Protocols for Adaptive Water Governance: The Future of the Columbia River Treaty

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Executive Summary

This paper examines legal mechanisms for flexibility and adaptive capacity in transboundary water agreements using existing models from both the international and domestic level to inform future approaches to cooperation on management of the Columbia River.

Since 1964, the United States and Canada have cooperated in the management of the Columbia River to achieve shared benefits from flood control and hydropower generation under the provisions of the Columbia River Treaty (CRT). The assured flood control provisions that govern operation of dams in Canada to control downstream flooding expire in 2024 and either Party may give notice to terminate the power sharing provisions by giving ten years notice commencing September 2014. These events, as well as changes in the basin not anticipated in 1964, have led to parallel comprehensive review processes on both sides of the border. On the U.S. side the review has been undertaken by the U.S. Entity designated under the CRT (i.e. Administrator of the Bonneville Power Administration and Division Engineer of the Northwestern Division of the U.S. Army Corps of Engineers) and on the Canada side of the border by the Province of British Columbia. In December of 2013, the U.S. Entity forwarded its Regional Recommendation to the U.S. Department of State calling for continuation of the underlying concept of shared benefits with modernization of the Treaty. In March of 2014, the Province of British Columbia released its decision on the Columbia River Treaty calling for continuation of the Treaty with negotiated improvements in the Treaty framework. Both review processes recognized the difficulty of predicting the future and acknowledged the uncertainty in water supply, demand, and timing of flow that may come with climate change; both recognized that this might warrant a degree of flexibility in the next generation of Columbia River management.

The U.S. Entity Recommendation calls for flexibility in both the treaty arrangements and its implementation as new information becomes available and as conditions change. In doing so, the Recommendation refers to both biophysical changes and changes in values. The Recommendation specifically recognizes the need for flexibility in addressing flood risk management due to changes in objectives and in climate; in the power system to accommodate intermittent sources of energy; and in a proposed new treaty purpose − ecosystem function − to address both climate change and legal changes such as listing under the U.S. *Endangered Species Act*. The Recommendation also refers to the use of adaptive management to mitigate impacts due to climate change. The B.C. Decision is much more concise, but does recognize the need for "adaptive mechanisms to address significant changes to key components and interests," and to address climate change in both planning and implementation. Both reviews recognize a need to involve Tribes/First Nations, communities and other regional sovereigns and interests during any negotiation process.

Although the focus of this paper is on the identified need for mechanisms for flexibility, it is important to also note that there are significant differences between the two positions, particularly in three areas: (1) the treatment of ecosystem values and perhaps other values, (2) the approach to sharing the benefits and (3) the assessment of what the treaty requires for the post-2024 called upon flood control regime.

This paper uses the concept of adaptive governance as a lens to explore the types of mechanisms needed to enhance flexibility and adaptive capacity in transboundary water management, and applies the concept to assess the degree of flexibility under the current CRT, and to identify models from other transboundary water agreements. Three attributes of transboundary arrangements that may be designed to facilitate flexibility are: (1) structure, (2) capacity, and (3) process. Using these attributes, it is apparent, for example, that as a result of structure (i.e. paying attention to whether a particular issue requires an international treaty or may be handled more readily at a subnational level) and capacity (i.e. paying attention to authority to use flexible mechanisms such as adaptive management), some of the models identified could serve to bridge differences between the parties on key issues such as the treatment of ecosystem values.

Columbia River Treaty

We begin our examination of "adaptive governance" mechanisms for flexibility with the CRT itself. The two most important mechanisms for flexibility in the CRT stem from the devolution of day-to-day operations to the Entities, and from the existence of non-treaty storage. The Entities have exercised considerable flexibility through the use of supplemental agreements to alter operations to serve additional purposes under the guiding principle that each party must be better off with the agreement than with the default operation prescribed by the Treaty. It is up to each Entity to make that assessment for itself, allowing each to reach its own domestic goals. Although generally used for year-to-year agreements, some agreements have a longer term, for example, the Libby Coordination Agreement. In addition, the Entities have agreed to the adoption of a number of important documents over the years to address flood control and hydropower planning, and these documents have evolved over the years. The existence of non-treaty storage has allowed the Entities to devise commercial arrangements to allow each Entity access to storage and flows to meet non-treaty objectives. Finally, in assessing the flexibility of the current CRT, it is important to consider the evolutive nature of treaty interpretation in international law which evolves to take into account changes in shared values.

Evolutive nature of treaty interpretation

The interpretation of international treaties can be evolutive, that is, can change over time in response to changing values. Any treaty must be *interpreted* in light of all of the relevant norms that bind the parties to that particular treaty. The relevant norms may include both other treaties as well as norms of customary law including international environmental law. In particular,

generic terms and broad concepts should be interpreted in light of the changing understanding of those concepts in general international law. The particular application of these ideas will always depend upon context, the particular treaty provision to be interpreted and proof of the relevant rules of international law. It is more difficult to apply the concept of evolutive treaty interpretation to the core provisions of the CRT and its Annexes which are specific and detailed and read more like a commercial contract than an international treaty. Clearly, in negotiating the Columbia River Treaty, both sides were as much concerned about the commercial aspects of the arrangement and the management of risk as they were concerned with traditional governmental and resource management matters. This more technical and precise form of drafting limits the opportunities to apply an evolutive and dynamic approach to the treaty. It follows from this that if the two states do wish to create a more adaptive treaty for the future, they would be well advised to adopt general and conceptual language and rely on appropriate institutional design to achieve broadly articulated goals. Some mechanisms for accommodating flexibility and changes are identified in other transboundary agreements considered in the paper.

Boundary Waters Treaty and the International Joint Commission

The 1909 Boundary Waters Treaty (BWT) governs boundary and transboundary waters between the United States and Canada and established the International Joint Commission (IJC) which takes the form of two bi-national sections, each supported by a secretary. In the Columbia River Basin, the CRT largely supersedes the BWT. In this paper we look at the BWT and the IJC, not as institutions that should govern the Columbia River, but for what we can learn about flexible approaches to the management of shared water bodies and as examples of mechanisms that could be considered in that context. The BWT and IJC offer a model of a bilateral political institution with the authority to take up new issues referred to it by both governments. The BWT's so-called "reference jurisdiction" allows new issues to be addressed where both governments agree. This ability to respond to change has ensured the continuing relevance of the BWT and allowed it to play a role in assisting the two governments in reaching agreement on new issues. In addition, and under its compulsory jurisdiction, the IJC has been able to keep its existing Orders of Approval for boundary and transboundary projects under review to ensure that they respond to changing needs and interests. The constraint here is that the IJC must ensure that its Orders still reflect the priorities and values of the treaty. Thus the IJC has been able to adapt over time but is subject to the constraints referred to, thereby assuring the perception of legitimacy in its actions.

BWT and IJC – St Mary and Milk Rivers

The allocation of the St. Mary and Milk Rivers occurs pursuant to terms of Article VI of the 1909 BWT, an IJC Order of 1921, and a set of administrative procedures agreed by authorized field officers. Although involving a much smaller set of issues and players than the Columbia River, the hierarchy of arrangements offers some parallels with the CRT insofar as the field officers have some limited opportunity to create win/win results for both parties which create benefits for both parties beyond those provided for by the Treaty and the 1921 Order.

Interestingly, in efforts to develop multi-year solutions, the IJC has encouraged the two jurisdictions most involved (Alberta and Montana) to explore other opportunities for shared benefits. Both jurisdictions have chosen to involve representatives of those most affected within their respective teams. In the case of Montana this has allowed the involvement of tribal interests in the process. These recent efforts offer more of a "bottom-up" attempt to find solutions than a "top-down" federally-driven approach. Perhaps the most important lesson from the St. Mary and Milk Rivers is the counsel of modesty of ambition. If it is difficult and slow to make progress in a much simpler system which engages fewer interests and players we should anticipate even greater challenges within the Columbia Basin in seeking to go beyond the flexibilities that exist within the current structure. An additional lesson is that there is a tradeoff between certainty and flexibility. The more an agreement prescribes a specific allocation (whether of water as with the St. Mary and Milk Rivers, or power and flood control costs and benefits as with the CRT), the more difficult it will be to change the arrangement unless each party can see at least some benefit from the adjustment.

BWT and IJC – Great Lakes Levels

The BWT requires that control structures that have the capacity to change the levels of boundary waters (or transboundary waters) must be approved by the IJC. In the Great Lakes, there are two significant sets of control structures that affect lake levels – in the St. Marys River at Sault Ste. Marie, and on the St. Lawrence River at Cornwall/Massena. Both structures are authorized by IJC Orders of Approval and have changed over time to adapt to changing circumstances. The levels decisions of the IJC offer excellent examples of bargaining for optimal arrangements within the framework of the Treaty. Levels Orders must always respect the values listed by the Treaty and their order of precedence but can recognize new interests and bring them into the mix provided that this does not have a significant impact on treaty protected interests. The IJC has used its continuing jurisdiction over old levels orders to recognize new interests and values such as ecological values and landowner and recreational interests. In doing so the IJC has taken great efforts to involve the public and all interests in the process of developing regulation plans that best meet the needs of all interests while respecting the values of the treaty. This is necessarily a slow and iterative process. Since it is a process that involves tradeoffs, not all parties will be satisfied with the outcome and some may incur incremental costs. In addition, the levels review process illustrates the importance of science and the peer review of that science. The IJC has included the concerns and interest of First Nations and the Tribes in the more recent reviews its levels orders. While it has not identified such interests as a separate interest that should be taken into account in developing levels orders it has suggested including indigenous representation on a Board of Control.

BWT and IJC/Great Lakes Water Quality Agreements (GLWQA)

Under the reference jurisdiction of the BWT, the IJC responded to a request in 1970 to investigate pollution in Lake Erie, Lake Ontario, and the international section of the St.

Lawrence River, and released a report finding that pollution of these waterways violated the BWT. This led to the first Great Lakes Water Quality Agreement in 1972. The United States and Canada have revised and extended this Agreement from time to time, most recently with the Great Lakes Water Quality Agreement of 2012 (GLWQA of 2012) which supersedes the previous agreements. In addition to providing further illustration of the flexibility under the reference jurisdiction of the IJC, the GLWQAs illustrate the importance of separating the decision-making body from the scientific advisory body, the use of domestic implementation to allow programs to be tailored to meet local needs and to increase the avenues for local input, and the use of adaptive management. In terms of organizational structure, the GLWQAs use a nested governance approach in which the advisory bodies are comprised of representatives from national and subnational agencies and governments, and an Executive Committee is established with representation that includes not only states and provinces, but also Tribes, First Nations, and municipal governments.

Great Lakes Compact and Agreement

The Great Lakes (GL) Compact and Agreement provide an example of a subnational, non-binding, transboundary agreement entered into by the states and provinces surrounding the Great Lakes. A subnational agreement approach which provides coordination may be particularly relevant for those aspects of Columbia River Basin management that require a degree not only of flexibility, but diversity in implementation due to differences in either ecological or social properties and values. Ecosystem function may be the type of issue that requires greater local control and tailoring although issues requiring coordination of river flow may still require implementation at the treaty level. It is important to emphasize that in referring to the GL Compact and Agreement as a potential model for coordination of measures aimed at ecosystem function, we are referring to the institutional structure in which subnational levels of governance play the lead role. The specific measures of the GL Compact and Agreement are limited in application to the Columbia River Basin in at least two significant ways. First, Tribes and First Nations are not included in the sovereigns that are party to the GL Compact and Agreement. Second, the GL Compact and Agreement deal primarily with preventing out-of-basin transfers, an issue in which sovereigns bordering a lake all suffer the consequences, whereas this is not necessarily the case with those sharing a river. In a soft law agreement that lacks binding effect, attention would need to be given to those aspects of the agreement that afford each party an incentive to comply and to resolve disputes.

Pacific Salmon Treaty (PST)

The PST is a very different instrument from the international water agreements discussed elsewhere in this paper. That this should be so is hardly surprising given the nature of the resource in question and the types of issues that it seeks to address. Some caution should therefore be exercised in thinking about the applicability of PST arrangements in the different context of an international water agreement. The PST establishes an institutional structure

comprising the Commission, the Panels and various technical committees and working groups and its work is strongly science-based. The architecture of the PST emphasizes the need for flexibility and adaptation in relation to the Pacific salmon fishery through use of a framework or umbrella treaty accompanied by detailed annexes which can be amended from time to time, and an annual cycle that pervades all of the arrangements including the technical chapters. As a result, the treaty has evolved incrementally, with the Parties building on its successes and adding new provisions as consensus could be achieved.

Treaty of February 3, 1944 between the United States of America and Mexico for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande

The 1944 Treaty between the United States and Mexico has proven remarkably flexible in handling issues from water quality to infrastructure damage, ecosystem restoration, and drought. This has been accomplished through its International Boundary and Water Commission (IBWC) and the authority of that Commission to enter its decisions in "Minutes" which become binding after transmission to the respective governments and acquiescence by the governments. Lessons from both the successes and failures in the U.S.-Mexico experience include the need to separate the diplomatic from the technical function of the international entity, the need to provide clear authority for agency oversight within state sections, and the need to require transparency and to provide a forum for both sovereign and public input, review and deliberation.

Glen Canyon Dam Adaptive Management Program (GCDAMP)

The GCDAMP is an experimental program in the United States to alter release from a federal dam and measure results for sediment transport and deposition downstream. It provides an example of the use of adaptive management to experiment with river flows in the face of uncertainty regarding ecological outcomes. It illustrates the following key lessons: that large-scale adaptive management can be implemented through an institutional design that provides clear authority to the operating entity while using the domestic law of the respective countries to assure input by sovereigns and major interests; and that large-scale adaptive management is probably appropriate only in situations where a clear objective for experimentation and the nature of the experiment are agreed upon through an initial political process. In addition, it provides a model for formation of an advisory body that includes both sovereign and major interest representation. One example of an area in which the Columbia River Basin might utilize this approach is with respect to the re-introduction of salmon above Grand Coulee.

Yellowstone Controlled Groundwater Area (CGWA)

The Yellowstone CGWA was established to monitor and regulate groundwater in Montana adjacent to Yellowstone National Park to protect the hydrothermal system within the Park. It provides a second example of the use of adaptive management. It illustrates the separation of decision making on tradeoffs (governance) from technical implementation (management), and the applicability of adaptive management for issues on which the parties can agree to clear

guiding principles and goals for implementation. One aspect of the transboundary issues facing the Columbia River Basin that may lend itself to this approach is flood risk management.

Mackenzie River Basin Master Agreements

The Mackenzie Master Agreement is another agreement between the sub-federal units within a federation; this time from Canada. The Agreement was negotiated after the upstream jurisdiction (B.C.) had already proceeded unilaterally with one major development. The Mackenzie Agreement offers a completely different way of approaching the cooperative management of a shared watercourse. Rather than focusing on particular outcomes and particular values (such as power and flood control) at the outset the parties concentrated on achieving agreement on an institutional and organizational structure and a set of broad principles. In addition, the parties seem resolved to take an adaptive approach to managing their shared watercourses by setting objectives and thresholds which will trigger additional management responses as necessary, all supported by information collection and monitoring procedures.

Conclusions

The formal review processes of the Columbia River Treaty initiated by the Province of British Columbia and the U.S. Entity reveal common ground on the need for flexibility in future arrangements and implementation, particularly in the face of climate change, and in the desire to involve Tribes and First Nations as well as various interests in any future negotiation and implementation of an agreement. At the same time significant differences between the two reviews include: (1) the treatment of ecosystem values and perhaps other values, (2) the approach to sharing the benefits, and (3) the assessment of what the treaty requires for the post-2024 called upon flood control regime.

Through the lens of adaptive governance we have explored mechanisms to enhance flexibility and adaptive capacity in transboundary water management. Some of the models identified could serve to bridge differences between the parties on key issues such as the treatment of ecosystem values.

1. Introduction

Since 1964, the United States and Canada have cooperated in the management of the Columbia River to achieve shared benefits from flood control and hydropower generation under the provisions of the Columbia River Treaty (CRT).[1] The degree of transboundary cooperation and the concept of shared benefits incorporated in the treaty has led to the CRT being hailed as "one of the most successful transboundary water treaties based on equitable sharing of downstream benefits."[2] The CRT contains no automatic expiration date, but since September 16, 2014, either party has the authority under the treaty to terminate certain of the treaty provisions provided they give at least ten years notice.[3] The earliest optional unilateral termination date of September 16, 2024 coincides with the expiration of the assured operation of storage in Canada to provide flood control downstream.[4] As of this writing, the deadline for providing a ten year notice of termination has passed for this initial termination date.

Changes in the basin since 1964 that include energy markets, ecosystem health, public values particularly in relation to the environment, public expectations of involvement in decision making, and empowerment of basin residents not consulted in the formulation of the CRT[5] have informed a comprehensive review process in both countries. This has been undertaken on the U.S. side of the border by the U.S. Entity designated under the CRT (i.e. Administrator of the Bonneville Power Administration and Division Engineer of the Northwestern Division of the U.S. Army Corps of Engineers)[6] and on the Canada side of the border by the Province of British Columbia.[7] In December of 2013, the U.S. Entity forwarded its Regional Recommendation to the U.S. Department of State calling for continuation of the underlying concept of shared benefits with modernization of the Treaty.[8] In March of 2014, the Province of British Columbia released its decision on the Columbia River Treaty calling for continuation of the Treaty with negotiated improvements in the Treaty framework.[9]

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[1] Treaty Between Canada and the United States of America Relating To Cooperative Development of the Water Resources of The Columbia River Basin (CRT), U.S.-Can., Jan. 17, 1961 *available at* http://www.crt2014-2024review.gov/Files/International%20Documents%20ColumbiaRiverTreaty.pdf

[2] John. M. Hyde, Columbia River Treaty Past and Future, HydroPower, July 2010.

[3] Columbia River Treaty, *supra* note 1, Article XIX(2).

[4] Columbia River Treaty, *supra* note 1, Article IV(2).

[5] *The Columbia River Treaty Revisited: Transboundary River Governance in the Face of Uncertainty,* edited by Barbara Cosens, A Project of the Universities Consortium on Columbia River Governance (Oregon State University Press, 2012).

[6] U.S. Army Corps of Engineers and Bonneville Power Admin., *Columbia River Treaty: 2012/2024 Review, available at*: http://www.crt2014-2024review.gov/.

[7] British Columbia, Columbia River Treaty Review, *available at* http://blog.gov.bc.ca/columbiarivertreaty/

[8] U.S. Army Corps of Engineers and Bonneville Power Administration, *Columbia River Treaty 2014/2024 Review, Regional Recommendation*, December 13, 2013, available at http://www.crt2014-2024review.gov/RegionalDraft.aspx

[9] British Columbia, Columbia River Treaty Review, B.C. Decision, March 2014, available at http://blog.gov.bc.ca/columbiarivertreaty/files/2012/03/BC_Decision_on_Columbia_River_Treaty.pdf

A common thread in the CRT review processes is the recognition that some of the assumptions on which the CRT was predicated, including those involving energy sources and energy markets[10] as well as public values concerning the environment did not play out in the manner anticipated, and importantly that uncertainty will likely continue into the future.[11] In addition, both domestic processes recognized that climate change reduces the ability of managers to rely on the historic water record in planning for system management. In particular, predictions for the Columbia River basin indicate that many of the lower elevation and lower latitude watersheds may flip (and some already have flipped) from snow to rain dominated, changing the timing of runoff and compromising system reliance on natural storage.[12] Not only do these predictions come with a high degree of uncertainty, but they include the possibility that the basin may experience greater extremes in water supply than in the past with implications for both flood and drought preparedness.[13] Changes in climate may also have consequences that cascade through the basin ecosystem altering the ability to rely on current ecosystem services. The pervasive variability and uncertainty accompanying climate change is referred to as nonstationarity,[14] and requires a different approach to water management than relied on in the past.[15]

Common to both the U.S. and B.C. review processes is the recognition that mechanisms to respond to change and a degree of flexibility in doing so may be needed in a modernized or improved Treaty or in the implementation of the existing Treaty. It is the purpose of this report to explore legal mechanisms for flexibility and adaptive capacity in transboundary water agreements at both the international and domestic level as potential models to inform the changes that the negotiators might be considering as part of any future treaty arrangements for the

[10] A current topic of debate in many jurisdictions is the use of hydraulic fracturing to produce non-conventional oil and natural gas reserves (shale oil and shale gas). The potential water issues associated with these developments are complex and include the large volumes of water required for fracturing operations, the safe disposal of fracturing fluids, and concerns as to possible contamination of potable groundwater sources. The implications of this for the Columbia Basin are briefly considered in Appendix I.

[11] *See e.g.,* Cosens (ed) *supra* note 5

[12] P. Mote, A. Hamlet, M. P. Clark and D. P. Lettenmaier, *Declining Snowpack in Western North America*, 86 Bulletin American Meteorological Society 39 (January 2005), *available at* http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/28018/MotePhilipW.CEOAS.DecliningMountainSnowpack.pdf?sequence=1

[13] A. F. Hamlet, P. W. Mote, M. P. Clark and D. P. Lettenmaier, *Effects of Temperature and Precipitation Variability on Snowpack Trends in the Western United States,* 18 Journal of Climate 4545–4561 (2005).

[14] P. C. Milly, J. Betancourt, M. Falkenmark, M. Hirsch, R. M. Kundzewicz, Z. W. Lettenmaier and R. J. Stouffer, *Stationarity Is Dead: Whither Water Management?* 319 Science 573–574 (2008).

[15] Stephen McCaffrey, *The Need for Flexibility in Freshwater Treaty Regimes* 27 Natural Resources Forum 156-162 (2003); Glen Hearns and Richard Kyle Paisley, *Lawyers Write Treaties, Engineers Build Dikes, Gods of Weather Ignore Both: Making Transboundary Waters Agreements Relevant, Flexible and Resilient in a Time of Global Climate Change*, 6 Golden Gate U. Envtl. L.J. 259 (2013); Alena Dieeschova, M. Giordano, and I. Fischhendler, *Governance Mechanisms to Address Flow Variability in Water Treaties*, 18 Global Environmental Change 285 – 295 (2008); Heather Cooley and Peter H. Gleick, *Climate-proofing Transboundary Water Agreements,* 56(4) Hydrological Sciences Journal 711 – 718 (2011); Gretta Goldenman, *Adapting to Climate Change: A Study of International Rivers and Their Legal Arrangements*, 17 Ecology Law Quarterly 741 – 802 (1990).

Columbia River. This paper begins with a review of the CRT, the review processes and their outcomes, and the position of the parties on the need for adaptive mechanisms for future transboundary cooperation on management of the Columbia River. The paper uses the concept of adaptive governance as a lens to explore the types of mechanisms needed to enhance flexibility and adaptive capacity in transboundary water management, and applies the concept to assess the degree of flexibility under the current CRT, and to identify models from other transboundary water agreements.

There are six parts to the paper. Following this introduction Part 2 offers a brief description of the CRT and then examines what each of the United States and Canada have had to say through their respective review processes about the future of the CRT. Part 3 of the paper examines the concept of adaptive water governance while Part 4 of the paper examines the flexibility mechanisms that are available to the two governments and their Entities under the terms of the current treaty. Part 5 examines a number of examples of flexibility and adaptive capacity in other treaty and compact arrangements. It provides a summary of the key elements of these arrangements; the appendices provide a more detailed discussion. Part 5 begins with a discussion of the evolutive interpretation of treaty texts as a means of providing flexibility over time. It then proceeds to examine, successively the Boundary Waters Treaty, 1909 (and the arrangements under that Treaty for the Milk and St. Mary Rives and for the Great Lakes Levels Orders), the Pacific Salmon Treaty, 1985, the Great Lakes Water Quality Agreements (1972 – 2012), the Great Lakes Compact and Agreement, and the practice under the 1944 Treaty between the United States and Mexico dealing with the Colorado, Rio Grande and Tijuana Rivers. Part 5 concludes by examining three domestic models for adaptive water management, Glen Canyon Dam and Yellowstone groundwater supplies from the United States and the Mackenzie River Basin from Canada. Part 6 offers some brief conclusions.

2. Background

This section of the paper provides an overview of the Columbia River Treaty and an account of the current positions resulting from the two review processes of the Columbia River Treaty. That part of the account draws principally on two documents: the U.S. Entity's Regional Recommendation to the Department of State and the Province of British Columbia's decision of March 2014. The Department of State is currently leading a multi-agency process in Washington to review the regional recommendation. The Government of Canada agrees with the province's position.

2.1. Columbia River Treaty

The Columbia River Treaty between Canada and the United States, concluded in 1961 and entering into force in 1964, addresses the cooperative management of the Columbia River for flood control and power purposes. The 1964 CRT was ratified by the President of the United States on the advice and consent of a two thirds majority of the Senate, and ratified by the federal Crown for Canada following parliamentary approval and agreement with the province of British Columbia. States in the U.S. portion of the basin were involved in negotiations through their representatives in the Senate. The province of British Columbia was also heavily involved in the negotiation of the Treaty on the Canadian side. Indigenous peoples were not involved in the development of the CRT on either side of the international boundary; neither in any significant way were other basin residents.

The main provisions of the CRT are as follows. Canada is to provide 15.5 million acre feet (MAF) of storage "usable for improving the flow of the Columbia River" at three facilities Mica, Duncan, and Keenleyside[16] with 8.45 MAF of that storage also dedicated to assured flood control.[17] In return, the U.S. is to pay Canada $64.4 million for assured flood control for the first sixty years of the Treaty and provide a 50/50 division of the benefit of the additional hydropower generated in the United States due to releases from the three new dams. The Canadian share is referred to as the "Canadian Entitlement"[18] or the Canadian downstream power benefits. In order to realize these benefits the Treaty provides that Canada must operate the Treaty dams in accordance with agreed upon flood control plans and hydroelectric operating plans. In addition, the Treaty allowed the United States to build Libby Dam on the Kootenai (Kootenay) River. Lake Koocanusa − the reservoir behind Libby − backs up into Canada.[19]

The Treaty also provided for the appointment of operating Entities by the United States and Canada. As its operating Entity, the U.S. selected the Administrator of the Bonneville Power

[16] Columbia River Treaty, *supra* note 1, Article II.
[17] *Id*., Article IV(2).
[18] *Id.,* Art. V.
[19] *Id.,* Art. XII.

Administration and Division Engineer of the Northwestern Division U.S. Army Corps of Engineers (USACE);[20] Canada selected BC Hydro.[21] The Treaty established one new institution, the Permanent Engineering Board (PEB) to report on performance under the Treaty with a view to ensuring that the objectives of the Treaty are being met.[22] It is important to note that BC Hydro and other private parties have other facilities on the Columbia and its tributaries in Canada and that not all of the storage in the Treaty facilities is dedicated to the Treaty. For example, Mica contains considerable non-Treaty storage and BC Hydro took advantage of the control offered by Mica to build the Revelstoke facility immediately downstream of Mica. The CRT did not directly accommodate values other than hydropower and flood control. The Entities have reached mutually acceptable annual supplementary agreements to meet some of the non-power and non-flood concerns but many believe that these arrangements do not go nearly far enough in accommodating ecosystem values and function. These supplementary agreements do not provide an avenue for re-consideration of the formula for sharing the costs and the benefits of providing enhanced power and flood control.

The CRT has no fixed term but either Party may unilaterally terminate parts of the CRT in 2024 or later provided that it gives at least ten years notice. Unilateral termination will principally affect the power provisions of the treaty. This is because the flood control provisions change automatically in 2024 and those changed flood control provisions survive treaty termination as does the right of the U.S. to operate Libby Dam.

The balance of this chapter examines the review processes that the US Entity and the government of British Columbia have put in place.

[20] Exec. Order No. 11,177, 29 Fed. Reg. 13097 (Sept. 16, 1964).
[21] James Barton and Kelvin Ketchum, "Columbia River Treaty: Managing for Uncertainty", in Cosens (ed) *supra* note 5, at 2.
[22] Columbia River Treaty, *supra* note 1, Article XV.

2.2. U.S. Entity regional recommendations

The U.S. Entity's Regional Recommendation to the Department of State (December 2013) consists of regional goals, general principles, detailed recommendations and a set of domestic matters to be addressed.[23]

Regional Goals

The regional recommendation articulates three main goals. The first goal is to include "additional ecosystem operations to expand, enhance and complement" existing arrangements for taking into account ecosystem and ecological considerations.[24] The document explicitly recommends inclusion of ecosystem-based function as a third primary purpose of the treaty to accompany flood control and power benefits. Second, the U.S. Entity recommends amending the current formula for sharing the power benefits of the treaty so as to make the sharing formula "more equitable" and based on "the more realistic measure of the power value of coordinated operations as compared to non-coordinated operations."[25] Third, the U.S. Entity recognizes the value of the flood control measures of the treaty and that the nature of the flood control operation changes in 2024 to a called upon operation, thus leading the U.S. Entity to call for a coordinated and resilient flood risk management plan to provide for public safety, developed in light of improved understanding of the implication of climate change. The document summarizes these goals as follows:[26]

> … the region's goal is for the United States and Canada to develop a modernized framework for the Treaty that ensures a more resilient and healthy ecosystem-based function throughout the Columbia River Basin while maintaining an acceptable level of flood risk and assuring reliable and economic hydropower benefits. Therefore, it is important to achieve a modernized framework for the Treaty that balances power production, flood risk management, and ecosystem-based function as the primary purposes, while also recognizing and implementing all authorized purposes.

General Principles

The U.S. Entity articulated nine general principles to inform the modernization of the treaty. We reproduce these principles below. In each case we have added, in italics, a short title.

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[23] U.S. Entity, Regional Recommendation for the Future of the Columbia River Treaty after 2024, December 13, 2013, http://www.crt2014-2024review.gov/Files/Regional%20Recommendation%20Final,%2013%20DEC%202013.pdf This version was preceded by a Draft Regional Recommendation that was made available September 20, 2013. There were relatively few changes made between the draft version and the final version.

[24] Id., at 1 – 2.

[25] Id., at 2.

[26] Id., at 2, footnotes omitted. The goals section of the paper also refers to other needs and authorized purposes including irrigation, municipal and industrial use, in-stream flows, navigation and recreation.

Principle 1: Maximize shared benefits
Treaty provisions should enable the greatest possible shared benefits in the United States and Canada from the coordinated operation of Treaty reservoirs for ecosystem, hydropower, and flood risk management, as well as water supply, recreation, navigation, and other pertinent benefits and uses, as compared to no longer coordinating Treaty storage operations.

Principle 2: Ecosystem health as a shared cost and benefit
The health of the Columbia River ecosystem should be a shared benefit and cost of the United States and Canada.

Principle 3: Duration, stability and adaptation
The minimum duration of the Treaty post-2024 should be long enough to allow each country to rely on the Treaty's planned operations and benefits for purposes of managing their long-range budgets, resource plans, and investments, but adaptable enough to allow responses to new information and changing conditions.

Principle 4: Best available science[27]
All operations of the Treaty should be based on the best available science, and, to the extent practicable, measurable outcomes.

Principle 5: Observe all obligations under domestic law
U.S. federal reservoirs/projects will continue to meet authorized uses consistent with applicable legislation, Indian treaties and tribal rights, the U.S. Government's trust responsibility to the tribes, and other U. S. laws such as the *Clean Water Act* and the *Endangered Species Act*. Non-federal U.S. projects will continue to meet their responsibilities pursuant to their Federal Energy Regulatory Commission licenses.

Principle 6: Extend cooperative arrangements to include Canada's non-treaty storage
The United States and Canada should pursue a more coordinated use of Treaty and Canadian non-Treaty storage under the Treaty to increase the flexibility to, and benefits of, meeting ecosystem-based function, power, flood risk management, and other authorized water management purposes in both countries.[28]

[27] This recommendation was added to the draft September 2013 version.
[28] The precise language of this recommendation was softened between the September and December versions of the document.

Principle 7: Build in resilience to take account of climate change
The region anticipates impacts from climate change to all of the elements described in this document. The strategy for adapting the Treaty to future changes in climate should be resilient, adaptable, flexible, and timely as conditions warrant.

Principle 8: Costs and benefits should be aligned
It is recognized that modifications to the Treaty could result in new benefits and/or costs to both Canada and the United States. U.S. interests should ensure that costs associated with any Treaty operation are aligned with the appropriate party.

Principle 9: Ecosystem functions should be compatible with the sharing of power benefits
Implementation of ecosystem-based functions in the Treaty should be compatible with rebalancing the entitlement and reducing U.S. power costs.

Detailed Recommendations

In addition to the nine principles the U.S. Entity also provides a series of more detailed recommendations under the headings of hydropower, flood risk management, ecosystem-based function, water supply, navigation, recreation and climate change.

Hydropower

In addition to matters already covered, the detailed recommendations deal with the need for a least cost transmission strategy and suggest the need to review the level of flexibility available for the return of Canada's power entitlement. The recommendations also emphasize that a modernized Treaty "should avoid substantial changes in hydropower generation during peak load periods that result in lower system reliability or flexibility" in order to ensure integration of intermittent source such as hydro and renewables.[29]

Flood risk management

The U.S. Entity contemplates that post-2024 coordinated flood control operations should provide the same level of risk management as pre-2024 operations based upon assured flood control unless a domestic review in the U.S. concludes that there should be a different level of risk. In effect this means that the target will still be to manage flows down to 450 Kcfs at The Dalles. In order to achieve this target the U.S. Entity contemplates the possibility of negotiating with Canada for some level of assured operations. Recognizing that the called upon operation is not well understood, the U.S. Entity recommends the development of a common understanding of the post-2024 called upon operation contemplated by the Treaty based on three principles that

[29] Id., at 4.

have been previously articulated in a white paper developed by the U.S. Entity in 2011. First, called-upon need only be used if other coordinated operations such as the Canadian power operation do not deliver enough storage. Second, U.S. projects should be drafted based on existing storage reservation diagrams unless modified to accommodate ecosystem based function (e.g., to provide flows in dry years). Third, the duty of the U.S. to make effective use of its own storage prior to triggering a called upon operation is confined to the eight U.S. reservoirs authorized for system flood control.

Compensation payable to Canada for flood control storage should be based on Canada's economic losses and operating costs (rather than on the basis of shared benefits i.e. avoided losses).[30] The domestic responsibility for these payments "should be consistent with the national flood risk funding policy of federal funding with applicable local beneficiaries sharing those costs as appropriate."[31] The flood control regime should be able to respond to both changes in the flood risk management objectives in each country and climate change.[32]

Ecosystem-based function

There are five specific recommendations under this heading. The first deals with streamflows. It recommends that the Treaty should provide streamflows that promote productive populations of both resident and anadromous fish. The Treaty should build upon existing flow augmentation arrangements but should also incorporate a dry-year strategy. The new arrangements should provide long-term assurance rather than the current annual arrangements. The second recommendation stipulates that Treaty operations should minimize effects on tribal and First Nation interests while recommendation 3 emphasizes that any new arrangements should be adaptable to changing conditions such as those associated with climate change. The fourth recommendation indicates that the U.S. would be open to investigating, on a shared cost basis, what would be needed to restore anadromous fish runs in the Canadian part of the basin. The recommendation acknowledges that any changes to Grand Coulee or Chief Joseph would require congressional authorization and appropriation. The final recommendation in this section deals with operations at Libby and contemplates that the coordinated operation of Libby would continue based on VarQ (variable flow) operations and with a view to "achieving mutually desirable ecosystem benefits on both sides of the border".[33]

Water supply

The current Treaty does not address water supply issues other than to note in Article XIII that the prohibition on out of stream diversions (except with the consent of the other party) does not

[30] Id., at 5, recommendation 4.
[31] Id. This section was added to the final version of the Recommendation.
[32] Id., at 5, recommendation 5.
[33] Id., at 6, recommendation 5.

apply to diversions for consumptive uses.[34] The Treaty defines consumptive use as the use of water for domestic, municipal, stock-water, irrigation, mining or industrial purposes. Thus in each case the upstream state is free to divert water out of channel for these purposes and there is no obligation to let a particular amount of water down to the downstream state. The Columbia River Treaty is therefore not an apportionment treaty.

