Future Flows:
Climate resilience, environmental flows and Alberta's water law

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The Environmental Law Centre (Alberta) Society

The Environmental Law Centre (ELC) has been seeking strong and effective environmental laws since it was founded in 1982. The ELC is dedicated to providing credible, comprehensive and objective legal information regarding natural resources, energy and environmental law, policy and regulation in Alberta. The ELC's mission is to educate and champion for strong laws and rights so all Albertans can enjoy clean water, clean air and a healthy environment. Our vision is a society where laws secure an environment that sustains current and future generations.

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Executive Summary

Making informed and science based decisions regarding environmental flows is made challenging by the complexity of hydrological systems and their interrelationship with aquatic and riparian ecosystems. This challenge is magnified by climate change. Responding to data and climate uncertainty requires ongoing monitoring and research. Uncertainty also requires management and governance systems that are responsive.

Effective environmental management decisions are also challenged by the historic approach to regulation and allocation of water rights in Alberta. Alberta's *Water Act*, while a step forward from previous provincial water legislation in terms of adaptation and planning, remains inadequate to the task of ensuring sustainable and resilient environmental flows for the province.

The tools in the *Act* that allow for setting water conservation objectives (WCO) and crown licencing to give WCOs priority have seen minimal use province wide. Planning in relation to water management has not incorporated significant adaptive and forward looking criteria to guide decision making. Further, the ability to curtail diversions to benefit environmental flows is legally constrained and is likely practically constrained as well.

While assignments of water between existing licence holders are feasible under the *Act* and transfers of water allocations are enabled in some basins, neither tool is likely to be sufficient to address environmental risks (particularly in the South Saskatchewan River Basin).

Transparency is also a problem in relation to understanding the government's options for management towards environmental flows. Instream objectives (IOs) and WCOs have been set for various rivers and streams but a reference and science based ecological flow condition for

comparison has not been articulated.[1] Public reporting on when the various instream objectives (WCOs, IOs and science based ecological flows) are met is also lacking.

Finally, the amount of discretion within licences to curb diversions for environmental purposes is unclear. The likelihood of exercising this discretion should also be evaluated. Discretionary conditions in licences typically allow government to alter diversion rates or volumes but the phrasing and scope of discretion to respond to instream flow needs varies through time and by licence.

Where the discretion exists, there appears to be barriers to exercising regulatory discretion to meet instream flows; the ELC is not aware of any instances where diversion rates or volumes were curtailed (for non-temporary licences) due to a mandatory direction of the Director. Exercising discretion that would result in reduced diversion rates and volumes for environmental outcomes is likely to come up against significant barriers that will favour maintaining the status quo of water diversions. This includes economic arguments against reducing diversions, general perceptions of water rights as property rights, and reliance on uncertainty related to the impacts of low flows and future flow conditions.

This suite of issues points to a need to be more proactive and precautionary in targeting instream flows and licencing these flows to gain a level of priority relative to other water uses. These issues also justify reform of Alberta's water law to become more adaptive in its planning, monitoring and allocation process.

The Environmental Law Centre recommends amending our water law and policy to ensure precautionary management of environmental flows in Alberta watersheds, particularly where

[1] While online systems of water flow tracking (with WCO and IO flows identified) has improved transparency, through the Albert River Basins web site https://rivers.alberta.ca there remains uncertainty of whether it includes all instream objectives. An additional significant gap is a reference condition of science based ecological flows, i.e. meeting an IO or WCO may or may not indicate potential risks to the aquatic health of the system.

surface water allocations are still available, and to become more adaptive to changing information and circumstances in those watersheds that have been highly allocated. These recommendations are focused on ensuring that future water supplies are sufficient to maintain and restore environmental flows.

Policy recommendations include:

1. Revise the *Framework for Water Management Planning* to include climate mitigation modelling and water allocation budgeting and decision making.[2]
    - The *Framework* should be amended to direct the inclusion of climate change considerations and long term water budgets in the matters and factors to be considered in authorization decisions under the *Water Act;*
    - Require review and revision of plans on a periodic basis (i.e. 5 year cycle) and submit for approval to the Lieutenant Governor in Council.
2. Draft and publish water wastage guidelines to empower the Director to issue orders for conservation purposes (as per sections 14 and 97(2) of the *Act*).
3. Develop directional policy for exercise of conditional restrictions to protect base flows for all licences (i.e. deemed licences and licences issued under the *Water Act*).
    - Review legal options for exercise of discretion in relation to conditions on deemed licence to respond to diminished base flows.
4. Formalize guidelines for determination of "potential" effects on the aquatic environment in allocation decisions.
5. Develop a system of tracking and public reporting to identify IOs, WCOs (as applicable) and instream flow needs (IFN) and the annual incidence of exceedances of these metrics.

[2] Government of Alberta, *Framework for Water Management Planning*, (Edmonton: Government of Alberta, 2001) https://open.alberta.ca/dataset/8a08440e-efed-4f38-8516-1c097b8a2442/resource/f5ef848b-49e0-4fed-8a1d-4cfb6bb3d93e/download/2001-watermanagementplan-framework-2001.pdf.

6. Ensure public access to the water use reporting system and the data it contains. The current system lacks transparency. This transparency is required to ensure a broader civic monitoring role and to foster accountability in environmental outcomes.

Legislative reform recommendations include:

1. Enable regional and community co-governance with related authority over water allocation.
2. Require the Director to consider instream flows informed by cumulative effects of allocations, land use impacts on water and future climate scenarios.
3. Require water budgeting at appropriate time scales to maintain or restore IFN.
4. Require periodic water need assessments that incorporate conservation and efficiency practices.
5. Streamline licence cancellations for non-use.
6. Streamline suspension process to respond to environmental risks (with accompanying compensation policy).
7. Develop and implement a water fee structure to support water monitoring, planning and to support a deemed licence compensation policy (as needed).

Contents

Introduction

The physical nature of water and its connection to climatic variability make it, among all natural resources, the pinnacle of challenges. Flood and drought, variability of flows, snow pack, glaciation (and de-glaciation) all must feed into how we manage water in the future. Groundwater and surface water interactions further add to the complexity of managing the resource.

The physical nature of the resource and the climatological variability and the uncertainty therein are often at odds with the legal certainty that is sought for economic endeavours that require diversion and use of Alberta's water resources. In this regard our water laws must attempt to reconcile the unknowable with expectations of investment and economic growth. More challenging still is to keep aquatic ecosystem objectives on an equal footing with these other demands.

This report seeks to identify whether Alberta's *Water Act* is prepared for current and future water management challenges with a focus on having flows in water bodies to maintain and restore aquatic ecosystems.[3] This focus leaves a broad suite of relevant water issues out of scope, including climate variability and its impacts on wetlands, water quality impacts, and hydrological implications of land use change.[4] The report is separated into 4 parts. Part 1 deals with the water management challenges Alberta faces and highlights evolving governance approaches in water management literature. Part 2 sets out the Environmental Law Centre's (ELC) objectives for law and policy in the face of Alberta's challenges and identifies a two pronged approach to restoring and maintaining environmental flows. Part 3 catalogues how

[3] *Water Act*. R.S.A. 2000, c. W-3, online: Queen's Printer http://www.qp.alberta.ca/documents/Acts/w03.pdf.
[4] See for example Blöschl, G., Ardoin-Bardin, S., Bonell, M., Dorninger, M., Goodrich, D., Gutknecht, D., Matamoros, D., Merz, B., Shand, P., Szolgay, J. "At what scales do climate variability and land cover change impact on flooding and low flows?" (2007) *Hydrological Processes* 21:9, 1241-1247.

the *Water Act* meets or fails to meet these objectives. Part 4 sets out the ELC's recommendations for law and policy reform to foster greater adaptability and precaution in Alberta's water management system.

Part 1: Instream flow challenges for Alberta's water management system

While Alberta has a wealth of fresh water when compared to much of the planet, water management challenges remain in the face of over allocation and water supply variability.[5] By virtue of growth pressures and historic water allocation decisions, streams and rivers in Alberta may be impacted both in near and long term time horizons. This in turn puts the aquatic environment at risk as flows may be diminished by the combined effect of climate and water diversions. In this regard, a regulatory system that supports the instream needs for environmental outcomes is required. Water quantity and flow requirements for maintaining aquatic ecosystems are typically articulated as an environmental flow, instream flow need (IFN) or ecological flows. This metric must be distinguished from a water conservation objective (WCOs) under the *Water Act* and other instream objectives (IO) set by government, which may or may not be scientifically based.

[5] See for example Faramarzi, M., Abbaspour, K., Adamowicz, W.L., Lu, W., Fennell, J., Zehnder, A.J.B, Goss, G., Uncertainty based assessment of dynamic freshwater scarcity in semi-arid watersheds of Alberta, Canada (2017) *Journal of Hydrology: Regional Studies* 9: 48-68, online: https://cms.eas.ualberta.ca/faramarzilab/wp-content/uploads/sites/14/2017/05/JHRS-2016-min.pdf.

Instream objectives: often unmet or too low

Meeting instream flow objectives in southern Alberta remains a key challenge in light of historic allocations of the provinces' water resources. Further, the instream objectives that are set (as water conservation objectives) may be insufficient to ward against risks of ecosystem degradation.[6] Elsewhere in the province instream objectives may not be set, are not readily publicly available, and may also be exceeded in times of low flow.[7] A public registry of instream objectives (whether they are general instream objectives or water conservation objectives) does not currently exist.

Instream objectives and water conservation objectives were not met for periods of 2018 in multiple locales, including the Castle River, Pincher Creek, Belly River, Sheep River, Kananaskis River, Oldman River, Bow River and the South Saskatchewan River.[8] Where these objectives are not met the issuance of temporary diversion licences may stop, however, there appears to be few if any instances where other allocations are mandatorily curtailed.

