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UNIVERSITY OF CALIFORNIA, BERKELEY  
Canadian Studies Program  
Institute of International Studies  
213 Moses Hall #2308  
Berkeley California 94720-2308 USA  
Tel: +1 510 642 0531  
email: [canada@berkeley.edu](mailto:canada@berkeley.edu)

## **New Science Requirements in Support of a Modernized Columbia River Treaty**

Prepared by the UC Berkeley Columbia River Treaty Science Advisory Group

### **Executive Summary**

A group of scientists supported by representatives of First Nations and Tribes from Canada and the United States held a workshop at the Centre for Canadian Studies at the University of California, Berkeley on April 28-30, 2017. The participants and their affiliations are identified in Appendix A<sup>1</sup>.

The participants supported the following recommendations:

1. We need a fundamental shift in the approach for modernizing the Columbia River Treaty, from a review of the original commercial contract for flood control and power generation to an ecosystem based management approach for the entire Columbia Basin;
2. The recommended re-negotiations should be based on the following principles: consider the basin as a whole; ensure that the river's natural assets are used and managed sustainably; reintroduce salmon runs wherever practicable; provide river flows of sufficient quantity and quality to restore and maintain healthy populations of salmon, sturgeon, bull trout, lamprey and other native fish; change the approach to managing flood risk from one based only on attempts to control floods through structural measures, to one which recognizes the full range of solutions including land-use zoning to prevent occupation of flood-prone lands; and recognize that future energy production will increasingly rely upon other renewable or alternative sources such as solar and wind power. This new approach should fully include First Nations and Tribes in the negotiations;
3. We recommend the Parties collaboratively address, working with Columbia Basin tribes and First Nations and regional sovereigns, specific research needs (listed below) in the areas of ecosystem based management; climate change; salmon and other aquatic resources; called-upon storage and flood risk management; power generation and Canadian Entitlement; and treaty development and governance; and
4. We recommend the Parties allocate appropriate resources to appoint a new bi-national science panel to further evaluate the available science information and identify deficiencies, develop a work plan and prepare a budget for the identified work. The Panel, in cooperation with other agencies and organizations, should also be responsible for ensuring the required science is available to support the parties in negotiating a comprehensive agreement for the Columbia Basin.

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<sup>1</sup> Representatives and staff from the First Nations and Tribes of the Columbia Basin participated in the workshop to provide information. Their participation was without prejudice, and their governments will consider these recommendations through their own process as well.

## **Preamble: A Vision for Modernizing the Columbia River Treaty**

The Columbia Watershed is one of the great river basins in North America. The Columbia River Treaty harnessed the river's hydropower potential to drive the economy of the Pacific Northwest and British Columbia, and provided storage capacity, which minimized future flood damages. However, these benefits also came with impacts to ecosystem functions, the decline of native, commercial and recreational fisheries, and losses to the wellbeing of indigenous and rural residents on both sides of the border.

The inevitability of a changing climate and hydrology throughout the Basin threatens future water security for a range of economic and environmental values and now demands a more flexible, resilient and adaptable management approach than envisaged by the framers of the original treaty. Society increasingly recognizes the value of fish and other ecological benefits. We now have stronger environmental regulations and a wider set of options for providing energy and managing flood risk. Restoring ecosystem functions will not only provide the Basin with a greater resilience to the potential effects of climate change but will also be more consistent with the values of First Nations' constitutionally supported titles and rights and the Columbia Basin tribes' rights and authorities reserved under treaties and recognized under executive orders.

These factors call for a broader, more comprehensive approach to the upcoming negotiations on the Columbia River Treaty. This new approach is based on the following basic principles: consider the Basin as a whole; ensure that the river's natural assets are used and managed sustainably; re-introduce salmon runs wherever practicable; provide river flows of sufficient quantity and quality to restore and/or maintain healthy populations of salmon, sturgeon, bull trout, lamprey and other native fish; change the approach to managing flood risk from one based only on attempts to control floods through structural measures, to one which recognizes the full range of solutions including land-use zoning to prevent occupation of flood-prone lands; and recognize that future energy production will increasingly rely upon other renewable or alternative sources such as solar and wind power. This new approach should fully include First Nations and Tribes in the negotiations, recognizing the UN DRIP principles of free prior and informed consent.

This process will require a solid, non-partisan science base to support the renegotiations, which could be modeled on the successful procedures developed by the International Joint Commission elsewhere along the Canada-US border. It will require new decision support tools credible to all parties and must consider a range of future climate scenarios to ensure a robust basis for decisions.