The U.S. Entity suggests that there is more potential for the additional storage of water in the fall and winter for release in the spring and summer and that such releases might be used for both in-stream and out-of-stream uses including irrigation and municipal/industrial uses. There is also the suggestion that a modernized treaty should recognize irrigation[35] as well as a reference to "water supply allocation decisions" associated with a modernized treaty but made pursuant to a "domestic process" and consistent with both ecosystem functions and tribal reserved water rights.[36]

Navigation

The current treaty is similarly silent with respect to navigation. The U.S. Entity recommends that operation under a modernized treaty should recognize the importance of navigation and provide for flows that do not undermine safe navigation.[37]

Recreation

The current treaty is similarly silent with respect to recreation. Here the U.S. Entity suggests that operations under a modernized treaty should strive to protect the recreational and cultural opportunities associated with the Columbia watershed.[38]

Climate change

Climate change is referred to at several places in the Entity recommendations. Here the specific recommendations are to include terms in the treaty "to allow the adaptive management of coordinated Treaty operations to better mitigate any impacts associated with climate change."[39] In addition the recommendation refers to continued collaboration between the hydro-meteorological teams of the two Entities.

Domestic Matters

The Entity recommendations draw attention to a number of matters that need to be addressed within the U.S. as party of the Treaty Review process. These include a Columbia River Basin

[34] Article XIII of the Treaty also contemplates the so-called Kootenay diversions which would have permitted Canada to divert a portion of the Kootenay flows into the Columbia at Canal Flats. This has never transpired..
[35] The explicit references to irrigation and irrigation and municipal/industrial uses were added in the final December version of the Recommendation; Entity Recommendation, *supra* note 23 at 6.
[36] Id.
[37] Id., at 6.
[38] Id., at 6.
[39] Id., at 6.

flood risk review; a process for the domestic allocation of any additional spring or summer flows; a process to assess the utility rate and revenue implications of any changes to the Canadian entitlement; development of plans to implement any changes flowing from a modernized treaty; a floodplain reconnection policy; an advisory mechanism to the Department of State with broad regional participation to "assist, inform and advise" in the negotiations and possibly as a mechanism for advice on additional work on ecosystem function, hydropower, flood risk management and other beneficial uses; and an assessment of the composition of the U.S. Entity. The U.S. Entity currently comprises the Administrator of the Bonneville Power Administration and the Division Engineer of the Northwestern Division of the U.S. Army Corps of Engineers. [40] There have from time to time been suggestions that the Entity might, for example, include the Tribes and/or the Department of the Interior.

Matters of Form and Timeframe

The U.S. Entity refers to the overall process as the "modernization" of the treaty and contemplates that this might include[41] "amendments or revisions to the existing Treaty, diplomatic notes or protocols, or other means resulting in a modernized Treaty". The U.S. Entity suggests that the U.S. government should decide by mid-2014 how to proceed[42] with a view to completing negotiations with Canada by the end of 2015 and if that is not achievable "other options to create a modernized post-2024 Treaty should be evaluated."[43] It is not clear what these other options would be since any options to create a new Treaty have to be consensual.

Adaptive Governance

The U.S. Entity Recommendation does not expressly use the term "adaptive governance" but it does refer to a number of similar concepts and expressly recognizes the need for flexibility in any future arrangements. Relevant references include the following:

- A reference to the *flexibility* arrangements in the current treaty (at 1).
- Future risk management procedures need to be *resilient* to provide for public safety (at 2).
- The need for "short- and long-term mechanisms that allow for adapting the Treaty to build in *flexibility* of operations as conditions change (e.g., climate change, ESA listings or de-listings, or as new information and technology become available)."

[40] Id., at 7 – 8.
[41] Id., at 3.
[42] See also the letter of 26 members of Congress from the Pacific Northwest to Barack Obama, President of the United States, 26 April 2014. The letters stresses the important and urgency of the matter "to ensure that a post-2024 Treaty better reflects the interests of our constituents in the region and the United States as a whole". The letter also references an Interagency Policy Committee that has been convened to consider the recommendation and urges the President to remain in regular and close communication with the Pacific Northwest Congressional Delegation.
[43] Entity recommendation, *supra* note 23 at 7.

- The need (Principle 3) for the new treaty to be "*adaptable* enough to allow responses to new information and changing conditions."
- The coordination of non-treaty storage (Principle 6) to increase the *flexibility* to, and benefits of, meeting ecosystem-based function, power, flood risk management, and other authorized water management purposes in both countries.
- The treaty (Principle 7) should be resilient, *adaptable*, *flexible*, in order to be able to respond to the impact of climate change as conditions warrant.
- The power system itself (at 4) needs to be *flexible* to accommodate intermittent sources.
- A modernized Treaty should (at 5) "enable the necessary *flexibility* to adapt both to changing flood risk management objectives in the United States and Canada and climate change (such as the potential for more frequent and intense winter flood events) to avoid additional risks to authorized purposes."
- The treaty (at 5) should have a strategy for responding to dry years.
- A modernized Treaty should (at 5) "be designed to be *adaptable* to meeting ecosystem-based function requirements as new information becomes available or conditions change (e.g., climate change) based on the management priorities of both countries."
- A modernized treaty should (at 6) contain "new terms … to allow the *adaptive management* of coordinated Treaty operations to better mitigate any impacts associated with climate change."

2.3. Treaty Review: Canada and British Columbia

Canada has largely deferred to British Columbia in matters related to the Columbia River Treaty. This deference is rooted in the constitutional division of legislative powers and property and in the terms of the agreements between Canada and British Columbia that were negotiated contemporaneously with the Treaty.[44] This deference is also recognized in actual practice under the Treaty. Day to day operations are managed by the Entities and the key Canadian Entity is British Columbia Hydro and Power Authority a Crown Corporation. The Province itself is the Entity for the limited purposes of the downstream entitlement. Consequently it is to British Columbia rather than Canada to which we must look for official policy positions with respect to the future of the Columbia River Treaty. As in the United States, the Province has been conducting a Treaty Review.

The B.C. Decision

As the culmination of its "treaty review" British Columbia released its "Decision"[45] in March 2014. This short document comprises a Preamble and a set of 14 principles. The Preamble refers briefly to the benefits and impacts of the Treaty and then describes B.C.'s Treaty Review Process which was initiated in November 2011. The key message in the decision document is that B.C.

[44] Canada – BC Agreements, of 8 July 1963 and 13 January 1964.
[45] British Columbia, Columbia River Treaty Review, B.C. Decision, http://blog.gov.bc.ca/columbiarivertreaty/files/2012/07/Columbia-River-Treaty-Draft-BC-Recommendation.pdf

seeks to "[c]ontinue the Columbia River Treaty and seek improvements within the existing Treaty framework". The document suggests that the fourteen principles will guide any changes to the Treaty that the Province may pursue. The fourteen principles are reproduced below. As was the case with the U.S. Entity recommendations we have also given each of these principles a short title.

Principle 1: Maximize benefits to both countries through coordination
The primary objective of the Treaty should be to maximize benefits to both countries through the coordination of planning and operations.

Principle 2: Ongoing impacts require compensation
The ongoing impacts to the Canadian Columbia Basin to meet Treaty requirements should be acknowledged and compensated for. The level of benefits to the Province, which is currently primarily in the form of the Canadian Entitlement, does not account for the full range of benefits in the United States (U.S.) or the impacts in British Columbia.

Principle 3: Benefits from coordinated benefits should be shared equitably
All downstream U.S. benefits, such as flood risk management, hydropower, ecosystems, water supply, recreation, navigation and any other relevant benefits, including associated risk reduction arising from coordinated operations compared to alternatives available to each country, should be accounted for and such value created should be shared equitably between the two countries.

Principle 4: Certainty and adaptation
Treaty provisions post-2024 should be fixed for a sufficient duration to provide planning and operational certainty while allowing for adaptive mechanisms to address significant changes to key components and interests.

Principle 5: No called upon operation without effective use
Implementation of post-2024 flood control obligations will be consistent with the Treaty requirements that a Called Upon Flood Control request can only be made when forecasts of potential floods indicate there is a reasonable risk of exceeding 600,000 cubic feet per second at The Dalles, and the U.S. must make effective use of all related storage in the U.S. before seeking additional help from British Columbia.

Principle 6: Coordinated flood risk management should extend to U.S. reservoirs
To supplement Called Upon Flood Control, a coordinated flood risk management

approach should maximize the benefits and mitigate impacts and risks to multiple U.S. interests as compared to Called Upon Flood Control regime post 2024 which includes effective use of U.S. reservoirs.

Principle 7: The parties apply ecosystem values and will continue to do so
Ecosystem values are currently, and will continue to be, an important consideration in the planning and implementation of the Treaty.

Principle 8: Explore ecosystem improvements within and outside the treaty
The Province will explore ecosystem based improvements recognizing that there are a number of available mechanisms inside and outside the Treaty.

Principle 9: Domestic limitations on the operation of Canadian facilities
Operating conditions of Canadian Columbia basin dams and reservoirs are subject to provincial and federal licensing including Water Use Plans where they exist, and consideration of aboriginal rights under the Canadian constitution.

Principle 10: Improved coordination of Libby
The Province will seek improved coordination on Libby Dam and Koocanusa Reservoir operations.

Principle 11: Responsibility for allowing salmon migration attributed to facility owner
Salmon migration into the Columbia River in Canada was eliminated by the Grand Coulee Dam in 1938 (26 years prior to Treaty ratification), and as such is not a Treaty issue. British Columbia's perspective is that restoration of fish passage and habitat, if feasible, should be the responsibility of each country regarding their respective infrastructure.

Principle 12: Incorporate climate change considerations
Adaptation to climate change should be incorporated in Treaty planning and implementation.

Principle 13: Engage First Nations and communities
The Canadian Entities (Province of British Columbia and BC Hydro) will continue to engage First Nations and communities throughout any negotiation process.

Principle 14: Address non-treaty issues in other fora
Canadian Columbia Basin issues not related to the Treaty will be addressed through other government programs and initiatives.

Matters of form and timeframe

Unlike the U.S. Entity's position, B.C.'s decision is silent on both the form and the timing for any negotiations on the modernization of the treaty (and "modernization" is not a term that British Columbia uses). The reasons for this seem fairly obvious. B.C. has no incentive to change the terms for sharing the downstream power benefits and thus has no interest in getting negotiations underway and concluded quickly; and it has little interest in expressing a position on the form of any changes since it takes the view that at least some, if not all of the issues on the table could be accommodated within the current framework.

Adaptive governance

As with the U.S. Entity position, B.C.'s decision makes no express reference to adaptive governance but by contrast with the U.S. Entity position it is harder to find any recognition in the shorter B.C. Decision of cognate concepts. In fact there appear to be only two relevant references. First, principle 4 (like U.S. general principle 3) seeks to balance the need for certainty with "adaptive mechanisms to address significant changes to key components and interests", Second, principle 12 contains the flat statement that "adaptation to climate change should be incorporated in Treaty planning and implementation." Ecosystem values are referenced in Principles 7 and 8.

2.4. Similarities and Differences

While the differences between the two positions would seem to outweigh the similarities there is certainly some common ground. Thus, both agree that there is a need to balance certainty and adaptability; both agree that there are gains to be made through coordination and that such gains and benefits should be shared; both agree that the current regime is accommodating ecosystem values to some degree even if not expressly recognized in the treaty text; both make reference to the constraints of domestic laws in guiding their respective negotiating positions; and both agree that there is merit in exploring changes in the post-2024 flood control regime to enhance the level of protection beyond that provided for in the called-upon regime. Both recognize a need to involve Tribes/First Nations, communities and other regional sovereigns and interests during any negotiation process.

But the differences are substantial. The most significant differences would seem to be three: (1) the treatment of ecosystem values and perhaps other values, (2) the approach to sharing the benefits and (3) the assessment of what the treaty requires for the post-2024 called upon flood control regime.

The treatment of ecosystem values and perhaps other values

It is clear that the U.S. Entity is proposing a major revision of the treaty to expressly incorporate ecosystem-based function as a third primary purpose of the Treaty. It also appears that the U.S. Entity seeks to establish the significance of other values within the treaty (e.g. navigation,

irrigation and perhaps recreation) although it less clear how these other values might be recognized. By contrast, British Columbia largely seems to take the view that ecosystem considerations can be accommodated in the current treaty although it is committed to exploring mechanisms outside the treaty as well as inside (Principle 8). British Columbia does not favour adding other values and interests to the treaty.

Sharing the benefits

The U.S. Entity is firmly convinced that the current arrangements for sharing the downstream power benefits are unjust and seeks to have that position recognized. Furthermore, the Entity takes the view that flood control measures taken by Canada should result in compensation for actual costs and losses and not compensation on the basis of a sharing of the benefits. Finally and more generally, the health of the ecosystem, including any measures taken to restore anadromous populations to the upper Columbia in Canada, should be a shared cost (and benefit).

The government of British Columbia takes a different view on all of these issues. Thus it has released a report suggesting that the Treaty conferred benefits on the U.S. that are not fully accounted for.[46] Furthermore, it calls for sharing the benefits that result from coordination rather than simply compensating for losses and it suggests that the party responsible for disrupting the passage of migrating fish should be responsible for the costs of any restoration measures within its jurisdiction rather than that such costs being shared.

The assessment of the post-2024 called upon flood control regime

As documented in detail elsewhere,[47] the U.S. Entity Report offers an expansive view of the post-2024 flood control entitlement of the U.S. This approach emphasizes that the level of desired protection remains the same as under the current assured operation (protection target of 450,000 cfs) while at the same time offering an interpretation of the U.S.'s effective use obligation of its own facilities limited to those federal dams already authorized for flood control purposes which is more restrictive than the B.C. interpretation. On the other hand the B.C. Decision suggests that the post-2024 risk protection target will be 600,000 cfs rather than the current 450,000 and at the same time has a more expansive view of what might be entailed in the effective use obligation by contemplating use of all U.S. storage that may offer protection at the Dalles. It should be noted however, that the U.S. Entity also indicates initiation of a study of flood risk including review of the historic record and opportunities for nonstructural measures to reduce flood risk. The results of this review may narrow the gap between the U.S. and B.C. positions.

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[46] U.S. Benefits from the Columbia River Treaty – Past, Present and Future: A Province of British Columbia Perspective, June 25, 2013, http://blog.gov.bc.ca/columbiarivertreaty/files/2012/07/US-Benefits-from-CRT-June-25-132.pdf

[47] Nigel Bankes, *The Flood Control Regime of the Columbia River Treaty: Before and After 2024*, 2 Washington Journal of Environmental Law and Policy 1 (2012).

3. Adaptive Water Governance

The increased uncertainty and degree of variability associated with climate change has led many to call for new more adaptive forms of water governance.[48] Even setting climate change aside, if the people of the Columbia River Basin have learned nothing else in the 50 years of CRT implementation, they have learned that there are limits on our ability to predict the future. The drafters of the CRT did not predict the changes that have unfolded in energy markets, population growth and settlement patterns, and the values placed on the ecosystem and public participation in decision making,[49] all of which call for caution in defining management for the next 50 years and indicate a need for flexibility.

If history could be relied on to predict the future, the basin could continue to rely on the approach of the CRT in which the tradeoffs and goals of joint management of the system were determined in the treaty negotiation phase, the means to achieve them were prescribed in the treaty itself, and the implementation effected by non-political technical Entities with engineering background. However, optimization for hydropower and flood control has increased system vulnerability to surprise.[50] The inability to predict future changes and the impact they might have on the basin means that an approach to implementation that relies on variability within anticipated bounds is risky. Additional capacity to make new tradeoffs, respond to unexpected change, and to adapt management accordingly, must be built into modern transboundary agreements.

The concept emerging in the literature for the introduction of flexibility and adaptive capacity to water management is adaptive water governance. The following paragraphs provide a working definition of adaptive water governance, a summary of the relevant literature and how it pertains to flexible institutions, and criteria for thinking about its application in the context of the Columbia River Basin. Co-author Cosens is co-chair on an NSF-funded synthesis project bringing together ecologists, legal and institutional scholars and climate scientists to develop legal models for adaptive water governance.[51] The Adaptive Water Governance project is the source for much of this background.

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[48] D. Huitema, 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*, 14(1) *Ecology and Society* 26 (2009). [online] URL: http://www.ecologyandsociety.org/vol14/iss1/art26/; Barbara Cosens, Lance Gunderson, Craig Allen and Harm Melinda Benson, *Identifying Legal, Ecological and Governance Obstacles and Opportunities for Adapting to Climate Change,* Special Issue on Environmental Law for Sustainability, 6(4) SUSTAINABILITY 2338-2356 (2014); doi:10.3390/su6042338 available at http://www.mdpi.com/2071-1050/6/4/2338

[49] *See generally*, Cosens (ed) *supra*, note 5.

[50] Cosens et al, *supra* note 48.

[51] Id. The Adaptive Water Governance Project is supported by the National Socio-Environmental Synthesis Center (SESYNC) under funding from the National Science Foundation DBI-1052875

The term governance is used to encompass "the process of resolving trade-offs and of providing a vision and direction . . ., management is the operationalization of this vision...".[52] Included in the term governance are the laws, policies, regulation, institutions, and institutional structures that both enable and constrain the process of governing, but also the informal norms and interactions that influence decisions including those of private and nongovernmental actors.[53] The concept of governance that is responsive to change in complex systems such as a river basin in which there is a high degree of uncertainty in both the change and how the system will respond is referred to as adaptive governance.

As viewed by the AWG project, adaptive governance enables society to navigate the dynamic, multi-scalar nature of a social-ecological system such as a water basin.[54] Recognition of adaptive governance in systems that have been studied suggests that under the right circumstances, it is a natural ("emergent" or "self-organizing") response to the challenges of managing complex landscapes.[55] Nevertheless, the right circumstances are frequently products of organizational and institutional design. Thus, there are measures that can be taken in arrangements for management of the Columbia River Basin that will facilitate adaptive capacity and make it more likely that the basin can adapt to change and surprise.

The Adaptive Water Governance project has identified three areas of inquiry to determine whether a particular approach to basin management can respond and adapt to change. Not all areas need be addressed in a single agreement such as the Columbia River Treaty, but they nevertheless provide a framework for viewing the role of the treaty in the context of other adaptive components of water management in the basin. The three areas are (1) structure, (2) capacity and (3) process.

[52] M. Boyle, J. Kay and B. Pond. Monitoring in Support of Policy: An Adaptive Ecosystem Approach. At 122 *in* T. Munn, editor. *Encyclopedia of global environmental change, volume 4.* Wiley, London, UK (2001).
[53] C. Folke, T. Hahn, P. Olsson and J. Norberg, *Adaptive Governance of Social-Ecological Systems*, 30 Annual Review of Environment and Resources 441-473 (2005). http://dx.doi.org/10.1146/annurev.energy.30.050504.144511; Huitema et al, *supra* note 48..
[54] *See e.g.,* B. C. Chaffin, H. Gosnell, and B. A. Cosens, *A Decade of Adaptive Governance Scholarship: Synthesis and Future Directions*, 19(3) Ecology and Society 56 (2014). http://dx.doi.org/10.5751/ES-06824-190356 (This definition stands on the shoulders of considerable theoretical and empirical work cited and synthesized in the article).
[55] Id.

Structure

The organizational framework that allows for adaptive governance must balance accountability and efficiency with adaptive coordination and response. Uncertainty imposes a greater need for both redundancy to provide the ability to respond to the same problem at different levels, and at the same level from different perspectives, and coordination at multiple levels. In adaptive governance literature, overlapping and connected levels of governance is referred to as "polycentric governance."[56] To describe a hierarchy in which coordination results from representation of lower levels of governance in decision making at higher levels, the term "nested governance" is used.[57] For purposes of a basin-scale agreement, it is important to identify those areas that may require coordination and assure that the authority to coordinate is provided. For example, if the negotiators of any future CRT seek to incorporate local measures for flood control to allow operation of reservoirs for higher flows, coordination from the international to the federal/provincial to the local level may be necessary. Similarly, if coordination on ecological function is elevated to the international level, local flexibility for decision making and implementation will nevertheless be essential, due to variability in both the ecosystem and societal goals throughout the basin and the uncertainty involved in how they will change. In addition, although international cooperation of the management of the Columbia River Basin allows response to change at the basin scale, not all water-related issues arise at that scale and it would be highly inefficient to elevate all issues to that level (this is the notion of subsidiarity in international law [see e.g. Article 69 of the Treaty for Functioning of the European Union],[58] and "fit" of governance to purpose. [59] For example, while habitat restoration and operation of hatcheries may have basin-wide implications for salmon recovery, their construction and operation is generally on domestic soil. Thus, while there may be a need for information sharing and a requirement that actions taken remain consistent with international agreements, the restoration itself and the operation of hatcheries do not necessarily require international action. Finally, recognizing that the introduction of flexibility creates a tension with one of the primary goals of a transboundary agreement which is to create certainty and stability in relations, a stable organizational structure that is itself capable of evolving is essential to creating a safe and legitimate space for flexibility.

[56] Huitema et al, *supra* note 48.
[57] Id.
[58] Treaty for the Functioning of the European Union, Article 69 states "National Parliaments ensure that the proposals and legislative initiatives submitted under Chapters 4 and 5 comply with the principle of subsidiarity, in accordance with the arrangements laid down by the Protocol on the application of the principles of subsidiarity and proportionality." TFEU available at http://eur-lex.europa.eu/resource.html?uri=cellar:ccccda77-8ac2-4a25-8e66-a5827ecd3459.0010.02/DOC_1&format=PDF
[59] J. Rijke, R. Brown, C. Zevenbergen, R. Ashley, M. Farrelly, P. Morison and S. van Herk, *Fit-for-Purpose Governance: A Framework to Make Adaptive Governance Operational.* 22 Environmental Science & Policy 73-84 (2012).

Capacity

In adaptive governance literature, capacity has two prongs: (1) adaptive capacity; and (2) participatory capacity.[60] Adaptive capacity requires both the authority to respond to change and the ability and resources to learn. This is a key component sought in our review of other international agreements for provisions that provide flexibility. Thus, we have sought models for authority to monitor for change, alter implementation in response to change, and revisit goals from time to time (also referred to as adaptive management). The second prong, participatory capacity is primarily related to the building of broad and diverse local ability to participate in decision making including a role for local knowledge when appropriate. Provisions for public participation in decision making are the primary focus related to local capacity building in an international agreement.

Process

It is a basic tenet of political theory that people seek legitimacy in the actions of those who govern them.[61] Processes must address the tension between flexibility and certainty inherent in any effort to make space for adaptive governance by facilitating legitimacy. The processes used by the United States and Canada for negotiation, ratification and implementation of an international agreement[62] are designed to assure legitimacy. Legitimacy is a feature of "good governance" generally,[63] but will be used here in its more specific application to the design and implementation of a transboundary agreement.[64] If we seek international water agreements that allow for flexibility and adjustment by management entities over time, the traditional mechanisms for securing legitimacy are challenged.[65] Thus, models for flexibility must be sought that place bounds on the exercise of discretion in operational flexibility, that consider both biophysical and social/economic timeframes in setting periods for adjustment, that establish processes to ensure accountability in adjustment of goals, and that provide an avenue for broad public input.[66] In addition, in any authority for periodic review and adjustment of implementation or alteration of goals, attention must be given to assuring that both parties have incentive to seek a solution through consideration of both benefits and exposure to risk. In

[60] Cosens et al, *supra* note 48.

[61] Thomas M. Franck, *Legitimacy in the International System*, 82 Am. J. Int'l L. 705 (1988); D. Bodansky, *The Legitimacy of International Governance: A Coming Challenge for International Environmental Law?* 93 American Journal of International Law 596-624 (1999) http://dx.doi.org/10.2307/2555262; Daniel C. Esty, *Good Governance at the Supranational Scale: Globalizing Administrative Law*, 115 Yale L.J. 1490 (2006).

[62] N. Bankes and B. Cosens, *The Future of the Columbia River Treaty*, research project for the Program on Water Issues, Munk School of Global Affairs, University of Toronto, October 2012, available at http://munkschool.utoronto.ca/research/the-future-of-the-columbia-river-treaty/.

[63] Franck *supra* note 61; Bodansky *supra* note 61

[64] Esty *supra* note 61; B. Cosens, *Transboundary River Governance in the Face of Uncertainty: Resilience Theory and the Columbia River Treaty*, 30 University of Utah Journal of Land Resources, and Environmental Law 229 (2010); B. Cosens, *Legitimacy, adaptation, and resilience in ecosystem management,*18(1) Ecology and Society 3 (2013). http://dx.doi.org/10.5751/ES-05093-180103

[65] Cosens (2013) id.

[66] Cosens (2010), *supra* note 64 and Cosens (2013), id.

negotiations between the U.S. and Canada, the relative military and economic power of the strong downstream country, is balanced by the positional power of the upstream country. In the case of the Columbia River Basin, this is further balanced by the geography of the Kootenai and Pend d'Oreille Rivers that reverses the upstream/downstream position of the two countries. Each country's view of the other as its most important ally will also influence negotiations because larger issues will influence the real and perceived risk in any diplomatic action. In considering a treaty that allows for flexibility and future adjustment of goals, the focus must be on assuring both parties have the ability to raise the prospect of change, both parties have equal bargaining power in addressing that change, and both parties have influence over the outcome. If either country bears disproportionate exposure in the implementation of a flexible agreement, finalization of that agreement will not be possible. If either country bears disproportionate exposure in the adjustment of treaty implementation or goals, the promise of flexibility will not be realized.

4. Flexibility and Adaptive Mechanisms under the Existing Columbia River Treaty

This part of the paper examines the flexibility mechanisms that are available to the two governments and their Entities under the terms of the 1964 Columbia River Treaty. For the most part the Treaty is deliberately very prescriptive since each Party sought a high degree of certainty that the Treaty would deliver the benefits that each sought to obtain through co-operation. Furthermore, the institutional provisions of the Treaty are quite limited. Thus the Treaty recognizes the Entities that are "empowered and charged with the duty to formulate and carry out the operating arrangements necessary to implement the Treaty"[67] and it establishes the Permanent Engineering Board (PEB).[68] The responsibilities accorded to the PEB are technical and this is reflected in both the name of the institution and its annual reports.[69] These are the only new institutions that the Treaty itself creates. The Entities have created a number of bilateral committees to assist them in fulfilling their obligations under the Treaty: an Engineering Committee, an Operating Committee and a Hydrometeorological Committee. These committees provide the basis for ongoing weekly and even daily co-operation and problem-solving.

The following sections discuss: (1) treaty amendment, (2) supplementing the treaty by means of an exchange of notes, (3) the Libby Coordination Agreement, (4) other entity agreements, (5) other entity practice outside the treaty, and (6) some final observations.

4.1. Treaty Amendment

One flexibility mechanism that is available to the parties to any treaty is that of an agreed amendment to respond to new concerns that have been identified. The CRT does not expressly provide for its amendment but there is little doubt that the Parties can always agree to amend any treaty – and the fewer the parties the easier the task.[70] The Parties to the CRT have never expressly amended the Treaty. However, it seems fairly clear that the Protocol to the CRT which was adopted before the Treaty was ratified not only clarified certain of the provisions but also amended others.[71] That said, the general intent of the Protocol was to make the Treaty even more certain and precise rather than building in additional adaptive mechanisms. Nevertheless, the Protocol still serves as an example of how the treaty could be amended to provide additional flexibility. The Protocol was brought into force by means of an Exchange of Notes.

[67] Columbia River Treaty *supra* note 1, Article XIV(1).
[68] Id., Article XV.
[69] The Board's responsibilities are prescribed in Article XV(2). The PEB's annual reports are available here: http://www.nwd-wc.usace.army.mil/PB/PEB_08/peb.htm
[70] For the general rules on treaty amendment see Vienna Convention on the Law of Treaties, Articles 39 et seq.
[71] See discussion in Bankes and Cosens, *supra* note 62 at pp. 76 – 77.

4.2. Supplementing the Treaty by way of an Exchanges of Notes

While the Treaty does not contain express provisions for its amendment, it does contain express provisions dealing with the elaboration of certain provisions by means of an Exchange of Notes. An exchange of notes is just that, an exchange of statements between authorized representatives of States (e.g., an ambassador and a minister of foreign affairs[72]) in which one party, by correspondence, proposes a particular agreement or understanding and the other responds by accepting the proposal. The CRT contains several such examples:

1. Article IV requires that the first hydroelectric operating plans or any subsequent plan which departs substantially from the preceding plan shall be approved by exchange of notes "in order to be effective".[73]
2. Article VIII contemplates that the parties, by exchange of notes could authorize disposal of Canada's downstream power benefits within the United States. The article contemplates that the general terms could be established by exchange of notes as soon as possible after ratification. Paragraph 3 of the Protocol varies this provision to stipulate that this exchange should occur "contemporaneously" with the exchange of the instruments of ratification.
3. Article IX deals with a proposal by the U.S. to modify the determination of downstream power benefits with respect to possible future new dams. Any such agreement must be evidenced by an exchange of notes.
4. Article X contemplates that an exchange of notes would confirm a "mutually satisfactory electrical coordination arrangement" between the Entities.
5. Article XIV(4) contemplates that the parties may, by exchange of notes, "empower or charge the Entities with any other matter coming within the scope of the Treaty" in addition to those powers and duties already conferred on the Entities by Article XIV(2) of the Treaty or by any other article of the Treaty.
6. Article XV prescribes that the Permanent Engineering Board must comply with any "directions, relating to its administration and procedures" agreed by the parties and evidenced by an exchange of notes.
7. Article XVI(5) & (6) contemplate that the parties may agree on arrangements and alternative arrangements for dispute resolution by means of an exchange of notes.

In addition to these express provisions allowing for or requiring an Exchange of Notes, the Parties could, at least as a matter of international law, use an Exchange of Notes with respect to

[72] On the power to enter into a treaty see Article 7 of the VCLT which contemplates either express "full powers" (i.e. a document expressly authorizing that person to negotiate or adopt that particular agreement) or the inference of full powers through the practice of the states concerned.

[73] The first five Assured Operating Plans (AOPs) (1970 – 1975) were covered by an Exchange of Notes but none of the subsequent AOPs have been.

any other matter and such an Exchange might elaborate or amend the treaty terms depending upon the intentions of the parties and the language used.[74]

We have discussed U.S./Canada Exchange of Notes practice in relation to the Treaty previously and we will not repeat it here.[75] But that practice does suggest several ways in which Exchanges of Notes have been used (or could be used in the future) to add additional flexibility to the treaty.

- The Parties could agree to give additional responsibilities to the PEB.
- The Parties could agree to special operating programs that depart from those authorized by the Treaty.
- The Parties could agree on different delivery points for the Entitlement.
- The Parties could elaborate on any number of contentious terms in the Treaty and the Protocol including agreement on the target level of flood control protection; the effective use of all related storage; and the cooperation and coordination obligations of para. 5 of the Protocol (Kootenay River).

4.3. Libby Coordination Agreement, 2000

The Libby Coordination Agreement (LCA) is an Agreement between the Entities that was designed to resolve a dispute about the operation of Libby Dam to provide flows to facilitate sturgeon spawning downstream of the dam. Canada argued that this operation breached the Treaty as modified by the Protocol and caused Canadian dams to spill water thereby losing generation. The LCA was designed to resolve this dispute in a way that allowed the U.S. to continue its sturgeon operation at Libby and allowed BC Hydro to draft Arrow in such a manner as to mitigate BC Hydro's power losses on the Kootenay.[76]

The LCA was only signed by representatives of the Entities following receipt of a Diplomatic Note from the Canadian Ambassador to the United States and the U.S. Secretary of State.[77] The Diplomatic Note recognizes that the agreement is an Entity Agreement, states that Canada will not claim losses during the operation of the Agreement, and states that "the Entity Agreement does not . . . modify, amend, interpret or imply changes to the terms of the Treaty."[78] The LCA

[74] i.e. an Exchange of Notes can itself be a treaty as that term is understood in international law: see Bankes and Cosens *supra* note 62 at pp. 21 – 22. We think that this is clear as a matter of international law. One of our reviewers cautioned that an Exchange of Notes not contemplated by the treaty might trigger a requirement for Senate's advice and consent under U.S. law. We have examined that issue in considerable detail in Bankes and Cosens, id.

[75] Bankes and Cosens, id, chapter 7

[76] Libby Coordination Agreement at Sections 10 and 11 and Attachment D.

[77] Letter from Ambassador Raymond Chrétien to Secretary of State Madeleine Albright, February 15, 2000.

[78] Id.

can be terminated by either party with 30 days' notice and terminates automatically on September 15, 2024.[79]

The LCA is an important example of how the parties have been able to agree to differ and yet still address the concerns of both, including ecological concerns.

4.4. Other Entity Agreements

As noted above, the CRT expressly requires approval of implementing activities by way of an Exchange of Notes in at least seven situations. However, the CRT also contemplates, expressly or impliedly, that the Entities will need to reach agreements for better implementation of the Treaty. In particular, the Parties understood that implementation of the flood control and power provisions of the Treaty would require a lot of elaboration. The two Annexes to the Treaty as supplemented by the Protocol contemplated that the U.S. entity would prepare the flood control operating plans (FCOP)[80] while the power operating plans were to be developed jointly.[81] The two Entities were also to cooperate on the establishment of a hydrometerological system in order to provide the essential data for both flood control and power operations.[82]

Article XIV of the Treaty, headed "Arrangements for Implementation" is of central importance here. Article XIV provides for the designation of the Entities and contemplates (Article XIV(1)) that they will be "charged with the duty to formulate and carry out the operating arrangements necessary to implement the Treaty". Paragraph 2 further specifies the duties of the Entities including:

> (h) preparation of the hydroelectric operating plans and the flood control operating plans for the Canadian storage together with determination of the downstream power benefits to which Canada is entitled; and
> (k) preparation and implementation of detailed operating plans that may produce results more advantageous to both countries than those that would arise from operation under the plans referred to in Annexes A and B.

Paragraph (k) is crucial. It evidently allows the Entities to agree to any variation from a prescribed operation provided only that each party perceives that it will be better off in some way than under the required operation.

In this section we examine Entity agreements and practice under seven headings: (1) flood control agreements and practice, (2) Entity agreements and practice in relation to principles and

[79] Id. at 4.
[80] Columbia River Treaty *supra* note 1, Annex A, Principles of Operation, para. 5.
[81] Id., Paras 7 – 8.
[82] Columbia River Treaty *supra* note 1, Annex A, para. 2.

procedures for the preparation and use of hydroelectric operating plans, (3) the agreement on the establishment of the hydrometeorological system (4) miscellaneous agreements, (5) Assured and Detailed Operating Plans, and (6) Supplemental Operating Agreements.

Flood control agreements and practice

The Treaty (Annex A, para 5) contemplates that flood control operations will be based on a flood control operating plan (FCOP) submitted by the U.S. Entity. The first draft of the FCOP for treaty storage was developed by a joint Entity task force established in 1965.[83] The FCOP was prepared in draft form by 1968 and the task force was then dissolved. The Corps of Engineers revised the draft in 1971 and the revised version was reviewed by the Columbia River Treaty Operating Committee in 1972. Revisions to the 1972 Plan were made in 1999 and the current version of the FCOP was adopted in May 2003. One of the crucial things that the FCOP does is to establish the flood control objectives for the first sixty years of treaty operations.[84]

While the Treaty allocated (Annex A para. 5) flood control storage space responsibilities to particular facilities, paragraph 5(d) of Annex A allows the Canadian Entity to exchange the flood control storage that is subject to the assured operation between different facilities (e.g., to move assured storage from Arrow upstream to Mica) if the Entities agree that the exchange provides the same effectiveness for control of floods at The Dalles.[85] The Entities agreed to allow BC Hydro to move 2 MAF of flood control from Arrow to Mica shortly after ratification of the Treaty. In 1995 the U.S. Entity further authorized transfer of an additional 1.5 MAF as long as Canada agreed to augment the Mica storage dedicated to assured flood control by a further 0.5 MAF.[86]

There are two points to make about the FCOP in the present context. The first is that the FCOP may be changed by agreement between the Entities at any time to respond to changing circumstances. As noted above there have been at least three versions of this crucial document since inception. All parties anticipate that the FCOP will need to be revised (whatever happens at any treaty re-negotiation table) in order to accommodate the post-2024 called-upon flood control regime. While any changes to the FCOP will require the agreement of both parties, a new FCOP could be one mechanism for addressing the need for flexibility. A new FCOP might provide for regular review or might build in certain triggers that would require an automatic review. Similarly a new FCOP might take a more holistic view of flood risk planning throughout the basin.

