

Responding to Climate Change - Adaptive Water Governance

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Water governance is experiencing a transformation. A new model of water governance, responding to climate change, and embracing principles of sustainable development, through community participation and shared responsibility is evolving. This model replicates the user-based model of water governance endorsed by many international water experts.

This paper will explain, outline and critique three models, user-based management, government agency management and a market-based management system and illustrate how aspects of each are adopted by the Western Canadian provincial governments for managing water resources. In assessing these models based on the principles of adaptive policy making, accountability, participation in decisions by all stakeholders, predictability, transparency, and decentralization, the user based management model is superior. However, best practices support a combination of the three models and a balance depending on the biophysical water resource and community needs.

Keywords: Adaptation to climate change, water governance, used based water management, integrated water management.

1. Introduction

It is increasingly being recognized that Canada's available freshwater is limited, and policy makers are facing increasing pressures to keep clean fresh water available to all those who need it (The Conference Board of Canada, 2005). Issues related to water are ranked the most important climate change impact for the Prairies (CCIAD, 2002). Given these factors, the review of water governance becomes increasingly important in a proactive strategy responding to Canada's future water requirements in the face of climate change and increasing water scarcity. In the Prairies (comprised of Manitoba, Saskatchewan and Alberta) scenarios of future climate for the 2050s and 2080s suggest a median temperature increase of between 2 to 6°C and median annual precipitation

increase ranging from 0 to 30%. This is expected to result in periods of water scarcity and aridity decreasing stream flow from four to 13 percent in some rivers (Sauchyn and Kulshreshtha, 2007, Henderson and Sauchyn, 2008). British Columbia is also expected to suffer from increasing water shortages in many regions and sectors and increasing frequency and intensity of extreme weather and related natural hazards (Walker and Sydneysmith, 2008). All four Western provinces are expected to have increasing water stress from shortages which will have the potential to increase water conflict and place increasing pressure on water governance.

This paper will examine the legal framework established by statute in the Western Canadian provinces of Manitoba, Saskatchewan, Alberta, and British Columbia. First, three predominant water governance models illustrated in the provincial frameworks will be discussed and then these frameworks assessed using the best practices of water governance developed by the World Water Council and principles of adaptive policy.

Western Canadian water governance, established through provincial legislation has a common tradition heralding from British common law and Canadian federal law until 1930. From 1930 on each Province had natural resources transferred to them and many of the main features of the original federal water law still apply. These include Crown ownership and allocation of interest by license. However, the Prairie Provinces have diverged in some respects in their respective water management regimes. These will be illustrated in the following water models.

2. Water Models

There are three major alternatives to the governance of water rights and interests. Generally these models relate to the bundle of property rights associated with water, i.e. whether it is owned privately, as public property or common property. In Canada, because the Crown owns all water, and water rights are allocated by license, this property ownership distinction isn't applicable. However, the property distinction is illustrative as parallels can be seen in the characteristics of bundles of water rights received by way of water license. Based on the three models of property rights, the three institutional models are:

- Government agency management (generally associated with water regarded as public property) – Government defers its authority for the management of water to an agency which assumes authority for directing who does and does not receive water rights in accordance with bureaucratic policies and procedures.
- User-based management (generally associated with water regarded as common property) - Water users, or those with license or rights to water join together and coordinate their actions in managing water resources. Decision making is collective among users.
- Market (generally associated with water owned as private property) – Water is allocated and reallocated through private transactions. Users can trade water rights through short term or long term agreements or temporary or permanent transfers, reallocating rights in response to prices (Bruns, 1995).

All of these models are used in Western Canada in a variety of combination. No one model is used exclusively. This is consistent with water management in other countries. In Chile, water is considered a public good, however, individuals can obtain private rights over water and many obtain water rights through market transactions. Any entity holding rights to water must join a users' organization or association which actively manages the water resource (Shen, 2003, 149). Australia also vests rights to control and use of water in the Crown. Water licensing regimes govern allocation and use of water. Certain water rights can be traded and priority between license holders in case of water shortage is set by type of use (ACIL Tasman, 2005). Although both jurisdictions use a combination of tools, Chile relies more heavily on the market and Australia more on government control.

Within the same river basin (or even within an irrigation system) there may be user - based management within and between some groups of users, transfers between individual farmers occurring through market-type mechanisms and government agencies administering allocation of water resources. Examples illustrating these models in Western Canada will be provided.

