



**WATER RITES:
Reimagining Water in the West**
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Indigenous water rights & global warming in alberta

david k. laidlaw

Indigenous Nations¹ living in Alberta have existing rights in the waters of Alberta under Canadian law. There may be additional rights, which are discussed below, with an emphasis on treaty rights under Treaty 7 and the Stoney Nakoda First Nations. According to Stoney Nakoda traditions and oral history, the Stoney Nakoda people² have always lived on the Great Island and as a branch of the Sioux people they speak the Nakota dialect.³ Their traditional territories encompassed the foothills and mountains of western Canada from the *Ožadé Tāga* (Brazeau River-Jasper area) down into the *Hūga Baha* (Chief Mountain) area in Montana, west to the *Čā-okiyé Wa-p̄ta* (Columbia River) and east to the Calgary.⁴ There were three main bands⁵ and before the arrival of Canadians,⁶ the Stoney Nakoda people “lived a nomadic way of life, hunting, fishing, and gathering from the abundance of this good land.”⁷

The Stoney Nakoda, like other Indigenous Nations, were oriented around an oral culture with a different worldview from Canadians.⁸ These differences impacted historical interactions and continue to inform current interactions.⁹ Indigenous peoples derived a livelihood from using all aspects of creation¹⁰ with ceremony to express their gratitude to the Creator and to what they harvested, and in that worldview waters were seen as a source of life and cyclical renewal for the resources that were husbanded for future generations.

Indigenous Nations exercised exclusive control over a defined territory with lands and resources *owned* communally by all members and shared in accordance with Indigenous

law.¹¹ Passage or sharing resources in a territory required oral agreement of the controlling Indigenous Nation and a web of diplomatic agreements mediated relations between Indigenous Nations. Those agreements needed periodic renewal to resolve any accumulating differences, particularly after conflicts between Nations, which proliferated during periods of resource scarcity. Alberta had numerous Indigenous Nations prior to contact.¹² How, then, did the government of Alberta come to claim control of the territories and waters of Indigenous Nations?

history

When Canadian settlers arrived in Canada, they found up to two million members of several hundred Indigenous Nations, with varying modes of living, social, and political organizations.¹³ Modern-day Alberta was once “owned” by the Hudson’s Bay Company [HBC], incorporated by a Royal Charter in 1670¹⁴ that granted monopoly trading rights and ownership for territories bounding the rivers draining into Hudson’s Bay¹⁵ — known as Rupert’s Land — in return for a nominal rent of “two Elks and two black Beaver.”¹⁶ The northern part of Alberta was included in Britain’s North-western Territories, described as lands surrounding rivers draining to the Arctic.¹⁷

Canada was organized from the British colonies of Ontario, Quebec, New Brunswick, and Nova Scotia on July 1, 1867 under the *Constitution Act, 1867*,¹⁸ which divided areas of legislative authority between the federal government in section 91 and the provinces in section 92. Canada had jurisdiction over “Indians, and Lands reserved for the Indians” in 91(24) and provincial governments had jurisdiction over property and civil rights in 92(13) and ownership of lands and resources in the provinces in section 109. From 1863 to 1870, Canada negotiated to acquire Rupert’s Land and Britain’s North-western Territory,¹⁹ resulting in a three-way transaction: HBC surrendered land rights under its Charter to Britain; Britain after accepting the surrender transferred Rupert’s Land and its North-western Territory on transfer terms to Canada, who would pay the surrender price to Britain for HBC and gain these lands on July 15, 1870. Aside from the Métis²⁰ in the Red River Colony who resisted under Louis Riel, Indigenous Nations played no role in this transfer.

Canada, under the transfer terms, negotiated eleven Numbered Treaties with Indigenous Nations, from 1871 to 1921, encompassing most of that territory.²¹ In Canadian law, Indigenous Nations were viewed as surrendering their occupancy in territories owned by the Crown.²² The written text of the Numbered Treaties were based on the Ontario Robinson Treaties from the 1850s, with major terms framed in identical legal language saying that Indigenous Nations surrendered rights to vast tracts of land, in return for

66 water rites reimagining water in the west

promises: that they could continue their traditional way of life on surrendered lands (subject to tracts being taken up by the government); lands would be reserved for their exclusive use (Reserves); as well as annual annuities, supplies, and other benefits.

Treaty negotiations were fraught with misunderstandings.²³ Canadian Treaty Commissioners were representatives of a written culture with legal backgrounds²⁴ that intended to open lands for settlement as cheaply as possible.²⁵ Indigenous Nations' leadership were representatives of an oral culture that was faced with dire prospects: threats of unregulated settlement and declining livelihood resources in the evident decline of bison herds. The differing worldviews, legal systems, and languages were a significant barrier to understanding: Treaty Commissioners spoke only English and Indigenous languages had no words or concepts as to the permanent surrender or individual ownership of "land."²⁶ Indigenous Nations were active, if reluctant, participants in Treaty Negotiations and some of their concerns made it into the written terms of the Treaty.²⁷

Indigenous Nations understood the oral promises as terms of the Treaty subject to periodic review.²⁸ Canadian governments tend to rely on the written text of the Treaty.²⁹ Growing Canadian settlement led to Treaties being ignored, with the rights of treaty nations not being recognized or "implemented in many, and possibly most, cases."³⁰

treaty 7

Treaty 7 was signed on September 22, 1877, between Canada and the Blackfoot Confederacy (Blood, Peigan, and Blackfoot), Tsuu T'ina First Nation (Sarcee), and Stoney Nakoda First Nations encompassing all of Southwestern Alberta in the land surrender provision.³¹ According to Stoney Nakoda elders, Treaty 7 was signed primarily as a peace treaty and some mention was made of "sharing 2 feet of the topsoil" but there was no translation as to the legal terms of land surrender.³² The written terms of Treaty 7 treated the Stoney Nakoda First Nations as one band, with Reserve locations and land amounts always disputed.³³

Indigenous common law riparian rights

In the prairie-numbered Treaties there was no separate mention of waters aside from Treaty 7 giving the Crown the right on Blackfoot, Blood, and Sarcee Reserves "to navigate, land and receive cargoes on the shores, to build bridges and operate ferries, and use the fords and all the trails leading to" their rivers.³⁴ This suggests that all other water rights were retained. There was no federal water legislation and the common law doc-

trine of “riparian rights” applied.³⁵ There is no property in flowing waters at common law. Riparian rights are part of Canadian common law that set out a number of principles under which the use of surface waters in defined channels (watercourses) are shared by owners of lands next to a watercourse. These principles included:

riparian water rights are automatically vested in owners of land bordering watercourses or through which watercourses flow: those properties are described as riparian property;• riparian property may be obtained by open notorious and continuous occupation for a number of years that gives common law possessory title [to Indigenous Nations];

- water may be used for ordinary domestic purposes connected with the riparian property — regardless of the impact to other downstream riparian property owners;

- water may be used for secondary or “extraordinary purposes” such as irrigation or industrial uses but any waters diverted for these uses must be returned to the watercourse substantially undiminished in quantity and quality, subject to an allowed “reasonable use” diminishment;

- the rights to use water were restricted to the riparian property as they were inseparable from the riparian property.³⁶

Riparian principles did not allocate a specific amount of water to riparian property, are not exclusive in nature (as all riparian properties have them) and do not carry a priority — other than being located closer to the water source. These principles, premised on abundant waters, continue to apply in Eastern Canada although they have been overlaid by provincial legislation.

