



Alternative Water Futures in Alberta



PARKLAND
INSTITUTE

Parkland Institute • December 2011



Alternative Water Futures in Alberta

Jeremy Schmidt

This report was published by the Parkland Institute
December 2011 © All rights reserved.

Contents

Acknowledgements	ii
About the Author	ii
About the Parkland Institute	iii
Executive Summary	1
Introduction	5
The evolution of water allocation in Alberta	7
Alberta's other water stories	15
Contemporary efforts to reform water allocation in Alberta	20
Water markets	23
Alternative water futures for Alberta	32
1. Water and common-pool resources	32
2. Water and public trusts	39
Recommendations	49

To obtain additional copies of the report or
rights to copy it, please contact:

Parkland Institute, University of Alberta
11045 Saskatchewan Drive
Edmonton, Alberta T6G 2E1
Phone: (780) 492-8558
Fax: (780) 492-8738
Web site: www.parklandinstitute.ca
Email: parkland@ualberta.ca

ISBN 978-1-894949-32-3

Acknowledgements

The author thanks the anonymous reviewers who gave comments and many excellent criticisms of previous drafts of this paper. The editorial work of Rachel Harvey was greatly appreciated. Thank you to Scott Harris for copy-edit suggestions and Flavio Rojas for the layout and design. The Parkland Institute and the steering committee of the ‘Our Water is Not for Sale’ network provided guidance to the project’s design and aims, and the work of Ricardo Acuña was especially valuable. In addition to the financial support offered by the Parkland Institute and its partners, the Pierre Elliott Trudeau Foundation supports the author. All defects are my own.

About the author

Jeremy J. Schmidt is a Trudeau Scholar and PhD candidate in the Department of Geography at the University of Western Ontario. He holds a MA in Geography (McGill) and two undergraduate degrees (Lethbridge; Prairie) with majors in geography, philosophy, theology and wilderness leadership. He is the co-editor of *Water Ethics: Foundational Readings for Students and Professionals* and has been a board member of the Canadian Water Resources Association (CWRA) since 2009. He has served on working groups for ethics and water management with UNESCO and for a pan-Canadian water strategy with the CWRA. He has been an invited participant of the Ecumenical Patriarch Bartholomew to the Religion, Science and Environment Symposium. His graduate work includes studies of global biogeochemistry, environmental economics, and resource management. His doctoral research examines water governance, ethics and environmental management in Alberta: www.waterethic.ca

Executive summary

Alberta's Minister of Environment and Water Diana McQueen has promised public consultations in 2012 regarding how to reform the province's water allocation system. This is welcome news, as Alberta's current water allocation system is in need of repair, and a public process for changing it offers the potential to move towards innovative, sustainable solutions. Recognizing there is no panacea for Alberta's water challenges, this report provides one resource amongst many to help the Alberta public in engaging in the water allocation review.

When determining the optimal water management system for Alberta, we must ask critical questions: Optimal for whom? For how long? At what risk or cost to others? Answering these and similar questions is a policy problem that requires the careful weighing of a range of policy options in light of existing obligations and rights.

The evolution of water allocation in Alberta

The way we understand Alberta's water policy history is of critical importance because how we understand it affects how we interpret our problems and identify potential solutions. Alberta's dominant water narrative dates back to as early as 1886. Informed by the allocation systems in numerous jurisdictions, legislation first crafted at the end of the 19th century vested water as property of the Crown, based allocation on a system of first-in-time, first-in-right (FIT-FIR), and granted water licences with seniority. Commitments to both community and distributive justice over private property were pillars of this early development.

As early as the 1920s, Alberta's allocation system showed signs of stress. Passage of the 1999 *Water Act*, a patchwork attempt to update 19th century legislation to the 20th century context, introduced key innovations, including the creation and implementation of watershed management plans and the introduction of market transfers and an optional 10% holdback. These and other changes eventually resulted in closing three of the South Saskatchewan River Basin's four sub-basins to new allocations.

While the *Water Act* created room for innovation, it ignored other critical water narratives, most notably the water narratives of First Nations peoples and the environment itself. Despite having water claims predating the entire allocation system, the priority of First Nations in Alberta's water allocation system has not been recognized, and steps must be taken to remedy this reality. Likewise, the narrative of the environment is under-represented, through a false division between surface and groundwater, the assumption

that water in situ is not in use, the granting of licences in absolute quantities, and separating water rights from responsibilities to concerns such as water quality.

Contemporary efforts to reform water allocation in Alberta

Three reports released by the provincial government to guide its allocation review all classify Alberta's water allocation problems in primarily economic terms. The recommendations to move to water markets are not unique to Alberta, but reflect a broader trend of devolving decision-making from the state to lower-level actors. But the current licensing regime makes it a problematic base for implementing a water allocation market, and in some respects water markets are opposed to the very ideas that are the foundation Alberta's existing rights regime.

The very classification of water allocation problems as economic constrains the options available to the Alberta policy community, a problematic direction given the unpredictability of future conditions. There is no clear argument that either 'efficiency' or the satisfaction of 'preferences' through markets can solve Alberta's water problems. Looking at evidence from other jurisdictions, and considering the flaws and exclusions of Alberta's existing allocation framework, it becomes less appealing to classify Alberta's water allocation problems as economic, or to expect a water market to solve them.

Alternative water futures in Alberta

There are at least two — and likely many more — alternate ways of classifying Alberta's water problems that provide a broader set of social principles upon which solutions to allocation dilemmas may be found, and which open up policy options for dealing with future uncertainties: looking at water as a common-pool resource or as a public trust.

Rather than looking for 'silver bullet' solutions, common-pool resource systems pay special attention to how we design water governance institutions to deal with specific and often localized problems, and recognize that if individuals (or corporations) pursue only what is best for them, it may come at a greater cost to the community. Unlike economic systems, common-pool resource systems work to accommodate rights that may be private, public or held in different forms of communal tenure, and therefore allow the rights of communities such as First Nations peoples to be accommodated in the system.

Several key principles for designing successful common-pool governance systems are already at play in Alberta, such as using multiple scales of decision making to govern large systems and allowing most resource users to participate in devising rules. The principles used to design common-pool governance systems are not prescriptive, but emerge from collective-choice decisions about how to achieve the requirements of social equity and environmental protection—both of which are central to economic prosperity in Alberta.

The idea that water should be held as a public trust resonates strongly across many water use traditions, including the broadly held Canadian notion that water is property of the Crown. To classify water allocation problems through the public trust lens is to suggest that there are social principles that work out of four beliefs: (1) that the public benefits mightily from private development, but that the public interest is in fact greater than the sum of private interests; (2) a belief that property ownership must be respected but that property rights in water are not absolute but can be regulated and adjusted in reasonable ways for the good of the citizenry as a whole; (3) a belief that wasteful uses of public resources are wrong; (4) a belief that rivers and canyons are more than commodities, that they have a trace of the sacred. These four beliefs about water's central importance are reflected in the history of Alberta's own legal tradition

Viewing Alberta's water allocation problems through the lens of common-pool resources or the public trust entail both limits and opportunities, and open up a range of options to amend the existing water licence system. What each offers is a way to think about water allocation in Alberta in a way that does not narrow future governance options unnecessarily.

Recommendations

Water allocation licences should be revised to correct for the empirical problems with the existing system, including:

- aligning water rights with a system for effective groundwater regulation;
- recognizing water in situ as fully in use and assess all existing and future licenses for their benefit to Alberta; and
- coupling allocation quantities with responsibilities regarding quality to prevent degradation of surface and groundwater.

Create institutions appropriate to meeting challenges, including:

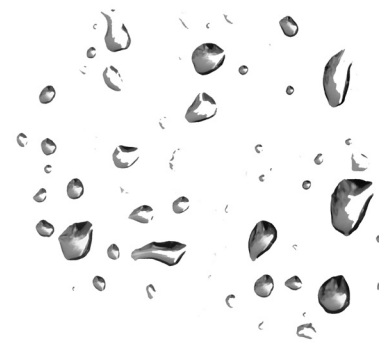
- acknowledging in the *Water Act* that water is a resource to be stewarded in trust for the well-being of the community

- supporting and recognizing a self-designed and self-governed First Nations water council that is granted authority for water planning in First Nations' territory and which coordinates with other governing bodies
- Enforcing minimum flows for the protection of aquatic ecosystems and human health
- Creating an independent board with appropriate expertise to develop water quality standards in Alberta's watersheds

Continue to move water management towards a watershed approach by engaging in public, participatory processes regarding policy, including, but not limited to:

- Using empirically improved future water scenarios to reform licences to proportions of watershed flows rather than in absolute quantities
- Gradually reducing water licences to integrate all land and water activities that affect water quality and quantity
- Designing policies that encourage entrepreneurial activities that are suited to Alberta's waterscape, such as initiatives that are (or nearly) water neutral

“The rules and regulations governing the use of water stem from legal water doctrines which themselves stem from the philosophies of law, equity and justice. It is therefore important for policy makers and lawyers drafting regulations, especially regulations concerning the use of a resource such as water in which there is an interdependency of supply, to consider formally the social justice implications of their policies and doctrines.”¹



Introduction

On October 31, 2011 Alberta’s Environment and Water Minister Diana McQueen announced that public consultations would be held in 2012 regarding how to reform the province’s water allocation system.² This is welcome news. Alberta’s current allocation system is in need of repair, and a public process to discuss how best to change it offers the potential to move towards innovative, sustainable solutions. Then, in a letter dated November 3, 2011, Alberta Premier Alison Redford created a new fivefold mandate for the Environment and Water minister that included moving forward on the consultation for the government’s *Water for Life* strategy and developing science-based environmental indicators.³

To facilitate these processes and the changes they stand to enable, this report provides a resource for the public’s engagement in Alberta’s water allocation reforms. It aims to support public consultation efforts in Alberta’s water sector and towards the improved stewardship of its vital resources. It works at two levels. The first identifies the myth of the popular account of Alberta’s water history, which narrows the options for innovation primarily to those available through market mechanisms. In this regard, several previously released reports have recommended that Alberta reform its allocation system to enable market-driven transfers of water licenses. The second identifies Alberta’s actual broad and rich water history. Proceeding from this historical perspective opens up numerous avenues for policy reform and positions economic tools more accurately as just one among several options. In addition, it aids in identifying when economic tools are not appropriate as a guide for public policy.

It is well known that Alberta is a land-locked province. Its arterial rivers and lakes rely on mountain water towers in the west, where moist air rises and precipitates over the Rockies as rain, snow and ice that together provide water throughout the year. Ultimately, changing oceanic currents and the planetary systems that impact them influence all of the moisture carried to Alberta. In this sense, water policy in Alberta governs only a subset of a much larger set of processes. Unfortunately, the first Canadian laws

1 J.G. Tisdell, “Equity and Social Justice in Water Doctrines,” *Social Justice Research* 16, no. 4 (2003): 401–16. At 415.

2 K. Cryderman, “Water policy a Tory Priority: new minister to seek public input in 2012,” *Calgary Herald*, 31 October, 2011.

3 A.M. Redford, “Letter to Diana McQueen” 3 November 2011.

governing water were not afforded with the kind of empirical perspective available to us today. As a result, many of the ideas that have shaped water governance in Alberta were not built on a sound and sustainable basis. And this has led to problems across the province regarding water quantity, water quality, and for preparing to deal with the ongoing and changing nature of the larger systems of which Alberta is a part.

This report begins by providing readers with an historical account of the evolution of Alberta's water allocation system. That system began with the aim of supporting a certain vision of Canadian society and economic growth, but it was also premised on values of community and distributive justice. As a result, even though there are unsustainable aspects to it, Alberta's water tradition has within it some of the tools to help us transition towards a future that is equitable and prosperous in the long-term. At present, many experts agree that reform is needed in Alberta's water sector, but there is less agreement about what *kind* of water allocation problems Alberta faces. As such, even though the need for reform is well established there is great deal at stake in how we classify the problems that reforms seek to resolve. This is because different ways of classifying problems determine the types of information and principles we consider in designing a solution. These issues are particularly salient in regard to environmental issues and in working towards reconciliation between Alberta's allocation regime and the rights of First Nations. As such, this report considers ways to classify water problems through the lens of economics, common-pool resource theory, and ideas of the public trust. All of these models are compatible with multiple economic tools for allocating water, but they each position them in different ways.

Competing, even conflicting views of how Alberta should reform its water allocation system are likely inevitable, given that water is a resource essential to the life and health of individuals, communities and ecological systems. We should not shy from these conflicts and the difficult questions they present. Rather, we must acknowledge that *any* water allocation system will result in actual distributions of water, in time and over space, that directly constrain both lives and livelihoods. In this regard, Alberta's current water allocation review process is also one that will actively shape its water ethic—that is, the normative framework that will be used to adjudicate between different assessments of the state of its resources, the ways society should be organized to govern them, and how multiple meanings and values will be respected. In fact, it is the first recommendation of this report that, in a similar way that hospitals have ethical experts to offer counsel regarding treatment and policy options, that Alberta secures ethical expertise both to counsel its water allocation reform process and to achieve effective water governance into the future.

The evolution of water allocation in Alberta

In May 2011, Alberta's Premier's Council for Economic Strategy recommended the creation of an Alberta Water Authority, whose principal goal will be to oversee a water allocation exchange, or market, that ensures "optimal water management across the province."⁴ But there is a great deal buried in the term 'optimal.' Optimal for whom? For how long? And at what risk or cost to others?

Answering questions regarding what is optimal is a distinct kind of policy problem that requires carefully weighing policy options against what is feasible given existing obligations and rights. In this regard, it is important to acknowledge two things. First, water allocation in Alberta is not beginning from a blank slate. There is a rich legal and cultural history of water allocation in Alberta. And there is a countervailing, competing history waiting to be told from the perspective of those left out of Alberta's water narrative; namely, the stories of First Nations and the now widely recognized need for water to remain *in situ* (literally: in place)—for the environment. Second, water allocation decisions necessitate careful deliberation about what the consequences are for 'optimizing' now, especially in view of the 2011 Premier Council's admission that we do not have much of the necessary information needed to effectively govern Alberta's complex water resources. In this context, an effective water allocation policy must be oriented to keeping as many future options open as possible because, just as today's context could not be predicted when Alberta's first water laws were crafted, neither is it prudent to close off avenues for adapting to future challenges.