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[83] This history is recounted in the FCOP itself. For the current 2003 version see www.crt2014-2024review.gov/Files/FCOP2003.pdf

[84] The Treaty itself is silent on this although the intentions of the parties can be inferred from contemporaneous documents. For further detail see Bankes, "Before and After" *supra,* note 47.

[85] Another example is Article V(2) which provides that the Canadian entitlement is to be delivered near Oliver, "or at such other place as the entities may agree upon".

[86] FCOP 2003, *supra* note 83 at 14.

The second point is simply to emphasize the example in the current FCOP which affords BC Hydro a degree of flexibility in how it allocates treaty storage between its facilities. There may be other similar ideas that the Entities might explore to afford the parties additional flexibility.

Entity agreements and practice in relation to principles and procedures for the preparation and use of hydroelectric operating plans

Annexes A and B of the Treaty, as well as Article XIV, contemplate that the Entities will develop assured operating plans (AOPs) for the sixth succeeding year of operation which may be modified or supplemented by annual detailed operating agreements (DOPs). However, the Entities also needed to be able to agree on how to go about preparing these operating plans and the contents of the plans. To that end, the Entities, within the context of the CRT Operating Committee, negotiated and agreed upon a document known as the Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans (the POPs document). The first version of the POPs document was agreed upon in 1967. It has been amended on at least five occasions since: in 1979, 1983, 1988, 1991 and most recently in 2003.

The POPs document is very complex and the details need not detain us here but it represents an agreement between the Entities as to how certain key provisions of the Treaty should be interpreted and implemented. For example, the POPs document specifies the content of the Assured Operating Plan and the Detailed Operating Plan.[87] Other examples are more complex. For example, the Treaty requires that the downstream power benefits should be calculated by reference to the operation of the Base System[88] and mainstem projects which makes the most effective use of the improvement in stream flow resulting from the Canadian storage.[89] This necessarily involves some agreement between the Entities as to "the established operating procedures of the projects involved".[90] This has become more contentious over the years, especially in the United States, as the need to operate facilities for non-power purposes has grown. While the general principle is that non-power purposes are *not* taken into account in calculating the downstream benefits or in the related process of reaching agreement upon the assured operating plan,[91] the Entities *have* reached agreement on certain minimum operating procedures for Canadian Treaty projects and for many of the facilities in the Base System. These procedures include minimum flow requirements and in a small number of cases, draft rate limitations. These agreed operating procedures represent an important elaboration of Treaty rules. The agreement of the Entities on these matters (initially reached in 1996) is currently recorded in Appendix 2 of the 2003 POP.

[87] POPs Document, 2003, at 36 for the AOP and at 53 for the DOP.
[88] The 'base system' is a defined term in the treaty and refers to the named facilities listed in the table that forms part of Annex B.
[89] Columbia River Treaty *supra* note 1, Article VII(2)(b) and Annex B.
[90] Id. Annex B , para. 7, Step I.
[91] *PEB Annual Report*, 1983, at 23, *PEB Annual Report*, 1985 at 24, and *PEB Annual Report*, 1986 at 24-25.

The POPs document is an important example of the reality that no transboundary treaty for the co-operative development of a river basin will ever be able to specify all of the operational details. This vital work must be accomplished by the operating Entities themselves within the four corners of the treaty. This provides some opportunity for flexibility in the implementation of the Treaty but it is a constrained flexibility. This is because both Entities must agree on how the treaty is to be implemented and they may also have to persuade the PEB that this is the appropriate implementation of the treaty.[92]

Agreement on the establishment of the hydrometeorological system

Paragraph 2 of Annex A of the CRT contemplates that the Entities, in consultation with the PEB, will reach agreement on the establishment of a hydrometeorological system including precipitation stations and stream flow gauges.[93] That work, which was clearly crucial to operationalizing the Treaty, was originally undertaken by a joint task force in 1965. This ultimately resulted in an agreement between the Entities in 1967 that describes both the base system as well as supporting facilities and provides for the creation of the Columbia River Treaty Hydrometeorological Committee to work in association with Columbia River Treaty Operating Committee.[94] The Hydrometeorological Committee continues to this day and the Committee is thus capable of responding to changing climate conditions so as to, for example, require additional gauge stations as necessary.

Miscellaneous Agreements

In addition to the POPs, the annual AOPs and DOPs and other agreements contemplated by the CRT, the Entities have also reached agreements on some contentious issues relating to the Treaty.[95] Some of the more important of these agreements have been incorporated into the POPs document. Thus the current POPs document lists the following important agreements in addition to the Libby Coordination Agreement discussed above:

(a) Columbia River Treaty Entity Agreement on Principles for the Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies, dated 20th July (U.S. Entity) and 28th July (Canadian Entity), 1988;
(b) Columbia River Treaty Entity Agreement on Changes to Procedures for Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies, dated 28th July (Canadian Entity) and 12th August (U.S. Entity), 1988;
(c) Columbia River Treaty Entity Agreement on Resolving the Dispute on Critical Period Determination, the Capacity Entitlement for the 1998/99, 1999/00, and 2000/01

[92] The PEB reports annually on whether the objectives of the treaty are being met.
[93] *See also,* Columbia River Treaty *supra* note 1, Article XIV(2)(e).
[94] The background and terms of reference for the committee can be found in the Supplemental Reports of the Columbia River Treaty Hydrometeorological Committee which are available on line at http://www.nwd-wc.usace.army.mil/PB/PEB_08/documents.htm
[95] The Annual Report of the Entities contains a list of Entity Agreements concluded in that year.

AOP/DDPB's, and Operating Procedures for the 2001/02 and Future AOP's, dated 29 August 1996;

(d) Columbia River Treaty Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for April 1, 1998 through September 15, 2024 between the Canadian Entity and the United States Entity, dated 29 March 1999.

The text of these agreements makes it crystal clear that these agreements are designed to resolve difficult interpretive questions without necessarily conceding the preferred interpretation of the other Entity. They represent pragmatic responses to problem solving that allows the Entities to proceed with their operations.

Assured Operating Plans and Detailed Operating Plans

The Assured Operating Plans (AOPs) and Detailed Operating Plans (DOPs) are part of the formal Treaty apparatus (see Annex A, para 9 and Article XIV(2)(k)).[96] According to the POPs document the AOP which is to be prepared and agreed to each year for the sixth succeeding year of operation "is intended to provide the Entities with essential information on the operation of Canadian Treaty Storage required for effective operational planning of their respective power systems" and forms the basis for computing the downstream power benefits.[97] The AOP establishes, *inter alia*, critical rules curves (graphical representations of the storage contents of reservoirs), assured and variable refill curves and upper rules curves for each of the Canadian Treaty projects.[98] The DOP is also prepared annually for the next ensuing operating year. The aim of the DOP is "to identify and evaluate proposed changes to the Assured Operating Plan that would be mutually advantageous to the Entities." The default principle is that the rule curves and procedures specified in the AOP will govern unless the Entities agree to a change (CRT Article XIV(2)(k)).

Supplemental operating agreements

In addition to the DOPs, the Entities may agree during the operating year to mutually beneficial arrangements known as supplemental operating agreements (SOAs) above or below the specified rule curves to meet both power and non-power benefits. The POPs document offers the following clarification of the relationship between DOPs and SOAs:[99]

> Each Supplemental Operating Agreement can be considered a "detailed operating plan" in accordance with Article XIV(2)(k) of the Treaty. However, for greater clarity, the term Detailed Operating Plan is generally used to refer to the plan put in place at the start of the operating year and "Supplemental Operating

[96] The AOPs and DOPs are available on line here http://www.nwd-wc.usace.army.mil/PB/PEB_08/documents.htm.
[97] POPs 2003 at 31.
[98] Id., at 36 – 37.
[99] Id., at 61, note 13.

> Agreements" generally refers to those agreements implemented during the operating year.

The SOAs serve to fine tune the operation of Treaty storage to address power and non-power objectives in light of actual stream flows and operating conditions. The POPs (2003) document provides the following examples of actions included in SOAs:[100]

> *Arrow Lakes Local Method:* Changes the method for determining the Variable Refill Curve for Arrow (see Appendix 5 for additional information on the Arrow Lakes Local Method); improves the power operation of Arrow, consistent with the refill objectives at that project, whenever Mica's project operating criteria cause it to draft below its Variable Refill Curve;
>
> *Libby – Canadian Storage Exchange:* Provides for exchange of storage between Libby and Canadian Treaty Storage to enhance power and environmental objectives;
>
> *Non-power Uses Agreement:* Provides for smoothing of project operations to meet several objectives including trout spawning downstream of Arrow, salmon spawning at Vernita Bar, Arrow reservoir level enhancement for dust control, improved recreation, and flow augmentation for downstream migration of salmon;
>
> *Whitefish agreement:* Provides January flow reductions to reduce impact of subsequent flow reductions on Whitefish spawning downstream of Arrow; and
>
> *Summer Treaty Storage Agreement:* Provides for storage above the Treaty Storage Regulation to enhance U.S. system reliability and to provide various non-power benefits to Canadian Treaty Storage (implemented once in recent low flow (2001) conditions).

SOAs can be used to assist in meeting the requirements of Biological Opinions related to the needs of listed fish species in the U.S. as well as minimum flows for resident fish in Canada. It is an important and practical flexibility arrangement.

4.5. Entity practice outside the Treaty

As noted in several other places in this paper, the Entities have many dealings and arrangements between them that are not required by the Treaty although they are declared to be consistent with the Treaty, such as the SOAs just discussed. The Entities also have dealings and arrangements

[100] Id., at 61.

that fall outside the Treaty, such as the Non-Treaty Storage Agreements (NTSAs).[101] What is perhaps most significant about these arrangements in the present context is that the parties to these agreements (the Entities whether acting as the Entities or simply as electric utilities, facility owners or an agency) recognize that there is a distinction to be made between: (1) arrangements that are required by the Treaty; (2) arrangements in relation to storage that are not required but are permitted by the Treaty; and (3) arrangements that relate to storage in Canada that is not subject to direct control under the Treaty other than through the general obligation imposed on Canada by the terms of Article IV(5) of the Treaty. Article VI(5) is Canada's obligation not to operate any storage constructed post-ratification in a manner that reduces the flood control and hydroelectric power benefits which would be produced by applicable operating plans.

The existence of non-treaty storage at Canadian facilities and the agreements about the operation of that storage provides additional flexibility in the management of this shared water basin. Insofar as each Entity may call for the release and storage of water outside of the context of the treaty each Entity can use that water to achieve non-treaty objectives. The NTSAs are governed by the law of contracts; they are agreements between the Entities rather than treaties between the two governments.

4.6. Observations

Actual practice under the Treaty suggests that there are a number of flexibility mechanisms available to the parties and more importantly to their Entities. The main conclusions are as follows.

First, flexibility is enhanced through structural mechanisms that devolve day-to-day operations to the Entities. The Entities have established a strong and respectful working relationship over the years. The relationship is formalized through a number of committees, the most important of which is the operating committee. This relationship has allowed the Entities to problem solve and to come up with practical solutions that were not prescribed by the Treaty. The solutions include the Libby Coordination Agreement and the annual supplementary operating agreements. The principle behind these agreements is that each Entity party must be better off with the agreement than with the default operation prescribed by the Treaty. It is up to each Entity to make that assessment for itself. This approach allows each to reach its own domestic goals. While the U.S. Entity has expressed the concern that the supplemental operating agreements do not offer sufficient certainty because they must be negotiated each year, the LCA offers an example of a longer term agreement between the Entities.

[101] For further discussion of the NTSAs see Bankes, "What Does the Future Hold for the Columbia River Treaty?" (2013), Rocky Mountain Mineral Law Institute 7 – 1 – 7-34 at 7-16. The current version of the NTSA is available here http://efw.bpa.gov/environmental_services/Document_Library/Non-Treaty_Storage_Agreement/

Second, the Entities have agreed to the adoption of a number of important documents over the years including the FCOP and the POPs documents. But these agreements have also changed and evolved over the years. This suggests that there is at least some capacity to adapt these arrangements over time. That said these arrangement are principally arrangements for the more detailed implementation of the treaty – they offer little scope for the Entities to reach beyond the terms of the treaty. They represent an example of constrained flexibility.

Third, the existence of non-treaty storage has allowed the Entities to devise commercial arrangements to allow each entity access to storage and flows to meet non-treaty objectives. Although the parties were unable to agree upon the terms of an NTSA for a number of years the present version of the agreement will continue in force until 2024.

Fourth, in some cases, it has been necessary to secure flexibility or clarity under the Treaty by means of an exchange of notes between the Parties (or the equivalent diplomatic correspondence as in the case of the LCA). This happens where the treaty requires it or where the Entities see the issue as being one that goes beyond the terms of the treaty (the examples here might include the LCA and the exchange of notes on the return of the entitlement.)

In conclusion, the practice under the Treaty suggests that the Entities have been quite adept at problem-solving over the years both to meet their own needs but also to meet needs imposed upon them by others including, for example, requirements for fish flows by regulators on both sides of the boundary. This rich practice has led some commentators to argue that it should be possible to accomplish a significantly expanded set of objectives without needing to amend the Treaty. Shurts and Paisley, for example, have developed what they call a "modest proposal" to address a new suite of objectives including the objective of according ecosystem, fish and wildlife concerns equal value and the objective of sharing the benefits of project operations (power, flood and ecosystem) which is closer to reality than the current provisions.[102]

[102] John Shurts and Richard Paisley, "The Columbia River Treaty" pp. 139 – 158, in Emma S Norman, Alice Cohen and Karen Bakker, (eds) *Water without Borders?* University of Toronto Press, Toronto, 2013, esp. at 152 – 156.

5. Models for Flexibility and Adaptive Capacity

This part of the paper examines models for flexibility and adaptive capacity in international and domestic water agreements. It first examines the concept of evolutive treaty interpretation before reviewing examples of mechanisms for flexibility in selected bi-lateral instruments between the U.S. and Canada and the U.S. and Mexico as well as domestic examples of flexibility in water management. The appendices to the paper offer more detailed analyses of each of the arrangements discussed in this chapter.

5.1. Flexibility through the evolutive interpretation of treaty texts

It is apparent that no treaty exists in isolation but rather is nested within the broader body of international law including customary law as well as other treaties that bind the parties. While treaties are typically static documents, customary law is constantly evolving. There is now a significant body of international case law which suggests that the interpretive interaction between a specific (bilateral) treaty and the broader body of international laws (customary and treaty) is one way in which bilateral treaties may adapt to changing norms and values. It is now possible to say that open textured phrases and concepts within a treaty can and should be interpreted in light of these changing norms. The principal authority for this proposition is Article 31 of the Vienna Convention on the Law of Treaties (VCLT).[103] Article 31 of the VCLT directs the treaty interpreter to interpret the treaty in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of the treaty's object and purpose. Importantly, the article goes on to provide (Article 31(3)(c)) that the interpreter shall take into account together with the context "any relevant rules of international law applicable in the relations between the parties."[104]

This point can be illustrated by referring to selected decisions of international tribunals, each of which demonstrates the application of the evolutive approach to treaty interpretation as a means of incorporating environmental values into an older treaty which makes no express mention of such values. These decisions are: (1) the decision of the International Court of Justice in the Case concerning the Gabčíkovo-Nagymaros Project (Hungary/Slovakia),[105] (2) the Iron Rhine Arbitral Award,[106] and (3) the Indus Waters Kishenganga Arbitral Award.[107] Each of these decisions is

[103] Vienna. 23 May 1969. Available here http://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf

[104] For some of the relevant literature *see* D. French, *Treaty Interpretation and the Incorporation of Extraneous Legal Rules*, 55 ICLQ 281 (2006); and C. McLachlan, *The Principle of Systemic Integration and Article 31(3)(c) of the Vienna Convention*, 54 ICLQ 279 (2005).

[105] [1997] ICJ Rep. 7.

[106] ,Belgium v Netherlands, 2005, http://www.pca-cpa.org/showfile.asp?fil_id=377

[107] Islamic Republic of Pakistan v The Republic of India, Partial Award, 18 February 2013 and Final Award, December 20, 2013 – both available http://www.pca-cpa.org/showpage.asp?pag_id=1392. Another example is *Pulp Mills on the River Uruguay, Argentina v Uruguay*, [2010] ICJ Rep 14.

examined in some detail in Appendix A. The conclusions to be drawn from this examination are as follows. Any treaty must be *interpreted* in light of all of the relevant norms that bind the parties to that particular treaty.[108] The relevant norms may include both other treaties[109] as well as norms of customary law including international environmental law. In particular, generic terms and broad concepts should be interpreted in light of the changing understanding of those concepts in general international law.

The particular application of these ideas will always depend upon context, the particular treaty provision to be interpreted and proof of the relevant rules of international law and thus it is not possible to do more than offer two examples of how changing values and the increased importance of international environmental law might be incorporated into the interpretation and application of the Columbia River Treaty. As a third illustration we offer an example from the Boundary Waters Treaty.

Example 1: the operation of the Libby dam, Treaty Article XII and Protocol, Article V
Article XII of the Treaty authorized the United States to construct the Libby dam. However, recognizing that Libby could also confer benefits on downstream Canadian operations, the United States agreed to some level of consultation and coordination of the operation of Libby which commitment was further elaborated in the Protocol. The two relevant provisions read as follows:

> 5. If a variation in the operation of the storage is considered by Canada to be of advantage to it the United States of America shall, upon request, consult with Canada. If the United States of America determines that the variation would not be to its disadvantage it shall vary the operation accordingly.
> V. Inasmuch as control of historic streamflows of the Kootenay River by the dam provided for in Article XII(1) of the Treaty would result in more than 200,000 kilowatt years per annum of energy benefit downstream in Canada, as well as important flood control protection to Canada, and the operation of that dam is therefore of concern to Canada, the entities shall, pursuant to Article XIV(2)(a) of the Treaty, cooperate on a continuing basis to coordinate the operation of that dam with the operation of hydroelectric plants on the Kootenay River and elsewhere in Canada in accordance with the provisions of Article XII(5) and Article XII(6) of the Treaty.

[108] VCLT Article 31. The U.S. is not a party to the VCLT but there is a widespread understanding, accepted by the U.S., that Articles 31 and 32 of the VCLT represent customary international law.
[109] For example, a potentially relevant treaty is the Convention on Biological Diversity but we say only potentially because the United States is not a party to this treaty so it can only be relevant in relations between Canada and the United States to the extent that any of its provisions also represent customary international law.

The question for present purposes (which might for example arise given the operation of Libby for sturgeon flows rather than power and flood control) might be how to interpret the term "disadvantage". Should it be read in light of the 1964 Treaty as requiring the U.S. to assess advantage entirely in terms of flood control and power (the two main purposes of the CRT) or can the U.S. also argue that the term must be interpreted in light of developments in customary international law and the duty of all states to take measures to protect endangered species and preserve biological diversity.[110]

Example 2: effective use of all related storage, Protocol, Article 1.
On the sixtieth anniversary of the Treaty the flood control operation prescribed by the Treaty changes from the assured operation (supplemented by on-call) to the called-upon operation. Article 1 of the Protocol seeks to clarify the nature of the trigger to the called-upon operation by stipulating that the U.S. can only make a call when it has used or effectively used all of its own facilities.

> (2) The United States entity will call upon Canada to operate storage under Article IV(3) of the Treaty only to control potential floods in the United States of America that could not be adequately controlled by all the related storage facilities in the United States of America existing at the expiration of 60 years from the ratification date but in no event shall Canada be required to provide any greater degree of flood control under Article IV(3) of the Treaty than that provided for under Article IV(2) of the Treaty.

Apart altogether from what meaning to attach to the term "related storage" there might still be questions about whether this would require the U.S. to completely draw down all of its storage to the minimum. Might not the U.S., for example, argue that it is entitled to take into account other values (including the need to keep some additional water in storage to provide for late season flows for fish purposes[111]) and in doing so, as above, refer to continuing developments in international law to properly interpret "adequately controlled by all the related storage facilities"?[112]

Example 3: the meaning of "interests" in Article VIII of the Boundary Waters Treaty.
Article VIII of the Boundary Waters Treaty establishes the criteria that the IJC shall apply in considering applications under Articles III and IV of the Treaty for projects that have an effect on the levels of boundary or transboundary waters. One provision of the Article requires the IJC as a condition of its approval for any project that raises water levels to require that "suitable and adequate provision … be made for the protection and indemnity of all *interests* on the other side

[110] It would of course be necessary to show that such obligations represented norms of customary international law, especially since the U.S. is not a party to the Convention on Biological Diversity.
[111] This is really the basis for the current VARQ operation at Libby and Hungry Horse.
[112] For further discussion see Bankes, Before and After, *supra* note 47.

of the line which may be injured thereby." (emphasis added) The Commission itself has indicated that this provision both authorizes and requires it to take into account a number of "interests" in addition to those prescribed by the treaty when considering not only the issuance of an Order of Approval but the ongoing review of such Orders. For example, in its Report to the two governments on a proposed new Plan of Regulation for Lake Ontario and the St Lawrence River in 2014 the Commission observed as follows:[113]

> The *Boundary Waters Treaty of 1909* lists an order of precedence for the uses of boundary waters. It gives precedence to water uses for domestic and sanitary water purposes, uses for navigation, and for hydroelectric generation and irrigation. The Treaty also requires that the IJC ensure, as part of its approval of a project, that "suitable and adequate provision be made for the protection and indemnity of all interests" on either side of the boundary. The IJC respects the order of precedence of the listed uses while ensuring that all legitimate interests are protected. (emphasis in original)

Accordingly, in this report the IJC took account of coastal development, ecosystems and recreational boating interests while maintaining the priority of the treaty prescribed uses.[114]

A cautionary note as to the limits of evolutive interpretation

A final cautionary note is in order. While the above are two possible examples of the application of the evolutive approach to the CRT (and one in relation to the Boundary Waters Treaty) it must be recognized that most of the CRT is not couched in such generic and conceptual terms. Indeed much of the treaty and its Annexes read more like a commercial contract than an international treaty. Clearly both sides were as much concerned about the commercial aspects of the arrangement and the management of risk as they were concerned with traditional governmental and resource management matters. This more technical and precise form of drafting counsels caution in applying an evolutive and dynamic approach to the interpretation of the treaty but it should also be recalled that the Court of Arbitration had little difficulty in its Kishenganga Award interpreting the 1960 Indus Waters Treaty (concluded only a year earlier than the CRT, and similarly single-minded in its focus on hydropower production and irrigation) to include an obligation to protect the environment downstream of a dam with no textual basis at all in the treaty (see discussion in Appendix A).

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[113] *Lake Ontario – St. Lawrence Plan 2014, Protecting against Extreme Water Levels, Restoring Wetlands and Preparing for Climate Change*, June 2014 at 23 available here http://www.ijc.org/files/tinymce/uploaded/LOSLR/IJC_LOSR_EN_Web.pdf

[114] For another example see International Upper Great Lakes Study, *Lake Superior Regulation: Addressing Uncertainty in Upper Great Lakes Water Levels*, March 2012 http://www.ijc.org/iuglsreport/wp-content/report-pdfs/Lake_Superior_Regulation_Full_Report.pdf esp. at 6 – 7. This example is discussed further in section 5.2.2 of the paper.

In any event, if the two states do wish to create a more adaptive treaty for the future they might wish to adopt general and conceptual language and rely on appropriate institutional design to achieve broadly articulated goals.

5.2. The Boundary Waters Treaty and the International Joint Commission

Concluded in 1909 between the United Kingdom (on behalf of Canada) and the United States, the Boundary Waters Treaty[115] (BWT) has endured for more than a century. The BWT deals with both boundary waters between the United States and Canada and transboundary waters. Boundary waters are waters through or along which the international boundary passes. Transboundary waters ("waters flowing across the boundary") are waters that cross the boundary. The Columbia and Kootenay are evidently examples of transboundary waters. The BWT established a number of legal rules to govern the manner in which the two states use boundary waters and transboundary waters. The treaty also establishes the International Joint Commission (IJC) which takes the form of two bi-national sections, each supported by a secretary.

The BWT affords the IJC four distinct forms of jurisdiction: (1) compulsory jurisdiction, (2) advisory jurisdiction, (3) administrative jurisdiction, and (4) arbitral jurisdiction.

Compulsory jurisdiction

Articles III and IV of the treaty stipulate that neither state may proceed with or authorize any project that changes the levels of boundary waters or the level of transboundary waters at the boundary without the approval of the IJC. Article VIII further elaborates the relevant rules.

Advisory jurisdiction

Article IX of the BWT allows the two governments to refer any matter to the IJC for its advice. This is also known as the IJC's Reference jurisdiction. The result of a reference is advisory to the two governments and is not binding as a matter of law. However, it may be politically difficult for one government to reject the joint advice of the IJC. For example, British Columbia was effectively forced to accept the recommendations of the IJC's Flathead Reference that certain coal deposits not be brought in to production.[116]

Administrative jurisdiction

Article VI of the treaty is a unique provision of the treaty that provides for the apportionment of the waters of the Milk and St Mary Rivers which are shared by Montana and the provinces of Alberta and Saskatchewan. Since the treaty itself effects the basic division, the IJC's

[115] January 11, 1909, 6 Stat. 2448.
[116] IJC, *Impacts of a Proposed Coal Mine in the Flathead River Basin*, December 1988.

responsibility is to provide any necessary details to give effect to the apportionment and to supervise that apportionment.[117]

Arbitral jurisdiction

In addition to the advisory jurisdiction under Article IX, Article X of the treaty contemplates that a dispute may be submitted to the IJC for it to make a binding arbitral award. However, any such submission requires the consent of both states, and, in the case of the U.S., the submission can only be authorized by and with the advice and consent of the Senate. The parties have not made any use of this provision and it seems unlikely that they will do so in the future.

Flexibility mechanisms in the treaty and in the practice of the IJC

There are a number of flexibility mechanisms in the BWT and in the practice of the IJC.[118] We have identified the following: (1) the institution of the advisory, or "reference," jurisdiction, (2) the continuing jurisdiction of the IJC over its orders of approval issued as part of its compulsory jurisdiction, and (3) the role of the IJC in informing the negotiation of more specific bilateral agreements.

The institution of the advisory jurisdiction

The existence and practice of the IJC's advisory jurisdiction has been the single most important mechanism in the treaty that has allowed the IJC to evolve over time, to identify new issues, to take up issues that are not dealt with in the other operative provisions of the agreement and to lay the basis for agreements between the governments on additional matters. The reference jurisdiction is what makes the IJC and the treaty an organic and evolving institution and instrument rather than a static one. Examples abound. Within the Columbia basin itself two references to the IJC laid the technical foundation for the consideration of various dam and storage options[119] and provided the principled basis on which the two states could consider dividing the costs and benefits of the coordinated development of the Columbia.[120] Another reference within the Columbia basin is the Flathead reference already referred to above.[121] This illustrates how a reference may be used to consider the transboundary implications of a project

[117] Article VI, final paragraph. The Milk/St Mary apportionment is discussed further in s. 5.2.1 of this paper.

[118] For an insider's view of the IJC see Murray Clamen, "The IJC and Transboundary Water Disputes: Past, Present and Future" in *Water Without Borders*, *supra* note 102, pp. 70 – 87 and noting (at 71) that "the IJC's institutional flexibility has been central to its ongoing success." Clamen was for many years the Secretary of the Canadian Section of the IJC.

[119] *Report of the International Columbia River Engineering Board* (hereafter *ICREB Report*) on the Water Resources of the Columbia River Basin to the International Joint Commission, 1959

[120] IJC, Principles for Determining and Apportioning Benefits from Cooperative Use of Storage of Waters and Electrical Interconnection within the Columbia River System (1959).

[121] IJC *supra*, note 116.

(in that case a coal mine) which would not otherwise have engaged the compulsory jurisdiction of the Commission.[122]

The IJC discharges its responsibilities for References by establishing bi-national study boards to advise it on the matter at hand. Members of such boards are drawn from the public service of state, provincial and federal governments and are expected to put aside national interests in working to identify the best solutions. The IJC is proud of its record in developing consensus positions on practically all of the matters that are referred to it. The only example of the IJC failing to reach agreement on a reference is the reference on the Belly/Waterton Rivers in the 1950s.

A more unusual reference was a 1997 Reference by both governments asking the IJC how it might best assist the governments in meeting the environmental challenges within the scope of the treaty.[123] In its Response − The IJC and the 21st Century − the IJC proposed the creation of international watershed boards. This proposal ultimately morphed into the International Watersheds Initiative when the Commission came to the realization that the idea of a watershed board was too ambitious. In implementing the initiative the Commission has been at pains to emphasize the importance of an ecosystem approach, integration, public participation and local involvement. In rolling out the proposal the Commission did encounter some lack of enthusiasm if not hostility (concerns that the IJC was "taking over" responsibilities in the watersheds) and as a result the IJC decided to "go slowly", identifying three pilot projects − St. Croix River, Rainy Lake - Rainy River and Lake of the Woods and the Red River. Under the umbrella of the IWI the IJC has supported a number of softer collaborative initiatives including harmonizing geographic data sets for watersheds along the boundary and promoting the development of hydrological models. The IJC has also used the IWI as the opportunity to amalgamate existing boards within the same watershed where appropriate. An assessment of progress to date in implementing the IWI notes that in the St. Croix River, "Success in this watershed is likely due in large part to its relatively small size, the somewhat limited number of governments and government agencies involved, an active and involved group of citizens, board members who have similar objectives and who have been able to cooperate effectively, the long history of IJC involvement in the watershed, and realistic expectations of what the IWI and an IJC watershed board can accomplish."[124]

[122] *Id*. The reference also engaged the free standing duty not to pollute the boundary waters or transboundary rivers (Article IV of the Treaty). By free-standing we simply mean that the treaty does not provide a means of enforcing this obligation. The IJC was only able to consider the obligation in this case because of the reference.
[123] This paragraph draws heavily on Clamen, *supra* note 118.
[124] Id., at 82.

The continuing jurisdiction of the IJC over its orders of approval issued as part of its compulsory jurisdiction

Where the IJC approves a boundary water or a transboundary water project, it will issue an order of approval containing terms and conditions and providing for regular reporting, typically all subject to supervision by a bi-national board of control. This provides both the means and a forum for maintaining a level of oversight over the project.

The Kootenay Lake Levels Order of 1938 provides a useful case in point from the basin. The IJC is involved in this matter because the operation of the Corra Linn Dam may affect water levels on Kootenay Lake and thence upstream to the international boundary near Bonners Ferry, Idaho under certain flow conditions.[125] Inflows into Kootenay Lake are now also influenced by the operation of the Duncan and Libby dams, both of which were either authorized or required by the Columbia River Treaty. The annual meeting of the Kootenay Lake Board of Control therefore provides the opportunity to review the operation of all of these facilities and to examine effects of water levels and in some cases to review the possible development of mitigation measures where necessary. A particular useful example was provided by the Board's review of the extreme flood event of 2012. The Board's 2013 meeting allowed all concerned to review the flood control protection offered by the treaty facilities but also provided an opportunity to consider other measures that might be taken to afford a greater degree of control over Kootenay Lake levels. In particular, it allowed consideration of measures to further modify the natural control of lake levels affected by the constriction at Grohman Narrows.[126]

The role of the IJC in informing the negotiation of more specific bilateral agreements

There is some overlap between the reference jurisdiction discussed above and the role of the IJC in informing the negotiation of more specific bilateral agreements. Nevertheless, whether arising from the IJC's compulsory jurisdiction or its advisory jurisdiction there is strong evidence that the IJC's reports have informed and laid the necessary groundwork for more formal negotiations between the two states that have led to the conclusion of new and more specific treaties between them as to a particular watershed. Examples include:

- The Columbia River Treaty which drew upon the IJC's work from two references.
- Agreement between the United States and Canada with Respect to the Regulation of the Lake of the Woods, 1925.[127] This agreement regulates the level of the Lake of the

[125] A constriction at the outflow known as Grohman Narrows provides natural regulation of Kootenay Lake. The IJC Order requires the operator of Corra Linn (currently Fortis) to ensure that its operation of Libby does not further compound the effect of the natural restriction thereby raising Kootenay Lake levels and causing elevated water table levels or flooding in Idaho (thereby increasing costs for agriculture in that area).

[126] See the Minutes on the International Kootenay Lake Board of Control Public Meeting, Nelson, BC, September 12, 2013. Available on the IJC's website at http://ijc.org/en_/iklbc/Other_Documents

[127] Washington, 24 February 1925. http://www.treaty-accord.gc.ca/text-texte.aspx?id=100416; 6 Bevans 14.

Woods. It was negotiated based upon recommendations made by the IJC in response to a Reference from the two governments.

- Convention Providing for the Emergency Regulation of Rainy Lake and other Boundary Waters in the Rainy Lake watershed, 1938.[128]
- Great Lakes Water Quality Agreements.[129]

Limitations on the flexibility/adaptive capacity of the IJC

What, if anything, has limited the flexibility/adaptive capacity of the IJC or the ability of the IJC to deploy that capacity? Probably the most important limitation has been the common understanding or convention that, notwithstanding the precise wording of Article IX of the treaty, neither government can refer a matter unilaterally to the IJC but that both must agree on the terms of reference. This has meant that in at least some cases the IJC never gets to examine an issue that is of bilateral concern. In some cases reluctance to agree to a reference may come from the relevant federal government while in others (and perhaps in most cases) the reluctance may come from the subnational government. Perhaps the most notorious example is the Devils Lake Diversion[130] but the Columbia basin itself perhaps provides another example. Thus a new reference to the IJC (either a standalone reference or a reference as part of the IJC's watersheds initiative) might be one way to consider how to take account of ecological values within the basin but it is fairly clear that British Columbia would not support such an initiative. British Columbia sees the Columbia River Treaty as the principal vehicle and forum for any broad-based discussions about the basin[131] and would oppose any enhanced role for the IJC within the basin.[132] The federal government would defer to British Columbia on this approach.

Lessons for the Columbia River Basin

What lessons can we draw from the experience with the BWT and the IJC that may be relevant to the Columbia River Basin? The first is that organizations matter but also that organizations need to have an appropriate mandate that is sufficiently malleable to allow the organization (either of its own motion or upon the direction of one or both governments) to take up new issues and to develop responses to issues that were not understood at the time of the original agreement.

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[128] Ottawa, September 15, 1938; 6 Bevans 115.

[129] Discussed further in part 5.4 of this paper.

[130] For discussion see Bankes "From Devils Lake to the Columbia River: Western Water Issues", Institute for United States Policy Research, Occasional papers Series, volume 2, # 2, January 2008, 17pp. and Norman Brandson and Robert Hearne, "Devils Lake and Red River Basin" in *Water Without Borders? supra* note 102 at 179 – 192. Brandson and Hearne see the Devils Lake situation as (at 180) "a concrete example of the much-discussed phenomenon of moving away from the IJC's references."

[131] Clamen, *supra* note 118 at 78, recognizes the challenge but also refers to other possible fora noting that "British Columbia and Washington … considered their existing provincial-state arrangements (such as the Washington – B.C. Environmental Cooperation Council ….) adequate to address most transboundary water issues."