The area covered by Treaty 7 covers the Palliser Triangle, a semi-arid region unsuitable for agriculture.³⁷ It soon became apparent that agriculture could not thrive in the prevailing conditions and riparian rights to waters were unsuited to the large-scale irrigation necessary for agrarian settlement. In response, Canada passed *The North-West Irrigation Act, 1894*³⁸ [NWIA] attempting to extinguish riparian rights by claiming initially the right to regulate use of all surface waters by Canada by way of a licence.³⁹ Rights to divert surface water would be licenced originally for three purposes: domestic, irrigation, and other purposes. NWIA established a priority system, based on the date of filing. Licences

68 water rites reimagining water in the west

allowed the diversion of water to benefit the land specified and for the purpose(s) listed; however it did not specify a licence duration, and licences were issued in perpetuity in large amounts. Holders of water licences would be entitled to the entire amount of their licence in priority of registration but licences could not deprive the owner of riparian property waters necessary for domestic purposes.⁴⁰

The *NWIA* initially required owners of existing riparian property to obtain a licence for the use of waters but it was amended in 1895 to claim the property in surface waters and to drop the licencing requirement for riparian properties' use of water for domestic purposes (as defined in the legislation).⁴¹ Riparian rights are not rights of the user of water subject to licencing; rather, they are property rights attached to riparian property, and extinguishing property rights requires an express enactment that is absent from the *NWIA* and succeeding federal legislation.⁴² The *NWIA* was renamed the *Irrigation Act* and was progressively amended to enlarge the definition of domestic uses to include certain agricultural and industrial purposes.⁴³

When Canada created Alberta in *The Alberta Act* (1905), it retained all crown lands and property “in the waters within the province” and instead provided a subsidy for Alberta’s government.⁴⁴ This differing treatment from the original provinces resulted in a series of identical agreements between Canada and the prairie provinces. *The Alberta Natural Resources Transfer Agreement, 1930 (NRTA)* transferred Crown lands and the natural resources to Alberta, excepting out federal lands including National Parks and Indian Reserves.⁴⁵ The *NRTA* did not, despite mention in the preamble, transfer surface water resources to Alberta.⁴⁶ Alberta proceeded to pass *The Water Resources Act*⁴⁷ claiming ownership of surface waters in Alberta where “the principles of the *Irrigation Act* were incorporated with only minor drafting amendments” on the basis of provincial ownership only.⁴⁸ This error was corrected in *The Natural Resources Transfer (Amendment) Act, 1938* with a *Memorandum of Amendment* transferring “the interest of the Crown in the waters ... under the *North-West Irrigation Act, 1898*” backdated to 1930.⁴⁹

Riparian rights are property rights, and any provincial legislation after 1930 extinguishing or regulating them on Reserves is outside of the province’s legislative authority and invalid.⁵⁰ Reserve land straddling or adjoining watercourses are riparian property and Indigenous Nations have riparian rights to divert surface water in unlimited amounts *without* requiring any licence for domestic purposes as defined in the *Irrigation Act* — including common law riparian rights and legislated reasonable consump-

tive use for agricultural machinery and industrial purposes. The Stoney Nakoda First Nations' Reserves straddle many waterways, including the Mini Thni (Bow River) flowing through Calgary.

treaty and Aboriginal rights to water?

Treaties are governed by the *honour of the crown* requiring consideration and fidelity to Treaty Indigenous Nations with special interpretative and implementing principles for Treaties and legislation affecting Treaty rights. Since April 17, 1982, Treaties are protected in the *Constitution Act, 1982* by section 35(1) where "the *aboriginal* and *treaty* rights of the aboriginal peoples of Canada are hereby recognized and affirmed."⁵¹ Aboriginal rights are activities central to the lifestyle of Indigenous Nations, being practised in a current form that relates to the original practice (prior to Canadian contact), which have not been extinguished by explicit legislation prior to April 17, 1982.⁵² Land-based practices that qualify as aboriginal rights can form site-specific aboriginal rights on Crown lands subject to the applicable treaty.⁵³ Aboriginal and Treaty rights cannot be restricted unless there is a valid legislative object, such as public safety or conservation, and the restriction must accord with historical relationship between Canada and aboriginal peoples including: the honour of the crown, and where the government has assumed control over a central aboriginal interest such as land, the fiduciary duty of the Crown to uphold aboriginal interests.⁵⁴ Aboriginal rights take priority over other uses as they pre-date those uses, thus in circumstances of a constrained resource — such as water — aboriginal rights to use water take priority over all other uses.⁵⁵

Treaties can embody some aboriginal rights and provide additional rights.⁵⁶ They are not a complete code, as aboriginal and treaty rights can be practised in the same territory unless barred by the Treaty. Treaties can, in Canadian jurisprudence, surrender aboriginal title and rights in the territorial surrender language, if any, in accordance with the Treaty terms with Reserves remaining aboriginal title lands.⁵⁷ The exercise of Treaty and aboriginal rights are not limited to traditional practices; they may be exercised in a modern form together with ancillary rights, if there is a continuity between the date of the Treaty or pre-contact practices. Ancillary rights include those rights necessarily incidental to the exercise of the protected rights and rights reasonably incidental to the protected rights.⁵⁸

The numbered Treaties in the prairie provinces⁵⁹ were intended to promote the transition of Indigenous Nations to a settler-agrarian lifestyle of farmers and ranchers for assimilation into Canadian society.⁶⁰ Indigenous pre-contact agricultural practices such as

70 water rites reimagining water in the west

horse breeding and care were common on the prairies, and pre-dated Treaty signing. Treaty 7 offered agricultural supplies “for the encouragement of the practice of agriculture among the Indians.”⁶¹ Ranching and farming require water supply security and may form the basis for a Treaty right to water.