Alberta's water narrative

Alberta's water allocation history is often discussed as though it began when the Canadian government passed the 1894 *North-west Irrigation Act*.⁵ But that law did not emerge from nowhere and it was not applied to an empty space. Prior to it, indigenous peoples had occupied Alberta for millennia and the force of geologic and ecologic processes had shaped its landscape since time immemorial. These alternate histories are considered for their important contributions below. This section begins with some of the context that shaped the *North-west Irrigation Act* in order to identify its shortcomings and to show how aspects of its heritage are worth recovering and renewing.

4 Report of the Premier's Council for Economic Strategy, "Shaping Alberta's Future" (2011).

5 An Act respecting the utilization of the waters of the North-West Territories for Irrigation and other purposes [Northwest Irrigation Act], 1894 57-8 Vict., c.30.

Though it is not widely acknowledged, the first formal water regulation in Alberta was passed in 1886 and preserved watering holes for cattle. This regulation was enacted at the request of cattle ranchers who were accustomed to leasing large tracts of land from the government. These ranchers were worried that government programs encouraging western settlement would begin to privatize land, reduce the lands available for lease and, critically, relic their idea of the frontier as private landholders began to control the lands abutting the region's arterial rivers. The cattlemen had good reason for caution. Canada's *North-west Irrigation Act* was designed not only to regulate the allocation of water but also to do so in a way that would encourage settlement along the path taken by the transcontinental railroad, which crossed the driest portions of present day southern Alberta and Saskatchewan.

The *North-west Irrigation Act* was informed by an examination of water experiences and laws in numerous other jurisdictions, such as Colorado, California, India and Australia. As such, it is a hybrid of different approaches to water allocation held together by a key aim: to bring as much total prosperity to Canada as possible. But the *North-west Irrigation Act* worked under the shadow of an earlier bill, the *Dominion Lands Act*,⁶ which had parceled the continuous landscape of the Prairies into 160-acre (65-hectare) plots of land and encouraged settlement along the course taken by the railroad. In this context, Canada's first water laws for the West treated water as wholly instrumental to both broader political agendas and ideals about land. For instance, the singular aim of building the railroad across the dry Prairies was to establish Canadian sovereignty and, for this, the federal government gave railroad developers a grant of 25 million acres that could, in turn, be sold to the settlers that would occupy the land. As it happened, much of the land granted to railroads formed the basis for the large irrigation cooperatives that now operate in Alberta.

Because Canadian sovereignty was being achieved, at least in part, through the settlement of some of Canada's driest western regions, it quickly became apparent that ensuring settlers had enough water would be critical for success. And for this the federal government was encouraged to take an active role in irrigation projects. As one of the *North-west Irrigation Act's* central architects, William Pearce, wrote in 1891, "[w]ater in a country dependent on irrigation is so precious that it is a duty the government owes to the community, or in other words, that the community owes to itself, to prevent its being captured by monopolists and sold to the farmers..."⁷ Indeed, Pearce concluded that water development must be a public enterprise, since privatization would result in only partial development and a "considerable loss of national wealth." In this sense, the private ownership of land, coupled with public investments in water, were designed to achieve a certain vision of agrarian society.

6 An Act respecting the Public Lands of the Dominion [Dominion Lands Act], 1872 35 Vict., c.23.

7 Pearce W, William Pearce Papers, University of Alberta Archives, (1891) 9/2/7/2/6.

Under Pearce's influence, and the idea that water regulation was a duty that the 'community owes to itself', the *North-west Irrigation Act* vested all water in the property of the Crown and began a system of allocation on a first-in-time, first-in-right basis, or FIT-FIR. Under this system water licenses were granted to land owners and made "appurtenant" to the land tenure system devised under the *Dominion Lands Act*. This literally tied water to land such that obtaining an existing water right required also obtaining the land it was bonded to. In so doing, the Act made it possible for those in-coming settlers whose land was not near a physical water source to obtain a secure license to water and, over time, eliminated many of the large ranches that once operated on the southern prairies.

Water rights in Alberta were also granted with seniority. Those who first applied for, and obtained, a water license could secure all of the water to which they were entitled before those holding newer licenses could obtain water. Importantly, however, rights were not granted to water itself. Thus, Alberta's water licenses do not grant property rights to water. So the rights that apply to things like land—the ability to exclude others, to transfer or dispose of your property through sale or lease, or to use it as you see fit—have not been the same for water.⁸ Part of the reason for treating water differently from land derives from its unique qualities. It flows, it dissolves and transports other materials, it can often be reused downstream (depending on what it is used for initially), and for many applications and ecological functions there is no substitute. Considering how the laws other jurisdictions shaped water allocation in Alberta, a second reason for treating water differently from other resources is to be found in understanding how these different laws dealt with water's unique properties. Central to these laws has been the notion of community.

The doctrine of prior appropriation (first-in-time, first-in-right) adopted by Alberta first emerged in Colorado in the late 19th century and was initially designed to prevent monopolies over water and to prevent capitalists from amassing water rights. In fact, as one expert on this doctrine put it, "[analysis] of the available historical evidence makes it quite clear not only that the doctrine of prior appropriation as developed in nineteenth-century Colorado was viewed as striking a blow at private property in order to advance distributive justice, but that it had that very effect as its central aim."⁹ Similarly, the idea that water licenses should be made appurtenant to land, such as it is found in Hispanic water law, reflects a perspective, "... where community is valued far more than efficiency."¹⁰

8 D. Percy, "Water Rights in Alberta," *Alberta Law Review* 15 (1977): 142-65. D. Percy, "Water Rights Law and Water Shortages in Western Canada," *Canadian Water Resources Journal* 11, no. 2 (1986): 14-22. D. Percy, "Seventy-Five Years of Alberta Water Law: Maturity, Demise & Rebirth," *Alberta Law Review* 35 (1996): 221-41.

9 D. Schorr, "Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights," *Ecology Law Quarterly* 32, no. 1 (2005): 3-71. At 5.

10 Joseph L. Sax, "Understanding Transfers: Community Rights and the Privatization of Water," *West-Northwest Journal of Environmental Law and Policy* 1 (1994): 13-16.

With commitments to both community and distributive justice underlying it, Alberta's water allocation system was designed to forward only one community—that of the Canadian nation. To this end, the *North-west Irrigation Act* vested all water in the property of the Crown. This had the unfortunate effect of marginalizing other politically and morally important communities, such as those of First Nations' peoples and those of other species. As Merrell-Ann Phare, a legal expert in indigenous water law argues, the declaration that the Crown owns all water in Alberta proceeds only by fiat and denies any limitations on water rights implied by the rights of First Nations that predate Canada itself.¹¹ In fact, First Nations water rights are not anywhere mentioned in the original Act. More broadly, McGill law scholar Jane Glenn argues that, "Because of the fundamental importance of water to life, it is inconceivable that Crown ownership of water *in situ* is full and absolute, giving the Crown the right to do with the water whatever it wants."¹²

In practical terms, the narrow interpretation of 'community' has meant that not only was water made instrumental to the project of Canadian sovereignty and land rights, other forms of life were simply ignored, and unjustly oppressed, because water was not viewed as supporting them. For instance, many First Nations communities in southern Alberta were pushed to take up irrigated agriculture as part of a 'moral mission' by the government. And while some thrived, others watched as government officials slowly used the need to irrigate as a pretence to curtail participation in cultural activities, such as the Siksika Sun Dance ceremony.¹³

Despite its orientation to community and distributive justice, the *North-west Irrigation Act* only supported the economic and political success of one form of life. Likewise, environmental considerations are absent. Despite these shortcomings, the basic framework of the *North-west Irrigation Act* was carried over when Alberta was granted constitutional control over its natural resources in 1930. From this basis, the 20th century was witness to numerous federal and provincial investments that created the conditions for economic growth through municipal, hydroelectric, and irrigation projects.

Like many other jurisdictions, state-led water development in Alberta was achieved primarily by increasing water supply, rather than efforts to manage demand. In part, this was an unforeseen outcome of how Alberta's water allocation system was subservient to the agenda of western settlement. Initially, secure water licenses had been established to guarantee water to incoming settlers, but this soon required finding new water supplies, and amending the FIT-FIR model. For instance, as early as the 1920s shortcomings with Alberta's water allocation system meant that, because there was no easy way to transfer water licenses without also acquiring the land it was tied to, the only way to meet new or changing demands was to

11 M.S. Phare, *Denying the Source: The Crisis of First Nations Water Rights* (Surrey: Rocky Mountain Books, 2009).

12 J.M. Glenn, "Crown Ownership of Water in Situ in Common Law Canada: Public Trusts, Classical Trusts and Fiduciary Duties," *Les Cahiers de Droit* 3-4 (2010): 493-520.

13 K. Matsui, *Native Peoples and Water Rights: Irrigation, Dams, and the Law in Western Canada* (Montreal: McGill-Queens University Press, 2009).

increase the amount of water available.¹⁴ The first amendments created a priority system that allowed water licenses to be moved (if approved) to levels of higher priority, such as those created by growing urban centers. In addition, Instream Objectives were created to help ensure that new allocations would not interfere with the claims of existing license holders. These objectives were not based on empirical assessments of environment needs, but only on how much water was needed to ensure existing license holders received the water approved under their licenses.

By the 1980s, support for large-scale projects aimed at increasing water supply was waning due to the social, cultural and environmental costs associated with interventions on Alberta's arterial waters. For instance, large protests and legal action surrounded the controversial completion of the Oldman Dam in southern Alberta because it would threaten unique riparian ecosystems and create a reservoir that flooded the lands of First Nations.¹⁵ As it turned out, the dam would also be completed despite a Federal Court of Appeal ruling for an environmental assessment that ultimately recommended the dam be decommissioned.¹⁶ Furthermore, the extent to which Alberta's water regulation system could be amended was reaching its limit. In fact, as University of Alberta law professor David Percy remarked, by the time Alberta updated its legal framework with the 1999 *Water Act* the patchwork attempts to fit the 19th century water legislation to the changing context of the 20th century resulted in water regulations that resembled "...an accident victim in a cartoon, entirely swathed in bandages to cover individual problems and its total shape visible only in outline."¹⁷

The outcome of continuing to find patchwork solutions to water allocation in Alberta was a gradual narrowing of the narrative used to define its problems. As a result, the large expansion of irrigated agriculture between 1970 and 1980—from 279 877 hectares to 419 730 hectares¹⁸—ultimately confronted the natural and social limits to the model of economic growth that had been used since western settlement. And after the completion of the Oldman Dam the government passed Regulation 307/1991 to establish limits to total water allocations and total irrigated lands in southern Alberta. These included lands for the Blackfoot, Blood, and Peigan First Nations of, respectively, 15000 acres (6070 ha), 25000 acres (10117 ha), and 15000 acres (6070 ha).¹⁹ But the regulation did not halt Alberta's appetite for over-extending its water. In fact, when both non-indigenous and First Nations limits are considered together, they expanded the total irrigation area to 14 000 ha more than that recommended even with the new Oldman Dam in place.²⁰ Today, many of Alberta's southernmost rivers have reached or exceeded sustainable levels of allocation. The St. Mary's, Belly, and Waterton rivers have 118%, 80% and 75% of their median annual flows allocated, with the Oldman and Bow Rivers sitting at 70% and 68%, respectively.²¹ One outcome of an increased focus on irrigated area and

14 D. Percy, "Water Rights Law and Water Shortages in Western Canada," *Canadian Water Resources Journal* 11, no. 2 (1986): 14–22.

15 J. Glenn, *Once Upon an Oldman: Special Interest Politics and the Oldman River Dam* (Vancouver: UBC Press, 1999).

16 Ibid.

17 D. Percy, "Seventy-Five Years of Alberta Water Law: Maturity, Demise & Rebirth," *Alberta Law Review* 35 (1996): 221–41.

18 Alberta Irrigation Projects Association, *South Saskatchewan River Basin: Irrigation in the 21st century, volume I: summary report. Water management study committee* (2002) Lethbridge, AB.

19 Gartner Lee Limited, "Technical review of draft water management plan for the South Saskatchewan River Basin in Alberta" Prepared for Treaty 7 First Nations (2006) March.

20 Glenn, 1999.

21 Alberta Environment, *South Saskatchewan River Basin water allocation* (revised). Regional services, southern region (2005).

quantitative assessments of allocation flows has been that pressing water challenges call for immediate solutions, but often what is required is systemic change.

Converging problems regarding contests over increases to water supply, coupled with the hindrances of its water legislation, meant that a new way to propel economic growth was needed. This led to a review of Alberta's water law in the 1990s. The result was the 1999 *Water Act*. Two key innovations were made under the *Water Act*. The first was the ability to create and implement watershed management plans. The second was the ability to transfer water licenses without also acquiring the land to which the license was originally tied. Soon after the *Water Act*, in 2003, the province's *Water for Life* strategy was created.²² The strategy itself is not backed by formal regulations or legally binding doctrine. Rather, it is the outcome of a broad public consultation effort and it relies on working towards what the Alberta Water Council has described as a new 'water ethic' for the province.²³ This ethic seeks to cultivate shared governance partnerships with Albertans using the governance model the strategy supports. This model includes recognition of local stewardship groups and the creation of regional watershed planning and advisory committees (WPACs) and the Alberta Water Council itself, which offers advice regarding provincial-scale water concerns. These three levels of governance seek to enhance the stewardship and conservation of Alberta's vital water resources. Membership in local WPACs is open to the public across the province.

The first watershed management plan approved under the *Water Act* was a two-phase plan for the South Saskatchewan River Basin (SSRB). The first phase, approved in 2002, enabled market transfers of water in southern Alberta.²⁴ Now almost a decade old, the market was structured using a "conservation holdback" that allows the government to withhold up to 10% of a transferred license as a means to recover over-allocated water. In addition, the transfer cannot have harmful effects on aquatic environments, unacceptably reduce water quality for household and traditional users, present a public safety threat, or interfere with infrastructure arrangements. To date, Alberta's existing water market has not been very active. In part this is due to the strict conditions that must be met for a transfer to be approved and because the process for approval can cause lengthy delays.

Phase two of the SSRB management plan covers virtually all of the water (allocated and not allocated) from the northern boundary of the Red Deer River watershed south to the American border and east to the border of Saskatchewan. Along the 49th meridian, the transboundary waters of the Milk River and the St. Mary's River are shared under the terms of a 1909 treaty with the United States. The SSRB is further divided into four sub-basins: the Red Deer, the Bow, the Oldman, and the South Saskatchewan.

