

**An Analysis of Trends Related to the Adaptation of Water Law to the
Challenge of Climate Change: experiences from Canada¹**

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Abstract

In the arid Canadian Prairies, and specifically Saskatchewan and Alberta, water is necessary for supporting not only agriculture, but also competing uses of industry, leisure and domestic use. This region of Canada has had significant droughts over the past hundred years and will continue to experience them as a result of climate change). As a result this area's water law has historically been adapted first by the federal government and later successive provincial governments with citizen and stakeholder input. This article focuses on the adaptive capacity of the institution of water law and water governance in this region through the examination of several water conflict case studies in the last decade.

Vulnerability to climate change is determined by exposure of a system to climate change stress and the system's adaptive capacity. A key determinant of adaptive capacity is institutional capacity. Water law is a formal institution and water governance, an often informal institution with significant linkages yet variations to water law. Although formal legal rules provide an important social structure of some permanency, in times of real water scarcity, the real actions of agents as they make decisions and negotiate the institution of water governance, is a rich study of institutional adaptive capacity.

These case studies illustrate the changing institution of water governance and provide insight into important modifications in the institution of water law which will increase adaptive capacity and are also consistent with the literature respecting adaptive policies. Important implications for future water law are evident and will be outlined.

Keywords: Adaptation, Water Law, Water Governance, Institutional Capacity, Policy, Water Conflict.

Introduction

The most arid area of the prairies in the Canadian provinces of Alberta and Saskatchewan is in the South Saskatchewan River Basin ("SSRB") (Sauchyn *et al.*, 2002a) which stretches from the Rocky Mountains across southern Alberta

and Saskatchewan, covering an area of 420,000 square kilometres with an estimated population of 1.5 million. See figure 1. The basin is under the jurisdiction of two provincial governments, Alberta and Saskatchewan, the federal government of Canada, and several First Nation governments. There are also a large number of local governments (rural municipalities) and approximately 225 rural communities (Sobool and Kulshreshtha, 2003). Competing uses of agriculture, hydroelectric and power generation dams, drinking water for 45% of Saskatchewan's population, diversions, irrigation and recreation occur and sometimes in periods of water shortage result in conflicts.

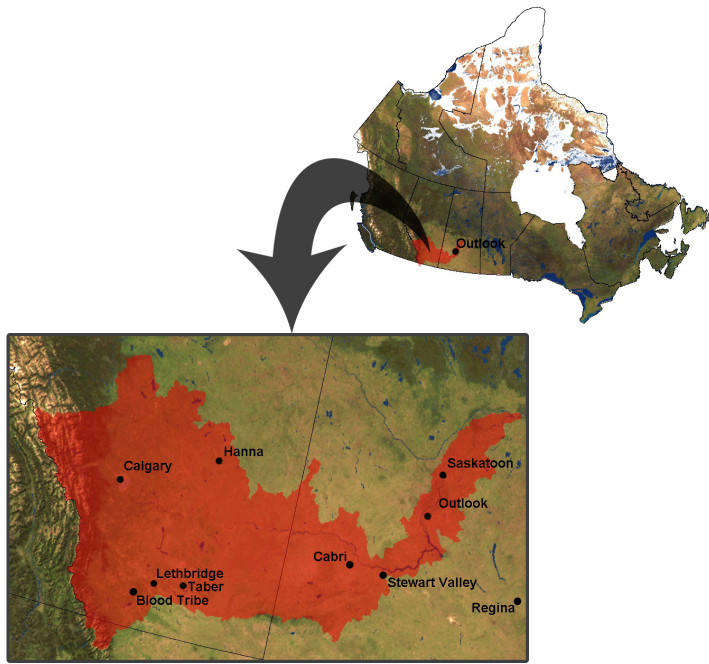


Figure 1: Canada's South Saskatchewan River Basin

Alberta and Saskatchewan have a history of climate variability affecting agricultural development and this particular area is at risk of desertification. When European immigrants first settled this region at the start of the 20th Century, there was a period of water abundance. However, the 1930s were an extremely difficult time for agriculture with many people vacating parts of this area. Droughts have followed with the most recent occurring in 1998 and again from 2001-2003. This history of periods of water scarcity over the past century has allowed for much learning about vulnerabilities to climate and the development of many institutional adaptations including the development of the formal legal water laws. It has also always been recognized that climate is only one variable affecting vulnerability; Multiple social conditions affect vulnerability including

social, economic and political factors which can't be separated from the impacts of climate change. This area has always been particularly susceptible to world grain prices and political policies of a perceived distant federal government many kilometers away in Ottawa.