(a) Government agency Management

All four western provinces have significant aspects of government agency management of water. This is partly due to the Crown ownership of water and consequent necessity to manage license rights, set water right priorities and resolve conflict. Saskatchewan and Manitoba are the best, most comprehensive and consistent examples of a government agency management of water. Saskatchewan moved to the Crown corporation model in 1984 with what is now the Saskatchewan Water Corporation tasked with the management of water rights (see *The Water Corporation Act*, S.S. 1983-84, C.W-4.1, s.42, now *The Saskatchewan Watershed Authority Act*, 2005, S.S. 2005, c. S-35.03.) In Manitoba, a government department, the Manitoba Water Stewardship has been created with a legislated mandate for the granting, revocation and amendment of licenses as set out in *The Water Rights Act*, C.C.S.M. c. W80. Alberta (see *The Water Act*, R.S.A. 2000, c. W-3) and British Columbia (see *The Water Act*, R.S.B.C. 1996, c. 483) have substantive aspects of Government Agency based management of water. Both provide for Crown ownership of water and the granting and administration of license interests. The comments contained in this paper will be based on these pieces of provincial water legislation, unless another statute or source is cited.

All four western provinces have a legislated scheme of priority for water uses and diversions administered by a government agency. These schemes generally involve some combination of grandfathering of rights issued pursuant to predecessor legislation, priorities based on a combination of principles of first in time or purpose of use (except Saskatchewan), and an ability of the provincial government to amend or cancel water rights (except British Columbia). The Western provinces all have legislated mechanisms for resolution of water conflict in the first instance by the government.

(b) User – based Management

Although promising aspects of user-based management are being incorporated into water governance frameworks (which will be discussed subsequently) the best example of user-based management of water licenses, or collective water user decision making, is irrigation districts. Alberta, Saskatchewan and British Columbia allow for the formation of irrigation districts or water user groups which allow collective water user decisions in respect of their irrigation area. Alberta irrigation legislation is consolidated in *The Irrigation Districts Act* R.S.A. 2000, c. I-11. The water users' community, once formed, has the exclusive control and operation of the works constructed or used under the licenses mentioned in its certificate of incorporation.

Principles of user-based management are also being incorporated into the Government agency management of water. In British Columbia, the comptroller of water rights or regional water manager issues licenses but provisions exist for publication of license applications and objections by any affected licensees or riparian owner. Although discretion is granted in respect of the issuance of the license, conflicts between users and problems of water quality aren't determined by these officials. Instead, the minister may designate the area for the purpose of developing a water management plan to address these issues. This is a "user" based response to conflict management.

In Saskatchewan, one or more advisory committees may be appointed by the Saskatchewan Watershed Authority for a specific period and specific purpose. These committees can be for the purpose of advising on any of the activities of the Saskatchewan Watershed Authority. There is no legal requirement that the Saskatchewan Watershed Authority follow the committees' advice so this may be only passing lip service to user-based management. However, it could also be an important first step in greater user-based water management. Manitoba also provides for the designation of a water planning authority for a watershed (many of whom are Conservation Districts as well) whose task is to set a watershed management plan and a water council to oversee the development and implementation of watershed management plans and advise on various water related issues. Again there is no legal requirement to follow the approved watershed management plan, but a regulation may be passed requiring it to be considered prior to any prescribed decision or approval under any specified Act or regulation.

The avenue for public consultation and participation in water management in Alberta is if the minister directs the development of a water management plan. Then, an integrated approach may be adopted and other persons, local authorities or agencies may be cooperated with. The plan must include a summary of issues and matters or factors to be considered in deciding whether to issue water licenses or approve a transfer of a water license. This policy reinforces Alberta's adoption of a market based solution to water management. Initially Water Advisory Committees assisted in the development of these plans. Some members of these committees have consolidated together to form Watershed Alliance groups to continue to participate in watershed management after finalization of the plan.