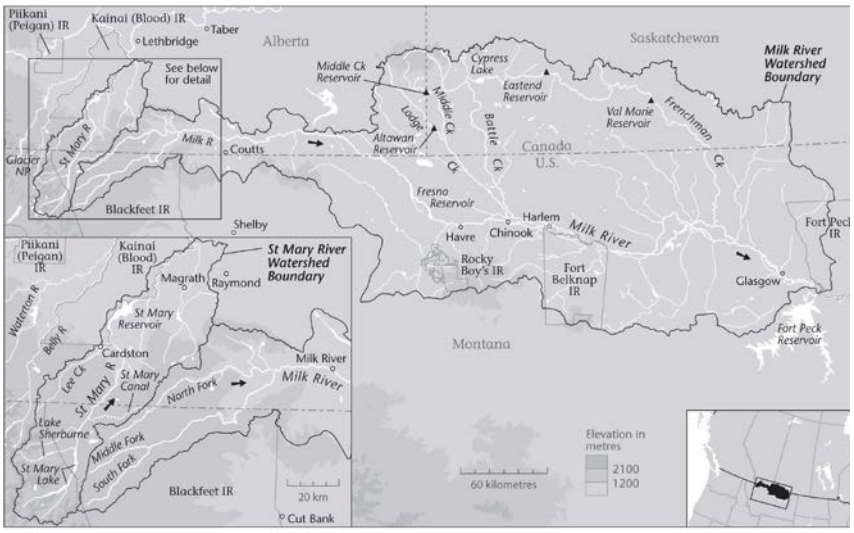
[132] The position of the states may be less clear but it is interesting to observe that a recent review of options by John Shurts and Richard Paisley, "The Columbia River Treaty" in *Waters Without Borders supra* note 102 makes no reference to a possible role for the IJC in the future of the CRT.

Thus, in the case of the BWT and the IJC, the existence of the IJC ensures the continuing relevance of the BWT but the treaty would have proven to be far less important had the IJC's jurisdiction been limited to its compulsory jurisdiction. It is the combination of the IJC and its reference jurisdiction that has assured the treaty of its continuing relevance and allowed the IJC to address new issues and indeed assist the two states in reaching agreement on those new issues.

A second point is that much can be achieved within the text of an old treaty. The only amendment to the BWT occurred in 1950 when paragraphs 3, 4 and 5 were replaced by the text of the Niagara River Treaty. Instead of amending the treaty the parties have chosen to supplement it by some of the more basin-specific agreements referred to above and in doing so the Parties in some cases (e.g., the Great Lakes Water Quality Agreements) have shown their support for the IJC by conferring on it additional responsibilities.

5.2.1. Arrangements for the apportionment of the St Mary and Milk Rivers

The St. Mary and Milk Rivers are shared between the U.S. state of Montana and the Canadian provinces of Alberta and Saskatchewan.[133]



Source: Eric Leinberger

The St. Mary is a mountain stream fed by snow and glacial melt as well as rain. The Milk River is a typical "flashy" prairie stream that runs dry in some years in the late summer. Of the two, the St. Mary has a higher annual runoff and is much the more reliable of the two streams. The St. Mary is part of the South Saskatchewan watershed. It rises in Montana and thence flows NW across the border. The Milk flows north across the border and then tracks east before turning south back into the United States where it forms part of the Missouri and consequently the Mississippi drainage. The Milk River also receives flows from a number of streams in

[133] This introductory section draws on Nigel Bankes and Elizabeth Bourget, "Apportionment of the St Mary and Milk Rivers" in *Water without Borders? supra* note 102, pp. 159 – 178.

Saskatchewan (the eastern tributaries) that rise in the Cypress Hills area and flow south across the border joining the mainstem once it has returned to the United States. There are a number of storage structures on the upper portions of these tributaries in Canada (Saskatchewan).

Both rivers flow through relatively arid areas where there is a high demand for diversions for irrigation purposes. The Milk River has long been fully appropriated. The St. Mary has been developed in Canada as part of the integrated operation of the so-called three tributaries of the Oldman River – the St. Mary, the Belly and the Waterton. The geography of the upper St. Mary in the United States severely limits the available opportunities to take advantage of the flow in the St. Mary. Thus most of the storage on the St. Mary is downstream in Alberta; only the United States maintains storage facilities on the Milk. There are significant tribal and First Nation interests in these shared resources and indeed the Milk River provides the backdrop for what is still the foundational tribal water rights case in the United States: *US v. Winters*.[134]

The basic apportionment of the St Mary and Milk Rivers between the United States and Canada is effected by Article VI of the Boundary Waters Treaty as supplemented by an Order of the Commission made in 1921, and as further implemented by the Procedures Manual of the accredited officers (water engineers) of the two countries. These elements of the apportionment are all examined in some detail in Appendix B, as are some of the flexibility arrangements that the parties have been able to develop.

Lessons for the Columbia River Basin

The St. Mary and Milk Rivers represent a dramatically scaled down version of the problems presented by the Columbia at all sorts of different levels. Not only are the watersheds and volumes of water much smaller but a much smaller group of players is involved – particularly on the U.S. side where only one state is involved as compared with the four states involved in a significant way on the Columbia. The range of issues involved also seems more limited in the case of the St. Mary and Milk Rivers. The principal value involved, both historically and currently, is water for irrigation. Flood control has not been a significant issue (although it has been accommodated as noted in the context of the eastern tributaries) and power is a non-issue. While there are listed fish species in both the Milk and St. Mary rivers, the issues associated with the recovery of these species pale in significance when compared with those on the Columbia.

These differences aside there are interesting analogies. Both offer examples of limited flexibility within the constraints of a formal set of rules. In the case of the Columbia, the rule framework is provided by the CRT and the assured operating plans. The flexibility in the system comes through the detailed operating plans and more specifically through the seasonal special operating agreements. Further flexibility is provided by the existence of non-treaty storage. The

[134] 207 US 564 (1908).

Parties/Entities are well positioned to take advantage of these flexibilities by virtue of standing organizational arrangements in the form of the Operating Committee of the Entities.
In the case of the St. Mary and Milk Rivers the rule system is provided by Article VI of the Treaty and the 1921 Order. The flexibility that exists comes through the Procedures Manual and the institution of the Accredited Officers which together have allowed the parties to craft multi-year solutions such as the Letter of Intent as well as the more *ad hoc* solutions that have been developed for the eastern tributaries. Efforts to explore and further enhance the flexibilities within the 1921 Order have yet to meet with success as have efforts to change the rule system by changing the terms of the Order. The chosen forum for these exploratory discussions is interesting insofar as it places responsibility for the discussions squarely on the two jurisdictions most involved (Alberta and Montana) which in both cases have chosen to involve representatives of those most affected within their respective teams. In the case of Montana this allowed the involvement of tribal interests within the process. This is more of a "bottom-up" attempt to find solutions than a "top-down" federal-driven approach.

Another point of commonality between the issues facing the parties within the two watersheds is the matter of money. Insofar as it is the case that Montana is not able take its full share of water because of the inadequacy of the diversion infrastructure, it follows that part of the solution would be additional investment in that infrastructure. The difficulty is that nobody (the state, the Montana irrigators, federal authorities) wishes to assume that responsibility. This suggests a further analogy with the Columbia where one of the issues that will need to be resolved in the future will be the allocation of the burden associated with post-2024 flood control operations especially if the U.S. is looking for some sort of assured operation from Canada.

Perhaps the most important lesson from the St. Mary and Milk Rivers is the counsel of modesty of ambition. If it is difficult and slow to make progress in a much simpler system which engages fewer interests and players we should anticipate even greater challenges within the Columbia Basin in seeking to go beyond the flexibilities that exist within the current structure. An additional lesson is that there is a tradeoff between certainty and flexibility. The more an agreement prescribes a specific allocation (whether of water or benefits), the more difficult it will be to change the arrangement unless each party can see at least some benefit from the adjustment.

5.2.2. Levels Jurisdiction of the IJC in the Great Lakes

This section of the paper explores the levels jurisdiction of the International Joint Commission in the Great Lakes, the degree of flexibility that the IJC has in establishing and modifying levels orders and recent efforts to incorporate ideas of adaptive management into its levels orders.

Lake Levels

Lake levels are subject to natural variation. In addition, humans have some capacity to affect levels through control structures on outlets to lakes. Control structures that have the capacity to change levels on boundary waters (or transboundary waters) must be approved by the IJC under Articles III, IV and VIII of the BWT. The IJC's Order of Approval will typically establish a range of levels within which the facility must operate in order to protect certain values. We have already seen one example of this in the context of Kootenay Lake.[135] Variations in water levels have a variety of different impacts. The following statement from the Building Collaboration report of the International Great Lakes-St. Lawrence River Adaptive Management Task Team provides a useful overview in the context of the Great Lakes:[136]

> The Great Lakes are a complex and dynamic system. Water level fluctuations on the Great Lakes-St. Lawrence River system vary on timescales ranging from months to millennia and are influenced by natural and anthropogenic factors, and long-term climate trends. Extreme water levels and changing flows through connecting channels and the St. Lawrence River pose significant risks to the economic and social well-being of the Great Lakes - St. Lawrence River region. When those water levels approach the extremes of the historic range, due to either persistent wet or dry conditions, the impacts can be detrimental and costly. High water levels can cause significant damage due to flooding, erosion, overtopping of shore protection structures, loss of beaches and recreational lands and their economic and social benefits, loss of wetlands, high channel flows that can impede navigation, and a greater susceptibility to storm damage from wind and waves. Low water can lead to increased dredging, ships forced to lighten their loads, encroachment of development in the nearshore, exposure of mudflats, undercutting of shore protection, loss of marina services and access to boat launch facilities, risks to water supply infrastructure, nearshore water quality issues, reductions in hydropower generation and ecosystem effects (e.g., isolating fish from their spawning habitats, or stranding wetlands). While the ecosystem requires natural variation in water levels over seasonal, yearly and decadal cycles, and flourishes under dynamic conditions, extended periods of extremely low or high water periods can also pose issues for ecosystem function and nearshore fish and wildlife habitats.

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[135] See section 5.2.

[136] *Building Collaboration Across the Great Lakes – St. Lawrence River System, An Adaptive Management Plan for Addressing Extreme Water Levels, Breakdown of Roles, Responsibilities and Proposed Tasks*, Final Report of the International Great Lakes – St. Lawrence River Adaptive Management Task Team prepared for the International Joint Commission, May 30, 2013 at 3. Available here http://ijc.org/files/tinymce/uploaded/documents/reportsAndPublications/FinalReport_Adaptive%20Management%20Plan_20130530.pdf

Source: US Army Corps of Engineers, http://en.wikipedia.org/wiki/File:Great_lakes_basin.jp

The IJC has been examining levels issues on the Great Lakes for decades either pursuant to a Reference or pursuant to the terms of an Order of Approval.[137]

The Great Lakes is a system of connected lakes.[138] Lake Superior is at the top of the chain. Water flows from Lake Superior through St Marys River into Lake Huron which is interconnected with Lake Michigan through the Straits of Mackinac. By virtue of this interconnection Lakes Huron and Michigan are at the same level. Water flows out of Lake Huron into Lake Erie through the St Clair River, Lake St. Clair and the Detroit River. Water flows from Lake Erie into Lake Ontario, the final Great Lake, via the Niagara River. Water leaves Lake Ontario for the Atlantic Ocean via the St. Lawrence River. Water also leaves the basin through the Chicago Diversion and is transferred into the upper basin via the Albany River (James Bay drainage).

[137] William R. Willoughby, "The International Joint Commission's Role in Maintaining Stable Water Levels" (1972), 28 Inland Seas 109 – 118. Willoughby refers to the IJC's work in the Lake of the Woods area as well as on the Great Lakes.

[138] This paragraph draws on *Great Lakes – St. Lawrence River Regulation: What it Means and How it Works*, 1990. The publication was jointly prepared by Environment Canada and the North Central Division of the Army Corps of Engineers. Available at http://www.ijc.org/files/tinymce/uploaded/Great%20Lakes-St.%20Lawrence%20River%20Regulation%20%20%20what%20it%20means%20and%20how%20it%20works.pdf

There are two significant sets of control structures on the Great Lakes system which have at least some limited capacity to affect lake levels. These are first the structures on the St. Marys River which have some effect on Lake Superior Levels. These structures, by controlling outflows from Lake Superior, can thereby have some effect on Michigan and Huron levels. Second, there are structures on the upper St Lawrence River in the stretch of the river which extends from Lake Ontario to Cornwall Ontario and Massena, New York. These structures have some effect on the levels of Lake Ontario but they also have some effect on downstream conditions in the St. Lawrence which are important both for navigational purposes but also offer some flood control protection for Montreal.

Both developments are authorized by IJC Orders of Approval. The developments on the St. Marys River were first authorized by a 1914 Order of Approval; the developments on the St. Lawrence were first authorized in 1952. In each case the Orders give effect to Article VIII of the Treaty which, *inter alia*, specifies an order of priority for different uses of shared waters as follows: domestic and sanitary water uses, navigation, and power and irrigation. Both Orders have been kept under review by the IJC although only the Lake Ontario/St Lawrence Order of Approval contains an express clause reserving the IJC's jurisdiction over the terms of the Order. The relevant clause reads as follows:

> And it is further ordered that the Commission retains jurisdiction over the subject matter of these Applications, and may, after giving such notice and opportunity to all interested parties to make representations as the Commission deems appropriate, make such further Order or Orders relating thereto as may be necessary in the judgment of the Commission.

Both Orders provide for a Board of Control and both contemplate that the terms of the Order will be supplemented by a regulation plan or a set of rule curves. It is perhaps best to think of the Order of Approval as establishing a set of criteria for the operation of the control structures and the plan of regulation as the scheme by which the Board of Control and the facility operators give effect to those criteria in the actual operation of the structure. Thus, as we have seen elsewhere in this paper, the hierarchical normative order comprises the treaty, the Order of Approval, and the plan of regulation or set of rule curves and any approved variation.

Appendix C of the paper examines in some detail how the IJC has used its continuing jurisdiction over these levels orders both to adapt to changing circumstances but also expressly to adopt an adaptive management approach.

The key points that emerge from our review of the Lake Superior levels orders are as follows:

- The levels order respects the use priorities listed in the treaty.
- A levels order is subject to review by the IJC.
- The levels order has changed over time (or been supplemented) to take into account a number of interests that were not included in the original order, including fisheries interests and interests on Lakes Huron and Michigan. Thus the Order has changed both in terms of the interests engaged and in its geographic reach or scale.
- Actual management of outlet facilities is carried out pursuant to a plan of operations which allows additional interests to be taken into account.
- The IJC has expressed an interest in applying adaptive management ideas more generally to the Great Lakes St. Lawrence Basin. The IJC draws a clear distinction between adaptation (i.e. changing levels order and plan of operation over time to take account of different interests) and adaptive management which involves the conscious learning by doing and reflection.

Similarly the key supplementary points that emerge from our review of the Lake Ontario – St. Lawrence Order of Approval are as follows:

- The Lake Ontario levels order has always taken account of a broad range of interests on the lake and downstream of the lake but failed to take account of environmental interests with the result that ecosystem health became degraded.
- Actual management of outlet facilities is carried out pursuant to a plan of operations which allows additional interests to be taken into account and provides additional flexibility.
- The IJC's process for reviewing its levels orders has changed over time. It is a science based process involving a lot of modelling but which also seeks to engage the public.
- Levels Orders inevitably involves tradeoffs and in that sense are highly political exercises. However, revisions to levels orders and any associated plan of operations must always respect treaty priorities, which means that the IJC and its Boards are inevitably looking to optimize operations within a fairly narrow range.
- The 2014 Plan, if implemented, will take account of environmental values and should improve aquatic ecosystem health. The Plan also demonstrates how ideas of adaptive management may be integrated into an Order of Approval and plans of operations. It also suggests that adaptive management will not bring about revolutionary change but will operate at the margins to secure additional science-based improvements to optimize operations to meet all treaty protected uses and other recognized interests.
- While the IJC ordinarily has the jurisdiction to make decisions and implement and changes to its Orders of Approval in this case the Commission is proceeding very cautiously given the history of this particular development.

Lessons for the Columbia River Basin

The levels decisions of the IJC offer excellent examples of bargaining for optimal arrangements within the framework of the Treaty. Levels Orders must always respect the values listed by the Treaty and their order of precedence but can recognize new interests and bring them into the mix provided that this does not have a significant impact on treaty protected interests. However, the IJC does not regard the terms of any Levels Order of Approval as sacrosanct and has been prepared to review its Orders of Approval in light of changing interests and values and to better achieve the objectives of the treaty.

Lots of different interests are impacted by levels decisions. The IJC has taken great efforts to involve the public and all interests in the process of developing regulation plans that best meet the needs of all interests while respecting the values of the treaty. This is necessarily a slow and iterative process. Since it is a process that involves tradeoffs not all parties will be satisfied with the outcome and some may incur incremental costs.

The levels review process illustrates the importance of science and the peer review of that science. The work of both study boards was subject to extensive peer review. This became important when, for example, in the Lake Ontario case affected "coastal development" interests sought to challenge the claim that lake regulation had a detrimental effect on coastal ecosystem health.

It is clear that the IJC now takes much seriously the concerns and interest of First Nations and the Tribes. While it has not identified such interests as a separate interest that should be taken into account in developing levels orders it has suggested including indigenous representation on a Board of Control.[139]

5.3. Great Lakes Water Quality Agreements

The Great Lakes contain 18% of the world's freshwater,[140] and are shared by eight U.S. states[141] and two Canadian provinces,[142] and are clearly among the waters the Boundary Waters Treaty was intended to address. In 1970, in response to a Reference on October 7, 1964, from the Governments of Canada and the United States to investigate pollution in Lake Erie, Lake

[139] It is perhaps particularly revealing that Plan 2014 begins with a Preface which acknowledges that the area subject to the Order is the traditional territory of the Akwesasne people and continues with an invocation from Henry Lickers, Director of the Mohawk Council of Akwesasne.

[140] Rick Findlay and Peter Telford, *The International Joint Commission and the Great Lakes Water Quality Agreement: Lessons for Canada-United States Regulatory Co-operation*, Government of Canada, Policy Research Initiative, Working Paper Series 023, April 2006 available at http://www.pollutionprobe.org/old_files/Reports/greatlakesagreement.pdf

[141] Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin

[142] Ontario and Quebec

Ontario, and the international section of the St. Lawrence River, the International Joint Commission (IJC), released a report finding pollution of these waterways to violate the prohibition on pollution harmful to the other party in Article IV[143] of the Boundary Waters Treaty.[144] This led to development of the initial agreement on Great Lakes water quality in 1972. Subsequently, the United States and Canada have entered into a series of agreements to address water quality issues in the Great Lakes and St. Lawrence River culminating in the Great Lakes Water Quality Agreement of 2012 (GLWQA of 2012) which supersedes the previous agreements. Details on the GLWQAs are found in Appendix D.

The successive GLWQAs have increased the scope and level of coordination concerning water quality issues over time. The first Agreement between the United States of America and Canada on Great Lakes Water Quality was signed at Ottawa on April 15, 1972.[145] The 1972 Agreement focused on reducing pollution discharge, particularly phosphorous oil and solid waste, to the Great Lakes. It established two advisory bodies under the umbrella of the IJC: the Great Lakes Water Quality Board comprised of senior representatives of federal, state, and provincial governments,[146] and a Research Advisory Board composed of research managers from relevant agencies. [147] The tasks of collecting and analyzing data were to be carried out jointly and separately under the coordination of these bodies.

The 1978 Agreement added toxic pollutants with the goal of eliminating any persistent toxics from the Great Lakes and international portion of the St. Lawrence River.[148] The 1978 Agreement is recognized for including an ecosystem approach by stating its purpose to be "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem," and defining the "Great Lakes Basin Ecosystem" as "the interacting components of air, land, water and living organisms, including humans".[149] It calls for the elimination of persistent toxic pollutants[150] and broadens the scope to include pollutants from

[143] Boundary Waters Treaty Article IV stating "It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other."
[144] International Joint Commission of Canada and the United States, "Pollution of Lake Erie, Lake Ontario, and the International Sections of the St. Lawrence River", 1970. Available at http://www.ijc.org/files/publications/ID364.pdf
[145] Great Lakes Water Quality Agreement, Article XII, U.S-Canada, Apr. 15, 1972, 23.1 U.S.T. 301
[146] See, IJC A Guide to the GLWQA, 1972 Agreement, available at http://www.ijc.org/en/activitiesX/consultations/glwqa/guide_3.php#1972, found at Article VIII.1.a. 1978 GLWQA as amended.
[147] See, IJC A Guide to the GLWQA, 1972 Agreement, available at http://www.ijc.org/en/activitiesX/consultations/glwqa/guide_3.php#1972, renamed named the Science Advisory Board at Article VIII.1.b. 1978 GLWQA as amended available at http://epa.gov/grtlakes/glwqa/1978/index.html
[148] 1978 GLWQA as amended supra note 146 Article II.
[149] Id.
[150] Id., Article VI.k.

land use activities.[151] The 1978 Agreement contemplates the possibility of new issues by providing for amendment to specific annexes as needed. It continues with implementation through the IJC and the advisory bodies that were established in the 1972 Agreement, revises and renames the Research Advisory Board to the Science Advisory Board,[152] and establishes a Great Lakes Regional Office to staff the advisory boards. [153]

In 1987 the two governments signed a Protocol amending the Water Quality Agreements after extensive review and public input. The Protocol maintained the basic framework of the 1978 Agreement, but expanded the types of pollutants[154] addressed and the management provisions.[155] Specifically it introduced the concept of restoration of impaired areas through procedures for development and implementation of Remedial Action Plans and procedures for addressing persistent toxic pollutants on the scale of the lakes through development of Lake-wide Management Plans.[156] It established a Binational Executive Committee chaired by the heads of Environment Canada and the U.S. EPA, with membership of senior officials from the federal, state and provincial agencies with responsibility for water quality related matters. The BEC took over the oversight role formerly provided by the IJC, a change that maybe consistent with the more narrowly drawn authority of the IJC.[157] The BEC must meet twice per year and oversee bilateral activities under the Agreement including remedial action plans for shared areas and lake management plans.

The GLWQA of 2012[158] reaffirmed the framework of the 1978 GLWQA as amended, and substantially amended it,[159] following a review that, among other things, concluded that "the GLWQA is outdated and unable to address current threats to Great Lakes water quality.[160] The GLWQA of 2012 was signed by the Governments of Canada and the United States on Sept. 7, 2012,[161] and entered into force on Feb. 12, 2013 following an exchange of diplomatic notes

[151] Id., Article VI.1.e.
[152] Id., Article VIII.1.b.
[153] Id., Article VIII.3.
[154] Id., Article VI.
[155] Id., Articles VII – X.
[156] Id., Article VI.1.o. and Annex 2.
[157] Stephen J. Toope and Jutta Brunnee. *Freshwater Regimes: the Mandate of the International Joint Commission*, 15 Arizona J. Int'l. & Comp. L. 273, 279-282 (1998).
[158] Great Lakes Water Quality Protocol of 2012, available at http://www.ijc.org/en_/Great_Lakes_Water_Quality
[159] Article II of the GLWQA of 2012 states: "The title, preamble, article and annexes of the 1978 Agreement are amended to read as set forth in the Appendix to this Protocol. "
[160] Agreement Review Committee. Report to the Great Lakes Binational Executive Committee Volume 1 ; Technical Report; Agreement Review Committee: Ottawa, Canada, 2007 quoted in Krantzbert, Gail, 2012, "Renegotiation of the 1987 Great Lakes Water Quality Agreement: From Confusion to Promise", 4 Sustainability 1239-1255; doi:10.3390/su4061239, available at http://www.cusli.org/Portals/0/files/conference/RenegotiationOf1987GLWQA.pdf
[161] The Protocol was signed by then Administrator of the EPA, Lisa Jackson, and the Canadian Minister for the Environment, Peter Kent.

between the two Parties. [162] The GLWQA of 2012 builds on and strengthens the prior Agreements, retains the Boundary Waters Treaty as its umbrella, takes an ecosystem approach,[163] and includes monitoring and adaptive management in its implementation.[164] Types of environmental harm are organized into ten annexes. In addition to the focus of prior agreements, the list of possible pollutants includes emerging pollutants and remains open ended.[165] Invasive species are added as an area of focus,[166] and climate change is the subject of one annex.[167] The 2012 Agreement increases the involvement of subnational governments and the sharing of information with the public. It does not set mandatory goals, leaving much to cooperation.

The GLWQA of 2012 appears to contain substantial authority for flexibility and coordination with all levels of governance with avenues for both input and implementation by domestic and subnational entities. Yet it accomplishes this through using relatively soft language with considerable agreement to cooperate, coordinate, and share information, but with specific goals left to be developed and an absence of mandatory compliance. GLWQA of 2012 is in its initial years of implementation, thus it remains to be seen if this approach works. The Parties have established a binational website available at http://binational.net/home_e.html which now has available their first report on priorities for science and action for 2014-2016.[168]

Concerns about progress in improving water quality sounded between the 1987 amendments and the GLWQA of 2012, raise a cautionary note in considering the tradeoff between flexibility and clear goals. A team of scientists with considerable collective experience in understanding the Great Lakes stated in 2005:

> There is widespread agreement that the Great Lakes presently are exhibiting symptoms of extreme stress from a combination of sources that include toxic contaminants, invasive species, nutrient loading, shoreline and upland land use changes, and hydrologic modifications. Many of these sources of stress and others have been impacting the lakes for over a century. These adverse impacts have appeared gradually over time, often in nearshore areas, in the shallower portions of the system, and in specific fish populations. Factors such as the size of the lakes, the time delay between the introduction of stress and

[162] http://www.ijc.org/en_/Great_Lakes_Water_Quality
[163] The Preamble to the 2012 GLWQA found in the Appendix states: "RECOGNIZING that restoration and enhancement of the Waters of the Great Lakes cannot be achieved by addressing individual threats in isolation, but rather depend upon the application of an ecosystem approach to the management of water quality that addresses individually and cumulatively all sources of stress to the Great Lakes Basin Ecosystem."
[164] 2012 GLWQA Article 2. 4. A supra note 158.
[165] Id., Annex 3B.
[166] Id., Annex 6.
[167] Id., Annex 9.
[168] Environment Canada and United States Environmental Protection Agency, 2014 – 2016 Binational Priorities for Science and Action (March 14, 2014) available at http://binational.net/priorities-science-action/index-en.html

subsequent impacts, the temporary recovery of some portions of the ecosystem, and failure to understand the ecosystem-level disruptions caused by the combination of multiple stresses have led to the false assumption that the Great Lakes ecosystem is healthy and resilient.[169]

Lessons for the Columbia River Basin

For purposes of the Columbia River Basin, the Great Lakes Water Quality Agreements illustrate the following key lessons:

- The GLWQAs come into effect through an Executive Agreement rather than the formal U.S. processes for a new treaty under Canada and U.S. (i.e. advice and consent of the Senate) law. This approach may provide a more flexible avenue for learning to work together on issues such as ecosystem function within a time period that would give the basin experience in determining which actions require international coordination and which are more appropriate for national and subnational implementation before locking in procedures and goals in a formalized Treaty. The following caveats may apply:
    - Consideration of this approach would require a mechanism for coordination with CRT operations on any ecosystem measures requiring alteration of flow.
    - The long history of the Columbia River Basin managing transboundary water without the involvement of the IJC may counsel its involvement in any Columbia River arrangement. Parties could consider the relative value of using an Executive Agreement.
    - There are tradeoffs between flexibility and hard goals that must be weighed in light of understanding of the degree of stress or resiliency of the basin's ecological system.
- The separation of the decision making body from the scientific advisory body in the GLWQAs allows adjustment as social and ecological conditions change without placing that discretion on technical agencies that lack a representative link to the public. Decision making discretion in the hands of technical entities tends to reduce legitimacy and accountability unless carefully constrained and embedded in a process that allows public involvement.
- Domestic implementation through domestic law and agencies maintains the ability to tailor programs to local needs, increases the avenues for local input, and addresses concerns regarding territorial sovereignty. Particularly in areas such as ecosystem function that implicate land use decisions, maintaining control over domestic implementation is important.

[169] J. Bails, A. Beeton, J. Bulkley, M. DePhilip, J. Gannon, M. Murray, H. Regier and D. Scavia, *Prescription for the Great Lakes*, 2005, available at http://healthylakes.org/wp-content/uploads/2011/01/Prescription-for-Great-Lakes-RestorationFINAL.pdf

- The GLWQAs establish an Executive Committee with representation that includes not only states and provinces, but Tribes, First Nations, and municipal governments.
- The GLWQAs use a nested governance approach in which the advisory bodies are made up of representatives from national and subnational agencies and governments rather than appointment separate from those entities. This increases the likelihood that communication will flow through to all levels of government and that decisions will be consistent with the goals and needs of subnational entities and local interests.
- The required scheduling of meetings of the Executive Committee and of a public forum assures that both transboundary and public communication will take place on a regular basis and not merely in response to a problem. This builds not only communication and knowledge, but relationships.
- The GLWQAs consider traditional ecological knowledge where appropriate.
- The GLWQAs have the effect of aligning domestic research priorities with the needs identified by the basin entities.
- The GLWQAs use adaptive management where appropriate. To this end, the requirement of monitoring and provision for addition of new annexes without re-visiting the entire agreement, and provision for amending the agreement through Exchange of Notes are avenues for informed adjustment to change.

5.4. Great Lakes Compact and Agreement

The Great Lakes Compact[170] and Agreement[171] (GL Compact and Agreement) are transboundary agreements entered into by the States and Provinces that, as subnational units of government, lack the authority to create binding international obligations. Nevertheless the approach represents a mechanism that holds promise for transboundary coordination of environmental issues while retaining subnational control over implementation.[172] The following paragraphs describe the legal mechanisms relied on in entering the GL Compact and Agreement and the relevant provisions for purposes of considering the approach in the Columbia River Basin, and an analysis of how this approach might apply within the Columbia River Basin. It provides an avenue for developing legitimacy with respect to new norms for implementation of ecosystem management before formal institutionalization at the international level.[173]

[170] Great Lakes-St. Lawrence River Basin Water Resources Compact (GL Compact), Pub. L. No. 110-342, 122 Stat. 3739 (2008), available at http://www.cglg.org/projects/water/Agreement-Compact.asp.
[171] Great Lakes-Saint Lawrence River Basin Sustainable Water Resources Agreement (GL Agreement), Dec. 13, 2005, available at http://www.cglg.org/projects/water/Agreement-Compact.asp
[172] Bradley C. Karkkainen, *The Great Lakes Water Resources Compact and Agreement: Transboundary Normativity without International Law*, 39 Wm. Mitchell L. Rev. 997 (2013).
[173] *See e.g.* Toope and Brunnee, *supra* note 157 at 274.

Legal Mechanisms for Entry into the GL Compact and Agreement and Relevant Provisions

The Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement was signed by the Great Lakes Governors and Premiers on December 13, 2005,[174] and the Governors endorsed the companion Compact that would bind them to the provisions of the Agreement. The Agreement is not binding across the international border because it is among subnational units of government. Its strength lies in both the diplomatic consequences of failure to comply, the distribution of exposure to risk which spreads the consequences of failure among all parties, and the fact that it provides a forum for increased communication, cooperation and collection of data that may form the basis for future joint action.

In contrast, the Compact is binding among the States. Under the United States' Constitution, "[n]o State shall, without the Consent of Congress, . . . enter into any Agreement or Compact with another State, or with a foreign Power . . ."[175] Congress provided its consent to the GL Compact through joint resolution on October 3, 2008, thus making the Compact binding on the States, and provided that the Compact would enter into force on December 8, 2008.[176] In addition, the Compact was ratified by each of the 8 state legislatures.[177] In practice, Congress may provide its consent prior to development of a compact, such as the authorization of a compact to create the Northwest Power and Conservation Council in the Northwest Power Act,[178] or, as in the case of the Great Lakes, following drafting and signing of the compact by the states.

The primary focus of the GL Compact and Agreement is the prevention of out-of-basin diversions of water and the provision of opportunity to review new large consumptive uses. The GL Compact and Agreement provide a framework but leave to each state and province the enactment of specific measures to accomplish this task. The GL Compact and Agreement also provide a framework for sharing information, developing a common database on water use and management, aligning efforts to conserve water, and seeking compatibility among water allocation standards.

[174] Council of Great Lakes Governors, Great Lakes Water Management website at http://www.cglg.org/projects/water/Agreement-Compact.asp The GL Compact and Agreement were signed by the Governors of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin, and the Premiers of Ontario and Quèbec. Id.

[175] U.S. Constitution, Article I, Section 10.

[176] GL Compact, *supra* note 170.

[177] Great Lakes-St. Lawrence River Water Resources Regional Body: Implementation, available at http://www.glslregionalbody.org/AgreementImplementationStatus.aspx

[178] Pacific Northwest Electric Power Planning and Conservation Act, (Dec. 5, 1980) 16 USC 12H (1994 & Supp. I 1995), P.L. 96-501, 94 Stat. 2697.

Two entities are established under the GL Compact and Agreement: the Great Lakes-St. Lawrence River Water Resources Regional Body (Regional Body),[179] and the Great Lakes-St. Lawrence River Basin Water Resources Council (Compact Council).[180] The Regional Body is comprised of the Governors and Premiers of the states and provinces that are signatory to the GL Compact and Agreement,[181] and the Compact Council is comprised of the 8 Governors.[182]

The GL Compact and Agreement do not provide for representatives of Tribes or First Nations in the membership of the Regional Body or the Compact Council. The GL Compact allows the establishment of Advisory Committees that may include representation from Tribes as well as local governments,[183] requires consultation with Tribes on proposals for water withdrawals made subject to regional review by the Compact (generally based on amount of water to be withdrawn),[184] and provides generally for public notice and input and public meetings.[185] The GL Agreement also provides for consultation with First Nations and Tribes on proposals to withdraw water that are subject to regional review.[186] That consultation must proceed according to the relevant requirements of the state or province in which the proposal originates.[187] The GL Agreement also applies requirements for notice and public meetings to the Regional Body.[188]

Lessons for the Columbia River Basin

Karkkainen (2013) has recognized the Compact and Agreement as the type of approach that may more readily lend itself to the complexity of problems such as ecosystem management, stating:

> A moment's reflection would suggest that integrated management of the entire suite of stressors and resources implicated in a genuine ecosystem approach would require the participation not only of the national governments but also of the states and provinces, which bring supplemental and in some cases unique capacities and competencies to the table, along with intimate familiarity with environmental, social, economic, and legal conditions in the Great Lakes Basin − and just possibly more political will than the national governments, which tend to see the Great Lakes as a regional and not a truly national concern, and consequently of secondary or tertiary importance. Such an effort would probably need to include some local public

[179] GL Agreement *supra* note 171, Chapter 4, see also, Great Lakes – St. Lawrence River Water Resources Regional Body http://www.glslregionalbody.org/
[180] GL Compact *supra* note 170, Article 2, Section 2.1; see also, Great Lakes – St. Lawrence River Basin Water Resources Council at http://www.glslcompactcouncil.org/
[181] Regional Body Membership at http://www.glslregionalbody.org/Membership.aspx
[182] Compact Council Membership at http://www.glslcompactcouncil.org/Membership.aspx
[183] GL Compact *supra* note 170, Article 2, Section 2.9.
[184] Id., Article 5.
[185] Id., Article 6.
[186] GL Agreement *supra* note 171, Article 504.
[187] Id., Article 504, 1.
[188] Id., Article 503.

> authorities as well − major cities, port authorities, water and sewer districts, watershed management agencies, and the like. It might need to include some intergovernmental organizations − the IJC, as well as the Great Lakes Fishery Commission, the Great Lakes Commission, and the Council of Great Lakes Governors. It needs to include tribal and First Nations authorities. It needs to find a way to integrate input from leading scientists familiar with the Basin or whose work is directly relevant to the management challenges at hand. To build legitimacy, transparency, and public support, it probably needs to include leading non-governmental organizations as well. At some level, these groups already talk to one another, and all are involved in one way or another with important aspects of Great Lakes governance. But for all the hard work and good work that has gone into the Great Lakes over the past four decades, precious little has gone into actually thinking through the design of governance institutions that would be capable of making an ecosystem approach a reality, and not merely words on paper.[189]

Karkkainen even goes so far as to hypothesize that the failure of the GLWQAs to achieve their stated goals of ecosystem management may be due to the over-emphasis on international instruments and the failure to match the complexity of ecosystem management with a governance approach capable of responding to that complexity.[190] Thus, the approach of creating subnational agreements with coordination, but not finalization and control at the international level may be particularly relevant for those aspects of Columbia River Basin management that require a degree not only of flexibility, but diversity in implementation due to differences in either ecological or social properties and values. Ecosystem function may be this type of issue with the caveat that ecosystem issues requiring coordination of river flow must have sufficient authority to allow coordination with CRT implementation.