In this area, drier conditions, with more extreme weather events, and increasing climatic uncertainty is expected with climate change (Sauchyn *et al.*, 2002b); as well, there will be impacts on water resources in terms of quantity and quality (Lapp, 2006). Increased periods of water scarcity are anticipated (Sauchyn, 2007). The potential for conflict as a response to resource scarcity has been well-documented (Homer-Dixon, 1999) from a theoretical and practical perspective. The existence of resource scarcity increases societal focus on distribution of that resource. Social and biophysical realities are intimately linked with the potential for conflict as people experience changes in their perceived security, well being, and relative equality (Deaton, 2001; Dollar and Gatti, 1999). Increased conflict results in increased vulnerability and risk when responding to climate change and climate variability.

The degree of susceptibility of a system to climate variability or climate change is partly a function of its adaptive capacity, or “ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses...” (Burton, 2005). Well developed institutions (such as the institutions of water law and water governance) have been identified as facilitative of the management of climate-related risks and thus important in reinforcing adaptive capacity (IPCC, 2007). A well developed institution does not mean a rigid rule driven institution.

Water governance refers to the both the range of political, social, economic, and administrative systems that are in place to regulate the development and management of water resources and provision of water services at different levels of society (UNDP, 2007) and the process of making decisions and reconciling competing priorities (UNHSP, 2007). Water governance is an important societal institution in respect of adaptation to climate change and ensuring that conflict is minimized. At the 2000 World Water Forum it was concluded that the water crisis is mainly a crisis of governance. Institutional structures and an enabling environment allow stakeholders to work together for effective water management (Global Water Partnership, 2000). Water law is an important institutional framework for water governance. It establishes the formal framework of rules within which people and organizations operate in relation to water and sets the framework for the organizational structure of government institutions with mandates relating to water.

This paper will first explain some aspects of water law in the SSRB followed by a discussion of the linkages and differences between water law and governance. Thereafter, case studies of water conflict in this arid region of the Canadian Prairies illustrate how water conflicts are resolved and illustrate the current state of water governance, which often does not represent the formal legal water law rules. These conflicts and their resolution provide a realist view of the institution of water governance and important guidance on vulnerability and adaptive capacity for responding to climate change. This guidance ultimately shapes future water law and governance policy decisions.

The Historic Adaptation of Water Laws

Canadian water law illustrates the law's history of adaptation. Water rights were based on two common law theories, the English riparian doctrine (a set of usufructuary rights) and the American prior appropriation doctrine (Lucas, 1990). The riparian doctrine was inherited from England and made part of the law of Alberta and Saskatchewan on July 15, 1870 (Gibson, 1968). In British common law, water, in its natural state, was incapable of ownership (Lucas, 1990). Landholders next to water acquired riparian rights of use which included a reciprocating obligation to return the water substantially undiminished in quality and quantity (Lucas, 1990). The common law riparian doctrine assumes an abundant, if not an inexhaustible, water supply such as existed in eighteenth century England. Because the common law riparian doctrine couldn't meet the development needs of Canada and specifically the arid area of western Canada, Canada and later the provinces, enacted statutes replicating portions of the United States' prior appropriation system which was a first come, first right doctrine (Percy, 2004). Canada modified this to require a government issued license to protect a water right. Common law riparian doctrine remains relevant in Canada to the extent it has not been clearly modified or abolished by statute and to the extent the courts find it applicable in the Prairie Provinces.

The provinces of Alberta and Saskatchewan were created in 1905 and in 1930 government jurisdiction in respect of natural resources (which included water) was transferred to the provinces. The provinces passed their own laws in relation to natural resources and water and over the years have each modified and amended their laws in respect to changes in the availability of water. Four main features of the original federal water law were as follows:

- (i) Crown Ownership;
- (ii) Allocation of Water by License;
- (iii) Prior Allocation Principle;
- (iv) Non-transferability of water rights.

