



Canadian federalism and the governance of water scarcity in the South Saskatchewan River Basin

B. Timothy Heinmiller¹

Received: 21 April 2017 / Accepted: 28 February 2018 / Published online: 28 March 2018
© Springer-Verlag GmbH Germany, part of Springer Nature 2018

Abstract

Water governance in the South Saskatchewan River Basin (SSRB), a transboundary river basin in western Canada, occurs in one of the world's most decentralized federations. The provinces sharing the SSRB—Alberta and Saskatchewan—have primary responsibility for governing water scarcity in the basin and have done so with minimal intergovernmental coordination, oriented around an interprovincial apportionment of their shared waters, and with little involvement of the federal government. While most studies of transboundary river basin governance have focused on the importance of intergovernmental collective action, the SSRB case highlights the importance of governmental policy innovation. The decentralized nature of SSRB governance has allowed Alberta to pursue a 'cap and trade' policy innovation and Saskatchewan to pursue a centralized management policy innovation simultaneously, creating an unusual degree of policy divergence between two basin-sharing jurisdictions. In this way, the SSRB shows a different 'face' of federalism that is not as evident in most other cases, that is, the capacity for federalism to spur sub-national policy innovation in addition to intergovernmental cooperation.

Keywords Canada · Federalism · Intergovernmental relations · Water governance · Water scarcity · Policy innovation

Canada is one of the most decentralized federations in the world, and the governance of interprovincial river basins in Canada is also unusually decentralized. This decentralization even prevails in the South Saskatchewan River Basin (SSRB), one of the driest and most heavily used river basins in the country. The provinces sharing the SSRB—Alberta and Saskatchewan—have primary responsibility for governing water scarcity in the basin and have done so with minimal intergovernmental coordination, oriented around an interprovincial apportionment of their shared waters.

This article examines the intergovernmental and domestic institutions governing the SSRB from a policy innovation perspective. It contends that a combination of decentralization and minimal intergovernmental coordination in SSRB water governance has allowed Alberta and Saskatchewan to innovate and diverge in their policy strategies for governing water scarcity. While both provinces have relied on water infrastructure construction to alleviate instances of localized scarcity,

their approaches to water allocation and prioritization have diverged significantly: Alberta has embraced the long-standing prior allocation system and combined it with a newer 'cap and trade' system, while Saskatchewan has abandoned the prior allocation system and moved to a system of centralized regulatory control. This is a substantial degree of policy innovation and divergence between any two jurisdictions, much less neighbouring jurisdictions, sharing river basins, within the same federation.

The SSRB provides an interesting case in the study of federalism and water governance because it highlights a 'face' of federalism that is typically overlooked in these studies. Much of the literature on federalism and water governance is preoccupied with cooperation and coordination between governments and assumes that this is the face worth studying. For example, in their recent review and synthesis of the literature, Garrick and De Stefano (2016, 78) state that a federal perspective to analyzing transboundary rivers '... emphasizes intergovernmental and multi-level water governance challenges, highlighting the politics and disputes that may impede coordinated approaches and require institutional mechanisms for conflict resolution, joint decision-making and adaptive governance'. In many cases, this predominant focus on intergovernmental relations is justified given that collective

✉ B. Timothy Heinmiller
theinmiller@brocku.ca

¹ Department of Political Science, Brock University, 1812 Sir Isaac Brock Way, St. Catharines, ON L2S 3A1, Canada

action is the locus of many significant water governance challenges.

Nevertheless, the preoccupation with collective action has meant that another face of federalism, its capacity to spur policy innovation and adaptation in sub-national governments, has been overlooked. Policy innovation is defined as non-incremental policy change involving the adoption of qualitatively new policy designs (Berry and Berry 2014, 307). The linkage between federalism and policy innovation can be traced all the way to the *Federalist Papers* and is one of the arguments most often cited by federalism proponents (Hamilton et al. 2009). The argument states that federalism promotes policy innovation because sub-national governments are given the latitude to invent new policy solutions to address local policy problems and, in some case, these innovations may diffuse to other governments facing similar problems. Policy innovation, and its merits and limits, is an important part of the federalism literature from qualitative studies of sub-national governments serving as ‘laboratories of democracy’ (see, for example, Osborne 1990) to quantitative studies tracing patterns of policy innovation and diffusion in all sorts of policy areas (see Berry and Berry 2014 for a literature overview).

Although policy innovation analyses have been undertaken in many environmental policy areas (see, for example, Vogel 1995), a policy innovation approach has not been applied in studies of federalism and basin water governance, even in the decentralized SSRB where such an application seems particularly apt. This is not to suggest that policy innovations have not been studied in the SSRB. Studies by Percy (2005), Bjornlund et al. (2007, 2009), Schmidt (2010), Poirier and de Loë (2011), Hurlbert and Pittman (2014), and others have documented the policy innovations described in this paper and investigated how these innovations have affected water use and water governance in various ways. However, no study has yet examined the connection between Canadian federalism and provincial water policy innovation in the SSRB, and that is the gap this paper seeks to fill. Moreover, applying a policy innovation approach to the governance of the SSRB serves as a reminder that innovation, and not just collective action, is an important feature of federalism and water governance.

The rest of the article is organized in six sections. The first section outlines the article’s research methodology. The second section describes the nature of water scarcity and water use in the SSRB. The third section explores the Canadian federal-provincial division of powers related to water, the increasing decentralization of water-related powers to Alberta and Saskatchewan and the intergovernmental institutions that have been created to apportion the waters of the SSRB. The “Governing water scarcity in southern Alberta” and “Governing water scarcity in southern Saskatchewan” sections then examine the water policy innovations adopted by

Alberta and Saskatchewan, respectively. The final section sums up what the SSRB case can contribute to the literature on federal river basins and critically analyses the future of the SSRB governance institutions.