The immense ecological and economic potential of the Columbia Basin can best be realized when both nations meet their basic needs and equitably share the joint benefits that result from the collaborative management of this international river. Taking into account these values and this cooperative vision, the Berkeley Columbia River Group examined the need for new science priorities. The ideas developed for science-based approaches to sound sustainable stewardship of the Basin are briefly summarized below.

## **Requirements for New Science**

The original treaty was in essence a commercial contract between the US and Canada, which considered only flood control and hydropower generation. There is increasing acknowledgement that a modernized treaty must recognize First Nations and tribal rights, and fisheries and ecosystem functions, in addition to providing for flood risk management and hydropower production. However, rather than thinking strictly in terms of altering operational details of Treaty dams, we propose a fundamental shift in perspective to ecosystem based management on a basin-wide scale. We recognize the river system and associated hydrological and ecological processes as the fundamental framework onto which a set of engineered structures has been imposed. The Treaty dams and power grid should not be the only 'framework' within which societal benefits should be assessed. The hydrologic models tracking potential changes in climate and hydrology are based on the original free-flowing river. This perspective provides scientists with a baseline upon which to assess the effects of

the existing engineering structures, which were built on the Columbia River and its tributaries before, because of, and after the Columbia River Treaty.

### **Ecosystem Based Management**

We recommend that:

- The physical and biological effects of historical changes in reservoir and channel conditions (resulting from natural processes, river regulation or other land use activities) be documented, and future conditions be predicted based on the anticipated effects of a changing climate and future land use;
- Reservoir operations and river flows necessary to support healthy, sustainable populations of native fish species be identified, along with habitat and passage requirements to support these populations, incorporating Indigenous Science and Traditional Ecological or Environmental Knowledge; and
- The literature on methods for valuing ecosystem functions and their application in other international river basin governance models be reviewed to assess their potential applicability to the Columbia River system, and to identify further research needs.

### **Climate Change**

We recommend that:

- Ongoing research into the potential hydrologic effects of climate change in the US and Canada be continued and hydro-meteorological networks be upgraded to allow future conditions to be monitored;
- The range of model boundary conditions be expanded, where required, to ensure that model assumptions encompass the full range of future climate scenarios; and
- The predicted climate and hydrometric values be used to estimate future water availability, flood control requirements, hydropower potential, and flow releases required to maintain thermal and environmental quality for sensitive aquatic biota.

### **Columbia Basin First Nations and Tribes**

We recommend that:

- First Nations Aboriginal Title and Rights and the Columbia Basin tribes reserved rights and management authorities and obligations, and their cultural traditional knowledge perspectives they bring with these authorities be recognized by both governments and be acknowledged and respected in Treaty renegotiations and in subsequent operational decisions;
- The management authorities and obligations of the Columbia Basin tribes and First Nations in fisheries management and restoration be acknowledged and that the technical needs for these functions be integrated into the science management needs of a modernized Treaty; and
- Scientific research be conducted to quantify the public health consequences of the Treaty and other dams upon indigenous peoples, including the health consequences of the loss of first foods such as a salmon-based diet on First Nations and tribal people of the Upper Columbia Basin.

### **Salmon and Other Aquatic Resources**

We recommend that:

- The goal of Columbia Basin First Nations and Tribes to re-establish anadromous fish upstream of Chief Joseph and Grand Coulee dams in the US, and Hugh Keenleyside, Brilliant, Waneta, and Seven Mile dams in Canada be recognized and accepted;
- A risk-based analysis of a range of potential fish habitat enhancements and options for re-establishing fisheries be completed to determine the most cost effective measures across the Basin;
- The effects of salmon reintroduction on resident fish be determined;
- The flow requirements to ensure sustainable salmon and sturgeon populations throughout the Columbia mainstem and tributaries in the upper basin be identified and provided; and,
- Passage requirements for lamprey populations be identified along the Columbia mainstem and the tributaries in the upper basin and passage provided where warranted.

## **Called-Upon Storage and More Comprehensive Flood Damage Reduction**

We recommend that:

- The present and future flood risks to populated areas of the Columbia Basin be evaluated in a comparable manner for a range of potential future discharge regimes and management scenarios;
- A revised Treaty explicitly consider a broader range of flood risk management options, including more effective management of floodplains and non-structural approaches like restoring floodplain storage, flood hazard mapping and risk based zoning; and
- The future value of the present Treaty and non-Treaty flood storage in Canada and the U.S. be determined and equitably allocated in light of its impacts and benefits.