The prairie numbered Treaties⁶² were signed prior to the passage of the *NWIA*'s amendments in 1895 that arguably appropriated the property in surface waters. This contemporaneous process of signing Treaties and the passage of the *NWIA* has led scholars to question the *NWIA* affecting Indigenous rights to water, as that would “entail a highly disenchanted view of federal policy to conclude, that the federal government, in the midst of treaty negotiation, engaged in so substantial a violation of the treaty promises.”⁶³

The numbered Treaties, encompassing all of Alberta's territory, preserved the right of Indigenous Nations to obtain a traditional livelihood in the surrendered territories on Crown lands not “taken up” and assigned to an incompatible use. In Clause 12 of the *NRTA*, Canada required Alberta to fulfill Treaty obligations on the lands and resources transferred to it. The Courts have interpreted the *NRTA* as a constitutional document, modifying the Treaties to expand Treaty rights over the entire province but eliminating the exercise of Treaty rights for commercial purposes.⁶⁴ Alberta's position, expressed in its “Policy on Consultation with First Nations,”⁶⁵ is that Treaty rights are limited to the “rights to hunt, fish and trap for food.”⁶⁶

Treaty rights, even on the limited basis acknowledged by Alberta, carry within them a number of necessary or reasonably incidental Treaty rights. These include adequate water supply for transportation and access to hunting, fishing, and trapping areas, as well as adequate water quality to support the supply of wildlife, fish, and fur-bearing animals.⁶⁷ Treaty rights to water supply and quality have not been adjudicated in Alberta, although there are a number of lawsuits including them.⁶⁸ These Treaty rights would apply off-Reserve, and may affect provincial laws through the application of section 88 of the *Indian Act*, which limits provincial laws under a Treaty.

water in alberta

Canada is often seen as a water rich country with 20 per cent of the world's fresh water. However, Canada holds only 6.5 per cent of the global supply that is renewable; the balance is stored in lakes, underground aquifers, and glaciers. Of that renewable water supply, 60 per cent drains northward into the Arctic Ocean and Hudson Bay. As a result, it

is unavailable to the 85 per cent of the Canadian population who live along the country's southern border. Alberta holds approximately 2.2 per cent of Canada's freshwater, but 80 per cent of Alberta's freshwater supply is found in the northern reaches of the province while 80 per cent of water demand lies in the south. Only 13.3 per cent of Alberta rivers drain south and east into Hudson's Bay with 86.6 per cent draining north to the Arctic Ocean.⁶⁹

Alberta's water system, inherited from the *NWIA/Irrigation Act*, involves: prior allocation by government licences giving landowners the right to use large amounts of water annually on their land, subject to limited domestic use by non-Indigenous riparian land owners. The priority is based on the time of registration, such that in times of water shortage, the earliest registration can use its entire allocation before a subsequently registered water licence receives any. Historically governments have allocated the majority of licences for agricultural uses and this remains the largest use today.⁷⁰ In 2009 Alberta licenced a total of 9.89 billion m³ water, of which 97 per cent (9.59 billion m³) is from surface water sources and only 3 per cent (301 million m³) of the volume is from groundwater sources. Water is allocated to 187,551 licence holders: 49,376 (~26 per cent) are groundwater licence holders, and 138,175 (~74 per cent) are surface water licence holders. The current allocation total as of 2016 is 10.198 billion m³ with essentially the same distribution of uses.⁷¹ Groundwater originates from precipitation soaking down into the ground, and while groundwater reserves may dwarf surface waters only 1 per cent of those reserves are in usable aquifers. Use of groundwater will not address water shortages given the limited recharge rate of aquifers.

Not all uses are equal. Agricultural uses are consumptive, as most of the water is incorporated into the products of agriculture such as grains or livestock. Other uses are less consumptive, as municipalities will return 80–90 per cent of the water; the commercial water used for cooling is entirely returned and other uses do not incorporate water to the same extent as agriculture. All consumptive uses generate pollution, affecting water quality for downstream users and environments; removing that pollution requires sewage and water treatment facilities. Environmental uses are supportive, as they represent water allocation retained in the sources as instream flows to maintain aquatic and riverine bank ecosystems.

The most extensive drought in Alberta history, the dustbowl era of the 1930s, did not lead to changes in the allocation system. Instead, Alberta embarked on an effort to increase the useable water supply by storing water behind dams. It is estimated that \$1B

72 water rites reimagining water in the west

was devoted to water projects from 1930–90, with Alberta continuing to issue extensive water licences.⁷² Suitable storage sites for major water projects, at least in the south of Alberta, have been exhausted.

The current *Water Act* (1995) has modified the allocation system, by among other things: requiring the development of basin-wide water management plans, the power to close water basins, new water licences issued on a conditional basis and limited to renewable five-year terms, and unlinking water licences from land to encourage a market for water licence transfers intended to drive conservation by indirect water pricing. Any approved water licence transfer leads to two new conditional water licences with the same priority number as the original but a potential reduction in water amount of up to 10 per cent for in-stream flows. This transfer mechanism has discouraged senior licence holders, holding the bulk of water licences, from participating in water licence markets. These *Water Act* measures can provide a “safety valve” in transferring uses — but are not likely to increase the water supply from conservation.

Alberta is divided into seven watershed basins named after the major river they drain into: the Hay River, Peace/Slave, Athabasca, Beaver, Milk, and the North and South Saskatchewan River Basins, with multiple water management plans. Each basin has varying distribution of licenced uses and water consumption; for example, in 2009 Alberta allocated 2.74 billion m³ of water from the Bow River, with 73 per cent used for irrigation and 17 per cent used by the City of Calgary, and from the North Saskatchewan River 2.01 billion m³ of water, with 79 per cent used in thermal power plants and 7 per cent used in the city of Edmonton.⁷³

Due to concerns about over-allocation and insufficient in-stream flows, Alberta stopped issuing new licences in the Oldman, Bow, and South Saskatchewan sub-basins in August 2006 in the *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)* (2006) [SSRB Water Management Plan].⁷⁴ Alberta made some exceptions for new in-flow stream allocations, water storage releases, and First Nation licences.⁷⁵ This closure has led to growing conflict between water users and it is estimated that, even with water conservation measures reducing water consumption by 30 per cent,⁷⁶ municipalities in the Calgary region will exhaust their own and Calgary’s current extensive water allocation by 2030.⁷⁷

Land use is inextricably tied to waters and the use of land has been regulated in Alberta since the early 1900s.⁷⁸ The current legislation, the *Alberta Land Stewardship Act*⁷⁹

[ALSA] was passed in 2009 and is derived from the *Land Use Framework* (2008)⁸⁰ that divided Alberta's territory into seven Regions corresponding generally with drainage basins of Alberta's major rivers.⁸¹ ALSA provides a mechanism to plan for the direction of desired economic, environmental, and social objectives by way of regional plans that are expressions of government policy approved by Cabinet. Provincial municipalities and decision-making bodies are required to amend their bylaws and policies to ensure compliance.⁸² The government-controlled public consultation, protection of regional plans by Cabinet secrecy, and extensive government discretion have been criticized by environmental groups, First Nations, and in academia — particularly with the cumulative impacts of development.⁸³

The South Saskatchewan Regional Plan [SSRP]⁸⁴ is the second regional plan approved by Cabinet effective September 1, 2014.⁸⁵ The SSRP encompasses the area described in 2007⁸⁶ as “water short,” namely the South Saskatchewan River Basin [SSRB]. The SSRP noted that the pressure on water resources is significant with over 20,000 water licences. The major use for these licences is agriculture, which accounts for 75 per cent of total water allocation combined with a growing population, currently at 1.8 million people, and while current actual use is 55 per cent for municipalities and 66 per cent for agricultural licences, those actual uses will grow. This is particularly compounded by periodic phases of natural low flow and drought in the region.⁸⁷