Methodology

This study investigates policy innovation in the SSRB by examining the institutions put in place to govern the allocation and use of SSRB water, at the federal, intergovernmental and provincial levels. Institutions are operationally defined as ‘... sets of working rules,’ so the focus of the investigation was uncovering the sets of rules that structure SSRB water use (Ostrom 1990, 51). Since the purpose of the study is to examine the impact of federalism, the scope of the investigation was limited to water use rules at the senior—or sovereign—levels of government; the various webs of local water governance rules and practices in the SSRB, though clearly important in their own right, were beyond the scope of this study. The overall research strategy was to determine the design of the institutions governing water use in the SSRB at the senior levels, and to compare the actual working institutions with the policy innovation model in the federalism literature, to determine if policy innovation was present.

The institutional rules governing the SSRB were investigated through a combination of document research and participant interviews. The investigation began with an extensive survey of primary source documents (including the Canadian constitution, constitutional case law, intergovernmental agreements, legislation, regulations, and policy statements) and secondary source documents (including refereed journal articles and books by various law and political science scholars) to determine potential SSRB water governance rules. This archival research was then supplemented with confidential interviews involving water management officials from the governments of Canada, Alberta and Saskatchewan, to verify and elaborate on the results of the archival research. Moreover, once a draft of the preliminary institutional findings was prepared, it was circulated for feedback to water management officials from the three governments as a further check on accuracy. In total, five government officials were consulted in the research. These officials were identified based on their relevant administrative positions and sampled in a stratified approach to ensure that each of the three governments was represented.¹ Throughout this process, triangulation—that is, using observations from different, independent sources—was used to ensure the veracity of the institutional findings (Beach and Pederson 2013, 128–129).

¹ Further details about the interviewees are not provided in order to protect their confidentiality.

The SSRB was selected for study because it provides the best available case for investigating the role of Canadian federalism in the governance of water scarcity. Canada is typically regarded as a water abundant country with few of the water scarcity challenges facing many other parts of the world. Yet, there are vast parts of the country that face endemic water scarcity, including parts of the British Columbia (BC) interior and the southern Prairies of Alberta, Saskatchewan and western Manitoba. Of these water-scarce regions, BC is geographically and hydrologically separated from the others by the western dividing mountain range, so its water scarcity challenges do not have an interprovincial dimension (Brandes and Curran 2017). On the Prairies, Alberta, Saskatchewan and Manitoba share the Saskatchewan River Basin which, as shown in Fig. 1, includes both the North Saskatchewan and South Saskatchewan branches. However, only Alberta and Saskatchewan share the South Saskatchewan (the SSRB) where water scarcity is most persistent and acute, hence the study's focus on the SSRB and on the two provincial governments who share it.

The period of analysis spans from the early 1970s to the present. This period was selected because it defines the modern period of water governance in the SSRB in which the federal government has largely retreated from basin governance and the governments sharing the basin have had an established interprovincial water apportionment agreement.

This period also includes a number of droughts in the SSRB, providing opportunities to illustrate how the diverging policy regimes in Alberta and Saskatchewan endeavour to cope with recurring water shortages.

Water scarcity and water use in the South Saskatchewan River Basin

Water scarcity in the SSRB has supply aspects and demand aspects, both of which are relevant to a fulsome understanding of the scarcity challenges in the SSRB.

On the supply side, the SSRB has an arid to semi-arid climate, with limited and variable precipitation. Average annual precipitation ranges from 250 to 500 mm, depending on the local area, but this average masks a substantial degree of variability which produces varying cycles of flood and drought (Environment Canada 2008). The rivers of the SSRB have their source in the Rocky Mountains and are fed by a varying mixture of glacial melt, snow melt and rainfall run-off (Halliday and Favari 2007, 77). As shown in Fig. 1, they generally flow in an easterly direction, rising in Alberta and flowing through Saskatchewan before converging with the North Saskatchewan and entering Manitoba. The major rivers of the basin include: the St. Mary, the Oldman, the Bow, the Red Deer and the mainstem of the South

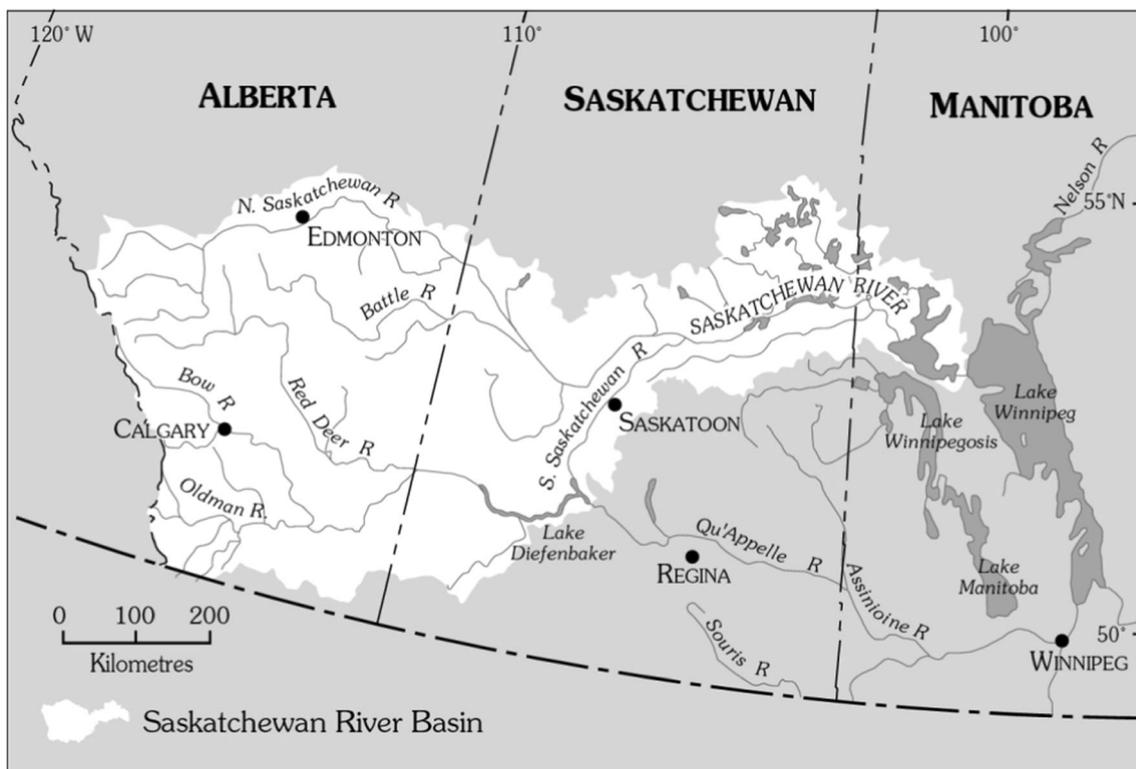


Fig. 1 The Saskatchewan River Basin

Source: South East Alberta Watershed Alliance, <http://seawa.ca/test/north-south-sask-river-basins/>

Saskatchewan. Flows on these rivers are quite variable, though it is rare for any of the major rivers to dry up completely. Flows are typically highest during the spring freshet and lowest in late summer but vary substantially from year to year (as precipitation varies) and river to river (Halliday and Favari 2007) (Glenn 1999) (Armstrong et al. 2009).

