THE COLUMBIA RIVER TREATY: A MODEL FOR INTERNATIONAL WATER RESOURCE COLLABORATION

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ABSTRACT

The Columbia River Treaty (Treaty) is an international Treaty established for the cooperative management of the Columbia River System in Canada and the United States. Since it was signed in 1961, the Treaty has served as an excellent example of international collaboration on water resource management. This paper will provide a brief background on the Treaty, describe the extensive international collaboration involved in managing the Columbia River System, and describe future strategies being developed for addressing changing conditions.

The headwaters of the Columbia River are in British Columbia (BC), but only about 15 percent of the 259,500 square miles of the Columbia River Basin is actually located in Canada. Yet the Canadian waters account for about 38 percent of the average annual volume, and up to 50 percent of the peak flood waters, that flow by The Dalles Dam on the lower Columbia River. In the 1940s, officials from the United States and Canada began a long process to seek a joint solution to the flooding caused by the Columbia River and to the postwar demand for greater energy resources. That effort culminated in the Columbia River Treaty, an international agreement between Canada and the United States for the cooperative development of water resources regulation in the upper Columbia River Basin. It was signed in 1961and implemented in 1964. The Treaty has served as a model of international cooperation since 1964, bringing significant flood risk management, power generation, and other benefits to both countries.

Sharing the benefits of cooperative water management was an integral principle in the Treaty's design. The principle applied in the Treaty was to share these benefits equally. Thus, for flood control, Canada was paid 50 percent of the value of U.S. flood damages prevented. In exchange for operating the Treaty storage projects for power, Canada also received an entitlement to one-half of the estimated additional downstream power benefits generated in the United States. Long and short-term plans are prepared each year by both countries in order to manage the river system in accordance with the Treaty and optimize the benefits for both countries.

Either country can terminate most provisions of the Treaty any time on or after September 16, 2024, with a minimum of 10 years' written advance notice. The U.S. and Canada are conducting a multi-year effort to study options for managing the river if the Treaty were continued, modified, or terminated. These options, as well as the background and details of the treaty will be presented in this paper.

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INTRODUCTION

The Columbia River, the fourth largest river on the North American continent as measured by the average annual flow, generates more power than any other river in North America. While its headwaters originate in British Columbia, only about 15 percent of the 259,500 square miles of the Columbia River Basin is actually located in Canada. Yet the Canadian waters account for about 38 percent of the average annual volume, and up to 50% of the peak flood waters, that flow by a key measuring point at The Dalles Dam on the lower Columbia River between Oregon and Washington. Figure 1 shows the major dams in the Columbia River Basin.