(c) Market – based Management

Alberta has led the provinces in the development of a water market. 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. Applications for transfer must be made to the Director and will only be allowed if one of these two conditions is met and the license is in good standing. Further restrictions on transfer are that there is no significant adverse effect on the aquatic environment or the rights of others (agreements in writing from the other users are required if their rights are affected). The proposed transfer will be reviewed and considerations such as existing, potential or cumulative effects on the aquatic environment or any applicable water conservation objective, hydraulic, hydrological and hydro geological effects, effects on other users and licensees, public safety and any other matters may be taken into account. If in the public interest in order to protect the aquatic environment or implement a water conservation objective, 10% of the allocation of water under a license being transferred can be withheld. In the South Saskatchewan River Basin in Alberta there is a South Saskatchewan Basin Water Management plan which allows the Director to consider applications to transfer water allocations within the basin. Legislation also allows for temporary transfers or water sharing arrangements in Alberta.

3. Assessment of Legislative Framework of Water Management

It is apparent from reviewing the three main water governance models and how these models are replicated in the legislative framework of the Western Canadian provinces that although the government agency model is predominant, significant aspects of user-based water governance are being incorporated into the government agency model, and in Alberta, a market based management model has appeared.

In order to assess the legislative framework of Western Canadian water governance, the criteria of the international water industry will be employed. These criteria are the principles developed by the World Water Council, Water Action Unit as principles to help guide the assessment and reformation of water institutions internationally (World Water Council Water Action Unit, 2003). International water researchers have found these principles of good governance to assist in the fair, effective and environmentally sensitive management of water (Brooks, 2002, 4). These principles (especially the first two, decentralization and participation) also reflect aspects of best practice in developing adaptive policy for water resources in the face of climate change. This body of literature identifies salient policy characteristics for adapting to anticipated and unanticipated conditions expected from climate change using complex adaptive systems theory (IISD, 2006).

The principles for analyzing the legislative framework are as follows:

- Decentralization and subsidiarity – delegation of responsibility and authority of water management to the lowest feasible level. This involves managing surface waters at the catchment's level with involvement of all stakeholders; Land and water resources should be managed at the basin level integrating groundwater in order to maximize and share water benefits.

- Participation by all stakeholders – whether public or private, communities or non-governmental organizations (NGOs).
- Accountability – in water management, conservation and service delivery.
- Predictability – all laws and regulations should be applied fairly and consistently.
- Financial sustainability – through recovery of both operational and capital costs.
- Transparency – clear policies, rules, regulations, and decisions, with information available to the public (World Water Council Water Action Unit, 2002).

The principles will be modified somewhat in this analysis for applicability to the situation of Western Canadian provinces. For the purpose of this paper an analysis will be carried out of the respective provincial legislative frameworks and their provisions. This will be effected without data on actual practices and decisions made implementing and effecting these legislative frameworks. It is acknowledged that this analysis is limited by the fact it is based solely on the provisions and language of the legislation governing water management. An overview of the assessment of the three models of water management is illustrated in Table 1.

Table 1
Water Management Assessment – Overview

Principle	User-based Management	Government Agency Management	Market
Decentralization and subsidiarity	Evidence of decentralization, not subsidiarity	Potential challenges identified	Potential challenges identified
Participation	Local participation	Limited participation	Market participants only
Accountability	Local accountability	Challenges in respect of quality	Dependent on market rules
Predictability	Predictable, given limited scope	Potential challenges identified	Predictable, to an extent
Financial Sustainability	Beyond scope of paper	Beyond scope of paper	Beyond scope of paper
Transparency	Yes, internally	Yes	Potential challenges identified

(a) Decentralization and Subsidiarity

International research has shown that decentralized natural resource management, or delegation of decisions to the lowest feasible level, more often than not yields not only economically efficient but also socially equitable and environmentally sustainable results (Brooks, 2002, 5; Rahaman, 2005). Decentralization does not entail a lack of involvement in water management by government. In fact clear government legislation and policy is required and a close collaboration with government by users to set guidelines and parameters of decentralization. Local management can implement a

restorative response to conflict and possibly prevent conflict over water, but national programs for sustainability and services to assist local empowerment and enforce local decisions will be required (Brooks, 2002,40).

Further, the related encompassing component of decentralized governance is subsidiarity or holistic water planning. Community planning in relation to water governance involves all aspects of water governance from allocation decisions, groundwater licensing decisions, to decisions regarding source pollution and activities affecting water quality. Integrated water resources management promotes the coordinated, sustainable development and management of water, land, and related resources to maximize equitable economic and social development.

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 (Brooks, 2002, 88).