While the SSRB has a limited and variable water supply, it is the large and growing demands for water that, to a large extent, have created the water scarcity challenges that exist today. For over a century, the biggest demand on the SSRB's water has come from irrigated agriculture, particularly in Alberta where irrigation accounts for 77% of water use in the province's portion of the SSRB (Alberta Economic Development Authority 2008, 14). Since the 1940s, the southern Prairies have evolved from an agricultural economy to a resource economy based on oil, natural gas and potash extraction. Though many resource extraction processes involve water in some way, a greater source of water demand has come from urban and sub-urban areas, such as greater Calgary, which have grown tremendously in the resource economy. Such urban water demands typically use less water and produce higher economic returns per water unit than irrigated agriculture, creating some water reallocation pressure and some rural-urban rivalry in water governance. There are also a growing number of water users who value water that is left instream, such as tourism operators, anglers, hunters, boaters and environmentalists. Environmentalists, in particular, emerged as a political force during conflicts over dam construction in the 1970s and 1980s, and they remain an influential voice in the water policy community. So, too, are First Nations, a number of which have unsettled water rights claims in the SSRB, claims which have the potential to upset the delicate balance among the other existing water demands (Heinmiller 2016, 13–14).

Looming over the limited supply and growing demand for SSRB water is the prospect of climate change. Most climate change models predict that the region's climate will become substantially warmer—exceeding the global average increase in temperature—and that precipitation patterns will shift so that winter months will have more rainfall (and less snowfall) and summer months will have less precipitation altogether (Byrne et al. 2010, 64–65). The shift in precipitation patterns will mean higher river flows in the winter and lower flows in the summer, the time of year when water demands are highest (Barnett et al. 2005). The warming climate also threatens to melt the Rocky Mountain glaciers that are an important water source for the SSRB. These glaciers have been receding for a number of years and are projected to disappear altogether in a matter of decades. Overall, the median climate change scenario predicts that, by mid-century, mean annual flow in the mainstem of the South Saskatchewan River at Medicine Hat could be reduced by 8.5% (Byrne et al. 2010, 68).

Clearly, the governments sharing the SSRB are beset by substantial water scarcity challenges. The basin's limited and variable water supply combined with large and competing water demands creates scarcity that is particularly acute during drought periods. If the climate change models are correct, these drought periods will become longer, drier and more frequent in the future, meaning that the governments of the SSRB may have to cope with even more water scarcity in the future.

Canadian federalism and the South Saskatchewan River Basin

As mentioned at the outset of this article, Canada takes an unusually decentralized approach to governing water scarcity in federal rivers. There are two key aspects to Canada's decentralized water governance regime: the first is a minimal federal presence in Prairie water governance, which dates to the early 1970s, and the second is an interprovincial water apportionment of the Prairie rivers, which dates to the late 1960s (Kennett 1991). Since this decentralized approach was put in place about 40 years ago, it has changed relatively little. This approach means that the Prairie provinces have been given primary responsibility for managing water scarcity challenges, with minimal coordination, allowing them to each 'go their own way' in coping with scarcity. In this section, we will analyse Canada's decentralized approach to governing water scarcity, focusing on its federal-provincial and interprovincial dimensions and how this decentralized approach came about.

Federal-provincial dimensions

To understand the federal-provincial relationship in water governance, the obvious starting point is the Canadian constitution. Under section 109 of the *Constitution Act, 1867* (Canada's founding constitutional document), the provinces were granted proprietary rights over most of the public lands and resources within their borders. This has effectively made the provinces the main regulators of water use, water extraction and water allocation, with some exceptions (Kennett 1991). Initially, Alberta and Saskatchewan were denied these powers when they became provinces in 1905 and resource ownership in these provinces was retained by the federal government. This was rectified in the 1930 *Natural Resources Transfer Agreements* which transferred resource ownership (including ownership of water rights) to Alberta and Saskatchewan, putting them on equal footing with the other provinces (Percy 2005). Provincial ownership of the natural resources within their respective borders was

later reiterated in section 92A of the *Constitution Act, 1982*, after a decade of federal-provincial wrangling over control of oil and mineral resources (Kennett 1991).

The exceptions to provincial regulation of water use pertain to various federal water-related responsibilities entrenched in the constitutional division of powers. For instance, Ottawa has jurisdiction over navigation and shipping (s. 91[10]), fisheries (s. 91[12]), international relations (s. 132) and federal lands, giving it some constitutional bases to intervene in water governance issues (Kennett 1991). Ottawa is also involved in the environmental assessment of large infrastructure projects, such as the construction of dams, which has periodically brought it into conflict with provincial dam-building ambitions (Glenn 1999). The federal government also has a much greater spending power than the provincial governments, and there are few constitutional constraints on where Ottawa can spend its money (Monahan 2002). This has been important, as billions of dollars of federal money have gone into dam and infrastructure construction as well as the expansion of the irrigation districts, and, occasionally, federal politicians have used their spending power to provide relief to those affected by drought.