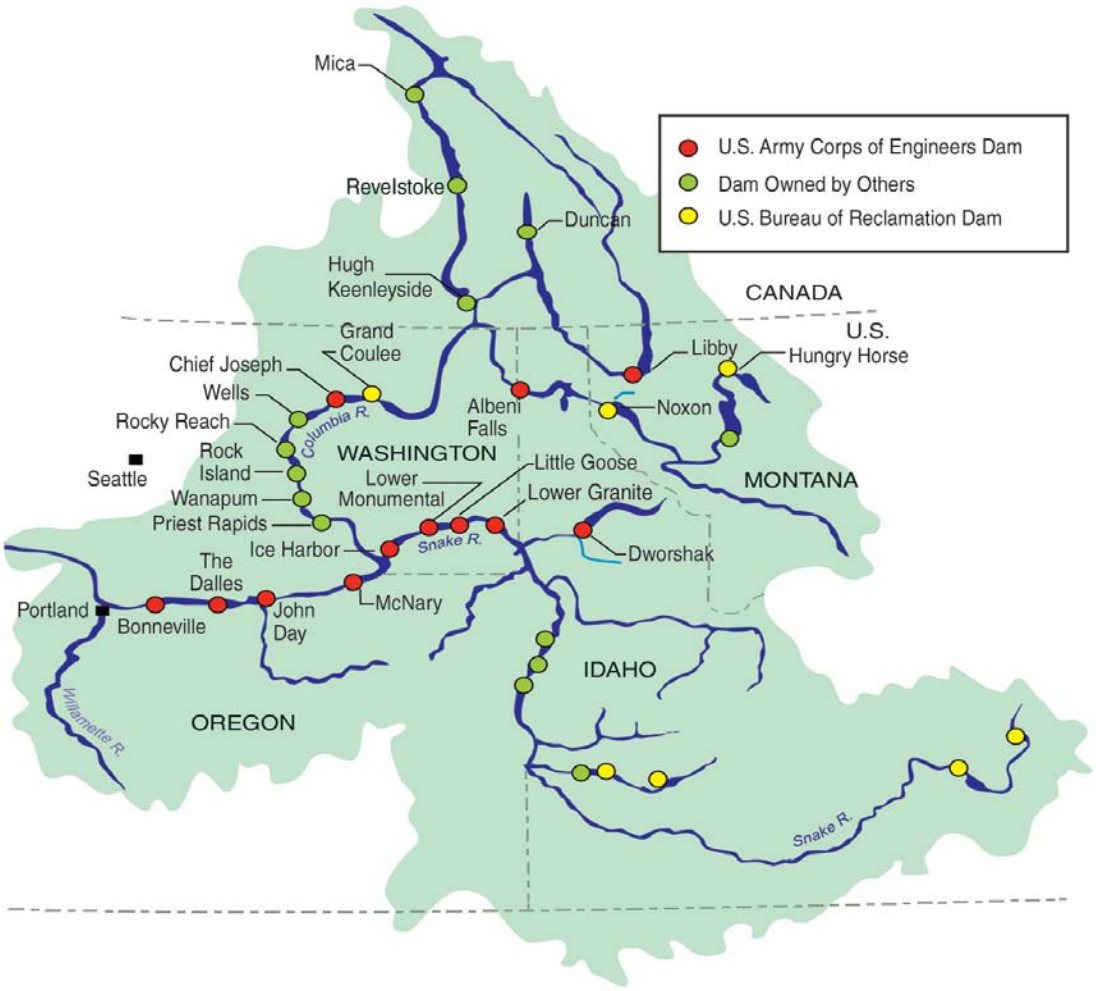

Figure 1: Major Dams in the Columbia River Basin

In the 1940's, officials from the United States and Canada began a long process to seek a joint solution to the flooding caused by the unregulated Columbia River and to the postwar demand for greater energy resources. That effort culminated in the Columbia River Treaty, an international agreement between Canada and the United States for the cooperative development of water resources regulation in the upper Columbia River Basin. It was signed in 1961 and implemented in 1964. The lead organizations for

implementation of the Treaty are the U.S. Army Corps of Engineers and the Bonneville Power Administration in the U.S., and British Columbia Hydro and Power Authority in Canada.

Effective implementation of the Treaty requires extensive collaboration between the two countries at many levels. Detailed coordination occurs among technical staff and managers on a regular basis, as well as involvement of higher level officials to provide management and oversight to ensure that it is implemented as required under the terms of the Treaty. Short and long-term plans are prepared each year by the two countries to describe the planned operation of the Treaty projects. An annual report is also prepared each year to document Treaty operations for the respective governments.

Discussions and collaboration between the U.S. and Canada have also been initiated regarding the future of the Treaty. These discussions are starting because of the Treaty provision that allows either country to terminate the Treaty at any time on or after September 16, 2024, with a minimum of 10 years' written advance notice. All of these various activities are excellent examples of how the two countries work very closely together to ensure the long-term success of the Treaty.

TREATY BACKGROUND

In 1944, the United States and Canada asked the International Joint Commission (IJC), an organization formed by both countries under the 1909 Boundary Waters Treaty, to investigate development of Columbia Basin water resources in Canada. The IJC established the International Columbia River Engineering Board to conduct technical studies in the basin, an effort that received added impetus following a major flood that occurred in 1948 and displaced more that 30,000 people and caused more than 50 deaths.