Climate variability and its impacts on Alberta's hydrology and on aquatic systems will pose challenges for regulators in the face of what is likely to be continued economic and population

[6] See discussion of water conservation objectives and other scientific methodologies of instream flow requirements set out *infra*.
[7] For example temporary diversion licences were suspended in various basins in September of 2015. See Alberta Energy Regulator, Bulletin 2015-26, online: https://www.aer.ca/regulating-development/rules-and-directives/bulletins/bulletin-2015-26.
[8] Data source: Alberta River Basins Interactive App. https://rivers.alberta.ca/.

growth. The variability and supply challenges, and knowledge of what the future holds, has attracted ongoing study and has implications for Alberta's future aquatic systems.[9]

The challenge ahead: uncertainty and legal and administrative paralysis

> *"Securing the supply and equitable allocation of fresh water to support human wellbeing while sustaining healthy, functioning ecosystems is one of the grand environmental challenges of the 21st century, particularly in light of accelerating stressors from climate change, population growth, and economic development."*[10]

This quote speaks to global water challenges but it is clearly applicable to Alberta. Creating an effective water regulatory framework that serves environmental outcomes is made particularly difficult where water demand is high and where supplies are often highly variable. Water supply issues pose economic risks to be certain, but they also pose risks of harm to aquatic and related environments, whether it is fish or cottonwood trees.[11]

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[9] See for example Stewart B. Rood, Stephen G. Foster, Evan J. Hillman, Andreas Luek, Karen P. Zanewich Flood moderation: Declining peak flows along some Rocky Mountain rivers and the underlying mechanism" (2016) *Journal of Hydrology* 536: 174-182, online: https://www.sciencedirect.com/science/article/pii/S0022169416300774, Chris M. DeBeer, Howard S. Wheater and Sean K. Carey "Recent climatic, cryospheric, and hydrological changes over the interior of western Canada: a review and synthesis" (2016) *Hydrol. Earth Syst. Sci* 20:1573-1598, online: https://core.ac.uk/download/pdf/148790288.pdf , David J. Sauchyna, Jeannine-Marie St-Jacques, and Brian H. Luckman "Long-term reliability of the Athabasca River (Alberta, Canada) as the water source for oil sands mining" (2015) *PNAS* 112:41, online: http://www.pnas.org/content/pnas/112/41/12621.full.pdf , Naz, B. S., Frans, C. D., Clarke, G. K. C., Burns, P., and Lettenmaier, D. P. (2014). Modeling the effect of glacier recession on streamflow response using a coupled glacio-hydrological model, *Hydrology and Earth System Sciences*, 18, 787-802. doi:10.5194/hess-18-787-2014 and, M.J. Beedle, B. Menounos, and R. Wheate "Glacier Change in the Cariboo Mountains, British Columbia, Canada (1952-2005)" (2104) *The Cryosphere Discussions* 8. (3367-3411).

[10] N. LeRoy Poff, Casey M. Brown, Theodore E. Grantham, John H. Matthews, Margaret A. Palmer, Caitlin M. Spence, Robert L. Wilby, Marjolijn Haasnoot, Guillermo F. Mendoza, Kathleen C. Dominique & Andres Baeza, "Sustainable water management under future uncertainty with eco-engineering decision scaling" (2016) *Nature Climate Change* 6:25–34.

[11] Benjankar, R.*, M. Burke, E. Yager, D. Tonina, G. Egger, S.B. Rood and N. Merz "Development of a spatially-distributed hydroecological model to simulate cottonwood seedling recruitment along rivers" (2014) *Journal of Environmental Management* 145:277-288.

Knowledge and understanding of hydrological cycles and the interaction with ecological systems is complex. Consistent and long term data about aquatic systems is also often not available.[12] While flow data may be available the relevant ecosystem metrics are often lacking. Further complexity is added where one considers climate variability and it impact on water quality and the cumulative impacts of land use impacts on water.[13]

Climate change is the magnifier of risks and uncertainty. In the absence of climate change we struggle to understand the complexities of environmental, hydrological and biophysical systems. These knowledge and science struggles result in regulatory challenges and increased risk of environmental consequences, requiring an adaptive regulatory response. With the added uncertainty of climate change the risks are simply that much greater.

Regulatory systems appear to often struggle with complexity, particularly in relation to common pool resources such as air and water. Garret Hardin noted in 1968 in his article *The Tragedy of the Commons* "the laws of our society follow the pattern of ancient ethics, and therefore are poorly suited to governing a complex, crowded, changeable world".[14] Instead we rely on administrative laws and the decision makers to select or weigh policy outcomes in a given situation. This led Hardin to conclude: [15]

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[12] See for example Ryan J. MacDonald, Sarah Boon, James M. Byrne, Mike D. Robinson, and Joseph B. Rasmussen "Potential future climate effects on mountain hydrology, stream temperature, and native salmonid life history" 2014, *Can. J. Fish. Aquat. Sci. 71: 189–202* , online: http://dx.doi.org/10.1139/cjfas-2013-0221.

[13] See Susanna Tong, Yu Sun, Thushara Ranatunga, Jie He, Jeffrey Yang "Predicting plausible impacts of sets of climate and land use change scenarios on water resources" 2012 *Applied Geography* vol. 32: 2.

[14] Garrett Hardin, "The Tragedy of the Commons" (1968) *Science* 162:3859, pp. 1243-1248. Hardin observed that the problem with managing commonly held resources is that those gaining benefits from the common resource are acting rationally when they undertake actions that benefit them even when those actions cause harm or degrade the resource; this harm is shared among the many, hence the tragedy of the commons. One more cow is one more cow to be sold by its owner, the harm of overgrazing by that cow is felt by all the users of the commons. Similarly, one litre of water taken from the stream can result in one more widget to sell for those who divert the water; however, the reduced volume instream is then a problem distributed among all others.

[15] Hardin (1968) at 1246.

> [T]he great challenge facing us now is to invent the corrective feedbacks that are needed to keep custodians honest. We must find ways to legitimate the needed authority of both the custodians and the corrective feedbacks.

The need for corrective feedbacks is amplified as we continue to understand the complexity and unveil the high level of uncertainty in our water worlds and the ecosystems they support.

Further it has been noted that aspects of administrative law act to constrain government discretion, i.e. administrative law acts in an "anti-adaptive" manner resulting in an inability to respond and manage around uncertainty. J.B. Ruhl observes: [16]

> The problem is that natural resources management agencies are locked in an administrative law system that places a premium on engineering resilience strategies and shows no signs of being flexible in that regard. The system's fixation on predecisional environmental assessment, cost-benefit analysis, records of decisions, and judicial review litigation has pushed the system toward a "frontend" focus on reliability and efficiency that has made adaptive management exceptionally difficult to implement. Consequently, it will be difficult for natural resource agencies, particularly in an era of climate change, to engage in even a "lite" version of "learning while doing" if they lack the authority and capacity to build the infrastructure necessary to implement the full scope of adaptive management. .... The relatively low adaptive capacity of administrative law is likely to stifle efforts in other fields of law to move toward ecological resilience strategies when variability is on the rise and prediction is unreliable.

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[16] J. B. Ruhl, "General Design Principles for Resilience and Adaptive Capacity in Legal Systems - With Applications to Climate Change Adaptation" (2011) 89 *N.C. L. Rev*. 1373, online: http://scholarship.law.unc.edu/nclr/vol89/iss5/3 and J.B. Ruhl "Regulation by Adaptive Management-Is It Possible?" (2005) 7 *Minn. J. L. Sci. & Tech.* 21, which explores impediments to adaptive management posed by the administrative law system.

As will be discussed this potential to have administration of our water laws paralyzed in front end assessments and decision making is, at least to a degree, likely active in Alberta's water resources decision making. Resource use decisions thus become less an exercise of discretion and more an operation of regulatory efficiency.

A revised approach to water management is needed to meet these water challenges.

Shifts in water governance: adaptive management and governance

> *Adaptive management … views policy as hypotheses; that is, most policies are really questions masquerading as answers.*[17]
>
> Lance Gunderson

Adaptive management and adaptive governance are approaches to dealing with uncertainty.[18] Adaptive management can be defined as "a systematic approach for improving resource management by learning from management outcomes".[19] Adaptive governance speaks to the governance systems through which adaptive management may be achieved.[20]

Climatic variability and other uncertainties in water supplies have resulted in calls for an evolution of our water governance approaches and the legislative frameworks that serve them.

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[17] Gunderson, L. "Resilience, flexibility and adaptive management - - antidotes for spurious certitude?" (1999) *Conservation Ecology* 3(1): 7. [online] URL: http://www.consecol.org/vol3/iss1/art7/.
[18] Walters, CJ, *Adaptive Management of Renewable Resources* (Basingstoke: Macmillan, 1986).
[19] Williams, B.K., Szaro, R.C., Shapiro, C.D., *Adaptive Management: The U.S. Department of the Interior Technical Guide*. (2009) Adaptive Management Working Group, U.S. Department of the Interior, Washington DC, as cited in MJ Westgate, GE Likens, D.B. Lindenmayer "Adaptive management of biological systems: A review" (2013) *Biological Conservation*, 158*: 128-139.*
[20] See Huitema, D., E. Mostert, W. Egas, S. Moellenkamp, C. Pahl-Wostl, and R. Yalcin "Adaptive water governance: assessing the institutional prescriptions of adaptive (co-)management from a governance perspective and defining a research agenda" (2009) *Ecology and Society* 14(1): 26.

This evolution of water governance is presented by Clarvis *et al's* Figure 1 below.[21] Specifically, there has been broad recognition that historic systems of water governance are not well suited to uncertainty, particularly in light of future climate variability. Fostering water resilience is said to require a governance approach that is flexible and responsive, "keeping options open" as the future is expected to be heterogeneous.[22] In this regard, the focus of a new governance system is on facilitating adaptive management.[23]

The challenge, as posed by Craig *et al.* , is:[24]

> How can legal frameworks transition toward adaptive governance without completely alienating the societal stakeholders who depend on stable legal systems for security?

Adaptive regulatory systems and the governance that supports them must ensure those participating in the system have trust in the system: trust that their interests will not be arbitrarily (or seemingly arbitrarily) changed.[25]

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[21] Margot Hill Clarvis, Andrew Allan and David M. Hannah "Water, Resilience and the law: From general concepts and governance design principles to actionable mechanisms" (2014) *Environmental Sciences & Policy* Vol 43: 98-110, online: http://dx.doi.org/10.1016/j.envsci.2013.10.005.

[22] This emerges as a common theme from C.S. Holling's initial work "Resilience and Stability in Ecological Systems" 1973. Subsequently it is taken up by J.B. Ruhl, "General Design Principles for Resilience and Adaptive Capacity in Legal Systems - With Applications to Climate Change Adaptation"(2011) *N.C. L. Rev.* 89:1373. For cautionary notes on the policy adoption of resilience see Marc Welsch, "Resilience and responsibility: governing uncertainty in a complex world" (2014) *The Geographical Journal*, Vol. 180, No. 1, March 2014, pp. 15–26, doi: 10.1111/geoj.12012.

[23] See Margot Hill Clarvis, Andrew Allan and David M. Hannah (2014), note 21.

[24] Robin Kundis Craig, Ahjond S. Garmestani, Craig R. Allen, Craig Anthony (Tony) Arnold, Hannah Birge, Daniel A. DeCaro, Alexander K. Fremier, Hannah Gosnell, and Edella Schlager, "Balancing stability and flexibility in adaptive governance: an analysis of tools available in US Environmental Law"(2017) *Ecology and Society* 22(2): 3.

[25] See Craig *et al* (2017), note 24.

