRCD staffs organize and oversee the programs which are proposed by subdistrict members and landowners within the Conservation District. Staffs are always willing to discuss potential projects with District residents. All landowners within the SRRCD boundaries have equal opportunity to apply for the SRRCD programs. Program application forms are available at the SRRCD office, or for download from the Programs page of the website.

The SRRCD utilizes Geographical Information Systems (GIS) software to assist with project planning and analysis. The GIS can spatially and graphically display an endless amount of land and human related information, such as aerial photography, land-use, soil type, highways, livestock sites, rivers, drainage channels, etc. There are multiple benefits in having the ability to create customized GIS maps and use them in watershed management planning.

Its mission is to "promote the stewardship of our land and water resources to ensure a healthy and prosperous lifestyle for all watershed residents, now and into the future (SSRCD, 2010: n.p.). Stemming from this its mandate is that "The SRRCD operates under the authority of the Conservation Districts Act and Regulations and correspondingly follows the CD Program Mandate to support and promote the sustainable management of the land, water and related resources in Manitoba SSRCD, 2010: n.p).

The Seine-Rat River has also made significant progress toward fulfilling their CD mandate through the completion of an integrated watershed management plan for the Seine River Basin and it is on its way to completing a draft plan for the Rat Marsh River Basin. For both basins, this process began with developing a State of the Watershed Report, Groundwater reports, and Source Water Protection Strategies. Meeting the requirements identified within the Water Protection Act for watershed planning, the Seine River integrated watershed management plan was completed in 2009. The Rat Marsh River integrated watershed management plan is in the planning stages.

The Seine-Rat River Conservation District is the main board is made up of the chairperson of each individual sub-district and within the sub-district there are representatives from the different rural municipality that are parts of the conservation district. When the RM appoints people usually they have two representatives in the sub watershed or sub-district. And of those two representatives usually one is a municipal councillor and one is an at large it is not allowed to have two councillors. In the sub-district board there's a chairperson and that chairperson is the one that sits on the main board. The person that's elected chairman usually is a councillor just because those are the types of people that are entrusted in such duties. And they have more time and experience on boards. Thus around the board there are members from the different sub-districts but the main board there is no representation from each of the RMs because it focuses more on watersheds other than municipal boundaries. The fact that representatives come from different RMs helps a different perspective being brought to the board. The other member that sits on the board is the provincial appointee. Since the watershed gets a little funding from the province then they will appoint an appointee to the district.

The people that are on the board are older men, not as many women that are interested in being on these boards and usually there are no young people. There are more rural people than urban on the board that is because projects are happening on the landscape thus a pretty good knowledge of the local landscape is demanded. There is one urban on the main board.

4.4 CDs finances

The PVCD shares the Pembina watershed with two other conservation districts. Most of agricultural Manitoba has an area called a Conservation District (CD); for which the groups work on any national resource issues for an area. The group is made up of mostly grass root organizations. Its board members are appointed by the municipalities and it has one provincial person representing the province on the board. The group has about 45 board members for 2000 mile area and one of them is a provincial representative. The way the conservation districts are funded in Manitoba is about 75% funded by the province, 25% by the local municipality or other sources.

The LSRCD's base funding is a contribution from its local municipal government and the provincial government. It also gets some external dollars through programs from the federal government, the municipal government, or some other organizations. Thus money comes from a lot of different sources. For the actual source water plan there was support from all three levels of government; there was cash support from the provincial government for the preparation of the plan.

The SRRCD gets 75% of its funding from the federal government and the provinces fund the remaining 25%. It also gets external funding from other grants and if it is doing special projects with RMs then it can get special funds from them for specific projects over and above what their local capacity. The SRRCD staff continually search out partnership and external funding opportunities for special projects. External funding for specific projects is a great way to supplement the SRRCD budget and complete more projects

4.5 First Nations participation

In general participation exits in two major CDs that were interviewed. The institutional arrangement of the conservation district program, reflecting centralized and decentralized characteristics that facilitate bottom-up planning, allows shared expectations about targeting rights holder and stakeholder groups within conservation district boundaries.

> *Just recently they implemented a policy that every conservation district can appoint two extra people to their boards who don't have to be part of the municipal appointed, elected structure, mostly to represent special interest groups, if they are a major part, and that obviously would include something like First Nations for us. (M50: 17).*

This policy has the potential to facilitate flexible, functional interaction with respect to First Nations participation.

> *So they were invited to participate, they did participate, we meet with them individually. We consider them a kind of a partner; they were not part of the steering group. You know the steering committee and not on our board but in terms of the plan they were part of, they were one of stakeholders [who] participated. M54: 1,2).*

Perceptions surrounding complex relationship between the federal government and First Nations groups within provincial boundaries exist that complicate the potential for functional interaction.

> *We don't really have that much involvement with them, uhmm, well Metis is a little bit different because, that I can see there's maybe a few Metis that maybe involved in it. But as for First Nations it's tricky because they deal more with federal levels of government, where as we are dealing more at a provincial level. So actually at our next board meeting we're having one of the representatives from the local first nations come to our board and just going to talk and see what we can do. But as far as it being a part of the conservation district's act not really a part of that because that's the provincial act and you know they deal more federally. (M53: 3).*

4.6 Complexity and overlap

The conservation districts look at themselves as a kind of municipal organizations, but they are not really municipal but are a kind of a quasi-municipal. Most of the board members are local grass-root people. The work the conservation districts do is based on the watershed plan they developed that plan with other partners based on the boundaries of the watershed. In the case of PVCD they are right up against North Dakota. They have developed the watershed plan in concert with the Americans. Because this Pembina valley watershed it is half Canadian and half American, half the watershed is in the USA.

4.7 Implementation: the efficacy of the CD model – conflict

Decisions in the SRRCD are made on a consensus bases. The group pays attention to issues that came up the most and are feasible to tackle. The feedback that this watershed group gets from the municipal and other stakeholder's input helps it make decisions through consensus.

One other mention was made in the interviews surrounding conflict which is detailed in the section below on drainage.

4.8 Implementation: the efficacy of the CD model – Climate Change

Secondary sources conclude that the conservation districts have adapted well to flood and drought. As an example Cooks Creek Conservation District experienced a 2010 flood and 2011 drought which allowed the district to conduct appropriate measures for flood, followed by drought the following year. Excessive water allowed the identification of troubled area and drought allowed the district to conduct needed maintenance on infrastructure. The drought also allowed expedited infrastructure work as operators didn't have to deal with saturated earth material. The report concluded, "2010 and 2011 were quite opposite and while no extremes are ideal, board members, residents, and producers can all agree that the District is able to keep and maintain its infrastructure in excellent condition during dry years" (Manitoba Conservation Districts Association, 2012, 10). The 2013 issue of the "Current" was dedicated

to "Managing Our Variable Environment" (Manitoba Conservation Districts Association, 2013).

Water Issues

Participants responded that both surface and ground water are used as potable water sources for municipal water systems. Water is used for irrigation, and livestock watering, as well as for recreation (boating and fishing) within the Seine-Rat River Conservation District (SRRCD). The use of groundwater is unique here

> *That's where all the drinking water comes from in this area from ground water. (M52: 1)*

It was observed that there are a lot of livestock operations that also use a great deal of water for the livestock. It was noted for surface water there are some people that still do water their animals using surface water and a significant amount comes from dug outs which is basically just getting to the shallow ground water table.

> *There are lots of RMs that will discharge their lagoons into surface water and they need to do that in flowing water, so there needs to be water in the creek, river, or wherever they're discharging there needs to be flowing water, they don't use it directly but they have to discharge each flowing water so, there is not a lot of irrigation around, so that's not a huge use. There is a provincial lake so recreational use is important (M52: 1).*

Exposure to extreme events mainly drought & flood

Drought

Participants noted that the occurrences of drought events have been declining.

> *Well, because we haven't had a lot of drought in recent times, and my history with the watershed doesn't go back to a point when there was a lot of drought but you'll get more people doing projects to store water on the land whether that be digging, dug out or building dams and stuff like that to store a little bit of water on the land for their use. (M58: 2)*

Some participants were critical of the government's dissemination of drought-related information

> *We don't have a lot of information on [droughts]. I know with our board we always talk that way, we try to think that way the programs we offer we want them to work for drought and for wet. Well that is a kind of the history of Manitoba it's been a lot about the flooding and the wet cycles and you know our answer has been to dig bigger ditches and kind of our philosophy has been for the last 100 (hundred) years. (M54: 5)*

> They forget about the drought period and they seem to be more concerned about the flooding and the wet period than they do the drought periods. (M54: 5)

II. Flooding

Participants have commented on the large flood events in the recent past. It was observed that the 2011 flood on the Souris River and Assiniboine River was "a tremendous flood" and it was a 1 in 300 years flood in the spring (M54: 3). It was observed that in the same year in the Little Saskatchewan River Conservation District (LSRCD) there was a long flood period. It was observed that the event started in the spring and the flood did not let up till the rain stopped at the end of June.

> *There [were a] few other [floods] earlier years let's say the last 15 (fifteen) years I think on the Pembina River we had 3 (three) or 4 (four) extreme events. They were the highest; they broke the record on the flood levels. (M54: 7)*

It was noted that there was flooding has cause significant infrastructural damage. The infrastructure that was lost included roads and bridges and as a result normal travel routes were interrupted for many weeks and farmlands were damaged and there were a few communities displaced.

Previous Manitoba floods

Participants in Pembina Valley Conservation District (PVDC) noted that there has been some extreme weather events impacts in the last 15 years. Some were skeptical about the role of climate variability in driving these events.

> *People generally do not believe you when you tell them you know it is climate variability, we are in a weather cycle. They don't really believe that, they point more to you know basically the farmer land has been drained, the wetlands have been removed and the sort of shock absorbers have been taken off the system and it is really the reason we've had some extreme floods is because of agricultural drainage. It seems like nobody can really prove it for sure but like I think it is more maybe 70% climate variability and maybe 10-30% increase in agricultural drainage. It is what I think but nobody believes me. When you talk to the stakeholders, they point to the drainage being more of a problem. (M54: 2)*

There have been transboundary issues noted because of flooding. It was observed that on the Souris River a lot of the water was coming from Canada and going into the United States and back again to Canada, almost like a horse shoe pattern.

> *[On] the Souris River definitely a lot of the water was coming from Canada and going into to the US and back again to Canada, almost like a horse shoe. That is the south east of Saskatchewan flows into North Dakota and back in the Manitoba and then Assiniboine and then towards Winnipeg. Whereas the Pembina River a lot of the water comes from US up into the Pembina River and*

> *then it goes back to the US again. So most of the watersheds are you know a bit back and forth. (M54: 4)*

Participants observed that not all floods have had the same intensity and affected different regions differently. The 2010 flood was a relatively small flood, but there was flooding in Pembina area in 2009. There was a big spring flood and also a summer flood. The cottage country suffered the most. Some of the cottages were damaged and people could not access their cottages for a long time.

It was observed that there were a few other floods in the last 15 years on the Pembina River and there were 3 or 4 extreme events that broke the flood level records.

> *..that is pretty rare to have that many extreme events compared to the previous 60 years. People can't really remember seeing floods on the Pembina up until the 2000s when the wet years sort of came, 1997 was bad, too. And a few years in the 2000s and before that was probably 1950 was a big year, it was really rare. It was a dry period 60-70 years and then the last 15 years were a lot wetter with 3, 4 and 5 extreme events, sort of set records. Definitely it is special climate variability. (M54: 7)*

Participants observed that the Little Saskatchewan River has experienced large rainfalls in the north, and also impacts so sudden and local in the southern portions of the watershed. It was also observed that drought has impacted the watershed because there is a lot of agricultural land use within this watershed in terms of cattle, cattle grazing and grain production.

In the Alonsa District due to climate changes there have recently been a number of events that led to a range of impacts to agricultural lands.

> *Due to climate changes there has recently been a number events that led to everything from emergency situations to excess of excessive maintenance work on agricultural lands and this is an agricultural area (M50: 1)*

M50 described that the conservation district is made up of two municipalities and large geographical areas, extending some 232 km^2 from one end to the other, bordered by two lakes.

> *It's a flat land where drainage elevations from east to west varies anywhere from 16 to 29 feet before the water gets into its lake basins. And on traveling from south to north on average there is a one foot of drop every mile. So that is what it is meant by flat land water management issues. (M50: 1)*

Participants noted that the last four years there were very wet conditions but this year has been somewhat of an exception.

> *June did give a very heavy rainfall event with a total rainfall in the RM of Lawrence of about nine and a half inches which was too much to deal with.(M50: 1).*

Respondents within Seine-Rat River area is affected by heavy spring runoff..

> *[W]e are affected a lot by flooding, there's usually an excess of water in our area so that can cause problems especially, yeah, there's spring water .like the spring flooding that is one thing, then there's also heavy summer rains and those are more destructive because it affects crops a lot more and in the spring time because nothing is growing yet then it's all pretty much frozen and probably affects more infrastructure like roads and maybe people's houses you know that kind of things. Where as in the summer time it affects the cropland a lot more, because if the water is sitting there for you know a week or two weeks, then it'll actually kill the crops so, then there is water crop loses, so that's the main impact in this area I think. (M52: 3)*

Respondents also commented that in summer of 2006, there was very wet flooding. There was also a lot of water in the spring of 2011.

People remember how the drought in the 1980s. This has only been repeated in 2011 and 2012.

> *Only last year (2011) and this year (2012) [drought] has kind of shown up I mean everybody remembers, well a lot of people remember what it was like in the 1980s, but it really hasn't been dry since then. So it's really last year and this year or when people have really been noticing otherwise it's always been wet it's been more of the issue. (M52: 5)*

Respondents commented on the impact this drought had on yields. The yields were less because the crops get stressed and start maturing faster. Thus there was not a crop failure but the yields were impacted.

> *Yeah, I don't know if anyone has done anything really different because it's so hard to say what's going to happen in the next year, and when the rains are going to come I think it all depends on the rains. And it hasn't been long term yet, but I think it's still very much just everyone kind of waits year to year to see what happens. I think if it was to be over a few years, then people will start doing things differently. (M52: 5)*

The way in which local watershed groups and communities have dealt with those extreme (drought & flood) climate conditions?