The Columbia Basin Study, which took more than 15 years to complete, investigated a number of different dam sites on the Columbia-Kootenay system above the U.S.-Canadian border, as well as alternative development plans. At the same time, the U.S. Army Corps of Engineers began updating its master resource plan, which had served as the basis for U.S. federal development of upriver storage on the Columbia River and its tributaries to provide both economic and flood control benefits to both countries.

In addition to the technical studies, the IJC recommended principles for determining and apportioning benefits from the cooperative use of storage. In developing the principles, the IJC recognized that developing and operating Canadian storage would allow a greater amount of usable energy and a higher level of dependable capacity to be generated at downstream power plants than was possible without Canadian storage. This would ultimately enable the United States and Canada to serve greater power demands. At the same time, the regulation would greatly reduce peak river flows during the spring runoff (snowmelt season) and provide significant flood protection to river basin occupants in both countries.

Treaty Negotiations

On February 11, 1960, direct negotiations began between the U.S. and Canadian representatives on the selection, construction, and joint use of specific hydroelectric projects. Talks proceeded rapidly and on January 17, 1961, U.S. President Dwight D. Eisenhower and Canadian Prime Minister John Diefenbaker signed the Columbia River Treaty. It would be more than three years, however, before President Lyndon Johnson, Canadian Prime Minister Lester Pearson, and British Columbia Premier W.A.C. Bennett would meet on September 16, 1964, at the International Boundary at Blaine, Washington, and Surrey, British Columbia, to acknowledge legislative ratification of the Columbia River Treaty and its Protocol, which amplified and clarified certain aspects of the Treaty.

Treaty Governance

As can be seen from the Treaty organization chart shown in Figure 2, the Treaty involves a multi-level organization structure. At the top of the organization structure are the U.S. Department of State and the Canadian Department of Foreign Affairs and International Trade. These are the organizations in the respective countries that are responsible for international treaties. At the next level down, the Treaty also established the Permanent Engineering Board (PEB), which is required by the two federal governments to monitor and report on the results being achieved under the Treaty. The PEB also can assist in resolving technical or operational issues that may arise between the Entities. The PEB also has an engineering committee known as the PEBCOM who assist them in carrying out their responsibilities. The U.S. and Canadian Entities are at the next level in the organization. The U.S. Entity, created by the President, consists of the Administrator of the Bonneville Power Administration (Chair) and the Northwestern Division Engineer of the U.S. Army Corps of Engineers (Member). The Canadian Entity, appointed by the Canadian Federal Cabinet, is the British Columbia Hydro and Power Authority (BC Hydro).

The Entities each have various different organizational components as well. For example, Coordinators are appointed to monitor and review policy matters. Secretaries address administrative and negotiation issues, and the Treaty Operating Committee focuses on planning and operations. There is also a Hydrometeorological Committee which is responsible for establishing and maintaining a network of hydrometeorologic stations for monitoring operations and forecasting river flows and volumes.