Since the early 1970s, the federal government has chosen to interpret its water-related powers quite narrowly, leaving the provinces to dominate this policy field. Part of this federal retreat was financial. Since 1935, through the Prairie Farm Rehabilitation Administration (PFRA), Ottawa had financed a massive expansion of water management and irrigation infrastructure on the Prairies. However, this was no longer a priority by the 1970s, so Ottawa began its retreat from the water management business, divesting its assets to the provinces and water users, eventually disbanding the PFRA in 2010 (Prairie Farm Rehabilitation Administration 1982) (Warren 2016, 147). Part of the federal retreat was also political. The 1970s and early 1980s were a tumultuous time in Canadian federalism with Ottawa and the provinces—particularly Alberta—engaged in a protracted conflict over control of natural resources. The intergovernmental resource conflict became so intense that it threatened national unity, eventually prompting Ottawa to retreat from its resource control ambitions, including that over water (Cairns 1992). Ottawa now regards water as a primarily provincial concern, notwithstanding the federal responsibilities related to protection of fish habitat, regulation of shipping, monitoring of interprovincial water issues and management of Canada-US water issues through the International Joint Commission (IJC), all of which it undertakes with close provincial consultation. In short, managing water scarcity on the Prairies has become, since the early 1970s, primarily a provincial concern, with federal involvement at the margins.

Interprovincial dimensions

The interprovincial dimension of managing water scarcity on the Prairies has a long and somewhat difficult history. In 1930, in conjunction with the *Natural Resource Transfer Agreements*, Alberta, Saskatchewan, and Manitoba formed the Western Water Board, a coordinative body for addressing interprovincial water issues in all shared Prairie rivers. This was replaced in 1948 by the Prairie Provinces Water Board (PPWB), which included not only provincial but federal representatives. The PPWB was mandated to recommend annual water apportionments between the three provinces, but this approach broke down in the 1960s as the provinces began asking for larger and larger apportionments, particularly in the scarcity-plagued SSRB. Negotiations were then undertaken toward a permanent apportionment of the Prairie rivers, resulting in the 1969 Master Agreement on Apportionment (MAA) and a reconstituted PPWB, which has been the institutional mainstay of interprovincial water governance in the SSRB ever since (Mitchner 1973; Prairie Provinces Water Board 2004).

The MAA is important because it established an interprovincial apportionment of all shared Prairie rivers. According to the PPWB, the MAA ‘contains a simple formula based on the principle of equal sharing of available water in the Prairies’ (Prairie Provinces Water Board 2004). Essentially, Alberta is entitled to use half of the natural water flow in its rivers, as measured at the provincial border, allowing the other half to flow into Saskatchewan. Saskatchewan is entitled to half of the water it receives from Alberta and half the natural flow of the rivers arising within its borders, leaving the rest for Manitoba. This principle of equitable apportionment applies to all interprovincial Prairie rivers, including the South Saskatchewan. Importantly, the Alberta-Saskatchewan apportionment on the South Saskatchewan is measured just downstream from its confluence with the Red Deer River (Prairie Provinces Water Board 2010). Quite often, surplus flows from the Red Deer, which is not heavily allocated in Alberta, serve to compensate for depleted flows from the South Saskatchewan River, which is heavily allocated in Alberta, allowing the government of Alberta to meet its overall apportionment obligation to Saskatchewan on a consistent basis. Should the Red Deer become heavily allocated in the future, the integrity of the interprovincial apportionment could be put in jeopardy (Figliuzzi 2002).

During dry periods, when water shortages are possible, there are special apportionment provisions that apply only to the South Saskatchewan: Alberta is guaranteed a minimum apportionment of 2.1 million acre-feet per year, even if this is more than half of the natural flow in that year; but, in taking this minimum apportionment, Alberta must not cause—through storage, use, or consumption—the rate of flow at the Alberta-Saskatchewan border to drop below 1500 cubic

feet per second (cfs), though flows may drop below this level due to natural factors (Prairie Provinces Water Board 2010). These special apportionment provisions were added to provide some water security to southern Alberta's water licence holders, some of whom have licences that long predate the MAA, while ensuring that the flow of water to Saskatchewan is never entirely cut-off during water shortages.² Thus far, the 1500 cfs threshold has only been breached a handful of times during the driest years and only during the winter season when flows are lowest and there is little irrigation demand. These breaches have been monitored, discussed and managed by the Alberta and Saskatchewan governments through the PPWB and have not become major points of intergovernmental contention.

Compliance with the MAA is undertaken at the provincial level, though the PPWB plays an important monitoring and reporting role. The PPWB reports on apportionment compliance, using flow data from water monitoring stations operated by Environment Canada and water use data provided by the provinces, and it provides an intergovernmental forum for discussion, coordination, and negotiation. Very few violations of the apportionment have been reported by the PPWB, and it has served as an effective forum for identifying potential intergovernmental conflicts, getting ahead of them, and developing trust between the jurisdictions on apportionment issues. Moreover, 'equitable apportionment of waters is considered by the PPWB to include the volume, timing, and quality of water that is delivered,' helping to ensure that the provinces receive their apportionments when they are needed with 'sufficient [water] quality to support anticipated uses'. The inclusion of water quality considerations in apportionment efforts is a relatively recent addition, with interprovincial water quality objectives added as an appendix to the MAA in 1992 (Prairie Provinces Water Board 2010).

Article 8 of the MAA commits the signatory governments to refer disputes regarding the apportionment to the Federal Court of Canada for resolution (Prairie Provinces Water Board 2010). However, Canadian federalism does not allow for binding intergovernmental agreements, such as interstate compacts in American federalism, so the entire apportionment regime is, fundamentally, a political handshake agreement that neither the federal government nor the courts could enforce if one or more of the signatory provinces decided to walk away from it (Monahan 2002).

Overall, the Canadian constitutional division of powers, federal deference on water issues and the interprovincial water

apportionment in the MAA combine to create a decentralized regime for governing water scarcity in the SSRB. The MAA provides the provinces with considerable security as to how much water will be available, and Ottawa rarely intervenes in intra-provincial water issues, leaving it to the provinces to determine their own policies for governing the water that has been apportioned to them. Ottawa does have a significant presence on the PPWB, holding two of the five seats on the Board and bearing much of the apportionment monitoring costs, which help to moderate any potential conflicts between the provinces, but apportionment compliance is—ultimately—in the hands of the provinces. The Alberta and Saskatchewan governments have used this latitude to go in different water policy directions, as shown in the next two sections below. This is an instance where, with minimal intergovernmental coordination, the provinces have been free to innovate and adopt water policy strategies based on their different political cultures, divergent internal politics and distinctive water scarcity challenges.