Figure 1: The Shifting Focus of water governance (Clarvis et al, 2014)[26]

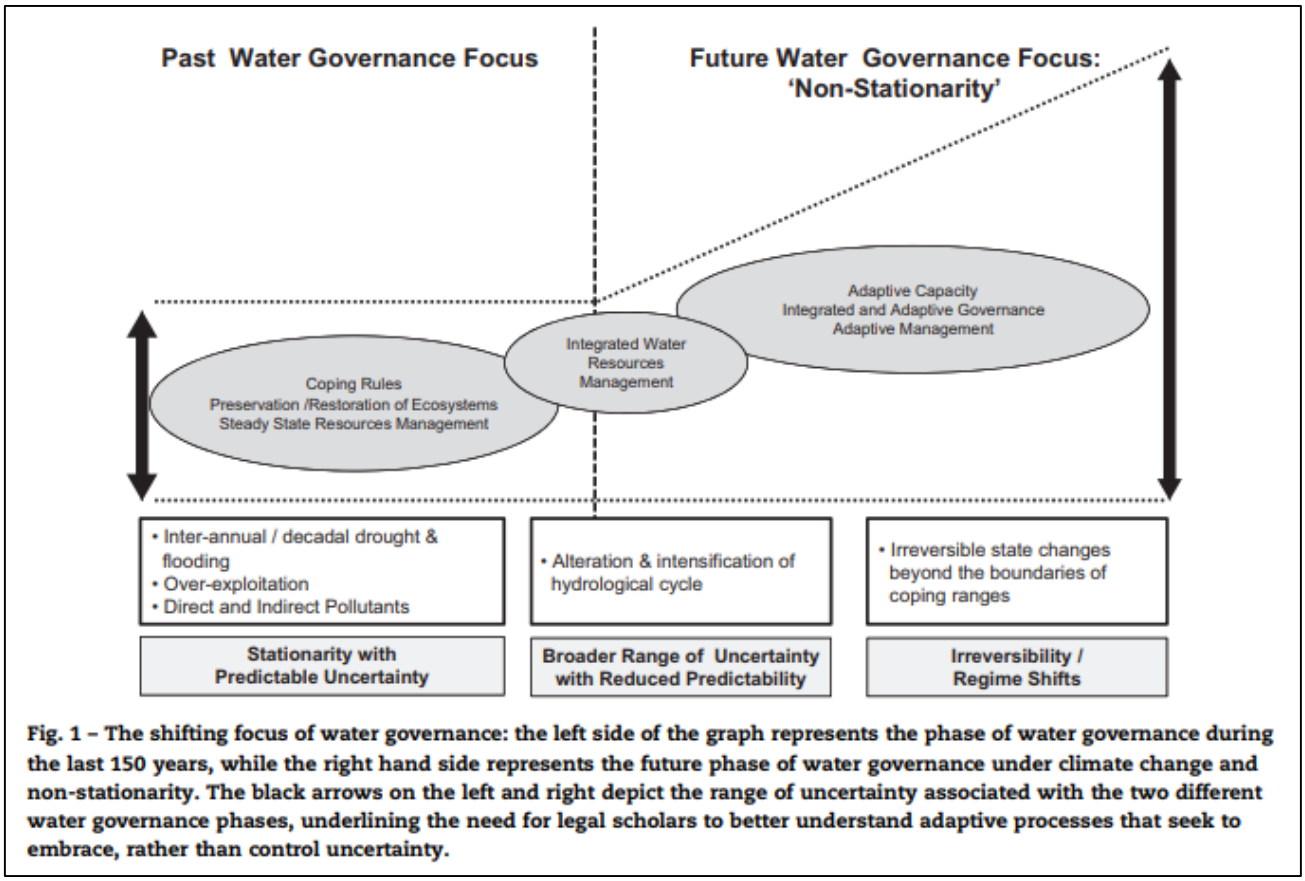

Fig. 1 – The shifting focus of water governance: the left side of the graph represents the phase of water governance during the last 150 years, while the right hand side represents the future phase of water governance under climate change and non-stationarity. The black arrows on the left and right depict the range of uncertainty associated with the two different water governance phases, underlining the need for legal scholars to better understand adaptive processes that seek to embrace, rather than control uncertainty.

Literature on adaptive governance for managing water resources to foster resilience to climate change finds much of its foundation in economic theory on common pool resource (CPR) management and the work of Elinor Ostrom and her contemporaries.

Ostrom observed that the tragedy of the commons is not reflected in all commons governance and that certain governance design features enable better commons management.[27] These

[26] Margot Hill Clarvis, Andrew Allan and David M. Hannah (2014), note 21.

[27] Dietz, Thomas, Elinor Ostrom, and Paul C. Stern "The Struggle to Govern the Commons" (2003) *Science*, 302(5652): 1907–12.
The "right" governance design will be circumstance specific, as past work has shown that a model governance system is elusive. Specific principles of note include:

CPR design principles, and their inherent recognition of the need to adapt to the uncertainty and complexity of resource supply and use has been picked up by legal scholars for the design of adaptive governance systems. Other scholars have highlighted the underpinning requirements of inclusivity, "trust, legitimacy and transparency".[28]

Legal design principles have been articulated by DeCaro *et al*. (See Table 1).[29] These legal design principles build on and supplement Ostrom's institutional principles to seek a system of adaptive governance that maintains legitimacy.[30]

The water management approach contemplated in the scholarship around CPR management and having adaptive and resilient systems consist of various themes. These themes include:

1. Multi-centered rule-making, monitoring and enforcement (often framed as "polycentric" governance);

- Appropriation and provision rules are congruent with local social and environmental conditions (Principle 2A, Cox *et al*.).
- Collective Choice Arrangements: Most individuals affected by a resource regime are authorized to participate in making and modifying its rules. (Principle 3, Cox *et a*l.).
- Decentralized monitoring of the resource and compliance of other users (Principle 4).
- The rights of local users to make their own rules are recognized by the government. (Principle 7).
- Nested Enterprises: When a common-pool resource is closely connected to a larger social-ecological system, governance activities are organized in multiple nested layers (Principle 8).

These principles are, in part, focused on recognition that resource users are best placed to monitor and enforce towards a sustainable system of resource allocation and use. Inherent in this system is a recognition that commons resources are typically burdened with high variability, complexity and uncertainty, requiring governance systems that respond to change and retain accountability among all resource users.

[28] See Craig R.K. *et al* (2017), note 24. Also see Cox, Michael, Gwen Arnold, and Sergio Villamayor-Tomás. 2009. "A Review of Design Principles for Community-Based Natural Resource Management." (2010) *Ecology and Society* 15(4):38 citing Harkes, I.H.T. 2006 *fisheries co-management, the role of local institutions and decentralisation in Southeast Asia: with specific reference to marine sasi in Central Maluku, Indonesia.* Dissertation. Leiden University, Leiden, the Netherlands. Ostrom "Beyond Markets and States: Polycentric Governance of Complex Economic Systems" (2010) *American Economic Review* vol. 100 No. 3, citing Daniel W. Bromley "Closing Comments at the Conference on Common Property Resource Management." (1986) In Proceedings of the Conference on Common Property Resource Management, 591–98. Washington, DC: National Academies Press.

[29] DeCaro, D. A., Chaffin, B. C., Schlager, E., Garmestani, A. S., & Ruhl, J. B. "Legal and institutional foundations of adaptive environmental governance." (2017).*Ecology and Society: a journal of integrative science for resilience and sustainability*, 22(1), 1-32.

[30] DeCaro, et al (2017) note 29.

2. Effective monitoring of users and resources, requiring transparent monitoring and reporting on various existing and potential impacts on users and the environment;
3. Clear processes for rule adaptation or responsiveness; and
4. Clear and efficient enforcement rules.

These systems, theoretically at least, have the benefit of promoting trust in the adaptation process but also are able to overcome (or bypass) any administrative stasis/paralysis in how discretion is exercised under one's water laws.

Table 1: Candidate legal design criteria (adapted from DeCaro *et al*.[31])

Reflexive	• The governance system does not rely on static rules, e.g., fixed water allocations, when flexibility is needed.
Legal Sunsets	• Planned periods of comprehensive evaluation, in which environmental policies and agreements can be periodically examined, renegotiated, and potentially modified.
Legally Binding Authority	• Authority to make decisions and implement chosen solutions is institutionalized in binding legislation, for multiple centres of governance activity in polycentric society, e.g., agencies, communities, regional governments.
Legally Binding Responsibility	• Formal definition and assignment of responsibility to resolve, or contribute to resolution, of a social-ecological dilemma, or element thereof.
Tangible Support	• Assistance from national, state, and local government, etc., in the form of dedicated and sufficient funds, technology, information, and training to meet one's legally binding responsibilities and pursue one's legally granted authority

[31] DeCaro, *et al* (2017), note 29.

Part 2: Water sustainability and climate resilience through precaution and adaptation

This report's recommendations and assessment of Alberta's water law are guided by the **ELC's objective** for management of our water resources in the province:

> Alberta's water resources are managed or restored to levels where resource use is sustainable, where aquatic species diversity and abundance is maintained, and aquatic ecosystems are resilient to climate variability.[32]

A resilient system can be described as one that has "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks".[33] Building resiliency in water management entails a transition from one where understanding of supply (and stationarity that has been historically assumed) to an understanding of how and to what extent aquatic systems can absorb disturbance (i.e. changes in quantity and quality of water).

Sustainability is linked to resiliency but forms a broader lens for the ELC recommendations. The ELC is informed by a definition for sustainable water management from Richter *et al*:

> Ecologically sustainable water management protects the ecological integrity of affected ecosystems while meeting intergenerational human needs for water and sustaining the full array of other products and services provided by natural freshwater

[32] It is recognized that this objective may not currently be achievable in all places at all times in Alberta. Rather the ELC's objective should be framed in how changes must occur in a manner that recognizes current water quantity and quality challenges. It is also recognized that many species have other pressures, both direct and indirect, such as harvest pressures and invasive species. This report is primarily focused on adaptation and resilience in water quantity management.

[33] Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. "Resilience, adaptability and transformability in social–ecological systems" (2004) *Ecology and Society* 9(2): 5, online: http://www.ecologyandsociety.org/vol9/iss2/art5.

ecosystems. Ecological integrity is protected when the compositional and structural diversity and natural functioning of affected ecosystems is maintained.[34]

While the bulk of academic discussion on climate resiliency focuses on adaptation and adaptive governance, as outlined above, the ELC views sustainability and resilience in water management as best achieved by a marriage of adaptation and precaution.

Precaution is required due to two aspects of our current water law. First, having adaptive laws and regulation is difficult, if not anachronistic to our current legal norms. This is particularly the case in Alberta with its historic (and continued) underpinning in a prior allocation system that favors providing certainty in relation to past allocations of water over any type of future change and uncertainty. Second, relying solely on adaptive governance is inherently risky as our knowledge of the resilience of our natural systems is incomplete (and may never be complete).