The SSRP affirmed the SSRB Water Management Plan as a provincial strategy that recognizes the limit of water resources has been reached in those watersheds, thus any decision-making bodies must review their rules and procedures to ensure compliance with the SSRP. SSRP says, in an understatement, that the challenge of matching water supply to demand will be compounded by changing climactic conditions.⁸⁸

global warming

Global warming is real, it is caused by humanity, and it represents a significant threat to humanity and the environment in the near future. All nations have agreed in the *Paris Accords* (2015)⁸⁹ that climate change is an urgent threat and a common concern of humankind, and have undertaken to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels,” and likewise pursue “efforts to limit the temperature increase to 1.5°C above pre-industrial levels.” This would significantly reduce the risks and impacts of climate change.⁹⁰

74 water rites reimagining water in the west

Globally the last three decades have been successively warmer at the Earth's surface than any preceding decade since 1850. The period from 1983 to 2012 was the warmest thirty-year period in the last 1400 years in the Northern Hemisphere. The globally averaged combined land and ocean surface temperature data as calculated by a linear trend show a warming of 0.85°C over the period 1880 to 2012.⁹¹ The Northern Hemisphere warms faster than the global average because it has more land and less ocean water than the Southern Hemisphere (water warms slowly).

In Alberta, over the past 100 years the mean temperature has increased by 1.4°C with most of the increase occurring since 1970. Between 1912 and 2011, the average annual temperature increased by 1.1°C (0.1 per decade) in the southern half of the province and double that (2.3°C or 0.2 per decade) in the north. Since 1970 the pace of warming has intensified increasing at a rate of 0.3°C per decade in both the north and the south.⁹²

River summer flows are important for irrigation in Alberta, as demand is higher in summer. In 2000 these flows have dropped in the South Saskatchewan River at Medicine Hat to 53.8 per cent, North Saskatchewan River at Prince Albert to 66.6 per cent, Peace River at Peace River to 62.3 per cent, and Oldman River at Lethbridge to 59.3 per cent from the 1910 summer flows. The summer flow reduction further downstream is even more severe, with measurements at Saskatoon being 20 per cent of the 1910 flows.⁹³ Some, but not all, of this decline in summer flows can be attributed to the extensive dam projects built between 1930 and 1990, with 50 per cent of flows being moderated by those water projects but only 25–50 per cent of the average river discharge being accounted for.⁹⁴

Cumulative emissions of CO₂ largely determine global mean surface warming into the late twenty-first century and beyond; reductions in global cumulative GHGs will take time, as GHG's do not dissipate rapidly. Even with reductions in current emissions, significant changes in trends will not occur until 2050.⁹⁵ This means temperature increases in Alberta from the temperature ranges in 2000, range from a projected high of >2.71 °C to a minimum 2.19 °C, with consequent moisture loss of 2.4 to 18 per cent. Southern Alberta has the higher ranges of temperature increases and moisture loss.⁹⁶

One of the most visible impacts of climate change in Alberta is glacial retreat, most evident in the accelerating retreat of the Athabasca Glacier in the Columbia Icefield between Jasper and Banff which is losing ~16,000,000 cubic metres of ice each year. Studies estimate that glacial melt contributes an average of 0.6 per cent of the annual

flow in the SSRB and about 2.4 per cent of the base flow in the Bow River at Calgary, although in low-flow years, the percentages could be significantly higher.⁹⁷ The SSRB lost half of the glacier area between 1975 and 1998; this loss of glaciers will lead to increased springtime flows and lower summer flows as glaciers, particularly in the Bow River basin, moderate river flows by retaining the winter snow and feeding meltwater into rivers into the crucial summer flows.⁹⁸

There have been significant advances in climate change modelling on a global and regional basis since 2009.⁹⁹ In Alberta, some recent representational studies have shown:

increase in winter and early spring flows, declines in summer (about 15 per cent) and annual flows (about 5 per cent) in the Oldman River Basin, from Shepherd et al., 2010.¹⁰⁰

Increases in both high and low flow magnitudes and frequencies, large increases to winter and spring streamflow are predicted for all climate scenarios. Spring runoff and peak streamflow occur up to four weeks earlier than in the 1961–90 baseline for the Cline River Basin (North Saskatchewan) (Kienzlea et al., 2012);¹⁰¹ and

In the 2050s and 2080s, southern Alberta will be expected to experience more frequent and severe intensive storm events in the May, June, July, and August season that could potentially increase the risk of future flooding in this region. (Gizaw et al., 2016).¹⁰²

Alberta will see significant economic and environmental impacts, between now and 2050 including:

infrastructure costs to protect towns and cities from flooding with higher spring flows and upgrading irrigation facilities to accommodate lower summer flows;

environmental impacts including: increased flow variability affecting riverine ecosystems (the most threatened ecosystem in Alberta); warmer waters threatening marine life and temperature-driven biome movement northward;

drought due to greater soil evaporation, lower recharge rate of rivers, leading to potential desertification in southern areas affecting agriculture incomes; and

76 **water rites** reimagining water in the west

water supply conflict with lower flows in summer leading to less “useable water” for irrigation and needs from an expanding population.

If we do nothing to lower CO₂ releases, Alberta in 2100 will see a doubling in CO₂ concentrations predicted to cause a 6–8°C warming and a resulting decrease in soil moisture, predicted to be between 20 and 40 per cent with “challenging” consequences for Albertans.¹⁰³

There have been proposals for additional water supply within the current regulatory systems, but Amec’s Report, “Water Storage Opportunities in The South Saskatchewan River Basin in Alberta (2014),” concluded there was limited opportunity to do so.¹⁰⁴ The original study leading to entrenchment of the SSRB Water Management Plan provided at best a thirty-year window before water shortages developed, but the proposed water licence market, intended to drive water conservation, has been frustrated by the historical distribution of water allocations.¹⁰⁵

Change to the Alberta’s water allocation system is needed. A proposal by Professor Arlene Kwasniak entitled *Climate Change and Water: Law and Policy Options for Alberta* (2017)¹⁰⁶ outlines transition to a new framework that would respect the environment, encourage sustainable development, and be climate change resilient. The development of these changes requires the participation of Indigenous Nations, not only to clarify and affirm their pre-existing rights to water, but also to access the stewardship worldview that has allowed them to live in a sustainable manner in Alberta for thousands of years.

notes

Websites are current to February 1, 2018. Case law and legislation may be found at The Canadian Legal Information Institute (CanLII)'s website at: canlii.org