22 Alberta Environment, *Water for life: Alberta's strategy for sustainability*. Publication No. I/955 (2003). Edmonton, Alberta.

23 Alberta Water Council, "Water for Life: recommendations for renewal" (2008).

24 Alberta Environment, *South Saskatchewan River Basin Water Management Plan: Phase One, water allocation transfers*. Publication No. T/661 (2002) Edmonton, Alberta.

Rather than treat each sub-basin individually, the management plan combines them when calculating the amount of water needed to meet a 1969 inter-provincial agreement requiring one half of the annual flow to pass to Saskatchewan.

In response to the over-allocation of water on many southern Alberta rivers, the second phase of the management plan for the SSRB closed three of the sub-basins to further licenses, leaving only the Red Deer River open to applications for new licenses. Further, the plan created and set water conservation objectives (WCOs) for all four rivers of 45% of the natural flow. The primary mechanism for achieving WCOs was the conservation holdback mechanism created by the water market.

Despite these innovations, two studies of the water management plan for the SSRB found it to be inadequate for achieving meaningful environmental protection or for fitting economic development to the forecasted demands for water in the region. Each study is considered briefly below. The first was undertaken prior to the formal approval of the plan in 2006. The second was based on publicly available background studies used to guide the planning process between 2003 and 2005.

The first study, prepared by Gartner Lee Limited in March 2006, argued that the proposed WCOs for the Red Deer did “not encourage conservation or efficiency” and that, more broadly, the “proposed WCO is therefore facilitating the degradation of the river aquatic environment and this is not allowed under the *Water Act*.”²⁵ The report also highlighted that the new management plan repealed the earlier 1991 Regulation and its stipulations regarding water for First Nations, yet it left undetermined how those commitments would be met. The report recommended that water gained by the ‘conservation holdback’ mechanism should be “... used for aquatic health and Treaty 7 First Nations water requirements.”²⁶

The second study, undertaken by a graduate student at McGill University in 2007, reported that due to the over-allocation of water in southern Alberta, the province would not see significant conservation gains even if *all* of the licenses in the region were traded through the existing market twice and even if the conservation holdback mechanism was applied to every transfer. This is because in dry years, according to Alberta Environment’s own calculations, even a 20% reduction in licensed withdrawals would still mean that fulfilling existing obligations to the holders of junior rights would use up any recovered water.²⁷

25 Gartner Lee, 2006.

26 Ibid. At A-2-8.

27 J.J. Schmidt, “The Past, Present, and Future of Water Policy in the South Saskatchewan River Basin, Alberta, Canada” (McGill University, Unpublished M.A. Thesis, 2007).

A deeper problem with the SSRB management plan was noted in the second study. This was that Alberta Environment's forecast of supply-and-demand scenarios, modeled with its Water Resources Management Model, were built using streamflow data from the 20th century but, as recent and abundant evidence shows, that period was atypically wet.²⁸ Alberta's model is a very unique tool, and it allows for comparisons of water supply and the allocations of existing water licenses on a weekly basis. However, by using the streamflow data from only the historical record (from 1912-1995) the plan worked on the faulty assumption that the 20th century served as a good proxy for likely future conditions. As is detailed in the section below on Alberta's environmental story, Alberta has experienced longer, more intense droughts than anything seen since western settlement began. And it should prepare for the likelihood that such events could happen in the future.

Both studies of the SSRB management plan noted that Alberta Environment's recommendation for Instream Flow Needs was to ensure 85% of natural flow remained in situ for channel maintenance, fish habitat, riparian needs and water quality.²⁹ Nevertheless, the first set of Water Conservation Objectives aim for only 45% of annual flow in rivers for the South Saskatchewan River Basin (SSRB).³⁰ Given this discrepancy, it is not clear that the management plan meets its claim that "[i]t defines how water should be respected now and into the future" or that "[i]t brings clarity to questions that have been posed for many years."³¹ Rather, central questions remain regarding the effectiveness of Alberta's existing allocation transfer system, its fit with the meaningful pursuit of environmental conservation, or the communities left out of its purview, such as those of First Nations peoples.

28 Alberta Environment, South Saskatchewan River Basin water management plan, Phase 2: Scenario modeling results, Part 1. Publication No. T/710 (2003). Edmonton, Alberta.

29 Alberta Environment, Instream flow needs determination report for the South Saskatchewan River, Alberta, Canada. Publication No. T/719 (2003). Edmonton, Alberta.

30 Alberta Environment. Approved water management plan for the South Saskatchewan River Basin (Alberta). Publication No. I/011 (2006). Edmonton, Alberta.

31 Alberta Environment, Approved water management plan for the South Saskatchewan River Basin (Alberta). Publication No. I/011 (2006). Edmonton, Alberta.

Alberta's other water stories

Alberta's 1999 *Water Act* created legal room for many kinds of innovations in water governance, but these have yet to make the histories of First Nations or the environment material to water allocation limits or future goals. And as a review of water allocation takes place, it is critical that all affected by water allocation decisions have their perspectives heard. And this requires understanding and responding to countervailing histories of water waiting to be told in Alberta.

First Nations

The water claims of First Nations in Alberta precede those of the province's entire water allocation system. And this fact has led to the broad recognition that First Nations claims to water also hold historical priority over even the most senior claims of the FIT-FIR system.³² As such, reforming Alberta's water allocation system must, at a minimum, seek to reconcile the long-standing marginalization of Indigenous rights to water.

It is well documented that multiple First Nations occupied Alberta for millennia prior to European settlement. But the rights and claims of First Nations to water have, in the main, been poorly respected if acknowledged at all. But First Nations have never been silent regarding their claims. As early as 1925, leaders of the Tsuu T'ina nation publicly identified conflicts regarding the Canadian system of making water instrumental to private property in land. In an essay in the *Lethbridge Tribune*, elder Eliza Eagle Tail wrote that western technique of valuing land and water in only instrumental terms ran counter to the indigenous view that the universe was delicately balanced and deserving of respect in its own right.³³ In this sense, the privatization of land, and the early 20th century land grabs from Treaty 7 land, had the effect of continuing to subject First Nations' water rights to Canada's colonial impulse. Once subjected, the colonial relationship was entrenched by requiring land and water claims to accord with Canadian law. As such, the multiple responses of different First Nations to the introduction of irrigation, agricultural practices, and energy developments (like hydropower) now require a sharp and systematic questioning in order to ensure that contemporary reforms do not reproduce historical injustices either by ignoring First Nations claims or by treating them in antiquated or homogenizing terms.

32 B. Sukhwil, "Native Americans Water Rights in the Water Scarce Western United States. Ots Causes, Consequences and Probably Solutions," *GeoJournal* 24 (1991): 347-54. R.H. Bartlett, *Aboriginal Water Rights in Canada: A Study of Aboriginal Title to Water and Indian Water Rights* (Calgary: The Canadian Institute of Resources Law, 1986).

33 K. Matsui, *Native Peoples and Water Rights: Irrigation, Dams, and the Law in Western Canada* (Montreal: McGill-Queens University Press, 2009).

When other North American jurisdictions are surveyed for their approaches towards indigenous water rights it is striking to see a contradiction that Alberta could avoid through a focus on social justice. This is the fact that although water rights are consistently held as having legal priority they are nevertheless denied because of the bare fact that the historical marginalization of claims has meant indigenous peoples could not discharge their rights as they saw fit. Thus, having been deprived of water rights, indigenous peoples are shut out from obtaining what is lawfully theirs because others are already using their water. For instance, in the recent case of the Pyramid Lake Paiute Tribe in Nevada, “historical lack of access to the [water allocation] system became the basis for denying them the right itself.”³⁴ So far in Alberta, one of the most telling recognitions of indigenous water rights was revealed in a 2002 agreement affecting the Piikani Nation which stated the Piikani no longer held a “prior or superior entitlement to water.” Merrell-Ann Phare, executive director and legal counsel for the Centre for Indigenous Environmental Resources, argues that this phrase reveals a tacit recognition by provincial and federal negotiators that First Nations did have prior claims to water, and that pursuing agreements outside of the courts worked to prevent creating legal precedent.³⁵

Elsewhere in Alberta, Chief Allan Adam of the Athabasca Chipewyan First Nation wrote in a 2008 submission to the United Nations Human Rights Commission that the provincial and federal governments continue to fail in discharging their treaty obligations and duties to consult First Nations peoples regarding northern energy development.³⁶ Likewise, two First Nations, the T’suu Tina and the Samson Cree, filed legal action against the Government charging a failure to consult during the development of the management plan for the South Saskatchewan River Basin in 2006.³⁷ Their motions were denied, a decision justified partly on the grounds that the water management plan would work to improve the quality of the SSRB. Hence the duty to consult was met because, insofar as consultation is required for plans that are likely to have adverse effects, no such effects were expected. However, and as noted by the studies mentioned above, building that assumption into the court’s judgment was not based on sound scientific assessments of the likely environmental effects of the management plan for the SSRB.

The treatment of First Nations water rights under the *North-west Irrigation Act*, the *Dominion Lands Act* and Alberta’s current *Water Act* are insufficiently oriented towards reconciling how water is to be shared not only for the benefit of one community, the Canadian nation, but also for all nations represented in Alberta. When considering the roots of Alberta’s FIT-FIR system in ideas of community and distributive justice, an argument may be made for expanding the ‘community’ to include First Nations. The first steps

34 C.F. Wilkinson, “Indian Water Rights in Conflict With State Water Rights: The Case of the Pyramid Lake Paiute Tribe in Nevada, Us,” in *Out of the Mainstream: Water Rights, Politics and Identity*, ed. R. Boelens, et al. (London: Earthscan, 2010).

35 Phare, 2009. At 4.

36 A. Adam, “Chief Allan Adam Athabasca Chipewyan First Nation UPR Submission RE Canada. United Nations Human Rights Commission, UPR submission under general assembly resolution 60/251 (2008).

37 T’suu Tina Nation v. Alberta (Environment), 2010 ABCA 137, [2010] 2. C.N.L.R. 316.

towards such a view is to create, “a legal and administrative regime, based on Indigenous Peoples’ governance and water rights, to manage their water resources and solve the water-related problems in their territories.”³⁸ In this way, the expansion of the ‘community’ is a step towards reinvigorating the heritage of Alberta’s existing water doctrines in a manner that brings them into step with contemporary considerations of fairness and justice. And this report recommends that Alberta take steps to support the creation of a First Nations water council.

The environment

Telling the story of the environment is contested terrain. This is especially the case because over the course of human occupation, settlement, and development, the landscape becomes a kind of artifact. It is not purely natural, nor only social. As water expert Jerome Delli Priscoli has argued, water planning is often disconnected from history yet “[l]ooking to the past is essential if we are to actively create water futures.”³⁹ As Delli Priscoli’s work reveals, building a kind of ecological realism depends precisely on seeing the environment and human society not as opposed or distinct, but as two participants in an active and evolving relationship.

One of the starkest prompts for Alberta to reconsider its environmental history occurred in 2001, when a severe drought highlighted the urgency of fitting water policies to a more robust understanding of environmental systems and natural water variability. Since that time, numerous empirical studies have shown that Alberta’s water regulation system has evolved during a 20th century which, in geologic terms, was wetter than average. This means that Alberta’s water allocation system has not only over-allocated water in some areas; it has done so during a period that had higher water availability than is typical. Tree ring records and lake sediments now confirm that Alberta’s precipitation patterns are highly variable, with severe droughts that can last decades.⁴⁰ This historical picture is becoming more and more complete as studies on the North Saskatchewan expand upon work in Alberta’s south.⁴¹ And as the picture grows more complete it can be used to help extrapolate some of the likely dynamics of climate variation into the future. The consensus of these models suggests that Alberta will experience increased water stress, a problem that may be exacerbated if rising temperatures change precipitation patterns or increase the amount of water evaporated from its surface.⁴² Or if Alberta’s growing population does not curb, and ultimately reduce, water demands.⁴³

38 Phare, 2009. At 78.

39 Jerome Delli Priscoli, “Water and Civilization: Using History to Reframe Water Policy Debates and to Build a New Ecological Realism,” *Water Policy* 1 (2000): 623-36. At 625.

40 K. Laird, et al., “Lake Sediments Record Large-Scale Shifts in Moisture Regimes Across the Northern Prairies of North America During the Past Two Millennia,” *Proceedings of the National Academy of Sciences* 100, no. 5 (2003): 2483-88.; R. Case, and G. MacDonald, “Tree Ring Reconstructions of Streamflow for Three Canadian Prairie Rivers,” *Journal of the American Water Resources Association* 39 (2003): 703-16.

41 D. Sauchyn et al., “Modes and forcing of hydroclimatic variability in the Upper North Saskatchewan River Basin since 1063,” *Canadian Water Resources Journal* 36 (2011) 205-218.

42 D. Schindler, and W. Donahue, “An Impending Water Crisis in Canada’s Western Prairie Provinces,” *Proceedings of the National Academy of Sciences* 103, no. 19 (2006): 7210-16.

43 Z. Chen, et al., “Historical Climate and Stream Flow Trends and Future Demand Analysis in the Calgary Region, Canada,” *Water Science & Technology* 53 (2006): 1-11.

Where should we start in thinking about Alberta's current allocation system in terms of a broader sense of environmental history? One place is to note where and how the current FIT-FIR model of water allocation has shortcomings with respect to empirical facts. There are at least four areas of poor fit that can prompt us to rethink how a new allocation system may work in concert with our growing understanding of water's complex nature and dependence on the physical environment.

