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The Columbia River Treaty Review: A Synopsis

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Why Now?

- » September 16, 1964, was the ratification date of the treaty.
- » Neither party may terminate the treaty within the first 60 years—i.e., prior to September 16, 2024.
- » A party wishing to terminate the treaty must provide 10 years notice, so termination in 2024 could occur only if notice were given in September 2014.
- » The possibility of giving notice in autumn 2014 has prompted each nation to undertake a review of the treaty.
- » No fixed termination date is specified within the treaty, so if neither nation takes action, the treaty will continue indefinitely (although certain provisions of the treaty will expire in 2024).

The Natural River.¹ The Columbia River watershed comprises 258,500 square miles (about the size of Texas), with 15 percent of the watershed located in Canada. Tributaries in the upper watershed drain a substantial portion of the Canadian and American Rocky Mountains; precipitation and snowmelt from the Rockies are main flow components. The river then crosses the arid Columbia Plateau and reaches the Pacific via the Columbia River Gorge. In an average year, the river discharges 198 million acre-feet (MAF) of water, with 25 percent of the runoff (a disproportionately large amount) originating in Canada. With snowmelt a large component of runoff, the river's flow peaks in the May - July period; those three months typically account for over half of the natural annual runoff. (See Figure 1.) Variations in spring temperatures and in snowpack can cause huge spikes in runoff, particularly in the Canadian headwaters—the estimated natural peak flow at the Canadian border is 550,000 cubic feet per second, compared to an annual average of 69,000 CFS. Major spring floods occurred regularly in the 1800s.

The Vision a Century Ago. Agencies envisioned a series of dams that would store some of the spring runoff and then release water during periods of lower flow, thus achieving multiple goals: flood mitigation; more uniform hydropower production throughout the year; maintenance of a channel depth adequate for commercial shipping; creation of reservoirs usable for recreation and irrigation. Figure 1 shows the extent to which the vision has been realized, with the “reshaped” present-day flow exhibiting a greatly reduced spring peak as compared to the natural flow that existed prior to the construction of dams. Basin geography dictated that the Canadian headwaters were the most useful for storage, and the Columbia River Treaty was

Figure 1. Proportion of Annual Flow Occurring in Each Month: Present-Day Reshaped Flow vs. Natural Flow,² with Overlay of Proportional Monthly Electric Usage (WA + OR + ID)³