It is also important to emphasize that in referring to the GL Compact and Agreement as a potential model for coordination of measures aimed at ecosystem function, we are referring to the organizational structure in which subnational levels of governance play the lead role. The specific measures of the GL Compact and Agreement are limited in application to the Columbia River Basin in at least two significant ways. First, Tribes and First Nations are not included in the sovereigns that are party to the GL Compact and Agreement. Second, the GL Compact and Agreement deal primarily with the prevention of out-of-basin transfers, an issue in which sovereigns bordering a lake all bear exposure to risk, whereas those sharing a river may have more nuanced exposure depending on their up- or down-stream position.[191] In a soft law

[189] Karkkainen, *supra* note 172 at 1014 – 1015.
[190] Id., at 1012 – 1013.
[191] The fact that an upstream state does not bear the same risk as a downstream state with respect to diversions is not to suggest that Canada does not have an interest in protection from large out-of-basin transfers in the United States. Such diversions could impact both hydropower revenue and salmon migration on tributaries in which anadromous fish still reach Canada. It is simply that it is more complicated than in the situation of a shared lake.

international agreement that lacks binding effect, attention would need to be made to those aspects of the agreement that give each party an incentive to comply and to resolve disputes.

5.5. The Pacific Salmon Treaty, 1985[192]

It is well recognized that basin residents were not engaged in the negotiation of the original Columbia River. Indeed, the Treaty was something that simply "happened" to the residents of the Basin, particularly those in Canada who had to learn to live with the large storage reservoirs and drawdowns required by the Treaty and Treaty operations.[193] In the search for an example of a more open and inclusive treaty process basin residents, and especially basin residents in the United States, sometimes refer to the Pacific Salmon Treaty (PST) as an appropriate example of an international negotiation that really engaged its stakeholders, indigenous and non-indigenous.[194] The PST is less likely to be seen as a positive example by residents of the Canadian portion of the Basin or by Canadian officials for a couple of reasons. First, Canadian residents of the Basin were never really engaged in the PST negotiations for the simple reason that, with the exception of the Okanagan (which is in the basin but not directly affected by the CRT), there are no salmon in the Canada portion of the basin. Coastal fishers and First Nations on the main salmon rivers elsewhere in the province were undoubtedly engaged but not Columbia residents. Second, Canadians are generally less likely to view the PST process as a "good" model for it was a model which seemed to require Canada to engage separately with state delegations and the tribes as well as with the U.S. treaty delegation as a whole.[195] If anything the PST example serves to confirm the complexity that we will likely see in future negotiations on the Columbia with one principal difference. In the case of the PST the default position was "no agreement" with continued interceptions of each other's fish; in the case of the CRT the default position is the post-2024 flood control provisions with or without the power provisions.

All that said it is important to recognize that the PST is an important example of organizational innovation insofar as it involves representatives of the tribes and user groups from different geographies within the governance structure for the regime.

In fact, with growing demand for water for new forms of energy production in nearby parts of Canada and the U.S., and the potential for increased drought in the southwestern U.S., this may be the type of agreement states and the province might want to consider.

[192] January 28, 1985.

[193] J.W. Wilson, *People in the Way: The Human Aspect of the Columbia River Project*, Toronto, University of Toronto Press, 1973.

[194] For background on the PST see MP Shepard and AW Argue, *The 1985 Pacific Salmon Treaty: Sharing Conservation Burdens and Benefits*, Vancouver, UBC Press, 2005.

[195] D. McRae, *Fisheries: Fishers, Natives, Sportsmen, States and Provinces*, 30 Can-US LJ 189 at 190 (2004).

Background to the PST

There is a long history of bilateral salmon treaties between the United States and Canada on the west coast going back to 1908.[196] While treaty relations were initially confined to Fraser River sockeye the two states ultimately resolved that it was necessary to have a treaty that addressed all of the different salmon fisheries on the west coast. The result was the Pacific Salmon Treaty (PST) of 1985 as subsequently amended. A key goal of the agreement was to address the problem of interception fisheries (i.e. the catch by fishers of state A of fish bound for home streams in state B or transboundary streams in state B) while at the same time recognizing historic fisheries.[197] Important interception fisheries included interceptions of U.S.-bound fish (coho, chinook) by Canadian fishers off Vancouver Island, interception by Alaskan fishers of fish bound for Canadian streams and transboundary panhandle rivers, and a historic interception fishery by Washington fishers targeting Fraser River sockeye. Alaskan fishers also intercepted fish bound for Oregon and Washington rivers raising concerns that such interceptions were interfering with the Stevens and Palmer treaty fishing rights of the tribes.[198] Given salmon migration patterns, there was very little interception of Alaskan bound fish and therefore Alaska was the least interested in reaching an agreement that was based on reducing (or at least equalizing) the interception fishery.[199] For these and other reasons, the negotiations of the original treaty and the Annexes were difficult and long drawn out. The terms of the treaty are examined in some detail in Appendix F.

Lessons for the Columbia River Basin

The PST is a very different instrument from the international water agreements discussed elsewhere in this paper. That this should be so is hardly surprising, given the nature of the resource in question and the types of issues that the different treaties seek to address. Some caution should therefore be exercised in thinking about the applicability of PST arrangements in the different context of an international water agreement.

The PST, like the BWT, is blessed with a strong, historically grounded institutional structure comprising the Commission, the Panels and various technical committees and working groups. Its work is strongly science-based as evidenced by its long-standing technical and science publications.[200]

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[196] Shepard and Argue, *supra* note 194 esp. c.2 covering the period from the 1890s to the 1960s. For other sources on the PST and its subsequent implementation see Thomas C. Jensen, *The United States-Canada Pacific Salmon Interception Treaty: An Historical and Legal Overview*, 16 Environmental Law 362 (1986); Joy A. Yanagida, *The Pacific Salmon Treaty*, 81 AJIL 577 (1987); Ted L. McDorman, *The West Coast Salmon Dispute: A Canadian View of the Breakdown of the 1985 Treaty and the Transit License Measure*, 17 Loy. L.A. Int'l & Comp. L. Rev. 477 (1995).

[197] PST, Article III(3).

[198] *Confederated Tribes and Bands of the Yakima Indian Nation v Baldridge*, 605 F.Supp. 833 (1985).

[199] Id., generally. For discussion of Alaska's concerns and its objections to the earlier 1982 agreement see Ted Stevens, "United States – Canada Salmon Treaty Negotiations: The Alaskan Perspective" (1985-1986) 16 Environmental Law 423.

[200] http://www.psc.org/publications.htm

It seems fair to say that the entire structure of the PST emphasizes the need for flexibility and adaptation in relation to the Pacific salmon fishery. This is apparent in the very architecture of the treaty (i.e. a framework or umbrella treaty accompanied by detailed annexes which can be amended from time to time) but also in the annual cycle that pervades all of the arrangements including the technical chapters of the important Annex IV. It is indeed an inherent part of a fishery with an annual escapement and regular spawning and return cycles that catch limits and the like must also be revisited on an annual and in-season basis as more information becomes available on returns and actual catch levels.

The treaty has proceeded incrementally, with the Parties building on its successes and adding new provisions as consensus could be achieved. For example the Parties have elaborated on the rules that should apply to the northern transboundary rivers and have added a very significant chapter dealing with the Yukon.

Given the importance of flexibility within fisheries regimes and global discourse on precautionary and adaptive approaches in the context of managing fisheries it is perhaps surprising that such concepts do not achieve greater prominence in the treaty text. In fact the only reference to an adaptive approach is found in chapter 3 of Annex IV dealing with chinook salmon where the text indicates that the Parties agree:[201]

> to implement measures that will effectively protect and conserve biological diversity and production under a broad range of unforeseen circumstances, an adaptive, precautionary approach will incorporate explicit, timely adjustments in fishery regimes; …. the CTC [chinook technical committee] shall evaluate and report to the Commission for its consideration precautionary criteria additional to those described below (e.g., trends in marine survival rates, sustainable exploitation rates compared to current) to achieve the objectives of sub-paragraph (a) [attaining sustainability of stocks and harvest] above, for specific stocks of conservation concern;

[201] PST, Annex IV, Chapter 3, s.13(b). There are additional references to a precautionary approach both within the chinook chapter, Appendix A, para. 6 asking the CTC to "develop and assessment framework for precautionary management" and within chapter 4 on the Fraser fishery (s.13 contrasting precautionary and optimistic projections), and in chapter 8 (s.1(e)) on the Yukon River noting that much work remained to be done to implement a precautionary management approach to the Yukon River fisheries.

5.6. Treaty of February 3, 1944 between the United States of America and Mexico for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande

On February 3, 1944, the United States and Mexico entered into a treaty "to fix and delimit the rights of the two countries to the Colorado and Tijuana Rivers and the Rio Grande (Rio Bravo) [where it forms the border between the two countries] in order to form the most complete and satisfactory utilization thereof. . . "[202] The 1944 Treaty provides both the framework and specific measures for allocation of the rivers between the two countries and development of the portion of the river that forms the boundary between the two countries. Our primary focus here is on the portion of the 1944 Treaty applicable to the Colorado River and the implementation of that portion.

Source: Glen Canyon Dam Adaptive Management Program

The International Boundary and Water Commission (IBWC) established by treaty in 1889 and renamed by Article 2 of the 1944 Treaty has been recognized as the focal point of flexibility under the 1944 Treaty.[203] The Commission has the duty of determining and implementing rights and obligations under the 1944 Treaty and resolving disputes arising from implementation of the

[202] Treaty Between the United States of America and Mexico for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, February 23, 1944, (US-Mexico 1944 Treaty) Proclamation, available at http://www.ibwc.state.gov/Files/1944Treaty.pdf

[203] McCaffrey, *supra* note 15 at 161.

treaty. The Commission is comprised of a U.S. Section and Mexican Section and the head of each must be an "Engineer Commissioner," appointed by their respective President. The Commission is an international body with diplomatic status for Section heads and staff.

The IBWC is more than simply a channel for diplomatic communication between Engineer Commissioners. In 2005, the U.S. Section of the IBWC had 243 employees.[204] Both the Colorado and Rio Grande Rivers have stretches that form the border between the two countries. In these shared river segment (referred to as the "limitrophe" section) the Commission has jurisdiction over any development located on the boundary, and the respective Sections have jurisdiction over the portion of any shared development within their country.[205] Thus, the IBWC includes employees who actually operate facilities within the system.

The 1944 Treaty allocates the three rivers shared by the United States and Mexico, but grants some flexibility to the Commission. Thus, Article 8 sets forth rules for the operation and management of the shared section of the Rio Grande by the Commission once reservoirs are constructed, but importantly, allows the Commission to modify, amend or supplement the rules with approval of their respective governments. No limitation is placed on this authority and this permits agreements to be reached at executive level and does not require a treaty amendment.

Procedural provisions of the Treaty require that decisions of the Commission be recorded in "Minutes" signed by each Commissioner and delivered to the two governments. The Governments have 30 days to disapprove a decision at which time it is deemed approved and the Commission may proceed to execute the decision. If a Minute is disapproved, the two governments may reach agreement (presumably through heads of state or the Department of State and Foreign Ministry) and communicate that to the Commission. Article III of the 1889 Treaty requires both Commissioners present for a decision. Article VII of the 1889 Treaty allows the Commission to summon witnesses and request information from their respective governments and to establish bylaws and regulations governing Commission procedures.

Lessons for the Columbia River Basin

The Commission has exercised considerable flexibility through the Minute process. [206] In addition to use of the Minute process to memorialize agreement on construction and border location issues where the rivers form the border, the Commission has relied on the process to address water sanitation issues in all three river basins covered by the 1944 Treaty. Article III of

[204] United States Department of State and the Broadcasting Board of Governors Office of Inspector General, Report of Inspection: OIG Report No. ISP-I-05-26, U.S. Section of the Int'l Boundary and Water Commission, March 2005, available at http://oig.state.gov/documents/organization/44344.pdf

[205] US-Mexico 1944 Treaty *supra* note 202, Article 2.

[206] Minutes of the IBWC are available at: The International Boundary Waters Commission, United States Section, Minutes between the United States and Mexican Sections of the IBWC, available here http://www.ibwc.state.gov/Treaties_Minutes/Minutes.html

the 1944 Treaty gave preference to resolution of border sanitation problems, thus the use of the Minute process for this purpose was clearly contemplated. However, in recent years the Commission has successfully used the Minute process on the Colorado River in situations arguably beyond the contemplation of the 1944 Treaty, including for water quality (Minute 242), ecological health of the Colorado River estuary (Minute 306), earthquake damage to delivery structures (Minute 318), and extended drought as the result of climate change (Minute 319). In Minute 242 entered in 1973, the Commissioners were directed by the heads of state to develop a solution to salinity issues. Subsequent Minutes described in the Appendix, were entered without that prior direction.

Despite the apparent flexibility exercised in the Minute process, the IBWC and in particular, the U.S. Section, has been heavily criticized for its failure to respond to issues of sanitation, environmental degradation, and even decay of infrastructure, and for its focus on technical rather than diplomatic issues due to its "Engineer-Commissioner" requirement.[207] In addition, lack of oversight, in part due to lack of clarity concerning whether or not the State Department bears that burden, has led to investigation of the function of the U.S. Section and criticism of its internal management (or lack thereof).[208] In a scathing review of both the internal and external activities of the U.S. Section, former General Counsel to the U.S. Section, Robert McCarthy, calls for modernization of the IBWC to, among other things, involve the public in its decision making process, reduce the dominance of the U.S. Section which is "hindering sustainable development on the Mexican side of the border",[209] give greater attention to concerns regarding environmental degradation, sanitation, and aging infrastructure, and clarify which agency is charged with oversight.[210]

Nevertheless, by establishing an entity with specific authority to coordinate across the international boundary and with broad flexibility in the interpretation and implementation of that authority, the U.S.-Mexico 1944 Treaty set the stage for flexibility on transboundary issues. Rather than discard the approach of the U.S.-Mexico 1944 Treaty in the face of criticism, it is useful to consider the aspects of the approach that appear to have value in providing flexibility, and how the identified problems might be avoided in application to another setting. Attention to the following three considerations may be useful:

1. *Separate the diplomatic from the technical function of the international entity.* In 1944, the concept of an "engineer commissioner" went hand in hand with the belief that issues associated with rivers were hydraulic in nature and could be addressed through the

[207] Robert J. McCarthy, *Executive Authority, Adaptive Treaty Interpretation, and the International Boundary and Water Commission, U.S. – Mexico*, 14 U. Denv. Water L. Rev. 197, 200 (2011).
[208] United States Department of State and the Broadcasting Board of Governors Office of Inspector General, Report of Inspection: OIG Report No. ISP-I-05-26, U.S. Section of the Int'l Boundary and Water Commission, March 2005.
[209] McCarthy, *supra* note 207.
[210] Id.

application of a technical fix. Even today, the role of technical solutions is important and may allow parties to avoid difficult choices. For example, the proposed study of flood risk management on the Columbia River may narrow the differences between the U.S. regional and Canadian Provincial positions. Thus the need for transboundary technical coordination, data collection and dialogue remains essential. However, today we have a more sophisticated understanding of the political nature of many issues, the increase in competing values, and the need for open decision making on tradeoffs. A technical entity is not the appropriate forum for this type of decision making. Designation of a separate transboundary commission to play the diplomatic role and to oversee the technical entity may be one solution.

2. *Provide clear authority for agency oversight within state sections.* The degree of flexibility that has been exercised by the IBWC in the Minute process may lack accountability if clear lines of oversight are not provided for state sections. For the U.S. Section, oversight for a diplomatic commission might be appropriate through the Department of State, whereas the technical entity might report to a cabinet of heads of federal agencies such as those that oversee the U.S. Army Corps of Engineers, Bureau of Reclamation, Fish and Wildlife Service, and NOAA Fisheries.

3. *Require transparency and a forum for both sovereign and public input.* Sunshine laws relevant to the domestic laws and practice of each state should be applied to both sections. In addition, broadly constituted advisory bodies to coordinate both sovereign (e.g. states, Tribes, local communities) and public input may help manage the scope of public access that would otherwise be unmanageable at the basin scale.

5.7. Domestic Models for Adaptive Water Management

Whereas discussion of governance addresses processes and institutional design for decision making, management is the technical implementation of those decisions.[211] Adaptive management is one tool available for implementation and its use is particularly suited to situations in which the societal goals are clear, but there is uncertainty in how the system being managed will respond to various approaches to implementation. Although not referred to as adaptive management, the current process under the CRT goals of preventing flood and maximizing hydropower benefits is an excellent example of this approach. The process includes planning for operations within six year (AOPs), one year (DOPs), and within-year (Supplemental Agreements) timeframes to allow adjustment to changes in precipitation and timing of runoff,. This adaptive management in the CRT works because it exists within the framework of an international treaty in which the goals of management were negotiated and thus the degree of flexibility constrained.

[211] Boyle and Pond *supra* note 52 at 122

Adaptive management alone is warranted when there are clear goals set through a law or some other process, where there is a single managing entity,[212] and where the degree of uncertainty is bounded such as by the ability to rely on historic precipitation patterns in the Columbia River. However, with multiple organizations, competing goals, and multiple sources of uncertainty, adaptive management becomes simply one tool for implementation within a broader institutional framework for adaptive governance. Thus, it is not surprising that the initial attempt by the NWPCC to implement adaptive management in a system as complex as the Columbia River failed in part due to disagreement on goals among Council members.[213] In addition, the element of experimentation in implementing and adjusting management actions to test a hypothesis is highly risky on a basin scale.[214] For purposes of the Columbia River Basin, adaptive management is a tool available to managers that should be embedded within a framework for governance and carefully constrained to limit exposure to risk.

The following sections describe three examples of the use of adaptive management in domestic water management: (1) experimental high flows from Glen Canyon Dam on the Colorado River; (2) the Montana controlled groundwater area established adjacent to Yellowstone National Park (YNP) for purposes of protection of the YNP hydrothermal system, and (3) the Mackenzie River Basin Transboundary Waters agreement.

5.7.1. Glen Canyon Dam Experimental High Flows: Colorado River

The Colorado River means "colored red" river in Spanish. The legendary red color of the river came from a high sediment load of silt and sand derived from the red rocks of the Colorado Plateau. Sandy beaches are an important aspect of habitat on the river.[215] Since the construction of Glen Canyon Dam, the sediment generated upstream of the dam drops out in Lake Powell.[216] Sediment sources downstream of Glen Canyon Dam are limited to two tributaries, the Paria and the Little Colorado Rivers, yet flows downstream from the dam are generally operated at levels too moderate to remobilize sediment from the river bed to the beaches.[217] In 1996, 2004, and

[212] Cosens et al (2014) *supra* note 48

[213] For discussion of the NWPCC efforts to adopt adaptive management, see J. M. Volkman and W. E. McConnaha, *Through a Glass, Darkly: Columbia River Salmon, the Endangered Species Act, and Adaptive Management*, 23 Environmental Law 1249-1272 (1993); K. N. Lee, *Compass and Gyroscope: Integrating Science and Politics for the Environment.* Island Press, Washington, D.C. USA (1993); K. N. Lee, *Appraising Adaptive Management*, 3(2) Conservation Ecology 3 (1999). [online] URL: http://www.consecol.org/vol3/iss2/art3/ .

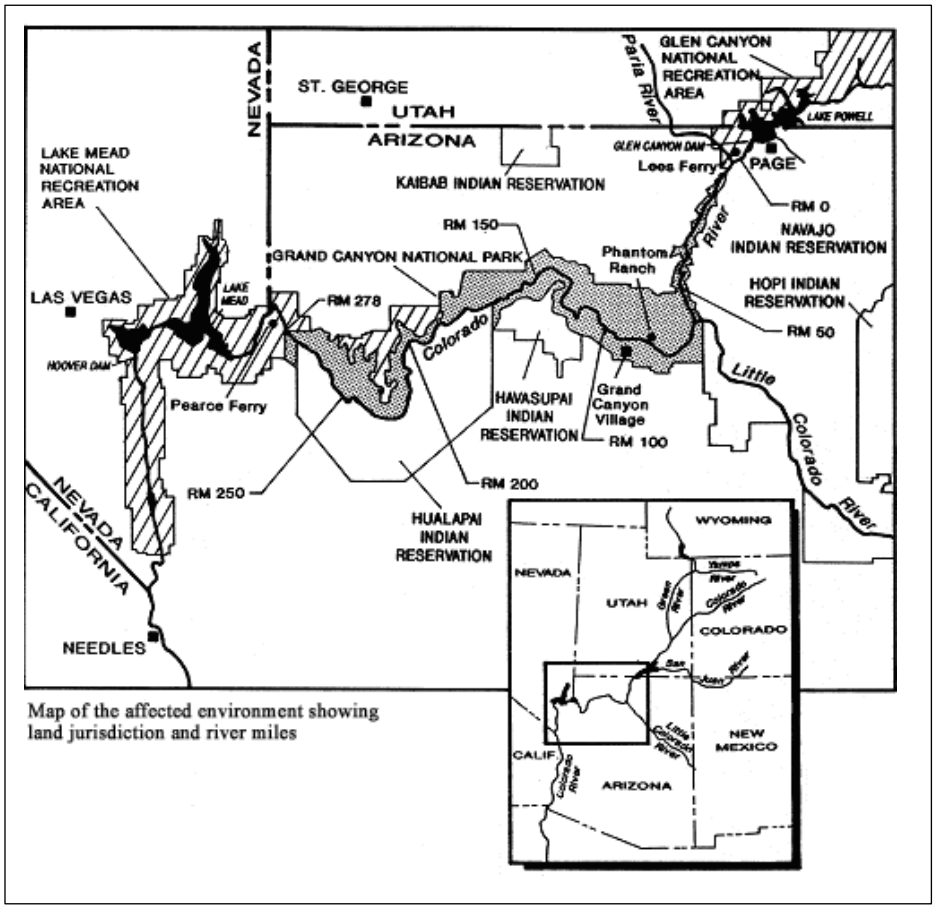
[214] B. A. Cosens and M. Kevin Williams, *Resilience and Water Governance: Adaptive Governance in the Columbia River Basin,* 17(4) Ecology and Society 3 (2012). [online] URL: http://www.ecologyandsociety.org/vol17/iss4/art3/

[215] Glen Canyon Adaptive Management Program, High Flow Releases at Glen Canyon Dam (August 2011), available at http://www.gcdamp.gov/fs/HFE-at-GlenCanyonDam.pdf

[216] T. S. Melis, P.E. Grams, T.A. Kennedy, B.E. Ralston, C.T. Robinson, J.C. Schmidt, L.M. Schmit, R.A. Valdez and S.A. Wright, *Three Experimental High-Flow Releases from Glen Canyon Dam, Arizona—Effects on the Downstream Colorado River Ecosystem*, USGS Fact Sheet 2011-3012 (February 2011) available at http://pubs.usgs.gov/fs/2011/3012/fs2011-3012.pdf

[217] Id.

2008, the U.S. Bureau of Reclamation released high flows from Glen Canyon Dam to allow scientists to study the impact of these flows on sediment distribution and ecological benefits.[218] Each successive experiment was adjusted based on findings from the earlier release(s).[219] The specific design of the experiments and outcomes of the research are not important for our purposes and the authors take no position nor do they have expertise on whether experimental flows are appropriate on the Columbia River. Instead, it is the institutional and organizational design and process for implementing large scale adaptive management that is important here.



Map of the affected environment showing land jurisdiction and river miles

Source: Glen Canyon Dam Adaptive Management Program: http://www.usbr.gov/uc/rm/amp/map.html

The 1992 *Grand Canyon Protection Act*[220] called for an Environmental Impact Statement and long-term monitoring program to identify means to mitigate the adverse impacts of river operation to Grand Canyon National Park, located on the stretch of the Colorado River downstream from Glen Canyon Dam and upstream from Lake Mead, both U.S. Bureau of

[218] Id.
[219] Id.
[220] Grand Canyon Protection Act, P.L. 102-575 (Oct. 30, 1992) available at http://www.riversimulator.org/Resources/LawOfTheRiver/HooverDamDocs/Appendices/1992GrandCanyonProtectionAct.pdf

Reclamation facilities. Mitigation measures were directed to be within the existing law.[221] Existing law on the Colorado River, although complex, gives considerable control to the U.S. Bureau of Reclamation, the developer and operator of the major dams on the U.S. portion of the system. The 1928 *Boulder Canyon Act* as interpreted by the U.S. Supreme Court allocated the Colorado River between the upper and lower basin and gave the Secretary of the Interior discretion to enter into contracts for delivery of water within that allocation including the discretion to alter deliveries to water users in each of the basin states in the event of drought.[222] In exercising that discretion, the Secretary has a long history of substantial involvement of the basin states and that practice is apparent in the implementation of the *Grand Canyon Protection Act*.[223]

The EIS and Record of Decision required by the *Grand Canyon Protection Act* led to the effort to experiment with high flow releases from Glen Canyon Dam.[224] The EIS process requires public comment. This type of unidirectional public comment under the *National Environmental Policy Act* (in which the public comment is available, but the agency decides how and whether to alter the EIS), is not the type of collaborative interaction called for by adaptive governance but in this case the Record of Decision called for the establishment of the Glen Canyon Dam Adaptive Management Program (GCDAMP),[225] including an entity for consultation with basin interests – the Adaptive Management Working Group (AMWG).[226] The AMWG is formed within the requirements of the Federal Advisory Committee Act[227] which specifies parameters to assure that committees set up to advise federal agencies on decision making are broadly representative and their actions are open to the public. Membership in the AMWG includes representatives of the basin states, Native American Tribes located in the affected area, relevant state and federal agencies, environmental organizations, and recreation and power interests.[228] The AMWG was established to provide advice and recommendations to the Secretary on program framework,

[221] Grand Canyon Protection Act, P.L. 102-575, Section 1802, (Oct. 30, 1992) available at http://www.riversimulator.org/Resources/LawOfTheRiver/HooverDamDocs/Appendices/1992GrandCanyonProtectionAct.pdf

[222] Arizona v. California, 373 U.S. 546 (1963).

[223] See e.g. Department of the Interior Record of Decision, Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Dec. 2007) describing a process in which the basin states arrived at consensus on the drought allocations memorialized in the ROD.

[224] Glen Canyon Adaptive Management Program *supra* note 215

[225] Id.

[226] Adaptive Management Working Group, URL: http://www.gcdamp.gov/aboutamp/member.html

[227] Federal Advisory Committee Act (FACA) P.L. 92-463; 5 U.S.C. App. (October 6, 1972); see also, Federal Advisory Committee Act (FACA) Management Overview, URL: http://www.gsa.gov/portal/content/104514?utm_source=OGP&utm_medium=print-radio&utm_term=committeemanagement&utm_campaign=shortcuts

[228] Glen Canyon Adaptive Management Program, Adaptive Management Working Group Membership, URL: http://www.gcdamp.gov/aboutamp/member.html

goals, actions, and monitoring, facilitate stakeholder input, and advise on impacts on cultural resources.[229]

Lessons for the Columbia River Basin

For purposes of the Columbia River Basin, the Glen Canyon Adaptive Management Program illustrates the following key lessons:

- Large-scale adaptive management can be implemented through an institutional design that provides clear authority to the operating entity while using the domestic law of the respective sovereigns to assure input by sovereigns and major interests.
- Large-scale adaptive management is probably appropriate only in situations where a clear objective for experimentation and the nature of the experiment are agreed upon through an initial political process (e.g., in the GCDAMP, the sole objective was to determine if changes in flow could improve ecological conditions on a specific river stretch, and the sole variable would be the rate of release from Glen Canyon Dam).
- The AMWG provides a model for formation of an advisory body that includes both sovereign and major interest representation.

One example of an area in which the Columbia River Basin might utilize this approach is with respect to the re-introduction of salmon above Grand Coulee. Many questions exist with high levels of uncertainty, including the suitability of habitat on spawning tributaries and the viability of migration through the reservoirs behind dams in Canada that have been constructed since Grand Coulee. In addition, cooperation at the basin scale would be necessary at the same time that specific local input from the Canada portion of the basin, Native American Tribes and First Nations would be crucial. The design of the GCDAMP might be one model for consideration.

5.7.2. Yellowstone Controlled Groundwater Area: Montana

The Yellowstone Controlled Groundwater Area (YCGA) was established as part of a reserved water right settlement between the state of Montana and the United States.[230] Montana's approach to resolving federal and Native American water rights sets up a process of government-to-government negotiation which includes substantial public outreach to residents in the

[229] U.S. Department of the Interior Bureau of Reclamation Glen Canyon Dam Adaptive Management Work Group CHARTER, available at http://www.usbr.gov/uc/rm/amp/amwg/pdfs/amwg_charter.pdf

[230] Mont. Code Ann. § 85-20-401, Article IV, available at http://leg.mt.gov/bills/mca/85/20/85-20-401.htm. *See also*, D. Amman, B. Cosens and J. Specking, *Negotiation of the Montana - National Park Service Compact*, 5 Rivers 35 (January, 1995). It should be noted that co-author Cosens was lead negotiator for the state of Montana in negotiation of the Montana-National Park Service Compact. Reserved water rights are recognized by U.S. federal common law as water rights implied in the establishment of a federal or Native American Reservation, because without the implication, the purpose of the reservation would not be fulfilled. Winters v. United States, 207 U.S. 564 (1908); Arizona v. California, 373 U.S. 546, 600 (1963); Cappaert v. United States, 426 U.S. 128 (1976); United States v. New Mexico, 438 U.S. 696 (1978); *see generally*, B. Cosens and J. Royster eds. *The Future of Federal and Indian Reserved Water Rights: The Winters Centennial* (University of New Mexico Press, 2012).

watersheds affected, state legislative hearings and approval, and ultimately a court decree in which interested parties may raise objections.[231]

In the negotiations for Yellowstone National Park (YNP), the National Park Service sought reserved water rights to protect the YNP hydrothermal system. However, both the controversial nature of recognition of reserved water rights to groundwater[232] and the technical difficulty of quantifying a water right for a system as complex and unexplored as the YNP hydrothermal system, led the parties to agree on a management plan to control and monitor groundwater development outside the park to protect the system within the park rather than a quantified water right.[233]

Source: Montana Bureau of Mines and Geology: http://www.mbmg.mtech.edu/grw/grw-

In the negotiations for Yellowstone National Park (YNP), the National Park Service sought reserved water rights to protect the YNP hydrothermal system. However, both the controversial

[231] Mont. Code Ann § 85-2-313. *See also*, B. Cosens, *The 1997 Water Rights Settlement Between the State of Montana and the Chippewa Cree Tribe of the Rocky Boy's Reservation - The Role of Community and of the Trustee*. 16 UCLA Journal of Environmental Law and Policy 255 (1998); B. Cosens, *A New Approach in Water Management or Business as Usual? The Milk River, Montana,* 18 Journal of Environmental Law & Litigation 1 (2003).
[232] The U.S. Supreme Court has thus far avoided the issue of whether reserved water rights extend to groundwater. See, Cappaert v. United States, 426 U.S. 128 (1976).
[233] Ammanet al. *supra* note 230.

nature of recognition of reserved water rights to groundwater[234] and the technical difficulty of quantifying a water right for a system as complex and unexplored as the YNP hydrothermal system, led the parties to agree on a management plan to control and monitor groundwater development outside the park to protect the system within the park rather than a quantified water right.[235]

The agreement established initial boundaries for the YCGA and an initial set of restrictions based on recommendations by a scientific panel chosen from researchers at several of Montana's public universities.[236] To separate science from decision making, the parties agreed to direct the panel to resolve any uncertainty in favor of park protection.[237] This precautionary approach was made possible by the iconic nature of Yellowstone as the first national park established in the United States and its economic value to Montana tourism.[238] A program was established for inventory of existing wells and metering and reporting on groundwater use.[239] The agreement then established a Technical Oversight Committee (TOC) composed of representatives of the National Park Service, the U.S. Geological Survey, the Montana Department of Natural Resources and Conservation, a research scientist from a Montana University, and a fifth member selected by the other four.[240] The TOC must meet at least every five years to review the boundaries and initial conditions, and to access the cumulative impact of groundwater development in the YCGA.[241] The precautionary approach used in setting the initial conditions is continued forward by requiring both a supermajority for recommendations for modification and by requiring that those recommendations be premised on the goal of protection of the hydrothermal system.[242] TOC recommendations are made to the state and the United States and the Montana Department of Natural Resources and Conservation must hold a hearing. Those who oppose adoption of the recommendations have the onus of adducing clear and convincing evidence why the TOC recommendation should not be adopted.[243]

Lessons for the Columbia River Basin

For purposes of the Columbia River Basin, the YCGWA illustrates the following key lessons:

- Separate the decision making on tradeoffs and degree of risk (governance) from the technical implementation (management).

[234] The U.S. Supreme Court has thus far avoided the issue of whether reserved water rights extend to groundwater. See, Cappaert v. United States, 426 U.S. 128 (1976).
[235] Amman et al, *supra* note 230.
[236] MCA 85-20-401, Article IV and Amman, id.
[237] Amman, id.
[238] Id.
[239] MCA 85-20-401, Article IV, H.
[240] MCA 85-20-401, Article IV, J.
[241] MCA 85-20-401, Article IV, J.
[242] MCA 85-20-401, Article IV, J.
[243] MCA 85-20-401, Article IV, J.

- Use adaptive management for issues in which the parties can agree to clear guiding principles and goals for implementation when faced with uncertainty.
- Constrain adjustment based on monitoring to those decisions that can be made based on scientific review. Adjustment to actual goals is a governance decision that should be made outside the adaptive management process.
- Provide broad representation and public input in any review process that might result in changes to initial parameters.
- While technical input is necessary for establishing initial parameters, on controversial issues or issues with broad implications for tradeoffs or restrictions in water use, establish initial parameters through a governance rather than a management process.

One aspect of the transboundary issues facing the Columbia River Basin that may lend itself to this approach is flood risk management. As noted above, there is currently disagreement in the level of flood protection provided in the existing CRT after 2024. There is also a degree of uncertainty in the exact level of protection required to prevent property loss in the basin.[244] More importantly, should the basin seek to reduce its reliance on CRT dams for flood control by implementing local structural and non-structural measures, and thereby increase flexibility for dam operation for other values, there is a high degree of uncertainty associated with any prediction on the degree of risk under any proposed local measure.[245] The YCGWA provides an illustration of a possible model for consideration. Flood risk management is an area in which Canada and the United States are likely to agree on a goal of no loss of life and minimizing property damage (albeit not on the issue of who pays). Given the uncertainty in how much protection that requires, how responsibility for that protection might be apportioned post-2024, and how much protection either coordination with tributary dams or new local measures can provide, the CRT parties might agree to use the most conservative approach as the initial conditions (i.e. the pre-2024 conditions in which CRT dams are relied on and target flows do not exceed 450K cfs at The Dalles). As tributary dams in the U.S. are authorized for coordination and new local measures are funded and developed, reliance on CRT dams, and the financial cost associated with doing so could be reduced incrementally as the data warrants.[246]

Additional detail on the Yellowstone Controlled Groundwater Area is found in Appendix H.

[244] It is the understanding of the authors that this is the subject of a current study underway by the U.S. Army Corps of Engineers, thus uncertainty may be reduced prior to 2024.
[245] B. Cosens, *Resilience and Law as a Theoretical Backdrop for Natural Resource Management: Flood Management in the Columbia River Basin,* 42 Environmental Law 241 (2012).
[246] Id.

5.7.3. The Mackenzie River Basin

The Mackenzie River Basin covers about 1.8 million square kilometres − about 20% of the landmass of Canada. The mean annual flow volume of the Mackenzie River is approximately 310 billion cubic metres of water, a volume comparable to that of the St. Lawrence River and Mississippi River.

Five jurisdictions share the Basin: British Columbia, Alberta, Saskatchewan, Yukon and Northwest Territories. First Nations and Inuit communities live throughout the basin. Some have old treaties with the Crown and others, such as the Inuvialuit, Gwich'in and Sahtu, have more recently negotiated land claim agreements which include complex co-management structures as well as provisions dealing with water quality and water quantity. The Mackenzie River Basin can be sub-divided into six major sub-basins the Athabasca, the Peace, the Liard, the Peel, the Great Slave, and the Mackenzie-Great Bear.