Governing water scarcity in southern Alberta

In its portion of the SSRB, Alberta has governed water scarcity through three main policy strategies.³ The first strategy has been to alleviate localized scarcity through the construction of an expansive infrastructure of dams, weirs, pipelines, canals and off-stream storages. This infrastructure allows the province to store water during wet periods and then move water to where it is needed during dry periods. The second strategy has been to rely on a statutory system for prioritizing water uses, a system known as prior allocation. Prior allocation is a seniority-based system in which older water licences have priority over newer licences, and, in times of shortage, available water is distributed based on licence seniority. The third and newest strategy has been a cap and trade system for limiting and reallocating water licences. Introduced by the *Water Act*, which was passed in 1996 and proclaimed into force in 1999, and implemented through the SSRB Water Management Plan of 2005, the cap and trade system allows for long-term adaptation to scarcity, through the movement of water licences from lower-valued to higher-valued water uses. It is important to note that these three policy strategies have not been mutually exclusive: all three strategies are still evident in Alberta water policy, though there has been a shift in emphasis away from infrastructure construction and toward cap and trade over the past two decades. By embracing cap and trade, Alberta has adopted an important water policy innovation that is unique in the SSRB and in Canada.

³ Alberta's 'Water for Life' initiative, introduced in 2003, might be considered a fourth policy strategy but it has not substantively changed the institutional rules governing water use in the SSRB, so it is not considered here.

² It is important to note that the interprovincial apportionment of the SSRB is nested within an international apportionment of the St. Mary and Milk rivers, in the headwaters of the SSRB, outlined in Article VI of the Boundary Waters Treaty (1909) between the USA and the UK (who signed the treaty on Canada's behalf). The implementation of Article VI is one of the few water governance areas in the SSRB where the Canadian government has a significant presence.

Coping with water scarcity through the construction of ‘hard’ infrastructure had been a water policy strategy for many decades in the southern Prairies, but, when Ottawa retreated from its infrastructure construction role in the early 1970s, the Alberta government stepped in to fill the void and push this policy strategy even further. Flush with oil money, the Alberta government undertook an ambitious dam-building program, starting with the construction of Dickson Dam on the Red Deer River and culminating in the Oldman Dam—the largest in Alberta—in the late 1980s and early 1990s. It even investigated the possibility of building a massive interbasin diversion to bring North Saskatchewan water to support growth in the SSRB but ultimately rejected the plan for fear that it would be the first step in exporting water to the USA (Heinmiller 2016, 63–65).

Alberta’s spate of infrastructure construction occasionally brought it into conflict with the federal government, but, in general, Alberta had considerable latitude in this area. The Oldman Dam is a good example of this. The dam was fiercely opposed by the Peigan First Nation, whose ancestral lands were affected by it and by a coalition of determined environmentalists and conservationists. The dam opponents went all the way to the Supreme Court of Canada to force the federal government to apply its environmental assessment legislation to the project, and the resulting assessment recommended that the dam, which was mostly built by that time, be decommissioned. However, fearing another protracted federal-provincial resource fight, Ottawa declined to act on the assessment recommendations and deferred to the Alberta government, who was sponsoring the dam (Glenn 1999). In the end, the dam was completed and Alberta was free to manage its water resources in its own way, without much federal interference. Water management infrastructure remains an important policy strategy for managing scarcity in Alberta’s portion of the SSRB, though the construction of new infrastructure has dropped off dramatically after the determined opposition to the Oldman Dam (Heinmiller 2016, 7).

Along with water control infrastructure, the Alberta government has also governed scarcity through the prior allocation system of water licensing. The prior allocation system dates from the 1894 *Northwest Irrigation Act*, a piece of federal legislation, introduced when Alberta, Saskatchewan, and part of Manitoba was still a federally governed territory. Prior allocation has two cornerstone principles: (1) ownership of all water is vested in the Crown and users can only access water by getting a government water licence, and (2) priority among water licences is based on licence seniority, with older licences having priority over newer ones (a principle called ‘first in time, first in right’). When jurisdiction over water governance was transferred to Alberta and Saskatchewan in 1930, both provinces retained the prior allocation system, with Alberta enshrining it in its *Water Resources Act* (Percy 2005). In southern Alberta, most of the largest and most senior licences

belong to the irrigation districts, giving them the most secure access to water, while newer water users cope with licences that are considerably less secure.

During water shortages, the prior allocation system is designed to adapt by calling on the priority of existing water licences. However, in practice, this is sometimes avoided by the development of ad hoc water sharing arrangements among water users in a localized area. For example, in early 2001, licence holders in the upper Oldman sub-basin, facing a second year of drought, negotiated an arrangement to ‘share the shortage’ so that no licence holders would be completely cut off from water. All participants received about 60% of their licenced entitlements, including some municipalities and important local businesses who would have received no water at all if users had relied on licence seniority alone (Rood and Vandersteen 2010, 1615–16). So, the prior allocation system provides a legal means for coping with acute scarcity through the prioritization of licences, if called on, but it also sometimes provides incentives for localized water sharing arrangements that can allow water users to cope with shortages as they arise.

The newest policy strategy for governing water scarcity in the SSRB has been the adoption of a cap and trade system for water licences, based in the 1999 *Water Act*, the first major overhaul of Alberta’s water laws since 1894. At the insistence of irrigators, the new legislation made clear that the prior allocation system would be maintained and that existing water licences would be recognized and protected. The new cap and trade system was layered on top of the old prior allocation system and involved a number of new policy instruments: a moratorium power for regulators, to put a halt to the growing problem of over-allocation; water licence trading, to allow for the buying and selling of water licences; water conservation objectives, to help restore riverine environments; and conservation holdbacks, to allow regulators to hold back up to 10% of the amount of water in any water licence trade and reallocate it toward water conservation objectives. While the *Water Act* created the policy instruments necessary for cap and trade, it also envisioned that these systems would be introduced on a basin-by-basin basis, through basin-level water management planning processes (Heinmiller 2013).