The first three of these principles still survive in both Alberta and Saskatchewan, and the last in just Saskatchewan. Saskatchewan's water law consists predominantly of *The Saskatchewan Watershed Authority Act, 2005*, S.S. 2005, S-35.03. The Act establishes the corporation, the Saskatchewan Watershed Authority, and establishes its powers, mandate, and rules for administration moving from a legislated water rights model to a water rights model managed by a Crown Corporation. Issues formerly dealt with by legislation were then left to be resolved at the discretion of officials of the then Water Corporation (and now Saskatchewan Watershed Authority). It is argued that the licensed water rights established by the statutory scheme prior to 1984 remain in tact; water licenses issued after that time are at the discretion of the Corporation (Percy, 2004). As there isn't a statutory scheme of water rights, and there isn't a publicly accessible record of water rights, it is unclear what the priority of water rights will be in the event of a conflict (although the case studies will illustrate there has been water shortage incidents in Saskatchewan). There has not yet been a full allocation of Saskatchewan water as in Alberta so the issue of transferring water rights and ensuring efficient allocation for maximum economic development has not manifested to the same extent.

In Alberta, The Minister of Environment responsible for the *Water Act* designates a "Director" who has responsibilities outlined in the Act for the management of water including issuing licenses, developing water management plans, water conservation objectives and authorizing water works. The *Water Act* establishes four classes of water rights: existing licenses, household users, traditional agricultural users, and new licenses and established a detailed structure of priority amongst these users. Transfer of water rights is allowed if in accordance with an approved water management plan, and in the absence of such a plan, Cabinet order. In the South Saskatchewan River Basin there is a South Saskatchewan Basin Water Management plan which allows the Director to consider applications to transfer water allocations within the basin. This is described as creating a non-regulatory method of reducing wasteful use by creating an incentive to save water and transfer its marginal value for compensation (Percy, 2004). Alberta has reached full allocation of water rights in this basin and its government extensively considered issues of transferability and curtailment which has resulted in the passing of formal laws facilitating this.

Defining Water Law and Water Governance

Law is generally regarded in a positivist fashion as a set of rules reflected in the wording of legislation and decisions of judges all forming a code binding on subsequent legal subjects (Luhmann, 2004). In system-theoretical terms, law

is an operatively closed network of communications which constantly refers to its own decisions, expressly based in turn on legal principles and procedures. However, in the actual workings of the legal system, people are not merely law “abiding” but also law “changing” and law “inventing” (Kleinhans, 1997). The legal system is composed of the interaction and intersection of different legal spaces operating simultaneously. Although it is recognized there is a social structure composed of statute and established precedent, there is a vaporous edge of this structure of legal conjecture, where definitive legal opinions about what the law is or is not can’t be given. In relation to water law in this study, there is also a variation between the positivist legal institution respecting water law, or the formal legal rules constructed by lawyers and the same institution constructed in resolution of water disputes by legal participants which may be done in accordance with formal legal rules or not (sometimes with participants knowingly in derogation of the legal rules, and sometimes not). It is the actual rules effected to resolve water conflict and issues which is the essence of water governance.

Water governance involves many organizations (many formal institutional actors), many institutions (such as water law and the separate but related institution of water policy), and informal institutional settings and actors (such as the rural community and households). Water governance, through this definition, is much broader than the formal legal rules and policies which only experts in various water organizations and lawyers could define with certainty. Water governance comprises of all those institutions and organizations playing a part in the decisions made respecting water quality and quantity. By way of illustration, this research in this paper will show that in the drought of 2001-2002 water allocations were not made according to the strict legal rules of water allocations, but in accordance with community norms of sharing and reciprocity. In this way, the informal community setting was significant in its role of water governance.

A complex institutional cluster is involved in water governance in the SSRB, involving federal and provincial agencies, local governments, civil society groups, and NGOs. This complex structure is partly a result of the historical development of water governance in Canada. Water management was not specifically dealt with in the Constitution of Canada. The topic of water spans several heads of legislative power assigned to the federal and provincial governments. Thus each level of government has a role to play. There is complicated overlapping of jurisdiction over water and related activities. The result is that a multitude of political actors at the municipal, provincial and federal levels each have some role or responsibility in water. This makes it difficult to identify issues and to balance interests at all levels or orders of government.