Source: Mackenzie River Basin Board, http://www.mrbb.ca/

Most of the industrial development in the Basin (including the oil sands of Alberta) falls within the Peace and Athabasca sub-basins. There are concerns that air and water pollution from these activities is affecting downstream water quality and fish populations with attendant concerns for human health. The Peace River system has also seen significant development of its hydro potential with the Williston Reservoir on the Peace River and the Bennett Dam. A further

development of the Peace at Site C is currently under environmental review. The creation and filling of the Williston Reservoir changed the natural hydrograph of the Peace and had a significant effect on the Peace/Athabasca Delta. There are very few consumptive diversions within the Basin although there are concerns that diversions for mining and in situ oil sands operations have a significant effect on flows in the Athabasca during the low flow (January – March) period of the year. There is a water management framework in effect to curb diversions at low flow times to preserve a minimum flow.[247]

There has long been recognition from both the five riparian jurisdictions and the federal government that it will be necessary to provide for the cooperative development of the Mackenzie Basin although it is notable that the most significant upper riparian, British Columbia proceeded unilaterally with the main developments on the Peace River long before there were cooperative arrangements in place.

The chosen instrument for the cooperative management of the Mackenzie Basin is the Mackenzie River Basin Transboundary Waters Master Agreement[248] which will ultimately be supplemented by a series of bilateral agreements between particular riparians. The Master Agreement, as the name implies, is a type of framework agreement which establishes some guiding principles and provides an institutional framework for future cooperation.[249] Several bilateral agreements are currently under negotiation specifically agreements between British Columbia and the Northwest Territories and between Alberta and the Northwest Territories. While the details of these negotiations are confidential a key part of the proposed arrangements is a risk-based approach which envisages more intense management of transboundary waters based upon the classification of each water body. The four classifications are: reporting, learning, objective setting, and objectives not met. A water body will be classified as "reporting" if it is characterized by little existing or projected development. In such a case the parties commit to report on developments and share available information on aquatic ecosystems. The "learning" classification is adopted where there is a moderate level of development affecting the water body. At this point the parties commit to develop a learning plan to improve understanding of how to protect the ecological integrity of the aquatic ecosystem of the water body. The "objective setting" classification is reserved for water bodies with high levels of development or a particular vulnerability or sensitivity. In such a case the parties set objectives or conditions that

[247] See Arlene Kwasniak, *Instream Flow and Athabasca Oil Sands Development: Contracting Out/Waiver of Legal Water Rights to Protect Instream Flow — A Legal Analysis*, 48 Alberta Law Review 1 (2010-2011). The framework is established by the governments of Alberta and Canada (because of its jurisdictional responsibility for fisheries) and the industrial licensees.

[248] The agreement, which came into effect in 1997, is available here http://www.mrbb.ca/uploads/files/general/19//mackenzie-river-basin-transboundary-waters-master-agreement.pdf

[249] The purpose of the Agreement is said to be "to establish common principles for the cooperative management of the Aquatic Ecosystem of the Mackenzie River Basin, to establish an administrative mechanism to facilitate application of these principles, and to make provisions for Bilateral Water Management Agreements".

must be met. Where objectives are not met immediate action must be initiated to meet those objectives and the relevant party must report progress on an agreed schedule.

Appendix H offers a more detailed discussion of the principles incorporated in the Master Agreement as well the institutional framework for the agreement.

Lessons for the Columbia River Basin

Unlike the Columbia River Treaty, the Mackenzie Master Agreement is an agreement between the sub-federal units within a federation. It is an Agreement that was negotiated *after* the upstream jurisdiction (B.C.) had already proceeded unilaterally with one major development. It is therefore quite different from the situation on the Columbia in which the *downstream* state had already developed its section of the river before negotiations commenced. The purpose of the Columbia negotiations was therefore to explore how cooperative development of the upper basin might be effected to secure additional benefits within the downstream jurisdiction in return for the sharing of those benefits. The lower portion of the Mackenzie basin in the Northwest Territories has really not been developed at all and is thus valued principally for its ecological resources and for navigation. Implementation of the Master Agreement through a series of bilateral arrangements is clearly a work in progress.

Given these differences one must be cautious in drawing any conclusions from the experience on the Mackenzie that can be applied to the Columbia. Nevertheless three observations seem in order. First, the Mackenzie offers a completely different way of approaching the cooperative management of a shared watercourse. Rather than focusing on particular outcomes and particular values (such as power and flood control) at the outset the parties concentrated on achieving agreement on an organizational structure and a set of broad principles. Second, the bilateral practice to date suggests the parties will approach the negotiation of the bilateral agreements in a holistic manner and will seek to reach agreement on a broad suite of issues (including aquatic ecosystem ecological integrity) rather than focusing only on a narrow set of instrumental issues. Third the bilateral practice to date suggests that parties will take an adaptive and risk based approach to managing their shared watercourses by setting objectives and thresholds which will trigger additional management responses as necessary, all supported by information collection and monitoring procedures.

6. Conclusions

The formal review processes of the Columbia River Treaty initiated by the Province of British Columbia and the U.S. Entity reveal common ground on the need for flexibility in future arrangements and implementation, particularly in the face of climate change, and in the desire to involve Tribes and First Nations as well as various interests in any future negotiation and implementation of an agreement. At the same time significant differences between the two reviews include: (1) the treatment of ecosystem values and perhaps other values; (2) the approach to sharing the benefits; and (3) the assessment of what the treaty requires for the post-2024 called upon flood control regime. Through the lens of adaptive governance we have explored mechanisms to enhance flexibility and adaptive capacity in transboundary water management, and in doing so, may have uncovered models that could bridge some of the gaps in these differences. The framework for adaptive governance focuses on three aspects of transboundary agreements that may facilitate flexibility: (1) structure, (2) capacity and (3) process. We conclude with a discussion of the relation between the arrangements discussed and these three factors, and identification of any gap bridging mechanism.

Structure

The BWT, Great Lakes Water Quality Agreements, and the Pacific Salmon Treaty provide models for establishment of standing, binational political bodies with the authority to address new issues within limited bounds. The GLWQAs, experience under the Great Lakes Levels Orders and the PST also provide examples of science-based decision making. Review of the U.S. – Mexico Treaty for the Colorado River cautions that the technical, operational and scientific functions should be separated from those of the political body, and that the political body must have some form of public and sovereign input and accountability to ensure legitimacy when addressing new issues. The Great Lakes Levels Orders, the GLWQAs and the PST provide a range of approaches to involve Tribes and First Nations, and local government and interests including the use of Advisory Bodies. In particular, the GLWQAs use a nested governance approach in which the advisory bodies are made up of representatives from national and subnational agencies and governments. This has the potential to improve coordination and flow of information among various levels of governance. Finally, the constraints on flexibility provided by all the agreements discussed, offer a variety of approaches to balancing stability and flexibility within the terms of a treaty.

Issues of structure include attention to the appropriate governmental level and scale of implementation. The Great Lakes Compact and Agreement is a reminder that not all issues on which transboundary cooperation is sought require implementation through a Treaty. In addition to the potential for greater flexibility in a subnational, nonbinding agreement, this approach provides a potential model for bridging the gap between the review processes on ecosystem

function. Possible reasons for hesitation in elevating ecosystem function to an international treaty include the fact that "ecosystem function" will be defined differently in different parts of the basin, and require substantial tailoring of solutions to local biophysical conditions and social values. The Compact and Agreement provide a model for coordinating data collection, exchange of information, and cooperation on those issues that require joint efforts across the border, such as experimental re-introduction of salmon to Canada and flow, while leaving local restoration initiatives to domestic implementation. Experience with the Great Lakes Levels Orders suggests the need to adjust scale over time as our understanding of interconnections within the basin is enhanced. The CRT is largely focused on the Canadian treaty dams (and to a lesser extent Libby). It may be fruitful to think of a different vehicle that can operate at a broader scale to address the range of issues that transcend the narrower scale of the treaty.

Capacity

Capacity overlaps with structure and scale. Capacity focuses on the authority of a binational decision making body to adapt as well as the role extended to any technical implementing entity. The referral jurisdiction of the IJC is an example of bounded authority to adapt. It allows the IJC to take up new issues, but only within the bounds of a referral. The standing binational political bodies in the GLWQAs and the PST also allow for adjustment to change and both the procedure for amending GL Levels Orders and the Minute process used in the U.S.-Mexico agreement illustrate effective mechanisms for recording and implementing new provisions. The use and funding of advisory bodies, discussed above, facilitates participation. The requirement of public scientific forums in the GLWQAs facilitates participatory capacity through education and sharing of information. In addition, the domestic models provided illustrate the use of adaptive management in both large-scale river and dam operation (the GCADMP) and between jurisdictions (the YCGWA between the U.S. and Montana), and provide a possible model for the approach to flood risk management on the Columbia River that could bridge the gap between the understanding of flood risk level after 2024.

Process

The accountability provided by separation of the political and technical roles (each of the Great Lakes agreements as opposed to the U.S.-Mexico agreement) and the use of advisory bodies and public input enhances the legitimacy of decision-making. At the same time, the concept of constrained discretion referred to in several places in the paper (Milk/St. Mary Rivers, the Great Lakes Levels Orders) and procedure for initiating references under the BWT, ensures legitimacy in the choice of new issues to address. Distribution of exposure to risk is important in assuring that Parties will have an interest in addressing new issues. None of the agreements expressly consider this factor. It is a difficult issue to address because risk plays out differently depending on the issue. At this time, we can merely caution the Parties to at least think through possible future scenarios including the consequences of any change in the treaty. For example, it is clear

in hindsight that the U.S. negotiators did not consider distribution of risk in agreeing to the expiration of assured flood control in 2024.

Finally, we again raise both the advisability and likelihood of modest ambitions and an incremental approach. Major changes in the management of the Columbia River will require the agreement of both Parties. That in turn will require the support of interests in the basin before it is likely that the two nations will view it in their interest to make changes. In order to build such a level of consensus and support it may be useful to experiment at the subnational level and use softer instruments in order to achieve broader and more concrete understanding of the consequences and advisability of different approaches.

Appendix A: Details on Flexibility through the Evolutive Interpretation of Treaty Texts

An overview of flexibility through the evolutive interpretation of treaty texts is provided in chapter 5.1. This Appendix offers a detailed examination of three decisions dealing with the evolutive approach to the interpretation of older bilateral treaties: (1) the decision of the International Court of Justice in Gabčíkovo-Nagymaros Project (Hungary/Slovakia), (2) the Iron Rhine Arbitral Award, and (3) the Indus Waters Kishenganga Arbitral Award.

Gabčíkovo-Nagymaros Project (Hungary/Slovakia)[250]

In this complex case the International Court of Justice was asked to interpret a bilateral treaty of 1977 between Hungary and Slovakia (as the relevant successor state to Czechoslovakia) dealing with the development of several dams on the Danube for hydroelectric purposes. Both states were found to be in breach of the treaty[251] and the question for the Court became one of providing guidance to the parties as to how they should return to fulfilling their obligations under the treaty in light of what had actually happened. The 1977 treaty had very little to say about environmental concerns. The Court noted that the relationship between the Parties was governed by the 1977 treaty but:

> is also determined by the rules of other relevant conventions to which the two States are party, by the rules of general international law and, in this particular case, by the rules of State responsibility (at para. 132)

The Court confirmed that while the 1977 treaty was principally concerned with the production of energy it had other objectives as well which must not be lost sight of:

> the improvement of the navigability of the Danube, flood control and regulation of ice-discharge, and the protection of the natural environment. None of these objectives has been given absolute priority over the other, in spite of the emphasis which is given in the Treaty to the construction of a System of Locks for the production of energy. None of them has lost its importance. (at para. 135)

The Court went on to note that the Project's impact on the environment was a key concern especially for Hungary as the downstream state. This concern had to be taken into account:

[250] 1997, http://www.icj-cij.org/docket/index.php?p1=3&k=8d&case=92&code=hs&p3=4

[251] Hungary was found to be in breach because it reneged on its commitment to proceed with the joint construction of the Gabčíkovo facility because of environmental concerns including groundwater supply concerns; Slovakia because it proceeded unilaterally with a variant of the Gabčíkovo project entirely on its own territory.

> In order to evaluate the environmental risks, current standards must be taken into consideration. This is not only allowed by the wording of Articles 15 and 19, but even prescribed, to the extent that these articles impose a continuing – and thus necessarily evolving – obligation on the parties to maintain the quality of the water of the Danube and to protect nature. The Court is mindful that, in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage.
>
> Throughout the ages, mankind has, for economic and other reasons, constantly interfered with nature. In the past, this was often done without consideration of the effects upon the environment. Owing to new scientific insights and to a growing awareness of the risks for mankind –for present and future generations – of pursuit of such interventions at an unconsidered and unabated pace, new norms and standards have been developed, set forth in a great number of instruments during the last two decades. Such new norms have to be taken into consideration, and such new standards given proper weight, not only when States contemplate new activities but also when continuing with activities begun in the past. This need to reconcile economic development with protection of the environment is aptly expressed in the concept of sustainable development.
>
> For the purposes of the present case, this means that the Parties together should look afresh at the effects on the environment of the operation of the Gabcikovo power plant. In particular they must find a satisfactory solution for the volume of water to be released into the old bed of the Danube and into the side-arms on both sides of the river. (at para. 140)

The Iron Rhine Arbitration[252]

The Iron Rhine Arbitration involved the interpretation of an 1839 Treaty between Belgium and the Netherlands at the time that Belgium separated from the Netherlands. One of the issues dealt with in the treaty was the matter of a communication link between Antwerp in the Netherlands and Germany. Article XII of the treaty addressed this concern by providing that in some circumstances Belgium might require the Netherlands to construct a new road or canal up to the German border but at Belgian expense. The parties subsequently agreed that these arrangements might also extend to a railway, the Iron Rhine ("Ijzern Rhine"). Pursuant to this arrangement a railway was constructed which came into operation in 1879. The railway fell into disuse in 1991 but interest grew in reactivating the line later in the 1990s. This led to the present dispute between the two states surrounding such matters as what rules (including environmental rules) the Netherlands might apply to the proposals to reactivate and modernize the railway and the

[252] 2005, Belgium v Netherlands, http://www.pca-cpa.org/showfile.asp?fil_id=377

question of who should bear the costs of bringing the line back into service (was this effectively a new line – in which case Belgium should pay; or was it a case of maintenance and repair – in which case the Netherlands should pay.)

For the Tribunal this question was essentially a question of treaty interpretation. The Tribunal began its analysis of the issue by noting that conceptual or generic terms in a treaty should be interpreted in an evolutive manner (i.e. they should be interpreted in light of the changed understanding of these terms rather than frozen at the particular point in time when the treaty was negotiated):[253]

> It has long been established that the understanding of conceptual or generic terms in a treaty may be seen as "an essentially relative question; it depends upon the development of international relations" (*Nationality Decrees Issued in Tunis and Morocco*, *P.C.I.J. Series B, No. 4 (1923)*, p. 24). Some terms are "not static, but were by definition evolutionary . . . . The parties to the Covenant must consequently be deemed to have accepted them as such" (*Namibia (SW Africa) Advisory Opinion*, *I.C.J. Reports 1971*, p. 16 at p. 31). Where a term can be classified as generic "the presumption necessarily arises that its meaning was intended to follow the evolution of the law and to correspond with the meaning attached to the expression by the law in force at any given time" (*Aegean Sea Continental Shelf (Greece/Turkey), Judgment, I.C.J. Reports 1978*, p. 3 at p. 32, para. 77). A similar finding was made by the WTO Appellate Body when it had to interpret the term "natural resources" in Article XX, paragraph (g) of the WTO Agreement (*United States – Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, 12 October 1998, para. 130).

The Tribunal however acknowledged that that was not the issue in the present case. There were no generic terms to be interpreted. Rather the question was how the treaty should be interpreted in light of "technical developments relating to the operation and capacity of the railway."[254] However, the Tribunal still considered that an evolutive approach was appropriate since it was most likely to ensure "an application of the treaty that would be effective in terms of its object and purpose."[255] What then did that mean in the present context? The Tribunal chose to emphasize the object and purpose of both the Treaty and the specific clause at issue:

> The object and purpose of the 1839 Treaty of Separation was to resolve the many difficult problems complicating a stable separation of Belgium and the Netherlands: that of Article XII was to provide for transport links from Belgium

[253] Iron Rhine Award at para. 79.
[254] Id., at para. 80.
[255] Id., at para. 80.

> to Germany, across a route designated by the 1842 Boundary Treaty. This object was not for a fixed duration and its purpose was "commercial communication." It necessarily follows, even in the absence of specific wording, that such works, going beyond restoration to previous functionality, as might from time to time be necessary or desirable for contemporary commerciality, would remain a concomitant of the right of transit that Belgium would be able to request.

Applying that test here, the Tribunal concluded that "a request for a reactivation of a line long dormant, with a freight capacity and the means to achieve that considerably surpassing what had existed before for nearly 130 years, is still not to be regarded as a request for a 'new line'."[256] But that still left a question as to the types of environmental and other requirements that the Netherlands could impose on Belgium's plans to reactivate the line. This was an especially sensitive question for one portion of the line since the Netherlands had designated this area (the Meinweg area) as a national park and as a Natura 2000 site under the EU's Habitat Directive; additionally, a regional authority had designated the area as a quiet site. The Netherlands therefore proposed that in this area the reactivated line would require tunneling at considerably increased costs. Were these requirements consistent with the terms of the original treaty? Here too the Tribunal emphasized the importance of taking into account developments in international environmental law. The Tribunal noted that "much of international environmental law has been formulated by reference to the impact that activities in one territory may have on the territory of another."[257] That was not the situation here but:[258]

> by analogy, where a state exercises a right under international law within the territory of another state, considerations of environmental protection also apply. The exercise of Belgium's right of transit, as it has formulated its request, thus may well necessitate measures by the Netherlands to protect the environment to which Belgium will have to contribute as an integral element of its request. The reactivation of the Iron Rhine railway cannot be viewed in isolation from the environmental protection measures necessitated by the intended use of the railway line. These measures are to be fully integrated into the project and its costs.

In general that meant that Belgium was responsible for "the environmental element of the overall costs of reactivation"[259] but in the case of the Meinweg area where a tunnel would be required, the costs should be shared principally on the basis that neither side had fully communicated its intentions (either reactivation in the case of Belgium or national park designation in the case of the Netherlands) and that thus "both Parties contributed to the occurrence of the situation which

[256] Id., at para. 84.
[257] Id., at para 222.
[258] Id., at para 223.
[259] Id., at para. 226, noting however that some of these costs would be shared with Netherlands to the extent that the Netherlands would also make use of the reactivated line.

now requires much more costly measures."[260] Interestingly the Tribunal also noted that the Netherlands might also be free to propose alternative routes in some cases to meet its national concerns. Belgium could not be required to accept such proposals and certainly the Netherlands would be required to cover any incremental costs associated with implementing such proposals but "if the Netherlands is willing to bear these extra costs, Belgium cannot reasonably withhold its consent to a deviation."[261]

The Indus Waters Kishenganga Arbitration, 2013[262]

The dispute at issue in this arbitration concerned the proper interpretation of the Indus Waters Treaty of 1960[263] between India and Pakistan, and in particular concerned the right of India to divert the waters of the Kishenganga River. The Treaty did not rule out diversions but it did require India to design and operate any project on the western rivers including the Kishenganga so "as not to adversely affect the existing Agricultural Use or hydroelectric uses on that Tributary."[264] The Court of Arbitration in its Partial Award emphasized that the same or additional constraints might also be imposed by customary international law[265] and that such constraints applied so as to require India to operate its facilities "in a manner that ensures a minimum flow of water in the riverbed of the Kishenganga/Neelum downstream of the Plant."[266] The Court of Arbitration elaborated as follows on the significance of customary international law:

> There is no doubt that States are required under contemporary customary international law to take environmental protection into consideration when planning and developing projects that may cause injury to a bordering State. Since the time of *Trail Smelter*, a series of international conventions, declarations and judicial and arbitral decisions have addressed the need to manage natural resources in a sustainable manner. In particular, the International Court of Justice expounded upon the principle of "sustainable development" in *Gabčíkovo-Nagymaros*, referring to the "need to reconcile economic development with protection of the environment."

[260] Id., at para. 234.
[261] Id., at para. 232.
[262] Islamic Republic of Pakistan v The Republic of India, Partial Award of 18 February 2013 and Final Award, December 20, 2013 – both available http://www.pca-cpa.org/showpage.asp?pag_id=1392
[263] Indus Waters Treaty, 19 September 1960, available http://siteresources.worldbank.org/INTSOUTHASIA/Resources/223497-1105737253588/IndusWatersTreaty1960.pdf
[264] Indus Treaty, Annexure D, paragraph 15(iii).
[265] In this particular case the Indus Waters Treaty itself (Para. 29 Annexure D as quoted at para. 447 of the Partial Award) expressly referred to an indeed limited the uses that could be
[266] Partial Award, at para. 445.

What became clear in the Final Award was that the Court was effectively relying on the evolutive approach to conclude that it was entitled to take into account environmental flows in addition to the treaty endorsed values of agricultural and hydroelectric uses (but only, as we shall see, to the extent that the treaty so permits).

The Court was at pains to emphasize in its Partial Award that the obligations of due diligence, vigilance and prevention apply not only to the initiation of a new project (which duties might require the completion of an environmental impact assessment[267]) but during operations and indeed throughout the life of the project.[268] The Court also acknowledged that both parties seemed to accept that there was a duty to provide a minimum instream flow but that they disagreed as to how such a flow should be quantified. Neither was the Court itself able to quantify that obligation at the time of the Partial Award – hence the "Partial" Award. However, it did indicate that it would do so in its Final Award:[269]

> In the Final Award, the precise rate of the minimum flow will be fixed. The Parties' use of the waters for hydro-electric and agricultural uses, and the environmental conditions, will never be static, of course; but stability and predictability in the availability of the waters of the Kishenganga/Neelum for each Party's use are vitally important for the effective utilization of rights accorded to each Party by the Treaty (including its incorporation of customary international environmental law).

The Court of Arbitration issued its Final Award on December 20, 2013. In that Award the Court affirmed the relevance of general international law and in particular international environmental law to its deliberations on the subject of minimum flows. But it was also at pains to point out that its ability to use general customary law was actually constrained by the Indus Waters Treaty and on that basis needed to distinguish some of the more general comments made by the Tribunal in the Iron Rhine Award.[270]

Annexure G of the Indus Waters Treaty makes provision for the Court of Arbitration and paragraph 29 specifies the Applicable Law as follows:

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[267] *Pulp Mills on the River Uruguay, Argentina v Uruguay*, ICJ Reports 2010, p.14,. p.83 – 84.
[268] Partial Award, at paras 450 – 451.
[269] Id., at para. 457.
[270] The Court of Arbitration (and notwithstanding para. 112 quoted below) is perhaps still open to the criticism that it is not making a clear enough distinction between the application of customary law as part of the applicable law and the application of customary law to influence the interpretation of a treaty term. It is at least arguable that paragraph 29 is merely a statement of what must always happen. For example, in interpreting a treaty a tribunal always draws on the general law of treaties; and in considering defenses and other matters a tribunal will necessarily advert to the general law of state responsibility.

> Except as the Parties may otherwise agree, the law to be applied by the Court shall be this Treaty and, whenever necessary for its interpretation or application, but only to the extent necessary for that purpose, the following in the order in which they are listed:
> (a) International conventions establishing rules which are expressly recognized by the Parties.
> (b) Customary international law.

There was no similar provision in the Iron Rhine case, either in the original treaty or in the submission to arbitration. This had concrete implications in this case:[271]

> As the Court held in its *Partial Award*, "States have 'a duty to prevent, or at least mitigate' significant harm to the environment when pursuing large-scale construction activities." In light of this duty, the Court has no difficulty concluding that the requirement of an environmental flow (without prejudice to the level of such flow) is necessary in the application of the Treaty. At the same time, the Court does not consider it appropriate, and certainly not "necessary," for it to adopt a precautionary approach and assume the role of policymaker in determining the balance between acceptable environmental change and other priorities, or to permit environmental considerations to override the balance of other rights and obligations expressly identified in the Treaty – in particular the entitlement of India to divert the waters of a tributary of the Jhelum. The Court's authority is more limited and extends only to mitigating significant harm. Beyond that point, prescription by the Court is not only unnecessary, it is prohibited by the Treaty. If customary international law were applied not to circumscribe, but to negate rights expressly granted in the Treaty, this would no longer be *"interpretation or application" of* the Treaty but the substitution of customary law *in place of* the Treaty. Echoing the Court's caution in the *Partial Award*, the prioritization of the environment above all other considerations would effectively "read the principles of Paragraph 15(iii) [of Annexure D] out of the Treaty." That Paragraph 29 does not permit.

By emphasizing the preventative nature of the protection afforded by international environmental law rather than according environmental flows equal weight with the other values expressed in the treaty (including India's vested right to engage in some development for hydroelectric purposes) the Court of Arbitration ended up reducing the prescribed minimum flow from 12 cumecs[272] at the Line of Control to an Award of 9 cumecs.[273] However, this is still a significant development. The Indus River Treaty was negotiated at about the same time as the CRT and was

[271] Final Award at para. 112.
[272] Id., at para. 105: "Taking environmental considerations alone, in the appreciation of the Court, would appear to suggest releasing a flow of some 12 cumecs downstream of the KHEP at all times."
[273] Id., at para. 115.

similarly an "engineers' treaty. The Court of Arbitration found it possible to prescribe a minimum flow requirement with little assistance from the treaty text.

Summary

Any treaty must be *interpreted* in light of all of the relevant norms that bind the parties to that particular treaty.[274] The relevant norms may include both other treaties[275] as well as norms of customary law including international environmental law. In particular, generic terms and broad concepts should be interpreted in light of the changing understanding of those concepts in general international law. The particular application of these ideas will always depend upon context, the particular treaty provision to be interpreted and proof of the relevant rules of international law.

[274] VCLT Article 31. The U.S. is not a party to the VCLT but there is a widespread understanding, accepted by the U.S., that Articles 31 and 32 of the VCLT represent customary international law.

[275] For example, a potentially relevant treaty is the Convention on Biological Diversity but we say only potentially because the United States is not a party to this treaty so it can only be relevant in relations between Canada and the United States to the extent that any of its provisions also represent customary international law.

Appendix B: Details on Arrangements for the Apportionment of the St Mary and Milk Rivers

The basic apportionment of the St Mary and Milk Rivers between the United States and Canada is effected by Article VI of the Boundary Waters Treaty as supplemented by an Order of the Commission made in 1921, and as further implemented by the Procedures Manual of the accredited officers (water engineers) of the two countries. An overview is presented in chapter 5.2.1. This appendix examines each of these elements as well as the flexibility arrangements that the parties have been able to put in place.

Article VI of the Treaty

Article VI is a complex provision with four key points. First, it pools the waters of the two rivers for the purposes of irrigation and power. Second, it effects an equal apportionment of the pooled waters. This apportionment is subject to a prior appropriation to Canada on the St. Mary River and to the United States on the Milk River. Third, it allows the United States to use the Milk River in Canada to convey the United States' share of St. Mary waters. Thus the Treaty approved what must be one of the first international inter basin transfers in the world. Finally, Article VI creates the administrative or supervisory jurisdiction of the IJC with respect to measurement and apportionment.[276]

The 1921 Order

The 1921 Order is equally complex. The Order implements the idea of "prior apportionment" by according Canada the opportunity to take a larger share of high flows on the St. Mary and the U.S. to take a larger share of high flows on the Milk. In each case the apportionment of actual flows is trued up every 15 days with no carrying forward of deficit or surplus deliveries and no crediting if the upstream state (the U.S. on the St. Mary and Canada on the Milk) passes down more than it needs to. This means that the upstream state must have the requisite infrastructure in place to use its share of the apportionment. Neither upstream state has made the necessary investments to fully take advantage of its upstream position. Thus, Canada has never built storage on the Milk and the United States has failed to maintain its investment on the siphon and related works that divert St. Mary water into the Milk diversion structure and thence downstream back in to Montana to meet the needs of downstream irrigators.

Another provision of the 1921 Order dealt with the eastern tributaries of the Milk River. This provision stipulates that the waters of these tributaries should be divided equally with no prior appropriation. Both parties have recognized through the terms of the Procedures Manual that detailed arrangements for measuring and apportionment need not be put in place in relation to

[276] Bankes and Bourget, *supra* note 133, at 165.

these waters until there are concerns that the upstream state (Canada) is in a position to divert more than its share of a particular tributary stream.

Although the Order has been in effect for nearly a century it has proven to be controversial. The United States, and in particular the state of Montana, have made several efforts to re-open the Order. The most recent effort began in 2003 and resulted in the IJC convening a bilateral Administrative Measures Task Force[277] which in turn led the two sub-federal governments of Alberta and Montana to launch a further initiative known as the Water Management Initiative (WMI) to explore mutually beneficial solutions for the optimal use of these shared waters. Montana's basic concern is that as a matter of practice it has received less than half of the shared waters of the two streams taken together. In particular, Canada has received close to 60% of the waters of the more productive stream (the St. Mary). This fact is incontestable. Whether it is a breach of the basic sharing obligation of the treaty is much more debatable given the point noted above, namely that it is up to each state to put in place the necessary infrastructure to allow it to take advantage of its apportionment. The WMI process is ongoing.

In addition to concerns about the irrigation entitlements of the two states there are also concerns as to maintaining flows for instream needs on the two bodies of water. None of the relevant instruments (the Treaty, the 1921 Order and the Procedures Manual) directly address this set of concerns which arise differently on the two bodies of water. On the St. Mary the concern is principally one of maintaining flows for cutthroat trout downstream of the boundary. On the Milk River there are concerns as to the effect of enhanced flows (and interrupted flows) on the Milk as a result of the basin transfer which may have a detrimental effect on the listed Western Silvery Minnow.[278]

The Procedures Manual

The third element in the apportionment arrangements for the Milk and St Mary Rivers is the Procedures Manual developed by the senior water engineers (accredited officers) on both sides of the boundary. The officers developed these procedures over a period of decades before formalizing them into a manual in the 1970s. The authority of the accredited officers turns on a paragraph of Article VI of the Treaty which provides that "[t]he measurement and apportionment of the water … shall from time to time be made jointly by the properly constituted reclamation officers of the United States and the properly constituted irrigation officers of His Majesty under the direction of the International Joint Commission." It is important to emphasize that these officers have had to make a series of important decisions that crucially affect the ability of each party to take advantage of its "share" of the two streams. These decisions include the choice of the appropriate balancing period and the decision not to award any credit for surplus deliveries.

[277] For the Report of the Administrative Measures Task Force (2006) see http://ijc.org/rel/pdf/SMMRAM.pdf

[278] See discussion in Bankes, *Protecting Listed Aquatic Species under the Federal Species at Risk Act: The Implications for Provincial Water Management and Provincial Water Rights*, 24 Journal of Environmental Law and Practice 19 – 65 at 33 – 34 (2012).

It is easiest to explain both of these ideas by reference to the position of each party on the St. Mary. The Manual provides for a 15 day balancing period meaning that within the 15 day period the upstream state must have delivered (allowed to pass without diversion) the agreed amount of water. There can be over delivery on any hour or day so long as accounts are balanced at the end of the 15 day period; by the end of the 15 day period the upstream must have met its commitment. This is clearly less demanding than hourly or daily balancing but it is more demanding (and provides less flexibility to the upstream state) than seasonal balancing. The crediting point is related. The absence of crediting means that the upstream state must be able to make instantaneous (or more precisely use within the balancing period) use of its share; it cannot use an over delivery in one period to justify holding back water in a later period. In the concrete context of the St. Mary this means that if the transfer syphon or infrastructure is out of commission, or operating at a lower capacity than the permitted diversion (perhaps during spring flows), the U.S. will likely over deliver; but it cannot rely on that over delivery to under deliver (and increase its own diversion into the Milk) later in the season when flows are lower.

Flexibility mechanisms in the apportionment arrangements for the St. Mary and Milk Rivers
The arrangements under Article VI offer another example of constrained flexibility. The terms of the treaty establish one set of constraints; further constraints are established by the terms of the 1921 Order. Within the terms of the Order there may be flexibility to optimize arrangements to benefit both parties. These adjustments are primarily realized through the decisions of the Accredited Officers and in some cases recorded in the terms of the Procedures Manual.

More profound adjustments would require a revision of the 1921 Order. In practice it has not proven possible to revise the Order. This is because both sections of the IJC would need to accede to such a request. The United States tried to have the Order reviewed in the 1930s but failed; and Montana's effort to have the Order reviewed in 2003 was adroitly channeled by the IJC into the Administrative Measures Task Force. This suggests that there are important limits to the flexibility of existing bilateral (and by their nature consensual) instruments, especially instruments like apportionment agreements which form the basis for investments in both large scale (dams) and smaller scale (irrigation canals and sprinkler systems) infrastructure. The basic paradigm for moving forward is consent and consent will likely be conditional upon each perceiving a benefit in the proposed arrangements over the existing arrangements. The default position is always the existing arrangements (i.e. the 1921 Order).

The practice under the terms of the 1921 Order confirms this point since it shows that the parties have been able to achieve some mutually beneficial arrangements within the terms of the existing Order. There are two examples of this, the first relates to the eastern tributaries, and the second relates to what are effectively some limited and exceptional crediting arrangements in relation to operations on the Milk and St. Mary.

Flexibility arrangements in relation to the eastern tributaries

As already noted above, while the Treaty itself does not expressly refer to the eastern tributaries, the 1921 Order establishes that they are subject to a 50/50 apportionment and the Procedures Manual suggests that they are subject to the usual balancing periods and the no crediting rule. However, as a matter of practice, irrigators on both sides of the border have come to the understanding that rigorous enforcement of the terms of the Order is not in anybody's best interest. This is principally because built storage on the Canadian side of the boundary permits the storage of spring run off for release later in the growing season. This benefits Canada but also protects American interests from flooding and allows U.S. irrigators to make more effective use of their water rights. The Treaty and the terms of the 1921 Order might require 15-day balancing but 15-day balancing during the run off delivers more water to American farmers than they can use. Consequently it makes more sense to both parties to store surplus flows for later release. While there is still an obligation to true up over the course of the irrigation season the result is that American farmers enjoy the benefit of Canadian storage. The crucial point is that this sort of win-win bargaining is only possible in light of the existing background rules. The particular solution the parties have reached to this point may not be the most optimal solution (after all the current arrangements do not appear to provide any credit for the ability of Canadian storage to control spring flows) but the fixed points of the Treaty and the 1921 do provide the opportunity to bargain on the basis of mutually beneficial arrangements to improve the status quo.

Flexibility on the mainstem of the Milk and St. Mary

Each side can identify a significant problem with the default arrangements of the Treaty, the 1921 Order and the standard procedures. From Canada's perspective the default arrangements mean that in some years there may be no flow in the Milk River at the end of the summer that is available for Canadian licensees. This is simply the result of natural flow conditions. Canada has no right to use water that the U.S. transfers to the Milk from the St. Mary. From the U.S. perspective the problem relates to the St. Mary and is basically that outlined above. The U.S. lacks the capacity to take its full share at times of high flow. It would be better positioned to take its full share if it could spread its allocation over a more extended period. Both sides have been able to accommodate the other's interests at least to a limited extent though an arrangement known as a Letter of Intent between the two accredited officers.[279] The arrangement authorizes each upstream state to under-deliver on its obligations up to a certain specified amount and within a certain period provided that the accounts are trued up by the end of October. In effect, this arrangement authorizes limited borrowing of water to meet the interests of each Party. Both of these examples illustrate how the parties can find mutually beneficial arrangements which improve on the prescriptive provisions of the 1921 Order. In each case the Order provides the rule framework within which these optimizing solutions can be identified.

[279] The current version of the Letter of Intent is reproduced in the Report of the Administrative Measures Task Force *supra* note 277.