The first basin to go through this planning process in Alberta was the SSRB. The process took place in two phases between 2001 and 2006 and involved a substantial amount of stakeholder involvement through sub-basin advisory committees. The resulting SSRB Water Management Plan introduced moratoria on the issuance of new licences in three of the four sub-basins of the SSRB, the Oldman, Bow, and South Saskatchewan, creating an immediate ‘hard cap’ on water allocations in these areas. In the only sub-basin without a licencing moratorium, the Red Deer, water conservation objectives were formulated that create a ‘soft cap’ on licencing, which allows for the distribution of new licences but only up to the point that the water conservation objectives can still be

achieved. Throughout the SSRB, water licence trading was introduced, as was the power for regulators to take conservation holdbacks from any water trades (Heinmiller 2016, 180–197). Under the SSRB Water Management Plan, Alberta's portion of the SSRB became the first river basin (or part basin) in Canada to be governed by a cap and trade system, a considerable policy innovation that was unhindered by the federal government or the interprovincial MAA.

Overall, of the three policy strategies adopted by the Alberta government to manage scarcity in its portion of the SSRB, two are incremental continuations of policies inherited from the federal government and one is a non-incremental provincial innovation. The two policy strategies originated by Ottawa—infrastructure construction and prior allocation—do not qualify as policy innovations, but Alberta made deliberate policy choices to continue them, and these policy choices were based on internal provincial politics not pressure or intervention from other governments. The subsequent adoption of cap and trade is a significant policy innovation and, although influenced by international examples, was an entirely made-in-Alberta solution for addressing water scarcity. Moreover, the design of the cap and trade system in the SSRB is entirely intra-provincial: the caps apply only to Alberta's portion of the SSRB and there is no interprovincial water trading. Ultimately, Canadian federalism has allowed Alberta to 'go its own way' in governing its portion of the SSRB, and the province used this latitude to adopt policies that are quite different from its neighbour, Saskatchewan.

Governing water scarcity in southern Saskatchewan

Saskatchewan's approach to governing water scarcity has relied on two policy strategies, one similar to Alberta and one much different. The similar policy strategy has been reliance on water management infrastructure as a means of alleviating localized scarcity. The much different policy strategy, and Saskatchewan's distinctive policy innovation, has been a reliance on state centralization in water allocation. Saskatchewan has established a centralized water regulator with almost unfettered authority over water allocation and use in the province, which can use its authority to allocate and reallocate water as needs arise, thereby allowing for adaptation to periodic water shortages. Saskatchewan has pursued this policy strategy since 1984, eschewing the prior allocation system it had inherited from the federal government and avoiding the cap and trade strategy adopted in Alberta. In fact, it is difficult to find two basin-sharing jurisdictions in the same federation that have chosen water allocation strategies as diverging as Alberta and Saskatchewan.

Saskatchewan has relied heavily on water management infrastructure as a means of coping with scarcity in the SSRB,

and they have relied predominantly on one project: Gardiner Dam and Lake Diefenbaker (shown in Fig. 1). Built between 1959 and 1967 by the federal and Saskatchewan governments, and the product of a federal-provincial agreement, Gardiner Dam has been operated by the Saskatchewan Water Security Agency (and its predecessors) since 1969 (Macdonald 1999; Saskatchewan Watershed Authority 2012, 1–2). In many ways, the project is the centrepiece of Saskatchewan's efforts to cope with water scarcity in the SSRB. Lake Diefenbaker is the water source for half of the province's population, including its two biggest cities, Saskatoon and Regina, and for much of the SSRB (Saskatchewan Water Security Agency 2017). The project also includes a hydro-electric generating station and a water diversion into the neighbouring Qu'Appelle River, helping to manage that river's endemic water scarcity.

The main purpose of the project was to create a massive reservoir that could support large-scale irrigation expansion throughout south-central Saskatchewan; however, for various reasons, irrigation uptake in the area never developed as anticipated (Warren 2016, 139). This has left a substantial amount of surplus water that can be called on during dry periods, helping to alleviate localized water scarcity for those who have access to Lake Diefenbaker water. This is in contrast to other parts of southern Saskatchewan which typically suffer acute water shortages during drought periods (Hood 1994; Warren 2016). The surplus water in Lake Diefenbaker has also muted calls for further dam construction in Saskatchewan's portion of the SSRB, as it is difficult to make a strong case for further construction based on need alone. In short, Saskatchewan's efforts to manage scarcity in its portion of the SSRB revolve around Gardiner Dam and Lake Diefenbaker, and reliance on this single project looms large in the province's other policy strategy for managing scarcity, centralized regulation.

In 1984, Saskatchewan made a non-incremental water policy change when it passed the *Water Corporation Act*. Under this legislation, ownership of water resources continued to be vested in the Crown (i.e., the provincial government), as it had under the old prior allocation system. This is similar to the situation in Alberta, but the similarities stop there (Percy 2005). The *Water Corporation Act* also created a new government agency, the Saskatchewan Water Corporation, and effectively designated it as the centralized water regulator in the province. The new water regulator was given the power to cancel, amend and place conditions on any water licence for any reason it deemed necessary, a regulatory power that '... was without precedent in North American water law...' (Percy 2005, 2099). Since 1984, the centralized regulator has changed twice: in 2002, the *Saskatchewan Watershed Authority Act* transferred water regulation responsibilities from the Saskatchewan Water Corporation to the newly formed Saskatchewan Watershed Authority, and, in 2012, the Saskatchewan Watershed Authority was replaced by the

Saskatchewan Water Security Agency (Hurlbert 2016; Horbulyk 2017, 37). Through all of these organizational changes, the innovative use of centralization as a strategy for coping with water scarcity has remained intact.