Coping with drought

Respondents noted that there has been a big increase in minimum tillage on the fields. So there has been less cultivation which helps prepare for more dry conditions and puts more moisture in the soil. Topography is changing because of technology. A lot of shelter belts are getting taken out

> *A lot of shelter belts are getting taken out. Our equipment is getting bigger and then they cut to a point to we have a minimum tillage so that protects us so we don't really need the trees anymore. We think the retention idea we have water retention as a solution to downstream flooding that will work for the drought period, too. You are saving the water that you do have instead of it all running*

> *off. So we think retention is a good scheme that works for droughts and for floods. (M54: 5)*

Coping with flooding

The watershed within the PVCD has a lot of topographical stratification and as a result, participants commented that generally the flooding does not threaten houses and communities like it does in the lower part where towns were definitely threatened by the flooding. They noted that here there is agricultural land that is flooded results in high economic impacts. In terms of infrastructure, bridges were washed out. In discussing impacts of flooding CDs are challenged with convincing farmers to change their practices to mitigate flooding impacts.

> *We can sort of move away from the floodplains and there isn't a huge lose other than the infrastructure, you know the bridges and that sort of things washing out. And that is a kind of our challenge to get farmers to recognize, you know they shouldn't be farming the floodplain, they should give it a little bit more room.*
>
> *You know we have programs for riparian buffers and even wetland restoration and those kinds of things. We think those are some of the answers leave a little more room, put the shock-absorbers back in the system and keep talking to people about you know about climate change. You know you got to be prepared for drought as well as for big floods. (M54: 2).*

It was observed that a lot of the land owners think that agricultural drainage is major problem.

> *Yeah for the most part, there has been not been a great system of licensing in the province so people always have done drainage to improve their land and that sort of thing we have been doing it for the last 100 (hundred) years. And the province has really stepped up in the last couple of years to have a good licensing program and people can apply for licensing and do it that way. But even with that yeah probably, a lot of it wasn't licensed, whether you want to call it illegal or not I am not sure but unlicensed. (M54: 7)*

It was observed that the area has taken a significant amount of financial impacts due to flooding. The financial loss in terms of infrastructure stems from roads and bridges.

> *Well just the amount of infrastructure that was lost roads and bridges, farmland that was damaged, there were few communities displaced, not so much of in our area but there are communities displaced and there are still people that are not back in their homes yet. The waters are so high and their communities are flooded out. (M54: 6)*

> *The waters are so high and their communities are flooded out. Typically we think of those types of disasters has been a large part federally funded. Like in the past you know the problems could expect to get 90% to be funding from feds. Because you know it is disaster something Canada as a whole helps out rather than one province so. I guess there is some problem with that and the feds aren't coming forward like what they had done in the past. So I think they are saying the numbers are billion dollars to pay for the flood and damages from the flood. And if you can get 90% of that from the federal government, that is great. But if you can't, then that puts Manitoba in an awkward situation. (M54: 6)*

It was observed that because there have been a lot of flooding in recent times people do projects to store water on the land whether that be digging dugouts or building dams to store a little bit of water on the land for their use.

> *Well, flooding has been pretty prevalent to us little while for years. And some land owners will do diking projects to protect their property and stuff like that. Whether that's temporary diking or more permanent type diking. Uhmm what else did they do? That's a lot of work the work done. when there is flooding and stuff, but not to say that post flood and stuff but people that rely on their own individual groundwater wells that they won't get their wells tested to make sure if it's been impacted by flooding. They won't get their wells tested to make sure that it is still safe to use and stuff like that.(M57: 8)*

On the topic of financial aid:

> *It is the most frustrating part is the ability or the lack of guidance on our Government disaster financial assistance but it's also the way the province has managed it, granted they, I don't think they ever have any, any proactive measures, there wasn't for such an event. I suspect that they are trying to build into for future in case we have another flood of such magnitude and proactive measures. But when you deal with the flood you are never fully prepared enough no matter how much policy or measures you have in place. (M50: 3)*

Who makes what decision?

It was observed that the CD is dealing with the ability to have sites assessed in regard to drainage and the province's role is to deal with compensating municipalities and compensating residents that are affected.

> *[I]t's still literally a mess and when I say a mess I mean the province doesn't seem to have anything in order. I did hear the other day that the federal government kicked in 100 million dollars or more but of course we all going to say that is not enough, but there's so much out there that qualifies for disaster financial assistance that is not being looked after you know. (M50: 4)*

So you know what happens with new bodies in places of those who are somewhat experienced and the thing is it continues to erode and breakdown the system. I believe it's probably a lot of money spent on certain projects that was not necessary not qualified but I mean you see that in all walks of government dealings… Most issues on infrastructure work with provinces of years in the making and when they finally get down to doing it I am referring to major drain rehabilitation or something like that because the provincial drains are still, it took them about five years to decide who own them the province or the CDs and municipalities. But anyway a lot of times their projects are outdated before they get them started… That's the system we live in, the system makes me believe that it's the lack of local autonomy. Let the people on the landscape be more decision makers that's why we have a democratic system, I don't know may be I'm really straight off in the wrong direction, I'm not sure. (M50: 4).

I guess with the infrastructure it more impacts the rural municipalities, they're the ones that are dealing with all the roads infrastructures, they are the ones that do more of the work that way so that'll be repairing roads and that kind of thing. They usually apply to kind of like disaster assistance. So they apply to that provincial program and usually get money to put towards fixing that. And then I guess that's what people would do if their houses are impacted also and then with the crops it's easy it just goes to crop insurance. (M52: 4)

I think disaster financial assistants that they called DFA, it doesn't provide any money usually for prevention, and it's more of a reactive program. So I think that is one of the flaws with it, yeah, it doesn't allow you to prevent these types of things from happening. It's more repairing the damage afterwards which can be more expensive. (M52: 5)

The role of the local conservation district groups in dealing with extreme (drought or flood) weather events?

It was observed that conservation districts are prioritizing flood event responses during flooding events. Not a lot is done while the flooding is going on other than learning about the impacts and bringing together the landowners so that everybody is aware about the impact and can get bigger picture of how the flooding impacts the larger area. That was used for project planning for future years since those problems seem to come up every year. It was observe that The Pembina Conservation District has a retention programs or projects and it is working and spending local money on water retention schemes to put the shock-absorbers back in into place and negate the increased agricultural drainage. Creating a balance by draining one area and by putting retention in the other area and there seems to be a kind of a growing interest in a basin-wide retention.

There is disagreement of CD's role with emergency events:

> *[L]ike immediately when there is a flood happening, then we don't have that big of a role. It's more for looking at where the problems are, and then figuring out what we can do to address them in the future with some of our projects. We don't really have a big role, you know during emergency types of events, more the RMs that deal with that… Basically they just have to go in and build berms on roads to keep flooding or repair road or you know, they're the ones that are dealing with that types of things. (M52: 8)*

Planning for Climate Change

LSRCD

> *Climate change wasn't around because as you are aware like we were doing this in 2009 well the climate change was around it wasn't say in the forefront like it is today, even those two short years ago and I guess here we are used to, there's always a certain amount of variability with the weather, so whether it's, whether we're gonna, whether it's due to the climate change or perceived climate change or just that is the way it is because we have wet cycles we have dry cycles and stuff like that so, we're always dealing with a certain amount of variability so, climate change not that it's ignore but it wasn't a large driver in the preparation of the plan. (M58: 5)*

SSRCD

Climate changes and climate variability were not yet incorporated into the plans of the CD.

The roles that external institutions have played in reducing the exposures or stresses to climate and/or water conditions of local watershed groups and communities. CDs are involved proactively in extreme weather, particularly flooding, with other agencies. Typically there is a one month lead time in one CDs and no reports of flash flooding were made.

> *I think local groups like ours you know that is where the flooding takes place; with the local people I think we do receive pretty good assistance from the larger agencies. So big government and even NGOs, so you know I just hope that continues that relationship between the grassroots and the bigger organizations. That is important. (M54: 7)*

> *[A] good example is 2011 flood on the Souris River and Assiniboine River, you know tremendous flood and it was one of these 1 in 300 years flood in the spring. It just kept raining and raining and the province I think they did a very good job of handling it. That is the province with their whatever kind of flood fighting forces, different government departments working together you know to hand sandbags to communities. The forecasting is the huge part of it to make*

sure you know where that flood peak is going to be. In the North Souris River there are two communities that were seriously threatened, but you know between the communities and the province they work incredibly fast and raised dikes 8 feet in a few days whereas on the Americans' side you know Minot totally got submerged. Because they did not seem to have the same kind of preparation, I guess they were closer to where the flood peak was coming from; they had less time to act. There seems to be night and day difference between the American side and Canadian side on the reaction side. They got the track down to the Canadian side to protect those communities. So I think the system they have in Manitoba because they are the recipient of a lot of water, they have a lot of government departments in place to react to the flood. Our floods are very slow you know, they don't flash flooding like some part of the world. Maybe got a month to get ready sometimes, the flood peaks so you have time. But they really seem to be organized and manage it for people. And then after the fact there is an emergency measures department, you know they take away the stress from the people because there is financial funding to get back on your feet even the bridges and the roads that are destroyed in the municipalities, there is federal and provincial money through these emergency measures. You know bridges get replaced because those are huge costs for the municipalities. So that takes away the stress from the local government. (M54: 7)

[I]t seems to be from my advantage point, it seems to be a really good system. I am sure for some people they will think it is never fast enough. But you know they have the flood preparation, they had the time and after flood the disaster assistance or emergency measures to help with the problems that have come up. You know when you are dealing with Mother Nature you can never be fully prepared for it. So you have to have the disaster assistance and those kinds of programs available you know insurance and what have you available. Because you can never prepare for Mother Nature, you know she is always going to through at you that are a little more than you have prepared for. We can't afford to build roads and bridges to that you know 1 in 10,000 (one in ten thousands) flood event, disasters are going to happen. You have to accept that. (M54: 4)

Manitoba Conservation and Water Stewardship: Government's Perspective

Water quality

CDs are working on issues of water quality within their areas.

We do have some water quality monitoring in those watersheds in the Pembina and the Seine River watersheds and we were told that certain parameters nitrogen phosphorus has increased. So as part of the planning process inside infor-

mation was made available to the public and to the planning group, the watershed team and we identified that as an issue and we tried to develop some recommendations on how to address that. So within the plan we stated a goal of trying to improve water quality and we have listed a number of recommendations and so far with the Seine River plan, majority of those recommendations are currently being implemented and with the Pembina River plan same thing, so I would say from addressing, from identifying water quality degradation as an issue to going into a process of identifying how we can improve it and starting to address it through implementation of the plan I think is going well. (M55: 1)

The challenges

Because there is majority of the land that is greater than 99 % of the land that we deal with in all watersheds is private land, one of the things that is the challenge or cause some challenges is having willing participants to change a different landscape or changing…what is there on their property, but there are still some good news stories as far as implementing the recommendations. (M55: 1)

Regulations that haven't been enforced – staff constraints

In some of the plans there were statements in some of the earlier watershed plans there were statements about increased enforcement, increased regulatory inspections it would lead into things like illegal drainage or illegal on-site or septic tanks that are on-site waste water systems so there was concerns about those, some of those activities not being in line with the regulations and the recommendation was increased enforcement or increased regulatory inspections and that just hasn't happened because across Manitoba there's just there…there's been limitations on staffing and what things these staff can do so some of that stuff hasn't really changed hasn't resulted a plan just because it's mentioned in the plan it hasn't changed because for that to change there's got to be a kind of a big change in government and the way government operates, and in some cases it's just lack of staff we are already overwhelmed with the current workload so they can't, they can't do additional inspections and that kind of stuff, most of the people who works like the regional people have pretty large areas and when the issues arise areas that are relatively populated, so, for them to get out and do inspection it's like almost another full time job to do all the stuff we kind of wished we could do but…so for the recommendations in the watershed plans we kind of knew a kind of a wish list things but, we still want to include them in the, in those things that really haven't been implemented (M55: 3).

Solutions, Public education and awareness

Well I guess [environmental awareness] will only go so far, if the province does public education and awareness campaigns and conservation districts always have that kind as part of their program, I know the program, so providing information out to the general public is a kind of an on-going thing and you know I mean there's an argument to be had whether those things need to be changed, so in some cases they're successful in some cases we've already reached that audience and how do you reach the other audience that you are missing from your educational campaigns so. (M55: 4)

North Dakota Perspective

The watershed area

North Dakota is a large, sparse rural area which is recently experiencing "drastic" drought and flood cycles.

North Dakota is pretty rural, pretty agricultural, a few cities with a big oil boom. The area of focus now is the north western third of the state. It's a pretty big area; it's around 50,000 sq. miles. The watershed group does monitoring on lakes and rivers on rotating bases once every 5 years" (ND60: 1).

It's pretty rural, pretty agricultural, I work, and the area that I work in is kind of a north western third of the state. It's a pretty big area, it's around 50,000 sq. miles and I am sorry I don't know my conversion to kilometers off the top of my head. So it's a pretty big area, a lot of agriculture a few cities and the big oil boom that is going on is kind of crazy, the , as far as like watershed assessment we don't have a whole lot going on this because an ambient plan to monitor certain like rivers around the state every year for it's about every 6 weeks and then we have other specialized projects where we do monitoring on a rotating basis so that the lakes and rivers get monitored about once every 5 years, we do it a subset every year and then around 5 years comes around again so…(ND 60: 1)

The major weather events and their impacts

The major weather impacts in recent past (2010-2011) have been drastic drought-flood cycles within the past couple of years. The floods were pretty devastating from upper Souris River and the other major river systems in North Dakota. The area went right into drought last fall (2011) as soon as it stopped raining. The crops survived because there was much water to start with that carried them over. The responses to those weather events were largely reactive not proactive. The preparation was enough to handle only an average flood. Minot was heavily impacted, houses were destroyed, roads and bridges were washed outs, pasturelands and farmlands were flooded sending many ranchers out of business.