First, Alberta's current water allocation system, like other versions of prior appropriation, treats surface water as distinct from groundwater.⁴⁴ This distinction is bad science and legal fiction. Further, it does not reflect the reality that hydrologic systems are connected and that surface and groundwater systems are connected in complex ways that are often not well understood. This is an especially pertinent issue for Alberta's northern waters and the use of Steam Assisted Gravity Drainage (SAG-D) to recover bitumen deposits from Alberta's oil sands. In this technology, two wells are drilled. The first injects steam into the ground to liquefy bitumen and the second pumps it out. But given the lack of knowledge regarding subsurface hydrogeology, its connection to aquifers, rivers and lakes the expansion of SAG-D presents a serious water challenge to both surface and groundwater in Alberta and exposes serious regulatory deficiencies.⁴⁵

Second, allocation under FIT-FIR assumes that water in situ (literally: in place) is not in "use" when it is not manipulated by humans. This is incorrect for two reasons. First, all surface and groundwater is in use providing and regulating the conditions for environmental and social activity. Second, many human activities that are not regulated under the *Water Act* have an effect on water. So water can be manipulated in many different ways that are not recognized as 'uses' yet should be part of a coordinated governance regime. For instance, clear-cut logging in the source areas of a watershed changes the rates of erosion and run-off, which affects the sediment load of nearby rivers and the amount of water that ends up as surface water flows. In these respects, defining water 'use' only in terms of recognized water allocations is too narrow to capture the complexity of human-water relationships.

Third, Alberta's FIT-FIR model grants water in absolute quantities. Justifying fixed allocation quantities requires either perennially stable amounts of water or knowledge of the outer limits of inter-annual water variability. This is often referred to as 'stationarity'—the idea that water availability fluctuates with a natural envelope of stability—but has now been rejected by hydrologists as untenable.⁴⁶ This is the basis for ideas like 'renewable water' that suppose there are perennial 'stocks' and annual 'flows' of water. However, because human impacts on the water cycle have changed the outer limits of natural variability, stationarity has been

44 C.F. Wilkinson, "Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine," *Land and Water Law Review* 24 (1989): 1-38.

45 J. Ko and W.F. Donahue, "Drilling down: groundwater risks imposed by in situ oil sands development," Report published by Water Matters Society of Alberta (2011) www.water-matters.org.

46 P.C.D. Milly, et al., "Stationarity is Dead: Whither Water Management?" *Science* 319 (2008): 573-74.

rejected. Likewise, the stock-and-flow model of ‘renewable’ water needs to be rethought.⁴⁷ As leading scientists have recommended, policies should aim to find a ‘safe operating space’ that positions human activity within a precautionary framework that incorporates a broader range of variability into planning exercises.⁴⁸ In Alberta, this could mean using the Water Resources Management Model to calculate supply-demand scenarios using a much broader range of water variability than the 20th century instrumental record.

Fourth, the current allocation system atomizes water licenses in a manner that is not clearly aligned with regulations regarding water quality. In this regard, the FIT-FIR model targets only half of the water allocation problem in its focus on clearly delineating rights. The other half is connecting these rights to responsibilities regarding the kinds of risks water resources are exposed to. These come in a variety of forms that are often not from a specific source, but are ‘non-point’ pollutants⁴⁹: pharmaceuticals, pesticides, temperature changes (i.e. from industrial cooling), and new techniques for energy extraction that may change subsurface flows by fracturing geologic formations. All of these can have effects on downstream communities.

To these four problems, here are four policy recommendations:

- Align existing water rights to surface water with a system for effective groundwater regulation and governance
- Recognize that water *in situ* is fully in use as part of socio-ecological systems and requiring all new allocations to meet tests of overall benefits to Alberta (not just the test of ‘beneficial use’)
- Re-run the Water Resources Management Model where data permits using parameters derived from the broader geological history of Alberta. Several assumptions would need to be made to do this since such records are often annual only, or at least not as detailed as the flow record of the 20th century. However, precautionary sampling assumptions are preferable to assuming abnormally high water availability will continue, or that such an assumption is a good basis for policy forecasting.
- Align water allocation quantities with corollary land and water use regulations that set preventative guidelines for non-point pollutants

47 J. Schmidt, “Integrating water management in the Anthropocene,” *Society and Natural Resources*, submitted manuscript.

48 J. Rockström, et al., “A Safe Operating Space for Humanity,” *Nature* 461 (2009): 472-75.

49 See for instance, Gannon, V. et al., “Bacterial pathogens in rural water supplies in southern Alberta, Canada,” *Journal of Toxicology and Environmental Health* 67 (2004) 1642-1653.

Contemporary efforts to reform water allocation in Alberta

In 2006, Alberta hosted the Rosenberg International Forum on Water Policy. This forum is one of the world's premier policy groups and experts participated in making recommendations regarding water allocation in Alberta. In particular, they commented that "accelerated energy production and population growth" in Alberta required that "all efforts...be made to advance the research and regulatory activities needed to protect water resources that could be threatened."⁵⁰ Shortly after, in 2008, the Alberta government initiated a review of its current allocation system in search of ways to re-regulate water.

To date, three formal reports have been offered from, respectively, an Alberta Water Council working group, the Alberta Water Resources Institute, and a special ministerial advisory board.⁵¹ Each of the reports makes important recommendations regarding environmental protection and strengthening the connection between water allocation (i.e. the granting of licenses) and water management (i.e. deciding how to balance competing water uses and needs). In certain respects, however, each of the reports perpetuates the standard narrative of Alberta's water story so that the current way out of allocation dilemmas is to re-regulate water licenses such that they are more easily transferred under market mechanisms. As was noted above, however, this is to fail to confront some of the serious empirical shortcomings of Alberta's FIT-FIR system, its effects on the environment, or the fact that the entire system itself has yet to be adequately constrained by the water rights of First Nations. So while there is policy wisdom in each report, there are good reasons to consider how the narrowing of Alberta's water allocation reforms according to a story that is both contested and empirically fallacious makes water markets appear rational at the expense of other options.

The special ministerial advisory board was struck for three tasks: to understand water management and allocation in Alberta, to understand pressures for the seven basins defined in the *Water Act*, and to make recommendations to meet these pressures. Its first recommendation is to protect water in accordance with community values and sound science. This recommendation is furthered in such a manner that the report finds Alberta's FIT-FIR system to provide "a reasonable basis" for allocation, provided that the province facilitate the market transfer of licenses and adequate protection of the environment. Critically, the report highlights ways in which existing water rights, and the mechanisms for transferring them, should be streamlined in order to be faster and appropriate to the

50 Rosenberg Policy Forum, Report of the Rosenberg international forum on water policy to the Ministry of Environment, Province of Alberta (2007) 26pp.

51 All three reports are available at: <http://ourwaterisnotforsale.com/content/resources#GoutReports>.

level of risk involved. In this respect, the report recommends a tiered-system that would replace the existing market in southern Alberta and relax the approval mechanisms for transfers that are ‘uncontroversial.’ Like other markets, the purpose of an Alberta-wide transfer system would be to move water to its highest economic value, or, if the market was so structured, to allow governments or private interests to compete in the market for the purposes of buying water for environmental purposes.

In light of the report of the special ministerial advisory committee, it is incumbent that clearly laid parameters be articulated for tests of what transfers are or are not ‘controversial’ and this, in turn, depends on a structure for determining risks that go beyond the proposed market itself. Further, the recommendation to protect water in accordance with community values and sound science depends on two critical assumptions: (1) that community values and sound science are not contradictory with each other, and (2) that community values and sound scientific levels of environmental protection are not contradictory with the kinds of allocation transfers enabled under the market format and management techniques the report forwards.

The Alberta Water Council also made recommendations regarding water allocation whilst following a mandate to, “recommend improvements to better utilize and enhance Alberta’s water allocation transfer system.” This mandate constrained the structure and content of options the water allocation working group could introduce and in so doing limited the scope of possibilities in which to find innovative solutions to Alberta’s water challenges. As a result, the Council’s report recommends setting up protections on water and a three-tiered system for allowing the transfer of water via markets to take place. The Council’s report notes several ‘non-consensus’ recommendations regarding what kinds of legal entities should be able to buy water, how much, and when such transfers should be the subject to the filings of Statements of Concern. There was also no consensus amongst the stakeholders in the group on what to do with licenses that were not fully using their allocated water.

A third report was conducted by the Alberta Water Research Institute. It compared Alberta’s case, and possible future scenarios, to water markets in western North America and Australia. It reached similar conclusions regarding the need to safeguard a certain portion of water for the environment while encouraging market transfers. Like the aforementioned reports, it also emphasized the need for increased data and monitoring so that transfers could be made with a degree of transparency regarding their likely effects on third parties (both in terms of positive and negative externalities).

Conclusion: Contemporary reforms, why does Alberta's water story matter?

The way that Alberta's water policy history is understood is of critical importance because how we understand it affects the interpretation of contemporary problems and what changes can be considered as solutions of them. For instance, the trend of previous reports to recommend water market solutions does not only reflect the mandates of specific working groups, it also reflects the predominant way of viewing current allocation challenges vis-à-vis the kinds of agricultural and energy economies that previous policies have supported. In this sense, water allocation decisions are contested terrain precisely because, as the epigraph to this report suggests, they reflect on broader values regarding social justice, equity and our shared and interdependent reliance on water.

When we consider Alberta's water policy history in a broader narrative, it is evident that the current recommendations focusing on water allocation markets are emphasizing certain elements at the expense of others. For instance, the role of keeping water in the community is central to the historical development of the doctrines of prior appropriation and the idea that water licenses should be appurtenant to land. In this regard, exchanging these community foundations for assessments of 'risk' in a tiered system for assessing the desirability of market transfers is a significant departure from the roots of Alberta's water policy history. Further, the ministerial recommendation to align water allocation with 'community' values and science begs the question of which community is being referred to. Is it that of license holders? Big cities? Small towns? First Nations? Ecological systems? All of the above? Finally, it is also important to note that recommendations to keep FIT-FIR in a water transfer system, but to divorce it from its communal roots that were decidedly opposed to market norms, is to make a commitment to a political idea regarding how Albertan's should cooperate; indeed, given the primacy of water, it is to solidify the idea that the economy should be the main steering mechanism for Alberta's future.

Water markets

“The point of democratic or political deliberation is not to maximize satisfaction...but to match rules to recognized situations, which is to say, to figure out how to classify a problem and then on what principle society should respond to problems of that kind.”⁵²

Alberta’s water has traditionally been valued instrumentally and in reference to Canadian sovereignty, western settlement and, more recently, to market mechanisms that seek to fix a century of both public and private decisions through individual transactions. The previous reports submitted regarding water allocation in Alberta, and the recommendations to create an Alberta Water Authority, continue this instrumental attitude to water by classifying Alberta’s allocation problems in primarily economic terms. These recommendations are not unique to Alberta. They rather reflect broad trends towards devolving water management to include multiple stakeholders. Or to go from “government to governance.” Very often, water markets are touted as one tool in the governance toolbox because, it is argued, they can be structured to achieve the aims of public policy held by many stakeholders. Some promoters of markets go further, arguing that governments have been historically inefficient, and in some cases blatantly political, in assigning water rights through various laws and bureaucratic arrangements.⁵³ Thus, part of the impetus for water markets is tied to broader claims that decision making should devolve from the state to lower level actors.

As we saw above, there are several initial conditions regarding Alberta’s existing water licensing regime that make it a problematic basis for implementing a water allocation market. These included treating surface water as distinct from groundwater, treating water *in situ* as unused, granting water in fixed quantities and not clearly aligning rights with issues of water quality. Given how Alberta’s water allocation emerges from communal ideas that are designed to prevent (not encourage) private transactions, water markets are in some respects opposed to the very ideas that lay behind Alberta’s existing rights regime. But, as the quote above suggests, we should ask: does classifying water allocation problems as economic problems offers the right kinds of principles for the democratic regulation of shared and vital water resources? If so, can this work in Alberta?

52 M. Sagoff, *Price, Principle, and the Environment* (New York: Cambridge University Press, 2004). At 14 and 41.

53 T. Anderson, and D. Leal, *Free Market Environmentalism*, Rev. ed. (New York: Palgrave, 2001).

What does it mean to ‘optimize’ or ‘maximize’ in economics?

To achieve optimal outcomes in economic terms is to maximize outcomes within a certain set of constraints. This requires determining water’s economic value, which is “defined in terms of a trade-off. When an economist states that, for some individual, X has a value of 50 in terms of Y, this means no more, and no less, than that the individual would be willing to exchange X for 50 units of Y.”⁵⁴ So, in economic terms, water’s value is given by whatever we are willing to trade-off to get it. As such, a properly functioning market allows for trade-offs whereby an optimal situation emerges from exchanges between willing parties, often mediated in dollar amounts (although economic value is not the same thing as price). To achieve management objectives that allocate water to its highest economic value, then, is to have regulatory and institutional constraints that, in the case of water markets, allow trade-offs to be made for the securing of the highest value of economic, environmental and social uses of water. Further, to define “economic equity” is to speak in terms of “...the fairness of the distribution of economic assets such as income, wealth, and capital.”⁵⁵ As Henry Vaux Jr., an emeritus professor of resource economics at the University of California, Berkeley, has argued, it is increasingly important to seek policies that jointly pursue economic equity with the aims of water and resource policies.⁵⁶

Some of the strongest objections to economic optimization methods for water allocation are due to the fact that third parties may bear undue burdens, or have their rights to water maligned, during water allocation transfers.⁵⁷ For economists, these challenges can be met by careful legal protections that account for: the areas in which water originates (since transferring water may affect those dependent upon these sources), instream flow needs, and the transaction costs of meeting the regulatory demands of the market without deterring transfers.⁵⁸ A central goal of adequately ‘trading-off’ values that are both between buyers and sellers and among private parties and third-parties, is to find ways of assessing the economic value of water across many competing types of uses (i.e. environmental, agricultural) such that its marginal value is equal—which is to say that buying one more unit of water costs the same regardless of use. This is what would allow for third-parties effects to be adequately accounted for under market transfer techniques because it provides a way to compare the [economic] values of all water uses. But there are good reasons to be skeptical about classifying water problems in these terms.

54 W.M. Hanemann, “The Economic Conception of Water,” in *Water Crisis: Myth Or Reality?* ed. P.P. Rogers, et al. (London: Taylor and Francis, 2006). At 64.

55 H. Vaux, “Equity in policy: failure and opportunity,” *Natural Resources Journal* 50 (2010) 517-538. At 521.

56 Ibid.

57 Joseph L. Sax, “Understanding Transfers: Community Rights and the Privatization of Water,” *West-Northwest Journal of Environmental Law and Policy* 1 (1994): 13-16.

58 Natural Research Council, *Water Transfers in the West: Efficiency, Equity, and the Environment* (Washington DC: National Academy Press, 1992).