The literature on adaptive policy in the face of changing climatic conditions is consistent with this first principle. This literature concludes that specific solutions are less important than the existence of processes and frameworks that enable solutions to be identified and implemented (IISD, 2006, 16). These frameworks allow strong social institutions and, although an important function is played by government, government needs to facilitate the self adjustment of policies through recognizing signposts and triggers and allowing defensive action through interaction amongst people, the economy and environment (IISD, 2006, 33). To be successful new ways of involving the public in decision making is required. This is consistent with the principles of decentralization and subsidiarity as it allows local decision makers to make adaptive decisions. The decentralization and subsidiarity of Western Canadian water governance models will be reviewed in respect of water institutions and water quality.

The user-based management model reflects the principle of decentralization the best as actual users make decisions (the lowest feasible stakeholder group). A market model of water governance does not provide for decentralization except in the initial phase of establishing the water management plan which establishes the parameters and conditions applicable to water trades. After these are set, water trades can occur with very little community involvement. The government agency model predominantly employed by the Western provinces does not achieve a goal of decentralization as the power for water allocation decisions resides in the government department or agency

managing water. However, with a population of one million people, there is a certain characteristic of decentralization in the single Saskatchewan government agency of the Saskatchewan Watershed Authority. This population may not support any more decentralization; together with local advisory committees perhaps this is the best water model in the circumstances.

An important first step in decentralization has also occurred in British Columbia and Alberta with water management plans (mandated to resolve conflicts in British Columbia with enforcement through regulation). This reflects a shift from a government agency management structure to a more decentralized model of shared responsibility between government and the community, and empowerment of community decision making. However, it's unclear if plans developed will be appropriate in relation to water basin or catchments or apply to only one portion thereof. In the latter case it's unclear what mechanism or institution will coordinate these plans on an appropriate basin level. Saskatchewan's watershed advisory committees and Manitoba's conservation districts are important institutions which appear to have a more permanent role in decentralized water governance beyond just initial watershed planning. A periodic review of these institutions and their contribution to ongoing water governance warrants further attention.

Decentralized water quality planning is also in the very formative stages and not yet reflected consistently in legislation. At the User-based level, the integration of water quality is just beginning. Although irrigation districts and water user groups aren't mandated to govern water quality, they do handle issues such as salinity with water quality ramifications. These issues, however, would be confined to their irrigation community. Local advisory committees in Saskatchewan don't have legislated authority to make binding declarations respecting water allocations let alone water discharges and land use. In Alberta water management plans have not yet provided guidance in respect of water quality decisions. In British Columbia provisions are made to enforce water management plans by legislation and it appears there is a possibility water quality may be included in the plan. However, whether this power is used in respect of land use, farm practices, non-point source pollution and source pollution has yet to be seen. Communities are in the formative stages of developing plans with the Town of Langley developing a pilot plan (Dixon, 2006, 239). Although still a predominantly government agency centralized water governance system, aspects of decentralization and subsidiarity are appearing in the Western provinces governance frameworks.

(b) Participation

The advantages of user-based management are legitimacy and community acceptance of decisions because of community participation. Again, this principle is consistent with literature on adaptive policy (World Bank, 2003). The principles behind decisions are based on custom, local knowledge and experience which makes them reflective of the community and the community values which they affect. This also makes them highly responsive to changing needs and problems which will be accentuated with climate change. The embracement of the community in decisions reduces enforcement costs. Because local community values are incorporated into decisions a

comprehensive set of factors are considered when making a decision. In such a manner there are less “externalities” or factors not accounted for in decision making. In addition, because actual users make decisions, these decisions can be adaptable and flexible, reacting to changes quickly and generally in a cost effective manner.

User-based management is difficult if users do not know one another and lack existing relationships. If the social capital or relationships of the community with outside agencies and institutions and between members of the community do not exist, decisions of water based management group may be difficult to achieve and implement and not reflective of a community consensus. It is important to assess whether sufficient community or social capital exists to support user participation and affect User-based management. If not, development of this social capital and community may be required.

British Columbia and Alberta allow for water management plans to be developed at the community level. As indicated, Manitoba and Saskatchewan have similar committees. These provisions are laudable and the only causes for concern are it is unclear that the advice of local advisory committees must be given weight in decisions, how often the plan will be revisited after written, and who exactly will determine water management plans. Without proper funding and capacity building by government of these groups and plans, and on going re-evaluation of the water management plans, their utility may be compromised. The development of Watershed alliance committees in Alberta from members of watershed advisory committees who put together watershed plans and are continuing to participate in watershed planning is positive. Again, their role and influence isn't evident on the wording of the legislation. It has yet to be determined if Saskatchewan's local advisory councils will play a significant part in water governance.