..you know we've been in kind of drastic drought-flood cycle here with the past couple of years. The floods were pretty devastating and I think a lot of that was because it

> *wasn't just the Souris River that was flooding at the same time all the major River systems in North Dakota were experiencing flood events that usually doesn't happen, it's usually one part of the state or the other maybe over the east River basin like flood and then, excuse me, in a different set of years it might be the Souris or the Missouri but you know in the previous year's let's see 2010-2011 it was pretty much the entire state had issues with flooding most of river basin that we had and so that made it a little more difficult to deal with on that watershed basis because there is so much going on at a time and then of course you know it was one of the most historically drastic floods that we've had you know what they called 1 in 500 years, a thousand years and it happened in Souris River, and then coming out of it this year I mean we as soon as it stopped raining last fall we basically went right into a drought and we really didn't notice it because of there was so much water around but you know there is almost no snow throughout the winter, we've had very little rainfall, I think the only reason that the crops and agriculture and things like that are surviving is because there's like eastern part of the United States we had so much water to start with so it kind of carried over yeah but yeah things are very dry and crispy right now so it's kind of the flip side of that, it seems like those patterns have gotten to be more drastic in the last maybe 10 years or so, it switched back and forth used kind of a drought cycle that would last I don't know 2 to 3 years and then come back out of it for a while, and maybe 10-15 years down the road you just have a flood cycle after a year or two and then go back to an average again and they seem to be following one on top of the other now. (ND 60: 2)*

> *The flood started that so that's the big city that got hit, well then all the politicians put their focus on that because that's where more people are that's where kind of more noise gets made, I was downstream of that and the farmers and ranchers down here the ag producers have been hit very hard as well, the pastor lands are flooded and this is the almost of third year that they've had to buy the feed for their ranch animals it's putting a huge stress on their business where is you know say there is 10 businesses might not been a business because of the flood, wouldn't impact the town as drastically as if 10 ranchers in my little town of 300 went out of business that's not a huge thing for them as they're all trying to come up with funds to put them back till the after effects on their ranching stocks and there hasn't been much if a plan for them either there's just kind of a, on and off, sometimes it almost feels like it's treated like well, your ranch you should expect it sort of a thing. (ND 60: 3)*

Working relationship across the boarder

At the watershed level and the grass root level there is a pretty good cooperation and interaction. But as one goes up the political scale, politics tends to complicate things. The international Souris River Board tries to do its best in the middle of the blame games between Manitoba and North Dakota, both sides blaming and accusing each other with what is going into Lake Winnipeg and not so much cooperating. But the Saskatchewan-North Dakota side seems to work together a little better. At the grass root level people are so friendly and eager to hear about things. There are invitations and calls for presentation and there is interest to get projects going together. There seems to be a lot of optimism on what can be done together in the future. Better communication and better access to information via media (TV) gave people the chance to know what was going on across the border and helped ease some of the negative feelings and the blaming for the flooding. Some of the staffs of the watershed groups

across the border have excellent communication; they let each other know if there is something going on. This kind of grass root networking is going well, but there still is room for improvement. During the flooding a command center mode was formed by big federal officials and the watershed group staffs were not allowed near it. Initially the communication back and forth was very bad. Canada dealt with its issues and the United States dealt with theirs before they realized there needed to be more communication.

> *The Saskatchewan North Dakota side it seems, it seems to work together a little bit better but that's just because, because the flow of water, I don't know, well, yeah as you move further up it is more difficult but on the grass root level it's been, I found it to be amazingly wonderful, people are so friendly and eager to hear about things and you know, I get invited to come up and talk about what's going on in North Dakota, and people are interested in how can we get projects going together, the border creek is kind of an issue with funding, because it, it would mean like international funding across the border and that could be problems but it doesn't mean that there's not a thing that we can't do to off trading and stuff like that that work and everybody seems really positive and hopeful and going towards that and since they're the people that really get stuff done (ND 60: 7).*

About the International Souris River and the International Red River Board

These two organizations operate separately with little communication between them until the last couple of years with a main focus of water quantity apportions to North Dakota and Manitoba and very little focus on water quality. The urge for more actions like acting as an advisory board and putting out advice and suggestions instead of managing how much water comes across the border.

> *They work separately I don't think they ever talk to each other which I think is kind of a shame, because it's all the same river basically but the timing that back up into Manitoba, Red River meets up with the Souris so there it is, I wish there was more communication with the operate separately and until probably 2 years ago, their main focus was water quantity and it was you know the apportion that is North Dakota getting what it's supposed to when it's supposed to? Was Manitoba getting what it was supposed to when it's supposed to and there was very little focus on water quality at all or any other type of you know, should we be doing something, should we act more as an advisory board putting out advice, suggestion and things like that instead of just there's so much water came to this border and here so much water went to that border and we are on target here. (ND 60: 9,10)*

4.9 Valuing Eco-System Services

<u>Manitoba DUC Perspective about EGNS</u>

About the DUC

> *DUC has been working on EGNS for almost 10 years now across the provinces but more in Ontario, Manitoba, Alberta and Saskatchewan. It focuses on research on the science aspect of the wetland loss. It has been working with University of Guelph and University of Saskatchewan. The research is presented and communicated with the government in order to change policy on wetlands. Another component of the work of the organization is public education. Fact sheets have been developed about natural capital and EGNS as*

> *well. It presents a 30 minute television program on the Nature of things program in Manitoba and also produces three minutes video on YouTube. They claim to be the pioneers of wetland study. (M59:5).*

What the government is doing about wetlands

The only reason that EGNS has not been taking off is because there is no political will to enforce the government's own regulations or legislation. The governments know that they should protect wetlands but to protect wetlands they have to impose some sort of restrictions on agriculture and they are not willing to do that. They have to decide that they really want to do this and they have to believe that it's not political suicide to do so. Governments know that wetlands should be protected but they have another big driving force (namely agriculture) in which the government paid farmers to drain their wetlands for years and now there is a deep mindset that wetlands should be drained and that to clean up a property one needs to drain the wetlands. Lack of political will and too many other competing interests and driving forces are stopping wetland policy from being effective.

The new information

> *Now there is new information that says wetlands are actually beneficial for carbon and water quality and flood mitigation. There needs to be a real shift in the way people think about wetlands. Effort is being made to show that is part of the organization's strategy to change the way people think but there have been a lot of years where governments, the public and agriculture has promoted wetland destruction. Reversing that straight away is going to be very difficult. (M59: 7).*

Protection of wetlands from farmers' point of view

> *For cattle ranchers there is some value to wetlands for watering livestock but for strictly grain farmers there is not such benefit to having a wetland on a property. During times of drought wetlands would help recharge local ground water but typically with the size of farming operations today with huge equipment it costs a lot of money to go around wetlands. It's inefficient so farmers want to go right through those wetlands. But this is what government needs to decide on what's most important. Furthermore, the government should provide incentives for farmers who do not drain their wetlands, and back up with strict regulation for those that don't want to accept those incentives and fail to protect wetlands. (M59: 8).*

Incentive program that has been tried but failed

> *In Manitoba there was a wetland restoration incentive program. There was very low uptake from farmers for this program and the program was discontinued. It was a good attempt to try to compensate farmers for EGNS but the program didn't have the appropriate design and financial resources to make it work. The government just let it die and failed to pursue it anymore. There is a strong belief by the organization that there needs to be a serious rethought and go at it again. But there is also a clear doubt on the government's commitment to implement this without some pressure from public. (M59:3).*

Economic versus environmental values

> *There needs to be a shift in the way individuals and governments think about the economic and environmental value of wealth or properties in order to make some progress. Researches done by this organization on a lot of occasions show only environmental values, they do not put an economic value. That is why now DUC is working with other researchers to put the economic values on properties so that governments can compare the value of these wetlands versus the value of some other government type programs. (M59:4).*

Farmers interest for environmental protection

There are few farmers interested in environmental protection and so far there is no program that is going to have an effect on a scale that is required for environmental change. But there are some programs that are testing whether farmers are interested in these types of programs.

About Alternative Land Use Services (ALUS)

The ALUS is a program designed by a producer group and it is essential to test whether farmers will be willing to take money for providing ecological service but there are a lots of problems associated with this program. Some pilot projects have been done but there's been no program developed yet. Currently DUC has some programs where it provides compensations to land owners to set aside their wetlands and grasslands. There are other organizations that have similar programs such as Manitoba Habited Corporation but there isn't one that's on a scale that is needed to provide environmental security.

About fresh water initiative

All of the things that this organization is doing are wrapped up under one umbrella of 'the fresh water initiative' so all of the researches and communications are part of this program. It is primarily designed to address information gaps through researching to understand the ecological services associated with wetlands and other natural habitat and to communicate that effectively to change policy.

About wild life protection

There are a lot of natural areas in Manitoba. There are still a lot of areas for a wild life so there needs to be a habitat for them to inhabit. There was Provincial Park created in the last 10 years in this area. So that is a good example where there is some habitat being protected and secured. The watershed group is involved with conservation agreements put on the land so that protects the land in perpetuity. It's not very popular but a lot of them are being held, but at least it is a tool. If land owners are interested they can sign up for this kind of program. It is called Conservation agreement and they can be held by a variety of different organizations but most of the conservation agreement is either held by Ducks Unlimited or Manitoba Habitat Heritage Corporation. So the watershed groups have to deal with them that if they have land owners interested they work together to secure this conservation agreement. The conservation district is seeking funding for maintaining and expanding the program it seems that the climate is very tight politically for an increase in programs or a kind of environmental programs. Because of that 2011 flood, Manitoba is in problem financially so those programs are not expected to grow. But there has been no money

for it, maybe get some other partners for these kinds of programs. Nature Conservancy Canada is another organization it does these kinds of things.

Manitoba Conservation and Water Stewardship: Government's Perspective
Why EGNS hasn't got anywhere in Manitoba

As a principle the government accepts what the provincial government and some of the key groups have talked about EGNS, but it hasn't implemented anything or developed any kind of policy related to that simply because it seems to be far too complicated and the government doesn't seems to know enough about where it should allow something like that to occur more often. It wants to take more of a targeted approach if it is going to implement something like that rather than a universal approach and it is not just there yet. Nobody in the province is there yet, so really EGNS hasn't gone anywhere in Manitoba at all. There were a couple of pilot projects but there's no long term project that really calls itself EGNS. There's some in centre programming for land owners to do improvements and to maintain certain habitat on their property but it's not really the same as EGNS. Manitoba just hasn't really advanced at all when it comes to EGNS. There's just not enough information about it. There has been a short term pilot project that was done in Western Manitoba. But other than that EGNS is just not going to be feasible for Manitoba according to the Manitoba Conservation and Water Stewardship.(M59:9).

4.10 Property Tax

The taxation system in Manitoba

> *There are differences across the prairies (between Manitoba and Saskatchewan) but for the most part there are more similarities in the way some of these conservation lands are being treated in terms of the taxation system. How the property tax system works in Manitoba is a little bit complicated. Land owners get a load of tax bill to pay every year and that's what people look at in the end. And it's broken down into two: municipal tax and school tax. This is based on a somewhat complex formula of pre-determined value of the property proportion of different types of land. So agricultural land in Manitoba is 26% and then this is multiplied by the mill rate which basically is Canada taxation figure. So each municipality in Canada will have a different mill rate and those change basically every year and that number is divided by a thousand. It's all those numbers that formulate gives what taxes one pay. The land owner doesn't necessarily know how the formula works. And not a lot of land owners really understand it fully and people don't get it because it is not presented or it's not made readily available to them. (M59:3).*

There is lack of transparency in differential tax laws

> *Each piece of property (conservation lands) has a different assessment and higher-assessed lands or higher-valued lands have higher tax on them. That's the way the property tax system works in Manitoba. Each one of those types of land uses such as bushes, wetlands cultivated lands and arable lands has a different assessment per acres and that information is not available to the land owner. That information is hidden from them under the current property*

tax system. The land owner has no idea what he/she is paying in taxes for each different land use. Essentially the tax system kind of hides some necessary information from the land owners which might help them or aid them in land use decision making. So land owners think they are paying some dollars for the wetland which they are not making any money on. That's actually providing an incentive to that land owner to drain wetland and to make it productive, because it is a liability for them to keep. (M59: 7).

The need to set up a new system

Presenting the information or setting up a system where it can be presented to the landowners what the actual differential tax was on the different land uses may in effect go a long way to assist the land owners in some of the decision making. At the very least it wouldn't provide an incentive to drain wetlands. Right now the property tax system kind of forces the land owners to make a false assumption in terms of how much they are paying in taxes for those wetlands. (M59:8).

What the pilot study showed

A pilot study done showed that about 80% of the people felt that the tax system was really good instrument to promote stewardship. In this case landowners keep their land and they keep the wetland and they are not going to pay taxes for it or maybe they get a credit for it. The survey showed it would be a significant enticement to many producers. The tax system is something that really motivates people. It's a very effective tool or technique to actually implement conservational incentives. (M59:4).

What the future holds for property tax

There's an increase in awareness about conservation EGNS on wetlands and other habitats. Stressing on the importance of encouraging landowners to keep it around; and if people, other groups and stakeholders continue to push and become more aware then this information will eventually come out and when it does it will be a critical mass and a huge momentum of support to do the right thing especially if it's not going to cost a lot of money to encourage proper land use and encourage proper decision making. Drainage activities that are causing negative benefits to society should be made to stop. It is going to be a long hill, a long steep that the society needs to climb but as soon as it gets to the top then the ball rolls down very quickly. Progress will be made very quickly once a critical mass of momentum and support for it is gained. Probably within the next ten years or so once sufficient momentum of interest and awareness has developed this will be a reality. (M59:9).

4.11 Drainage

In Manitoba, exasperation was expressed in relation to the drainage system (M50). Drainage was regarded as a very cumbersome system and it was stated, "there has not been a great system of licensing in the province so people always have done drainage to improve their land and that sort of thing we have been doing it for the last one hundred years" (M54: 7). Some Conservation Districts were responsible for

maintaining drainage and received a portion of taxes to fulfill this function. Of 18 Conservation districts, 14 had never had any infrastructure responsibilities (M50). However, in order to clean the vegetation out of a drain, they needed a license. This could create problems when licenses were stalled because of complaints (detailed below) Frustration was expressed that Conservation Districts had a legal obligation to look after drainage, but no authority to do so (M50).