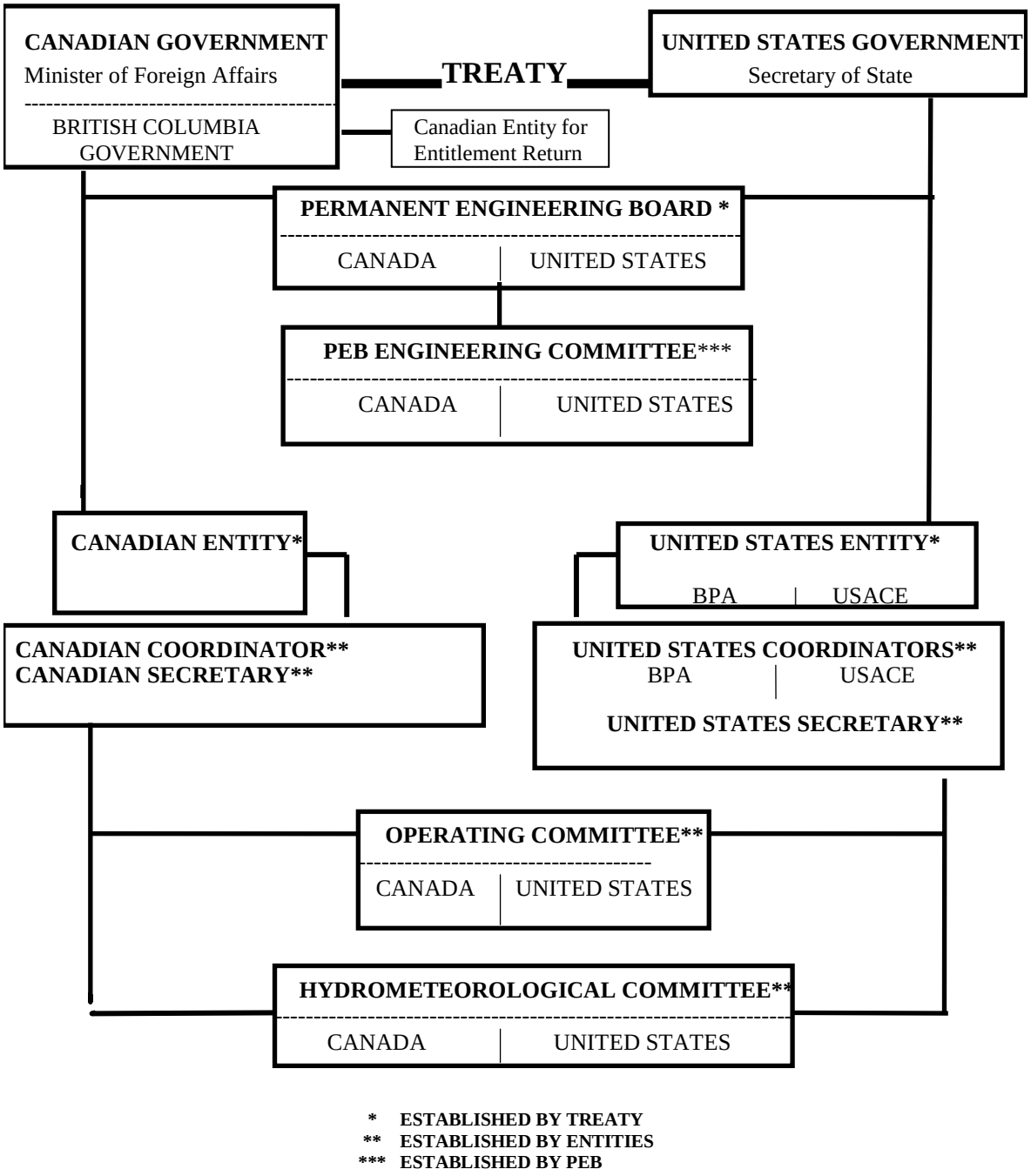

Figure 2. The Columbia River Treaty Organizational Structure

Treaty Implementation

A key aspect of the Treaty called for Canada to develop reservoirs in the upper reaches of the Columbia Basin sufficient to provide 15.5 million acre-feet of water storage. To do this, Canada built three dams: Duncan (1968), Hugh Keenleyside (also referred to as Arrow) (1969), and Mica (1973). The Treaty also allowed the U.S. the option to build Libby Dam on the Kootenai River, a tributary of the Columbia River, in Montana. Construction of Libby Dam, whose reservoir Lake Koocanusa backs 42 miles into Canada, began in 1966 and was completed in 1973. Together, these four dams more than doubled the storage capacity of the Columbia River Basin at the time.