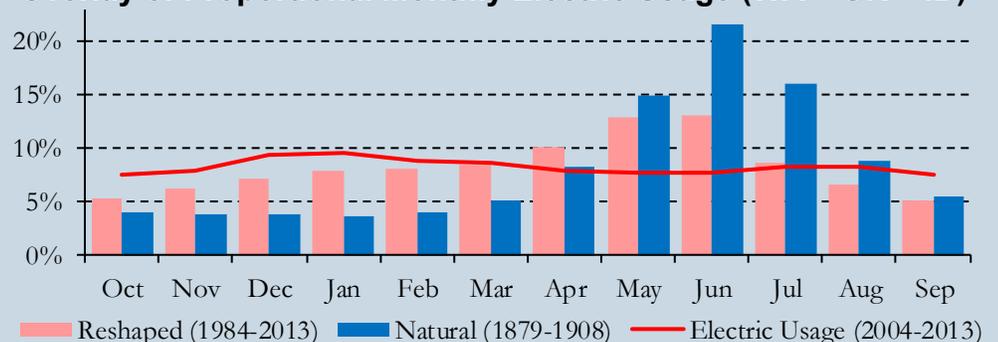
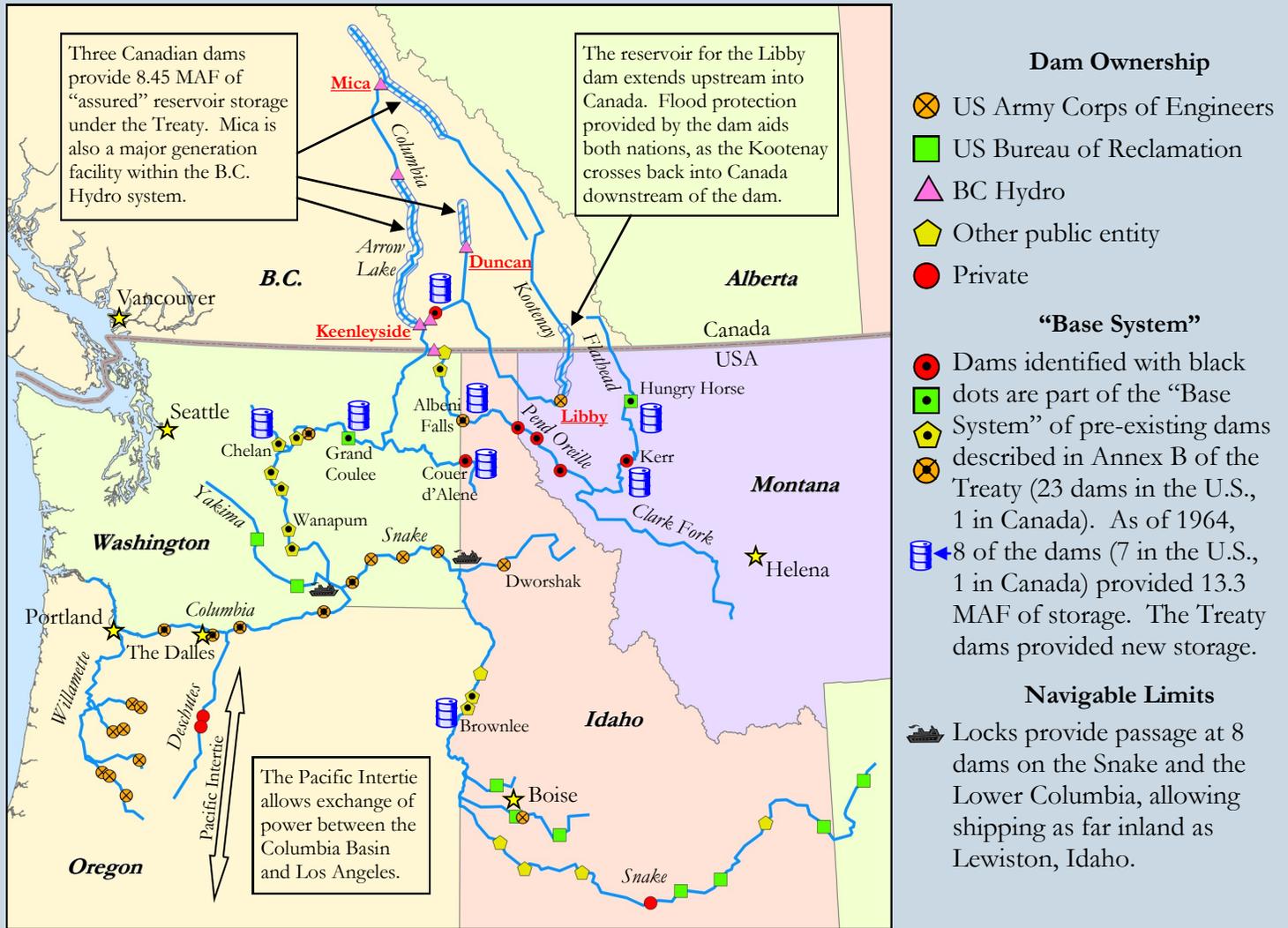


Figure 2: Aspects of the Columbia River Basin and Hydropower System



crafted to support the construction and operation of dams that would provide Canadian headwater storage—three (Keenleyside, Mica, Duncan) to be built in Canada and one (Libby) to be built in the U.S., but with a reservoir extending into Canada. The Treaty’s main provisions are straightforward:⁴