Respondents commented on drainage issues. Drainage has been a big problem just because of how much moisture there has been in the past number of years forcing everyone to drain more with all ending up at the same place downstream which in turn forced the watershed to do the water retention program.

> *[Drainage is] a big problem just because of how much moisture we've had in the past number of years then, yeah, everyone is trying to drain more with all ending up at the same place downstream which is which is why we're trying to do the water retention program it kind of stagers up a little bit, especially once you get into the provincial drains that you know the size of back in the 60s then there have been a lot of drainage upstream and so they can't handle that, that amount of water that's been added to the system we have a lot of issues that way. (M52: 7)*

[W]ell the provinces have been trying for the last few years really to keep on top of drainage in the area so, ah, they've added I don't know how many officers it is but there are a number of officers that have been added to try and work on that because now they want to have all farm drains licensed. They're working on they are not just handing about licensing new drains we're talking about licensing all the old ones that have been made as well. And so it's kind of creating a problem with it, a bit of a back hold for that now. But I would say that because people know this is happening then there're a lot less illegal drains that are happening than there have been. We know still people that kind of decide they want just do whatever they want to do but it gets less of a problem. (M52: 8)

A specific recurring complaint was the ability of one person to stop a license for drainage. To obtain a drainage license all stakeholders had to be contacted and one person complaining could stop it:

> *You have to contact all of the stakeholders. So you have to find five people that have land along the drain. And you have to contact each one.*
> *R: And one person can stop it.*
> *R: Most of the time they do (M50: 29).*

"If a drainage is in place and you are just doing improvements – you contact stakeholders like say five landowners on a drain and one person can stop a license" (M: 1). And complaints are responded to instantaneously, and even if made anonymously (M50). In one circumstance the interviewee recollected clearing a drainage

of silt and vegetation and still being on site when a call was received from the Manitoba enforcement person (ibid.). This was contrasted with the process of obtaining a drainage license that takes six months and is painful (M6). It was generally felt that the complaint process should be in writing. One Conservation District wished to be more involved in the licensing (M53, 6).

One conservation district does have powers in respect of drainage license which other conservation districts have requested. So far no new conservation districts had been awarded these powers and thus complained about problems in respect of drainage licensing and working with the Manitoba government.

Very detailed technical complaints were made about the drainage system. It appears certain classifications are made and depending on topography and the classification of lands and in respect of some, no drainage works or maintenance is allowed which was viewed as problematic:

> *Yes well in our area most of it conservation district there is quite a variance in the landscape land classification there is a lot of what is referred to as crown lands which is passed 5 and 6 soils capability where we have problems at present time and have had the last three-four years is that the province has set out regulations with regards to any drain maintenance and drainage works on class 5 or 6 land they basically don't allow it and because of the topography of the land that is big problems for us because the majority of the water that we are dealing with in the drainage networks flows from class one and two land and before it gets to its destination in the lake has to cross in 90% of the times it has to cross over class 5 and 6 land and that's where the problem arises is that our inability to deal with the maintenance of the natural lands of natural lands and natural drainage systems in the class 5 and 6 land and in our inability to deal with it because of we can't get licensing and that's one of the big problems right now, and we're currently working with the province too to get that changed or you know some of the problems is regulation and that is imposed on province wide basis that not always hit the geographical areas and there is a complete lack of local autonomy when it comes to dealing with issues because we are tied, we are tied by regulations and that. That's a major, major problem right now (M50: 2).*

Crown lands also were very problematic in respect of drainage and drain maintenance:

> *Well, that's where it all starts is the local authorities and decision making has to be made with regards to which drain might receive maintenance first. It starts at the local absolutely and then local request go to the CD where who do have their role of responsibility for water resource management in their designated drains. So there's and they designated drains order one, two and three is provincial but we do manage the order three drains, too at the CD level. But there are numerous others I mean there is all kinds of other drains that are involved with the municipal level. There is only so much that*

> *the CDs can do or take their responsibility for. So there is a lot of other issues municipalities deal with. They maybe small issues because municipal and crossings one thing another and that's not really a big problem that's just general day to day businesses as far as I'm concerned. It's dealing with those smaller ones some of the major ones become more major where the CDs involved and like I said impacted by crown lands inability to get licensing to do works on crown lands (M50: 8).*

Interviewees were taken aback by the province being able to build infrastructure like a channel from Lake St. Martins without public consultation, without adherence to federal environmental laws, and yet continue to complainant react when farmers do what they had been doing for decades (M50: 33).

Conflict over drainage was a normal occurrence. At one point a fist fight broke out at a meeting:

> *When you had your stakeholder meetings were there any people within the district that are in conflict? Are there just disagreements or something? Ask Harry. At the one meeting a fist fight broke out.*
>
> *I: Are you serious? Between who?*
>
> *R: Two producers.*
>
> *I: Between who?*
>
> *R: Two producers, like two patrons or producers or whatever.*
>
> *I: Because of drainage? (M59, 58).*
>
> *R: That's what gets them going, but in this case I think it was over some women that they both shared 20 years ago. The water is just an excuse for the fight but it's not the reason for the fight and this is quite typical. Up in the RM of Lawrence, for instance, those people just hate each other (M50, 28).*

Although one Conservation District was very specific about their role in bringing people to consensus:

> *Ok, on the conflict it is a consensus basis so I think it is just a question of just spending the time so it just takes time to work them out and then come up with a consensus. So when we working on the plan there definitely were times where there was conflict, disagreement and I think basically that is the reason why the plan took 2 (two) years to develop. Because you have to work a lot of these things out and take time to develop a consensus. So in one way maybe the plan is a bit of a compromise in a sense because you know what can everybody live with is not going to be extreme position one way or the other. It is going to be a position that everybody can live with and everybody can agree to. So if you want to go consen-*

sus, you have to kind of accept the fact it is a kind of the middle of the road approach. But if everybody can agree to it, then more likely something is going to get done and there will be changes made. So you are moving forward. And on the environmental side I think it is the same kind of approach. I mean if we have all the stakeholders there, and everybody is making a case, some of them are extreme environmental sort of opinions you know pushing through the environmental side of things. I think it is the same thing consensus based and you come up with a plan that isn't extreme environmentally or extreme economically, you know it is a kind of best fit for everybody. Does that answer your questions? (discussing after drainage, speaks to approach to contentious issues) (M54: 7,8).

And another very cognizant of all water users contributing to the problem of drainage:

> *Not so much but as I mentioned there a variety of uses within our watershed so as we were preparing the plan that was to make sure we were inclusive of all the uses, so drainage just wasn't targeted as a problem because of agriculture was, it was a problem because of all the uses whether it be these are the cottage owners, whether it be the agricultural, whether it be the municipal waste water for example so it wasn't, there was no finger pointing solely at any one industry (M58: 5).*

Enforcement within Manitoba government was becoming an issue because of increased drainage and the number of officers required in respect of licensing new drains, let alone old ones:

> *Yes, yeah, that's a big problem just because of how much moisture we've had in the past number of years then, yeah, everyone is trying to drain more with all ending up at the same place downstream which is which is why we're trying to do the water retention program it kind of stagers up a little bit, especially once you get into the provincial drains that you know the size of back in the 60s then there have been a lot of drainage upstream and so they can't handle that, that amount of water that's been added to the system we have a lot of issues that way.*
>
> *Q. And is this drainage problems, are they unlicensed or illegal drainages or?*
>
> *Ah, well the provinces have been trying for the last few years really to keep on top of drainage in the area so, ah, they've added I don't know how many officers it is but there are a number of officers that have been added to try and work on that because now they want to have all farm drains licensed. They're working on they are not just handing about licensing new drains we're talking about licensing all the old ones that have been made as well. And so it's kind of creating a problem with it, a bit of a back hold for that now. But I would say that because people know this is happening then there're a lot less illegal drains that are happening than there have been. We know still people that kind of decide they want just do whatever they want to do but it gets less of a problem (M52: 7).*

> *What is not working with implementation? In some of the plans there were statements in some of the earlier watershed plans there were statements about increased enforcement, increased regulatory inspections it would lead into things like illegal drainage or illegal on-site or septic tanks that are on-site waste water systems so there was concerns about those, some of those activities not being in line with the regulations and the recommendation was increased enforcement or increased regulatory inspections and that just hasn't happened because across Manitoba there's just there…there's been limitations on staffing and what things these staff can do so some of that stuff hasn't really changed hasn't resulted a plan just because it's mentioned in the plan it hasn't changed because for that to change there's got to be a kind of a big change in government and the way government operates, and in some cases it's just lack of staff we are already overwhelmed with the current workload so they can't, they can't do additional inspections and that kind of stuff, most of the people who works like the regional people have pretty large areas and when the issues arise areas that are relatively populated, so, for them to get out and do inspection it's like almost another full time job to do all the stuff we kind of wished we could do but…so for the recommendations in the watershed plans we kind of knew a kind of a wish list things but, we still want to include them in the, in those things that really haven't been implemented (M56: 10).*

Some Conservation districts were involved in water retention projects to try and slow down drainage a bit.

One interviewee talked about finding the right balance between maintaining wet lands and the larger farm equipment (M58: 3). There was recognition that other government policies and drainage were connected. A connection was seen with the tax system the shelterbelt program (now discontinued) and ecological goods and services:

> *Ok, well I think in one hand, look at the tax system. Say if you put in your farm a shelterbelt, that is a good environmental thing but you might be taxed for it. Say if your property value goes up, you will be taxed on that. Because your property value is going up you will be taxed for it, you are doing something good for the environment. If you drain the wetland, your tax is going to go up I guess. But if you left that wetland, you are still going to be taxed on it. You know that is contrary to environmental progress. You should not be paying taxes on wetlands and if you plant trees and if you protect that area with that sort of thing, your taxes should go down rather than going up or paying for it. So looking at the tax system in terms of is it working contrary to what you want to do environmentally. So if you do good things environmentally, you should be rewarded not penalized for it. On the crop insurance I think it is this way it works, it encourages farmers to do more drainage. I guess the way the crop insurance works is, it kind of works in an area average. So if one field gets flooded out, but if your other fields are very productive, then you might not get any bonus, you might not be able to claim on the*

crop insurance. Because your area average is ok, so it kind of make sense on an economic point of view but what does that encourage you to actively drain those marginal areas, making the problem worse. I think the crop insurance should be more focused, if it is working on an area average, just looking at a parcel of land, I mean if that land floods seven years out of ten, you probably shouldn't be able to get insurance on it. That's all; it should be maybe sold down something like someone that can handle it.

Q, so what you are saying is that to promote the environmental people that are doing good for the environment should be rewarded not penalized for it?

Right, and that is the same thing with the (EGNF) Ecological Goods and Services program. When farmers are providing services for society, then that should be recognized somehow whether through tax system or otherwise.

Q, which program is that?

(EGNF), Ecological Goods and Services, so if you plant trees and if you leave wetlands really good buffers and riparian areas you know those should be look at as providing services to the environment rather than penalized (M54, 9).

4.12 The Future of Conservation Districts

It's clear that Conservation Districts are an enduring feature of the Manitoba water governance system landscape and can have a real impact on the physical land as well. There is a diversity of Conservation Districts with certain powers respecting drainage, water infrastructure, and water planning, which this research couldn't comprehensively assess. The differences appear to be part historical anomalies, and part related to the mixed topography and socio-economic practices occurring on the land. Close relationships exist between the Conservation Districts and the municipalities which also links to provincial tax funding. Whatever the reason, the Manitoba experience suggests "one size perhaps does not fil all" in respect of watersheds. Also, based on the Manitoba experience, local watershed groups may be capable of taking on increased regulatory functions.

Manitoba Conservation Districts have directly experienced the impacts of climate change, specifically in relation to the increasing variability of climate including flood and drought. Several of the Conservation Districts take very central roles in respect of drainage issues, cleaning drains, negotiating the opening of drains, and sometimes with respect to licensing. Small scale drainage works of the Conservation Districts are overshadowed by provincial projects which appear to operate within another governance realm outside of the public participation and processes employed by the Conservation Districts. Although not directly involved in the emergency response in respect of flood, the initiatives of the Conservation Districts are directly related to adaptation in respect of planning and prevention. Like all government institutions, staffing constraints and enforcement is an issue. Ecological goods and services are challenging issues in Manitoba and not assisted by the current property tax system.

5. Integrative Discussion

5.1 Introduction

This section provides an integrative discussion which answers the key research question of how these local groups are responding to climate change within the water governance context.

5.2 Comparison of provincial models in dealing with climate change

Alberta

The Alberta Government's climate change considerations and planning outcomes derive from and arise through their legislation, various departments and through various polices specifically Alberta's Water for Life Strategy. Alberta's has legislated climate change considerations within the Climate Change and Emissions Act (2003) and through their Climate Change Strategy (2008); however, these documents frame climate change planning and adaptation strategies within an energy governance arrangement. Climate change considerations within a water governance arrangement flows through only policy such as the Alberta Land-Use Framework and the Water for Life Strategy. Climate change, within the scope of the strategy is viewed as a threat to water security in light of other possible threats such as growing population and economic development (see Government of Alberta, Environment and Sustainable Resource Development, 2012).

The level climate change consideration and number of linkages within Alberta's water governance arrangement is dependent on its decentralized framework and as a result there is very little direction for how to address climate change impacts or incorporate climate change planning within LWCs' integrated watershed management plan. The Government of Alberta directly address planning for future climate change impacts within their Water for Life Strategy which sets forth planning for climate change in relation to their action plan at the provincial level. The Alberta Government endeavours to:

> Address the water management and policy risks associated with a changing future water supply resulting from the impacts of changing climate regimes
> -develop future hydro-climate scenarios for major watersheds
> -develop strategies to deal with the management of changing future water supplies through the
> Provincial Climate Change Adaptation Strategy and though implementation of the Land-framework and watershed planning. Government of Alberta, Environment and Sustainable Resource Development, 2008: 15.