The Treaty also requires the U.S. and Canada to prepare annually an Assured Operating Plan (AOP) for the operation of Canadian Treaty storage six years in advance of each operating year. The AOP is developed to meet flood control and power objectives, the only recognized purposes for project operation when the Treaty was signed, and to define the amount of compensation that Canada is entitled to for power benefits associated with improved downstream regulation at U.S. projects due to Canadian storage operations. The Treaty allows the Entities the option to develop Detailed Operating Plans (DOPs) that may produce results more advantageous to both countries than the AOP. This also permits both of the Entities to include fishery and other non-power objectives that provide mutual benefits. The AOP and DOP form the basis for the operating rule curves for Treaty projects in Canada. They provide the projected releases of water from those reservoirs crucial for coordinated system planning in the U.S.

BPA markets the power from federal projects in the Columbia Basin in the U.S., while the Corps of Engineers is responsible for the operation of its dams and oversees flood risk management and other multi-purpose uses of Corps projects. Under the provisions of the Treaty, B.C. Hydro is responsible for the operation of the three Canadian Treaty Dams.

Payment for Benefits

Sharing the benefits of cooperative water management was an integral part of the Treaty's design. The principle applied in the Treaty was to share these benefits equally. Thus, for flood control, Canada was to be paid 50 percent of the established value of U.S. flood damages prevented. Instead of receiving an annual payment for the flood control benefits, Canada elected to receive lump sum payments totaling $64.4 million when each of the three Canadian dams became operational. The $64.4 million payment was for flood control benefits through September 2024.

In exchange for providing and operating the Treaty storage projects for power, Canada also received an entitlement to one-half of the estimated downstream power benefits generated in the U.S. Canada initially sold its share of this additional power, called the Canadian Entitlement, for $254 million to a consortium of U.S. utilities for a period of 30 years. This agreement expired completely in 2003. Since then, the Canadian Entitlement power is delivered on a daily schedule to the Province of British Columbia at the U.S.-B.C border for Canada's use or resale.

The initial $254 payment from U.S. utilities for downstream power benefits, together with the $64.4 million payment from the U.S. Government for flood control, helped fund the construction of the three Treaty dams in Canada.

COLLABORATION ON THE TREATY

International collaboration and sharing of the benefits between both countries are key aspects of the Treaty and are a critical factor in the long-term success of the Treaty. In order to facilitate this collaboration, there is an extensive governance system that involves people from all levels of government in both countries. There is very regular coordination between the technical staff in the two countries to plan and operate the system in accordance with the Treaty. The AOP and DOP are examples of the types of planning and coordination that is done. Weekly conference calls are also held among the Treaty staff to discuss upcoming operations based on current and projected stream flow and other factors. Associated with this short-term planning, a bi-monthly (or more frequent if needed) Treaty Storage Regulation (TSR) study is performed to define the storage and draft rights for Canadian Treaty storage.

In addition to the extensive technical coordination that occurs between the two countries, there is extensive international collaboration that occurs at higher levels within the two governments. For example, an annual report is jointly prepared each year by the Entities to describe the overall operation of the Treaty projects and report this information to higher level government officials. The PEB also prepares a report each year that is provided to the U.S. Department of State and Canadian Department of Foreign Affairs and International Trade to report on Treaty compliance. The PEB is also available to help resolve disputes that cannot be resolved at the Entity level.

Through their excellent working relationships and collaborative approach, the Entities, often in collaboration with the PEB, have successfully resolved all major issues that have arisen regarding the Treaty. Several significant issues have developed over the years, but these have all been worked out between the two countries. Examples include: (1) the Canadian Entitlement capacity credit limit; (2) the start date for the critical period used in studies; and (3) the operation of Libby Dam to meet U.S. fisheries requirements. One issue related to the operation of Libby Dam will be described below in order to highlight the ability of the two countries to collaborate to effectively resolve important issues.