The combination of these two policy strategies—significant reliance on Lake Diefenbaker and centralized water regulation—means that the plans and procedures used by the province's water administrators to operate Lake Diefenbaker are very important in Saskatchewan's management of scarcity in its portion of the SSRB. Rather than leaving these plans entirely in the hands of water administrators, the province has engaged in public consultation processes to give water stakeholders some input into how the reservoir is managed. The latest consultation on the operating plan for Lake Diefenbaker was in 2012, and it involved a large variety of interests, including irrigators, industrialists, environmentalists, recreationalists, municipalities and First Nations (Saskatchewan Water Security Agency 2017). However, at the time of writing, the operating plan had yet to be completed by the Saskatchewan Water Security Agency, so it is unclear how much influence these interests will have in its final design.

The adoption of centralized regulation in Saskatchewan has meant that water prioritization in times of shortage went from being statutorily based to administratively based. That is, when there is not enough water available to meet existing water licences, it is at the discretion of Saskatchewan's central water regulator to determine who gets water and how much. This may seem to invite arbitrary bureaucratic decisions on water allocation, but, in practice, the central regulator typically endeavours to ensure that socio-economically important and high value uses, such as domestic, municipal and industrial uses, are prioritized ahead of less important or lower value uses, such as irrigation. This hierarchy of uses is administratively determined and has not been formalized in any legislation or regulation, but most water users are aware of where they (roughly) fit into this hierarchy based on the conditions of their water licences. So, water prioritization in Saskatchewan is not as arbitrary and opaque as it may first seem, but much still depends on the discretion of the central water regulator who manages water shortages on a case-by-case basis.

Overall, the decentralization of water governance responsibilities in Canadian federalism and the limited constraints offered by the interprovincial apportionment in the MAA have given Saskatchewan plenty of latitude for water policy innovation. Saskatchewan has used this latitude to adopt policy strategies for governing water scarcity that are unique in western North America and much different from those adopted in Alberta. While Saskatchewan relies on important water management infrastructure for managing scarcity, as most water scarce jurisdictions do, it has bucked the trend toward the adoption of market-based water management policies, opting instead for centralized government regulation. Historically,

Saskatchewan has been more accepting of such statist policy solutions—it was, after all, the first province in Canada to adopt public health care and public auto insurance—so its adoption of a statist solution in managing water scarcity is not entirely surprising. Nevertheless, without the latitude to innovate provided by Canadian federalism, Saskatchewan's distinctive approach to managing scarcity in the SSRB would not have been possible.

Conclusion

A comparison of Alberta's and Saskatchewan's policy strategies for governing water scarcity in the shared South Saskatchewan River Basin reveals a substantial amount of policy innovation and divergence. The only policy strategy they have in common is a reliance on water management infrastructure to cope with localized scarcity, a strategy that both provinces inherited from the federal government and a strategy that is used in most jurisdictions in the world dealing with water scarcity. Beyond this, the two provinces' water allocation policies share little in common. Alberta has preserved the long-standing prior allocation system and layered a cap and trade system on top of it, while Saskatchewan has abandoned prior allocation and adopted an approach based largely on centralized government regulation. Both Alberta's adoption of cap and trade and Saskatchewan's adoption of centralized regulation were non-incremental water policy changes representing important policy innovations. Clearly, policy innovation, and Canadian federalism's allowance of policy innovation, has been an important face of federalism shaping water governance in the South Saskatchewan River Basin.

This is not to suggest that intergovernmental cooperation and coordination is irrelevant in the South Saskatchewan River Basin. There is no question that both the Master Agreement on Apportionment and the Prairie Provinces Water Board that monitors it are crucial institutions in the peaceable governance of the South Saskatchewan River Basin. The apportionment provides some level of water security to the provinces, the absence of which could trigger all sorts of competition and conflict between them. Furthermore, the relative water security provided by the Master Agreement on Apportionment has been a supporting factor in the provinces' abilities to innovate in the governance of their respective shares of the South Saskatchewan River Basin. So, the water policy innovation and divergence evident in the South Saskatchewan River Basin is, to some extent, predicated upon the presence of sound and stable intergovernmental institutions in the basin, and this must not be overlooked.

Ultimately, the South Saskatchewan River Basin case serves as a reminder that sub-national policy innovation is an aspect of federal river governance that has been too

often overlooked. However, this does not discount the importance of intergovernmental collective action, and one of the challenges of designing governance institutions for federal rivers may be finding an appropriate balance between allowing latitude for policy innovation, on one hand, and engaging in substantive collective action, on the other. The institutions of the South Saskatchewan River Basin are tilted toward the encouragement of policy innovation, but this may not be appropriate in other federal rivers facing governance problems of a different severity, scope or kind.

Acknowledgements The author would like to thank the interviewees in this study for their valuable input and feedback. He would also like to thank Dustin Garrick and Lucia De Stefano for organizing this special issue and providing important guidance in the article's development and the journal's anonymous reviewers for providing critical and constructive suggestions that improved the article greatly.