While watershed planning is mentioned as a potential area to develop climate change planning, the current governance arrangement seems to be designed to enable WPACs to self-determine climate change as a regional issue within their plans. That is, guiding planning documents that focus on the how WPACs should proceed with integrated watershed management planning make little reference to how climate should be included within the WPACs plans. In addition, research resources are not yet available for WPACs to plan for climate change, as the Alberta Government is

still in a research phase on many key actions that would contribute developing a climate change knowledge base. Although this research may be necessary to understand future climate change impacts, scenarios and possible adaptation strategies, this leaves WPACs to determine that their regional planning efforts should include climate change considerations and linkages on their own in terms of current planning for climate change. How provincial resources may change the planning context for WPACs in unknown. Thus, while this framework allows for regional planning and regional solutions to climate change impacts identified through public participation, the governance structure does not promise that climate change planning will be accomplished when a WPAC has the capacity to do so. Thus, while the government encourages LWC autonomy, the preliminary planning of the LWCs requires greater delivery of initial resources in addition to funding.

Public participation – a characteristic of bottom-up governance – is limited as a result of the level of influence that that participation leads to. In other words, the role of local knowledge is utilized to identify regional needs that could include a desire for climate change planning but the overall water governance structure has a limited capacity to using that knowledge to bring about reductions in vulnerability. Identified by the participants in this study, this limited capacity stems from perceptions about a lack of decision-making authority by the LWCs and as a result, this relates to greater confusion surrounding the role of government and the LWCs in relation to public engagement in the planning and implementation process. This confusion works in opposition to governmental goals of having the LWCs as autonomous planning institutions because autonomy for the LWCs means also decision-making autonomy in addition to financial security.

Saskatchewan

Like Alberta, Saskatchewan's approach to climate change planning is focused through policy, in this case, through the Saskatchewan Water Security Agency's 25 Year Water Security Plan (2012). But unlike Alberta, climate change planning is centralized through the one government agency. However, this centralized approach accounts for regional variability in planning. The 25 Year Water Security Plan, the WSA devotes a section of their plan to climate change considerations. In this action area, climate change adaptation is discussed in relation to the continuance of working with key partnerships on climate change impacts to identify adaptation strategies (p.11). One such partnership between Saskatchewan, Manitoba and Canadian Governments that is discussed is PARC, or the Prairie Adaptation Research Collaborative.

As seen with Alberta's structure, regional planning produces regional solutions but unlike Alberta's approach, the centralized characteristics stemming from the Water Security Agency's role allows for a greater access to resources pertaining to planning for climate change. However, like Alberta there is some confusion relating to the LWC's role in climate change planning in relation to accessing those resources. The LWCs identified that in some cases they lack the human and financial resources to affect large changes in relation to climate change beyond their awareness-raising and educational capacities; however most of the studied LWCs include climate change considerations within their source water protection planning. It is not clear the, if

these groups lack financial and human resources to affect change, whose role it will be to implement planning items that relate to climate change.

Like Alberta, the influence of the public in planning for climate changes is limited at the LWC level but unlike Alberta, this relates to the lack of resources. At the provincial level, stakeholder engagement seems to be producing influence as a result of how stakeholder perceptions were integrate into the 25 Year Water Security Plan. This leads to an incongruence among the centralized structure and a desire for bottom-up governance. Specifically, this stems from the greater capacity to integrate local knowledge to mitigate future climate change risk and vulnerability at the provincial level but not at the LWC level. This is an important disconnect that needs to be resolved as the literature suggests that provincial solutions (i.e. top-down) lead to greater regional vulnerabilities. Influence of public participation, for example beyond mere access, at the LWC level is needed to reduce vulnerability and as it has been identified by the participants, this requires greater financial capacity.

Manitoba

Manitoba's approach integrates climate change throughout the integrated watershed management planning process. Climate change considerations are acknowledged within legislation and a climate change-specific strategy document called Climate Change: Adapting to the Future. At the legislative level, climate change is acknowledged in the Water Resources Act. In its preamble, the act states:

> In light of the fact that future domestic needs and the potential effects of climate change are unknown, such a scheme should be based on the precautionary principle and on sustainable water resource management practices (n.p.)

The Government of Manitoba discusses actions-to-date and future directions in the aforementioned publication. Within this document, actions-to-date relating to climate change adaptation are the development of integrated watershed management plans, the revision of flood protection plans, the expansion of Manitoba's hydrometric network, the introduction of incentive-based programs, and the development of research relating to land-use planning (Government of Manitoba: 47).

Unlike with both Alberta and Saskatchewan's approaches, the emphasis on climate change planning through bottom up strategies is promoted within Manitoba's governance arrangement. Public participation seems to lead to greater influence than in other provinces as LWCs in Manitoba have greater influence over land-use and management decisions within their boundaries. As a result, public participation in the integrated watershed management planning process presumably leads to greater influence in decision-making. This sentiment is also reflected by participants' responses. However, as identified by government representatives, is limited by the property rights regime. In addition, respondents perceived that a lack of resources was not a problem due to substantial support from larger institutions. This also allows for greater capacity to plan for future climate change impacts. But as of yet the two of the four LWCs that responded about whether climate change was included in their planning had stated that climate change had not been included in their planning. As a result, there is a disconnect between the promotion of climate change within the integrated watershed management process and its inclusion within the plans developed.

5.3 Level of Integration of climate change in planning

The level of integration of climate change in planning varied significantly among the studied LWCs. Where data was available, the level of integration of climate change into planning was dependent on several factors. First, planning for climate change was dependent on when LWCs were formed. For example, the Athabasca Watershed Council in Alberta stated that they had not included future climate change in their planning but this was because the organization was newly formed. Second, planning for climate change was also dependent on how the LWC was formed. For example, the Assiniboine Watershed Stewardship Association in Saskatchewan was formed to implement existing plans and because planning for future climate change was not in those plans, the group is discussing making climate change linkages in future planning. Third, the group may include planning for future climate change in relation to planning for future climate variability, but because of their understanding of climate change, they do not consider this climate variability planning as an extension of planning for future climate variability. Fourth, the LWC purposely frames future climate change within the categories of excessive moisture and drought, such as with the Moose Jaw River Watershed Stewards. Last, the LWC considers future climate change variability as a necessary component of a long-term future planning horizon and as a result included it in their plan. As a result of these factors, the level integration varies among LWCs.

5.4 Recommendations to reduce vulnerability and sharing best practices

Stemming from the participants' perspectives in this study, there are several recommendations to reduce climate variability:

Participants noted that there is some confusion on the role of the various institutional actors in reducing variability. In other words, greater clarity needs to be established in each province pertaining to who will take the lead in reductions in variability. The efficacy of reducing variability can rest on support from the public, who is engaged in all three provincial models, and be implemented with the necessary level of resources, whether that is financial, human or otherwise.

Stemming from clarifying roles, communication among institutions and with the public regarding potential extreme whether events should be a priority. There are LWCs that recognize the importance of communication but greater emphasis should be made to help the public be active participants in the communication process. Does the public know where to get real-time information? Do they have the means to access this information? What other communication modalities can be employed to deliver real time information?

Where public is engaged in planning, institutional actors should evaluate the level of influence that the public that they have engaged has. That is, the LWC should strive to include the public beyond engaging them in an understanding of issues. Has the public that was initially engaged validated the results of the plan? How can the public be engaged to support the implementation of the plan? Perceptions that the public does not have real influence in directing planning with regards to reducing climate variability has seemed to contribute to confusion and tension regarding their expectations of institutions, including the government and the extent to which these institutions should be dealing with extreme weather events should occur.

Institutional planners should have a more comprehensive understanding of the interconnectivity of extreme weather events and thus the interconnectivity of the events' impacts. Respondents reported that extreme weather in each watershed is usually not just instances of flood or instances of drought. Rather, these watersheds are experiencing long periods of droughts or floods followed by another type of event. Issues derive from the notion that institutional respondents suggested that their role in planning for climate variability is limited during extreme events. The comprehensiveness of flooding events and the difficulty to plan during an event pose a significant challenge to planners. However, when planning is done it should for how to cope with both drought and flood, even if there is a disproportionately higher perceived likelihood of one occurring over the other. For example, some respondents stated that they try to plan for both excessive moisture and extremely dry periods in such a way that they are planning for one event. They reported some success with planning in this way.

Respondents seem to determine market-based incentivised programs as successful but have pointed to cultural values as a main barrier in success of these programs. For example, in the ENGS program respondents suggested that there are persisting perceptions that there is prestige associated with who has more cultivable farm in spite of the intended program benefits. Stemming from an education priority, more research should be done at the local level to find a way to alter these persisting cultural values.

Timing is important. Respondents stated that successful planning has occurred directly from learning from past events. It is possible to employ the other recommendations in planning to reduce vulnerability following the extreme weather events.

6. Appendices

6.1 Acknowledgements

The funding for this research was provided by the Social Science and Humanities Research Council (SSHRC) of Canada.

Research interviews were conducted by graduate students, Evan Andrews, Yordanos Tesfamariam, Kait Quinn, as well as the principal investigator, Margot Hurlbert.

6.2 Interview Guide

Interview Guide for SSHRC Water Governance and Climate Change Project

(Questions will vary; not all questions will apply to every respondent)
@ Outset: Establish rapport via basic demographic questions:

- Age, occupation(s),
- genders etc. please note the gender of the person you are talking to), educational achievement
  It is important to ascertain prior to interviews:
- Who is involved with the watershed group **(membership)?** What groups/people are missing? What groups are represented? How are members selected?

1. **How do they (their community/watershed) use water?**

Is it agricultural use? Oil and gas? Urban requirements? Irrigation? – if you have this info from other community info/interviews, don't waste your time!
How was the watershed group formed? How did members become involved and/or get selected?

2. **How does weather impact their watershed?**

- What type of weather events have impact?
- What other variables are important in their watershed? (environmental concerns, open wells, cattle practices).
- How do they cope with these events or variables? Why do they choose to cope in this way?
- Do they prepare for the impacts? Why, why not, how?

3. **What has happened in variable climate (drought, flood) in the past?**

- **Drought**? What are the impacts? What , how when etc? Recent droughts – when were they? How bad were they? (impact – shortage of water? crop failure? Financial impact? Fires? On water supply? Insect infestations? Soil erosion? Livestock?) -> ***timing of impact***? (e.g. equipment supply dealer – might be a year later?)
- What happens when there is not enough water?

- **Flood/excessive moisture (too much water at the wrong times) -**Too much water? What are the impacts? Drainage problems, what, how when etc.
- What is the role of watershed groups in planning for water variability – or how is the watershed plan responding to these incidents of high variability?
- Will the plan respond, or will other meetings/measures actions be needed? What type/kind?
- When has this happened before, how long did it last, how severe was it? What was done to get through it? Did the watershed group assist in getting through it? Why, why not, how?
- Did the plan/ watershed group deal with these issues and all other environmental issues in the community? What is missing?

4. **Planning/Ongoing Activities**
    a. (You should have an idea of the groups' **plans and activities** before meeting with them – it's on the internet) update activities/plans etc. How are plans revisited? Reassessed? Changed? What is the process/timeline? Who is involved and how do issues come to the group's attention?
    b. How are decisions made on the plan? Consensus? Is there conflict and how was that handled?
    c. Is the public or other groups involved in the groups' decisions and /or planning? Who does the group hear from?
    d. What sorts of information do you need to help you plan? Who should provide it? (what further information about drought characteristics do they need?)

    Have you incorporated **future climate variability due to climate change** in your plans? How are these incorporated into the plan? Why/why not?

Are there future considerations?

- Did the last drought/flood change how things are done?
- What planning horizons do people use now, and what did they use then? (i.e. how many years could your current/past strategies deal with? How well? How are these changing?) What if you had a four-five-six year drought?
- For what range of conditions are people planning for? Are they planning for changes in water quality? How?
- What does this planning consist of? When will plans be reconsidered? How are they monitored?

5. **What disagreements have occurred if any in the watershed committee deliberations?**

What types of positions/ interests are represented on the committee? How has this played out in issues? (Follow a specific issue if possible)
How was this resolved or was it? Who was successful in having their needs met? Why? Is the conflict ongoing? How will or might future conflicts be handled?

6. **Resources - Federal/provincial support for their activities**

- Was there any institutional involvement? (did they participate with any support programs? Federal, provincial, local government? Funding of their activities?
- Has the government implemented or assisted in any of the measures contained in the Plan? (Enacted through regulation etc.)
- What difference has the plan made? Does the group just provide information to the government or do they actually interact and self-mobilize?
- What in the plan might assist the next drought or flood or could have assisted last drought or flood?
- What was successful about the experience, how could it have been better, would you do the same thing; Did the watershed committees have any influence on this? Community organizations? NGOs? Did they go to agricultural extension sources?)
- If 2001-2002 **(or 1988 or 1998(?) – swift current)** did not come up, bring it up – get that story too!
- What would you like to see available in the next drought/flood?

7. **What can be done at the institutional level to build more adapted communities?**

- What can be done beyond the community to ensure that the communities can cope better? (What do they need from the province, federal government, local government…? What are the price points that enable participation in existing programs…?)

- **Last questions:** is there anything I should have asked you about water and drought that I missed?

6.3 Ethics Clearance

University of Regina

OFFICE OF RESEARCH SERVICES

MEMORANDUM

DATE: May 12, 2011

TO: Margot A. Hurlbert
Justice Studies, Department of Sociology and Social Studies, CPRC

FROM: Dr. Bruce Plouffe
Chair, Research Ethics Board

Re: **Water Governance and Climate Change: The Engagement of Civil Society (File #87R1011)**

Please be advised that the University of Regina Research Ethics Board has reviewed your proposal and found it to be:

☑ 1. APPROVED AS SUBMITTED. Only applicants with this designation have ethical approval to proceed with their research as described in their applications. For research lasting more than one year (Section 1F). **ETHICAL APPROVAL MUST BE RENEWED BY SUBMITTING A BRIEF STATUS REPORT EVERY TWELVE MONTHS.** Approval will be revoked unless a satisfactory status report is received. Any substantive changes in methodology or instrumentation must also be approved prior to their implementation.