» **Storage.** Canada would build three dams designed to provide a minimum of 15.5 MAF of storage (slightly more than all storage existing in the U.S. at the time). The U.S. would pay \$64.4 million to buy “assured” use of 8.45 MAF of the storage until 2024, meaning that the U.S. could dictate the timing and volume of water released from storage throughout the year. In 2024 this flood-control provision of the Treaty changes to a new scheme in which *Canada* has the right to operate the storage as it sees fit, *except* that if “called upon” by the U.S., Canada will operate the storage for a short time in a manner to aid the U.S. Such aid is to be given only after the U.S. has made use of “all related storage”⁵ existing in the U.S. as of 2024, and only if it appears that flood flows will exceed 600,000 CFS at The Dalles, Oregon. For each such event, the U.S. will reimburse Canada for “the economic loss to Canada arising directly from Canada foregoing alternative uses”⁶ of the storage. Interestingly, this provision for “called upon” flood-storage cooperation persists even if the Treaty is terminated.

» **Power.** Regulating the discharge from Canadian storage makes it possible to optimize the generation of power at downstream dams within the U.S., creating a benefit that didn’t previously exist. The Treaty dictates that this benefit is to be shared equally between the U.S. and Canada—i.e., Canada is entitled to half of the downstream power benefit, defined as “the difference in the hydroelectric power being generated in the U.S. with and without the use of Canadian storage.”⁷ The size of this

“Canadian Entitlement” is a theoretical value, determined in advance, under the assumption that the “base system” of U.S. dams (24 dams specified in the Treaty, together with any other dam built in the U.S. on the Columbia main stem) is operated for *optimization of generation*. A consortium of U.S. utilities paid \$254.4 million to Canada in 1964 to purchase the first 30 years of the Entitlement, and those funds were used by Canada to build the three dams. By 2003 the prepaid arrangement had come to an end, and Canada has been receiving the Entitlement in the form of power for over a decade. The Treaty gives Canada the right to receive power *when requested*, allowing deliveries to be timed to achieve maximum monetary value (which translates to maximum U.S. cost, should the U.S. need to purchase power on the western grid to fulfill a Canadian request). Amounting to an annual average of about 500 megawatts (enough for roughly 300,000 homes), the Entitlement’s monetary value fluctuates from year to year within a range of roughly \$200 to \$300 million.

It was anticipated that economic growth in the Pacific Northwest would lead to a larger demand for electricity, which would be met by building thermal plants (nuclear or fossil-fuel fired). The method for calculation of the Entitlement allows new *thermal* plants to be included as part of the base system, which means that the size of the Entitlement was anticipated to shrink over time (i.e., hydroelectricity would represent an ever-smaller proportion of total generation capacity). However, much growth in demand has been met by conservation and wind generation, which are ignored in the calculation.

Annual Operational Cycle. The system of dams and reservoirs is operated in a regular cycle. In early spring, reservoirs are at the lowest levels of the year. As the snowpack melts and peak flows arrive (in May / June—see Fig. 1), reservoirs are filled, which reduces downstream flood hazards. Peak flows imply peak generation capacity, as water is the system’s “fuel.” Ideally, all water would flow through turbine intakes and generate power, but late spring is a time of low demand along the west coast—heating demand has fallen in the Pacific Northwest, and air-conditioning demand has not yet ramped up in California. Water is spilled over the tops of dams. Reservoirs are full by mid-summer, supporting irrigation and recreation, and excess power flows south to the California market. In early fall, drawdown might be necessary to provide minimum flows for fish migration. Throughout the fall and winter, drawdown occurs in order to power the region’s peak demand and make room for the coming spring runoff. Power also flows north from California to meet the winter heating demand.

Note that the Treaty focuses exclusively upon flood storage and power generation, whereas there are other water uses (fish-flow, irrigation, navigation, recreation) that affect the annual operational cycle. Calculation of the Entitlement is blind to all such uses.