This latter point bolsters the need for precaution in approaching water management as there is a need to recognize the inherent risks of "resiliency" theory and an adaptive governance approach. When data is lacking there is a risk of using uncertainty to favour inaction. Why do we need to take action when the future is unknowable? This de-politicization of change in turn carries risks that environmental outcomes will remain unstated. Political accountability for these outcomes can then be minimized.[35]

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[34] Brian D. Richter, Ruth Mathews, David L. Harrison, and Robert Wigington "Ecologically sustainable water management: management river flows for ecological integrity" (2003) *Ecological Applications* 12(1) 206-224, online: http://prti.colostate.edu/files/Cooperative_Adaptive_Management.pdf.

[35] Marc Welsh frames the criticism of resilience theory in "Resilience and Responsibility: governing uncertainty in a complex world" (2014) *The Geographical Journal* vol. 180. No. 1.
Online: https://rgs-ibg.onlinelibrary.wiley.com/doi/pdf/10.1111/geoj.12012.
[R]esilience is politically neutral, sitting comfortably with a consensus rhetoric of criticality (certain practices are 'bad' or unsustainable) yet proffering technocratic solutions (of adaptive management) framed within and using the same (capitalist) logic and vocabulary (of capital and services etc.) that those problems result from. Consequently the resilience discourse can become defined by a set of consensual socio-scientific knowledges that

The understanding of resiliency of our aquatic systems may turn out to be incorrect. Resilience theory demands that we are particularly cautious of "unknown unknowns".

The ELC therefore supports adaptive governance but only with a strong precursor of precaution. The fundamental issue that must be addressed is the extent to which the *Water Act* is adaptive and precautionary in its approach to aquatic ecosystem.

For other reading on this topic the ELC recommends the following publications:

Arlene Kwasniak "Climate Change and Water: Law and Policy Options for Alberta" *Canadian Institute of Resources Law Occasional Paper #57*, March 2017.[36]

David Percy "Climate Change and Water Allocation in Alberta" in *Resilient Systems, Resilient Communities* (Edmonton: University of Alberta and the Kule Institute for Advanced Study, 2018).[37]

Part 3: Precaution and adaptation under the *Water Act*

The central focus of Alberta's *Water Act* is on regulating water diversions, by way of issuing licences, and other activities with impacts on water and water bodies, by way of issuing approvals. Government discretion under the Act is focused on guiding the Director's decisions regarding issuances of these authorizations. The Act also enables the production of water management plans which further directs how government discretion is exercised. These plans are directional and are primarily relevant to the issuance of new licences (and to a degree, the renewal of authorizations that have set terms).[38] These plans may also allow for the transfer of

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reduce the political to the policing of change (Swyngedouw 2009), diverting attention from questions of power, justice or the types of (socio-natural) future that can be envisaged.

[36] Online: https://cirl.ca/files/cirl/water-and-climate-change_kwasniak.pdf.

[37] Online: https://era.library.ualberta.ca/items/489c0395-45a1-4290-a1ad-210a543d6d25.

[38] *Water Act*, s. 51.

licenced allocations between parties (with the approval of government). As will be discussed, many tools in the *Water Act* may serve both precautionary and adaptation roles.

The fundamental underpinning of Alberta's water remains in providing certainty in water allocations authorized by licences. While Alberta water law does not grant clear property rights in water it does have a clear orientation towards protecting rights to the use of licenced water volumes. [39] The Act achieves this by adopting the first-in-time, first-in-right, or prior allocation system of water allocation, where volumes are basically guaranteed to those who obtained licences earlier in time. The Act further solidifies water rights by deeming licenses issued prior to the passage of the *Water Act* to be permanent and paramount to the terms and conditions of the *Water Act*.

Commons resource issues and environmental protection are left to discretionary tools under the Act. Accountability of the law is primarily oriented towards the licence holders and in over-allocated basins this may result in a lack of exercising discretion to reach environmental outcomes.

Accountability for other valid water entitlements, such as Indigenous rights and environmental rights, is not apparent in the historic administration of the province's water law.

[39] For a detailed review of Alberta's water laws some important reading is recommended, including: David Percy, "Water Rights in Alberta" (1977) *Alberta Law Review* Vol. XV: 142, Alastair Lucas, *Security of Title in Canadian Water Rights* (Calgary: Canadian Institute of Resources Law, 1990) and Michael M. Wenig, Arlene J.Kwasniak, Michael S. Quinn "Water Under The Bridge? The Role of Instream Flow Needs (IFNs) Determinations In Alberta's River Management", in *Water: Science and Politics* H. Epp and D. Ealey (eds) Proceedings of the Conference Held by the Alberta Society of Professional Biologists on March 25-28, 2006, online: https://cirl.ca/files/cirl/ifn-determin.pdf.

Precursors to assessing precaution and adaptation in Alberta's water law

A major challenge in an assessment of the precaution and adaptation of Alberta's water law is the fact that many regulatory tools are discretionary in nature, many terms and conditions have evolved through time, and transparent and consistent environmental metrics to ensure accountability of decisions have been lacking.

Measuring aquatic sustainability

Protection of the aquatic environment requires a mechanism to monitor and measure the health of aquatic systems. Typically articulated as an environmental flow, instream flow need (IFN) or ecological flows, there is a significant amount of scientific literature (and policy guidance) towards determining the right "IFN". A science based IFN must be distinguished from a water conservation objective (WCO) under the *Water Act* or other IOs set by government, which may or may not be scientifically based.[40] There is significant complexity in determining an IFN particularly because there may be various outcomes that the IFN may focus on including fish habitat, water quality, riparian vegetation, and channel maintenance.[41]

To be sustainable, within the framing of this report, an IFN should maintain "compositional and structural diversity and natural functioning of affected ecosystems".

Provincial articulation of environmental metrics for aquatic systems in Alberta has been slow to occur. In 2011 *A desk-top method for establishing environmental flows in Alberta Rivers and Streams (Desk-top Method)* was published, providing a general guide for maintenance of

[40] See the discussion of WCOs later in this document.

[41] See G. Kasey Clipperton, C. Wendell Koning, Allan G.H. Locke, John M. Mahoney, and Bob Quazi, *Instream flow needs determinations for the South Saskatchewan River Basin, Alberta, Canada* (Edmonton: Alberta Environment and Alberta Sustainable Resource Development, 2003), online: https://open.alberta.ca/publications/0778530450.

flows.[42] The *Desk-top Method* recognizes that site specific IFN studies would be ideal for making decisions under the *Water Act* but that such studies are cost prohibitive.[43]

In 2018 a *Draft Water Allocation Directive* was proposed that would guide decisions in areas where WCOs or IOs have not been set.[44] It is worth noting that the Draft Directive does not adopt the desk-top method for curtailing water allocations at low flows nor does it articulate a protected base flow for rivers with greater than 10 m^3/s mean annual discharge (or where the discharge is unknown, stream orders of 7 or higher, i.e. typically the mainstems of major rivers).[45]

The federal government has also set out some guidance in relation to determinations of ecological flows.[46] It should also be noted that the federal government may have a renewed interest in instream flows as the federal Bill C-68 includes regulatory prohibitions related to harm to fish habitat, including water flows. The proposed amendment to s.2(2) of the Act states "for the purpose of this Act, the quantity, timing and quality of the water flow that are necessary to sustain the freshwater or estuarine ecosystems of a fish habitat are deemed to be fish habitat".[47]

While these guidance documents are relevant to management of instream flows they must be revisited frequently to ensure that they are adaptive in nature. Reliance on historic data sets for flow calculations and the general proxy of flow as determinative of ecological health (as

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[42] Government of Alberta, (Edmonton: Government of Alberta 2011) online: https://open.alberta.ca/publications/9780778599791.

[43] *Desk-top Method* at 1.

[44] Government of Alberta *Surface Water Allocation Directive* (October 1, 2018), online: https://talkaep.alberta.ca/6655/documents/11835 accessed on November 16, 2018. [*Allocation Directive*].

[45] *Allocation Directive* (October 1, 2018) at 14.

[46] Fisheries and Oceans Canada, "Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada" *Canadian Science Advisory Secretariat Science Advisory Report 2013/017.*

[47] See s. 2(2) of Bill C-68, *An Act to Amend the Fisheries Act and other Acts of consequence*, 1st Session, 42nd Parliament, 64-65-66-67 Elizabeth II, 2015-2016-2017-2018, online: http://www.parl.ca/DocumentViewer/en/42-1/bill/C-68/third-reading.

measured by both composition and structural diversity of aquatic systems) gives rise to concerns of uncertainty of effects in a given place and time.

Transparency of instream objectives

Another barrier in assessing tools for adaptation and precaution in Alberta is a lack of publicly available information where instream objectives currently exist, how they might compare to a scientific IFN and how often they are met (or not). Various instream objectives exist across the province, sometimes in the form of instream objectives and others as WCOs. A publicly accessible record of all instream objectives and WCOs and a reference condition based on scientifically based IFN is essential if one is to evaluate the level of precaution and adaption offered in *Water Act* licences. Tracking and reporting on IFN and IO/WCOs is needed to get a good understanding of how well our regulatory system is being administered.

Transparency and clarity of discretionary options available to government

The discretion to take precautionary and adaptive measures is often embedded in the terms and conditions of licences. While these licences are publicly available there is a lack of readily accessible data about which licenses (of thousands) have which conditions and, of those conditions, which are likely to trigger discretionary decisions by the Director. It is important to consider that different terms and conditions will give the Director different levels of confidence in a discretionary decision they take. The risks of being challenged on a given decision will vary based on the nature of the condition and when the licence was issued.

The terms and conditions on licences have clearly evolved over time. It is unclear the scope of discretion that existed under historic licences and whether discretion was ever exercised for environmental purposes under the *Water Resources Act.* Can the government be expected to exercise discretion to protect IFN in such muddied waters?

The following samples of licence conditions illustrate the issue.

Table 2: Sample licence conditions

Licence purpose (year issued)	Licence terms of potential application for IFNs
Irrigation (2017) [48]	**3.12** The Director reserves the right to amend this licence to reduce the maximum allowable diversion volume if, upon receipt of the analysis required pursuant to condition 3.11 [regarding a licencee "needs" analysis as may be required by the Director], the Director is of the opinion that the Licensee has not demonstrated a need for the licensed maximum diversion volume, and a reduced total allowable annual diversion would more appropriately reflect the steady-state requirements for the project. **3.13** This licence is based on knowledge available at the time of issue, and therefore the Director reserves the right to amend this licence by: (a) reducing the quantity of water diversion; (b) changing the maximum rate of water diversion; (c) requiring the Licensee to modify monitoring systems and the annual water monitoring information; and (d) requiring the Licensee to evaluate off-stream storage or alternative sources of water supply; if, in the Director's opinion, an adverse effect has occurred, is occurring or may occur due to the diversion of water under this licence on: (e) the North Saskatchewan River; (f) other water users; (g) instream flow needs; (h) instream objectives; or

[48] Licence to Divert Water Province of Alberta *Water Act*, R.S.A. 2000, c.W-3, as amended, Licence No. 00391408-00-00, Anchor F. Farms Ltd. Priority No. 2017-03-29-001, online: Alberta Environment and Parks authorization viewer, https://avw.alberta.ca/pdf/00391408-00-00.pdf.