Libby Dam Operations for Endangered Species Act Requirements

Libby Dam, located on the Kootenai River in Montana, is operated by the Corps of Engineers to meet multiple purposes, including flood control, hydropower, recreation, fisheries requirements, and others. In the 1990's, various species of salmon and steelhead on the Columbia River downstream of Libby Dam were listed as endangered under the U.S. Endangered Species Act (ESA). In addition, the Kootenai white sturgeon, which inhabits the Kootenai River immediately downstream from Libby Dam, was listed as endangered under the ESA. One of the outcomes of the ESA listings of these species was that Libby Dam had to make higher discharges during the spring compared to what had

traditionally been discharged under similar hydrologic conditions. These higher releases had to be made in an attempt to reproduce the natural hydrograph that occurred during the spring before the dam was in place when high discharges would occur due to the spring runoff. These high discharges help facilitate sturgeon spawning.

This revised operating plan resulted in less than optimal power generation at Canadian power plants on the Kootenai River downstream of Libby Dam due to extra spill at these plants during the high discharge periods. Because of this, the Canadian Entity objected to the implementation of this new operating regime at Libby Dam. The U.S. Entity responded that it was required to operate Libby in this manner in order to meet the requirements of the Endangered Species Act. These actions led to several years of discussions between the two countries about how to resolve this dispute. The Treaty Operating Committee was unable to agree on the rights and obligations regarding Libby Dam operation, and because of this, the Assured Operating Plans that are required under the Treaty could not be signed for several years.

Eventually, after several years of extensive discussions and collaboration, the Entities came up with an innovative solution to the dispute, an agreement known as the Libby Coordination Agreement (LCA). Under this agreement, a new process was agreed to under which the requirements of one country could be met in exchange for providing more operating flexibility for the other country. Once this agreement was reached, the two Entities were able to sign the required Assured Operating Plans and return to "business as usual" under the Treaty. It is important to note that throughout this dispute between the two countries, effective working relationships were maintained because of the professional approach taken by all parties and commitment to working together.

FUTURE OF THE TREATY

The Treaty has provided significant benefits to the United States and Canada through coordinated river management by the two countries. It remains the standard against which other international water coordination agreements around the world are compared. When the Treaty was negotiated, its goals were to provide significant flood control and power generation benefits to both countries. However, the Treaty contains two provisions that may significantly change those benefits as early as the year 2024.

First, in 2024 the 60 years of purchased flood control space in Canadian Treaty projects expires. Instead of a coordinated and managed plan to regulate both Canadian and U.S. projects for flood control, the Treaty calls for a shift to a Canadian operation under which the United States can call upon Canada for flood control assistance. The United States can request the "called upon" assistance as needed, but only to the extent necessary to meet forecast flood control needs in the United States that cannot adequately be met by U.S. projects. When the called upon flood control space is requested, the United States will have to pay Canada for its operational costs and any economic losses resulting from the called upon flood control operation.

Second, while the Treaty has no specified end date, it does allow either Canada or the United States the option to terminate most of the provisions of the Treaty on or after September 16, 2024, with a minimum of 10 years advance written notice. Thus, the year 2024 is the first year a notice of termination would take effect, assuming written notice of termination is given by the Canadian or U.S. governments by 2014. Unless the Treaty is terminated, or the federal governments choose to modify the Treaty, its provisions continue indefinitely, except for the changes in flood control discussed above.

Given the significance of both of these provisions, it is important that the parties to the Treaty understand the implications for post-2024 Treaty planning and Columbia River operations. The Corps, BPA, and BC Hydro are conducting a multi-year effort to understand these implications. This effort is called the 2014/2024 Columbia River Treaty Review.

Operations under the Treaty are complex and affect millions of people and a wide variety of issues on both sides of the border. Implementing the required specified Treaty changes in flood control provisions in 2024, and considering the consequences of possible Treaty termination, will be a major challenge for both countries. Due to the scope and complexity of these issues, the U.S. Entity is taking a phased approach to studying the Treaty and the issues related to its future. Each phase will provide valuable information, building toward a comprehensive and informed picture for evaluating the future of the Treaty.