1. Indigenous People living in Canada prefer the name for themselves in their language and are mostly indifferent to the Canadian name accorded to them, although they may describe themselves as a First Nation to emphasize their political status and priority. The modern collective term is Indigenous.
2. In Nakoda they are known as the *Īyāñé Nakoda*, previously as the *lyethkabi*. At Rocky Mountain Nakoda website: <<http://www.rockymountainnakoda.com>>. They are also known as *Yéłka*, *Yéłkabi*, or *lyéłka*, which means "Those Without Blemish," and historically they were known as the *Wapamakóé*, meaning "Head Decapitators."
3. *These Mountains Are Our Sacred Places*, Chief John Snow (Toronto: Samuel Stevens, 1977) [Snow, *Mountains Are Our Sacred Places*], 2. Great Island is an English translation of their Indigenous name for North America.
4. Ibid. According to Rocky Mountain Nakoda website, supra n2, their territory goes north to *Osoda Wa-pta* (Smoky River), south to *Īdukabi Tida* (tobacco plains) in Montana, and east to *Wotawa Baha* (Cypress Hills).
5. Ibid., 4. Now called the Goodstoney/Wesley in the north, the Bears paw in the south, and the Chiniki in the middle.
6. The use of "Canadians" is deliberate. Current Canadian residents have, since 1867, inherited the territories, resources, and obligations of Britain arising from historical encounters with Indigenous Peoples, as well as incurring new obligations. Current Canadian residents may not have participated in the history of Indigenous Peoples' suppression and dispossession but they live in a Canadian society that has prospered on that history.
7. Snow, *These Mountains Are Our Sacred Places*, supra n3, 2.
8. This difference may be attributable to the respective creation stories: in both versions the Creator made the world and everything in it, but in Canadian Biblical stories the Creator (God) expelled humans from his presence in Paradise and gave humans dominion over plants and every living thing on Earth whereas in Indigenous creation stories the Creator remained in the world with his creations and there was no distinction between them. Snow, *These Mountains Are Our Sacred Places*, supra n3, 1-13, describes the Stoney Nakoda creation stories and the consequent social organizations of the Stoney Nakoda Nations. See generally: Sandra Tomsons and Lorraine Mayer, eds., *Philosophy and Aboriginal Rights: Critical Dialogues* (Don Mills: Oxford University Press, 2013) and Rupert Ross, *Dancing with a Ghost: Exploring Indian Reality* (Markham: Reed Publishing, 1992).
9. *Report of the Aboriginal Justice Inquiry of Manitoba* (1999) at <<http://www.ajic.mb.ca/volume.html>> [Manitoba *Aboriginal Justice*] volume 1, chapter 2 at <<http://www.ajic.mb.ca/volumel/chapter2.html>>. A basic summary, *Differences between Traditional Aboriginal Cultures and Mainstream Western Culture*, can be found at <http://www.med.uottawa.ca/SIM/data/Images/Aboriginal_x_Western_values.pdf>.
10. Contrary to stereotypes, Indigenous Nations traded portable, high-value resources including *underground resources*, such as chalk, flint, copper, and hydrocarbons (pitch) gathered from sites where their technology made them accessible through "kin trade" networks spanning North America. See Kerry Abel, ed., *Aboriginal Resource Use in Canada* (Winnipeg: University of Manitoba Press, 1991).
11. Sidney L. Harring, *White Man's Law: Native People in Nineteenth-Century Canadian Jurisprudence* (Toronto: University of Toronto Press, 1998) [Harring, *White Man's Law*], 129-31. See also Edwin Thompson Denig, *The Assiniboine*, ed. J.N.B. Hewitt, (Regina: Canadian Plains Research Center, 2000), 82-4.
12. A map of pre-contact Indigenous language groups is in volume 1 of the *Report of the Royal Commission on Aboriginal People* (Ottawa: Supply and Services Canada, 1996) [*Aboriginal Peoples Report*], 21. Online: <<https://qspace.library.queensu.ca/handle/1974/6874>>. A colourized version can be found at

78 water rites reimagining water in the west

<<http://www.amauta.info/satellite/cai.jpg>>. An interesting but incomplete description by the Alberta Government, *Aboriginal Peoples of Alberta: Yesterday, Today, and Tomorrow* is online at <<http://indigenous.alberta.ca/documents/AboriginalPeoples.pdf?0.051602806285153124>>.

13. *Aboriginal Peoples Report*, *ibid.*, contains an extensive history. See *Manitoba Aboriginal Justice*, *supra* n9, volume 1, chapter 3 at <<http://www.ajic.mb.ca/volume1/chapter3.html>> for a historical overview.
14. Hudson's Bay Company History Foundation, online at <<http://www.hbcheritage.ca/things/artifacts/the-charter-and-text>>.
15. *Ibid.*, 1, para 3. This ownership was justified on the basis of *first discovery*, a doctrine that originally excluded claims from other European powers which was transformed to say that the discovering country could, by settlement if the area was unoccupied (*terra nullius*), obtain title, or if occupied by conquest or agreement with the original occupants (*cession*). Canada did not engage in Indian Wars and no lands were acquired by conquest. *Tsilhqot'in Nation v British Columbia*, [2014] 2 SCR 257, 2014 SCC 44 (CanLII), at para 69 notes that the doctrine of *terra nullius* did not apply in Canada because of the *Royal Proclamation, 1763* (an accurate transcription is in *Aboriginal Peoples Report* volume 1 appendix D) which came after the British and Indigenous Nation allies conquered Québec. After the surrender of French colonies, the British Government issued the *Royal Proclamation, 1763*, which preserved lands beyond the "frontier" as "Hunting Grounds" for the Indigenous Nations and any unsundered lands within the colonies. It established a Crown monopoly on land purchases (*cession*) from Indigenous Nations saying purchases must be approved at a public meeting of the "Indians" held for that purpose.
16. *Ibid.*, 3, para 8. This Rent was to be paid whenever the Monarch came to that territory and has been performed four times: <<http://www.hbcheritage.ca/history/fur-trade/the-rent-ceremony>>.
17. *An Act to make further Provision for the regulation of the Trade with the Indians, and for the Administration of Justice in the North-western territories of America* (1859) 22 & 23 Vic, c 26 (UK). Online: <http://eco.canadiana.ca/view/oocihm.9_01245/2?r=0&s=1>.
18. *The Constitution Act, 1867*, 30 & 31 Vict, c 3. (*Constitution Act, 1867*).
19. A map is in Frank J. Tough, "Aboriginal Rights Versus the Deed of Surrender: The Legal Rights of Native Peoples and Canada's Acquisition of the Hudson's Bay Company Territory" *Prairie Forum* 17, no. 2 (1992): 225–6. This is the largest land purchase in the world and contains 75 per cent of Canada's territory.
20. The Métis people are descendants of fur traders and Indigenous women, who became a separate people acting as intermediaries in the fur trade. See Sylvia Van Kirk, *Many Tender Ties: Women in Fur-Trade Society, 1670–1870* (Winnipeg: Watson & Dwyer, 1999). They are now recognized as one of Canada's aboriginal peoples.
21. Historical Indian Treaties of Canada, Atlas of Canada Reference Maps online: <http://ftp.geogratis.gc.ca/pub/nrcan_rncan/raster/atlas_6_ed/reference/eng/treaties.jpg>.
22. The Privy Council, Canada's highest court until 1949, decision in *St. Catherines Milling and Lumber Co v The Queen* (1888), 14 App Cas 46 (PC), described "Indian title" as a "personal and usufructuary right [to harvest the land owned by another], dependent upon the good will of the Sovereign [under the *Royal Proclamation, 1763*] ... that there has been all along vested in the Crown a substantial and paramount estate, underlying the Indian title, which became a *plenum dominium* [complete ownership] whenever that title was surrendered or otherwise extinguished," 54–5. Haring, *White Man's Law*, *supra* n11, describes this case, 135–47. This did not mean the surrender by Treaty comported with Indigenous law, which "generally did not have a concept of land ownership that would have included authority to transfer absolute title to the Crown." In Kent McNeil, "Extinction of Aboriginal Title in Canada: Treaties, Legislation, and Judicial Discretion," *Ottawa Law Review* 301, no. 33 (2001–02): 304–8. Douglas Harris, *Fish, Law, and Colonialism: The Legal Capture of Salmon in British Columbia* (Toronto: University of Toronto Press, 2001), 18–27 and 62–5, argued that dividing lands/"hunting grounds"/livelihood resources was contrary to Indigenous law as they could be *shared* with various peoples, including Canadians, but not divided.