Licence purpose (year issued)	Licence terms of potential application for IFNs
	(i) the aquatic environment. **3.14** The Director may amend this licence, pursuant to condition 3.13, in consideration of the contribution of this licence to regional cumulative effects, upon a minimum of 12 months written notice to the Licensee.
Oilfield waste processing (2017)[49] (issued by the Alberta Energy Regulator)	**3.13** The Director may amend this licence to establish In-stream Objectives, or other restrictions, to the source of water upon a minimum of 12 months written notice to the Licensee. **3.14** When the In-stream Objectives for the specific reach of the North Saskatchewan River have been provided to the Licensee by the Director, the Licensee shall divert water in accordance with the In-stream Objectives as required in writing by the Director.
Feedlot (1997)[50]	**1.** Diversion of water from the Bow River to supply this licence can only take place when the Instream Objective established by the Controller of Water Resources …are being met. The Controller reserves the right to revise the Instream Objective from time to time.
Irrigation (1963)[51]	**4.** That the quantity of water may be diminished from time to time by the Minister under and by virtue of authority vested in the Lieutenant Governor in Council by the *Water Resources Act* by defining the duty of water. **5.** That the rate of diversion may be increased or diminished in the discretion of the Minister to ensure an equitable apportionment of the waters in compliance with the

[49] Licence to Divert Water Alberta Energy Regulatory *Water Act*, R.S.A. 2000, c.W-3, as amended, Licence No. 00388345-00-00, Newalta Corporation, Priority No. 2017-01-05-005, online: Alberta Environment and Parks authorization viewer https://avw.alberta.ca/pdf/00388345-00-00.pdf.

[50] Interim License pursuant to the *Water Resources Act*, Licence No. 21371, John Van Nistelrooy, Priority No. 1997-02-06-01, online: Alberta Environment and Parks authorization viewer https://avw.alberta.ca/pdf/00022001-00-00.pdf.

[51] Water Licence for Irrigation Purposes under the *Water Resources Act*, Licence No. 111A, Eastern Irrigation District, issued 4th January 1963, online: Alberta Environment and Parks authorization viewer https://avw.alberta.ca/pdf/00045541-00-00.pdf.

Licence purpose (year issued)	Licence terms of potential application for IFNs
	requirements of the *Water Resources Act*, and the regulation made there under from time to time.

Precautionary options under the *Water Act*

The *Water Act* establishes various means by which precautionary measures can be taken. These measures are discretionary and rely on the Director, Minister and other delegates to make certain value choices in administration of the Act.

These precautionary measures include:

1. **Planning framework**

   The *Water Act* required the creation of a planning framework and an aquatic environment protection strategy.[52] The contents of the planning framework and strategy are discretionary in scope. The current strategy and the *Framework for Water Management Planning* do not articulate metrics for measuring and evaluating the aquatic environment and specific strategies, actions and targets are not identified. [53]

2. **Water management plans**

   A water management plan may be developed by the Director or another person and once approved by cabinet, must be considered in a variety of decisions under the Act.[54]

[52] *Water Act*, ss 7 & 8.
[53] Government of Alberta, *Framework for Water Management Planning*, (Edmonton: Government of Alberta, 2001) https://open.alberta.ca/dataset/8a08440e-efed-4f38-8516-1c097b8a2442/resource/f5ef848b-49e0-4fed-8a1d-4cfb6bb3d93e/download/2001-watermanagementplan-framework-2001.pdf at s.5.3.
[54] See *Water Act* Part 2, Division 1.

Approved water management plans must set out matters and factors that will be considered in approval decision, licence decisions and transfer decisions. In addition, plans may set geographic regions where a transfer of water allocation and where water conservation holdbacks are allowed.[55]

3. Water guidelines

Ministerial established guidelines may be considered in licence and approval decisions and may be used to direct water conservation initiatives in conjunction with water management orders.[56] The Director has the power to issue water management orders where a licence or approval holder has failed to conserve water or has wasted water where it is contrary to a "water conservation guideline respecting wastage of water".[57]

4. Water conservation objectives (and licencing of WCO)

The Director may establish WCOs following public consulation.[58] WCOs are focused on "protection of a natural water body or its aquatic environment, or any part of them, protection of tourism, recreational, transportation or waste assimilation uses of water, or management of fish or wildlife.[59] WCOs may include a "rate of flow of water or water level requirements".[60]

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[55] Water Conservation holdbacks refer to the ability of the Director to retain up to 10% of a licenced allocation earmarked for transfer for purposes of protecting the aquatic environment or to implement a water conservation objective (see s.83).
[56] *Water Act*, s.14 & s.97(2).
[57] *Water Act*, s.97(2).
[58] *Water Act*, ss14 & 15.
[59] *Water Act*, s 1(1)(hhh).
[60] *Water Act*, s 1(1)(hhh).

The Act provides that licences may be issued to government for the purpose of reaching a WCO.[61] This in turn gives a WCO a priority over more junior licence holders. This is of more value in basins that have yet to be heavily allocated.

WCOs may also guide decisions related to licence renewals under the Act.

5. Ministerial orders

The Minister may make an order that an activity, diversion or transfer not proceed where it is deemed not to be in the public interest.[62] An order may apply to a proposed activity, diversion or operation of works or classes thereof.

6. Reserves

The Minister may, by way of order, reserve water not currently allocated, as water reserved for any purpose.[63] This water so reserved can be given a priority date (of the date of reservation or later) and the Director may refuse to accept an application for a licence for the reserved water.[64] The Director may also issue licences that are in compliance with the reserve order.

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[61] Jurisprudence regarding the *Water Act* has confirmed that water licences for instream flows will not be issued to private parties, such as water trusts. Water Conservation Trust of Canada v Alberta (Environmental Appeals Board), 2015 ABQB 686 (CanLII), http://canlii.ca/t/glwpw.
[62] *Water Act*, s.34.
[63] *Water Act*, s.35.
[64] *Water Act*, s35(3)9d). Where not prohibited by the order the Director may issue licences for temporary diversions of reserved water.

7. Holdbacks

Transfers of water allocations can only occur where there is a cabinet order or approved water management plan saying that a water allocation transfer is permitted. Similarly, a "holdback" of water for the purpose of protecting the aquatic environment or meeting an WCO may be required by the Director when a transfer takes place.[65] The water held back may be up to 10% of water allocation subject to the transfer. [66]

8. Discretionary approval and licence decisions

When making approval and licence decisions there is the opportunity for the Director to consider "existing, potential or cumulative effects" of an activity or diversion on the aquatic environment or on hydrology.[67] Terms and conditions may be included on licences to allow for precautionary measures to be taken at the discretion of the Director.[68]

9. Cancellation of unused licences

The Director may cancel a licence for a variety of reasons, including where there has been no diversion or use of the rights granted by the licence for 3 years and there is no reasonable prospect of resuming the exercise of the rights granted under the licence.

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[65] *Water Act,* S.83. The order or approved water management plan must allow for the holdback.
[66] *Water Act*, s.83. It should also be noted that when a part of a licence water allocation is transferred the Director has the discretion to add certain terms and conditions to the licence from which the water licence (even deemed licences) under s.82(6) of the Act. These amendments are limited but do include the ability rate of flow and volume of water diverted and could add monitoring conditions. These amendments are likely to have minimal effect on the overall rights to divert under a deemed licence.
[67] See sections 38 and 51 of the *Water Act*.
[68] *Water Act*, s. 51(3).

The Director may also cancel a licence for non-performance of obligations under the licence (or a serious breach of a term or condition of the licence).[69]

10. Suspending licence applications

The Director has the discretion to close areas of the province to applications for further licences for a specified time.[70] This time may be extended where a "public review" is undertaken by the Director.[71] Considerations that may drive this decision include "existing, potential or cumulative effects on the aquatic environment…or any other matters…including any applicable water guideline, water conservation objective and water management plan".[72]

Adaptation in the *Water Act*

In a world of uncertainty there is the need to learn and adapt. In instances of low flows, where degradation of the aquatic environment is most likely, there are several opportunities to adapt. The regulatory levers to get water back in the stream inherently requires a reduction in diversion and consumptive use. This may be done through voluntary measures but regulatory direction may be required. These regulatory backstops need to focus on reducing consumptive diversions and may also require alterations in return flows (as water quality and temperature at low flows may have aggravating effects).

[69] *Water Act*, s.55 (1)(e) and (f).
[70] *Water Act*, s.53.
[71] *Water Act*, s.53.
[72] *Water Act*, s.53.

The need to get water back into a stream clearly gives rise to equity concerns among diverters/water users. Whether a priority call is put in place by government, hence shutting down junior licences, or whether there is the ability to assign water allocations or transfer allocations, the question becomes one of picking winners and losers (either directly or indirectly). Adaptation under the Act becomes more political in this regard.

1. Adaptation in issuance of licences

There is relatively broad discretion to consider climate change in making decisions about climate induced water supply variability. In making licencing decisions the Director must consider matters and factors as articulated in an approved water management plan. In addition the Director may consider "existing, potential, or cumulative effects on the aquatic environment, hydraulic, hydrological and hydrogeological effects, and effects on household users, other licensees and traditional agriculture users".[73]

As such, the Director has the ability, on a case by case basis, to consider the impacts of future supply and impacts on a climate change impacted aquatic environment and other users. These considerations are discretionary, unless integrated into an approved water management plan.

The difficulty in this approach is that the Director's decision, being focused on a single licence decision based on the potential impacts of climate variable supply, may become a *de facto* closure to the basin. If one licence should not be issued due to future supply issues than few if any other licences in relation to the same basin (or sub-basin) would appear to be justified.

[73] *Water Act*, s 51(4).

2. Limited adaptability of deemed licences

The *Water Act* gives a priority to deemed licences that were issued under preceding legislation.[74] The *Water Act* states:[75]

> A person who holds a deemed licence under this section may continue to exercise the right to divert water in accordance with (a) the priority number of the deemed licence, and (b) the terms and conditions of the deemed licence and this Act, and if a term or condition of the deemed licence is inconsistent with this Act, that term or condition prevails over this Act.

This in effect limits the ability of the Director to amend or review those licences issued in the past. This does not mean that the Director's hands are fully tied in relation to all deemed licences, as often discretionary terms and conditions were in place in past licences as well (as set out in the samples above). The nature of adaptive measures that could be taken under deemed licences will likely depend on the specific conditions on the licence (which have evolved through time).

3. Suspension and cancellation

Cancellations of licences for non-use are treated as precautionary measures in this report while suspension and cancellation of licences under current use are viewed as an adaptive tool.

Licences under the Act may only be suspended or cancelled in limited instances.

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[74] *Water Act*, s 18.
[75] *Water Act*, s. 18.