Government agency management scores low in participation partly due to the nature of governing legislation. The government agency retains full authority to make decisions; no legislative provisions require delegation. Generally a government agency will set standard procedures and policy. Because of the standardizing process, some difficulty to customize these procedures and policies to particular conditions may occur. Decisions are generally at the discretion of agency officials applying their interpretation of the standard policies. Participation of users is limited (Bruns, 2002).

The market model approach allows for open participation. Any barriers would be structural and include such factors as inadequate capital and unavailability of water licenses which favour large, well established water users and exclude small, first time water users from participation (Brooks, 2002, 26 and 47). Based on this assessment of statutory language it would appear that the user based management model ranks highest based on these principles of sustainable water governance and adaptive policy.

(c) Accountability

This best practice relates to the water governance model employed being answerable to all water users in respect of (i) service delivery, (ii) conservation and (iii)

water management. As actual service delivery evaluation would require an audit, close examination of this is beyond the scope of this paper.

Although full scale water conservation through such specific implementation plans as demand side management has not yet occurred, all Western Canadian provinces with their government agency management system have developed water conservation plans. This is promising evidence that the issue is being reviewed, monitored and planned for, albeit not necessarily reflected in legislation. Both Manitoba and Alberta have developed comprehensive water strategies which include conservation as a key strategy.¹ In Saskatchewan the Saskatchewan Watershed Authority consulted and in November, 2006 released the Saskatchewan Water Conservation Plan.² British Columbia consulted and released a Water Conservation Strategy and is currently developing an implementation plan.³ Few provinces have embarked on watershed protection through legislation which links land use, water allocations and water quality together. These water strategies, albeit not yet reflected through legislation, show promise. Generally, the accountability of Western Canadian provincial water institutions is good but accountability is challenging because of fragmentation in respect of water quality, accountability loopholes in legislation, and management of inter-jurisdictional issues. Each will be discussed in turn.

Accountability is not so clear when examining allocation decisions and their affect on quality, the fragmented nature of water quality governance and finally the legislated obligation in respect of water quality. Although allocation decisions reside in one accountable water institution (generally the Minister responsible for the environment), it's not clear decisions which affect water quality are always considered by this one institution. Other departments are responsible for agricultural or industrial development with varying degrees of influence from the Minister responsible for the environment. Often other entities make decisions which have affects on water quality without the involvement of the institution responsible for water quality. As a result it's hard to think a Minister of the Environment with responsibility for water quality would have the ability to effectively manage the issue. Further exasperating this is the fact that although provinces have many environmental laws in place, considerable concern exists in the lack of enforcement of environmental laws and prosecution for environmental offences (Boyd, 2003, 36-41).

The inter-jurisdictional nature of Western Canada water governance affects water accountability in two major respects. The first is determining responsibility between the provinces and federal government in respect of water issues and the second resolving issues of quality and quantity between provincial and federal governments. The constitutional arrangement of the provinces in relation to water has accountability implications. At times the constitutional arrangement is used by each level of government as a reason not to take accountability for an environmental issue. Often governments blame one another for environmental problems and the other's lack of action in regard to a specific problem (Kennett, 1991, 89). However, this position is misleading as a constitutional analysis of water issues will provide an answer to

jurisdiction which may point to one or the other level of government, and perhaps in certain situations, both levels of government.

The topic of water spans several heads of legislative power assigned to the federal and provincial governments in the Canadian Constitution. The provincial government has powers which relate to water including property (generally including water in its definition (Jowitt, 1959, 1053). The federal government has certain powers in relation to water, albeit historically somewhat more limited than the provinces. The federal government takes control of water once it crosses an inter-provincial or international boundary in accordance with the federal head of power relating to inter-provincial works and undertakings (Kennett, 1991, 23-28). Very complicated legal rules exist for determining if a matter is of federal or provincial jurisdiction and if it can be affected by both pieces of legislation. On some of the rules, legal scholars disagree (Hogg, 2002; *Ordon Estate v. Grail* [1998] 3 S.C.R. 437). Often it is somewhat unclear which head of power a matter falls in and a detailed constitutional analysis is required.