The Water Management Initiative

As noted above, the WMI was launched by Montana and Alberta as a follow-up to the work of the Administrative Measures Task Force.[280] This is probably an over simplification but it is perhaps useful to think of the WMI as the means by which the two sub-federal units could explore, on a more comprehensive basis, opportunities for finding win-win solutions within the existing framework along the lines of the examples discussed in the previous section. In addition, the terms of reference allowed the parties to recommend changes to the 1921 Order and the Administrative Measures if either presented a barrier to implementing preferred options. The Joint Initiative Team (the JIT) which was responsible for developing or considering the various options was active in the period between 2008 and 2010 but there has been no reported activity since then.[281] The JIT did provide some opportunity to engage tribes and First Nations in the process but this was more effective in the composition of the Montana team than the Canadian team. In sum, while the WMI provided a mechanism for exploring additional flexibilities both within and beyond the framework provided by the 1921 Order it has yet to complete its work.

[280] The Terms of Reference are available here http://www.dnrc.mt.gov/wrd/water_mgmt/planning_activities/montana-alberta/default.asp

[281] For the minutes of the meetings see *id*.

Appendix C: Details on the Levels Jurisdiction of the IJC in the Great Lakes

An overview of the Great Lakes levels jurisdiction is provided in chapter 5.2.2. This appendix examines in some greater detail how the IJC has used its continuing jurisdiction over the Lake Superior and Lake Ontario levels orders. It also illustrates the interplay between the International Joint Commission's compulsory jurisdiction and its advisory jurisdiction which arises by way of a reference. This is most obviously illustrated in the case of the regulation of Lake Ontario where the two governments contemporaneously made a joint application for an Order of Approval and sought the advice of the IJC by way of a Reference as to whether it was possible to achieve certain water level objectives. The results of the Reference led the IJC to amend the terms of the Order of Approval shortly after it had been issued.[282]

Lake Superior Regulation

Lake Superior first became subject to regulation through the IJC's Order of Approval issued in 1914.[283] A key objective of the Order was to aim to regulate levels between 601.7 and 603.2 feet above sea level, which was a narrower range than the natural range. The original order only concerned itself with Lake Superior levels but the Order was amended in 1979 following the work of the International Great Lakes Levels Board to also take into account the levels of Michigan/Huron − a process known as systemic regulation. The 1979 amendments also provided for minimum flows in the rapids section of St. Marys River for fish habitat purposes.

The Lake Superior Board of Control established by the 1914 Order has applied four different regulation plans to operations under the Order – all developed to meet the criteria specified in the Order as amended over time. The current systemic regulation plan (Plan 1977) was introduced following approval of the 1979 amendments to the Order of Approval.

In 2007 the IJC issued a Directive establishing the ten-person bi-national International Upper Great Lakes Study Board. The IJC noted its authority to do so as follows: "Pursuant to the Boundary Waters Treaty of 1909 (Treaty), the International Joint Commission has an ongoing responsibility for assuring that projects it has approved continue to operate in a manner that is consistent with the provisions of the Treaty as interpreted by the Commission and the governments of Canada and the United States (governments)."[284] The Directive went on to set the mandate of the Study Board as being:

> To undertake the studies required to provide the Commission with the information it needs to evaluate options for regulating levels and flows in the Upper Great

[282] *See also,* IJC, Report to the Governments of Canada and the United States, *Further Regulation of the Great Lakes*, 1976
[283] *See generally*, Anne H. Clites and Frank H. Quinn, *The History of Lake Superior Regulation: Implications for the Future*, 29(1) J. Great Lakes Res. 157 – 171 (2003).
[284] http://www.iugls.org/Mandate

> Lakes system in order to benefit affected interests and the system as a whole in a manner that conforms to the requirements of the Treaty, and the Board shall be guided by this mandate in pursuing its studies. These studies include:
>
> a. examine physical processes and possible ongoing St. Clair River changes and its impacts on levels of Lake Michigan and Huron. Additionally, depending on the nature and extent of St. Clair River changes and impacts, recommend and evaluate potential remedial options;
> b. review the operation of structures controlling Lake Superior outflow in relation to impacts of such operations on water levels and flows, and consequently affected interests;
> c. assess whether changes to the Order or regulation plan are warranted to meet contemporary and emerging needs, interests and preferences for managing the system in a sustainable manner; and
> d. evaluate any options identified to improve the operating rules and criteria governing the system.
>
> The Study Board … is encouraged to integrate as many relevant considerations and perspectives into its work as possible, including those that have not been incorporated to date in assessments of The Upper Great Lakes System regulation, to assure that all significant issues are adequately addressed.

The geographical scope of the study was therefore large covering the entire upper Great Lakes basin from the headwaters of Lake Superior downstream through Lakes Michigan, Huron, St. Clair and Erie and the connecting channels (the St Marys, St. Clair and Detroit Rivers, the Straits of Mackinac and the upper Niagara River). The Study Board was instructed to carry out its work separately from that of the Lake Superior Board of Control. It provided its final recommendations to the IJC in March 2012.[285]

In reflecting on the question of whether it was possible to develop a New Regulation Plan that improved on the then current regulation plan 1977A The Study Board noted that it faced two principal challenges – the effects of climate change on the natural climate variability and glacial isostatic adjustment which in general is causing the northern and eastern portions of the basin to rise while the southern and western portions are falling causing a gradual tilting of the basin over time.[286] The Board also recognized the legal context for its review noting that:[287]

> Under the *Boundary Waters Treaty of 1909*, domestic and sanitary water uses, navigation, and power and irrigation are given order of precedence. These uses

[285] International Upper Great Lakes Study, *Lake Superior Regulation: Addressing Uncertainty in Upper Great Lakes Water Levels*, March 2012 http://www.ijc.org/iuglsreport/wp-content/report-pdfs/Lake_Superior_Regulation_Full_Report.pdf
[286] Id., at 6.
[287] Id., at 6 – 7.

> must be taken into account in the development of regulation plans. However, the Treaty does require that the IJC consider impacts on "any interests on either side of the boundary". These others interests include ecosystems, coastal zone uses, and recreational and tourism uses. A challenge for any regulation plan, therefore, is the extent to which the needs of these evolving interests can be reasonably met, while adhering to the order of precedence of interests and other requirements established in the Treaty.

To assist it in its work the Study Board appointed a bi-national Public Interest Advisory Group both to provide it with advice but also to assist the Board in developing and implementing its extensive public information and engagement activities.[288] In addition, the Board also recognized the particular interests of First Nations, the Tribes and Metis although it noted that their interests tended to cut across other interests already identified, including domestic water users, coastal zone and ecosystem interests.[289] The work of the Board was also subject to extensive peer review.

A key part of the Board's work was to develop and evaluate possible new Lake Superior regulation plans to see if it was possible to improve on the performance of 1977A. The Board tested these plans against a series of net basin supply sequences eventually whittling a list of over 100 alternatives down to four before selecting one particular plan (Lake Superior Regulation Plan, 2012) based upon performance against a number of different criteria:[290]

- To maintain or improve the health of coastal ecosystems;
- To reduce flooding, erosion and shore protection damages;
- To reduce the impact of low water levels on the value of coastal property;
- To reduce or maintain shipping costs;
- To maintain or increase hydropower value;
- To maintain or increase the value of recreational boating and tourism opportunities; and
- To maintain or enhance municipal-industrial water supply withdrawal and wastewater discharge capacity.

In carrying out its evaluation the Board was acutely aware of the limits of our scientific knowledge of the Great Lakes system. The Board put this as follows:[291]

> Perhaps most striking from the perspective of effective lake regulation is how little the lake dynamics on interannual and decadal timescales are understood.

[288] Id., chapter 10, "Public Engagement in the Study".
[289] Id., at 36 – 38.
[290] Id., at 67 and 180 .
[291] Id., at 183.

> *Despite best efforts, the lake levels remain almost entirely unpredictable more than a month ahead*. In terms of understanding the lake system relative to lake levels, the unavoidable conclusion is that *the Great Lakes basin is a complex system whose dynamics are only partially understood*. (emphasis supplied)

This led the Board to emphasize the importance of robustness (defining 'robustness' in this context as "the capacity to meet regulation objectives under a broad range of possible future water level conditions) in the selection of any future regulation plan. The Board was particularly attracted to one plan, LSRP, 2012 because it performed well in significantly drier years that might be possible in a climate changed future.

The Board was skeptical about efforts to restore Lake Michigan-Huron levels[292] and even more skeptical about the idea of multi-lake regulation noting that any such proposal would entail very high costs, environmental concerns and be very demanding in institutional concerns.[293]

The Review Board examined the role that adaptive management could play in assisting interests in the upper basin anticipate and respond to future extreme water levels. In the Board's view the process of adaptive management[294]

> …. involves an ongoing effort to identify and reduce specific uncertainties and test management options and policies. The results of implemented management options are monitored to evaluate their expected performance. The lessons learned are then used to adjust subsequent management decisions. Adaptive management is designed to complete the feedback loop whereby the uncertainties associated with future choices are reduced through the application of new knowledge.

It also noted that effective implementation of adaptive governance required "overarching institutional arrangements (governance) and the need for strong, effective interjurisdictional collaboration." This was an important observation in the present context since, as the Board noted, absent an ongoing IJC study there is no mechanism for the ongoing collaboration required for data collection and management for ongoing adaptive management in the Great Lakes and especially the Great Lakes as a whole including Lake Ontario. This led the Board to recommend the creation of a new Great Lakes St. Lawrence Board to champion adoption of an adaptive management strategy. The full recommendations of the Board were as follows:[295]

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[292] The Board noted that Michigan/Huron levels had been affected by a number of factors including changing climate patterns, dredging of the St. Clair River which increased its conveyance capacity and glacial isostatic adjustment. The Board also observed that regulation on the St. Marys River would have little effect on Michigan/Huron levels in dry years.

[293] Id., key findings 4 and 5 at 186 and 187.

[294] Id., at 153 (references omitted)

[295] Id., at 168.

1. An adaptive management strategy should be applied to address future extreme water levels in the Great Lakes-St. Lawrence River basin through six core initiatives:
   • strengthening hydroclimatic monitoring and modelling;
   • ongoing risk assessment;
   • ensuring more comprehensive information management and outreach;
   • improving tools and processes for decision makers to evaluate their actions;
   • establishing a collaborative regional adaptive management study for dealing with water level extremes; and,
   • promoting the integration of water quality and quantity modelling and activities.

2. The IJC should seek to establish a Great Lakes-St. Lawrence River Levels Advisory Board to champion and help administer the proposed adaptive management strategy for the entire Great Lakes-St. Lawrence River system.

3. The IJC should work with governments to pursue funding options and coordinate adaptive management efforts with the Lake Ontario-St. Lawrence River Working Group, the renewal of the Great Lakes Water Quality Agreement, and the implementation of the Great Lakes-St. Lawrence River Basin Sustainable Water Resource Agreement.

The Commission held 13 public hearings on the Board's report before providing its "advice to Governments" in April 2013.[296] The Commission accepted most of the Board's recommendations including LSRP, 2014 and the recommendation that multi-lake regulation not be pursued. It also recommended that the governments undertake further research and assessment of the different proposals that had been advanced to deal with low levels of Michigan/Huron by reducing the conveyance capacity of the St. Clair River.

The Commission adopted a two-step response to the Board's proposals in relation to adaptive management and the creation of a Great Lakes/St. Lawrence levels advisory board. Its first response had been to create the International Great Lakes – St. Lawrence River Adaptive Management Task Team in 2012. The second part of its response to the Board's recommendation was to express support in principle for Board's proposal and in particular the Board's emphasis on the need for a "comprehensive approach to adaptive management and broader governance mechanisms for managing water levels in the entire system."[297] The Commission returned to this issue in 2014 in its consideration of the adoption of a new levels Order for Lake Ontario. This issue is discussed in detail in the next section. The U.S. chair, Lana

[296] http://ijc.org/iuglsreport/wp-content/uploads/2013/04/IUGLS-IJC-Report-Feb-12-2013-15-April-20132.pdf
[297] Id., at 13.

Pollack while expressing her support for the Board's work, declined to sign the Commission's Advice for two reasons. First, she took the view that the Advice placed inadequate emphasis on climate change and the need to pursue adaptive strategies supported by adequate funding. Second, she considered that the Commission's support for further work on the St. Clair options might raise false hopes as to the capacity of any such option to resolve continuing low-water problems while at the same possibly disrupting interests downstream in Lake St. Clair and Lake Erie.

Lake Ontario – St. Lawrence Order of Approval

The original application for the development of the St. Lawrence downstream from Lake Ontario was initiated by both governments in 1952 and the Order of Approval issued that same year. The Order was amended in 1956 to provide that Lake Ontario should be regulated within a target range of 243.29 and 247.29 feet above sea level. This target was established based on water supplies into the basin based on a period of record from 1860 – 1954. The 1954 Order established 11 criteria for managing Lake Ontario levels and flows including minimum Montreal water harbour levels, winter outflows for power generation, managing outflows during spring break-up and during flood discharge from the Ottawa River to protect Montreal, minimum flows to maximize dependable power production as well as target levels in the interests of property owners on Lake Ontario.[298]

Actual operations pursuant to the Order have been carried out pursuant to a Regulation Plan which establishes a set of rule curves which determine outflows on a weekly basis. The Regulation Plan was amended a number of times in the first few years to reduce the occurrence of low water levels in Montreal Harbour. One particular Plan of Regulation, Plan 1958-D has been in force since 1963. The Board of Control has the authority from the IJC to deviate from the Plan on a temporary basis in order to achieve some particular objective.[299]

Over time concerns grew that the Order did not take into account all necessary interests, in particular recreational boating and the environment. One response from the IJC was to expand the composition of the Board of Control. In the mid-1980s it appointed a member with expertise in the effects of water levels on recreational boating interests and in 1995 expanded the membership from 8 to 10 to include members with expertise on the effect of water fluctuations on a number of communities on Lake Ontario, the Upper St. Lawrence and Montreal.[300]

As a further response the IJC asked the Board of Control to develop and test some alternative plans. The Board did so and in 1997 recommended that the IJC adopt Plan 1998 which was based on the 1958-D plan with experience based on the deviations. The proposed plan faced

[298] IJC, History of the Lake Ontario-St Lawrence River Order of Approval and the Regulation Plan and Related Studies, (LOSL, History) at 2.
[299] Id., at 4.
[300] Id., at 5.

significant opposition and the IJC elected not to implement it, choosing instead, and with the support of both governments, to launch a more comprehensive review of options with the creation of the International Lake Ontario-St Lawrence River Study Board in December 2000.[301] The IJC listed the following reasons for launching the study:[302]

- Changing needs and interests; intensification of use including further development of the shoreline, a longer commercial navigation season and emergence of recreational boating.
- Dissatisfaction of some interests with the way in which Lake Ontario levels had been regulated.
- Environmental concerns. The 1956 Order did not take into account the impacts of water regulation on the ecosystem. "Restricting the range of water levels has reduced the diversity and resiliency of wetlands which is a core component of shoreline ecosystem health."
- More extreme water supplies. Water supplies since regulation commenced have been significantly above and below the period of record on which the plan of regulation was based.
- Climate change. It is important to understand the possible implication of climate change for compliance with the order.
- Lack of information about the impacts of regulation.
- Need for more information. The IJC noted that it needed more information to be able to respond to concerns and questions that had been raised when it proposed to implement changes to 1958-D.
- Advances in science and technology. These advances including computerized modelling allowed for increased understanding and therefore better options for regulating Lake Ontario outflows.

A highlight of the five year study was the development of a model which allowed the study board to test various regulation plans against 495 hypothetical centuries of stochastic water supplies clearly providing a more diverse variation than the historical record. The Board developed three plans A, B and D (refined to A+, B+ and D+) before the IJC put forward its preferred plan, the 2007 Plan. The Commission held further hearings during 2008 during which it heard widespread opposition to the Plan and as a result drew back once again, signaling to the governments that "Plan 2007 is not a practical option" but concluding on the basis of what it had heard "that the regulation of water levels and flows should be based on a revised set of goals and objectives and criteria, specifically moving towards more natural flows to benefit the environment, while respecting other interests." [303]

[301] Id., at 6
[302] Id., at 6 – 8.
[303] Plan 2014 at 14. http://www.ijc.org/files/tinymce/uploaded/LOSLR/IJC_LOSR_EN_Web.pdf

In order to make progress the IJC asked the two federal governments and the governments of Quebec, Ontario and New York to nominate two senior officials to a working group (2009) to assess the regulation plans that had been developed to date. The Working Group favoured adoption of a variant of the B+ regime (Plan Bv7). Once again the Commission held hearings and technical sessions during the summer 2013 to assess what had become known as Plan 2014. In the Commission's summary:[304]

> There was widespread strong opposition to the plan in south shore communities, with a minority expressing support. Shipping industry representatives in Montreal supported the ecosystem goals so long as the order of precedence was maintained. There was strong, widespread support for Plan 2014 elsewhere around the lake and in communities along the river.

But the Commission had also come to the appreciation, as had its independent Public Interest Advisory Group, that no plan could satisfy all interests.[305] U.S. government agencies were themselves divided on Plan 2014. The U.S. EPA supported the Plan on the basis that Plan 1958DD "had significantly degraded Lake Ontario wetlands and vital fish and wildlife populations.[306] Plan 2014 should increase the diversity and functioning of wetlands. By contrast the U.S. Department of Transport raised concerns that the priority given to environmental interests by Plan 2014 violated the Treaty on the basis that it failed to accord priority to commercial navigational interests which might be significantly lower levels on Lake Ontario in a few years out of a hundred.[307] This time the IJC decided that it had heard enough and that a revised Order of Approval and the accompanying Plan 2014 "should be implemented as soon as possible".

Perhaps the most contentious issue to be addressed in adopting the revised plan was the potential for conflict between ecosystem restoration which required a return to more natural levels and benefits to shore property interests which wished to see the same or increased levels of regulation. The Commission took the view that it was engaged in a balancing exercise and that none of the proposed regulation plans could completely protect development interests. The IJC summarized the issue and its response as follows:[308]

> In summary, the IJC recognizes that there are challenges to balancing ecosystem protection interests and benefits to shore property development interests along the Lake Ontario shoreline. Each regulation plan involves a tradeoff among interests. Plans that restore a significant measure of coastal ecosystem health do so with

[304] Plan 2014, at 15.
[305] Plan 2014 at 15 – 16.
[306] Plan 2014 at 16.
[307] Plan 2014 at 17.
[308] Plan 2014 at 40 – 41.

> more natural lake levels. More natural levels, by contrast, could increase damages to shoreline development.
>
> In selecting a new regulation plan, the IJC chose to strike a balance between the two objectives. Plan 2014 would produce a large improvement in coastal ecosystems in return for a small reduction in the benefits provided in the 1956 Order for those who live along the shore of Lake Ontario.

The IJC also proposed to implement one important institutional change which was to transform the St. Lawrence Board of Control into the International Lake Ontario – St Lawrence River Board. The Board will have at least ten members including at least one member from the five governments. In addition the IJC contemplates appointing members to assure a balance of expertise and to obtain the participation of the First Nations and Tribes.[309] Finally, the IJC committed to adopt an adaptive management approach to the implementation of Plan 2014 noting that "Adaptive management can provide an objective measure of how well a plan is meeting its goals, replacing the current ad hoc approach to regulation plan improvement."[310]

Plan 2014 and Adaptive Management

The Commission elaborated on the idea of adaptive management at length in the four-page Annex E to its Report, "Adaptive Management Strategy". In the Strategy the Commission notes that it cannot undertake an adaptive management strategy on its own and will need to collaborate with "jurisdictions and stakeholder groups that have capacity for monitoring various effects of regulation …".[311] The IJC also recognizes that such an approach will need to be adopted incrementally as governments makes resources available. The Commission proposes the creation of an Adaptive Management Committee that will report to the new Board. The Committee will be made up of "technical experts who will coordinate the monitoring, research and modelling needed to carry out the adaptive management strategy." The Board in turn may use the information gained to propose modifications to the Plan of Regulation but the Commission is cautious to note that such changes would only be adopted by the Commission following public review.[312] The Strategy also identified three areas of focus for further work: (1) water supply research and monitoring, (2) environmental impact research and monitoring, (3) economic impact research and monitoring, and (4) periodic assessment of the regulation rules.

We cannot examine any of these focus areas in any detail but we will offer some further comments on the water supply research and monitoring topic. Within this topic the Commission suggested four examples of the type of adaptive management research that would be useful: (a) forecasting of water supplies, (b) redefined deviation triggers, (c) creation of a coordinated Lake-

[309] Plan 2014 at 22.
[310] Plan 2014 at 51.
[311] Plan 2014 at 76.
[312] Plan 2014 at 51 and 76 – 77,

Ontario St. Lawrence Climate Change Model, and, (d) environmental impact research and monitoring. Within these topics two examples are particularly useful for present purposes. First in relation to the topic of Redefined Deviation Triggers the Commission noted that Plan 2014 uses as a trigger for taking exceptional action in the case of high water levels a scenario in which the Board expects levels to be exceeded in any quarter-month of a year 2% of the time. The Commission suggests that further research on this issue might refine the trigger to "produce even better economic and environmental results using a different mix of trigger levels."[313] The second example relates to the creation of a coordinated Lake-Ontario St. Lawrence Climate Change Model. What is interesting here are the problems of scale that the Commission identifies. The first scale problem is the familiar one of refining global and regional models to basin models. But the scale issue that the Commission focuses on is the need to have a model that is capable of simulating not only flows into Lake Ontario but also flows from the Ottawa River (as well as the operating rules for reservoirs on the Ottawa system). This serves to emphasize the importance of including data inputs from geographical areas which fall outside the historical purview of the Lake Ontario levels order.

The Commission provided the following summary statement as to why it was proposing to include adaptive management in its regulations plans:

> The IJC always has strived to improve its regulation rules over time; adaptive management is a more structured, science-based and effective way of doing it because:
>
> • data collection is more purposeful and better coordinated, increasing the chances that the data needed to inform regulation decisions will be available;
>
> • on-going evaluation of the rules should be easier because the tools and knowledge needed to assess performance are maintained on a continuing basis, with a relatively small, steady effort; and,
>
> • decisions are more transparent because the community of experts, decision makers and stakeholders that helped build the models used in adaptive management will be sustained in the outreach efforts of the new International Lake Ontario-St. Lawrence Board.

Translating adaptive management into the terms of the Order of Approval

The Commission's Pan 2014 Report includes a number of different Annexes. Annex A contains what is in effect a draft Order of Approval. Annex B contains a more technical discussion of the Plan of Operation. Annex C is a draft Directive to the Board dealing with deviations and Annex D is more general Directive to the Board. Annex E deals with adaptive management (discussed in the last section) but ideas of adaptive management also come to the fore in Annex A (the

[313] Plan 2014 at 77.

Order of Approval) and Annex D (the general directive). These references are important because they illustrate how the Commission believes that it will be able to integrate and operationalize adaptive management within ongoing operations.

First, in relation to the draft Order of Approval, the Commission expressly contemplates that the Board will (subject to certain conditions) be able to consciously experiment with different flows:

> … the Board, after obtaining the approval of the Commission, may temporarily modify or change the restrictions as to the discharge of water from Lake Ontario and the flow of water through the International Rapids Section for the purpose of determining what modifications or changes in the plan of regulation may be advisable. The Board shall report to the Commission the results of such experiments, together with its recommendations as to any changes or modifications in the plan of regulation. When the plan of regulation has been improved so as best to meet the requirements of all interests, within the range of levels and criteria above defined, the Commission will recommend to the two governments that it be implemented and, if the two governments thereafter agrees, such plan of regulation shall be given effect as if contained in this Order. Should there be a change to the approved regulation plan, then the Commission will consult with governments as appropriate.

Second, and also in relation to the Order of Approval, the Commission provides for a review:[314]

> No later than 15 years after the effective date of this Order, and periodically thereafter, the Commission will conduct a review of the results of regulation under this Order. This review will be to assess the extent to which the results predicted by the research and models used to develop any approved regulation plan occurred as expected, consistent with the adaptive management plan. The review will be based upon the information available at the time of the review and may provide the basis for possible changes to the regulation of water levels and flows.

And finally the ideas of Adaptive Management are expressly included in the Commission's general instructions to the Board (Annex D):

> The Board will take part in an adaptive management plan designed to verify that the effects of the new regulation plan over time are as anticipated, react to the influence of changing conditions such as climate change, and adapt or improve the implementation of the regulation plan as required. The Board may also use the

[314] Plan 2014, at 57

> information acquired through the adaptive management strategy to propose to the Commission modifications to the plan should it learn over time that conditions (climatic, socio-economic or environmental) have changed enough such that the plan is no longer meeting its intended objectives or improvements to the plan could realize increased benefits.

Decision or recommendation?

In the ordinary course of things it is fairly clear from the text of the Boundary Waters Treaty that the IJC has the authority to make decisions in relation to levels matters at least in the case of the first application. It does not need the concurrence of the contracting parties to make a decision under Articles III, IV and VIII provided that it is not seeking to subvert the order of precedence established by Article VIII. Presumably also if the Commission has expressly reserved its jurisdiction in any Order of Approval (as it expressly did in its Lake Ontario levels order) it can also re-visit the terms of the order in the future. Where such a jurisdiction has not been expressly reserved the Commission may still be able to argue that the Commission's continuing supervision of the order is necessarily implied, i.e. its jurisdiction has not been exhausted by the original application.[315]

However, the Commission always seems to have acknowledged that the Lake Ontario levels order was a special case because the original application was a joint application by both governments. The Commission continues to adhere to this view as is apparent in the Plan 2014 Report which is framed as a report to the governments in which the IJC in its covering letter recites that the two governments were "the applicants on the St. Lawrence Power Project as well as the Parties" to the BWT and goes on to state that "The Commission seeks the concurrence of the Parties on revising the Order to consider ecosystem health with respect to all other interests and uses of the Lake Ontario - St. Lawrence River system."

[315] This is clearly the position that the IJC takes in relation to the Order of Approval in relation to Lake Superior.

Appendix D: Details on the Great Lakes Water Quality Agreements

An overview of the Great Lakes Water Quality Agreements (GLWQA) is provided in chapter 5.3 This appendix provides additional detail.

In terms of process of adoption, these agreements are Executive Agreements in U.S. law as opposed to treaties ratified with the Advice and Consent of the Senate. [316] They are entered into under Executive authority derived from the Boundary Waters Treaty with the International Joint Commission playing an umbrella role. As noted in Bankes and Cosens,[317] Executive Agreements have the same force as a treaty in international law. Both the pre-2012 GLWQAs and the GLWQA of 2012 will be covered here because they include different examples of flexibility, and to illustrate the evolution of the agreements in the face of change in both ecological and water quality conditions and understanding of what was needed to address those changes. Thus, the Columbia Basin can learn from that evolution.

First, a chronology on the agreements is useful. The successive GLWQAs have increased the scope and level of coordination concerning water quality issues over time as follows:

- 1972: The first Agreement between the United States of America and Canada on Great Lakes Water Quality was signed at Ottawa on April 15, 1972.[318] The Agreement focused on reducing pollution discharge, particularly phosphorous oil and solid waste, to the Great Lakes. The Agreement established two advisory bodies under the umbrella of the IJC: the Great Lakes Water Quality Board comprised of senior representatives of federal, state, and provincial governments,[319] and a Research Advisory Board composed of research managers from relevant agencies. [320] The tasks of collecting and analyzing data were to be carried out jointly and separately under the coordination of these bodies.
- 1978: The 1978 Agreement added toxic pollutants with the goal of eliminating any persistent toxics from the Great Lakes and international portion of the St. Lawrence River.[321] The Agreement is recognized for including an ecosystem approach by stating its purpose to be "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem," and defining the "Great Lakes Basin Ecosystem" as "the interacting components of air, land, water and living organisms,

[316] Bankes and Cosens, *supra* note 62.
[317] Id.
[318] Great Lakes Water Quality Agreement, Article XII, U.S-Canada, Apr. 15, 1972, 23.1 U.S.T. 301
[319] See, IJC Guide to the GLWQA, 1972 Agreement, available at http://www.ijc.org/en/activitiesX/consultations/glwqa/guide_3.php#1972, found at Article VIII.1.a. 1978 GLWQA as amended.
[320] See, IJC Guide, id., renamed named the Science Advisory Board at Article VIII.1.b. 1978 GLWQA as amended *supra* note 146.
[321] 1978 GLWQA id. Article II

including humans".[322] It calls for the elimination of persistent toxic pollutants[323] and broadens the scope to include pollutants from land use activities.[324] The Agreement contemplates the possibility of new issues by providing for amendment to specific annexes as needed. The Agreement continues with implementation through the IJC and the advisory bodies that were established in the 1972 Agreement, revises and renames the Research Advisory Board to the Science Advisory Board,[325] and establishes a Great Lakes Regional Office to staff the advisory boards. [326]

- 1983: The 1983 supplement to the 1978 Agreement adds enhanced measures to reduce phosphorous.
- 1987: In 1987 the two governments signed a Protocol amending the Water Quality Agreements after extensive review and public input. The Protocol maintained the basic framework of the 1978 Agreement, but expanded the types of pollutants[327] addressed and the management provisions.[328] Specifically it introduced the concept of restoration of impaired areas through procedures for development and implementation of Remedial Action Plans and procedures for addressing persistent toxic pollutants on the scale of the lakes through development of Lake-wide Management Plans.[329] It established a Binational Executive Committee chaired by the heads of Environment Canada and the U.S. EPA, with membership of senior officials from the federal, state and provincial agencies with responsibility for water quality related matters. The BEC must meet twice per year and oversee bilateral activities under the Agreement including remedial action plans for shared areas and lake management plans.
- 2012: The GLWQA of 2012,[330] reaffirmed the framework of the 1978 GLWQA as amended, and substantially amended it,[331] following a review that, among other things, concluded that "the GLWQA is outdated and unable to address current threats to Great Lakes water quality.[332] The GLWQA of 2012 was signed by the Governments of Canada

[322] Id., Article II
[323] Id., Article VI.k.
[324] Id., Article VI.1.e.
[325] Id., Article VIII.1.b.
[326] Id., Article VIII.3.
[327] Id, Article VI
[328] Id., Articles VII - X
[329] Id., Article VI.1.o. and Annex 2
[330] Great Lakes Water Quality Protocol of 2012, *supra* note 158
[331] Article II of the GLWQA of 2012 states: "The title, preamble, article and annexes of the 1978 Agreement are amended to read as set forth in the Appendix to this Protocol. "
[332] Agreement Review Committee. Report to the Great Lakes Binational Executive Committee Volume 1 ; Technical Report; Agreement Review Committee: Ottawa, Canada, 2007 *quoted in* Gail Krantzbert, *Renegotiation of the 1987 Great Lakes Water Quality Agreement: From Confusion to Promise*, 4 Sustainability 1239-1255 (2012); doi:10.3390/su4061239, available at http://www.cusli.org/Portals/0/files/conference/RenegotiationOf1987GLWQA.pdf

and the United States on Sept. 7, 2012,[333] and entered into force on Feb. 12, 2013, following an exchange of diplomatic notes between the two Parties. [334] The GLWQA of 2012 builds on and strengthens the prior Agreements, retains the Boundary Waters Treaty as its umbrella, takes an ecosystem approach,[335] and includes adaptive management in its implementation.[336] Types of environmental harm are organized into ten annexes. In addition to the focus of prior agreements, the list of possible pollutants includes emerging pollutants and remains open ended.[337] Invasive species are added as an area of focus,[338] and climate change is the subject of one annex.[339]

For purposes of this study, the following paragraphs will detail components of the Great Lakes Water Quality Agreements that may facilitate adaptive response as follows: (1) structural and scale components that either (a) increase coordination at the scale of the ecosystem, or (b) provide input from subnational levels of government, Tribes and First Nations, non-governmental entities, and the public; and (2) capacity components that either (a) increase communication, coordination and data collection, or (b) provide flexibility. The pre-2012 Agreements will be referred to as the 1978 GLWQA as amended, and the 2012 Agreement will be referred to as the GLWQA of 2012.

Structure and Scale: Basin-wide Coordination

1978 GLWQA as amended:

- The International Joint Commission was used as an umbrella to "assist in the implementation of this Agreement."[340]
- IJC was to play a role in the collection and dissemination of data, advice on regulation and on research priorities.[341]
- The IJC was to be assisted in its role by the two advisory bodies created initially under the 1972 Agreement: the Science Advisory Board made up of experts and advising on research and scientific matters,[342] and the Great Lakes Water Quality Board.[343] Under

[333] The Protocol was signed by then Administrator of the EPA, Lisa Jackson, and the Canadian Minister for the Environment, Peter Kent.
[334] http://www.ijc.org/en_/Great_Lakes_Water_Quality
[335] The Preamble to the 2012 GLWQA found in the Appendix states: "RECOGNIZING that restoration and enhancement of the Waters of the Great Lakes cannot be achieved by addressing individual threats in isolation, but rather depend upon the application of an ecosystem approach to the management of water quality that addresses individually and cumulatively all sources of stress to the Great Lakes Basin Ecosystem."
[336] 2012 GLWQA Article 2. 4. a. available at http://www.ijc.org/en_/Great_Lakes_Water_Quality
[337] Id., Annex 3B.
[338] Id., Annex 6.
[339] Id., Annex 9.
[340] 1978 GLWQA as amended *supra* note 321, Article VII (1).
[341] Id., Article VII.1.
[342] Id., Article VIII.1.b.
[343] Id., Article VIII.1.a.; Rick Findlay and Peter Telford, *The International Joint Commission and the Great Lakes Water Quality Agreement: Lessons for Canada-United States Regulatory Co-operation*, Government of Canada,

Article VIII of the GLWQA the IJC established a Great Lakes Regional Office allowing more direct provision of services to the board.[344]

GLWQA of 2012:

- The GLWQA of 2012 calls for coordination in setting specific lake ecosystem goals, and numeric water quality goals,[345] while implementing actions to achieve them domestically.[346]
- Article 5 of the GLWQA of 2012, facilitates both the components of basin-wide coordination and building legitimacy for flexibility by setting up a specific program for informing the public and receiving public input. Specifically, Article 5 includes:
    - The Great Lakes Public Forum to be held every 3 years to receive comment on the state of the lakes and on science priorities and actions,[347] and a Great Lakes Summit to be held at the same time for coordination among the Parties, the IJC and other binational entities.[348]
    - The Great Lakes Executive Committee co-chaired by the Parties and with representatives of the "Federal Governments, State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, and other local public agencies,"[349] is required to meet two times per year to provide consultation to the Parties on science and action priorities and report preparation for the Great Lakes Public Forum.[350]
    - Requirements for sharing of data related to Great Lakes water quality.[351]
- Under the GLWQA of 2012 and consistent with the Boundary Waters Treaty, the IJC plays the role of:
    - independent review of data and implementation and consultation with the public,
    - advising to the Parties, and
    - investigating any subject referred to them by the Parties.[352]
- Carried over from the 1978 GLWQA as amended, the IJC is charged with establishing " a Great Lakes Water Quality Board, a Great Lakes Science Advisory Board, and a Great Lakes Regional Office to assist in exercising the powers and responsibilities assigned to it under" the GLWQA of 2012.[353] These Advisory Boards are comprised of

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Policy Research Initiative, Working Paper Series 023, April 2006. At 8-9. available at http://www.pollutionprobe.org/old_files/Reports/greatlakesagreement.pdf

[344] Id. At 9

[345] 2012 GLWQA *supra* note 158, Article 3.1(b)(i) and (ii)

[346] Id., Article 3.2.

[347] Id., Article 5.1.

[348] Id., Article 5.3

[349] Id., Article 5.2.a.

[350] Id., Article 5.2.b.-e.

[351] Id., Article 5.6.

[352] Id., Article 7.