Where the Director finds that a "significant adverse effect on aquatic environment" has or may occur a licence may be suspended or cancelled.[76] The effect must not have been reasonably foreseeable at the time of the licence being issued and compensation is payable in this scenario.[77]

Where a significant adverse effect on human health or public safety is or may occur the Director may also suspend or cancel the licence. The effect must not have been reasonably foreseeable at the time of the licence being issued.[78] Unlike suspensions or cancellations for environmental purposes the Act does not state compensation is payable.[79]

The "reasonable foreseeability" of these effects would likely be questioned in the event that the Director moved to suspend or cancel a licence.

Temporary diversion licences can be cancelled, suspended or amended at the discretion of the Director.[80]

4. Amendments and modifications to licences post issuance

Amendments to licences are limited in their scope. The Director may amend a licence to give effect to a transfer of the licence, and/or to amend a term or condition relating to monitoring, reporting and inspection.[81] Also, a term or condition of the licence may allow for an amendment (see example above).

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[76] *Water Act*, s.55(2).
[77] *Water Act*, s.55(2).
[78] *Water Act*, s 55(1)(j).
[79] Interestingly compensation is payable where there is a water management order for these same purposes. (See *Water Act*, s.97).
[80] *Water Act*, s.64.
[81] *Water Act*, s.54.

This being the case licences could have conditions within them to clearly articulate that amendments to diversions may be required to "decrease the volume of diversion" in response to some preconditions related to climate change (or other factors) or ecological flows.

Terms and conditions that allow for adaptive water management must be included at the time of issuance.

5. Changing diversion volumes or rates using licence conditions

Several examples of licence conditions are outlined above. Terms and conditions on licences have changed throughout Alberta's water regulatory history. The phrasing of the terms and conditions of the licence (and the laws under which the licence was issued) will dictate the scope of discretion the government has to manage or direct a change in the volume or rate of diversion to be responsive to environmental flow needs. Several issues are likely to arise in the use of environmental conditions to justify altering a diversion.

First, for deemed licences, there is a sufficient lack of clarity with respect to how discretion can be used (relying on the law at the time, the *Water Resources Act*, such that, when combined with the practical and political implications of reviewing older licences on an individual basis, reliance on such conditions becomes practically untenable.[82]

Second, exercising discretion to alter diversion rates in the broader context of the priority system may give rise to equity arguments (if not legal arguments). This would

[82] Outright cancellation of a licence was limited under the *Water Resources Act* to instances of failure to divert water, wasting water, or other breach of a condition of the licence or the relevant acts or regulations.

apply to both deemed licences and licences issued under the *Water Act*. This would further discourage the exercise of discretion.

Third, even where conditions exist within licences to allow for the direction of reducing diversions for instream flow needs it appears that procedural hurdles, when combined with uncertainty, would favor government inaction. For example, the 12-month notification requirement currently included in licences is likely to favor the status quo as arguments about future flows appear likely. In this regard, the provisions are not temporally responsive to shorter term instream flow needs and uncertainty of future flows may be relied upon by government to defer decisions which are likely to be contentious.

Further, the administrative capacity to monitor and implement diversion changes on a licence by licence basis is likely to be lacking, particularly where such decisions are likely to be subject of regulatory appeals and/or litigation.

6. Licence renewals

Water licences issued under legislation prior to the *Water Act* do not have an expiry date. This clear barrier to adaptation is significant in basins where water is "over-allocated".

All licences issued under the *Water Act* have an expiry date. If an application for licence renewal is not received in the prescribed time the licence expires, as do all the rights related to the licence.[83]

[83] *Water Act*, s.59.

The Director may choose not to reissue a licence in certain circumstances. This includes where:

- the Director is of the opinion that it is not in the public interest to renew the licence;
- the renewal is inconsistent with an approved water management plan;
- the water is diverted from a body of water where a water conservation objective is not being met; and
- the Director is of the opinion that the renewal would cause a significant adverse effect on the aquatic environment.[84]

There is significant discretion related to this section in determining what is "in the public interest" and what is "a significant adverse effect". Climate variability and impacts on water supply could drive these considerations.

The renewal terms also illustrate the importance of setting WCOs and water management planning, and the need to consider climate variability in both these areas.

The Director may also place any terms and conditions on the renewed licence the Director deems appropriate.[85]

The renewal provisions of the Act also raise some issue around how discretion is exercised and how diverters may push back on issues of interpretation of the breadth of the Director's discretion. By way of example, what is meant by "where a water conservation objective is not being met"? Does this mean a single instance of not

[84] *Water Act*, s 60(3). The Director must provide written reasons where she refuses to issue a renewal.
[85] *Water Act*, s.60(5).

meeting a WCO can be used to refuse a renewal or does it require a consistent and prolonged failure to meet a WCO?

7. Water Sharing (assigning licenced allocations)

The *Water Act* enables the assignment of licence allocations but it is quite restricted.[86] Assignments are possible between licenced water or between traditional agricultural users. Licences must be in good standing and the rights of household users or other licenced users with higher priority must not be adversely affected by the assignment. [87] Further, access to the water must be a result of the natural flow or natural presence of the water and no adverse effects on a water body or the aquatic environment are permitted.[88] Also, water previously diverted under licence is unassignable.[89] This means that water reuse is limited for assignment purposes. The Director may stop diversions where there is (in the Director's opinion) the chance of adverse effects on other users with a higher priority or on the water body or aquatic environment. [90]

David Percy has noted that assignments have been used in the past and are adaptive, as among licence holders.[91] Assignments are not used to foster instream flows, although benefits to instream flows may occur where the assignee has higher return flows (assuming no change in water quality). Similarly, assignments may result in increased risks to the aquatic environment where the Director decides to allow an assignment notwithstanding the environmental impacts.

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[86] *Water Act*, s 33.
[87] *Water Act*, s.33.
[88] *Water Act*, s 33.
[89] *Water Act*, s.33(2).
[90] *Water Act*, s.33(5).
[91] Percy, note 32.

8. Adaptation and approved water management plans

Water management plans provide an opportunity to drive decision making under the Act. In undertaking water management planning the *Framework for Water Management Planning* must be followed.[92] Climatic variability and the risks of climate change receive sparse direct mention in the framework with the primary reference to research and the need for increased knowledge.[93]

The scope and application of water management plans is otherwise quite open ended. Current and future risks to aquatic environments is clearly one area of work that can be focused on in the framing of a water management plan.

That noted, a key challenge for water management plans in Alberta is that their adaptive nature is limited as they do not have legal authority to change existing dispositions, water diversion licences or otherwise. They may be used to set an adaptive course by way of enabling water allocation transfers and related holdbacks and by identifying WCOs which may be of relevance in licence terms and conditions or in the considerations for licence renewals.

As noted above, the SSRB AWMP and the BRB AWMP take various approaches to adaptation. Both plans rely on transfers and holdbacks to reach WCOs. The BRB AWMP has a stated 5-year review timeline whereas the SSRB AWMP does not.

Further, the matters and factors that must be considered for the issuance of new licences set out in the existing water management plants do not show indicia of taking a long term, "forward looking adaption" approach to water quantity issues and allocation. The Guidelines in the SSRB and BRB AWMP focus on ensuring against

[92] *Water Act*, s 9(2)(d).
[93] *Water Act*, s 9(2)(d).

significant adverse effects, a basic reiteration of the *Water Act*, however no guidance is given as to how to frame potential and cumulative effects or supply variability.

The SSRB AWMP highlights the need to deal with climate change but otherwise the issue was deemed "out of scope".[94] While the plan recognizes "that adjustments to this plan be made, as research result on the potential water management implications of climate change are better understood" it goes on to state that "[c]limate change was not considered due to the absence of "high-confidence" research conclusion on water supply and demand that may result from climate change".

Matters and factors considered for new water licences include general guidelines against issuance where there is a "significant adverse effect on the aquatic environment".[95]

Discussion of precautionary and adaptive measures

The *Water Act* has various tools to ensure a precautionary approach to sustainable and resilient water management and to adapt to changing knowledge and circumstances. To date these legislative tools have been used sparingly if at all and often belatedly. There appears to be hesitance within government to proactively use the tools available under the Act and to develop policy that promotes these legislative tools.

This delay is problematic as Alberta's water law does not provide a priority to instream flows or base flows. Delay in legal protections for instream flows can be said to be counter to

[94] SSRB AWMP at p 41 (Appendix D). https://open.alberta.ca/publications/0778546209.
[95] *Ibid*. at page 50.

precaution as legal mechanisms to protect flows may be diminished, depending on how conditions on licences are framed and administered.

This section reviews government opportunities taken and missed and provides commentary regarding the nature and extent that the opportunities have been used or are likely to be used.

Licence conditions for instream flows: an opportunity or a paper tiger?

Licences have integrated instream flows requirements as a method of curbing diversions pursuant to a licence. This, theoretically at least, allows government to dictate diversions rates or volumes to adjust to ecological flows.

Embedding IFN conditions in licences is likely viewed as a key step in being more adaptive however it is unclear whether these conditions will be used. Monitoring and administration of conditions on a licence by licence basis requires extensive government capacity and may invite disputes and litigation as to whether the exercise of discretion is justified. In light of economic and political arguments, litigation risks, and administrative capacity it must be questioned whether IFN licence conditions are a paper tiger of environmental discretion.

Opportunities taken

Discretionary actions	Comment
Water management planning: The Battle River Basin	The Battle River Basin (BRB) has capped allocations under its approved water management plan (AWMP) and has also identified a WCO.[96] While not perfect, the plan sets a water allocation limit in the basin at 57,500 dam^3 of licensed water use, at which point the basin should be closed to further allocations (allowing for an additional ~2000 dam3 in additional use at the time of the publication of the

[96]See Approved water management plan for the Battle River Basin (Alberta) 2014, online: https://open.alberta.ca/publications/approved-water-management-plan-battle-river-basin. (BRB AWMP)

Discretionary actions	Comment
	plan).[97] The BRB AWMP articulates a WCO as "a rate of flow that is 85% of the nature flow and is further augmented at low flow periods.[98] It is recognized that the WCO will only be achieved through flow restoration.[99] The plan also calls for a thorough review at 5-year intervals.[100] The BRB AWMP also sets out a monitoring framework for "ecosystem base flow" with direction to stop water diversions in licences that are subjected to the recommended WCO.[101] Voluntary flow restrictions on all licences are recommended to minimize the impacts on WCO constrained licences.[102]
Water allocation transfers and holdbacks	The South Saskatchewan River Basin Approved Water Management Plan (SSRB AWMP) recommended that holdbacks (in 2006) be used when water licence transfers occur in the basin and that WCO licences be issued to protect those held back volumes. [103] Several of these WCO licences have been issued.[104] These holdback amounts are typically small relative to the need to restore water to rivers and streams to reach environmental flows.[105] There would be a greatly

[97] BRB AWMP at page 48.