23. Canadian contemporary views: Alexander Morris, *The Treaties of Canada with the Indians of Manitoba and the North-West Territories, Including the Negotiations on Which They Were Based, and Other Information Relating Thereto* (Toronto: Belfords, Clarke & Co., 1880). Online: <<http://www.gutenberg.org/ebooks/7126>>; Indigenous views: Richard T. Price, ed., *The Spirit of the Alberta Indian Treaties*, 3rd ed. (Edmonton: University of Alberta Press, 1999) [Price, *Spirit of Alberta Indian Treaties*]. An American historian's view: Harring, *White Man's Law*, supra n11, 250–70, with a description of misunderstandings in Treaty Negotiations.
24. Alexander Morris was the main Treaty Commissioner; a lawyer, judge, and politician, he was also actively involved in treaty negotiations with aboriginal groups, signing Treaties 3, 4, 5, and 6, and revising Treaties 1 and 2.
25. Reserves in the Prairie region were limited to one square mile for each family of five persons, or in that proportion with minimal annual annuities. There was some flexibility in the amount of supplies and annual gifts.
26. *Aboriginal Peoples Report*, supra n13, volume 2, chapter 5: "Many of the [historical] treaties ... were made with one of the parties (the Crown) believing that the central feature of the treaty was the purchase or extinguishment of the other party's Aboriginal title, while the very idea of selling or extinguishing their land rights was beyond the contemplation of the Aboriginal party, because of the nature of their relationship to the land." See John Leonard Taylor, "Two Views on the Meaning of Treaties Six and Seven," 9–46, and Richard Daniel, "The Spirit and Intent of Treaty Eight," in Price, *Spirit of Alberta Indian Treaties*, supra n23, 47–102.
27. Notably in Treaty 6's mention of a "medicine box," but also education promises for Reserve schools.
28. They have passed that oral knowledge to their descendants. See Bruce G. Miller, *Oral History On Trial: Recognizing Aboriginal Narratives In The Courts* (Vancouver: University of British Columbia Press, 2011).
29. *Smith v The Queen*, [1983] 1 SCR 554, 1983 CanLII 134 (SCC), 568–70.
30. *Aboriginal Peoples Report*, supra n13, vol. 2, 48.
31. A transliteration of Treaty 7 is at <<http://www.aadnc-aandc.gc.ca/eng/1100100028793/1100100028803>>. The Federal Government had commissioned research Historical Treaties during the late 1980s. Online: <<http://www.aadnc-aandc.gc.ca/eng/1100100028653/1100100028654>>
32. Walter Hildebrandt, *The True Spirit and Original Intent of Treaty 7* (Montreal: McGill-Queen's University Press, 1996), 77–80. The North-West Mounted Police had ended American fur traders' provision of alcohol to Indigenous people, and the presence of their commander at the treaty negotiation was influential.
33. A 2012 Amended Specific Claim for a Treaty Land Entitlement argues that they are entitled to an additional 25,472 acres. Online: <<http://www.scttrp.ca/apption/cms/UploadedDocuments/20126001/018-SCT-6001-12-Doc12.pdf>>. Historically Reserve surveys excluded productive lands, especially mineral resources. See Claudia Notzke, *Aboriginal Peoples and Natural Resources in Canada* (Lethbridge: Captus Press, 1994), 203–4.
34. This is from the first provision setting aside Reserves of Treaty 7. See supra n31.
35. J.E. Cote, "The Reception of English Law," *Alberta Law Review* 15 (1977): 29.
36. Alistair R. Lucas, *Security of Title in Canadian Waters* (Calgary: Canadian Institute of Resources Law, 1990), 5–8. The rules for acquisition and use of underground waters are different (8–11).
37. The Palliser Triangle named for Captain John Palliser, the leader of 1857–59 Official Survey Expedition to Canada's west. A map can be found online at <https://commons.wikimedia.org/wiki/File:Palliser%27s_Triangle_map.png>.
38. *The North-West Irrigation Act*, 1894, 57-8 Vic c 30 [NWIA].