The SSRB watershed and its water resources are defined by geographic boundaries, but it is separated by artificial provincial and municipal boundaries representing different legal norms, rules and laws, or legal instruments. In Alberta, Alberta Environment takes a lead on water management but Alberta Health and Alberta Agriculture have important roles relating to public health and water and irrigation and drought management respectively. Similarly in Saskatchewan the Saskatchewan Watershed Authority is tasked with water management and watershed protection but the ministries of health and agriculture have similar roles. In addition the ministry of environment has responsibility for protecting the environment. The federal Canadian government has five departments with significant mandates relating to water including Environment Canada, Health Canada, Agriculture Canada, Natural Resources Canada and Fisheries and Oceans. Added to this is the patchwork of First Nation lands subject to a different regime of water management and environmental laws.

The complex institutional structure of water governance in Canada and the positivist legal rules established by provincial governments lay the foundation for the operation of water governance. The following case studies illustrate the variety and diversity of governance in practice. As will be evidenced in the next section of this paper, the construction of water governance by water stakeholders in practice can be much richer and adaptive than the formal institution of legal water law.

Water Conflict Case Studies

The case studies described below were identified in a larger study of water governance assessed by interviewing a wide range of water stakeholders representing rural communities, the diversity of water institutions, and all orders of government in the SSRB² (IACC, 2008). This section discusses some of the case studies identified in the resolution of water conflicts during times of drought and development.

St. Mary's - 2001

In 2001 the lower south west corner of Alberta experienced a drought. Usually during years of water shortages regional people with Alberta Environment have to advise junior licenses (or last in time licensees) that they need to shut down their pumps and are being cut off. In the St. Mary's river in 2001 there was a severe water shortage which was going to allow only six or

seven licenses to operate. Stop orders would have had to be issued on 500 to 600 licenses. This could have dried up the river. The sharing provisions which were put into the Act between 1993 and 1996 allowed two licenses to share water back and forth (if physically possible) as long as no other licensee complains that it is hurting their right.

Irrigation districts sent out letters to their licensees and held meetings to discuss water shortages. A smaller percentage of water allocation for each license was agreed on (approximately 60%). However, because irrigators and other uses of water couldn't meet their agricultural or business needs with this smaller allocation of water, novel arrangements were made. Farmers transferred their allocation to another farmer in exchange for agreed upon consideration which allowed at least one farmer to irrigate and obtain a crop that year. Approximately 70 licensees didn't agree to the sharing arrangement and received stop orders as a result. The actual water allocations agreed upon during this time were significantly different than those provided for in the formal institution of water law.

Oldman Dam Water Conflict

The Oldman Dam Conflict is a classic dispute regarding the building of a dam in Alberta in the late 1980s and its failed opposition by indigenous peoples (the Piegan Indian Band) and environmentalists (Daschuk and Marchildon, 2006). Politicians and water agencies took the lead and managed to end run the Alberta Environmental Assessment Guidelines, the Province of Alberta issued itself a license to build the dam, and the Cabinet worked around in stream flow policy in the "public interest" in order to allow the promised quantity of water to irrigators (Glenn, 1999, 130). Once the matter was in the court system the behaviour of the two governments was to deny access to information, and refuse to comment publicly because of the court proceedings effectively ending public debate. Both of these actions are contrary to a government's elected mandate. This case illustrates that it is futile to look to the courts to protect the environment (ibid. 273) and governments continue to treat indigenous people unfairly (ibid, 275) thus further marginalizing them.

The Blood Tribe Indian Reservation – 2001

The Blood Tribe Indian Reservation is located in the south west corner of Alberta and comprised of 349,295 acres covering 545.8 square miles in the heart of Blackfoot territory (Magzul, 2008). The Blood Tribe is comprised of nine to ten thousand members but less than half live on the reserve. The Blood Tribe

operates many businesses but the main one is the Kainai Agri Business Corporation which is the agricultural arm of the reserve. Twenty thousand acres of the reserve are irrigated in the north east corner of the reserve. The Corporation also runs a feedlot and has stock initiatives (Magzul, 2008).

During the droughts of 2001 and 2002 in the SSRB, the Blood Tribe did not decrease their water intake from the river(s). The Blood Tribe does not acknowledge the provincial water allocation system of Alberta. They would not have respected a provincial enforcement order to suspend their intake, nor did they participate in the voluntary agreement described in the previous section relating to St. Mary's 2001. The Blood Tribe do not deal with provincial governments, only the federal government and believe that, as their reserve is surrounded on three sides by water (the rivers), they own the water to the middle of the water course. This opinion, although perhaps contentious or believed incorrect by some, is reasonable when considering the historical development of Canadian law.