[98] BRB AWMP at 56. The plan states that "during those times when natural flow approaches the lowest quintile (20%) flow reductions shall be applied based on the greater of either 15% reduction of instantaneous flow or the lesser of either the natural flow or the 80% exceedance natural flow based on available time step data".

[99] BRB AWMP.

[100] BRB AWMP at page 61.

[101] BRB AWMP at 63.

[102] BRB AWMP.

[103] SSRB AWMP, (Edmonton: Alberta Environment, 2006) https://open.alberta.ca/publications/0778546209.

[104] See Government of Alberta, Guide to compelling reasons to not take the 10% holdback for water transfers within the South Saskatchewan River Basin (2015) https://open.alberta.ca/publications/esrd-water-quantity-2015-no-1.

[105] A ten-year review in the South Saskatchewan River indicated that 106457.7 dam3 had been held back in transfers. Source: Mike Murray *SSRB WMP 10 year review* , presentation undated *online:* http://www.saskriverbasin.ca/images/files/ADC%20Edits%20SSRB%20Presentation%20Final.pdf . Holdback amounts can be viewed on the Alberta Environment and Parks authorization viewer.

Discretionary actions	Comment
	increased number of transfers and holdbacks to make substantial headway in restoring flows to meet environmental flows (or the less protective WCO) in the SSRB.
Draft water allocation directive	The *Draft Water Allocation Directive*, if adopted in a similar form as published in 2018, is a step towards proactively limiting discretion to allocate water to the detriment of the environment. This policy development reflects a significant step in guiding discretion to protect environmental flows that has been long been delayed. While the policy does not have a minimum base flow for larger rivers it reflects a major step forward to address a significant policy gap. Further steps to licence these flows, to maintain priority, is required.
Cancellation of unused licences	Publicly available documentation on water licence cancellations is limited. The BRB AWMP indicated that 5 licences were cancelled in the basin (with a cumulative amount of 4986 dam^3).[106] This reflects an important step in review and identification of unused licences.

Opportunities missed

Discretionary action	Comment
Strategy for the protection of the aquatic	The statutorily required strategy for the protection of the aquatic environment can be found in the *Framework for water management*

[106] BRBWMP at 48.

Discretionary action	Comment
environment	*planning*.[107] The strategy articulates that "protection will occur through maintaining, restoring or enhancing current conditions" and that the government "recognizes the *need to be proactive and react quickly and effectively to protect the aquatic environment*".[108] It continues by enumerating the various tools, under various pieces of legislation, that could be employed to reach the protection that is stated, including a focus on WCOs and guidelines. The strategy lacks articulation of outcomes, goals and actions, i.e. the strategy fails to be adequately strategic in its content and direction (beyond the laudable "protection" definition).
The South Saskatchewan River Basin approved water management plan and closure	The closure of the SSRB to further surface allocations in the majority of the basin in 2006 may be presented as a precautionary measure to water management however it is also a reactive regulatory response to past over-allocations and inter-provincial water allocation commitments under the *Master Agreement on Apportionment*.[109] The *Master Agreement on Apportionment* requires that Alberta "permit a quantity of water equal to one-half the natural flow of each watercourse to flow into Saskatchewan.[110] The SSRB AWMP set water conservation objectives (WCO) in the Bow, Oldman and South Saskatchewan River Basin at "either 45% of the natural rate of flow, or the existing instream objective increased by 10%, whichever is greater at any point in time".[111] For the Red

[107] Government of Alberta, *Framework for Water Management Planning*, (Edmonton: Government of Alberta, 2001) https://open.alberta.ca/dataset/8a08440e-efed-4f38-8516-1c097b8a2442/resource/f5ef848b-49e0-4fed-8a1d-4cfb6bb3d93e/download/2001-watermanagementplan-framework-2001.pdf at s.5.3.
[108] Framework for Water Management Planning at s.5.3.
[109] The majority of basin was closed in 2006 with no further applications being accepted for surface water diversions in the Bow, Oldman and South Saskatchewan River basins, following the approval of the water management plan for the region. See the SSRB AWMP online: https://open.alberta.ca/publications/0778546209.
[110] *Master Agreement on Apportionment* at s. 3 of Schedule A, dated October 1969, online: https://www.ppwb.ca/information/109/index.html.
[111] SSRB AWMP at 8, online: https://open.alberta.ca/publications/0778546209.

Discretionary action	Comment
	Deer River subbasin it is 45% of the natural rate of flow, or 16 cubic metres per second, whichever is greater at any point in time".[112] This must be contrasted with a flow rate more protective of the aquatic environment, of having 80-90% of the natural rate of flow maintained.[113] The Plan also recommended holdbacks of 10% during licence transfers, although this has not always occurred.[114] The WCO was applied in a basin wide approach (unless an existing instream objective was greater), thereby undermining opportunities to be more protective in some tributaries and reaches.[115] The WCO in the SSRB cannot be deemed precautionary in nature by an objective environmental analysis. Tellingly, the SSRB planning process did not consider climate change. Rather, "[c]limate change was not considered due (sic) the absence of "high-confidence" research conclusions on future water supply and demand that may result from climate change."[116] There may be an opportunity to reprise the plan in light of advancement of climate change work that has been ongoing for the past decade. The plan itself left timing for review and revision of the plan open-ended.[117] Functionally speaking there is no flow buffer for the aquatic environment to ward against future climate change risk. Hence in this SSRB there is an almost exclusive reliance on adaptation

[112] SSRB AWMP at 9, online: https://open.alberta.ca/publications/0778546209.
[113] See *Desk-top Method* (note 36) and federal instream flow framework (note 39).
[114] See Government of Alberta, Guide to compelling reasons to not take the 10% holdback for water transfers within the South Saskatchewan River Basin (2015) https://open.alberta.ca/publications/esrd-water-quantity-2015-no-1.
[115] *Ibid*. at 8.
[116] SSRB AWMP, at Appendix D. https://open.alberta.ca/publications/0778546209.
[117] SSRB AWMP at 18.

Discretionary action	Comment
	measures. Further, the matters and factors that must be considered for the issuance of new licences set out in the both the SSRB and BRB AWMP do not show indicia of taking a long term "forward looking adaption" approach to water quantity issues and allocation. The guideline in the SSRB and BRB AWMP for the determination of effects of an allocation focus on ensuring against significant adverse effects; however, no guidance is given as to how to frame potential and cumulative effects or supply variability. In light of reliance on historic flows for determination of risks there is a clear gap in evaluating "potential" effects as contemplated by the Act. As the Plan has recently undergone a review there may be opportunities to revise and improve the plans approach.
Crown reserve	The *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* was put in place to reserve the remaining surface water in the named basins for specified purposes. The order indicates that licences may be issued for the purposes of a WCO.[118] In contrast, the *Oldman River Basin Allocation Order* (Alta Reg. 318/2003) reserves 11,000 acre feet for a variety of non-environmentally related purposes (that can be allocated in the southwestern region of the basin (i.e. upper reaches)).[119] There are no other Crown reserves that have been taken in the province. This is another mechanism that could feasibly be used to ensure allocation does not undermine ecological flows.

[118] Alta. Reg 171/2007. See s.6(1)(b)(c).
[119] See Order at s.3.

Discretionary action	Comment
Steps to engage in water conservation and mitigating water waste.	The *Water Act* provides the Director the power to issue orders to mandate water conservation and avoid water wastage.[120] A "water conservation guideline respecting the wastage of water" has not been publicly released.[121]
Cancellation of unused licences	While licence cancellations have been noted in the Battle River Basin there is no indication that a broader assessment and cancellation of unused licences has occurred (or is planned) across the province. Further, the terms of the *Water Act* may make cancellations challenging. There is the need for monitoring capacity to know which licences to track for non-use (as per section 55) and a further determination of no "reasonable prospect" of future use. These provisions give rise to legal risks of challenge, particularly in basins where water transfers have been approved and a risk of "sleeper licences" exists.[122] Where basins are closed, licence holders may seek to continue water diversions to maintain the licence in good standing.
WCO setting	Significant delays in setting of WCOs have occurred outside of the SSRB. Where instream objectives do exist and licence conditions

[120] *Water Act*, s 97 (2). (2) If the Director is of the opinion that water is not being conserved or that a person has wasted any water that is diverted pursuant to an approval, licence, registration or this Act and the wastage is contrary to a water conservation guideline respecting wastage of water, the Director may issue to any person a water management order for conservation purposes.

[121] *Water Act*, s 97 (2).

[122] Sleeper licences are those that may have been unused prior to the ability to transfer licenced allocations was approved in a region. In effect, the ability to transfer a licences changes a licence of limited value into something that may attract significant monetary value. The interest in the licence is thereby "awakened" and pressure against cancellation of licenses for non-use will mount. One area where the Director could take action to cancel or suspend licences is for non-performance or a serious breach of a term or condition (under s.55(1)(e)). What constitutes non-performance or a "serious" breach is open to interpretation. Presumably it could include things such as failure to report to the water use reporting system. Admittedly, this approach could be challenged as insufficiently serious and the optics of this approach may appear draconian.

Discretionary action	Comment
	permit, diversions may be curbed. The government's own *Action Plan* (of 2009) set out that WCOs for all major basins were to be set by 2015.[123] This has not occurred. A multi-sector advisory group, the Alberta Water Council, recommended that interim-WCOs be set by August of 2010 where an approved water management plan was not in place and to issue a licence to the government for the WCO.[124] The recommendation further stated that water should be protected in the seven major basins with "consideration …given to instream flow science, riparian habitat, water quality, fish and wildlife habitat , source water protection, seasonal streamflow and non-consumptive recreational purposes".[125] The recommendation was agreed to by government. Setting WCOs and licencing these WCOs in a timely fashion can be an effective measure for implementing precautionary measures to ensure resilience in the face of climate variability. The provisions of the *Water Act* itself favoured immediate action on WCOs. The Act made an allowance for allocation of heightened priority for WCO applications that were made within 5 years of the Act coming into force (or for water placed in a Crown reserve within 5 years of the Act coming into force). In both instances, the priority date was the date of the Act coming into force rather than the date of the application, as the case would be for other licences. All other WCO licences are given a priority date consistent with the date of the completed application.

[123] https://open.alberta.ca/dataset/2a91e8c6-ea9a-44c4-a76d-cd35a9a296f7/resource/49531a5a-e16c-4250-a9a4-0028fa500854/download/2009-waterforlife-actionplan-nov2009.pdf.
[124] Alberta Water Council, *Recommendations for Improving Alberta's Water Allocation Transfer System,* August 2009. Alberta Water Council, https://awchome.ca/LinkClick.aspx?fileticket=fVWx--_wG3A%3d&tabid=107. at page 13.
[125] Alberta Water Council, *Recommendations for Improving Alberta's Water Allocation Transfer System,* August 2009. Alberta Water Council, https://awchome.ca/LinkClick.aspx?fileticket=fVWx--_wG3A%3d&tabid=107 at 13.