The dynamics of water and its travel across borders creates accountability issues. An upstream provincial government which imposes significant externalities of pollution, scarcity and water fluctuations on downstream users currently has a significant advantage. Downstream users and their governments don't have accessible legal mechanisms to remedy this activity and little political leverage exists to negotiate a solution. In the case of *Interprovincial Cooperative v. R.* [1976] 1 S.C.R. 477 Manitoba environmental legislation which created a statutory right of action against pollution originating upstream in the neighbouring provinces of Saskatchewan and Ontario was found unconstitutional. The extraterritorial origin of the pollution removed it from the legislative reach of Manitoba despite the injury to Manitoba's fishery. The time delay of legal and negotiated resolution of transboundary water issues significantly affect responsiveness to water issues and conflicts (Lake Winnipeg Stewardship Board). A solution will require a model of inter-jurisdictional accountability and coordinated water management.

The current Master Agreement on Apportionment between Canada, Alberta, Saskatchewan, and Manitoba contains a strict formula of sharing water (Prairie Provinces Water Board, 2006). In the event of severe water shortage, the inability of Saskatchewan residents to have drinking water will be inconsequential as the formula is the only mechanism of allocation. This strict formula was developed partly as a response to inability for Saskatchewan and Alberta to agree on what developments should occur and a mandate change several decades ago. This historical impasse for agreeing on developments affecting water should not be forgotten as water shortages loom on the horizon. In respect of the South Saskatchewan River Basin, the 50% flow requirement occurs after certain needs are met in Alberta jurisdictions Prairie Provinces Water Board, *The 1969 Master Agreement on Apportionment and Bylaws, Rules and Procedures* (PPWB, 2006). Research confirms, having mechanisms in place to respond to issues is important in responding to issues and potential conflicts (Adger, 2003, 29-49).

Because the market based model used in Alberta consists of relatively small and local transfers assessing accountability in the limited framework of this review is

problematic. In a larger more formalized market accountability would be determined by the market rules. Similarly, the user based management model employed by irrigation districts doesn't appear in statute or regulation, but in more difficult to access procedures internal to the irrigation district. However, legislation requires that these mechanisms of accountability be adopted by irrigation districts. Finally, watershed advisory committees in the Western provinces are in the formative stages of developing mechanisms of accountability through governance processes. Laws are in place requiring these mechanisms and setting certain parameters.

(d) Predictability

Most aspects of water allocation based on government agency management in the Western Canadian provinces appear very clear and predictable. Manitoba and British Columbia's legislation sets out procedures for obtaining water licenses, priorities, and disputes resolution procedures. Alberta legislation clearly specifies priority of licenses and how decisions in respect of transferring water licenses will occur. Although Saskatchewan legislation is very clear on who is making decisions, the Saskatchewan Watershed Authority, factors taken into account in decision making aren't as clear in the legislation. The lack of direction respecting priority of licenses in the Saskatchewan legislation may result in a lack of certainty, potential for arbitrariness, and unpredictability (Percy, 1986, 19-20).

Generally in a government agency model standard procedures and policy will be set. Because of the standardizing process, some difficulty to customize these procedures and policies to particular conditions may occur. Decisions are generally at the discretion of agency officials applying their interpretation of the standard policies. Often there is relatively little communication to users (Bruns, 1995). As such predictability may be compromised. Further, the government agency generally has extensive technical expertise as the management of water is very information intensive. Allocation decisions are often framed primarily in technical terms of engineering procedures such as irrigation schedules and reservoir operation rules. This technical information is not always comprehended by water users. Because of the reduction of conflicts or issues to technical solutions, agency administration is often criticized for being unclear, uncertain, and unpredictable.

Because of the limited mandate of managing their users' licenses, user-based management as practiced in the Western Canadian provinces is quite predictable. A risk does exist that the users group make decisions without clear communicated policy and a version of "sand box" politics ensues, reducing predictability. More research would need to occur to determine if this in fact is a concern.

The market model employed by Alberta is not a true laissez faire market with vendors and purchasers conducting transactions purely based on market rules. A certain amount of oversight is retained in the review of these transactions and as such the predictability of a market model reduced somewhat. However, the factors taken into

account when reviewing the transaction are quite specific which increases the predictability of this discretionary review.