☐ 2. ACCEPTABLE SUBJECT TO MINOR CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB.** Do not submit a new application. Once changes are deemed acceptable, ethical approval will be granted.

☐ 3. ACCEPTABLE SUBJECT TO CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB.** Do not submit a new application. Once changes are deemed acceptable, ethical approval will be granted.

☐ 4. UNACCEPTABLE AS SUBMITTED. The proposal requires substantial additions or redesign. Please contact the Chair of the REB for advice on how the project proposal might be revised.

Dr. Bruce Plouffe

** supplementary memo should be forwarded to the Chair of the Research Ethics Board at the Office of Research Services (Research and Innovation Centre, Room 109) or by e-mail to research.ethics@uregina.ca

Phone: (306) 585-4775
Fax: (306) 585-4893
www.uregina.ca/research

6.4 OW 12

(0:00)
I: So did you just want to tell me a bit about yourself?
R: My name is Brian Hills and I am the science and technical support team lead for Alberta Environment and Water for the Southern Region which is basically from BC to Saskatchewan and from Montana to North of Calgary. So in my team lead role, I supervise water quality specialists, hydrologists, air quality specialists, and a gamut of environmental media specialists.
I: Excellent so you are really the person to talk to about this sort of stuff.
R: Hopefully.
I: Did you go to school?
R: I have a Bachelor of Science actually from U of L. I have some background in fishery biology and management and prior to working with Alberta Environment. I have been with Alberta Environment, in Lethbridge, since 1994 and run the gamut from regulatory initiative related to water under Alberta Environment's legislation.
I: Okay perfect I was going to ask you about that later on.
R: To my current role of more of just the science and support piece for some of that regulatory work.
I: Okay excellent. Are you involved with the watershed council?
R: I am. At least on the periphery in that I have staff members now who are members of teams, particularly the Oldman Watershed Council has a watershed science team. So I have one person who is actually the co-chair of that team. And previously I was on that team, prior to moving into management. And we are in constant contact with them with regard to we provide them, most of their funding and so we review contracts and their proposals as far as what kind of work they are going to undertake, requesting money for their contracts and quite often participate in reviewing the materials that come from, as part of those contracts.
I: Do you feel that there are any people or groups that aren't involved with the council's initiatives that should be?
R: I don't know that I would say that. They are a pretty wide spectrum as far as the numbers and types of groups that they have who participate on the council in one form or another, whether that is on their boards or as individuals on some of their teams. So it is broad spectrum. I guess the question is if you are there as representing a sector or representing a municipal government or whatever it might be how is that person communicating what they are participating and hearing and learning to their sector or agency or whatever it is. Because I think we see that a lot where and it applies even for people who are sitting there as a member of government or of a particular department like ourselves, they participate but they are not always participating as that representative. They just participate based on their own interests and don't necessarily communicate it out. In that sense, I think that the OWC is networked pretty well but how well that translating into a broader understanding beyond those individual members is questionable I think.
I: What stakeholder groups are represented by other teams? So we have got the rural team, he urban team, and you have got the science team. So what kind of stakeholder groups…?

R: I guess what I know is the science team the best and its representing currently a number different government departments and Sustainable Resource Development is there as I understand it and also some affiliated agencies like the Alberta Conservation Association that works under a memorandum of understanding with Sustainable Resource Development and they focus on fish and wildlife and that sort of thing. (5:08)
I: They represent based on who they represent. They represent their interests and it is kind of an information sharing..
R: Yah generally speaking…each of them are involved with and I think trying to help the OWC understand where the science and the knowledge is around the…the different activities and state of knowledge that is out there for the watershed. So those kinds of NGO groups and then they are also tacked into the U of L, as well as Lethbridge College. So that they do have some ..
I: Students and stuff?
R: I think it's mostly professors and instructors so that they can understand where there might be some opportunities for their students. And then on the education committee, one of our staff members was part of that, Cheryl Bastien to assist the OWC as a planning support for right now they have their Integrated Watershed Management Planning process underway. So she is a big part of that and she was part of their education team if they are still active. I am not sure how active they are and the same way Alberta environment and water has one of our municipal approval people working as part of that urban team and one of their…so they were participating in an outreach activity for municipal government staff members who are part of drinking water waste water. I think it was drinking water people around water use. So they did workshop that I participated in and led that last fall.
I: I am glad to be sitting here with you because you are kind of the head of all this in a sense where you provide funding for the Oldman Watershed Council that I am doing research on. So that's great.
R: I have been on the science team that they had for the last four years I guess so coming into 2012, will be the third time. It will be 6 years now that they put on a one day science forum. So what kind of activities are going on from a science point of view, research activities and some already have been what's been done that's providing a one day work shop that's open to anybody that I recall it was no charge for attendance and meals provided.
I: How often does the, when you were working with science team, how often do they get together to talk about their activities and programs and interests?
R: It was monthly with a short break in the summer of course but generally speaking for ten months of the year it was monthly. They may have cut that back to quarterly now, but I am not exactly sure if they have. That might make sense. Again I think they are still struggling to understand what their role is and how to help the OWC and move forward with the OWC, the membership has tended to vary at times and just if it's a monthly commitment to have a meeting whether there is enough to meet on.
I: Okay I see
R: So everybody is busy in their own jobs and that kind of thing. So they just need to make sure that they are using their time to the best of their needs and the OWC's needs.
I: Are people that work for the government…are they…is it part of their job description to go and be a part of this council?

R: Not necessarily part of their job description but it is an agreed upon activity so within Alberta Environment and Water, I am assuming other agencies as well, we do what we call performance contracts or performance agreements on a fiscal year basis which is just an understanding between the employee and the management as to what kinds of activities and what kinds of deliverables we expect out of them over the course of that year. So for myself it is…yes water quality people, hydrologists or whoever would participate on those teams as necessary to fulfill our obligations to those groups, that we will provide some in kind support, but like I said we that to be something more tangible than just attending the monthly meeting. There has to be a purpose for attending that meeting right? That it's both…so where that providing information on what we are doing as an agency that contributes to the knowledge of the OWC or contributing to a particular project. That's really I think where we want to move more towards that is better understanding by the OWC and better planning on their part of what they need from us to deliver and what their expectations are on a yearly basis.
(10:54)
I: So they are just in the stage right now of kind of compiling the information of what they feel they need to do and then going to report back to what they need from you guys?
R: Right like right now they submitted their request for the Alberta government works on a April to the end of March as their fiscal year. So they submitted to us their contract requests for their fiscal year and…but in doing that…we are finding that those requests are just sort off the cuff or based on very limited understanding of one or two people and they are putting them together so they are not doing enough pre-planning, as far as having those conversations what their needs are and how to best meet those needs. So as a result we get requests where and end up going back to them and asking them well are you aware of the work that's already underway or have you talked to these people to see whether they have even…to contribute to the project and quite often the answer is no we haven't. So it's an evolving process.
I: Is there anything you could suggest to make that process easier for them or something you would like to see available to make it a little easier?
R: It's about committing to do the pre-planning and sort of so building that kind of process into how they do their work. So that ….doing it at a time that works for not being rushed into it. As I say everybody has different understandings around project management and doing that preplanning. It's a learning process and we are certainly not perfect with it ourselves.
I: Good. Thanks for that insight because you read about things and you kind of have an idea of how things work but until you actually sit down with somebody. How does the communities of the Oldman Watershed use the water? Is it more for, I guess on a broad scale, is it more for agricultural use? Is it more for irrigation would you say?
R: Generally speaking that information is out in the public domain as far as how water has been allocated and used and that's been summarized for the Oldman in their state of the watershed report. But generally speaking in the Oldman Basin a large percentage…85% of the water that has been allocated…has been allocated to the irrigation sector and so we have a number of irrigation districts buts also a lot of private irrigation that has individual licenses across the basin.
I: Is it difficult to get a private license?

R: It is now. So since 2008…2006/2008 somewhere in there. I forget the exact date…the government implemented the South Saskatchewan River Basin Water Management Plan and under that plan, we stopped accepting any new applications for water because we reached a decision that we didn't have any more additional water to allocate with the exception of a couple of areas within the Oldman and so where some previous commitments have been made and or we also have still a backlog of applications that have come into us that haven't been dealt with prior to the government making that decision. So those applications are still being reviewed and decision is being made on them but generally speaking the only way to get outside of those particular areas and what which those areas those are, are Willow creek sub-watershed of the Oldman River, where we have built some new storage in 1998 and so under…and that whole project underwent environmental impact assessment process and was covered with public hearings. That was with Alberta as well as federal government under the Canadian Environmental Assessment Act so the full environmental impact assessment process. So they had a identified a quantity of water that that storage would be able to provide for and they are still the ability there in that watershed...or sub-watershed to acquire a new license and there is one other one, in upstream to the Oldman River Dam where there had been an agreement to the construction of that dam that a portion of that water would be allocated to the communities upstream of the dam as well. There is need to develop those areas and so there is still water to be allocated there but otherwise the only way to obtain a new allocation, if you don't have one elsewhere in the basin, would be to go what's go through waters call a Water Allocation Transfer process so that is somebody being able to reach an agreement with an existing licensee to acquire all or a portion of their water and then that would go through an approval process to assess the impacts of that transfer.
(17:15)
I: So that water management strategy that you had talked about in 2008, was that a result of I guess to suggest that there is only so much water to go around…
R: Basically that's exactly right. It was a 6 year planning process that they underwent hat when into making that decision and it was actually, they had, under that planning process, they had created what they called Basin Advisory Council or Committees, BACs for each of the Oldman, South Saskatchewan proper so the most decent portion downstream below the confluence of the Oldman, and Bow as well as the Red Deer Subbasins. Each had a basin advisory council that was used and so those were all individuals representing the different sectors again in those basins where they were provided information on what we knew about current allocations, the flows, the storage that was available through modelling scenarios, how much water might or might be available for further allocation or for setting environmental flows for the aquatic environment and so it was actually, in the creation of the Oldman Watershed Council, that was the watershed councils are called Watershed Planning and Advisory Councils and those were created under the Water For Life Strategy but for the OWC, as well as some of the others like the Southeast Alberta Water Coop and part of the South Saskatchewan or for BRBC in the Bow they were kind of an amalgamation of those Basin Advisory Councils and some other existing groups so for the Oldman, it was the Oldman Basin Advisory committee as well as there was another initiative for water quality that was going on at the same time called the Oldman River Water Quality Initiative and so really the first formation of the Oldman Watershed Council and its board structure was the amalgamation of those two groups.
(20:00)

I: What data would you like to see available moving forward?
R: All data. So that's where…and we do a fair job of providing data. We don't necessarily do a great job of providing information but we do a better job of providing data. I think we can do it better and make it a little bit more transparent and make it some of it more accessible. So right now off our website you can get near real-time, so by near I just mean that there might be a delay of a few hours type of thing, on flows, on elevation, on water level elevation so those kind of go together. Where we do have some water temperature and or dissolved oxygen being collected on a continuous basis, that information is available near real-time as well as well as precipitation information and climate information. So that is all available out there but…and we also provide on a periodic basis, water supply outlooks. So that's particularly of importance going into the operating season for the irrigation districts and others around sort of what kind of expectations we can…we have for water supply, just based on primarily snow pack. So that that's is sort of one of our leading indicators of what kind of water year might be. Recognizing and what type of year actually turns out to be on how much precipitation falls after the issuance of those forecasts. They base it sort of on normal precipitation within the periods that are being forecasted. And people can make requests to us for water quality data for where we collect data and all of the station information is available out there and we also provide on our website usually about a year behind, the data that has been collected on what we call our long-term river network sites. So that data that collected on a monthly basis and a number of different sites on our main system rivers. And so there is three of those along the Oldman river, one just below the Oldman River Dam, it's called the Oldman River Brocket Station, one here at City of Lethbridge at Highway 3 and one downstream at Highway 36. So that information is available off our website but unfortunately it's about a year behind and that's a process that we are trying to address internally. And to make more…have it available more quickly and also that we would make it available for more than just those stations because we do collect water quality data at other locations in the basins on an annual basis but it hasn't been as freely available.
I: Since you have been with Alberta Environment for so long, have you noticed any changes in the watershed?
R: Every year is different. Generally speaking, probably not so much changes in the lower part of the watershed but its already undergone significant changes with the dams as well as the agriculture and how much cultivation there is and all of that. That has been underway for a long time. There has been sort of some incremental change over the last 15 or 20 years around some additional irrigation and things like that but for the most part that has been sort of an incremental thing where the percentage of land that's under irrigation has been quite large for a long time here and so it has been…maybe there might have been another 10 or 15% that has been added but it was already at a high level from the last 15 or 20 years. Where I am noticing and maybe it's just from our recreational point of view, where I notice the biggest changes is in the headwaters and the recreational use up there. The fact that we have just got a larger population considering the City of Calgary, as well as the City of Lethbridge and some of the urban communities, urban communities have all increased and that has really driven recreational use and it has also changed the recreational use with the popularity of off-highway vehicles and there are very few restrictions on their use in the Oldman which is different than particularly the Bow where a lot of the area, forested area is a park of one way or another and so there is