Because of Canada's colonial development, Indian reservations are not governed in the same manner as provincial lands surrounding them. Historically, Aboriginal peoples were within the jurisdiction of the federal government, not the provincial governments. The federal government established through federal legislation, the *Indian Act*, R.S.C. 1985, c. I- 5, Indian "Bands" and their mechanisms of governance and establishment of reserve lands. Indian reserves, and Indians, have been held not to be an "enclave" of federal jurisdiction³ (Lysyk, 1967). The general rule is that provincial laws do not apply to Indians and land reserved for the Indians. However, there are exceptions for matters with only incidental effects (Hogg, 2002, 586). For the most part, provincial legislation dealing with land on reserve and incidentally water, will not apply.⁴ As a result, provincial laws dealing with priorities and enforcement of provincial environmental and water laws may be unenforceable on reserve land.

This case study illustrates the power of Indians on reserve land because of their unique position in law. However, in other water conflicts the occupation of a separate place may not play out as advantageously, as illustrated in the Oldman Dam conflict. If a reserve were downstream of irrigators, the natural system may have rendered the special place of the reservation ineffective. This had important implications for a meaningful involvement of Aboriginal people in water governance.

Swift Current Creek, 1988

An example of an effective upstream geophysical water priority effecting water governance differently than that envisioned in the formal institution of

water law occurred in Saskatchewan in the Swift Creek shortage of 1988. In 1988 the Swift Current Creek, one of the main Saskatchewan tributaries into the SSRB ran dry. This creek is fed by snow pack in the Cypress Hills located in the south west corner of Saskatchewan and because of low snow pack that year suffered drought. Licensed Saskatchewan water users along that creek experienced water shortages. The licensed users shorted were those downstream. Upstream users were able to withdraw water. As such, priority was based on geographical and environmental determinants, not first in time, first in right uses. This area did not experience water shortages in the 2001 time frame because of the abundance of snow pack in the Cypress Hills.

Now the Swift Current Watershed Stewards group has been formed (not due to this specific drought, but other water quality issues along the Swift Current Creek). It is anticipated that this organization might be a forum to help alleviate a year of water shortage such as 1988 and provide a more equitable solution to water shortages.

Northern Alberta Oil Sands

Although outside of the SSRB, an interesting example of agreement to water interests contrary to water law rules occurred in northern Alberta, where oil sand development uses 349 million square metres of water each year from the Athabasca River.⁵ As outlined previously, Alberta water licenses have a very detailed priority of first in time, first in right and grandfathered interests. Two of these grandfathered licenses are held by Syncrude Canada Ltd. and Suncor Energy Inc. which gives them priority to use water from the Athabasca River for their oil sands mining operations based on the terms and conditions of the original license and not subject to the provisions of the current Act (if inconsistent). These companies have agreed to a significantly different water priority structure and a reduction of their license priority during periods of certain water shortages. Instead of their current licenses which allow for a combined peak withdrawal rate of close to double the average allocation rate, they agreed to a maximum rate equal to their average annual allocation rate. This agreement came after Alberta Environment and the federal Department of Fisheries and Oceans Canada issued a draft Water Management Framework (2006) with the goal was to protect the river and set in stream flow needs to meet environmental and socio-economic goals over the long term.

More recently, in this area, Alberta has expanded the decision making framework by implementing a civil society engagement in water conservation, environmental decisions and development. Alberta Environment has released a water management framework for the Industrial Heartland and Capital Region which is comprised of 470 Square kilometer area north east of Edmonton (Alberta Environment, 2008) and is a major oils sands development area. Although an

interesting example of cooperative decision making in the face of water scarcity, more research on the concerns of Aboriginal peoples and environmental groups in this area is required.

Lessons Learned

Climate is the initiating factor of all of these case studies dealing with water shortage and was the impetus for the modifications to water law in Saskatchewan and Alberta by government through the late 19th and 20th Century. Increased periods of water scarcity are anticipated with climate change, but when exactly they occur can't be predicted. More extreme weather events and increased climatic uncertainty is also expected (Sauchyn et al., 2002b; Lapp, 2006). The challenges of climate change are presenting the necessity of further modifications to water law and governance in this region. The case studies relating to droughts (St. Mary's, Blood Tribe, Swift Current 1988) evidence some of the features of expected climate change.