Phase I Joint Technical Studies

Phase I of the 2014/2024 Columbia River Treaty Review, the initial modeling and analysis phase, is a joint effort between the U.S. and Canadian Entities. Its purpose is to provide fundamental information about post-2024 conditions both with and without the current Treaty and only from the limited perspective of power and flood control. These initial studies are not designed to establish future operating strategies, alternatives to the Treaty, or government policies, but simply to begin the learning process about the future of the Treaty.

The United States and Canada initiated the Phase I joint technical studies in early 2008. These joint technical studies will provide some insights into the implications of the Treaty's post-2024 provisions and will provide baseline information such as possible ranges of system operations, reservoir elevations, generation, and other similar information. There are three main studies being considered in Phase I:

Study A: Assumes the Treaty continues post-2024 with no significant modifications. Canadian flood control obligations change from a known and coordinated annual plan to the "called upon" provisions.

Study B: Assumes the Treaty is terminated in 2024 with no replacement agreement. Canadian flood control obligations change from a known and coordinated annual plan to the "called upon" provisions. Canadian storage projects are operated only for Canadian benefits except in the implementation of "called upon" flood control provisions. The United States continues to coordinate the operation of Libby Dam with

Canada. This study is looking at two operational scenarios, one with minimal Canadian draft for local flood control only and one with reservoir draft specifically for optimizing power production in Canada. Both scenarios are intended to capture a range of possible flows across the U.S. – Canadian border and are not intended to represent future operations.

Study C: Assumes the Treaty continues with the current power and flood control plans and procedures. This assumption would require a new agreement or modification to the Treaty to enable continuation of the current Flood Control Operating Plan that defines the planned flood control operation.

Results from these studies will be presented in a joint U.S.- Canadian report that will: (1) describe the methodologies and assumptions employed to complete the studies; (2) describe the risks, issues, and limitations encountered; and (3) discuss results, including findings for each of the three studies.

Beyond Phase I

Once Phase I of the Treaty 2014/2024 Review is complete, the U.S. Entity and the U.S. Department of State will work together to coordinate the next steps, including developing the appropriate level of consultation and involvement with other U.S. parties, such as affected states, tribes, and other stakeholders. The Corps and BPA, on behalf of the U.S. Entity, will play a major role in modeling, data analysis, scenario evaluation, and education. However, it is important to remember that while the U.S. and Canadian Entities were given broad discretion to implement the Treaty, they are not authorized to modify or terminate the Treaty. The decision to terminate the Treaty, or to re-negotiate its provisions is the responsibility of the respective governments. The information developed in Phase I will help ensure that the U.S. and Canadian governments, as well as the stakeholders in the respective countries, are well informed of the basic power and flood control implications should the Treaty remain in effect or alternatively, be terminated.

CONCLUSIONS

The Treaty is an outstanding example of international cooperation on water resources development and management between two nations. It has been studied by many international scholars and practitioners interested in transboundary water management. This is particularly impressive given the complex nature of the Columbia River Basin. The system is comprised of over 100 water resource projects operated by many different public and private entities. It has been successfully operated for many decades to meet multiple objectives in both countries.

Although many changes have occurred in the goals, objectives, and requirements placed upon this complex river system since the Treaty was signed in 1964, the Treaty has proven to have the flexibility to readily adapt to changes and uncertainty. As part of its basic structure, the Treaty provides a robust governance structure and collaborative framework that incorporates the changing needs and demands of the broad spectrum of

stakeholders and users throughout the system who depend on the many different outputs of this river system.

The Entities responsible for implementing the Treaty, in cooperation with the respective organizations responsible for international treaties in each country, are beginning efforts to evaluate the future of the Treaty. Given the critical importance of the Treaty to the region, it is very important that decisions about the future of the Treaty be considered very carefully and informed by the stakeholders throughout the region.