## **Power Generation and the Canadian Entitlement**

We recommend that:

- Projected future costs for providing electricity from centralized (hydropower) and decentralized renewable sources (wind and solar) be determined;
- Studies be undertaken to identify the additional information needed to optimize hydropower, flood risk management and ecosystem function throughout the Columbia Basin given current societal values and projected changes in climate and power production technology;
- Methods to determine the value of water storage in Canada and the U.S. and resulting power production be reviewed in light of the need to sustain ecosystem functions throughout the Columbia River Basin, the changing opportunities for electricity generation and demands, the economic, social or cultural values assigned to various ecosystem functions, historical impacts such as the loss of agricultural and other lands beneath reservoirs, and the changing hydrology of the Basin;
- The recommended research be used to determine an equitable method for allocating costs and benefits and to calculate the future value of the Canadian Entitlement; and
- Research be undertaken to define the requirements for a new international system-wide operating plan accounting for broad ecosystem values.

## **Treaty Development and Governance**

While the Treaty currently has provisions to realign actual operations with current needs and opportunities, there is insufficient flexibility to incorporate an entirely new set of values and needs, as will be required in a robust revised Treaty. Thus, we recommend that:

- The current composition and expertise of the Canadian and US Entities be supplemented to accommodate the expanded skill sets that would be required to manage a modernized Treaty;
- A modernized Treaty incorporate a wider range of perspectives, including First Nations, Tribes, and local governments, in both its development and future operations;
- A modernized Treaty aim for a restorative approach which considers a broad range of values such as the role of ecosystem function, natural fisheries and increased floodplain connectivity within the context of the entire watershed;
- Strategies be identified to allow future uncertainties associated with a changing environment, societal expectations and power requirements to be addressed. In this context, methods should be specified to determine when there is a need to either renew, amend or otherwise modify the agreement and how this should be undertaken; and
- Management strategies and governance models in other transboundary watersheds be reviewed to identify mechanisms to facilitate continued progress towards mutually beneficial outcomes.

## **Concluding Recommendations**

Previous Canada - U.S. experience has shown that successful bi-national negotiations are normally based on two premises - an interest-based approach where interests and values are shared, and effective international fact-finding. Preparatory studies completed for the US and Canada Entities have identified a number of shared values and interests. An even broader array of shared values and

interests could flow from a more restorative approach relying on the best available science on both sides of the border.

We recommend that the Parties appoint (and allocate appropriate resources for) a new bi-national Science Panel with the initial objective to review the science completed to date, specify the science needed to achieve the basic principles set out above, and to develop a budget for this work. This panel could be modeled on the successful procedures developed by the International Joint Commission. The panel, along with other agencies and organizations, should also be responsible for ensuring that the required science is available to support both sovereign nations engaged in the renegotiation of the Columbia River Treaty.

Submitted on behalf of the UC Berkeley CRT Science Advisory Group by:



G. Mathias Kondolf  
Professor of Environmental Planning  
Dept. Landscape Architecture & Environmental Planning  
University of California Berkeley  
+1 510 664 7804 office  
[kondolf@berkeley.edu](mailto:kondolf@berkeley.edu)  
<http://riverlab.berkeley.edu/>

## Appendix A List of Participants

Elaine Abbott,	Government of Alberta (retired)
Oriana Chegwidan,	University of Washington
Murray Clamen,	International Joint Commission Canada (retired)
Barbara Cosens,	University of Idaho
Jim Heffernan,	Columbia River Inter-Tribal Fish Commission
Kim Hyatt,	Fisheries & Oceans Canada
Matt Kondolf,	University of California, Berkeley
Graeme Lee Rowlands,	Quest University Canada
Bruce Maclock,	Government of Alberta (retired), Independent Consultant
Stephen McCaffrey,	McGeorge Law School, University of the Pacific
Mike Miles,	M. Miles and Associates Ltd.
Jon O'Riordan,	Simon Fraser University, Vancouver
Ralph Pentland,	Ralbet Enterprises Inc.
John Radke,	University of California, Berkeley
Jeff Romm,	University of California, Berkeley
Anna Serra-Llobet,	University of California, Berkeley
John Sirois,	Upper Columbia United Tribes
Elliott Smith,	University of California, Berkeley
Ronald Suppah, Sr.,	Confederated Tribes of the Warm Springs Reservation of Oregon
Pauline Terbasket,	Okanagan Nations Alliance
Colin Thorne,	University of Nottingham (UK)
Jim Waddell,	Dam Sense & US Army Corps of Engineers (retired)
Rosalie Wilson,	Okanagan Nations Alliance
Ashton Wesner,	University of California, Berkeley