What they also show is that formal legal rules, the resolution of which often requires lengthy court processes were not resorted to, presumably given the short advance notice given of water shortage. Because of the short notice of water shortage given, response to shortages must occur over the space of several days or weeks. This requires flexible, quickly accessible institutions for responding to water shortages. These institutions are not so much deterministic institutions (as formal legal rules would be) but facilitative of adaptation processes and decision making for optimization of results.

These case studies also illustrate that regional responses to climate and water shortage are not necessarily consistent with the boundaries of a river basin but relate to other features such as local and provincial government boundaries. The St. Mary's case study related to a group of water interests situated in Alberta in close enough proximity to one another to enter into the sharing arrangement discussed. It did not apply to the same river basin suffering shortages in Saskatchewan, another province. This is consistent with findings in other studies (Moss, 2008).

Although law is often regarded as the determining factor in times of competing water interests, these cases show that this is not always the case (in fact was not the case in any of the identified case studies). Other factors of importance in determining the outcome of water shortage due to climate include the geophysical property of the natural resource of water and the institutional mechanisms allowing the creative and optimal resolution of conflict. These are important areas of focus for policy makers. This is consistent with previous literature respecting institutional adaptation to climate change.

Variability in resolution of conflicts in legal institutions in water governance would be argued by some to reflect lack of certainty and increase risk of conflict and protracted legal disputes. However, in the field of adapting to climate change and variability, this diversity of water conflict resolution in the cases of St. Mary's, the Blood Tribe, and the Northern Alberta Oil sand, is cause for some optimism. The St. Mary's and Northern Alberta Oil sand cases illustrate novel solutions for water shortages able to optimize the water resource through consensus of parties for water sharing and not strict enforcement of first in time water rights. The Blood Tribe case illustrates an optimal solution for these Aboriginal people and reflects the special place of Aboriginal peoples in Canada. These cases also illustrate very important features of adaptive capacity critical for responding to climate variability and climate change: well established decision making frameworks and processes, grassroots civic engagement, and subsidiarity or integrated decision making. Each will be explained in turn. In combination with the other cases, important implications for future water law and governance can be ascertained.

Adaptive capacity requires flexibility of institutions to deal with the unanticipated conditions that may result from the impacts of climate change. In respect of governance, the role of institutions includes implementing an enabling environment that allows civil society to deal successfully with the challenges of climate change and applying specific policies (resource mobilization and allocation and incentives and disincentives). Adaptive capacity, to be successful, must allow for the identification and resolution of communities' problems and the satisfaction of their needs in a fair, efficient and sustainable manner. Thus, the fundamental contribution of governance to reducing the vulnerabilities of people rests on its ability to anticipate problems and to manage risk and challenges in a way that balances social, economic, and natural interests (IPCC, 2007). This entails a well **established decision making framework** and process involving **grassroots civic engagement**. This is not the same as a rigid, positivist framework of water law only requiring dissemination to the constituents affected by it. The St. Mary's case study evidenced a flexible responsive decision framework successful in quickly responding to the 2001 drought in a manner allowing the efficient allocation of water priorities maximizing economic return. This was done within a very short time period of a few weeks; a solution the institution of formal water law arbitrated by courts could not offer. The Northern Oil sands Agreement also illustrates this adaptive capacity in relation to development in light of unanticipated future water scarcity. Even when planning for future development and increasing water shortages, the certainty of a negotiated agreement was preferred to stakeholder disapproval and potential court challenges.

The second element of this pluralistic water law and governance institutional framework illustrated by these case studies is that of **subsidiarity or integrated decision making**. Subsidiarity and decentralization, or delegation of responsibility and authority of water management to the lowest feasible level involves managing surface waters at the catchment's level with involvement of all stakeholders (WWCWAU, 2003; Brooks, 2002). Decentralization and subsidiarity is important for two main reasons:

- (i) Decentralized management decisions and planning allows for local community practices and values which are then adopted and embraced in practice. Community participation ensures community commitment;
- (ii) Decentralization also allows a three part economic analysis which incorporates externalities which might otherwise be lost in the cost benefit analysis: A conventional top down economic perspective reflects prices paid and relative values of inputs and outputs; a bottom up perspective that reflects the true value to the community and its residents of what might be otherwise marginal resources to outsiders; and lastly a sideways interaction of economic interventions with non economic values such as health benefits from improved water quality.