The market model is thought a solution to the more efficient allocation and pricing of water. The statutory provisions allowing transfer are touted by some researchers and the Alberta government as advancing the goals of efficient allocation of water interests and conservation in incenting the transfer of surplus interests. This is also 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, 1986). Many would argue that the market tool does not capture the community value of water nor facilitate political and ethical considerations in allocation decisions. The risk of the market is that impacts on third parties not party to a market transaction are neglected and third parties have difficulty enforcing their interests in a court of law.

Amongst certain classes of water users, such as irrigators or industrial users, the commoditization of water may add value, if supported by sufficient numbers of users and market transactions, and enforceability. This creation and support of a market may require significant government involvement to ensure comprehensive water management in the interests of all stakeholders and all types of uses. It may be that the cost of creating, regulating and administering such a water market offsets any efficiency created by a market. In a government agency or user-based model, agreeing on what externalities exist respecting provincial and community management of water and its uses and then how to ensure adequate internalization of these (by those receiving the benefit and not downstream users) in either monetary payments or services in kind is a monumental task with little precedent of success (Kennet, 1991, 95).

(f) Transparency

All Western Canadian provinces employ the government agency model and have legislation containing clear rules for water license priorities and the procedure for applications for water licenses. There are also obligations on government officials managing water to communicate decisions to applicants in respect of their decisions in relation to determining conflicts. Overall, Western Canadian provinces employ a high degree of transparency through their government agency model.

In respect of the market model employed in Alberta it is unclear if obligations exist to publish decisions in respect of allowing a transfer. There is a clear provision to have a public review of a proposed transfer of allocation of water under license. It would be presumed that notification of the Director's decision would naturally follow even without a legislated obligation.

User-based decisions respecting water management will be transparent to all users. Obligations of management are imparted on the user community with some powers of delegation to a manager. Decisions of the irrigation community are based on majority decisions; there are obligations to notify users of meetings. What is not apparent in all Western Canadian provinces is whether any water stakeholder who is not

an irrigation user has an ability to receive notice of decisions made by the irrigation district or communities.

Transparency and the disclosure of water quality tests is starting to become a statutory obligation. In Saskatchewan, if the results of drinking water tests are outside specified parameters, labs conducting water quality tests must notify the Minister of the Environment and the water consumers (s. 39(8)(9) of *The Water Regulations, 2002 R.S. c. E-10.21 Reg 1*) Similar public notification obligations exist in other provinces (s. 14 *The Drinking Water Act, S.B.C. 2001, c.9*). As well, once a year the supplier of drinking water must provide its consumers with notification of the quality of water in comparison with the levels set by regulation and their compliance with the sample submission requirement in their permit or an annual report of the quality of drinking water.

Conclusion

The Western Canadian provinces have employed a combination of the three water models and have in their selection achieved a degree of success in meeting the criteria of the World Water Council. This analysis has illustrated that user-based governance is most consistent with these World Water Council criteria but is not without considerable challenge in Western Canada in achieving integrated water management. A careful well thought path for future changes to Western Canadian water governance is warranted. Great care should be taken in the determination of the appropriate combination of water management models. In order to ensure proper decisions, consultation with all stakeholders and participation of the community is essential. Participatory forums in which representatives of water users are brought together to provide knowledge and understanding in the evaluation of water governance and its applicability to their particular circumstance is optimal. These forums would legitimize existing water rights and management practices and provide insightful consultation and guidance of any needed changes or outstanding issues. Research shows that allowing non-governmental organizations, research organizations and a variety of other groups to collaborate in evaluating changes in water management tend to perform better than those controlled exclusively by government at any level (Brooks, 2002). This institutional framework for decision making is consistent with facilitating adaptive policy in the face of climate change.

Examples of the three international models of water governance can be found in the Western Canadian provinces' legislative frameworks. This pattern of employing a combination of models is consistent with good water governance. Irrigation councils in Alberta and Saskatchewan, and water users' associations in British Columbia reflect a user-based management model with local community participation. Saskatchewan has a predominantly government agency based management system, but all Western provinces employ this model to an extent. Alberta has all three types of water management models including a market based model with transferable water licenses.