[353] Id., Article 8.

representatives of national and subnational government, including Tribes and First Nations, are staffed by the Regional Office, and serve in an advisory role to the IJC.[354]

Structure and Scale: Subnational Involvement

1978 GLWQA as amended:

- The need to coordinate across multiple levels of government became particularly apparent in the call for remedial action plans for impaired areas and lakewide management plans. The 2006 Government of Canada report on the GLWQA states that: The RAPs and LaMPs provisions of the 1987 Protocol brought into play a number of complex jurisdictional issues. Many of the 43 designated areas of concern are wholly within Canada or the United States, and are the responsibility of the respective party. However, some are shared by the two countries (e.g., connecting river channels such as the Detroit River) and must be addressed in co-operative programs. Also, development and implementation of the remedial action plans require the participation of local communities or municipal governments in a much more integrated manner than the broader Great Lakes programs administered by Canada and the United States under the GLWQA. Similarly, development and implementation of lake-wide management plans require the strong and ongoing involvement of all levels of government in a particular lake basin.[355]
- The federal government of Canada and the Province of Ontario entered the Canada-Ontario Agreement on the Great Lakes Ecosystem to coordinate the activities of the federal and provincial agencies under the GLWQA, and to coordinate response to recommendations by the IJC.[356] In the U.S. the coordination across jurisdictions is accomplished through the U.S. Federal Great Lakes Program which is an "alliance of federal, state, tribal, and local agencies ..."[357] A policy committee develops and implements strategic plans for the U.S. portion of the Great Lakes and coordinates the development of U.S. views for meetings of the Binational Executive Committee. The role of secretariat to the U.S. efforts is filled by the Great Lakes National Program Office of EPA Region 5.[358]
- Article VI setting up the Programs and Other Measures directs the Parties to act "in cooperation with State and Provincial governments."[359]

GLWQA of 2012:

- The Preamble to the GLWQA of 2012 states: "RECOGNIZING that, while the Parties are responsible for decision-making under this Agreement, the involvement and

[354] Id., Article 8.
[355] Findlay and Telford *supra* note 343 at 5.
[356] Id., at 8
[357] Id., at 8
[358] Id., at 8
[359] 1978 GLWQA as amended *supra* note 146 Article VI.

participation of State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, local public agencies, and the Public are essential to achieve the objectives of this Agreement."[360] Specifically, Article 4 on implementation calls on the Parties to work "in cooperation and consultation with State and Provincial Governments, Tribal Governments, First Nations, Métis, Municipal Governments, watershed management agencies, other local public agencies, and the Public, shall develop and implement programs and other measures." [361]

- Annex 3 addressing chemical pollution of mutual concern states "that chemicals of mutual concern may be managed at the federal, state, provincial, tribal, and local levels through a combination of regulatory and non-regulatory programs"[362]
- Article 2 calls for use of "traditional ecological knowledge when available"[363]
- The establishment of the Great Lakes Water Quality Board, a Great Lakes Science Advisory Board, and a Great Lakes Regional Office in Article 8 and described above under basin-wide coordination, provide a means to both enhance capacity for subnational governmental involvement and to assure coordination with these levels of government.
- The Annexes to the GLWQA of 2012 specifically refer to the coordination with subnational levels of government. Annex 10 on Science seeks both cooperation with subnational levels of government and use of traditional ecological knowledge where appropriate.[364]

Capacity: Components that increase communication, coordination and data collection

1978 GLWQA as amended:

- As part of their role on the Binational Executive Committee, Environment Canada and U.S. EPA produce a State of the Lakes Ecosystem Conference every two years and a biannual report.[365]
- Article V.2.a. requires that the parties use their "best efforts" to align domestic research funding priorities with the priorities of the Science Advisory Board and the IJC.
- Inventory of pollution abatement requirements and compliance schedules is required to be provided to the IJC and revised annually.[366]
- The Parties are required to share any data requested pertaining to water quality of the Great Lakes.[367]

[360] 2012 GLWQA *supra* note 158 Appendix.
[361] Id., Article 4.1.
[362] Id., Annex 3.A.8.
[363] Id., Article 2.4.l.
[364] Annexes to the GLWQA of 2012 available at http://www.ijc.org/en_/GLWQA_Annexes
[365] http://www.epa.gov/solec/ The report is required by Article VII.3.
[366] 1978 GLWQA as amended *supra* note 146 Article VI.1.c.
[367] Id., Article IX.3.

GLWQA of 2012:

- The GLWQA of 2012 specifically calls for monitoring,[368] and for the use of results in adaptive management.[369]
- The Great Lakes Public Forum, Executive Committee, Water Quality Board, Science Advisory Board, and Regional Office described above are all designed to increase the coordination and dissemination of information as well as establish priorities for data collection.

Capacity: Flexibility

1978 GLWQA as amended:

- The 1978 GLWQA defines "compatible regulations" to mean "regulations no less restrictive than the agreed principles set out in this Agreement"[370] thus allowing any regulating entity within the basin to be more restrictive.[371]
- The 1978 GLWQA sets forth specific objectives, but requires the IJC and the parties to keep those objectives under review and to make recommendations accordingly.[372]
- The Parties are authorized to "implement such additional programs as they jointly decide are necessary and desirable to fulfill the purpose" of the GLWQA.[373]
- Following receipt of the biennial report provided by the IJC,[374] the Parties must consult and consider modifications to objectives and programs.[375]
- The Agreements and Annexes may be amended by joint agreement and must be confirmed by Exchange of Note or letter through appropriate diplomatic channels.[376]

GLWQA of 2012:

- The GLWQA of 2012 calls for adaptive management to "assess effectiveness of actions and adjust future actions to achieve the objectives of this Agreement, as outcomes and ecosystem processes become better understood." [377]
    - The agreement then specifically calls for monitoring.[378]
- The Annexes to the GLWQA of 2012 each address different areas of water quality concern and set up programs for ongoing collection and sharing of information and coordination on implementation with the appropriate national and subnational entities with responsibility and expertise in that area. Annex 10 specifically addresses science,

[368] 2012 GLWQA supra note 158, Article 3.3.
[369] Id., Article 2. 4. a.
[370] 1978 GLWQA as amended *supra* note 146 Article I e.
[371] Id., Article IV. 1. a.
[372] Id., Article IV. 2.
[373] Id., Article VI.2.
[374] Id., Article VII.3.
[375] Id., Article X.1.
[376] Id., Article XIII.
[377] 2012 GLWQA *supra* note 158 Article 2. 4. a.
[378] Id., Article 3.3.

and Annex 9 addresses climate change.[379] Breaking down issues into separate Annexes may increase the ease of amendment and provide a means to add additional issues through additional Annexes with less collateral consequences.

- The regular meetings and forums, continued production of information and adjustment of programs based on that information, and the formal entities established for coordination with subnational levels of government described above, all introduce flexibility and adaptive capacity into the implementation of the GLWQA.
- The GLWQA of 2012 may be amended simply by agreement of the Parties and Exchange of Notes.[380] In particular, the specific areas of water quality are addressed under a series of Annexes that may be amended in this manner.

The GLWQA of 2012 appears to contain substantial authority for flexibility and coordination with all levels of governance with avenues for both input and implementation by domestic and subnational entities. Yet it accomplishes this through using relatively soft language with considerable agreement to cooperate, coordinate, and share information, but with specific goals left to be developed and an absence of mandatory compliance. GLWQA of 2012 is in its initial years of implementation, thus it remains to be seen if this approach works. The Parties have established a binational website available at http://binational.net/home_e.html which now has available their first report on priorities for science and action for 2014-2016.[381] Concerns about progress in improving water quality sounded between the 1987 amendments and the GLWQA of 2012, raise a cautionary note in considering the tradeoff between flexibility and clear goals. A team of scientists with considerable collective experience in understanding the Great Lakes stated in 2005:

> There is widespread agreement that the Great Lakes presently are exhibiting symptoms of extreme stress from a combination of sources that include toxic contaminants, invasive species, nutrient loading, shoreline and upland land use changes, and hydrologic modifications. Many of these sources of stress and others have been impacting the lakes for over a century. These adverse impacts have appeared gradually over time, often in nearshore areas, in the shallower portions of the system, and in specific fish populations. Factors such as the size of the lakes, the time delay between the introduction of stress and subsequent impacts, the temporary recovery of some portions of the ecosystem, and failure to understand the ecosystem-level disruptions caused by the combination of

[379] Annexes supra note 364
[380] 2012 GLWQA *supra* note 158 Article 11.
[381] Environment Canada and United States Environmental Protection Agency, 2014 – 2016 Binational Priorities for Science and Action (March 14, 2014) available at http://binational.net/priorities-science-action/index-en.html

multiple stresses have led to the false assumption that the Great Lakes ecosystem is healthy and resilient.[382]

Relevant Text of Agreement

The provisions referred to above are found throughout the 2012 GLWQA and the earlier agreements. Rather than reproduce that language here, the 1978 GLWQA as amended can be found at http://epa.gov/grtlakes/glwqa/1978/index.html, and the 2012 GLWQA can be found at http://www.ijc.org/en_/Great_Lakes_Water_Quality

[382] J. Bails, A. Beeton, J. Bulkley, M. DePhilip, J. Gannon, M. Murray, H. Regier and D. Scavia, *Prescription for the Great Lakes* (2005), available at http://healthylakes.org/wp-content/uploads/2011/01/Prescription-for-Great-Lakes-RestorationFINAL.pdf

Appendix E: Details on the Great Lakes Compact and Agreement

An overview of the Great Lakes Compact and Agreement is provided in chapter 5.4. Additional detail is presented here.

As noted in chapter 5,4, the primary focus of the GL Compact and Agreement is the prevention of out-of-basin diversions of water and the provision of opportunity to review new large consumptive uses. The GL Compact and Agreement provide a framework but leave to each state and province the enactment of specific measures to accomplish this task. The GL Compact and Agreement also provide a framework for sharing information, developing a common database on water use and management, aligning efforts to conserve water, and seeking compatibility among water allocation standards. Thus, the Joint Resolution of Congress ratifying the Compact states that the "Purposes" are, among other things, to:

> a. To act together to protect, conserve, restore, improve and effectively manage the Waters and Water Dependent Natural Resources of the Basin under appropriate arrangements for intergovernmental cooperation and consultation because current lack of full scientific certainty should not be used as a reason for postponing measures to protect the Basin Ecosystem;
> b. To remove causes of present and future controversies;
> c. To provide for cooperative planning and action by the Parties with respect to such Water resources;
> d. To facilitate consistent approaches to Water management across the Basin while retaining State management authority over Water management decisions within the Basin;
> e. To facilitate the exchange of data, strengthen the scientific information base upon which decisions are made and engage in consultation on the potential effects of proposed Withdrawals and losses on the Waters and Water Dependent Natural Resources of the Basin;[383]

Relevant Text

From the Agreement: the following summary of language indicates commitment by the parties to enact legislation to accomplish the goals of the agreement. While any party could unilaterally amend or eliminate such legislation, it does increase the likelihood of implementation of the Agreement.

Chapter 1 reflects the agreement of the parties to enact their own measures to implement the agreement, thus allowing for diversity of approach and tailoring to local needs and values.

[383] GL Compact *supra* note 170, Article 1, Section 1.3, 2.

Chapter 1 also defines adaptive management

Chapter 2, while not providing a means for judicial review of decisions on diversions by the individual parties, the Agreement does indicate a desire by the parties to do so by agreeing to "seek to adopt and implement" a process.

Chapter 3 includes agreement on reporting, information sharing, collaboration on science, and reporting of applications and decisions regarding water withdrawals. Chapter 4 establishes the Regional Body composed of the Governor or Premier of each of the parties and sets forth their procedures.

Chapter 5 sets for the process for review of a proposed diversion covered by the Agreement, and includes an article on Tribal/First Nation consultation.

Chapter 6 addresses dispute resolution:.

Chapter 7 includes language assuring that the agreement is not a treaty, does not infringe on the sovereign powers of the U.S. and Canada, and does not abrogate the treaty rights of any Tribe or First Nation.

Appendix F: Details on the Pacific Salmon Treaty, 1985[384]

The background to this Treaty is discussed in chapter 5. This annex contains additional information with respect to the treaty.

In the Pacific Salmon Treaty, there is one provision dealing with the salmon of Canadian origin on the Columbia in the transboundary rivers chapter of Annex IV which reads as follows:

> Recognizing that stocks of salmon originating in Canadian sections of the Columbia River constitute a small portion of the total populations of Columbia River salmon, and that the arrangements for consultation and recommendation of escapement targets and approval of enhancement activities set out in Article VII are not appropriate to Columbia River system as a whole, the Parties consider it important to ensure effective conservation of up-river stocks which extend into Canada and to explore the development of mutually beneficial enhancement activities. Therefore, notwithstanding Article VII, paragraphs 2, 3, and 4**,** the Parties shall consult with a view to developing, for the transboundary sections of the Columbia River, a more practicable arrangement for consultation and setting escapement targets than those specified in Article VII, paragraphs 2 and 3. Such arrangements will seek to *inter alia*:
>
> (a) ensure effective conservation of the stocks;
>
> (b) facilitate future enhancement of the stocks on an agreed basis;
>
> (c) avoid interference with United States management programs on the salmon stocks existing in the non-transboundary tributaries and the main stem of the Columbia River.

The PST established the Pacific Salmon Commission and comprises 15 Articles (covering such matters as principles, conduct of fisheries and specific articles dealing with the Fraser River, transboundary rivers and the Yukon River) and four Annexes. The treaty acknowledges the important indigenous interest in the salmon fishery with a provision in Article XI to the effect that "This treaty shall not be interpreted or applied so as to affect or modify existing aboriginal rights or rights established in existing Indian treaties and other existing federal laws." In addition, Article VI of the Treaty dealing with the Fraser River contains a specific provision enjoining the Fraser River Panel and the Commission to "take into account and seek consistency with existing aboriginal rights, rights established in existing Indian treaties and domestic allocation objectives."

The structure of the Commission and the various panels established for particular rivers was important to both sides but especially so within the United States since it wished to use its

[384] January 28, 1985.

appointments on these bodies as a way of ensuring regional and tribal representation.[385] The treaty itself leaves the matter of representation to the Parties but provides that the Commission shall be composed of two national sections each comprised of four commissioners. Each section shall have one vote. This is an important provision because it means that each Commissioner has a veto.[386] The U.S. implementing legislation[387] contemplates that the four U.S. Commissioners shall be appointed as follows: one official of the U.S. government who shall be a non-voting member, one member from a list nominated by the Governor of Alaska, one from a list nominated by the Governors of Oregon and Washington and one from a list nominated by the treaty Indian tribes of Washington, Oregon and Idaho. The federal Commissioner is expected to "serve in a conciliatory and advisory role".[388] The representative approach carries over to the appointment of panel members.

The current version of the treaty establishes five panels: a Southern Panel, a Fraser River Panel, a Northern Panel, a Transboundary Panel (for the Alsek, Stikine and Taku Rivers) and a Yukon River Panel.[389] The Panels play a crucial role in advising the Commission and, in particular, advise the Commission on an annual basis as to the proposed fishery regime for the following year.[390] The Commission in turn recommends fishery regimes to the Parties on an annual basis. Each Party is responsible for establishing and enforcing the fishery regime once adopted by both Parties.[391] The Treaty also provides for additional committees and working groups in some cases. For example, Annex IV, chapter 1, provides for the appointment of a Transboundary Technical Committee to advise the Transboundary Panel and the Commission.

The initial term of the treaty is stated to be three years subject to termination thereafter on 12-months' notice (Article XV); however some of the annexes run for considerably longer periods. As an example, chapter 1 (transboundary rivers) of Annex IV is currently stipulated to apply "for the period 2009-2018). The Treaty does not make express provision for its amendment but Article XIII does provide for the amendment of Annexes. It contemplates that the Commission shall keep the Annexes under review and make recommendations to the Parties for their amendment. Annexes may be amended through an Exchange of Notes. Although the Treaty does not authorize the addition of new Annexes this has not proven to be an impediment since the parties have simply added new chapters to an existing annex. In many respects the PST serves as a framework convention. The terms of the treaty establish the principles and some of the framework leaving the detail to be fleshed out in the Annexes and in particular Annex IV.

[385] Shepard and Argue, *supra* note 194, esp. at 90 – 93 "contrasting approaches to representation".
[386] See Stevens, *supra* note 199 at 429.
[387] Pacific Salmon Fishing Act, 16 USC Title 16, chapter 56A, s.3632.
[388] Jensen, *supra* note 196 at 412.
[389] PST, Annex I. Initially there were only three panels - for the Fraser, the South and the North.
[390] PST, Article IV.
[391] Id.

Annex IV comprises 8 chapters: (1) Transboundary Rivers, (2) Northern British Columbia and Southeastern Alaska, (3) Chinook Salmon, (4) Fraser River Sockeye and Pink Salmon, (5) Coho Salmon, Southern British Columbia and Washington State Chum Salmon, and (7) General Obligation. With the exception of the very short chapter 7, these chapters contain detailed provisions dealing with the management of the various stocks that are the subject of each chapter. Thus there are rules dealing with the assessment and allocation of allowable harvests, escapement targets, research needs and genetic sampling as well as various enhancement projects, including in some cases provisions on cost sharing. The chapters provide for pre- and post-season evaluation tools as well as the possibility of mid-season adjustments. As noted above Annexes can be amended by an Exchange of Notes. The Annexes have been amended in 1991, 1999, 2002, 2005 and 2008. The 2002 amendments included a new chapter to deal with the Yukon River.[392] The Yukon River chapter of Annex IV is a new treaty in all but name.

The entry into force of the PST terminated the Convention for the Protection, Preservation and Extension of the Sockeye Salmon Fishery in the Fraser River System (as amended, of 1930) except insofar as the Commission established by that Agreement has continuing responsibilities under the PST.[393]

[392] Exchange of Notes of December 4, 2002
[393] PST, Article XV(3).

Appendix G: Details on the Treaty of February 3, 1944 between the United States of America and Mexico for the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande

An overview of the Colorado River Treaty is provided in chapter 5.6. This appendix provides additional detail.

As noted in chapter 5.6, The International Boundary and Water Commission (IBWC) has been recognized as the focal point of flexibility under the 1944 Treaty.[394] The Commission has the duty of determining and implementing rights and obligations under the 1944 Treaty and resolving disputes arising from implementation of the treaty. The Commission is comprised of a U.S. Section and Mexican Section and the head of each must be an "Engineer Commissioner," appointed by their respective President. The Commission is an international body with diplomatic status for Section heads and staff. According to the IBWC, U.S. Section website:

> The United States Section of the International Boundary and Water Commission (USIBWC) is a federal government agency and is headquartered in El Paso, Texas. The USIBWC [Section] operates under the foreign policy guidance of the Department of State. The Mexican Section is under the administrative supervision of the Mexican Ministry of Foreign Affairs and is headquartered in Ciudad Juarez, Chihuahua, Mexico.[395]

The IBWC is more than simply a channel for diplomatic communication between Engineer Commissioners. In 2005, the U.S. Section of the IBWC had 243 employees.[396] Both the Colorado and Rio Grande Rivers have stretches that form the border between the two countries. In these shared river segment (referred to as the "limitrophe" section) the Commission has jurisdiction over any development located on the boundary, and the respective Sections have jurisdiction over the portion of any shared development within their country.[397] Thus, the IBWC includes employees who actually operate facilities within the system.

The 1944 Treaty allocates the three rivers shared by the United States and Mexico, but grants some flexibility to the Commission. Thus, Article 8 sets forth rules for the operation and management of the shared section of the Rio Grande by the Commission once reservoirs are constructed, but importantly, allows the Commission to modify, amend or supplement the rules

[394] McCaffrey *supra* note 15 at 161.
[395] International Boundary & Water Commission, United States and Mexico, United States Section, http://www.ibwc.state.gov/About_Us/About_Us.html
[396] United States Department of State and the Broadcasting Board of Governors Office of Inspector General, Report of Inspection: OIG Report No. ISP-I-05-26, U.S. Section of the Int'l Boundary and Water Commission, March 2005, available at http://oig.state.gov/documents/organization/44344.pdf
[397] US-Mexico 1944 Treaty *supra* note 202, Article 2.

with approval of their respective governments. No limitation is placed on this authority and this permits agreements to be reached at executive level and does not require a treaty amendment.

Article 9 provides for coordination and approval of diversions from the shared portion of the river, including the ability to allow use that is inconsistent with the allocation between the two countries on agreement and a finding of no injury by the Commission. This article also allows increased withdrawals from storage on approval by the Commission if a country is suffering severe drought.

Article 13 authorizes the Commission to study flood control needs in the Lower Colorado and report back to their respective governments. Further action requires agreement by the two governments; but again at the Executive level. Article 19 allows the two governments to conclude any agreement necessary for the production of hydropower.

Article 24 spells out in more detail the authority of the Commission over construction in the shared portion of the river and the Commission's dispute resolution authority. In the event the Commission cannot agree, disputes are reported to their respective governments to be handled through "diplomatic channels."

Article 25 preserves the rules of procedure covering the Commission from Articles III and VII of the Convention of March 1, 1889, [398] that set up its precursor – the International Boundary Commission – and supplements them with the requirement that decisions of the Commission be recorded in "Minutes" signed by each Commissioner and delivered to the two governments. The Governments have 30 days to disapprove a decision at which time it is deemed approved and the Commission may proceed to execute the decision. If a Minute is disapproved, the two governments may reach agreement (presumably through heads of state or the Department of State and Foreign Ministry) and communicate that to the Commission. Article III of the 1889 Treaty requires both Commissioners present for a decision. Article VII of the 1889 Treaty allows the Commission to summon witnesses and request information from their respective governments and to establish bylaws and regulations governing Commission procedures.

The Commission has exercised considerable flexibility through the Minute process. [399] In addition to use of the Minute process to memorialize agreement on construction and border location issues where the rivers form the border, the Commission has relied on the process to address water sanitation issues in all three river basins covered by the 1944 Treaty. Article III of the 1944 Treaty gave preference to resolution of border sanitation problems, thus the use of the

[398] Convention of March 1, 1889 Between the United States and Mexico on the Water Boundary, available at http://www.ibwc.state.gov/Files/TREATY_OF_1889.pdf

[399] Minutes of the IBWC are available at: The International Boundary Waters Commission, United States Section, Minutes between the United States and Mexican Sections of the IBWC, http://www.ibwc.state.gov/Treaties_Minutes/Minutes.html

Minute process for this purpose was clearly contemplated. However, in recent years the Commission has successfully used the Minute process in situations arguably beyond the contemplation of the 1944 Treaty, including for water quality (Minute 242), ecological health of the Colorado River estuary (Minute 306), earthquake damage to delivery structures (Minute 318), and extended drought as the result of climate change (Minute 319). In Minute 242 entered in 1973, the Commissioners were directed by the heads of state to develop a solution to salinity issues. Subsequent Minutes described here were entered without that prior direction.

> *Minute 242:* At the direction of the heads of state of the U.S. and Mexico, the Commission met to develop a solution to the salinity problem associated with water delivery to Mexico. The Minute establishes salinity limits on water delivered to Mexico and a deadline for achieving the limits.
>
> *Minute 306:* Minute 306 reflects agreement to recommend to the respective governments that the Commission set up a framework for consideration of studies by agencies, universities and NGOs on ecological conditions of the Colorado River Delta and to have the binational task force (established under minute 242) study salinity issues and examine flow needs.
>
> *Minute 318:* In April of 2010, an earthquake in the Mexicali Valley damaged infrastructure used to deliver Colorado River water to an irrigation district in Mexico. Minute 318 sets forth the agreement by the Commission to reduce deliveries during the 3 year reconstruction period and to allow increased delivery on completion of construction. The Commission relied on three sources of authority for its entry into Minute 318: (1) the overarching goal of the 1944 Treaty to "obtain the most complete and satisfactory utilization" of the waters; (2) Article 15 (allowing adjustment to deliveries); and (3) the process begun in Minute 317 (and finalized in Minute 318) to develop cooperative actions to address change in water supply.
>
> *Minutes 317* and *319:* The most remarkable achievement under the Minute process is the agreement in Minute 319 on measures to address extended drought resulting from climate change on the Colorado River. The process began with Minute 317, entered on June 17, 2010, which established a framework for a binational dialogue that would include representatives of U.S. and Mexican states in the basin through a Consultative Council. The Council is comprised of members of the Commission, and representatives of federal agencies and the basin states. Working groups were set up on issues of water conservation, new water sources, system operations and environmental issues from a binational team that included governmental and non-governmental representatives as well as research institutions. Minute 306 also served as a framework for addressing environmental issues. Minute 319, entered on Nov 20,

2012, established interim measures for shortage until 2017. Although longer term solutions are being contemplated, the short duration of the agreement allowed the Commission to implement measures in phases. Minute 319 uses similar approaches and language to the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead, issued by the U.S. Bureau of Reclamation on Dec. 13, 2007,[400] for the U.S. portion of the basin. The Interim Guidelines were the product of a dialogue among the basin states facilitated by the Bureau.[401] Similar to the Interim Guidelines, Minute 319, sets forth delivery reductions based on lake levels in Lake Mead in the U.S., allows Mexico to benefit during shortage from its development of conservation and new water sources, and provides for cooperation on use of U.S. facilities to convey irrigation water for a lateral to Mexico. Referring to the framework in Minute 306 for addressing environmental issues, Minute 319 sets up a pilot program for delivery of base and pulse flows to the shared section of the river and the Colorado River Delta. In addition, Minute 319 provides for joint funding and development of a pilot restoration project in Mexico.

Despite the apparent flexibility exercised in the Minute process, the IBWC and in particular, the U.S. Section, has been heavily criticized for its failure to respond to issues of sanitation, environmental degradation, and even decay of infrastructure, and for its focus on technical rather than diplomatic issues due to its "Engineer-Commissioner" requirement.[402] In addition, lack of oversight, in part due to lack of clarity concerning whether or not the State Department bears that burden, has led to investigation of the function of the U.S. Section and criticism of its internal management (or lack thereof).[403] In a scathing review of both the internal and external activities of the U.S. Section, former General Counsel to the U.S. Section, Robert McCarthy, calls for modernization of the IBWC to, among other things, involve the public in its decision making process, reduce the dominance of the U.S. Section which is "hindering sustainable development on the Mexican side of the border",[404] give greater attention to concerns regarding environmental degradation, sanitation, and aging infrastructure, and clarify which agency is charged with oversight.[405]

[400] U.S. Bureau of Reclamation, Record of Decision – Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead - December 13, 2007 (Record of Decision), available at http://www.usbr.gov/lc/region/programs/strategies/documents.html

[401] Id., at 1; The States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming Governor's Representatives on Colorado River Operations, December 13, 2007, Seven Basin States Affirmation Statement, available at http://www.usbr.gov/lc/region/programs/strategies/Affirmation.pdf.

[402] McCarthy *supra* note 207.

[403] United States Department of State and the Broadcasting Board of Governors Office of Inspector General, Report of Inspection: OIG Report No. ISP-I-05-26, U.S. Section of the Int'l Boundary and Water Commission, March 2005.

[404] McCarthy, *supra* note 207.

[405] Id.

Relevant Text

Note that the 1944 Treaty is finalized in both English and Spanish. Only the English version is provided here.

> ARTICLE 24
>
> The International Boundary and Water Commission shall have, in addition to the powers and duties otherwise specifically provided in this Treaty, the following powers and duties:
>
> . . .
>
> (d) To settle all differences that may arise between the two Governments with respect to the interpretation or application of this Treaty, subject to the approval of the two Governments. In any case in which the Commissioners do not reach an agreement, they shall so inform their respective governments reporting their respective opinions and the grounds therefor and the points upon which they differ, for discussion and adjustment of the difference through diplomatic channels and for application where proper of the general or special agreements which the two Governments have concluded for the settlement of controversies.
>
> ARTICLE 25
>
> . . .
>
> Decisions of the Commission shall be recorded in the form of Minutes done in duplicate in the English and Spanish languages, signed by each Commissioner and attested by the Secretaries, and copies thereof forwarded to each Government within three days after being signed. Except where the specific approval of the two Governments is required by any provision of this Treaty, if one of Governments fails to communicate to the Commission its approval or disapproval of a decision the Commission within thirty days reckoned from the date of the Minute in which it shall have been pronounced, the Minute in question and the decisions which it contains shall be considered to be approved by that Government. The Commissioners, within the limits of their respective jurisdictions, shall execute the decisions of the Commission that are approved by both Governments. . . .

Appendix H: Details on Domestic Models for Adaptive Water Management

Yellowstone Controlled Groundwater Area: Montana

An overview of the Yellowstone Controlled Area in Montana is provided in chapter 5.7. This appendix provides additional detail.

The Yellowstone Controlled Groundwater Area and the adaptive management program is established by Article IV of the Montana-National Park Service Compact, 85-2-702 MCA. Due to the high value of Yellowstone National Park, the parties agreed on initial highly restrictive conditions for development of groundwater adjacent to the Park, then provided a scientific body to review and adjustments.

Relevant Text

ARTICLE IV YELLOWSTONE CONTROLLED GROUNDWATER AREA

. . .

J. Modification of the Yellowstone Controlled Groundwater Area

1. Technical Oversight Committee: Establishment and Authority

a. A joint federal-state Technical Oversight Committee is hereby established to review scientific evidence related to the Yellowstone Controlled Groundwater Area; to advise the Department on administration of the Area, including review of applications to appropriate water of 60< F. or more; to consult with the Bureau on inventory and sampling; and to recommend modification of boundaries and restrictions.

…

e. The TOC shall:

i. review the boundaries of the Area and the Subareas;

ii. review the initial restrictions on groundwater development imposed pursuant to this Article, and future modifications of those restrictions;

iii. assess the cumulative impact of all development in the Area;

iv. review changes in the groundwater and hydrothermal systems revealed by inventory and analyses done by the Bureau, and any other pertinent scientific evidence;

v. review new scientific evidence pertinent to the Area;

vi. consult with the Bureau or the Department on request;

vii. present evidence and make recommendations to the Department in accordance with Article IV, section J.2.

viii. review applications for a permit to appropriate groundwater on request by the Department as set forth in Article IV, section G.2.c.; and

ix. take any additional action necessary to implement this Article.

. . .

2. Modification Pursuant to Review

. . .

b. The Department shall follow the rules for a contested case under the Montana Administrative Procedures Act, Title 2, Chapter 4 of the Montana Code Annotated. In addition, the Department shall apply the following provisions:

. . .

ii. The scientific evidence and recommendations presented in the report by the TOC have a rebuttable presumption of validity for the purposes of Article IV. . . .

The Mackenzie River Basin

An overview of the Mackenzie River Basin Transboundary Master Agreement is provided in chapter 5.7. This part of the appendix discusses the principles that have been incorporated in the Master Agreement for the Mackenzie River Basin as well as the institutional framework.

The principles

The Master Agreement commits the Parties[406] to five principles:

1. Managing the Water Resources in a manner consistent with the maintenance of the Ecological Integrity of the Aquatic Ecosystem;
2. Managing the use of the Water Resources in a sustainable manner for present and future generations.
3. The right of each to use or manage the use of the Water Resources within its jurisdiction provided such use does not unreasonably harm the Ecological Integrity of the Aquatic Ecosystem in any other jurisdiction;
4. Providing for early and effective consultation, notification and sharing of information on developments and activities that might affect the Ecological Integrity of the Aquatic Ecosystem in another jurisdiction; and
5. Resolving issues in a cooperative and harmonious manner.

As can be seen there is no explicit reference to adaptive management in these principles.

The institutional framework

The Master Agreement establishes the Mackenzie River Basin Board (MRBB) with representation (one) from each of the five riparian jurisdictions plus up to three members from Canada. In addition there shall be a member representing an aboriginal organization from each of the riparian jurisdictions. The responsibilities of the Board include the following:

[406] The Parties are the five littoral jurisdictions plus the federal government.

a. providing a forum for communication, coordination, information exchange, notification and consultation;
b. identifying, recommending and implementing such studies, investigations, programs and activities as are required to carry out this Agreement;
c. considering the needs and concerns of Aboriginal people through,
    i. the provision of culturally appropriate communication, and
    ii. the incorporation of their traditional knowledge and values;
d. recommending uniform objectives or guidelines for the quality and quantity of the Water Resources;
e. establishing and directing technical committees which may be required to support the work of the Board;
f. encouraging consistent monitoring programs;
b. j. meeting at least annually;
c. k. reviewing this Agreement at least once every three years and proposing amendments to the Parties;

The adaptive features of the Master Agreement include the provisions for monitoring and regular review and consideration of amendments.

The parties to the Master Agreement have adopted (2009) a Guidance Document to guide the parties in their bilateral negotiations.[407] That document provides a framework for the bilateral agreements with a view to having the parties reach agreement on[408]

> … thresholds for key measurable attributes …. such as, but not limited to, surface water quantity, water consumption, flow, surface water quality, groundwater quantity and quality, and aquatic ecosystem health). The bilateral agreements will describe the attributes, how they are measured, and how data and information is to be measured, managed, interpreted and reported. The data or information is then interpreted to confirm that the water is being used in a sustainable manner which maintains the ecological integrity of the Mackenzie River Basin. If not, then a fair, flexible and adaptive management process is triggered to respond to issues noted.

To date there is only one bilateral agreement – that between Yukon and Northwest Territories – completed in 2002, well before the Guidance Document was finalized and it is widely

[407] http://www.mrbb.ca/uploads/files/general/28//mrbb-bilateral-guidance_document-final-1.pdf
[408] Id., at 8.

anticipated that it will need to be re-negotiated to provide the level of detail contemplated by that document.[409]

Negotiations between Alberta and the Northwest Territories are well advanced and the parties have a draft in place with some bracketed text still outstanding. A key element of the agreement is the incorporation of a Risk Informed Management (RIM) approach which will establish mechanisms to initiate early monitoring, learning and bilateral action. The objectives include facilitating "joint learning, and proactive and adaptive actions". The Agreement is expected to have four detailed appendices indicating how the RIM approach will be applied to each of Surface Water Quantity, Surface Water Quality, Groundwater and Aquatic Ecosystem Ecological Integrity. Each Appendix is broken down under four headings classification, learning plans, transboundary objectives and methodologies. The Agreement will establish a Bilateral Management Committee that will be responsible for implementing the agreement and monitoring its achievement.

[409] Available here http://www.mrbb.ca/uploads/files/general/18//yukon-northwest-territories-transboundary-water-management-agreement.pdf. The Mackenzie Board's website rather optimistically offers the following time table for these negotiations: The schedule for the production of the bilateral agreements for each of the four major watersheds is as follows: Peace, Athabasca, Slave Watershed, 2009 – 2012; Hay, Great Slave Lake Watershed, 2012 – 2013; Liard Watershed, 2013 – 2014; Peel Watershed, Complete (may need to be amended).

Appendix I: Hydraulic fracturing and water use in the Columbia Basin

A current topic of debate in many jurisdictions is the use of hydraulic fracturing to produce non-conventional oil and natural gas reserves (shale oil and shale gas). The potential water issues associated with these developments are complex and include the large volumes of water required for fracturing operations, the safe disposal of fracturing fluids, and concerns as to possible contamination of potable groundwater sources. Production of non-conventional reserves has also led to a demand for new routes and ways of getting product to market including new pipelines and the dramatically increased use of rail transportation.

There is however little discussion of non-conventional oil and gas production within the Columbia Basin apart from coalbed methane potential in southeast British Columbia in the Flathead basin. It is just conceivable that there may be a demand to use Columbia water out of the basin for fracturing purposes. Subject to a special provision in relation to the Kootenay (which authorizes B.C. to divert Kootenay waters into the Columbia), Article XIII of the CRT prohibits both the United States and Canada from any diversions of water from any transboundary river within the Basin in a way that alters the flow at the boundary. However this prohibition does *not* apply to "consumptive" uses. Consumptive use is defined broadly to mean domestic, municipal, stock-water, irrigation, mining or industrial purposes. It is clear therefore that the CRT would *not* prevent the transfer of Columbia water out of the basin for fracturing purposes – or indeed any other mining or industrial purpose. Neither the U.S. Regional Review nor the B.C. Decision, nor stakeholders in the review process have raised any particular concerns with respect to out of basin transfers. Should the basin seek to address this issue (which is generally a matter of state and provincial law), the discussion of the Great Lakes Compact and agreement (discussed in Part 5.4 of the paper) would be a useful starting point for a relevant model. British Columbia currently addresses inter-basin transfers indirectly through the terms of the *Water Protection Act*, RSBC 1996, c. 484. Section 8 of that Act prohibits the issuance of a water license that will permit removal of water from B.C. or any related diversion; it also prohibits any large scale project (greater than 10 m^3 per second) capable of transferring water from one major watershed in the province to another. In sum, the Act would prohibit any transfers of Columbia water from British Columbia to Alberta or any other prairie province or any U.S. state. Major diversions within British Columbia out of basin are also prohibited.