In order to achieve the goal of subsidiarity in relation to adaptive capacity, a formalistic positivist set of water laws will only limit and bind grassroots participants and water stakeholders in making water management decisions. Consequently, water management decisions will be very diverse (or inconsistent perhaps) if made embracing the three features: well established decision making frameworks and processes, grassroots civic engagement, and subsidiarity. The St. Mary's 2001 drought and the Northern Oilsands Agreement also illustrate this principle. The constituent parties were able to arrive at an agreement reflecting their values, including economic values with very little advance notice, in a time of water shortage. Although traditional water priorities existing in Alberta may have to be retained for commercial reasons such as certainty the legal institutions such as the courts take months if not years to resolve water conflict. Flexible institutions facilitating adaptive practice are important for adaptive water governance in order to respond to water shortage on short notice as is predicted in relation to climate change.

With the exception of the Swift Current Creek case and Oldman Dam River Conflict, all of the cases discovered in this research project illustrate flexibility and civic engagement for the resolution of water conflicts. It is these

characteristics which are important for reducing vulnerability and promoting resiliency in adapting to climate change. Community resolution of water conflict allows for community commitment to result and the incorporation by the community of important considerations both socially and economically into decisions. What might be determined to be scattered fragmented water governance, on careful examination, is really an important development in water governance in adaptation to climate variability and change. Facilitating this somewhat messy institutional process of dialogue in water governance will be important.

Important policy implications also arise from the Oldman Dam Blood Tribe Conflict and Northern Alberta Oilsand Agreement (opposed by Aboriginal groups and Environmentalists). These case studies show an exclusion of Aboriginal voices from the grassroots civic engagement and decision making frameworks. The Oldman Dam conflict case study research confirms and illustrates how failing to adequately integrate these voices and their relegation to expensive time consuming and lengthy court challenge further marginalizes these voices. Although the Northern Oilsand Development appears to be repeating this de-habilitating trend it is still not too late for corrections to water governance and ultimately law to occur. The development of adaptive capacity requires the participation of all members of a community in a manner balancing social, economic, and natural interests. Although these case studies illustrate the emergence in water governance of important practices facilitating adaptive capacity, measures in policy and law need to be implemented to ensure the meaningful participation of marginalized voices, specifically Aboriginal and environmental. Changing laws to ensure this participation and meaningful engagement should be a priority.

Conclusion

Climate change in the SSRB is expected to result in drier conditions with increasing climatic uncertainty (Sauchyn et al., 2002b). Because of increased scarcity more water conflicts and pressure on balancing water interests for development is expected. These case studies show positive aspects of water governance and institutional capacity in responding to this climate change. In the SSRB to reduce vulnerability of people and adapt to these conditions with ingenious solutions such as occurred in St. Mary's in 2001 and the Alberta oil sands development.

However, attention needs to be paid to nurturing the flexible institutions that allowed these creative solutions to occur and building on and expanding this institutional strength. The obstacle of geo physical barriers to such solutions

(which incent upstream priority regardless of both legal priority and optimal economic solution) needs to be tackled so situations such as what occurred in Swift Current in 1988 can be prevented. Institutions of governance must be available and flexible due to climate variability and the fact that water shortages occur in an unpredictable pattern from year to year with very little notice. The time frame of this variability does not allow for the long, protracted resolution of water interests pursuant to legal means such as courts (which take months if not years).

Lastly, the absence of effective participation by Aboriginal people needs to be remedied. Their exclusion from the important institutional process of water governance and adaptation as found in St. Mary's and the Athabasca Oil sands development and their marginalization evidenced in the Oldman Dam conflict does not reflect the diverse, just, inclusive country Canada holds itself out to be.

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² IACC (Institutional Adaptation to Climate Change Project) (2008) available www.parc.ca/mcri

³ *4B Manufacturing v. U. G. W.* [1980] 1 S.C.R. 1031

⁴ *Derrickson v. Derrickson* [1986] 1 S.C.R. 285, and *Western Canada Ranching Co. v. Department of Indian Affairs*, [1921] 2 W.W. 834 (B.C. C.A.)

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