80 water rites reimagining water in the west

39. *Ibid.*, s 4. Richard H. Bartlett, *Aboriginal Water Rights in Canada: A Study of Aboriginal Title to Water and Indian Water Rights* (Calgary: Canadian Institute of Resources Law, 1990) [Bartlett, *Aboriginal Water Rights*], 152.
40. *Ibid.*, s 9.
41. *An Act to amend the North-West Irrigation Act*, (1895), 58-9 Vic c 33, [NWIA Amendments, 1895]. It continued the licencing requirement for riparian owners' non-domestic uses. David R. Percy, "Water Rights in Alberta," *Alberta Law Review* 15 (1977) [Percy, *Water Rights in Alberta*]: 156-7.
42. Monique M. Passelac-Ross and Christina M. Smith, *Defining Aboriginal Rights to Water in Alberta: Do They Still "Exist"? How Extensive Are They?* (Calgary: Canadian Institute of Resources Law, 2010) [Ross and Smith, *Aboriginal Rights to Water in Alberta*], 35-6; Percy, "Water Rights in Alberta," supra n41, 150-60; Bartlett, *Aboriginal Water Rights*, supra n39, 155-63.
43. *Irrigation Act*, RSC 1906 c 61. and subsequently *Irrigation Act, 1927*, RSC 1927. [*Irrigation Act*]. This would include household, sanitary, stock watering, and operation of agricultural and industrial machinery. The *Irrigation Act* remained in force until 1952 but did not apply in the Western provinces after the 1930s. Percy, "Water Rights in Alberta," supra n41, 146.
44. *The Alberta Act*, SC 1905, c 3, s 21. This was to maintain Canada's control over prairie settlement.
45. The NRTA was implemented by legislation, *An Act respecting the transfer of the Natural Resources of Alberta*, SA 1930, c 21, and *An Act respecting the transfer of the Natural Resources of Alberta*, SC 1930, c 3.
46. *Ibid.* The NRTA Clause 8 entitled *Water* dealt with the ownership of hydropower dams.
47. *The Water Resources Act*, SA 1931, c 71.
48. Percy, "Water Rights in Alberta," supra n41, 146 and 158.
49. *The Natural Resources Transfer (Amendment) Act, 1938*, SC 1938, c 36, and *An Act to Ratify a certain Agreement between the Government of the Dominion of Canada and the Government of the Province of Alberta*, SA 1938, c 14. [*NRTA Amendment, 1938*]. Underground water resources were not transferred to Alberta. Ross and Smith, *Aboriginal Rights to Water in Alberta*, note among other things that the NRTA did "not abrogate the Indian interest in reserve lands nor the federal government's right to administer such lands," supra n42, 36-40.
50. *Re Stony Plain Indian Reserve No. 135*, [1982] 1 WWR 302, 314-15. Provincial legislation of this nature is *ultra vires* - that is shorthand for being outside of the provincial legislative powers in section 92.
51. *R v Sparrow*, [1990] 1 SCR 1075, 1990 CanLII 104 (SCC) interpreted this language.
52. *R v Van der Peet*, [1996] 2 SCR 507, 137 DLR (4th) 289, *R v Sappier; R v Gray*, 2006 SCC 54, [2006] 2 SCR 686 In *R v Powley*, 2003 SCC 43, [2003] 2 SCR 207, Métis rights originated in the contact to *pre-control* period when Canadians achieved political and legal control in an area. *Sparrow*, supra n51 set the requirements to extinguish aboriginal rights by explicit legislation prior to 1982.
53. *R v Adams*, [1996] 3 SCR 101, 138 DLR. (4th) 657 [*Adams*].
54. *Sparrow*, supra n58, *Wewaykum Indian Band v Canada*, [2002] 4 SCR 245, 2002 SCC 79 (CanLII), *Manitoba Métis Federation Inc v Canada (Attorney General)*, [2013] 1 SCR 623, 2013 SCC 14 (CanLII).
55. *Sparrow*, supra n51, 115-16.
56. *Adams*, supra n53, 49. E.g. Treaty rights to annuities, supplies, and healthcare in Treaty 6's "medicine box."
57. *Guerin v The Queen*, [1984] 2 SCR 335, 13 DLR (4th) 321. Subject to regulation under the *Indian Act*.

58. Ross and Smith, *Aboriginal Rights to Water in Alberta*, supra n42, 22.
59. Historical Treaty Map supra n21. Treaty 8 excepted as lands area were inhospitable to agriculture.
60. Bartlett, *Aboriginal Water Rights*, supra n39, 20; see generally Sarah Carter, *Lost Harvest: Prairie Indian Reserve Farmers and Government Policy* (Montreal and Kingston: McGill-Queen's University Press, 1990).
61. Stoney Nakoda First Nations were one of the few Treaty 7 Indigenous Nations to choose agrarian supplies.
62. With smaller areas in subsequent adhesions to Treaty 5 in 1908 and Treaty 6 in 1899.
63. Bartlett, *Aboriginal Water Rights*, supra n39, 154–64. This conclusion is bolstered by the *honour of the crown* as a constitutional principle in interpreting Treaties.
64. *R v Badger*, [1996] 1 SCR 771, *Frank v The Queen*, [1978] 1 SCR 95, and *R v Horseman*, [1990] 1 SCR 901.
65. *The Government of Alberta's Policy on Consultation with First Nations on Land and Natural Resource Management, 2013*. Online at <<http://indigenous.alberta.ca/documents/GoAPolicy-FNConsultation-2013.pdf?0.45142952131362>>.
66. *Ibid.*, appendix 2, 61. It considers any other practices as “traditional uses” being “customs and practices on the land that *are not existing section 35 Treaty rights*. We have argued that is a fundamental misinterpretation of the Treaties in David K. Laidlaw and Monique Passelac-Ross, *Alberta First Nations Consultation & Accommodation Handbook*, CIRL Occasional Paper #44 (Canadian Institute of Resources Law, Calgary, 2014) online at <<http://cir.ca/system/files/ConsultationHandbookOP44w.pdf>>.
67. Ross and Smith, *Aboriginal Rights to Water in Alberta*, supra n42, 28.
68. *Ibid.*, 28–30, has a comparison of claims in other jurisdictions and suggest those decision would apply in Alberta.
69. Alberta Environment Information Centre, *Facts About Water in Alberta* (Edmonton: Government of Alberta, 2010) [*Facts About Water in Alberta*], 5–6. A map is on page 12, at <<http://aep.alberta.ca/water/water-conversation/documents/FactsAboutWaterAlberta-Dec2010A.pdf>>.
70. *Ibid.*, 35.
71. *Ibid.*, 33–5. Information about the 2016 licenced water allocation by industry is available at the Alberta Energy Regulator [AER] website: <<https://www.aer.ca/data-and-publications/water-use-performance#report>>.
72. David R. Percy, “Seventy-Five Years of Alberta Water Law: Maturity, Demise & (and) Rebirth,” *Alberta Law Review* 35 (1996): 227.
73. Facts about Water, supra n69, 37.
74. *Approved Water Management Plan for the South Saskatchewan River Basin (Alberta)* (2006) online <<http://aep.alberta.ca/water/programs-and-services/river-management-frameworks/south-saskatchewan-river-basin-approved-water-management-plan/documents/SSRB-ApprovedWaterManagementPlan-2006.pdf>>.
75. *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order*, Alta Reg 171/2007 authorizes the granting of junior water licences to certain Indigenous Nations. Alberta is attempting to compel them to obtain a provincial water licence by refusing project approvals. See Matthew McClearn, “Showdown over Water Looms for Alberta Reserves,” *Globe & Mail*, October 16, 2016.
76. A target set on the basis that this goal would not substantially affect modern lifestyles in the *Water for Life*

82 water rites reimagining water in the west

Policy: Alberta's Strategy for Sustainability (2003) online at <<http://aep.alberta.ca/water/programs-and-services/water-for-life/strategy/documents/WaterForLife-Strategy-Nov2003.pdf>>.