Discretionary action	Comment
	These provisions reflect a clear legislative intent, by way of providing an exception to the normal rule of priority setting, of having WCOs issued for environmental purposes within 5 years of the Act coming into force. This is also in line with the planning and strategy for protection of the aquatic environment provisions of the Act (which had to published by the end of 2001). The Government could have feasibly could have applied to issue a licence in 2004, prior to the closure of the basin, and that licence, would have priority back to January 1, 1999. The ELC is not aware of a WCO licence being issued pursuant to s. 29(2)(b) timing and no crown reserves for the purposes of fostering a WCO were taken within 5 years of the date the Act came into force. Further, the ELC is not aware of whether any licences have been issued for the purpose of a WCO pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order.*[126]

Conclusion on precaution and adaptation

The *Draft Water Allocation Directive*, if adopted, reflects a more precautionary policy initiative in relation to environmental flows where no instream objectives have been set. There remains heavy reliance on discretionary measures that have not borne significant restoration of flows (particularly in the SSRB). The reliance on government discretion points to a need within the Act to overlay the first-in-time, first-in-right principle with a defensible determination of beneficial and efficient resource use. There is also a need to clearly articulate the instream flow

[126] Alta. Reg 171/2007. See s.6(1)(b)(c).

policy related to terms and conditions that currently are included in licences and how they may be used.

Planning documents need to be revised to be more precautionary and forward looking in how they direct future licence decisions.

Adaptation measures for the protection of environmental flows have been integrated as discretionary terms and conditions within more recently issued licences. The question then becomes whether these conditions in a licence are of any practical effect. Any reduction in allocation required by government for environmental outcomes is likely to be highly political. Cancellation of licences and non-renewal, while providing a high level of certainty in the restoration flows, are also not very palatable options (for both economic and political reasons).

The certainty gained by adopting the prior allocation approach and the empowerment of deemed licences for historical diversions have placed any discretion to limit diversions in proverbial shackles. Claims of undermining "rights" and economic uncertainty will undoubtedly continue to undermine proactive exercises of discretion for adapting to variable supplies.

As an example of this, consider how the *Water Act* constrains the ability to adapt via licence suspensions, permitting them only where an effect on the aquatic environment was "not reasonably foreseeable" at the time of issuance. The question then becomes, are all (or most) future adverse effects now reasonably foreseeable? It would seem our knowledge is now such that they are and future allocation decisions should at least theoretically consider them. This in turn is likely to inoculate licences from any attempts to suspend or cancel them based on the effects of the withdrawal (assuming this was even a palatable option).

Similarly, the focus of allocation decisions is reliant on front-end risk assessments, as allocation decisions are focused on a limited amount of data for the base line reference condition and are not well suited for review and adaptation. Some discretion has been exercised to stop

temporary diversion licences (tdl) yet the author is not aware of any instance of reduced diversion being required by government of non-tdl licence holders to meet instream objectives.

Fundamental policy changes are needed to provide support for the adaptive tools to be of practical value. First, a fund earmarked for restoration of flows at relevant times and a policy how that fund and compensation is decided is required for deemed licences. For more recent licences, where IFN terms and conditions are included, a policy on when and how diversions may be augmented is required.

Part 4: Legislative and policy innovation to deal with climate uncertainty

There is plenty of space and need for law and policy innovation in Alberta. Table 3 (below) outlines a general summary of how the *Water Act* fits with proposed design principles, as proposed by DeCaro *et al*., to become more adaptive. The *Water Act* is premised on a historic allocation system that was focused on certainty of diversions not adaptive to uncertainty of supply and environmental flows.

There are some signs of progress but administration of discretion in favour of environmental flows remains to be seen. Specifically, instream objectives appear to be well represented in more recent licences. A more thorough review of terms and conditions of licences is needed to understand the actual options open to government to act in an adaptive manner.

A variety of tools under the Act remain underutilized. This includes WCOs and related licences and water management plans that focus on the future potential effects. Deemed licences remain a challenge, as adaptive and precautionary tools in the *Water Act* are superceded by

these licences. Authority to manage these diversions in an adaptive manner was given up at the time of the passage of the *Water Act*. The predecessor *Water Resources Act* was even less adaptive and that is essentially what is carried over for many large licences.

The *Water Act* does not foster polycentric or decentralized management, the ability to review and amend existing rights are limited (both permanently and temporarily), and where they exist they are not likely to be exercised for the purpose of restoring environmental flows. Capacity (financial and human) for regional and community planning and governance of water resources is largely absent.

The *Water Act* reflects a marriage of granting clarity of rights to divert water (in a similar vein to property rights) and a step towards decentralized governance, by way of advisory water management planning. Areas of adaptation and precaution for non-consumptive uses are highly discretionary and have seen limited proactive application. Admittedly the reasons behind this timidity to exercise discretion is likely multi-faceted and additional work is necessary to determine mechanisms that can overcome this perceived administrative paralysis (if not a straightforward policy choice).

The ELC recommends augmenting both law and policy in an effort to become more adaptive and precautionary in water management. These recommendations recognize the diverse reality of water allocations across the province. Therefore, some areas of the province may be served by policy change alone, if tools and planning are proactively applied. Other, more water short areas of the province may require legislative changes.

Table 3: General design principles and Alberta's *Water Act* (adapted from DeCaro et al.[127])

Design principle		*Water Act* approach
Reflexive	• Does not rely on static rules, e.g., fixed water allocations, when flexibility is needed.	Limited flexibility in deemed licences and prior allocation
Legal Sunsets	• Planned periods of comprehensive evaluation, in which environmental policies and agreements can be periodically examined, renegotiated, and potentially modified.	Planned evaluation of approaches not mandated
Legally Binding Authority	• Authority to make decisions and implement chosen solutions is institutionalized in binding legislation, for multiple centres of governance activity in polycentric society, e.g., agencies, communities, regional governments.	Community and regional water governance not legislated*
Legally Binding Responsibility	• Formal definition and assignment of responsibility to resolve, or contribute to resolution, of a social-ecological dilemma, or element thereof.	Social-ecological issues not defined or assigned. Implied in policy decisions.
Tangible Support	• Assistance from national, state, and local government, etc., in the form of dedicated and sufficient funds, technology, information, and training to meet one's legally binding responsibilities and pursue one's legally granted authority	Decentralized and advisory planning has ad hoc support

*water management plans are directional to government but do not reflect polycentric governance

Policy Recommendations

Water management plans (*most relevant to basins that remain open to future surface water allocations)

1. Revise the *Framework for Water Management Planning* to include climate mitigation modelling and water allocation budgeting.[128]

[127] DeCaro, *et al* (2017), note 29.
[128] Government of Alberta, *Framework for Water Management Planning*, (Edmonton: Government of Alberta, 2001) https://open.alberta.ca/dataset/8a08440e-efed-4f38-8516-1c097b8a2442/resource/f5ef848b-49e0-4fed-8a1d-4cfb6bb3d93e/download/2001-watermanagementplan-framework-2001.pdf.

- The *Framework* should be amended to direct the inclusion of climate change considerations and long term water budgets in the matters and factors to be considered in authorization decisions under the *Water Act;*
- Revise plans on a periodic basis (i.e. 5 year cycle) and submit for approval to the Lieutenant Governor in Council.

Water wastage and conservation guidelines

2. Draft and publish Ministerial water wastage guidelines to empower the Director to issue orders for conservation purposes (as per sections 14 and 97(2) of the Act).

Licence discretion

3. Develop directional policy for exercise of conditional restrictions to protect base flows for all licences (i.e. deemed licences and licences issued under the *Water Act*).
    - Review legal options for exercise of discretion in relation to conditions on deemed licence to respond to diminished base flows.

Licence allocation guidelines

4. Formalize guidelines for determination of "potential" effects on the aquatic environment in allocation decisions;

Instream objective, WCO, and IFN tracking and reporting

5. Develop a system of tracking and public reporting to identify IO, WCOs (as applicable) and IFN and the annual incidence of exceedances of these metrics.

Public access to water use

6. Ensure public access to the water use reporting system and the data it contains. The current system lacks transparency. This transparency is required to ensure a broader civic monitoring role and to foster accountability in environmental outcomes.

Water Act reform

Fundamentally policy development (as set out above) will serve the purposes of Alberta's more northern basins where licenced allocations currently pose less of a long term threat to environmental flows. In the SSRB, if Alberta is to maintain ecological integrity of aquatic systems, the difficulties of government being proactively adaptive must be overcome through reform to the *Water Act* itself.

Adaptive governance

1. Enable regional and community co-governance with related authority over water allocation.

An example of a jurisdiction where regional/community governance is enabled with the potential to impact water allocations can be found in British Columbia, with its *Water Sustainability Act,* S.B.C. 2014, c. 15.[129]

[129] See Part 3, Division 4 of the Act. The legislation includes the ability to impose changes on authorization holders but compensation may be payable. Online: BC Laws http://www.bclaws.ca/civix/document/id/complete/statreg/14015#division_d0e10157.

Precautionary and adaptive allocation measures

2. Require the Director to consider instream flows informed by cumulative effects of allocations, land use impacts on water and future climate scenarios.

3. Require water budgeting at appropriate time scales to maintain or restore IFN.

4. Require periodic water need assessments that incorporate conservation and efficiency practices.

   Motivation for water conservation practices may be in play where water allocation transfers are enabled however there is a need to ensure broader scale use efficiency and minimization of waste and to ensure against the transfer of "sleeper rights". Rather than a "use it or lose it" approach the ELC recommends the regulations be promulgated to determine water "need" and for periodic revision and variance of the need assessment. An analogous approach is likely already at play in a closed basin for those new entrants into the basin seeking a licence transfer.

5. Streamline licence cancellations for non-use.

   Currently the legal prerequisites for licence cancellation are likely to cause a barrier to licence cancellation. A reverse onus provision should be used to provide that a licence will be cancelled where reporting of water use has not occurred for a set time frame, with the opportunity to furnish evidence of actual and/or potential use.

6. Streamline suspension process for environmental risks (with accompanying compensation policy).

The *Water Act* requirement that effects on the aquatic environment were "not reasonably foreseeability" at the time of the allocation should be removed.[130] A compensation policy should be created to clarify in what instances a cancellation or suspension may give rise to compensation and in what instances terms and conditions will be used for the protection of instream flows. It is likely that this power would only be engaged rarely, where potentially irreparable harm to aquatic systems may result.

7. Water fee structure to support water monitoring and planning.

   The *Water Act* should be amended to clearly enable the payment of fees and charges payable in relation to water allocations. These charges should be clearly identified (as with any exemptions) in regulation and should be allocated to the administration of the Act, monitoring, evaluation and assessment of water supply and climate variability, to pay compensation where licences are suspended to protect instream flows, and the support of community and basin based planning.

[130] *Water Act*, s 55(2).