Nobel Laureate Amartya Sen has argued that, “[t]he very idea that I treat the prevention of an environmental damage just like buying a private good is itself quite absurd... [It] would be amazing if the payment I am ready to make to save nature is totally independent of what others are ready to pay for it, since it is specifically a social concern. The ‘lone ranger’ model of environmental evaluation ... confounds the nature of the problem at hand.”⁵⁹ As Douglas Kysar, professor of law at Yale University, has recently shown, efforts to achieve ‘optimal’ resource policies through economic means fall short because they require policy community’s to ‘regulate from nowhere’—meaning that they must act as though there is an objective point of view for calculating the costs and benefits of different policy options.⁶⁰ For instance, defining value in terms of ‘trade-offs’ cloaks in technical language the fact that regulating such ‘trade-offs’ is in fact regulating the ethical and political choices of individuals and communities. As Mark Sagoff, a senior scholar at the University of Maryland’s Institute for Philosophy and Public Policy, points out, “[e]conomists announce ex cathedra that the goal of social policy is welfare maximization” and this has the effect of saying that individuals “... can make any social judgment they wish, as long as it concerns the extent to which policy outcomes harm or benefit them.”⁶¹ In this sense, economic rationality echoes the kind of choice Henry Ford is rumored to have supported when he said that people can have automobiles in “any color, as long as it’s black.”⁶²

Why do these sorts of debates matter? It is because the very classification of water allocation problems as economic problems constrains the options available to the Alberta policy community. In the Canadian context, many of the potentials and limits of such classifications have been reported on previously in publicly available publications, such as in the Conference Board of Canada’s 2008 report, *Going with the flow? Evolving water allocations and the potential and limits of water markets in Canada*. For the purposes of this report, a central goal is to identify options for Alberta’s water policy community that do not reduce water’s value to just one kind of framework, but rather remains open to the multiple ways that First Nations, historians, economists and health practitioners classify water problems. This is a prudent approach given that, just as today’s conditions could not have been predicted when Alberta’s original water regulations were crafted, neither should preparation for future uncertainties or the likelihood of rapid or otherwise significant changes in financial, social or environmental sectors prioritize certain frameworks over others. It is inevitable that this report will not meet such an ambitious goal, but it hopes to contribute to it.

59 A. Sen, “The discipline of cost-benefit analysis,” *Journal of Legal Studies* 29 (2000) 931-952.

60 D. Kysar, *Regulating From Nowhere: Environmental Law and the Search for Objectivity* (New Haven: Yale University Press, 2010).

61 M. Sagoff, *Price, Principle, and the Environment* (New York: Cambridge University Press, 2004). At 14.

62 Sagoff, 2004. At 41.

The above argument may not be convincing to those who believe that, despite their failings, markets still provide the best alternative because they enable greater efficiency for the achievement of preferences. The next section offers an assessment of how and why water markets have succeeded, or not, and the role of active policy communities in sustaining them.

Water markets and efficiency

Most of us make efficiency calculations frequently, but we do not do so blindly. We have an end in view. For instance, we want to use fewer litres per 100 km (or get more miles per gallon) in our vehicles. Likewise, farmers seek to increase bushels per acre, and factories seek to produce the most output with the fewest inputs. In such decisions, we make judgments about what we value and these decisions guide what we compare.

At first glance, increasing water efficiency seems like a self-evident, even objective good.⁶³ On closer inspection, the very notion of efficiency requires judgments about social values. First, any calculation of efficiency requires us to make a ratio of two different things, but does not provide normative guidance for choosing what to put in the numerator and what to put in the denominator. We do not, for instance, calculate the total hours spent watching a movie against the price of admission to a theatre. We could, but that would not tell us anything about whether we thought the film was good. Which is just to say that some other value or values orients what we choose to compare. Second, just identifying ratios between two things doesn't tell us how we should achieve efficiency. That is, should we try to get 'more crop per drop' or should we try to use less water to get the same yield? In this respect, the idea that efficiency should be sought to 'maximize' outcomes requires us to first define what a maximal outcome is and for this we must consider other values not included in the calculus of efficiency itself.

There is a third reason not to give blanket support to the idea of efficiency. In this case, we might consider how, if we pay more for water, we are more likely not to waste it. There are beneficial aspects to this kind of conservation if it means that we ultimately use less water. But if we pay more for water, we are also more likely to want to hold on to it in order to get our money's worth. So there can be both costs and benefits to being more efficient. For instance, an irrigator who withdraws 100 units of water and is 50% efficient generates a return flow of 50% of the water he or she withdraws. This water may evaporate, seep into the ground, or become run-off. But imagine that the same irrigator achieves 80% efficiency. That leaves only a 20% return flow. Seen in this way, there are good reasons to be inefficient with water, since that can allow more water to be returned to

63 These arguments parallel those in: T. Princen, *The Logic of Sufficiency* (Cambridge, Mass: The MIT Press, 2005).

subsequent users. For instance, cities like Calgary and Edmonton are very *inefficient* users of water in the sense that, if we measure the flow of the Bow and North Saskatchewan Rivers upstream and downstream from each city, the quantity of water in these rivers does not reflect a large loss of volume. Once put in these terms, it is clear that when we make decisions about what to compare, that we are making judgments about which kinds of efficiency are good. And because water is a shared resource, these judgments should work in tandem with the kinds of uses that increase well being across society.

Similar issues are found in claims that increasing efficiency through water markets is good. Here, the argument is that an efficient market allocates water to its highest economic value. This means that we must put two things into ratio: water and dollars. But this is a political judgment without an argument to back it. For some economists, the goal of a market is to include all water uses—including ‘environmental uses’—in calculations until their marginal costs are the same. This means that we do not differentiate between different *kinds* of water uses in terms of economic value. Yet while this may support a certain ideal of individualism, it is not a sound basis for public policy for the reasons that the next section suggests.

Water and ‘preferences’

One of the most powerful responses to the above arguments is that markets do provide the kinds of information regarding broader values by revealing the preferences of buyers and sellers through economic transactions. That is, we do not need to make judgments about all kinds of efficiency because individuals will do so on their own, and these will be reflected in how they make transactions over water. But this response fails. First, markets do not reveal the preferences of individuals in a way that matters to sound public policy. Second, those who hold the kinds of rights needed to participate in markets do so because a broader community sees those claims as legitimate. So any market structure must respect the broader community’s values and concerns in determining how rights are transferred—even if many members of the community never participate in market transactions. Each of these issues is treated in turn using examples from Spain, Chile, and Australia.

(1) Do water market activities reveal individual ‘preferences’? The short answer is no. The long answer is that observing water markets tells us what buyers and sellers of water licenses have done. But it is only by making several assumptions that we may say that these buyers and sellers have revealed their ‘preferences.’ One faulty assumption is that ‘preferences’ may be inferred from the choices people make. In the literature on economics, preferences are widely considered to be unobservable, while choices are considered good candidates for analysis. The problem with this assumption

is that choices are also unobservable—they must be inferred from the set of opportunities that the observer (i.e. the economist) believes the individual is operating within.⁶⁴ Consider an example from Spain.

Until its collapse in 1983, the water market in Alicante, Spain was the world's oldest and has been widely promoted as an example for other jurisdictions (even though it ceased to function entirely in 1989). When it did function, most of the transactions involved farmers buying 'old' water from the feudal lords that held rights to most of the water. This was required because the 'new' water created by a communal dam could not support local livelihoods. If the choice to buy water reflected an individual's 'preference' we might ask what preference was it? Would it be to feed a family? Maintain good social relationships? Gain political power? Increase profits? Improve sanitation? It is impossible to know based only on the choice to buy water at a certain price. All the facts reveal is that one person bought water and another person sold it.

Anthropologist Paul Trawick has studied the Alicante market in detail.⁶⁵ He has shown that as water rights were transferred back and forth between waterlords and individuals, its actual delivery rested on the communal institutions that defined and secured water rights. So theoretical claims that transactions in this market revealed the 'preferences' of buyers and sellers are misleading because individuals cannot be viewed in isolation. Rather, each of their transactions was dependent on broader social values and norms that regulated water. In fact, as Trawick goes on to show, if individual's operated on their own profit motive, such operations were always secondary to the using "the resource wisely, obeying the rules [for sharing water], and respecting tradition." As such, the total set of available choices to individuals was not defined by their 'preferences' but was constrained by the broader community. In this sense, Trawick argues that the success of transferring rights was not dependent on them being worth money, but rather on cooperative institutions. Furthermore, as Trawick points out, the market ultimately collapsed because water transfers revealed a fundamental inequity in the initial distribution of water rights that meant water sales went only in one direction: from the water rich to the water poor.

(2) Are communities the aggregate of individual preferences? In the search for optimal resource policies, understandings of 'community' are frequently constrained such that the community is an aggregate of individuals who have particular interests, and who express these interests as market preferences when such markets are available. Clearly, however, 'community' can be expressed in many other ways that affect what sorts of political and moral obligations public policies serve.⁶⁶ As the above example from Spain shows, the shared nature of water means that market choices only reveal 'preferences' (in the economic sense) if we ignore the social constraints that

64 Sagoff, 2004.

65 Paul Trawick, "Encounters With the Moral Economy of Water: General Principles for Successfully Managing the Commons," in *Water Ethics: Foundational Readings for Students and Professionals*, ed. P.G. Brown, and J.J. Schmidt (Washington DC: Island Press, 2010).

66 A. Mason, *Community, Solidarity and Belonging: Levels of Community and Their Normative Significance* (Cambridge: Cambridge University Press, 2000).

secure rights to water and which limit the total set of choices individuals may pursue. But we should also be concerned with the way that the ‘community’ is understood because this has direct bearings on how we conceive of who brokers the social values that are used to design governance institutions and regulations. Consider the example in Chile.

In the early 1980s, Chile privatized water rights under its 1981 *Water Code*. Establishing private rights required severing some of the existing claims to water, such as the customary uses that many households and farmers held, and altering others, such as those that defined consumptive (i.e. agricultural) versus non-consumptive uses (i.e. hydropower). In its place, the new community for governing Chile’s water was the aggregate of individual rights holders. This, as geographer Jessica Budds has shown, required conceiving of private rights to water as neutral, technical tools for achieving optimal outcomes.⁶⁷ In reality, such rights are never neutral. Rather, they reflect existing social relationships, power dynamics, and the happenstance of historical contingency. Budds concludes that, “...the social outcomes of the Water Code should not be understood as the effects of a policy *per se*, but as the result of a wider set of social relations (the law, the market and socioeconomic status) that favour stronger social actors and disadvantage weaker ones.”

Empirical research on Chile’s water markets has revealed that the results of market activity have been mixed. Early reports were exceedingly positive only to be tempered later by the reality that water markets had not achieved the kinds of gains their proponents suggested.⁶⁸ Changes have secured private rights to water and enabled market transfers but success in the agricultural sector has been premised on strong government leadership that ensured the principles that had allowed previous systems of water-sharing to be successful were integrated into water markets.⁶⁹ The shortcomings of the Chilean experience have centered on the fact that even though legal reforms were achieved, the operational aspects of the market did not achieve policy goals, such as increasing efficiency. The government therefore remains active in subsidizing infrastructure maintenance and expansion in order to keep the market active. Furthermore, shortcomings have revealed that the *Water Code* was not expressly designed for, nor adequate to deal with, coordinating the multiple types of water demands that exist within watersheds, such as those between environmental health, social equity and economic sustainability.⁷⁰ In part, this may be due to the fact that not all water problems are accurately classified as *economic* problems, and markets do not include the social principles needed to address problems of different kinds.

67 J. Budds, “Water Rights, Mining and Indigenous Groups in Chile’s Atacama,” in *Out of the Mainstream: Water Rights, Politics and Identity*, ed. R. Boelens, et al. (London: Earthscan, 2010).

68 C. Bauer, “Results of Chilean Water Markets: Empirical Research Since 1990,” *Water Resources Research* 40, no. 9 (2004).

69 Trawick, 2010.

70 Bauer, 2004.

A third example of water markets is from Australia. As the driest inhabited continent on earth, Australia is often touted as the vanguard of water policy. Part of this is necessity. The country has experienced devastating droughts and water shortages have highlighted the shortcomings of relying on infrastructure to create water supply rather than on managing demand.⁷¹ To help solve this dilemma, Australia has created a market for water transfer that attempts to deal with similar legal problems faced in Alberta—the over-allocation of water and water licenses that are appurtenant to land. To deal with these issues, and in particular to recover water for environmental uses, the Australian government initially allocated \$500 million dollars to buy back water rights from existing license holders.⁷² More recently, that amount has expanded to \$3.1 billion as part of a \$12.9 billion program entitled “Water for the Future.”⁷³

There is no denying that, when coupled with significant public sector activity by the government, Australia’s water markets have achieved a measure of success. In fact, over 1.7 million mega-litres of water were traded in 2008-2009 within the Murray-Darling Basin.⁷⁴ Yet as recent comparative analyses between Australia water trading and that in the Colombia River (U.S.) suggests, it is increasingly recognized that markets are not sufficient for achieving the aims of public policy on their own. Rather, they are effective as ‘niche’ solutions and only if institutions are designed specifically for them.⁷⁵ Why do ‘niches’ need to be so carefully constructed? In part it is because, as in places like Australia, the creation of a market encouraged ‘economic efficiency’ through the selling of water rights that had not historically been fully used, or not used at all.⁷⁶ This meant that in some areas the total actual demand for water increased under the market system. Second, attempts to redistribute the wealth generated through the sale of water, that is, to tax water in the same way other goods are taxed, can be met with political opposition by the irrigation communities who held most of the water rights when market reforms were introduced.