quite a bit more restricted and regulated than what it is in the Oldman. So between that recreational use of random camping and off-highway vehicle use is really, I think impacting upon the upper part of the watershed and we haven't, from Alberta Environment standpoint, we haven't focused very many of our water quality monitoring in the headwaters. We have tended to focus more on the lower parts of the watershed where we already have known impacts and that. So it's one of the impacts from off highway vehicles and that random camping is more sediment-related and our sampling program primarily is based on monthly data collection. That doesn't necessarily capture sediment and its impacts because that's more event-driven, storm-driven and so it requires of a different sampling methodology and design that we haven't done down here until this point.
(27:02)
I: So moving forward would you like to have information on that?
R: I think it's one of those things that is necessary whether it's done by Alberta Environment or someone else. There is some other monitoring that has been going on. The University of Alberta has been doing fairly intensive study up in a portion of the Alberta Watershed related to the Lost Creek Fire in 2003 and so they have an interesting network up there and they were doing intensive enough monitoring where they have gotten some of that temporal piece related to how different it can be if you are looking at things from a monthly basis versus an event basis. It is different information and different way of looking at it. So that's something that I think we, with the Oldman Watershed Council, need to take a look at is how to better get a grasp of what is happening and whether or not it is or isn't a concern. The public is raising it as a concern but we don't necessarily have the information to say whether…
I: Clear data…
R: Yah exactly.
I: If you were to get that data collected and discover that these recreational activities are impacting the watershed, would the Alberta Environment and Water, I guess lobby for some sort of regulatory action?
R: There is different mechanisms there. For the most part Alberta Environment and Water is not a land manager per se. So then it would be a case of yes, needing to work as a government of Alberta with other departments on what is the policy or what are the expectations of the government for both the social, the economic, as well..
I: Everything…
R: How do we integrate all of those demands and policies to get the best outcomes from Alberta and Albertans. So I think the Oldman Watershed Council has a role in that and there is another initiative going on right now within Alberta called the Land-Use framework. So that land use framework identified 7 planning regions across the province to really focus on developing the outcomes that they want for those planning regions and some of the strategies and actions, things that the Government of Alberta would put in place to make sure that whatever was agreed upon for those areas was followed through on. So for this area, it's called the South Saskatchewan Regional Planning Area, the government went through a process of meeting with a regional advisory council for about a year where they had discussions, with that regional advisory council around what are the issues and what are the expectations that that regional advisory council could provide to the government for what they could put forward for that planning area and that information was made available and is available on the Government of Alberta's website. As far of the recommendations of

that regional advisory council, unfortunately it's gotten caught up in a little bit in all the political uncertainty that exits in Alberta right now such that the Government of Alberta hasn't gone out and actually discussed that advice with the general public at this point and time. The expectation is now that that's going to happen immediately following our next election which is expected to be announced anytime. So hopefully that will happen in the first half of this year. This 2012 year. But it is unfortunately caught up in some of that political uncertainty and that part. So hopefully the, I think, based on the rack advice and what the government has heard from the public they are going to have to kind of wrestle with what they want to do with…
I: Managing all of those demands
(32:02)
R: Managing that but the watershed has indicated that status quo doesn't seem to be acceptable but it's not an easy…it's not going to be easy to address everybody's concerns because while everybody understands that we want a good quality of environment out there, there is also those expectations by people that, that area is available to be recreated in and it's going to be difficult for some individuals and some groups to give up some of what they are experiencing presently and so we will see how that will transmit.
I: I am interested to see where this all goes. Now I just have a quick question. With these regional committees that were kind of formed, what stakeholders do those represent, was it people from industry? Was it people from the public? Was it landowners?
R: For the regional planning process and there has only been two that have been underway. The was the Athabasca so kind of in the Oil Sands and North East Alberta area and that one is closest to being actually put into a plan. They have a put out a draft plan for public comment and they are redrafting it based on that and are expecting to go out again, following the election on basically whatever changes they have made to the initial draft and then the South Sask was the second one. So those are again they were appointed by government and it's not clear to me how they went about choosing the people were put on but generally they were considered to be fairly influential people within 4 different sectors, within the different regions. So there has generally has been somebody within the oil and gas sector, somebody representing a larger municipality, somebody representing smaller rural municipalities, NGOs, and perhaps some of them were just more individuals but considered to be influential individuals who sort of have their fingers on the pulse of things and are involved in a number of different places or groups within the region and all of that information should be available on the Land-Use… the government of Alberta's website. So if you are familiar with it, it's the Land-Use Secretariat is the government agency that has been created to oversee all of that regional planning and they have a separate website, which is of the Government of Alberta' s website.
I: What was the name of that website?
(35:0)
R: It was the Land-Use Secretariat. If you Google…and they fall under Sustainable Resource Development, that Ministry so if you go to Sustainable Resource Development's main page, there should be a link and they say there is general information on the Land-Use framework itself and then planning stuff. So there is a separate site for the South Saskatchewan Regional Plan, that should identify who was on RAC and their affiliation and the rack advice and there is a workbook there for people to provide comments on the RAC advice which was one methodology but like I say the

government is planning to do general open-house type interactions to gather fuller comments on what was there.
I: Do you think the Oldman Watershed Council should engage oil and gas companies, logging companies into their council?
R: Yes. I think…each watershed council is a separate society and so it's all non-profit societies and so they create their own bylaws and set up their own mechanisms for how they obtain their board members but so whether they… but whether they want to have those sectors as part of their boards, that's always open to anybody I think. Although I think they do identify some particular sectors. That's what I know about the Oldman but whether are not they are part of their board structure or not I think it is…there are issues related to particular sector that they should be engaging those sectors to understand both from that sectors point of view as well as the OWC's point of view of how they can work together and address concerns that are being raised. I think they have to be aware that the Oldman Watershed Council shouldn't be perceived to be an environmental advocacy group. They are there to represent all of the interests, whether economic, social or environmental so they can provide that forum to bring people together to have those broader discussions that are necessary. That I don't think everybody understands. I think some people look at them as advocacy.
I: And not really understanding their real role. I would like to talk to you a little bit about flooding because this area specifically has some extreme weather events. I have witnessed it being here for a few months. It's beautiful today.
R: It's looking dry.
I: We can talk about drought in a few minutes. I would really like to talk about how the Oldman Watershed has been impacted by flooding. I have being talking to people and the 1995 flood…
R: A record for the Oldman
I: A very big one and there was a flood in 2002 and 2005. So what were the impacts of those on a broad scale or if you have any specific examples.
R: There were some good things and some bad things about flood events
I: Good I would like to hear about that.
I think from sort of a positive aspect, we have learned and particularly, we have learned quite a bit around how to manage our infrastructure during and following flood events with regard to providing the best environment for recruitment of cottonwoods because those are flood dependent components of the environment that require those high flow events in order to sustain themselves and so we have in and along with the University of Lethbridge and Dr. Stewart Rude learned quite a bit about how to manage our infrastructure and that we can manage it is a way that does provide a positive environment for cottonwoods. And we see that as beneficial. Most people see floods as the negative consequences and some of that is related to, and this is I guess personal bias as opposed to the Government of Alberta Environment bias,… we in my opinion don't do a good job of planning decisions with regard to activities, development activities within known floodplains. The City of Lethbridge has done a pretty good job in that it decided following a flood event back in the '50s that they weren't going to develop their river valley for residential, commercial, that kind of thing and so that's why, compared to other communities, there is fairly minimal development in the river valley of Lethbridge and that's a good thing but that's not necessarily communities outside of Lethbridge and so particularly rural communities. Some of that is related to Alberta Environment hasn't had the resources to

necessarily map floodplains to the same standard we use within urban areas and so as a result of that we are now looking at can we provide something based on satellite imagery or some lesser amount of known data to identify some flood-risk areas.
(41:27)
I: To make communities less vulnerable and to adapt.
R: Exactly because up to this point in time we have only worked with worked with what's called the flood damage reduction program that was developed with the federal government way back in the '70s. That program has now died out and gone but we were continuing it on and using…it was really only applicable to urban areas so that it costs millions of dollars because of the surveying and the model development and all of that kind of thing to identify basically 4 up to a 1 in 1000 year designed flood event. What is the flood fringe? What is the flood way? With the flood way being the area that would be most impacted has the highest velocities would cause the most damage and the flood fringe beyond yes it may go under water but the flows are less and so the damage would be less. Like I say those are very expensive programs to do so they are only applied to more urban type areas and so we do need to be able to provide some of that information to others but even then and we have had not in other communities particularly the Town of High River where they have experienced floods and with one or two more years they are making development decisions and allowing further development to occur in areas that they knew flooded just based on an experience one or two years later. So it's not just the provincial government putting in place things. Its…within Alberta municipal governments are the ones making development decisions for the most part. So they need to have the tools available to them and have the ability to say no to some developments and unfortunately…
I: To learn from experiences…
R: Yes. And it does, to a certain degree, there is some disincentives in the way the decisions are made whereby local municipalities, they get tax base from development right so there is an economic incentive for them to allow development to occur and there is no economic disincentive because it's the Government of Alberta that covers and depending on how much damage there is it also can bring in the federal government who covers the losses. So there is no disincentive necessarily other than the emergency and instant backlash that can occur in having to put in place all of their emergency plans and that kind of thing that a local community has to put in place but like I say there some disincentives in the system right now that somehow they have to be able to make some better decisions but hopefully for some of it, it is just the government providing better mapping of where those risk areas are.
I: So more research, especially in rural communities and that kind of thing.
R: Yes.
(44:57)
I: Okay good. Would you say that you have, I guess over these past few years, let's say 10 or 15 years, has this area in particular, Southern Alberta, experienced more intense flooding? More intense storms? More frequently?
R: I don't know…I haven't seen anything to suggest that it's more frequent. I don't know that…I know that Alberta Environment hasn't necessarily done a good analysis to see whether or not its occurring with more frequency but there is so much variability that it does take some fairly..
I: Long term statistics
R: Yes but also some good, some specialized statistics to tease things out just because one of the concepts around hydrology is what's called, and this goes into our

flood-risk mapping, is called stationarity. So what that is saying is that really if we are doing a frequency analysis of okay this is based on or historical record of however many years, this is what a 1 in a 100 year flood would be. So that term of stationarity is suggesting that for that assessment to be valid is it that there hasn't been any changes in climate over that period and like I say that requires some research and some specialized statistics and methodologies and evaluation to look at whether stationarity is in place and generally I think that the common assumption nowadays in hydrology is that there is a bit of a whoops there. Probably that's not a valid assumption and so the way that we do flood frequency analysis is perhaps not the best way anymore but at the same time…
I: You need more data..
R: Yah and so we can look at things like tree-ring analysis and that kind of thing but there are some questions out there as to are things more frequent? Don't know. They seem to come in bits of cycles and so we tend to look at things in a short-term view and say yah they are happening more frequently but are they really scientifically and statistically? Maybe yes, maybe no but I don't think…I haven't seen anything that say yes or no with any sort of really certainty to it.
I: So having said that, has climate change or the possibility of a changing climate, having more extreme weather events, have those concepts been incorporated in planning?
R: To a limited extent. Not to the degree that some people would like but it is around probabilities and uncertainty and human beings as a species don't… the whole concept of precautionary principal and that kind of thing. It's nice in theory but actually applying it is really tough and we have seen that constantly here around how we have developed our water management infrastructure. We have gone through planning cycles and the answer is okay we will build more storage and then we keep allocating, keep allocating, keep allocating and then oops we need more storage and we just continue on through that cycle and we are at a point now in the Oldman Basin where we really don't have many more opportunities to build more storage as far as capturing higher flows, and at the same time, we are at a place where with the amount of storage we put in place and the allocation that we have that we are probably are starting to impact upon the aquatic environment with regard to the lower flow stuff. So it's that whole balance piece between low flows and high flows and for the most part we help designed our storage for water supply to address irrigation needs of not enough water.
I: For a short term?
(49:56)
R: And really we can do two possibly three years of drought but by that third year we are kind of…we are in big problems…and that was our experience of 1999 through 2001.
I: Do you want to talk about that?
R: Yes I can.
I: What were the impacts of the drought?
R: Well there were some fairly major impacts with regard to water availability so that and so that there were some good things in learning and some of that is around our storage and some of the policies that were in place particularly by irrigation districts where one of the learnings that they took away from, from that period of 1999 to 2001, is that they had to be more...a little bit more cautious on how much water they were providing to their water users because decisions that they made in 1999

and 2000 impacted upon the amount of water that available in 2001 and so they should have been cutting back their water use earlier and maybe it would have made less impact.
I: Be a bit more proactive instead of reactive?
R: Yes. But that…so 2001 was the year where we, Alberta Environment, basically early in April or even earlier than that we were starting to see again on the water supply forecasts on how much snowfall that we had and where are reservoirs where at that time that we were not going to have enough water for everybody and when we drew the line based on our allocations that line fell for 1951 priorities. Most of our allocations as far as number of allocations have occurred after 1950. So we were in a dire situation and so we had to go to the irrigation districts because we work on a first in time, first in right priority system and so we were looking at those priorities and what the allocations were. Those were the 1950 allocations to the irrigation districts in the Southern Tributaries portion of the basin so that's the Waterton-Belly-St.Mary portion which supports most of the irrigation development in the Oldman Basin. The only other district is the Lethbridge Northern Irrigation district which takes its water from the Oldman River directly and is support by the Oldman River Dam but most of the rest of the irrigation districts, so that's the three small ones, Mountainview, Abbot, and Aetna irrigation districts that get their water out of the Upper Belly and irrigate areas in that Cardston area. The United Irrigation District which also gets water off the Belly as well as the Waterton Rivers and is in that Glenwood area, and then the largest district, the St. Mary Irrigation District along with the Raymond, McGrath, and Tabor Irrigation districts which all get their water out of that Waterton-Belly-St. Mary water system. So that was…they were all impacted upon for that...by that 2001 drought and so when we told them…approached them about that, they made a decision towards the end of April that they were going to call priority. So that was basically saying okay all other water users you are not going to get your water unless we can be satisfied with getting our share. Anybody doing that… they also said well what we will do is we will enter into a sharing agreement with all other licensees and share some of our water, our licensed allocations with all those other water users and so that was a recognition that basically, the irrigation districts are part of the community. So there is no point in the irrigation districts allocating and using all their water to grow crops and particularly like the Tabor Irrigation District in particular, that's all special crops, so potatoes and sugar beets and those that then once they are harvested, they go to processing facilities that require water. So those processing facilities which all have more junior licenses to process their products, if they couldn't operate, what was the point of having the crop in the first place. And it was the same too with a lot of the smaller communities, the Town of Tabor and number of other small towns and rural communities have junior licenses and so if the irrigators live within those communities and they can't necessarily have any water for turning on their taps then that's not a good thing to do. So it did raise awareness and bring the community together a little built around sharing what water was available. But the consequence of that there wasn't water available for everything and some communities made some decisions that maybe in hindsight they would make some different decisions as to how they used that water within their communities. So hear some anecdotal stories, for example, that there was more injuries on sports fields because the ground was so hard because there was no irrigation of parks and sport field and things like that. I don't know whether that's true or not.