Entities and Recent Activities. The Treaty was a product of negotiations between the two federal governments, but the ongoing implementation is conducted by subnational “entities” (the term used in the Treaty). The U.S. entity is a team composed of the regional District Engineer of the U.S. Army Corps of Engineers and the Administrator of the Bonneville Power Administration; B.C. Hydro, an electric utility owned by the province of B.C., is the designated Canadian entity. Over the past three years, these entities have completed Treaty-review processes in order to develop regional recommendations regarding the future of the Treaty in the post-2024 era.^{8,9}

Areas of Agreement. First and foremost, B.C. and the U.S. agree that the Treaty should persist beyond 2024 and that there is latitude within the framework of the Treaty to achieve other desired outcomes. Each entity recognizes that within its given jurisdiction there have been major benefits attributable to the coordinated operation of reservoirs: flood damages have been avoided and low-cost hydroelectric power has been a driver of economic growth. The entities share a common goal of maximizing the shared benefits achievable by coordinated planning and operations. The entities also agree that the post-2024 Treaty should be of sufficient duration to provide the certainty that enables long-range investment strategies and budgeting. That said, the entities also support the crafting of provisions that will allow *adaptation* of the Treaty to changing circumstances, with *climate change* cited by both entities as an example of a factor that likely will lead to the need for revision of operations over time. Each entity notes that stakeholder input is of far greater importance today

than was the case in 1964. Government-to-government consultation with Tribes and First Nations is now a given, for example, as is the need to consider public opinion and to honor the mandates of other agencies that regulate aspects of the system. But neither entity proposes that provisions related to stakeholder input be incorporated within the Treaty; each entity simply refers to a more inclusive process within its own jurisdiction, with the U.S. additionally contemplating that the formally designated U.S. entity might need to be revised.

Areas of Disagreement. Operation of the U.S. hydropower system has changed since 1964, and that change is at the heart of some areas of disagreement. Fish recovery and renewable energy development (i.e., wind) are modern societal goals, but within a framework where calculation of the Entitlement ignores such goals, the Entitlement has grown disproportionately large in the eyes of the U.S. The U.S. wants a formula that is based upon the *actual manner in which the river is operated today*, rather than the theoretical scenario embedded in the Treaty. The U.S. also seeks to relax the condition that power must be provided “when requested.” Such changes would have the effect of reducing the Entitlement to less than half its existing value.

B.C. notes that the Entitlement is the *sole* benefit received by Canada if the Treaty continues in its current form beyond 2024, and that the existing formula is flawed in another way—i.e., that it fails to account for the many *benefits accrued in the U.S.* from coordinated operation of the river (such as water supply, ecosystem values, recreation, navigation). B.C. asserts that when comparing the value of coordinated operations with that of uncoordinated operations, *all* beneficial uses should be considered, and the resulting value should be equitably shared between the two entities. In addition, B.C. seeks compensation for *impacts in the Canadian Columbian Basin* (e.g., ongoing economic costs associated with existence of reservoirs) arising from continued operations under the Treaty. B.C. believes that the current value of the Entitlement might understate what actually is owed.

The positions adopted by the entities are far apart, which raises the specter that an entity might opt to terminate the Treaty. Even then, issues would need to be resolved. There is disagreement about how a post-Treaty “called upon” flood-control scenario would work. The U.S. has performed modeling under the assumption that its “related storage” (to be used prior to calling upon Canada) is a set of designated storage reservoirs, most of which were a part of the 1964 base system of dams. B.C. says that “related storage” must include many other U.S. dams that exist throughout the basin (this despite the fact that prior Flood Control Operating Plans developed pursuant to the Treaty and accepted by B.C. do not envision such use). Furthermore, the U.S. assumes that reimbursement to B.C. for a “called upon” event would be based only on the value of the hydroelectricity that B.C. might otherwise have generated, while B.C. says that reimbursement should reflect a broader set of costs.

While there are significant differences between the positions of the entities, it is encouraging that each entity strongly affirms that continuation of the Treaty is the preferred path. One must hope that negotiations prove successful and that an updated Treaty continues to serve as a model of what can be accomplished within the arena of cooperative trans-boundary watershed management.

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