It is also clear from the Australian case that the ‘market’ does not reflect the ‘preferences’ or values of Australians. For instance, social psychologists in Australia have been world leaders in identifying social water values across society and in terms of attitudes towards planning, equity, efficiency and allocation. The outcomes of studies on water values in Australia revealed a remarkable uniformity of principles for achieving fairness. The principles were (in order): (1) all sections of a community have a right to have a say in allocation; (2) the natural environment has rights to water; (3) if decision making is fair, people should accept the final outcome; (4) there are no general rules about how to share water, it depends on the situation; (5) you can’t really solve water sharing problems by analyzing the costs and benefits in dollars; (6) everybody should be treated equally in water allocation;

-
- 71 John Pigram, *Australia’s Water Resources: From Use to Management* (Collingwood, VIC: CSIRO Publishing, 2006).
- 72 L. Godden, “Water Law Reform in Australia and South Africa: Sustainability, Efficiency and Social Justice,” *Journal of Environmental Law* 17 (2005): 181-205.
- 73 Australia, “Water for the Future,” Speech to the 4th Annual Australian Water Summit, 29 April 2008.
- 74 J.G. Tisdell, “Water Markets in Australia: An Experimental Analysis of Alternative Market Mechanisms,” *Agricultural and Resource Economics* 55 (2011): 500-17.
- 75 D. Garrick, et al., “Water Markets and Freshwater Ecosystem Services: Policy Reform and Implementation N the Columbia and Murray-Darling Basins,” *Ecological Economics* 69 (2009): 366-79.
- 76 J. McKay, “Water Institutional Reforms in Australia,” *Water Policy* 7 (2005): 35-52.

(7) water allocation should be made to maximize economic income of a community; (8) all water should be put on the market and sold to those who will pay most, regardless of what it is used for.⁷⁷ As this evidence suggests, community and environmental values are ranked much more highly than economic values, revealing that finding ways to discuss non-economic values is of critical policy importance to sound water policy.⁷⁸

Conclusion: water markets for Alberta

Are Alberta's water allocation problems correctly classified as economic problems? If they are, there is no clear argument that either 'efficiency' or the satisfaction of 'preferences' are sufficient principles for society to solve them. Further, as the evidence from other jurisdictions suggests, water markets are only successful to the degree that they reflect broader social values and the degree to which other aspects of social and political life (such as laws) are fundamentally altered to accommodate economic transactions. Even then, however, markets do not eliminate the need for effective governance and wise management of water resources.

If we consider Alberta's existing allocation framework, particularly its four empirical flaws and the exclusion of both First Nations considerations and the historical evidence of environmental variability, it becomes less appealing to classify Alberta's water allocation problems as economic. Indeed, it is not appropriate to talk in terms of 'trade-offs' when what is at issue are problems of justice, sustaining the conditions of aquatic life, or rectifying historical deficiencies. These problems are better classified in terms of law, ethics, science and custom. As such, the suite of policy reforms that would be required to define Alberta's water allocation problems in economic terms does not have the kind of theoretical or empirical support that would eliminate the need for Alberta to support robust water management institutions. This raises the question as to whether we cannot tell Alberta's water policy history in a broader, more comprehensive light that would allow its water allocation problems to be classified such that social principles for resolving its current problems may be forthcoming and, more than that—sufficient for taking a long-term view of water stewardship.

77 G. Syme, et al., "Defining the Components of Fairness in the Allocation of Water to Environmental and Human Uses," *Journal of Environmental Management* 57 (1999): 51-70.

78 G. Syme, et al., "Integrating Social Well Being Into Assessments of Water Policy: Meeting the Challenge for Decision Makers," *Water Policy* 10 (2008): 323-43.

Alternative water futures for Alberta

There are at least two alternate ways of classifying Alberta's water problems that provide a broader set of social principles upon which solutions to allocation dilemmas may be found. There are certainly others, but understanding Alberta's allocation problems either in terms of common-pool resources or in reference to notions of the public trust both enable Alberta's water story to be told in a manner that opens up, rather than closes off, future policy options. Neither represents a panacea for water governance. Indeed, there are no such panaceas. Rather, both common-pool resources and public trusts classify water allocation problems in ways that can help to confront both historical injustices, and empirical deficiencies, in Alberta's water allocation system.

1. Water and common-pool resources

It is undeniable that water is a shared resource. It travels downhill and downstream from one user to another. In market formats, water is shared according to carefully partitioned units that are freely tradable according to well-defined property rights. But actual water systems are not so tidy. Rather, uses of water in one place directly affect water uses in other places and, further, reveal that all of the social and economic activities relying on shared water sources are highly interdependent. Common-pool resources are resources that are part of systems that are too large to exclude others from them and which require collective institutions to ensure that individual uses of the resource are considered cumulatively, and not independently.⁷⁹

The idea that water is a common-pool resource holds in tension the fact that our interdependent reliance on water means that if individuals pursue only what is best for them, it may come at a greater cost to the community. Very often, common-pool systems emerge in response to what is called the 'tragedy of the commons.' In that tragedy, no rules stop individuals from acting in self-interested ways and, as everybody lays claims to as many resources as possible, the collective resource base is diminished. One example of this kind of tragedy is the over-fishing of cod off the coast of Newfoundland, which was perpetuated in part because once fish entered international waters, there were no enforced rules for limiting the harvest.

79 E. Ostrom. *Governing the commons: the evolution of institutions for collective action*. (Cambridge: Cambridge University Press, 1990).

Nobel Laureate Elinor Ostrom has pioneered and vastly expanded our knowledge of how communities have built successful systems for managing common-pool resources. She and her colleagues have shown that communities are often highly successful at developing shared rules for ensuring that individual actions do not undermine the resource base that is shared collectively. Because all contexts are unique, the first lesson that Ostrom and her colleagues offer is that, “[t]here is no one best system of governing water resources.”⁸⁰ In this sense, once we start thinking of water allocation problems in terms of our common and collective duty to limit actions that will degrade shared water resources, then simply applying market mechanisms to all allocation problems is not adequate. It is like saying that getting warm is always accomplished by covering up with a blanket when, in fact, sometimes it is best just to get out of the cold.

Rather than looking for ‘silver bullet’ solutions, common-pool resource systems pay special attention to how we design water governance institutions to deal with specific and often localized problems. In so doing, it makes a careful distinction between how we define a ‘unit’ of the resource we are managing and the rights we develop to manage that resource in total.⁸¹ In this sense, and as has sometimes been advocated by progressive water economists as well, it is important to distinguish rights of use from those of quantity.⁸² From a common-pool perspective, we might allocate two kinds of water rights. The first would reflect the proportion of water that we would like to see for agricultural, municipal or environmental uses. The second would be the amount of water that is allocated for any particular use over time. A good analogy is to think of the Canadian Food Guide, which recommends various servings of different foods based on our bodily needs. But the food guide does not tell us which meals to have these foods at. Similarly, we can imagine how, given the vastly different challenges faced by water managers in Picture Butte, Wainwright, Rocky Mountain House and Fort McMurray it would not be appropriate to create a one-size-fits-all solution. This is because social and economic demands and values are different and because the actual availability and timing of water fluctuates dramatically across Alberta.

How do common-pool systems work? They first recognize the pluralistic basis upon which claims to water rest. In this respect, any particular claim to water is only legitimate insofar as the rights that protect it are recognized by a group of persons larger than those actually claiming rights.⁸³ For instance, individual license holders in Alberta have their claims respected by others in the province and the Alberta Government itself, which in turn is respected by other provinces under broader arrangements of Canadian federalism. Further, where such recognition does not occur, claims are not respected. For instance, First Nations claims to water are in many ways not

80 E. Ostrom, et al., “Water Rights in the Commons,” *Water Resources IMPACT* (2003).

81 E. Ostrom, “A Diagnostic Approach for Going Beyond Panaceas,” *Proceedings of the National Academy of Sciences* 104, no. 39 (2007): 15181-87.

82 M. Young and J. McColl, “Defining tradable water entitlements and allocations: a robust systems,” *Canadian Water Resources Journal* 30 (2005) 65-72.

83 R. Pradhan, and R. Meinzen-Dick, “Which Rights Are Right? Water Rights, Culture, and Underlying Values,” *Water Nepal* 9/19, no. 1/2 (2003): 37-61.

recognized by the broader community of water claimants in Alberta, other provinces, or Canada.⁸⁴ Thus, the first task of thinking about water from the perspective of common-pool resource management is to expand the community to include *all* those who have a stake in common-pool water resources. According to the definition of common-pool resources offered above, this implicates a very large community since it is often impossible, and often morally wrong, to exclude people from the externalities of the water uses of others. What is important in thinking about water rights from the perspective of common-pool resources is that not all rights need to be of the same kind for common-pool resource systems to be effective. Thus, unlike economic systems that require uniform property rights, common-pool resource systems work to accommodate rights that may be private, public or held in different forms of communal tenure, such as in co-ops.

Is a common-pool resource system appropriate for Alberta?

Several key principles for designing successful common-pool governance systems are already at play in Alberta, such as using multiple scales of decision making to govern large systems and allowing most resource users to participate in devising rules. For instance, Alberta's *Water for Life* system has created a multi-level approach to governance that allows for solutions to be sought at the most appropriate scale. Thus, determining how to manage issues surrounding Pigeon Lake or the Red Deer River needn't be the same as those for the Peace River or Spray Lakes in Kananaskis. Likewise, Alberta's efforts to develop a shared framework for governance offers the opportunity for multiple stakeholders to affect the planning and management of their watershed. Such arrangements, however, require further clarification of responsibilities, and the power to enact them.

The principles used to design common-pool governance systems are not prescriptive. Rather, they emerge from collective-choice decisions about how to achieve the requirements of social equity and environmental protection—both of which are central to economic prosperity in Alberta. In this respect, governing water as a common-pool resource would require the Alberta government to invest more clarity, money, and regulatory power in its multi-level governance structure. The ministerial advisory group's report also recommends this. However, their recommendation sees First Nations as one stakeholder among others in Alberta's governance framework. As Merrell-Ann Phare has argued, what is needed is a narrative that allows for, "a legal and administrative regime, based on Indigenous Peoples' governance and water rights, to manage their water resources and solve the water-related problems in their territories."⁸⁵ In a common-pool system, the different kinds of rights held by First Nations and the classification of the problems

84 Phare, 2009.

85 Phare, 2009. At 78.

they seek to address could maintain a distinct status. This could be achieved, for instance, by supporting the creation of a First Nation's water council in Alberta and vesting it with the power to: (1) regulate the waters under the purview of First Nations treaties, and (2) coordinate management with other water governance institutions in Alberta.

A second reason that a common-pool resource system may be appropriate for classifying water governance challenges in Alberta is because this could accommodate the management of both public and private property. In Alberta, the federal and provincial governments own vast areas of public land. This ownership includes much of the northern half of the province and, critically, the mountain 'water towers' that are key sources of water for central and southern Alberta. Further, Alberta already has legislative provisions to take a preventative stance towards water management on public land. For instance, section 4(1) of the *Public Lands Act*, prohibits "(d) the doing of any act on public land that may injuriously affect watershed capacity, (e) the disturbance of any public land in any manner that results, or is likely to result in injury to the bed or shore of any river, stream, watercourse, lake or other body of water or land in the vicinity of that public land[.]" Expressly coordinating water governance in terms of common-pool resources would require water governance to be connected in explicit terms with the recent developments regarding land management in Alberta—the *Alberta Land Stewardship Act*—which has created regional management areas that are not always congruent with the boundaries of watersheds.

Classifying existing (and probable) conflicts between land-use planning and water governance solely in economic terms is unlikely to prevent certain kinds of activities that violate treaty rights or which may have irreversible environmental effects. For instance, after years of arguments over data and experimental design, it is now widely acknowledged that Alberta's oil sands have a negative effect on local waterways. These effects are from extraction and the pollutants exhausted in manufacturing processes, which accumulate during winter in local snow packs and melt in spring freshets that drain via the Athabasca River and its tributaries.⁸⁶ Likewise, it is also now scientifically documented that methods of natural gas extraction through hydraulic fracturing can affect groundwater supplies.⁸⁷

As it currently stands, the informal nature of water governance recommendations from the Alberta Water Council and regional Water Planning and Advisory Committees perpetuate the long-standing subjection of water use to land tenure in Alberta. If Alberta is to achieve an effective solution to its water allocation problems it must, *at a minimum*, see land and water as a connected system and manage that system according to empirically sound principles. This is especially the case if Alberta wishes to

86 E. Kelly, et al., "Oil Sands Development Contributes Polycyclic Aromatic Compounds to the Athabasca River and Its Tributaries," *Proceedings of the National Academy of Sciences* 106 (2009): 22346–51. E. Kelly, et al., "Oil Sands Development Contributes Elements Toxic At Low Concentrations to the Athabasca River and Its Tributaries," *Proceedings of the National Academy of Sciences* 107, no. 37 (2010): 16178–83.

87 S. Osborn, et al., "Methane Contamination of Drinking Water Accompanying Gas-Well Drilling and Hydraulic Fracturing," *Proceedings of the National Academy of Sciences* 108 (2011): 8172–76.

avoid reproducing disconnections between land and water management in its northern regions that its historical allocation doctrine produced in the south.

Finally, common-pool resource systems allow us to classify *all* resource allocations problems with great flexibility for matching local resource contexts to place-specific demands. This can be a significant tool not only for protecting water for the environment, but also for empowering communities that may otherwise be excluded from participating in governance if the only option to do so is through water markets. On the first point, common-pool systems allow for more adaptability than uniform governance systems that grant, and then must secure, strong property rights. This is a key advantage that common-pool systems hold over water markets because the latter entrench and protect private property rights as a key pillar for the legal transfer of water. Under Alberta's current system, however, water licenses are not property rights.⁸⁸ As such, classifying water allocation problems in Alberta through the lens of common-pool resource theory (rather than economic theory) allows changes in water rights to pursue any number of paths that increase its flexibility for dealing with future uncertainties. On the second point, the broad search for 'integrated' water and land management in Alberta requires a perspective towards governance institutions that does not see the activities affecting different resources, such as water, land, minerals and energy as independent. In traditional approaches, each sector is seen independently, and economic or other policy tools are used to find metrics to 'integrate' them. But from a common-pool resource perspective, these activities are seen as interdependent and the goal is to rethink the model of governance itself. In certain respects, the creation of the Environment and Water Ministry represents a small step towards this. If it were premised on a new way of ordering governance institutions, it could potentially go much further.

88 D. Percy, "Water Rights in Alberta," *Alberta Law Review* 15 (1977): 142-65. D. Percy, "Water Rights Law and Water Shortages in Western Canada," *Canadian Water Resources Journal* 11, no. 2 (1986): 14-22.