References

- Alberta Economic Development Authority (2008) Sustainable water management and economic development in Alberta. Government of Alberta, Edmonton. http://economic.alberta.ca/documents/sustainable_water_management_economic_development.pdf. Accessed 18 Mar 2018
- Armstrong C, Evenden M, Nelles, HV (2009) *The river returns—an environmental history of the bow*. McGill-Queens University Press, Montreal.
- Barnett TP, Adam JC, Lettenmaier DP (2005) Potential impacts of a warming climate on water availability in snow-dominated regions. *Nature* 438:303–309. <https://doi.org/10.1038/nature04141>
- Beach D, Pederson RB (2013) *Process-tracing methods: foundations and guidelines*. University of Michigan Press, Ann Arbor
- Berry FS, Berry WD (2014) Innovation and diffusion models in policy research. In: Sabatier PA, Weible C (eds) *Theories of the policy process*, 3rd edn. Westview, Boulder, pp 307–359
- Bjornlund H, Nicol L, Klein K (2007) Challenges in implementing economic instruments to manage irrigation water on farms in southern Alberta. *Ag Wat Man* 92:131–141. <https://doi.org/10.1016/j.agwat.2007.05.018>
- Bjornlund H, Nicol L, Klein K (2009) The adoption of improved irrigation technology and management practices—a study of two irrigation districts in Alberta, Canada. *Ag Wat Man* 96:121–131. <https://doi.org/10.1016/j.agwat.2008.07.009>
- Brandes OM, Curran D (2017) Changing currents: a case study in the evolution of water law in western Canada. In: Renzetti SR, Dupont DD (eds) *Water policy and governance in Canada*. Springer, Switzerland, pp 45–67
- Byrne J, Kienzle S, Sauchyn D (2010) Prairie water and climate change. In: Sauchyn D, Diaz H, Kulshreshtha S (eds) *The new normal—Canadian prairies in a changing climate*. Canadian Plains Research Centre, Regina, pp 61–79
- Cairns RD (1992) Natural resources and Canadian federalism: decentralization, recurring conflict, and resolution. *Publius* 22(1):55–70. <https://doi.org/10.1093/oxfordjournals.pubjof.a037996>
- Environment Canada (2008) Section 2: annual statistics: Canada's physical environment. In: *Human activity and the environment: annual statistics 2007 and 2008*. <http://www.statcan.gc.ca/pub/16-201-x/2007000/5212638-eng.htm>. Accessed 16 Nov 2016
- Figliuzzi S (2002) South Saskatchewan River sub-basin contributions to international and interprovincial water-sharing agreements. Government of Alberta, Edmonton. <https://www.aep.alberta.ca/water/programs.../Water-SharingAgreements-SSRB-Oct2002.pdf>. Accessed 18 Mar 2018
- Garrick DE, De Stefano L (2016) Adaptive capacity in federal rivers: coordination challenges and institutional responses. *Curr Opin Environ Sustain* 21:78–85. <https://doi.org/10.1016/j.cosust.2016.11.003>
- Glenn J (1999) *Once upon an Oldman: special interest politics and the Oldman River Dam*. UBC Press, Vancouver
- Halliday R, Faveri G (2007) The St. Mary and Milk rivers: the 1921 order revisited. *Can Wat Res J* 32:75–92. <https://doi.org/10.4296/cwrj3201075>
- Hamilton A, Madison J, Jay J (2009) *The federalist papers*. Genovese MA (ed). Palgrave MacMillan, New York
- Heinmiller BT (2013) Advocacy coalitions and the Alberta Water Act. *Can J Pol Sci* 46(3):525–547. <https://doi.org/10.1017/S0008423913000541>
- Heinmiller BT (2016) *Water policy reform in southern Alberta: an advocacy coalition approach*. University of Toronto Press, Toronto
- Hood GN (1994) *Against the flow—Rafferty-Alameda and the politics of the environment*. Fifth House, Saskatoon
- Horbulyk T (2017) Water policy in Canada. In: Renzetti SR, Dupont DD (eds) *Water policy and governance in Canada*. Springer, Switzerland, pp 29–44
- Hurlbert M (2016) Water governance in the prairie provinces. In: Diaz H, Hurlbert M, Warren J (eds) *Vulnerability and adaptation: the Canadian prairies and South America*. University of Calgary Press, Calgary, pp 217–247
- Hurlbert M, Pittman J (2014) Exploring adaptive management in environmental farm programs in Saskatchewan, Canada. *J of Nat Res Pol Res* 6(2–3):195–212. <https://doi.org/10.1080/19390459.2014.915131>
- Kennett S (1991) *Managing interjurisdictional waters in Canada: a constitutional analysis*. Canadian Institute of Resources Law, Calgary
- Macdonald M (1999) *The dam the drought built: a history of the South Saskatchewan river project*. Canadian Plains Research Centre, Regina
- Mitchner EA (1973) *The development of western waters 1885–1930*. Department of History, University of Alberta, Edmonton
- Monahan P (2002) *Constitutional law*, 2nd edn. Irwin Law, Toronto
- Osborne D (1990) *Laboratories of democracy*. Harvard Business School, Boston
- Ostrom E (1990) *Governing the commons—the evolution of institutions for collective action*. Cambridge University Press, Cambridge
- Percy DR (2005) Responding to water scarcity in western Canada. *Tex Law Rev* 83(7):2091–2107
- Poirier B, de Loë R (2011) Protecting aquatic ecosystems in heavily allocated river systems: the case of the Oldman River Basin, Alberta. *Can Geo* 55(2):243–261. <https://doi.org/10.1111/j.1541-0064.2010.00322.x>
- Administration PFR (1982) *History of irrigation in western Canada*. Government of Canada, Ottawa
- Prairie Provinces Water Board (2010) Master agreement on apportionment. <http://www.ppwb.ca/information/109/index.html>. Accessed 19 Jan 2017
- Prairie Provinces Water Board (2004) *Prairie provinces water board—overview*. <http://www.pnr-rpn.ec.gc.ca/water/fa01/fa01s01.en.html>. Accessed 13 Sept 2004
- Rood SB, Vandersteen JW (2010) Relaxing the principle of prior appropriation: stored water and sharing the shortage in Alberta, Canada. *Wat Res Mgmt* 24:1605–1620. <https://doi.org/10.1007/s11269-009-9516-0>
- Saskatchewan Water Security Agency (2017) *Developing an operating plan for Lake Diefenbaker*. <https://www.wsask.ca/Lakes-and->

- [Rivers/Dams-and-Reservoirs/Developing-and-Operating-Plan-for-Lake-Diefenbaker](#). Accessed 25 Aug 2017
- Saskatchewan Watershed Authority (2012) Lake Diefenbaker reservoir operations: context and objectives. <https://www.wsask.ca/Lakes-and-Rivers/Dams-and-Reservoirs/Developing-and-Operating-Plan-for-Lake-Diefenbaker>. Accessed 25 Aug 2017
- Schmidt J (2010) The ethics of instream flows: science and policy in southern Alberta, Canada. *Intl J of Env, Chem, Ecologic, Geologic and Geophysic Eng* 4: 442–448. scholar.waset.org/1999.6/13718
- Vogel D (1995) *Trading up: consumer and environmental regulations in the global economy*. Harvard University Press, Cambridge
- Warren J (2016) The troubled state of irrigation in southwestern Saskatchewan: the effects of climate variability and government off-loading on a vulnerable community. In: Diaz H, Hurlbert M, Warren J (eds) *Vulnerability and adaptation: the Canadian prairies and South America*. University of Calgary Press, Calgary, pp 133–158