Like I say that has been brought up by a few people that kids were getting hurt more because the ground was so hard and dry.
(56:33)
I: That's a great example. I haven't heard that one yet so that's really good.
R: Yah there were economic consequences.
I: Were there any crop loss that year?
R: You would have to ask Alberta Agriculture and Irrigation Districts more around the specifics of that.
I: Of the impacts that way?
R: Yah, but certainly for those crops that aren't under any irrigation, there definitely was lots of reduced yields and losses. How much it would affected the irrigation community, those irrigation districts based on less water, like I say you would have to talk to the irrigation districts and Alberta Agriculture more specifically as to what kind of losses and economics that there may or may not have been as a result of that. It did, like I say, highlight that we don't have enough water to support everything that we have allocated and decisions have to be made and that there is…that the community can come together to a degree.
I: It was good to see that?
R: It was good to see that but it was only a portion of the basin and like I say, we made some decisions in years leading up to that and even in that year elsewhere in the basin that hindsight, maybe wasn't necessarily the best way to go about things. For example, the Lethbridge Northern Irrigation District, they were okay for water that year and they didn't put any restrictions on their users and as a result of that we pretty much emptied the Oldman River Dam. As far as providing all the demands sort of doing it on a normal basis for the Lethbridge Northern Irrigation District but also meeting our apportionment commitments down into the South Saskatchewan, across the border with Saskatchewan most of that was done it was in the Oldman River Dam because it was basically dint have the water available out of the rest of the system yet that…
I: So that's really good that the dam has been in place.
R: It did provide that but we were…2001 was bad, 2002 was just going to plain ugly if we hadn't of had storm event that we did because our reservoirs were empty and there was no snowpack in the winter of 2002. We were out of water.
I: Scary time…
R: It was. I am not sure what we were going to do and I am still not sure how we would have dealt with it because it would have now been basin wide and not just a portion of the basin. It was also starting to impact up into the Bow and that area and its starting to become more regional. So were saying that 2002 storm event was huge. It filled our reservoirs instantly and then all of a sudden thins were good and we haven't been back to that kind of not having enough water or being close to that again since then. Even this year, you know, it's looking like it is setting up to be a dry year from a water-use point of view it's not going to be a problem for anything that is supported by storage and main rivers because we are seeing good snow packs and so we would have snow pack to bring into the reservoirs and have later in the year and support irrigations.
(1:00:23)
I: And that's not including rainfall..
R: Exactly and we are at a pretty good place with our reservoirs right now, just going into the year. It's potentially set up to be a dry year but it's not going to be a problem

year for anybody who is supported by storage and that kind of thing. Having said that, as we start to move into the spring and see how much rains and some of that that should start to take some of the variance from that 99-200 period and say well things are good this and things are going to be good next year. So can are there some decisions on how much water the irrigation districts allocate to their users this year and maybe they will cut them back a couple of inches per acre and just to start to build in a little more comfort for the future because…
I: Adapt to those…
R: Yeah and most of the irrigation within the area within the irrigation districts anyways they have the ability to adjust based on the crops they plant and which ones they irrigate, they can adjust and put most of their water if they are allocated a certain number of inches of water per acre, they can adjust that between their fields so that they put more water on the higher priced crops and most of them that they will get the most economic bang for versus something like Barley Silage or something like that, that doesn't require a lot of water to begin with and…
I: Manage it better..
R: Just manage within their own farms.¸
I: You have been very informative. So this is excellent. So when we talked about the drought, was there any…from a science point of view, was there any impacts of that in terms of soil erosion?
R: Yes. We definitely saw it in 2002 with our drinking water facilities. When we had that storm event in 2002, that flood event, we haven't seen sediment levels like that in any of our previous floods. The '05 flood we didn't see it. In the 2005 flood, we didn't see it. Where we had boil water orders for a number of our drinking water facilities that lasted well into the fall, just because of the real finds that came out. I reasoning is that there was just so much less of that vegetation on the ground that could absorb that that some of pounding that the rain did and as a result of that there was more fines and colloidal clays and stuff like that, that ran off just because we had had three years of very little..
I: Right that's going to happen as soon as you get rainfall like that. Now does Southern Alberta currently have a plan to conserve water as they move forward with variable climate? We kind of talked about that a little bit.
R: A little bit. I think there is room for improvement there. It's kind of hard to understand how to bring people together to really talk about that and really understand what we can do. There are plans in place with regard to water conservation and efficiency but by different sectors, but at the same time, if the only thing that happens as result of that is that the water that is freed up as a result of that conservation and efficiency, if that is used up by growth then we are no further ahead. And that seems to be, to a large degree, the way the irrigation districts are approaching it of yah water conservation efficiency is that they just want to add more acres as a result of that. So I am not sure that gets us much further ahead and I guess just to come back to something I just remembers the irrigation districts, through their organization, I guess the irrigation districts association just put out some sort of news release within the last couple of months talking about if we get into that sort of same scenario like we did in 2000, 2001 that they would share their water with communities and ensure that that basic human water need is covered.
(1:05:30)
I: Yah because that's the most important thing. Good. Do you have any concerns with industrial developments that may impact the watershed?

R: I guess it depends on how you are defining industrial but if you are talking obviously oil and gas and that particular…some of the fracking has been raised as an issue and there is some potential for concerns related to that. I don't think the potential is as high as what some of the general public think it might be. But there are some potential concerns there. It is a regulated activity. So it's not a free-for-all and where they are in fracking is that very deep depths in relation to the water, where water table… people draw their water from but that's not to say that some things can happen with regard to cementing and encasings and things like that between where they are actually doing the fracking and the surface where there can be releases and the other aspect of it to then is also just overtime, some period of time, some of those chemicals may travel through those aquifers and there maybe start to be some surface water-groundwater interaction. That's not something that we are going to see in any sort of near future, but something that we have to consider for the long term. But otherwise than that it's just around the whole general water-use overall and how that affects the aquatic environment and that availability.
I: And management of everything, everybody's needs and demands. When you were working with the science team was there any disagreements that occurred about how the team should go about things? Was there any conflict?
R: Not that was expressed outright, but I think underneath there was and it again comes back to it was around some of the value of what are we getting out of participating in this. So you could see Alberta Agriculture actually pull out of some of the teams.
I: Is that right? Okay.
I was actually going to bring that up. I read a few days ago, that the MD of Tabor is thinking about of I guess revoking membership.
R: Right so I don't know the details of that but you would have to talk to Shannon Frank but certainly the OWC as part of their fundraising asked for a nominal donation from each municipality in the Oldman Watershed based on per capita funding. And it is a pretty nominal thing but its tons of tight budgets for the communities. So the question becomes what is the value that the OWC is providing to our community. Is for us to continue to do that?
I: Exactly in times of financial constraints…
R: Well at any time really. I don't think anybody wants money to be wasted per se. So even if money isn't tight, we want it to be put to the best use because there is always competing uses for tax dollars. So I think that is part of that program review that municipalities have but it could also make the OWC reflect on what are they doing? What is their mandate? How are they using those dollars? And have they really had those conversations with the MDs around what do they see that they…what would they like to see from the OWC. Rather than expecting the OWC to just know how we can help you.
(1:10:16)
I: Better communication
R: Better communication and I think that comes back again to one of these earlier questions around you may have a sector representative who is sitting on the board and actually sharing what is going on and getting some feedback and taking it to the board or to the teams and to the communities rather than sitting around and giving their own thoughts.

I: I just have a few more questions here for you. We talked about what can be done at the institutional level to build more adaptive communities to extreme weather events in terms of flooding. How can wind and hail…how has that impacted communities?
R: Probably the largest windstorm that we had down here was last fall where there was some damage but generally speaking wind here, that's just sort of part of life. I don't think we necessarily… affects us too much. We expect to have wind and we do. So I am not sure that it impacts upon us terribly.
I: You have adapted to it.
R: Yeah exactly. We are already pretty adapted to it and you see it we have a higher threshold… Environment Canada has a higher threshold in here than what they do in Calgary. So yah we are better adapted to it than if we do see more extremes and this winter, my perception, I haven't looked at any data to see whether that's fact, my perception is that we have had more high wind events this winter than we have certainly in the last few. And you know more of them being over 100kms an hour.
I: That's ridiculous. My car door almost just flies right off.
R: And then hail, yeah we get the occasional event and again the one that I recall is that we had some hail but it was more intense rain on July 1st of 2009 I think it was and just extreme event flooded lots of people here in the city and again it comes down to well our storms sewer stuff is designed to it to a certain event level and this was beyond that event level.
I: It's hard to predict when you continue updating infrastructure and the storms keep coming worse
R: Exactly. Again it comes back to the previous piece around is it changing and increasing so that the designed storm event and what are system is built for is… how adaptable or sustainable is that for our future and again it is hard to overbuild things because that gets quite expensive but if you have some science to suggest that things are changing then perhaps you can justify it in some instances but generally speaking, not being an agricultural producer, hail tends to be spotty and I don't think it's generally that bad in this watershed. We are just too dry here. We don't get the humidity most years to really have hailstorms like they do for North of that Red Deer Corridor.
I: What barriers do you see the Oldman Watershed Council facing that may hinder its abilities to carry out its goals?
R: I think we have talked about it a little bit.
I: Communication…
R: Communication and understanding its role and then making sure that it's meeting both of those I guess of understanding what its role is and then communicating that role and getting the buy-in from people to that role and to participate with them and engage with them and to be something as a useful organization.
(1:15:04)
I: If the council had more funds what would you personally like to see it go towards?
R: I think they should be using it to around the communication and to derive a role to facilitate communication amongst the different sectors. I think they are trying to…the science piece to support them I don't think they have the capacity to do that themselves. So I think their ability to provide funds to Alberta Environment, rather than the other way around, for us to provide more monitoring. I just don't see that has happening and I think the GoA in general with Alberta Environment in the lead right now is looking at putting into place some better monitoring system for the prov-

ince, not necessarily run by Alberta Environment that would support all the monitoring needs and so I don't see it that way and that's why I say I think they would be better focused on engaging their community and the different sectors around conversations, around water-use and conservation and efficiency and that's helping communities do flood planning or drought planning or that kind of thing. So we bring people together but have some substance behind it.
I: Have a scientific basis to actually be able to use that information to help communities and to help watershed groups with their planning and that kind of thing.
R: That's my thoughts.
I: Moving forward, what can the government do to help achieve the goals of the Oldman Watershed Council?
R: I think we are already doing a number of things in that we are supporting them with in-kind support as well with actual contract dollars. There is a desire on the part of government that the watershed groups develop some other funding mechanisms so that they are not just dependant on government funding for their work. If they are truly going to be non-profit societies that are part of the community, then they should be part being able to get funding on a broader basis from the community. So that's how I think, we are already providing that and the other thing that the GoA needs to do is I guess be a little bit more explicit around their expectations of planning and the WPACs like the Oldman Watershed Council do and that question has to come up with regard to these regional planning exercises under a Land-Use framework. If you are doing that planning then what the WPACs and the watershed plan supposed to be doing and how do the two interact. So that's what the GoA needs to monitor more and look at and make some decisions around and provide some better guidance on how the two fit together. I think they can be complimentary because we are starting to work at different special scales and as we talked about the Saskatchewan Regional Plan and that sort of larger region, that covers the Bow and the Oldman and with regard to the headwaters and what is going on in the headwaters, it is different in the Bow than the Oldman. So what may come out of the regional planning may not necessarily cover all the needs of the Oldman. The problem that we are running into is around timing and how those things are aligned, or not aligned and the reason that the South Saskatchewan regional plan was the second plan of the government kicked off was because there was believed to be an urgent need to provide some guidance on development from a regional point of view, given all the growth that has been occurring and is still occurring in this region. But politically when we get sort of things slowing down and not progressing as a result of the political stuff, then that takes up out of alignment and the expectations that people that that they watershed council and that kind of thing. Are we asking them to not do their integrated watershed management planning while they wait for the government to finally do something?
(1:20:37)
I: And I just had one more question. Is there anything I should have asked you about water and drought-flood issues pertaining to the Oldman Watershed I should have asked you?
R: Well I guess a few things. It's not necessarily that you didn't ask them but I just wasn't necessarily thinking about them at the time that you asked. But there are some differences for the Oldman versus some of the other watersheds in the province and one of those is that there is very little groundwater use in this watershed and for some good reasons in that we don't have a lot of good quality potable groundwater. So out of the groundwater that does exist would require a fair amount treatment as well. So

that is why most of our communities rely on surface water sources which is quite different from central and northern Alberta where it's just the opposite. So that piece. But at the same time, like I say, what is out there isn't all that good quality and/or is in bedrock formations as opposed to consolidated materials and bedrock formations, unless you are going to drill multiple wells, they can't support large diversion rates. So you have a scattering of wells with small diversion rates for households but…and that can be sustainable, but they wouldn't be able to sustain a large community or an industry type of thing. And then I guess just the only other point was just around… there is a linkage between water and water supply as well as…and water quality and so because of the amount of water that we have allocated we do put pressures on the aquatic environment, on fish, on the plants and macrophytes and algae and things like that within the water and some of that is influenced directly by the Land-Use activities and how much we have to treat and how expensive it's going to be to treat wastewater to put water back into the system. And we have tended to sometimes treat them isolated and I think it has been a failing of our department in particular in how we have allocated water and how we sometimes some of our policies and some of our procedures between our two pieces of legislation which is the Water Act on the water allocation side and the Environmental Protection and Enhancement Act with regard to wastewater and drinking water facilities that we haven't tied those together very well and we haven't also tied them together with regard to communication with communities around land-use and development. So if we are creating new reservoirs like Pine Coulee, excuse me, like Twin Valley Reservoir, on the upper level Bow and then putting in intakes to supply regional drinking water supplies, we should be also communicating that we need to ensure that the quality of that water, that those reservoirs are providing is the best quality water that we can provide and not compromised as a result of other decisions and that's not necessarily not what we are seeing right now. We are seeing reservoirs that then attract development and so then we are getting right into the cycle of needing more expensive treatment or not being able to treat or deal with nonpoint source because of all the development and how they have impacted water bodies and have increased concerns around toxins from blue-green algae and things like…So that's my final point.
(1:25:41)

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