Limits and opportunities to water allocation in Alberta under common-pool approaches

Limits: The key limits that would need to be overcome to adopt a common-pool approaches in Alberta are three. First, Alberta has not traditionally respected multiple kinds of water claims. In specific, water development in many areas has proceeded without, and sometimes against, consideration of the water rights of First Nations. Thus, moving towards a common-pool approach will require assessing existing water licenses in view of government responsibilities and the legitimate claims of others. Second, Alberta has not traditionally used empirical measures to limit water allocation. As such, *existing water* licenses that allow costs to accrue to the environment must be curtailed to prevent the (possibly irreversible) degradation of the common resource base. Third, Alberta's current ministerial structure at least partially constrains the integrated management of common-pool resources because different regulatory powers are assigned to different sectors and in this sense certain resource problems are treated independently of others that they affect.

Opportunities: Common-pool resource systems creates three significant opportunities for Alberta. **First**, they define resource units in a way that respects multiple kinds of water users. This allows them to meet multiple objectives and to rely on multiple variables for achieving them. In complex systems, such as Alberta's, relying on multivariate decision structures creates a safer, more redundant system. Such a system is more resilient to potential disturbances, such as the empirical likelihood that drought conditions will return to the province in ways more severe than previously experienced. Thus, rather than relying on one market variable (price), a common-pool resource system can track water values in several domains. **Second**, common-pool resource systems create opportunities to empower the entire community of water users. In this way, the multi-level governance structure *Water for Life* framework could be used to strengthen education regarding the benefits of conservation and in developing a new water ethic for the province. **Third**, pursuing a common-pool resource system needn't reinforce the non-empirical basis of water allocation licenses in the province, which makes a distinction between surface and groundwater that is factually incorrect. In this way, common-pool resource systems would open up opportunities to manage both surface and ground water as a connected and common system. **Fourth**, a common-pool resource system would allow a place-specific approach to governing water that can work alongside of other legislative and regulatory principles affecting water resources, such as those affecting land use.

Options

Under a common-pool system, existing licenses could be amended such that:

- Customary uses of water are recognized as entailing certain kinds of rights. For instance, certain kinds of rights may be accorded to support basic levels of groundwater protection for landowners or, in the case of public land, all citizens. Similar rights may apply for levels of hormones or chemicals in waters that serve as drinking water sources.
- The *Water for Life* strategy is reinvigorated such that its multi-level governance structure has certain regulatory powers and that the strategy is part of an integrated land and water management framework
- Water licenses gradually reduce the total amount of water allocated in order to recognize the many uses of the environment that also affect water. For instance, existing water licenses could be reduced by 1% per year for 30 years, with bonuses available at 5-year intervals for license holders that meet or exceed this threshold.
- The ability to exercise licenses is conditioned by various other kinds of countervailing rights, such as the right of a river to have adequate instream flows
- Water licenses could be reduced as a negative function of population growth (by watershed). This would have the effect of decoupling increased water use from demographic growth, and by implication increased economic activity.

2. Water and public trusts

The idea that water should be held in trust resonates strongly across many water use traditions, including the broadly held Canadian notion that water is property of the Crown.⁸⁹ In general, declaring that an environmental resource be held within the public trust rests on three criteria. The first is a legal right for the general public. The second is that this general right must be enforceable against the government. The third is that this right must be able to be interpreted in terms consistent with environmental quality.⁹⁰ To classify water allocation through the lens of the public trust is to suggest that there are social principles that work out of the four beliefs that legal expert Charles Wilkinson describes as modest: “(1) a belief that the public benefits mightily from private development, but that the public interest is in fact greater than the sum of private interests; (2) a belief that property ownership must be profoundly respected but that property rights in water, like rights in land, are not absolute but rather can be regulated and adjusted in reasonable ways for the good of the citizenry as a whole; (3) a belief that wasteful uses of public resources are wrong and are not excused by return flows...[of] silt, salts, agrichemicals, and temperature changes; (4) a belief that rivers and canyons are more than commodities, that they have a trace of the sacred.”⁹¹

These four beliefs about water’s central importance are partially reflected in the history of Alberta’s own legal tradition—particularly in William Pearce’s idea that water should be managed for the community. In fact, as Pearce thought of it, the state was itself a kind of community. In this Pearce was not alone. American water policy makers at the turn of the 20th century, some of whom influenced Pearce, had a similar idea: the state is a kind of community in which each of its members hold rights to their person and to the resources vital to life, such as water.⁹² But as also mentioned above, the standard interpretation of the ‘community’ has supported only one nation, and often at the expense of others. In this sense, considering Alberta’s water through the lens of the public trust may afford opportunity to expand water allocation considerations to a broader community of those dependent on its waters.

89 J.M Glenn, “Crown Ownership of Water in Situ in Common Law Canada: Public Trusts, Classical Trusts and Fiduciary Duties,” *Les Cahiers de Droit* 3-4 (2010): 493-520.

90 J. Sax, “The public trust doctrine in natural resources law: effective judicial intervention,” *Michigan Law Review* 68 (1970) 471-566.

91 C.F. Wilkinson, “The Headwaters of the Public Trust: Some Thought on the Source and Scope of the Traditional Doctrine,” *Environmental Law* 19 (1989): 524-472.

92 W.J. McGee, “Principles of Water-Power Development,” *Science* 34, no. 885 (1911): 813-25.

Belief 1: Private development is good, but does not exceed the public interest

Making the idea of a public trust to water operational requires thinking about the community of users dependent on water in a different—but not conflicting—register than that offered by contemporary economics. The difference can be seen by looking at what economists call the ‘diamond-water paradox,’ which roughly asks: why do diamonds, which have limited functional value, command such a high price when water, which is a vital resource, often has a low price, or no price at all? The answer to this ‘paradox’ is that diamonds have a high marginal value because they are scarce in a way that getting just one more is greatly valued. Water is not like this. Rather, water has a low *marginal value* but a high *total value*—which means that if we totaled up all of the economic activity supported by water it would vastly exceed that of diamonds. For instance, Alberta’s gross domestic product would tumble without water. Without diamonds in Alberta, not nearly so much would change.

If we think about water in terms of its total utility, then the notion of a public trust begins to make more economic sense and the idea that *all* water use should be ‘optimized’ according to marginal value becomes even less appealing. This is the case for two reasons. First, we know that private economic transactions are only one part of the social activities that make participation in the economy possible—for instance, it does not include unpaid work in the home, free recreational activities (like running), community events, religious support networks, or myriad other activities that support the health and well-being of Albertans. Yet water supports all of them. Further, water provides for many of the ecological conditions upon which all life—human and non-human—depends. Thought of in this way, the idea of having water stewarded as a public trust represents a way to think about the economy as part of, rather than the guiding rule for, what Albertans want. This is an important part of respecting individual rights and freedoms, since how we participate in our political community should not be curtailed by the kinds of property rights that place shared resources beyond democratic reach.⁹³

The recent turn towards valuing ‘ecosystem services’ represents a way to work from water’s total utility to its marginal value. These kinds of values might include considering how expensive it would be to filter water if a wetland that naturally purifies water were to be removed. Despite its promise, there are a number of reasons to reject this idea as the basis for social policy.⁹⁴ For one, determining ‘ecosystem services’ is not an objective exercise, but rather depends on the ecological model used to identify different processes. In complex systems like wetlands, forests, and watersheds, it is inevitable that some ecological models are more useful than

93 P.G. Brown, *The Commonwealth of Life: Economics for a Flourishing Earth*, 2 ed. (Montreal: Blackrose Books, 2008).

94 It may have value for specific policy questions.

others because of differences in species, scales and the types of processes ecologists are interested in studying. But the calculation of ‘ecosystem services’ requires us to ignore all of the ecological models that do not fit with economic assumptions, even though they may yield valuable insights into the way the world works.⁹⁵ So there is a significant hurdle to efforts in the valuation of ‘ecosystem services’ because selecting indicators upon which to measure them is a “practice that asks science to do things it cannot do in a stable way.”⁹⁶ That is, the search to put a price on ‘ecosystem services’ forces assumptions regarding ecosystems themselves that may not be correct given the dynamic and changing nature of ecological systems.⁹⁷ And this is especially problematic when, as we saw earlier, human perturbations to water systems are recognized as changing the outer limits within which the water cycle in particular fluctuates.⁹⁸

One response to ecological uncertainties and the growing recognition that private development is good, but does not exceed the public interest, has been the call by Canadian water experts for a new water ethic. In their recently released book, *Ethical water: learning to value what matters most*, Robert Sandford and Merrell-Ann Phare articulate both why such an ethic is needed and what types of principles present good candidates for continuing to navigate between private development and the public good.⁹⁹ Jeremy Schmidt, co-editor of the book *Water Ethics*, has argued that we can organize ethical concerns in water governance in three basic areas.¹⁰⁰ The first are claims about states of affairs, or the empirical facts of the matter. In this area, policy should be developed on clear standards for what counts as having water of ‘adequate’ quality or quantity. The second are claims about how society should order relationships towards water. This requires articulating both instrumental and non-instrumental values. The third is the recognition that in a pluralistic society, individuals will have different personal values and meanings of water. Once viewed in this way, the large uncertainties regarding changing ecological systems require orienting water management decisions away from maximizing (or optimizing) for one or two variables and toward a view “wherein we use our existing knowledge toward ends that are conducive to a good life for the entire community of life that is dependent on water.”¹⁰¹

95 Norgaard, R. “Ecosystem services: from eye-opening metaphor to complexity blinder,” *Ecological Economics* 69 (2010) 1219–1227.

96 M. Robertson, “The Nature That Capital Can See: Science, State, and Market in the Commodification of Ecosystem Services,” *Environment and Planning D: Society and Space* 24 (2006): 367–87. At 384.

97 C. Walters, “Challenges in Adaptive Management of Riparian and Coastal Ecosystems,” *Conservation Ecology* 1, no. 2 (1997): 1.

98 P.C.D. Milly, et al., “Stationarity is Dead: Whither Water Management?,” *Science* 319 (2008): 573–74.

99 R.W. Sandford, and M.S. Phare, *Ethical Water: Learning to Value What Matters Most* (Victoria, Vancouver, Calgary: Rocky Mountain Books, 2011).

100 P.G. Brown, and J.J. Schmidt, *Water Ethics: Foundational Readings for Students and Professionals* (Washington DC: Island Press, 2010).

101 Ibid.

Belief 2: Affirming property claims in ways that respect the good of the citizenry

The kinds of difficulties raised by efforts to estimate ‘ecosystem services’ reveals a key strength of the public trust model. This is the recognition that all of the water in a given place and time is already in use and that any type of property claim to it affects the social relationships already existing across socio-ecological systems. This is a revealing aspect of how property rights to natural resources typically work: they assume that the environment is an idle reservoir of goods for humanity.¹⁰² This is misleading for two reasons. First, they perpetuate the assumption that the objects of property are passive. This is a basic premise of property law: that legal relationships matter between people with respect to things, not between people and the things themselves. Second, property rights suggest that human relationships themselves are somehow independent of ecological processes. An instance of the first is evident in how the test for obtaining a water license in Alberta has traditionally been that such uses will be of ‘beneficial use’. To meet this test there has never been a requirement to prove that the new use—such as for deep well injection in oilfield applications—is more beneficial than what already exists, such as a wetland that purifies water in the source area for a municipality. Second, the assumption that water is an idle object fails to respect how it is already *affected* by human activities, such as changes in land cover from forests to agriculture. As such, it is not clear how ‘natural’ if at all, current water systems are. For instance, the Bow River has historically, and continues to be, impounded behind dams, siphoned off of for cities, and diverted for irrigation.¹⁰³ In many ways then, rivers like the Bow are human artifacts, and this complicates the straightforward ideas of economic theory that divorce water from the kinds of social relations that create and moderate certain flows of water.¹⁰⁴

Alberta’s current water allocation system does not consider water to be ‘in use’ prior to human diversions. Yet Albertan water law already has several elements that could support such a view through a water allocation based on the notion of a public trust. First, no individual property rights to water exist in the province because all water is vested in the Crown. Second, the existing allocation system has granted licenses that were not, as initially conceived, rights to property but rights of use. Third, Alberta has traditionally applied different priorities to water uses to determine an order of their social importance. Together, these three elements offer the opportunity to design new water allocation rights in ways that respect our growing knowledge of hydrological systems while respecting the plurality of values toward water held by Albertans. How? It is by recognizing that water licenses have traditionally been considered in terms of what their effect will be on the public good. The main difference would now be to redefine what the public good is. This would necessarily need to start by rectifying the empirical

102 P.G. Brown, “Are There Any Natural Resources?,” *Politics and the life sciences* 23, no. 1 (2004): 11–20.

103 C. Armstrong, et al., *The River Returns: An Environmental History of the Bow* (Montreal & Kingston: McGill-Queen’s University Press, 2009).

104 Ibid. See also on social relationships to water, J. Linton, *What is Water? The History of a Modern Abstraction* (Vancouver, BC: UBC Press, 2010).

deficiencies in Alberta's water licenses, and the work outwards from there so that water licenses accord with the beliefs that underpin the public trust (i.e. as in Belief three below, to eliminate waste).

Perhaps the most significant advance in Alberta that may be made by affirming property claims in ways that respect the good of the citizenry would be with respect to First Nations. At present, the settlement of water claims in Alberta's First Nations communities, such as that of the Piikani (or Peigan), have been pursued in terms that tacitly acknowledge water rights, but do not create legal precedent.¹⁰⁵ Critically, these agreements have been reached through deliberations amongst the respective governments of the Piikani Nation, Alberta, and Canada. As such, they can be seen as a kind of negotiation regarding what each level of government holds, as a fiduciary duty, to the community of citizens it represents. By pursuing a public trust model, such negotiations would be both more widespread and more deliberate. Further, this model would make Alberta's water allocation reforms less complicated. This is because neither the government nor the courts would be tasked with also adjudicating the private claims to water that would be necessary under a water market but which may come into conflict with the unsettled aspects of territorial claims to water, resources and land in Alberta. Avoiding that kind of litigation, and the damage it can do to the fabric of Albertan society, is a laudable policy goal.

Belief three: Stopping waste and negative return flows

From the perspective of the public trust, it is wrong to waste water or to return it to shared waterways in ways that degrade them. As legal scholar Joseph Sax argues, "there is no legal or logical difference between poisoning fish by what you put in the water and suffocating them by what you take out."¹⁰⁶ In this regard, classifying allocation problems through the lens of the public trust prohibits waste and the degradation of quality or quantity as a basic social principle. This principle also extends for dealing with the kinds of problems that can accrue from the cumulative effects of private activity because, as belief one (above) suggests, the public interest outweighs the sum of private interests. In this sense, public trust models work out of the impulse to first protect the values and resources of a community rather than to compensate for the 'externalities' of the market and which often fall to those who do not benefit from private transactions.