The user-based management model scored highest of all models in respect of best practices and adaptation to changing climate conditions. However, there is still a need to

safeguard for predictability of water decisions which can be done with an explicit decision making process, the provision of required information to the public, clear guidelines and policies. Although government agency management initially scores low, this is partly due to the generic, flexible nature of the wording of the governing legislation. For example, decision making responsibility resides with the government which results in a low score in the category of decentralization. It may be, however, that actual water governance in the government agency model is effected differently through consultation, participation and accommodation. Similarly, market-based management ranks very low, but this may be indicative of its inapplicability as a comprehensive water management solution (which these principles were developed to assess). Relying on a market for a commodity satisfying a basic human need which has traditionally been a public property resource in Canada, may also be ideologically difficult for some. However, amongst certain classes of users, such as irrigators or industrial users, commodification of a water right may be possible and add value, if transactions are enforceable, transparent and supported by sufficient numbers of users and market transactions. The creation and support of a market may require significant government involvement to overcome possible challenges in meeting the criteria and to ensure comprehensive water management in the interests of all stakeholders and all types of uses.

Support for user-based management is increasing internationally as the most appropriate water governance model because it allows participation through decentralization and achieves socially equitable and environmentally sustainable results. The Western Canadian provinces are incorporating more user-based governance into their water frameworks. This is promising and consistent with this study's positive evaluation of the user-based model based on the World Water Council criteria of good water governance. However, the market model and government agency model shouldn't be automatically dismissed based on this evaluation. Each governance model has advantages and disadvantages. The market model can ensure the efficient use of the water resource; the government agency model has the benefits of transparency, accessibility to water as a "right," and accountability.

The applicability of the proper combination of models for a specific province or water basin should be determined based on the appropriateness of the model for the water resource in the area and characteristics of the community and water stakeholders. In Saskatchewan, given its small population, government agency based management may be most appropriate with the appropriate measures to protect against any potential disadvantages of not allowing for participation, decentralization and subsidiarity. In Alberta, irrigation farmers may be best served by the ability to participate in a water market in respect of their water allocations while municipal drinking water is excluded and protected from this market.

It is important to note that in assessing the Western Canadian provinces' water governance and the three models (albeit modified in regards to the Crown ownership of water), no one model is problematic. There is cause for optimism in the Western Canadian provinces' legal framework for managing water. There is accountability,

participation and transparency of decision making in relation to water. Any identified challenges can be appropriately managed by policy, regulation, or practices and procedure. Each model has the potential for certain challenges; the recognition of these challenges is the important first step for their mitigation. In the assessment of Western Canadian water governance it is evident that the biggest challenge is meeting the best practice of decentralization and subsidiarity or the delegation of responsibility and authority of water management to the lowest feasible level, and managing water on a catchments level with the involvement of all stakeholders. However, this is the most important policy change required in order to adapt to climate change.

In Western Canada the allocation of water rights has evolved through practice and statutory provision for several decades; water quality has only more recently entered the political and legislative sphere, typically in a separate forum of legislation dealing with environment. This history creates challenges in integrating institutional structure for dealing with both water quality and quantity. The current trend to decentralization and user-based governance requires attention to both the integration of water quality management (in order to maximize decentralization benefits) and the minimization of decentralization costs.

The importance of careful thought and community participation in decisions with implications on both water quality and quantity needs to be reinforced to communities. Thereafter, grassroots decisions of these communities must be allowed in respect of both water quality and quantity. This may include environmental permitting of industrial development, to be determined on a careful consideration of the communities' views of effects of an industrial development on water quality and quantity. The legal framework to allow for this is in place. What is needed is fine tuning to ensure all development decisions which may impact water quality and quantity are reviewed by the affected communities and specifically those individuals involved in community water governance. If significant investment by government, institutions, and community is made in local advisory committees, increased participation in environmental assessment procedures, and the development of water conservations plans in Saskatchewan and water management plans in both Alberta and British Columbia, this transformed user-based, integrated water management framework could be a reality.

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¹ Manitoba’s can be found at <<http://www.gov.mb.ca/waterstewardship/waterstrategy/pdf/index.html>> and Alberta’s at <<http://www.waterforlife.gov.ab.ca/>> It is noteworthy that Manitoba’s strategy embraces planning the water resource for the next generation; Alberta’s focuses on sustainable industry.

² <http://www.swa.ca/WaterConservation/default.asp>, see the Saskatchewan Water Conservation Plan available online at www.swa.ca.

³<http://www.env.gov.bc.ca/wsd/plan_protect_sustain/water_conservation/wtr_cons_strategy/implement.html>