77. David J. Pernitsky and Natalie D. Guy, "Closing the South Saskatchewan River Basin to New Water Licences: Effects on Municipal Water Supplies," *Canadian Water Resources Journal* 35, no. 1 (2010): 90.
78. Bernard J. Roth and Rachel A. Howie, "Land-Use Planning and Natural Resource Rights: The Alberta Land Stewardship Act," *Journal Energy & Natural Resources Law* 29 (2011): 473-6. History of Planning Legislation, online at <<http://propertyrightsguide.ca/history-of-planning-legislation-in-alberta/>>. Sara L Jaremko, *A Critical Exploration of the South Saskatchewan Regional Plan in Alberta* (Calgary: Canadian Institute of Resources Law, 2016), 7-13 [Jaremko, *Critical SSRP*]. Online: <<https://dSPACE.ualgary.ca/retrieve/46560/SouthSaskPlanOP54w.pdf>>.
79. *Alberta Land Stewardship Act*, SA 2009, c A-26.8 [ALSA] The Alberta Environment and Parks maintains a website at <<https://landuse.alberta.ca/ResultsResources/Pages/MapsandShapefiles.aspx>>.
80. *Land Use Framework* (2008). Online: <<https://landuse.alberta.ca/LandUse%20Documents/Land-use%20Framework%20-%202008-12.pdf>>. Alan Harvie and Trent Mercier, "The *Alberta Land Stewardship Act* and its Impact on Alberta's Oil and Gas Industry," *Alberta Law Review* 48 (2010-11): 295.
81. ALSA was hailed as unique in the common law world and promoted as a way to address cumulative effects of development in Roth and Howie, "Land-Use Planning and Natural Resource Rights," 472.
82. Implementation of regional plans is governed by regulatory frameworks, but many of them are still in development, however in s 62 and s 18 ALSA directs that regional plans are valid in their absence.
83. Monique Passelac-Ross and Karin Buss, *Water Stewardship in the Lower Athabasca River: Is the Alberta Government Paying Attention to Aboriginal Rights to Water?* (Calgary: Canadian Institute of Resources Law, 2011), 37-40. Online: <<http://dSPACE.ualgary.ca/bitstream/1880/48638/1/StewardshipOP35w.pdf>>; Monique Passelac-Ross, "Public Participation in Alberta's Land-Use Planning Process," *Canadian Institute of Resources Law* 112 (2011); Nigel Bankes, "The Proof of the Pudding: ALSA and the Draft Lower Athabasca Regional Plan" (Ablawg.ca, April 15, 2011); Parastoo Emami, *Evaluating Procedural Justice in Regional Planning Process: Lessons From Alberta's Regional Plans* (MA thesis: University of Lethbridge, 2014), online at <<https://www.uleth.ca/dSPACE/bitstream/handle/10133/3626/Emami-Parastoo-MA-2014.pdf?sequence=1>>; and Shaun Fluker, "The Right to Public Participation in Resources and Environmental Decision-Making in Alberta," *Alberta Law Review* 52, no. 3 (2015): 567.
84. South Saskatchewan Regional Plan [SSRP], online at <<https://landuse.alberta.ca/LandUse%20Documents/South%20Saskatchewan%20Regional%20Plan%202014-2024%20-%20February%202017.pdf>>.
85. Jaremko *Critical Exploration SSRP*, supra n78. The North Saskatchewan Regional Plan has been started.
86. *Understanding Land Use in Alberta* (2007), 33. Online: <<https://landuse.alberta.ca/LandUse%20Documents/Understanding%20Land%20Use%20in%20Alberta%20-%202007-04.pdf>>.
87. SSRP, 27.
88. SSRP, 79, emphasis added.
89. *Paris Accords* (2015), online at <http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf>.
90. Article 2 of Paris Accord. For doubters, there is a website called *Skeptical Science* devoted to countering the arguments against global warming: <http://www.skepticalscience.com>.
91. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and

- L.A. Meyer (eds.)). IPCC, Geneva, Switzerland, 151 pp. Online: < http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf>, 2-3. Figure SPM.1a. Colours indicate different data sets.
92. Christopher C. Shank and Amy Nixon, *Climate Change Vulnerability of Alberta's Biodiversity: A Preliminary Assessment. Biodiversity Management and Climate Change Adaptation Project* (Edmonton: Alberta Biodiversity Monitoring Institute, Edmonton, 2014) [Shank and Nixon, *Biodiversity and Climate Change*], 1. Online: <http://biodiversityandclimate.abmi.ca/wpcontent/uploads/2015/01/ShankandNixon_2014_ClimateChangeVulnerabilityofAlbertasTerrestrialBiodiversity_ABMI.pdf?>>.
93. University of Alberta, Environmental Research and Studies Centre [UA ERC]. Online: <<https://sites.ualberta.ca/~ersc/water/climate/impacts4.htm>>.
94. Amec 2009, *South Saskatchewan River Basin in Alberta Water Supply Study*, Alberta Agriculture and Rural Development, Lethbridge, Alberta [Amec 2009, SSRB Water Supply Study] online at <[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/irr13053/\\$FILE/ssrb_main_report.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/irr13053/$FILE/ssrb_main_report.pdf)>, 36. It notes that flows were relatively high during the twentieth century and variability is likely to be higher in the future, with climate change studies indicating that "future reductions in flows are more likely than increases in all of the sub-basins," iii.
95. IPCC 2014, *supra* n91, 8-11.
96. Shank and Nixon, *Biodiversity and Climate Change*, *supra* n92.
97. Amec 2009, SSRB Water Supply Study, *supra* n94, 58.
98. *Ibid.*, 57-8.
99. *Ibid.* That Report predicted that in 2050 Alberta would see future annual precipitation range from a decrease of 3.8 per cent to an increase of 11.5 per cent, with an average increase of 3.6 per cent. Temperature increases ranged from 1.5°C to 2.8°C. Despite the increased precipitation, streamflows were predicted to decrease by 8.4 per cent, averaged across the sub-basins and the various climate models. However, on average, the simulations indicate future reductions in flow in all of the sub-basins of the SSRB.
100. Anita Shepherd, Karen M. Gill, and Stewart B. Rood, "Climate Change and Future Flows of Rocky Mountain Rivers: Converging Forecasts from Empirical Trend Projection and Down-Scaled Global Circulation Modelling," *Hydrological Processes* 24 (2010): 3864-77, 3864.
101. Stefan W. Kienzlea, Michael W. Nemethb, James M. Byrnea, and Ryan J. MacDonalda, "Simulating the Hydrological Impacts of Climate Change in the Upper North Saskatchewan River Basin, Alberta, Canada," *Journal of Hydrology* 412-13 (2012): 76.
102. Mesgana Seyoum Gizaw and Thian Yew Gan, "Possible Impact of Climate Change on Future Extreme Precipitation of the Oldman, Bow and Red Deer River Basins of Alberta," *International Journal of Climatology* 36 (2016): 208.
103. UA ERC, 7. Online at < <https://sites.ualberta.ca/~ersc/water/climate/impacts7.htm>>.
104. Amec Report, *Water Storage Opportunities in The South Saskatchewan River Basin in Alberta* (2014) online at <[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/irr15015/\\$file/ssrb-water-storage-main-report.pdf?OpenElement](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/irr15015/$file/ssrb-water-storage-main-report.pdf?OpenElement)>.
105. Amec 2009, SSRB Water Supply Study, *supra* n94, Executive Summary, vi.
106. Arlene Kwasniak, *Climate Change and Water: Law and Policy Options for Alberta* (Calgary: Canadian Institute of Resources Law, 2017). Online: < <https://www.cirl.ca/files/cirl/water-and-climate-change-occasional-paper-57.pdf>>.