105 Phare, 2009.

106 Quoted in, H. Ingram, and C. Oggins, "The Public Trust Doctrine and Community Values in Water," *Natural Resources Journal* 32 (1992): 515-37.

A precautionary impulse towards protecting community values already lies latent within the histories of Alberta's water allocation doctrines. As we have seen, however, the expression of that impulse has been wed to empirical facts that are both incorrect and inadequate for the long-term stewardship of water resources. How can it be recovered? One way is to cultivate new social norms for water use; a second is to enforce existing regulations, treaty obligations and laws. A third is to establish clear standards for both the quantity and quality of water needed for the Crown to meet the obligations it has under the *Water Act*. At present, a great deal of that Act is discretionary but it is reticent on the issue about how discretion should be constrained by empirical—not only legal—matters of fact.

Although this report has worked to show the limits of water markets, there are nevertheless good reasons to price water in the interests of the public good where they will work to eliminate wasteful practices. Such prices, like those advocated for in water transfers, needn't price water itself, but can be oriented to make the costs of undesired water uses prohibitive. In Alberta, the establishment of Water Conservation Objectives (WCOs) for the South Saskatchewan River Basin, represents one (albeit not empirically adequate) place to begin to price uses of water that result in adequate levels of water either in terms of quality or quantity. Thus, for instance, the public trust model allows for a re-regulation of water licenses such that water licensees have free use of their water up to the proportion that exceeds desired environmental regulations but that is well short of an environmental threshold. After this, licenses could be charged monetarily through rising block-tariffs (i.e. a set price for exceeding certain units of water use (i.e. x acre-feet) that increases with each of those units consumed—or those used and returned to waterways in an unacceptable condition. Such tariffs could be phased in over time to allow operators to adjust water use practices. Of course, paying for water quantity does not preclude regulations that prevent actions we want to avoid entirely, such as those that would degrade water quality.

The clearest (economic) objection to the idea above is that such a system does not alter the allocation of licenses because it does not provide a mechanism for transferring changing the proportion of licensees using water for different uses, such as irrigation, mining, or municipalities. That is only partially true. It is foreseeable that: (1) the costs of pricing water in this way will lead certain water users to stop diverting water, for which compensation formulas may be designed, or (2) the total water savings of reduced water use will open up basins that are 'closed' to allocations by enabling entrepreneurial ventures that use water in ways that accord with the public trust principle of eschewing waste and protecting water quality.

Belief four: water is something more than a commodity

Many of Alberta's natural resources are unavailable for purchase or transfer. Because of this, all of the prices set for remaining resources are shaped by the social regulation of resource supply. For instance, Banff National Park is not on the open market and this affects the supply of land, timber and minerals available for sale, lease, or other forms of tender to private development. Because Banff National Park's resources are not part of the market, the prices of the remaining land, timber and minerals in Alberta does not reflect a pure market value.¹⁰⁷ Likewise, we prohibit the use of markets for buying positions on city councils, university faculty positions, or the biological materials needed for reproduction (both eggs and sperm).

Many of these prohibitions recognize that there is something unique to these positions or materials that makes market allocations of them inadequate. That is, we recognize that these are not the kinds of things that should be classified under the principles that generate prices when supply and demand meet. *Similarly, once we act to protect environmental water uses we, as a policy community, are actively making a judgment about all water values in the province.* In this sense, none of the three aforementioned policy reports have endorsed a free market for water allocation transfers in Alberta.

Recognizing the broad consensus of previous reports (and this one) on environmental protection may aid in the task of making subsequent judgments about how to allocate water that is not set aside for the environment. This has been the case in other jurisdictions where water's unique features are recognized. For instance, the European Union's Water Framework Directive describes water as part of our common heritage.¹⁰⁸ Bolivia is in the process of granting legal rights to natural systems, including the right to clean water.¹⁰⁹ Seen in this way, viewing water allocation as an exercise that is *both* economic and non-economic terms presents a way to keep the democratic lines for determining social values open indefinitely. This open disposition has also been forwarded in the Water Strategy of the Northwest Territories, which defines "watershed values" to "include spiritual water features, significant aquatic furbearers, waterfowl or fish habitat, navigational channels, river crossings, ice road routes, particularly biodiverse areas, community public water supply sources, significant wetlands that may purify or slowly collect and release waters to a specific area, and recreationally significant activities." These watershed values, in the NWT Strategy, are designed to help make "more informed decisions regarding water and land use."¹¹⁰

107 Brown, 2008.

108 European Union, "Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy." Official Journal of the European Communities: 327 (2000): 1-72.

109 "Law of the land: Bolivia grants nature unprecedented legal rights," The Solutions Journal 2 (2011) 8-9. Online at: <http://www.thesolutionsjournal.com/node/964>

110 NWT, "Northern Voices, Northern Waters: NWT Water Stewardship Strategy," 2010.

Again, Alberta has some of the roots of a broader social ethic in its existing water governance framework. In specific, the renewal of its *Water for Life* strategy has frequently emphasized the need to cultivate a new ethic in the province based on sound science, correctly ordered social relationships, and a recognition of water's meaning to individuals of various political, cultural, religious, and value orientations.¹¹¹ Despite this, however, there has been no focused engagement with the many social and religious networks that exist across the province and which also have traditions of environmental stewardship in many of their respective belief systems.

Limits and opportunities to water allocation in Alberta under the public trust

Limits: There are two principal difficulties with reforming Alberta's water allocation system on the notion of the public trust. First, there are no clear models of water allocation for public trusts in general. Rather, the development of public trust doctrines has tended to emerge from case decisions by courts and reflect unique contextual considerations. However, given that ownership of water is vested in the Crown, Alberta arguably has a duty to act as a steward of the resource that is in keeping with models of trusteeship.^{cxii} There are two responses to this limit. The first, following the work of Jane Glenn, a law scholar at McGill University, is to point out that Crown ownership does not imply absolute control over water.^{cxiii} Second, we may argue that there are effective ways to manage water, the principles of which have been increasingly refined as various approaches to water management are tested and refined. The goal, then, would need to be to use the Public Trust to manage water apart from complete Crown control, such as through a robust multi-level governance arrangement.

Second, the scope of the trust must be determined in terms of either the persons or purposes that the trust operates for. Here we can begin by affirming the previous policy reports to the Alberta government and their emphasis on first setting aside water for environmental protection. However, this agreement does not tell us *why* or *for* whom we have protected these waters and, consequently, does not yield insight into how remaining water's should fit with environmental considerations. As we saw above, economic tools cannot provide these answers either. The limits of the public trust doctrine in this respect are more aptly put as an ambiguity over what constitutes the 'public.' This type of ambiguity, however, is not an intractable problem, but an opening to think more broadly about the various countervailing communities that have been left out of previous allocation regimes in Alberta, specifically First Nations and those ecologically defined.

111 Alberta Water Council, "Water for Life: recommendations for renewal" (2008).

112 Glenn, 2010.

113 Ibid.

Opportunities: The above limits to understanding water allocation under a public trust scenario open up significant opportunities. **First**, Alberta has not had sound empirical principles upon which to allocate water. This has resulted in a fractured set of rights to surface versus ground water and to allocations that are not tied to facts about water variability. In this context, reforming Alberta's water allocation system under a public trust scenario would create the opportunity to pursue proportional allocation rights. Alberta has already indicated a move towards this model by creating WCOs based on 45% of annual flow. Further elaboration of a public trust doctrine would allocate water in proportion to the total value of water to the community of water users. **Second**, rethinking the scope of water allocation issues in Alberta opens up discussions regarding how the 'public' is defined. In this regard, the public trust model holds potential for Alberta to work towards meeting the obligations it has under treaty rights to respect the water quantity and quality amongst First Nations and the Federal Government of Canada. In particular, a public trust model could be constructed so that it sets a limit on the return flows from agriculture and industry that negatively affect the health and livelihoods of First Nations communities. **Third**, establishing water allocation through the notion of a public trust encourages democratic deliberation regarding that constitutes 'the public.' This creates the potential to further support the stakeholder governance model established under the *Water for Life* framework by expanding how we determine who holds a stake in the future of Alberta's water allocation system.

Options

Classifying water allocation problems through the lens of the public trust offers four basic principles for adjudicating water problems: (1) private development is good, but the public interest outweighs it, (2) property rights should forward relations that benefit the citizenry as a whole, (3) waste or misuse of shared resources is not tolerable, (4) water has many kinds of value that need to be respected. In this light, and considering the forgoing discussion, several options are possible for reforming water licenses through the lens of the public trust doctrine, including:

- Empowering multi-level governance partners in Alberta with appropriate regulatory power
- Ensuring that water's total value to society is not curtailed according to valuation techniques that claim a degree of objectivity (i.e. ecosystem services valuation) but are forced to make several simplifying assumptions to interpret ecological activity in economic terms
- Identifying how the social relationships of First Nations have been, and continue to be, affected by water licensing that assumes water in Alberta was not 'in use' prior to western forms of allocation
- Using a gradually introduced block tariff pricing system to reduce total water consumption and/or degradation of water ways and designing public policies towards ends that encourage entrepreneurial activities that are suited to Alberta's waterscape
- Recognizing the broad set of values that affect, and are important in determining the future of, Alberta's vital water resources
- Delineate rights of use (such as those of agricultural uses) from rights of quantity

Recommendations

Neither viewing water as a common-pool resource or through the lens of a public trust represents a panacea. Indeed, there are no such panaceas in water governance. What each does offer, however, is a way to think about water allocation in Alberta in a way that does not narrow future governance options unnecessarily. Indeed, both ways of conceptualizing systems of water rights have elements that explain the Alberta case quite well and in ways that reposition the multiple water narratives in the province. A key difference between them is how they classify problems and the kinds of principles these classifications make available for resolving the question of how best to reform water allocation. As noted earlier, neither way of conceptualizing Alberta's water allocation reforms precludes the use of water markets, but both keep the social values that guide even 'niche' water market success at the fore of public policy. This is of critical import because water's instrumental and non-instrumental values require that decisions remain within the domain of democratic adjudication. With these considerations at hand, the following recommendations are made:

1. Alberta should, in a similar manner to how health professionals seek the counsel of bio-ethicists, secure ethical expertise for the political and moral challenges faced during the process of water allocation reforms and for the ongoing task of achieving effective water governance

Revise water allocation licenses to correct for the four empirical problems with Alberta's existing water allocation system that are identified in this report:

2. Align water rights with a system for effective groundwater regulation and governance
3. Recognize that water *in situ* is fully in use as part of socio-ecological systems and establish criteria upon which to assess all existing and future water allocation licenses for their benefit to Alberta
4. Re-run the Water Resources Management Model, where data is available, using parameters derived from the broader environmental history of Alberta. Several assumptions would need to be made to do this since such records are annualized, or at least not as detailed as the flow record of the 20th century. However, precautionary sampling assumptions are preferable to assuming abnormally high water availability will continue, or that such an assumption is a good basis for policy forecasting.

5. Align water allocation quantities with corollary responsibilities regarding quality that prevent pharmaceutical, chemical and temperature changes that degrade Alberta's surface and groundwater

Create and foster as appropriate institutions appropriate to meet the four above concerns and additional social considerations by:

6. Modifying the *Water Act* to explicitly acknowledge that Crown ownership of water is not absolute, but limited by water's life-giving characteristics and therefore a resource to be stewarded in trust for the well-being of the community of life dependent upon it
7. Supporting and recognizing a self-designed and self-governed First Nations water council in Alberta that is granted authority for water planning in First Nations' territory and which coordinates with other governing bodies as appropriate
8. Establishing and empowering clear policy direction and goals between formal water allocation regulations in Alberta, its informal water governance structure under *Water for Life* and the land-use planning framework of the *Alberta Land Stewardship Act*
9. Enforcing minimum flows for the protection of aquatic ecosystems and human health that consider Alberta's common-pool water resources as an interdependent system and which require curtailing individual actions such that there is no cumulative degradation to the shared resource base
10. Creating an independent board with the appropriate scientific, environmental, and health expertise for developing water quality standards in Alberta's watersheds
11. Creating a mechanism for the recommendations of the aforementioned board (recommendation # 10) to achieve binding, regulatory force until such time as the empirical objectives of the regulations are achieved and after that modified to maintain policy outcomes

Continue to move water management in Alberta towards a watershed approach by engaging in public, participatory processes regarding policy options such as (but not limited to):

- 12.** Granting customary uses of water certain kinds of rights. For instance, Albertans are accustomed to, and have claims to, water that does not expose them to pharmaceuticals, hormones and other chemicals
- 13.** Using the outcomes of an empirically improved set of future water scenarios (see recommendation #4) for reforming water licenses to proportions of watershed flows rather than in absolute quantities
- 14.** Gradually reducing water licenses as part of a plan to integrate all land and water activities that affect water quantity and quality. For instance, existing water licenses could be reduced by 1% per year for 25 years, with bonuses available at 5-year intervals for license holders that meet or exceed this threshold. Funds could be generated by using royalty and other public monies generated from other sectors affecting water quantity and quality (i.e. forestry, mining and energy)
- 15.** Creating a formula for decoupling economic growth from increased water use. This could include reducing water allocation licenses as a function of population growth by watershed until empirical derived Water Conservation Objectives are achieved
- 16.** Ensuring and protecting in law a statute that prevents water's total value to society from being calculated by valuation techniques that simplify ecological systems to meet economic criteria
- 17.** Introducing a block tariff pricing system to reduce total water consumption. Such a system could retain a set percentage of water licenses as granting free water, and then increase costs of water above that amount, but short of environmental thresholds, but short of environmental thresholds, such as the minimum flow requirements suggested in recommendation #9.
- 18.** Designing public policies towards ends that encourage entrepreneurial activities that are suited to Alberta's waterscape, including subsidies for private enterprises that are (or nearly) water neutral
- 19.** Delineating rights of use (i.e. agriculture, energy) from the rights to allocated units of water.



11045 Saskatchewan Drive,
Edmonton, Alberta
T6G 2E1
Phone: 780.492.8558
Email: parkland@ualberta.ca
Website: www.parklandinstitute.ca

ISBN 978-1-894949-32-3